



**SNIPGOLD**  
A SUBSIDIARY OF SEABRIDGE GOLD INC.

## Johnny Mountain Mine

### Annual Reclamation Report for 2020 *Mines Act Permit M-178*

FINAL

March 2021

Project No.: 0539378-0001



March 2021

# Johnny Mountain Mine

## Annual Reclamation Report for 2020 *Mines Act* Permit M-178

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## EXECUTIVE SUMMARY

The Johnny Mountain Mine (JMM) is a closed underground gold mine located in the Coast Mountain Range of British Columbia (BC), approximately 100 km northwest of Stewart, BC. It has been closed since 1993, and reclamation activities took place sporadically on the site from 1999 to 2015. In 2016 Seabridge Gold Inc. acquired SnipGold Corp. and their associated properties, and commenced annual reclamation activities in addition to on-going permit compliance programs. Currently there are three provincial permits associated with the site: *Mines Act* Reclamation Permit M-178, *Environmental Management Act* Permit PE-8415, and *Environmental Management Act* Permit PR-7927. The Johnny Mountain Mine site, along with surrounding mineral tenures and the Bronson Airstrip, comprise Seabridge Gold Inc.'s Iskut Project. SnipGold continues to carry out an exploration program on the property under *Mines Act* Permit MX-1-46.

The overall land use objective of the reclamation plan is to return disturbed lands and new anthropogenic landforms to alpine tundra wildlife habitat. Permit M-178 stipulates that the average land capability to be achieved should not be less than the average that existed pre-mining.

Returning the area to its original land use will be accomplished by meeting the following objectives, as outlined in the *Closure Plan for the Johnny Mountain Gold Mine, Reclamation Permit No. M-178* (Woznow and Yeager 1999):

- develop a closure scenario that prevents potential impacts to surface and groundwater resources;
- restore the natural appearance of the area after mining ceases through the re-contouring and re-vegetation of disturbed lands and anthropogenic landforms;
- ensure that disturbances and re-developed landforms are stable from a long-term geotechnical and geochemical perspective;
- re-vegetate the site through the development of self-sustaining natural succession processes; and
- develop landforms and vegetative cover that provide a stable and productive wildlife habitat for resident and transient species utilizing the area.

### 2020 Environmental Protection (Environmental and Engineering) Activities

Due to the COVID-19 pandemic in 2020 and the associated health and safety risks, activities outlined in the 2020 Project Execution Plan for the Johnny Mountain Mine site were deferred. On site activities in 2020 were limited to compliance related requirements associated with SnipGold's *Mines Act* Permit M178, *Environmental Management Act* (EMA) Permit PR-7927, and EMA Permit PE-8415, as well as a small exploration drill program. The following Environmental Protection (Environmental and Engineering) activities took place in 2020:

- completion of the compliance surface water quality monitoring program for EMA Permit PE-8415;
- completion of the compliance groundwater and surface water quality monitoring program for BC EMA Permit PR-7927;
- operation and maintenance of the Johnny Mountain meteorological station located approximately 400 m west of the tailings storage facility (TSF);
- hydrologic monitoring of TSF seepage at two stations and manual measurements of flows at level 10, level 11, and level 12 portals;
- groundwater level and groundwater quality sampling; and

- monitoring of vegetation trials on the decommissioned airstrip.

### 2020 Reclamation Program

A dam safety inspection was conducted on August 20, 2020 by Engineer of Record (EoR) Neil K. Hemrajani Singh, P.Eng. of Klohn Crippen Berger (KCB) and representatives of SnipGold (TSF Qualified Person Elizabeth Miller and the SnipGold representatives Jessy Chaplin, and Lionel Sequeira). In addition site inspections were conducted by Kevin Hidber of SnipGold on June 17, 2020 and August 1, 2020.

In 2020 Wood PLC (Wood) continued the environmental site investigation of areas of potential environmental concern (APECs) and areas of environmental concern (AECs). In 2020, to limit exposure from the COVID-19 virus, heavy equipment was not available at the Site for investigations, excavation of hydrocarbon contaminated soil for further soil remediation or mechanical aeration of treatment areas. The modified 2020 objectives to support ongoing Site reclamation work included:

- Continue to assess hydrocarbon impacts in groundwater within APECs/AECs;
- Evaluation of petroleum hydrocarbon levels in material located in the Treatment Areas 1 and 2;
- Continuing evaluation of background concentration of metals in groundwater; and
- Collection of surface water and groundwater samples.

### Planned Reclamation Activities

Achieving the approved closure and reclamation objectives will remain the priority of SnipGold. SnipGold will continue to develop detailed Project Execution Plans for each year of activity. The key objectives for reclamation include:

- Removal of infrastructure and cleanup of the JMM site;
- Relocation to TSF water cover of potentially acid generating waste rock remaining at Portals #10, 11, 12, and isolated pockets from the decommissioned airstrip and secondary roads;
- Decompact disturbed lands to enable development of natural habitat for wildlife utilization; and
- Establish long-term biological, geotechnical and geochemical stability of restored areas.

Through this time SnipGold will maintain a controlled, safe and secure site, where safety and safe work practices are of paramount importance.

The primary goal of the 2021 season is the excavation and relocation of PAG waste rock from the Level 10, 11, 12 portals, as well as isolated pockets of PAG waste rock located on the JMM airstrip and secondary access roads. All excavated waste rock will be mixed with hydrated lime to add neutralization potential and prevent the release of dissolved metals as the waste rock is placed below water cover inside the TSF.

Complete reclamation and closure of the JMM Site is anticipated within the next few years. This will be achieved through sequenced decommissioning of remaining on site infrastructure, complete PAG waste rock relocation to the TSF, continue in-situ soil remediation, removal of waste materials from the surface of the site, disposal of inert materials in the site landfill, site grading, and subsequent re-vegetation of target areas as identified in Section 4.1.2 above.

Environmental programs and monitoring required through the JMM permits (i.e., *Mines Act* Reclamation Permit M-178, *EMA* Permit PE-8415, and *EMA* Permit PR-7927) will continue at JMM in 2021, and annual reports documenting associated activities will be provided.

SnipGold will continue to implement management and monitoring plans required for the JMM site, for example the Metal Leaching/Acid Rock Drainage (ML/ARD) Monitoring Plan, Closure Management Manual, Drainage Management Plan and others.

#### Outstanding Reclamation Liability

The total expenditures in 2020 were [REDACTED]. The net outstanding reclamation liability estimate is [REDACTED]. This is based on the 2018 estimate (prepared to an ACE Class 2 Construction Cost Estimate level, with an expected accuracy range of 10%/+20%).

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## GLOSSARY AND ABBREVIATIONS

AEC	Area of Environmental Concern
AM	Alpine meadow
APEC	Area of Potential Environmental Concern
ARR	Annual Reclamation Report
As. t	Total arsenic
AW <sub>F</sub>	Aquatic life water use standards
BC	British Columbia
BEC	Biogeoclimatic ecosystem classification
BTEX	Benzene, toluene, ethylbenzene, and xylene
CWHws2	Coastal Western Hemlock Wet Submaritime Subzone Montane Variant
CIS LRMP	Cassiar-Iskut Land and Resource Management Plan
CMA	Coastal Mountain-heather Alpine
CMAun	Coastal Mountain-heather Alpine (undifferentiated)
COD	Chemical oxygen demand
CSR	Contaminated Sites Regulation
DEC	Alaska Department of Environmental Conservation
DFG	Alaska Fisheries Department
DNR	Alaskan Department of Natural Resources
DSI	Dam Safety Inspection
DSR	Dam safety review
EC	Electrical conductivity
ECCC	Environment Canada
EMA	<i>Environmental Management Act</i>
EMLI	British Columbia Ministry of Energy, Mines, and Low Carbon Innovation
EMPR	British Columbia Ministry of Energy, Mines, and Petroleum Resources
ENV	British Columbia Ministry of Environment and Climate Change Strategy

EPH	Extractable petroleum hydrocarbons
EoR	Engineer of Record
ERA	Ecological Risk Assessment
ERM	Environmental Resources Management
EPSC	Erosion prevention and sediment control
ha	Hectares
HDPE	High-density polyethylene
HEPH	Heavy extractable petroleum hydrocarbons
HUB	Hydrocarbon utilizing bacteria
ILMB	Integrated Land Management Bureau
JMM	Johnny Mountain Mine
KCB	Klohn Crippen Berger
kg	Kilogram
kN	Kilo Newton
kPa	Kilo Pascal
L	Litre
LEPH	Light extractable petroleum hydrocarbons
LiDAR	Light Detection and Ranging
LNAPL	A light non-aqueous phase liquid
m	Metres
masl	Metres above sea level
mbg	Metres below grade
MDL	Method detection limit
MH	Mountain Heather Parkland
MHmm2	Moist Maritime Subzone Leeward Variant
MHmm2p	Mountain Hemlock moist maritime subzone leeward variant
MM	Mountain Heather Meadows

MN	Non-vegetated Morainal
mg	Milligrams
ML/ARD	Metal Leachate/Acid Rock Drainage
MR	Mountain Heather - Rhacomitrium Scrub
NPAG	Non potentially acid generating
NWR	NorthWest Response Ltd.
ORP	Oxidation-Reduction Potential
PAG	Potentially acid generating
PAHs	Polycyclic aromatic hydrocarbons
Permit M-178	<i>Mines Act</i> Permit M-178
Permit PE-8415	<i>Environmental Management Act</i> Permit PE-8451
Permit PR-7927	<i>Environmental Management Act</i> Permit PR-7927
PEP	Project Execution Plan
Portal 10	Level 10 Portal
Portal 11	Level 11 Portal
Portal 12	Level 12 Portal
P. Geo	Professional Geologist
QA/QC	Quality Assurance/Quality Control
RDL	Reported detection limit
RMZ	Resource Management Zone
RPD	Relative percent differences
RTEC	A joint venture company between ERM Consultants Canada Ltd. (ERM) and the Tahltan Nation Development Corporation (TNDC)
Seabridge	Seabridge Gold Inc.
SI	Site Investigation
Skyline Gold Corporation	Previous owners of the Johnny Mountain Mine site and SnipGold properties.

SnipGold	SnipGold Corp., a subsidiary of Seabridge Gold Inc. Seabridge Gold Inc. acquired SnipGold Corp on June 21, 2016 which includes the Iskut exploration land package and the closed Johnny Mountain Mine Site.
SS	Sedge meadows
SSI	Supplemental Site Investigation
TARP	Trigger Action Response Plan
TCG	Tahltan Central Government
TDS	Total dissolved solids
TEM	Terrestrial Ecosystem Mapping
TIC	Total inorganic carbon
TNDC	Tahltan Nation Development Corporation
TOC	Total organic carbon
TRCR	The British Columbia Technical and Research Committee on Reclamation
TSF	Tailings Storage Facility. Referred to as the Tailings Impoundment or Tailings Pond in Permit PE-8415, referred to as the Tailings Storage Facility in Permit M-178.
VPH	Volatile petroleum hydrocarbons
VOCs	Volatile organic compounds
WAD	Weak acid dissociable

## 1. INTRODUCTION

### 1.1 History of the Project

The Johnny Mountain Mine (JMM) is a closed underground gold mine located in the Coast Mountain Range of British Columbia (BC), approximately 100 km northwest of Stewart, BC.

The underground mine has been closed since 1993, and reclamation activities took place sporadically on the site from 1999 to 2015. In 2016 Seabridge Gold Inc. acquired SnipGold Corp. (SnipGold) and their associated properties, and commenced annual reclamation activities. SnipGold is a subsidiary of Seabridge Gold Inc. Currently there are three provincial permits associated with the site: *Mines Act* Reclamation Permit M-178, *EMA* Permit PE-8415 (Permit PE-8415) (amended June 2019; Appendix A), and *EMA* Permit PR-7927 (Permit PR-7927) (amended on April 17, 2019; Appendix A). The Johnny Mountain Mine site, along with surrounding mineral tenures and the Bronson Airstrip, comprise Seabridge Gold Inc.'s Iskut Project.

The site began development in 1986 and mining operations were conducted from 1988 to 1990. There was also a three-month operating period in 1993. The milling process was comprised of conventional grinding and gravity separation. A cyanide leach process was initially included in the mill design. Due to inefficiencies, the cyanide leach process was decommissioned early on during active mining operations (prior to the 1990 shutdown).

Since acquiring the property, SnipGold has conducted site closure, remediation and monitoring work to ensure compliance with existing authorizations and to implement remediation programs to effectively mitigate the impacts of historical mining activity. A formal closure plan under Permit M-178 was developed and accepted by the British Columbia Ministry of Energy and Mines in 1999; *Closure Plan for the Johnny Mountain Gold Mine* (Woznow and Yeager 1999). In March 2020, SnipGold submitted to the Ministry of Energy, Mines and Petroleum Resources (EMPR) an updated Mine Reclamation and Closure Plan, and Closure Management Manual to address Condition 3(b) of the *Mines Act* Permit M-178. These documents are currently in review by the EMLI. SnipGold also continues to carry out an exploration program on the property.

### 1.2 Location and Access

The Johnny Mountain Mine site is located approximately 100 km northwest of Stewart, BC (Figure 1.2-1). The site is situated on a sub-alpine plateau surrounded by steep valleys, and is located near the confluence of the Craig and Iskut Rivers. The northwest face of Johnny Mountain is covered by an alpine glacier. The Johnny Mountain Mine site dimensions are approximately 700 m by 1,000 m. The site is legally described as District Lots 7031 and 7032, Cassiar District.

Currently, exploration and reclamation activities are staged from the Bronson airstrip. The Bronson airstrip and camp are currently only accessible by fixed wing aircraft or by helicopter. Access to the closed mine site is via helicopter or by driving 10 km along an access road from the Bronson airstrip. There is a decommissioned airstrip at the Johnny Mountain Mine site.

### 1.3 General Setting

The former mine site is situated on a sub-alpine plateau at approximately 1,100 m elevation. Above the plateau are glaciers on Johnny Mountain, which feed streams that run through and around the site. Much of the site above the decommissioned airstrip is located on morainal till deposits exposed by the receding glacier. The deglaciated areas typically have limited, if any, soil development; where present, soils are derived from glacial till and colluvium. Terrain falls off steeply around the plateau, with glacier-fed streams falling in cascades surrounding the plateau. The site is surrounded by treed, steep valleys.

The climate at the site is typical of an alpine tundra site located near the Pacific Coast. Winters include heavy snowfall and cold temperatures, and rain is common during the rest of the year. A meteorology station was installed on the plateau in September 2016, and this station collects local data including wind speed, wind direction, temperature, humidity, solar radiation, snow depth, and precipitation. A summary of the meteorological data collected in 2020 is provided in Appendix B (RTEC 2021a).

Three main streams originate and drain from the plateau: Johnny Creek (drains to the north-northeast, and enters Bronson Creek); Stonehouse Creek (drains to the southwest, and enters the Craig River); and Sky Creek (drains to the northwest, and enters the Craig River). Below the plateau Bronson Creek drains to the Iskut River. Stonehouse Creek and Sky Creek drain into the Craig River, then into the Iskut River, which eventually drains into the Stikine River, which flows west to the Pacific Ocean. There are fish barriers on Johnny Creek (at the confluence with Bronson Creek), Stonehouse Creek (3 km downstream of the mine), and Sky Creek (4 km downstream of the mine), which prevent fish from accessing the site (RTEC 2017a, 2017b).

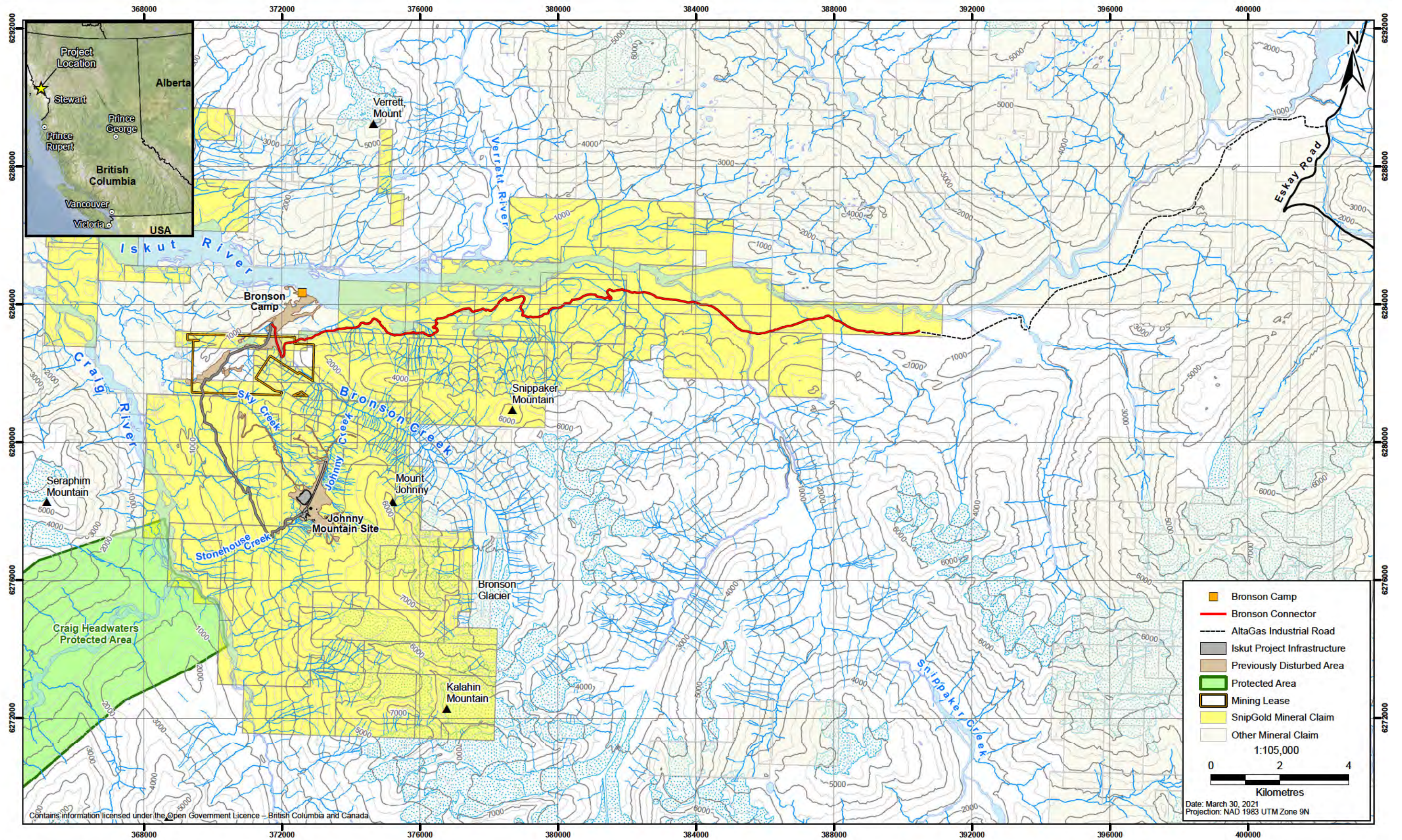
Downstream of the fish barriers below the plateau, fish species known to inhabit the regional watersheds of the area include Dolly Varden (*Salvelinus malma*), Cutthroat Trout (*Oncorhynchus clarkii*), Rainbow Trout/steelhead (*O. mykiss*), Coho Salmon (*O. kisutch*), Chinook Salmon (*O. tshawytscha*), Sockeye Salmon (*O. nerka*), Pink Salmon (*O. gorbuscha*), Chum Salmon (*O. keta*), Coastrange Sculpin (*Cottus aleuticus*), Prickly Sculpin (*C. asper*), and Mountain Whitefish (*Prosopium williamsoni*) (BC MOE 2009). Fish captured in Bronson Creek, lower Stonehouse Creek, lower Sky Creek, and surrounding reference stations in 2016 included Dolly Varden, Bull Trout, Mountain Whitefish, Coastrange Sculpin, Coho Salmon, Cutthroat Trout, and Chinook Salmon (RTEC 2017b).

The Biogeoclimatic (BGC) units include the Coastal Western Hemlock Wet Submaritime Subzone Montane Variant (CWHws2) that occurs from 600 to 1,000 m elevation, Moist Maritime Subzone Leeward Variant (MHmm2) that extends from 800 m to 1,800 m in elevation, MHmm2 parkland that is comprised of open subalpine meadows and tree clumps, and Coastal Mountain-heather Alpine (CMA) above the treeline. These BGC units support mature forests, wetlands, alpine areas, and riparian forests that provide habitat to a diverse wildlife community. Common species or groups that occur regionally include ungulates (e.g., moose, mountain goat), omnivores/carnivores (e.g., grizzly bear, black bear, wolves), furbearers (e.g., beaver, fisher, marten, wolverine), hoary marmots, bats, birds (forest and alpine birds, raptors, waterfowl), and amphibians (e.g., Columbia spotted frog, western toad).

For the JMM site specifically, the wildlife habitat is high elevation parkland and CMA. Wildlife on the site is limited in its number of resident species due to the relatively exposed conditions that prevail on the Johnny Mountain plateau. Hoary marmots were the most prevalent species observed in the baseline studies in the 1980s (Woznow and Yeager 1999). Marten, weasel, pack rat, deer mouse and northern red-backed voles were other species observed or expected to be present at the JMM site prior to operations. Pre-existing hoary marmot colonies remained intact during operations despite extremely close proximity to heavy vehicular traffic (Woznow and Yeager 1999). Marten inhabited the unused buildings in 1999, probably feeding on small rodents (Woznow and Yeager 1999). In 2018 a marmot den survey was conducted on site and marmots were found to be abundant in the general area (RTEC 2018a).

Large mammals comprising of mountain goat, wolf, grizzly bear and black bear have historically been observed directly or indirectly at the JMM site. These are all considered transient, however, as no sign of residency has been observed. Mountain goats were observed on the side slopes of Johnny Mountain for several days during pre-production observations (Woznow and Yeager 1999). SnipGold prepared and implemented a Goat Management Plan upon acquiring the property in 2016 (SnipGold 2016; RTEC 2016).

Figure 1.2-1  
Project Location





## 1.4 Regional Management Plans

The site is located within the provincial Cassiar-Iskut Land and Resource Management Plan (CIS LRMP), and within the Lower Iskut Resource Management Zone (RMZ). The CIS LRMP, which encompasses approximately 5.2 million ha, was completed in October 2000 with the support of the Tahltan joint councils, representing the Tahltan and Iskut bands (BC ILMB 2000a,b). Land management within the CIS LRMP includes objectives intended to preserve the physical, aesthetic, and cultural characteristics of the region. The CIS LRMP acknowledges and confirms the importance of the economic potential of the area's mineral and energy resources. Under the plan, exploration and development of mineral deposits, as well as construction of access roads, are allowable activities, except within protected areas.

Some of the goals/desired future state for this land use region includes the establishment of a world class mining and energy industry, and economically and environmentally sound mining industry that provides long term benefits to the local community, and certainty of access to support a viable exploration industry. The continued operation of the Bronson airstrip and exploration activities for the Iskut Project are in line with the existing CIS LRMP goals and growth strategies.

## 1.5 Goals and Objectives

The overall land use objective as established in the 1999 closure plan update is to return disturbed lands and new anthropogenic landforms to their original land use and capability of alpine tundra wildlife habitat (Woznow and Yeager 1999).

Five supporting closure objectives that support the overall land use objective are outlined below (as described in the 1999 Closure Plan):

1. Develop a closure scenario that prevents potential impacts to surface and groundwater resources.
2. Restore the natural appearance of the area after mining ceases through the re-contouring and re-vegetation of disturbed lands and anthropogenic landforms.
3. Ensure that disturbances and re-developed landforms are stable from a long-term geotechnical and geochemical perspective.
4. Re-vegetate the site through the development of self-sustaining natural successional processes.
5. Develop landforms and vegetative cover that provide a stable and productive wildlife habitat for resident and transient species utilizing the area.

*Mines Act* Permit M-178 (Permit M-178) stipulates that the average land capability to be achieved should not be less than the average that existed pre-mining, excepting the tailings pond area which is exempt from this requirement.

This report focuses on the reclamation and associated activities conducted under Permit M-178. However, there are related project components and activities that are summarized in this report and reported on in associated JMM compliance reports. For example, work conducted at the Main Landfill is conducted in accordance with the amended *EMA* Permit PR-7927 (Appendix A) and required updates are provided in detail within the 2020 report for Permit PR-7927.

## 1.6 Summary of Historical Reclamation Activities

### 1.6.1 Overview

Prior to the acquisition of the site by SnipGold, mine reclamation activities were being conducted on a campaign basis beginning in 2000 (Yeager 2001). Annual reclamation reports were submitted each year from 1988 to 2001 and from 2008 to 2015. Reclamation work completed prior to the current SnipGold ownership structure (i.e., prior to 2016) included:

- o Removal of mobile equipment.
- o Demolition and disposal of some unused accommodation and ancillary buildings.
- o Reclamation and vegetation of unused mine areas, roads and borrow areas.
- o Re-distribution of tailings with the TSF such that all but a small portion were situated underwater.
- o Construction of TSF spillway

Since acquiring the property, SnipGold has prepared and submitted annual reclamation reports on an annual basis from 2016 to present.

Detailed annual reclamation report histories are included in the 2017 report (RTEC 2018b). A brief history of the reclamation activities carried out between 2016 and 2019 is provided below. Activities completed in 2020 are described in Chapter 3 and Chapter 4 of this report. The current condition (i.e. to December 31, 2020) of disturbed and reclaimed areas is provided in Section 2.5 and summarized in Table 2.5-1 of this report in accordance with the Standard Table 1 (Summary of Areas Disturbed and Reclaimed) specified in the Annual Reclamation Report general information and format requirements from the Ministry of Energy, Mines, and Low Carbon Innovation (EMLI; January 2021).

### 1.6.2 2016

Seabridge Gold Inc. acquired SnipGold Corp. and their associated properties on June 21, 2016. In 2016, SnipGold carried out permit compliance programs as well as a voluntary Aquatic Characterization Program. New reclamation activities were completed in 2016, along with reclamation planning for the next five years. Details of the 2016 activities can be found in the *Iskut Project: Annual Reclamation Report for 2017: Mines Act Permit M-178* (RTEC 2018b).

The following Environmental Protection (Environmental and Engineering) activities took place in 2016:

- o Completion of the compliance surface water quality program, which included *EMA* Permit PE-8415 permit stations including additional locations identified in the 2000 permit amendment;
- o Completion of a voluntary comprehensive 2016 Johnny Mountain Mine Aquatic Characterization Program, which included water quality, sediment quality, benthic invertebrates, and fisheries sampling and included a regional geographical area;
- o Installation of two hydrology stations to monitor water quantity exiting the TSF via the spillway and TSF seepage;
- o Inspection of existing groundwater wells around the TSF;
- o Installation of a meteorological station ~400 m west of the TSF;
- o A dam safety review (DSR) of the TSF was conducted in August 2016. The Engineer of Record was transferred to Neil K. Hemrajani Singh, P.Eng of Klohn Crippen Berger;

- Conducted an Archeological Impact Assessment in exploration area; and
- Developed of an Iskut Project Goat Management Plan.

The following Reclamation Program activities took place in 2016:

- A dam safety review (DSR) conducted in August 2016. The Engineer of Record was transferred to Neil K. Hemrajani Singh, P.Eng of Klohn Crippen Berger (KCB); and
- The development of a five-year Johnny Mountain Mine Project Execution Plan that met the objectives of the approved Closure and Reclamation Plan.

### 1.6.3 2017

In 2017, SnipGold carried out permit compliance programs as well as voluntary environmental programs. New reclamation activities were completed in 2017, along with reclamation planning for the next five years. Details of the 2017 activities can be found in the *Iskut Project: Annual Reclamation Report for 2017: Mines Act Permit M-178* (RTEC 2018b).

The following Environmental Protection (Environmental and Engineering) activities took place in 2017:

- Completion of the compliance surface water quality monitoring program, which included *EMA* Permit PE-8415 permit station locations;
- Completion of a voluntary comprehensive 2017 Johnny Mountain Mine Aquatic Characterization Program, which included water quality, sediment quality, and hydrology (as a continuation of the 2016 Aquatic Characterization Program);
- Conducted a bathymetric survey of the TSF;
- Collected tailings samples from within the TSF for geochemical characterization;
- Installation of two hydrology stations to monitor TSF seepage;
- Installation of hydrology stations to monitor water discharging from the portals;
- Inspection of existing groundwater wells around the TSF;
- Installation of new groundwater wells and advancement of test pits around the local site area;
- Installation of new vibrating wire level loggers in groundwater wells around the Tailings Storage Facility (TSF);
- Operated a meteorological station ~400 m west of the TSF;
- Completion of archeological overview assessments of the Quartz Rise Exploration Track;
- Removed and replaced the Sky Creek Bridge which is located along the access road; and
- Constructed the Quartz Rise Exploration Track.

The following Reclamation Program activities took place in 2017:

#### Tailings Storage Facility (TSF)

- A Dam Safety Inspection (DSI) of the TSF was conducted by Neil K. Hemrajani Singh, P.Eng of KCB on August 23, 2017;
- Completion of an updated dam classification and breach analysis study;

- Completion of a TSF Closure Design Report;
- General maintenance of the TSF including additional fill placement and grading of the TSF;
- Removal of crane and SeaCan from the TSF berm;
- General cleanup around the TSF including removal of wood and vegetation from the spillway; and
- Construction of test pad within the TSF to give an indication of the stability of the existing tailings when placing additional future fill.

#### Mill Building

- Assessed the structural integrity of the Mill Building;
- Installation of groundwater monitoring wells around the Mill Building to collect geotechnical information;
- Site grading and ditching around the Mill Building;
- Removal and off-site shipment of hazardous waste from the Mill Building;
- Avalanche sensitivity assessment of Mill Building and TSF-site visit by BGC Engineering;
- Installation of cross-bracing on Mill Building; and
- Removal of mercury vapor bulbs from inside of Mill Building.

#### Fuel Tanks

- Certification of fuel tanks;
- Demolition of Old Tank Farm and general area cleanup;
- Cut up cleaned metal and stockpiled for future removal from site;
- Clean up of 300 L diesel spill; and
- In-situ remediation of hydrocarbon contaminated soils.

#### Other Johnny Mountain Site Activities

- Test pitting for Main Landfill expansion;
- Sourcing TSF cover material and sampling;
- Decommissioning of Johnny Mountain Mine airstrip;
- Closure plan of portals and vents-site visit by Golder Associates;
- Temporary closure of portal 11 and 12 by earth type barricade;
- Temporary closure of vent raise to portal 11 using beams and plywood to cover surface opening;
- Maintenance activities including cover materials added to the Main Landfill;
- Grass seeding of 2017 disturbed areas on Johnny Mountain site due to groundwater well drilling operations; and
- Upgrades to access road from Bronson airstrip to Johnny Mountain site.

#### 1.6.4 2018

In 2018, SnipGold carried out permit compliance programs. New reclamation activities were also completed in 2018, along with reclamation planning for the next five years. Details of the 2018 activities can be found in the *Iskut Project: Annual Reclamation Report for 2018: Mines Act Permit M-178* (RTEC 2019a).

The following Environmental Protection (Environmental and Engineering) activities took place in 2018:

- Completion of the compliance surface water quality monitoring program for *EMA* Permit PE-8415;
- Completion of the compliance groundwater and surface water quality monitoring program for *BC EMA* Permit PR-7927 which was amended on April 17, 2019;
- Operation and maintenance of the Johnny Mountain meteorological station located ~400 m west of the TSF;
- Installation and operation of two hydrology stations to monitor TSF seepage;
- Monitoring groundwater flow from the level 10, level 11, and level 12 portals;
- Groundwater well level and water quality sampling; and
- Marmot den survey in area of upgraded Main Landfill and borrow areas.

The following Reclamation Program activities took place in 2018:

- Landfill Upgrades - Cells 1 and 2 of the Main Landfill were constructed, filled, and covered with a temporary landfill cover, and runoff was directed to the TSF.
- Relocation of material to the upgraded Main Landfill including Disposal Site #1 and #2 material, old septic tanks, and material from general site cleanup.
- Ore concentrate was removed from the Mill Building and placed below water cover in the tailings storage facility.
- Five vent raises were permanently closed, and the ground surface was re-contoured and seeded.
- The Portal 10 was demolished and the area re-contoured and seeded.
- Demolition waste from Portal 12 (generated in 2017) was relocated to the upgraded Main Landfill.
- In-situ hydrocarbon remediation was carried out near the Old Tank Farm area (now In-situ Hydrocarbon Remediation Area).
- A dam safety inspection was conducted by Klohn Crippen Berger David Willms, P.Eng. (KCB), under the direction of Engineer of Record Neil K. Hemrajani Singh, P.Eng (KCB), on August 20-22, 2018.
- Other opportunistic reclamation activities including:
  - Repairs to onsite equipment;
  - Additional test pits;
  - Septic Tank and Riser removal;
  - Demolition of Old Exploration Cabin;
  - Waste Disposal Site #3 relocation to the approved landfill, cleanup, re-contoured;
  - Grading around piezometers located on the TSF;

- Drainage Improvements around Old Tank Farm and Mill Building;
- Island removal within TSF;
- General Site cleanup; and
- Re-vegetation of disturbed areas.

### 1.6.5 2019

In 2019, SnipGold carried out permit compliance programs and completed new reclamation activities, along with reclamation planning for the next five years. Details of the 2019 activities can be found in the *Iskut Project: Annual Reclamation Report for 2019: Mines Act Permit M-178 (RTEC 2020b)*.

The following Environmental Protection (Environmental and Engineering) activities took place in 2019:

- o Completion of the compliance surface water quality monitoring program for *EMA* Permit PE-8415 which was amended on June 10, 2019;
- o Completion of the compliance groundwater and surface water quality monitoring program for *BC EMA* Permit PR-7927 which was amended on April 17, 2019;
- o Operation and maintenance of the Johnny Mountain Mine meteorological station located ~400 m west of the TSF;
- o Installation and operation of two hydrology stations to monitor TSF seepage;
- o Monitoring groundwater flow from the level 10, level 11, and level 12 portals;
- o Monitoring groundwater levels and water quality sampling; and
- o Initiation of vegetation trials on the decommissioned airstrip.

The following Reclamation Program activities took place in 2019:

- o Main Landfill activities. Non potentially acid generating (NPAG) gravel was hauled from Borrow Areas #1 and #3 to the Cell 2 area, placed and compacted for the base levelling course. A total of 3,352 m<sup>3</sup> of inert waste was placed at the approved Main Landfill, and covered with a minimum of 300 mm of mineral soil.
- o Relocation of material to the upgraded Main Landfill included non-hazardous material from the former warehouse site, portal 11 mechanics shop, the Old Tank Farm, and from the Mill Building.
- o Excavation and relocation of five **additional un-documented waste sites to the Main Landfill.**
- o Mill building reclamation continued with further deconstruction of much of the remaining (interior) mine equipment, cyanide tanks, conveyors, pumps, wood timbers and non-load bearing steel structural members.
- o In-situ hydrocarbon remediation continued in the In-situ Hydrocarbon Remediation Area. Approximately 6,000 m<sup>3</sup> of contaminated soils were treated.
- o A trial placement of PAG material excavated from the decommissioned airstrip was mixed with hydrated lime and was placed in two areas in the TSF to assess closure cover constructability. A total of 2,620 m<sup>3</sup> of waste rock mixed with 635 kg of hydrated lime was placed in the TSF in 2019.
- o A dam safety inspection was conducted on August 13 to 14, 2019 by Engineer of Record Neil K. Hemrajani Singh, P.Eng. of KCB and Drew Hegadoren, P.Eng. of KCB, with SnipGold representatives Kevin Hidber and Brent Murphy, as well as Elizabeth Miller (TSF Qualified Person) in attendance.

- Other reclamation activities including:
  - Repairs to onsite equipment;
  - Portal 11 Site Grading;
  - Excavation of ground water diversion trench east of Old Tank Farm;
  - Additional test pits;
  - Onsite testing for ML/ARD of waste rock at portal 10, 11 and 12 and decommissioned airstrip;
  - Repairs to piezometers located on the TSF (DH17-02 and DH17-05);
  - Lower remaining two ore islands inside the TSF below water elevation;
  - Rough and loose technique used on north section of decommissioned airstrip ~ 0.8 ha;
  - Copper Wire salvage and recycling; and
  - Burning of un-treated timbers.

### 1.7 Progressive and Ongoing Reclamation

SnipGold's focus at the JMM Site is reclamation and closure of the site. SnipGold have developed a JMM Project Execution Plan that guides the sequencing of these reclamation activities annually.

Due to the COVID-19 pandemic in 2020 and the associated health and safety risks, activities outlined in the 2020 Project Execution Plan for the non-operating Johnny Mountain Mine site were deferred. On site activities in 2020 were limited to compliance related requirements associated with SnipGold's *Mines Act* Permit M-178, EMA Permit PR-7927 and EMA Permit PE-8415.

The 2021 Project Execution Plan can be found in Appendix C.

SnipGold also has an active exploration program ongoing in the general area; the exploration activities and associated reclamation activities are authorized under *Mines Act* Permit MX-1-46.

## 2. HISTORICAL MINING PROGRAM

### 2.1 Surface Development to Date

The remaining surface development on site is described in Section 2.5 below (including Standard Table 1 from the EMLI ARR requirements (January 2021)). Reclamation efforts continue to remove remaining surface infrastructure and reclaim areas where historical infrastructure was located.

In order to provide a safe and appropriate disposal location for non-hazardous waste on site, two cells of the Main Landfill were upgraded in 2018. These two cells of the Main Landfill continued to be available for use, however no waste was deposited in 2020. Due to the COVID-19 provincial health restrictions, no mine reclamation works or landfill upgrades took place during 2020. However, Permit PR-7927 requires an annual inspection of erosion prevention and sediment control measures. On 29 August, 2020, the Main Landfill inspection (refer to Appendix D) was conducted in parallel with the 2020 Site Environmental Investigation.

### 2.2 Current Life of Mine

The Johnny Mountain Mine has been closed since 1993. While SnipGold has an active annual exploration season, there are currently no plans to reopen the former mine.

### 2.3 Surface Development in the Past Year

No new surface infrastructure developments occurred in 2020. Details of the locations and surface areas are provided in Section 2.5 below.

### 2.4 Surface Development Projected over the Next Five Years

SnipGold is focused on reclaiming and closing the site as outlined in the Closure Plan. Phase 2 development of the Main Landfill upgrade is planned prior to the demolition of the mill building. Temporary borrow areas will continue to be used for reclamation and closure activities (i.e., TSF closure and Main Landfill). No surface infrastructure development is projected from 2021 to 2024.

### 2.5 Disturbed Areas (Location, Aspect, and Size in Hectares)

Table 2.5-1 presents the required summary of the areas disturbed and reclaimed to end 2020 (Standard Table 1 in the EMLI ARR requirements (January 2021)), which specifies the following: *Ensure that the exempt area reported is not double-counted under the different classifications. In the body of the report, the exempt areas must be specified, rational provided for the exemption, and maps included depicting the exempt areas.*

For the Johnny Mountain site, the TSF (i.e., tailings pond area) is excluded as specified in Section 3 of Permit M-178: “**excluding the tailings pond area, the average land capability to be achieved in the remaining lands shall not be less than the average that existed prior to mining**”. Based on this condition in Permit M-178, the TSF is not required to achieve average pre-disturbance land capability. The TSF is 9.02 ha, and the embankment is 3.23 ha, for a total area of 12.25 ha that is excluded from the land capability permit requirement. As of the end of 2020, the area left to be re-contoured and seeded/planted at JMM Site is 28.31 ha (excluding the TSF area).



Table 2.5-1: Summary of Areas Disturbed and Reclaimed to December 31, 2020 (Standard Table 1)

Disturbance	Mining		Reclamation								Land Use Objective
	Area Disturbed (ha)		Area Contoured (ha)		Area Seeded/Planted (ha)		Area Fertilized (ha)		Area Re-vegetated (ha)		
	2020	Total	2020	Total	2020	Total	2020	Total	2020	Total	
Tailings Storage Facility	0	12.25	exempt								exempt
Waste Rock Storage Areas (Level 10, 11, 12 portal pads)	0	1.11	0	0	0	0	0	0	0	0	alpine tundra wildlife habitat
Decommissioned Airstrip <sup>a</sup>	0	5.26	0	0	0	0	0	0	0	0	alpine tundra wildlife habitat
Five Vent Raises	0	0	0	1.25	0	1.25	0	0	0	0	alpine tundra wildlife habitat
Three Portals (Level 10, 11, 12), not including areas of pads containing waste rock	0	0.16	0	0.88	0	0.88	0	0	0	0	alpine tundra wildlife habitat
Mill Building	0	0.82	0	0	0	0	0	0	0	0	alpine tundra wildlife habitat
Septic Field Area	0	0	0	0.56	0	0.56	0	0	0	0	alpine tundra wildlife habitat
General Laydown Area south of airstrip	0	1.99	0	0	0	0	0	0	0	0	alpine tundra wildlife habitat
Main Landfill Area (includes cells 1 and 2 and Borrow Area #3)	0	2.64	0	0	0	0	0	0	0	0	alpine tundra wildlife habitat
Local Site Roads	0	4.71	0	0	0	0	0	0	0	0	alpine tundra wildlife habitat
Access Road from Bronson Airstrip to JMM	0	2.82	0	0	0	0	0	0	0	0	alpine tundra wildlife habitat
Core Storage Area	0	0.11	0	0	0	0	0	0	0	0	alpine tundra wildlife habitat

Disturbance	Mining		Reclamation								Land Use Objective
	Area Disturbed (ha)		Area Contoured (ha)		Area Seeded/Planted (ha)		Area Fertilized (ha)		Area Re-vegetated (ha)		
	2020	Total	2020	Total	2020	Total	2020	Total	2020	Total	
Disposal Sites #1, #2 and #3 (waste relocated to Main Landfill in 2018)	0	0.1	0	1.95	0	1.95	0	0	0	0	alpine tundra wildlife habitat
Borrow Area #1 (New: Required for future TSF closure activities)	0	5.42 <sup>b</sup>	0	0	0	0	0	0	0	0	alpine tundra wildlife habitat
Old Exploration Cabin	0	0	0	0.3	0	0.3	0	0	0	0	alpine tundra wildlife habitat
In-situ Hydrocarbon Remediation Area <sup>c</sup>	0	1.04	0	0	0	0	0	0	0	0	alpine tundra wildlife habitat
General Mine Site <sup>d</sup>	0	2.13	0	4.03	0	0	0	0	0	0	alpine tundra wildlife habitat
Total	0	40.56		8.97		4.94					

<sup>a</sup> 0.8 ha of the Decommissioned Airstrip is being utilized as part of a revegetation trial. This has not been registered in the contoured and seeded/planted columns. See Section 4.1.4 for details of the trial.

<sup>b</sup> The total disturbance area comprises existing disturbance and projected future disturbance required for planned reclamation activities.

<sup>c</sup> 'In-situ Hydrocarbon Remediation Area' has replaced the Old Tank Farm area. Old Tank Farm structures were removed in 2017 from the area and on site hydrocarbon contaminated soil remediation treatment has been conducted in the area since 2018. The area used for in-situ hydrocarbon remediation extends beyond the original 0.39 ha of the Old Tank Farm. Related disturbance areas have been adjusted accordingly.

<sup>d</sup> 'General Mine Site' includes areas of JMM Site that are not directly associated with existing on-site infrastructure or on-going activities.

No activities were completed at the JMM site in 2020 that resulted in changes to the areas disturbed and reclaimed. Previously, in 2019 (as in 2018), the areas disturbed and reclaimed were updated based on measurements made by site personnel. The areas of disturbed, reclaimed, or seeded/re-vegetated areas were measured and recorded by SnipGold, and are presented and summarized in Table 2.5-1 and Figure 2.5-1.

Most of the buildings and infrastructure at the site have been emptied, demolished, and burned. The following structures remain at the site:

- o the Mill Building; and
- o a shipping container.

Mobile equipment remaining at the site includes: CAT D8L Dozer, Kenworth DumpTruck, CAT 235 Excavator, CAT 312 Excavator, and CAT D8K Dozer.

## 2.6 Disposal/Storage Locations and Volumes of Tailings and Waste Rock

The information on disposal/storage locations and volumes of tailings, waste rock and overburden is provided in Table 2.6-1 (per EMLI (January 2021) Standard Table 2 Quantities of Waste Rock, Tailings, Low Grade Ore, Coarse Reject, and Other Mine Waste). Volumes and ML/ARD classification of waste rock and tailings for the Johnny Mountain Mine site are also summarized in Table 2.6-1.

No changes to the total quantities presented in Table 2.6-1 are reported for 2020, compared to 2019.

## 2.7 Mining and Milling Production

The JMM has not been operational since 1993, hence no Table 3 (Monthly Milling and Milling Production) is provided.

## 2.8 Custom Milling Production

The JMM has not been operational since 1993, hence no Table 4 (Monthly Custom Milling Production) is provided.

## 2.9 Stockpiling of Surface Soil Materials

There is no stockpile of surface soil materials for reclamation use available on the JMM site, so no Table 5 (Quantities of Soil and Overburden Salvaged and Stockpiled for Reclamation Use) is provided.

Figure 2.5-1  
Site Layout

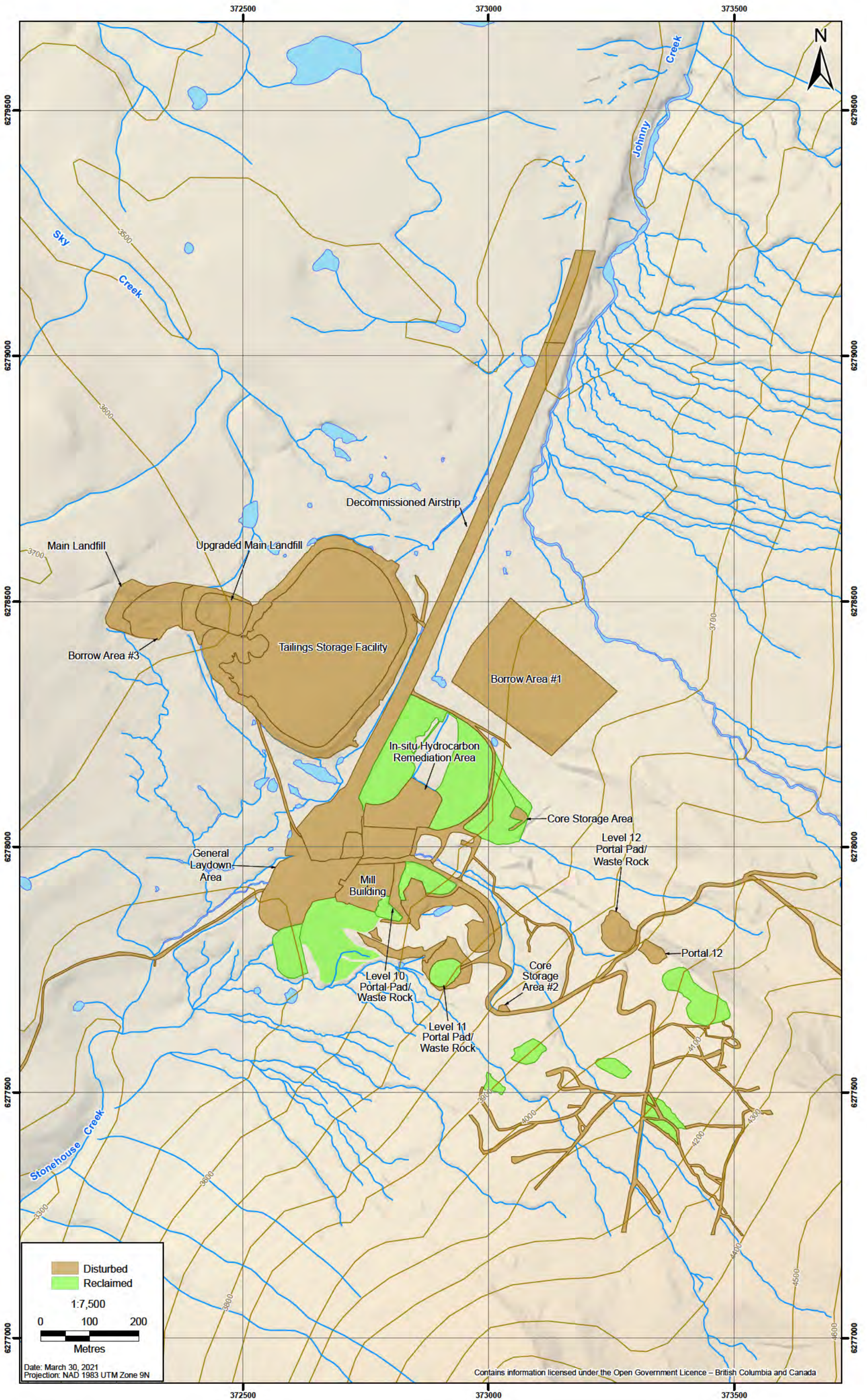


Table 2.6-1: Quantities Of Waste Rock, Tailings, Low Grade Ore, Coarse Reject and Other Mine Waste as of December 31, 2020 (EMLI Standard Table 2)

Name of Waste Pile or Pond	Acid Generating Waste		Potentially Acid Generating Waste**			Non-Acid Generating Waste**	
	2020	Total	2019 Total	Amount Relocated to the TSF in 2020	Updated Amount as of End of 2020	2020	Total
<b>Waste Dumps*</b>							
1. Portal 10 Pad	0	0	74,943 t	0	74,943 t	0	0
2. Portal 11 Pad	0	0	53,000 t	0	53,000 t	0	0
3. Portal 12 Pad	0	0	25,000 t	0	25,000 t	0	0
4. Decommissioned airstrip	0	0	4,314 t	0	4,314 t	0	0
5. Secondary access road	0	0	10,000 t	0	10,000 t	0	0
<i>Total</i>	0	0	167,257 t	0	167,257 t	0	0
<b>TSF</b>							
1. Johnny Mountain	0	0	207,743 t	0	207,743 t	0	0
<i>Total</i>	0	0	207,743 t	0	207,743 t	0	0
<b>Low Grade Ore / Coarse Reject / Other Mine Waste</b>							
1. None	0	0	Unknown ***	0	Unknown	0	0
<i>Total</i>	0	0	Unknown	0	Unknown	0	0

\* There are no designated waste dumps at the site; the portal pad areas contain waste rock. Original waste rock tonnages are from Price and Yeager 2004.

\*\* 2017 testing indicates that some material in each portal pad is NPAG (Non potentially acid generating); however, the material cannot be segregated.

\*\*\* 45 m<sup>3</sup> of ore concentrate was removed from the Mill Building in 2018 and relocated to the TSF.

### 3. ENVIRONMENTAL AND ENGINEERING ACTIVITIES

The most recent version of the *Mines Act* Permit *General Information and Format Requirements for Annual Reclamation Reports* (EMLI; updated January 2021) was used for the preparation of this chapter. The guidelines list many potential components for an Environmental Protection Program described here as the Environmental and Engineering Activities. The following sections provide information on the requested components from the guidelines for the past year, including projections for next year.

#### 3.1 Past Year: 2020 Activities

##### 3.1.1 *Environmental Management Systems/Plans/Audit*

SnipGold's focus for the site's Environmental Management Systems include complying with the existing permits, and conducting its exploration and reclamation programs in a safe and cost effective manner.

In 2020, SnipGold prepared an updated Closure Plan and an updated Closure Management Manual for JMM; these were submitted to EMPR March 31, 2020 for review and approval.

Additional management plans in place and implemented for activities carried out at JMM include:

- JMM Reclamation Project Execution Plan;
- Health, Safety and Environmental Plan;
- Erosion Prevention and Sediment Control Plan for the Main Landfill Upgrades;
- Drainage Management Plan; and
- Iskut Goat Management Plan.

Due to the COVID-19 health restrictions, no mine reclamation works or landfill upgrades took place during 2020. However, Permit PR-7927 requires an annual inspection of erosion prevention and sediment control measures. On 29 August, 2020, the Main Landfill inspection was conducted in parallel with the 2020 Site Environmental Investigation carried out by Wood (refer to Section 3.1.7).

SnipGold retains overall responsibility for implementation and maintenance of the erosion prevention and sediment control (EPSC) measures while Wood provides training, ongoing support, inspections, and assessment of the effectiveness of the controls. As outlined in Section 3.1.7, minor erosion was noted during the 2020 site inspection, however, the EPSC measures were observed to be effective. Wood concluded that the Erosion Prevention and Sediment Control measures complied with the plans and supporting documents, such as the Wood design guidelines and Ministry of Environment and Climate Change Strategy (ENV) Permit PR-7927 requirements (Appendix D).

In 2020, a Drainage Management Plan was prepared by RTEC (RTEC 2021b) to address Conditions 3, 4(b), and 5 of Permit M-178. The Drainage Management Plan is described in Section 3.1.6.

##### 3.1.2 *ML/ARD Characterization and Mine Waste Management*

After the acquisition of SnipGold by Seabridge, additional geochemical characterization studies of tailings, waste rock, the decommissioned airstrip, and Portal 10 cribbing waste material were completed to inform reclamation activities and were reported in the 2017 and 2018 Annual Reclamation Reports (RTEC 2018b, 2019). Waste ore concentrate was relocated to the TSF in 2018 (RTEC 2019a).

In consideration of the requirements of Permit M-178, in 2019, SnipGold continued planning for the relocation of PAG waste rock to the TSF from the portal pads and isolated pockets from the decommissioned airstrip and secondary roads. PAG material from two locations at the decommissioned airstrip and from the Portal 10 pad was relocated to the TSF. A total of 2,620 m<sup>3</sup> of waste rock was disposed in the TSF in 2019.

Additional testing was conducted in 2019 to refine the process of relocating this material, and to determine potential treatment requirements for the material. SnipGold commissioned BOE Water to conduct the test work and trials for treating and relocating waste rock to the TSF (BOE 2020). BOE recommended that waste rock be amended with lime before it is deposited into the TSF to add neutralization potential and prevent the release of dissolved metals. Lime addition with PAG waste rock deposited in the TSF is a requirement of the ML/ARD section of the Permit M-178, subsection 2 c: Disposal of PAG Waste Material:

*The Permittee shall monitor the rinse pH of all PAG waste rock being placed in the tailings impoundment. Where the rinse pH is less than 4.5, the Permittee shall add alkalinity at a rate of 75 g/tonnes of waste rock (i.e. 2kg of lime per 25 tonnes of waste rock during excavation and loading of the trucks. No lime is to be applied when the daily pH in the tailings impoundment exceeds 7.5.*

In 2020, to limit exposure from outbreak of the COVID-19 virus, heavy equipment was not available at the Site and Site activities during the 2020 season were limited to permit compliance and environmental monitoring. No material/waste rock was moved to the TSF.

Table 2.6-1 presents the quantities of waste rock and tailings at the Johnny Mountain Mine site in accordance with Standard Table 2 in the guidelines.

### 3.1.3 Surface Water Quality and Quantity Monitoring

#### 3.1.3.1 Surface Water Quality Monitoring

Surface water quality monitoring in 2020 was carried out in accordance with permits PE-8415 and PR-7927 (Appendices F and G).

#### Permit PE-8415 Surface Water Quality Monitoring

Conditions of Permit PE-8415 require annual surface water quality sampling at seven stations within the JMM local area (JM1 to JM7), and one field duplicate sample and one travel blank. Authorized discharge characteristics are provided in Table 3.1-1. The only numeric discharge limits (0.05 mg/L dissolved copper, and 0.2 mg/L dissolved zinc) are for Station JM5, which is located downstream of the TSF spillway prior to entering Johnny Creek. For the remaining stations, the authorized discharge characteristics are qualitative. There are no specified limits for discharge rates or volumes at any of the stations. Table 1 of Permit PE-8415 designates the required parameter list: pH, hardness, sulphate, dissolved copper, dissolved iron, and dissolved zinc.

Water quality samples were collected on August 23 and 24, 2020. Table 3.1-1 provides a summary of the locations of sampling stations, and Figure 3.1-1 illustrates the sampling locations. The 2020 annual report for Permit PE-8415 is included as Appendix E. No non-compliance events occurred in 2020.

Figure 3.1-1  
Permit PE-8415 Water Quality Sampling Stations

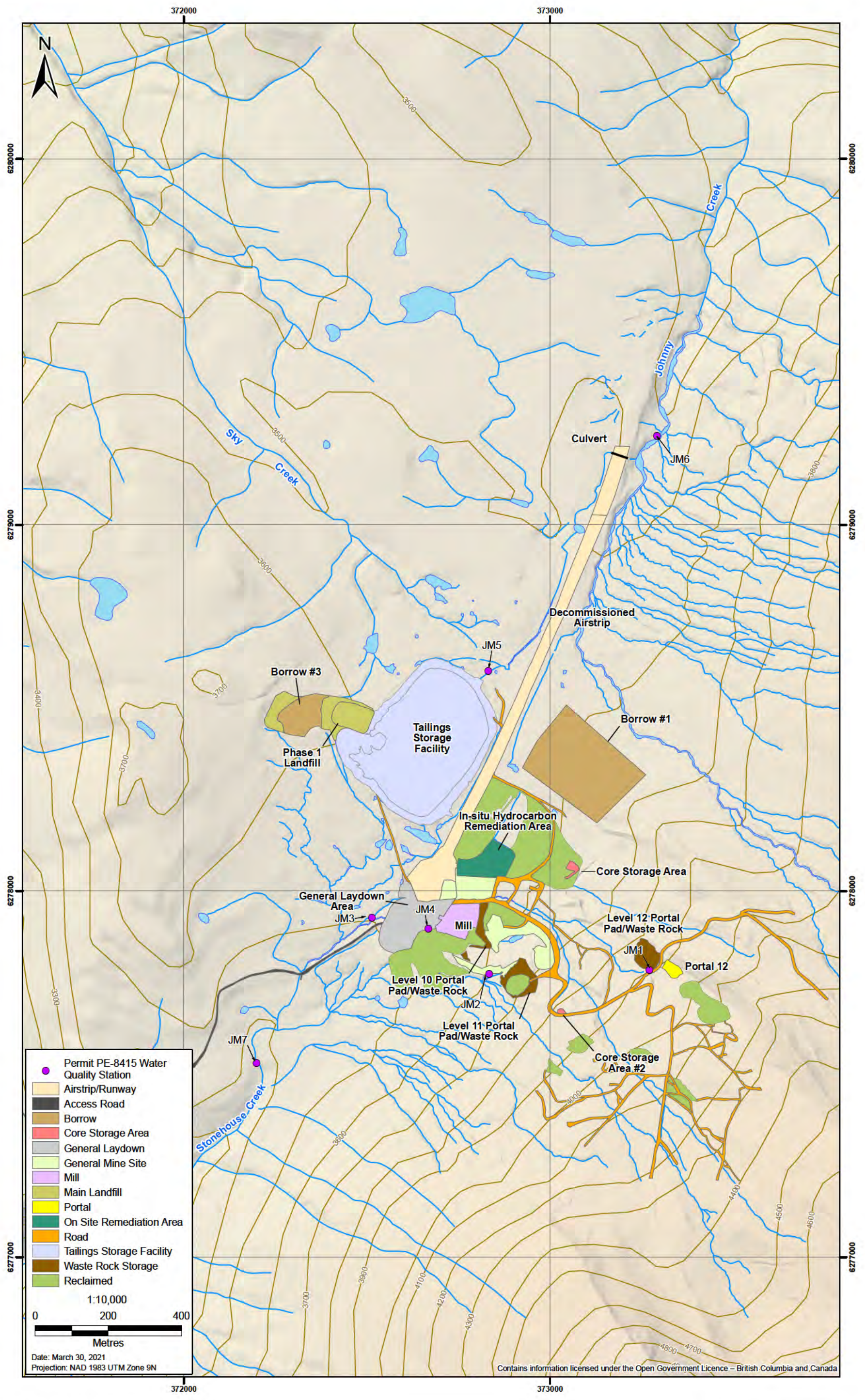




Table 3.1-1: Surface Water Quality Station Descriptions and Conditions Outlined in Permit PE-8415

Station	Description (from amended permit)	Authorized Discharge Limits or Characteristics of Discharge
JM1	12-Level Waste Rock Seepage	The characteristics of the discharge must be typical of leachate, which has passed through inert waste rock
JM2	11-Level Waste Rock Seepage	The characteristics of the discharge must be typical of leachate, which has passed through inert waste rock
JM3	10-Level Waste Rock Seepage	The characteristics of the discharge must be typical of leachate, which has passed through inert waste rock
JM4	Mine Water Discharge at 10-level portal (represents minewater from all levels)	The characteristics of the discharge must be typical of groundwater seepages coming from #10 level portal
JM5	TSF discharge	0.05 mg/L dissolved copper maximum 0.2 mg/L dissolved zinc maximum
JM6	Johnny Creek at end of Johnny Flats	none
JM7	Stonehouse Creek	none
JM8	Duplicate sample from any one of the sampling stations	none
JM9	Travel blank	none

#### Permit PR-7927 Surface Water Quality Monitoring

Permit PR-7927 includes conditions for groundwater and surface water monitoring down-gradient of the Main Landfill. Monitoring is required for a period of five years commencing in 2018. Hence 2020 reflects the third year of monitoring.

Compliance surface water quality samples were collected on August 23 and 28, 2020. Table 3.1-2 summarizes the required surface water sampling program outlined in EMA Permit PR-7927. Figure 3.1-2 presents the groundwater and surface water sampling stations required under Permit PR-7927. The 2020 annual report for Permit PR-7927 is included as Appendix F.

Table 3.1-2: Surface Water Monitoring Requirements under Permit PR-7927

Monitoring Site	Location Description	Coordinates	Water Quality Sampling
JM10-2018 <sup>1</sup>	Surface water station on a tributary to Sky Creek, downslope from the Main Landfill and upstream from MW17-22.	372498, 6278574	Annually <sup>2</sup> (during summer)

<sup>1</sup> Sky Creek 1.0 is a new site identified in the most recent amendment (April 2019) of Permit PR-7929; however, the label JM10-2018 has been retained by SnipGold for consistency with previous years' monitoring.

<sup>2</sup> Field Parameters: specific conductivity, temperature and pH.

Analytical parameters: Ethylbenzene and Xylenes (BTEX), Extractable Petroleum Hydrocarbon (EPH), Polycyclic aromatic hydrocarbons (PAHs), total metals, pH, alkalinity, bicarbonate, carbonate, chloride, electrical conductivity (EC), fluoride, hardness, nitrate, nitrite, ammonia, sulphate, total dissolved solids (TDS), total inorganic carbon (TIC), total organic carbon (TOC), chemical oxygen demand (COD) and turbidity, acidity (hot peroxide titration) and cyanides (weak acid dissociable (WAD), free, total, cyanate and thiocyanate).

#### 3.1.3.2 Surface Water Quantity

Flow monitoring is required as per ML/ARD condition 4(b) of Permit M-178. Surface water quantity has been monitored on site since 2016.

The objective of the 2020 program was to continue monitoring the water discharging/seeping from the Johnny Mountain Mine TSF (two locations) and three portal discharge locations (level 10, level 11, and level 12 portals). Both automated and manual monitoring methods were used. Automated hydrometric monitoring stations were installed at the two TSF locations and at the level 10 portal. The level 11 and level 12 portal locations are not amenable to installing hydrometric stations due to minimal discharge volumes, and discharge at these locations was measured using manual measurements (RTEC 2021c).

The first 2020 site visit was conducted in mid-June. This site visit included re-installation of two hydrometric stations: one station for the TSF discharge/seepage location (JTS-H1), and one station for the level 10 portal location (P10-A). Due to the depth of snow present at the time of the June site visit and inclement weather hindering safe access to the plateau, hydrometric station JTN-H1 could not be re-installed at that time and was re-installed in July. There were five site visits in total in 2020.

Figure 3.1-3 shows the locations of the monitoring stations and Table 3.1-3 provides station details. Details of the field methods, data analyses, and Quality Assurance/Quality Control (QA/QC) procedures can be found in Appendix G of this report (RTEC 2021c).

Table 3.1-3: 2020 Tailings Storage Facility and Portal Hydrometric Monitoring Stations

Station	Location	Easting	Northing	Period of Operation
JTS-H1	Downstream of seepage. Small stream ~100 m southwest of the tailing pond. Discharges into Stonehouse Creek.	372,609	6,278,081	Jun 14 - Oct 17 (2020)
JTN-H1	Downstream of passive spillway. Small stream ~230 m northeast of the TSF. Discharges into Johnny Creek.	372,973	6,278,720	Jul 9 - Sep 24 (2020)
P10-A	Portal 10 discharge around the northeast side of the old Mill Building. Relocated in 2019 due to reclamation work to ~40 m downstream of portal discharge culvert.	372,802	6,277,921	Jun 14 - Oct 17 (2020)
P11 <sup>a</sup>	Portal 11 discharge upslope of the old Mill Building.	372,955	6,277,725	Aug 31, Sep 25, Oct 17 (2020)
P12 <sup>a</sup>	Portal 12 discharge upslope of the old Mill Building.	373,324	6,277,787	Jul 14, Aug 31, Sep 24, Oct 17 (2020)

Note:

UTM NAD 83, Zone 9V

<sup>a</sup> Manual discharge measurements only

The relationships between stage and discharge were established for the three monitoring stations with available data (JTS-H1, JTN-H1 and P10-A). The 2020 stage-discharge measurements were compared to the existing rating curves to determine if the relationships were still valid. Where geomorphic changes to the channel occurred and rating points did not plot along the existing rating curve, a new curve was developed. Between six and thirteen rating points from the 2016 through 2020 monitoring programs were used to develop each curve. The rating equations are summarized in Table 3.1-4 and 2020 rating curves along with previous 2016 through 2019 curves are presented in Appendix G (RTEC 2021c).

Figure 3.1-2  
Permit PR-7927 Groundwater and Surface Water Sampling Stations

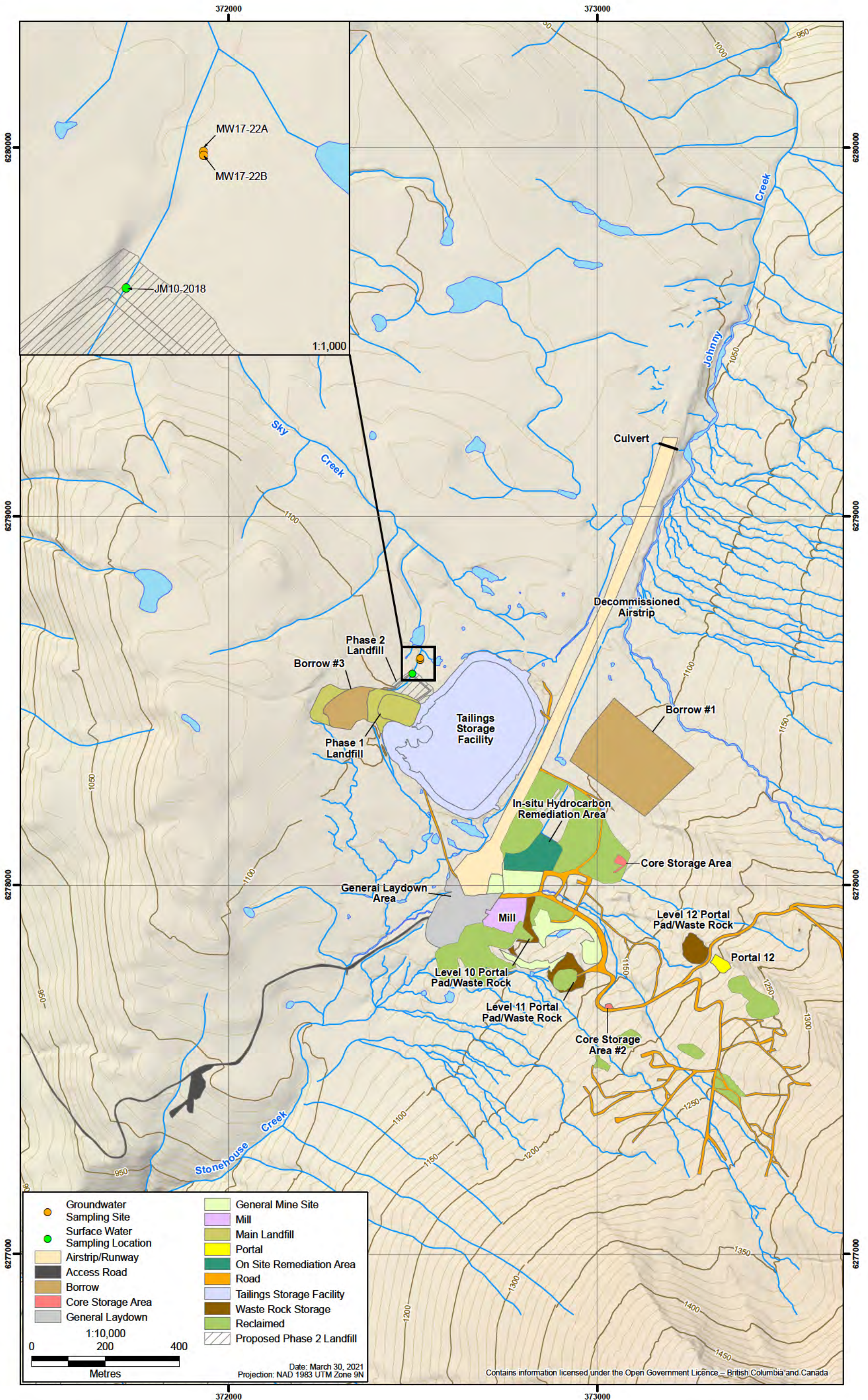


Figure 3.1-3  
Hydrometric Monitoring Locations

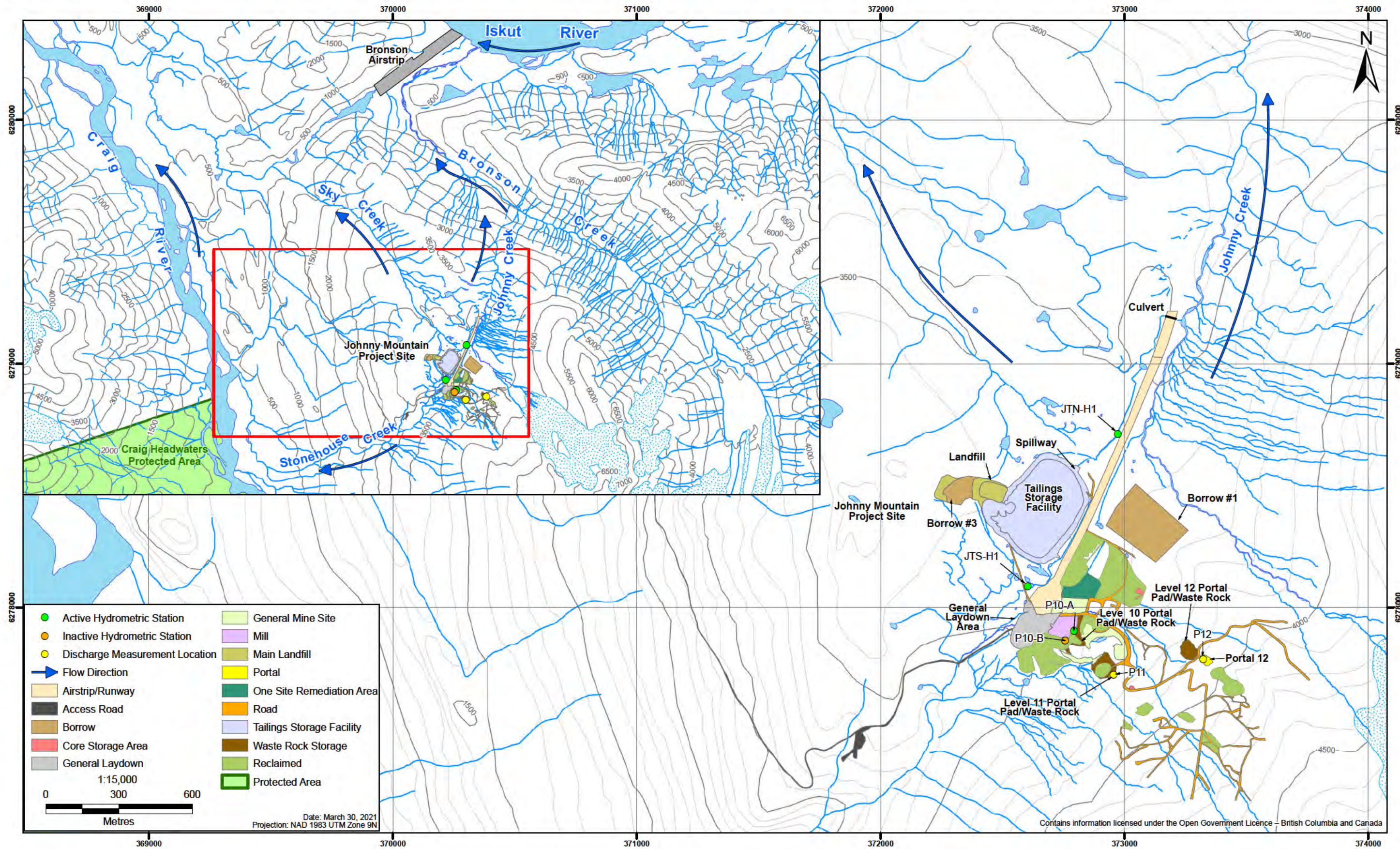


Table 3.1-4: Stage-Discharge Rating Equations

Station	Rating Equation <sup>1</sup>	Number of Rating Points Used in Curve Development	RMS Error <sup>2</sup> (Shift RMS)	Rating Period
JTS-H1	$Q = 4.015(h - 98.848)^{2.354}$	13	10.9	2016 - 2020
JTN-H1	$Q = 1.698(h - 99.494)^{1.947}$	13	7.1 (0.2)	2016 - 2020
P10-A	$Q = 1.339(h - 98.877)^{2.006}$	6	9.1	2019 - 2020

<sup>1</sup> Equation  $Q = C(h - a)^b$  :  $Q$  is the discharge ( $m^3/s$ ),  $C$  and  $b$  are dimensionless coefficients,  $h$  is the stage (m), and  $a$  is the stage at zero flow (m).

<sup>2</sup> RMS error is a statistical parameter that describes how well the values predicted by the stage-discharge relationship fit or represent the observed data, it is an indicator of uncertainty.

Daily discharge hydrographs were generated for the operational periods using the corrected stage records and rating curves for each station. These are presented in Appendix G (see Figures 3.3-1 to 3.3-3 of Appendix G), and include daily precipitation data collected at the Johnny Mountain meteorological station (UTM 371,942 E; 6,278,283 N; Zone 9V; NAD 83). The daily discharge tables for the hydrographs and historical discharge tables are also presented in Appendix G (See Appendixes B and D of Appendix G).

Annual hydrographs for the two automated hydrometric stations monitoring the TSF show a nival (snowmelt dominated) streamflow regime. The hydrographs are characterized by elevated streamflow during the spring freshet, when snow is melting, followed by a general decline in flow rate through the summer with periods of high flow resulting from precipitation events. Substantial peak events occurred in August as well as in the early fall, while a relatively warm and dry period in September saw a major decrease in stream flows.

Mean annual discharges were 0.020  $m^3/s$  at JTS-H1 and 0.007  $m^3/s$  at JTN-H1, while P10-A had an observed mean discharge of 0.010  $m^3/s$  during its operational period (Table 3.1-5). All stations experienced higher than average peak flows, with TSF monitoring stations experiencing discharges significantly higher than previous historical maximums. Likewise, summer low flows were near or greater than historical maximums, occurring in late September during a warm dry period.

Table 3.1-5: 2020 Mean Annual Discharge

Station	MAD ( $m^3/s$ )	Observed Average ( $m^3/s$ )
JTS-H1	0.020	0.045
JTN-H1	0.007	0.013
P10-A <sup>1</sup>	N/A	0.010

<sup>1</sup> A complete annual data series is not available for P10-A, value is based on the station's period of operation from June 14<sup>th</sup> through October 17<sup>th</sup>, 2020.

Annual daily peak flows are presented in Table 3.1-6. High flows were driven largely by snowmelt and heavy precipitation over the Project area in what was a wetter than average year (RTEC 2021c).

Summer low-flows (June to September) and annual low flows were calculated using the minimum 7-day average of daily flows. The summer low flows at each station occurred in late September and ranged from 0.003  $m^3/s$  at JTN-H1 to 0.006  $m^3/s$  at P10-A. In contrast to observed daily flow averages and peak flows, P10-A has the highest low flows rather than JTS-H1. Annual low flows occurred in early April when precipitation is stored in the snowpack and streamflows are dependent on available groundwater. Annual daily low flows ranged from 0.002  $m^3/s$  at JTN-H1 to 0.004  $m^3/s$  at JTS-H1. Annual daily low flows are not available for P10-A in 2020 as the station was not operational for the entirety of the year and as a

groundwater discharge monitoring location, is not suitable for modelling off of nearby stream data. The 7-day summer and annual low flows are presented in Tables 3.4-3 and 3.4-4 of Appendix G.

Table 3.1-6: 2020 and Historical Daily Peak Flow

Station Name	Daily Peak Flow (m <sup>3</sup> /s)				
	Observed 2016 to 2019 <sup>1</sup>			2020	Date
	Min	Mean	Max		
JTS-H1	0.004	0.050	0.155	0.190	20-Jun-20
JTN-H1	0.003	0.023	0.047	0.092	20-Jun-20
P10-A <sup>1</sup>	0.006	0.012	0.018	0.017 <sup>2</sup>	20-Jun-20

<sup>1</sup> Complete annual data series are not available for historic data, values are based on the stations period of operation during the open water season.

<sup>2</sup> A complete annual data series is not available for P10-A, values are based on the station's period of operation from June 14th through October 17th, 2020.

### 3.1.4 Groundwater Quality and Quantity

#### 3.1.4.1 Permit PR-7927 Groundwater Monitoring

Permit PR-7927 includes conditions for groundwater and surface water monitoring in the vicinity of the Main Landfill. Monitoring is required for a period of five years commencing in 2018. Hence 2020 reflects the third year of monitoring.

In addition to the surface water monitoring outlined in Section 3.1.3.1, the permit requires annual sampling at groundwater stations MW17-22A and MW17-22B. Table 3.1-7 summarizes the required groundwater monitoring sites, descriptions, locations, parameters and frequencies outlined in the permit and Figure 3.1-2 illustrates the sampling locations.

Table 3.1-7: Permit PR-7927 Groundwater Sampling Requirements

Monitoring Sites	Location Description	Coordinates	Monitoring Period, Parameters, and Frequencies	
			Water Quality	Water Level
MW17-22A (existing site)	Deep monitoring well downgradient from the Main Landfill.	372519, 6278611	A <sup>1</sup>	A
MW17-22B (existing site)	Shallow monitoring well downgradient from the Main Landfill.	372519, 6278610	A <sup>1</sup>	A

Note:

A = Annually (during summer)

<sup>1</sup> Field Parameters: specific conductivity, temperature, ORP (Oxidation-Reduction Potential), and pH. Analytical parameters: BTEX, EPH, PAH, dissolved metals, pH, alkalinity, bicarbonate, carbonate, chloride, conductivity (EC), fluoride, hardness, hydroxide, total iron, total magnesium, total manganese, nitrate, nitrite, ammonia, total potassium, total sodium, sulphate, TDS, TIC, TOC, COD and turbidity, acidity (hot peroxide titration) and cyanides (WAD, free, total, cyanate and thiocyanate).

Groundwater monitoring was completed on August 23 and 28, 2020, including the collection of groundwater quality samples and groundwater level measurements from the two nested groundwater wells, MW17-22A and MW17-22B. Water levels are presented in Table 3.1-8. Results of the Permit PR-7927 sampling can be found in Appendix F (RTEC 2021d) and are summarized in Section 3.1.4.2.

Table 3.1-8: 2020 Groundwater Levels Specified in Permit PR-7927

Well ID	Date Sampled	Groundwater Level (m btoc)	Bottom of Well Depth (m)
MW17-22A	28-Aug-20	0.905	11.83
MW17-22B	28-Aug-20	1.375	3.275

Notes:

**btoc = below top of the well's casing**

### 3.1.4.2 Groundwater Quantity

As part of the TSF groundwater monitoring program groundwater levels were measured at nine of the eleven groundwater monitoring wells. P89-01 was unable to be located and an accurate water level reading could not be taken at P89-03 due to well damage. (RTEC 2021d; Figure 3.1-4). Groundwater level measurements are presented in Table 3.1-9.

Table 3.1-9: August 2020 Johnny Mountain Tailings Management Facility Groundwater Level Measurements

Well ID	Easting <sup>A</sup> (m)	Northing <sup>A</sup> (m)	Water level (m)	Date	Notes
P88-01-1	372,497	6,278,243	0.000	24-Aug-20	
P88-01-2	372,497	6,278,243	0.000	24-Aug-20	
P88-01-alt1	372,498	6,278,248	0.200	29-Aug-20	
P88-02-1	372,659	6,278,136	0.146	24-Aug-20	
P88-02-2	372,659	6,278,136	0.582	24-Aug-20	
P88-03	372,870	6,278,308	1.442	24-Aug-20	
P88-04	372,871	6,278,534	0.000	29-Aug-20	
P89-01	372,710	6,278,244	n/a	29-Aug-20	Well was not located.
P89-02	372,702	6,278,248	0.000	24-Aug-20	PVC filled with silt.
P89-03	372,626	6,278,203	n/a	24-Aug-20	PVC damaged, water level reading could not be taken.
P89-06	372,720	6,278,226	1.426	24-Aug-20	

Notes:

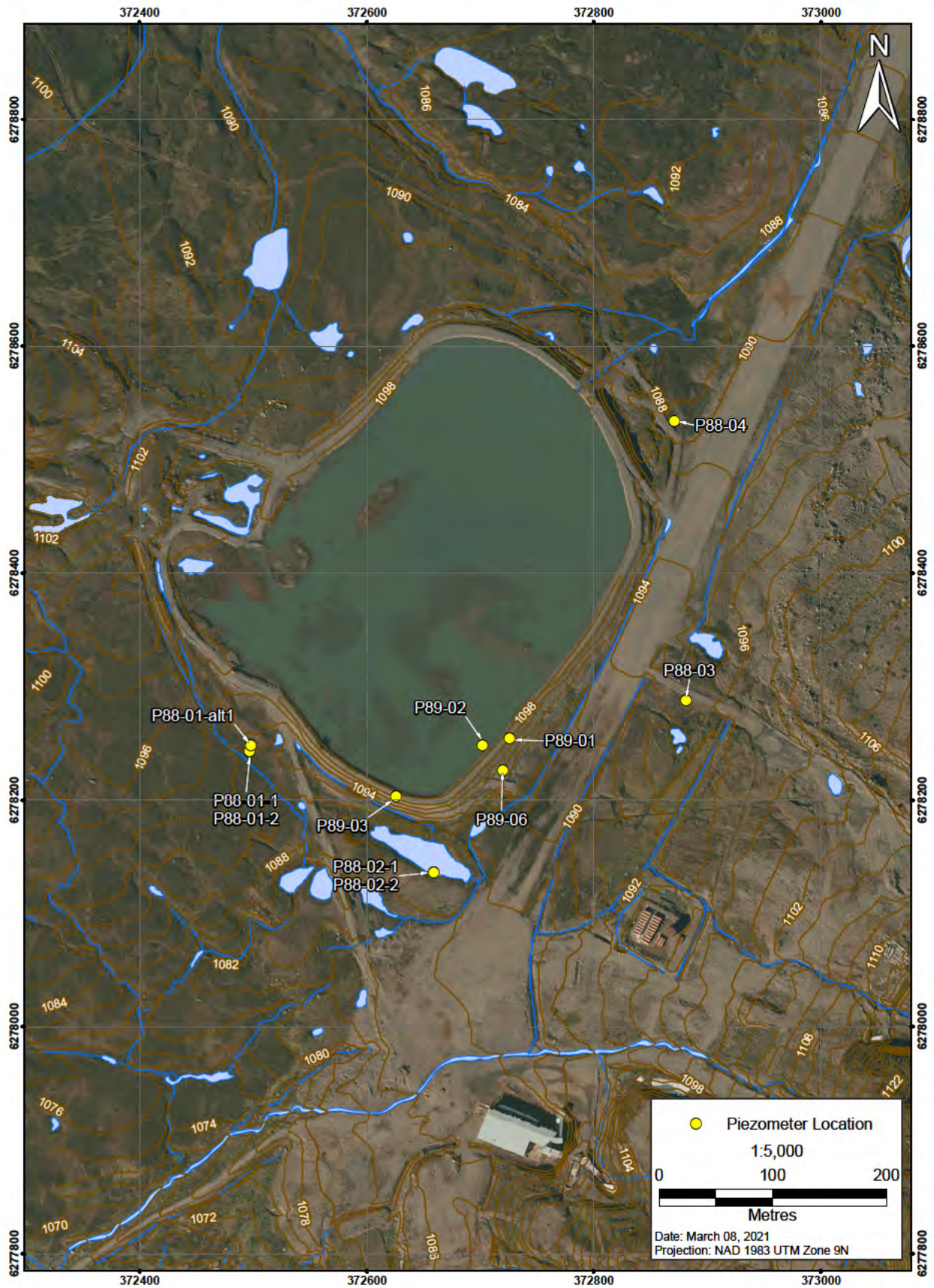
<sup>A</sup> UTM Zone 9V, NAD83

### 3.1.5 Water Quality Prediction, Mitigation, and Treatment

Geochemical testwork activities completed in previous years for the JMM are described in Section 3.1.2. In 2020, water quality results from monitoring at JM5, the sampling site location downstream of the TSF spillway, did not exceed the authorized discharge characteristics under Permit PE-8415 (Section 3.1.3.1).

Figure 3.1-4

2020 Groundwater Levels Measurements for Standpipe  
Piezometers at the Johnny Mountain Tailings Storage Facility





A trial placement of PAG material excavated from the decommissioned airstrip was mixed with hydrated lime and was placed in two areas in the TSF to assess closure cover constructability. A total of 2,620 m<sup>3</sup> of waste rock mixed with 635 kg of hydrated lime was placed in the TSF in 2019. Due to the COVID-19 Pandemic, no heavy equipment was available on site, hence no waste rock was moved to the TSF in 2020. Relocation of waste rock to the TSF from the Level 10, 11, 12 portals is planned in 2021, as well as PAG waste rock located in isolated pockets on the decommissioned JMM airstrip and secondary access roads. All excavated waste rock will be mixed with hydrated lime to mitigate potential pH issues as the waste rock is placed below water elevation inside the TSF (Appendix C).

### 3.1.6 Water Management

The local and regional drainages can be seen on the local site map in Figure 3.1-3.

The TSF is the site water management infrastructure. Inputs that contribute to the water volume in the TSF are direct precipitation that falls on the TSF and drainage from the Main Landfill. There have been no substantial changes to the TSF water management in 2020. The TSF continues to be maintained with a water cover over the tailings and surplus water is passively decanted through a permanent spillway on the Northeast Dam. The spillway channel directs flow to an old polishing pond east of the dam and onward down Johnny Creek and Bronson Creek to Iskut River (Appendix H).

Small volumes of water seep through the TSF and are collected in surrounding ditches. Two hydrometric monitoring stations are in place to monitor this seepage. See Section 3.1.3.2 ‘Surface Water Quantity’ above for details.

A DSI was conducted on August 20, 2020 by Engineer of Record Neil K. Hemrajani Singh, P.Eng. of KCB and representatives of SnipGold (TSF Qualified Person Elizabeth Miller and the SnipGold representatives Jessy Chaplin, and Lionel Sequeira). In addition site inspections were conducted by Kevin Hidber of SnipGold on June 17, 2020 and August 1, 2020. Neil K. Hemrajani Singh, P.Eng. of KCB is the Engineer of Record for reporting to the EMLI. There were no significant changes to the TSF in 2020, and there were no significant changes to stability or surface water control. The spillway is in good condition (Appendix H; KCB 2021). The full dam safety inspection report including notes and recommendations can be found in Appendix H (KCB 2021).

No drainage improvements were undertaken in 2020. A Drainage Management Plan was prepared (RTEC 2021b, Appendix I) to address Conditions 3, 4(b), and 5 of Permit M-178:

*Condition 3: Drainage Monitoring: The Permittee shall implement a program to monitor and track changes to drainage chemistry from disturbed areas and waste materials. The program shall be capable of detecting significant metal leaching and provide early warning about the onset of ARD or increases in contaminant loadings. This program must specify the frequency, sampling type, location, parameters to be analysed, detection limits and QA/QC procedures and triggers for implementing additional mitigation works, and shall be submitted with the 2004 annual Reclamation Report due March 31, 2005, for approval by the Chief Inspector.*

*Condition 4(b): Drainage Management and Collection: The Permittee shall install weirs or other suitable flow measuring equipment at all water quality monitoring locations so that flows can be monitored when water quality monitoring is conducted.*

*Condition 5: Contingency Plans: Pursuant to condition 4 above, the Permittee must develop contingency plans demonstrating how contaminant loadings will be reduced, and receiving environment reclamation objectives will be achieved, should the underground and/or tailings mitigation strategies fail to protect against the onset of ML/ARD. Contingency Plans shall be described in the updated Closure Plan due March 31, 2005.*

The Drainage Management Plan describes monitoring and response for drainage discharging into the three primary drainages from the Johnny Mountain Mine: Johnny Creek that flows into Bronson Creek, Stonehouse Creek and Sky Creek. Passive discharge of water from the TSF and the portals is monitored to estimate flows at water quality monitoring locations as required by Condition 4(b) of Permit M-178. The water quality monitoring program under the Drainage Management Plan is designed to monitor and track changes to drainage chemistry from disturbed areas and waste materials, including the portal areas and the TSF. Monitoring results are assessed using Trigger Levels described in a Trigger Action Response Plan (TARP). The TARP is designed to detect significant metal leaching, provide early warning about the onset of ARD or increases in contaminant loadings, and specify triggers for implementing additional mitigation works, using numeric water quality thresholds for Level 1 “alert” Trigger Levels for additional investigation and Level 2 “action” Trigger Levels to ensure the receiving environment is not adversely affected.

### 3.1.7 *Erosion and Sediment Control*

Erosion and sediment control measures are carried out as part of reclamation activities at the JMM site. No mine reclamation works or landfill upgrades took place during 2020. However, Permit PR-7927 requires an annual inspection of erosion prevention and sediment control measures. On 29 August, 2020, the Main Landfill inspection was conducted in parallel with the 2020 Site Environmental Investigation (Wood 2021a and 2021b). SnipGold retained overall responsibility for implementation and maintenance of the erosion prevention and sediment control measures while Wood provided training, ongoing support, inspections, and assessment of the effectiveness of the controls.

As outlined in the 2020 site inspection record included in Appendix D, minor erosion, ponding and sedimentation deficiencies were noted. These include minor erosion on the north slopes of Cell 2, west slopes of Cell 1, and south slopes of Cell 2. Some metal was also exposed where surface water had eroded the interim cover material along the north slopes of Cell 2. Self armoring of gravel and cobbles in the silty kame material was observed in these erosional locations (Appendix D; Wood 2021b).

Additionally, minor ponding of water was observed in the following locations:

- Northeast access road of the Main Landfill;
- along the north edge of Cell 2; and,
- along the borrow area in the immediate southern edge of Cell 1, west of the culvert.

Since no construction work took place during 2020, it is recommended that this maintenance is addressed in 2021 prior to the continuation of any waste placement or landfill upgrades.

Wood reported the professional opinion that the Erosion Prevention and Sediment Control measures substantially comply with the plans and supporting documents referenced herein (Appendix D; Wood 2021b).

Water quality monitoring ultimately assesses the effectiveness of erosion and sediment controls. Results from the 2020 compliance water quality program indicated results comparable with nearby reference stations.

### 3.1.8 *Soil Salvage and Stockpiling*

There are no stockpiles of surface soil materials available for reclamation on site.

### 3.1.9 *In Situ Hydrocarbon Remediation Management*

#### 3.1.9.1 *Johnny Mountain Mine Environmental Site Investigations*

In 2020 the environmental site investigation continued on specific areas of potential environmental concern (APECs) and areas of environmental concern (AECs). The scope was modified as test pitting with an excavator could not be completed. Additionally, excavation of hydrocarbon contaminated soil for further soil remediation or mechanical aeration of treatment areas could not be completed in 2020. The modified 2020 objectives to support ongoing Site reclamation work included:

- Continue an environmental site investigation of specific AECs and APECs to assess hydrocarbon impacts in groundwater within the following APECs/AECs:
  - AEC 1 (APEC 1): Mill/10 Level Portal;
  - AEC 2 (APEC 2 / APEC 14) : Tank Farm and Fuel Lines and AEC 3 (APEC 4) - Fuel Pump Shed;
  - AEC 5 (APEC 9): Main Landfill; and
  - Tailings storage facility (TSF).
- Evaluation of petroleum hydrocarbon levels in material located in the Treatment Areas 1 and 2 by hand digging test pits into the material;
- Continuing evaluation of background concentration of metals in groundwater by completing additional groundwater monitoring and sampling activities; and
- Collection of groundwater quality data at the Main Landfill, required to support annual compliance reporting requirements for Permit PR-7927.

#### Areas of Environmental Concern (AECs) and Areas of Potential Environmental Concern (APECs)

An initial Site Investigation in 2017 followed by annual Supplemental Site Investigations (SSIs) have been completed to investigate areas of potential environmental concern (APECs) relating to historic mining operations (AMECFW 2018; Wood 2019, 2020, 2021b). Results indicating that there was contamination present related to former operations were carried forward as areas of environmental concern (AECs).

Based on the result of the 2020 SSI, which focused on the assessment of hydrocarbon impacts in groundwater, there are nine APECs/AECs at the JMM to be carried forward for additional assessment and/or remediation work:

- AEC 1 (APEC 1): Mill / 10 Level Portal
- AEC 2 (APEC 2 / APEC 14): Tank Farm Area / Fuel Lines
- AEC 3 (APEC 4): Fuel Pump Shed
- AEC 4 (APEC 5): Mechanical Shop / 11 Level Portal
- AEC 5 (APEC 9): Main Landfill
- AEC 6 (APEC 11): Airstrip
- AEC 7 (APEC 13): Warehouse East Area
- APEC 10: Burial Site #1 (Former Chalet)
- APEC 12: Burial Site #2

All data, results, analysis and mapping for AECs are presented in detail within Appendix J.

#### Petroleum Hydrocarbons - Groundwater

Groundwater samples collected from monitoring wells MW17-04A, MW17-04B, MW17-06A, MW17-06B, MW17-07A, MW17-07B, MW17-12A, MW17-12B, MW17-13, MW17-17A, MW17-22A, MW17-22B, MW17-20A, MW17-20B and MW17-23A were submitted for analysis of BTEX, PAHs and LEPH/LEPHs. Groundwater sample MW17-17A was also submitted for analysis on VPHs and samples MW17-22A and MW17-22B were also submitted for analysis VOCs. A synopsis of the analytical results is as follows:

- Groundwater sample MW17-4B, located within APEC 1/AEC 1 (Mill and 10 Level Portal), contained elevated concentrations of methyl-naphthalene and LEPH<sub>w</sub>
- Groundwater sample MW17-6B, located within APEC 1/AEC 1 (Mill and 10 Level Portal), contained elevated concentrations of acenaphthene and methyl-naphthalene,
- Groundwater sample MW17-12A, located within APEC 14/AEC 2 (Fuel Lines), contained an elevated concentration of LEPH<sub>w</sub>,
- Groundwater sample MW17-17A, located within APEC 14/AEC 2 (Fuel Lines), contained an elevated concentration of methyl-naphthalene.
- Groundwater sample MW17-20A, located downstream of the TSF, contained elevated concentrations of methyl-naphthalene and naphthalene.
- Groundwater samples collected from monitoring well MW17-22A, located at the Main Landfill, contained elevated concentrations of ethylbenzene, methyl-naphthalene and naphthalene.
- A light non-aqueous phase liquid (LNAPL) (measurement of 1 cm) was measured with a Heron interface probe within monitoring well MW17-17B located within APEC 14/AEC 2 (Fuel Lines). The presence of LNAPL was also verified visually with a bailer.

#### Petroleum Hydrocarbons Results - Discussion

Based on a threshold of five times the laboratory method detection limit (MDL) to define elevated concentrations for discussion purposes, groundwater impacted by petroleum hydrocarbons was identified at AEC 1 (APEC 1) and AEC 2 (APEC 2 / APEC 14). LNAPL was identified at monitoring well MW17-17B. Soil impacted by petroleum hydrocarbons was also identified within these AECs during previous assessments. Soil contamination identified within those AECs has impacted groundwater quality.

Elevated concentrations of methyl-naphthalene and naphthalene were observed downstream of the TSF (MW17-20A) in the 2020 sampling event; however, they were lower than the previous groundwater sampling events completed in July and October 2017. The groundwater quality in that area seems to have improved since 2017. Natural attenuation is likely occurring and concentrations of PHCs appear to be decreasing with time.

Elevated concentrations of ethylbenzene, methyl-naphthalene and naphthalene were observed downstream of the Main Landfill (APEC 9/AEC 5) (MW17-22A); however, they were lower or within the same range than the previous groundwater sampling events completed in July and October 2017, July and September 2018 and July 2019. The groundwater quality in that area seems to have improved since 2017. Natural attenuation is likely occurring and concentrations of PHCs appear to be decreasing with time.

### 3.1.9.2 *In-situ Hydrocarbon Remediation*

In-situ remediation of petroleum hydrocarbon soil contamination in the area of the Fuel Tank Farm and Fuel Lines (AEC 2 (APEC 2 / APEC 14)) was commenced by NorthWest Response (NWR) during the 2018 and 2019 field season. As a result of the remediation program, there is a stockpile of soil excavated in 2018 that contains approximately 3,000 m<sup>3</sup> of soil, hereafter referred to as Treatment Area 1. Treatment Area 1 is located in the Fuel Line area portion of AEC 2. In 2019 an additional 6,000 m<sup>3</sup> of soil was excavated in 2019 from AEC 2 and placed into a stockpile, hereafter referred to as Treatment Area 2. Treatment Area 2 is located in the former Tank Farm portion of AEC 2.

Wood’s 2020 scope of work included the completion of year-end sampling of Treatment Area 1 and Treatment Area 2 to determine the effectiveness of the remediation program. The treated soil was evaluated for petroleum hydrocarbon constituents, nutrients, moisture content, pH and hydrocarbon utilizing bacteria (HUB). Based on the results of the 2020 soil sampling and the data collected during the 2017 Site Investigation (2017 SI), 2018 SSI and 2019 SSI, concentrations of light extractable petroleum hydrocarbons (LEPH) have decreased significantly as shown in Tables 3.1-10 and 3.1-11 (Supplemental Site Investigation Appendix J).

Table 3.1-10: Treatment Area 1 - 95<sup>th</sup> Percentile Over Time

Sampling Event	95 <sup>th</sup> Percentile (mg/kg)	Average Concentration (mg/kg)
2017 In-Situ (LEPH)	3748	3138
2018 (Year End) LEPH	3582	1857
2019 (Mid-Year) LEPH	2005	1217
2019 (Year End) LEPH	1394	738
2020 (Year End) LEPH	1164	710

Table 3.1-11: Treatment Area 2 - 95<sup>th</sup> Percentile 2020 Year End Sampling

Sampling Event	95 <sup>th</sup> Percentile (mg/kg)	Average Concentration (mg/kg)
2017 In-Situ (LEPH)	3748	3138
2019 (Year End) LEPH	2772	1619
2020 (Year End) LEPH	1292	813

### 3.1.9.3 *Background Groundwater Assessment*

From 2017 to 2020, the site investigations and supplementary site investigations conducted by Wood have included groundwater sampling (AMECFW 2018; Wood 2019, 2020, 2021b). The groundwater sampling was intended to capture potential trends in groundwater quality in the areas around the two disposal sites, Mill Building, Old Tank Farm, and Main Landfill. Results of the groundwater sampling, maps and information on other aspects of the site investigation can be found in the appended Wood 2020 *Supplementary Environmental Site Investigation Report* (Wood 2021b; Appendix J). The following results summary was provided by Wood (2021b), and the full report with the analytical results is available in Appendix J.

#### 2020 Activities

On August 23-28, 2020, Wood collected groundwater samples from 28 monitoring wells in addition to samples collected at MW17-22A and MW17-22B, located downgradient from the Main Landfill, to satisfy

the requirements for Permit PR-7927, which authorizes the discharge of waste to the Main Landfill. Further information on monitoring, sampling, and QA/QC of these groundwater samples is provided in Appendix J (Wood 2021b).

### 2020 Results

The 2017 to 2020 field investigations identified elevated concentrations of dissolved metals: aluminum, antimony, cobalt, manganese, cadmium, copper, lithium, iron, uranium and arsenic in groundwater. An assessment of background concentrations of dissolved metals has indicated that antimony, arsenic, uranium, iron, lithium, cobalt and manganese are elevated compared to background concentrations and could be attributed to historical mining activities. Wood observed that the concentrations of dissolved metals are generally decreasing over time. When compared to the BC Contaminated Sites Regulation (CSR), many of the dissolved metals concentrations that are elevated are still less than BC Contaminated Site Regulation (CSR) aquatic life (AW<sub>F</sub>) water use standards. Based on observed concentrations compared to background, manganese appears to be the remaining dissolved metal that would require further assessment (Wood 2021b).

Elevated dissolved concentrations of manganese appear to be associated with the AEC 1 (APEC 1) - Mill Building and 10 Level Portal; however, elevated manganese was also identified at APEC 10 - Burial Site # 1, APEC 12 - Burial Site # 2 and at AEC 2 (APEC 2 / APEC 14) - Tank Farm and Fuel Line area. The locations where elevated manganese was identified were all in disturbed areas and the highest concentrations were found around the AEC 1 (APEC 1) - Mill Building and 10 Level Portal.

Please refer to Appendix J for additional maps, figures and details.

#### *3.1.10 Vegetation Management*

In July 2019, a set of revegetation trials was established at the north end of the decommissioned airstrip. The northern end of the airstrip was selected to conduct the reclamation trials because it is relatively isolated from the historical mine area and is unlikely to be disturbed by other reclamation activities. The airstrip is also the largest single feature that will be reclaimed at 5.27 ha. The trials initiated in 2019 were monitored in July and September 2020. A report is presented in sub-section 4.1.4 below and Appendix K (Johnny Mountain Mine Revegetation Monitoring 2020).

#### *3.1.11 Wildlife Protection*

The Goat Management Plan that was prepared in 2016 continues to be implemented. The Plan aims to protect goats from potential negative effects of helicopter overflights. A PowerPoint slide presentation was developed in 2016 (RTEC 2016) and continues to be used for pilots and other personnel doing work in the area.

Following the recommendations from the JMM marmot den survey conducted in the area of the Main Landfill and borrow areas in 2018 (RTEC 2018a), required excavation activities are carried out at a slower than normal pace around the previously observed den areas, in order to give potential transient marmots an opportunity to escape. It was also a recommendation of the survey findings that the field crew appoint a spotter when working close to known marmot dens. Large boulders could also be moved to undisturbed areas of site, where they may act as attractants to marmots. Although not required for site activities in 2020, these recommendations will be considered for future activities conducted on site.

Best management practices are used to avoid or minimize wildlife-human interactions, such as management of garbage and waste, and regular communication check-ins for field staff.

### 3.1.12 *Archeological Resources*

In 2019 an Archeological Impact Assessment (AIA) report was prepared that summarized archaeological assessments that have taken place from 2016 to 2019 (RTEC 2020c). The AIAs were carried out under *Heritage Conservation Act* Heritage Inspection Permit 2016-0229. No further archaeological assessment was performed in 2020.

Based on the AIAs the following general management recommendations were provided:

- On the steep north facing slope down to Bronson Creek within Exploration Focus Area A no further archaeological assessment is required, however, if impacts are anticipated at the top of the slope additional assessment will be required.
- No further archaeological assessment is recommended within Exploration Focus Area B, which encompasses the majority of the historical mine area.
- The area around the Meteorological Station was assessed (20 metre radius), no archaeological concerns were identified, and no further work is required.

Even the most thorough study may not identify all archaeological resources that may be present and **SnipGold's Archaeological Chance Find Procedure should continue to be implemented prior to the commencement of ground altering activities.** All staff on site should be familiarized with the procedure and protocols for managing known archaeological sites and any chance finds that may occur during construction.

The management recommendations presented above are offered by RTEC and are subject to review and acceptance by the Archaeology Branch.

### 3.1.13 *Meteorological Station*

A meteorology station was installed on the plateau in September 2016 and continued to operate through 2020. The station is collecting local information for wind speed, direction, temperature, humidity, solar radiation, snow depth, and precipitation. The station includes a network camera and satellite telemetry connection, and hosts an online website to display up-to-date and historical data. A detailed description of the station and information collected to date can be found in Appendix B (RTEC 2021a).

During the monitoring period of August 2016 to October 2020, average air temperature was 0.8°C with daily average temperature ranging from 19.6°C (June 19, 2018) to -24.4°C (February 2, 2019). The mean relative humidity records indicate that fog and low clouds were present at the Johnny Mountain plateau approximately 36% of the time during the reporting period. The monthly average total precipitation adjusted for wind undercatch ranged from 86 mm in April to 237 mm in November, and the maximum daily precipitation recorded during the monitoring period was 66 mm on January 1, 2019. Missing daily temperature and precipitation data were estimated using regression analysis with data from the KSM Project meteorological stations. The estimation methodology was found to be satisfactory to predict missing daily temperature and precipitation data. The snow season typically extends from October to May and the snowpack reaches its maximum depth in March or April. The maximum daily snowpack depth during the monitoring period was 220 cm recorded on March 16, 2020.

Winds were predominantly from the southwest quadrant during warm months and from the northeast during the wintertime. Northeastern winds were characterized by higher speeds. The average wind speed during the period of record was 4 m/s while 33% of time the wind speed ranged from 3 to 5 m/s.

Calm winds occurred 1.7% of time. The maximum hourly average wind speed was 30 m/s (108 km/h) and the maximum wind gust speed was 45.1 m/s (162 km/h), both occurred on January 15, 2020. The hourly average solar radiation ranged from 0 to 990 W/m<sup>2</sup>, peaking during the summer.

### 3.1.14 *Tahltan Engagement*

The following engagement activities were conducted in 2020:

- The Seabridge annual environmental program update meeting was held on June 9 and June 10, 2020 (via video conference due to COVID-19) to present the JMM Reclamation work summary. The attendees included representatives of Seabridge (Elizabeth Miller, Kevin Hidber and Taryn Cutler), Environment and Climate Change Canada (ECCC) (Yee Ting Choy), the Ministry of Environment (ENV) (Mark Love and Lisa Torunski), EMPR (Martina Bezzola and Lowell C), RTEC (Wade Burnham, Eri Ratwanati, Kelsey Norlund, Jill Zyla and Coby Hall), Wood (Jeremiah Gladu and Mario Bianchin), Golder Associates (Kristin Salzsauler), Skeena Fisheries - Gitanyow (Kyla Warren), Nisga'a Government (Tracey McKay and Kathryn McLeod), Tahltan Central Government (TCG) (Nailaine Morin), Alaska Department of Environmental Conservation (DEC) (Allan Nakanishi and David Khan), Alaska Fisheries Department (DFG) (Kate Kanouse), and Alaskan Department of Natural Resources (DNR) (Kyle Moselle) (RTEC 2021e).
- In 2020 a co-authored paper on JMM reclamation was presented to The British Columbia Technical and Research Committee on Reclamation (TRCR) by TCG and SnipGold Corp.
- TCG attended the annual SnipGold presentation to EMLI in Feb 2020 in Victoria.

### 3.2 Next Year: 2021 Planned Activities

The planned 2021 reclamation season involves the following:

- PAG relocation to the TSF;
- continued in-situ soil remediation of contaminated soils located within the historic tank farm and a portion of the JMM airstrip;
- place all miscellaneous site equipment into expanded landfill (grader, crane, D6 dozer and snow cat);
- excavation and relocation of any additional undocumented waste sites to the JMM Landfill;
- ongoing environmental monitoring;
- ongoing dam safety inspections (DSI) on the TSF;
- seeding and vegetating of disturbed areas; and
- upgrade to the JMM access road as required.

#### 3.2.1 *Environmental Management Systems/Plans/Audit*

No new environmental management systems, plans or audits are planned for 2021. SnipGold have developed a Project Execution Plan for 2021 (Appendix C) which aligns with the objectives of the overall JMM PEP and JMM Closure Plan.



### 3.2.2 *ML/ARD Characterization and Mine Waste Management*

The primary goal of the 2021 season is the excavation and relocation of ML/ARD waste rock from the Level 10, 11, 12 portals, as well as waste rock located on the JMM airstrip and secondary access roads surfaced with waste rock (see Table 3.2-1 below). All excavated waste rock will be mixed with hydrated lime to add neutralization potential and prevent the release of dissolved metals as the waste rock is placed below water elevation inside the TSF (for more details see the Project Execution Plan for 2021 in Appendix C).

Table 3.2-1: Estimated Volume of Waste Rock to relocate per area

Area	Volume (m <sup>3</sup> )
Level 10	37,500
Level 11	26,500
Level 12	12,500
JMM Airstrip	5,000
Secondary access roads	4,000
Total (Estimated) waste rock	85,500

### 3.2.3 *Surface Water Quality and Quantity Monitoring*

#### 3.2.3.1 *Surface Water Quality*

Surface water quality monitoring will be carried out in 2021 in accordance with requirements of permits PE-8415 and PR-7927.

#### 3.2.3.2 *Surface Water Quantity*

Surface water quantity monitoring will be carried out in 2021.

### 3.2.4 *Groundwater Quality and Quantity*

The compliance groundwater sampling for Permit PR-7927 will be carried out as required during the snow-free period in 2021. Groundwater level measurements of the wells around the TSF will be completed as part of the TSF groundwater monitoring program.

### 3.2.5 *Water Quality Prediction, Mitigation, and Treatment*

There are no plans for a water quality prediction program in 2021. Water quality sampling will be carried out for Permit PE-8415 and Permit PR-7927. The main mitigation and treatment measure for water quality on site is to relocate PAG waste rock to the TSF water cover from the Portals #10, 11, 12, and isolated pockets from the decommissioned airstrip and secondary roads, following the treatment procedures outlined in Permit M-178. The relocation of this material is planned for 2021, and will likely continue into 2022.

### 3.2.6 *Water Management*

The TSF will continue to be inspected on an annual basis. Permit M-178 requires the permittee to prepare a Dam Safety Inspection Report for the TSF every two years (or annually should a yearly field

inspection of the TSF not be undertaken), and Dam Safety Reviews (DSR) every 10 years (superseded by the Mines Act and Code which since 2014, require all TSFs to have a DSI annually and a DSR every five years. The two hydrometric stations collecting seepage from the TSF will be installed again in 2021, and hydrometric monitoring at the three portals will continue. There may be active management of water within the TSF during the relocation of waste rock in an effort to control the quality of surface water existing in the TSF during the activities planned for 2021. In 2021, water management activities will include maintenance of effective surface water diversions around the mill building, maintenance of collection channels to effectively maintain drainage across the site and control sedimentation, and mitigate erosion (Appendix C).

### 3.2.7 *Erosion and Sediment Control*

The site is subject to approximately 2,000 mm of precipitation as well as added and concentrated flows from the local melting glaciers. Spring/summer flows can also be significant with melting of the accumulated snow pack in the area. Many ditches and swales have been installed over the 2017 and 2018 reclamation season to manage surface flows and direct runoff water toward historic channels. The 2021 season will be a continuation of the overall water management plan, including re-establishing effective surface water diversions around the Mill Building area, re-establishment of collection channels to effectively maintain drainage across the site and control sedimentation, and mitigate erosion (Appendix C; Project Execution Plan [PEP]; SnipGold 2021).

Current best practices and/or guidelines from agencies will be followed when moving waste rock is undertaken in 2021. Water quality monitoring will take place in 2021 as described above, which assesses the effectiveness of erosion and sediment controls.

### 3.2.8 *Soil Salvage and Stockpiling*

There are no plans to stockpile soils in 2021.

### 3.2.9 *In Situ Hydrocarbon Remediation Management*

An estimated soil volume of 9,000 m<sup>3</sup> was treated within the JMM tank farm area in 2020. 2021 will continue with treatment of contaminated soils within the historical JMM tank farm and a portion of the JMM airstrip. Fertilizer and a natural biocatalyst (oil Gator) may be added to the soils and turned several times during the 2021 season to speed aeration and the treatment process (Appendix C).

In regards to the groundwater site investigation sampling program, Wood recommended that select groundwater wells are sampled and analyzed to supplement the existing groundwater data set (Appendix J). Wood also provided recommendations on which APECs/AECs should be carried forward for additional assessment and/or remediation work in 2021 (Appendix J). Based on the results of the 2020 SSI, the following APECs/AECs in the table below (Table 3.2-2) are recommended to be carried forward for additional assessment and/or remediation work. More details are provided in Appendix J.

### 3.2.10 *Vegetation Management*

The 2019 vegetation trial established on 0.8 ha of the northern end of the decommissioned airstrip will be monitored in 2021 to evaluate the success of the establishing of native vegetation.

Table 3.2-2: Summary of AECs/APECs and Contaminant Type

Initial APEC	Description	2019 Classification	Contaminant Type
APEC 1	Mill / Portal 10	AEC 1	Diesel fuel and lubricants
APEC 2 / APEC 14	Tank Farm Area / Fuel Lines	AEC 2	Diesel fuel, aviation fuels and possibly gasoline, waste rock
APEC 4	Fuel Pump Shed	AEC 3	Diesel fuel and Avgas
APEC 5	Mechanical Shop / Portal 11	AEC 4	Fuels, lubricants, and waste rock storage
APEC 9	Main Landfill	AEC 5	Inferred to be diesel fuel
APEC 10	Burial Site 1 (Fmr. Chalet)	APEC 10	Waste rock
APEC 11	Airstrip	AEC 6	Waste rock
APEC 12	Burial Site #2	APEC 12	Contents of burial site, waste rock
APEC 13	Warehouse East Area	AEC 7	Stored / used fuel and lubricants

### 3.2.11 *Wildlife Protection*

The Goat Management Plan will continue to be implemented in 2021. Best management practices will continue to be used to avoid or minimize wildlife-human interactions, such as management of garbage and waste, and regular communication check-ins for field staff.

### 3.2.12 *Archaeological Resources*

Archeological baseline work may be conducted if any new exploration areas are identified, or if any activities are anticipated to take place outside of the areas already assessed.

### 3.2.13 *Meteorological Station*

For 2021, it is anticipated that the meteorological station will be maintained, winterized, and kept in good working condition so that remote access to data is maintained.

### 3.2.14 *Tahltan Engagement*

SnipGold will continue to engage with Tahltan Nation representatives in 2021, where appropriate, in order to keep all parties well informed on the on-going efforts by SnipGold to reclaim and remediate the JMM site.

## 3.3 Next Five Years: Summary 2021-2025

Environmental programs and monitoring required through the JMM permits (i.e., *Mines Act* Reclamation Permit M-178, *EMA* Permit PE-8415, and *EMA* Permit PR-7927) will continue, as necessary. Annual reports documenting associated activities will be provided as required.

SnipGold will continue to implement relevant management and monitoring plans required for the JMM site and associated activities, for example the ML/ARD Monitoring Plan, Closure Management Manual, etc.

Achieving the approved closure and reclamation objectives will remain the priority of SnipGold and SnipGold will continue to develop detailed Project Execution Plans for each year of activity. The key objectives being:

- Removal of infrastructure and cleanup of the JMM site;
- Decompact disturbed lands to enable development of natural habitat for wildlife utilization; and
- Establish long-term stability of restored areas, biologically, geotechnically and geochemically.

Through this time SnipGold will maintain a controlled, safe and secure site, where safety and safe work practices are of paramount importance.

## 4. RECLAMATION PROGRAM

### 4.1 Past Year: 2020 Activities

No reclamation activities were completed in 2020. Activities during the 2020 season were limited to permit compliance and environmental monitoring.

#### 4.1.1 *End Land Use*

The overall objective of the reclamation and closure plan for the Johnny Mountain Mine is to return disturbed lands and anthropogenic landforms to their original land use and capability of alpine tundra wildlife habitat (Woznow and Yeager 1999). This aligns with the end land use requirement specified in Permit M-178. As described in Section 1.5 of this report, the target wildlife species associated with the end land use of alpine tundra wildlife habitat are marmots, mice, voles, and shrews, and their transient predators, including marten and grizzly bears.

The end land use proposed in Permit M-178 is alpine tundra wildlife habitat, and it remains as the objective for future reclamation efforts.

#### 4.1.2 *Land Capability*

The capability condition specified in Permit M-178 is as follows: *Excluding the tailings pond area, the average land capability to be achieved on the remaining lands shall not be less than the average that existed prior to mining.*

The land capability as specified in Permit M-178 will remain the capability objective for future reclamation efforts.

##### 4.1.2.1 *Pre-Disturbance Landscape*

In addition to historical information, LiDAR (Light Detection and Ranging), historical airphotos, and recent imagery were used to identify pre-disturbance ecosystems and conduct a desk-based Terrestrial Ecosystem Mapping (TEM) of the areas adjacent to the site (RTEC 2018b). The historical airphotos were georeferenced in ArcMap and used in combination with more recent imagery and LiDAR to create the TEM. The ecosystem types and boundaries were delineated based on the interpretation of the imagery and LiDAR and on site units described in *A Field Guide to Site Identification and Interpretation for the Prince Rupert Forest Region* (Banner et al. 1993) and the *Biogeoclimatic Ecosystem Classification (BEC) of Non-Forested Ecosystems in British Columbia* (MacKenzie 2012). In areas disturbed by the former mine, ecosystems were delineated and identified using the historic airphotos. Two BEC zones were identified: the MHmm2p which occurs in the transition from treeline to the alpine; and the CMAun which is the true alpine zone and is not treed (Figure 4.1-1).

Within each BGC Unit, site units were mapped. Site units reflect a recurring pattern of variation in soil and physiographic properties. Site units are grouped according to their potential to produce similar “stable” plant communities as influenced by environmental properties such as soil moisture and soil nutrient regimes.

Almost one-third of the mapped area is comprised of non-vegetated morainal till and rock, upslope of the Mill Building and the decommissioned Airstrip/Runway, which reflects the relatively recent retreat of the glacier from the higher elevations.

The MHmm2 parkland unit is the most common. However, due to cold air drainage, trees are not present on most sites. The majority of the MHmm2p site is Sedge Meadows (SS) followed by Heather Meadows (HM). There are minor amounts of Mountain Heather Parkland (i.e., contains gappy open trees) (MH) and Mountain hemlock - Sedge Meadows (SH), and non-vegetated morainal deposits (MN).

The CMAun occurs above the TSF and airstrip, and is comprised of non-vegetated recent morainal till (MN), Mountain Heather Meadows (MM), Alpine Meadow (AM), and sparsely vegetated Mountain Heather - Rhacomitrium Scrub (MR).

#### 4.1.2.2 Existing Landscape

The JMM site is located in a rugged area at approximately 1,100 to 1,200 m above sea level (masl). Surrounding peaks are up to 2,000 m in elevation. Much of the site above the airstrip is located on morainal till deposits exposed by the receding glacier. The deglaciated areas typically have limited, if any, soil development; where present, soils are derived from glacial till and colluvium.

The site is located in the subalpine parkland of the Mountain Hemlock moist maritime subzone leeward variant (MHmm2p) and in the Coastal Mountain-heather Alpine (undifferentiated; CMAun) Biogeoclimatic Zone (BGC) zone. Due to the cold air drainage from the glacier coniferous trees are largely absent and most of the area is comprised of heathers, herbs, and low shrub species. These BGC units have some of the harshest climates of any of the biogeoclimatic zones in British Columbia. Temperatures remain low even during the growing season, which has a short frost-free period.

Plant species located near the mine site include: *Leutkea pectinata* (partridgefoot), *Phyllodoce empetrififormis* (pink mountain-heather), *Cassiope mertensiana* (white mountain-heather), *Empetrum nigrum* (crowberry), *Veratrum viride* (Indian hellebore), *Festuca altaica* (altai fescue), *Epilobium latifolium* (willow herb), *Epilobium angustifolium* (fireweed), *Senecio triangularis* (arrow-leaved groundsel), *Alnus viridis ssp. Sinuate* (green alder); *Tsuga mertensiana* (mountain hemlock), *Tsuga heterophylla* (western hemlock), and *Chaemaecyparis nootkensis* (yellow cedar).

#### 4.1.3 Long-term Stability

The long-term stability condition specified in Permit M-178 is as follows: *Land, watercourses and access roads shall be left in a manner that ensures long-term stability.*

The access road to the site from the Bronson airstrip needs to remain active for ongoing reclamation and exploration activities.

The long-term stability of the tailings dam was considered by conducting the required annual dam safety inspection in 2020 (Appendix G; KCB 2021). A dam breach analysis and consequence classification update was conducted in 2017 (KCB 2018a), and an updated closure design for the TSF was prepared in 2018 (KCB 2018b).

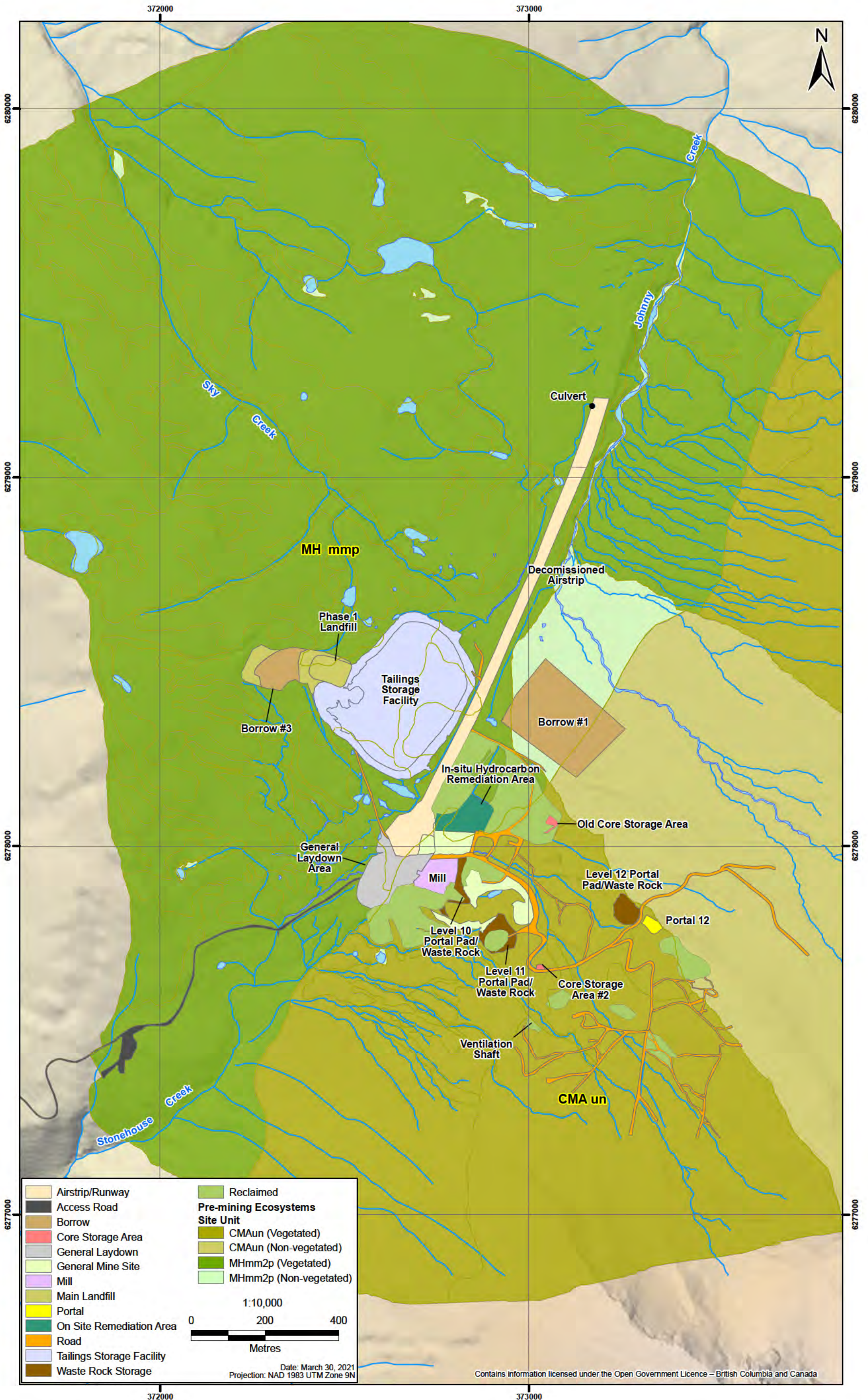
The five vent raises and three portals have all been closed, contributing to the long-term stability of the land and watercourses on site.

#### 4.1.4 Revegetation

The vegetation condition specified in Permit M-178 is as follows: *On all lands suitable, as designated by the Chief Inspector, the land shall be re-vegetated to a self-sustaining state using appropriate plant species.*

Figure 4.1-1

Terrestrial Ecosystem Mapping of the Johnny Mountain and Adjacent Areas



In July 2019, a set of revegetation trials was established at the north end of the decommissioned airstrip. The northern end of the airstrip was selected to conduct the reclamation trials because it is relatively isolated from the historical mine area and is unlikely to be disturbed by other reclamation activities. The airstrip is also the largest single feature that will be reclaimed at 5.26 ha.

The objective of the trials was to evaluate potential revegetation methods for the site that achieve the closure and reclamation goals, specifically of revegetating disturbed lands through the development of self-sustaining natural successional processes, and to produce vegetative cover that provides stable and productive wildlife habitat (RTEC 2021f). The trial methods were designed to provide some grass cover while allowing natural ingress and establishment of other native plant species. Based on estimates in the field at the time of the revegetation trials, the soil in the trial area is a silty loam with 60 to 70% CFC and has less than 1% organic matter content (RTEC 2019b).

In the revegetation trials, four treatment plots were established that included seeding native grasses at four different rates and transplanting plugs of alpine vegetation. Monitoring surveys were conducted on July 9, 2020 and September 7, 2020. In July 2020, four 5.64 m radius circular plots were established in each of the four treatment plots. Within these plots, a smaller, 2 m radius plot was established, and three 1 m<sup>2</sup> subplots were randomly identified for survey.

During the July 2020 survey, the following variables were measured in each of the four treatments:

- In 2 m radius plots, stem counts of:
  - shrubs, and
  - herbs.
- In 2 m radius plots and 1 m<sup>2</sup> subplots, percent cover of:
  - shrubs,
  - herbs,
  - grass, and
  - lichen and moss.
- In 5.64 m radius plots, percent survival of transplanted plugs of native plants.

In addition to the quantitative measurements above, photos were taken to document the vegetation in the 1 m<sup>2</sup> subplots and in each of the four cardinal directions for the 5.64 m radius plots.

During the September 2020 monitoring survey, photos were repeated in the 5.64 m radius plots in each of the four cardinal directions.

The vegetation was relatively immature during the first survey period in July. Plants in the trial plots were at early stages of development. Surveyors were unable to consistently identify plants to the species level, but were able to assess vegetation cover by type, and overall survival of transplanted vegetation plugs within the plots sampled. A second set of photos was collected in September to document vegetation establishment and growth later in the season. A detailed report including the Johnny Mountain Vegetation Monitoring Protocol, Raw data for stem counts and percent cover is found in Appendix K (Johnny Mountain Mine Revegetation Monitoring 2020).

Plugs were assessed within four 5.64 m radius plots in Treatment 1, the only treatment that had plugs installed in 2019. Plugs were counted as live if even a portion of the plug was living and percent of the



plug alive was recorded. Of the 103 total plugs observed in the plots sampled, 95% were alive and only five of the live plugs had less than 50% live vegetation in July 2020 (Photo 4.1-1). Planting conditions in 2019 were hot and dry and not optimal. However, overall survival of the plugs after the first year was high.



Photo 4.1-1: Plugs in Treatment 1 (seeding = 5 kg/ha, planting = 2,253 plants/ha). A) A Successfully transplanted live plug with high survival, July 2020. B) Plug with less than 50% survival, July 2020.

#### 4.1.5 Growth Medium

The Growth Medium condition specified in Permit M-178 is as follows: a) On all lands to be *re-vegetated*, the growth medium shall satisfy land use, capability, and water quality objectives; b) All severely compacted areas shall be deeply ripped prior to placement of growth media and/or vegetation.

In-situ hydrocarbon remediation has been undertaken since 2018 in the In-situ Hydrocarbon Remediation Area (Appendix J; Wood 2021a), which aims to modify hydrocarbon contaminated soil on site towards appropriate standards for use in reclamation activities. In 2020 the scope of work included the completion of year-end sampling of Treatment Area 1 and Treatment Area 2. The results of the 2020 sampling are described in Section 3.1.9.2, and indicate continued improvement in soil quality.

#### 4.1.6 Landforms

The landforms condition specified in Permit M-178 is as follows: *where practicable, land and watercourses shall be reclaimed in a manner that is consistent with the adjacent landforms.*

#### 4.1.7 Structures and Equipment

The Structures and Equipment condition specified in Permit M-178 is as follows: *a) prior to abandonment, and unless the Chief Inspector has made a ruling with respect to heritage project status or industrial*

use, i) all machinery, equipment and building superstructures shall be removed; ii) concrete foundations shall be covered and re-vegetated, unless because of impracticality, they have been exempted by an Inspector, and iii) all scrap material shall be disposed of in a manner acceptable to the district Inspector of Mines, Engineer.

#### 4.1.7.1 Mill Building

No Mill Building decommissioning activities were performed. Completion of Mill Building demolition and Site grading is planned for 2023 (Appendix C Project Execution Plan).

#### 4.1.7.2 Main Landfill

No Main Landfill upgrades or waste filling activities took place during 2020.

#### 4.1.7.3 Onsite Equipment Repairs in 2020

The onsite equipment is critical to the Johnny Mountain Mine reclamation/closure plan and ongoing repairs are necessary when heavy equipment are available. Heavy equipment was not available for the 2020 field season.

#### 4.1.8 Watercourse Reclamation

The watercourses condition specified in Permit M-178 is as follows: *Watercourses shall be reclaimed to a condition that ensures a) Drainage is restored either to original watercourses or to new watercourses which will sustain themselves without maintenance, and b) The level of productive capacity shall not be less than existed prior to mining, unless the Permittee can provide evidence, which demonstrates, to the satisfaction of the Chief Inspector, that impracticality of doing so.*

The local drainages can be seen on the local site map in Figure 3.1-1. There was no reclamation work for watercourses on site in 2020.

#### 4.1.9 Waste Dump Reclamation

The dump condition specified in Permit M-178 is as follows: *Dumps shall be reclaimed to ensure a) long-term stability, and b) long-term erosion control.*

There are no waste rock dumps at JMM Site. However, there are three underground portals that were built up with waste rock to enable access to these sites. Each portal pad was found to contain a combination of non-acid generating and potentially acid generating materials, and segregation is not practical. In addition to placement of waste rock at the three portals, waste rock was used in the construction of on site roads, the decommissioned airstrip and the general laydown area (Price and Yeager 2004).

No waste rock was relocated in 2020. The relocation of waste rock material will continue to be included in the reclamation planning as documented in the 2021 Project Execution Plan (Appendix C).

#### 4.1.10 Open Pit Reclamation

There are no open pits at the Johnny Mountain Mine.

#### 4.1.11 Tailings Storage Facility Reclamation

The TSF condition specified in Permit M-178 is as follows: *Impoundment facilities shall be inspected, monitored and maintained to ensure stability.*

The TSF continued to operate passively in 2020 as intended. As per Permit M-178 conditions, a Dam Safety Inspection was carried out in August 2020 (Appendix H; KCB 2021). Refer to Section 3.1.6 for more details.

#### 4.1.12 Road Reclamation

The Roads condition specified in Permit M-178 is as follows: *a) All roads shall be reclaimed in accordance with land use objectives unless permanent access is required. This shall include the ripping of the road surface and re-contouring the roadway into adjacent landforms to reconstruct the areas' relative original landscape and moisture regime. b) Soil cover shall be replaced over the re-contoured surface and immediately re-vegetated with appropriate species that will lead to achieving end land use and productivity objectives. c) Included under this permit are all mine roads, the airstrip, and the 10 km Johnny Mountain Access Road.*

The Johnny Mountain access road from the Bronson airstrip is required to enable ongoing reclamation and exploration activities, therefore efforts will continue to maintain this road and not decommission it.

In 2017, LiDAR data was obtained and this information was used to evaluate the area of historical exploration trails that have been overgrown and vegetated naturally overtime through disuse. Table 2.5-1 (i.e., Standard Table 1 (Summary of Areas Disturbed and Reclaimed) EMLI ARR requirements (January 2021); see Section 2.5-1) captures the surface area for both these historical unused exploration trails and local site roads that remain active. Roads around the remaining infrastructure that will be needed until the completion of the on-going reclamation activities will remain active.

No road reclamation activities took place in 2020 at the JMM site.

#### 4.1.13 Infrastructure Decommissioning/Reclamation

There is no specific condition in Permit M-178 relating to Infrastructure Decommissioning/Reclamation.

No activities took place in 2020 for decommissioning infrastructure on site.

#### 4.1.14 Securing Openings

The Secure Openings condition specified in Permit M-178 is as follows: *a) All access roads shall be effectively blocked to prevent inadvertent vehicular access to surface areas of the mine that may be dangerous. b) All shafts, raises, stope openings, adits, or drifts opening to the surface shall either be capped with reinforced concrete or filled with material so that subsidence of the material will not pose a future hazard. c) In the case of shafts or raises, the cap shall be secured to solid rock, or to a concrete collar secured to solid rock, and capable of supporting a uniformly distributed load of 12 kPa or a concentrated load of 24 kN, whichever is greater. d) Where there is evidence or a potential for use by wildlife, mine openings may be fitted with a barrier that allows wildlife passage but prevents human entry. e) When mine openings are permanently closed and it may be possible for mine water to build to dangerous pressures, a permanent drain shall be installed.*

No additional reclamation activities to secure openings were necessary in 2020.

#### 4.1.15 *Disposal of Hazardous Materials, Chemicals, and Reagents*

The Disposal of Fuels and Toxic Chemicals condition specified in Permit M-178 is as follows: *Fuels, chemicals or reagents, which cannot be returned to the manufacture/supplier, are to be disposed of as directed by the Chief Inspector in compliance with municipal, regional, provincial and federal statutes.*

The scope of work for the Hydrocarbon Remediation Area was limited to end-of-year sampling in Treatment Area 1 and Treatment Area 2; see Section 3.1.9 for more details.

#### 4.1.16 *Reclamation Research*

Vegetation trials were initiated in 2019. The scope of work for 2020 included trials to evaluate the revegetation methods, and are described in Section 4.1.4. Refer to Appendix K for further details of the trials.

### 4.2 Next Year: 2021 Reclamation Program

The following text provides an overview of the planned 2021 reclamation activities as described in the 2021 Project Execution Plan (Appendix C; SnipGold 2021). The primary goal of the 2021 season is the excavation and relocation of PAG waste rock from the Level 10, 11, 12 portals, as well as isolated pockets of PAG waste rock located on the JMM airstrip and secondary access roads. All excavated waste rock will be mixed with hydrated lime to add neutralization potential and prevent the release of dissolved metals as the waste rock is placed below water cover inside the TSF.

The objective in 2021 is to show tangible progress, working toward completing the JMM reclamation project within the established budget and timeline, highlighting value to SnipGold stakeholders.

#### 2021 Planned Reclamation Related Activities:

- Ensure No Harm to Personnel or Environment by maintaining a controlled, safe and secure site. Safety and Safe work practices are of paramount importance to SnipGold.
- Ongoing environmental monitoring. A key component of the JMM Reclamation Program is to show continued improvement to the JMM site as the reclamation program moves toward returning the site to its natural state as per permit PE-8415 and M-178.
- In-situ Soil Remediation - An estimated soil volume of 9,000 m<sup>3</sup> was treated within the JMM tank farm area during the 2018 and 2019 seasons. 2021 will continue with treatment of contaminated soils within the historic JMM tank farm and a portion of the JMM airstrip. Fertilizer and a natural biocatalyst (oil Gator) will be added to the soils and turned several times during the 2021 season to speed aeration and the treatment process.
- Excavation and Relocation of PAG waste rock - A significant scope of the JMM reclamation plan is the relocation of waste rock generated during the mine operation. The waste rock will be relocated from the portal location into the TSF. Hydrated lime will be added to the waste rock prior to being placed in the TSF to add neutralization potential and prevent the release of dissolved metals.
- Disposal of Mining Equipment - All miscellaneous site equipment will be disposed into the expanded JMM landfill (grader, crane, D6 dozer and snow cat). The old mining equipment has been deemed unsalvageable by Finning and Matrix mechanics and will be cut down and placed into the JMM landfill. All fluids will be drained from equipment prior to disposal and transported off site and disposed in an approved disposal facility.

- Complete minor upgrades to JMM access road. The JMM access road will require upgrades early in the 2021 season. This will involve ditching, brushing, culvert installation and upgrades where wash outs occurred late in the 2019 season.
- Conduct annual Dam Safety Inspection (DSI). Klohn Crippen Berger (KCB) is the Engineer of Record and will conduct the yearly DSI of the JMM TSF. Data will be downloaded from the TSF vibrating wire piezometers to support the DSI. A Dam Safety Review is required every 5 years, and it will be carried out in 2021.
- Test pits and material testing. Conduct additional test pits and material testing to prove borrow source material on site.
- Equipment Repairs and upgrades. Complete ongoing repairs and upgrades to site equipment to ensure minimal delays due to breakdowns. Repairs to DJB Rock Truck, CAT 235 excavator, Kenworth dump truck, CAT 966 Loader.

Additional opportunities to complete reclamation activities may arise through 2021. Should this occur, activities will be reported in the 2021 Annual Reclamation Report.

#### 4.3 Next Five Years: Planned 2021-2025 Activities

SnipGold will continue to execute the JMM Closure Plan objectives and actions in order to achieve the overall land use objective of returning disturbed lands and new anthropogenic landforms to alpine tundra wildlife habitat.

Some of the tasks scheduled for the next five years include:

- completion of ML/ARD waste relocation from portals #10, 11, 12, and isolated pockets from the decommissioned airstrip and secondary roads to the TSF, placed below water cover;
- TSF downstream embankment modifications for final closure;
- continued dam safety inspections;
- annual environmental monitoring (water quality, hydrology, weather station, weirs and groundwater wells);
- complete Mill building demolition and site grading;
- final upgrades and closure of JMM landfill;
- decommission all exploration roads on JMM Site;
- site auction or transport off site of all mobile stock; and
- vegetation planting (Appendix C Project Execution Plan).

Complete reclamation and closure of the JMM Site is anticipated within the next few years. This will be achieved through sequenced decommissioning of remaining on site infrastructure (e.g., conveyor and Mill Building demolition), and site grading, removal of waste materials from the surface of the site and subsequent re-vegetation of target areas as identified in Section 4.1.2 above.

The Main Landfill will be used to dispose of all inert authorized waste types generated on site. Phase 2 expansion of the Main Landfill will occur should SnipGold need additional capacity beyond the 38,000 m<sup>3</sup> of Phase 1's Cell 1 and 2. Hazardous wastes will continue to be disposed of at appropriately authorized facilities off site.

SnipGold have a planned program to excavate, treat with hydrated lime and remove the waste rock pads remaining on the surface of the JMM Site to the TSF. As per Permit M-178, all waste rock will be submerged in the TSF. Additionally, once it is safe to do so, the remaining ore concentrate in the Mill Building will be collected and disposed of in the TSF.

In-situ remediation of hydrocarbon contaminated soils will continue to encourage aeration and treatment of soils. The water management and drainage system associated with the In-situ Hydrocarbon Remediation Area where the treatment is occurring will be maintained, as required.

SnipGold will continue to conduct the necessary environmental programs and compliance monitoring associated with the JMM Site throughout the closure phase. As per the *Mines Act* and EMA permits requirements, compliance reports will be submitted to the relevant regulatory bodies annually.

## 5. OUTSTANDING RECLAMATION LIABILITY

Due to the COVID-19 pandemic, activities during the 2020 season were limited to permit compliance and environmental monitoring. The total expenditures in 2020 were [REDACTED]. The net outstanding reclamation liability estimate is [REDACTED]. This is based on the 2018 estimate (prepared to an AACE Class 2 Construction Cost Estimate level, with an expected accuracy range of 10%/+20%).

The scope of this estimate includes costs for the following areas where activities were carried out in 2020:

- o Code: 2100. Waste dumps (waste rock). Environmental sampling and planning. The estimated expenditures in 2020 were [REDACTED].
- o Code: 2200. Landfills/In-situ hydrocarbon remediation. In-situ hydrocarbon remediation continued in 2020. The estimated expenditures in 2020 were: [REDACTED].
- o Code 9100. Engineering and Technical Services. In 2020 tasks included the Dam Safety Inspection (M-178) and Inspection of erosion prevention and sediment control measures (PR-7927). The estimated expenditures for 2020 were: [REDACTED].
- o Code 9400. Construction Support. Temporary Construction Maintenance estimated expenditures were [REDACTED].
- o Code 9700. Health, Safety, Security and Environment, including safety supplies and training estimated expenditures were [REDACTED].
- o Code 9800. Temporary Camp and Catering costs. The estimated expenditures in 2020 were: [REDACTED].
- o Code 9900. Freight and Logistics/Contractor Support. This included freight shipping, transport shuttle and helicopter support for 2020. Estimated expenditures were: [REDACTED].
- o SnipGold Corp. internal Salaries were: [REDACTED].

Ongoing monitoring costs for 2020 are provided in Table 5-2.

Table 5-1: 2020 Reclamation Costing Estimate for Johnny Mountain Mine

Code	WBS #	Description	Detail	2017 Closure Cost Estimate	2018 Closure Cost Expenditures	2019 Closure Cost Expenditures	2020 Closure Cost Expenditures
2017 Cost Estimate	1100	Mine Adits	10 Level, 11 Level, 12 Level Adits	██████████	-	-	-
	1200	Vent Raises	Vent raises 11-17-76, 11-29B Stope, 11-28-66, 12-06-05, 12-13-03	██████████	██████████	-	-
	2100	Waste dumps (waste rock)	Waste rock dump Level 10, Level 11, Level 12	██████████	-	-	██████████
	2200	Landfills/In-situ hydrocarbon remediation	Main landfill, Burial Site #1, Burial Site #2, in-situ hydrocarbon remediation	██████████	██████████	██████████	██████████
	2300	Surface Water Management	Site grading, restoration of channels, airstrip grading, re-soiling and vegetation	██████████	-	-	-
	3100	Mill Demolition	Removal of ore from mill build., demolition and removal of Mill Building	██████████	██████████	██████████	-
	3200	Tank Farm Deconstruction	Tank farm deconstruction	██████████	-	-	-
	4100	Civil Works Associated with TSF Design	TSF dewatering, water treatment, improvements to TSF embankment, tailings and PAG Rock co-disposal, improvements to TSF spillway	██████████	-	-	-
	6200	Asset Management (Equipment Value)	325 excavator, D8K, B931 Loader, D8L, Knelson concentrator, misc. equipment	██████████	-	-	-
9100	Engineering and Technical	Civil and Landfill services, TSF Support, UG Closure Services, Hazmat specialist	██████████	██████████	██████████	██████████	



Code	WBS #	Description	Detail	2017 Closure Cost Estimate	2018 Closure Cost Expenditures	2019 Closure Cost Expenditures	2020 Closure Cost Expenditures
2017 Cost Estimate (cont'd)	9300	Temporary Construction Utilities	Temporary fuel storage and distribution, fuel consumption	██████████	-	-	-
	9400	Construction Support	Temporary Construction Maintenance	██████████	██████████	██████████	██████████
	9600	Site Survey	Site survey- Setting out/Topography collection, bathymetry of TSF	██████████	-	-	-
	9700	Health, Safety, Security and Environment	Safety Supplies and Training	██████████	██████████	██████████	██████████
	9800	Temporary Camp and Catering	Construction Camp Set-up, rentals, labour, rotations, maintenance	██████████	██████████	██████████	██████████
	9900	Freight and Logistics/ Contractor Support	Freight, transport shuttle, helicopter support	██████████	██████████	██████████	██████████
	P200	Taxes	Provincial sales taxes	██████████			-
			SnipGold Corp. internal salaries*		██████████	██████████	██████████
			Closure Costs		██████████	██████████	██████████
Closure Securities held by MEMPR	Guaranteed Investment Certificates and Cash			██████████	██████████	██████████	██████████
	Mining Equipment Posted as Collateral			██████████	██████████	██████████	██████████
	Total Security Held by Government			██████████	██████████	██████████	██████████
TOTAL OUTSTANDING CLOSURE LIABILITY (2019)				██████████	██████████	██████████	██████████

\*2018 includes a one-time internal salary adjustment. SnipGold has decided to manage the reclamation project internally. These funds include salary dollars for staff time.

Table 5-2: Monitoring Costs for 2020

Monitoring Item	Cost
Water Quality Sampling (PE-8415 & PR 7927) and reporting	██████████
Hydrology	██████████
Annual Reclamation Reporting	██████████
Annual Dam Inspection	██████████
Helicopter	██████████
Camp	██████████
Total	██████████

Notes:

Camp costs assume 5 trips - 4 days per trip, ██████/day.

Helicopter costs assume 2 hours of helicopter time per trip, at ██████ per hour.

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APPENDIX A            JOHNNY MOUNTAIN MINE PROVINCIAL PERMITS



April 17, 2019

Tracking Number: 379083  
Authorization Number: 7927

**REGISTERED MAIL**

SNIPGOLD CORP.  
10TH FLOOR, 595 HOWE STREET  
VANCOUVER, BC, V6C 2T5

Dear Permittee:

Enclosed is amended permit PR-7927 issued under the provisions of the *Environmental Management Act*. Your attention is respectfully directed to the terms and conditions outlined in the permit. An annual fee will be determined according to the Permit Fees Regulation.

This permit does not authorize entry upon, crossing over, or use for any purpose of private or Crown lands or works, unless and except as authorized by the owner of such lands or works. The responsibility for obtaining such authority rests with the permittee. This permit is issued pursuant to the provisions of the *Environmental Management Act* to ensure compliance with Section 120(3) of that statute, which makes it an offence to discharge waste, from a prescribed industry or activity, without proper authorization. It is also the responsibility of the permittee to ensure that all activities conducted under this authorization are carried out with regard to the rights of third parties, and comply with other applicable legislation that may be in force.

This decision may be appealed to the Environmental Appeal Board in accordance with Part 8 of the *Environmental Management Act*. An appeal must be delivered within 30 days from the date that notice of this decision is given. For further information, please contact the Environmental Appeal Board at (250) 387-3464.

Administration of this permit will be carried out by staff from the Environmental Protection Division's Regional Operations Branch. Plans, data and reports pertinent to the permit are to be submitted by email or electronic transfer to the director, designated officer, or as further instructed.

Yours truly,

Mark P. Love P.Ag.  
for Director, *Environmental Management Act*  
Authorizations - North Region

Enclosure



MINISTRY OF  
ENVIRONMENT AND  
CLIMATE CHANGE  
STRATEGY

PERMIT

7927

*Under the Provisions of the Environmental Management Act*

**SNIPGOLD CORP.**  
**10TH FLOOR, 595 HOWE STREET**  
**VANCOUVER BC V6C 2T5**

is authorized to discharge refuse to the land and emissions to the air from open burning and incineration from a non-operating Johnny Mountain gold mine, mill and camp, located 90 kilometres northwest of Stewart, British Columbia, subject to the requirements listed below.

Contravention of any of these requirements is a violation of the *Environmental Management Act* and may lead to prosecution.

This authorization supersedes and replaces all previous versions of permit PR-7927 issued under sections 14 or 16 of the *Environmental Management Act*.

Where this authorization provides that the director may require an action to be carried out, the permittee must carry out the action in accordance with the requirements of the director.

**1. AUTHORIZED DISCHARGES**


**1.1 Inert Solid Waste Disposal**

This section applies to the discharge of refuse from a non-operating gold mine, mill and camp. The site reference number for this discharge is E236686.

1.1.1 The maximum authorized volume of solid waste that can be discharged is 38,000 m<sup>3</sup>.

1.1.2 The authorized discharge period is continuous between the years 2018 to

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for Director, *Environmental Management Act*  
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2022 snow-free seasons.

1.1.3 The Authorized Works are the Main Landfill.

1.1.4 The permittee must not discharge under this authorization unless the Authorized Works are complete and fully operational.

1.1.5 The location of the facilities from which the discharge is authorized to originate is the non-operating Johnny Mountain Mine. The point of discharge is the Main Landfill located at latitude 56° 04' 28" and longitude 131° 37' 57".

1.2 **Emissions from Regulated Open Burning of Wood Waste and Associated Products**

This subsection applies to the discharge of contaminants to the air from the open burning of wood waste and associated products from the demolition and reclamation of the Johnny Mountain Mine site, mill.

1.2.1 The maximum authorized rate of discharge is indeterminate.

1.2.2 The characteristics of the emissions must be typical of those originating from the regulated open burning of wood waste, cardboard, paper and paper products.

1.2.3 The location of the facilities from which the discharge is authorized to originate and the point where the discharge is authorized to occur is the same as specified in subsection 1.1.5 above.

2. **GENERAL REQUIREMENTS**

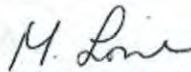
2.1 **Auxiliary Fueled, Forced Air Incineration**

Authorization for the discharge of emissions from a properly designed auxiliary fired refuse incinerator that serves a remote industrial camp with a design capacity of less than 100 persons is through the Waste Discharge Regulation pursuant to the *Environmental Management Act*.

2.2 **Nature of Open Burn Waste**

The permittee must not open burn waste which is unacceptable to the director.

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Unacceptable materials include nuisance causing combustibles such as painted and treated wood, rubber, plastics, tars, asphalt shingles, roofing material, insulation, etc.

Acceptable materials include unpainted, untreated demolition and construction wood wastes, broken lumber and pallets, slabs, log ends and branches, brush and miscellaneous, non-recyclable cardboard and paper products.

### 2.3 **Combustion Residue Disposal**

The permittee must incorporate the residue of combustion from a burn into the landfill authorized in subsection 1.1 or a landfill authorized by the director once such residue has cooled to ambient temperature.

### 2.4 **Licence to Publish Documents**

- a. Subject to paragraph b, the permittee authorizes the Province to publish on the Ministry of Environment and Climate Change Strategy website the entirety of any Regulatory Document.
- b. The Province will not publish any information that could not, if it were subject to a request under section 5 of the *Freedom of Information and Protection of Privacy Act*, be disclosed under that Act.
- c. The permittee will indemnify and save harmless the Province and the Province's employees and agents from any claim for infringement of copyright or other intellectual property rights that the Province or any of the Province's employees or agents may sustain, incur, suffer or be put to at any time that arise from the publication of a Regulatory Document.


### 2.5 **Maintenance of Works and Emergency Procedures**

#### 2.5.1 **Maintenance of Works**

The permittee must regularly inspect the Authorized Works and maintain them in good working order. If components of the Authorized Works have a manufacturer's recommended maintenance schedule, then those components must, at a minimum, be maintained in accordance with that schedule.

The permittee must maintain a record of inspections and maintenance of the Authorized Works, and make the record available to an officer upon request.

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### 2.5.2 Emergency Procedures

In the event of an emergency or other condition which prevents normal operation of the Authorized Works or leads to an unauthorized discharge, the permittee must take remedial action immediately to restore the normal operation of the Authorized Works and to prevent any unauthorized discharges. The permittee must immediately report the emergency or other condition and the remedial action that has and will be taken to the [EnvironmentalCompliance@gov.bc.ca](mailto:EnvironmentalCompliance@gov.bc.ca) email address or as otherwise instructed by the director.

### 2.6 Use of Qualified Professional(s)

The permittee must cause a Qualified Professional to

- a. Certify all facilities and information, including works, plans, assessments, investigations, surveys, programs and reports related to the design, and
- b. Seal all as-built drawings.

### 2.7 Landfill Operation

The permittee must compact all refuse and confine such compacted refuse to the smallest practical area and volume at the operating face of the landfill. The permittee must apply a minimum 0.15 metre of cover material that is to the satisfaction of the director, on all exposed solid waste at least once per month while in use. The director may vary the frequency of covering when freezing conditions adversely affect normal operation or when sufficient quantities of soil material are incorporated with the waste.

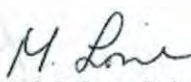
### 2.8 Litter Control

The permittee must use the best practical means available to prevent the scatter of litter at the site. The permittee must clean up any litter scattered at a minimum of twice per year.

### 2.9 Final Cover

The permittee must apply final cover to all areas of the site that have reached final landfill elevations as soon as practical thereafter. Final cover requirements must be in accordance with the approved 2018 Johnny Mountain Mine TAR Chapter 3.2 Facility Design, Operation, and Closure Plan.

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### 2.10 Wildlife Nuisance

The director may require the permittee to construct or modify works, or follow specific operating instructions, if the director is of the opinion that there is a possibility of a nuisance or hazard being caused by bears or other animals that are attracted to the site.

### 2.11 Water Table Restriction

The permittee must not deposit or store waste at the site at less than 1.22 metres above the highest groundwater level at the site.

### 2.12 Hazardous Waste Segregation

The permittee must comply with all applicable provisions of the Hazardous Waste Regulation of the *Environmental Management Act* when handling and disposing any hazardous waste generated during the mine reclamation. Hazardous waste as defined by the regulation is not authorized for discharge to the Main Landfill. Where conflict exists between this permit and the Hazardous Waste Regulation, the latter must take precedence.


### 2.13 Confirmatory Soil Testing

Following the excavation of Burial Sites #1 and #2, the permittee must complete confirmatory soil sampling and analysis from the walls and floors of the excavations to confirm removal of all waste material. The confirmatory testing must be completed in a matter consistent with the Technical Guidance 1 on Contaminated Sites, "Site Characterization and Confirmation Testing". Results and interpretations of the confirmatory soil testing must be submitted as part of the annual report required by section 3.

### 2.14 Erosion Prevention and Sediment Controls

At the start of the reclamation activities the permittee must develop, implement and then maintain erosion prevention and sediment control measures. Each snow-free season, until the end of the authorization provided in section 1.1, a Qualified Professional must assess whether those controls are being undertaken and are effective. That assessment, including recommended updates to the control measures, must be submitted as part of the annual report required by section 3.

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Date amended: April 17, 2019  
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Authorizations - North Region

## 2.15 Main Landfill Water Monitoring

The permittee must annually monitor groundwater and surface water downslope from the Main Landfill for a period of five years, starting in summer 2018. The following table specifies the monitoring sites, frequency and parameters.

Table 1: Monitoring sites, frequency and parameters to be analyzed

Monitoring Sites	Location Description	Monitoring Period, Parameters and Frequencies	
		Water Quality	Water Level
MW17-22A (existing site)	Deep monitoring well downgradient from the Main Landfill.	A <sup>1</sup>	A
MW17-22B (existing site)	Shallow monitoring well downgradient from the Main Landfill.	A <sup>1</sup>	A
Sky Creek 1.0 (new site)	New surface water station on a tributary to Sky Creek, downslope from the Main Landfill and upstream from MW17-22.	A <sup>2</sup>	-

**Notes:**

**A** Annually (during summer)

**1** Field Parameters: specific conductivity, temperature, ORP, and pH.  
Analytical parameters: BTEX, EPH, PAH, dissolved metals, pH, alkalinity, bicarbonate, carbonate, chloride, conductivity (EC), fluoride, hardness, hydroxide, total iron, total magnesium, total manganese, nitrate, nitrite, ammonia, total potassium, total sodium, sulphate, TDS, TIC, TOC, COD and turbidity, acidity (hot peroxide titration) and cyanides (WAD, free, total, cyanate and thiocyanate).


**2** Field Parameters: specific conductivity, temperature and pH.

Analytical parameters: BTEX, EPH, PAH, total metals, pH, alkalinity, bicarbonate, carbonate, chloride, conductivity (EC), fluoride, hardness, nitrate, nitrite, ammonia, sulphate, TDS, TIC, TOC, COD and turbidity, acidity (hot peroxide titration) and cyanides (WAD, free, total, cyanate and thiocyanate).

Results and interpretations of the water monitoring program specified above must be submitted as part of the annual report required by section 3.

Date issued: March 22, 1989

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Mark P. Love P.Ag.  
for Director, *Environmental Management Act*  
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### 3. ANNUAL REPORTING

The permittee must, on or before each March 31 that occurs during the term of this Authorization, submit such data, operating and discharge periods for the preceding calendar year to the director, by email at [EnvAuthorisationsReporting@gov.bc.ca](mailto:EnvAuthorisationsReporting@gov.bc.ca) or as otherwise instructed by the director, in a form that is tabulated, graphically represented and interpreted to the satisfaction of the director. For guidelines on how to properly name the files and email subject lines or for more information visit the Ministry website: <https://www2.gov.bc.ca/gov/content/environment/waste-management/waste-discharge-authorization/data-and-report-submissions/routine-environmental-reporting-submission-mailbox>

The annual report must include:

- a. A summary of spills and other environmental incidents;
- b. All environmental monitoring data collected during the demolition, waste excavation and associated disposal activities;
- c. Description and volume of waste materials excavated from Burial Sites #1 and #2;
- d. Description and volume of demolition waste;
- e. Characterization of suspected hazardous waste materials and its disposal method, as required by section 2.12;
- f. Results of confirmatory soil testing, as required by section 2.13;
- g. Assessment of sediment control measures, as required by section 2.14;
- h. A summary of all surface water and groundwater quality, and groundwater levels, including from previous years, suitably tabulated and graphed, where appropriate, to indicate key water quality trends, as required by section 2.15;
- i. Assessment of quality control/quality assurance data; and
- j. Site management and monitoring recommendations related to the mine reclamation.


The format of the annual report must be suitable for review by the public and copies must be made available to the Ministry of Energy, Mines and Petroleum Resources and the Tahltan First Nation.

### 4. NON-COMPLIANCE REPORTING

#### 4.1 Non-compliance Notification

The permittee must immediately notify the director or designate by email at [EnvironmentalCompliance@gov.bc.ca](mailto:EnvironmentalCompliance@gov.bc.ca), or as otherwise instructed by the

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director of any non-compliance with the requirements of this Authorization by the permittee and take remedial action to remedy any effects of such non-compliance.

The permittee must provide the director with written confirmation of all such non-compliance events, including available test results within 24 hours of the original notification by email at [EnvironmentalCompliance@gov.bc.ca](mailto:EnvironmentalCompliance@gov.bc.ca), or as otherwise instructed by the director.

#### 4.2 **Non-compliance Reporting**

If the permittee fails to comply with any of the requirements of this Authorization, the permittee must, within 30 days of such non-compliance, submit to the director a written report that is satisfactory to the director and includes, but is not necessarily limited to, the following:

- a. All relevant test results obtained by the permittee related to the non-compliance,
- b. An explanation of the most probable cause(s) of the non-compliance, and
- c. A description of remedial action planned and/or taken by the permittee to prevent similar non-compliance(s) in the future.


The permittee must submit all non-compliance reporting required to be submitted under this section by email to the Ministry's Compliance Reporting Submission Mailbox (CRSM) at [EnvironmentalCompliance@gov.bc.ca](mailto:EnvironmentalCompliance@gov.bc.ca) or as otherwise instructed by the director. For guidelines on how to report a non-compliance or for more information visit the Ministry website:

<https://www2.gov.bc.ca/gov/content/environment/waste-management/waste-discharge-authorization/data-and-report-submissions/compliance-reporting-mailbox>

#### 5. **SPILL REPORTING**

The permittee must immediately report all spills to the environment (as defined in the Spill Reporting Regulation) in accordance with the Spill Reporting Regulation, which among other things, requires notification to Emergency Management BC at 1-800-663-3456.

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## 6. GLOSSARY

Capitalized terms referred to in this authorization are defined below. Other terms used in this authorization have the same meaning as those defined in the *Environmental Management Act* and applicable regulations.

### 6.1 "Authorized Works"

"Authorized Works" means Main Landfill as stated in subsection 1.1.3 and auxiliary fired refuse Incinerator as stated in subsection 2.1;

### 6.2 "Regulatory Document"

"Regulatory Document" means any document that the permittee is required to provide to the director or the Province pursuant to:

- i. This Authorization;
- ii. Any regulation made under the *Environmental Management Act* that regulates the facility described in this Authorization or the discharge of waste from that facility; or
- iii. Any order issued under the *Environmental Management Act* directed against the permittee that is related to the facility described in this Authorization or the discharge of waste from that facility;


### 6.3 "Qualified Professional"

"Qualified Professional" means an applied scientist or technologist specializing in an applied science or technology applicable to the duty or function, including, if applicable and without limiting this, agrology, biology, chemistry, engineering, geology or hydrogeology and who :

- i. Is registered with the appropriate professional organization, is acting under that organization's code of ethics and is subject to disciplinary action by that organization, and
- ii. Through suitable education, experience, accreditation and/or knowledge, may be reasonably relied on to provide advice within their area of expertise.

All documents submitted to the director by a Qualified Professional must be signed by the author(s).

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PROVINCE OF BRITISH COLUMBIA  
MINISTRY OF ENERGY AND MINES

**AMENDED PERMIT**

**APPROVING WORK SYSTEM AND RECLAMATION PROGRAM**

(Issued pursuant to Section of the **Mines Act** R.S.B.C. 1996, c. 293)

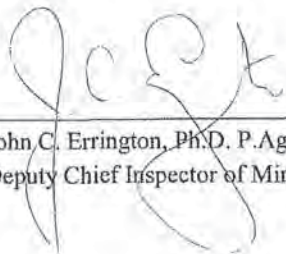
Permit: **M-178**

Issued to: **Skyline Gold Corporation**  
**1118 - 925 West Georgia Street**  
**Vancouver, British Columbia**  
**V6C 3L2**

for work located at the:

**Johnny Mountain Mine**

Amended at Victoria, British Columbia this 7th day of July in the year 2004.



---

John C. Errington, Ph.D. P.Ag.  
Deputy Chief Inspector of Mines

## PREAMBLE

An application describing plans for the protection and reclamation of the surface of the land and watercourses affected by the mine, entitled "Closure Plan for the Johnny Mountain Gold Mine, International Skyline Gold Corporation", dated October 13, 1999 was filed with the Chief Inspector of Mines (Chief Inspector) on October 21, 1999 in accordance with Part 10(6) of the **Mines Act**.

The following letter forms part of this application:

Letter by D. Yeager entitled "Aspects of ML/ARD in Closure Plan for the Johnny Mountain Mine Site" dated December 24, 2002.

This application was referred to other agencies in accordance with Part 10.3 of the Health, Safety and Reclamation Code for Mines in British Columbia (Code).

This permit contains the requirements of the Ministry of Energy and Mines (MEM) for reclamation. It also is compatible, to the extent possible, with the requirements of other provincial ministries for reclamation issues. The amount of security required by this permit and the manner to which this security may be applied, will also reflect the requirements of those ministries. However, nothing in this permit limits the authority of other provincial ministries to set other conditions, or to act independently, under their respective permits and legislation.

The reclamation liability to fully implement closure on this property has been estimated by MEM to be \$1,591,179.00 (One Million, Five Hundred and Ninety One Thousand, One Hundred and Seventy Nine Dollars). This estimated cost of reclamation liability includes:

- site decommissioning, including chemical and waste oil disposal
- disposal of PAG waste rock into a secure flooded location
- tailings relocation
- tailing impoundment stabilization
- sealing of portals and vent raises
- contaminated soil treatment
- removal of mill buildings and tank farm
- miscellaneous demolition and disposal of camp facilities, warehouses and offices
- construction of diversion ditches etc.
- estimate of demobilization costs
- site preparation and revegetation
- on-going site monitoring and maintenance requirement and,
- water quality sampling

## CONDITIONS

The Chief Inspector of Mines (herein called the Chief Inspector) hereby approves the amended programs for protection and reclamation of the land surface and watercourse affected by the mine reclamation plan subject to compliance with the following terms and conditions.

### General

1. Compliance with Mines Act and Code

All work shall be in compliance with all sections and parts of the **Mines Act** and Code and the owner, agent or manager (herein called the Permittee) shall obey all orders issued by the Chief Inspector or his delegate.

2. Departure from Approval

The Permittee shall notify the Chief Inspector in writing of any intention to depart from either the plan of the work system or the program for the protection and reclamation of the surface of the land and watercourses to any substantial degree, and shall not proceed to implement the proposed changes without the written authorization of the Chief Inspector.

3. Reporting

- (a) By March 31 of each year, an Annual Reclamation Report shall be submitted in a form and containing the information required by the Chief Inspector. The Annual Reclamation Report shall document the current status of the work system, reclamation obligations, the outstanding liability and associated costs, and all monitoring including water quality, and ongoing maintenance activities.
- (b) An update to the Closure Plan shall be submitted by **March 31, 2005** providing the current status of the work system and reclamation obligations, a compilation of all monitoring including ML/ARD prediction, water quality, closure and maintenance activities, any changes to the reclamation program that affect long-term mitigation, contingency plans, schedule for completion of reclamation works, and a breakdown of outstanding liabilities and associated costs.

- (c) By **March 31, 2005** the Permittee shall submit a Closure Management Manual which describes and documents key aspects of the operational surveillance and monitoring requirements used to track important changes which could affect long term mitigation performance, monitoring and maintenance requirements. This document shall be a living document that is kept up to date with updates submitted to this Ministry whenever significant changes occur.

#### **Health and Safety**

1. Operational Procedure for Waste Dumping into the Tailings Impoundment

The Permittee shall prepare and submit an operational procedure describing the methodology to be used for waste dumping into the tailings impoundment, including platform construction (if required), monitoring and operator training. This procedure shall be submitted to the district Inspector of Mines, Engineer for review and approval before dumping will be allowed to commence.

#### **Geotechnical**

1. Tailings Storage Facility

The Permittee shall submit a final closure design report for all aspects of the tailings storage facility and water management system on the property for review and approval. The report shall include a stability review of the dam final designs. The report shall be submitted by **September 30, 2004**.

2. Tailings Storage Facility As-built Report

The Permittee shall submit an as-built report for closure construction of the tailings storage facility and water management system no later than March 31st of the year following completion of construction.

3. Long-term Inspections and Reporting

- (a) The Permittee shall inspect the tailings impoundment at least once a year, with the results reported in the Annual Reclamation Report. Any changes shall be immediately reported to the district Inspector of Mines, Engineer and Geotechnical Inspector.
- (b) Every 2 years, a Dam Safety Inspection Report prepared by a professional engineer, shall be submitted to the Chief Inspector by March 31st of the year following inspection.

- (c) If the yearly field inspection (a) is not undertaken by the Permittee, then every year, a Dam Safety Inspection Report prepared by a professional engineer, shall be submitted to the Chief Inspector by March 31st of the year following inspection.
- (d) A Dam Safety Review, prepared by a professional engineer, shall be submitted to the Chief Inspector by **March 31, 2005**, and every 10 years thereafter.

### **Metal Leaching and Acid Rock Drainage (ML/ARD)**

#### 1. General

- (a) All materials with the potential to generate ML/ARD shall be placed in a manner that minimizes the production and release of metals and contaminants to levels that assure long-term protection of environmental quality.
- (b) All plans for the prediction, and if necessary, the prevention, mitigation and management of metal leaching and acid rock drainage shall be prepared in accordance with the *Guidelines for Metal Leaching and Acid Rock Drainage at Minesites in British Columbia*.

#### 2. Disposal of PAG Waste Material

- (a) The only approved disposal location for PAG waste material is in the flooded tailings impoundment. Upon completion, the Permittee shall ensure that all PAG waste rock and tailings placed in the tailings impoundment is covered by a minimum of one metre of water during periods of minimum water levels.
- (b) PAG waste is defined as waste material with a  $NPR_{(sobek)} < 2$  and/or has a weathering rinse pH  $< 6$  and/or has an acidic drainage pH  $< 5.5$  and/or is showing signs of visible limonite staining.
- (c) The Permittee shall monitor the rinse pH of all PAG waste rock being placed in the tailings impoundment. Where the rinse pH is less than 4.5, the Permittee shall add alkalinity at a rate of 75 g/tonnes of waste rock (i.e. 2 kg of lime per 25 tonnes of waste rock) during excavation and loading of the trucks. No lime is to be applied when the daily pH in the tailings impoundment exceeds 7.5.
- (d) The Permittee shall keep an inventory of the materials placed in the tailings impoundment including: volume and tonnes of material, deposition location within the impoundment, rinse pH values, lime addition and drainage monitoring data.

3. Drainage Monitoring

The Permittee shall implement a program to monitor and track changes to drainage chemistry from disturbed areas and waste materials. The program shall be capable of detecting significant metal leaching and provide early warning about the onset of ARD or increases in contaminant loadings. This program must specify the frequency, sampling type, location, parameters to be analysed, detection limits and QA/QC procedures and triggers for implementing additional mitigation works, and shall be submitted with the 2004 annual Reclamation Report due **March 31, 2005**, for approval by the Chief Inspector.

4. Drainage Management and Collection

- (a) The Permittee shall maintain a system of drainage diversion and collection ditches to minimize contaminate loadings for areas of disturbance or waste disposal.
- (b) The Permittee shall install weirs or other suitable flow measuring equipment at all water quality monitoring locations so that flows can be monitored when water quality monitoring is conducted.
- (c) In the event that the mine site drainage is not of acceptable discharge quality, the Permittee shall collect and treat, or otherwise mitigate drainage for as long as is necessary.

5. Contingency Plans

Pursuant to condition 4 above, the Permittee must develop contingency plans demonstrating how contaminant loadings will be reduced, and receiving environment reclamation objectives will be achieved, should the underground and/or tailings mitigation strategies fail to protect against the onset of ML/ARD. Contingency Plans shall be described in the updated Closure Plan due **March 31, 2005**.

6. Research - Field Test Cells

The Permittee shall provide an update on the existing field test cells and reinstate a plan to provide for future monitoring. Plans shall be described in the updated Closure Plan due **March 31, 2005**.

## Reclamation Program

### 1. Reclamation Security

- (a) The Permittee shall cause to be deposited with the Minister of Finance, within 30 days of receipt of this permit, additional security in the amount of Nine Thousand Six Hundred and Seventy Two dollars (\$9,672.00) bringing the total security for this permit to Five Hundred and Twenty-five Thousand dollars (\$525,000.00). The security will be held by the Minister of Finance for the proper performance of the approved program and all the conditions of this permit in a manner satisfactory to the Chief Inspector..
- (b) The Permittee shall conform to all Ministry of Sustainable Resource Management and Ministry of Water, Land air Protection approval, license and permit conditions, including the **Waste Management Act**, Contaminated Sites and Special Waste regulations as well as the **Wildlife Act** and **Land Act**. Should the Permittee not conform to these requirements, and then all or part of the security may be used to cover the costs of these requirements.
- (c) The Province holds a security interest as detailed in the Asset Security Agreement dated April 1, 2000. The Permittee must annually inspect the assets for appraisal purposes, and provide a report to the Province as to their condition including any related maintenance records and depreciation.
- (d) The Permittee must annually estimate the outstanding liability for unfulfilled or ongoing work system, protection of the land and watercourses, and reclamation obligations. The detailed costs shall include those for the monitoring, care and maintenance of geotechnical works, and required predictive testwork and mitigation for metal leaching and acid rock drainage (ML/ARD).
- (e) The amount of security will be adjusted for inflation where required. The first adjustment will be made when the cumulative inflation from January 2005 exceeds 10% based on each of the previous years annual increase in the British Columbia Consumer Price Index (B.C. CPI).

### 2. Land Use

The proposed end land use as alpine tundra wildlife habitat is approved.

3. Capability

Excluding the tailings pond area, the average land capability to be achieved on the remaining lands shall not be less than the average that existed prior to mining.

4. Long-term Stability

Land, watercourses and access roads shall be left in a manner that ensures long-term stability.

5. Re-vegetation

On all lands suitable, as designated by the Chief Inspector, the land shall be re-vegetated to a self-sustaining state using appropriate plant species.

6. Growth Medium

- (a) On all lands to be re-vegetated, the growth medium shall satisfy land use, capability, and water quality objectives.
- (b) All severely compacted areas shall be deeply ripped prior to placement of growth media and/or vegetation.

7. Landforms

Where practicable, land and watercourses shall be reclaimed in a manner that is consistent with the adjacent landforms.

8. Structures and Equipment

- (a) Prior to abandonment, and unless the Chief Inspector has made a ruling with respect to heritage project status or industrial use,
  - (i) All machinery, equipment and building superstructures shall be removed,
  - (ii) Concrete foundations shall be covered and re-vegetated, unless because of impracticality, they have been exempted by an Inspector, and
  - (iii) All scrap material shall be disposed of in a manner acceptable to the district Inspector of Mines, Engineer.



- (b) The Permittee is responsible for the following structures and equipment located at the Bronson airstrip:
- (i) 'cold storage' building,
  - (ii) two storage buildings adjacent to the 'cold storage' building ("horse barn" and "green house"),
  - (iii) shipping office building,
  - (iv) mechanics lunchroom cabin,
  - (v) two aircraft maintenance cabins,
  - (vi) two 1986 Chevrolet 1-ton dual flat deck 4x4 trucks, one in running condition and one for parts,
  - (vii) miscellaneous shelving, benches and storage cupboards in buildings, and
  - (viii) 70 ton 'Link-belt' crane.

9. Dumps

Dumps shall be reclaimed to ensure,

- (a) long-term stability, and
- (b) long-term erosion control.

10. Erosion Control

Reduction of erosion shall be achieved through development of maintenance-free vegetation covers and the development of self-sustaining, erosion-resistant watercourses.

11. Watercourses

Watercourses shall be reclaimed to a condition that ensures,

- (a) Drainage is restored either to original watercourses or to new watercourses which will sustain themselves without maintenance, and

- (b) The level of productive capacity shall not be less than existed prior to mining, unless the Permittee can provide evidence, which demonstrates, to the satisfaction of the Chief Inspector, the impracticality of doing so.

12. Impoundments

Impoundment facilities shall be inspected, monitored and maintained to ensure stability.

13. Roads

- (a) All roads shall be reclaimed in accordance with land use objectives unless permanent access is required. This shall include the ripping of the road surface and re-contouring the roadway into adjacent landforms to reconstruct the areas' relative original landscape and moisture regime.
- (b) Soil cover shall be replaced over the re-contoured surface and immediately revegetated with appropriate species that will lead to achieving end land use and productivity objectives.
- (c) Included under this permit are all mine roads, the airstrip and the 10 km Johnny Mountain Access Road.

14. Securing Openings

- (a) All access roads shall be effectively blocked to prevent inadvertent vehicular access to surface areas of the mine that may be dangerous.
- (b) All shafts, raises, stope openings, adits, or drifts opening to the surface shall either be capped with reinforced concrete or filled with material so that subsidence of the material will not pose a future hazard.
- (c) In the case of shafts or raises, the cap shall be secured to solid rock, or to a concrete collar secured to solid rock, and capable of supporting a uniformly distributed load of 12 Kpa or a concentrated load of 24 kn, whichever is greater.
- (d) Where there is evidence or a potential for use by wildlife, mine openings may be fitted with a barrier that allows wildlife passage but prevents human entry.
- (e) When mine openings are permanently closed and it may be possible for mine water to build to dangerous pressures, a permanent drain shall be installed.

15. Disposal of Fuels and Toxic Chemicals

Fuels, chemicals or reagents, which cannot be returned to the manufacturer/supplier, are to be disposed of as directed by the Chief Inspector in compliance with municipal, regional, provincial and federal statutes.

16. Monitoring

The Permittee shall undertake monitoring to demonstrate that reclamation and environmental protection objectives including land use, water quality and stability of structures are being achieved.



June 10, 2019

Tracking Number: 382371  
Authorization Number: 8415

**REGISTERED MAIL**

SNIPGOLD CORP.  
10TH FLOOR, 595 HOWE STREET  
VANCOUVER BC V6C 2T5

Dear Permittee:

Enclosed is amended permit 8415 issued under the provisions of the *Environmental Management Act*. Your attention is respectfully directed to the terms and conditions outlined in the permit. An annual fee will be determined according to the Permit Fees Regulation.

This permit does not authorize entry upon, crossing over, or use for any purpose of private or Crown lands or works, unless and except as authorized by the owner of such lands or works. The responsibility for obtaining such authority rests with the permittee. This permit is issued pursuant to the provisions of the *Environmental Management Act* to ensure compliance with Section 120(3) of that statute, which makes it an offence to discharge waste, from a prescribed industry or activity, without proper authorization. It is also the responsibility of the permittee to ensure that all activities conducted under this authorization are carried out with regard to the rights of third parties, and comply with other applicable legislation that may be in force.

This decision may be appealed to the Environmental Appeal Board in accordance with Part 8 of the *Environmental Management Act*. An appeal must be delivered within 30 days from the date that notice of this decision is given. For further information, please contact the Environmental Appeal Board at (250) 387-3464.

Administration of this permit will be carried out by staff from the Environmental Protection Division's Regional Operations Branch. Plans, data and reports pertinent to the permit are to be submitted by email or electronic transfer to the director, designated officer, or as further instructed.

Yours truly,

Mark P. Love P.Ag.  
for Director, *Environmental Management Act*



**MINISTRY OF  
ENVIRONMENT AND  
CLIMATE CHANGE  
STRATEGY**

**PERMIT**

**8415**

*Under the Provisions of the Environmental Management Act*

**SNIPGOLD CORP.**

**10TH FLOOR, 595 HOWE STREET  
VANCOUVER BC V6C 2T5**

is authorized to discharge mine influenced water to Johnny Creek, and Stonehouse Creek from the closed Johnny Mountain Gold Mine located 90 kilometres northwest of Stewart, British Columbia, subject to the requirements listed below.

Contravention of any of these requirements is a violation of the *Environmental Management Act* and may lead to prosecution.

This authorization supersedes and replaces all previous versions of Permit 8415 issued under Section 14 or 16 of the *Environmental Management Act*.

Where this authorization provides that the director may require an action to be carried out, the permittee must carry out the action in accordance with the requirements of the director.


The permittee must not discharge under this authorization unless the Authorized Works are complete and fully operational.

**1. AUTHORIZED DISCHARGES**

**1.1 Tailings Impoundment Supernatant and Seepage**

This section applies to the discharge of effluent from the tailings impoundment to Johnny Creek. The site reference number for this discharge is E207745 (JM5).

Date issued: June 6, 1990  
Date amended: June 10, 2019  
(most recent)

  
Mark P. Love P.Ag.  
for Director, *Environmental Management Act*  
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- 1.1.1 The maximum limit for the rate of discharge is indeterminate.
- 1.1.2 The characteristics of the discharge must be equivalent to or better than:

Dissolved Copper  
Maximum: 0.05 mg/L

Dissolved Zinc  
Maximum: 0.2 mg/L

- 1.1.3 The discharge is authorized from Authorized Works, which are a tailings impoundment, spillway and discharge weir, seepage collection ditches and ponds, and related appurtenances approximately located as shown on Site Plan A.
- 1.1.4 The location of the facilities from which the discharge is authorized to originate and the point where the discharge is authorized to occur is Crown Grant Mineral Claims Reg 3 and Reg 4, Liard Mining Division.

## 1.2 Mine Water Discharges


This section applies to the portal seepage from the closed and reclaimed #10 level portal to Stonehouse Creek. The site reference number for this discharge is E213930 (JM4).

- 1.2.1 The maximum limit for the rate of discharge is indeterminate.
- 1.2.2 The characteristics of the discharge must be typical of groundwater seepages coming from #10 level portal.
- 1.2.3 The location of the facilities from which the discharge is authorized to originate and the point where the discharge is authorized to occur is the same as specified in section 1.1.4 above.

## 1.3 Waste Rock Seepage Discharges

This section applies to the discharge of seepage from the #10, #11 and #12 level waste rock piles to ground and Stonehouse Creek. The site reference numbers for the #10, #11 and #12 level seepage discharges are E236846 (JM3), E213931 (JM2) and E216683 (JM1), respectively.

Date issued: June 6, 1990  
Date amended: June 10, 2019  
(most recent)

  
Mark P. Love P.Ag.  
for Director, *Environmental Management Act*  
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- 1.3.1 The maximum limit for the rate of discharge is indeterminate.
- 1.3.2 The characteristics of the discharge must be typical of leachate, which has passed through inert waste rock.
- 1.3.3 The location of the facilities from which the discharge is authorized to originate and the point where the discharge is authorized to occur is the same as specified in section 1.1.4 above.

## 2 GENERAL PROVISIONS

### 2.1 Licence to Publish Documents

- 2.1.1 Subject to paragraph 2.1.2, the permittee authorizes the Province to publish on the Ministry of Environment and Climate Change Strategy website the entirety of any Regulatory Document.
- 2.1.2 The Province will not publish any information that could not, if it were subject to a request under section 5 of the *Freedom of Information and Protection of Privacy Act*, be disclosed under that Act.
- 2.1.3 The permittee will indemnify and save harmless the Province and the Province's employees and agents from any claim for infringement of copyright or other intellectual property rights that the Province or any of the Province's employees or agents may sustain, incur, suffer or be put to at any time that arise from the publication of a Regulatory Document.


### 2.2 Maintenance of Works and Emergency Procedures

#### 2.2.1 Maintenance of Works

The permittee must regularly inspect the Authorized Works and maintain them in good working order. If components of the Authorized Works have a manufacturer's recommended maintenance schedule, then those components must, at a minimum, be maintained in accordance with that schedule.

The permittee must maintain a record of inspections and maintenance of the Authorized Works, and make the record available to an officer upon request.

Date issued: June 6, 1990  
Date amended: June 10, 2019  
(most recent)

  
Mark P. Love P.Ag.  
for Director, *Environmental Management Act*  
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2.2.2 **Emergency Procedures**

In the event of an emergency or other condition which prevents normal operation of the Authorized Works or leads to an unauthorized discharge, the permittee must take remedial action immediately to restore the normal operation of the Authorized Works and to prevent any unauthorized discharges. The permittee must immediately report the emergency or other condition and the remedial action that has and will be taken to the [EnvironmentalCompliance@gov.bc.ca](mailto:EnvironmentalCompliance@gov.bc.ca) email address or as otherwise instructed by the director.

3. **MONITORING REQUIREMENTS**

3.1 **Sampling Facilities**

The permittee must install and maintain, suitable to the director, sampling facilities. The permittee must collect samples at each site according to the schedule specified in Table 1. The permittee must take due care in sampling, storing and transporting the samples to control temperature and avoid contamination, breakage, and any other factor or influence that may compromise the integrity of the samples.

Table 1: Water Quality Sampling Requirements

Parameter	JM1	JM2	JM3	JM4	JM5	JM6	JM7	JM8	JM9
Fe (dissolved)	A	A	A	A	A	A	A	A	A
Cu (dissolved)	A	A	A	A	A	A	A	A	A
Zn (dissolved)	A	A	A	A	A	A	A	A	A
pH	A	A	A	A	A	A	A	A	A
SO <sub>4</sub>	A	A	A	A	A	A	A	A	A
Hardness	A	A	A	A	A	A	A	A	A

A: Annual Water Quality Sample Required

3.2 **Water Quality Sampling Site Locations**

The permittee must collect the water quality samples at sampling site locations described in Table 2.

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Table 2: Water Quality Sampling Site Locations

Designation	Coordinates		EMS #	Description
	Easting	Northing		
JM1	373272	6277784	E216683	12-Level Waste Rock Seepage
JM2	372834	6277774	E213931	11-Level Waste Rock Seepage
JM3	372514	6277926	E236846	10-Level Waste Rock Seepage
JM4	372668	6277897	E213930	Mine Water Discharge at 10 (represents minewater from all levels)
JM5	372832	6278600	E207745	Tailings pond discharge
JM6	373292	6279242	E207735	Johnny Creek at end of Johnny Flats
JM7	372199	6277529	E207737	Stonehouse Creek
JM8	-	-	-	Duplicate sample from any one of the sampling stations
JM9	-	-	-	Travel blank

Note: GPS coordinates are Easting, Northing Zone 9, NAD 83

### 3.3 Analytical Procedures

The permittee must carry out analyses in accordance with procedures described in the "British Columbia Laboratory Manual (2015 Permittee Edition)", or the most recent edition or by alternative procedures as authorized by the director.


A copy of the above manual is available on the Ministry web page at <https://www2.gov.bc.ca/gov/content/environment/research-monitoring-reporting/monitoring/laboratory-standards-quality-assurance/bc-environmental-laboratory-manual>

### 3.4 Quality Assurance

The permittee is required to conduct the following quality assurance and control program to determine the acceptability of data required by this authorization and section 2(d) of the Environmental Data Quality Assurance Regulation.

- 3.4.1 The permittee must obtain from the analytical laboratory(ies) their precision, accuracy and blank data for each sample set submitted by the permittee and an evaluation of the data acceptability, based on criteria set

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by such laboratory.

- 3.4.2 The permittee must prepare and submit for analysis by the analytical laboratory(ies) a duplicate sample from one of the monitoring sites identified in Table 1 during each monitoring period.
- 3.4.3 The permittee must submit samples to analytical laboratory(ies) that meet the definition of a qualified laboratory under the Environmental Data Quality Assurance Regulation.
- 3.4.4 The permittee must report the results for each parameter of the field duplicates in terms of variation as the relative percent difference.
- 3.4.5 The permittee must prepare and submit to the laboratory a sample collection blank containing distilled water and preservative if required during each monitoring period. If any result for any parameter indicates detectable concentrations, then efforts must be made to determine and control the source of contamination.

### 3.5 **Sampling Procedures**

The permittee must carry out sampling in accordance with the procedures described in the "British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples, (2013 Permittee Edition)" or most recent edition, or by alternative procedures as authorized by the director.


A copy of the above manual is available on the Ministry web page at <https://www2.gov.bc.ca/gov/content/environment/research-monitoring-reporting/monitoring/laboratory-standards-quality-assurance/bc-field-sampling-manual>

## 4. **REPORTING REQUIREMENTS**

The permittee must, on or before each March 31 that occurs during the term of this authorization, submit an annual report for the preceding calendar year to the director, by email at [envauthorizationsreporting@gov.bc.ca](mailto:envauthorizationsreporting@gov.bc.ca) or as otherwise instructed by the director and includes, but is not limited to:

- a. a review and interpretation of the monitoring data for the preceding calendar year,

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- b. an evaluation of the laboratory analysis, and quality and precision based on the results of the quality assurance program required herein,
- c. an evaluation of the performance of the treatment works and identify any changes,
- d. an implementation schedule for any alterations to the treatment and disposal works which may impact the discharge under this authorization.

## 5. NON-COMPLIANCE REPORTING

### 5.1 Non-compliance Notification

The permittee must immediately notify the director or designate by email at [EnvironmentalCompliance@gov.bc.ca](mailto:EnvironmentalCompliance@gov.bc.ca), or as otherwise instructed by the director of any non-compliance with the requirements of this authorization and take remedial action to remedy any effects of such non-compliance.

The permittee must provide the director with written confirmation of all such non-compliance events, including available test results within 24 hours of the original notification by email at [EnvironmentalCompliance@gov.bc.ca](mailto:EnvironmentalCompliance@gov.bc.ca), or as otherwise instructed by the director.


### 5.2 Non-compliance Reporting

If the permittee fails to comply with any of the requirements of this authorization, the permittee must, within 30 days of such non-compliance, submit to the director a written report that includes, but is not necessarily limited to, the following:

- a. all relevant test results obtained by the permittee related to the non-compliance,
- b. an explanation of the most probable cause(s) of the non-compliance, and
- c. a description of remedial action planned and/or taken by the permittee to prevent similar non-compliance(s) in the future.

The permittee must submit all non-compliance reporting required to be submitted under this section by email to the Ministry's Compliance Reporting Submission Mailbox (CRSM) at [EnvironmentalCompliance@gov.bc.ca](mailto:EnvironmentalCompliance@gov.bc.ca) or as otherwise instructed by the director. For guidelines on how to report a non-compliance or for more information visit the Ministry website:

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<https://www2.gov.bc.ca/gov/content/environment/waste-management/waste-discharge-authorization/data-and-report-submissions/compliance-reporting-mailbox>

## 6 **Spill Reporting**

The permittee must immediately report all spills to the environment (as defined in the Spill Reporting Regulation) in accordance with the Spill Reporting Regulation, which among other things, requires notification to Emergency Management BC at 1-800-663-3456.

## 7. **GLOSSARY**

Capitalized terms referred to in this authorization are defined below. Other terms used in this authorization have the same meaning as those defined in the *Environmental Management Act* and applicable regulations.

### 7.1 **“Authorized Works”**


“Authorized Works” means a tailings impoundment, spillway and discharge weir, seepage collection ditches and ponds, and related appurtenances as stated in Section 1.1.3;

### 7.2 **“Regulatory Document”**

“Regulatory Document” means any document that the permittee is required to provide to the director or the Province pursuant to:

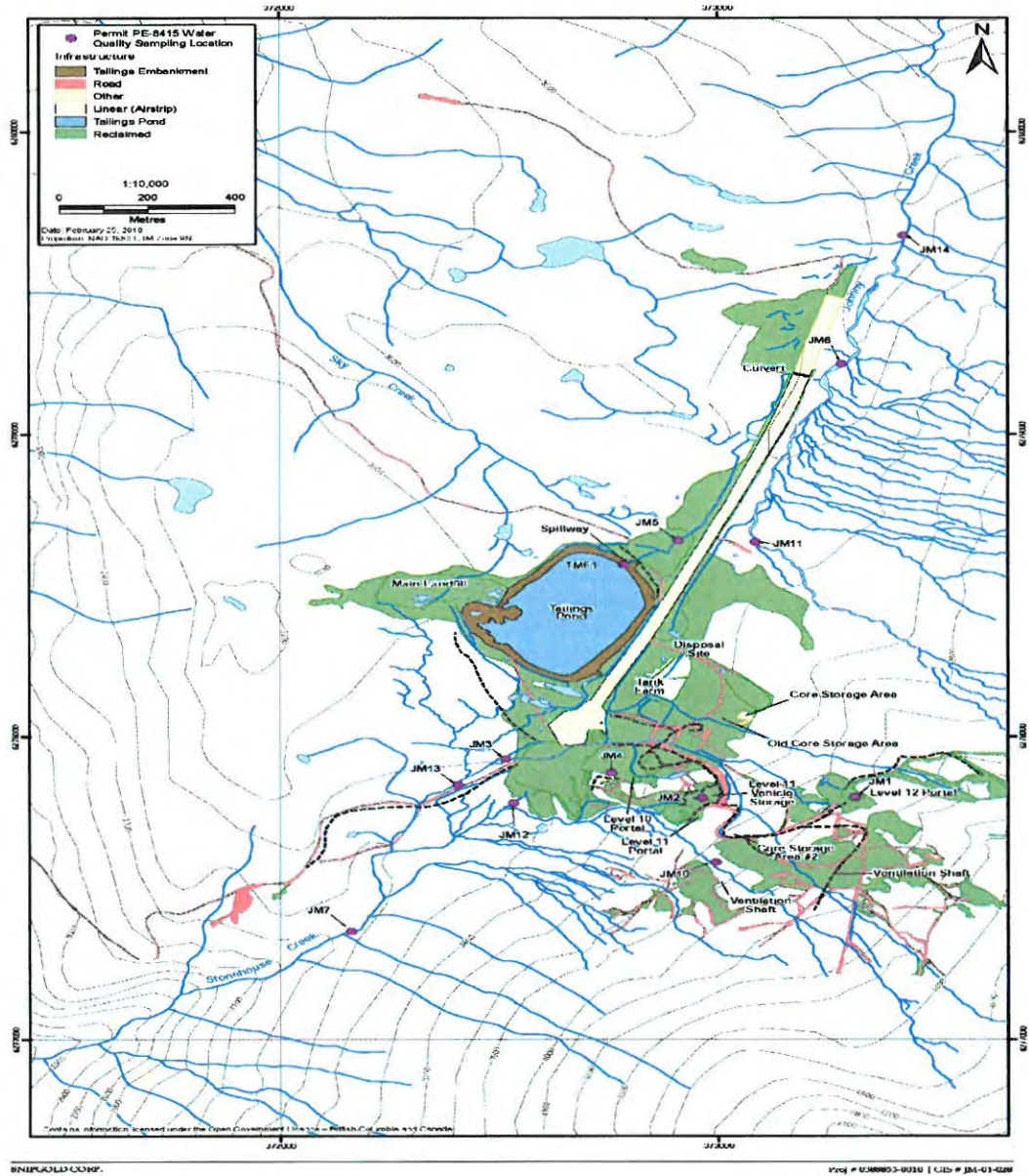
- i. this authorization;
- ii. any regulation made under the *Environmental Management Act* that regulates the facility described in this authorization or the discharge of waste from that facility; or
- iii. any order issued under the *Environmental Management Act* directed against the permittee that is related to the facility described in this authorization or the discharge of waste from that facility;

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Site Plan A

Figure 1  
Permit PE-8415 Water Quality Sampling Stations



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(most recent)

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Authorizations - North Region

Ministry of Environment  
Regional Operations

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10th Floor, 595 Howe Street  
Vancouver, BC V6C 2T5

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APPENDIX B      JOHNNY MOUNTAIN MINE 2016-2020 METEOROLOGICAL DATA  
SUMMARY (RTEC 2021A)



## Johnny Mountain Mine

### 2016-2020 Meteorological Data Summary

March 2021

Project No.: 0539378





March 2021

# Johnny Mountain Mine

## 2016-2020 Meteorological Data Summary

RTEC

1111 West Hastings Street, 15th Floor  
Vancouver, BC  
Canada V6E 2J3

T: +1 604 689 9460

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## EXECUTIVE SUMMARY

The Johnny Mountain Mine is a closed underground gold mine located in the Coast Mountain Range of British Columbia, approximately 100 km northwest of Stewart, BC. The site is situated on a sub-alpine plateau near the confluence of the Craig and Iskut Rivers. The northwest face of Johnny Mountain is covered by an alpine glacier.

The underground mine has been closed since 1993, and reclamation activities have taken place sporadically on the site from 1999 to 2016. Seabridge Gold Inc. acquired SnipGold, now a subsidiary of Seabridge Gold Inc. on June 21, 2016. The Johnny Mountain Mine site, along with the surrounding mineral tenures and the Bronson Airstrip, make up the Iskut Project (the Project).

During the summer of 2016, a new meteorological station was installed on the Johnny Mountain plateau. The station has been serviced and maintained throughout 2016 to 2020. The station includes a network camera and satellite telemetry connection, and hosts a website to display up-to-date and historical data.

This report presents data from the meteorological station from August 2016 to October 2020. Section 2 presents the methodology used for the fieldwork and analysis, Section 3 presents results, and Section 4 presents a short summary. All data (monthly, daily and hourly) are included as appendices to this report.

During the monitoring period of August 2016 to October 2020, average air temperature was 0.8°C with daily average mean temperature ranging from 19.6°C (June 19, 2018) to -24.4°C (February 2, 2019). The mean relative humidity records indicate that fog and low clouds were present at the Johnny Mountain plateau approximately 36% of the time during the reporting period. The monthly average total precipitation adjusted for wind undercatch ranged from 86 mm in April to 237 mm in November, and the maximum daily precipitation recorded during the monitoring period was 66 mm on January 1, 2019. **Missing daily temperature and precipitation data were estimated using regression analysis with data from the KSM Project meteorological stations. The estimation methodology was found to be satisfactory to predict missing daily temperature and precipitation data.** The snow season typically extends from October to May and the snowpack reaches its maximum depth in March or April. The maximum daily snowpack depth during the monitoring period was 220 cm recorded on March 16, 2020.

Winds were predominantly from the southwest quadrant during warm months and from the northeast during the wintertime. Northeastern winds were characterized by higher speeds. The average wind speed during the period of record was 4 m/s while 33% of time the wind speed ranged from 3 to 5 m/s. Calm winds occurred 1.7% of time. The maximum hourly average wind speed was 30 m/s (108 km/h) and the maximum wind gust speed was 45.1 m/s (162 km/h), both occurred on January 15, 2020. The hourly average solar radiation ranged from 0 to 990 W/m<sup>2</sup>, peaking during the summer.

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## GLOSSARY AND ABBREVIATIONS

Terminology used in this document is defined where it is first used. The following list will assist readers who may choose to review only portions of the document.

°C	Degree Celsius
BC MOE	British Columbia Ministry of Environment
CE	Catch efficiency
cm	Centimetre
EC	Environment Canada
ECCC	Environment and Climate Change Canada
km	Kilometre
km/h	Kilometres per hour
kPa	Kilopascal
KSM	KSM Mining ULC
m	Metre
m/s	Metres per second
masl	Metres above sea level
mm	Millimetre
MSC	Meteorological Service of Canada
SnipGold	SnipGold Corporation, a subsidiary of Seabridge Gold Inc., acquired the Iskut Project in June of 2016.
RH	Relative humidity
RTEC	A joint venture company between ERM Consultants Canada Ltd. (ERM) and the Tahltan Nation Development Corporation (TNDC)
SWE	Snow-water-equivalent
the Project	The Iskut Project
URL	Uniform resource locator
US EPA	United States Environmental Protection Agency
W/m <sup>2</sup>	Watts per square metre
WMO	World Meteorological Organization

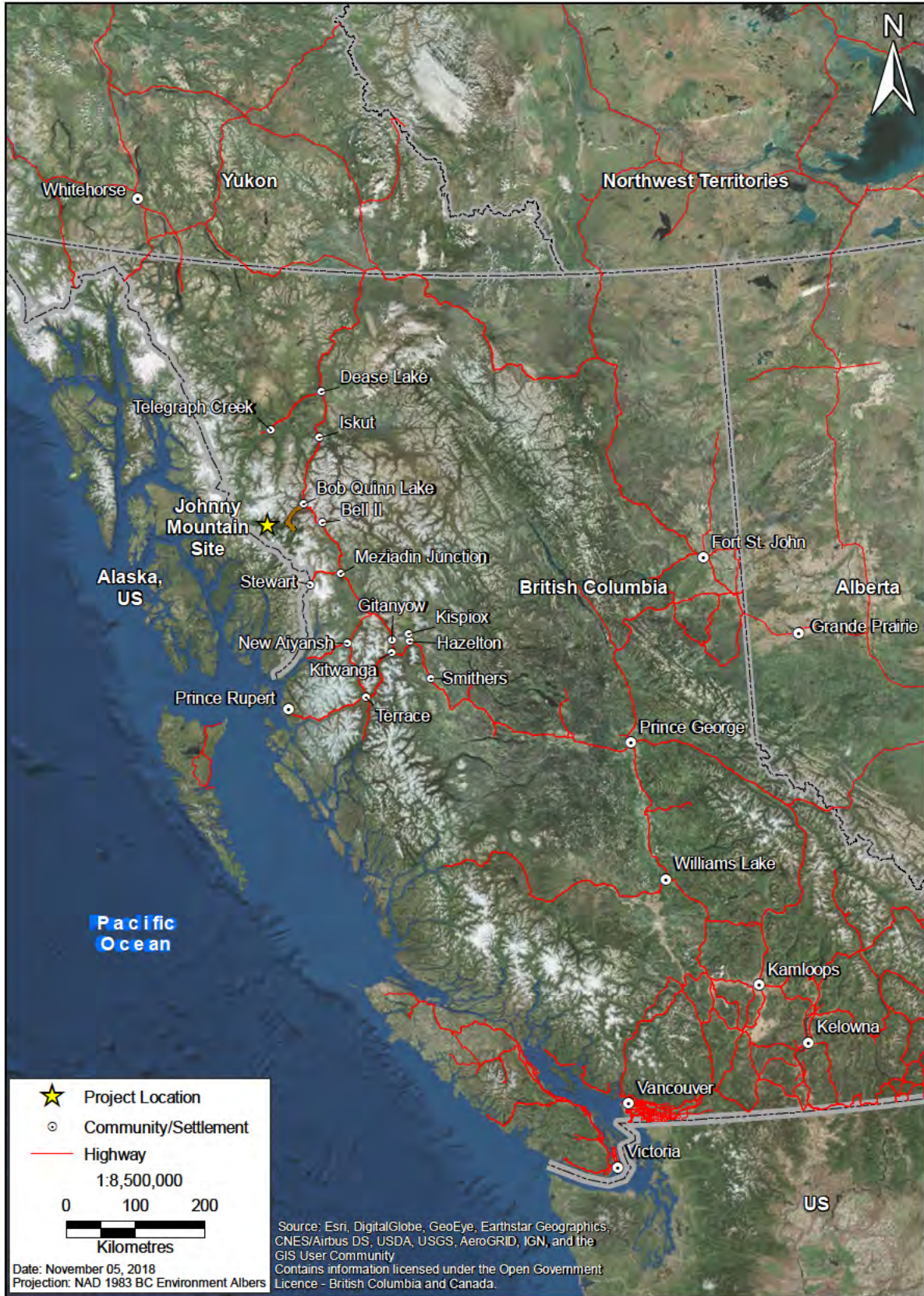
## 1. INTRODUCTION

The Johnny Mountain Mine is a closed underground gold mine located in the Coast Mountains Range of British Columbia (BC), approximately 100 kilometres (km) NW of Stewart, BC (Figure 1-1). The mine is located on a sub-alpine plateau near the confluence of the Craig and Iskut Rivers on the northwest face of Johnny Mountain, where an alpine glacier covers higher altitudes of the Mountain.

The underground mine has been closed since 1993, and reclamation activities have taken place sporadically on the site from 1999 to 2016. Seabridge Gold Inc. acquired SnipGold on June 21, 2016. The Johnny Mountain Mine site, along with the surrounding mineral tenures and the Bronson Airstrip, make up the Iskut Project (the Project).

During the summer of 2016 a new meteorological station was installed on the Johnny Mountain plateau. The station has been serviced and maintained throughout 2016 to 2020. The station includes a network camera and satellite telemetry connection, and hosts a website to display up-to-date and historical data.

This report presents data from the meteorological station from August 2016 to October 2020. Section 2 presents the methodology used for the fieldwork and analysis, Section 3 presents results, and Section 4 presents a short summary. All monthly, daily and hourly data are included as appendices to this report.



**Figure 1-1: Project Location**

## 2. METHODOLOGY

### 2.1 Historical Meteorological Stations

Two government meteorological stations (ECCC 2020) were operational historically on Johnny Mountain (1988 to 1992) and near the Bronson airstrip (1989 to 1999). Hence, no local government meteorological data are available for the area after 1999.

Environment and Climate Change Canada (ECCC) reported locations of the historical Johnny Mountain and Bronson Creek stations are based on the available latitude and longitude locations, which have limited precision (ECCC 2020). The converted UTM coordinates of these two stations represent estimated locations and their reported elevations do not agree with the elevation of their reported latitude and longitude. Based on the elevation data, it is likely that the stations were located close to the Johnny Mountain Airstrip and the Bronson Creek Airstrip, respectively. Table 2.1-1 and Figure 2.1-1 present the historical locations as they are reported by ECCC.

Table 2.1-1: Current Project and Historical Meteorological Stations in the Iskut Project Area

Station Name	Reporting Organization	Data Reporting Period	UTM Coordinates <sup>1</sup>		Elevation (masl)
			Easting (m)	Northing (m)	
Project Station					
Johnny Mountain	SnipGold	July 28, 2016 to present	371942	6278283	1,143
Historical Stations					
Johnny Mountain	ECCC	April 1, 1988 to September 30, 1992	372211	6278512	1,075
Bronson Creek	ECCC	May 15, 1989 to September 30, 1999	371302	6282252	107

<sup>1</sup> UTM Zone 9V, NAD83

### 2.2 Johnny Mountain Project Meteorological Station

SnipGold's Johnny Mountain meteorological station was installed on the Johnny Mountain plateau on July 28, 2016. It is located on the western side of the plateau approximately 500 m west of the Tailing Storage Facility (Table 2.1-1; Figure 2.1-1; and Photos 2.2-1 and 2.2-2).

The current Johnny Mountain station and sensors were installed according to the sensor siting guidelines developed by Environment Canada (EC 2004, 2012) and the British Columbia Ministry of Environment (BC MOE 2016). These guidelines, wherever possible, follow standards set by the World Meteorological Organization (WMO) and were established to promote standardization and describe practices, procedures and specifications for proper siting of instruments, precision and accuracy of measurements, and archive formats. The station location was selected to avoid any obstructions or shaded areas that would bias wind speed and direction or solar radiation. The wind sensor is located over open and relatively level terrain. The height of the wind sensor is 10 metres above the ground, which is the standard reference height for wind measurements (EC 2004, 2012). The temperature and relative humidity sensor is shaded from solar radiation by a shield that is adequately ventilated.

The meteorological station was programmed according to EC and BC MOE guidelines to automatically log hourly average data for air temperature, relative humidity, solar radiation, snow depth, wind speed, wind direction and standard deviation of wind direction; in addition to five-minute and hourly total accumulated precipitation, hourly average battery power supply voltage and hourly camera



images during the daytime. Daily maximum and minimum air temperature, daily maximum wind speed, the wind direction at maximum speed, the time when the maximum wind speed was observed and the total daily precipitation are logged each day at midnight.

Table 2.2-1: Johnny Mountain Station Sensors and Equipment Installed in February 2019<sup>1</sup>

Description	Make	Model	Serial Number
Wind speed and direction sensor	RM Young	05305	WM131021
Air temperature and relative humidity sensor	Vaisala <sup>2</sup>	HMP45C212 <sup>2</sup>	C2080
Solar radiation shield	RM Young	41003-X	-
Solar radiation sensor	Kipp & Zonen	SP Lite2	140075
Snow depth sensor	Campbell Scientific	SR50A	6034
Precipitation sensor	Geonor <sup>3</sup>	T-200BMD	41516 <sup>4</sup>
Network camera	Campbell Scientific	CCFC	1057 <sup>4</sup>
Datalogger	Campbell Scientific	CR1000-XT	78496 <sup>4</sup>
Satellite telemetry modem	Hughes	9502 BGAN	-

Notes:

Dash (-) = not available or not applicable

<sup>1</sup> Newly recalibrated sensors were installed in February 2019; old sensors that were removed from the station were sent to Campbell Scientific for repair and calibration.

<sup>2</sup> Sensor installed in September 2020

<sup>3</sup> New transducers installed in September 2020

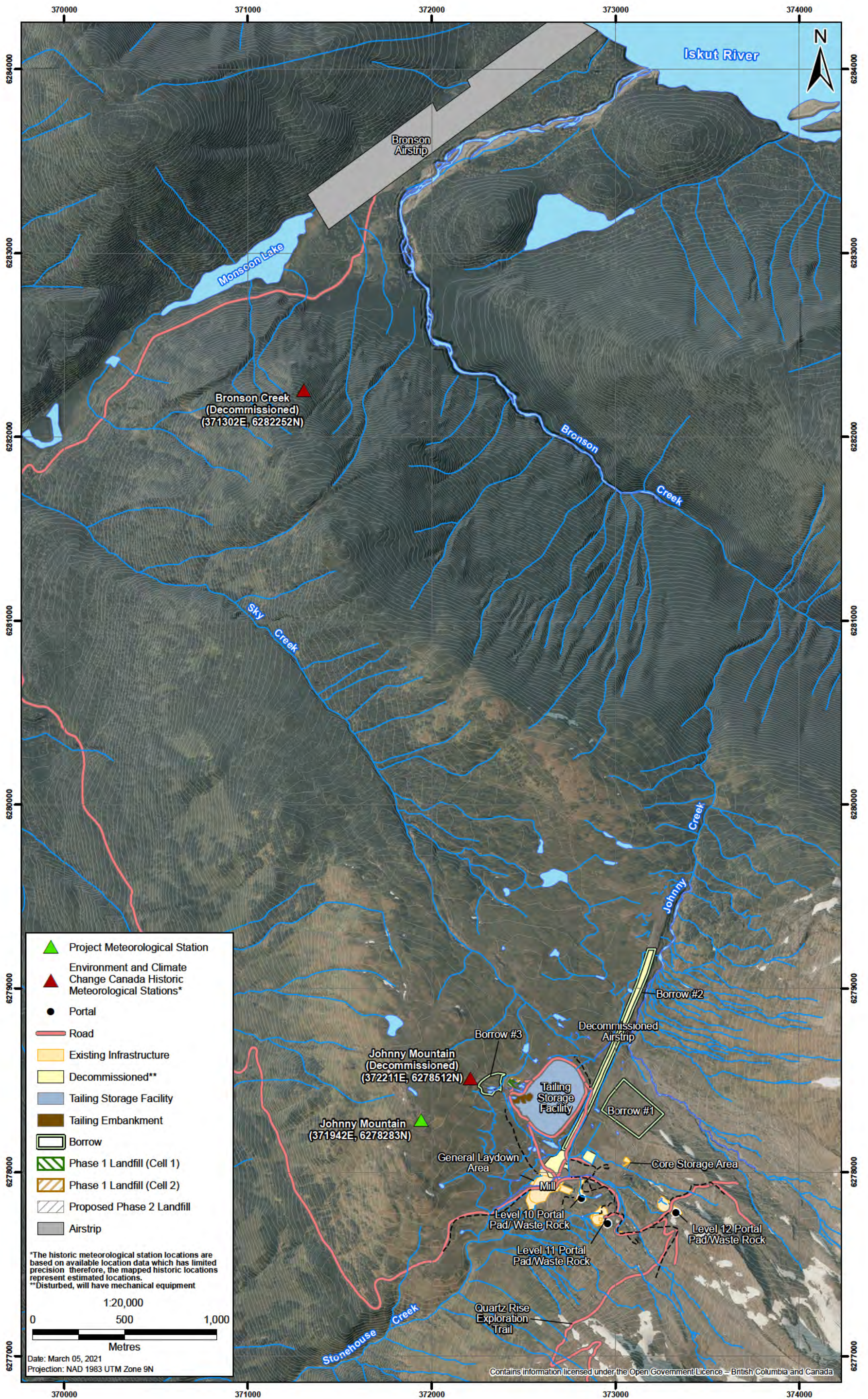
<sup>4</sup> Unit was not replaced since its first install in July 2016.

The sensors and equipment that were installed on the Johnny Mountain station are summarized in Table 2.2-1. A photo of the station with labelled sensors and equipment components is included in Appendix D.

A satellite telemetry system is installed on the station to allow for remote communication access to the station. The satellite telemetry system allows for remote two-way communication including downloading of data and viewing of the latest hourly data and controlling and modifying the station datalogger remotely. Telemetry also allows for faster identification and resolution of instrumentation issues, and more informed planning for field visits. The satellite telemetry system power supply is kept independent of the datalogger power supply because the satellite system uses more power than the datalogger. Separate power supplies allow the datalogger to continue to collect data in the event that the satellite telemetry system power supply runs low, preventing meteorological data gaps.

A maintenance program is in place for the Johnny Mountain meteorological station. When necessary, the sensors are returned to the supplier for calibration because specialized equipment is required for most calibration procedures. The recommended recalibration intervals are every one or two years, depending on the particular sensor or piece of equipment.

Meteorological station maintenance site visits were conducted by experienced technicians to ensure that installation and maintenance were conducted properly (Table 2.2-2). During each site visit, data were downloaded and reviewed and sensors and equipment were checked to ensure that they were operating normally.



**Figure 2.1-1: Project and Historic Regional Meteorological Monitoring Stations**



*Photo 2.2-1: The Johnny Mountain Meteorological Station on arrival. February 18, 2020.*



*Photo 2.2-2: The Johnny Mountain Meteorological Station after winter servicing. September 29, 2020.*

### 2.3 Data Analysis

All meteorological data were reviewed after collection in order to filter out or correct any erroneous values. The screening process used by RTEC draws on screening criteria used by the United States Environmental Protection Agency (US EPA 2000), EC (EC 2004), and the BC MOE (2016), as well as using professional judgement and experience (Figure 2.3-1). Erroneous data were marked as missing; the periods of missing and erroneous data are summarized in Table 2.3-1. After data were screened, the recorded hourly and daily values were analysed and processed into daily and monthly summaries.

As an example, during months with snowfall, the snow depth data were used to verify precipitation events. If snow depth increased but the precipitation gauge did not record any precipitation during the same time period, it was likely that there was a snow cap blocking the precipitation gauge orifice. The hourly network camera photos of the precipitation gauge were also used to determine whether the gauge was blocked by snow. In these cases, precipitation data were marked as missing. Large winter precipitation events recorded by the precipitation gauge were also verified by comparing the event with the snow depth change over the same period.

Similar to most precipitation gauges, the Geonor T-200B series, have a precipitation collection orifice located above ground level, which results in wind turbulence being generated in the vicinity of the gauge. The amount of air turbulence generated depends on the gauge shape and the wind speed. The turbulence alters the trajectory of a falling precipitation particle, and can cause the particle to miss the precipitation gauge's collection orifice completely, especially in the case of solid precipitation (e.g., snow). The Geonor precipitation gauge used at the Project is fitted with a single Alter wind screen, which reduces wind speed around the gauge thus decreasing, but not eliminating, the amount of wind-induced undercatch.

Table 2.2-2: Site Visits and Sensor Maintenance, November 2016 - October 2020

Station Visit Dates	Tasks Performed	Removed Sensors for Repair	Installed Sensors	Repaired Sensors / Equipment
February 1, 2017	<ul style="list-style-type: none"> <li>Data and automatic field camera photos downloaded</li> <li>Station inspected</li> <li>Precipitation gauge emptied and antifreeze replaced</li> </ul>	-	-	-
May 16, 2017	<ul style="list-style-type: none"> <li>Data downloaded</li> <li>Station inspected</li> <li>Satellite telemetry and network camera troubleshooting</li> </ul>	-	-	-
June 10, 2017	<ul style="list-style-type: none"> <li>Station inspected</li> </ul>	-	-	-
July 7, 2017	<ul style="list-style-type: none"> <li>Data downloaded</li> <li>Station inspected</li> <li>Precipitation gauge emptied</li> <li>Precipitation gauge's Alter windscreen repaired<sup>1</sup></li> <li>Satellite telemetry antenna realigned<sup>1</sup></li> <li>Network camera removed for off-site repair<sup>2</sup></li> </ul>	Campbell Scientific CCFC Network Camera S/N: 1057	-	-
July 25 - 26, 2017	<ul style="list-style-type: none"> <li>Data downloaded</li> <li>Station inspected</li> <li>Repaired network camera installed with a new support pipe to protect the cable connector junction<sup>2</sup></li> <li>The camera was repositioned to look towards the southeast, by request</li> </ul>	-	Campbell Scientific CCFC Network Camera S/N: 1057	-
October 24, 2017	<ul style="list-style-type: none"> <li>Data and automatic field camera photos downloaded</li> <li>Station inspected</li> <li>Precipitation gauge emptied and antifreeze added</li> <li>Network camera settings were modified and the camera was repositioned to look towards the east, by request</li> </ul>	-	-	-
December 6, 2017	<ul style="list-style-type: none"> <li>Data and automatic field camera photos downloaded</li> <li>Station inspected and cleared of snow and rime ice</li> <li>Precipitation gauge emptied and antifreeze replaced</li> <li>Field camera defrost heater timer was increased from two minutes to four minutes</li> </ul>	-	-	-

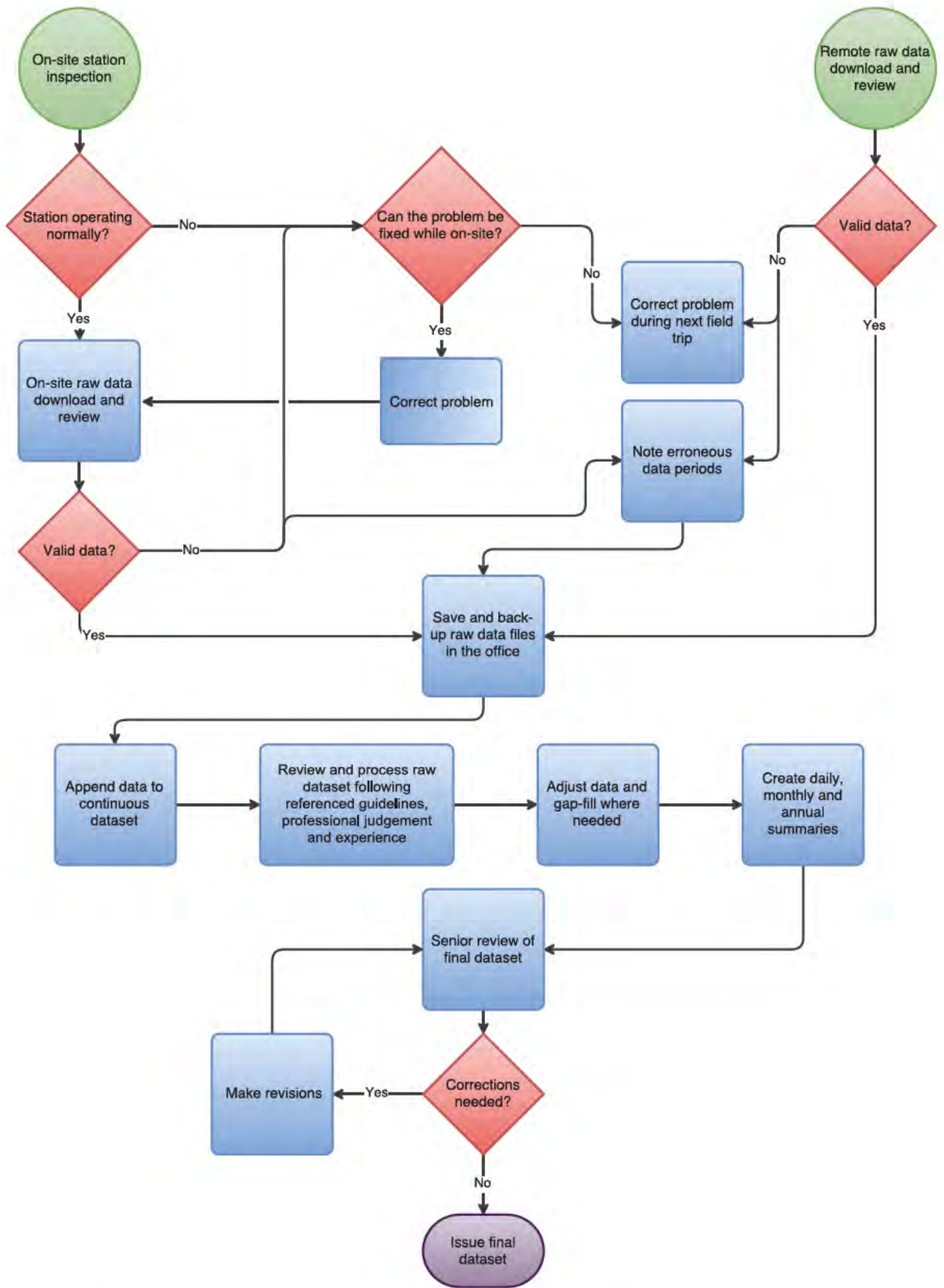
Station Visit Dates	Tasks Performed	Removed Sensors for Repair	Installed Sensors	Repaired Sensors / Equipment
January 23, 2018	<ul style="list-style-type: none"> <li>Station inspected</li> </ul>	-	-	-
May 6, 2018	<ul style="list-style-type: none"> <li>Data and automatic field camera photos downloaded</li> <li>Station inspected</li> <li>Precipitation gauge emptied and hydraulic oil was added</li> <li>Two battery boxes were replaced by a new metal box</li> <li>Two batteries were replaced by four batteries, two for datalogger and two for the satellite telemetry</li> </ul>	-	-	-
October 15, 2018	<ul style="list-style-type: none"> <li>Data and automatic field camera photos downloaded</li> <li>Station inspected</li> <li>Precipitation gauge emptied and antifreeze added</li> <li>Weather stripping seals were installed on the battery box and all desiccants were replaced in all enclosures</li> </ul>	-	-	-
February 12 - 13, 2019	<ul style="list-style-type: none"> <li>Data and automatic field camera photos downloaded</li> <li>Station inspected</li> <li>Precipitation gauge emptied and antifreeze replaced</li> <li>Completed a sensor swap of the wind, temperature/relative humidity (RH), radiation and snow depth sensors</li> </ul>	<ul style="list-style-type: none"> <li>Wind</li> <li>Temp/RH</li> <li>Snow depth</li> <li>Solar radiation</li> </ul>	<ul style="list-style-type: none"> <li>Wind</li> <li>Temp/RH</li> <li>Snow depth</li> <li>Solar radiation</li> </ul>	-
June 19 - 20, 2019	<ul style="list-style-type: none"> <li>Data and automatic field camera photos downloaded</li> <li>Station inspected</li> <li>Precipitation gauge emptied</li> <li>Fixed cut wires by wildlife</li> </ul>	-	-	<ul style="list-style-type: none"> <li>Temp/RH</li> <li>Precipitation</li> </ul>
August 21 - 22, 2019	<ul style="list-style-type: none"> <li>Data downloaded</li> <li>Station inspected</li> <li>Fixed the power outage that was likely caused by a lightning</li> </ul>	-	-	<ul style="list-style-type: none"> <li>Wind</li> <li>Temp/RH</li> <li>Snow depth</li> <li>Solar radiation</li> </ul>
October 26 - 30, 2019	<ul style="list-style-type: none"> <li>Data and automatic field camera photos downloaded</li> <li>Measure fluid level at the precipitation gauge manually, and then emptied it and add antifreeze</li> <li>Replace a malfunctioning solar controller</li> </ul>	-	-	<ul style="list-style-type: none"> <li>Solar controller</li> </ul>

Station Visit Dates	Tasks Performed	Removed Sensors for Repair	Installed Sensors	Repaired Sensors / Equipment
February 18 & 24, 2020	<ul style="list-style-type: none"> <li>Data and automatic field camera photos downloaded</li> <li>Installed a new telemetry system including a new modem and antenna</li> <li>Measure fluid level at the precipitation gauge manually, and then emptied it and add antifreeze</li> <li>Removing rime ice from the station tower and sensors and the precipitation gauge</li> </ul>	<ul style="list-style-type: none"> <li>Temp/RH</li> </ul>	-	-
June 14 - 15, 2020	<ul style="list-style-type: none"> <li>Data and automatic field camera photos downloaded</li> <li>Measure fluid level at the precipitation gauge manually, and then emptied it</li> <li>Replace a broken temperature/relative humidity sensor</li> </ul>	<ul style="list-style-type: none"> <li>Temp/RH</li> </ul>	<ul style="list-style-type: none"> <li>Temp/RH</li> </ul>	<ul style="list-style-type: none"> <li>Temp/RH</li> </ul>
September 29, 2020	<ul style="list-style-type: none"> <li>Data and automatic field camera photos downloaded</li> <li>Replace the malfunctioning Geonor sensor transducers</li> <li>Measure fluid level at the precipitation gauge manually, and then emptied it and add antifreeze</li> <li>Swap the temperature/relative humidity sensor by a recalibrated sensor</li> </ul>	<ul style="list-style-type: none"> <li>Precipitation (transducers)</li> <li>Temp/RH</li> </ul>	<ul style="list-style-type: none"> <li>Precipitation (transducers)</li> <li>Temp/RH</li> </ul>	<ul style="list-style-type: none"> <li>Precipitation</li> <li>Temp/RH</li> </ul>

Notes:

<sup>1</sup> The satellite antenna was found to be out of alignment and the Alter windscreen was repaired. These issues were due to numerous periods of high winds during the 2016-2017 winter, up to hurricane wind gust speeds of 34 m/s (122 km/h).

<sup>2</sup> The camera was damaged on February 13, 2017, likely due to heavy snow and ice loading on the camera's rear cable connector, which caused the connector junction to snap.



**Figure 2.3-1: Overview of Meteorological Monitoring Program Quality Assurance and Quality Control Process**

Table 2.3-1: Missing and Erroneous Data, August 2016 - October 2020

Parameter	Known or Suspected Reason for Missing or Erroneous Data	Date of Missing or Erroneous Data
All parameters	Power outage due to cut wire by wildlife	<ul style="list-style-type: none"> <li>November 4 - 16, 2018</li> </ul>
	Station servicing	<ul style="list-style-type: none"> <li>February 12, 2019</li> </ul>
	Power outage likely due to a lightning strike <sup>1</sup>	<ul style="list-style-type: none"> <li>July 9 - August 21, 2019</li> </ul>
	Station servicing	<ul style="list-style-type: none"> <li>February 18 - 19, 2020</li> </ul>
	Station servicing	<ul style="list-style-type: none"> <li>June 14 - 15, 2020</li> </ul>
Wind speed and direction	Frozen sensor	<ul style="list-style-type: none"> <li>December 19 - 30, 2016</li> <li>February 12 - 18, 2017</li> <li>March 14 - 18, 2017</li> <li>October 16 - 19, 2017</li> <li>November 19 - 20, 2017</li> <li>November 30 - December 5, 2017</li> <li>December 16 - 22, 2017</li> <li>January 7 - 9, 19 - 20, 2018</li> <li>February 13 - 14, 24 - 28, 2018</li> <li>November 28, 30; December 11 - 15, 2018;</li> <li>January 3 - 8, 11 - 13, 18 - 19, 22- 23, 26 - 31, 2019</li> <li>February 1, 4 - 5, 7, 10 - 11, 2019</li> <li>November 19 - 20, 2019</li> <li>December 24 - 25, 2019</li> <li>January 30 -31, 2020</li> <li>February 1 - 7, 13 - 19, 24 - 27, 2020</li> <li>March 2 - 7, 28 -29, 2020</li> </ul>
Temperature and relative humidity and precipitation	Wire cut due to wildlife	<ul style="list-style-type: none"> <li>April 12 - June 20, 2019</li> </ul>
	Sensor damage due to fall ice	<ul style="list-style-type: none"> <li>March 13 - June 13, 2020</li> </ul>
Solar radiation	Sensor blocked by snow	<ul style="list-style-type: none"> <li>December 1 - 4, 2017</li> <li>December 16 - 18, 2017</li> <li>January 4, 2018</li> </ul>
	Sensor malfunction	<ul style="list-style-type: none"> <li>November 17, 2018 to February 12, 2019</li> </ul>
	Sensor blocked by snow	<ul style="list-style-type: none"> <li>December 20, 24, 2019</li> <li>January 1 - 10, 24 -25, 29 - 31, 2020</li> <li>February 1 - 23, 26 - 27, 2020</li> <li>March 1 - 5, 10 - 12, 2020</li> </ul>
Precipitation	Sensor blocked by snow	<ul style="list-style-type: none"> <li>December 19, 2018 to January 1, 2019</li> </ul>
	Wire cut due to wildlife	<ul style="list-style-type: none"> <li>April 12 to June 20, 2019</li> </ul>
	Sensor malfunction	<ul style="list-style-type: none"> <li>August 22, 2019 to September 29, 2020</li> </ul>



Parameter	Known or Suspected Reason for Missing or Erroneous Data	Date of Missing or Erroneous Data
Snow depth	Low quality data	<ul style="list-style-type: none"> <li>• January 26, 2019</li> <li>• May 25 - 31, 2019</li> <li>• June 1 - 13, 2020</li> </ul>

Note:

<sup>1</sup> The website [www.lightningmaps.org](http://www.lightningmaps.org) shows that there were three lightning strikes within 5 km of the Johnny Mountain station on July 9, 2019 between 0:45 am and 1:48 am PDT, which matches the time when the station recorded its last data prior to being repaired on August 21, 2019.

The wind-induced undercatch can be accounted for using catch efficiencies for single Alter wind screens (Rasmussen et al. 2012). The catch efficiency (CE) method used in this report was developed by MacDonald and Pomeroy (M & P 2007) to quantify the catch efficiency of Geonor T-200B precipitation gauges with single Alter wind screens. RTEC compared the M & P methodology against other methodologies and found the M & P method outperformed other methods when applied to the snowfall characteristics of the BC coastal region.

The catch efficiency equation developed by M & P is:

$$CE = 1.01 \times \exp(-0.09 \times U)$$

Where CE is the catch efficiency of a single Alter wind screen Geonor precipitation gauge referenced to true snowfall, and U is the wind speed (m/s) at the Geonor orifice gauge height. These undercatch equations are not applied to rainfall because the catch efficiency is near 100% for all wind speeds (C. Smith, National Hydrology Research Center, pers. comm. 2011). For this report, the equation was applied to daily total SWE and daily mean wind speed datasets.

Each catch efficiency equation requires wind speed at the precipitation gauge orifice; the logarithmic wind profile (assuming neutral atmospheric stability; Stull 2016) was used to estimate wind speeds at the height of the precipitation gauge's orifice. The logarithmic wind profile equation is:

$$U_2 = U_1 \times \ln(z_2/z_0) / \ln(z_1/z_0)$$

Where  $U_1$  is the wind speed at height above ground  $z_1$ ,  $U_2$  is the wind speed at height above the ground  $z_2$ , and  $z_0$  is the aerodynamic surface roughness length. For this report,  $z_0$  was assumed to be 0.017 m which is a typical value for snow covered ground,  $z_1$  was the height of the wind speed measurement (10 m), and  $z_2$  was the height of the Geonor precipitation gauge orifice (3.3 m). The  $z_2$  and  $z_1$  values were assumed to remain constant although in reality they would change with fluctuating snow pack levels.

Total precipitation data were then separated into daily rainfall and snowfall based on daily air temperature data and followed the methodology provided by Quick (1995). The algorithm is as follows:

$$\begin{aligned} \text{if } T > 2 \text{ then} & \quad R = P, \text{ and } SWE = 0 \\ \text{if } T < 0 \text{ then} & \quad R = 0, \text{ and } SWE = P \\ \text{if } 0 < T < 2 \text{ then} & \quad R = P \times T/2, \text{ and } SWE = P \times \left(1 - \left(\frac{T}{2}\right)\right) \end{aligned}$$

where T = Mean Daily Air Temperature (°C)  
P = Daily Precipitation (mm)  
R = Daily Rainfall (mm)  
SWE = Daily Snow-Water-Equivalent (mm)

Erroneous data (e.g., abnormal trends or outliers) were excluded from the finalized datasets. Periods of missing or erroneous temperature or precipitation data were gap-filled using data from the KSM Project meteorological stations.

Missing daily precipitation and temperature data were calculated using linear regression equations between data from the Johnny Mountain meteorological station and KSM Project meteorological stations (Table 2.3-2). The equation with the highest correlation coefficient ( $R^2$ ) value was used for the calculation. Precipitation equations were derived by using orthogonal regressions on concurrent historical monthly precipitation datasets between all stations. Orthogonal regressions were used because the resulting equations had better  $R^2$  values than using regular linear regressions. The precipitation equations were developed using total monthly precipitation datasets but were applied to the daily dataset. The original offset values were divided by the average number of days per month (30.5). When applying these equations, any resulting negative precipitation values were set to zero. Also, if a source value was zero, the resulting value was also set to zero. Temperature equations were derived using normal linear regression on concurrent historical daily temperatures between all stations and were applied to the daily dataset.

Table 2.3-2: Linear Relationship Equations between Johnny Mountain and KSM Project Meteorological Stations Applied to Gap Fill Daily Precipitation and Temperature Data, August 2016 - October 2020

Linear Equation $Y = mX + b$				R2	Number of Monthly Data Points Pairs; n
Daily Total Precipitation "Y" (mm)	Daily Total Precipitation "X" (mm)	Slope "m"	Intercept "b"		
Johnny Mountain	Eskay Creek Mine	0.659	1.380	0.340	30
	Mitchell Deposit	1.233	-0.043	0.659	25
	Sulphurets Creek	1.474	-0.271	0.786	28
	Teigen Creek	1.993	-0.848	0.581	20
	Unuk-Teigen	0.904	0.168	0.643	13
Air Temperature "Y" (°C)	Air Temperature "X" (°C)				Number of Daily Data Points Pairs; n
Johnny Mountain	Eskay Creek Mine	0.937	-1.809	0.962	1,293
	Mitchell Deposit	1.004	-2.138	0.976	1,296
	Sulphurets Creek	1.027	1.441	0.965	1,265
	Teigen Creek	0.867	0.446	0.956	1,261
	Unuk-Teigen	0.944	0.938	0.969	1,256

To validate the results of the estimation methodology, the regression equations were applied to periods of available daily temperature and precipitation data from the Johnny Mountain station; hence, a comparison between predicted and recorded data was performed. The difference in the annual total precipitation between the estimated and recorded data ranged from - 5% to +5%, indicating that the methodology of estimating daily precipitation is satisfactory for the purpose of calculating total annual precipitation. The estimated daily mean temperatures were on average 0.6°C higher than the recorded daily data, indicating a slight overestimation of the temperature data. However, the estimated daily temperature data are based on a high  $R^2$  value (0.976; Table 2.3-2), which is satisfactory in terms of regression analysis.

### 3. RESULTS

The Johnny Mountain post processed (gap-filled and quality controlled) meteorological station data collected from August 2016 to October 2020 for air temperature, relative humidity, precipitation, snow depth, wind speed and direction and solar radiation are presented in this section and compiled in the following appendices:

- o Appendix A: 2016 - 2020 Summary of Monthly Meteorological Data;
- o Appendix B: 2016 - 2020 Daily Meteorological Data; and
- o Appendix C (digital): 2016 - 2020 Hourly Meteorological Data.

Table 3-1 presents monthly data averages for the Johnny Mountain meteorological station for the reporting period (August 2016 - October 2020). The historical Johnny Mountain and Bronson Creek stations are presented in Table 3-2 along with the current Johnny Mountain station data for comparison in air temperature, precipitation, and snow depth.

#### 3.1 Air Temperature and Humidity

For the available monitoring data from August 2016 to October 2020 (Figure 3.1-1 and 3.1-2; Table 3-1; Appendix A to C), the average air temperature was 0.8°C with a daily average range from -24.4°C (February 2, 2019) to 19.6°C (June 19, 2018). The absolute temperature ranged between a minimum of -26.8°C (February 2, 2019) to a maximum of 24.8°C (July 31, 2020). Temperatures tended to steadily rise above freezing from late March to early April, and fall below zero in October. Several Arctic outbreaks tended to occur from December through early March, resulting in many days with temperatures dropping below -15°C (Figure 3.1-1). Table 3-1 shows that the monthly average air temperature of all months is below 10°C with 6 months (November to April) below 0°C. The coldest month is February with an average of -8.1°C, while the warmest is July with an average of 9.6°C. According to Koppen-Geiger climate classification (Peel et al. 2007), these monthly temperature ranges correspond to a Dfc (D: Cold climate, f: Without dry season, c: Cold summer) climate class, which is described as a subarctic climate characterized by a cool summer and an absence of a dry season. Similar monthly temperature ranges were recorded at the historical Johnny Mountain station (Table 3-2).

The hourly relative humidity levels  $\geq 95\%$  recorded at the station occurred approximately 36% of the available record. High relative humidity measurements ( $\geq 95\%$ ) indicate that fog has likely formed at the station's location, and therefore visibility is reduced during these periods. The area on the Johnny Mountain plateau is notorious for having frequent periods of reduced visibility from fog and low level clouds as evident from the humidity measurements and the hourly network camera photos.

#### 3.2 Precipitation

During the August 2016 to October 2020 monitoring period, the monthly average total precipitation ranged from 86 mm in April to 237 mm in November (Tables 3-1 and 3-2; Figure 3.2-1). The wettest month during the monitoring period was November 2019 (450 mm; estimated), while the driest was May 2019 (39 mm; estimated; Figure 3.2-1, Appendix A). As mentioned in Section 3.1, the climate is characterized by an absence of a dry season as a result of the alpine location of the station that is relatively adjacent to the coast. The average monthly total precipitation at the Johnny Mountain station correspond to the records of the historical Johnny Mountain station (Table 3-2).

The majority of the rainfall records correspond to months with average air temperature above 0°C (May to October) with the highest monthly average rainfall was recorded in August, while the highest monthly average snow water equivalent (SWE) was recorded in January (Table 3-1).

Table 3-1: Johnny Mountain Monthly Average Meteorological Data (August 2016 - October 2020)

Month	Wind Speed (m/s)		Air Temperature <sup>1</sup> (°C)					Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)			Adjusted Precipitation <sup>1</sup> (mm)		
	Mean	Max. Gust	Mean	Mean Daily Max.	Mean Daily Min.	Absolute Max.	Absolute Min.	Mean	Mean	Mean	Max.	Min.	Total Precipitation	Total Rainfall	Total SWE
Jan	5.1	45.1	-6.6	-4.0	-9.0	9.2	-25.7	87.5	23.4	93.9	155.3	45.3	179.6	1.7	178.0
Feb	5.8	39.4	-8.1	-5.5	-10.6	6.2	-26.8	76.5	63.5	103.6	176.4	57.9	102.2	4.0	98.3
Mar	5.0	32.9	-4.5	-1.5	-7.0	11.2	-20.1	74.0	125.2	128.5	220.7	73.1	108.7	1.9	106.7
Apr	3.9	29.0	-0.2	3.4	-3.0	13.5	-14.7	74.6	181.6	134.1	211.9	82.2	86.0	8.0	78.0
May	3.4	23.1	5.3	8.8	2.2	20.5	-3.4	79.8	216.3	77.8	193.2	0.0	87.0	64.8	22.2
Jun	3.3	20.6	6.5	9.9	3.8	24.5	-0.7	81.1	191.3	0.0	0.0	0.0	123.6	122.7	0.9
Jul	3.1	20.8	9.6	12.7	7.2	24.8	2.4	84.2	175.8	0.0	0.0	0.0	114.2	114.2	0.0
Aug	3.4	18.7	9.3	12.2	7.0	23.5	-1.2	86.5	137.1	0.0	0.0	0.0	195.9	195.3	0.6
Sep	3.6	27.8	6.7	9.2	4.7	21.6	-0.3	80.5	109.9	0.0	0.0	0.0	159.7	158.6	1.1
Oct	4.0	29.1	0.9	3.1	-0.9	13.1	-10.8	82.2	57.9	7.1	48.7	0.0	168.7	74.4	94.3
Nov	4.3	24.4	-3.1	-0.9	-5.0	6.4	-16.9	88.1	24.0	22.0	97.1	0.0	237.4	74.4	163.0
Dec	3.8	27.6	-5.9	-3.6	-8.1	6.1	-25.9	85.3	11.8	61.2	220.7	26.0	150.7	8.8	141.9
Mean	4.1	28.2	0.8	3.6	-1.6	15.1	-12.0	81.7	109.8	52.4	110.3	23.7	142.8	69.1	73.7
Max.	5.8	45.1	9.6	12.7	7.2	24.8	2.4	88.1	216.3	134.1	220.7	82.2	237.4	195.3	178.0
Min.	3.1	18.7	-8.1	-5.5	-10.6	6.1	-26.8	74.0	11.8	0.0	0.0	0.0	86.0	1.7	0.0
Total	-	-	-	-	-	-	-	-	-	-	-	-	1713.6	828.7	884.9

Notes:

dash (-) = not applicable

<sup>1</sup> Gap-filled

Table 3-2: Historical Meteorological Data Summary Comparison

Month	Air Temperature (°C)									Snow Depth (cm)			Precipitation (mm)		
	Mean			Mean Daily Maximum			Mean Daily Minimum			Mean <sup>2</sup>			Average Monthly Total		
	Johnny Mtn. (Aug 2016 - Oct 2020)	Historic Johnny Mtn. (1988 - 1992)	Historic Bronson Creek (1989 - 1999)	Johnny Mtn. (Aug 2016 - Oct 2020) <sup>1</sup>	Historic Johnny Mtn. (1988 - 1992)	Historic Bronson Creek (1989 - 1999)	Johnny Mtn. (Aug 2016 - Oct 2020)	Historic Johnny Mtn. (1988 - 1992)	Historic Bronson Creek (1989 - 1999)	Johnny Mtn. (Aug 2016 - Oct 2020)	Historic Johnny Mtn. (1988 - 1992)	Historic Bronson Creek (1989 - 1999)	Johnny Mtn. (Aug 2016 - Oct 2020) <sup>3</sup>	Historic Johnny Mtn. (1988 - 1992)	Historic Bronson Creek (1989 - 1999)
Jan	-6.6	-6.8	-8.7	-4.0	-4.1	-5.8	-9.0	-9.5	-11.6	93.9	377.5	154.2	179.6	304.9	207.6
Feb	-8.1	-5.6	-4.8	-5.5	-2.4	-1.8	-10.6	-8.8	-7.7	103.6	320	141.7	102.2	208.4	140.6
Mar	-4.5	-4.2	-0.1	-1.5	-1.5	3.4	-7.0	-6.8	-3.6	128.5	386.7	100.2	108.7	201.8	134.3
Apr	-0.2	-0.3	4.9	3.4	3.3	9.9	-3.0	-3.9	-0.2	134.1	332.7	0	86.0	85.4	86.4
May	5.3	3.2	10	8.8	6.4	15.7	2.2	0	4.2	77.8	203	0	87.0	105.2	79.1
Jun	6.5	6.9	13.5	9.9	10.2	18.9	3.8	3.5	7.5	0.0	0	0	123.6	94.6	59.5
Jul	9.6	9.2	15.2	12.7	12.6	20.4	7.2	5.8	9.9	0.0	0	0	114.2	95.6	60.1
Aug	9.3	9.5	14.1	12.2	12.6	18.9	7.0	6.5	8.6	0.0	0	0	195.9	152.3	93.3
Sep	6.7	4.9	10.2	9.2	7.5	14.2	4.7	2.3	6.1	0.0	0	0	159.7	287.6	213
Oct	0.9	0.1	4.1	3.1	2.5	6.3	-0.9	-2.3	1.7	7.1	32	0	168.7	315.5	252
Nov	-3.1	-5	-2	-0.9	-2.4	0.2	-5.0	-7.6	-4.2	22.0	177	12.3	237.4	296.3	193.6
Dec	-5.9	-5.1	-4.8	-3.6	-2.5	-2.7	-8.1	-7.7	-7	61.2	276.7	39.3	150.7	484.5	236
Mean	0.8	0.6	4.3	-1.6	3.5	8.1	-1.6	-2.4	0.3	52.4	175.5	37.3	142.8	219.3	146.3
Max.	9.6	9.5	15.2	7.2	12.6	20.4	7.2	6.5	9.9	134.1	386.7	154.2	237.4	484.5	252.0
Min.	-8.1	-6.8	-8.7	-10.6	-4.1	-5.8	-10.6	-9.5	-11.6	0.0	0.0	0.0	86.0	85.4	59.5
Total	-	-	-	-	-	-	-	-	-	-	-	-	1713.6	2632.1	1755.5

Notes:

dash (-) = not applicable

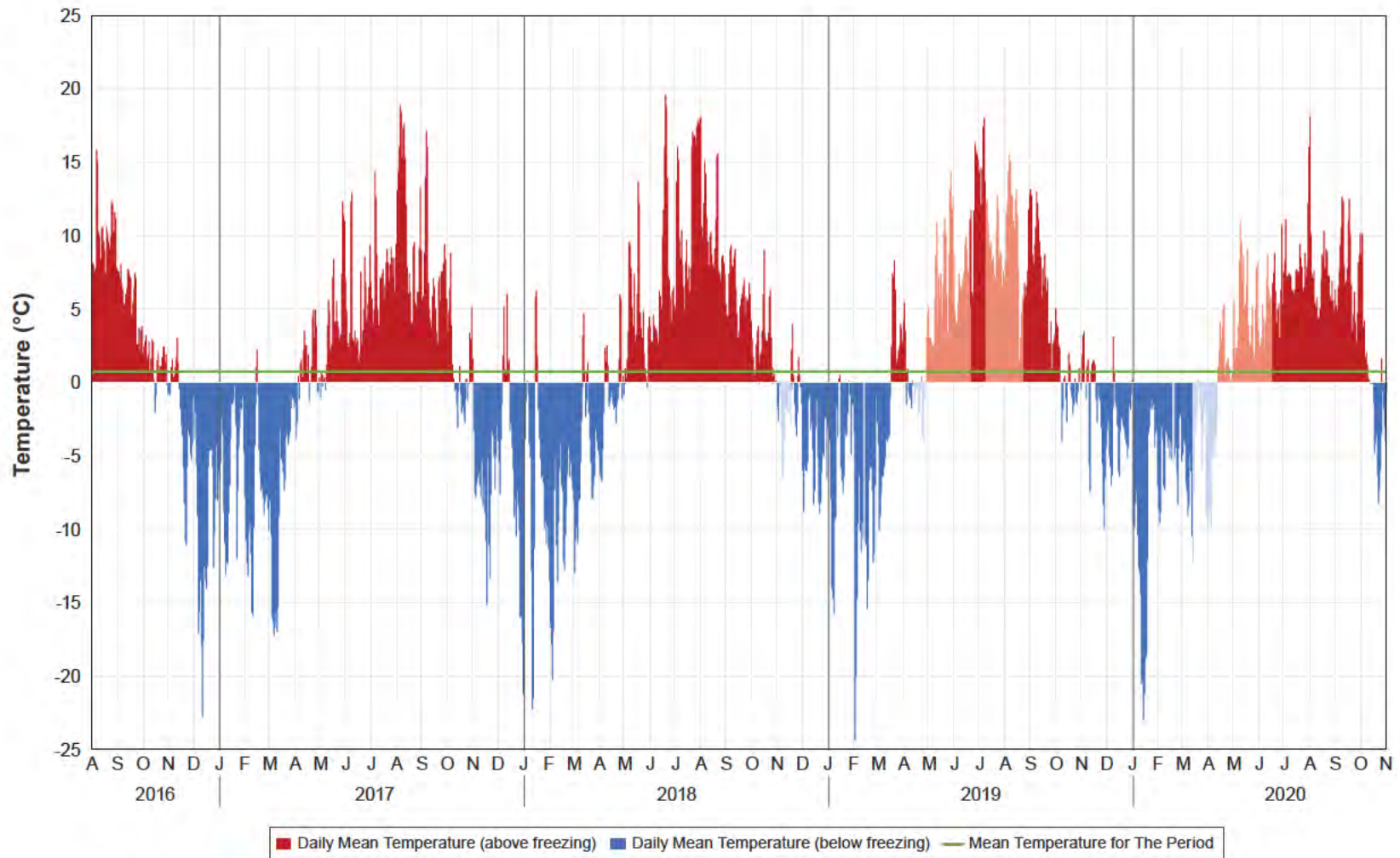
The tabulated monthly data for each historical regional station were calculated from the monthly values averaged over all available years of data for each station.

Source for the historic Johnny Mountain and Bronson Creek station data: ECCC (2019).

<sup>1</sup> Gap-filled temperature.

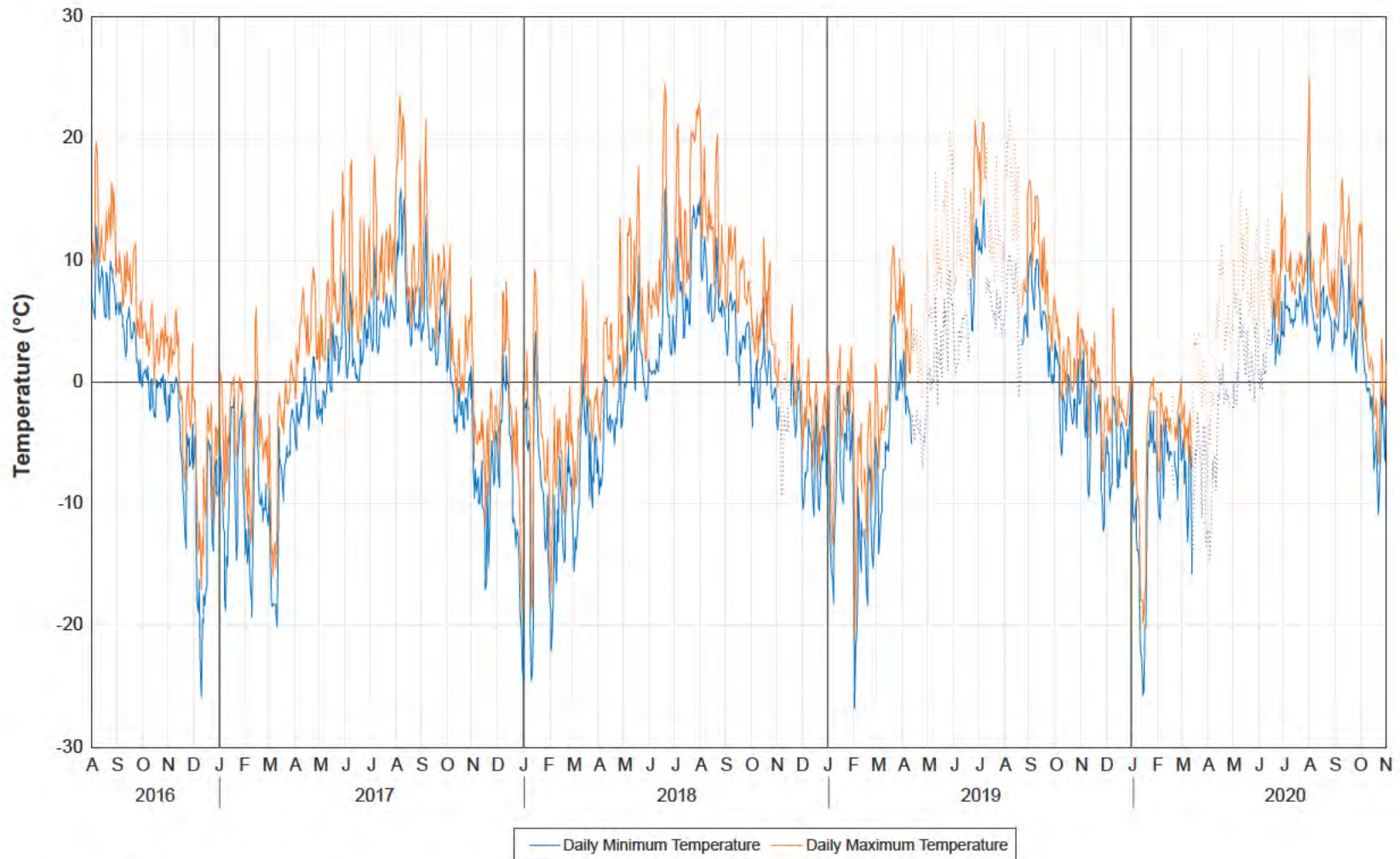
<sup>2</sup> The Johnny Mountain (Aug 2016 - Oct 2020) data are the mean monthly snow depth. The historical Johnny Mountain (1988 - 1992) and Bronson Creek (1989 - 1999) data are the mean values from the snow depth on the last day of each month.

<sup>3</sup> Adjusted and gap-filled precipitation.



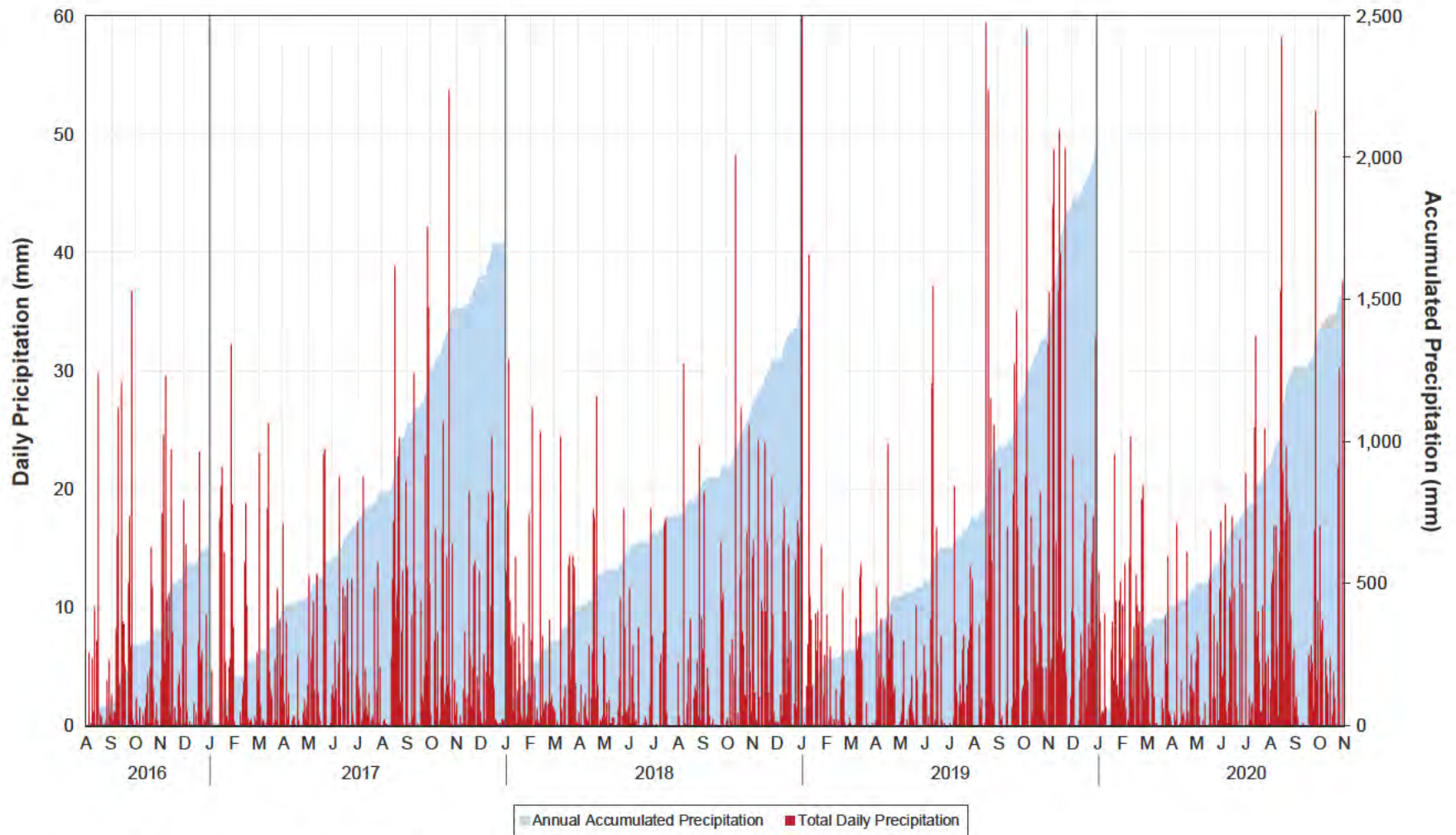
Note: Light coloured areas represent gap filled data

**Figure 3.1-1: Johnny Mountain Daily Mean Temperature, August 2016 - October 2020**



Note: Light coloured areas represent gap filled data

**Figure 3.1-2: Johnny Mountain Daily Minimum and Maximum Temperature, August 2016 - October 2020**



*Note: Data from April 2019 onward are estimated*

**Figure 3.2-1: Johnny Mountain Daily Total Precipitation and Annual Accumulated Precipitation, August 2016 - October 2020**



During the monitoring period, the highest total daily precipitation was 66 mm (estimated and adjusted for wind undercatch) recorded on January 1, 2019. During the same day, the Eskay Creek Mine, the Mitchell Creek and the Sulphurets2 meteorological stations from the KSM Project recorded 73 mm, 58 mm and 43 mm, respectively. The annual precipitation at the Johnny Mountain station (observed and estimated) ranged from 1,460 mm in 2018 to 2,034 mm in 2019 (available records for 2016 and 2020 do not cover the entire year).

The highest amount of precipitation over an hourly period as well as over a five minute period were recorded before the power outage occurred on the night of July 9, 2019, which indicates a very intense thunderstorm that caused the power outage. The highest hourly precipitation was 13.4 mm recorded from 0000 hours to 0045 hours on July 9. The power outage occurred at 0045 hours; therefore, the 13.4 mm fell over a period of 45 minutes only and not a full hour. The highest five minute amount of precipitation was 4.5 mm recorded at 0045 hours on July 9 (the last available five-minute record before the power outage). These precipitation records are validated against available observations in the region.

### 3.3 Snow Depth

During the August 2016 to October 2020 monitoring period, snow often began to accumulate from early October to early November and reached its maximum daily mean depth in late March to late April. The ground around the station became snow free each year from mid May to early June (Figure 3.3-1). The maximum daily snow depth recorded in the station was 220 cm on March 16, 2020. The 2019/2020 winter season recorded the highest snowpack (Figure 3.3-1).

The snow depth data recorded by the meteorological station is representative of the area around the station. High winds on the plateau area (see Section 3-5) have a large impact on the amount of snow that is entrained and redistributed by winds. This redistribution causes high variability in the snow pack depth in the area.

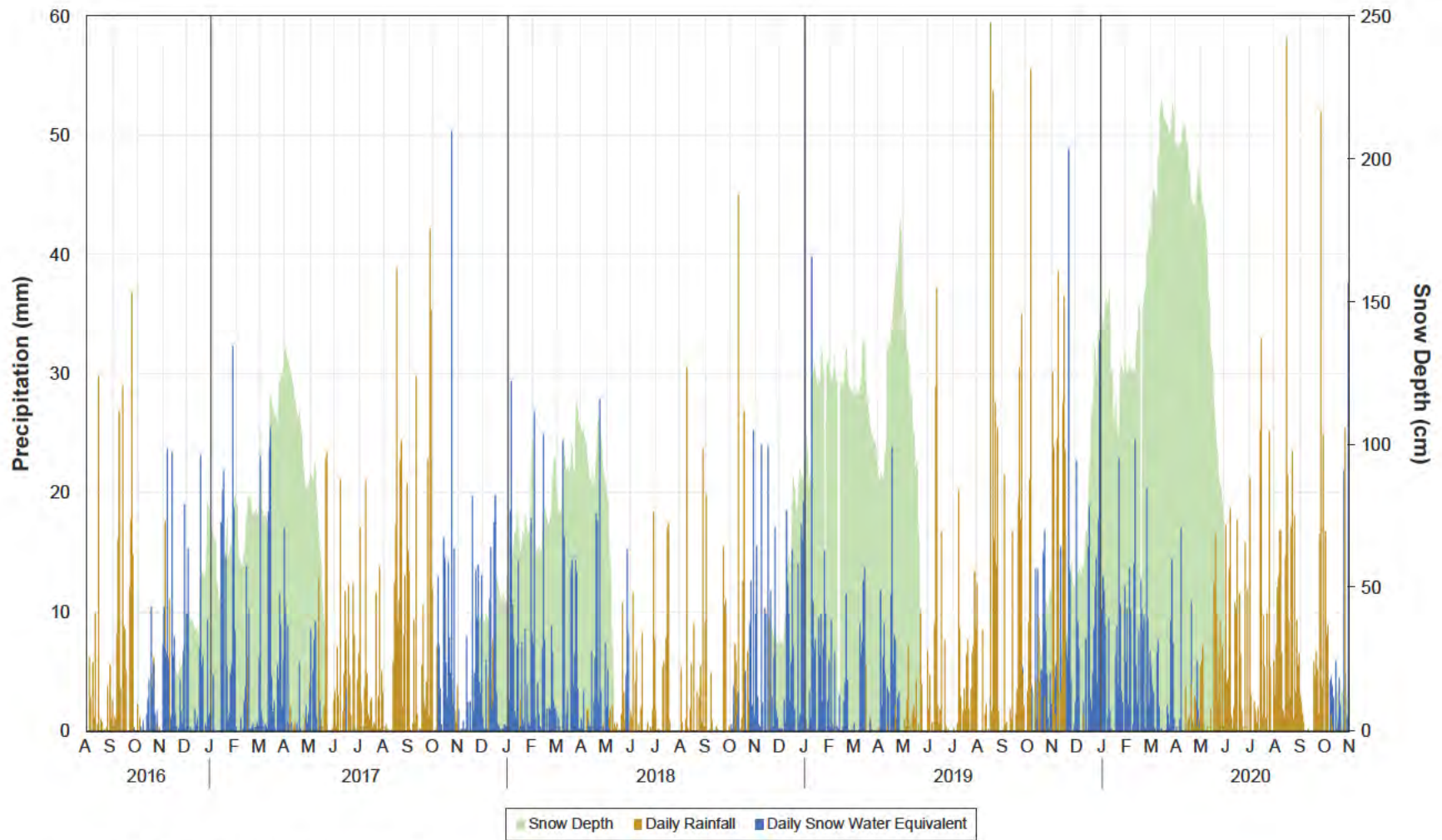
### 3.4 Solar Radiation

During the August 2016 to October 2020 monitoring period, hourly mean solar radiation ranged from 0 to 990 Watts per square metre ( $W/m^2$ ). The potential maximum daily mean solar radiation follows a smooth sinusoidal pattern over the course of a year (Figure 3.4-1), in relation to the amount of sunlight received by the surface. The amount of solar radiation received on the ground primarily depends on the time of day, the time of year and the amount of cloud cover. The plotted troughs in Figure 3.4-1 (e.g., July 2020) give an indication of the amount and duration of cloud cover on each day.

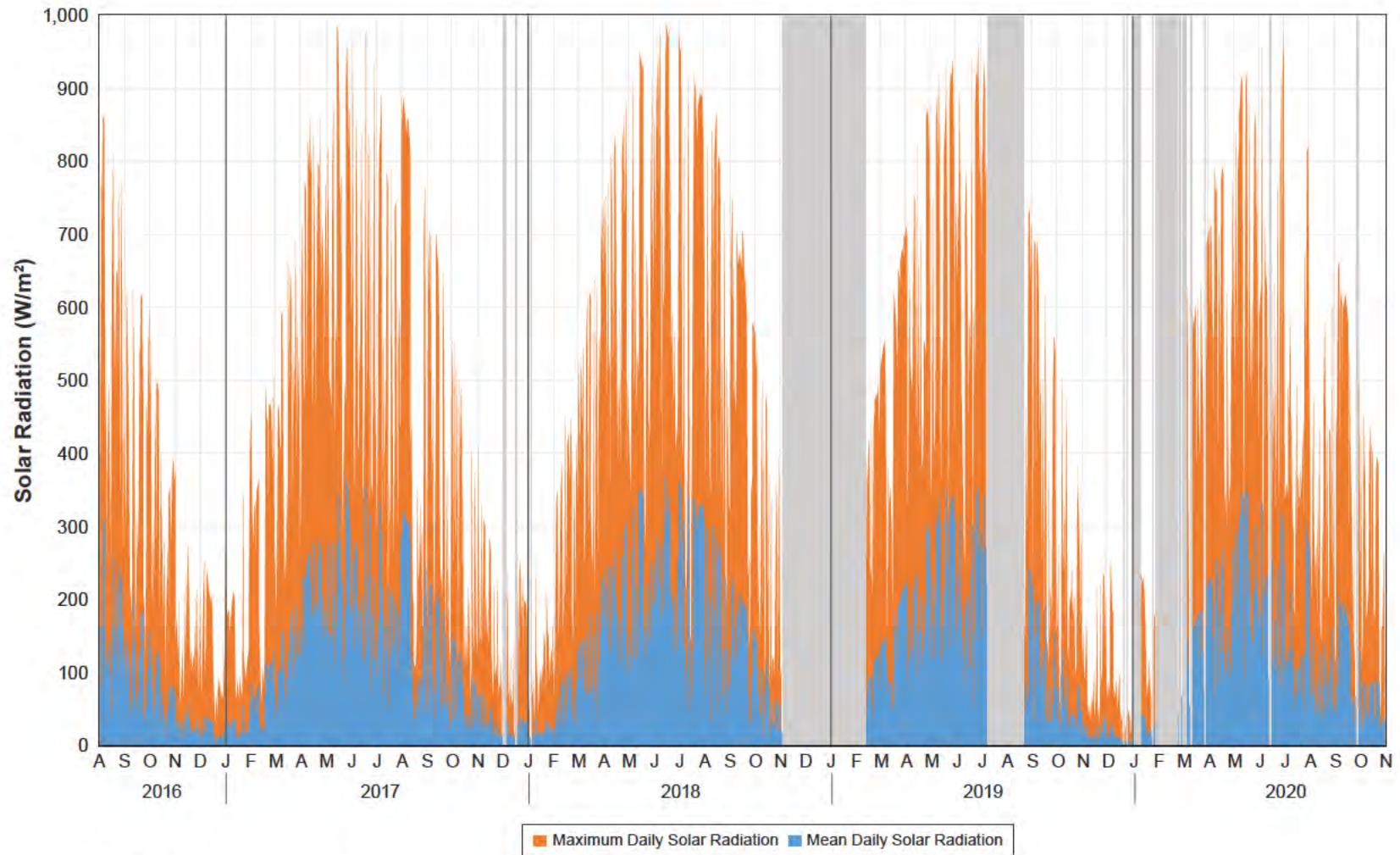
### 3.5 Wind Speed and Direction

During the August 2016 to October 2020 monitoring period, winds predominantly blew from the southwest quadrant, particularly during warmer months (May to September), with a secondary predominant direction from the northeast (Figure 3.5-1). Northeastern winds were characterized by higher speeds and blew mostly during wintertime. These predominant wind directions are parallel with the alignment of the old existing Johnny Mountain Airstrip.

The average wind speed was 4 m/s with most frequent speeds were between 3 and 5 m/s (33%). Calm winds ( $< 0.5$  m/s) occurred 1.7% of the time and winds  $\geq 11$  m/s occurred 0.8% of the time. The maximum hourly average wind speed was 30 m/s (108 km/h) and the maximum wind gust speed was 45.1 m/s (162 km/h) both occurred on January 15, 2020. For comparison, a category two hurricane has sustained wind speeds of 154 to 177 km/h. Such wind speeds can uproot shallow rooted trees and cause extensive damage to building roofing and siding.



**Figure 3.3-1 Johnny Mountain Daily Mean Snow Depth and Calculated Rainfall and Snow Water Equivalent, August 2016 - October 2020**

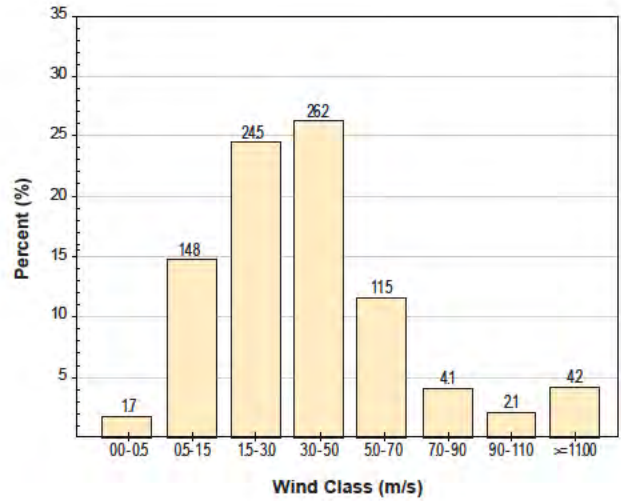
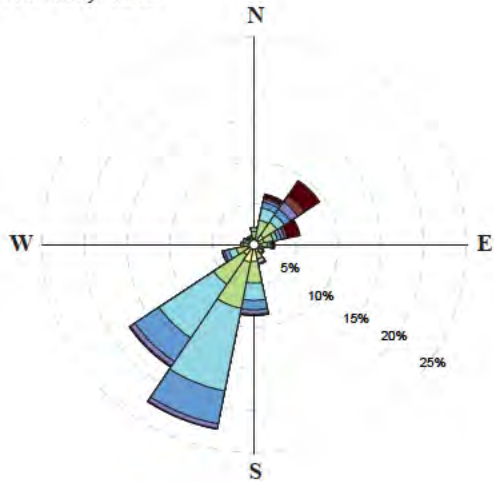


Note: Grey coloured areas represent missing data

**Figure 3.4-1 Johnny Mountain Daily Mean and Maximum Solar Radiation, August 2016 - October 2020**

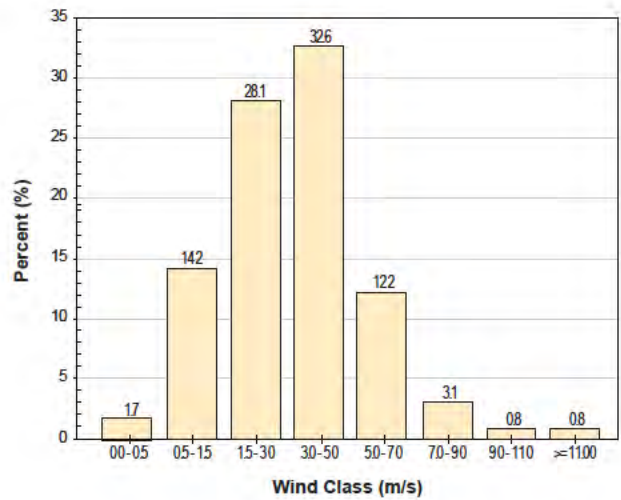
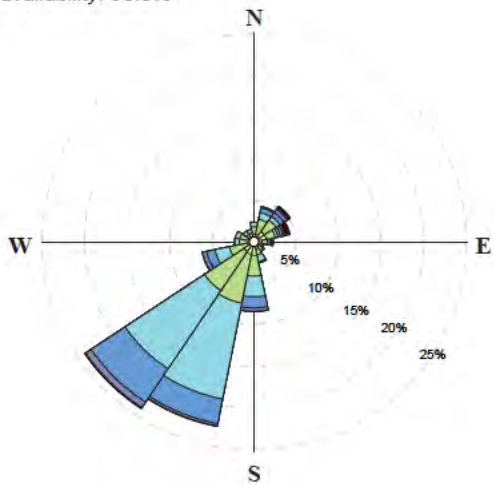
**August 2016 - October 2020**

Data availability: 89%



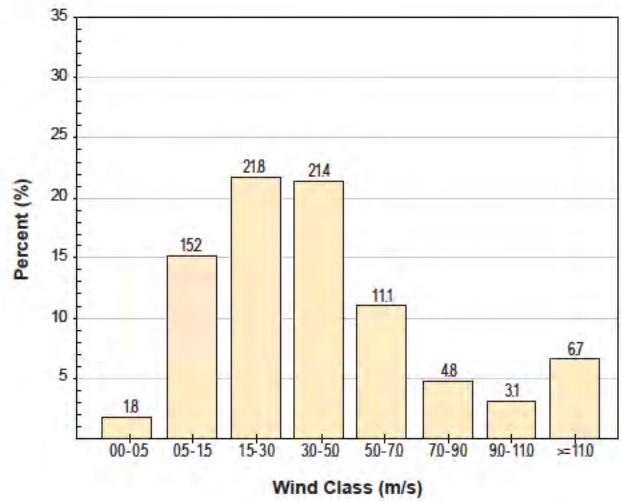
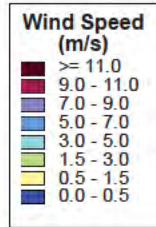
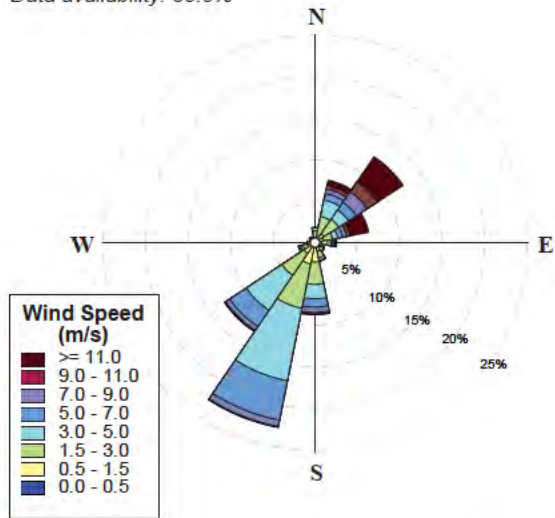
**May - September**

Data availability: 93.3%



**October - April**

Data availability: 85.8%



**Figure 3.5-1 Johnny Mountain Wind Rose and Wind Speed Frequency Distribution, August 2016 - October 2020**

## 4. SUMMARY

The Johnny Mountain meteorological station continued to operate in 2020. Data presented in this report are from August 2016 to October 2020.

During the monitoring period of August 2016 to October 2020, the average air temperature was 0.8°C and ranged from 24.8°C (July 31, 2020) to -26.8°C (February 2, 2019). The coldest month is February (-8.1°C) and the warmest is July (9.6°C). The mean relative humidity records indicate that fog and low clouds were present at the Johnny Mountain plateau approximately 36% of the time during the reporting period. The monthly average total precipitation ranged from 86 mm in April to 237 mm in November. The snowpack reached its maximum depth in late March to late April. The maximum daily snowpack (220 cm) was recorded on March 16, 2020. The ground at the meteorological station became snow free each year between mid May and early June. Snow cover on the plateau was variable due to strong winds that redistribute the snow.

Winds were predominately from the southwest quadrant with a secondary predominant direction from the northeast. The highest wind speeds generally blew from northeast during wintertime. The average wind speed was 4 m/s while most frequent speeds were between 3 and 5 m/s (33%). The maximum wind gust speed was 45.1 m/s (162 km/h; January 15, 2020). The hourly average solar radiation ranged from 0 to 990 W/m<sup>2</sup>, peaking during the summer

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APPENDIX A      JOHNNY MOUNTAIN CALCULATED MONTHLY  
METEOROLOGICAL DATA SUMMARY

**Appendix A: Johnny Mountain Calculated Monthly Meteorological Data Summary**

Month	Wind Speed		Air Temperature					Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth			Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation (mm)			
	(m/s)		(°C)							(cm)				Total Precipitation	Total Precipitation	Total Rainfall	Total SWE
	Mean	Max. Gust	Mean	Mean Daily Max.	Mean Daily Min.	Absolute Max.	Absolute Min.			Mean	Max.	Min.					
Aug-16	3.2	18.2	9.9	12.8	7.8	19.7	5.1	87.9	152.4	0	0	0	79.4	79.4	79.4	0	
Sep-16	3.9	23.8	5.6	7.9	3.7	11.4	-0.3	87.9	92.9	0	0	0	202.1	202.1	201.9	0.2	
Oct-16	3.6	24	1.2	3.6	-0.6	6.6	-3.2	77.6	66.4	0.3	5.6	0	50.4	55.5	23.2	32.3	
Nov-16	3.5	22.7	-2.5	-0.3	-4.3	6	-13.6	90.5	24	16.2	41.4	0	165.8	204.4	54.7	149.6	
Dec-16	4.52	27.63	-9.9	-7.4	-12.4	-1.3	-25.9	82.6	20.1	49.7	80.2	34.4	72.9	91.1	0	91.1	
Mean	3.7	23.3	0.9	3.3	-1.1	8.5	-7.6	85.3	71.2	13.2	25.4	6.9	114.1	126.5	71.9	54.6	
Max.	4.5	27.6	9.9	12.8	7.8	19.7	5.1	90.5	152.4	49.7	80.2	34.4	202.1	204.4	201.9	149.6	
Min.	3.2	18.2	-9.9	-7.4	-12.4	-1.3	-25.9	77.6	20.1	0	0	0	50.4	55.5	0	0	
<b>Total</b>	-	-	-	-	-	-	-	-	-	-	-	-	<b>570.6</b>	<b>632.5</b>	<b>359.3</b>	<b>273.2</b>	

Notes:

dash (-) = data not available or not applicable

<sup>1</sup> Adjusted to compensate for wind undercatch

<sup>2</sup> Missing 13 days of data

<sup>3</sup> Missing 12 days of data

Month	Wind Speed		Air Temperature					Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth			Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation (mm)			
	(m/s)		(°C)							(cm)				Total Precipitation	Total Precipitation	Total Rainfall	Total SWE
	Mean	Max. Gust	Mean	Mean Daily Max.	Mean Daily Min.	Absolute Max.	Absolute Min.			Mean	Max.	Min.					
Jan-17	6.2	42.3	-5.6	-2.9	-8.2	1	-18.7	82.7	26.6	63.2	82.5	45.9	123.5	168.9	0	168.9	
Feb-17	6.73	35	-8	-5.3	-10.3	6.2	-19.3	69.9	66.2	72.1	82	57.9	59.3	65.5	15.9	49.6	
Mar-17	5.03	26.4	-7.5	-5	-9.7	1.7	-20.1	86.3	109.8	102	128.4	73.1	134.8	169.4	0	169.4	
Apr-17	3.9	26.3	1.1	4.4	-1.5	9.4	-5.6	72.6	199.8	111.2	134.1	82.2	33.9	43.1	5	38.1	
May-17	3.4	23.1	4	7.1	1.7	17.3	-3.4	79.4	209.5	47.7	94.4	0	123.8	133.6	90.2	43.4	
Jun-17	3.4	20.6	5.3	8.4	2.7	18.3	0	84.2	179.2	0	0	0	121.9	123	119.6	3.4	
Jul-17	2.9	15.6	7.5	10.4	5.5	18.5	2.4	88.1	158.2	0	0	0	119.6	119.6	119.6	0	
Aug-17	3.2	16.6	10.3	13.1	7.9	23.5	3	80.9	159.2	0	0	0	226.7	226.7	226.7	0	
Sep-17	3.1	13.1	7	9.5	5.1	21.6	1.4	86.1	103.6	0	0	0	214.1	214.1	214.1	0	
Oct-17	4.44	26.8	0.9	3.1	-0.9	11.3	-4.1	81.7	59.3	5.1	22.1	0	159.8	202.5	34.1	168.4	
Nov-17	5.35	24.4	-6.8	-4.3	-9.1	1.3	-16.91	80.9	30.6	13.3	43	0	87.3	112.9	0	112.9	
Dec-17	4.76	26.6	-5.7	-3	-8.3	-8.3	-24.2	76.9	22.6	42	54.9	26	107.2	123.4	33.1	90.4	
Mean	4.2	24.7	0.2	2.9	-2	11.1	-8.7	82.1	109.6	38.9	55.4	24.5	129.7	146.8	73.3	73.5	
Max.	6.7	42.3	10.3	13.1	7.9	23.5	3	90.5	209.5	111.2	134.1	82.2	226.7	226.7	226.7	169.4	
Min.	2.9	13.1	-9.9	-7.4	-12.4	-1.3	-25.9	69.9	20.1	0	0	0	33.9	43.1	0	0	
<b>Total</b>	-	-	-	-	-	-	-	-	-	-	-	-	<b>1,556.30</b>	<b>1,762.00</b>	<b>879.9</b>	<b>881.9</b>	

Notes:

dash (-) = data not available or not applicable

<sup>1</sup> Adjusted to compensate for wind undercatch

<sup>2</sup> Missing 13 days of wind data

<sup>3</sup> Missing five days of wind data

<sup>4</sup> Missing four days of wind data

<sup>5</sup> Missing three days of wind data

<sup>6</sup> Missing twelve days of wind data



**Appendix A: Johnny Mountain Calculated Monthly Meteorological Data Summary**

Month	Wind Speed		Air Temperature					Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth			Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation (mm)			
	(m/s)		(°C)							(cm)				Total Precipitation	Total Precipitation	Total Rainfall	Total SWE
	Mean	Max. Gust	Mean	Mean Daily Max.	Mean Daily Min.	Absolute Max.	Absolute Min.			Mean	Max.	Min.					
Jan-18	3.32	19.8	-6	-3.1	-8.7	9.2	-24.6	88	17.4	68.2	102.3	45.3	148.8	183.1	4.4	178.8	
Feb-18	4.43	39.4	-9.3	-6.7	-11.9	-0.3	-22.1	74.8	58.1	76.2	106.5	61.6	90.9	111.7	0	111.7	
Mar-18	5.3	32.9	-4.6	-1.6	-7	8.2	-15.5	75.2	115	93.5	116.2	76.6	92.8	122.1	0.9	121.2	
Apr-18	4	29	-1	2.4	-3.3	13.5	-9.2	76.5	183.2	97.3	114.3	86.9	87.8	110.7	4.7	106	
May-18	3.3	15.2	4.5	7.5	2.2	17.8	-1.6	80.2	197.1	21.2	86.3	0	69.7	80.9	37.7	43.3	
Jun-18	3.3	17.1	6.9	10.3	4.3	24.5	0.7	78	218.6	0	0	0	67	67	67	0	
Jul-18	2.9	18.8	12	15.6	9	22.9	2.4	74	240.3	0	0	0	61.3	61.3	61.3	0	
Aug-18	3.7	17.1	9.8	12.9	7.5	20.4	4.3	83.1	157.4	0	0	0	101.9	101.9	101.9	0	
Sep-18	4.2	26.8	6.3	9	4.1	12.9	-0.2	68.1	141.6	0	0	0	73.4	73.4	73.4	0	
Oct-18	4.1	22.6	2.9	5.6	0.7	12	-3.6	73.4	62.6	0	0	0	143.6	196.3	127.7	68.6	
Nov-18	-	-	<u>-1.5</u>	<u>0.3</u>	<u>-3.1</u>	<u>6.4</u>	<u>-9.3</u>	-	-	-	-	-	114.8	<u>181.4</u>	<u>25.2</u>	<u>156.2</u>	
Dec-18	3.05	23.2	-4.9	-2.7	-6.7	1.9	-11	87	-6	64	92.1	30.7	-	<u>170.2</u>	<u>0.0</u>	<u>170.2</u>	
Mean	4.1	24.1	1.2	4.7	-1.1	12.4	-7.5	77.4	120.4	34.3	52	24.7	94.3	108.2	42.6	65.6	
Max.	5.32	39.4	12.0	15.6	9.0	24.5	4.3	88	240.3	97.3	116.2	86.9	148.8	183.1	126.8	178.8	
Min.	2.9	15.2	-9.3	-6.7	-11.9	-0.3	-24.6	68.1	17.4	0	0	0	61.3	61.3	0	0	
<b>Total</b>	-	-	-	-	-	-	-	-	-	-	-	-	<b>1131.7</b>	<b>1,298.30</b>	<b>511.2</b>	<b>787.3</b>	

Notes:

dash (-) = data not available or not applicable

Underlined values are calculated from partially or completely gap-filled daily data

<sup>1</sup> Adjusted to compensate for wind undercatch

<sup>2</sup> Missing five days of wind data

<sup>3</sup> Missing seven days of wind data

<sup>4</sup> Missing last six days of October data (26 - 31)

<sup>5</sup> Missing five days of wind data due to frozen sensor

<sup>6</sup> Solar radiation sensor malfunctioned

Month	Wind Speed		Air Temperature					Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth			Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation (mm)			
	(m/s)		(°C)							(cm)				Total Precipitation	Total Precipitation	Total Rainfall	Total SWE
	Mean	Max. Gust	Mean	Mean Daily Max.	Mean Daily Min.	Absolute Max.	Absolute Min.			Mean	Max.	Min.					
Jan-19	-	-	-5.0	-2.5	-7.3	3.0	-18.2	91.0	-	115.3	134.7	81.1	137.1	218.5	2.2	216.3	
Feb-19	8.1	32.3	-10.2	-7.0	-13.4	1.5	-26.8	63.5	-	123.6	134.2	118.8	28	43.7	0.0	43.7	
Mar-19	3.1	21.4	-0.9	2.3	-3.3	11.2	-14.0	60.5	137.0	115.3	136.9	95.1	48.6	62.0	6.8	55.2	
Apr-19	3.4	19.5	<u>0.0</u>	<u>3.7</u>	<u>-2.9</u>	<u>10.5</u>	<u>-6.9</u>	-	173.6	129.1	178.9	87.3	-	<u>128.3</u>	<u>4.0</u>	<u>124.3</u>	
May-19	3.1	14.0	<u>7.2</u>	<u>11.5</u>	<u>3.1</u>	<u>20.5</u>	<u>-1.8</u>	-	226.6	111.5	175.1	-	-	<u>38.8</u>	<u>38.8</u>	<u>0.0</u>	
Jun-19	3.2	14.6	<u>8.5</u>	<u>12.5</u>	<u>5.3</u>	<u>21.5</u>	<u>0.7</u>	-	194.7	0.0	0.0	0.0	-	<u>132.7</u>	<u>132.7</u>	<u>0.0</u>	
Jul-19	-	-	<u>10.7</u>	<u>14.2</u>	<u>7.8</u>	<u>21.4</u>	<u>4.1</u>	-	-	0.0	0.0	0.0	-	<u>110.4</u>	<u>110.4</u>	<u>0.0</u>	
Aug-19	-	-	<u>9.6</u>	<u>13.4</u>	<u>6.4</u>	<u>22.2</u>	<u>-1.2</u>	-	-	0.0	0.0	0.0	-	<u>229.5</u>	<u>226.7</u>	<u>2.8</u>	
Sep-19	3.7	18.8	7.2	9.4	5.2	16.0	-0.1	81.5	99.8	0.0	0.0	0.0	-	<u>181.2</u>	<u>175.9</u>	<u>5.3</u>	
Oct-19	3.6	21.7	0.0	1.9	-1.5	5.8	-6.0	90.7	46.7	24.9	48.7	0.0	-	<u>220.5</u>	<u>112.7</u>	<u>107.8</u>	
Nov-19	4.1	20.2	-1.6	0.6	-3.5	4.4	-12.2	93.0	17.4	36.5	59.6	22.1	-	<u>450.7</u>	<u>217.5</u>	<u>233.2</u>	
Dec-19	2.8	18.1	-3.1	-1.5	-4.8	6.1	-9.8	94.6	10.6	89.1	147.7	51.8	-	<u>217.9</u>	<u>2.1</u>	<u>215.8</u>	
Mean	3.9	20.1	1.9	4.9	-0.7	12.0	-7.7	82.1	113.3	61.9	81.7	41.3	-	169.5	85.8	83.7	
Max.	8.1	32.3	10.7	14.2	7.8	22.2	4.1	94.6	226.6	129.1	178.9	118.8	-	450.7	226.7	233.2	
Min.	2.8	14.0	-10.2	-7.0	-13.4	1.5	-26.8	60.5	10.6	0	0	0	-	38.8	0.0	0.0	
<b>Total</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	2034.3	1029.8	1004.4	

Notes:

dash (-) = data not available or not applicable

Underlined values are calculated from partially or completely gap-filled daily data

**Appendix A: Johnny Mountain Calculated Monthly Meteorological Data Summary**

Month	Wind Speed		Air Temperature					Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth			Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation (mm)			
	(m/s)		(°C)							(cm)				Total Precipitation	Total Precipitation	Total Rainfall	Total SWE
	Mean	Max. Gust	Mean	Mean Daily Max.	Mean Daily Min.	Absolute Max.	Absolute Min.			Mean	Max.	Min.					
Jan-20	5.9	45.1	-9.6	-7.4	-11.9	0.5	-25.7	88.3	26.3	129.1	155.3	97.5	-	<u>148.0</u>	<u>0.0</u>	<u>148.0</u>	
Feb-20	4.1	18.4	<u>-5.0</u>	<u>-3.2</u>	<u>-6.6</u>	<u>0.2</u>	<u>-11.3</u>	97.7	66.3	142.7	176.4	123.7	-	<u>188.1</u>	<u>0.0</u>	<u>188.1</u>	
Mar-20	6.7	27.1	<u>-5.1</u>	<u>-1.7</u>	<u>-8.0</u>	<u>4.0</u>	<u>-15.7</u>	-	138.9	203.3	220.7	171.1	-	<u>81.2</u>	<u>0.0</u>	<u>81.2</u>	
Apr-20	4.2	18.3	<u>-0.8</u>	<u>3.3</u>	<u>-4.2</u>	<u>11.3</u>	<u>-14.7</u>	-	169.8	198.9	211.9	183.2	-	<u>61.9</u>	<u>18.2</u>	<u>43.7</u>	
May-20	3.7	22.1	<u>5.3</u>	<u>9.0</u>	<u>1.9</u>	<u>15.6</u>	<u>-2.2</u>	-	232.0	130.9	193.2	67.0	-	<u>94.7</u>	<u>92.5</u>	<u>2.2</u>	
Jun-20	3.1	13.3	<u>5.4</u>	<u>8.5</u>	<u>2.8</u>	<u>15.5</u>	<u>-0.7</u>	-	172.6	0.0	0.0	0.0	-	<u>171.5</u>	<u>171.5</u>	<u>0.0</u>	
Jul-20	3.5	20.8	8.2	10.5	6.4	24.8	3.8	90.4	128.9	0.0	0.0	0.0	-	<u>165.4</u>	<u>165.4</u>	<u>0.0</u>	
Aug-20	3.6	18.7	6.9	8.9	5.4	13.3	2.5	94.2	79.2	0.0	0.0	0.0	-	<u>341.9</u>	<u>341.9</u>	<u>0.0</u>	
Sep-20	3.2	27.8	7.5	10.0	5.2	16.8	0.9	79.1	111.6	0.0	0.0	0.0	-	<u>127.6</u>	<u>127.6</u>	<u>0.0</u>	
Oct-20	4.2	29.1	-0.5	1.5	-2.2	13.1	-10.8	87.7	54.3	5.2	13.6	0.0	-	<u>164.3</u>	<u>66.6</u>	<u>97.6</u>	
Mean	4.2	<u>24.1</u>	<u>1.2</u>	<u>3.9</u>	<u>-1.1</u>	<u>11.5</u>	<u>-7.4</u>	<u>89.6</u>	<u>118.0</u>	<u>81.0</u>	<u>97.1</u>	<u>64.3</u>	-	<u>153.4</u>	<u>101.9</u>	<u>51.5</u>	
Max.	6.7	45.1	8.2	10.5	6.4	24.8	3.8	97.7	232.0	203.3	220.7	183.2	-	341.9	341.9	188.1	
Min.	3.1	13.3	-9.6	-7.4	-11.9	0.2	-25.7	79.1	26.3	0.0	0.0	0.0	-	61.9	0.0	0.0	
<b>Total</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	<u>1380.3</u>	<u>917.2</u>	<u>463.1</u>	

*Notes:*

*dash (-) = data not available or not applicable*

*Underlined values are calculated from partially or completely gap-filled daily data*

APPENDIX B      JOHNNY MOUNTAIN DAILY METEOROLOGICAL DATA

Johnny Mountain 2016 Daily Meteorological Data

Johnny Mountain 2017 Daily Meteorological Data

Johnny Mountain 2018 Daily Meteorological Data

Johnny Mountain 2019 Daily Meteorological Data

Johnny Mountain 2020 Daily Meteorological Data

Appendix B1: Johnny Mountain 2016 Daily Meteorological Data

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation after Gap Fill (mm)		
	Mean	Max.	Mean	Max.	Min.	Mean	Mean	Mean	Total	Precipitation	Rainfall	SWE
										Total	Total	Total
29-Jul-16	3.6	6.9	6.8	9.5	6.4	94.9	107.6	0.0	0.0	0.0	0.0	0.0
30-Jul-16	2.8	7.6	8.1	12.3	5.7	89.9	277.6	0.0	0.0	0.0	0.0	0.0
31-Jul-16	1.9	5.1	7.6	9.4	6.4	95.3	93.8	0.0	0.3	0.3	0.3	0.0
1-Aug-16	1.6	5.7	8.2	10.2	7.0	89.3	111.1	0.0	0.0	0.0	0.0	0.0
2-Aug-16	2.8	7.9	8.1	11.5	6.3	89.5	165.6	0.0	0.0	0.0	0.0	0.0
3-Aug-16	3.9	10.0	7.6	9.6	5.9	97.1	78.3	0.0	6.2	6.2	6.2	0.0
4-Aug-16	1.9	6.0	7.8	12.4	5.2	93.0	163.3	0.0	2.8	2.8	2.8	0.0
5-Aug-16	1.9	4.9	12.6	18.3	7.6	77.4	309.6	0.0	0.0	0.0	0.0	0.0
6-Aug-16	1.4	4.8	15.8	19.7	12.7	63.9	299.3	0.0	0.0	0.0	0.0	0.0
7-Aug-16	2.2	7.6	15.1	18.8	11.5	73.0	305.3	0.0	0.2	0.2	0.2	0.0
8-Aug-16	3.7	8.4	10.2	12.0	9.1	95.2	109.5	0.0	5.7	5.7	5.7	0.0
9-Aug-16	3.7	8.5	9.9	12.2	8.8	96.0	124.7	0.0	1.2	1.2	1.2	0.0
10-Aug-16	4.7	9.5	8.4	9.9	7.4	97.2	54.1	0.0	10.0	10.0	10.0	0.0
11-Aug-16	4.2	9.5	9.6	11.2	8.7	99.0	110.7	0.0	1.0	1.0	1.0	0.0
12-Aug-16	2.1	4.5	10.5	12.9	8.8	96.1	140.7	0.0	0.0	0.0	0.0	0.0
13-Aug-16	3.9	9.6	10.5	11.9	9.5	88.7	101.2	0.0	0.5	0.5	0.5	0.0
14-Aug-16	3.8	9.5	9.7	10.8	8.9	97.6	71.0	0.0	7.1	7.1	7.1	0.0
15-Aug-16	4.8	14.7	9.0	10.0	6.5	99.3	43.9	0.0	29.8	29.8	29.8	0.0
16-Aug-16	2.5	5.9	7.4	10.3	5.4	90.4	168.2	0.0	0.0	0.0	0.0	0.0
17-Aug-16	1.9	8.1	8.9	13.4	5.3	83.8	256.4	0.0	0.1	0.1	0.1	0.0
18-Aug-16	2.9	8.7	10.7	14.1	9.1	85.9	141.3	0.0	1.0	1.0	1.0	0.0
19-Aug-16	3.4	7.7	10.1	11.6	8.8	92.0	126.3	0.0	0.7	0.7	0.7	0.0
20-Aug-16	3.0	8.0	9.5	13.2	6.9	89.2	160.0	0.0	0.0	0.0	0.0	0.0
21-Aug-16	2.7	6.2	9.2	14.5	5.1	79.5	206.8	0.0	0.0	0.0	0.0	0.0
22-Aug-16	3.7	10.2	9.9	13.9	7.5	83.3	214.9	0.0	0.1	0.1	0.1	0.0
23-Aug-16	3.3	5.7	9.6	11.8	10.0	95.5	98.7	0.0	0.1	0.1	0.1	0.0
24-Aug-16	2.0	6.5	12.3	16.4	9.3	87.3	247.0	0.0	0.0	0.0	0.0	0.0
25-Aug-16	2.0	5.1	12.2	15.3	9.4	89.6	170.5	0.0	0.2	0.2	0.2	0.0
26-Aug-16	4.7	11.6	10.2	12.6	8.5	95.9	52.1	0.0	3.8	3.8	3.8	0.0
27-Aug-16	6.3	16.5	11.6	15.8	8.2	65.6	228.8	0.0	0.0	0.0	0.0	0.0
28-Aug-16	5.6	18.2	11.2	13.7	7.3	60.1	175.8	0.0	0.1	0.1	0.1	0.0
29-Aug-16	2.0	8.3	7.1	8.7	5.6	85.2	61.8	0.0	5.5	5.5	5.5	0.0
30-Aug-16	3.1	11.5	7.8	10.9	5.9	92.3	102.1	0.0	0.9	0.9	0.9	0.0
31-Aug-16	2.6	9.4	7.7	9.2	6.4	95.6	126.5	0.0	2.6	2.6	2.6	0.0

Notes:

dash (-) = erroneous data that was removed

<sup>1</sup> Adjusted to compensate for wind undercatch

Appendix B1: Johnny Mountain 2016 Daily Meteorological Data

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation after Gap Fill (mm)		
	Mean	Max.	Mean	Max.	Min.	Mean	Mean	Mean	Total	Precipitation	Rainfall	SWE
										Total	Total	Total
1-Sep-16	2.2	5.1	7.5	9.4	6.5	93.1	87.8	0.0	0.2	0.2	0.2	0.0
2-Sep-16	1.7	5.5	7.1	9.0	5.6	93.6	82.6	0.0	0.3	0.3	0.3	0.0
3-Sep-16	4.3	10.5	8.1	10.8	5.7	75.2	144.0	0.0	0.0	0.0	0.0	0.0
4-Sep-16	2.4	6.1	7.9	9.7	6.7	81.6	130.3	0.0	1.1	1.1	1.1	0.0
5-Sep-16	2.6	6.0	6.8	8.5	5.7	87.4	107.8	0.0	1.0	1.0	1.0	0.0
6-Sep-16	4.1	9.2	6.3	7.5	5.6	98.7	60.2	0.0	8.2	8.2	8.2	0.0
7-Sep-16	2.3	6.6	5.3	6.2	4.6	96.8	50.6	0.0	16.1	16.1	16.1	0.0
8-Sep-16	3.4	9.6	5.4	6.5	4.6	98.0	53.1	0.0	2.2	2.2	2.2	0.0
9-Sep-16	6.4	23.3	6.0	10.4	3.3	96.7	49.5	0.0	26.8	26.8	26.8	0.0
10-Sep-16	3.6	16.8	4.3	7.3	2.2	92.7	135.8	0.0	3.5	3.5	3.5	0.0
11-Sep-16	2.5	5.3	6.4	10.6	2.9	86.3	205.4	0.0	0.0	0.0	0.0	0.0
12-Sep-16	3.5	9.8	7.7	10.8	5.1	76.8	144.0	0.0	0.0	0.0	0.0	0.0
13-Sep-16	5.6	11.2	7.6	8.7	5.3	94.8	32.0	0.0	29.0	29.0	29.0	0.0
14-Sep-16	4.2	10.0	7.3	8.4	6.2	99.0	52.0	0.0	2.4	2.4	2.4	0.0
15-Sep-16	6.2	14.2	7.2	9.8	5.0	95.4	63.5	0.0	8.8	8.8	8.8	0.0
16-Sep-16	4.2	11.9	6.7	8.4	4.8	93.8	69.2	0.0	8.6	8.6	8.6	0.0
17-Sep-16	3.5	8.6	4.6	6.5	3.6	96.1	70.1	0.0	5.1	5.1	5.1	0.0
18-Sep-16	2.1	5.0	5.4	8.4	3.6	90.2	125.3	0.0	0.6	0.6	0.6	0.0
19-Sep-16	1.7	4.6	6.4	10.0	4.3	86.7	130.0	0.0	0.0	0.0	0.0	0.0
20-Sep-16	2.0	6.8	7.3	10.8	5.0	79.7	180.5	0.0	0.0	0.0	0.0	0.0
21-Sep-16	3.2	9.0	7.5	11.2	4.8	68.7	181.3	0.0	0.0	0.0	0.0	0.0
22-Sep-16	3.8	17.4	7.1	11.4	3.9	57.1	67.0	0.0	12.1	12.1	12.1	0.0
23-Sep-16	3.8	9.9	2.6	3.9	1.6	97.9	42.5	0.0	17.6	17.6	17.6	0.0
24-Sep-16	3.4	7.9	2.6	4.0	1.7	95.3	33.9	0.0	6.6	6.6	6.6	0.0
25-Sep-16	2.2	9.7	3.7	5.2	1.8	93.9	29.0	0.0	36.7	36.7	36.7	0.0
26-Sep-16	4.3	10.6	2.2	4.0	0.2	99.0	52.3	0.0	14.7	14.7	14.7	0.0
27-Sep-16	4.0	8.5	1.4	3.6	-0.1	94.9	85.0	0.0	0.4	0.5	0.3	0.2
28-Sep-16	2.5	9.9	3.6	6.4	1.9	83.8	105.5	0.0	0.0	0.0	0.0	0.0
29-Sep-16	6.8	14.3	3.9	6.6	0.2	65.2	153.6	0.0	0.0	0.0	0.0	0.0
30-Sep-16	13.5	23.8	2.0	3.7	-0.3	68.7	64.9	0.0	0.0	0.0	0.0	0.0

Notes:

dash (-) = erroneous data that was removed

<sup>1</sup> Adjusted to compensate for wind undercatch

Appendix B1: Johnny Mountain 2016 Daily Meteorological Data

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation after Gap Fill (mm)		
	Mean	Max.	Mean	Max.	Min.	Mean	Mean	Mean	Total	Precipitation	Rainfall	SWE
										Total	Total	Total
1-Oct-16	6.9	16.6	2.5	4.6	0.8	62.5	134.8	0.0	2.2	2.2	2.2	0.0
2-Oct-16	2.9	7.5	2.7	5.1	0.7	63.2	110.7	0.0	0.3	0.3	0.3	0.0
3-Oct-16	3.0	12.0	2.9	4.9	0.9	72.1	38.2	0.0	0.0	0.0	0.0	0.0
4-Oct-16	1.8	10.5	3.2	4.9	1.1	74.5	77.0	0.0	0.1	0.1	0.1	0.0
5-Oct-16	1.3	5.3	1.6	3.0	0.4	93.7	39.4	0.0	1.4	1.4	1.1	0.3
6-Oct-16	5.7	17.9	1.8	3.7	0.2	85.9	51.8	0.0	0.0	0.0	0.0	0.0
7-Oct-16	11.5	24.0	2.8	4.0	1.4	60.6	95.8	0.0	0.0	0.0	0.0	0.0
8-Oct-16	6.2	15.5	0.8	2.3	-0.4	66.7	43.8	0.0	0.0	0.0	0.0	0.0
9-Oct-16	4.2	13.7	0.4	3.1	-2.3	61.7	127.6	0.0	0.7	0.9	0.2	0.8
10-Oct-16	1.5	3.9	1.7	5.7	-2.1	61.4	127.0	0.0	0.0	0.0	0.0	0.0
11-Oct-16	2.2	7.2	2.9	5.9	0.2	49.4	122.9	0.0	0.0	0.0	0.0	0.0
12-Oct-16	2.2	10.4	2.8	6.6	0.3	44.8	115.1	0.0	0.0	0.0	0.0	0.0
13-Oct-16	5.9	17.1	0.2	4.3	-2.0	73.3	31.2	0.0	1.0	1.4	0.1	1.3
14-Oct-16	3.3	12.7	-2.0	-0.2	-2.8	94.9	71.6	0.0	2.1	2.7	0.0	2.7
15-Oct-16	2.3	7.6	-0.9	1.1	-2.6	96.4	48.5	0.0	3.7	4.3	0.0	4.3
16-Oct-16	2.0	6.5	-0.8	1.5	-2.9	83.3	56.5	0.0	0.0	0.0	0.0	0.0
17-Oct-16	2.0	5.7	1.5	3.2	0.2	83.6	32.9	0.0	0.1	0.2	0.1	0.0
18-Oct-16	2.3	7.2	2.1	3.9	0.2	84.1	41.9	0.0	4.8	4.8	4.8	0.0
19-Oct-16	2.3	12.1	0.7	3.4	-0.4	94.9	17.1	0.0	13.5	15.0	4.6	10.4
20-Oct-16	1.7	7.5	0.4	1.4	-0.1	96.3	12.8	0.0	4.0	4.4	0.7	3.7
21-Oct-16	2.0	7.5	1.1	2.3	0.0	89.5	34.2	0.0	11.1	11.8	6.2	5.7
22-Oct-16	3.1	12.6	1.2	4.2	-0.4	88.8	51.9	1.8	2.8	3.1	1.6	1.5
23-Oct-16	8.0	20.4	1.8	3.0	0.3	74.8	32.9	5.6	0.1	0.1	0.1	0.0
24-Oct-16	6.5	17.9	2.5	4.4	0.2	72.2	73.7	2.5	0.0	0.0	0.0	0.0
25-Oct-16	9.6	22.0	2.4	3.9	0.7	70.6	85.7	0.0	0.6	0.6	0.6	0.0
26-Oct-16	1.7	8.4	0.3	1.9	-1.0	94.2	47.5	0.0	1.7	1.8	0.3	1.5
27-Oct-16	1.5	9.0	1.4	5.6	-1.8	84.6	47.2	0.0	0.0	0.0	0.0	0.0
28-Oct-16	1.2	3.3	1.9	4.8	0.3	83.0	78.0	0.0	0.3	0.3	0.2	0.0
29-Oct-16	2.8	10.7	-0.1	3.2	-2.3	81.3	78.5	0.0	0.0	0.0	0.0	0.0
30-Oct-16	1.0	4.3	-0.8	3.8	-3.2	79.7	65.4	0.0	0.0	0.0	0.0	0.0
31-Oct-16	1.5	5.4	-0.7	2.7	-2.9	82.9	68.0	0.0	0.0	0.0	0.0	0.0

Notes:

dash (-) = erroneous data that was removed

<sup>1</sup> Adjusted to compensate for wind undercatch

**Appendix B1: Johnny Mountain 2016 Daily Meteorological Data**

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation after Gap Fill (mm)					
	Mean	Max.	Mean	Max.	Min.					Mean	Mean	Total	Precipitation	Rainfall	SWE
													Total	Total	Total
1-Nov-16	3.3	7.5	-0.3	0.7	-1.0	88.5	27.4	0.0	3.0	3.8	0.0	3.8			
2-Nov-16	5.1	20.8	-0.8	2.0	-2.8	90.2	33.5	2.4	5.0	7.2	0.0	7.2			
3-Nov-16	5.7	20.5	1.0	3.9	-0.1	94.6	22.8	0.0	14.4	17.9	7.5	10.4			
4-Nov-16	3.9	18.7	1.5	3.5	-0.1	95.2	14.7	0.0	22.8	24.5	17.6	6.9			
5-Nov-16	5.3	14.4	0.3	1.4	-0.1	97.9	31.7	0.0	3.8	5.3	0.6	4.7			
6-Nov-16	3.9	21.4	0.1	2.7	-0.9	93.4	10.8	6.6	5.2	6.8	0.3	6.4			
7-Nov-16	3.9	22.7	0.5	2.3	-0.6	94.3	8.9	9.0	23.8	29.5	5.8	23.7			
8-Nov-16	4.9	12.5	1.0	2.5	0.0	96.3	23.4	10.6	8.8	10.6	4.6	6.0			
9-Nov-16	3.9	13.5	1.7	5.1	0.0	89.9	30.2	8.8	6.8	7.1	5.8	1.3			
10-Nov-16	4.6	16.3	3.1	6.0	0.4	78.0	12.0	7.5	11.0	11.0	11.0	0.0			
11-Nov-16	7.5	15.3	1.3	3.0	0.0	86.3	25.2	5.6	1.6	2.1	1.1	1.0			
12-Nov-16	2.0	8.0	0.7	4.1	-0.7	81.9	43.2	4.4	0.8	0.9	0.3	0.6			
13-Nov-16	4.8	16.7	-0.4	1.4	-2.0	98.2	16.9	8.9	16.5	23.3	0.0	23.3			
14-Nov-16	2.0	6.4	-1.8	-0.2	-2.5	97.6	25.0	18.1	5.5	6.3	0.0	6.3			
15-Nov-16	1.1	5.0	-3.0	-1.6	-5.5	95.2	39.2	25.3	7.4	7.9	0.0	7.9			
16-Nov-16	6.4	16.2	-3.6	-1.0	-6.2	74.0	51.8	23.9	0.0	0.0	0.0	0.0			
17-Nov-16	3.1	11.9	-5.8	-3.3	-7.7	78.7	36.1	21.8	1.1	1.4	0.0	1.4			
18-Nov-16	1.2	5.3	-7.3	-6.1	-8.6	94.7	24.6	20.7	0.2	0.2	0.0	0.2			
19-Nov-16	0.9	4.7	-8.3	-6.5	-9.9	94.9	17.9	20.3	0.3	0.3	0.0	0.3			
20-Nov-16	0.7	1.8	-10.8	-8.3	-12.5	92.4	16.6	19.2	0.0	0.0	0.0	0.0			
21-Nov-16	2.9	11.4	-11.0	-6.4	-13.6	86.0	18.9	19.4	0.1	0.1	0.0	0.1			
22-Nov-16	4.3	11.2	-5.7	-2.9	-10.3	91.4	24.7	21.6	2.5	3.4	0.0	3.4			
23-Nov-16	2.7	10.3	-3.2	-0.8	-4.2	90.8	20.0	25.9	3.6	4.3	0.0	4.3			
24-Nov-16	2.7	14.1	-2.8	-0.1	-5.2	89.3	21.3	21.1	1.3	1.6	0.0	1.6			
25-Nov-16	3.5	9.0	-3.6	-2.7	-4.5	92.8	17.7	23.6	0.4	0.5	0.0	0.5			
26-Nov-16	2.5	9.0	-4.9	-2.6	-6.8	72.3	36.1	23.2	0.0	0.0	0.0	0.0			
27-Nov-16	2.7	7.7	-5.2	-3.8	-6.7	91.5	15.4	27.1	5.6	6.7	0.0	6.7			
28-Nov-16	2.8	7.7	-4.3	-2.7	-6.1	94.5	19.6	28.9	1.8	2.2	0.0	2.2			
29-Nov-16	6.0	20.8	-1.0	3.2	-3.5	96.8	9.9	41.4	12.3	19.0	0.0	19.0			
30-Nov-16	1.5	4.3	-3.8	-1.0	-7.1	97.6	24.4	40.9	0.1	0.1	0.0	0.1			

**Notes:**

dash (-) = erroneous data that was removed

<sup>1</sup> Adjusted to compensate for wind undercatch

Appendix B1: Johnny Mountain 2016 Daily Meteorological Data

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation after Gap Fill (mm)		
	Mean	Max.	Mean	Max.	Min.	Mean	Mean	Mean	Total	Precipitation	Rainfall	SWE
										Total	Total	Total
1-Dec-16	2.3	9.1	-3.8	-1.5	-6.5	96.1	11.4	41.8	8.4	9.8	0.0	9.8
2-Dec-16	6.0	16.3	-2.0	-1.3	-4.4	98.9	8.3	42.2	9.9	15.3	0.0	15.3
3-Dec-16	4.9	17.0	-5.6	-4.4	-6.8	96.8	15.4	40.5	0.9	1.3	0.0	1.3
4-Dec-16	3.3	15.2	-9.1	-6.1	-11.2	94.0	29.6	39.9	0.0	0.0	0.0	0.0
5-Dec-16	8.7	17.7	-13.8	-9.7	-18.0	80.5	39.8	39.2	0.0	0.0	0.0	0.0
6-Dec-16	1.3	4.1	-17.0	-14.0	-18.8	85.0	20.8	39.1	0.3	0.3	0.0	0.3
7-Dec-16	1.6	4.0	-15.6	-13.4	-17.2	78.0	17.3	39.0	0.0	0.0	0.0	0.0
8-Dec-16	3.2	12.8	-13.4	-11.4	-16.2	57.5	37.2	38.8	0.1	0.1	0.0	0.1
9-Dec-16	2.6	12.4	-18.0	-13.2	-23.3	67.0	38.5	37.9	0.0	0.0	0.0	0.0
10-Dec-16	6.7	25.7	-22.8	-16.9	-25.9	71.3	37.5	38.1	0.0	0.0	0.0	0.0
11-Dec-16	9.8	27.6	-16.3	-12.8	-19.5	50.1	35.2	35.2	0.9	1.9	0.0	1.9
12-Dec-16	2.6	12.6	-17.6	-14.3	-19.8	63.4	33.0	35.4	0.4	0.5	0.0	0.5
13-Dec-16	1.5	4.6	-12.5	-6.8	-17.4	50.6	33.4	35.0	0.0	0.0	0.0	0.0
14-Dec-16	3.6	16.3	-13.5	-9.7	-18.3	52.4	31.4	34.8	0.8	1.1	0.0	1.1
15-Dec-16	9.0	22.1	-14.1	-10.9	-17.2	54.3	32.3	34.4	0.0	0.0	0.0	0.0
16-Dec-16	2.9	7.2	-12.5	-7.5	-16.8	54.9	15.5	35.0	0.0	0.0	0.0	0.0
17-Dec-16	4.6	9.9	-5.7	-3.8	-7.8	96.5	9.3	39.3	5.0	6.9	0.0	6.9
18-Dec-16	5.5	16.0	-3.0	-2.0	-4.6	98.3	3.9	54.0	15.5	23.1	0.0	23.1
19-Dec-16	-	-	-4.6	-4.1	-5.1	97.4	7.0	55.0	1.6	1.6	0.0	1.6
20-Dec-16	-	-	-4.6	-3.5	-5.7	97.4	8.5	55.0	5.5	5.5	0.0	5.5
21-Dec-16	-	-	-4.6	-3.7	-5.1	97.4	3.7	55.5	6.3	6.3	0.0	6.3
22-Dec-16	-	-	-5.8	-1.6	-9.2	96.4	11.7	54.3	0.0	0.0	0.0	0.0
23-Dec-16	-	-	-11.0	-8.9	-13.1	92.5	12.6	54.6	0.0	0.0	0.0	0.0
24-Dec-16	-	-	-12.7	-11.4	-13.8	90.9	13.0	55.0	0.6	0.6	0.0	0.6
25-Dec-16	-	-	-10.3	-8.8	-12.0	89.7	14.4	55.8	0.3	0.3	0.0	0.3
26-Dec-16	-	-	-7.9	-6.4	-9.7	95.2	9.8	68.9	9.3	9.3	0.0	9.3
27-Dec-16	-	-	-4.2	-3.5	-6.5	97.5	10.0	80.2	3.2	3.2	0.0	3.2
28-Dec-16	-	-	-4.8	-4.0	-6.3	97.0	9.5	78.3	1.1	1.1	0.0	1.1
29-Dec-16	-	-	-8.1	-6.1	-9.3	94.6	19.0	78.2	0.0	0.0	0.0	0.0
30-Dec-16	-	-	-6.1	-3.9	-9.2	96.1	11.6	75.2	1.5	1.5	0.0	1.5
31-Dec-16	-	24.5	-6.8	-3.5	-9.1	73.4	43.8	74.3	1.4	1.4	0.0	1.4

Notes:

dash (-) = erroneous data that was removed

<sup>1</sup> Adjusted to compensate for wind undercatch



Appendix B2: Johnny Mountain November 2016 - October 2017 Daily Meteorological Data

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation after Gap Fill (mm)		
	Mean	Max.	Mean	Max.	Min.	Mean	Mean	Mean	Total	Precipitation	Rainfall	SWE
										Total	Total	Total
1-Jan-17	9.7	20.9	-5.5	-2.6	-8.1	62.2	31.6	70.1	0.0	0.0	0.0	0.0
2-Jan-17	9.3	16.0	-2.3	1.0	-5.3	59.0	31.2	68.6	2.3	4.6	0.0	4.6
3-Jan-17	4.1	15.3	-3.1	0.3	-7.1	55.5	23.7	67.4	0.7	1.0	0.0	1.0
4-Jan-17	1.0	3.2	-3.5	-0.6	-8.4	51.9	32.3	67.1	0.1	0.1	0.0	0.1
5-Jan-17	3.0	18.2	-8.7	-5.2	-11.9	73.3	18.3	67.3	0.0	0.0	0.0	0.0
6-Jan-17	16.9	35.2	-10.9	-9.8	-12.3	72.6	24.3	65.0	0.0	0.0	0.0	0.0
7-Jan-17	18.8	31.8	-13.1	-10.2	-17.4	66.7	27.5	53.0	0.0	0.0	0.0	0.0
8-Jan-17	17.4	40.9	-12.2	-2.7	-18.7	48.7	34.6	51.6	0.0	0.0	0.0	0.0
9-Jan-17	19.2	42.3	-12.4	-8.2	-14.3	47.3	36.2	46.4	0.0	0.0	0.0	0.0
10-Jan-17	10.8	23.4	-10.9	-7.1	-15.1	59.2	36.4	45.9	0.0	0.0	0.0	0.0
11-Jan-17	1.8	6.7	-8.9	-4.5	-12.8	53.3	34.2	46.1	0.0	0.0	0.0	0.0
12-Jan-17	4.7	10.3	-7.0	-5.3	-10.9	91.1	13.1	47.1	2.0	2.8	0.0	2.8
13-Jan-17	5.0	17.1	-3.8	-2.1	-5.5	97.6	10.5	52.8	12.2	17.5	0.0	17.5
14-Jan-17	4.9	17.6	-1.4	-0.9	-2.5	99.0	10.4	57.0	14.1	20.2	0.0	20.2
15-Jan-17	5.2	20.2	-1.4	0.0	-2.0	99.1	11.6	61.8	15.0	21.9	0.0	21.9
16-Jan-17	9.5	21.5	-0.9	-0.2	-1.9	99.2	12.8	61.4	0.0	0.0	0.0	0.0
17-Jan-17	2.7	7.7	-1.2	0.1	-2.1	99.0	17.9	60.8	0.0	0.0	0.0	0.0
18-Jan-17	2.9	9.0	-0.3	0.5	-1.1	98.9	18.2	62.5	11.9	14.6	0.0	14.6
19-Jan-17	3.4	9.6	-2.8	-0.8	-5.9	98.3	13.4	69.4	4.2	5.4	0.0	5.4
20-Jan-17	5.4	22.3	-7.1	-5.8	-9.9	91.0	13.0	75.1	0.4	0.6	0.0	0.6
21-Jan-17	2.5	20.2	-12.1	-6.0	-14.7	87.3	56.1	61.1	0.7	0.9	0.0	0.9
22-Jan-17	2.0	7.9	-7.5	-4.7	-13.0	85.7	27.7	61.7	0.3	0.4	0.0	0.4
23-Jan-17	2.5	6.9	-4.4	-3.2	-6.1	93.0	16.3	62.5	1.3	1.5	0.0	1.5
24-Jan-17	4.1	13.7	-3.1	-0.5	-5.0	97.9	16.3	63.8	3.6	4.9	0.0	4.9
25-Jan-17	4.5	15.7	-1.8	0.5	-2.9	97.8	15.9	65.6	4.0	5.6	0.0	5.6
26-Jan-17	4.4	12.8	-1.9	-0.8	-2.9	97.9	18.6	63.4	5.5	7.5	0.0	7.5
27-Jan-17	4.0	14.3	-0.6	0.1	-1.6	99.2	21.3	64.5	24.2	32.3	0.0	32.3
28-Jan-17	3.9	12.7	-1.0	-0.1	-2.4	99.1	21.6	77.2	14.1	18.7	0.0	18.7
29-Jan-17	3.3	7.3	-4.7	-2.2	-8.3	97.0	33.6	82.5	6.6	8.3	0.0	8.3
30-Jan-17	3.0	9.6	-7.8	-5.3	-10.0	94.7	60.1	82.1	0.0	0.0	0.0	0.0
31-Jan-17	1.2	4.7	-10.8	-2.5	-13.3	91.9	84.9	79.3	0.3	0.3	0.0	0.3

Notes:

dash (-) = erroneous data that was removed

<sup>1</sup> Adjusted to compensate for wind undercatch

Appendix B2: Johnny Mountain November 2016 - October 2017 Daily Meteorological Data

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation after Gap Fill (mm)		
	Mean	Max.	Mean	Max.	Min.	Mean	Mean	Mean	Total	Precipitation	Rainfall	SWE
										Total	Total	Total
1-Feb-17	2.2	11.2	-12.3	-8.7	-14.2	77.4	62.7	79.0	0.0	0.0	0.0	0.0
2-Feb-17	12.2	25.5	-9.6	-7.2	-12.1	59.2	66.4	78.0	0.0	0.0	0.0	0.0
3-Feb-17	18.5	34.0	-13.2	-11.4	-14.9	56.1	45.5	66.7	0.0	0.0	0.0	0.0
4-Feb-17	17.7	35.0	-10.2	-6.8	-13.3	50.0	53.3	60.7	0.0	0.0	0.0	0.0
5-Feb-17	15.1	26.2	-9.6	-8.2	-10.9	45.5	67.0	59.3	0.0	0.0	0.0	0.0
6-Feb-17	14.8	30.5	-11.7	-9.2	-15.5	44.6	46.2	58.6	0.4	1.1	0.0	1.1
7-Feb-17	13.1	34.1	-15.2	-13.2	-17.2	39.4	77.2	57.9	0.0	0.0	0.0	0.0
8-Feb-17	1.7	11.6	-15.7	-11.9	-18.0	43.0	79.0	58.1	0.1	0.1	0.0	0.1
9-Feb-17	1.7	4.3	-15.9	-11.3	-19.3	49.5	81.7	58.2	0.0	0.0	0.0	0.0
10-Feb-17	3.9	9.2	-9.9	-7.3	-12.5	73.9	32.4	60.7	1.9	2.5	0.0	2.5
11-Feb-17	7.2	17.2	-4.4	-1.9	-7.5	97.3	22.7	64.4	2.2	3.7	0.0	3.7
12-Feb-17	-	18.9	-1.5	-1.0	-2.0	99.2	12.3	72.4	13.7	13.7	0.0	13.7
13-Feb-17	-	13.1	1.0	4.7	-1.0	92.5	24.1	77.8	18.8	18.8	9.7	9.1
14-Feb-17	4.7	19.0	2.3	6.2	0.2	78.4	23.7	77.4	6.2	6.2	6.2	0.0
15-Feb-17	2.3	9.6	-0.9	1.2	-4.8	98.5	16.4	81.5	8.7	10.2	0.0	10.2
16-Feb-17	-	-	-4.6	-1.1	-5.9	96.6	25.4	81.3	0.6	0.6	0.0	0.6
17-Feb-17	-	-	-6.2	-2.6	-7.7	91.4	69.5	81.0	0.2	0.2	0.0	0.2
18-Feb-17	-	19.3	-7.4	-5.4	-9.8	72.3	113.6	82.0	0.1	0.1	0.0	0.1
19-Feb-17	2.6	16.7	-7.1	-2.7	-10.0	59.2	107.1	75.8	0.3	0.4	0.0	0.4
20-Feb-17	0.9	2.4	-7.1	-3.7	-9.1	66.3	90.2	76.5	0.0	0.0	0.0	0.0
21-Feb-17	2.2	5.4	-7.8	-5.6	-10.6	84.1	62.1	75.8	0.4	0.5	0.0	0.5
22-Feb-17	2.3	5.7	-9.0	-6.4	-11.4	75.4	112.7	76.3	0.0	0.0	0.0	0.0
23-Feb-17	4.7	16.5	-8.1	-5.8	-10.3	76.3	108.6	76.6	0.0	0.0	0.0	0.0
24-Feb-17	6.0	15.9	-7.7	-4.9	-10.4	56.6	114.1	76.3	0.2	0.3	0.0	0.3
25-Feb-17	8.7	24.6	-6.4	-4.7	-8.3	75.3	80.0	77.2	0.4	0.7	0.0	0.7
26-Feb-17	5.0	18.7	-7.6	-6.1	-10.3	57.3	85.5	75.6	0.2	0.2	0.0	0.2
27-Feb-17	3.8	13.6	-8.7	-4.4	-10.9	60.3	126.9	75.6	0.1	0.1	0.0	0.1
28-Feb-17	2.9	9.0	-10.1	-8.6	-11.8	80.7	48.3	76.7	5.0	6.1	0.0	6.1

Notes:

dash (-) = erroneous data that was removed

<sup>1</sup> Adjusted to compensate for wind undercatch

Appendix B2: Johnny Mountain November 2016 - October 2017 Daily Meteorological Data

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation after Gap Fill (mm)		
	Mean	Max.	Mean	Max.	Min.	Mean	Mean	Mean	Total	Precipitation	Rainfall	SWE
										Total	Total	Total
1-Mar-17	3.3	7.4	-8.1	-6.5	-9.3	94.2	68.1	80.4	3.0	3.8	0.0	3.8
2-Mar-17	3.7	10.7	-5.9	-2.7	-8.8	96.1	40.4	106.6	17.6	23.0	0.0	23.0
3-Mar-17	5.7	19.4	-10.3	-8.6	-14.5	92.8	50.5	107.8	1.1	1.6	0.0	1.6
4-Mar-17	10.9	20.9	-16.1	-14.2	-18.1	82.8	105.4	77.9	0.4	0.9	0.0	0.9
5-Mar-17	4.2	12.7	-16.3	-13.6	-18.5	82.9	94.2	75.2	0.0	0.0	0.0	0.0
6-Mar-17	9.4	16.2	-17.2	-15.9	-18.3	76.1	100.3	75.1	0.0	0.0	0.0	0.0
7-Mar-17	9.7	22.2	-16.5	-14.6	-18.2	83.9	94.1	75.1	0.2	0.5	0.0	0.5
8-Mar-17	2.4	14.2	-16.2	-13.2	-18.2	85.7	99.1	75.2	0.3	0.4	0.0	0.4
9-Mar-17	10.4	24.2	-15.6	-13.5	-18.3	68.9	157.4	74.7	0.0	0.0	0.0	0.0
10-Mar-17	9.2	26.4	-17.0	-15.2	-18.8	61.2	152.4	73.1	0.1	0.2	0.0	0.2
11-Mar-17	10.2	20.1	-15.4	-11.9	-20.1	68.9	102.4	73.4	0.0	0.0	0.0	0.0
12-Mar-17	6.4	14.9	-9.1	-2.0	-13.9	92.9	48.7	73.9	11.5	18.3	0.0	18.3
13-Mar-17	5.0	12.3	-2.1	-1.0	-3.7	98.5	66.1	92.7	16.6	23.8	0.0	23.8
14-Mar-17	-	17.9	-3.2	-0.9	-6.0	98.0	59.2	118.5	25.5	25.5	0.0	25.5
15-Mar-17	-	10.0	-5.2	-2.1	-6.7	96.7	92.5	114.7	4.5	4.5	0.0	4.5
16-Mar-17	-	-	-5.4	-3.0	-7.0	96.5	88.1	116.2	2.9	2.9	0.0	2.9
17-Mar-17	-	-	-6.1	-3.6	-8.4	91.3	128.1	113.8	1.6	1.6	0.0	1.6
18-Mar-17	-	-	-7.4	-2.4	-9.7	81.4	116.6	110.6	2.5	2.5	0.0	2.5
19-Mar-17	3.8	8.6	-6.7	-4.2	-8.6	79.0	154.4	111.6	0.0	0.0	0.0	0.0
20-Mar-17	1.9	6.8	-4.8	-1.7	-6.8	73.9	167.5	110.1	0.1	0.1	0.0	0.1
21-Mar-17	1.5	11.0	-3.7	0.3	-6.5	59.6	183.2	109.0	0.0	0.0	0.0	0.0
22-Mar-17	2.7	10.6	-3.4	-1.6	-5.2	89.4	92.9	111.4	4.6	5.5	0.0	5.5
23-Mar-17	3.7	13.3	-4.3	-1.2	-6.1	82.8	151.7	105.9	0.3	0.4	0.0	0.4
24-Mar-17	3.3	10.4	-3.7	-1.8	-6.1	87.1	108.6	109.2	3.4	4.3	0.0	4.3
25-Mar-17	4.1	12.1	-3.0	-1.4	-5.7	97.5	110.6	121.8	8.5	11.5	0.0	11.5
26-Mar-17	3.2	15.7	-3.4	-0.3	-6.0	78.8	190.9	123.1	0.0	0.0	0.0	0.0
27-Mar-17	2.2	8.5	-1.7	0.5	-3.7	94.4	100.4	125.0	7.6	8.9	0.0	8.9
28-Mar-17	1.9	6.6	-1.0	1.7	-2.6	96.4	126.9	125.2	1.8	2.0	0.0	2.0
29-Mar-17	2.1	7.6	-1.2	0.7	-2.2	97.0	122.6	123.3	3.5	4.1	0.0	4.1
30-Mar-17	4.4	15.3	-1.7	0.1	-3.1	92.8	157.0	123.0	4.3	6.0	0.0	6.0
31-Mar-17	4.1	11.9	-1.5	0.0	-3.0	98.5	73.9	128.4	12.7	17.0	0.0	17.0

Notes:

dash (-) = erroneous data that was removed

<sup>1</sup> Adjusted to compensate for wind undercatch

Appendix B2: Johnny Mountain November 2016 - October 2017 Daily Meteorological Data

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation after Gap Fill (mm)		
	Mean	Max.	Mean	Max.	Min.	Mean	Mean	Mean	Total	Precipitation	Rainfall	SWE
										Total	Total	Total
1-Apr-17	4.1	10.5	-1.4	0.4	-3.5	98.5	118.5	134.1	7.8	10.4	0.0	10.4
2-Apr-17	4.0	10.5	-3.8	-1.3	-5.1	96.9	164.1	133.9	1.4	1.9	0.0	1.9
3-Apr-17	2.3	5.6	-2.7	0.6	-5.6	82.4	232.3	132.0	0.0	0.0	0.0	0.0
4-Apr-17	6.2	20.5	0.4	2.9	-1.7	60.6	121.4	129.8	0.6	0.8	0.1	0.7
5-Apr-17	4.8	15.4	-1.0	1.6	-2.7	92.7	136.0	129.5	6.2	8.8	0.0	8.8
6-Apr-17	3.1	10.3	-1.1	2.4	-3.4	76.1	230.7	128.6	0.4	0.6	0.0	0.6
7-Apr-17	6.0	16.7	1.3	5.0	-2.8	50.0	229.7	127.1	0.0	0.0	0.0	0.0
8-Apr-17	3.1	10.7	1.6	4.7	-1.6	82.4	134.4	125.8	2.5	2.7	2.0	0.7
9-Apr-17	1.8	5.1	0.4	4.8	-2.8	66.7	249.1	124.3	0.0	0.0	0.0	0.0
10-Apr-17	1.2	5.6	2.0	7.0	-0.9	51.7	263.3	123.1	0.0	0.0	0.0	0.0
11-Apr-17	2.5	13.4	2.1	7.8	-1.9	59.7	260.2	121.6	0.4	0.4	0.4	0.0
12-Apr-17	12.5	26.3	3.5	5.4	1.2	46.0	226.1	118.0	0.0	0.0	0.0	0.0
13-Apr-17	9.9	20.5	2.6	4.7	0.2	46.9	225.6	116.0	0.7	0.7	0.7	0.0
14-Apr-17	4.2	12.8	2.5	5.1	0.4	50.5	176.2	115.3	0.0	0.0	0.0	0.0
15-Apr-17	3.3	9.9	0.4	2.4	-0.8	90.1	130.2	113.3	0.6	0.7	0.1	0.6
16-Apr-17	2.5	6.2	0.7	5.7	-1.2	81.6	184.0	111.8	0.0	0.0	0.0	0.0
17-Apr-17	2.3	10.3	1.9	5.4	-1.4	61.4	275.8	110.6	0.0	0.0	0.0	0.0
18-Apr-17	4.6	12.0	-1.3	2.3	-3.9	78.9	187.4	109.4	3.2	4.4	0.0	4.4
19-Apr-17	1.6	5.3	0.1	3.0	-1.9	95.0	154.1	112.4	5.3	5.9	0.2	5.7
20-Apr-17	2.5	10.1	1.1	4.0	-0.5	90.7	193.4	110.1	0.3	0.3	0.2	0.2
21-Apr-17	2.0	7.3	2.5	6.3	0.2	74.8	187.2	106.7	0.0	0.0	0.0	0.0
22-Apr-17	6.0	16.2	4.5	8.0	0.3	48.0	255.3	103.0	0.0	0.0	0.0	0.0
23-Apr-17	2.0	8.8	5.0	9.4	2.1	53.2	278.5	98.2	0.0	0.0	0.0	0.0
24-Apr-17	1.9	7.7	3.2	8.2	1.2	81.7	213.7	94.0	0.1	0.1	0.1	0.0
25-Apr-17	2.5	11.1	4.9	9.1	2.1	59.7	270.5	88.3	0.0	0.0	0.0	0.0
26-Apr-17	4.2	17.5	3.9	7.2	0.1	65.4	164.3	83.9	1.0	1.0	1.0	0.0
27-Apr-17	4.8	13.4	-0.6	1.9	-2.4	96.0	203.5	83.8	1.5	2.1	0.0	2.1
28-Apr-17	3.2	11.2	-0.6	2.8	-3.0	86.0	194.5	85.1	0.5	0.6	0.0	0.6
29-Apr-17	4.2	15.9	-0.3	1.9	-2.8	67.1	148.6	84.1	0.0	0.0	0.0	0.0
30-Apr-17	3.0	12.7	0.4	4.2	-1.5	87.7	185.7	82.2	1.5	1.7	0.3	1.5

Notes:

dash (-) = erroneous data that was removed

<sup>1</sup> Adjusted to compensate for wind undercatch

Appendix B2: Johnny Mountain November 2016 - October 2017 Daily Meteorological Data

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation after Gap Fill (mm)		
	Mean	Max.	Mean	Max.	Min.	Mean	Mean	Mean	Total	Precipitation	Rainfall	SWE
										Total	Total	Total
1-May-17	3.9	10.1	-1.1	1.0	-2.8	94.2	167.3	87.8	2.6	3.4	0.0	3.4
2-May-17	2.4	9.6	0.7	5.6	-2.2	74.9	157.7	87.4	11.2	12.5	4.0	8.6
3-May-17	5.5	15.2	-0.2	2.2	-2.1	94.6	154.4	89.5	3.7	5.5	0.0	5.5
4-May-17	1.9	6.7	0.5	5.2	-3.4	73.1	273.8	89.0	0.0	0.0	0.0	0.0
5-May-17	2.6	7.1	0.2	2.3	-0.7	94.0	151.4	88.4	4.7	5.5	0.4	5.1
6-May-17	4.2	11.8	0.4	2.0	-0.8	89.9	135.2	87.5	0.4	0.5	0.1	0.4
7-May-17	3.7	9.1	-0.5	1.7	-2.1	92.2	151.9	87.2	5.8	7.6	0.0	7.6
8-May-17	4.1	10.9	0.3	2.6	-1.1	97.8	145.6	94.4	8.1	10.4	1.3	9.1
9-May-17	1.7	5.8	1.3	6.7	-1.0	85.3	237.6	90.2	2.9	3.0	1.8	1.2
10-May-17	3.2	9.5	3.9	8.3	0.3	62.6	277.9	86.9	0.0	0.0	0.0	0.0
11-May-17	9.1	21.0	5.7	8.5	3.6	66.0	205.6	80.1	0.1	0.1	0.1	0.0
12-May-17	4.1	23.1	4.9	7.9	2.6	90.0	114.1	71.4	6.9	6.9	6.9	0.0
13-May-17	2.8	9.1	2.2	5.0	0.2	97.7	172.5	67.0	12.8	12.8	12.8	0.0
14-May-17	4.2	11.0	0.3	2.5	-0.7	94.6	154.1	64.1	2.2	2.8	0.3	2.5
15-May-17	4.3	14.1	2.6	6.6	-0.7	81.4	274.7	62.2	0.9	0.9	0.9	0.0
16-May-17	3.4	9.6	7.2	12.3	2.6	56.6	341.8	57.1	0.0	0.0	0.0	0.0
17-May-17	2.2	11.7	8.4	14.1	4.9	51.8	280.5	51.0	0.3	0.3	0.3	0.0
18-May-17	4.5	11.4	4.1	6.4	2.2	77.4	191.2	44.9	0.0	0.0	0.0	0.0
19-May-17	3.0	8.5	4.2	8.2	1.8	81.9	235.1	39.4	0.0	0.0	0.0	0.0
20-May-17	4.7	14.5	5.6	8.1	3.7	73.1	223.7	33.2	2.2	2.2	2.2	0.0
21-May-17	6.6	14.7	4.9	6.1	3.9	98.0	67.3	17.4	22.9	22.9	22.9	0.0
22-May-17	3.2	9.7	4.1	4.8	3.3	98.2	89.2	3.5	23.3	23.3	23.3	0.0
23-May-17	2.4	9.1	3.7	5.9	2.8	95.1	123.6	0.0	10.2	10.2	10.2	0.0
24-May-17	2.3	6.8	2.9	5.0	0.7	89.5	185.9	0.0	0.0	0.0	0.0	0.0
25-May-17	2.2	5.1	3.3	5.2	1.5	87.3	168.1	0.0	0.0	0.0	0.0	0.0
26-May-17	3.3	11.5	5.5	9.2	2.8	73.5	368.0	0.0	0.0	0.0	0.0	0.0
27-May-17	1.3	3.7	7.4	12.5	2.8	57.5	358.0	0.0	0.0	0.0	0.0	0.0
28-May-17	1.5	8.7	12.3	17.3	8.0	36.9	329.4	0.0	0.0	0.0	0.0	0.0
29-May-17	2.9	9.8	11.4	13.3	9.1	50.1	264.6	0.0	0.2	0.2	0.2	0.0
30-May-17	1.4	7.6	11.0	15.2	8.4	57.3	304.0	0.0	0.0	0.0	0.0	0.0
31-May-17	2.3	6.7	7.0	9.3	4.6	88.5	189.8	0.0	2.6	2.6	2.6	0.0

Notes:

dash (-) = erroneous data that was removed

<sup>1</sup> Adjusted to compensate for wind undercatch

Appendix B2: Johnny Mountain November 2016 - October 2017 Daily Meteorological Data

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation after Gap Fill (mm)		
	Mean	Max.	Mean	Max.	Min.	Mean	Mean	Mean	Total	Precipitation	Rainfall	SWE
										Total	Total	Total
1-Jun-17	3.5	12.0	5.5	8.1	3.7	85.7	181.2	0.0	3.3	3.3	3.3	0.0
2-Jun-17	3.7	18.3	4.8	8.6	1.5	80.5	173.8	0.0	2.3	2.3	2.3	0.0
3-Jun-17	3.7	11.6	2.7	5.4	0.3	74.3	251.5	0.0	0.4	0.4	0.4	0.0
4-Jun-17	1.3	6.1	2.5	4.1	1.7	84.4	136.2	0.0	7.0	7.0	7.0	0.0
5-Jun-17	2.1	7.1	3.4	5.0	1.9	88.0	126.1	0.0	3.1	3.1	3.1	0.0
6-Jun-17	2.6	13.2	7.8	12.3	3.6	65.2	276.4	0.0	0.0	0.0	0.0	0.0
7-Jun-17	3.8	15.0	12.3	17.7	7.3	58.1	273.4	0.0	0.0	0.0	0.0	0.0
8-Jun-17	6.3	20.6	12.9	18.3	6.4	62.7	191.4	0.0	5.3	5.3	5.3	0.0
9-Jun-17	4.7	11.2	3.0	6.7	1.6	98.7	67.3	0.0	21.0	21.0	21.0	0.0
10-Jun-17	3.3	8.0	2.9	4.7	1.3	98.1	145.2	0.0	0.0	0.0	0.0	0.0
11-Jun-17	5.9	12.6	3.6	6.1	2.0	91.2	184.8	0.0	1.6	1.6	1.6	0.0
12-Jun-17	5.2	10.2	2.7	6.1	1.5	92.7	162.8	0.0	0.0	0.0	0.0	0.0
13-Jun-17	3.2	7.4	2.5	6.2	0.3	91.4	205.6	0.0	4.8	4.8	4.8	0.0
14-Jun-17	2.0	15.1	3.1	7.2	0.8	91.3	166.3	0.0	11.7	11.7	11.7	0.0
15-Jun-17	1.7	9.2	2.9	4.5	0.5	92.5	116.6	0.0	7.7	7.7	7.7	0.0
16-Jun-17	5.3	12.0	1.5	3.2	0.1	98.3	119.7	0.0	9.8	10.9	7.4	3.4
17-Jun-17	5.4	13.8	2.0	5.0	0.0	90.1	147.1	0.0	0.0	0.0	0.0	0.0
18-Jun-17	2.0	7.1	7.3	13.5	1.6	64.6	353.3	0.0	0.0	0.0	0.0	0.0
19-Jun-17	2.8	10.4	7.5	10.9	3.6	79.1	186.5	0.0	12.3	12.3	12.3	0.0
20-Jun-17	4.3	9.4	2.7	4.3	1.4	97.2	133.3	0.0	4.6	4.6	4.6	0.0
21-Jun-17	3.9	10.8	3.5	6.9	1.8	93.5	202.4	0.0	1.2	1.2	1.2	0.0
22-Jun-17	2.6	8.3	5.1	9.2	2.8	84.6	232.4	0.0	0.0	0.0	0.0	0.0
23-Jun-17	2.0	9.2	8.5	13.4	4.1	64.7	318.1	0.0	0.0	0.0	0.0	0.0
24-Jun-17	2.0	10.3	7.9	10.6	5.6	80.0	69.1	0.0	12.3	12.3	12.3	0.0
25-Jun-17	3.6	8.9	6.8	8.8	3.9	92.1	180.6	0.0	8.0	8.0	8.0	0.0
26-Jun-17	3.3	6.9	4.3	5.7	2.9	98.0	107.0	0.0	1.1	1.1	1.1	0.0
27-Jun-17	2.7	7.3	5.4	6.8	4.4	91.2	120.0	0.0	0.2	0.2	0.2	0.0
28-Jun-17	2.4	7.9	6.5	10.5	3.7	86.3	201.4	0.0	0.0	0.0	0.0	0.0
29-Jun-17	3.8	10.8	9.4	12.9	6.6	74.1	227.1	0.0	0.0	0.0	0.0	0.0
30-Jun-17	2.1	7.1	7.6	9.5	5.3	78.2	119.9	0.0	4.3	4.3	4.3	0.0

Notes:

dash (-) = erroneous data that was removed

<sup>1</sup> Adjusted to compensate for wind undercatch

Appendix B2: Johnny Mountain November 2016 - October 2017 Daily Meteorological Data

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation after Gap Fill (mm)		
	Mean	Max.	Mean	Max.	Min.	Mean	Mean	Mean	Total	Precipitation	Rainfall	SWE
										Total	Total	Total
1-Jul-17	2.6	8.8	6.8	7.9	5.6	94.8	94.5	0.0	6.5	6.5	6.5	0.0
2-Jul-17	3.5	11.8	5.8	6.9	3.7	98.0	82.4	0.0	17.1	17.1	17.1	0.0
3-Jul-17	4.6	10.4	4.0	7.6	2.6	96.9	142.8	0.0	3.2	3.2	3.2	0.0
4-Jul-17	2.8	6.1	5.0	7.8	3.4	94.7	172.9	0.0	2.4	2.4	2.4	0.0
5-Jul-17	1.7	7.0	9.5	15.4	4.5	71.8	331.6	0.0	0.0	0.0	0.0	0.0
6-Jul-17	1.8	6.0	14.4	18.5	11.1	49.4	294.0	0.0	0.0	0.0	0.0	0.0
7-Jul-17	3.4	11.8	12.6	15.3	8.5	66.3	222.7	0.0	0.4	0.4	0.4	0.0
8-Jul-17	3.1	9.8	8.8	13.7	6.9	82.5	214.7	0.0	3.6	3.6	3.6	0.0
9-Jul-17	4.7	12.9	4.9	7.4	3.4	98.2	66.4	0.0	21.0	21.0	21.0	0.0
10-Jul-17	4.1	10.6	3.9	6.9	2.4	94.9	174.6	0.0	1.2	1.2	1.2	0.0
11-Jul-17	2.0	8.2	4.9	6.8	2.8	92.2	74.3	0.0	4.8	4.8	4.8	0.0
12-Jul-17	1.9	8.7	7.1	10.5	5.6	89.9	129.8	0.0	1.2	1.2	1.2	0.0
13-Jul-17	2.2	6.6	7.1	9.1	5.9	89.8	164.9	0.0	1.4	1.4	1.4	0.0
14-Jul-17	2.1	6.6	7.4	11.1	5.6	85.9	214.2	0.0	1.0	1.0	1.0	0.0
15-Jul-17	2.4	9.9	7.7	12.2	5.6	85.4	217.3	0.0	2.6	2.6	2.6	0.0
16-Jul-17	4.1	9.4	5.5	6.5	4.9	96.8	52.8	0.0	2.6	2.6	2.6	0.0
17-Jul-17	2.5	5.4	5.8	7.4	4.7	96.9	120.8	0.0	0.0	0.0	0.0	0.0
18-Jul-17	2.3	6.4	6.7	8.4	5.4	94.9	106.5	0.0	0.3	0.3	0.3	0.0
19-Jul-17	2.9	8.2	8.1	11.6	5.8	84.3	204.8	0.0	0.0	0.0	0.0	0.0
20-Jul-17	3.1	9.9	9.1	12.6	7.3	75.4	211.9	0.0	0.7	0.7	0.7	0.0
21-Jul-17	2.5	7.2	8.2	11.2	6.0	82.5	129.8	0.0	0.5	0.5	0.5	0.0
22-Jul-17	3.1	11.9	6.9	9.5	4.9	93.2	70.1	0.0	11.6	11.6	11.6	0.0
23-Jul-17	2.9	6.1	6.2	8.5	4.5	92.7	143.9	0.0	0.0	0.0	0.0	0.0
24-Jul-17	2.1	6.1	8.1	13.0	5.6	90.9	195.1	0.0	0.1	0.1	0.1	0.0
25-Jul-17	2.8	7.4	9.2	11.4	7.2	89.8	186.3	0.0	2.9	2.9	2.9	0.0
26-Jul-17	3.5	9.4	8.5	10.0	7.0	96.1	99.1	0.0	13.8	13.8	13.8	0.0
27-Jul-17	4.1	10.4	7.3	8.9	6.6	97.3	81.1	0.0	12.4	12.4	12.4	0.0
28-Jul-17	2.8	6.3	7.6	11.8	6.0	92.8	175.6	0.0	0.2	0.2	0.2	0.0
29-Jul-17	3.8	15.6	8.5	10.9	5.6	81.5	136.6	0.0	4.9	4.9	4.9	0.0
30-Jul-17	4.0	9.5	6.2	7.4	5.2	92.5	113.1	0.0	3.3	3.3	3.3	0.0
31-Jul-17	2.1	6.3	9.4	14.7	5.9	82.4	278.8	0.0	0.0	0.0	0.0	0.0

Notes:

dash (-) = erroneous data that was removed

<sup>1</sup> Adjusted to compensate for wind undercatch

Appendix B2: Johnny Mountain November 2016 - October 2017 Daily Meteorological Data

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation after Gap Fill (mm)		
	Mean	Max.	Mean	Max.	Min.	Mean	Mean	Mean	Total	Precipitation	Rainfall	SWE
										Total	Total	Total
1-Aug-17	1.8	6.2	13.1	17.3	9.7	63.7	292.4	0.0	0.0	0.0	0.0	0.0
2-Aug-17	1.8	8.8	14.4	18.5	11.7	61.3	314.4	0.0	0.4	0.4	0.4	0.0
3-Aug-17	2.6	7.9	13.7	18.0	10.3	69.6	320.9	0.0	0.0	0.0	0.0	0.0
4-Aug-17	1.9	4.7	16.1	21.1	11.0	63.0	319.2	0.0	0.5	0.5	0.5	0.0
5-Aug-17	1.6	5.6	18.9	23.5	15.1	48.5	309.6	0.0	0.1	0.1	0.1	0.0
6-Aug-17	1.8	5.2	18.5	21.7	15.9	54.4	305.6	0.0	0.0	0.0	0.0	0.0
7-Aug-17	2.0	6.3	15.3	18.4	12.5	76.3	265.9	0.0	0.1	0.1	0.1	0.0
8-Aug-17	1.8	5.1	14.3	18.8	10.5	68.6	302.7	0.0	0.0	0.0	0.0	0.0
9-Aug-17	1.6	5.0	17.3	22.1	13.1	54.3	305.0	0.0	0.0	0.0	0.0	0.0
10-Aug-17	1.9	6.6	17.7	21.2	15.1	58.3	284.9	0.0	0.0	0.0	0.0	0.0
11-Aug-17	3.2	11.0	15.3	18.5	12.5	66.5	253.6	0.0	0.1	0.1	0.1	0.0
12-Aug-17	2.7	9.0	12.2	14.7	9.7	62.6	96.5	0.0	1.9	1.9	1.9	0.0
13-Aug-17	5.2	16.6	7.9	10.6	6.9	88.8	121.9	0.0	5.7	5.7	5.7	0.0
14-Aug-17	5.5	10.9	5.6	6.9	4.8	98.0	54.0	0.0	12.4	12.4	12.4	0.0
15-Aug-17	3.3	8.6	6.0	7.0	5.0	97.5	64.2	0.0	17.2	17.2	17.2	0.0
16-Aug-17	5.2	9.7	7.5	7.9	6.7	98.3	35.5	0.0	14.8	14.8	14.8	0.0
17-Aug-17	4.2	15.6	6.1	7.6	4.7	98.5	36.2	0.0	38.8	38.8	38.8	0.0
18-Aug-17	5.4	14.0	4.1	5.5	3.0	97.2	38.8	0.0	9.1	9.1	9.1	0.0
19-Aug-17	3.7	7.7	4.0	4.8	3.4	98.1	55.8	0.0	8.8	8.8	8.8	0.0
20-Aug-17	1.8	5.8	6.7	9.6	4.4	93.4	85.9	0.0	11.0	11.0	11.0	0.0
21-Aug-17	3.5	11.1	9.3	10.9	7.7	96.5	52.5	0.0	22.7	22.7	22.7	0.0
22-Aug-17	5.0	14.8	9.6	11.3	5.8	96.3	64.4	0.0	24.4	24.4	24.4	0.0
23-Aug-17	3.9	9.7	5.4	7.2	4.3	85.4	93.0	0.0	0.0	0.0	0.0	0.0
24-Aug-17	3.4	8.3	5.2	6.4	4.4	94.4	74.7	0.0	2.0	2.0	2.0	0.0
25-Aug-17	3.6	11.1	6.2	7.9	4.9	94.9	86.1	0.0	8.0	8.0	8.0	0.0
26-Aug-17	4.6	15.3	6.0	7.7	4.5	97.8	44.7	0.0	13.0	13.0	13.0	0.0
27-Aug-17	1.9	5.0	6.2	8.6	4.4	90.5	120.5	0.0	0.1	0.1	0.1	0.0
28-Aug-17	1.4	4.1	9.2	12.4	6.3	78.4	204.8	0.0	0.0	0.0	0.0	0.0
29-Aug-17	1.8	6.6	13.3	18.4	7.9	65.3	242.1	0.0	0.0	0.0	0.0	0.0
30-Aug-17	5.6	16.1	9.0	15.6	4.2	92.5	43.5	0.0	20.7	20.7	20.7	0.0
31-Aug-17	6.0	11.8	4.6	5.8	3.4	98.2	46.8	0.0	15.0	15.0	15.0	0.0

Notes:

dash (-) = erroneous data that was removed

<sup>1</sup> Adjusted to compensate for wind undercatch



Appendix B2: Johnny Mountain November 2016 - October 2017 Daily Meteorological Data

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation after Gap Fill (mm)		
	Mean	Max.	Mean	Max.	Min.	Mean	Mean	Mean	Total	Precipitation	Rainfall	SWE
										Total	Total	Total
1-Sep-17	4.0	9.0	5.7	6.8	4.7	97.4	55.9	0.0	13.3	13.3	13.3	0.0
2-Sep-17	2.4	6.1	5.9	9.2	4.3	88.9	159.6	0.0	0.0	0.0	0.0	0.0
3-Sep-17	1.1	4.5	8.8	13.7	4.7	65.9	220.0	0.0	0.1	0.1	0.1	0.0
4-Sep-17	3.4	9.2	14.0	17.6	10.9	60.8	142.5	0.0	0.0	0.0	0.0	0.0
5-Sep-17	1.4	5.0	17.2	21.6	13.8	56.3	221.7	0.0	0.0	0.0	0.0	0.0
6-Sep-17	2.5	7.7	16.0	18.5	13.3	59.7	67.1	0.0	0.6	0.6	0.6	0.0
7-Sep-17	4.6	12.3	8.4	13.6	6.1	92.4	97.8	0.0	9.3	9.3	9.3	0.0
8-Sep-17	3.8	9.9	6.8	9.6	4.7	84.6	89.8	0.0	0.7	0.7	0.7	0.0
9-Sep-17	4.2	11.7	5.0	7.7	3.5	96.0	36.1	0.0	29.8	29.8	29.8	0.0
10-Sep-17	4.4	13.1	4.2	6.3	2.9	94.2	66.5	0.0	11.8	11.8	11.8	0.0
11-Sep-17	3.7	8.8	3.8	6.2	2.6	95.1	75.2	0.0	1.4	1.4	1.4	0.0
12-Sep-17	2.0	5.3	4.6	8.1	2.7	84.1	196.7	0.0	0.0	0.0	0.0	0.0
13-Sep-17	1.5	5.4	5.9	9.9	3.2	79.1	209.4	0.0	0.0	0.0	0.0	0.0
14-Sep-17	1.6	5.6	7.1	10.7	4.4	76.9	198.1	0.0	0.2	0.2	0.2	0.0
15-Sep-17	2.3	5.4	6.5	9.2	4.4	84.0	167.1	0.0	0.1	0.1	0.1	0.0
16-Sep-17	2.5	8.1	5.1	7.2	3.1	85.8	113.9	0.0	0.0	0.0	0.0	0.0
17-Sep-17	2.1	9.4	3.5	5.2	2.1	90.5	49.2	0.0	5.6	5.6	5.6	0.0
18-Sep-17	2.4	5.5	2.2	3.0	1.4	96.0	56.9	0.0	10.5	10.5	10.5	0.0
19-Sep-17	1.9	6.4	2.7	4.3	1.4	96.2	51.5	0.0	2.5	2.5	2.5	0.0
20-Sep-17	5.1	11.8	6.9	10.5	2.2	70.5	183.5	0.0	0.0	0.0	0.0	0.0
21-Sep-17	2.1	7.8	7.3	10.5	5.1	64.5	151.7	0.0	1.9	1.9	1.9	0.0
22-Sep-17	4.3	7.8	5.5	6.6	4.0	97.3	58.2	0.0	4.1	4.1	4.1	0.0
23-Sep-17	3.5	8.3	6.9	7.7	6.1	97.6	30.7	0.0	22.8	22.8	22.8	0.0
24-Sep-17	4.4	10.0	7.6	8.4	6.9	97.6	50.1	0.0	5.4	5.4	5.4	0.0
25-Sep-17	3.0	6.5	7.6	9.4	6.4	97.7	86.9	0.0	1.3	1.3	1.3	0.0
26-Sep-17	5.3	12.5	8.2	9.4	7.1	97.4	22.6	0.0	42.2	42.2	42.2	0.0
27-Sep-17	4.4	12.9	9.4	11.3	8.4	91.3	59.3	0.0	2.2	2.2	2.2	0.0
28-Sep-17	2.8	8.6	8.5	9.9	6.6	96.1	23.1	0.0	35.4	35.4	35.4	0.0
29-Sep-17	3.0	9.3	5.7	6.9	3.2	98.4	34.7	0.0	11.9	11.9	11.9	0.0
30-Sep-17	2.7	7.1	3.0	5.7	1.7	91.4	132.7	0.0	0.9	0.9	0.9	0.0

Notes:

dash (-) = erroneous data that was removed

<sup>1</sup> Adjusted to compensate for wind undercatch

Appendix B2: Johnny Mountain November 2016 - October 2017 Daily Meteorological Data

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation after Gap Fill (mm)		
	Mean	Max.	Mean	Max.	Min.	Mean	Mean	Mean	Total	Precipitation	Rainfall	SWE
										Total	Total	Total
1-Oct-17	3.6	10.7	3.6	6.6	0.9	73.6	150.6	0.0	0.0	0.0	0.0	0.0
2-Oct-17	2.3	11.7	4.8	8.5	1.4	52.7	142.2	0.0	0.0	0.0	0.0	0.0
3-Oct-17	2.7	8.1	6.4	9.0	5.1	50.0	35.4	0.0	0.0	0.0	0.0	0.0
4-Oct-17	2.4	7.4	8.8	11.3	6.3	34.9	145.3	0.0	0.1	0.1	0.1	0.0
5-Oct-17	5.8	15.0	3.9	7.5	1.2	65.3	21.2	0.0	7.2	7.2	7.2	0.0
6-Oct-17	4.9	13.4	0.6	1.8	-0.1	98.0	45.4	0.0	12.7	16.6	3.7	12.9
7-Oct-17	2.0	5.0	1.2	4.5	0.0	93.9	113.8	0.0	1.4	1.5	0.8	0.7
8-Oct-17	5.4	15.0	0.3	1.6	-0.6	96.7	15.8	0.0	5.6	7.9	0.7	7.2
9-Oct-17	3.2	13.5	-0.6	1.4	-2.2	96.7	87.3	0.0	2.9	3.6	0.0	3.6
10-Oct-17	5.4	12.8	-0.5	1.7	-3.4	75.4	127.2	0.0	0.0	0.0	0.0	0.0
11-Oct-17	2.5	10.1	-1.5	-0.3	-2.8	84.2	85.2	0.0	0.5	0.5	0.0	0.5
12-Oct-17	5.6	11.9	-1.3	0.4	-3.5	62.5	115.7	0.0	0.0	0.0	0.0	0.0
13-Oct-17	3.6	9.8	-3.1	-1.8	-4.1	78.9	36.3	0.0	3.2	4.1	0.0	4.1
14-Oct-17	3.9	11.6	-0.6	1.5	-2.0	96.6	67.9	1.9	12.2	16.1	0.0	16.1
15-Oct-17	7.2	15.5	1.1	3.5	-0.3	97.9	23.7	1.3	19.8	25.7	11.2	14.5
16-Oct-17	-	-	-0.8	0.1	-2.1	98.2	29.7	2.4	5.7	5.7	0.0	5.7
17-Oct-17	-	-	-2.1	-0.7	-2.7	97.4	42.2	5.4	1.8	1.8	0.0	1.8
18-Oct-17	-	-	-1.6	-1.0	-2.1	96.0	24.5	7.4	2.8	2.8	0.0	2.8
19-Oct-17	-	-	-0.8	0.6	-1.6	96.8	26.5	13.1	14.2	14.2	0.0	14.2
20-Oct-17	3.7	9.5	-2.1	-0.6	-3.6	96.3	43.4	19.3	6.0	7.8	0.0	7.8
21-Oct-17	3.7	19.3	-2.8	-0.8	-3.9	87.3	25.5	15.1	2.6	3.4	0.0	3.4
22-Oct-17	3.2	10.1	-1.1	-0.3	-2.3	88.5	39.4	14.7	3.9	4.8	0.0	4.8
23-Oct-17	5.3	26.8	0.2	5.6	-1.2	97.8	11.4	22.1	37.6	53.7	3.4	50.3
24-Oct-17	6.7	24.0	0.2	2.9	-1.5	93.1	21.0	14.8	1.6	2.4	0.2	2.2
25-Oct-17	2.9	11.3	-1.3	2.2	-3.0	86.6	92.8	17.5	0.1	0.1	0.0	0.1
26-Oct-17	4.3	10.7	-0.1	1.8	-1.5	69.8	24.9	17.5	11.2	15.3	0.0	15.3
27-Oct-17	7.5	14.2	3.4	5.2	0.1	98.6	21.4	6.7	1.6	1.6	1.6	0.0
28-Oct-17	7.1	17.7	2.9	4.8	0.8	76.0	86.5	0.0	0.0	0.0	0.0	0.0
29-Oct-17	4.3	18.9	2.7	6.4	-1.3	44.7	83.6	0.0	0.7	0.7	0.7	0.0
30-Oct-17	4.3	11.3	5.1	8.6	1.3	55.2	31.8	0.0	3.8	3.8	3.8	0.0
31-Oct-17	4.7	17.1	1.6	3.2	-0.6	92.4	22.5	0.0	0.8	0.9	0.7	0.2

Notes:

dash (-) = erroneous data that was removed

<sup>1</sup> Adjusted to compensate for wind undercatch

Appendix B2: Johnny Mountain November 2016 - October 2017 Daily Meteorological Data

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation after Gap Fill (mm)		
	Mean	Max.	Mean	Max.	Min.	Mean	Mean	Mean	Total	Precipitation	Rainfall	SWE
										Total	Total	Total
1-Nov-17	13.6	24	-3.3	1.3	-6.8	47.2	63.0	0.00	0.7	1.9	0.0	1.9
2-Nov-17	12.7	21	-7.6	-6.5	-8.8	42	71.0	0.00	0.0	0.0	0.0	0.0
3-Nov-17	2.2	15.9	-7.8	-2.6	-9.6	55.1	28.7	0.00	0.1	0.1	0.0	0.1
4-Nov-17	10.4	19.8	-5.2	-3.5	-7.1	63.9	30.5	0.00	0.0	0.0	0.0	0.0
5-Nov-17	3.6	16	-7.0	-4.7	-9.0	58.5	70.1	0.00	0.2	0.2	0.0	0.2
6-Nov-17	3.7	15.8	-6.5	-5.1	-8.1	53.8	20.0	0.00	0.6	0.8	0.0	0.8
7-Nov-17	7	17.4	-6.1	-4.3	-7.7	83.8	32.7	0.00	0.1	0.2	0.0	0.2
8-Nov-17	2.4	14.2	-7.0	-3.9	-10.0	76.7	64.1	0.00	0.1	0.1	0.0	0.1
9-Nov-17	1.8	4.8	-7.8	-4.8	-9.9	81	61.8	0.00	0.1	0.1	0.0	0.1
10-Nov-17	3.5	9.4	-5.3	-4.0	-8.7	86.4	22.4	0.00	2.4	3.0	0.0	3.0
11-Nov-17	5.8	21.4	-4.1	-2.3	-6.4	90.1	31.5	0.00	5.2	7.9	0.0	7.9
12-Nov-17	3.2	15.2	-8.4	-4.6	-10.0	92.3	30.4	0.00	1.9	2.4	0.0	2.4
13-Nov-17	6.9	18.5	-6.8	-3.3	-10.3	84.1	29.2	0.00	0.0	0.0	0.0	0.0
14-Nov-17	7.2	18.8	-8.8	-6.7	-10.5	80.8	27.8	0.00	0.0	0.0	0.0	0.0
15-Nov-17	15.9	24.4	-10.8	-8.6	-13.0	64.5	44.5	0.00	0.8	2.5	0.0	2.5
16-Nov-17	6.4	20	-15.2	-11.7	-16.9	64.6	52.9	0.00	0.0	0.0	0.0	0.0
17-Nov-17	3.2	8.5	-9.1	-5.3	-16.6	86.6	14.8	1.05	15.7	19.7	0.0	19.7
18-Nov-17	2.3	6.3	-5.1	-3.0	-8.2	94.9	23.1	19.53	4.9	5.8	0.0	5.8
19-Nov-17	-	-	-11.1	-8.1	-14.3	90.1	10.9	19.83	1.6	1.6	0.0	1.6
20-Nov-17	-	-	-13.4	-9.3	-15.1	87.7	19.7	18.85	0.6	0.6	0.0	0.6
21-Nov-17	3.2	13.7	-7.6	-3.4	-11.7	92.9	33.8	17.93	3.9	4.8	0.0	4.8
22-Nov-17	3	9.3	-4.0	-0.5	-7.0	95.5	13.5	16.05	10.9	13.5	0.0	13.5
23-Nov-17	3.5	12.2	-3.3	-1.1	-4.8	96.3	18.6	22.94	7.3	9.5	0.0	9.5
24-Nov-17	2.5	10.4	-3.6	-2.6	-4.8	96.2	12.4	39.33	11.6	13.9	0.0	13.9
25-Nov-17	3.1	14	-5.0	-4.0	-6.5	90.1	27.2	42.97	0.0	0.0	0.0	0.0
26-Nov-17	3.4	14.3	-7.3	-5.0	-8.4	93.1	10.0	38.99	3.2	4.1	0.0	4.1
27-Nov-17	3.4	12.1	-5.0	-3.4	-7.6	95.4	12.8	39.49	2.5	3.2	0.0	3.2
28-Nov-17	4.2	14.9	-3.7	-2.0	-4.8	92.1	11.3	39.52	2.1	2.9	0.0	2.9
29-Nov-17	4.2	9.8	-2.9	-1.9	-4.0	96.4	15.0	40.39	9.6	13.0	0.0	13.0
30-Nov-17	-	9.4	-4.0	-3.1	-5.2	95.8	13.8	41.01	1.2	1.2	0.0	1.2

Note:

dash (-) = Missing or erroneous data that were removed

<sup>1</sup> Adjusted to compensate for wind undercatch

Appendix B2: Johnny Mountain November 2016 - October 2017 Daily Meteorological Data

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation after Gap Fill (mm)		
	Mean	Max.	Mean	Max.	Min.	Mean	Mean	Mean	Total	Precipitation	Rainfall	SWE
										Total	Total	Total
1-Dec-17	-	-	-5.4	-3.8	-7.5	95	-	40.05	0.2	0.2	0.0	0.2
2-Dec-17	-	-	-7.6	-5.9	-8.6	93.4	-	38.72	0.1	0.1	0.0	0.1
3-Dec-17	-	-	-3.9	-2.4	-5.9	96	-	37.18	0.1	0.1	0.0	0.1
4-Dec-17	-	-	-2.2	-1.1	-3.1	97.2	-	39.24	5.9	5.9	0.0	5.9
5-Dec-17	-	9.4	-1.4	0.1	-3.3	97.3	10.6	40.43	0.2	0.2	0.0	0.2
6-Dec-17	4.4	9.4	1.8	4.0	-1.1	64.8	32.4	40.23	0.2	0.2	0.2	0.0
7-Dec-17	5.2	11.4	5.2	7.5	3.3	40	31.5	39.39	0.0	0.0	0.0	0.0
8-Dec-17	6.2	18.5	3.5	7.2	0.0	60.7	12.3	38.92	4.5	4.5	4.5	0.0
9-Dec-17	4.6	14	0.9	2.6	-0.2	97.4	6.7	36.80	14.0	17.1	6.0	11.1
10-Dec-17	3.9	10.3	0.5	3.6	-0.6	90.7	15.6	33.51	15.9	19.6	4.3	15.4
11-Dec-17	7.7	24.9	6.0	8.3	2.2	40.2	13.6	30.74	1.0	1.0	1.0	0.0
12-Dec-17	4.7	16.5	1.3	6.0	-0.1	91.2	9.7	29.71	3.6	4.1	2.4	1.7
13-Dec-17	3	8.8	1.6	3.4	0.0	94.3	9.5	28.56	9.7	10.1	7.7	2.4
14-Dec-17	5.9	21.3	0.8	3.4	-2.5	98.2	11.1	25.97	18.4	24.5	6.9	17.5
15-Dec-17	3.2	11.4	-3.3	-2.4	-4.3	96.7	14.8	38.44	5.9	7.5	0.0	7.5
16-Dec-17	-	9.5	-2.8	-1.8	-4.4	97	-	43.51	19.7	19.7	0.0	19.7
17-Dec-17	-	-	-4.4	-2.6	-5.3	96.1	-	52.63	3.1	3.1	0.0	3.1
18-Dec-17	-	-	-5.8	-5.1	-7.7	95	-	54.88	0.4	0.4	0.0	0.4
19-Dec-17	-	-	-9.1	-7.0	-11.6	88.1	28.3	52.52	0.5	0.5	0.0	0.5
20-Dec-17	-	-	-7.0	-3.6	-11.1	89	12.8	50.59	0.4	0.4	0.0	0.4
21-Dec-17	-	-	-8.0	-5.4	-11.6	69.3	40.2	48.50	0.2	0.2	0.0	0.2
22-Dec-17	-	-	-10.5	-6.8	-13.5	64.4	37.8	46.26	0.2	0.2	0.0	0.2
23-Dec-17	2.7	13.5	-7.5	-2.1	-13.0	50.1	34.0	46.47	0.0	0.0	0.0	0.0
24-Dec-17	2.6	5.2	-8.4	-3.5	-12.1	52	22.2	46.50	0.2	0.2	0.0	0.2
25-Dec-17	1.8	4.5	-10.0	-7.6	-12.5	56.1	35.0	46.65	0.1	0.1	0.0	0.1
26-Dec-17	4.2	16.6	-10.7	-8.6	-15.0	79.1	13.6	46.81	0.1	0.1	0.0	0.1
27-Dec-17	5.9	18.8	-16.1	-12.1	-19.5	54.7	32.7	46.92	0.4	0.5	0.0	0.5
28-Dec-17	9.2	26.6	-15.9	-13.5	-18.7	49.4	32.7	46.13	0.0	0.0	0.0	0.0
29-Dec-17	10.2	20.3	-17.8	-15.9	-20.2	56	32.6	45.57	0.2	0.4	0.0	0.4
30-Dec-17	1.7	6.4	-21.2	-18.8	-23.8	71.4	33.1	45.47	0.4	0.4	0.0	0.4
31-Dec-17	1.8	7.6	-19.9	-8.8	-24.2	64.2	20.6	45.43	1.8	2.0	0.0	2.0

Note:

dash (-) = Missing or erroneous data that were removed

<sup>1</sup> Adjusted to compensate for wind undercatch

**Appendix B3: Johnny Mountain 2018 Daily Meteorological Data**

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation after Gap Fill (mm)		
	Mean	Max.	Mean	Max.	Min.	Mean	Mean	Mean	Total	Precipitation	Rainfall	SWE
										Total	Total	Total
1-Jan-18	5.2	10.2	-3.9	-1.3	-10.8	95.9	6.8	45.30	8.9	13.0	0.0	13.0
2-Jan-18	3.1	10.2	-1.0	-0.5	-1.6	97.9	10.8	46.90	2.1	2.6	0.0	2.6
3-Jan-18	2.7	9.8	-1.3	-0.7	-2.1	97.8	10.5	49.20	15.3	18.5	0.0	18.5
4-Jan-18	2.6	7.8	0.1	2.1	-1.3	97.6	-	56.92	26.1	31.0	1.7	29.3
5-Jan-18	4.6	18.4	-0.8	2.6	-4.8	92.6	11.3	57.75	4.5	6.4	0.0	6.4
6-Jan-18	3.8	9.2	-4.1	-2.4	-5.5	96.0	13.4	57.65	8.1	10.6	0.0	10.6
7-Jan-18	-	-	-2.9	-1.9	-4.7	96.5	17.6	63.66	6.7	6.7	0.0	6.7
8-Jan-18	-	-	-5.1	-3.9	-6.3	95.0	4.5	67.03	7.7	7.7	0.0	7.7
9-Jan-18	-	18.5	-12.8	-6.1	-20.0	83.9	9.6	69.71	1.6	1.6	0.0	1.6
10-Jan-18	5.9	18.9	-22.3	-18.8	-24.6	75.3	38.7	69.33	0.8	1.2	0.0	1.2
11-Jan-18	2.0	4.4	-21.5	-17.8	-23.9	80.4	20.3	69.10	0.0	0.0	0.0	0.0
12-Jan-18	3.0	10.3	-11.2	-5.9	-19.4	77.7	14.7	69.84	5.7	7.1	0.0	7.1
13-Jan-18	3.7	8.6	-1.9	2.7	-6.4	96.3	8.3	78.00	10.9	14.2	0.0	14.2
14-Jan-18	3.9	10.3	5.8	9.2	2.0	72.2	18.5	69.71	0.1	0.1	0.1	0.0
15-Jan-18	4.5	16.2	6.2	9.2	4.2	56.4	12.7	64.94	0.0	0.0	0.0	0.0
16-Jan-18	4.1	13.7	1.8	6.0	-1.2	75.0	18.0	61.53	2.8	2.9	2.6	0.3
17-Jan-18	5.3	18.3	-1.9	0.6	-3.1	84.2	14.0	63.16	5.1	7.5	0.0	7.5
18-Jan-18	1.5	8.1	-2.7	-0.4	-4.0	96.4	16.6	68.68	4.7	5.2	0.0	5.2
19-Jan-18	-	-	-3.8	-1.4	-5.9	95.8	14.6	70.03	0.9	0.9	0.0	0.9
20-Jan-18	-	13.6	-5.2	-1.3	-6.5	92.7	19.9	68.79	0.5	0.5	0.0	0.5
21-Jan-18	1.5	9.1	-6.5	-3.4	-8.5	93.5	24.4	67.72	0.4	0.5	0.0	0.5
22-Jan-18	2.4	12.3	-6.3	-4.2	-8.2	94.0	10.8	76.03	7.2	8.5	0.0	8.5
23-Jan-18	4.5	18.7	-6.8	-4.3	-8.9	74.8	34.7	75.06	0.0	0.0	0.0	0.0
24-Jan-18	2.7	10.6	-7.1	-4.8	-9.0	91.4	26.8	69.08	3.1	3.8	0.0	3.8
25-Jan-18	1.5	5.7	-9.9	-6.9	-11.1	91.3	28.5	68.85	0.4	0.4	0.0	0.4
26-Jan-18	1.7	6.6	-9.4	-7.9	-12.1	90.7	16.9	69.50	0.7	0.8	0.0	0.8
27-Jan-18	1.5	9.3	-11.0	-8.2	-13.7	85.6	15.6	69.47	0.4	0.4	0.0	0.4
28-Jan-18	7.3	19.8	-9.8	-7.3	-12.8	79.8	23.6	67.91	1.6	2.7	0.0	2.7
29-Jan-18	4.6	11.9	-6.6	-4.6	-9.2	94.4	23.8	86.92	12.8	17.8	0.0	17.8
30-Jan-18	1.6	5.6	-11.2	-7.4	-13.4	90.2	15.9	95.21	7.4	8.2	0.0	8.2
31-Jan-18	0.8	4.0	-13.5	-8.1	-15.5	87.7	19.3	102.26	2.4	2.5	0.0	2.5

Note:

dash (-) = Missing or erroneous data that were removed

Gap-filled temperature and precipitation data are underlined

<sup>1</sup> Adjusted to compensate for wind undercatch

**Appendix B3: Johnny Mountain 2018 Daily Meteorological Data**

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation after Gap Fill (mm)		
	Mean	Max.	Mean	Max.	Min.	Mean	Mean	Mean	Total	Precipitation	Rainfall	SWE
										Total	Total	Total
1-Feb-18	1.9	7.0	-16.5	-14.8	-18.0	84.9	9.8	100.49	6.3	7.2	0.0	7.2
2-Feb-18	5.7	19.9	-17.8	-16.3	-18.7	83.6	28.9	106.47	17.8	26.8	0.0	26.8
3-Feb-18	8.2	21.8	-20.3	-17.5	-22.1	81.6	35.0	66.72	0.7	1.2	0.0	1.2
4-Feb-18	2.0	7.8	-17.0	-12.4	-20.8	76.6	48.0	61.95	0.0	0.0	0.0	0.0
5-Feb-18	1.2	4.4	-12.0	-7.3	-17.7	47.8	65.3	61.59	0.0	0.0	0.0	0.0
6-Feb-18	2.7	7.8	-7.3	-3.4	-11.6	77.4	24.8	62.68	3.3	4.0	0.0	4.0
7-Feb-18	2.2	7.9	-5.1	-1.9	-9.3	95.1	27.5	63.93	0.3	0.3	0.0	0.3
8-Feb-18	5.3	17.7	-11.1	-8.2	-14.5	84.3	44.5	63.65	0.9	1.3	0.0	1.3
9-Feb-18	2.6	14.3	-13.6	-8.6	-16.6	73.1	76.9	63.21	0.3	0.3	0.0	0.3
10-Feb-18	3.8	8.9	-5.8	-3.0	-10.4	27.5	85.9	63.11	0.0	0.0	0.0	0.0
11-Feb-18	1.8	5.0	-9.5	-6.3	-13.1	54.7	85.3	63.16	0.1	0.1	0.0	0.1
12-Feb-18	5.5	12.4	-5.9	-3.7	-8.9	78.5	27.1	63.35	4.6	6.9	0.0	6.9
13-Feb-18	-	10.5	-4.2	-3.0	-6.1	95.9	43.2	79.23	24.9	24.9	0.0	24.9
14-Feb-18	-	16.1	-7.1	-5.6	-8.8	78.3	93.5	80.96	0.8	0.8	0.0	0.8
15-Feb-18	3.7	8.2	-7.5	-6.1	-9.5	76.3	38.6	77.06	5.8	7.6	0.0	7.6
16-Feb-18	2.8	16.8	-8.0	-5.6	-11.5	88.4	58.4	78.23	0.0	0.0	0.0	0.0
17-Feb-18	14.6	26.5	-12.2	-9.9	-13.5	62.8	83.1	75.00	0.5	1.4	0.0	1.4
18-Feb-18	8.9	29.0	-12.8	-10.8	-14.7	52.7	101.3	72.73	0.9	1.8	0.0	1.8
19-Feb-18	2.6	14.0	-10.4	-7.1	-14.4	42.8	93.4	72.26	0.0	0.0	0.0	0.0
20-Feb-18	5.1	20.2	-8.4	-6.4	-11.1	65.0	78.2	72.41	1.4	2.0	0.0	2.0
21-Feb-18	2.6	10.0	-6.2	-2.5	-9.9	56.8	107.4	72.45	0.0	0.0	0.0	0.0
22-Feb-18	4.5	10.1	-6.1	-4.8	-7.1	61.1	66.6	73.66	1.3	1.8	0.0	1.8
23-Feb-18	3.9	11.7	-4.4	-3.7	-5.3	95.6	46.4	76.65	6.7	8.8	0.0	8.8
24-Feb-18	-	-	-6.4	-5.3	-7.5	94.3	33.4	84.66	6.6	6.6	0.0	6.6
25-Feb-18	-	-	-5.5	-0.3	-6.9	94.8	66.3	91.88	1.9	1.9	0.0	1.9
26-Feb-18	-	-	-6.6	-4.8	-8.5	94.2	38.2	94.94	2.4	2.4	0.0	2.4
27-Feb-18	-	-	-6.2	-5.1	-7.8	94.5	31.8	96.11	1.9	1.9	0.0	1.9
28-Feb-18	-	39.4	-7.3	-4.1	-9.5	75.4	89.2	94.47	1.6	1.6	0.0	1.6

Note:

dash (-) = Missing or erroneous data that were removed

Gap-filled temperature and precipitation data are underlined

<sup>1</sup> Adjusted to compensate for wind undercatch

**Appendix B3: Johnny Mountain 2018 Daily Meteorological Data**

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation after Gap Fill (mm)		
	Mean	Max.	Mean	Max.	Min.	Mean	Mean	Mean	Total	Precipitation	Rainfall	SWE
										Total	Total	Total
1-Mar-18	19.3	32.0	-8.1	-5.0	-11.6	68.5	74.9	89.71	0.3	1.4	0.0	1.4
2-Mar-18	19.5	30.3	-13.0	-10.0	-15.5	58.1	129.9	82.69	0.0	0.0	0.0	0.0
3-Mar-18	13.6	27.6	-10.8	-6.4	-13.9	31.5	137.6	77.91	0.4	1.1	0.0	1.1
4-Mar-18	1.4	11.4	-9.9	-7.2	-12.7	39.5	92.1	77.30	0.0	0.0	0.0	0.0
5-Mar-18	2.4	10.5	-10.9	-8.5	-13.8	57.1	141.2	76.63	0.3	0.3	0.0	0.3
6-Mar-18	1.6	4.5	-10.2	-7.7	-12.5	69.7	112.3	76.56	0.0	0.0	0.0	0.0
7-Mar-18	1.2	4.6	-8.0	-3.0	-10.4	68.8	117.9	77.14	0.0	0.0	0.0	0.0
8-Mar-18	1.7	6.6	-7.9	-3.8	-9.9	69.9	144.7	76.98	0.0	0.0	0.0	0.0
9-Mar-18	5.4	11.4	-5.5	-3.3	-8.2	89.1	60.3	85.56	16.5	24.4	0.0	24.4
10-Mar-18	3.2	10.2	-2.6	-1.4	-4.0	96.6	77.5	108.49	13.0	16.3	0.0	16.3
11-Mar-18	2.6	15.2	-0.3	2.8	-2.6	80.9	71.8	100.67	1.1	1.3	0.0	1.3
12-Mar-18	2.7	9.0	3.2	6.6	0.1	65.9	122.8	95.80	0.0	0.0	0.0	0.0
13-Mar-18	3.5	12.8	4.7	8.2	1.6	40.5	153.3	91.95	0.0	0.0	0.0	0.0
14-Mar-18	2.5	8.6	0.8	4.7	-1.4	82.5	73.2	90.33	2.1	2.3	0.9	1.5
15-Mar-18	2.1	5.4	-2.4	-1.4	-3.6	94.8	65.8	91.37	2.9	3.4	0.0	3.4
16-Mar-18	0.9	3.2	-1.3	4.0	-4.3	88.7	174.2	92.33	0.0	0.0	0.0	0.0
17-Mar-18	1.2	3.9	0.8	6.8	-3.1	72.9	177.9	89.76	0.0	0.0	0.0	0.0
18-Mar-18	3.7	9.5	1.4	2.7	-1.2	70.3	84.5	89.22	0.0	0.0	0.0	0.0
19-Mar-18	4.4	8.7	-2.1	-1.1	-2.9	96.8	73.9	92.82	9.8	13.6	0.0	13.6
20-Mar-18	1.8	4.6	-3.8	-2.0	-7.3	95.6	91.0	100.32	12.6	14.3	0.0	14.3
21-Mar-18	11.6	24.2	-5.5	-1.5	-9.5	75.3	150.8	98.47	0.0	0.0	0.0	0.0
22-Mar-18	19.7	32.9	-2.9	-1.5	-4.1	79.0	58.4	90.31	0.9	3.8	0.0	3.8
23-Mar-18	5.2	13.6	-7.9	-4.1	-9.2	91.5	82.1	91.29	4.4	6.4	0.0	6.4
24-Mar-18	1.8	6.9	-7.9	-4.3	-10.3	89.2	182.5	90.98	0.0	0.0	0.0	0.0
25-Mar-18	1.4	4.9	-6.9	-4.9	-7.7	92.7	62.2	102.23	13.0	14.3	0.0	14.3
26-Mar-18	2.4	8.7	-6.3	-2.4	-8.2	93.2	38.2	116.21	11.3	13.3	0.0	13.3
27-Mar-18	5.2	10.9	-3.2	-1.3	-4.7	96.1	113.3	113.05	2.4	3.5	0.0	3.5
28-Mar-18	3.8	9.5	-3.3	-0.9	-4.3	95.9	135.8	110.98	1.5	1.9	0.0	1.9
29-Mar-18	6.8	18.0	-4.0	-1.8	-7.3	76.8	152.8	109.05	0.1	0.2	0.0	0.2
30-Mar-18	5.8	15.0	-4.6	-0.4	-7.4	47.1	229.0	107.38	0.1	0.2	0.0	0.2
31-Mar-18	5.5	17.0	-5.0	-3.0	-6.3	55.3	182.8	106.23	0.0	0.0	0.0	0.0

Note:

dash (-) = Missing or erroneous data that were removed

Gap-filled temperature and precipitation data are underlined

<sup>1</sup> Adjusted to compensate for wind undercatch

**Appendix B3: Johnny Mountain 2018 Daily Meteorological Data**

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation after Gap Fill (mm)		
	Mean	Max.	Mean	Max.	Min.	Mean	Mean	Mean	Total	Precipitation	Rainfall	SWE
										Total	Total	Total
1-Apr-18	7.8	17.2	-6.2	-3.7	-9.2	41.8	234.8	105.33	0.6	1.0	0.0	1.0
2-Apr-18	1.8	9.2	-6.5	-4.7	-7.8	59.5	150.8	105.03	0.1	0.1	0.0	0.1
3-Apr-18	4.5	13.5	-6.8	-4.0	-8.5	80.1	163.2	104.30	2.3	3.2	0.0	3.2
4-Apr-18	2.8	17.1	-5.7	-0.8	-8.4	72.7	218.1	106.10	2.8	3.4	0.0	3.4
5-Apr-18	11.5	29.0	-4.6	-1.1	-7.4	49.9	173.4	103.40	0.0	0.0	0.0	0.0
6-Apr-18	4.0	18.0	-2.0	0.6	-4.4	61.7	124.8	101.32	0.0	0.0	0.0	0.0
7-Apr-18	8.2	20.9	1.0	4.6	-3.2	57.0	244.6	100.46	0.0	0.0	0.0	0.0
8-Apr-18	2.4	8.3	2.4	5.0	0.6	66.7	135.3	99.15	1.7	1.7	1.7	0.0
9-Apr-18	3.1	7.8	1.4	4.7	0.1	89.5	128.7	94.77	2.4	2.6	1.7	0.9
10-Apr-18	9.5	26.3	2.5	5.3	0.2	67.6	67.4	91.01	0.4	0.4	0.4	0.0
11-Apr-18	5.6	19.3	1.2	5.0	-2.6	65.2	244.1	88.81	0.6	0.8	0.4	0.4
12-Apr-18	3.2	13.4	-1.7	1.9	-3.9	78.2	170.0	87.87	0.3	0.4	0.0	0.4
13-Apr-18	2.1	11.6	-1.4	2.2	-2.8	87.1	137.9	88.00	5.7	6.7	0.0	6.7
14-Apr-18	2.4	7.5	-1.0	1.8	-2.7	90.6	231.5	91.75	2.5	3.0	0.0	3.0
15-Apr-18	1.4	5.8	-0.5	4.5	-4.1	74.5	266.8	86.96	0.0	0.0	0.0	0.0
16-Apr-18	1.2	6.3	-0.6	4.9	-3.2	73.1	205.2	86.94	2.2	2.4	0.0	2.4
17-Apr-18	3.9	12.7	-1.5	1.9	-3.1	80.0	180.6	87.53	0.1	0.1	0.0	0.1
18-Apr-18	4.8	10.9	-1.8	0.1	-3.6	96.4	127.1	87.78	4.3	6.1	0.0	6.1
19-Apr-18	4.2	10.6	-1.7	-0.4	-3.5	97.0	119.0	92.50	13.5	18.2	0.0	18.2
20-Apr-18	2.1	7.5	-2.7	0.1	-5.0	95.5	148.6	98.37	15.2	17.6	0.0	17.6
21-Apr-18	4.1	14.8	-1.6	0.7	-3.0	96.9	116.7	114.28	6.0	8.1	0.0	8.1
22-Apr-18	3.0	9.1	-1.5	1.3	-3.4	95.8	170.2	107.77	1.9	2.3	0.0	2.3
23-Apr-18	3.6	8.5	-1.1	0.0	-1.7	97.0	114.2	108.63	21.5	27.9	0.0	27.9
24-Apr-18	4.1	9.6	-0.4	2.2	-1.5	93.9	199.2	112.40	2.5	3.4	0.0	3.4
25-Apr-18	4.1	8.2	1.6	5.8	-1.6	81.6	258.6	106.64	0.0	0.0	0.0	0.0
26-Apr-18	1.7	4.7	5.9	13.5	2.2	67.4	218.4	100.93	0.0	0.0	0.0	0.0
27-Apr-18	3.0	11.8	5.6	9.8	0.8	68.6	297.8	94.68	0.5	0.5	0.5	0.0
28-Apr-18	3.8	11.2	-1.2	3.6	-3.8	66.4	243.2	90.30	0.2	0.3	0.0	0.3
29-Apr-18	1.8	7.4	0.4	5.6	-3.3	57.1	306.9	89.29	0.0	0.0	0.0	0.0
30-Apr-18	5.5	12.3	-0.8	0.6	-1.7	84.8	98.1	87.73	0.5	0.7	0.0	0.7

Note:

dash (-) = Missing or erroneous data that were removed

Gap-filled temperature and precipitation data are underlined

<sup>1</sup> Adjusted to compensate for wind undercatch



**Appendix B3: Johnny Mountain 2018 Daily Meteorological Data**

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation after Gap Fill (mm)		
	Mean	Max.	Mean	Max.	Min.	Mean	Mean	Mean	Total	Precipitation	Rainfall	SWE
										Total	Total	Total
1-May-18	5.7	11.1	-0.1	1.3	-1.2	97.1	124.2	86.29	4.8	7.3	0.0	7.3
2-May-18	6.9	14.9	1.0	2.9	0.0	93.0	150.3	83.93	2.4	3.2	1.2	2.1
3-May-18	4.0	9.3	0.4	1.3	-0.4	94.1	123.5	82.38	4.8	6.1	0.9	5.2
4-May-18	5.0	9.5	1.5	3.0	0.3	97.2	123.1	80.25	0.6	0.7	0.5	0.2
5-May-18	4.6	9.0	3.5	4.4	2.4	95.1	104.4	73.68	1.0	1.0	1.0	0.0
6-May-18	1.3	3.2	7.4	12.3	3.9	72.2	187.6	64.99	1.9	1.9	1.9	0.0
7-May-18	3.8	11.5	9.5	12.0	7.1	56.8	265.5	56.26	0.0	0.0	0.0	0.0
8-May-18	2.2	8.1	9.5	13.5	5.6	56.5	322.8	46.92	0.0	0.0	0.0	0.0
9-May-18	4.2	14.8	7.8	12.0	3.1	67.6	121.6	37.40	2.1	2.1	2.1	0.0
10-May-18	2.6	10.5	5.1	8.6	2.5	84.4	218.6	27.49	0.2	0.2	0.2	0.0
11-May-18	5.1	9.2	3.8	5.1	3.0	92.5	130.3	15.12	0.2	0.2	0.2	0.0
12-May-18	4.4	9.3	4.6	6.7	3.2	94.8	119.6	3.48	0.6	0.6	0.6	0.0
13-May-18	2.0	10.2	7.3	11.8	4.2	77.0	179.9	0.02	0.3	0.3	0.3	0.0
14-May-18	4.3	14.9	2.7	6.2	0.6	86.4	197.7	0.00	0.6	0.6	0.6	0.0
15-May-18	1.7	7.0	3.3	8.1	-0.7	69.5	345.6	0.00	0.0	0.0	0.0	0.0
16-May-18	1.2	6.0	6.1	10.7	2.3	56.5	350.7	0.00	0.0	0.0	0.0	0.0
17-May-18	1.1	4.1	9.8	15.4	4.2	46.1	346.8	0.00	0.0	0.0	0.0	0.0
18-May-18	2.5	11.9	13.7	17.8	10.4	37.9	344.9	0.00	0.1	0.1	0.1	0.0
19-May-18	1.7	7.8	12.3	16.8	8.3	50.0	333.6	0.00	0.0	0.0	0.0	0.0
20-May-18	4.6	10.8	4.8	8.5	2.7	83.7	160.5	0.00	1.4	1.4	1.4	0.0
21-May-18	4.4	15.2	3.7	5.1	2.7	90.8	118.0	0.00	4.0	4.0	4.0	0.0
22-May-18	3.9	9.5	3.1	4.2	2.1	95.4	102.8	0.00	10.8	10.8	10.8	0.0
23-May-18	2.4	11.9	4.9	7.7	2.3	93.0	153.1	0.00	3.2	3.2	3.2	0.0
24-May-18	4.2	10.4	2.1	5.2	0.6	89.3	180.7	0.00	0.0	0.0	0.0	0.0
25-May-18	3.1	8.3	2.0	4.8	0.0	87.3	220.6	0.00	0.8	0.8	0.8	0.0
26-May-18	4.1	11.6	1.0	2.2	-0.6	93.7	108.2	0.00	6.7	7.9	3.2	4.7
27-May-18	3.4	10.9	0.4	1.8	-1.2	94.9	143.8	0.00	15.1	18.4	3.2	15.2
28-May-18	4.0	14.0	-0.3	1.8	-1.6	97.3	152.5	0.00	6.1	8.2	0.0	8.2
29-May-18	1.5	7.5	1.4	5.7	-0.7	89.4	236.6	0.00	1.1	1.1	0.8	0.3
30-May-18	1.8	8.7	3.7	8.4	0.7	73.6	250.7	0.00	0.0	0.0	0.0	0.0
31-May-18	1.9	9.3	4.5	8.1	1.9	73.9	190.7	0.00	1.0	1.0	1.0	0.0

Note:

dash (-) = Missing or erroneous data that were removed

Gap-filled temperature and precipitation data are underlined

<sup>1</sup> Adjusted to compensate for wind undercatch

**Appendix B3: Johnny Mountain 2018 Daily Meteorological Data**

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation after Gap Fill (mm)		
	Mean	Max.	Mean	Max.	Min.	Mean	Mean	Mean	Total	Precipitation	Rainfall	SWE
										Total	Total	Total
1-Jun-18	3.1	9.1	3.8	6.2	1.2	74.6	198.6	0.00	1.6	1.6	1.6	0.0
2-Jun-18	3.2	10.6	2.8	6.3	0.9	88.1	249.1	0.00	1.2	1.2	1.2	0.0
3-Jun-18	1.7	6.7	2.8	5.2	0.9	88.0	163.1	0.00	11.6	11.6	11.6	0.0
4-Jun-18	3.8	9.7	2.1	6.1	0.7	89.6	193.0	0.00	0.1	0.1	0.1	0.0
5-Jun-18	4.0	11.6	4.6	7.8	0.9	60.4	284.9	0.00	0.0	0.0	0.0	0.0
6-Jun-18	3.6	15.8	3.9	6.8	1.0	78.7	230.4	0.00	4.1	4.1	4.1	0.0
7-Jun-18	2.3	17.1	3.6	6.4	0.7	85.3	174.9	0.00	6.7	6.7	6.7	0.0
8-Jun-18	3.6	11.7	3.6	8.2	1.3	74.9	266.8	0.00	1.9	1.9	1.9	0.0
9-Jun-18	2.6	9.8	3.3	7.7	1.9	82.5	218.8	0.00	0.0	0.0	0.0	0.0
10-Jun-18	4.7	12.4	2.7	6.5	1.2	88.0	175.9	0.00	0.2	0.2	0.2	0.0
11-Jun-18	4.7	10.9	2.7	5.4	0.8	94.9	107.0	0.00	0.5	0.5	0.5	0.0
12-Jun-18	2.1	8.8	6.3	10.1	2.7	72.8	279.0	0.00	0.0	0.0	0.0	0.0
13-Jun-18	3.2	7.8	5.9	8.4	4.0	85.4	185.0	0.00	1.9	1.9	1.9	0.0
14-Jun-18	4.6	10.9	5.1	7.3	3.2	87.3	161.3	0.00	8.2	8.2	8.2	0.0
15-Jun-18	2.4	8.7	7.0	12.2	2.8	72.9	368.9	0.00	0.0	0.0	0.0	0.0
16-Jun-18	2.7	7.0	10.0	15.7	5.8	68.2	303.0	0.00	0.0	0.0	0.0	0.0
17-Jun-18	3.2	9.2	11.8	16.9	8.6	71.0	320.6	0.00	0.0	0.0	0.0	0.0
18-Jun-18	2.2	5.9	16.0	22.1	9.5	54.7	348.5	0.00	0.0	0.0	0.0	0.0
19-Jun-18	1.5	5.0	19.6	24.5	15.9	30.7	348.9	0.00	0.0	0.0	0.0	0.0
20-Jun-18	2.6	11.7	18.8	23.5	15.8	37.4	318.4	0.00	0.0	0.0	0.0	0.0
21-Jun-18	3.1	8.9	13.9	16.9	10.3	71.6	205.7	0.00	0.1	0.1	0.1	0.0
22-Jun-18	4.3	10.7	9.1	12.4	6.6	86.7	158.8	0.00	0.7	0.7	0.7	0.0
23-Jun-18	4.2	11.4	7.3	10.2	5.4	78.4	209.7	0.00	0.0	0.0	0.0	0.0
24-Jun-18	2.1	7.5	7.0	10.2	5.6	81.0	189.3	0.00	0.3	0.3	0.3	0.0
25-Jun-18	4.2	12.0	5.8	8.0	4.4	87.4	135.0	0.00	0.0	0.0	0.0	0.0
26-Jun-18	6.2	13.5	4.2	7.4	2.4	83.5	203.7	0.00	0.1	0.1	0.1	0.0
27-Jun-18	4.0	8.3	4.1	6.5	2.3	87.6	144.0	0.00	0.2	0.2	0.2	0.0
28-Jun-18	2.5	6.9	6.3	9.8	3.8	84.1	153.3	0.00	1.7	1.7	1.7	0.0
29-Jun-18	3.8	9.8	6.5	8.3	5.5	95.2	126.6	0.00	18.4	18.4	18.4	0.0
30-Jun-18	4.0	9.0	5.3	7.0	3.9	97.9	135.1	0.00	7.5	7.5	7.5	0.0

Note:

dash (-) = Missing or erroneous data that were removed

Gap-filled temperature and precipitation data are underlined

<sup>1</sup> Adjusted to compensate for wind undercatch

**Appendix B3: Johnny Mountain 2018 Daily Meteorological Data**

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation after Gap Fill (mm)		
	Mean	Max.	Mean	Max.	Min.	Mean	Mean	Mean	Total	Precipitation	Rainfall	SWE
										Total	Total	Total
1-Jul-18	3.2	7.5	4.9	8.5	2.4	88.2	259.5	0.00	1.7	1.7	1.7	0.0
2-Jul-18	2.4	8.3	8.5	14.3	4.2	76.6	361.6	0.00	0.0	0.0	0.0	0.0
3-Jul-18	4.0	9.0	13.7	19.5	6.4	56.8	353.4	0.00	0.0	0.0	0.0	0.0
4-Jul-18	2.6	9.4	16.0	20.7	12.0	46.0	356.5	0.00	0.0	0.0	0.0	0.0
5-Jul-18	2.8	18.8	15.2	21.2	10.1	53.0	277.9	0.00	0.1	0.1	0.1	0.0
6-Jul-18	4.0	9.3	9.8	12.3	8.3	90.4	139.9	0.00	0.1	0.1	0.1	0.0
7-Jul-18	3.3	7.4	8.5	10.3	7.6	92.0	118.8	0.00	0.0	0.0	0.0	0.0
8-Jul-18	3.4	8.3	10.4	15.2	7.5	78.3	307.2	0.00	0.0	0.0	0.0	0.0
9-Jul-18	2.8	7.3	10.1	12.0	8.3	80.0	130.2	0.00	0.0	0.0	0.0	0.0
10-Jul-18	4.5	10.2	8.0	9.5	6.9	94.8	56.5	0.00	5.2	5.2	5.2	0.0
11-Jul-18	5.7	11.7	6.5	7.9	4.7	97.5	59.3	0.00	5.9	5.9	5.9	0.0
12-Jul-18	3.8	9.0	5.0	7.1	3.7	97.9	102.6	0.00	4.3	4.3	4.3	0.0
13-Jul-18	1.9	7.3	8.2	14.2	4.2	78.5	340.8	0.00	0.0	0.0	0.0	0.0
14-Jul-18	3.2	8.9	9.7	14.2	7.4	74.9	216.5	0.00	1.0	1.0	1.0	0.0
15-Jul-18	4.7	10.1	7.1	8.5	6.2	95.5	48.1	0.00	7.8	7.8	7.8	0.0
16-Jul-18	5.9	12.1	7.0	8.2	5.9	98.5	52.9	0.00	17.0	17.0	17.0	0.0
17-Jul-18	3.7	9.7	8.0	9.8	6.9	98.7	76.5	0.00	17.4	17.4	17.4	0.0
18-Jul-18	3.0	9.3	6.2	8.5	4.7	94.9	129.2	0.00	0.9	0.9	0.9	0.0
19-Jul-18	2.1	6.3	7.8	11.7	4.8	84.9	224.6	0.00	0.0	0.0	0.0	0.0
20-Jul-18	2.7	6.4	12.2	17.6	6.4	69.6	339.2	0.00	0.0	0.0	0.0	0.0
21-Jul-18	2.1	6.9	16.1	20.6	11.0	56.6	333.7	0.00	0.0	0.0	0.0	0.0
22-Jul-18	4.0	9.5	17.1	20.5	13.6	46.7	314.7	0.00	0.0	0.0	0.0	0.0
23-Jul-18	1.6	6.2	16.7	20.2	13.6	46.6	297.2	0.00	0.0	0.0	0.0	0.0
24-Jul-18	1.4	6.6	16.8	20.5	14.5	49.9	289.0	0.00	0.0	0.0	0.0	0.0
25-Jul-18	1.7	8.7	16.3	19.8	13.7	58.0	311.2	0.00	0.0	0.0	0.0	0.0
26-Jul-18	1.8	7.3	16.1	20.3	12.7	63.1	326.1	0.00	0.0	0.0	0.0	0.0
27-Jul-18	1.8	6.1	17.4	22.4	13.2	67.9	329.4	0.00	0.0	0.0	0.0	0.0
28-Jul-18	1.9	5.5	17.9	22.4	14.6	66.9	330.3	0.00	0.0	0.0	0.0	0.0
29-Jul-18	2.0	6.4	17.7	21.9	14.7	66.3	329.0	0.00	0.0	0.0	0.0	0.0
30-Jul-18	1.9	6.5	17.9	22.9	13.7	61.4	327.6	0.00	0.0	0.0	0.0	0.0
31-Jul-18	1.5	7.1	18.1	22.2	15.1	64.7	309.7	0.00	0.0	0.0	0.0	0.0

Note:

dash (-) = Missing or erroneous data that were removed

Gap-filled temperature and precipitation data are underlined

<sup>1</sup> Adjusted to compensate for wind undercatch

**Appendix B3: Johnny Mountain 2018 Daily Meteorological Data**

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation after Gap Fill (mm)		
	Mean	Max.	Mean	Max.	Min.	Mean	Mean	Mean	Total	Precipitation	Rainfall	SWE
									Total	Total	Total	Total
1-Aug-18	3.5	11.0	15.1	18.4	12.8	80.4	221.4	0.00	0.0	0.0	0.0	0.0
2-Aug-18	4.1	11.3	10.7	12.9	9.3	91.6	71.0	0.00	5.3	5.3	5.3	0.0
3-Aug-18	4.6	11.6	9.9	11.7	8.4	90.3	111.8	0.00	0.7	0.7	0.7	0.0
4-Aug-18	2.5	8.9	12.2	15.6	9.5	75.5	150.5	0.00	0.0	0.0	0.0	0.0
5-Aug-18	1.9	7.9	15.1	19.3	11.5	55.7	297.2	0.00	0.0	0.0	0.0	0.0
6-Aug-18	6.2	15.5	14.2	18.1	12.0	55.9	202.8	0.00	0.0	0.0	0.0	0.0
7-Aug-18	4.5	9.1	12.6	14.7	10.9	68.7	120.9	0.00	0.0	0.0	0.0	0.0
8-Aug-18	5.4	13.4	11.3	12.9	9.5	84.4	94.3	0.00	0.9	0.9	0.9	0.0
9-Aug-18	6.1	17.1	9.7	12.1	6.9	89.8	28.5	0.00	30.5	30.5	30.5	0.0
10-Aug-18	2.9	10.0	8.0	11.7	6.0	86.0	197.2	0.00	0.2	0.2	0.2	0.0
11-Aug-18	2.1	6.2	10.0	15.1	5.6	75.1	300.3	0.00	0.0	0.0	0.0	0.0
12-Aug-18	2.4	6.4	10.3	12.6	7.6	82.2	202.6	0.00	0.0	0.0	0.0	0.0
13-Aug-18	5.4	13.8	10.1	14.0	8.1	89.5	147.1	0.00	1.8	1.8	1.8	0.0
14-Aug-18	5.2	11.1	8.8	12.5	6.6	93.1	183.2	0.00	5.7	5.7	5.7	0.0
15-Aug-18	2.5	7.5	8.1	12.6	5.0	79.3	287.1	0.00	0.0	0.0	0.0	0.0
16-Aug-18	3.8	11.0	7.8	12.8	5.2	79.0	231.0	0.00	0.0	0.0	0.0	0.0
17-Aug-18	4.4	9.1	6.8	7.9	5.4	94.0	47.8	0.00	9.0	9.0	9.0	0.0
18-Aug-18	2.6	8.7	9.1	13.1	7.1	85.3	257.0	0.00	0.0	0.0	0.0	0.0
19-Aug-18	1.5	4.7	11.1	16.2	6.7	71.2	275.0	0.00	0.0	0.0	0.0	0.0
20-Aug-18	1.2	4.4	15.5	19.5	12.0	50.7	266.5	0.00	0.0	0.0	0.0	0.0
21-Aug-18	4.3	12.5	15.6	20.4	9.7	53.7	262.7	0.00	2.4	2.4	2.4	0.0
22-Aug-18	3.4	9.6	7.6	9.7	6.3	95.8	62.6	0.00	3.2	3.2	3.2	0.0
23-Aug-18	2.3	4.9	7.3	9.5	6.0	90.6	130.7	0.00	0.0	0.0	0.0	0.0
24-Aug-18	4.2	8.5	6.4	7.0	5.8	97.5	45.3	0.00	2.9	2.9	2.9	0.0
25-Aug-18	3.8	7.7	6.9	8.5	6.2	97.7	71.9	0.00	5.4	5.4	5.4	0.0
26-Aug-18	2.7	7.0	8.6	13.0	5.4	83.3	231.0	0.00	0.0	0.0	0.0	0.0
27-Aug-18	4.9	10.5	8.6	11.8	6.8	95.4	45.9	0.00	0.7	0.7	0.7	0.0
28-Aug-18	5.2	13.4	8.2	10.0	6.5	98.4	47.5	0.00	23.7	23.7	23.7	0.0
29-Aug-18	2.4	5.5	7.4	9.7	6.1	95.9	131.6	0.00	0.4	0.4	0.4	0.0
30-Aug-18	4.3	12.6	6.7	9.6	5.0	95.2	82.1	0.00	0.3	0.3	0.3	0.0
31-Aug-18	5.1	12.3	5.4	7.3	4.3	94.9	75.7	0.00	9.1	9.1	9.1	0.0

Note:

dash (-) = Missing or erroneous data that were removed

Gap-filled temperature and precipitation data are underlined

<sup>1</sup> Adjusted to compensate for wind undercatch

**Appendix B3: Johnny Mountain 2018 Daily Meteorological Data**

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation after Gap Fill (mm)		
	Mean	Max.	Mean	Max.	Min.	Mean	Mean	Mean	Total	Precipitation	Rainfall	SWE
										Total	Total	Total
1-Sep-18	3.6	9.5	4.6	6.1	3.9	94.3	76.3	0.00	6.4	6.4	6.4	0.0
2-Sep-18	1.4	6.6	4.5	6.9	2.2	91.5	121.0	0.00	19.7	19.7	19.7	0.0
3-Sep-18	1.2	5.3	7.3	11.6	4.3	77.6	219.9	0.00	0.0	0.0	0.0	0.0
4-Sep-18	1.2	6.2	9.1	12.7	6.3	62.0	230.2	0.00	0.0	0.0	0.0	0.0
5-Sep-18	1.0	7.0	8.5	10.4	6.7	66.8	79.9	0.00	0.0	0.0	0.0	0.0
6-Sep-18	1.2	3.9	9.4	12.9	7.4	75.6	162.0	0.00	0.1	0.1	0.1	0.0
7-Sep-18	2.0	8.6	8.0	10.6	6.6	87.3	124.7	0.00	4.9	4.9	4.9	0.0
8-Sep-18	3.1	12.6	7.9	10.1	5.9	87.5	110.0	0.00	3.2	3.2	3.2	0.0
9-Sep-18	8.4	24.2	8.1	10.6	6.1	76.8	89.1	0.00	0.9	0.9	0.9	0.0
10-Sep-18	7.5	15.9	8.6	11.5	6.5	62.9	175.1	0.00	0.0	0.0	0.0	0.0
11-Sep-18	2.0	8.0	9.1	12.7	6.8	63.6	187.0	0.00	0.0	0.0	0.0	0.0
12-Sep-18	6.4	13.5	6.4	8.8	3.8	39.3	207.3	0.00	0.0	0.0	0.0	0.0
13-Sep-18	2.7	10.7	4.7	8.1	1.7	41.0	175.7	0.00	0.1	0.1	0.1	0.0
14-Sep-18	6.3	23.1	3.0	5.8	1.5	70.5	136.6	0.00	0.4	0.4	0.4	0.0
15-Sep-18	10.7	26.8	3.3	5.7	1.4	47.5	200.8	0.00	0.0	0.0	0.0	0.0
16-Sep-18	2.6	12.4	3.5	7.7	-0.2	52.0	184.6	0.00	0.1	0.1	0.1	0.0
17-Sep-18	1.8	7.6	5.2	8.9	3.5	55.8	193.0	0.00	0.0	0.0	0.0	0.0
18-Sep-18	1.5	6.4	5.8	10.0	2.2	54.8	190.3	0.00	0.0	0.0	0.0	0.0
19-Sep-18	1.3	4.8	6.1	9.4	3.0	52.0	190.0	0.00	0.0	0.0	0.0	0.0
20-Sep-18	1.1	4.8	6.5	10.3	3.8	49.9	182.5	0.00	0.0	0.0	0.0	0.0
21-Sep-18	4.2	11.7	7.0	10.1	3.5	48.0	185.0	0.00	0.0	0.0	0.0	0.0
22-Sep-18	2.9	10.0	6.2	10.0	3.9	54.2	150.1	0.00	0.0	0.0	0.0	0.0
23-Sep-18	4.7	11.2	4.6	6.9	2.7	95.4	40.3	0.00	15.5	15.5	15.5	0.0
24-Sep-18	4.5	8.9	5.8	6.8	4.5	96.5	67.5	0.00	0.1	0.1	0.1	0.0
25-Sep-18	5.1	11.3	5.6	6.8	4.5	98.6	30.7	0.00	10.5	10.5	10.5	0.0
26-Sep-18	3.1	7.7	5.6	6.5	4.7	98.9	32.7	0.00	11.1	11.1	11.1	0.0
27-Sep-18	0.9	6.0	6.3	8.3	5.0	95.2	89.0	0.00	0.0	0.0	0.0	0.0
28-Sep-18	6.8	23.9	6.7	8.4	4.4	73.6	97.3	0.00	0.0	0.0	0.0	0.0
29-Sep-18	13.7	25.9	6.0	7.8	4.0	41.0	159.9	0.00	0.0	0.0	0.0	0.0
30-Sep-18	12.3	24.9	4.2	6.8	2.1	33.6	158.2	0.00	0.4	0.4	0.4	0.0

Note:

dash (-) = Missing or erroneous data that were removed

Gap-filled temperature and precipitation data are underlined

<sup>1</sup> Adjusted to compensate for wind undercatch

**Appendix B3: Johnny Mountain 2018 Daily Meteorological Data**

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation after Gap Fill (mm)		
	Mean	Max.	Mean	Max.	Min.	Mean	Mean	Mean	Total	Precipitation	Rainfall	SWE
										Total	Total	Total
1-Oct-18	8.8	22.6	3.0	5.6	-0.8	35.3	134.5	0.00	0.0	0.0	0.0	0.0
2-Oct-18	5.9	21.7	0.2	3.9	-3.6	34.8	146.5	0.00	0.4	0.6	0.0	0.5
3-Oct-18	2.8	8.7	1.7	5.0	-0.4	40.9	142.4	0.00	0.0	0.0	0.0	0.0
4-Oct-18	3.4	7.3	0.4	3.3	-1.6	56.9	106.6	0.00	0.1	0.1	0.0	0.1
5-Oct-18	3.9	8.0	0.8	2.5	-0.1	79.0	36.3	0.00	5.0	5.9	2.1	3.8
6-Oct-18	3.0	6.0	2.6	4.0	1.2	91.0	71.8	0.00	0.2	0.2	0.2	0.0
7-Oct-18	2.1	4.4	3.6	5.3	1.8	92.1	43.6	0.00	7.3	7.3	7.3	0.0
8-Oct-18	5.4	19.3	3.8	5.7	0.5	92.2	40.7	0.00	5.7	5.7	5.7	0.0
9-Oct-18	5.7	16.9	-0.1	1.7	-1.7	71.1	93.8	0.00	0.0	0.0	0.0	0.0
10-Oct-18	2.5	7.4	1.4	4.7	-2.1	80.7	102.8	0.00	4.1	4.3	2.9	1.4
11-Oct-18	4.0	8.4	1.9	3.5	0.0	98.4	13.4	0.00	47.5	48.3	45.0	3.3
12-Oct-18	2.8	7.1	2.0	3.8	1.1	84.5	74.6	0.00	0.0	0.0	0.0	0.0
13-Oct-18	2.6	8.6	3.5	5.9	1.2	75.0	38.3	0.00	0.0	0.0	0.0	0.0
14-Oct-18	5.3	11.5	2.8	4.4	1.9	82.7	17.3	0.00	0.1	0.1	0.1	0.0
15-Oct-18	4.9	12.2	6.0	9.2	2.8	41.2	114.0	0.00	1.1	1.1	1.1	0.0
16-Oct-18	6.3	15.1	9.0	12.0	7.0	27.2	98.1	0.00	0.0	0.0	0.0	0.0
17-Oct-18	5.2	15.6	3.3	9.4	2.0	91.0	20.6	0.00	12.5	12.5	12.5	0.0
18-Oct-18	2.1	7.9	2.9	5.5	0.9	82.0	78.8	0.00	0.9	0.9	0.9	0.0
19-Oct-18	6.1	15.3	2.9	7.5	0.6	95.2	12.7	0.00	26.8	26.8	26.8	0.0
20-Oct-18	5.3	16.6	0.9	2.4	-0.2	97.5	26.7	0.00	6.3	7.9	2.9	4.9
21-Oct-18	2.8	7.0	3.4	6.7	1.2	67.5	60.3	0.00	0.1	0.1	0.1	0.0
22-Oct-18	2.7	9.3	5.9	9.4	2.7	76.0	14.3	0.00	6.7	6.7	6.7	0.0
23-Oct-18	2.9	11.4	6.3	10.0	2.2	64.1	30.4	0.00	2.6	2.6	2.6	0.0
24-Oct-18	2.2	10.4	3.1	4.6	2.0	82.2	29.1	0.00	2.4	2.4	2.4	0.0
25-Oct-18	4.6	14.7	1.1	3.7	-0.6	96.4	17.0	0.00	13.7	16.3	7.2	9.0
26-Oct-18	-	-	0.0	3.1	-1.4	-	-	-	-	12.6	0.0	12.6
27-Oct-18	-	-	0.4	3.1	-1.2	-	-	-	-	0.0	0.0	0.0
28-Oct-18	-	-	0.6	3.1	-0.6	-	-	-	-	2.8	0.7	2.1
29-Oct-18	-	-	0.0	0.8	-0.6	-	-	-	-	25.3	0.0	25.3
30-Oct-18	-	-	0.1	0.9	-0.4	-	-	-	-	4.5	0.1	4.4
31-Oct-18	-	-	-1.6	0.6	-3.2	-	-	-	-	1.1	0.0	1.1

Note:

dash (-) = Missing or erroneous data that were removed

Gap-filled temperature and precipitation data are underlined

<sup>1</sup> Adjusted to compensate for wind undercatch

Appendix B3: Johnny Mountain 2018 Daily Meteorological Data

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation after Gap Fill (mm)		
	Mean	Max.	Mean	Max.	Min.	Mean	Mean	Mean	Total	Precipitation	Rainfall	SWE
										Total	Total	Total
1-Nov-18	4.7	10.5	-2.6	0.0	-3.9	92.4	22.2	8.0	7.1	9.9	0.0	9.9
2-Nov-18	-	5.7	-2.4	-0.4	-3.8	97.2	18.6	14.6	14.2	14.2	0.0	14.2
3-Nov-18	-	7.6	-0.3	2.0	-2.0	98.1	18.4	22.0	15.6	15.6	0.0	15.6
4-Nov-18	-	-	<u>-1.0</u>	<u>1.6</u>	<u>-2.4</u>	-	-	-	-	<u>2.8</u>	<u>0.0</u>	<u>2.8</u>
5-Nov-18	-	-	<u>-3.2</u>	<u>-1.8</u>	<u>-5.2</u>	-	-	-	-	<u>0.5</u>	<u>0.0</u>	<u>0.5</u>
6-Nov-18	-	-	<u>-6.4</u>	<u>-5.0</u>	<u>-9.2</u>	-	-	-	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
7-Nov-18	-	-	<u>-6.5</u>	<u>-3.6</u>	<u>-9.3</u>	-	-	-	-	<u>0.3</u>	<u>0.0</u>	<u>0.3</u>
8-Nov-18	-	-	<u>-4.0</u>	<u>-1.9</u>	<u>-6.0</u>	-	-	-	-	<u>24.1</u>	<u>0.0</u>	<u>24.1</u>
9-Nov-18	-	-	<u>-1.4</u>	<u>0.6</u>	<u>-3.1</u>	-	-	-	-	<u>2.4</u>	<u>0.0</u>	<u>2.4</u>
10-Nov-18	-	-	<u>-1.8</u>	<u>0.0</u>	<u>-2.8</u>	-	-	-	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
11-Nov-18	-	-	<u>-1.9</u>	<u>0.3</u>	<u>-3.0</u>	-	-	-	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
12-Nov-18	-	-	<u>-2.0</u>	<u>0.2</u>	<u>-4.1</u>	-	-	-	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
13-Nov-18	-	-	<u>-0.5</u>	<u>3.3</u>	<u>-3.6</u>	-	-	-	-	<u>10.3</u>	<u>0.0</u>	<u>10.3</u>
14-Nov-18	-	-	<u>-1.1</u>	<u>0.5</u>	<u>-2.1</u>	-	-	-	-	<u>9.9</u>	<u>0.0</u>	<u>9.9</u>
15-Nov-18	-	-	<u>-2.0</u>	<u>-0.4</u>	<u>-4.1</u>	-	-	-	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
16-Nov-18	-	-	<u>-2.9</u>	<u>-1.4</u>	<u>-4.5</u>	-	-	-	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
17-Nov-18	4.9	13.6	-0.4	0.8	-1.9	92.5	-	40.2	16.8	23.9	0.0	23.9
18-Nov-18	5.3	9.8	2.2	4.3	0.1	96.7	-	36.1	9.6	9.6	9.6	0.0
19-Nov-18	2.9	10.3	4.0	6.4	1.6	80.0	-	31.0	0.0	0.0	0.0	0.0
20-Nov-18	2.4	6.8	0.6	1.8	-0.6	97.5	-	30.2	13.7	15.5	3.9	11.7
21-Nov-18	2.2	6.6	-1.5	-0.5	-3.0	97.9	-	35.3	2.4	2.8	0.0	2.8
22-Nov-18	1.7	12.3	-3.0	-2.0	-3.8	91.7	-	35.8	0.0	0.0	0.0	0.0
23-Nov-18	1.8	13.9	-3.6	-2.0	-4.5	92.2	-	31.0	0.3	0.3	0.0	0.3
24-Nov-18	2.7	8.5	-2.1	-0.5	-3.5	92.9	-	32.0	5.1	6.2	0.0	6.2
25-Nov-18	2.3	7.0	0.4	2.0	-0.7	96.1	-	36.6	18.3	20.9	3.7	17.2
26-Nov-18	3.2	13.2	1.7	3.1	0.3	92.9	-	33.4	9.0	9.3	7.6	1.7
27-Nov-18	0.8	6.8	0.6	2.4	-0.4	95.1	-	31.5	1.7	1.8	0.5	1.3
28-Nov-18	-	4.0	-0.4	0.3	-0.7	98.7	-	31.0	1.1	1.1	0.0	1.1
29-Nov-18	1.6	4.1	-1.4	0.1	-3.1	94.9	-	30.8	0.0	0.0	0.0	0.0
30-Nov-18	-	-	-3.6	-2.0	-4.6	91.7	-	29.8	0.1	0.1	0.0	0.1

Note:

dash (-) = Missing or erroneous data that were removed

Gap-filled temperature and precipitation data are underlined

<sup>1</sup> Adjusted to compensate for wind undercatch

Appendix B3: Johnny Mountain 2018 Daily Meteorological Data

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation after Gap Fill (mm)		
	Mean	Max.	Mean	Max.	Min.	Mean	Mean	Mean	Total	Precipitation	Rainfall	SWE
										Total	Total	Total
1-Dec-18	3.7	11.7	-5.9	-4.4	-8.7	90.8	-	30.7	0.2	0.2	0.0	0.2
2-Dec-18	1.1	3.6	-8.7	-5.4	-10.4	89.6	-	30.8	0.2	0.2	0.0	0.2
3-Dec-18	2.5	6.9	-5.6	-2.8	-9.6	48.8	-	31.0	-0.3	0.0	0.0	0.0
4-Dec-18	1.6	6.6	-5.9	-2.0	-7.4	69.6	-	30.9	0.2	0.2	0.0	0.2
5-Dec-18	1.4	3.8	-6.0	-3.7	-7.8	70.5	-	31.0	0.0	0.0	0.0	0.0
6-Dec-18	1.2	5.5	-5.5	-3.4	-7.3	67.6	-	31.0	-0.2	0.0	0.0	0.0
7-Dec-18	2.9	7.5	-3.4	0.6	-7.3	53.8	-	30.7	2.1	2.6	0.0	2.6
8-Dec-18	3.7	12.1	-1.2	1.5	-3.7	87.4	-	40.2	0.6	0.7	0.0	0.7
9-Dec-18	4.2	15.6	-0.9	1.9	-3.0	87.6	-	39.6	11.5	15.6	0.0	15.6
10-Dec-18	3.8	13.4	-3.2	-2.0	-4.3	97.3	-	46.6	14.0	18.4	0.0	18.4
11-Dec-18	-	14.5	-2.7	-1.2	-4.2	97.7	-	56.6	12.4	12.4	0.0	12.4
12-Dec-18	-	-	-4.6	-3.6	-5.5	96.3	-	59.6	9.8	9.8	0.0	9.8
13-Dec-18	-	-	-4.6	-3.1	-7.1	96.3	-	61.9	2.6	2.6	0.0	2.6
14-Dec-18	-	-	-8.3	-7.1	-9.5	76.7	-	55.4	-0.2	0.0	0.0	0.0
15-Dec-18	-	16.5	-7.3	-3.8	-11.0	66.7	-	53.4	5.7	5.7	0.0	5.7
16-Dec-18	3.7	9.3	-3.1	-1.1	-5.2	96.8	-	70.4	11.7	15.2	0.0	15.2
17-Dec-18	2.8	14.4	-1.2	-0.2	-1.8	98.1	-	87.2	4.0	4.9	0.0	4.9
18-Dec-18	3.2	10.0	-1.2	-0.1	-1.8	97.4	-	89.7	-	<u>7.1</u>	<u>0.0</u>	<u>7.1</u>
19-Dec-18	3.0	12.0	-5.0	-1.6	-7.4	96.1	-	85.9	-	<u>1.8</u>	<u>0.0</u>	<u>1.8</u>
20-Dec-18	1.1	4.8	-8.2	-5.0	-10.1	92.9	-	83.7	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
21-Dec-18	1.9	6.0	-8.9	-7.4	-10.5	91.4	-	81.1	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
22-Dec-18	4.9	23.2	-8.1	-4.0	-10.6	82.2	-	77.8	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
23-Dec-18	6.0	14.5	-6.2	-5.3	-7.7	82.9	-	75.6	-	<u>1.8</u>	<u>0.0</u>	<u>1.8</u>
24-Dec-18	3.0	6.3	-4.5	-3.6	-6.0	96.4	-	83.6	-	<u>14.0</u>	<u>0.0</u>	<u>14.0</u>
25-Dec-18	2.1	8.4	-4.8	-3.8	-6.4	89.5	-	86.2	-	<u>0.8</u>	<u>0.0</u>	<u>0.8</u>
26-Dec-18	3.5	9.4	-5.0	-3.0	-6.4	93.1	-	92.1	-	<u>1.4</u>	<u>0.0</u>	<u>1.4</u>
27-Dec-18	4.1	8.4	-2.4	-1.6	-3.5	98.1	-	90.0	-	<u>17.3</u>	<u>0.0</u>	<u>17.3</u>
28-Dec-18	1.8	7.5	-2.4	-0.8	-4.5	97.8	-	87.6	-	<u>2.5</u>	<u>0.0</u>	<u>2.5</u>
29-Dec-18	4.0	13.7	-5.6	-4.0	-6.6	96.0	-	89.1	-	<u>15.9</u>	<u>0.0</u>	<u>15.9</u>
30-Dec-18	1.8	7.9	-6.6	-4.5	-8.4	94.6	-	87.7	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
31-Dec-18	5.5	11.7	-3.1	-0.9	-5.0	96.2	-	87.7	-	<u>19.2</u>	<u>0.0</u>	<u>19.2</u>

Note:

dash (-) = Missing or erroneous data that were removed

Gap-filled temperature and precipitation data are underlined

<sup>1</sup> Adjusted to compensate for wind undercatch



Appendix B4: Johnny Mountain 2019 Daily Meteorological Data

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation (mm)						
	Mean	Max.	Mean	Max.	Min.					Mean	Mean	Mean	Total	Precipitation	Rainfall	SWE
														Total	Total	Total
1-Jan-19	5.0	19.1	-0.4	2.4	-1.5	99.2	-	91.7	-	-	-	-				
2-Jan-19	1.6	4.6	-4.0	-0.9	-6.7	97.6	-	104.7	0.8	0.9	0.0	0.9				
3-Jan-19	-	-	-8.0	-5.4	-11.1	83.6	-	102.7	0.0	0.0	0.0	0.0				
4-Jan-19	-	-	-11.3	-7.0	-13.4	80.3	-	100.3	0.1	0.1	0.0	0.1				
5-Jan-19	-	-	-14.0	-12.0	-15.7	80.6	-	98.7	0.1	0.1	0.0	0.1				
6-Jan-19	-	-	-14.8	-13.4	-16.1	67.0	-	81.1	0.0	0.0	0.0	0.0				
7-Jan-19	-	-	-15.8	-10.4	-18.2	83.3	-	81.8	3.4	3.4	0.0	3.4				
8-Jan-19	-	-	-9.4	-7.6	-13.9	86.7	-	89.9	1.0	1.0	0.0	1.0				
9-Jan-19	7.3	24.8	-9.1	-7.1	-11.8	87.4	-	82.7	4.0	6.8	0.0	6.8				
10-Jan-19	2.3	7.9	-4.1	-0.9	-9.4	97.1	-	100.8	33.9	39.8	0.0	39.8				
11-Jan-19	-	-	-1.6	-0.4	-4.9	98.9	-	125.6	10.9	10.9	0.0	10.9				
12-Jan-19	-	-	-3.7	-0.4	-5.5	94.3	-	125.2	6.9	6.9	0.0	6.9				
13-Jan-19	-	9.9	0.3	1.2	-0.4	99.3	-	129.1	8.9	8.9	1.2	7.7				
14-Jan-19	1.1	5.2	0.6	1.4	-0.2	93.6	-	127.8	3.1	3.3	0.9	2.4				
15-Jan-19	0.5	5.9	-0.4	3.0	-2.9	85.5	-	124.1	0.0	0.0	0.0	0.0				
16-Jan-19	0.8	10.0	-5.8	-2.2	-8.0	95.5	-	121.0	0.0	0.0	0.0	0.0				
17-Jan-19	2.2	11.7	-6.6	-3.9	-8.9	81.2	-	120.8	0.1	0.1	0.0	0.1				
18-Jan-19	-	10.2	-7.6	-4.7	-9.7	93.0	-	124.1	9.4	9.4	0.0	9.4				
19-Jan-19	-	16.3	-6.4	-1.0	-9.9	89.6	-	120.7	3.9	3.9	0.0	3.9				
20-Jan-19	4.2	7.6	-3.2	-2.3	-6.7	98.0	-	122.0	4.6	6.3	0.0	6.3				
21-Jan-19	2.3	6.8	-2.9	-2.0	-4.1	98.3	-	123.3	8.3	9.8	0.0	9.8				
22-Jan-19	-	4.6	-3.7	-2.5	-4.3	97.8	-	134.7	2.4	2.4	0.0	2.4				
23-Jan-19	-	8.9	-3.5	-1.5	-5.5	97.8	-	130.2	0.0	0.0	0.0	0.0				
24-Jan-19	3.9	8.4	-2.1	-0.7	-3.2	98.8	-	127.9	5.4	7.1	0.0	7.1				
25-Jan-19	3.8	10.6	0.0	1.0	-0.7	99.3	-	124.0	11.6	15.2	0.1	15.1				
26-Jan-19	-	11.4	-0.8	0.0	-2.7	99.3	-	-	9.9	9.9	0.0	9.9				
27-Jan-19	-	-	-4.5	-2.5	-6.1	97.2	-	128.0	0.0	0.0	0.0	0.0				
28-Jan-19	-	-	-4.9	-0.3	-6.5	81.0	-	127.8	0.0	0.0	0.0	0.0				
29-Jan-19	-	-	-1.5	2.9	-5.1	64.5	-	128.0	2.5	2.5	0.0	2.5				
30-Jan-19	-	-	-1.5	-0.8	-2.4	99.2	-	129.4	6.0	6.0	0.0	6.0				
31-Jan-19	-	-	-3.4	-0.7	-10.7	97.5	-	130.6	0.0	0.0	0.0	0.0				

Note:

dash (-) = Missing or erroneous data that were removed

Gap-filled temperature and precipitation data are underlined

<sup>1</sup> Adjusted to compensate for wind undercatch

Appendix B4: Johnny Mountain 2019 Daily Meteorological Data

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation (mm)						
	Mean	Max.	Mean	Max.	Min.					Mean	Mean	Mean	Total	Precipitation	Rainfall	SWE
														Total	Total	Total
1-Feb-19	-	26.3	-17.6	-10.5	-24.9	78.9	-	125.8	0.3	0.3	0.0	0.3				
2-Feb-19	19.0	32.3	-24.4	-20.9	-26.8	61.2	-	123.6	2.3	9.3	0.0	9.3				
3-Feb-19	11.2	26.1	-20.0	-17.1	-21.9	50.2	-	123.1	0.0	0.0	0.0	0.0				
4-Feb-19	-	-	-14.7	-11.1	-20.7	55.2	-	123.2	0.5	0.5	0.0	0.5				
5-Feb-19	-	8.9	-9.6	-6.2	-16.2	63.4	-	123.0	0.1	0.1	0.0	0.1				
6-Feb-19	3.4	7.4	-6.3	-4.9	-8.6	92.0	-	126.9	5.1	6.6	0.0	6.6				
7-Feb-19	-	-	-7.3	-4.5	-10.4	94.6	-	132.1	0.7	0.7	0.0	0.7				
8-Feb-19	13.0	25.2	-10.1	-5.7	-14.1	56.9	-	124.3	0.0	0.0	0.0	0.0				
9-Feb-19	4.7	25.5	-11.6	-3.3	-15.5	56.1	-	122.7	0.0	0.0	0.0	0.0				
10-Feb-19	-	21.5	-9.5	-7.8	-11.3	48.6	-	122.3	0.4	0.4	0.0	0.4				
11-Feb-19	-	-	-10.7	-9.1	-12.7	41.4	-	122.1	0.1	0.1	0.0	0.1				
12-Feb-19	-	-	<u>-11.2</u>	<u>-8.0</u>	<u>-14.0</u>	-	-	-	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>				
13-Feb-19	1.1	3.8	-10.7	-8.5	-12.1	80.9	39.1	122.2	2.8	3.0	0.0	3.0				
14-Feb-19	14.3	27.9	-9.4	-7.0	-12.7	62.4	76.5	121.4	0.0	0.0	0.0	0.0				
15-Feb-19	8.2	22.3	-11.1	-8.7	-13.8	60.9	72.4	121.2	0.0	0.0	0.0	0.0				
16-Feb-19	15.0	25.9	-15.4	-13.1	-17.2	54.1	92.8	120.8	0.1	0.3	0.0	0.3				
17-Feb-19	5.3	26.0	-13.5	-8.0	-18.3	46.1	92.8	120.2	0.0	0.0	0.0	0.0				
18-Feb-19	5.3	10.7	-6.6	-5.1	-9.1	81.1	46.1	120.7	1.7	2.4	0.0	2.4				
19-Feb-19	2.6	6.4	-4.7	-2.8	-6.6	94.0	54.5	125.2	3.3	4.0	0.0	4.0				
20-Feb-19	2.5	7.7	-5.8	-1.6	-8.0	84.7	96.0	126.2	0.1	0.2	0.0	0.2				
21-Feb-19	4.6	9.7	-5.8	-4.2	-7.0	90.7	35.7	132.8	8.3	11.5	0.0	11.5				
22-Feb-19	8.9	23.1	-7.4	-5.3	-11.2	81.0	86.4	134.2	2.2	4.2	0.0	4.2				
23-Feb-19	12.4	22.0	-12.2	-9.9	-14.2	57.5	112.7	122.9	0.0	0.0	0.0	0.0				
24-Feb-19	9.8	21.7	-11.7	-8.4	-15.2	38.9	117.2	121.8	0.1	0.1	0.0	0.1				
25-Feb-19	10.8	19.5	-9.0	-5.9	-12.1	41.9	119.1	120.2	0.0	0.0	0.0	0.0				
26-Feb-19	3.1	16.2	-7.0	0.0	-10.9	46.8	118.9	119.4	0.0	0.0	0.0	0.0				
27-Feb-19	12.2	20.1	-1.0	1.5	-4.4	42.8	123.0	118.8	0.0	0.0	0.0	0.0				
28-Feb-19	2.7	14.8	-2.8	1.0	-5.5	53.1	125.7	118.8	0.1	0.1	0.0	0.1				

Note:

dash (-) = Missing or erroneous data that were removed

Gap-filled temperature and precipitation data are underlined

<sup>1</sup> Adjusted to compensate for wind undercatch

Appendix B4: Johnny Mountain 2019 Daily Meteorological Data

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation (mm)		
	Mean	Max.	Mean	Max.	Min.	Mean	Mean	Mean	Total	Precipitation	Rainfall	SWE
										Total	Total	Total
1-Mar-19	1.2	6.5	-4.3	-0.9	-6.2	63.3	81.9	118.8	0.0	0.0	0.0	0.0
2-Mar-19	10.8	21.4	-8.4	-4.7	-11.8	47.2	134.0	118.1	0.3	0.6	0.0	0.6
3-Mar-19	3.1	12.7	-10.0	-7.0	-14.0	33.3	136.5	118.2	0.1	0.2	0.0	0.2
4-Mar-19	1.6	5.3	-9.1	-4.9	-12.8	40.7	137.5	118.2	0.0	0.0	0.0	0.0
5-Mar-19	3.8	17.8	-7.5	-3.7	-10.9	38.3	141.1	118.2	0.0	0.0	0.0	0.0
6-Mar-19	4.7	12.1	-6.4	-2.2	-10.7	37.0	144.4	118.2	0.0	0.0	0.0	0.0
7-Mar-19	1.9	4.5	-6.4	-3.9	-9.1	43.6	145.8	117.9	0.0	0.0	0.0	0.0
8-Mar-19	2.7	5.9	-5.7	-3.7	-7.2	50.8	148.9	117.9	0.1	0.1	0.0	0.1
9-Mar-19	3.3	9.0	-5.7	-3.9	-7.2	67.0	115.2	118.1	0.0	0.0	0.0	0.0
10-Mar-19	5.9	15.1	-5.1	-3.3	-7.0	89.7	37.1	117.8	5.9	9.0	0.0	9.0
11-Mar-19	2.5	6.5	-3.9	-1.9	-4.9	94.8	71.9	121.8	5.3	6.3	0.0	6.3
12-Mar-19	2.9	6.1	-4.0	-2.3	-5.5	94.7	88.1	123.4	2.7	3.4	0.0	3.4
13-Mar-19	2.8	11.1	-3.8	-2.2	-5.2	92.3	86.9	124.9	6.2	7.5	0.0	7.5
14-Mar-19	4.0	17.8	-3.6	-1.5	-5.0	95.4	85.8	136.9	9.5	12.6	0.0	12.6
15-Mar-19	2.5	8.0	-3.7	-0.3	-5.7	94.1	79.1	134.3	0.8	1.0	0.0	1.0
16-Mar-19	3.9	8.7	-1.0	0.7	-3.5	97.3	54.6	136.6	10.3	13.7	0.0	13.7
17-Mar-19	6.1	13.7	2.4	5.8	0.3	94.8	51.0	133.2	5.5	5.5	5.5	0.0
18-Mar-19	3.0	10.4	6.2	9.9	4.4	64.5	170.1	120.8	0.0	0.0	0.0	0.0
19-Mar-19	1.5	4.0	7.4	10.6	5.1	37.9	181.4	116.4	0.0	0.0	0.0	0.0
20-Mar-19	1.8	5.0	7.3	11.2	5.2	35.1	154.5	114.6	0.0	0.0	0.0	0.0
21-Mar-19	2.1	6.7	8.3	11.0	5.6	36.6	167.9	112.1	0.0	0.0	0.0	0.0
22-Mar-19	3.6	16.7	6.3	8.3	4.6	50.6	111.6	108.5	0.0	0.0	0.0	0.0
23-Mar-19	4.7	13.9	1.3	5.8	-0.2	75.1	117.8	104.4	1.7	1.9	1.1	0.8
24-Mar-19	1.3	5.2	1.3	6.0	-1.5	56.3	196.1	103.8	0.1	0.1	0.1	0.0
25-Mar-19	1.0	2.9	1.7	6.5	-1.4	48.5	193.4	103.4	0.0	0.0	0.0	0.0
26-Mar-19	1.2	3.7	2.2	4.8	0.1	44.9	164.0	103.1	0.0	0.0	0.0	0.0
27-Mar-19	1.4	5.2	2.5	8.0	-0.7	50.0	203.8	101.6	0.0	0.0	0.0	0.0
28-Mar-19	1.3	6.7	4.0	10.2	0.6	44.1	208.6	101.1	0.0	0.0	0.0	0.0
29-Mar-19	2.3	5.3	3.7	5.9	1.9	49.0	211.9	100.3	0.1	0.1	0.1	0.0
30-Mar-19	1.0	3.5	2.7	7.9	0.4	55.1	205.5	98.1	0.0	0.0	0.0	0.0
31-Mar-19	4.9	12.4	2.3	5.0	-0.6	53.9	219.2	95.1	0.0	0.0	0.0	0.0

Note:

dash (-) = Missing or erroneous data that were removed

Gap-filled temperature and precipitation data are underlined

<sup>1</sup> Adjusted to compensate for wind undercatch

Appendix B4: Johnny Mountain 2019 Daily Meteorological Data

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation (mm)		
	Mean	Max.	Mean	Max.	Min.	Mean	Mean	Mean	Total	Precipitation	Rainfall	SWE
										Total	Total	Total
1-Apr-19	6.8	15.5	4.2	7.0	0.9	39.6	218.0	90.8	0.1	0.1	0.1	0.0
2-Apr-19	2.8	7.7	5.5	9.1	2.6	35.7	222.8	88.9	0.1	0.1	0.1	0.0
3-Apr-19	5.3	14.1	3.5	5.3	-0.8	46.5	170.5	87.7	0.3	0.3	0.3	0.0
4-Apr-19	3.2	11.5	-1.6	-0.2	-2.6	97.0	86.7	87.3	9.4	11.7	0.0	11.7
5-Apr-19	3.1	12.3	0.7	3.8	-1.2	95.7	117.7	91.2	2.6	3.1	0.9	2.2
6-Apr-19	3.1	13.7	1.0	4.4	-1.0	73.6	170.8	89.0	0.4	0.5	0.2	0.3
7-Apr-19	4.8	19.5	-0.6	2.7	-2.0	90.8	123.6	88.6	4.4	6.2	0.0	6.2
8-Apr-19	4.8	13.6	-1.1	1.3	-2.2	94.8	136.4	88.8	2.8	3.9	0.0	3.9
9-Apr-19	3.3	8.4	-1.1	0.9	-2.4	98.2	122.5	93.7	7.1	9.0	0.0	9.0
10-Apr-19	2.7	7.5	-1.7	0.8	-2.9	92.1	158.2	97.6	3.9	4.8	0.0	4.8
11-Apr-19	2.4	9.4	-0.2	6.4	-4.9	73.7	212.0	95.8	0.0	0.0	0.0	0.0
12-Apr-19	4.9	13.0	<u>0.2</u>	<u>2.9</u>	<u>-2.8</u>	-	135.9	112.8	-	<u>4.0</u>	<u>0.3</u>	<u>3.7</u>
13-Apr-19	3.0	14.9	<u>-0.2</u>	<u>4.4</u>	<u>-4.1</u>	-	226.1	136.4	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
14-Apr-19	2.9	7.2	<u>-1.3</u>	<u>2.7</u>	<u>-3.9</u>	-	114.1	131.7	-	<u>3.3</u>	<u>0.0</u>	<u>3.3</u>
15-Apr-19	2.4	9.6	<u>-0.6</u>	<u>3.6</u>	<u>-4.7</u>	-	236.3	135.1	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
16-Apr-19	2.2	10.1	<u>-0.3</u>	<u>3.2</u>	<u>-2.7</u>	-	93.5	135.4	-	<u>8.7</u>	<u>0.0</u>	<u>8.7</u>
17-Apr-19	4.8	19.5	<u>-0.4</u>	<u>4.3</u>	<u>-2.3</u>	-	155.2	142.9	-	<u>11.4</u>	<u>0.0</u>	<u>11.4</u>
18-Apr-19	5.0	17.1	<u>-1.1</u>	<u>2.3</u>	<u>-2.4</u>	-	100.1	138.7	-	<u>23.8</u>	<u>0.0</u>	<u>23.8</u>
19-Apr-19	3.9	12.4	<u>-2.1</u>	<u>0.1</u>	<u>-3.7</u>	-	158.9	144.3	-	<u>5.6</u>	<u>0.0</u>	<u>5.6</u>
20-Apr-19	2.6	7.6	<u>-2.0</u>	<u>1.3</u>	<u>-4.3</u>	-	203.1	145.4	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
21-Apr-19	2.8	7.8	<u>-0.6</u>	<u>3.8</u>	<u>-3.6</u>	-	112.4	150.1	-	<u>8.0</u>	<u>0.0</u>	<u>8.0</u>
22-Apr-19	6.0	18.6	<u>0.5</u>	<u>3.8</u>	<u>-3.0</u>	-	125.6	155.9	-	<u>9.3</u>	<u>2.1</u>	<u>7.2</u>
23-Apr-19	5.2	14.8	<u>-3.6</u>	<u>-1.3</u>	<u>-5.8</u>	-	130.0	161.8	-	<u>7.5</u>	<u>0.0</u>	<u>7.5</u>
24-Apr-19	3.3	9.3	<u>-4.1</u>	<u>-0.9</u>	<u>-6.9</u>	-	153.1	164.0	-	<u>1.1</u>	<u>0.0</u>	<u>1.1</u>
25-Apr-19	1.6	5.1	<u>-2.2</u>	<u>2.2</u>	<u>-5.9</u>	-	192.9	158.8	-	<u>2.8</u>	<u>0.0</u>	<u>2.8</u>
26-Apr-19	2.1	9.2	<u>-1.1</u>	<u>3.9</u>	<u>-4.2</u>	-	154.2	164.3	-	<u>3.3</u>	<u>0.0</u>	<u>3.3</u>
27-Apr-19	1.5	5.1	<u>-0.1</u>	<u>6.0</u>	<u>-5.0</u>	-	297.3	165.3	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
28-Apr-19	2.0	8.8	<u>1.9</u>	<u>7.7</u>	<u>-2.8</u>	-	294.8	176.1	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
29-Apr-19	2.4	7.2	<u>3.1</u>	<u>8.3</u>	<u>-2.3</u>	-	299.8	178.9	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
30-Apr-19	1.4	4.8	<u>4.8</u>	<u>10.5</u>	<u>-0.3</u>	-	284.5	174.9	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>

Note:

dash (-) = Missing or erroneous data that were removed

Gap-filled temperature and precipitation data are underlined

<sup>1</sup> Adjusted to compensate for wind undercatch

Appendix B4: Johnny Mountain 2019 Daily Meteorological Data

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation (mm)					
	Mean	Max.	Mean	Max.	Min.					Mean	Mean	Total	Precipitation	Rainfall	SWE
													Total	Total	Total
1-May-19	3.4	10.5	<u>5.2</u>	<u>9.6</u>	<u>0.9</u>	-	243.8	175.1	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
2-May-19	6.0	11.8	<u>3.2</u>	<u>5.6</u>	<u>0.6</u>	-	121.2	135.3	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
3-May-19	6.0	10.6	<u>3.1</u>	<u>5.6</u>	<u>1.2</u>	-	103.4	142.6	-	<u>0.3</u>	<u>0.3</u>	<u>0.0</u>			
4-May-19	5.5	12.2	<u>2.7</u>	<u>5.3</u>	<u>-0.4</u>	-	170.4	145.2	-	<u>0.9</u>	<u>0.9</u>	<u>0.0</u>			
5-May-19	4.4	9.9	<u>2.6</u>	<u>6.1</u>	<u>-0.6</u>	-	222.7	147.2	-	<u>0.3</u>	<u>0.3</u>	<u>0.0</u>			
6-May-19	5.1	9.4	<u>2.5</u>	<u>4.9</u>	<u>0.4</u>	-	117.2	142.3	-	<u>2.5</u>	<u>2.5</u>	<u>0.0</u>			
7-May-19	3.9	7.5	<u>2.6</u>	<u>5.2</u>	<u>0.0</u>	-	133.3	135.7	-	<u>7.1</u>	<u>7.1</u>	<u>0.0</u>			
8-May-19	2.4	6.5	<u>5.7</u>	<u>10.4</u>	<u>0.7</u>	-	198.0	132.3	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
9-May-19	1.3	3.5	<u>8.7</u>	<u>13.5</u>	<u>2.3</u>	-	310.8	129.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
10-May-19	2.7	13.1	<u>11.0</u>	<u>17.2</u>	<u>7.1</u>	-	299.9	125.7	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
11-May-19	5.7	12.7	<u>5.0</u>	<u>7.7</u>	<u>1.4</u>	-	235.9	116.5	-	<u>0.5</u>	<u>0.5</u>	<u>0.0</u>			
12-May-19	2.7	7.8	<u>3.8</u>	<u>9.0</u>	<u>-1.8</u>	-	334.8	118.6	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
13-May-19	1.8	7.4	<u>7.3</u>	<u>11.7</u>	<u>2.8</u>	-	306.9	116.5	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
14-May-19	2.0	12.9	<u>5.7</u>	<u>9.1</u>	<u>2.5</u>	-	116.5	110.7	-	<u>1.6</u>	<u>1.6</u>	<u>0.0</u>			
15-May-19	2.8	10.5	<u>5.3</u>	<u>9.7</u>	<u>1.5</u>	-	159.1	102.3	-	<u>2.1</u>	<u>2.1</u>	<u>0.0</u>			
16-May-19	3.4	14.0	<u>7.4</u>	<u>9.5</u>	<u>4.3</u>	-	164.6	104.6	-	<u>1.1</u>	<u>1.1</u>	<u>0.0</u>			
17-May-19	2.6	9.9	<u>4.4</u>	<u>7.9</u>	<u>1.3</u>	-	127.0	82.8	-	<u>4.2</u>	<u>4.2</u>	<u>0.0</u>			
18-May-19	2.5	8.5	<u>6.7</u>	<u>12.6</u>	<u>0.4</u>	-	211.6	91.9	-	<u>1.1</u>	<u>1.1</u>	<u>0.0</u>			
19-May-19	1.9	9.1	<u>10.3</u>	<u>14.9</u>	<u>5.1</u>	-	308.7	94.3	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
20-May-19	1.7	6.3	<u>11.2</u>	<u>14.8</u>	<u>6.9</u>	-	263.7	91.1	-	<u>0.5</u>	<u>0.5</u>	<u>0.0</u>			
21-May-19	1.8	8.8	<u>9.5</u>	<u>14.3</u>	<u>4.6</u>	-	347.4	74.8	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
22-May-19	1.6	7.6	<u>10.1</u>	<u>16.4</u>	<u>6.0</u>	-	250.6	68.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
23-May-19	2.6	8.0	<u>6.0</u>	<u>9.4</u>	<u>3.0</u>	-	83.4	48.6	-	<u>10.0</u>	<u>10.0</u>	<u>0.0</u>			
24-May-19	2.9	6.6	<u>3.4</u>	<u>5.1</u>	<u>2.1</u>	-	134.5	45.8	-	<u>3.9</u>	<u>3.9</u>	<u>0.0</u>			
25-May-19	2.4	11.3	<u>8.7</u>	<u>14.6</u>	<u>1.0</u>	-	315.4	-	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
26-May-19	1.3	9.0	<u>13.1</u>	<u>19.7</u>	<u>8.3</u>	-	333.4	-	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
27-May-19	2.9	11.0	<u>14.4</u>	<u>20.5</u>	<u>9.3</u>	-	336.0	-	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
28-May-19	3.6	12.1	<u>12.2</u>	<u>17.7</u>	<u>7.1</u>	-	324.7	-	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
29-May-19	2.8	9.4	<u>11.8</u>	<u>17.2</u>	<u>6.2</u>	-	340.6	-	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
30-May-19	2.6	10.6	<u>12.6</u>	<u>19.0</u>	<u>6.6</u>	-	310.2	-	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
31-May-19	4.1	9.4	<u>8.7</u>	<u>11.7</u>	<u>5.2</u>	-	98.4	-	-	<u>2.8</u>	<u>2.8</u>	<u>0.0</u>			

Note:

dash (-) = Missing or erroneous data that were removed

Gap-filled temperature and precipitation data are underlined

<sup>1</sup> Adjusted to compensate for wind undercatch

Appendix B4: Johnny Mountain 2019 Daily Meteorological Data

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation (mm)					
	Mean	Max.	Mean	Max.	Min.					Mean	Mean	Total	Precipitation	Rainfall	SWE
													Total	Total	Total
1-Jun-19	4.8	11.8	<u>4.9</u>	<u>7.7</u>	<u>3.2</u>	-	138.7	0.0	-	<u>6.7</u>	<u>6.7</u>	<u>0.0</u>			
2-Jun-19	1.6	6.1	<u>4.0</u>	<u>8.5</u>	<u>1.3</u>	-	160.5	0.0	-	<u>1.8</u>	<u>1.8</u>	<u>0.0</u>			
3-Jun-19	2.9	8.3	<u>3.3</u>	<u>8.4</u>	<u>0.7</u>	-	217.4	0.0	-	<u>4.6</u>	<u>4.6</u>	<u>0.0</u>			
4-Jun-19	3.2	9.3	<u>4.1</u>	<u>9.0</u>	<u>1.3</u>	-	236.4	0.0	-	<u>2.7</u>	<u>2.7</u>	<u>0.0</u>			
5-Jun-19	2.5	10.5	<u>5.5</u>	<u>11.4</u>	<u>1.4</u>	-	205.4	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
6-Jun-19	3.4	9.4	<u>7.4</u>	<u>14.2</u>	<u>1.7</u>	-	311.4	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
7-Jun-19	3.1	8.6	<u>6.7</u>	<u>11.8</u>	<u>4.3</u>	-	184.0	0.0	-	<u>0.8</u>	<u>0.8</u>	<u>0.0</u>			
8-Jun-19	4.7	11.7	<u>6.6</u>	<u>10.1</u>	<u>4.1</u>	-	116.5	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
9-Jun-19	3.1	8.8	<u>6.3</u>	<u>10.5</u>	<u>3.3</u>	-	146.4	0.0	-	<u>9.0</u>	<u>9.0</u>	<u>0.0</u>			
10-Jun-19	2.3	8.3	<u>6.6</u>	<u>10.2</u>	<u>3.7</u>	-	127.0	0.0	-	<u>5.3</u>	<u>5.3</u>	<u>0.0</u>			
11-Jun-19	4.6	10.3	<u>7.0</u>	<u>9.7</u>	<u>4.7</u>	-	82.0	0.0	-	<u>28.9</u>	<u>28.9</u>	<u>0.0</u>			
12-Jun-19	3.1	8.6	<u>7.6</u>	<u>10.0</u>	<u>5.5</u>	-	77.0	0.0	-	<u>37.2</u>	<u>37.2</u>	<u>0.0</u>			
13-Jun-19	2.5	6.8	<u>8.2</u>	<u>12.3</u>	<u>5.2</u>	-	186.9	0.0	-	<u>2.1</u>	<u>2.1</u>	<u>0.0</u>			
14-Jun-19	3.0	9.4	<u>9.3</u>	<u>14.4</u>	<u>5.5</u>	-	204.8	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
15-Jun-19	3.1	9.8	<u>9.9</u>	<u>15.8</u>	<u>5.5</u>	-	197.9	0.0	-	<u>0.5</u>	<u>0.5</u>	<u>0.0</u>			
16-Jun-19	3.5	8.9	<u>9.1</u>	<u>13.0</u>	<u>5.9</u>	-	165.7	0.0	-	<u>1.8</u>	<u>1.8</u>	<u>0.0</u>			
17-Jun-19	4.8	11.5	<u>7.7</u>	<u>9.8</u>	<u>5.4</u>	-	108.2	0.0	-	<u>16.7</u>	<u>16.7</u>	<u>0.0</u>			
18-Jun-19	5.2	12.7	<u>4.8</u>	<u>7.3</u>	<u>2.7</u>	-	109.3	0.0	-	<u>5.0</u>	<u>5.0</u>	<u>0.0</u>			
19-Jun-19	3.3	7.9	<u>5.2</u>	<u>9.4</u>	<u>2.0</u>	-	182.2	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
20-Jun-19	3.1	10.7	11.1	<u>13.5</u>	<u>3.0</u>	54.3	237.5	0.0	0.0	0.0	0.0	0.0			
21-Jun-19	3.0	11.6	11.7	15.8	8.5	55.6	302.5	0.0	0.0	0.0	0.0	0.0			
22-Jun-19	5.2	14.4	6.2	9.8	4.4	97.1	55.2	0.0	7.6	7.6	7.6	0.0			
23-Jun-19	2.7	7.9	5.9	8.6	4.2	93.0	147.3	0.0	1.5	1.5	1.5	0.0			
24-Jun-19	1.7	4.9	7.0	9.4	5.1	90.2	151.4	0.0	0.4	0.4	0.4	0.0			
25-Jun-19	2.4	7.2	11.7	17.3	6.8	78.9	294.8	0.0	0.0	0.0	0.0	0.0			
26-Jun-19	2.5	7.4	16.3	21.5	11.7	58.1	344.2	0.0	0.0	0.0	0.0	0.0			
27-Jun-19	4.0	14.6	15.7	20.0	13.4	56.3	261.4	0.0	0.2	0.2	0.2	0.0			
28-Jun-19	2.5	9.3	15.6	19.5	11.3	61.8	349.8	0.0	0.0	0.0	0.0	0.0			
29-Jun-19	2.4	8.3	15.2	19.5	12.8	71.4	262.8	0.0	0.0	0.0	0.0	0.0			
30-Jun-19	3.0	8.4	13.6	17.5	10.9	89.4	275.2	0.0	0.0	0.0	0.0	0.0			

Note:

dash (-) = Missing or erroneous data that were removed

Gap-filled temperature and precipitation data are underlined

<sup>1</sup> Adjusted to compensate for wind undercatch

Appendix B4: Johnny Mountain 2019 Daily Meteorological Data

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation (mm)					
	Mean	Max.	Mean	Max.	Min.					Mean	Mean	Total	Precipitation	Rainfall	SWE
													Total	Total	Total
1-Jul-19	2.1	5.5	14.3	18.4	10.9	86.8	236.4	0.0	0.0	0.0	0.0	0.0			
2-Jul-19	3.0	9.2	14.7	18.9	11.7	88.5	291.4	0.0	0.0	0.0	0.0	0.0			
3-Jul-19	2.2	5.6	12.1	14.6	11.0	93.2	148.1	0.0	0.0	0.0	0.0	0.0			
4-Jul-19	2.7	8.0	14.6	19.9	10.6	78.2	265.3	0.0	0.2	0.2	0.2	0.0			
5-Jul-19	2.4	8.2	17.1	21.4	12.8	53.1	342.3	0.0	0.0	0.0	0.0	0.0			
6-Jul-19	2.2	5.9	17.4	21.3	12.8	53.5	270.8	0.0	0.0	0.0	0.0	0.0			
7-Jul-19	2.2	6.2	18.0	21.3	15.1	61.5	271.3	0.0	0.0	0.0	0.0	0.0			
8-Jul-19	3.1	9.0	13.7	16.7	11.1	89.2	220.8	0.0	-	<u>0.6</u>	<u>0.6</u>	<u>0.0</u>			
9-Jul-19	-	-	<u>12.3</u>	<u>16.9</u>	<u>7.4</u>	-	-	-	-	<u>20.2</u>	<u>20.2</u>	<u>0.0</u>			
10-Jul-19	-	-	<u>12.4</u>	<u>19.7</u>	<u>8.5</u>	-	-	-	-	<u>8.6</u>	<u>8.6</u>	<u>0.0</u>			
11-Jul-19	-	-	<u>10.9</u>	<u>15.4</u>	<u>8.6</u>	-	-	-	-	<u>0.3</u>	<u>0.3</u>	<u>0.0</u>			
12-Jul-19	-	-	<u>9.6</u>	<u>12.4</u>	<u>7.7</u>	-	-	-	-	<u>2.8</u>	<u>2.8</u>	<u>0.0</u>			
13-Jul-19	-	-	<u>9.6</u>	<u>11.0</u>	<u>8.4</u>	-	-	-	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
14-Jul-19	-	-	<u>9.2</u>	<u>10.9</u>	<u>7.5</u>	-	-	-	-	<u>1.6</u>	<u>1.6</u>	<u>0.0</u>			
15-Jul-19	-	-	<u>9.6</u>	<u>13.7</u>	<u>7.5</u>	-	-	-	-	<u>0.6</u>	<u>0.6</u>	<u>0.0</u>			
16-Jul-19	-	-	<u>8.3</u>	<u>10.3</u>	<u>6.5</u>	-	-	-	-	<u>3.6</u>	<u>3.6</u>	<u>0.0</u>			
17-Jul-19	-	-	<u>8.6</u>	<u>11.9</u>	<u>5.7</u>	-	-	-	-	<u>1.8</u>	<u>1.8</u>	<u>0.0</u>			
18-Jul-19	-	-	<u>7.3</u>	<u>9.6</u>	<u>5.7</u>	-	-	-	-	<u>6.4</u>	<u>6.4</u>	<u>0.0</u>			
19-Jul-19	-	-	<u>7.0</u>	<u>9.0</u>	<u>5.4</u>	-	-	-	-	<u>1.9</u>	<u>1.9</u>	<u>0.0</u>			
20-Jul-19	-	-	<u>7.1</u>	<u>8.5</u>	<u>5.9</u>	-	-	-	-	<u>7.5</u>	<u>7.5</u>	<u>0.0</u>			
21-Jul-19	-	-	<u>10.5</u>	<u>16.6</u>	<u>4.5</u>	-	-	-	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
22-Jul-19	-	-	<u>12.8</u>	<u>18.5</u>	<u>7.6</u>	-	-	-	-	<u>1.9</u>	<u>1.9</u>	<u>0.0</u>			
23-Jul-19	-	-	<u>11.8</u>	<u>17.4</u>	<u>6.6</u>	-	-	-	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
24-Jul-19	-	-	<u>8.7</u>	<u>11.5</u>	<u>6.1</u>	-	-	-	-	<u>3.4</u>	<u>3.4</u>	<u>0.0</u>			
25-Jul-19	-	-	<u>8.6</u>	<u>12.4</u>	<u>5.2</u>	-	-	-	-	<u>0.5</u>	<u>0.5</u>	<u>0.0</u>			
26-Jul-19	-	-	<u>9.0</u>	<u>12.2</u>	<u>7.0</u>	-	-	-	-	<u>6.5</u>	<u>6.5</u>	<u>0.0</u>			
27-Jul-19	-	-	<u>8.7</u>	<u>12.2</u>	<u>6.6</u>	-	-	-	-	<u>7.1</u>	<u>7.1</u>	<u>0.0</u>			
28-Jul-19	-	-	<u>6.6</u>	<u>8.8</u>	<u>4.5</u>	-	-	-	-	<u>13.3</u>	<u>13.3</u>	<u>0.0</u>			
29-Jul-19	-	-	<u>6.3</u>	<u>8.4</u>	<u>4.1</u>	-	-	-	-	<u>0.5</u>	<u>0.5</u>	<u>0.0</u>			
30-Jul-19	-	-	<u>7.6</u>	<u>11.4</u>	<u>4.9</u>	-	-	-	-	<u>8.6</u>	<u>8.6</u>	<u>0.0</u>			
31-Jul-19	-	-	<u>7.1</u>	<u>10.1</u>	<u>4.8</u>	-	-	-	-	<u>12.4</u>	<u>12.4</u>	<u>0.0</u>			

Note:

dash (-) = Missing or erroneous data that were removed

Gap-filled temperature and precipitation data are underlined

<sup>1</sup> Adjusted to compensate for wind undercatch

Appendix B4: Johnny Mountain 2019 Daily Meteorological Data

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation (mm)					
	Mean	Max.	Mean	Max.	Min.					Mean	Mean	Total	Precipitation	Rainfall	SWE
													Total	Total	Total
1-Aug-19	-	-	<u>8.4</u>	<u>12.0</u>	<u>5.5</u>	-	-	-	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
2-Aug-19	-	-	<u>11.6</u>	<u>17.7</u>	<u>5.6</u>	-	-	-	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
3-Aug-19	-	-	<u>12.3</u>	<u>17.1</u>	<u>7.8</u>	-	-	-	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
4-Aug-19	-	-	<u>14.1</u>	<u>19.7</u>	<u>8.2</u>	-	-	-	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
5-Aug-19	-	-	<u>14.4</u>	<u>19.3</u>	<u>9.6</u>	-	-	-	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
6-Aug-19	-	-	<u>15.5</u>	<u>22.2</u>	<u>10.4</u>	-	-	-	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
7-Aug-19	-	-	<u>15.0</u>	<u>21.7</u>	<u>10.6</u>	-	-	-	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
8-Aug-19	-	-	<u>12.8</u>	<u>17.3</u>	<u>9.0</u>	-	-	-	-	<u>8.4</u>	<u>8.4</u>	<u>0.0</u>			
9-Aug-19	-	-	<u>12.7</u>	<u>17.6</u>	<u>8.6</u>	-	-	-	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
10-Aug-19	-	-	<u>11.0</u>	<u>14.5</u>	<u>8.5</u>	-	-	-	-	<u>1.5</u>	<u>1.5</u>	<u>0.0</u>			
11-Aug-19	-	-	<u>9.2</u>	<u>11.8</u>	<u>7.2</u>	-	-	-	-	<u>2.2</u>	<u>2.2</u>	<u>0.0</u>			
12-Aug-19	-	-	<u>10.4</u>	<u>15.1</u>	<u>7.5</u>	-	-	-	-	<u>1.9</u>	<u>1.9</u>	<u>0.0</u>			
13-Aug-19	-	-	<u>12.5</u>	<u>19.5</u>	<u>7.6</u>	-	-	-	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
14-Aug-19	-	-	<u>13.2</u>	<u>17.8</u>	<u>9.9</u>	-	-	-	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
15-Aug-19	-	-	<u>9.6</u>	<u>11.9</u>	<u>8.0</u>	-	-	-	-	<u>0.2</u>	<u>0.2</u>	<u>0.0</u>			
16-Aug-19	-	-	<u>11.4</u>	<u>17.6</u>	<u>7.0</u>	-	-	-	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
17-Aug-19	-	-	<u>7.8</u>	<u>10.9</u>	<u>4.5</u>	-	-	-	-	<u>59.4</u>	<u>59.4</u>	<u>0.0</u>			
18-Aug-19	-	-	<u>1.5</u>	<u>4.6</u>	<u>-1.2</u>	-	-	-	-	<u>10.5</u>	<u>7.7</u>	<u>2.8</u>			
19-Aug-19	-	-	<u>3.0</u>	<u>6.9</u>	<u>0.1</u>	-	-	-	-	<u>1.6</u>	<u>1.6</u>	<u>0.0</u>			
20-Aug-19	-	-	<u>4.7</u>	<u>8.0</u>	<u>1.9</u>	-	-	-	-	<u>53.7</u>	<u>53.7</u>	<u>0.0</u>			
21-Aug-19	-	-	<u>5.8</u>	<u>7.7</u>	<u>3.5</u>	-	-	-	-	<u>16.1</u>	<u>16.1</u>	<u>0.0</u>			
22-Aug-19	3.8	11.9	4.5	6.3	3.1	92.3	82.9	0.0	-	<u>3.6</u>	<u>3.6</u>	<u>0.0</u>			
23-Aug-19	2.6	8.3	5.7	7.4	3.4	97.8	39.2	0.0	-	<u>27.6</u>	<u>27.6</u>	<u>0.0</u>			
24-Aug-19	4.5	10.1	6.8	8.4	5.5	98.7	39.8	0.0	-	<u>13.9</u>	<u>13.9</u>	<u>0.0</u>			
25-Aug-19	3.5	7.1	5.9	8.0	4.8	95.9	84.2	0.0	-	<u>1.8</u>	<u>1.8</u>	<u>0.0</u>			
26-Aug-19	3.2	7.7	6.6	7.4	5.7	93.8	63.6	0.0	-	<u>25.4</u>	<u>25.4</u>	<u>0.0</u>			
27-Aug-19	3.9	10.1	5.8	7.4	4.6	98.9	63.9	0.0	-	<u>1.6</u>	<u>1.6</u>	<u>0.0</u>			
28-Aug-19	2.6	10.1	7.7	11.5	3.7	83.2	212.7	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
29-Aug-19	3.3	10.8	11.8	15.4	7.6	57.9	240.2	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
30-Aug-19	1.6	4.6	12.8	16.3	9.5	55.8	237.4	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
31-Aug-19	1.5	4.4	13.1	16.6	10.3	58.1	200.1	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			

Note:

dash (-) = Missing or erroneous data that were removed

Gap-filled temperature and precipitation data are underlined

<sup>1</sup> Adjusted to compensate for wind undercatch



Appendix B4: Johnny Mountain 2019 Daily Meteorological Data

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation (mm)					
	Mean	Max.	Mean	Max.	Min.					Mean	Mean	Total	Precipitation	Rainfall	SWE
													Total	Total	Total
1-Sep-19	3.4	7.4	12.7	16.0	10.7	65.2	222.3	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
2-Sep-19	4.5	9.3	9.3	11.7	7.6	79.9	55.1	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
3-Sep-19	3.6	7.1	8.8	9.5	8.2	100.0	38.8	0.0	-	<u>21.5</u>	<u>21.5</u>	<u>0.0</u>			
4-Sep-19	2.7	7.2	8.1	10.5	6.8	93.5	152.5	0.0	-	<u>0.5</u>	<u>0.5</u>	<u>0.0</u>			
5-Sep-19	1.2	4.2	9.5	13.2	6.0	77.5	195.7	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
6-Sep-19	1.2	3.4	10.5	12.5	9.4	70.4	83.8	0.0	-	<u>0.8</u>	<u>0.8</u>	<u>0.0</u>			
7-Sep-19	3.3	13.3	12.0	15.3	8.4	67.8	149.5	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
8-Sep-19	6.8	16.6	13.0	15.3	10.1	52.2	192.8	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
9-Sep-19	3.9	11.6	12.2	15.3	10.1	52.8	199.1	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
10-Sep-19	1.6	4.1	11.1	13.4	9.6	65.7	113.7	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
11-Sep-19	1.9	7.5	9.7	11.6	8.0	75.7	81.3	0.0	-	<u>1.8</u>	<u>1.8</u>	<u>0.0</u>			
12-Sep-19	2.5	9.0	8.6	11.2	7.4	91.2	102.6	0.0	-	<u>1.1</u>	<u>1.1</u>	<u>0.0</u>			
13-Sep-19	4.3	10.1	6.8	8.5	4.9	93.9	46.5	0.0	-	<u>16.7</u>	<u>16.7</u>	<u>0.0</u>			
14-Sep-19	2.1	4.7	5.8	7.9	4.4	89.4	116.6	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
15-Sep-19	2.6	9.2	7.8	11.7	4.6	84.7	129.8	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
16-Sep-19	3.9	10.2	6.7	7.6	5.9	80.2	41.2	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
17-Sep-19	2.9	12.3	8.7	11.9	5.8	68.2	188.4	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
18-Sep-19	3.8	10.2	7.2	8.9	5.7	84.7	72.1	0.0	-	<u>1.5</u>	<u>1.5</u>	<u>0.0</u>			
19-Sep-19	5.1	13.6	5.9	6.4	5.5	100.0	31.6	0.0	-	<u>3.4</u>	<u>3.4</u>	<u>0.0</u>			
20-Sep-19	5.4	12.6	6.2	8.1	4.8	100.0	33.0	0.0	-	<u>19.5</u>	<u>19.5</u>	<u>0.0</u>			
21-Sep-19	5.7	18.8	7.0	9.2	3.9	99.9	20.4	0.0	-	<u>30.5</u>	<u>30.5</u>	<u>0.0</u>			
22-Sep-19	4.3	10.0	2.7	4.3	0.8	99.0	77.3	0.0	-	<u>2.4</u>	<u>2.4</u>	<u>0.0</u>			
23-Sep-19	3.9	14.8	2.7	5.0	0.5	99.1	32.3	0.0	-	<u>17.7</u>	<u>17.7</u>	<u>0.0</u>			
24-Sep-19	4.8	11.7	4.2	5.4	3.0	99.1	36.8	0.0	-	<u>35.0</u>	<u>35.0</u>	<u>0.0</u>			
25-Sep-19	5.0	13.0	2.5	4.9	0.9	99.7	28.4	0.0	-	<u>16.7</u>	<u>16.7</u>	<u>0.0</u>			
26-Sep-19	3.8	9.1	0.9	2.5	0.1	97.0	58.4	0.0	-	<u>10.0</u>	<u>4.8</u>	<u>5.3</u>			
27-Sep-19	7.0	15.1	2.6	4.4	-0.1	74.6	114.3	0.0	-	<u>2.1</u>	<u>2.1</u>	<u>0.0</u>			
28-Sep-19	3.9	12.6	2.9	5.3	0.6	63.4	153.3	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
29-Sep-19	1.9	7.2	3.3	7.0	0.0	62.5	144.9	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
30-Sep-19	3.4	7.2	5.0	6.6	3.5	58.5	81.9	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			

Note:

dash (-) = Missing or erroneous data that were removed

Gap-filled temperature and precipitation data are underlined

<sup>1</sup> Adjusted to compensate for wind undercatch

Appendix B4: Johnny Mountain 2019 Daily Meteorological Data

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation (mm)					
	Mean	Max.	Mean	Max.	Min.					Mean	Mean	Total	Precipitation	Rainfall	SWE
													Total	Total	Total
1-Oct-19	2.9	12.0	3.8	5.6	1.8	75.3	32.3	0.0	-	<u>2.9</u>	<u>2.9</u>	<u>0.0</u>			
2-Oct-19	2.1	7.3	4.0	4.8	2.7	90.8	43.6	0.0	-	<u>3.4</u>	<u>3.4</u>	<u>0.0</u>			
3-Oct-19	1.2	3.3	3.8	5.5	2.3	95.9	76.6	0.0	-	<u>9.1</u>	<u>9.1</u>	<u>0.0</u>			
4-Oct-19	3.6	8.6	2.6	3.7	1.6	98.9	35.2	0.0	-	<u>21.0</u>	<u>21.0</u>	<u>0.0</u>			
5-Oct-19	6.7	13.6	2.3	3.1	1.3	98.9	17.2	0.0	-	<u>0.2</u>	<u>0.2</u>	<u>0.0</u>			
6-Oct-19	8.5	18.2	1.9	4.3	-1.4	99.8	4.5	0.0	-	<u>58.8</u>	<u>55.6</u>	<u>3.2</u>			
7-Oct-19	8.3	21.7	-3.3	-1.0	-4.9	79.7	98.3	7.8	-	<u>3.7</u>	<u>0.0</u>	<u>3.7</u>			
8-Oct-19	5.8	19.2	-4.0	-1.4	-6.0	61.7	130.0	13.8	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
9-Oct-19	3.2	7.0	-1.9	0.4	-4.1	83.3	53.0	13.4	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
10-Oct-19	2.8	7.3	0.3	2.3	-0.9	88.5	67.5	13.6	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
11-Oct-19	5.3	12.6	0.5	2.8	-1.4	92.6	18.4	9.0	-	<u>17.7</u>	<u>4.1</u>	<u>13.5</u>			
12-Oct-19	3.3	8.0	-1.1	0.0	-1.8	100.0	48.1	7.4	-	<u>5.0</u>	<u>0.0</u>	<u>5.0</u>			
13-Oct-19	1.3	5.2	-2.0	0.9	-3.7	99.1	93.6	17.6	-	<u>0.9</u>	<u>0.0</u>	<u>0.9</u>			
14-Oct-19	3.9	10.7	-2.7	-1.1	-4.0	91.5	29.8	18.8	-	<u>2.3</u>	<u>0.0</u>	<u>2.3</u>			
15-Oct-19	3.0	7.5	-0.1	1.7	-1.8	99.9	22.9	38.7	-	<u>13.6</u>	<u>0.0</u>	<u>13.6</u>			
16-Oct-19	3.0	9.5	2.0	3.7	0.7	94.4	25.5	39.9	-	<u>9.6</u>	<u>9.4</u>	<u>0.1</u>			
17-Oct-19	2.3	13.6	1.2	3.3	0.2	94.2	38.9	32.1	-	<u>6.8</u>	<u>4.1</u>	<u>2.7</u>			
18-Oct-19	2.9	7.5	-0.2	1.6	-2.0	98.9	46.7	29.1	-	<u>5.1</u>	<u>0.0</u>	<u>5.1</u>			
19-Oct-19	1.8	6.2	-0.6	0.8	-1.6	98.8	47.0	26.3	-	<u>0.9</u>	<u>0.0</u>	<u>0.9</u>			
20-Oct-19	2.5	6.6	-1.0	-0.4	-2.5	98.9	42.4	25.9	-	<u>5.0</u>	<u>0.0</u>	<u>5.0</u>			
21-Oct-19	3.7	14.8	-2.1	-0.8	-3.4	96.2	37.8	30.5	-	<u>15.0</u>	<u>0.0</u>	<u>15.0</u>			
22-Oct-19	3.8	9.9	-1.6	-0.2	-3.0	98.7	38.6	43.5	-	<u>0.7</u>	<u>0.0</u>	<u>0.7</u>			
23-Oct-19	4.7	10.7	0.3	2.0	-1.4	97.8	13.0	44.3	-	<u>19.7</u>	<u>2.8</u>	<u>16.8</u>			
24-Oct-19	4.1	13.8	-0.2	1.9	-1.4	100.0	22.9	42.6	-	<u>8.4</u>	<u>0.0</u>	<u>8.4</u>			
25-Oct-19	3.1	6.7	-1.3	0.1	-2.6	100.0	23.2	46.6	-	<u>4.8</u>	<u>0.0</u>	<u>4.8</u>			
26-Oct-19	2.0	7.5	-1.5	0.9	-3.8	85.1	61.7	44.8	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
27-Oct-19	1.5	4.4	-0.7	3.3	-3.2	61.2	83.9	43.1	-	<u>1.0</u>	<u>0.0</u>	<u>1.0</u>			
28-Oct-19	-	-	-	-	-	-	-	-	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
29-Oct-19	-	-	-	-	-	-	-	-	-	<u>0.2</u>	<u>0.1</u>	<u>0.2</u>			
30-Oct-19	-	-	-	-	-	-	-	-	-	<u>4.8</u>	<u>0.0</u>	<u>4.8</u>			
31-Oct-19	-	-	-	-	-	-	-	-	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			

Note:

dash (-) = Missing or erroneous data that were removed

Gap-filled temperature and precipitation data are underlined

<sup>1</sup> Adjusted to compensate for wind undercatch

Appendix B4: Johnny Mountain 2019 Daily Meteorological Data

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation (mm)					
	Mean	Max.	Mean	Max.	Min.					Mean	Mean	Total	Precipitation	Rainfall	SWE
													Total	Total	Total
1-Nov-19	6.1	14.1	1.9	4.4	-1.0	100.0	15.2	50.29	-	<u>32.3</u>	<u>30.1</u>	<u>2.2</u>			
2-Nov-19	4.6	7.8	3.2	4.2	1.8	100.0	30.3	38.44	-	<u>2.1</u>	<u>2.1</u>	<u>0.0</u>			
3-Nov-19	4.9	8.4	1.3	3.1	-0.1	100.0	17.3	36.39	-	<u>36.6</u>	<u>23.8</u>	<u>12.8</u>			
4-Nov-19	6.0	9.9	3.4	3.9	2.8	100.0	15.8	28.33	-	<u>1.4</u>	<u>1.4</u>	<u>0.0</u>			
5-Nov-19	5.0	12.0	-0.1	3.1	-3.5	97.0	22.2	22.38	-	<u>4.6</u>	<u>0.0</u>	<u>4.6</u>			
6-Nov-19	1.9	6.1	-1.1	2.6	-4.6	97.1	27.6	22.88	-	<u>5.6</u>	<u>0.0</u>	<u>5.6</u>			
7-Nov-19	2.2	8.0	1.1	2.3	-0.2	99.7	8.1	22.14	-	<u>44.0</u>	<u>24.5</u>	<u>19.4</u>			
8-Nov-19	1.4	5.0	1.6	3.4	-0.4	99.3	11.6	22.63	-	<u>48.7</u>	<u>38.6</u>	<u>10.1</u>			
9-Nov-19	10.1	16.4	-5.7	0.2	-8.9	97.6	8.1	25.44	-	<u>20.5</u>	<u>0.0</u>	<u>20.5</u>			
10-Nov-19	2.4	12.2	-7.4	-4.5	-9.4	96.0	11.0	23.60	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
11-Nov-19	3.4	7.1	-3.0	0.8	-6.4	96.2	5.5	30.78	-	<u>15.5</u>	<u>0.0</u>	<u>15.5</u>			
12-Nov-19	3.2	9.1	0.8	2.1	-0.2	99.7	9.4	35.76	-	<u>8.1</u>	<u>3.3</u>	<u>4.8</u>			
13-Nov-19	4.2	12.3	1.3	2.9	0.3	98.9	15.7	31.40	-	<u>7.2</u>	<u>4.6</u>	<u>2.6</u>			
14-Nov-19	4.6	13.2	1.5	2.6	0.1	99.4	10.5	27.87	-	<u>36.7</u>	<u>27.6</u>	<u>9.1</u>			
15-Nov-19	5.1	10.4	0.4	1.3	0.0	99.6	14.4	28.62	-	<u>8.0</u>	<u>1.4</u>	<u>6.5</u>			
16-Nov-19	4.3	11.4	1.5	3.6	0.2	99.6	6.7	31.51	-	<u>50.3</u>	<u>36.6</u>	<u>13.8</u>			
17-Nov-19	5.7	18.3	1.2	4.1	-1.4	100.0	9.2	25.61	-	<u>39.8</u>	<u>23.5</u>	<u>16.3</u>			
18-Nov-19	0.9	6.8	-1.2	-0.6	-2.0	100.0	18.6	27.98	-	<u>7.4</u>	<u>0.0</u>	<u>7.4</u>			
19-Nov-19	-	6.8	-2.8	-0.3	-4.2	99.7	25.7	29.11	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
20-Nov-19	-	11.6	-0.1	1.4	-1.8	100.0	7.0	34.42	-	<u>6.1</u>	<u>0.0</u>	<u>6.1</u>			
21-Nov-19	4.4	12.3	-1.1	0.8	-2.2	96.7	11.1	34.72	-	<u>6.4</u>	<u>0.0</u>	<u>6.4</u>			
22-Nov-19	5.5	18.6	-0.2	1.2	-1.0	100.0	4.3	43.50	-	<u>48.9</u>	<u>0.0</u>	<u>48.9</u>			
23-Nov-19	4.3	14.2	-1.3	-0.1	-2.0	100.0	27.6	47.08	-	<u>13.4</u>	<u>0.0</u>	<u>13.4</u>			
24-Nov-19	4.1	12.8	-3.1	-1.6	-4.7	99.5	17.6	53.32	-	<u>4.3</u>	<u>0.0</u>	<u>4.3</u>			
25-Nov-19	1.2	4.4	-5.5	-2.1	-8.8	97.8	16.9	59.62	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
26-Nov-19	8.4	17.3	-8.3	-7.2	-9.5	80.1	37.5	58.50	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
27-Nov-19	5.2	20.2	-9.9	-7.3	-12.2	71.6	39.3	51.01	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
28-Nov-19	1.0	4.6	-6.5	-2.7	-11.7	40.2	26.9	50.67	-	<u>0.2</u>	<u>0.0</u>	<u>0.2</u>			
29-Nov-19	0.9	2.5	-5.4	-1.7	-7.9	50.8	37.6	50.47	-	<u>0.5</u>	<u>0.0</u>	<u>0.5</u>			
30-Nov-19	3.4	7.9	-4.4	-2.4	-6.3	73.0	13.1	50.54	-	<u>2.3</u>	<u>0.0</u>	<u>2.3</u>			

Note:

dash (-) = Missing or erroneous data that were removed

Gap-filled temperature and precipitation data are underlined

<sup>1</sup> Adjusted to compensate for wind undercatch

Appendix B4: Johnny Mountain 2019 Daily Meteorological Data

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation (mm)					
	Mean	Max.	Mean	Max.	Min.					Mean	Mean	Total	Precipitation	Rainfall	SWE
													Total	Total	Total
1-Dec-19	3.9	9.7	-3.3	-2.3	-4.5	99.0	11.5	52.79	-	<u>9.9</u>	<u>0.0</u>	<u>9.9</u>			
2-Dec-19	6.4	17.2	-2.6	-1.2	-5.0	99.7	8.7	51.82	-	<u>22.7</u>	<u>0.0</u>	<u>22.7</u>			
3-Dec-19	2.9	12.9	-4.9	-3.5	-5.9	98.2	13.2	53.39	-	<u>9.1</u>	<u>0.0</u>	<u>9.1</u>			
4-Dec-19	3.3	7.9	-5.0	-4.1	-5.7	98.0	11.2	55.30	-	<u>6.9</u>	<u>0.0</u>	<u>6.9</u>			
5-Dec-19	1.7	6.3	-5.7	-2.8	-9.8	97.2	22.7	56.29	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
6-Dec-19	1.7	4.4	-7.0	-4.2	-8.6	84.8	30.2	56.58	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
7-Dec-19	1.2	4.7	-6.3	-2.9	-8.3	77.4	24.3	54.93	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
8-Dec-19	2.9	6.6	-1.7	0.6	-3.6	92.1	23.3	54.84	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
9-Dec-19	1.4	5.1	3.1	6.1	-1.1	56.1	15.7	56.79	-	<u>0.2</u>	<u>0.2</u>	<u>0.0</u>			
10-Dec-19	2.7	7.1	0.7	4.0	-1.3	76.2	10.9	57.28	-	<u>3.8</u>	<u>1.4</u>	<u>2.4</u>			
11-Dec-19	3.1	7.6	-1.3	-0.4	-2.3	95.5	11.6	57.66	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
12-Dec-19	2.3	6.2	-1.7	-0.2	-2.6	95.5	9.7	63.30	-	<u>7.6</u>	<u>0.0</u>	<u>7.6</u>			
13-Dec-19	2.1	8.3	-2.9	-1.7	-3.7	99.2	11.7	68.34	-	<u>5.8</u>	<u>0.0</u>	<u>5.8</u>			
14-Dec-19	0.9	3.2	-6.1	-3.6	-8.6	97.2	6.5	69.91	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
15-Dec-19	1.3	5.3	-6.4	-3.5	-8.5	83.5	11.3	67.93	-	<u>0.1</u>	<u>0.0</u>	<u>0.1</u>			
16-Dec-19	2.5	9.2	-3.4	-0.3	-6.4	96.0	13.1	75.05	-	<u>15.5</u>	<u>0.0</u>	<u>15.5</u>			
17-Dec-19	4.7	15.0	-3.4	-2.1	-7.8	98.8	8.4	85.49	-	<u>18.8</u>	<u>0.0</u>	<u>18.8</u>			
18-Dec-19	1.4	4.8	-2.4	-2.0	-3.4	99.6	4.9	94.55	-	<u>2.6</u>	<u>0.0</u>	<u>2.6</u>			
19-Dec-19	1.6	7.5	-2.6	-1.5	-3.2	99.5	5.9	106.81	-	<u>1.7</u>	<u>0.0</u>	<u>1.7</u>			
20-Dec-19	1.6	4.9	-3.0	-2.5	-3.6	99.3	-	107.94	-	<u>0.6</u>	<u>0.0</u>	<u>0.6</u>			
21-Dec-19	3.6	8.8	-2.9	-2.2	-3.8	99.6	3.4	115.38	-	<u>4.9</u>	<u>0.0</u>	<u>4.9</u>			
22-Dec-19	3.1	9.0	-3.3	-2.9	-4.4	99.3	2.9	110.73	-	<u>8.5</u>	<u>0.0</u>	<u>8.5</u>			
23-Dec-19	3.4	9.7	-3.8	-2.9	-5.3	98.8	4.8	112.56	-	<u>6.5</u>	<u>0.0</u>	<u>6.5</u>			
24-Dec-19	-	-	-4.3	-3.0	-6.8	98.2	-	136.77	-	<u>12.0</u>	<u>0.0</u>	<u>12.0</u>			
25-Dec-19	-	11.2	-5.1	-3.7	-7.1	98.1	5.2	129.47	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>			
26-Dec-19	4.8	18.1	-3.0	-2.4	-3.9	99.5	8.3	121.17	-	<u>14.6</u>	<u>0.0</u>	<u>14.6</u>			
27-Dec-19	3.7	11.9	-4.4	-1.4	-6.0	98.4	6.4	119.38	-	<u>4.0</u>	<u>0.0</u>	<u>4.0</u>			
28-Dec-19	3.6	11.0	-1.5	-0.1	-2.6	99.9	5.4	138.95	-	<u>17.6</u>	<u>0.0</u>	<u>17.6</u>			
29-Dec-19	3.1	11.5	-1.8	-0.5	-3.4	99.5	2.5	139.76	-	<u>7.3</u>	<u>0.0</u>	<u>7.3</u>			
30-Dec-19	3.6	9.5	-0.8	0.2	-1.4	100.0	3.1	143.15	-	<u>32.8</u>	<u>0.0</u>	<u>32.8</u>			
31-Dec-19	2.3	8.4	0.2	0.7	-0.3	99.9	10.3	147.71	-	<u>4.4</u>	<u>0.5</u>	<u>3.9</u>			

Note:

dash (-) = Missing or erroneous data that were removed

Gap-filled temperature and precipitation data are underlined

<sup>1</sup> Adjusted to compensate for wind undercatch

Appendix B5: Johnny Mountain January - October 2020 Daily Meteorological Data

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation (mm)		
	Mean	Max.	Mean	Max.	Min.	Mean	Mean	Mean	Total	Total	Rainfall	SWE
1-Jan-20	4.6	17.3	-3.9	0.2	-8.4	98.1	-	144.0	-	<u>10.2</u>	<u>0.0</u>	<u>10.2</u>
2-Jan-20	3.1	17.8	-9.7	-7.9	-10.7	92.6	-	142.5	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
3-Jan-20	4.7	20.3	-9.9	-8.5	-11.4	87.3	-	143.2	-	<u>12.9</u>	<u>0.0</u>	<u>12.9</u>
4-Jan-20	3.2	12.9	-8.3	-5.6	-10.6	96.0	-	143.1	-	<u>11.7</u>	<u>0.0</u>	<u>11.7</u>
5-Jan-20	1.7	7.5	-7.5	-5.6	-9.6	96.2	-	149.6	-	<u>8.8</u>	<u>0.0</u>	<u>8.8</u>
6-Jan-20	0.7	2.5	-10.4	-7.0	-12.4	94.0	-	151.2	-	<u>0.7</u>	<u>0.0</u>	<u>0.7</u>
7-Jan-20	0.7	2.3	-12.6	-9.7	-13.9	92.3	-	149.4	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
8-Jan-20	1.4	3.6	-11.0	-9.4	-13.8	93.5	-	149.3	-	<u>1.2</u>	<u>0.0</u>	<u>1.2</u>
9-Jan-20	1.2	4.9	-13.0	-10.9	-15.3	92.1	-	150.0	-	<u>1.1</u>	<u>0.0</u>	<u>1.1</u>
10-Jan-20	10.0	25.0	-14.4	-11.2	-18.0	91.1	-	155.3	-	<u>9.4</u>	<u>0.0</u>	<u>9.4</u>
11-Jan-20	15.2	29.8	-20.6	-18.0	-22.0	84.7	40.7	138.4	-	<u>1.6</u>	<u>0.0</u>	<u>1.6</u>
12-Jan-20	17.0	31.8	-20.3	-18.0	-22.6	56.3	38.8	126.3	-	<u>0.1</u>	<u>0.0</u>	<u>0.1</u>
13-Jan-20	7.9	20.1	-20.7	-17.8	-24.8	57.8	40.3	125.9	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
14-Jan-20	5.8	17.8	-23.0	-19.8	-25.7	64.8	41.3	126.2	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
15-Jan-20	17.7	45.1	-21.2	-19.2	-25.4	59.7	36.8	124.9	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
16-Jan-20	20.4	38.8	-18.8	-17.2	-20.1	67.1	20.9	103.6	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
17-Jan-20	7.9	22.3	-18.6	-16.1	-20.0	70.6	25.3	114.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
18-Jan-20	7.6	24.2	-12.1	-9.1	-19.4	81.1	11.7	116.4	-	<u>0.9</u>	<u>0.0</u>	<u>0.9</u>
19-Jan-20	4.2	10.9	-6.4	-3.5	-9.4	95.2	14.7	105.1	-	<u>6.3</u>	<u>0.0</u>	<u>6.3</u>
20-Jan-20	3.1	7.4	-3.5	-2.5	-4.8	99.0	15.1	106.6	-	<u>8.8</u>	<u>0.0</u>	<u>8.8</u>
21-Jan-20	3.0	16.7	-3.0	-1.4	-5.2	87.0	19.4	97.5	-	<u>3.9</u>	<u>0.0</u>	<u>3.9</u>
22-Jan-20	2.7	6.5	-1.8	-1.3	-2.4	100.0	19.1	102.5	-	<u>2.9</u>	<u>0.0</u>	<u>2.9</u>
23-Jan-20	3.5	9.1	-1.1	-0.4	-2.4	100.0	12.6	116.8	-	<u>22.9</u>	<u>0.0</u>	<u>22.9</u>
24-Jan-20	4.3	14.7	-1.8	0.0	-4.9	99.5	-	130.1	-	<u>10.5</u>	<u>0.0</u>	<u>10.5</u>
25-Jan-20	3.7	13.8	-1.5	-0.2	-4.0	99.8	-	129.6	-	<u>3.4</u>	<u>0.0</u>	<u>3.4</u>
26-Jan-20	3.3	16.1	-1.5	0.5	-2.3	93.0	24.5	127.2	-	<u>0.1</u>	<u>0.0</u>	<u>0.1</u>
27-Jan-20	3.4	23.5	-4.4	-1.5	-5.8	98.3	30.6	125.0	-	<u>2.3</u>	<u>0.0</u>	<u>2.3</u>
28-Jan-20	2.9	8.8	-3.4	-1.2	-4.9	94.2	28.4	124.2	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
29-Jan-20	5.9	18.3	-3.1	-1.4	-5.7	99.3	-	128.7	-	<u>10.5</u>	<u>0.0</u>	<u>10.5</u>
30-Jan-20	-	-	-4.2	-1.8	-5.8	98.7	-	131.7	-	<u>12.1</u>	<u>0.0</u>	<u>12.1</u>
31-Jan-20	-	-	-7.0	-4.5	-7.6	96.7	-	123.0	-	<u>5.7</u>	<u>0.0</u>	<u>5.7</u>

Note:

dash (-) = Missing or erroneous data that were removed

Gap-filled temperature and precipitation data are underlined

<sup>1</sup> Adjusted to compensate for wind undercatch

Appendix B5: Johnny Mountain January - October 2020 Daily Meteorological Data

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation (mm)		
	Mean	Max.	Mean	Max.	Min.	Mean	Mean	Mean	Total	Precipitation	Rainfall	SWE
1-Feb-20	-	-	-8.7	-7.3	-9.6	95.5	-	124.6	-	<u>10.2</u>	<u>0.0</u>	<u>10.2</u>
2-Feb-20	-	-	-9.6	-7.3	-11.0	94.5	-	125.7	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
3-Feb-20	-	-	-8.9	-5.8	-11.3	95.1	-	127.6	-	<u>2.3</u>	<u>0.0</u>	<u>2.3</u>
4-Feb-20	-	-	-3.1	-0.9	-5.8	99.0	-	127.7	-	<u>13.7</u>	<u>0.0</u>	<u>13.7</u>
5-Feb-20	-	-	-2.2	-0.9	-3.4	99.7	-	123.7	-	<u>10.1</u>	<u>0.0</u>	<u>10.1</u>
6-Feb-20	-	-	-3.9	-2.4	-6.3	98.6	-	126.6	-	<u>1.4</u>	<u>0.0</u>	<u>1.4</u>
7-Feb-20	-	-	-7.1	-2.7	-8.9	95.8	-	126.9	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
8-Feb-20	4.1	11.0	-7.3	-4.2	-9.5	96.5	-	126.2	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
9-Feb-20	5.7	12.5	-3.3	-2.6	-4.2	99.0	-	126.5	-	<u>0.5</u>	<u>0.0</u>	<u>0.5</u>
10-Feb-20	5.7	10.7	-2.5	-2.0	-3.0	99.6	-	126.2	-	<u>14.0</u>	<u>0.0</u>	<u>14.0</u>
11-Feb-20	2.4	7.7	-3.5	-2.1	-5.2	99.0	-	126.5	-	<u>0.7</u>	<u>0.0</u>	<u>0.7</u>
12-Feb-20	3.9	10.0	-4.4	-3.1	-5.7	98.3	-	131.2	-	<u>24.4</u>	<u>0.0</u>	<u>24.4</u>
13-Feb-20	-	-	-3.8	-2.9	-4.8	98.3	-	139.3	-	<u>5.5</u>	<u>0.0</u>	<u>5.5</u>
14-Feb-20	-	-	-5.2	-4.0	-6.4	97.5	-	140.1	-	<u>2.3</u>	<u>0.0</u>	<u>2.3</u>
15-Feb-20	-	-	-4.1	-2.9	-5.7	98.4	-	147.7	-	<u>8.3</u>	<u>0.0</u>	<u>8.3</u>
16-Feb-20	-	-	-5.0	-4.0	-5.8	97.5	-	149.0	-	<u>1.0</u>	<u>0.0</u>	<u>1.0</u>
17-Feb-20	-	-	-5.3	-4.2	-6.0	97.3	-	146.9	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
18-Feb-20	-	-	-4.5	-1.3	-6.8	-	-	-	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
19-Feb-20	-	-	<u>-5.5</u>	<u>-3.3</u>	<u>-8.4</u>	-	-	-	-	<u>12.7</u>	<u>0.0</u>	<u>12.7</u>
20-Feb-20	6.4	14.5	<u>-5.0</u>	<u>-3.8</u>	<u>-5.7</u>	98.0	-	147.4	-	<u>10.2</u>	<u>0.0</u>	<u>10.2</u>
21-Feb-20	5.7	18.4	-4.4	-3.5	-6.5	98.2	-	150.0	-	<u>8.4</u>	<u>0.0</u>	<u>8.4</u>
22-Feb-20	3.0	8.1	-6.2	-4.8	-7.2	96.5	-	152.0	-	<u>9.7</u>	<u>0.0</u>	<u>9.7</u>
23-Feb-20	3.1	11.9	-6.0	-3.5	-7.8	96.7	-	153.1	-	<u>1.3</u>	<u>0.0</u>	<u>1.3</u>
24-Feb-20	-	-	-8.3	-4.7	-9.6	94.0	76.5	155.5	-	<u>0.1</u>	<u>0.0</u>	<u>0.1</u>
25-Feb-20	-	-	-4.5	-2.4	-8.9	98.4	42.1	165.4	-	<u>19.1</u>	<u>0.0</u>	<u>19.1</u>
26-Feb-20	-	-	-2.3	-1.7	-2.7	99.8	-	167.8	-	<u>20.3</u>	<u>0.0</u>	<u>20.3</u>
27-Feb-20	-	-	-2.1	-0.9	-3.2	99.9	-	171.6	-	<u>9.4</u>	<u>0.0</u>	<u>9.4</u>
28-Feb-20	2.5	11.1	-3.4	0.2	-5.8	98.7	79.7	172.0	-	<u>2.3</u>	<u>0.0</u>	<u>2.3</u>
29-Feb-20	2.9	9.9	-5.3	-3.3	-6.4	97.2	66.8	176.4	-	<u>0.2</u>	<u>0.0</u>	<u>0.2</u>

Note:

dash (-) = Missing or erroneous data that were removed

Gap-filled temperature and precipitation data are underlined

<sup>1</sup> Adjusted to compensate for wind undercatch

Appendix B5: Johnny Mountain January - October 2020 Daily Meteorological Data

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation (mm)		
	Mean	Max.	Mean	Max.	Min.	Mean	Mean	Mean	Total	Total	Rainfall	SWE
1-Mar-20	6.5	18.5	-4.9	-3.0	-6.2	97.9	-	172.5	-	<u>6.7</u>	<u>0.0</u>	<u>6.7</u>
2-Mar-20	-	-	-3.9	-2.4	-4.7	98.2	-	171.1	-	<u>5.3</u>	<u>0.0</u>	<u>5.3</u>
3-Mar-20	-	-	-4.3	-1.7	-5.9	98.0	-	183.2	-	<u>3.8</u>	<u>0.0</u>	<u>3.8</u>
4-Mar-20	-	-	-6.8	-5.6	-8.3	96.5	-	187.3	-	<u>1.1</u>	<u>0.0</u>	<u>1.1</u>
5-Mar-20	-	-	-5.2	-3.5	-6.5	97.5	-	189.9	-	<u>3.2</u>	<u>0.0</u>	<u>3.2</u>
6-Mar-20	-	-	-7.4	-4.6	-10.1	96.0	107.9	188.3	-	<u>0.1</u>	<u>0.0</u>	<u>0.1</u>
7-Mar-20	-	-	-9.1	-3.7	-13.1	94.6	146.3	186.4	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
8-Mar-20	4.6	13.2	-8.4	-6.8	-10.0	95.2	110.1	186.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
9-Mar-20	5.3	12.4	-4.9	-3.8	-6.8	97.6	55.0	187.2	-	<u>6.6</u>	<u>0.0</u>	<u>6.6</u>
10-Mar-20	5.3	13.6	-3.5	-2.5	-5.2	98.8	-	200.0	-	<u>7.6</u>	<u>0.0</u>	<u>7.6</u>
11-Mar-20	3.0	8.9	-6.1	-4.9	-7.1	97.1	-	201.8	-	<u>2.4</u>	<u>0.0</u>	<u>2.4</u>
12-Mar-20	8.1	26.4	-10.4	-6.9	-15.7	91.8	-	200.8	-	<u>2.0</u>	<u>0.0</u>	<u>2.0</u>
13-Mar-20	15.9	25.2	<u>-12.3</u>	<u>-9.8</u>	<u>-15.2</u>	-	161.4	214.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
14-Mar-20	12.0	24.8	<u>-7.4</u>	<u>-1.1</u>	<u>-13.0</u>	-	162.7	220.6	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
15-Mar-20	1.7	5.5	<u>-3.6</u>	<u>4.0</u>	<u>-8.9</u>	-	166.4	220.7	-	<u>0.2</u>	<u>0.0</u>	<u>0.2</u>
16-Mar-20	2.7	7.2	<u>-2.5</u>	<u>3.1</u>	<u>-5.6</u>	-	154.5	215.1	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
17-Mar-20	3.4	12.8	<u>-2.3</u>	<u>3.2</u>	<u>-6.3</u>	-	172.1	214.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
18-Mar-20	1.4	14.6	<u>-2.3</u>	<u>3.2</u>	<u>-5.8</u>	-	97.2	213.9	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
19-Mar-20	5.2	16.9	<u>0.1</u>	<u>3.9</u>	<u>-2.6</u>	-	175.8	213.8	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
20-Mar-20	4.2	9.9	<u>-0.4</u>	<u>4.0</u>	<u>-3.9</u>	-	180.6	213.3	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
21-Mar-20	3.6	12.3	<u>-1.6</u>	<u>2.4</u>	<u>-5.2</u>	-	118.7	211.9	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
22-Mar-20	6.9	18.1	<u>-2.2</u>	<u>0.7</u>	<u>-5.2</u>	-	70.2	211.7	-	<u>2.3</u>	<u>0.0</u>	<u>2.3</u>
23-Mar-20	15.5	22.2	<u>-2.9</u>	<u>0.4</u>	<u>-7.4</u>	-	183.3	209.3	-	<u>1.3</u>	<u>0.0</u>	<u>1.3</u>
24-Mar-20	5.5	18.8	<u>-6.1</u>	<u>-1.9</u>	<u>-11.0</u>	-	186.2	209.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
25-Mar-20	5.2	13.2	<u>-3.6</u>	<u>1.2</u>	<u>-7.6</u>	-	126.2	209.9	-	<u>0.5</u>	<u>0.0</u>	<u>0.5</u>
26-Mar-20	4.1	8.1	<u>-1.9</u>	<u>1.7</u>	<u>-3.9</u>	-	96.6	210.4	-	<u>9.2</u>	<u>0.0</u>	<u>9.2</u>
27-Mar-20	5.2	13.2	<u>-1.2</u>	<u>0.5</u>	<u>-3.6</u>	-	74.9	211.6	-	<u>5.2</u>	<u>0.0</u>	<u>5.2</u>
28-Mar-20	-	-	<u>-4.7</u>	<u>-1.2</u>	<u>-7.2</u>	-	-	219.9	-	<u>14.3</u>	<u>0.0</u>	<u>14.3</u>
29-Mar-20	-	-	<u>-9.0</u>	<u>-5.6</u>	<u>-11.7</u>	-	130.2	216.5	-	<u>7.4</u>	<u>0.0</u>	<u>7.4</u>
30-Mar-20	15.7	27.1	<u>-9.1</u>	<u>-4.9</u>	<u>-13.6</u>	-	163.4	207.0	-	<u>1.1</u>	<u>0.0</u>	<u>1.1</u>
31-Mar-20	12.6	22.3	<u>-10.0</u>	<u>-8.1</u>	<u>-12.1</u>	-	217.0	206.0	-	<u>0.8</u>	<u>0.0</u>	<u>0.8</u>

Note:

dash (-) = Missing or erroneous data that were removed

Gap-filled temperature and precipitation data are underlined

<sup>1</sup> Adjusted to compensate for wind undercatch

Appendix B5: Johnny Mountain January - October 2020 Daily Meteorological Data

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation (mm)		
	Mean	Max.	Mean	Max.	Min.	Mean	Mean	Mean	Total	Precipitation	Rainfall	SWE
1-Apr-20	5.2	18.3	<u>-8.9</u>	<u>-5.3</u>	<u>-12.3</u>	-	221.2	205.5	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
2-Apr-20	6.6	14.2	<u>-8.5</u>	<u>-3.1</u>	<u>-12.2</u>	-	225.8	205.2	-	<u>0.3</u>	<u>0.0</u>	<u>0.3</u>
3-Apr-20	2.4	9.9	<u>-9.9</u>	<u>-5.0</u>	<u>-14.7</u>	-	176.8	204.4	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
4-Apr-20	3.8	11.1	<u>-7.6</u>	<u>-3.1</u>	<u>-12.4</u>	-	227.7	204.9	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
5-Apr-20	2.7	12.2	<u>-5.1</u>	<u>-0.8</u>	<u>-9.8</u>	-	220.1	205.5	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
6-Apr-20	7.9	17.8	<u>-3.9</u>	<u>-1.1</u>	<u>-6.3</u>	-	138.0	205.5	-	<u>0.9</u>	<u>0.0</u>	<u>0.9</u>
7-Apr-20	5.5	12.0	<u>-5.1</u>	<u>-2.1</u>	<u>-7.9</u>	-	147.1	204.9	-	<u>0.4</u>	<u>0.0</u>	<u>0.4</u>
8-Apr-20	5.0	13.1	<u>-4.4</u>	<u>-1.2</u>	<u>-6.4</u>	-	69.1	206.2	-	<u>17.1</u>	<u>0.0</u>	<u>17.1</u>
9-Apr-20	2.3	8.2	<u>-2.3</u>	<u>0.2</u>	<u>-5.9</u>	-	199.0	211.5	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
10-Apr-20	9.1	18.2	<u>-3.8</u>	<u>1.2</u>	<u>-8.5</u>	-	252.6	211.9	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
11-Apr-20	3.1	15.7	<u>-2.4</u>	<u>3.7</u>	<u>-8.8</u>	-	254.7	211.2	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
12-Apr-20	2.2	5.7	<u>1.1</u>	<u>6.3</u>	<u>-4.2</u>	-	235.4	211.8	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
13-Apr-20	5.3	9.3	<u>1.9</u>	<u>4.7</u>	<u>-0.9</u>	-	84.8	211.3	-	<u>0.2</u>	<u>0.2</u>	<u>0.0</u>
14-Apr-20	2.9	9.9	<u>2.2</u>	<u>7.1</u>	<u>-1.3</u>	-	181.2	207.6	-	<u>3.8</u>	<u>3.8</u>	<u>0.0</u>
15-Apr-20	1.8	5.5	<u>4.2</u>	<u>9.7</u>	<u>1.0</u>	-	161.8	205.4	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
16-Apr-20	3.4	8.4	<u>2.9</u>	<u>8.9</u>	<u>-0.3</u>	-	128.6	202.8	-	<u>0.9</u>	<u>0.9</u>	<u>0.0</u>
17-Apr-20	5.2	13.2	<u>3.8</u>	<u>11.3</u>	<u>-0.3</u>	-	243.1	197.3	-	<u>1.1</u>	<u>1.1</u>	<u>0.0</u>
18-Apr-20	0.8	3.4	<u>5.2</u>	<u>9.1</u>	<u>1.5</u>	-	269.8	195.1	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
19-Apr-20	5.0	10.6	<u>5.3</u>	<u>9.3</u>	<u>1.5</u>	-	265.9	190.9	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
20-Apr-20	4.7	9.3	<u>2.1</u>	<u>7.1</u>	<u>-1.9</u>	-	126.8	186.8	-	<u>0.4</u>	<u>0.4</u>	<u>0.0</u>
21-Apr-20	4.5	8.4	<u>0.5</u>	<u>2.8</u>	<u>-1.0</u>	-	102.0	185.1	-	<u>14.7</u>	<u>3.8</u>	<u>10.9</u>
22-Apr-20	5.2	10.2	<u>1.4</u>	<u>4.6</u>	<u>-1.1</u>	-	99.5	184.4	-	<u>1.1</u>	<u>0.8</u>	<u>0.3</u>
23-Apr-20	5.0	10.8	<u>1.5</u>	<u>3.5</u>	<u>-0.6</u>	-	102.1	184.1	-	<u>0.3</u>	<u>0.3</u>	<u>0.1</u>
24-Apr-20	2.9	7.1	<u>1.3</u>	<u>4.1</u>	<u>-1.5</u>	-	161.0	183.3	-	<u>0.1</u>	<u>0.1</u>	<u>0.0</u>
25-Apr-20	4.2	14.7	<u>1.7</u>	<u>6.3</u>	<u>-1.0</u>	-	133.6	183.2	-	<u>3.5</u>	<u>2.9</u>	<u>0.6</u>
26-Apr-20	2.5	9.5	<u>1.0</u>	<u>3.6</u>	<u>-1.9</u>	-	109.0	185.4	-	<u>4.6</u>	<u>2.4</u>	<u>2.2</u>
27-Apr-20	5.2	12.8	<u>0.1</u>	<u>3.3</u>	<u>-2.0</u>	-	109.3	189.2	-	<u>6.0</u>	<u>0.2</u>	<u>5.8</u>
28-Apr-20	3.1	9.5	<u>0.2</u>	<u>3.7</u>	<u>-2.0</u>	-	94.4	192.6	-	<u>2.9</u>	<u>0.3</u>	<u>2.6</u>
29-Apr-20	5.0	10.8	<u>0.8</u>	<u>4.6</u>	<u>-1.9</u>	-	184.5	198.4	-	<u>2.8</u>	<u>1.0</u>	<u>1.7</u>
30-Apr-20	3.8	11.7	<u>0.4</u>	<u>4.4</u>	<u>-2.0</u>	-	169.0	194.4	-	<u>1.0</u>	<u>0.2</u>	<u>0.8</u>

Note:

dash (-) = Missing or erroneous data that were removed

Gap-filled temperature and precipitation data are underlined

<sup>1</sup> Adjusted to compensate for wind undercatch



Appendix B5: Johnny Mountain January - October 2020 Daily Meteorological Data

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation (mm)		
	Mean	Max.	Mean	Max.	Min.	Mean	Mean	Mean	Total	Total	Rainfall	SWE
1-May-20	3.3	12.5	<u>2.3</u>	<u>6.4</u>	<u>-2.2</u>	-	266.9	193.2	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
2-May-20	7.7	17.9	<u>5.5</u>	<u>10.0</u>	<u>0.1</u>	-	201.2	189.0	-	<u>5.4</u>	<u>5.4</u>	<u>0.0</u>
3-May-20	3.0	12.7	<u>1.5</u>	<u>6.2</u>	<u>-1.5</u>	-	143.1	184.4	-	<u>7.7</u>	<u>5.9</u>	<u>1.8</u>
4-May-20	3.5	11.1	<u>2.4</u>	<u>7.2</u>	<u>-1.8</u>	-	287.2	183.4	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
5-May-20	3.9	11.9	<u>2.4</u>	<u>6.2</u>	<u>-1.7</u>	-	222.9	183.3	-	<u>7.1</u>	<u>7.1</u>	<u>0.0</u>
6-May-20	3.6	10.1	<u>2.9</u>	<u>5.8</u>	<u>0.9</u>	-	151.9	181.8	-	<u>0.7</u>	<u>0.7</u>	<u>0.0</u>
7-May-20	1.5	6.3	<u>3.9</u>	<u>8.1</u>	<u>-0.2</u>	-	292.1	180.5	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
8-May-20	2.9	11.5	<u>8.4</u>	<u>13.0</u>	<u>3.7</u>	-	271.5	178.6	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
9-May-20	5.9	15.0	<u>11.0</u>	<u>15.6</u>	<u>6.8</u>	-	308.5	171.5	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
10-May-20	8.3	22.1	<u>9.6</u>	<u>12.5</u>	<u>5.9</u>	-	318.7	160.2	-	<u>0.4</u>	<u>0.4</u>	<u>0.0</u>
11-May-20	5.4	15.3	<u>7.0</u>	<u>11.1</u>	<u>3.6</u>	-	338.5	154.5	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
12-May-20	1.3	3.9	<u>8.3</u>	<u>12.1</u>	<u>4.7</u>	-	340.2	151.1	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
13-May-20	5.5	13.2	<u>8.6</u>	<u>12.0</u>	<u>4.6</u>	-	346.0	146.1	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
14-May-20	3.9	10.0	<u>5.0</u>	<u>7.6</u>	<u>3.2</u>	-	90.9	135.5	-	<u>1.8</u>	<u>1.8</u>	<u>0.0</u>
15-May-20	2.6	8.6	<u>5.4</u>	<u>8.9</u>	<u>1.9</u>	-	174.2	131.8	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
16-May-20	1.6	6.0	<u>6.7</u>	<u>10.6</u>	<u>0.6</u>	-	319.3	128.8	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
17-May-20	3.0	13.1	<u>9.1</u>	<u>14.2</u>	<u>4.3</u>	-	347.3	125.2	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
18-May-20	4.0	12.0	<u>8.3</u>	<u>12.5</u>	<u>4.1</u>	-	344.5	117.1	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
19-May-20	4.7	9.6	<u>3.9</u>	<u>6.4</u>	<u>2.1</u>	-	119.9	109.3	-	<u>12.4</u>	<u>12.4</u>	<u>0.0</u>
20-May-20	2.4	7.4	<u>2.5</u>	<u>5.6</u>	<u>0.0</u>	-	209.2	105.1	-	<u>16.5</u>	<u>16.5</u>	<u>0.0</u>
21-May-20	2.1	9.0	<u>2.7</u>	<u>6.4</u>	<u>-0.8</u>	-	254.1	102.4	-	<u>9.8</u>	<u>9.8</u>	<u>0.0</u>
22-May-20	2.5	6.6	<u>3.9</u>	<u>6.3</u>	<u>2.0</u>	-	163.0	98.8	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
23-May-20	2.3	8.3	<u>5.2</u>	<u>9.3</u>	<u>2.4</u>	-	143.5	95.8	-	<u>2.4</u>	<u>2.4</u>	<u>0.0</u>
24-May-20	5.0	13.3	<u>4.3</u>	<u>6.8</u>	<u>1.7</u>	-	120.5	91.0	-	<u>6.3</u>	<u>6.3</u>	<u>0.0</u>
25-May-20	4.7	13.7	<u>2.0</u>	<u>5.3</u>	<u>0.4</u>	-	139.6	86.8	-	<u>9.3</u>	<u>9.2</u>	<u>0.1</u>
26-May-20	3.4	9.3	<u>1.8</u>	<u>4.1</u>	<u>-1.0</u>	-	210.4	85.4	-	<u>2.3</u>	<u>2.0</u>	<u>0.3</u>
27-May-20	1.3	6.5	<u>5.1</u>	<u>10.1</u>	<u>-1.5</u>	-	301.8	84.8	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
28-May-20	2.8	13.3	<u>7.8</u>	<u>11.5</u>	<u>4.7</u>	-	162.9	83.7	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
29-May-20	4.0	13.2	<u>8.1</u>	<u>12.5</u>	<u>5.0</u>	-	226.6	78.0	-	<u>7.0</u>	<u>7.0</u>	<u>0.0</u>
30-May-20	2.2	8.6	<u>6.7</u>	<u>10.9</u>	<u>3.2</u>	-	203.1	72.5	-	<u>0.4</u>	<u>0.4</u>	<u>0.0</u>
31-May-20	5.0	10.0	<u>3.6</u>	<u>5.2</u>	<u>1.6</u>	-	172.6	67.0	-	<u>5.1</u>	<u>5.1</u>	<u>0.0</u>

Note:

dash (-) = Missing or erroneous data that were removed

Gap-filled temperature and precipitation data are underlined

<sup>1</sup> Adjusted to compensate for wind undercatch

Appendix B5: Johnny Mountain January - October 2020 Daily Meteorological Data

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation (mm)		
	Mean	Max.	Mean	Max.	Min.	Mean	Mean	Mean	Total	Precipitation	Rainfall	SWE
1-Jun-20	3.4	13.3	<u>2.5</u>	<u>5.7</u>	<u>0.5</u>	-	135.4	-	-	<u>11.4</u>	<u>11.4</u>	<u>0.0</u>
2-Jun-20	3.9	10.6	<u>2.5</u>	<u>6.0</u>	<u>-0.5</u>	-	167.6	-	-	<u>17.3</u>	<u>17.3</u>	<u>0.0</u>
3-Jun-20	3.6	10.1	<u>3.0</u>	<u>6.2</u>	<u>0.9</u>	-	184.7	-	-	<u>4.1</u>	<u>4.1</u>	<u>0.0</u>
4-Jun-20	2.1	8.4	<u>4.6</u>	<u>10.2</u>	<u>0.3</u>	-	217.1	-	-	<u>4.3</u>	<u>4.3</u>	<u>0.0</u>
5-Jun-20	2.3	7.0	<u>5.4</u>	<u>9.6</u>	<u>-0.7</u>	-	333.3	-	-	<u>0.5</u>	<u>0.5</u>	<u>0.0</u>
6-Jun-20	2.8	6.7	<u>4.3</u>	<u>6.3</u>	<u>2.4</u>	-	120.6	-	-	<u>13.6</u>	<u>13.6</u>	<u>0.0</u>
7-Jun-20	5.5	9.5	<u>2.4</u>	<u>3.8</u>	<u>0.6</u>	-	100.0	-	-	<u>18.6</u>	<u>18.6</u>	<u>0.0</u>
8-Jun-20	3.0	8.1	<u>4.2</u>	<u>7.9</u>	<u>1.1</u>	-	212.2	-	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
9-Jun-20	2.0	10.2	<u>6.0</u>	<u>10.9</u>	<u>0.7</u>	-	227.4	-	-	<u>1.2</u>	<u>1.2</u>	<u>0.0</u>
10-Jun-20	2.8	11.7	<u>7.0</u>	<u>11.6</u>	<u>3.0</u>	-	204.8	-	-	<u>0.2</u>	<u>0.2</u>	<u>0.0</u>
11-Jun-20	1.7	10.6	<u>8.8</u>	<u>13.3</u>	<u>4.2</u>	-	235.7	-	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
12-Jun-20	1.4	5.4	<u>6.4</u>	<u>9.2</u>	<u>4.5</u>	-	134.4	-	-	<u>1.9</u>	<u>1.9</u>	<u>0.0</u>
13-Jun-20	3.0	8.4	<u>5.6</u>	<u>6.9</u>	<u>4.1</u>	-	92.9	-	-	<u>10.7</u>	<u>10.7</u>	<u>0.0</u>
14-Jun-20	-	-	<u>5.9</u>	<u>9.6</u>	<u>3.3</u>	-	-	-	-	<u>0.9</u>	<u>0.9</u>	<u>0.0</u>
15-Jun-20	-	-	<u>4.6</u>	<u>6.2</u>	<u>2.9</u>	-	-	-	-	<u>10.3</u>	<u>10.3</u>	<u>0.0</u>
16-Jun-20	4.6	9.1	4.1	5.3	3.3	100.0	83.8	0.0	-	<u>17.7</u>	<u>17.7</u>	<u>0.0</u>
17-Jun-20	2.3	8.7	6.8	10.9	3.3	80.4	254.2	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
18-Jun-20	2.9	10.1	7.5	9.0	5.6	95.1	109.9	0.0	-	<u>11.4</u>	<u>11.4</u>	<u>0.0</u>
19-Jun-20	1.3	4.8	8.9	10.9	6.9	90.2	125.3	0.0	-	<u>4.1</u>	<u>4.1</u>	<u>0.0</u>
20-Jun-20	4.6	10.8	6.2	9.1	3.0	99.2	103.5	0.0	-	<u>6.5</u>	<u>6.5</u>	<u>0.0</u>
21-Jun-20	4.7	9.8	3.2	5.2	1.4	90.2	174.5	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
22-Jun-20	2.8	8.8	4.1	5.6	2.8	89.4	102.1	0.0	-	<u>1.6</u>	<u>1.6</u>	<u>0.0</u>
23-Jun-20	4.1	8.6	5.0	7.6	4.0	98.4	114.9	0.0	-	<u>0.3</u>	<u>0.3</u>	<u>0.0</u>
24-Jun-20	3.2	10.8	5.4	8.8	3.1	84.3	241.9	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
25-Jun-20	3.7	9.6	3.0	4.3	2.4	99.2	83.6	0.0	-	<u>7.1</u>	<u>7.1</u>	<u>0.0</u>
26-Jun-20	2.9	7.9	4.1	5.9	2.4	100.0	107.8	0.0	-	<u>15.7</u>	<u>15.7</u>	<u>0.0</u>
27-Jun-20	2.3	6.1	6.4	11.1	3.8	91.1	257.2	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
28-Jun-20	2.7	7.8	10.8	15.5	6.7	69.8	318.7	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
29-Jun-20	4.2	9.7	5.4	9.4	3.9	99.0	79.5	0.0	-	<u>11.9</u>	<u>11.9</u>	<u>0.0</u>
30-Jun-20	2.2	7.0	7.6	12.6	4.2	82.6	309.5	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>

Note:

dash (-) = Missing or erroneous data that were removed

Gap-filled temperature and precipitation data are underlined

<sup>1</sup> Adjusted to compensate for wind undercatch

Appendix B5: Johnny Mountain January - October 2020 Daily Meteorological Data

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation (mm)		
	Mean	Max.	Mean	Max.	Min.	Mean	Mean	Mean	Total	Total	Rainfall	SWE
1-Jul-20	2.5	10.1	8.3	13.2	3.8	83.9	248.5	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
2-Jul-20	10.8	20.8	11.1	13.7	8.9	70.6	93.6	0.0	-	<u>21.2</u>	<u>21.2</u>	<u>0.0</u>
3-Jul-20	2.8	6.6	7.6	10.0	6.3	96.9	100.9	0.0	-	<u>2.9</u>	<u>2.9</u>	<u>0.0</u>
4-Jul-20	2.8	7.8	7.3	9.3	6.1	95.2	117.7	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
5-Jul-20	3.0	6.1	7.2	9.1	6.3	96.6	114.1	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
6-Jul-20	2.3	5.9	7.4	9.3	5.9	90.7	112.6	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
7-Jul-20	2.8	7.8	7.4	10.2	6.1	91.6	130.2	0.0	-	<u>2.5</u>	<u>2.5</u>	<u>0.0</u>
8-Jul-20	2.7	5.7	6.9	8.4	5.9	97.8	115.6	0.0	-	<u>0.5</u>	<u>0.5</u>	<u>0.0</u>
9-Jul-20	3.9	9.9	7.3	10.6	4.9	85.4	209.6	0.0	-	<u>1.7</u>	<u>1.7</u>	<u>0.0</u>
10-Jul-20	3.1	9.7	6.4	7.4	5.2	86.0	87.0	0.0	-	<u>0.8</u>	<u>0.8</u>	<u>0.0</u>
11-Jul-20	2.9	9.3	6.2	8.2	5.1	89.3	132.7	0.0	-	<u>1.9</u>	<u>1.9</u>	<u>0.0</u>
12-Jul-20	3.6	8.2	6.0	7.8	4.6	94.5	104.2	0.0	-	<u>0.1</u>	<u>0.1</u>	<u>0.0</u>
13-Jul-20	3.3	8.4	6.3	7.9	5.2	92.2	97.9	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
14-Jul-20	3.6	9.1	6.3	7.2	5.1	98.0	65.5	0.0	-	<u>25.2</u>	<u>25.2</u>	<u>0.0</u>
15-Jul-20	3.2	8.1	7.7	8.5	6.7	100.0	58.1	0.0	-	<u>32.9</u>	<u>32.9</u>	<u>0.0</u>
16-Jul-20	3.6	10.4	7.7	9.3	6.9	100.0	87.8	0.0	-	<u>7.6</u>	<u>7.6</u>	<u>0.0</u>
17-Jul-20	4.2	9.5	7.6	9.9	6.3	95.9	106.4	0.0	-	<u>1.2</u>	<u>1.2</u>	<u>0.0</u>
18-Jul-20	4.7	8.9	7.5	9.1	6.2	100.0	73.3	0.0	-	<u>9.7</u>	<u>9.7</u>	<u>0.0</u>
19-Jul-20	4.8	9.0	7.8	8.8	6.7	100.0	103.9	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
20-Jul-20	3.6	8.3	9.4	10.7	8.2	100.0	104.5	0.0	-	<u>5.4</u>	<u>5.4</u>	<u>0.0</u>
21-Jul-20	3.0	7.0	8.5	9.8	6.9	100.0	86.8	0.0	-	<u>1.1</u>	<u>1.1</u>	<u>0.0</u>
22-Jul-20	2.4	7.2	7.9	10.6	6.5	97.2	122.7	0.0	-	<u>1.1</u>	<u>1.1</u>	<u>0.0</u>
23-Jul-20	3.6	10.2	6.2	7.6	4.8	99.1	73.1	0.0	-	<u>10.0</u>	<u>10.0</u>	<u>0.0</u>
24-Jul-20	3.2	7.9	6.5	8.6	5.3	97.1	121.5	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
25-Jul-20	4.3	9.1	6.6	8.0	5.5	100.0	105.1	0.0	-	<u>3.3</u>	<u>3.3</u>	<u>0.0</u>
26-Jul-20	5.5	13.2	8.8	10.0	7.2	99.6	48.1	0.0	-	<u>25.1</u>	<u>25.1</u>	<u>0.0</u>
27-Jul-20	2.8	7.4	7.2	9.0	5.6	94.8	128.3	0.0	-	<u>5.3</u>	<u>5.3</u>	<u>0.0</u>
28-Jul-20	2.1	8.4	7.9	11.7	4.7	82.0	189.3	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
29-Jul-20	2.9	8.1	12.2	17.0	6.4	63.5	300.2	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
30-Jul-20	1.5	5.1	16.0	20.7	11.8	51.7	284.0	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
31-Jul-20	2.8	16.9	18.1	24.8	12.2	54.2	272.7	0.0	-	<u>5.9</u>	<u>5.9</u>	<u>0.0</u>

Note:

dash (-) = Missing or erroneous data that were removed

Gap-filled temperature and precipitation data are underlined

<sup>1</sup> Adjusted to compensate for wind undercatch

Appendix B5: Johnny Mountain January - October 2020 Daily Meteorological Data

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation (mm)		
	Mean	Max.	Mean	Max.	Min.	Mean	Mean	Mean	Total	Total	Rainfall	SWE
1-Aug-20	3.7	10.6	11.3	13.3	9.5	77.9	118.2	0.0	-	<u>0.2</u>	<u>0.2</u>	<u>0.0</u>
2-Aug-20	2.9	6.3	10.2	11.9	8.3	88.6	92.6	0.0	-	<u>3.0</u>	<u>3.0</u>	<u>0.0</u>
3-Aug-20	4.3	10.9	7.4	8.5	6.3	99.4	64.8	0.0	-	<u>7.3</u>	<u>7.3</u>	<u>0.0</u>
4-Aug-20	3.9	9.2	7.1	8.4	5.8	100.0	72.2	0.0	-	<u>12.1</u>	<u>12.1</u>	<u>0.0</u>
5-Aug-20	3.3	12.3	7.6	10.1	5.2	92.7	78.8	0.0	-	<u>12.9</u>	<u>12.9</u>	<u>0.0</u>
6-Aug-20	3.2	9.8	6.5	8.8	5.2	85.8	150.7	0.0	-	<u>1.5</u>	<u>1.5</u>	<u>0.0</u>
7-Aug-20	4.6	13.3	5.5	7.3	4.4	95.6	73.4	0.0	-	<u>16.8</u>	<u>16.8</u>	<u>0.0</u>
8-Aug-20	4.1	8.9	5.1	6.1	4.4	99.9	43.7	0.0	-	<u>3.8</u>	<u>3.8</u>	<u>0.0</u>
9-Aug-20	5.7	15.4	5.8	7.6	4.8	100.0	50.1	0.0	-	<u>16.9</u>	<u>16.9</u>	<u>0.0</u>
10-Aug-20	5.5	17.2	4.4	5.3	3.7	100.0	39.3	0.0	-	<u>6.6</u>	<u>6.6</u>	<u>0.0</u>
11-Aug-20	3.1	6.9	4.2	5.5	2.9	97.0	88.7	0.0	-	<u>1.7</u>	<u>1.7</u>	<u>0.0</u>
12-Aug-20	3.8	9.1	4.4	5.7	3.8	99.4	52.6	0.0	-	<u>0.7</u>	<u>0.7</u>	<u>0.0</u>
13-Aug-20	3.3	7.5	5.0	7.3	3.4	95.1	126.0	0.0	-	<u>1.2</u>	<u>1.2</u>	<u>0.0</u>
14-Aug-20	2.6	8.8	7.0	9.5	4.9	96.5	60.4	0.0	-	<u>14.6</u>	<u>14.6</u>	<u>0.0</u>
15-Aug-20	2.9	8.8	8.8	10.8	7.4	95.2	46.5	0.0	-	<u>36.7</u>	<u>36.7</u>	<u>0.0</u>
16-Aug-20	2.7	9.4	8.5	11.9	7.4	97.6	38.3	0.0	-	<u>58.2</u>	<u>58.2</u>	<u>0.0</u>
17-Aug-20	3.5	12.4	10.4	13.1	8.0	93.3	84.0	0.0	-	<u>21.5</u>	<u>21.5</u>	<u>0.0</u>
18-Aug-20	3.3	12.0	7.4	10.1	5.5	98.1	58.4	0.0	-	<u>9.2</u>	<u>9.2</u>	<u>0.0</u>
19-Aug-20	2.2	12.9	7.8	11.4	5.7	82.2	140.0	0.0	-	<u>3.8</u>	<u>3.8</u>	<u>0.0</u>
20-Aug-20	3.2	11.9	9.1	13.0	6.2	90.0	114.8	0.0	-	<u>2.8</u>	<u>2.8</u>	<u>0.0</u>
21-Aug-20	2.5	10.7	8.9	11.5	7.1	93.9	94.9	0.0	-	<u>17.1</u>	<u>17.1</u>	<u>0.0</u>
22-Aug-20	4.4	9.4	7.3	8.9	6.2	99.3	41.4	0.0	-	<u>23.5</u>	<u>23.5</u>	<u>0.0</u>
23-Aug-20	2.7	5.4	7.3	8.7	6.3	98.4	86.1	0.0	-	<u>19.2</u>	<u>19.2</u>	<u>0.0</u>
24-Aug-20	3.5	9.0	6.9	7.6	5.9	100.0	49.5	0.0	-	<u>0.9</u>	<u>0.9</u>	<u>0.0</u>
25-Aug-20	3.6	8.1	5.9	6.9	5.3	100.0	60.3	0.0	-	<u>7.1</u>	<u>7.1</u>	<u>0.0</u>
26-Aug-20	2.9	8.3	5.6	7.4	5.0	99.4	97.5	0.0	-	<u>18.0</u>	<u>18.0</u>	<u>0.0</u>
27-Aug-20	1.8	7.5	6.9	9.2	4.7	77.6	118.5	0.0	-	<u>3.3</u>	<u>3.3</u>	<u>0.0</u>
28-Aug-20	5.6	16.4	4.1	6.5	2.5	93.2	50.8	0.0	-	<u>9.3</u>	<u>9.3</u>	<u>0.0</u>
29-Aug-20	1.9	6.0	5.6	8.5	3.2	84.3	159.3	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
30-Aug-20	3.9	9.3	4.9	6.0	4.1	94.7	48.3	0.0	-	<u>5.5</u>	<u>5.5</u>	<u>0.0</u>
31-Aug-20	7.9	18.7	6.3	9.4	5.2	95.5	55.0	0.0	-	<u>6.4</u>	<u>6.4</u>	<u>0.0</u>

Note:

dash (-) = Missing or erroneous data that were removed

Gap-filled temperature and precipitation data are underlined

<sup>1</sup> Adjusted to compensate for wind undercatch

Appendix B5: Johnny Mountain January - October 2020 Daily Meteorological Data

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation (mm)		
	Mean	Max.	Mean	Max.	Min.	Mean	Mean	Mean	Total	Precipitation	Rainfall	SWE
1-Sep-20	4.9	10.8	5.3	6.0	4.8	100.0	22.5	0.0	-	<u>3.0</u>	<u>3.0</u>	<u>0.0</u>
2-Sep-20	3.7	8.4	4.8	5.3	4.5	100.0	43.1	0.0	-	<u>1.5</u>	<u>1.5</u>	<u>0.0</u>
3-Sep-20	2.6	7.3	5.9	7.9	4.4	96.9	85.1	0.0	-	<u>2.3</u>	<u>2.3</u>	<u>0.0</u>
4-Sep-20	1.7	8.2	6.5	8.8	4.3	84.2	120.9	0.0	-	<u>1.5</u>	<u>1.5</u>	<u>0.0</u>
5-Sep-20	1.7	6.1	7.6	10.7	5.2	79.4	201.6	0.0	-	<u>0.7</u>	<u>0.7</u>	<u>0.0</u>
6-Sep-20	2.4	11.1	9.4	12.7	6.9	66.2	203.5	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
7-Sep-20	3.0	9.0	10.6	13.1	8.2	49.2	81.3	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
8-Sep-20	3.6	8.2	12.7	15.8	10.3	89.3	191.5	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
9-Sep-20	2.9	8.7	12.3	16.8	8.6	83.8	195.9	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
10-Sep-20	3.0	9.5	10.5	13.6	7.9	82.9	108.5	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
11-Sep-20	1.9	4.7	8.0	11.1	5.4	79.3	165.4	0.0	-	<u>0.1</u>	<u>0.1</u>	<u>0.0</u>
12-Sep-20	2.8	10.0	6.7	9.7	3.1	65.6	180.5	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
13-Sep-20	5.7	13.9	6.9	9.7	4.0	57.1	179.2	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
14-Sep-20	5.6	16.8	7.8	10.7	3.6	55.1	189.5	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
15-Sep-20	1.8	5.3	9.3	13.4	4.9	56.9	185.4	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
16-Sep-20	2.4	5.5	11.0	13.9	8.7	57.9	167.2	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
17-Sep-20	2.2	7.3	12.5	15.4	9.6	58.7	167.4	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
18-Sep-20	2.9	8.1	10.1	12.3	7.4	85.8	24.9	0.0	-	<u>5.3</u>	<u>5.3</u>	<u>0.0</u>
19-Sep-20	4.6	11.6	6.7	9.6	3.8	91.1	143.6	0.0	-	<u>5.9</u>	<u>5.9</u>	<u>0.0</u>
20-Sep-20	2.8	7.5	3.6	6.2	2.3	87.9	66.3	0.0	-	<u>4.5</u>	<u>4.5</u>	<u>0.0</u>
21-Sep-20	3.6	9.6	3.6	5.4	2.1	87.9	61.6	0.0	-	<u>6.7</u>	<u>6.7</u>	<u>0.0</u>
22-Sep-20	2.0	8.8	4.6	5.3	3.7	79.8	36.8	0.0	-	<u>0.1</u>	<u>0.1</u>	<u>0.0</u>
23-Sep-20	2.4	11.0	6.2	8.1	4.3	81.5	53.7	0.0	-	<u>5.2</u>	<u>5.2</u>	<u>0.0</u>
24-Sep-20	3.5	10.9	4.2	6.2	2.7	89.4	28.8	0.0	-	<u>1.4</u>	<u>1.4</u>	<u>0.0</u>
25-Sep-20	3.8	10.8	2.7	5.0	1.3	95.6	31.9	0.0	-	<u>16.5</u>	<u>16.5</u>	<u>0.0</u>
26-Sep-20	4.0	10.4	2.8	4.3	0.9	96.6	66.6	0.0	-	<u>6.8</u>	<u>6.8</u>	<u>0.0</u>
27-Sep-20	6.7	27.8	3.43	7.0	-0.1	92.6	8.4	0.0	-	<u>51.9</u>	<u>51.9</u>	<u>0.0</u>
28-Sep-20	4.8	16.1	2.93	4.2	1.4	95.0	39.4	0.0	-	<u>3.7</u>	<u>3.7</u>	<u>0.0</u>
29-Sep-20	3.3	10.2	4.73	6.7	4.3	75.9	70.7	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
30-Sep-20	3.7	9.5	8.19	12.2	5.4	79.5	49.9	0.0	-	<u>10.5</u>	<u>10.5</u>	<u>0.0</u>

Note:

dash (-) = Missing or erroneous data that were removed

Gap-filled temperature and precipitation data are underlined

<sup>1</sup> Adjusted to compensate for wind undercatch

Appendix B5: Johnny Mountain January - October 2020 Daily Meteorological Data

Date	Wind Speed (m/s)		Air Temperature (°C)			Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Precipitation (mm)	Adjusted <sup>1</sup> Precipitation (mm)		
	Mean	Max.	Mean	Max.	Min.	Mean	Mean	Mean	Total	Total	Rainfall	SWE
1-Oct-20	1.5	6.3	8.8	12.1	6.2	81.8	129.5	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
2-Oct-20	2.8	11.1	10.1	13.1	6.8	88.3	35.0	0.0	-	<u>4.3</u>	<u>4.3</u>	<u>0.0</u>
3-Oct-20	4.5	13.1	7.7	12.7	4.4	95.0	81.1	0.0	-	<u>16.8</u>	<u>16.8</u>	<u>0.0</u>
4-Oct-20	4.9	11.3	3.8	4.6	3.0	99.9	23.3	0.0	-	<u>8.0</u>	<u>8.0</u>	<u>0.0</u>
5-Oct-20	6.9	17.9	4.2	6.3	1.5	100.0	29.9	0.0	-	<u>8.9</u>	<u>8.9</u>	<u>0.0</u>
6-Oct-20	3.0	8.9	1.7	3.4	0.6	95.7	71.7	0.0	-	<u>0.7</u>	<u>0.6</u>	<u>0.1</u>
7-Oct-20	1.4	3.4	2.1	4.7	0.7	89.6	82.7	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
8-Oct-20	1.5	7.2	1.2	3.3	-0.3	86.8	83.3	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
9-Oct-20	2.7	14.5	0.5	2.5	-0.8	87.5	39.3	0.0	-	<u>5.6</u>	<u>1.3</u>	<u>4.3</u>
10-Oct-20	3.2	6.3	0.3	1.4	-0.4	99.3	39.7	0.0	-	<u>5.4</u>	<u>0.9</u>	<u>4.5</u>
11-Oct-20	3.0	6.8	0.2	1.2	-0.8	99.6	50.8	0.0	-	<u>4.2</u>	<u>0.4</u>	<u>3.8</u>
12-Oct-20	3.0	6.3	0.0	1.0	-0.6	97.9	37.2	0.0	-	<u>2.8</u>	<u>0.0</u>	<u>2.8</u>
13-Oct-20	1.6	8.2	-0.1	2.2	-2.3	85.1	83.0	0.0	-	<u>0.5</u>	<u>0.0</u>	<u>0.5</u>
14-Oct-20	3.5	8.0	0.0	1.9	-1.1	91.9	77.5	0.0	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
15-Oct-20	3.3	13.8	-0.3	1.0	-1.7	93.7	27.1	0.6	-	<u>5.8</u>	<u>0.0</u>	<u>5.8</u>
16-Oct-20	3.3	12.8	-1.4	1.4	-3.2	94.1	86.8	13.3	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
17-Oct-20	5.4	15.9	-4.8	-2.6	-7.2	76.7	86.3	13.2	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
18-Oct-20	2.0	6.9	-4.1	-2.8	-5.7	87.7	35.4	13.1	-	<u>0.8</u>	<u>0.0</u>	<u>0.8</u>
19-Oct-20	3.5	7.0	-3.5	-1.5	-5.0	99.3	38.7	4.4	-	<u>4.4</u>	<u>0.0</u>	<u>4.4</u>
20-Oct-20	2.9	7.2	-2.7	-1.3	-4.0	99.6	35.6	3.6	-	<u>3.0</u>	<u>0.0</u>	<u>3.0</u>
21-Oct-20	8.5	14.6	-6.3	-3.3	-7.9	78.7	90.8	12.0	-	<u>2.3</u>	<u>0.0</u>	<u>2.3</u>
22-Oct-20	7.1	17.2	-8.3	-6.8	-10.8	67.5	80.4	13.2	-	<u>0.1</u>	<u>0.0</u>	<u>0.1</u>
23-Oct-20	14.9	29.1	-7.2	-5.3	-8.7	50.5	82.5	13.6	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
24-Oct-20	5.9	23.8	-6.0	-2.8	-8.0	43.7	87.0	12.9	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
25-Oct-20	4.3	11.5	-3.5	-1.0	-6.2	69.0	19.2	10.9	-	<u>21.8</u>	<u>0.0</u>	<u>21.8</u>
26-Oct-20	7.3	14.8	1.7	3.6	-1.0	100.0	4.8	3.7	-	<u>30.2</u>	<u>25.4</u>	<u>4.8</u>
27-Oct-20	3.8	14.0	-0.6	1.4	-1.9	99.1	30.1	3.1	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
28-Oct-20	2.7	5.9	-1.8	-0.8	-2.7	87.6	29.9	12.7	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
29-Oct-20	2.2	13.2	-3.0	-1.9	-4.0	83.2	37.8	13.1	-	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
30-Oct-20	4.6	10.1	-4.0	-1.9	-6.5	90.9	35.1	10.6	-	<u>1.1</u>	<u>0.0</u>	<u>1.1</u>
31-Oct-20	3.9	11.1	-0.7	1.7	-2.2	100.0	11.9	8.3	-	<u>37.6</u>	<u>0.0</u>	<u>37.6</u>

Note:

dash (-) = Missing or erroneous data that were removed

Gap-filled temperature and precipitation data are underlined

<sup>1</sup> Adjusted to compensate for wind undercatch

APPENDIX C      JOHNNY MOUNTAIN HOURLY METEOROLOGICAL DATA  
(AUGUST 2016 TO OCTOBER 2020)

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
28-Jul-16 17:00	3.7	246.4	23.2	10.6	98.1	66.6	0.0	46.5
28-Jul-16 18:00	5.1	229.0	8.6	9.8	98.2	81.7	0.0	49.1
28-Jul-16 19:00	2.2	213.0	18.0	9.9	98.2	64.7	0.0	49.5
28-Jul-16 20:00	2.6	228.1	13.1	9.6	99.0	14.9	0.0	53.1
28-Jul-16 21:00	5.5	232.8	10.8	9.6	99.3	2.4	0.0	53.7
28-Jul-16 22:00	6.3	222.8	10.1	8.9	99.3	0.1	0.0	54.0
28-Jul-16 23:00	5.2	232.1	20.3	8.5	99.3	0.0	0.0	54.0
29-Jul-16 0:00	5.4	240.8	14.0	7.9	99.3	0.0	0.0	54.0
29-Jul-16 1:00	5.5	242.9	12.5	7.5	99.3	0.0	0.0	54.1
29-Jul-16 2:00	5.1	224.5	11.8	6.9	99.3	0.0	0.0	54.0
29-Jul-16 3:00	4.0	231.0	15.8	6.6	99.3	0.0	0.0	54.1
29-Jul-16 4:00	3.8	228.7	13.4	6.2	99.3	0.0	0.0	54.0
29-Jul-16 5:00	3.7	213.8	13.4	6.0	99.3	1.6	0.0	54.1
29-Jul-16 6:00	3.3	219.7	12.9	5.9	99.3	14.1	0.0	54.1
29-Jul-16 7:00	4.0	204.9	10.3	5.6	99.2	23.3	0.0	54.0
29-Jul-16 8:00	3.4	202.3	17.3	5.6	97.0	102.7	0.0	54.1
29-Jul-16 9:00	2.9	203.9	16.2	5.8	98.3	212.5	0.0	54.1
29-Jul-16 10:00	3.7	213.3	11.3	6.0	95.2	165.6	0.0	54.1
29-Jul-16 11:00	2.9	230.4	28.3	6.6	90.9	250.5	0.0	54.1
29-Jul-16 12:00	2.8	251.2	22.9	6.8	92.4	243.9	0.0	54.0
29-Jul-16 13:00	2.7	203.4	14.7	7.0	91.9	206.7	0.0	54.0
29-Jul-16 14:00	2.8	208.8	10.3	7.2	91.7	175.7	0.0	53.9
29-Jul-16 15:00	2.2	211.3	17.1	7.7	88.0	298.1	0.0	53.8
29-Jul-16 16:00	3.8	210.8	13.3	8.1	88.8	350.0	0.0	53.7
29-Jul-16 17:00	4.2	220.1	9.9	8.2	90.8	279.8	0.0	53.7
29-Jul-16 18:00	4.0	214.9	14.8	7.5	96.8	119.6	0.0	53.7
29-Jul-16 19:00	3.6	203.4	14.3	7.4	93.0	70.2	0.0	53.7
29-Jul-16 20:00	3.9	203.5	12.2	7.4	91.4	63.8	0.0	53.7
29-Jul-16 21:00	3.3	199.4	9.8	7.1	90.2	4.8	0.0	53.7
29-Jul-16 22:00	3.1	209.0	12.7	6.7	93.9	0.2	0.0	53.7
29-Jul-16 23:00	3.0	213.7	14.4	6.6	93.6	0.0	0.0	53.6
30-Jul-16 0:00	2.4	203.3	17.9	6.5	94.9	0.0	0.0	53.6
30-Jul-16 1:00	2.7	203.6	13.3	6.4	95.7	0.0	0.0	53.7
30-Jul-16 2:00	2.5	203.8	11.0	6.1	97.6	0.0	0.0	53.6
30-Jul-16 3:00	2.5	216.2	11.0	5.9	99.0	0.0	0.0	53.6
30-Jul-16 4:00	2.5	218.4	9.6	5.8	99.0	0.0	0.0	53.6
30-Jul-16 5:00	1.9	205.4	10.2	5.7	99.3	0.6	0.0	53.7
30-Jul-16 6:00	2.2	206.3	10.6	5.8	98.9	41.5	0.0	53.6
30-Jul-16 7:00	1.7	225.4	7.3	5.8	99.1	111.0	0.0	53.7
30-Jul-16 8:00	1.5	220.2	13.0	6.7	93.1	340.4	0.0	53.9
30-Jul-16 9:00	1.2	240.3	39.9	7.2	89.5	372.6	0.0	53.6
30-Jul-16 10:00	1.7	236.6	20.4	7.6	87.3	518.7	0.0	53.7
30-Jul-16 11:00	2.2	252.9	21.7	8.1	88.6	595.3	0.0	53.6
30-Jul-16 12:00	2.3	243.1	21.7	8.5	86.6	539.5	0.0	53.5
30-Jul-16 13:00	2.6	244.7	22.5	9.4	83.8	615.6	0.0	53.5
30-Jul-16 14:00	3.1	250.3	23.6	10.1	80.4	817.0	0.0	53.5
30-Jul-16 15:00	3.6	247.7	22.2	10.8	78.0	791.2	0.0	53.4
30-Jul-16 16:00	4.0	251.6	21.2	11.3	76.5	699.4	0.0	53.4
30-Jul-16 17:00	3.7	250.8	22.6	11.3	77.6	533.2	0.0	53.2
30-Jul-16 18:00	4.3	250.8	27.2	10.9	80.4	319.9	0.0	53.2
30-Jul-16 19:00	4.5	225.3	13.5	10.2	83.4	258.3	0.0	53.1
30-Jul-16 20:00	4.2	212.8	15.9	9.4	87.0	96.7	0.0	53.1
30-Jul-16 21:00	3.4	208.5	19.5	8.4	91.5	11.5	0.0	53.2



Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
30-Jul-16 22:00	3.1	213.7	16.5	7.8	95.1	0.1	0.0	53.3
30-Jul-16 23:00	2.5	221.0	13.9	7.7	95.0	0.0	0.0	53.3
31-Jul-16 0:00	2.6	209.9	15.3	7.4	95.5	0.0	0.0	53.3
31-Jul-16 1:00	2.6	213.2	12.5	7.3	95.9	0.0	0.0	53.2
31-Jul-16 2:00	2.2	203.5	13.8	7.1	96.5	0.0	0.0	53.2
31-Jul-16 3:00	2.0	204.5	14.8	7.0	96.4	0.0	0.0	53.3
31-Jul-16 4:00	1.1	210.9	16.8	6.9	96.9	0.0	0.0	53.2
31-Jul-16 5:00	1.8	208.3	10.3	6.6	97.8	0.8	0.0	53.2
31-Jul-16 6:00	1.1	174.5	25.3	6.7	96.1	8.6	0.0	53.3
31-Jul-16 7:00	0.7	152.7	52.8	6.8	95.8	29.3	0.0	53.3
31-Jul-16 8:00	1.1	231.6	31.7	6.7	97.7	59.7	0.0	53.3
31-Jul-16 9:00	1.7	227.4	14.8	6.6	98.4	97.5	0.0	53.3
31-Jul-16 10:00	2.0	235.9	11.3	6.7	97.2	164.3	0.0	53.3
31-Jul-16 11:00	2.0	228.2	13.6	7.1	95.4	211.7	0.0	53.3
31-Jul-16 12:00	2.3	227.7	12.1	7.5	93.4	288.1	0.0	53.2
31-Jul-16 13:00	3.1	228.3	14.0	8.1	93.0	279.1	0.0	53.2
31-Jul-16 14:00	2.9	238.5	16.7	8.7	93.4	287.2	0.0	53.3
31-Jul-16 15:00	2.5	244.6	19.2	9.0	90.9	256.2	0.0	53.2
31-Jul-16 16:00	1.9	263.2	19.4	9.0	90.0	217.6	0.0	53.2
31-Jul-16 17:00	1.7	269.0	16.8	9.1	89.9	167.2	0.0	53.2
31-Jul-16 18:00	1.9	256.1	12.9	9.0	91.4	102.0	0.0	53.2
31-Jul-16 19:00	1.7	228.5	29.5	8.8	92.9	53.7	0.0	53.1
31-Jul-16 20:00	1.8	244.2	16.9	8.5	95.5	23.6	0.0	53.2
31-Jul-16 21:00	1.8	263.5	15.3	8.0	98.4	5.2	0.0	53.1
31-Jul-16 22:00	2.5	243.4	11.6	7.7	99.3	0.0	0.0	53.1
31-Jul-16 23:00	1.7	315.1	25.2	7.2	98.4	0.0	0.0	53.4
01-Aug-16 0:00	1.0	57.0	41.5	7.2	97.5	0.0	0.0	53.5
01-Aug-16 1:00	0.9	59.3	22.6	7.1	98.1	0.0	0.0	53.6
01-Aug-16 2:00	1.0	171.5	18.0	7.2	94.9	0.0	0.0	53.7
01-Aug-16 3:00	0.6	211.0	23.6	7.3	92.7	0.0	0.0	53.7
01-Aug-16 4:00	0.6	224.7	22.3	7.2	93.1	0.0	0.0	53.7
01-Aug-16 5:00	1.0	190.2	11.6	7.2	93.9	0.8	0.0	53.7
01-Aug-16 6:00	1.2	201.8	12.2	7.1	95.1	12.7	0.0	53.7
01-Aug-16 7:00	1.4	230.2	16.3	7.1	91.6	46.4	0.0	53.7
01-Aug-16 8:00	1.3	227.0	16.6	7.2	89.2	97.3	0.0	53.7
01-Aug-16 9:00	1.8	239.6	11.6	7.4	88.2	157.0	0.0	53.7
01-Aug-16 10:00	1.7	249.8	16.9	7.7	85.8	191.0	0.0	53.7
01-Aug-16 11:00	1.2	251.0	25.4	8.0	88.4	213.1	0.0	53.7
01-Aug-16 12:00	1.6	242.6	24.8	8.2	90.7	225.4	0.0	53.7
01-Aug-16 13:00	1.7	257.5	20.3	8.4	89.6	257.8	0.0	53.6
01-Aug-16 14:00	1.9	251.3	20.5	8.7	89.3	298.1	0.0	53.7
01-Aug-16 15:00	2.0	265.3	21.1	9.2	87.5	288.7	0.0	53.6
01-Aug-16 16:00	1.9	286.5	19.5	9.7	83.9	287.5	0.0	53.6
01-Aug-16 17:00	2.1	287.1	18.2	9.8	82.9	251.4	0.0	53.6
01-Aug-16 18:00	2.0	295.5	15.8	9.8	82.9	192.3	0.0	53.6
01-Aug-16 19:00	2.6	322.2	15.2	9.5	84.0	99.0	0.0	53.5
01-Aug-16 20:00	3.1	327.9	11.6	9.1	85.4	41.9	0.0	53.5
01-Aug-16 21:00	2.9	321.8	8.7	8.8	86.6	6.0	0.0	53.5
01-Aug-16 22:00	1.6	24.5	26.8	8.8	86.7	0.2	0.0	53.5
01-Aug-16 23:00	1.5	31.9	12.4	8.6	86.3	0.0	0.0	53.5
02-Aug-16 0:00	1.1	222.1	30.3	8.3	90.8	0.0	0.0	53.5
02-Aug-16 1:00	0.7	225.4	24.9	8.1	94.0	0.0	0.0	53.5
02-Aug-16 2:00	1.7	12.1	23.0	7.4	92.8	0.0	0.0	53.5

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
02-Aug-16 3:00	2.5	31.7	10.7	7.2	91.4	0.0	0.0	53.4
02-Aug-16 4:00	2.5	29.9	15.9	6.9	91.4	0.0	0.0	53.4
02-Aug-16 5:00	2.1	42.2	14.9	6.7	92.2	1.3	0.0	53.5
02-Aug-16 6:00	2.1	23.8	17.9	6.6	92.1	16.8	0.0	53.5
02-Aug-16 7:00	2.2	3.8	17.8	6.5	92.9	45.5	0.0	53.5
02-Aug-16 8:00	2.0	352.9	22.2	6.6	91.7	92.9	0.0	53.5
02-Aug-16 9:00	2.0	334.9	15.7	6.8	90.9	157.8	0.0	53.6
02-Aug-16 10:00	2.4	298.1	12.5	6.8	91.4	177.5	0.0	53.5
02-Aug-16 11:00	2.0	260.2	21.2	7.1	91.5	235.6	0.0	53.6
02-Aug-16 12:00	2.9	249.3	14.6	7.5	91.9	314.2	0.0	53.5
02-Aug-16 13:00	3.3	239.4	13.3	8.0	91.4	364.6	0.0	53.6
02-Aug-16 14:00	3.9	251.1	21.1	9.4	86.4	631.8	0.0	53.6
02-Aug-16 15:00	3.6	273.6	20.4	10.3	83.0	780.2	0.0	53.5
02-Aug-16 16:00	3.5	288.3	16.8	10.7	82.8	668.9	0.0	53.5
02-Aug-16 17:00	2.7	295.3	20.3	10.1	85.0	248.5	0.0	53.4
02-Aug-16 18:00	4.0	228.2	21.4	9.5	87.2	116.8	0.0	53.3
02-Aug-16 19:00	4.6	221.5	15.4	9.1	88.7	71.7	0.0	53.4
02-Aug-16 20:00	4.4	233.2	11.2	9.0	86.5	39.2	0.0	53.4
02-Aug-16 21:00	4.2	225.8	11.0	8.6	86.4	10.5	0.0	53.4
02-Aug-16 22:00	4.5	221.3	11.6	8.4	87.5	0.1	0.0	53.4
02-Aug-16 23:00	3.5	207.6	9.1	8.3	87.9	0.0	0.0	53.4
03-Aug-16 0:00	3.5	213.0	7.3	8.1	88.9	0.0	0.0	53.5
03-Aug-16 1:00	3.9	218.4	6.3	8.3	86.2	0.0	0.0	53.4
03-Aug-16 2:00	3.6	214.7	9.8	7.9	91.2	0.0	0.0	53.4
03-Aug-16 3:00	3.8	217.6	7.6	7.7	93.2	0.0	0.0	53.4
03-Aug-16 4:00	3.7	217.7	7.1	7.6	94.9	0.0	0.0	53.4
03-Aug-16 5:00	3.6	206.7	8.3	7.8	90.1	0.6	0.0	53.4
03-Aug-16 6:00	4.1	205.2	10.7	7.4	98.3	5.2	0.0	53.4
03-Aug-16 7:00	4.2	213.4	10.0	7.4	99.3	46.8	0.0	53.5
03-Aug-16 8:00	4.9	220.9	7.2	7.6	99.3	74.6	0.0	53.7
03-Aug-16 9:00	5.4	222.4	6.5	7.6	99.3	83.5	0.0	53.9
03-Aug-16 10:00	5.6	219.6	8.0	7.6	99.3	102.6	0.0	54.2
03-Aug-16 11:00	4.6	220.8	8.7	7.9	99.2	195.6	0.0	54.2
03-Aug-16 12:00	4.6	219.7	9.3	8.3	99.0	274.0	0.0	54.3
03-Aug-16 13:00	3.6	225.1	9.3	8.5	99.0	272.5	0.0	54.5
03-Aug-16 14:00	3.2	230.0	12.3	8.9	99.0	277.2	0.0	55.1
03-Aug-16 15:00	4.9	235.9	9.7	8.8	99.2	163.8	0.0	58.5
03-Aug-16 16:00	2.9	253.2	23.8	8.8	99.1	200.3	0.0	58.7
03-Aug-16 17:00	3.7	304.1	22.2	7.5	99.2	103.5	0.0	58.8
03-Aug-16 18:00	5.3	246.6	15.7	7.5	99.3	27.2	0.0	59.0
03-Aug-16 19:00	4.5	233.5	11.9	7.0	99.3	23.9	0.0	59.1
03-Aug-16 20:00	3.2	202.0	13.2	6.4	99.3	19.7	0.0	59.6
03-Aug-16 21:00	2.2	201.7	14.6	6.2	99.3	6.9	0.0	59.7
03-Aug-16 22:00	1.9	198.2	21.2	6.0	99.3	0.1	0.0	59.7
03-Aug-16 23:00	2.5	215.3	15.5	6.0	99.2	0.0	0.0	59.7
04-Aug-16 0:00	2.2	220.9	12.2	5.8	99.0	0.0	0.0	59.7
04-Aug-16 1:00	1.6	201.1	17.2	5.8	99.2	0.0	0.0	59.7
04-Aug-16 2:00	1.6	202.0	17.7	5.8	98.0	0.0	0.0	59.8
04-Aug-16 3:00	1.6	331.3	30.2	5.6	98.6	0.0	0.0	59.7
04-Aug-16 4:00	2.8	1.0	10.6	5.4	99.2	0.0	0.0	59.7
04-Aug-16 5:00	1.6	34.5	11.4	5.4	99.3	0.3	0.0	59.9
04-Aug-16 6:00	2.0	354.7	15.1	5.3	99.3	8.6	0.0	60.0
04-Aug-16 7:00	2.3	31.1	9.7	5.2	99.3	14.1	0.0	60.5

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
04-Aug-16 8:00	1.2	210.6	25.5	5.4	99.3	41.5	0.0	62.9
04-Aug-16 9:00	2.1	219.0	10.6	5.5	99.3	93.5	0.0	63.0
04-Aug-16 10:00	1.0	227.7	25.5	6.0	98.8	184.6	0.0	63.1
04-Aug-16 11:00	0.9	309.7	27.9	6.8	97.2	231.9	0.0	63.2
04-Aug-16 12:00	1.4	305.9	29.0	7.3	97.0	329.2	0.0	63.3
04-Aug-16 13:00	1.9	311.1	27.9	7.7	96.4	346.4	0.0	63.2
04-Aug-16 14:00	2.0	313.4	23.0	9.0	92.2	726.4	0.0	63.1
04-Aug-16 15:00	1.9	293.1	24.1	9.8	91.2	452.3	0.0	62.9
04-Aug-16 16:00	1.9	287.7	23.7	10.2	89.1	461.9	0.0	62.9
04-Aug-16 17:00	2.7	317.9	28.7	11.5	77.5	556.0	0.0	62.7
04-Aug-16 18:00	2.1	295.4	23.8	11.5	80.3	265.3	0.0	62.7
04-Aug-16 19:00	2.1	354.8	18.6	11.0	82.5	120.6	0.0	62.6
04-Aug-16 20:00	2.1	21.9	13.4	10.7	84.0	66.1	0.0	62.5
04-Aug-16 21:00	2.0	24.7	11.6	10.3	84.7	20.9	0.0	62.5
04-Aug-16 22:00	1.5	22.1	6.9	9.9	85.4	0.1	0.0	62.5
04-Aug-16 23:00	2.1	21.4	5.8	9.7	86.2	0.0	0.0	62.5
05-Aug-16 0:00	1.7	42.8	4.6	9.4	87.9	0.0	0.0	62.5
05-Aug-16 1:00	2.9	20.4	5.8	9.2	88.6	0.0	0.0	62.5
05-Aug-16 2:00	2.2	39.7	5.8	8.7	91.3	0.0	0.0	62.6
05-Aug-16 3:00	1.3	49.3	20.8	8.8	90.5	0.0	0.0	62.6
05-Aug-16 4:00	2.0	19.8	15.4	8.1	93.6	0.0	0.0	62.5
05-Aug-16 5:00	0.6	82.2	42.4	8.0	95.1	1.5	0.0	62.5
05-Aug-16 6:00	1.1	203.1	23.3	8.4	93.1	13.7	0.0	62.6
05-Aug-16 7:00	1.3	202.2	15.9	9.1	90.1	141.4	0.0	62.8
05-Aug-16 8:00	1.0	217.7	17.5	10.0	86.2	300.8	0.0	63.1
05-Aug-16 9:00	1.1	277.7	34.7	10.4	86.8	459.5	0.0	63.0
05-Aug-16 10:00	1.5	230.2	25.0	10.9	86.1	594.7	0.0	63.0
05-Aug-16 11:00	1.5	254.1	21.6	12.1	84.5	702.5	0.0	63.0
05-Aug-16 12:00	1.7	233.8	23.6	13.0	83.7	803.0	0.0	63.0
05-Aug-16 13:00	1.9	274.1	24.7	14.3	80.9	859.0	0.0	62.9
05-Aug-16 14:00	1.7	292.5	38.9	15.6	69.6	814.0	0.0	62.8
05-Aug-16 15:00	2.0	291.6	21.9	16.5	61.4	746.4	0.0	62.7
05-Aug-16 16:00	2.5	293.6	15.9	17.3	58.2	662.3	0.0	62.5
05-Aug-16 17:00	2.8	297.7	17.3	17.7	58.2	539.9	0.0	62.3
05-Aug-16 18:00	2.7	300.0	16.4	17.9	56.5	410.4	0.0	62.2
05-Aug-16 19:00	2.5	308.8	18.4	17.5	56.5	258.0	0.0	62.2
05-Aug-16 20:00	2.1	339.4	6.1	16.6	57.7	110.0	0.0	62.2
05-Aug-16 21:00	2.0	35.0	13.2	15.4	62.9	12.9	0.0	62.2
05-Aug-16 22:00	2.9	47.9	4.2	14.4	68.9	0.2	0.0	62.2
05-Aug-16 23:00	2.4	47.5	5.0	14.1	68.6	0.0	0.0	62.2
06-Aug-16 0:00	1.2	152.7	38.1	14.3	65.1	0.0	0.0	62.2
06-Aug-16 1:00	0.9	202.5	19.5	14.4	63.8	0.0	0.0	62.2
06-Aug-16 2:00	0.9	43.7	13.8	13.9	63.1	0.0	0.0	62.2
06-Aug-16 3:00	1.2	50.1	11.1	13.6	63.2	0.0	0.0	62.1
06-Aug-16 4:00	0.9	16.9	21.2	13.2	69.3	0.0	0.0	62.1
06-Aug-16 5:00	0.9	22.1	20.7	13.2	67.2	1.4	0.0	62.1
06-Aug-16 6:00	1.1	37.5	7.4	12.9	67.6	14.9	0.0	62.1
06-Aug-16 7:00	1.3	354.6	16.5	13.5	68.4	128.5	0.0	62.4
06-Aug-16 8:00	0.6	152.5	45.6	14.3	68.6	286.6	0.0	62.6
06-Aug-16 9:00	1.0	190.4	20.3	15.1	61.6	453.2	0.0	62.6
06-Aug-16 10:00	1.1	242.4	22.3	15.7	61.7	594.8	0.0	62.5
06-Aug-16 11:00	1.4	248.9	20.7	15.6	64.9	647.8	0.0	62.5
06-Aug-16 12:00	1.5	244.4	23.3	16.3	65.3	777.9	0.0	62.4

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
06-Aug-16 13:00	1.9	241.3	18.0	16.8	64.5	861.0	0.0	62.2
06-Aug-16 14:00	1.8	264.2	27.9	17.6	61.0	787.3	0.0	62.1
06-Aug-16 15:00	1.7	271.4	26.9	18.4	59.2	686.2	0.0	61.9
06-Aug-16 16:00	2.4	248.6	23.6	19.1	55.0	654.3	0.0	61.7
06-Aug-16 17:00	2.5	267.9	23.7	19.3	55.2	530.0	0.0	61.6
06-Aug-16 18:00	2.6	305.0	18.7	19.0	57.6	397.0	0.0	61.7
06-Aug-16 19:00	1.5	318.5	31.6	18.6	59.7	247.0	0.0	61.6
06-Aug-16 20:00	1.9	349.7	15.7	17.1	66.1	101.4	0.0	61.7
06-Aug-16 21:00	1.3	5.0	8.4	16.8	65.2	13.0	0.0	61.7
06-Aug-16 22:00	1.8	27.0	9.6	15.8	71.1	0.1	0.0	61.6
06-Aug-16 23:00	0.7	6.9	36.9	15.6	70.2	0.0	0.0	61.5
07-Aug-16 0:00	1.1	198.3	12.8	15.2	69.5	0.0	0.0	61.5
07-Aug-16 1:00	1.3	203.2	7.3	15.1	66.1	0.0	0.0	61.5
07-Aug-16 2:00	1.4	221.5	4.8	14.4	69.8	0.0	0.0	61.7
07-Aug-16 3:00	1.0	204.5	15.7	14.0	71.5	0.0	0.0	61.6
07-Aug-16 4:00	0.5	175.2	23.3	13.8	73.3	0.0	0.0	61.6
07-Aug-16 5:00	0.5	190.4	25.9	13.7	70.0	1.1	0.0	61.5
07-Aug-16 6:00	0.5	259.9	50.0	13.0	82.8	11.6	0.0	61.5
07-Aug-16 7:00	0.6	290.7	24.5	13.4	81.6	112.1	0.0	61.6
07-Aug-16 8:00	0.8	37.9	30.4	14.1	77.1	293.7	0.0	61.8
07-Aug-16 9:00	0.9	193.4	32.5	14.8	72.2	453.3	0.0	61.9
07-Aug-16 10:00	1.2	248.0	25.2	15.2	68.7	587.2	0.0	62.0
07-Aug-16 11:00	1.7	231.9	18.1	15.4	71.0	693.3	0.0	61.9
07-Aug-16 12:00	2.3	221.0	12.9	15.3	74.1	795.3	0.0	61.9
07-Aug-16 13:00	3.3	218.4	14.0	16.0	68.7	857.0	0.0	61.8
07-Aug-16 14:00	3.5	245.4	19.1	16.9	68.3	812.0	0.0	61.6
07-Aug-16 15:00	3.2	248.8	20.9	17.9	65.9	744.7	0.0	61.5
07-Aug-16 16:00	3.4	273.7	19.7	18.0	66.2	662.0	0.0	61.4
07-Aug-16 17:00	3.3	283.0	21.8	17.9	65.8	539.6	0.0	61.4
07-Aug-16 18:00	3.2	296.7	19.8	17.5	65.6	407.0	0.0	61.5
07-Aug-16 19:00	4.2	259.7	27.4	16.5	71.2	247.6	0.0	61.4
07-Aug-16 20:00	4.1	220.2	14.8	15.1	77.1	99.1	0.0	61.5
07-Aug-16 21:00	3.5	198.5	16.3	13.6	81.8	10.8	0.0	61.5
07-Aug-16 22:00	4.2	211.3	14.3	12.6	85.6	0.0	0.0	61.6
07-Aug-16 23:00	3.1	200.9	14.0	11.9	88.4	0.0	0.0	61.6
08-Aug-16 0:00	3.5	205.2	11.1	11.6	89.4	0.0	0.0	61.6
08-Aug-16 1:00	3.1	212.7	9.3	11.2	91.0	0.0	0.0	61.7
08-Aug-16 2:00	3.1	210.3	8.9	10.8	92.0	0.0	0.0	61.7
08-Aug-16 3:00	2.7	215.7	9.5	10.3	95.1	0.0	0.0	61.7
08-Aug-16 4:00	2.7	213.3	9.8	10.0	96.6	0.0	0.0	61.7
08-Aug-16 5:00	3.2	212.6	8.7	9.8	97.7	0.5	0.0	61.7
08-Aug-16 6:00	2.6	210.2	10.0	9.7	97.8	8.9	0.0	61.7
08-Aug-16 7:00	3.3	224.6	8.9	9.6	97.9	72.0	0.0	61.7
08-Aug-16 8:00	3.4	226.3	6.5	9.7	97.4	142.6	0.0	61.7
08-Aug-16 9:00	3.9	223.8	6.3	9.9	95.1	250.9	0.0	61.7
08-Aug-16 10:00	4.1	225.9	9.3	10.6	91.2	475.1	0.0	61.7
08-Aug-16 11:00	4.0	241.6	11.8	11.6	87.3	498.4	0.0	61.6
08-Aug-16 12:00	4.6	230.0	11.0	11.6	86.4	393.0	0.0	61.6
08-Aug-16 13:00	4.4	233.6	11.2	11.7	85.6	229.9	0.0	61.6
08-Aug-16 14:00	4.3	218.5	14.9	10.9	93.1	161.1	0.0	61.9
08-Aug-16 15:00	4.1	213.9	12.6	10.0	98.1	105.0	0.0	63.1
08-Aug-16 16:00	4.0	208.3	10.5	9.7	98.9	79.6	0.0	64.0
08-Aug-16 17:00	5.3	223.4	11.5	9.8	99.1	101.9	0.0	64.3

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
08-Aug-16 18:00	4.1	220.8	12.7	9.8	99.2	67.3	0.0	65.2
08-Aug-16 19:00	4.1	219.8	8.2	9.6	99.3	31.4	0.0	65.8
08-Aug-16 20:00	4.3	223.7	8.3	9.7	99.3	8.1	0.0	66.5
08-Aug-16 21:00	3.8	217.8	9.2	9.7	99.3	1.2	0.0	67.0
08-Aug-16 22:00	3.8	211.1	8.6	9.5	99.3	0.0	0.0	67.2
08-Aug-16 23:00	3.5	205.6	9.0	9.3	99.3	0.0	0.0	67.3
09-Aug-16 0:00	4.3	207.8	8.5	9.2	99.3	0.0	0.0	67.4
09-Aug-16 1:00	4.1	208.2	9.7	9.2	99.3	0.0	0.0	67.5
09-Aug-16 2:00	4.2	213.5	8.5	9.1	99.3	0.0	0.0	67.7
09-Aug-16 3:00	3.8	216.8	7.0	9.1	99.3	0.0	0.0	68.1
09-Aug-16 4:00	3.4	205.7	8.5	9.0	99.3	0.0	0.0	68.6
09-Aug-16 5:00	3.9	206.4	7.9	8.9	99.3	0.1	0.0	68.7
09-Aug-16 6:00	3.9	202.1	8.2	8.9	99.3	4.9	0.0	68.7
09-Aug-16 7:00	3.4	213.2	8.5	8.9	99.3	14.7	0.0	68.7
09-Aug-16 8:00	2.8	205.7	11.6	9.0	99.3	44.6	0.0	68.8
09-Aug-16 9:00	3.3	218.2	7.3	9.1	99.3	89.6	0.0	68.8
09-Aug-16 10:00	3.2	217.5	9.6	9.4	99.2	248.5	0.0	68.8
09-Aug-16 11:00	3.2	227.0	10.2	9.6	99.2	264.2	0.0	68.7
09-Aug-16 12:00	3.2	216.7	12.5	10.3	98.9	350.3	0.0	68.7
09-Aug-16 13:00	3.3	230.8	13.1	10.4	99.0	352.9	0.0	68.7
09-Aug-16 14:00	3.1	224.1	13.6	10.9	98.8	391.7	0.0	68.6
09-Aug-16 15:00	3.4	224.7	16.5	11.1	98.7	319.3	0.0	68.5
09-Aug-16 16:00	3.8	221.7	12.5	11.2	98.5	272.2	0.0	68.5
09-Aug-16 17:00	3.6	216.0	14.0	11.3	97.3	232.9	0.0	68.5
09-Aug-16 18:00	4.6	220.0	9.6	11.4	93.7	175.0	0.0	68.5
09-Aug-16 19:00	5.3	225.8	11.6	11.4	90.3	129.7	0.0	68.4
09-Aug-16 20:00	3.7	228.7	9.6	10.7	89.9	81.8	0.0	68.4
09-Aug-16 21:00	3.9	211.4	9.8	10.1	84.2	20.0	0.0	68.4
09-Aug-16 22:00	4.5	203.1	11.7	9.8	81.2	0.0	0.0	68.4
09-Aug-16 23:00	3.5	200.9	9.1	9.6	82.0	0.0	0.0	68.5
10-Aug-16 0:00	2.5	211.7	13.1	9.5	83.5	0.0	0.0	68.6
10-Aug-16 1:00	2.6	225.0	10.7	9.2	88.3	0.0	0.0	68.5
10-Aug-16 2:00	3.3	206.8	12.1	8.9	90.1	0.0	0.0	68.5
10-Aug-16 3:00	3.1	198.9	10.0	8.3	96.5	0.0	0.0	68.5
10-Aug-16 4:00	3.4	199.5	9.1	8.0	96.4	0.0	0.0	68.5
10-Aug-16 5:00	3.6	195.9	11.7	7.8	96.4	0.6	0.0	68.5
10-Aug-16 6:00	3.6	220.0	10.4	7.6	98.0	12.9	0.0	68.4
10-Aug-16 7:00	5.0	219.8	9.1	7.6	96.3	47.4	0.0	68.4
10-Aug-16 8:00	5.3	209.8	10.8	7.6	98.2	88.9	0.0	68.4
10-Aug-16 9:00	5.4	214.4	9.3	7.7	98.4	129.8	0.0	68.4
10-Aug-16 10:00	5.7	217.2	8.9	7.6	99.3	104.9	0.0	68.7
10-Aug-16 11:00	5.6	214.4	9.1	7.7	99.3	127.6	0.0	69.9
10-Aug-16 12:00	6.2	207.7	9.3	7.6	99.3	63.3	0.0	72.8
10-Aug-16 13:00	6.8	211.5	8.4	7.9	99.3	112.2	0.0	73.3
10-Aug-16 14:00	6.3	214.3	8.6	8.3	99.3	98.0	0.0	73.9
10-Aug-16 15:00	6.0	215.1	9.3	8.6	99.3	107.7	0.0	74.7
10-Aug-16 16:00	5.0	213.3	9.4	8.8	99.3	120.1	0.0	75.1
10-Aug-16 17:00	5.0	210.2	9.7	8.8	99.3	110.7	0.0	75.6
10-Aug-16 18:00	4.9	210.2	7.9	8.9	99.3	97.8	0.0	75.8
10-Aug-16 19:00	4.9	206.7	9.3	9.0	99.3	52.8	0.0	75.9
10-Aug-16 20:00	4.8	208.6	8.6	9.1	99.3	21.7	0.0	76.3
10-Aug-16 21:00	4.4	204.6	8.9	9.1	99.3	2.4	0.0	76.5
10-Aug-16 22:00	5.0	200.5	7.3	9.0	99.3	0.0	0.0	76.7

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
10-Aug-16 23:00	4.3	204.9	8.2	9.1	99.3	0.0	0.0	77.9
11-Aug-16 0:00	3.9	205.6	9.4	9.2	99.3	0.0	0.0	78.6
11-Aug-16 1:00	4.6	205.0	9.8	9.2	99.3	0.0	0.0	78.7
11-Aug-16 2:00	4.2	206.2	10.1	9.1	99.3	0.0	0.0	78.8
11-Aug-16 3:00	4.2	200.1	11.2	9.1	99.3	0.0	0.0	78.9
11-Aug-16 4:00	3.9	207.9	10.2	9.1	99.3	0.0	0.0	79.0
11-Aug-16 5:00	5.0	210.3	10.4	8.9	99.3	0.1	0.0	79.1
11-Aug-16 6:00	4.0	202.6	8.8	8.9	99.3	5.3	0.0	79.1
11-Aug-16 7:00	4.1	206.3	9.2	8.7	99.3	34.6	0.0	79.1
11-Aug-16 8:00	3.9	203.6	9.5	9.0	99.3	106.1	0.0	79.1
11-Aug-16 9:00	3.7	213.7	6.7	9.2	99.2	256.3	0.0	79.1
11-Aug-16 10:00	3.8	216.7	7.8	9.4	99.2	212.8	0.0	79.1
11-Aug-16 11:00	4.4	221.5	11.4	9.5	99.3	166.1	0.0	79.3
11-Aug-16 12:00	4.1	222.4	8.8	9.7	99.2	321.8	0.0	79.5
11-Aug-16 13:00	4.1	227.4	8.9	10.3	99.1	366.7	0.0	79.4
11-Aug-16 14:00	4.9	234.6	10.9	10.5	99.1	355.3	0.0	79.4
11-Aug-16 15:00	5.2	233.2	13.0	10.5	99.0	309.4	0.0	79.3
11-Aug-16 16:00	5.2	227.5	9.1	10.4	98.5	243.8	0.0	79.3
11-Aug-16 17:00	5.0	231.2	7.8	10.6	96.6	170.5	0.0	79.3
11-Aug-16 18:00	3.8	228.8	13.0	10.2	97.8	68.4	0.0	79.3
11-Aug-16 19:00	3.8	221.6	8.9	10.0	98.8	24.6	0.0	79.3
11-Aug-16 20:00	4.3	220.5	10.4	9.8	99.3	12.0	0.0	79.4
11-Aug-16 21:00	3.4	205.9	8.5	9.6	99.3	2.4	0.0	79.4
11-Aug-16 22:00	3.4	209.9	9.8	9.6	99.3	0.0	0.0	79.5
11-Aug-16 23:00	3.8	217.2	7.4	9.7	99.3	0.0	0.0	79.5
12-Aug-16 0:00	3.0	206.4	9.1	9.6	99.3	0.0	0.0	79.5
12-Aug-16 1:00	2.9	203.3	7.2	9.6	99.3	0.0	0.0	79.5
12-Aug-16 2:00	2.8	208.1	7.9	9.5	99.3	0.0	0.0	79.6
12-Aug-16 3:00	2.8	212.5	7.9	9.4	99.3	0.0	0.0	79.6
12-Aug-16 4:00	2.9	206.4	8.5	9.0	99.3	0.0	0.0	79.6
12-Aug-16 5:00	1.7	207.9	16.1	9.0	99.2	0.1	0.0	79.6
12-Aug-16 6:00	1.7	210.0	10.2	9.1	98.9	7.2	0.0	79.6
12-Aug-16 7:00	1.3	223.8	12.2	9.3	97.6	50.5	0.0	79.6
12-Aug-16 8:00	1.4	207.8	12.4	9.5	97.4	114.7	0.0	79.7
12-Aug-16 9:00	1.1	240.5	26.5	10.1	94.9	182.2	0.0	79.8
12-Aug-16 10:00	1.4	207.3	18.5	10.3	93.8	261.4	0.0	79.9
12-Aug-16 11:00	2.1	228.8	13.9	10.5	93.0	285.8	0.0	79.5
12-Aug-16 12:00	2.0	231.3	12.2	11.0	91.2	301.9	0.0	79.5
12-Aug-16 13:00	1.9	224.3	13.6	11.4	91.2	405.3	0.0	79.5
12-Aug-16 14:00	2.3	238.6	19.3	12.0	89.0	495.5	0.0	79.4
12-Aug-16 15:00	2.7	238.7	16.5	12.3	90.2	458.3	0.0	79.3
12-Aug-16 16:00	1.9	229.1	16.3	12.0	92.1	224.9	0.0	79.3
12-Aug-16 17:00	2.2	231.1	16.2	12.0	92.3	217.4	0.0	79.3
12-Aug-16 18:00	2.5	239.7	11.0	11.9	94.4	241.6	0.0	79.3
12-Aug-16 19:00	2.2	226.9	7.5	11.5	96.8	112.4	0.0	79.3
12-Aug-16 20:00	2.0	212.2	8.4	11.0	99.1	14.8	0.0	79.3
12-Aug-16 21:00	1.9	201.0	8.9	10.8	99.3	3.0	0.0	79.3
12-Aug-16 22:00	1.9	215.8	6.4	10.8	99.3	0.0	0.0	79.3
12-Aug-16 23:00	2.8	208.1	9.3	10.7	99.1	0.0	0.0	79.3
13-Aug-16 0:00	2.2	204.7	10.9	10.6	99.1	0.0	0.0	79.3
13-Aug-16 1:00	2.6	192.4	11.3	10.5	98.0	0.0	0.0	79.4
13-Aug-16 2:00	3.1	200.7	9.3	10.5	96.2	0.0	0.0	79.4
13-Aug-16 3:00	3.0	204.4	12.5	10.3	96.0	0.0	0.0	79.4

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
13-Aug-16 4:00	2.9	204.9	9.2	10.2	92.6	0.0	0.0	79.3
13-Aug-16 5:00	3.6	189.7	6.9	10.1	90.0	0.1	0.0	79.3
13-Aug-16 6:00	3.2	195.0	10.8	10.3	87.7	4.3	0.0	79.3
13-Aug-16 7:00	3.4	194.0	9.4	10.4	86.0	49.6	0.0	79.3
13-Aug-16 8:00	3.3	205.4	11.8	10.6	85.6	63.8	0.0	79.3
13-Aug-16 9:00	3.0	176.6	12.3	10.7	85.1	102.2	0.0	79.5
13-Aug-16 10:00	2.8	178.1	31.5	11.1	84.0	215.2	0.0	79.4
13-Aug-16 11:00	3.8	218.0	11.0	11.2	85.9	343.4	0.0	79.4
13-Aug-16 12:00	3.9	213.2	11.1	11.1	89.1	227.4	0.0	79.5
13-Aug-16 13:00	3.2	216.5	12.6	10.6	93.1	267.6	0.0	79.7
13-Aug-16 14:00	3.3	216.8	14.1	11.0	93.0	384.6	0.0	79.8
13-Aug-16 15:00	4.2	208.6	14.6	11.1	88.4	210.6	0.0	79.7
13-Aug-16 16:00	5.5	198.2	11.1	11.3	82.0	181.5	0.0	79.7
13-Aug-16 17:00	4.7	205.1	13.0	11.0	84.5	176.1	0.0	79.8
13-Aug-16 18:00	6.3	186.8	9.6	10.5	83.8	128.8	0.0	79.8
13-Aug-16 19:00	4.8	193.9	12.4	10.2	84.6	55.6	0.0	79.8
13-Aug-16 20:00	5.2	172.5	8.9	10.3	82.9	15.5	0.0	79.8
13-Aug-16 21:00	5.5	179.1	8.2	10.1	85.3	1.9	0.0	79.8
13-Aug-16 22:00	6.0	176.4	8.4	9.9	87.4	0.0	0.0	79.8
13-Aug-16 23:00	4.0	174.9	13.0	9.8	89.5	0.0	0.0	79.8
14-Aug-16 0:00	3.1	152.4	32.2	9.9	88.7	0.0	0.0	79.8
14-Aug-16 1:00	2.8	187.3	37.8	9.7	90.4	0.0	0.0	79.8
14-Aug-16 2:00	3.2	209.3	12.9	9.4	94.2	0.0	0.0	79.8
14-Aug-16 3:00	3.0	190.9	15.7	9.4	95.5	0.0	0.0	79.8
14-Aug-16 4:00	2.9	130.6	41.3	9.4	95.3	0.0	0.0	80.2
14-Aug-16 5:00	3.0	201.1	19.9	9.2	97.9	0.1	0.0	80.1
14-Aug-16 6:00	3.0	204.5	11.6	9.0	99.3	6.9	0.0	80.4
14-Aug-16 7:00	3.1	199.2	11.5	9.2	99.3	44.6	0.0	80.4
14-Aug-16 8:00	3.6	204.6	9.8	9.4	99.2	149.7	0.0	80.4
14-Aug-16 9:00	3.9	203.9	9.2	9.6	98.8	157.1	0.0	80.5
14-Aug-16 10:00	4.1	205.8	10.9	10.0	97.8	233.1	0.0	80.5
14-Aug-16 11:00	3.2	218.9	14.5	10.3	96.6	187.6	0.0	80.5
14-Aug-16 12:00	3.5	222.5	12.0	10.3	97.7	205.8	0.0	80.4
14-Aug-16 13:00	4.5	216.1	17.4	10.3	98.3	174.9	0.0	80.5
14-Aug-16 14:00	5.1	215.3	17.6	10.2	99.2	166.8	0.0	80.4
14-Aug-16 15:00	5.4	221.2	12.7	10.1	99.2	154.1	0.0	80.4
14-Aug-16 16:00	4.7	220.8	17.4	9.8	99.3	41.4	0.0	80.7
14-Aug-16 17:00	4.1	218.4	14.9	9.6	99.3	50.2	0.0	82.1
14-Aug-16 18:00	3.9	206.0	12.4	9.7	99.3	65.7	0.0	82.7
14-Aug-16 19:00	3.9	204.8	11.8	9.6	99.3	48.0	0.0	83.3
14-Aug-16 20:00	4.4	205.3	9.9	9.5	99.3	17.1	0.0	83.5
14-Aug-16 21:00	4.9	205.2	10.5	9.5	99.3	1.4	0.0	83.7
14-Aug-16 22:00	4.3	206.6	10.6	9.5	99.3	0.0	0.0	85.1
14-Aug-16 23:00	4.4	204.6	10.6	9.4	99.3	0.0	0.0	85.9
15-Aug-16 0:00	4.7	204.1	8.7	9.4	99.3	0.0	0.0	86.9
15-Aug-16 1:00	5.3	220.8	9.9	9.5	99.3	0.0	0.0	87.4
15-Aug-16 2:00	4.6	217.8	11.4	9.5	99.3	0.0	0.0	87.9
15-Aug-16 3:00	4.3	207.5	12.1	9.4	99.3	0.0	0.0	88.9
15-Aug-16 4:00	4.0	201.3	9.5	9.4	99.3	0.0	0.0	90.4
15-Aug-16 5:00	3.3	198.8	9.6	9.4	99.3	0.0	0.0	92.6
15-Aug-16 6:00	2.6	215.4	16.0	9.3	99.3	3.2	0.0	95.1
15-Aug-16 7:00	3.5	202.2	16.1	9.4	99.3	11.4	0.0	99.7
15-Aug-16 8:00	3.4	211.7	13.4	9.5	99.3	31.2	0.0	100.2

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
15-Aug-16 9:00	5.3	217.4	9.9	9.6	99.3	126.4	0.0	102.6
15-Aug-16 10:00	5.3	212.7	11.5	9.7	99.3	155.1	0.0	102.6
15-Aug-16 11:00	5.6	220.6	11.6	9.4	99.3	109.9	0.0	103.0
15-Aug-16 12:00	4.7	220.5	10.5	9.5	99.3	188.4	0.0	103.3
15-Aug-16 13:00	4.5	222.0	8.6	9.5	99.3	134.2	0.0	104.2
15-Aug-16 14:00	4.2	218.7	12.7	9.6	99.3	103.5	0.0	105.1
15-Aug-16 15:00	6.2	222.6	14.0	9.5	99.3	36.0	0.0	107.7
15-Aug-16 16:00	6.7	226.7	13.8	9.0	99.3	41.7	0.0	108.9
15-Aug-16 17:00	6.5	235.9	11.7	8.4	99.3	49.3	0.0	110.1
15-Aug-16 18:00	5.2	225.8	11.8	8.2	99.3	34.5	0.0	112.5
15-Aug-16 19:00	5.7	230.6	8.3	8.2	99.3	19.0	0.0	113.3
15-Aug-16 20:00	5.2	218.8	9.6	8.2	99.3	9.5	0.0	113.4
15-Aug-16 21:00	5.9	241.8	11.1	8.1	99.3	0.3	0.0	116.2
15-Aug-16 22:00	4.8	226.5	10.9	7.4	99.3	0.0	0.0	116.6
15-Aug-16 23:00	3.9	220.1	12.9	6.8	99.3	0.0	0.0	116.6
16-Aug-16 0:00	3.0	195.3	11.9	6.3	99.3	0.0	0.0	116.7
16-Aug-16 1:00	3.8	196.3	13.1	6.1	99.3	0.0	0.0	116.7
16-Aug-16 2:00	2.8	192.8	15.4	6.1	99.3	0.0	0.0	116.7
16-Aug-16 3:00	3.2	198.8	13.4	6.0	99.3	0.0	0.0	116.7
16-Aug-16 4:00	3.2	209.5	12.7	5.9	99.3	0.0	0.0	116.7
16-Aug-16 5:00	2.7	214.1	10.6	5.7	99.3	0.0	0.0	116.7
16-Aug-16 6:00	2.6	196.9	12.3	5.5	99.3	7.7	0.0	116.7
16-Aug-16 7:00	1.8	186.0	17.9	5.7	98.5	56.5	0.0	116.8
16-Aug-16 8:00	2.9	209.4	13.2	5.8	97.2	155.6	0.0	116.7
16-Aug-16 9:00	2.3	228.9	9.7	6.1	95.1	204.9	0.0	116.7
16-Aug-16 10:00	1.9	223.5	10.3	6.7	89.4	323.3	0.0	116.7
16-Aug-16 11:00	2.7	222.2	10.9	7.4	85.5	409.8	0.0	116.6
16-Aug-16 12:00	2.5	240.1	13.1	7.9	85.5	329.2	0.0	116.4
16-Aug-16 13:00	2.5	253.7	24.3	8.9	81.6	642.3	0.0	116.3
16-Aug-16 14:00	2.9	237.0	24.3	9.6	80.8	617.0	0.0	116.1
16-Aug-16 15:00	3.2	225.4	14.0	9.4	78.1	376.1	0.0	115.9
16-Aug-16 16:00	3.1	239.1	10.0	9.3	80.4	239.3	0.0	115.9
16-Aug-16 17:00	1.9	255.9	26.1	9.2	81.9	167.2	0.0	115.9
16-Aug-16 18:00	2.8	226.0	20.1	9.4	83.6	258.6	0.0	115.8
16-Aug-16 19:00	2.8	218.8	14.1	9.3	82.7	174.8	0.0	115.7
16-Aug-16 20:00	2.4	225.1	11.7	8.8	85.5	70.6	0.0	115.7
16-Aug-16 21:00	1.9	226.2	18.2	7.9	88.5	4.2	0.0	115.8
16-Aug-16 22:00	1.2	282.0	23.7	7.6	89.3	0.0	0.0	115.7
16-Aug-16 23:00	1.0	221.2	41.5	7.4	89.9	0.0	0.0	115.7
17-Aug-16 0:00	1.4	0.1	16.4	6.9	92.5	0.0	0.0	115.6
17-Aug-16 1:00	1.1	51.8	28.7	6.6	92.2	0.0	0.0	115.6
17-Aug-16 2:00	1.2	202.2	15.8	6.6	92.1	0.0	0.0	115.8
17-Aug-16 3:00	1.8	37.4	15.8	6.3	93.9	0.0	0.0	115.9
17-Aug-16 4:00	1.9	41.1	14.4	6.0	95.1	0.0	0.0	115.9
17-Aug-16 5:00	2.5	26.3	5.4	5.9	96.9	0.1	0.0	115.9
17-Aug-16 6:00	1.5	29.6	18.5	5.6	99.2	6.4	0.0	115.9
17-Aug-16 7:00	0.7	139.5	28.6	5.7	98.0	56.7	0.0	116.0
17-Aug-16 8:00	0.5	200.4	39.9	6.4	94.8	136.9	0.0	116.0
17-Aug-16 9:00	1.1	224.4	19.1	7.4	90.4	369.0	0.0	116.1
17-Aug-16 10:00	1.5	294.7	18.5	7.5	91.8	321.0	0.0	115.9
17-Aug-16 11:00	1.3	262.2	27.2	8.4	89.2	515.1	0.0	115.9
17-Aug-16 12:00	1.9	239.3	28.2	9.5	88.0	765.1	0.0	115.8
17-Aug-16 13:00	1.9	272.5	27.3	10.5	82.7	813.0	0.0	115.9



Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
17-Aug-16 14:00	2.2	263.6	32.0	11.7	72.1	774.2	0.0	115.8
17-Aug-16 15:00	3.0	268.7	28.9	12.4	67.4	698.1	0.0	115.7
17-Aug-16 16:00	3.7	293.0	20.8	12.7	64.9	621.9	0.0	115.6
17-Aug-16 17:00	3.4	300.6	20.4	12.7	66.8	464.6	0.0	115.6
17-Aug-16 18:00	3.1	310.5	25.2	12.6	64.8	356.1	0.0	115.5
17-Aug-16 19:00	3.3	321.7	18.5	11.9	66.6	191.5	0.0	115.5
17-Aug-16 20:00	3.2	344.4	16.2	10.8	75.0	61.4	0.0	115.6
17-Aug-16 21:00	1.6	36.7	21.1	10.2	76.4	1.8	0.0	115.5
17-Aug-16 22:00	0.8	142.0	38.6	10.1	78.0	0.0	0.0	115.4
17-Aug-16 23:00	0.7	133.1	41.5	9.6	82.4	0.0	0.0	115.3
18-Aug-16 0:00	1.5	176.3	20.1	9.7	82.0	0.0	0.0	115.7
18-Aug-16 1:00	1.2	170.0	17.4	9.8	81.5	0.0	0.0	115.8
18-Aug-16 2:00	1.0	177.2	28.0	9.8	81.9	0.0	0.0	115.9
18-Aug-16 3:00	1.4	207.1	10.9	9.5	84.3	0.0	0.0	115.7
18-Aug-16 4:00	1.1	222.5	14.8	9.2	85.6	0.0	0.0	115.7
18-Aug-16 5:00	0.5	265.2	22.3	9.3	85.6	0.0	0.0	115.6
18-Aug-16 6:00	0.6	310.1	47.1	9.4	84.7	3.1	0.0	115.7
18-Aug-16 7:00	0.7	197.3	45.1	9.3	86.3	32.5	0.0	115.7
18-Aug-16 8:00	1.7	218.6	12.7	9.3	87.1	75.6	0.0	115.8
18-Aug-16 9:00	2.1	211.2	11.1	9.6	85.5	126.5	0.0	115.6
18-Aug-16 10:00	2.4	220.9	10.0	9.5	86.6	171.2	0.0	115.6
18-Aug-16 11:00	3.7	221.2	9.5	9.9	85.5	332.1	0.0	115.6
18-Aug-16 12:00	4.6	224.1	7.0	10.3	84.8	341.0	0.0	115.6
18-Aug-16 13:00	4.9	224.1	7.2	10.5	87.1	357.7	0.0	115.5
18-Aug-16 14:00	4.5	221.8	6.5	11.0	87.8	356.0	0.0	115.5
18-Aug-16 15:00	3.9	219.3	7.1	11.4	89.0	332.9	0.0	115.5
18-Aug-16 16:00	4.3	222.4	9.4	13.0	84.6	545.5	0.0	115.5
18-Aug-16 17:00	4.8	223.5	7.7	13.5	81.6	383.0	0.0	115.4
18-Aug-16 18:00	3.8	223.6	8.3	13.2	82.5	209.8	0.0	115.4
18-Aug-16 19:00	3.8	221.5	7.3	12.9	83.9	108.6	0.0	115.5
18-Aug-16 20:00	3.6	204.7	11.8	12.4	86.8	16.3	0.0	115.5
18-Aug-16 21:00	4.5	206.1	11.8	11.8	89.8	0.4	0.0	115.5
18-Aug-16 22:00	5.0	215.5	10.9	11.4	89.8	0.0	0.0	115.5
18-Aug-16 23:00	4.3	216.0	10.6	10.7	96.9	0.0	0.0	115.7
19-Aug-16 0:00	4.6	216.3	12.8	10.2	99.3	0.0	0.0	116.7
19-Aug-16 1:00	4.9	209.2	10.9	10.0	99.3	0.0	0.0	117.1
19-Aug-16 2:00	4.9	213.1	9.3	9.8	99.3	0.0	0.0	117.2
19-Aug-16 3:00	4.1	211.9	10.7	9.9	99.3	0.0	0.0	117.3
19-Aug-16 4:00	4.4	205.4	9.4	10.0	99.3	0.0	0.0	117.4
19-Aug-16 5:00	3.5	213.7	12.5	9.8	99.3	0.0	0.0	117.4
19-Aug-16 6:00	3.6	213.8	9.3	9.5	99.3	8.3	0.0	117.4
19-Aug-16 7:00	4.1	209.9	10.8	9.4	99.3	43.6	0.0	117.4
19-Aug-16 8:00	4.3	208.3	11.5	9.3	99.3	110.4	0.0	117.4
19-Aug-16 9:00	3.9	210.6	12.0	9.3	99.2	215.0	0.0	117.4
19-Aug-16 10:00	4.1	212.9	12.7	9.6	98.3	434.7	0.0	117.5
19-Aug-16 11:00	4.4	226.6	10.0	10.2	95.0	580.1	0.0	117.4
19-Aug-16 12:00	3.3	236.5	11.5	10.9	91.5	380.4	0.0	117.3
19-Aug-16 13:00	4.0	223.0	11.1	11.0	87.9	289.5	0.0	117.3
19-Aug-16 14:00	3.9	224.8	10.7	11.2	86.4	237.8	0.0	117.3
19-Aug-16 15:00	4.1	215.5	11.4	11.3	85.0	205.5	0.0	117.3
19-Aug-16 16:00	3.0	251.6	21.4	11.3	85.7	192.8	0.0	117.4
19-Aug-16 17:00	2.1	354.8	17.8	10.7	90.0	150.2	0.0	117.4
19-Aug-16 18:00	2.7	348.1	15.5	10.6	85.4	115.9	0.0	117.4

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
19-Aug-16 19:00	1.3	348.6	32.0	10.5	74.7	49.6	0.0	117.4
19-Aug-16 20:00	0.7	331.6	42.0	10.4	78.1	16.3	0.0	117.4
19-Aug-16 21:00	2.6	324.3	21.4	9.8	81.0	1.0	0.0	117.4
19-Aug-16 22:00	1.8	23.3	39.9	9.1	89.4	0.0	0.0	117.4
19-Aug-16 23:00	2.2	210.9	9.7	9.3	87.8	0.0	0.0	117.4
20-Aug-16 0:00	2.9	208.4	7.2	9.0	91.9	0.0	0.0	117.4
20-Aug-16 1:00	2.8	204.9	9.8	9.0	92.8	0.0	0.0	117.4
20-Aug-16 2:00	2.1	225.9	11.4	8.9	96.2	0.0	0.0	117.5
20-Aug-16 3:00	1.5	193.4	12.1	9.1	98.8	0.0	0.0	117.5
20-Aug-16 4:00	2.2	209.7	9.1	8.9	99.3	0.0	0.0	117.4
20-Aug-16 5:00	2.7	230.2	7.7	8.9	99.3	0.0	0.0	117.4
20-Aug-16 6:00	3.0	209.1	11.5	8.6	99.3	2.6	0.0	117.4
20-Aug-16 7:00	3.4	215.2	11.9	8.6	99.3	22.2	0.0	117.4
20-Aug-16 8:00	3.3	217.1	11.3	8.6	99.3	53.9	0.0	117.4
20-Aug-16 9:00	3.5	221.2	8.5	8.7	99.3	143.6	0.0	117.4
20-Aug-16 10:00	3.6	225.2	11.1	9.0	99.2	242.2	0.0	117.3
20-Aug-16 11:00	3.3	223.6	12.2	9.2	99.0	264.5	0.0	117.4
20-Aug-16 12:00	3.4	218.4	16.8	10.0	95.4	485.0	0.0	117.5
20-Aug-16 13:00	2.9	248.9	18.8	10.4	94.0	410.6	0.0	117.4
20-Aug-16 14:00	2.6	242.0	18.2	10.8	85.0	336.5	0.0	117.4
20-Aug-16 15:00	2.3	249.6	28.2	11.5	79.2	418.8	0.0	117.3
20-Aug-16 16:00	4.4	235.0	14.6	11.9	71.9	408.7	0.0	117.3
20-Aug-16 17:00	4.7	226.1	12.4	11.5	69.0	401.4	0.0	117.3
20-Aug-16 18:00	4.3	236.5	13.0	11.5	70.2	327.2	0.0	117.3
20-Aug-16 19:00	3.7	297.5	25.1	11.0	73.4	258.8	0.0	117.3
20-Aug-16 20:00	3.4	335.6	34.9	9.5	77.0	61.3	0.0	117.4
20-Aug-16 21:00	1.7	20.6	51.2	8.5	82.1	1.9	0.0	117.4
20-Aug-16 22:00	2.5	18.9	16.9	7.6	85.1	0.0	0.0	117.4
20-Aug-16 23:00	2.0	31.8	15.6	7.4	85.2	0.0	0.0	117.4
21-Aug-16 0:00	2.7	8.8	17.5	6.9	87.8	0.0	0.0	117.4
21-Aug-16 1:00	1.6	35.7	12.4	6.9	87.1	0.0	0.0	117.3
21-Aug-16 2:00	1.4	26.9	14.6	6.7	88.2	0.0	0.0	117.2
21-Aug-16 3:00	2.5	31.0	12.4	6.0	92.2	0.0	0.0	117.4
21-Aug-16 4:00	3.8	30.8	7.5	5.9	92.6	0.0	0.0	117.4
21-Aug-16 5:00	3.5	30.4	5.0	5.6	95.9	0.0	0.0	117.4
21-Aug-16 6:00	3.9	25.7	6.0	5.4	97.3	6.4	0.0	117.5
21-Aug-16 7:00	4.1	12.3	5.9	5.5	97.1	31.9	0.0	117.5
21-Aug-16 8:00	3.3	20.0	8.3	5.6	98.9	83.7	0.0	117.5
21-Aug-16 9:00	3.5	19.8	7.4	6.7	94.9	329.4	0.0	117.6
21-Aug-16 10:00	2.9	346.3	18.1	8.4	85.5	585.2	0.0	117.7
21-Aug-16 11:00	3.1	305.2	11.8	9.2	80.7	566.0	0.0	117.4
21-Aug-16 12:00	2.4	307.2	20.0	10.2	75.2	639.8	0.0	117.5
21-Aug-16 13:00	3.1	327.1	18.0	10.8	66.9	316.6	0.0	117.3
21-Aug-16 14:00	3.2	329.4	15.7	11.1	65.4	304.2	0.0	117.3
21-Aug-16 15:00	2.5	331.8	25.8	11.9	62.9	376.0	0.0	117.4
21-Aug-16 16:00	2.6	305.0	26.7	13.3	59.5	648.3	0.0	117.3
21-Aug-16 17:00	2.6	299.6	28.8	13.8	58.6	538.6	0.0	117.2
21-Aug-16 18:00	1.2	4.0	37.9	13.6	60.3	289.6	0.0	117.2
21-Aug-16 19:00	2.8	342.9	17.9	13.3	65.3	192.2	0.0	117.2
21-Aug-16 20:00	2.1	11.8	26.1	12.2	69.1	53.9	0.0	117.2
21-Aug-16 21:00	1.6	243.9	27.6	11.6	70.5	1.0	0.0	117.3
21-Aug-16 22:00	2.4	226.2	12.6	10.7	76.8	0.0	0.0	117.3
21-Aug-16 23:00	2.7	172.0	7.1	10.4	79.4	0.0	0.0	117.4

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
22-Aug-16 0:00	2.4	199.4	9.9	10.1	81.6	0.0	0.0	117.3
22-Aug-16 1:00	2.0	204.5	11.8	10.0	81.8	0.0	0.0	117.2
22-Aug-16 2:00	1.8	217.7	17.3	9.6	84.1	0.0	0.0	117.2
22-Aug-16 3:00	2.1	228.0	6.2	8.7	90.1	0.0	0.0	117.3
22-Aug-16 4:00	2.8	230.8	8.1	8.3	92.5	0.0	0.0	117.3
22-Aug-16 5:00	2.9	214.1	8.1	7.9	95.2	0.0	0.0	117.4
22-Aug-16 6:00	3.4	200.1	11.8	7.8	96.4	12.2	0.0	117.4
22-Aug-16 7:00	2.8	202.7	17.0	7.8	96.8	71.2	0.0	117.4
22-Aug-16 8:00	2.4	220.5	13.1	8.3	93.5	165.8	0.0	117.4
22-Aug-16 9:00	3.3	214.1	12.3	8.3	93.7	186.9	0.0	117.3
22-Aug-16 10:00	3.9	223.2	8.6	8.9	90.1	284.6	0.0	117.3
22-Aug-16 11:00	3.8	225.3	10.0	9.4	89.5	479.1	0.0	117.3
22-Aug-16 12:00	4.4	230.7	12.0	10.2	86.8	597.8	0.0	117.3
22-Aug-16 13:00	4.6	233.9	15.5	10.9	81.3	650.0	0.0	117.4
22-Aug-16 14:00	4.6	249.0	19.3	12.1	74.1	621.0	0.0	117.3
22-Aug-16 15:00	4.1	254.7	21.6	11.7	73.2	429.0	0.0	117.3
22-Aug-16 16:00	4.6	248.0	19.2	12.8	67.0	556.2	0.0	117.2
22-Aug-16 17:00	5.3	253.8	25.2	13.0	65.3	468.3	0.0	117.2
22-Aug-16 18:00	5.5	256.3	20.1	12.6	68.5	334.1	0.0	117.2
22-Aug-16 19:00	5.4	246.4	20.2	12.0	70.0	234.1	0.0	117.1
22-Aug-16 20:00	4.8	225.8	12.2	10.8	74.9	66.0	0.0	117.3
22-Aug-16 21:00	3.3	194.2	14.8	9.5	82.1	0.8	0.0	117.3
22-Aug-16 22:00	3.4	187.7	10.6	9.0	85.5	0.0	0.0	117.3
22-Aug-16 23:00	3.9	201.6	11.8	9.0	85.8	0.0	0.0	117.3
23-Aug-16 0:00	3.3	204.9	12.6	8.8	87.3	0.0	0.0	117.3
23-Aug-16 1:00	4.0	210.1	12.1	8.7	87.9	0.0	0.0	117.3
23-Aug-16 2:00	3.1	207.2	10.1	8.6	89.0	0.0	0.0	117.3
23-Aug-16 3:00	3.6	205.2	9.0	8.6	89.1	0.0	0.0	117.3
23-Aug-16 4:00	3.9	201.5	10.1	8.3	91.6	0.0	0.0	117.3
23-Aug-16 5:00	4.6	203.8	9.5	7.9	95.4	0.0	0.0	117.4
23-Aug-16 6:00	4.0	215.1	7.4	7.4	97.7	2.6	0.0	117.4
23-Aug-16 7:00	3.6	206.2	8.3	7.4	99.3	20.1	0.0	117.4
23-Aug-16 8:00	3.6	206.1	7.8	7.5	98.2	78.4	0.0	117.4
23-Aug-16 9:00	2.4	201.3	8.9	8.3	98.5	82.7	0.0	117.5
23-Aug-16 10:00	2.6	222.3	10.6	9.4	97.9	261.8	0.0	117.4
23-Aug-16 11:00	3.0	208.1	15.1	9.9	95.7	333.0	0.0	117.5
23-Aug-16 12:00	3.2	235.9	12.4	10.3	94.5	315.8	0.0	117.3
23-Aug-16 13:00	3.8	211.0	13.8	10.2	97.6	268.2	0.0	117.3
23-Aug-16 14:00	3.4	216.3	13.9	10.5	98.4	284.0	0.0	117.3
23-Aug-16 15:00	3.4	215.5	12.5	10.6	98.6	196.5	0.0	117.3
23-Aug-16 16:00	3.2	216.0	16.9	10.9	97.5	175.5	0.0	117.3
23-Aug-16 17:00	3.3	213.1	15.6	11.4	96.2	138.3	0.0	117.3
23-Aug-16 18:00	2.4	214.0	13.8	11.1	98.5	109.9	0.0	117.3
23-Aug-16 19:00	2.5	226.7	16.8	11.4	97.0	85.0	0.0	117.3
23-Aug-16 20:00	2.2	224.7	15.3	10.9	97.4	15.7	0.0	117.3
23-Aug-16 21:00	2.6	210.8	9.2	10.6	98.7	0.7	0.0	117.3
23-Aug-16 22:00	3.7	198.1	8.3	10.8	91.6	0.0	0.0	117.3
23-Aug-16 23:00	2.5	230.1	11.4	10.3	98.8	0.0	0.0	117.4
24-Aug-16 0:00	2.2	211.9	15.7	10.5	96.0	0.0	0.0	117.4
24-Aug-16 1:00	1.1	306.3	17.4	10.2	96.2	0.0	0.0	117.4
24-Aug-16 2:00	1.3	323.7	13.4	10.2	95.1	0.0	0.0	117.4
24-Aug-16 3:00	1.4	4.5	23.2	10.1	95.4	0.0	0.0	117.4
24-Aug-16 4:00	1.6	39.5	13.4	10.1	92.9	0.0	0.0	117.3

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
24-Aug-16 5:00	2.3	29.6	12.8	9.7	96.5	0.0	0.0	117.4
24-Aug-16 6:00	1.6	30.6	13.9	9.5	97.6	3.3	0.0	117.4
24-Aug-16 7:00	1.6	33.0	15.7	9.4	98.4	31.7	0.0	117.4
24-Aug-16 8:00	1.6	23.8	13.4	9.7	97.5	118.4	0.0	117.5
24-Aug-16 9:00	1.8	28.7	21.8	10.2	96.1	291.0	0.0	117.6
24-Aug-16 10:00	1.3	283.7	37.5	11.2	93.5	435.0	0.0	117.6
24-Aug-16 11:00	1.3	253.6	40.8	12.0	91.8	609.2	0.0	117.6
24-Aug-16 12:00	1.5	323.1	34.2	13.5	83.7	683.7	0.0	117.5
24-Aug-16 13:00	1.8	266.1	27.6	13.7	87.8	769.1	0.0	117.5
24-Aug-16 14:00	2.2	297.3	28.1	14.4	80.9	727.1	0.0	117.4
24-Aug-16 15:00	2.8	296.5	18.2	15.3	74.5	662.7	0.0	117.3
24-Aug-16 16:00	3.2	302.0	23.6	15.6	72.6	575.2	0.0	117.3
24-Aug-16 17:00	3.0	301.2	21.7	16.0	72.1	451.2	0.0	117.3
24-Aug-16 18:00	2.9	296.5	15.9	16.0	71.3	333.9	0.0	117.2
24-Aug-16 19:00	2.9	326.4	14.4	15.3	72.7	188.7	0.0	117.2
24-Aug-16 20:00	2.5	352.6	10.7	13.8	79.9	47.8	0.0	117.3
24-Aug-16 21:00	2.2	36.7	15.2	13.0	82.5	0.8	0.0	117.3
24-Aug-16 22:00	1.4	221.8	33.0	13.2	81.9	0.0	0.0	117.3
24-Aug-16 23:00	1.4	202.1	21.3	12.4	87.8	0.0	0.0	117.2
25-Aug-16 0:00	1.0	60.3	38.8	12.1	88.4	0.0	0.0	117.1
25-Aug-16 1:00	1.2	79.4	35.5	11.9	87.5	0.0	0.0	117.1
25-Aug-16 2:00	0.8	213.7	22.9	11.4	92.9	0.0	0.0	117.0
25-Aug-16 3:00	0.6	218.5	53.1	11.6	90.1	0.0	0.0	117.0
25-Aug-16 4:00	1.3	350.3	35.5	10.9	95.5	0.0	0.0	117.4
25-Aug-16 5:00	2.0	1.9	20.4	10.8	91.5	0.0	0.0	117.3
25-Aug-16 6:00	2.2	6.8	25.0	10.4	94.4	10.9	0.0	117.4
25-Aug-16 7:00	1.8	17.6	27.8	10.2	94.7	43.5	0.0	117.4
25-Aug-16 8:00	1.0	359.9	39.1	10.9	92.3	165.4	0.0	117.6
25-Aug-16 9:00	0.9	2.6	48.4	12.3	87.1	349.8	0.0	117.7
25-Aug-16 10:00	2.3	7.6	20.4	12.0	89.9	404.6	0.0	117.5
25-Aug-16 11:00	2.0	17.3	38.8	13.0	86.5	534.1	0.0	117.5
25-Aug-16 12:00	1.3	330.2	51.1	13.3	87.9	519.8	0.0	117.4
25-Aug-16 13:00	1.3	248.7	55.0	14.0	86.5	529.2	0.0	117.3
25-Aug-16 14:00	2.8	218.2	17.0	13.0	90.8	364.8	0.0	117.3
25-Aug-16 15:00	3.3	227.5	10.9	12.8	89.4	328.7	0.0	117.3
25-Aug-16 16:00	3.0	230.4	10.9	13.3	86.9	311.8	0.0	117.3
25-Aug-16 17:00	3.5	224.0	9.5	13.5	87.4	216.7	0.0	117.3
25-Aug-16 18:00	3.1	218.9	10.0	13.6	87.0	187.1	0.0	117.3
25-Aug-16 19:00	3.2	233.5	9.2	13.5	87.4	102.1	0.0	117.3
25-Aug-16 20:00	2.5	210.6	11.1	13.0	87.4	23.3	0.0	117.3
25-Aug-16 21:00	2.1	229.1	9.3	12.3	89.7	0.3	0.0	117.3
25-Aug-16 22:00	2.6	218.3	14.3	12.0	90.0	0.0	0.0	117.4
25-Aug-16 23:00	3.1	229.1	7.7	11.9	89.6	0.0	0.0	117.3
26-Aug-16 0:00	2.8	215.3	15.8	11.7	90.4	0.0	0.0	117.3
26-Aug-16 1:00	3.2	233.5	12.1	11.5	91.1	0.0	0.0	117.4
26-Aug-16 2:00	2.3	238.6	24.1	11.1	93.3	0.0	0.0	117.4
26-Aug-16 3:00	3.9	221.7	12.4	10.9	93.7	0.0	0.0	117.3
26-Aug-16 4:00	4.8	199.4	9.3	11.7	89.0	0.0	0.0	117.3
26-Aug-16 5:00	4.8	208.6	11.1	11.2	92.0	0.0	0.0	117.3
26-Aug-16 6:00	4.6	208.4	11.8	10.5	96.8	0.2	0.0	117.3
26-Aug-16 7:00	5.6	200.3	9.6	10.3	99.3	4.4	0.0	117.4
26-Aug-16 8:00	5.6	210.6	10.3	10.4	99.3	24.7	0.0	118.0
26-Aug-16 9:00	6.4	212.0	10.2	10.3	99.3	29.5	0.0	118.8

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
26-Aug-16 10:00	7.2	207.4	12.9	10.4	99.3	55.9	0.0	119.8
26-Aug-16 11:00	7.1	217.8	8.6	10.5	99.3	83.5	0.0	120.4
26-Aug-16 12:00	8.1	227.4	8.3	10.8	99.3	153.3	0.0	120.7
26-Aug-16 13:00	7.2	213.4	12.9	10.6	99.2	245.2	0.0	120.8
26-Aug-16 14:00	6.1	214.6	16.5	10.9	98.7	274.9	0.0	120.8
26-Aug-16 15:00	5.5	225.5	13.7	10.2	98.6	121.0	0.0	120.8
26-Aug-16 16:00	4.9	198.5	11.5	9.4	98.9	89.6	0.0	121.0
26-Aug-16 17:00	5.1	221.7	10.9	9.4	98.8	76.2	0.0	121.1
26-Aug-16 18:00	4.1	202.4	13.1	9.2	97.9	66.3	0.0	121.1
26-Aug-16 19:00	3.7	189.2	14.3	9.2	93.8	19.9	0.0	121.1
26-Aug-16 20:00	2.1	203.7	19.9	9.1	92.7	5.6	0.0	121.1
26-Aug-16 21:00	2.4	203.6	12.4	8.9	93.9	0.4	0.0	121.1
26-Aug-16 22:00	2.3	195.5	15.1	8.6	93.7	0.0	0.0	121.1
26-Aug-16 23:00	2.2	208.2	18.2	8.7	92.4	0.0	0.0	121.1
27-Aug-16 0:00	1.4	207.7	17.5	8.6	92.7	0.0	0.0	121.2
27-Aug-16 1:00	1.5	30.6	39.2	8.7	90.7	0.0	0.0	121.1
27-Aug-16 2:00	3.1	27.6	16.4	8.6	92.1	0.0	0.0	121.1
27-Aug-16 3:00	9.9	37.8	8.8	9.3	78.9	0.0	0.0	121.1
27-Aug-16 4:00	11.7	35.8	7.5	9.2	74.8	0.0	0.0	121.2
27-Aug-16 5:00	11.6	35.9	7.8	9.3	73.5	0.0	0.0	121.2
27-Aug-16 6:00	9.1	30.2	6.4	9.2	74.9	2.1	0.0	121.1
27-Aug-16 7:00	9.9	36.5	7.3	9.2	73.7	20.6	0.0	121.2
27-Aug-16 8:00	9.9	39.6	6.1	9.2	73.4	40.2	0.0	121.2
27-Aug-16 9:00	9.9	48.9	7.2	9.6	70.8	106.2	0.0	121.2
27-Aug-16 10:00	6.8	36.8	10.4	10.4	69.8	489.4	0.0	121.3
27-Aug-16 11:00	6.2	46.4	12.0	11.5	66.1	594.6	0.0	121.2
27-Aug-16 12:00	8.0	66.1	9.8	12.3	60.7	729.4	0.0	121.2
27-Aug-16 13:00	8.1	61.7	9.8	13.0	57.0	770.5	0.0	121.2
27-Aug-16 14:00	7.5	57.9	10.2	14.0	53.7	725.7	0.0	121.1
27-Aug-16 15:00	6.3	53.1	13.4	14.7	50.5	658.7	0.0	121.0
27-Aug-16 16:00	5.2	43.0	14.2	15.0	49.5	565.7	0.0	120.9
27-Aug-16 17:00	4.6	37.1	18.5	15.3	49.6	476.4	0.0	120.9
27-Aug-16 18:00	6.1	33.3	11.7	14.7	51.8	252.6	0.0	121.0
27-Aug-16 19:00	6.2	68.5	9.8	14.1	52.7	53.3	0.0	120.9
27-Aug-16 20:00	2.7	72.4	40.6	13.7	53.1	7.0	0.0	121.0
27-Aug-16 21:00	2.1	116.7	51.4	13.4	54.2	0.1	0.0	121.0
27-Aug-16 22:00	1.2	211.1	53.4	13.1	55.0	0.0	0.0	120.9
27-Aug-16 23:00	1.7	318.0	42.0	12.8	55.6	0.0	0.0	121.0
28-Aug-16 0:00	1.2	119.5	56.5	12.4	57.7	0.0	0.0	121.0
28-Aug-16 1:00	1.6	22.6	23.6	12.5	56.6	0.0	0.0	121.0
28-Aug-16 2:00	1.4	349.3	23.8	11.8	61.0	0.0	0.0	120.9
28-Aug-16 3:00	2.2	32.4	13.2	11.5	61.6	0.0	0.0	121.0
28-Aug-16 4:00	1.0	359.8	49.5	11.1	64.6	0.0	0.0	120.9
28-Aug-16 5:00	3.5	40.8	12.3	10.5	70.4	0.0	0.0	121.0
28-Aug-16 6:00	4.2	35.2	10.6	9.9	74.0	1.9	0.0	121.0
28-Aug-16 7:00	5.3	33.0	5.4	9.5	76.7	34.7	0.0	121.1
28-Aug-16 8:00	6.5	30.9	8.2	9.9	74.2	91.4	0.0	121.0
28-Aug-16 9:00	6.3	57.6	15.7	10.8	70.6	267.1	0.0	121.2
28-Aug-16 10:00	9.5	56.0	7.2	11.4	60.3	500.9	0.0	121.3
28-Aug-16 11:00	7.5	47.9	8.8	11.7	58.6	509.3	0.0	121.3
28-Aug-16 12:00	6.4	61.6	15.7	12.4	58.2	623.4	0.0	121.3
28-Aug-16 13:00	7.2	87.4	10.8	12.5	54.2	470.7	0.0	121.0
28-Aug-16 14:00	7.6	50.7	9.0	12.8	50.7	547.7	0.0	121.0

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
28-Aug-16 15:00	7.5	52.1	16.9	13.2	46.0	533.5	0.0	121.0
28-Aug-16 16:00	6.4	48.2	14.4	13.2	45.4	323.9	0.0	121.0
28-Aug-16 17:00	6.7	48.2	12.0	12.8	44.5	174.8	0.0	120.9
28-Aug-16 18:00	8.8	87.5	18.6	12.4	42.7	90.7	0.0	121.0
28-Aug-16 19:00	12.0	94.2	10.0	10.9	51.6	35.6	0.0	121.1
28-Aug-16 20:00	12.0	96.2	8.4	9.5	60.1	12.6	0.0	121.0
28-Aug-16 21:00	5.1	110.8	21.1	9.1	62.1	0.0	0.0	121.0
28-Aug-16 22:00	2.6	254.3	39.4	8.3	69.1	0.0	0.0	121.0
28-Aug-16 23:00	2.2	285.8	28.0	7.9	70.8	0.0	0.0	121.1
29-Aug-16 0:00	1.0	208.4	30.0	8.0	69.5	0.0	0.0	121.0
29-Aug-16 1:00	1.1	262.3	34.9	7.9	69.2	0.0	0.0	121.0
29-Aug-16 2:00	1.6	317.6	40.9	7.7	69.8	0.0	0.0	121.1
29-Aug-16 3:00	2.3	342.8	20.7	7.2	73.8	0.0	0.0	121.1
29-Aug-16 4:00	1.1	326.4	25.5	7.3	73.6	0.0	0.0	121.0
29-Aug-16 5:00	1.5	248.5	18.9	6.9	77.0	0.0	0.0	121.1
29-Aug-16 6:00	0.6	261.6	32.1	6.5	81.7	0.8	0.0	121.3
29-Aug-16 7:00	0.9	10.5	24.2	6.3	83.6	17.6	0.0	121.4
29-Aug-16 8:00	2.3	23.4	16.0	6.1	85.3	22.5	0.0	123.0
29-Aug-16 9:00	1.9	42.0	43.1	6.0	86.7	83.2	0.0	123.3
29-Aug-16 10:00	2.1	53.7	33.1	6.3	87.9	114.2	0.0	123.7
29-Aug-16 11:00	3.1	40.2	12.3	6.5	90.3	195.9	0.0	124.0
29-Aug-16 12:00	4.0	17.5	9.4	6.6	90.8	203.5	0.0	124.3
29-Aug-16 13:00	3.3	13.1	7.3	6.7	91.3	154.1	0.0	124.9
29-Aug-16 14:00	2.2	0.7	15.4	7.2	91.1	177.1	0.0	125.5
29-Aug-16 15:00	1.8	356.8	24.6	7.6	89.2	182.8	0.0	125.5
29-Aug-16 16:00	1.3	328.8	29.2	8.0	89.0	136.0	0.0	125.8
29-Aug-16 17:00	2.5	26.0	37.6	7.5	93.9	96.8	0.0	126.1
29-Aug-16 18:00	0.9	190.7	44.1	7.1	98.0	51.6	0.0	126.4
29-Aug-16 19:00	1.9	32.4	26.9	7.2	94.3	38.4	0.0	126.5
29-Aug-16 20:00	3.2	49.4	19.1	7.1	93.5	8.9	0.0	126.5
29-Aug-16 21:00	2.8	59.6	33.4	7.4	89.5	0.0	0.0	126.5
29-Aug-16 22:00	1.9	30.9	57.2	7.5	88.3	0.0	0.0	126.4
29-Aug-16 23:00	3.3	55.7	60.3	7.7	86.9	0.0	0.0	126.4
30-Aug-16 0:00	2.0	188.8	33.1	6.5	99.2	0.0	0.0	126.5
30-Aug-16 1:00	1.0	178.1	49.2	6.5	98.9	0.0	0.0	126.7
30-Aug-16 2:00	1.3	350.1	43.3	6.8	93.8	0.0	0.0	126.8
30-Aug-16 3:00	1.0	54.2	19.1	6.9	92.3	0.0	0.0	126.8
30-Aug-16 4:00	1.9	66.6	33.1	6.7	92.7	0.0	0.0	126.9
30-Aug-16 5:00	1.3	174.9	34.7	6.2	99.0	0.0	0.0	126.9
30-Aug-16 6:00	1.1	176.3	36.9	6.5	94.6	1.1	0.0	126.8
30-Aug-16 7:00	1.8	110.1	40.4	6.3	95.6	15.8	0.0	126.9
30-Aug-16 8:00	1.9	193.2	48.8	6.3	99.3	103.4	0.0	127.0
30-Aug-16 9:00	1.2	212.9	29.2	6.8	99.2	125.7	0.0	126.8
30-Aug-16 10:00	1.0	256.6	57.6	7.1	97.4	164.9	0.0	126.9
30-Aug-16 11:00	0.9	347.4	60.7	7.9	96.0	248.0	0.0	127.1
30-Aug-16 12:00	2.2	196.3	45.0	8.3	95.9	306.7	0.0	126.9
30-Aug-16 13:00	3.8	34.3	22.7	9.8	84.2	485.7	0.0	126.8
30-Aug-16 14:00	2.6	48.2	60.7	9.5	90.3	321.5	0.0	126.7
30-Aug-16 15:00	2.9	316.8	32.1	9.4	91.4	301.5	0.0	126.7
30-Aug-16 16:00	3.4	44.0	53.3	9.5	87.0	154.8	0.0	127.1
30-Aug-16 17:00	4.3	59.2	36.1	8.8	88.7	117.0	0.0	127.3
30-Aug-16 18:00	7.4	46.8	5.8	8.9	84.7	73.4	0.0	127.2
30-Aug-16 19:00	6.6	40.2	5.1	8.7	87.1	26.5	0.0	127.2

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
30-Aug-16 20:00	6.4	39.7	4.9	8.2	90.2	3.5	0.0	127.4
30-Aug-16 21:00	6.6	37.5	3.9	8.2	88.6	0.0	0.0	127.4
30-Aug-16 22:00	5.5	36.4	8.9	8.3	85.6	0.0	0.0	127.4
30-Aug-16 23:00	5.8	47.2	7.6	8.4	83.5	0.0	0.0	127.4
31-Aug-16 0:00	4.3	69.0	54.3	7.7	89.9	0.0	0.0	127.5
31-Aug-16 1:00	4.4	55.9	36.7	8.0	86.4	0.0	0.0	127.4
31-Aug-16 2:00	4.4	49.5	52.0	7.9	87.3	0.0	0.0	127.5
31-Aug-16 3:00	2.2	76.5	31.4	7.0	97.2	0.0	0.0	127.8
31-Aug-16 4:00	1.7	199.9	45.3	6.9	98.8	0.0	0.0	127.9
31-Aug-16 5:00	1.5	279.4	32.4	6.7	98.6	0.0	0.0	128.0
31-Aug-16 6:00	0.6	299.8	68.2	6.6	98.5	0.2	0.0	128.4
31-Aug-16 7:00	2.4	37.7	8.6	6.5	98.7	16.2	0.0	129.7
31-Aug-16 8:00	2.0	29.0	9.6	6.7	98.4	71.8	0.0	130.2
31-Aug-16 9:00	2.8	20.5	12.7	7.0	97.8	175.1	0.0	130.3
31-Aug-16 10:00	4.9	22.3	7.3	7.4	96.5	311.3	0.0	130.5
31-Aug-16 11:00	3.7	357.5	20.0	7.9	94.9	390.3	0.0	130.3
31-Aug-16 12:00	3.3	15.3	13.0	8.1	94.1	445.4	0.0	130.3
31-Aug-16 13:00	3.1	18.7	13.1	8.5	93.5	452.6	0.0	130.1
31-Aug-16 14:00	3.5	23.0	9.1	8.4	94.8	294.2	0.0	130.1
31-Aug-16 15:00	3.1	19.4	11.8	8.6	94.4	271.0	0.0	130.1
31-Aug-16 16:00	2.1	12.7	19.8	8.6	96.5	219.7	0.0	130.1
31-Aug-16 17:00	2.8	7.4	13.1	8.5	94.3	156.9	0.0	130.1
31-Aug-16 18:00	2.8	359.9	8.0	8.3	94.6	104.4	0.0	130.1
31-Aug-16 19:00	2.5	8.0	8.9	8.4	92.2	114.7	0.0	130.1
31-Aug-16 20:00	2.7	13.8	7.3	7.8	98.1	11.7	0.0	130.1
31-Aug-16 21:00	0.9	185.2	46.3	7.5	99.3	0.0	0.0	130.1
31-Aug-16 22:00	0.2	195.4	23.2	7.4	99.3	0.0	0.0	130.1
31-Aug-16 23:00	0.5	248.9	24.6	7.4	99.2	0.0	0.0	130.1
01-Sep-16 0:00	1.6	23.9	19.2	7.2	99.2	0.0	0.0	130.1
01-Sep-16 1:00	2.3	5.4	11.2	6.8	99.2	0.0	0.0	130.1
01-Sep-16 2:00	2.0	5.0	12.8	6.7	99.0	0.0	0.0	130.1
01-Sep-16 3:00	1.7	6.6	12.9	6.8	99.2	0.0	0.0	130.1
01-Sep-16 4:00	2.0	3.0	9.6	6.7	99.3	0.0	0.0	130.1
01-Sep-16 5:00	3.2	11.1	5.5	6.8	98.4	0.0	0.0	130.1
01-Sep-16 6:00	4.1	16.4	4.8	7.0	95.0	0.5	0.0	130.2
01-Sep-16 7:00	2.8	4.5	10.1	6.6	98.9	17.2	0.0	130.2
01-Sep-16 8:00	3.7	5.9	9.6	7.1	93.2	54.2	0.0	130.2
01-Sep-16 9:00	3.5	14.6	6.3	7.2	93.0	145.7	0.0	130.2
01-Sep-16 10:00	2.5	346.8	18.2	8.0	89.1	291.2	0.0	130.2
01-Sep-16 11:00	2.7	358.8	19.8	7.6	92.3	146.4	0.0	130.2
01-Sep-16 12:00	2.5	334.3	27.3	8.3	88.1	349.0	0.0	130.2
01-Sep-16 13:00	1.9	316.0	31.2	8.7	89.7	339.9	0.0	130.1
01-Sep-16 14:00	1.7	307.2	26.2	8.6	91.0	290.0	0.0	130.1
01-Sep-16 15:00	1.9	295.3	19.1	8.4	95.3	222.3	0.0	130.1
01-Sep-16 16:00	1.5	316.4	24.9	8.0	92.9	102.3	0.0	130.1
01-Sep-16 17:00	1.8	28.8	22.8	7.9	91.0	74.3	0.0	130.1
01-Sep-16 18:00	2.4	14.7	12.2	8.0	91.0	56.9	0.0	130.2
01-Sep-16 19:00	2.0	2.7	17.1	7.6	91.1	16.3	0.0	130.2
01-Sep-16 20:00	1.9	26.9	21.6	7.4	87.2	1.6	0.0	130.2
01-Sep-16 21:00	1.1	24.5	11.9	7.7	84.7	0.0	0.0	130.2
01-Sep-16 22:00	0.9	256.4	28.9	7.7	87.4	0.0	0.0	130.2
01-Sep-16 23:00	0.7	194.5	24.9	7.7	88.8	0.0	0.0	130.3
02-Sep-16 0:00	0.9	221.4	12.2	7.5	90.0	0.0	0.0	130.2

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
02-Sep-16 1:00	0.6	70.4	19.1	7.3	90.6	0.0	0.0	130.2
02-Sep-16 2:00	2.0	16.1	8.3	6.7	91.4	0.0	0.0	130.2
02-Sep-16 3:00	0.8	26.3	16.5	6.6	92.0	0.0	0.0	130.2
02-Sep-16 4:00	0.7	217.9	28.0	6.7	95.2	0.0	0.0	130.2
02-Sep-16 5:00	0.6	123.2	35.7	6.6	96.5	0.0	0.0	130.2
02-Sep-16 6:00	1.5	33.9	26.9	6.0	97.7	0.6	0.0	130.2
02-Sep-16 7:00	0.7	102.1	30.7	6.1	98.4	15.1	0.0	130.3
02-Sep-16 8:00	1.0	49.1	14.5	6.5	96.9	49.2	0.0	130.4
02-Sep-16 9:00	1.4	24.7	8.6	6.5	96.4	108.6	0.0	130.4
02-Sep-16 10:00	1.5	26.7	12.6	6.7	96.3	187.1	0.0	130.3
02-Sep-16 11:00	1.8	22.7	11.1	6.9	96.2	250.4	0.0	130.3
02-Sep-16 12:00	1.3	343.2	32.8	7.7	92.0	240.6	0.0	130.3
02-Sep-16 13:00	1.2	242.2	24.3	7.7	93.6	228.9	0.0	130.3
02-Sep-16 14:00	1.0	296.0	34.0	8.1	91.1	264.8	0.0	130.3
02-Sep-16 15:00	1.7	315.2	25.5	8.6	88.0	262.5	0.0	130.3
02-Sep-16 16:00	2.8	347.9	12.6	8.0	89.6	162.9	0.0	130.2
02-Sep-16 17:00	2.0	23.2	21.9	8.1	86.7	104.8	0.0	130.2
02-Sep-16 18:00	2.7	17.5	13.4	7.8	88.7	67.7	0.0	130.2
02-Sep-16 19:00	2.6	20.1	13.1	7.3	92.9	30.6	0.0	130.2
02-Sep-16 20:00	2.5	20.6	11.6	6.9	95.3	9.7	0.0	130.3
02-Sep-16 21:00	2.8	8.4	8.5	6.6	96.5	0.0	0.0	130.4
02-Sep-16 22:00	3.4	4.8	5.8	6.4	97.1	0.0	0.0	130.5
02-Sep-16 23:00	4.4	6.7	5.6	6.3	97.0	0.0	0.0	130.6
03-Sep-16 0:00	4.4	8.9	6.7	6.0	98.2	0.0	0.0	130.6
03-Sep-16 1:00	4.3	14.3	7.8	6.0	99.0	0.0	0.0	130.6
03-Sep-16 2:00	5.0	26.4	5.1	6.5	92.8	0.0	0.0	130.6
03-Sep-16 3:00	5.0	14.4	9.3	6.5	91.6	0.0	0.0	130.6
03-Sep-16 4:00	5.4	32.0	4.1	6.8	84.8	0.0	0.0	130.5
03-Sep-16 5:00	5.5	34.6	4.6	6.8	83.8	0.0	0.0	130.6
03-Sep-16 6:00	6.3	30.8	4.0	6.8	81.5	1.3	0.0	130.6
03-Sep-16 7:00	6.9	37.4	4.8	6.6	80.3	22.6	0.0	130.5
03-Sep-16 8:00	7.7	44.1	6.2	7.0	76.2	63.2	0.0	130.6
03-Sep-16 9:00	7.7	35.3	6.5	7.4	74.8	245.1	0.0	130.7
03-Sep-16 10:00	7.1	39.3	6.5	7.9	75.6	480.7	0.0	130.8
03-Sep-16 11:00	7.5	40.7	7.0	8.6	71.4	622.5	0.0	130.8
03-Sep-16 12:00	6.8	38.5	6.6	8.8	66.9	553.5	0.0	130.5
03-Sep-16 13:00	5.9	32.8	6.9	8.8	65.6	236.3	0.0	130.6
03-Sep-16 14:00	2.3	17.9	53.0	10.0	62.8	404.4	0.0	130.5
03-Sep-16 15:00	4.6	11.3	10.2	9.4	63.9	242.3	0.0	130.5
03-Sep-16 16:00	3.3	5.2	13.9	9.5	66.2	271.5	0.0	130.5
03-Sep-16 17:00	2.9	16.2	13.4	9.5	64.3	178.0	0.0	130.5
03-Sep-16 18:00	1.4	349.5	17.2	9.4	67.2	104.2	0.0	130.4
03-Sep-16 19:00	0.8	43.1	26.1	9.2	70.1	28.7	0.0	130.4
03-Sep-16 20:00	0.5	33.2	16.9	8.9	70.3	2.9	0.0	130.4
03-Sep-16 21:00	0.6	97.1	14.5	9.0	66.3	0.0	0.0	130.4
03-Sep-16 22:00	0.2	303.1	15.8	9.0	61.8	0.0	0.0	130.4
03-Sep-16 23:00	1.2	208.4	8.0	8.7	70.4	0.0	0.0	130.4
04-Sep-16 0:00	1.4	173.5	17.2	8.5	71.9	0.0	0.0	130.5
04-Sep-16 1:00	1.1	194.9	11.4	8.4	72.8	0.0	0.0	130.5
04-Sep-16 2:00	1.4	199.3	5.1	8.5	71.4	0.0	0.0	130.5
04-Sep-16 3:00	2.2	187.4	7.5	8.3	73.0	0.0	0.0	130.5
04-Sep-16 4:00	1.7	204.0	9.3	7.8	75.6	0.0	0.0	130.4
04-Sep-16 5:00	1.9	187.3	9.9	7.7	78.4	0.0	0.0	130.4



Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
04-Sep-16 6:00	1.8	189.4	8.1	7.4	82.3	0.9	0.0	130.4
04-Sep-16 7:00	1.9	215.8	7.6	7.1	85.9	19.4	0.0	130.4
04-Sep-16 8:00	2.2	195.0	10.7	6.8	88.4	39.6	0.0	130.7
04-Sep-16 9:00	2.1	207.6	12.3	7.1	85.8	66.5	0.0	130.9
04-Sep-16 10:00	2.2	190.1	9.0	7.0	87.5	92.5	0.0	130.8
04-Sep-16 11:00	3.1	136.2	15.4	7.7	78.6	167.1	0.0	131.0
04-Sep-16 12:00	2.3	205.8	26.9	8.6	80.2	549.4	0.0	131.3
04-Sep-16 13:00	2.9	279.2	23.8	8.6	84.5	533.7	0.0	131.3
04-Sep-16 14:00	2.6	181.8	38.0	8.1	82.9	274.4	0.0	131.7
04-Sep-16 15:00	4.1	211.2	10.9	8.7	85.4	497.3	0.0	131.6
04-Sep-16 16:00	3.5	201.8	10.6	8.3	84.0	209.5	0.0	131.6
04-Sep-16 17:00	3.5	222.8	11.9	8.8	85.8	355.0	0.0	131.5
04-Sep-16 18:00	3.6	227.3	11.0	9.2	81.3	269.9	0.0	131.6
04-Sep-16 19:00	2.2	212.7	7.8	8.1	83.8	44.9	0.0	131.5
04-Sep-16 20:00	2.3	210.3	8.7	7.6	84.8	7.2	0.0	131.6
04-Sep-16 21:00	2.0	213.6	6.8	7.5	84.3	0.0	0.0	131.6
04-Sep-16 22:00	2.5	198.6	8.3	7.3	84.9	0.0	0.0	131.6
04-Sep-16 23:00	2.1	209.8	7.5	6.9	85.4	0.0	0.0	131.6
05-Sep-16 0:00	2.4	186.0	8.3	7.0	83.3	0.0	0.0	131.6
05-Sep-16 1:00	2.0	200.0	8.1	6.8	83.7	0.0	0.0	131.6
05-Sep-16 2:00	2.0	183.0	7.0	6.7	86.5	0.0	0.0	131.6
05-Sep-16 3:00	1.8	177.5	8.6	6.7	83.6	0.0	0.0	131.6
05-Sep-16 4:00	1.6	189.7	5.3	6.4	82.9	0.0	0.0	131.6
05-Sep-16 5:00	2.1	187.4	10.3	6.2	86.0	0.0	0.0	131.6
05-Sep-16 6:00	0.8	152.8	21.2	6.4	85.1	1.1	0.0	131.6
05-Sep-16 7:00	2.6	182.0	8.2	6.3	85.0	30.5	0.0	131.6
05-Sep-16 8:00	3.1	185.4	9.4	6.4	85.3	92.0	0.0	131.6
05-Sep-16 9:00	3.2	171.8	14.3	7.4	80.4	276.6	0.0	131.5
05-Sep-16 10:00	2.4	193.7	21.6	7.3	81.2	286.9	0.0	131.6
05-Sep-16 11:00	2.6	210.5	21.7	7.6	81.0	453.1	0.0	131.6
05-Sep-16 12:00	3.0	221.4	15.5	7.7	80.5	358.2	0.0	131.5
05-Sep-16 13:00	3.1	218.4	19.0	7.5	82.1	209.8	0.0	131.5
05-Sep-16 14:00	3.0	223.1	20.8	7.8	81.6	260.4	0.0	131.5
05-Sep-16 15:00	3.6	218.9	10.3	7.8	83.2	236.7	0.0	131.5
05-Sep-16 16:00	3.2	222.2	9.3	7.7	82.8	188.1	0.0	131.5
05-Sep-16 17:00	2.7	220.3	10.4	7.1	90.9	95.2	0.0	131.6
05-Sep-16 18:00	3.2	223.4	7.6	6.6	95.2	68.4	0.0	131.5
05-Sep-16 19:00	3.1	218.0	11.0	6.1	99.0	25.9	0.0	131.9
05-Sep-16 20:00	2.6	201.1	9.0	6.0	99.3	4.0	0.0	132.6
05-Sep-16 21:00	2.6	194.8	8.4	5.9	99.3	0.0	0.0	132.6
05-Sep-16 22:00	2.9	204.7	8.0	5.8	99.3	0.0	0.0	132.6
05-Sep-16 23:00	3.6	211.3	7.1	5.8	99.3	0.0	0.0	132.6
06-Sep-16 0:00	4.0	196.3	7.6	5.9	98.0	0.0	0.0	132.6
06-Sep-16 1:00	3.4	205.8	7.1	5.9	98.8	0.0	0.0	132.8
06-Sep-16 2:00	3.1	207.9	7.4	5.9	99.3	0.0	0.0	132.8
06-Sep-16 3:00	3.3	198.7	7.2	6.1	99.0	0.0	0.0	133.0
06-Sep-16 4:00	3.2	206.0	9.2	6.1	99.3	0.0	0.0	133.2
06-Sep-16 5:00	3.3	211.8	11.1	6.1	99.3	0.0	0.0	133.3
06-Sep-16 6:00	3.3	201.3	16.7	5.9	99.3	0.1	0.0	133.3
06-Sep-16 7:00	3.7	209.6	6.8	6.1	99.3	17.9	0.0	133.5
06-Sep-16 8:00	3.4	208.6	10.0	6.1	99.3	48.1	0.0	133.6
06-Sep-16 9:00	3.6	212.8	9.7	6.2	99.3	77.0	0.0	134.0
06-Sep-16 10:00	4.4	203.3	11.7	6.4	99.0	192.0	0.0	134.3

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
06-Sep-16 11:00	4.7	207.7	19.5	6.8	98.1	220.9	0.0	134.2
06-Sep-16 12:00	4.5	199.1	14.6	6.7	98.8	219.5	0.0	134.5
06-Sep-16 13:00	4.1	218.4	12.5	6.8	98.6	146.0	0.0	134.6
06-Sep-16 14:00	5.5	225.6	11.4	7.0	99.3	82.4	0.0	136.1
06-Sep-16 15:00	5.2	191.2	12.8	6.9	98.1	173.1	0.0	136.4
06-Sep-16 16:00	5.4	211.0	9.5	7.0	98.4	92.8	0.0	136.7
06-Sep-16 17:00	4.4	207.2	11.4	6.7	99.0	67.9	0.0	137.2
06-Sep-16 18:00	4.9	202.1	14.4	6.8	97.7	89.1	0.0	137.2
06-Sep-16 19:00	4.4	212.8	11.9	6.7	98.6	17.1	0.0	137.4
06-Sep-16 20:00	3.6	201.7	11.6	6.3	99.0	1.5	0.0	137.6
06-Sep-16 21:00	3.5	187.3	11.3	6.1	98.9	0.0	0.0	137.8
06-Sep-16 22:00	4.5	200.0	13.2	6.0	98.7	0.0	0.0	138.5
06-Sep-16 23:00	4.6	187.9	11.7	5.8	96.4	0.0	0.0	139.5
07-Sep-16 0:00	3.0	200.9	10.6	5.6	99.1	0.0	0.0	140.8
07-Sep-16 1:00	3.8	193.2	10.2	5.7	98.8	0.0	0.0	141.1
07-Sep-16 2:00	3.2	210.6	9.9	5.5	99.2	0.0	0.0	141.3
07-Sep-16 3:00	4.1	194.6	12.9	5.5	99.3	0.0	0.0	141.4
07-Sep-16 4:00	2.8	213.3	17.5	5.5	99.3	0.0	0.0	141.5
07-Sep-16 5:00	3.3	212.3	13.5	5.4	98.8	0.0	0.0	141.6
07-Sep-16 6:00	3.3	177.2	13.4	5.6	96.7	0.2	0.0	141.6
07-Sep-16 7:00	1.7	134.0	19.8	5.6	94.6	8.6	0.0	141.6
07-Sep-16 8:00	1.3	124.6	20.4	5.8	93.3	20.2	0.0	142.8
07-Sep-16 9:00	0.8	41.2	27.7	5.8	95.1	32.9	0.0	143.9
07-Sep-16 10:00	0.6	301.6	20.3	5.7	96.2	49.2	0.0	145.4
07-Sep-16 11:00	1.8	264.3	23.2	5.3	97.0	63.5	0.0	147.0
07-Sep-16 12:00	1.2	227.7	27.3	5.1	95.3	121.8	0.0	148.2
07-Sep-16 13:00	1.2	249.4	24.5	5.1	95.2	122.9	0.0	149.1
07-Sep-16 14:00	1.4	229.3	20.1	5.2	93.0	173.8	0.0	150.0
07-Sep-16 15:00	1.0	288.3	23.4	5.6	90.5	220.4	0.0	150.4
07-Sep-16 16:00	0.8	302.7	25.0	5.7	91.4	205.7	0.0	150.6
07-Sep-16 17:00	1.2	273.0	23.0	5.5	95.9	115.9	0.0	151.0
07-Sep-16 18:00	3.2	199.5	11.5	4.9	99.2	56.9	0.0	151.4
07-Sep-16 19:00	3.0	225.4	6.8	4.9	99.3	20.4	0.0	152.0
07-Sep-16 20:00	3.0	205.0	12.2	4.8	99.3	1.2	0.0	152.6
07-Sep-16 21:00	3.0	223.9	5.7	4.7	99.3	0.0	0.0	153.6
07-Sep-16 22:00	3.4	208.1	7.4	4.7	99.2	0.0	0.0	154.8
07-Sep-16 23:00	3.4	193.2	8.4	4.7	97.8	0.0	0.0	156.0
08-Sep-16 0:00	3.1	195.6	8.9	4.8	97.4	0.0	0.0	156.8
08-Sep-16 1:00	3.0	199.5	10.9	5.0	95.0	0.0	0.0	156.9
08-Sep-16 2:00	2.7	219.6	11.7	5.0	96.1	0.0	0.0	157.0
08-Sep-16 3:00	2.4	222.3	12.3	5.0	97.7	0.0	0.0	156.9
08-Sep-16 4:00	3.0	205.7	10.5	5.0	98.2	0.0	0.0	157.0
08-Sep-16 5:00	2.9	203.3	15.1	5.1	98.4	0.0	0.0	157.0
08-Sep-16 6:00	2.8	222.6	11.4	5.0	99.3	0.1	0.0	157.0
08-Sep-16 7:00	2.8	217.4	12.9	5.0	99.3	5.7	0.0	157.0
08-Sep-16 8:00	2.2	223.9	14.5	5.1	99.1	31.5	0.0	157.0
08-Sep-16 9:00	3.0	215.6	11.2	5.1	99.1	58.6	0.0	157.0
08-Sep-16 10:00	3.3	203.4	10.1	5.4	97.4	98.9	0.0	157.0
08-Sep-16 11:00	3.6	216.7	9.0	5.2	99.3	110.2	0.0	157.0
08-Sep-16 12:00	3.8	223.9	8.1	5.5	99.3	135.9	0.0	157.0
08-Sep-16 13:00	3.5	219.9	13.2	5.8	98.3	200.2	0.0	157.0
08-Sep-16 14:00	3.5	220.9	9.7	5.9	98.3	152.4	0.0	156.9
08-Sep-16 15:00	3.3	218.5	8.3	6.2	96.0	197.0	0.0	156.9

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
08-Sep-16 16:00	4.1	211.4	9.3	6.2	98.4	134.4	0.0	156.9
08-Sep-16 17:00	3.7	205.0	11.3	5.9	99.3	82.2	0.0	157.0
08-Sep-16 18:00	4.0	208.5	7.7	5.8	98.0	56.4	0.0	157.0
08-Sep-16 19:00	3.6	209.7	9.7	5.7	97.7	9.2	0.0	157.1
08-Sep-16 20:00	3.3	208.1	10.2	5.6	98.8	0.5	0.0	157.1
08-Sep-16 21:00	3.2	209.7	10.5	5.6	98.9	0.0	0.0	157.1
08-Sep-16 22:00	4.2	203.1	15.5	5.5	97.8	0.0	0.0	157.3
08-Sep-16 23:00	6.5	184.7	8.4	5.5	94.7	0.0	0.0	158.0
09-Sep-16 0:00	5.7	184.6	9.7	5.3	90.9	0.0	0.0	159.0
09-Sep-16 1:00	5.1	176.4	11.9	4.6	96.5	0.0	0.0	160.1
09-Sep-16 2:00	3.5	159.3	29.1	4.5	93.7	0.0	0.0	161.9
09-Sep-16 3:00	2.9	191.6	34.0	4.2	93.6	0.0	0.0	163.0
09-Sep-16 4:00	2.3	239.9	40.4	3.8	94.8	0.0	0.0	163.8
09-Sep-16 5:00	2.2	238.3	32.8	3.8	96.8	0.0	0.0	164.8
09-Sep-16 6:00	2.2	205.9	43.0	4.0	99.0	0.0	0.0	166.0
09-Sep-16 7:00	1.6	298.2	55.8	4.4	99.0	2.5	0.0	169.1
09-Sep-16 8:00	2.6	253.1	32.9	5.0	99.3	20.0	0.0	172.9
09-Sep-16 9:00	4.1	222.2	22.6	5.4	99.3	72.8	0.0	173.8
09-Sep-16 10:00	5.5	224.7	13.3	6.2	99.3	47.2	0.0	174.9
09-Sep-16 11:00	4.0	220.2	21.2	6.9	99.3	140.2	0.0	175.0
09-Sep-16 12:00	6.7	195.3	21.3	7.7	98.6	118.2	0.0	177.0
09-Sep-16 13:00	5.1	221.8	13.1	8.1	99.2	173.2	0.0	177.4
09-Sep-16 14:00	9.5	193.4	15.6	9.1	94.1	154.2	0.0	178.1
09-Sep-16 15:00	11.7	189.1	11.1	9.2	90.8	105.6	0.0	178.4
09-Sep-16 16:00	10.2	215.8	10.6	8.7	98.8	79.4	0.0	179.7
09-Sep-16 17:00	13.7	225.7	8.6	8.8	98.7	139.3	0.0	180.3
09-Sep-16 18:00	13.6	221.4	11.0	8.0	89.7	116.1	0.0	180.0
09-Sep-16 19:00	8.6	215.3	13.6	6.5	96.8	17.7	0.0	180.4
09-Sep-16 20:00	8.8	215.5	13.1	6.1	96.6	0.7	0.0	180.7
09-Sep-16 21:00	8.3	216.3	14.3	5.5	98.7	0.0	0.0	182.7
09-Sep-16 22:00	8.0	207.0	13.4	4.9	98.3	0.0	0.0	184.5
09-Sep-16 23:00	8.2	210.3	12.6	4.1	98.3	0.0	0.0	185.3
10-Sep-16 0:00	8.5	210.2	13.6	3.9	93.1	0.0	0.0	185.8
10-Sep-16 1:00	8.0	209.4	14.5	3.9	92.9	0.0	0.0	185.9
10-Sep-16 2:00	7.9	208.3	13.3	4.2	85.9	0.0	0.0	185.8
10-Sep-16 3:00	5.3	203.6	13.1	3.9	85.4	0.0	0.0	185.7
10-Sep-16 4:00	5.4	216.0	12.5	3.1	99.2	0.0	0.0	186.5
10-Sep-16 5:00	4.4	185.4	13.5	3.3	91.3	0.0	0.0	186.5
10-Sep-16 6:00	4.4	196.8	13.2	3.0	94.4	0.0	0.0	187.5
10-Sep-16 7:00	3.9	221.9	8.7	2.5	99.3	5.9	0.0	188.6
10-Sep-16 8:00	4.7	207.7	11.2	2.4	99.3	36.2	0.0	188.7
10-Sep-16 9:00	4.1	210.1	11.8	2.4	99.3	93.9	0.0	189.0
10-Sep-16 10:00	2.8	222.6	8.3	2.6	99.3	166.9	0.0	189.2
10-Sep-16 11:00	2.6	226.8	12.9	3.1	98.9	288.6	0.0	189.6
10-Sep-16 12:00	2.2	226.0	16.5	4.0	97.3	404.3	0.0	189.7
10-Sep-16 13:00	2.2	228.5	24.0	4.6	97.9	362.1	0.0	189.5
10-Sep-16 14:00	2.6	229.9	18.5	5.3	94.4	494.0	0.0	189.5
10-Sep-16 15:00	2.0	250.8	32.6	5.9	91.3	405.0	0.0	189.5
10-Sep-16 16:00	2.4	280.0	18.5	6.8	84.4	518.7	0.0	189.4
10-Sep-16 17:00	1.6	259.4	27.1	6.5	84.5	246.9	0.0	189.3
10-Sep-16 18:00	1.6	234.0	38.5	6.4	84.7	187.0	0.0	189.3
10-Sep-16 19:00	1.4	203.1	12.2	5.6	88.7	46.4	0.0	189.3
10-Sep-16 20:00	2.6	202.4	7.8	5.2	88.4	2.3	0.0	189.3

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
10-Sep-16 21:00	2.0	202.1	14.9	5.0	93.3	0.0	0.0	189.3
10-Sep-16 22:00	1.6	197.8	15.8	4.9	91.3	0.0	0.0	189.3
10-Sep-16 23:00	1.4	50.3	39.6	4.8	91.4	0.0	0.0	189.3
11-Sep-16 0:00	2.4	28.6	5.2	4.7	92.8	0.0	0.0	189.3
11-Sep-16 1:00	2.1	30.2	8.2	4.5	92.3	0.0	0.0	189.3
11-Sep-16 2:00	3.7	359.8	7.4	4.1	97.8	0.0	0.0	189.4
11-Sep-16 3:00	3.9	356.7	13.1	3.9	98.5	0.0	0.0	189.4
11-Sep-16 4:00	3.8	353.5	9.2	3.7	99.0	0.0	0.0	189.4
11-Sep-16 5:00	2.9	3.6	10.9	3.4	99.3	0.0	0.0	189.4
11-Sep-16 6:00	3.9	348.2	10.3	3.3	99.3	0.3	0.0	189.4
11-Sep-16 7:00	3.3	344.0	17.0	3.5	99.2	9.2	0.0	189.4
11-Sep-16 8:00	1.9	333.3	30.3	3.5	98.8	64.6	0.0	189.6
11-Sep-16 9:00	2.1	7.0	46.2	4.9	93.3	325.7	0.0	189.7
11-Sep-16 10:00	1.7	275.6	62.3	5.8	90.2	438.0	0.0	189.7
11-Sep-16 11:00	1.6	306.2	68.0	7.2	84.0	563.9	0.0	189.6
11-Sep-16 12:00	1.7	228.5	20.7	7.2	84.0	617.6	0.0	189.5
11-Sep-16 13:00	1.8	227.0	21.4	8.4	80.0	621.6	0.0	189.3
11-Sep-16 14:00	2.1	221.7	19.9	8.9	78.2	614.2	0.0	189.2
11-Sep-16 15:00	2.5	237.7	18.0	9.7	68.4	591.6	0.0	189.1
11-Sep-16 16:00	2.8	250.3	19.0	9.9	70.2	466.5	0.0	189.1
11-Sep-16 17:00	2.4	274.8	19.9	10.0	63.4	353.4	0.0	189.1
11-Sep-16 18:00	2.1	295.4	30.0	9.7	64.2	194.4	0.0	189.1
11-Sep-16 19:00	1.6	242.3	26.0	9.0	70.5	65.6	0.0	189.1
11-Sep-16 20:00	2.3	198.6	12.1	8.0	76.9	1.8	0.0	189.2
11-Sep-16 21:00	2.4	216.4	13.6	7.2	84.9	0.0	0.0	189.2
11-Sep-16 22:00	3.1	200.6	13.7	6.6	92.9	0.0	0.0	189.2
11-Sep-16 23:00	2.8	190.4	12.2	6.3	94.2	0.0	0.0	189.2
12-Sep-16 0:00	2.8	201.4	14.4	6.0	95.4	0.0	0.0	189.2
12-Sep-16 1:00	2.7	206.1	11.3	5.8	95.3	0.0	0.0	189.2
12-Sep-16 2:00	2.2	229.6	9.9	5.7	93.0	0.0	0.0	189.2
12-Sep-16 3:00	2.2	233.2	12.4	5.7	91.2	0.0	0.0	189.2
12-Sep-16 4:00	1.6	225.7	19.3	5.6	87.7	0.0	0.0	189.2
12-Sep-16 5:00	1.7	232.4	8.7	5.6	85.7	0.0	0.0	189.3
12-Sep-16 6:00	1.7	229.4	22.6	5.5	87.1	0.2	0.0	189.3
12-Sep-16 7:00	1.7	210.2	16.4	5.6	82.4	15.4	0.0	189.3
12-Sep-16 8:00	2.1	218.3	20.8	5.9	79.6	73.3	0.0	189.4
12-Sep-16 9:00	2.8	225.5	8.7	7.0	71.4	276.2	0.0	189.4
12-Sep-16 10:00	2.7	240.2	12.0	7.3	71.3	358.0	0.0	189.2
12-Sep-16 11:00	3.1	237.8	10.1	8.1	64.5	416.7	0.0	189.4
12-Sep-16 12:00	3.4	236.9	11.5	8.8	66.3	390.6	0.0	189.1
12-Sep-16 13:00	3.5	225.2	11.2	9.1	66.5	426.4	0.0	189.2
12-Sep-16 14:00	5.5	221.7	9.9	10.2	66.4	490.3	0.0	189.1
12-Sep-16 15:00	5.0	224.7	8.1	10.2	70.2	338.3	0.0	189.1
12-Sep-16 16:00	5.4	201.4	11.6	10.2	68.5	258.5	0.0	189.1
12-Sep-16 17:00	5.8	207.8	9.6	10.3	69.3	243.7	0.0	189.1
12-Sep-16 18:00	5.2	209.4	10.7	10.0	69.5	132.8	0.0	189.1
12-Sep-16 19:00	4.9	200.7	12.9	9.3	69.4	34.4	0.0	189.1
12-Sep-16 20:00	4.2	192.8	10.1	8.7	72.5	0.7	0.0	189.1
12-Sep-16 21:00	4.2	192.0	8.2	8.3	73.2	0.0	0.0	189.1
12-Sep-16 22:00	4.8	198.0	10.3	8.1	73.3	0.0	0.0	189.1
12-Sep-16 23:00	4.6	209.0	10.0	7.9	73.0	0.0	0.0	189.2
13-Sep-16 0:00	5.3	212.5	8.2	7.9	70.7	0.0	0.0	189.2
13-Sep-16 1:00	5.9	202.7	9.6	7.7	69.6	0.0	0.0	189.2

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
13-Sep-16 2:00	5.2	196.9	11.3	7.3	71.6	0.0	0.0	189.1
13-Sep-16 3:00	4.1	201.7	12.9	6.5	86.3	0.0	0.0	189.2
13-Sep-16 4:00	4.2	212.8	12.1	6.0	94.3	0.0	0.0	189.2
13-Sep-16 5:00	5.2	203.5	11.1	6.1	98.3	0.0	0.0	189.2
13-Sep-16 6:00	7.6	200.7	8.7	6.4	96.6	0.0	0.0	189.2
13-Sep-16 7:00	6.9	208.1	21.7	6.6	99.2	5.3	0.0	189.5
13-Sep-16 8:00	5.5	195.7	22.7	7.0	99.3	11.9	0.0	196.2
13-Sep-16 9:00	6.3	200.0	13.3	7.2	99.3	53.2	0.0	198.3
13-Sep-16 10:00	6.9	195.2	10.1	7.4	99.3	51.8	0.0	201.0
13-Sep-16 11:00	6.9	204.8	9.6	7.4	99.3	48.5	0.0	203.6
13-Sep-16 12:00	6.0	206.1	13.8	7.7	99.3	77.4	0.0	204.5
13-Sep-16 13:00	6.6	197.1	11.3	7.9	99.3	66.5	0.0	207.7
13-Sep-16 14:00	6.4	210.7	10.4	8.0	99.3	78.6	0.0	209.2
13-Sep-16 15:00	5.8	208.7	10.4	8.2	99.3	99.2	0.0	211.2
13-Sep-16 16:00	5.2	209.0	10.6	8.5	99.3	137.4	0.0	211.5
13-Sep-16 17:00	4.9	212.2	10.4	8.4	99.3	80.1	0.0	211.6
13-Sep-16 18:00	4.6	207.0	10.8	8.5	99.3	47.7	0.0	211.7
13-Sep-16 19:00	4.7	207.5	9.5	8.3	99.3	9.4	0.0	212.9
13-Sep-16 20:00	5.5	209.4	10.4	8.3	99.3	0.2	0.0	215.2
13-Sep-16 21:00	5.7	217.8	6.4	8.4	99.3	0.0	0.0	217.3
13-Sep-16 22:00	4.6	220.2	7.1	8.4	99.3	0.0	0.0	217.9
13-Sep-16 23:00	4.3	210.5	8.7	8.4	99.3	0.0	0.0	218.1
14-Sep-16 0:00	4.1	221.2	9.6	8.3	99.3	0.0	0.0	218.2
14-Sep-16 1:00	3.5	220.4	6.8	8.3	99.3	0.0	0.0	218.2
14-Sep-16 2:00	3.6	208.6	11.1	8.1	99.3	0.0	0.0	218.2
14-Sep-16 3:00	3.7	191.3	10.4	8.0	99.3	0.0	0.0	218.2
14-Sep-16 4:00	3.9	207.3	8.5	7.9	99.3	0.0	0.0	218.2
14-Sep-16 5:00	3.2	208.1	8.6	7.9	99.3	0.0	0.0	218.2
14-Sep-16 6:00	2.6	287.8	17.4	7.7	99.3	0.0	0.0	218.3
14-Sep-16 7:00	2.0	314.6	37.1	7.5	99.3	3.4	0.0	218.8
14-Sep-16 8:00	2.5	215.1	11.7	7.6	99.3	18.9	0.0	218.8
14-Sep-16 9:00	3.2	230.4	11.0	7.5	99.3	39.6	0.0	219.0
14-Sep-16 10:00	3.9	232.2	9.6	7.3	99.3	76.0	0.0	219.1
14-Sep-16 11:00	5.3	238.2	10.9	7.3	99.3	94.0	0.0	219.4
14-Sep-16 12:00	5.5	226.2	13.7	7.0	99.3	106.5	0.0	219.5
14-Sep-16 13:00	5.4	218.5	12.2	6.7	99.3	132.2	0.0	219.5
14-Sep-16 14:00	6.1	224.9	9.0	7.0	99.2	222.8	0.0	219.5
14-Sep-16 15:00	6.0	224.7	8.9	7.0	99.1	206.4	0.0	219.5
14-Sep-16 16:00	4.7	209.8	12.1	6.8	99.1	129.4	0.0	219.5
14-Sep-16 17:00	4.4	211.6	8.8	6.9	97.6	158.9	0.0	219.4
14-Sep-16 18:00	4.4	212.6	10.2	6.9	95.2	46.7	0.0	219.4
14-Sep-16 19:00	4.9	212.7	8.6	6.7	98.7	13.6	0.0	219.4
14-Sep-16 20:00	5.0	207.7	9.0	6.4	99.3	0.1	0.0	220.0
14-Sep-16 21:00	4.3	205.7	10.0	6.3	99.3	0.0	0.0	220.4
14-Sep-16 22:00	4.9	202.1	8.6	6.5	99.3	0.0	0.0	220.5
14-Sep-16 23:00	4.8	198.4	8.0	6.8	99.3	0.0	0.0	220.5
15-Sep-16 0:00	4.9	204.7	10.2	7.0	99.3	0.0	0.0	220.6
15-Sep-16 1:00	5.2	211.8	11.0	7.2	99.3	0.0	0.0	220.7
15-Sep-16 2:00	5.1	209.3	10.2	7.4	99.3	0.0	0.0	220.7
15-Sep-16 3:00	5.6	204.4	11.8	7.6	99.3	0.0	0.0	220.9
15-Sep-16 4:00	5.7	205.2	12.0	7.6	99.3	0.0	0.0	221.4
15-Sep-16 5:00	6.0	209.4	10.7	7.7	99.3	0.0	0.0	223.7
15-Sep-16 6:00	6.0	204.1	10.4	7.7	99.3	0.0	0.0	224.7

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
15-Sep-16 7:00	5.4	201.9	9.4	7.6	99.3	4.1	0.0	225.2
15-Sep-16 8:00	4.9	207.3	11.5	7.7	99.3	31.0	0.0	225.3
15-Sep-16 9:00	4.5	206.8	14.9	7.9	99.3	74.2	0.0	225.3
15-Sep-16 10:00	6.1	195.5	14.3	8.0	98.8	213.4	0.0	225.4
15-Sep-16 11:00	7.3	188.9	11.1	8.7	89.1	317.3	0.0	225.3
15-Sep-16 12:00	8.0	183.9	10.5	9.2	81.7	291.3	0.0	225.2
15-Sep-16 13:00	9.9	178.4	8.9	9.2	76.3	228.6	0.0	225.1
15-Sep-16 14:00	8.8	186.1	9.3	8.0	81.6	147.4	0.0	225.0
15-Sep-16 15:00	7.3	195.6	9.5	6.5	94.8	82.5	0.0	225.4
15-Sep-16 16:00	7.7	181.0	12.7	6.4	91.5	41.0	0.0	226.3
15-Sep-16 17:00	7.0	188.2	10.0	6.1	88.2	36.3	0.0	226.6
15-Sep-16 18:00	5.4	203.2	10.1	5.4	98.0	48.8	0.0	227.0
15-Sep-16 19:00	5.0	217.0	12.7	5.5	99.3	7.1	0.0	227.2
15-Sep-16 20:00	5.8	202.2	10.5	5.7	99.3	0.1	0.0	227.7
15-Sep-16 21:00	7.1	191.6	9.4	5.7	99.3	0.0	0.0	228.5
15-Sep-16 22:00	4.6	215.1	11.1	5.8	99.3	0.0	0.0	229.0
15-Sep-16 23:00	5.4	197.9	13.5	6.0	99.3	0.0	0.0	229.2
16-Sep-16 0:00	4.4	206.4	14.3	6.1	99.3	0.0	0.0	229.4
16-Sep-16 1:00	4.7	206.1	15.0	6.2	99.3	0.0	0.0	229.8
16-Sep-16 2:00	7.0	186.8	9.0	6.4	99.2	0.0	0.0	231.1
16-Sep-16 3:00	6.0	188.3	12.2	6.4	98.3	0.0	0.0	232.5
16-Sep-16 4:00	6.2	193.7	10.0	6.5	98.2	0.0	0.0	232.5
16-Sep-16 5:00	6.5	190.0	11.0	6.6	98.0	0.0	0.0	235.7
16-Sep-16 6:00	6.4	183.9	10.4	7.2	89.6	0.0	0.0	236.5
16-Sep-16 7:00	5.9	198.4	8.9	6.6	96.9	7.0	0.0	236.5
16-Sep-16 8:00	3.9	201.8	11.7	6.7	98.3	47.7	0.0	236.5
16-Sep-16 9:00	3.8	210.1	10.0	7.0	98.9	159.8	0.0	236.6
16-Sep-16 10:00	5.2	213.2	12.1	7.2	99.2	210.9	0.0	236.5
16-Sep-16 11:00	6.0	224.5	11.1	7.0	99.3	107.4	0.0	236.6
16-Sep-16 12:00	4.5	236.5	17.8	6.6	99.2	176.0	0.0	236.7
16-Sep-16 13:00	3.1	230.1	19.4	6.7	98.7	141.8	0.0	236.6
16-Sep-16 14:00	2.8	240.4	20.5	6.8	96.5	151.9	0.0	236.6
16-Sep-16 15:00	2.8	223.3	18.3	7.1	90.9	165.0	0.0	236.6
16-Sep-16 16:00	2.1	231.7	29.0	7.4	86.0	154.7	0.0	236.5
16-Sep-16 17:00	2.2	242.7	30.8	7.9	81.6	244.2	0.0	236.5
16-Sep-16 18:00	2.4	212.0	14.5	7.1	84.7	74.9	0.0	236.5
16-Sep-16 19:00	2.8	205.2	12.4	6.8	84.5	19.1	0.0	236.6
16-Sep-16 20:00	2.6	201.8	10.9	6.5	85.2	0.2	0.0	236.6
16-Sep-16 21:00	3.3	204.7	10.8	6.5	84.2	0.0	0.0	236.6
16-Sep-16 22:00	2.6	209.9	17.9	5.8	91.0	0.0	0.0	236.8
16-Sep-16 23:00	2.5	204.6	13.2	5.0	95.0	0.0	0.0	237.5
17-Sep-16 0:00	3.6	185.0	12.1	4.6	95.3	0.0	0.0	238.0
17-Sep-16 1:00	3.4	197.6	11.6	4.3	98.8	0.0	0.0	238.6
17-Sep-16 2:00	4.6	183.7	9.9	4.3	94.7	0.0	0.0	238.7
17-Sep-16 3:00	4.2	153.4	24.9	4.6	90.7	0.0	0.0	238.8
17-Sep-16 4:00	6.0	180.0	8.2	4.2	95.0	0.0	0.0	239.3
17-Sep-16 5:00	5.8	184.7	9.2	4.2	93.0	0.0	0.0	239.3
17-Sep-16 6:00	4.4	189.0	9.4	3.9	95.0	0.0	0.0	239.5
17-Sep-16 7:00	4.4	194.9	9.9	3.8	95.4	5.6	0.0	239.8
17-Sep-16 8:00	3.4	181.2	9.7	4.1	92.2	27.9	0.0	239.8
17-Sep-16 9:00	1.9	175.4	13.5	4.2	93.8	65.6	0.0	240.0
17-Sep-16 10:00	2.4	203.3	10.2	4.5	94.3	108.1	0.0	240.0
17-Sep-16 11:00	3.0	213.7	9.9	4.7	94.6	203.6	0.0	239.9

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
17-Sep-16 12:00	3.1	202.1	13.5	4.4	98.9	158.7	0.0	240.3
17-Sep-16 13:00	2.8	219.7	19.4	5.3	95.5	308.7	0.0	240.4
17-Sep-16 14:00	2.2	242.0	41.7	5.9	96.1	323.7	0.0	240.3
17-Sep-16 15:00	3.2	248.1	12.7	5.8	93.9	202.4	0.0	240.2
17-Sep-16 16:00	4.4	231.1	9.8	5.2	98.0	99.2	0.0	240.6
17-Sep-16 17:00	2.9	218.7	11.9	5.2	96.4	156.4	0.0	240.8
17-Sep-16 18:00	3.4	233.5	10.4	4.9	97.9	19.2	0.0	240.8
17-Sep-16 19:00	3.2	252.1	15.9	4.6	99.3	2.3	0.0	240.9
17-Sep-16 20:00	2.9	213.8	13.5	4.4	99.3	0.1	0.0	240.9
17-Sep-16 21:00	2.6	216.5	13.9	4.1	99.3	0.0	0.0	240.9
17-Sep-16 22:00	2.5	231.1	10.9	4.2	99.3	0.0	0.0	241.9
17-Sep-16 23:00	3.2	235.7	8.9	4.2	99.3	0.0	0.0	242.3
18-Sep-16 0:00	3.0	229.7	7.0	4.3	99.3	0.0	0.0	243.1
18-Sep-16 1:00	2.3	219.1	9.8	4.2	99.3	0.0	0.0	243.5
18-Sep-16 2:00	2.3	200.4	12.2	4.1	99.3	0.0	0.0	243.5
18-Sep-16 3:00	2.9	203.7	8.2	4.0	99.3	0.0	0.0	243.5
18-Sep-16 4:00	2.7	203.4	7.9	3.9	99.1	0.0	0.0	243.5
18-Sep-16 5:00	2.4	194.6	8.3	3.8	98.3	0.0	0.0	243.5
18-Sep-16 6:00	2.5	201.5	8.7	3.9	98.3	0.0	0.0	243.8
18-Sep-16 7:00	2.0	202.8	10.1	3.8	98.8	3.3	0.0	243.9
18-Sep-16 8:00	2.7	191.7	5.9	4.2	96.2	52.8	0.0	243.9
18-Sep-16 9:00	1.9	212.2	20.5	4.6	93.8	121.8	0.0	243.9
18-Sep-16 10:00	1.9	215.4	15.0	5.2	91.6	237.0	0.0	243.9
18-Sep-16 11:00	2.3	210.1	15.8	5.4	91.6	237.5	0.0	243.8
18-Sep-16 12:00	2.4	216.1	16.9	5.9	88.8	299.7	0.0	243.7
18-Sep-16 13:00	2.5	220.8	14.2	6.9	83.8	549.1	0.0	243.8
18-Sep-16 14:00	2.4	207.4	21.2	6.7	82.4	307.5	0.0	243.6
18-Sep-16 15:00	2.0	235.2	19.3	7.5	78.7	472.0	0.0	243.6
18-Sep-16 16:00	2.5	231.7	18.8	7.5	81.0	374.0	0.0	243.5
18-Sep-16 17:00	2.2	222.4	10.3	7.1	81.3	172.5	0.0	243.5
18-Sep-16 18:00	1.5	271.0	24.7	7.5	79.7	159.7	0.0	243.6
18-Sep-16 19:00	1.2	254.8	12.4	6.5	78.9	19.1	0.0	243.5
18-Sep-16 20:00	1.0	227.4	14.2	6.3	79.6	0.3	0.0	243.5
18-Sep-16 21:00	2.2	204.1	7.7	5.9	86.9	0.0	0.0	243.6
18-Sep-16 22:00	1.5	194.5	13.7	5.5	92.3	0.0	0.0	243.5
18-Sep-16 23:00	1.1	152.4	15.1	5.7	86.9	0.0	0.0	243.5
19-Sep-16 0:00	0.9	210.9	12.0	5.5	88.2	0.0	0.0	243.6
19-Sep-16 1:00	0.8	153.4	9.1	5.4	89.7	0.0	0.0	243.6
19-Sep-16 2:00	1.0	176.5	6.5	5.4	90.8	0.0	0.0	243.6
19-Sep-16 3:00	0.5	138.3	17.8	5.3	90.3	0.0	0.0	243.6
19-Sep-16 4:00	1.6	26.8	14.9	4.9	94.0	0.0	0.0	243.6
19-Sep-16 5:00	1.7	356.4	12.8	4.8	94.6	0.0	0.0	243.6
19-Sep-16 6:00	2.5	25.7	11.4	4.5	97.7	0.0	0.0	243.6
19-Sep-16 7:00	2.8	21.1	4.0	4.7	96.1	3.9	0.0	243.6
19-Sep-16 8:00	2.2	6.6	7.6	5.1	92.4	33.9	0.0	243.7
19-Sep-16 9:00	1.3	25.1	9.5	5.2	94.4	76.6	0.0	243.7
19-Sep-16 10:00	1.4	19.5	11.7	5.5	93.2	120.1	0.0	243.7
19-Sep-16 11:00	0.9	330.2	33.1	6.0	92.3	201.5	0.0	243.7
19-Sep-16 12:00	1.7	310.3	22.5	6.5	93.0	343.2	0.0	243.7
19-Sep-16 13:00	1.2	304.9	35.5	7.2	88.7	477.3	0.0	243.8
19-Sep-16 14:00	1.4	301.8	33.0	7.9	88.0	425.2	0.0	243.6
19-Sep-16 15:00	1.7	269.7	22.9	8.2	82.8	431.7	0.0	243.5
19-Sep-16 16:00	1.6	294.0	31.7	8.6	73.1	412.9	0.0	243.5

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
19-Sep-16 17:00	1.8	294.4	33.1	9.4	64.6	376.5	0.0	243.5
19-Sep-16 18:00	1.6	309.9	30.6	9.0	68.6	188.2	0.0	243.5
19-Sep-16 19:00	2.3	28.2	7.8	7.3	82.6	27.6	0.0	243.5
19-Sep-16 20:00	1.8	46.1	10.5	7.2	77.0	0.2	0.0	243.5
19-Sep-16 21:00	2.0	37.4	9.0	7.0	77.4	0.0	0.0	243.6
19-Sep-16 22:00	2.9	21.7	5.3	6.7	84.5	0.0	0.0	243.6
19-Sep-16 23:00	2.8	21.4	6.5	6.3	87.7	0.0	0.0	243.6
20-Sep-16 0:00	2.4	2.0	11.9	6.0	89.9	0.0	0.0	243.6
20-Sep-16 1:00	1.7	65.6	14.7	5.8	88.8	0.0	0.0	243.6
20-Sep-16 2:00	1.9	45.8	7.8	6.0	86.6	0.0	0.0	243.6
20-Sep-16 3:00	1.7	39.7	8.2	6.1	82.3	0.0	0.0	243.6
20-Sep-16 4:00	1.3	49.1	7.8	6.0	81.3	0.0	0.0	243.6
20-Sep-16 5:00	0.6	29.0	31.7	5.7	85.3	0.0	0.0	243.6
20-Sep-16 6:00	0.6	221.9	19.7	5.6	87.9	0.0	0.0	243.6
20-Sep-16 7:00	0.4	240.0	16.2	5.5	88.4	4.9	0.0	243.7
20-Sep-16 8:00	0.4	294.2	33.4	5.4	91.1	15.3	0.0	243.7
20-Sep-16 9:00	0.5	41.7	51.8	6.8	84.2	251.9	0.0	244.0
20-Sep-16 10:00	1.1	195.9	40.9	7.5	78.9	399.4	0.0	243.9
20-Sep-16 11:00	1.6	221.8	14.5	7.7	74.0	511.4	0.0	243.9
20-Sep-16 12:00	2.3	213.2	12.1	8.5	72.8	589.3	0.0	243.8
20-Sep-16 13:00	2.6	226.1	13.6	9.0	67.9	617.6	0.0	243.7
20-Sep-16 14:00	2.8	237.3	16.7	9.7	69.4	591.1	0.0	243.6
20-Sep-16 15:00	3.0	263.0	20.3	10.1	66.3	515.5	0.0	243.6
20-Sep-16 16:00	3.2	278.3	18.8	10.1	64.0	409.5	0.0	243.5
20-Sep-16 17:00	3.0	261.3	23.9	9.9	64.7	281.2	0.0	243.5
20-Sep-16 18:00	3.1	248.4	14.5	9.3	69.6	119.5	0.0	243.5
20-Sep-16 19:00	3.3	218.4	12.7	8.3	76.0	25.5	0.0	243.5
20-Sep-16 20:00	2.8	210.2	13.8	7.5	80.5	0.1	0.0	243.6
20-Sep-16 21:00	2.5	243.1	10.5	6.9	86.0	0.0	0.0	243.6
20-Sep-16 22:00	2.6	219.7	11.9	6.5	87.5	0.0	0.0	243.6
20-Sep-16 23:00	2.3	205.1	12.6	6.1	88.9	0.0	0.0	243.6
21-Sep-16 0:00	2.6	203.8	10.2	6.0	89.7	0.0	0.0	243.6
21-Sep-16 1:00	2.6	216.9	6.2	5.8	90.1	0.0	0.0	243.6
21-Sep-16 2:00	2.8	213.0	6.3	5.9	86.3	0.0	0.0	243.7
21-Sep-16 3:00	2.5	221.5	5.4	5.7	88.4	0.0	0.0	243.7
21-Sep-16 4:00	2.8	210.0	3.4	5.4	86.8	0.0	0.0	243.7
21-Sep-16 5:00	2.5	217.9	5.1	5.4	84.7	0.0	0.0	243.7
21-Sep-16 6:00	2.4	218.6	4.9	5.2	85.9	0.0	0.0	243.7
21-Sep-16 7:00	2.9	213.0	5.0	5.1	85.2	7.2	0.0	243.7
21-Sep-16 8:00	3.2	207.7	5.6	5.3	78.3	22.9	0.0	243.7
21-Sep-16 9:00	2.5	211.0	8.0	5.9	74.4	240.3	0.0	243.9
21-Sep-16 10:00	2.5	203.1	9.2	7.0	64.7	399.3	0.0	243.8
21-Sep-16 11:00	2.7	218.5	7.0	7.5	58.9	504.4	0.0	243.9
21-Sep-16 12:00	2.9	215.7	10.0	8.6	54.4	589.2	0.0	243.8
21-Sep-16 13:00	3.5	222.7	10.5	9.2	52.1	613.8	0.0	243.7
21-Sep-16 14:00	3.9	224.7	12.8	9.9	53.6	589.1	0.0	243.7
21-Sep-16 15:00	4.6	227.8	11.1	10.4	52.3	524.9	0.0	243.6
21-Sep-16 16:00	4.4	226.5	13.9	10.7	52.9	422.8	0.0	243.5
21-Sep-16 17:00	4.4	232.3	12.6	10.7	54.0	289.2	0.0	243.4
21-Sep-16 18:00	4.8	199.0	13.8	10.1	54.6	138.2	0.0	243.5
21-Sep-16 19:00	5.1	192.4	8.8	8.6	59.4	10.0	0.0	243.5
21-Sep-16 20:00	4.1	195.2	8.8	8.1	62.1	0.0	0.0	243.6
21-Sep-16 21:00	2.6	158.1	15.1	7.5	63.0	0.0	0.0	243.6



Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
21-Sep-16 22:00	1.5	135.1	33.7	7.5	60.4	0.0	0.0	243.6
21-Sep-16 23:00	2.6	128.6	20.9	7.8	57.6	0.0	0.0	243.6
22-Sep-16 0:00	1.9	136.0	27.6	7.3	60.2	0.0	0.0	243.6
22-Sep-16 1:00	1.9	88.3	50.3	7.7	53.3	0.0	0.0	243.6
22-Sep-16 2:00	2.2	135.9	36.5	7.1	52.8	0.0	0.0	243.6
22-Sep-16 3:00	2.2	118.4	43.4	7.2	49.2	0.0	0.0	243.6
22-Sep-16 4:00	1.8	128.9	28.2	7.0	48.4	0.0	0.0	243.6
22-Sep-16 5:00	2.1	129.5	52.2	7.3	43.6	0.0	0.0	243.7
22-Sep-16 6:00	4.2	178.3	24.0	7.8	39.1	0.0	0.0	243.7
22-Sep-16 7:00	2.3	215.7	46.7	7.9	37.6	8.5	0.0	243.6
22-Sep-16 8:00	3.7	192.8	52.3	8.0	36.2	40.9	0.0	243.7
22-Sep-16 9:00	5.3	164.6	28.3	9.3	31.6	264.9	0.0	243.8
22-Sep-16 10:00	7.1	175.7	20.1	9.5	32.0	257.2	0.0	243.8
22-Sep-16 11:00	7.6	188.0	11.6	10.5	28.9	484.3	0.0	243.8
22-Sep-16 12:00	6.2	187.9	16.5	10.4	28.5	199.0	0.0	243.5
22-Sep-16 13:00	6.0	177.3	18.7	10.2	28.8	84.8	0.0	243.5
22-Sep-16 14:00	8.1	184.5	14.3	10.2	28.8	83.5	0.0	243.5
22-Sep-16 15:00	6.8	187.7	19.2	7.1	56.3	60.0	0.0	243.6
22-Sep-16 16:00	8.7	182.2	15.0	4.5	85.7	56.9	0.0	244.3
22-Sep-16 17:00	4.8	158.0	24.3	5.1	81.7	48.0	0.0	244.3
22-Sep-16 18:00	2.0	84.4	41.2	5.0	84.7	15.3	0.0	244.6
22-Sep-16 19:00	1.8	86.0	39.7	4.5	90.3	3.5	0.0	245.4
22-Sep-16 20:00	1.4	47.3	34.0	4.3	91.8	0.0	0.0	246.1
22-Sep-16 21:00	0.6	39.4	40.3	4.3	92.9	0.0	0.0	247.6
22-Sep-16 22:00	1.4	256.1	41.5	4.1	95.1	0.0	0.0	250.3
22-Sep-16 23:00	1.4	335.1	59.1	4.1	92.2	0.0	0.0	253.2
23-Sep-16 0:00	1.6	53.3	41.3	3.6	92.5	0.0	0.0	255.7
23-Sep-16 1:00	1.7	65.1	18.9	3.2	90.4	0.0	0.0	258.6
23-Sep-16 2:00	1.1	67.5	42.7	3.1	90.1	0.0	0.0	261.6
23-Sep-16 3:00	1.9	194.6	23.4	2.8	96.2	0.0	0.0	263.3
23-Sep-16 4:00	3.3	227.5	10.6	2.5	99.3	0.0	0.0	264.7
23-Sep-16 5:00	4.1	204.2	9.6	2.4	99.3	0.0	0.0	264.8
23-Sep-16 6:00	4.5	197.6	9.1	2.2	99.3	0.0	0.0	265.0
23-Sep-16 7:00	3.9	206.1	9.8	2.6	99.2	1.1	0.0	265.1
23-Sep-16 8:00	4.4	192.9	16.6	2.7	98.8	27.1	0.0	266.1
23-Sep-16 9:00	3.9	217.7	11.7	3.0	99.2	67.7	0.0	266.1
23-Sep-16 10:00	3.8	221.5	9.3	3.0	99.3	71.1	0.0	267.2
23-Sep-16 11:00	4.9	225.8	14.6	3.2	99.3	97.9	0.0	268.1
23-Sep-16 12:00	5.5	196.2	12.9	2.9	97.4	144.6	0.0	268.6
23-Sep-16 13:00	3.7	206.5	11.4	3.0	98.5	173.3	0.0	269.0
23-Sep-16 14:00	3.9	202.7	11.5	3.3	98.4	174.7	0.0	269.1
23-Sep-16 15:00	4.9	211.8	10.3	2.6	99.2	36.1	0.0	271.2
23-Sep-16 16:00	5.2	202.1	11.1	2.5	98.5	175.1	0.0	271.5
23-Sep-16 17:00	4.0	218.9	8.6	2.4	98.9	30.1	0.0	272.1
23-Sep-16 18:00	4.1	209.1	11.7	2.5	99.3	18.3	0.0	272.6
23-Sep-16 19:00	4.4	212.1	13.2	2.5	99.3	3.4	0.0	272.9
23-Sep-16 20:00	4.8	197.7	9.3	2.1	99.3	0.0	0.0	273.1
23-Sep-16 21:00	4.9	191.9	8.6	1.9	99.3	0.0	0.0	273.3
23-Sep-16 22:00	4.0	204.6	9.0	1.9	99.3	0.0	0.0	273.3
23-Sep-16 23:00	3.9	208.6	10.3	1.7	99.3	0.0	0.0	273.3
24-Sep-16 0:00	4.0	198.2	9.5	2.0	97.7	0.0	0.0	273.4
24-Sep-16 1:00	4.4	203.5	10.2	2.0	95.8	0.0	0.0	273.4
24-Sep-16 2:00	4.2	194.0	7.5	2.2	93.5	0.0	0.0	273.4

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
24-Sep-16 3:00	4.0	204.9	10.1	2.2	93.4	0.0	0.0	273.4
24-Sep-16 4:00	3.0	197.4	10.0	2.4	92.7	0.0	0.0	273.5
24-Sep-16 5:00	2.6	204.0	15.1	2.1	96.1	0.0	0.0	273.5
24-Sep-16 6:00	3.1	208.6	16.2	2.3	93.2	0.0	0.0	273.6
24-Sep-16 7:00	2.9	207.9	12.6	2.5	92.9	7.7	0.0	273.6
24-Sep-16 8:00	3.3	187.3	19.6	2.6	94.0	38.5	0.0	273.6
24-Sep-16 9:00	4.3	188.3	12.8	2.8	94.5	34.7	0.0	273.5
24-Sep-16 10:00	4.1	198.3	15.7	2.9	94.0	66.9	0.0	273.6
24-Sep-16 11:00	3.9	195.1	12.2	2.8	96.0	61.6	0.0	273.6
24-Sep-16 12:00	4.1	187.5	12.3	2.7	96.9	76.8	0.0	274.1
24-Sep-16 13:00	5.1	178.4	9.4	2.4	97.3	100.4	0.0	274.7
24-Sep-16 14:00	2.3	228.7	61.1	3.3	92.6	203.5	0.0	274.8
24-Sep-16 15:00	1.9	205.9	42.1	3.4	93.5	105.0	0.0	275.1
24-Sep-16 16:00	2.3	161.6	48.2	3.4	94.0	66.0	0.0	275.6
24-Sep-16 17:00	2.5	202.6	50.0	3.3	95.4	34.2	0.0	276.7
24-Sep-16 18:00	4.3	180.4	13.5	2.8	99.2	15.8	0.0	277.5
24-Sep-16 19:00	4.0	164.2	13.9	2.8	97.7	2.5	0.0	277.9
24-Sep-16 20:00	3.7	153.9	27.6	3.1	93.6	0.0	0.0	278.4
24-Sep-16 21:00	3.5	192.2	11.5	2.4	98.9	0.0	0.0	279.4
24-Sep-16 22:00	2.3	179.3	14.2	2.3	98.7	0.0	0.0	279.8
24-Sep-16 23:00	1.2	90.6	54.4	2.5	96.4	0.0	0.0	279.8
25-Sep-16 0:00	1.9	137.5	39.8	3.0	92.9	0.0	0.0	280.0
25-Sep-16 1:00	1.4	99.0	60.3	3.0	93.4	0.0	0.0	280.0
25-Sep-16 2:00	2.0	141.7	27.9	3.3	91.3	0.0	0.0	280.1
25-Sep-16 3:00	1.4	90.6	37.5	3.3	92.9	0.0	0.0	280.3
25-Sep-16 4:00	1.3	69.0	24.4	3.3	92.5	0.0	0.0	280.4
25-Sep-16 5:00	1.3	8.1	13.5	3.6	90.0	0.0	0.0	280.4
25-Sep-16 6:00	1.1	24.3	19.7	3.8	88.3	0.0	0.0	280.4
25-Sep-16 7:00	1.5	47.5	43.0	4.0	86.9	2.3	0.0	280.4
25-Sep-16 8:00	0.8	288.0	32.4	4.3	85.7	26.5	0.0	923.7
25-Sep-16 9:00	1.5	31.3	11.9	4.6	86.5	52.1	0.0	923.8
25-Sep-16 10:00	1.2	21.2	35.8	4.6	89.1	71.3	0.0	923.7
25-Sep-16 11:00	0.8	45.3	25.6	4.4	93.5	88.4	0.0	923.8
25-Sep-16 12:00	1.0	287.6	23.9	4.6	96.9	99.2	0.0	923.9
25-Sep-16 13:00	0.9	308.8	28.3	4.3	97.9	108.0	0.0	924.0
25-Sep-16 14:00	2.0	17.3	15.3	4.8	96.7	103.8	0.0	924.6
25-Sep-16 15:00	1.3	334.7	37.9	4.9	97.6	80.1	0.0	925.8
25-Sep-16 16:00	2.0	24.7	9.2	4.8	95.9	39.9	0.0	927.5
25-Sep-16 17:00	1.9	15.2	19.5	4.5	97.1	18.6	0.0	930.1
25-Sep-16 18:00	1.4	305.3	40.0	3.9	95.3	6.4	0.0	933.1
25-Sep-16 19:00	2.9	6.1	22.7	3.3	96.5	0.6	0.0	934.9
25-Sep-16 20:00	5.6	35.9	7.5	2.4	98.8	0.0	0.0	937.4
25-Sep-16 21:00	5.6	35.2	7.6	1.9	99.3	0.0	0.0	942.4
25-Sep-16 22:00	6.2	19.8	7.3	2.0	99.2	0.0	0.0	948.1
25-Sep-16 23:00	5.8	24.1	8.7	2.4	99.3	0.0	0.0	954.1
26-Sep-16 0:00	4.1	29.8	11.8	2.8	99.3	0.0	0.0	959.9
26-Sep-16 1:00	2.4	327.8	56.5	2.4	99.2	0.0	0.0	963.6
26-Sep-16 2:00	2.5	57.8	26.7	1.8	99.3	0.0	0.0	965.1
26-Sep-16 3:00	3.3	200.9	11.7	2.2	99.3	0.0	0.0	966.0
26-Sep-16 4:00	2.9	214.1	6.5	2.1	99.3	0.0	0.0	967.3
26-Sep-16 5:00	2.6	219.7	13.6	2.3	99.3	0.0	0.0	968.3
26-Sep-16 6:00	2.6	213.2	10.5	2.5	99.3	0.0	0.0	968.9
26-Sep-16 7:00	4.1	225.1	8.9	2.5	99.3	0.4	0.0	969.7

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
26-Sep-16 8:00	5.1	218.1	8.9	2.6	99.3	5.3	0.0	968.9
26-Sep-16 9:00	3.6	211.3	8.7	2.7	99.3	46.2	0.0	970.3
26-Sep-16 10:00	4.6	216.4	8.9	2.8	99.3	104.3	0.0	970.0
26-Sep-16 11:00	4.7	218.2	10.3	3.0	99.3	117.2	0.0	969.7
26-Sep-16 12:00	5.6	222.1	8.6	3.1	99.3	142.4	0.0	969.5
26-Sep-16 13:00	6.8	229.7	8.8	2.7	99.3	82.0	0.0	971.6
26-Sep-16 14:00	6.6	228.7	6.6	3.3	99.2	310.5	0.0	970.6
26-Sep-16 15:00	6.3	210.1	12.8	3.2	99.0	184.0	0.0	970.8
26-Sep-16 16:00	6.3	200.5	11.2	2.4	97.6	163.8	0.0	971.2
26-Sep-16 17:00	3.9	204.6	10.9	2.0	94.6	78.3	0.0	970.3
26-Sep-16 18:00	4.7	221.3	11.4	1.7	98.5	20.8	0.0	970.7
26-Sep-16 19:00	4.7	219.0	11.6	1.4	99.3	0.8	0.0	970.9
26-Sep-16 20:00	4.2	201.7	10.2	0.9	99.3	0.0	0.0	971.6
26-Sep-16 21:00	3.3	199.3	9.1	0.7	99.3	0.0	0.0	973.2
26-Sep-16 22:00	4.3	205.5	11.9	0.5	99.3	0.0	0.0	973.8
26-Sep-16 23:00	4.1	202.2	12.1	0.5	99.3	0.0	0.0	973.8
27-Sep-16 0:00	4.6	195.0	11.4	0.7	99.3	0.0	0.0	974.7
27-Sep-16 1:00	4.8	207.2	11.4	0.5	99.3	0.0	0.0	974.6
27-Sep-16 2:00	4.7	216.3	9.6	0.3	99.3	0.0	0.0	975.0
27-Sep-16 3:00	5.0	212.5	12.0	0.4	99.3	0.0	0.0	974.8
27-Sep-16 4:00	5.2	204.9	11.9	0.3	99.3	0.0	0.0	975.1
27-Sep-16 5:00	5.7	193.2	8.3	0.1	99.3	0.0	0.0	974.0
27-Sep-16 6:00	4.8	187.0	10.3	0.2	97.3	0.0	0.0	975.1
27-Sep-16 7:00	4.5	195.6	9.5	0.2	97.1	1.7	0.0	974.7
27-Sep-16 8:00	4.0	186.6	11.5	0.2	97.4	20.9	0.0	974.5
27-Sep-16 9:00	3.6	204.3	10.9	0.4	96.3	89.7	0.0	975.4
27-Sep-16 10:00	3.5	210.3	9.7	0.6	97.1	135.1	0.0	974.5
27-Sep-16 11:00	3.2	205.4	11.8	1.6	91.9	306.7	0.0	975.4
27-Sep-16 12:00	4.0	210.5	10.5	2.5	90.5	465.9	0.0	974.5
27-Sep-16 13:00	4.6	215.9	9.0	2.0	93.0	226.8	0.0	974.8
27-Sep-16 14:00	4.1	214.0	17.3	2.3	92.0	227.2	0.0	975.8
27-Sep-16 15:00	4.1	218.7	9.5	3.0	86.8	279.3	0.0	975.1
27-Sep-16 16:00	3.8	224.7	9.4	2.5	95.0	172.8	0.0	974.9
27-Sep-16 17:00	3.4	214.2	16.8	2.0	99.2	63.4	0.0	975.3
27-Sep-16 18:00	3.4	195.4	10.4	2.0	97.5	46.5	0.0	975.7
27-Sep-16 19:00	2.9	200.1	11.8	2.1	94.1	4.6	0.0	975.1
27-Sep-16 20:00	2.7	183.0	13.4	2.3	90.2	0.0	0.0	975.4
27-Sep-16 21:00	2.7	169.1	10.0	2.3	88.4	0.0	0.0	975.0
27-Sep-16 22:00	3.5	150.0	11.6	2.5	86.5	0.0	0.0	975.1
27-Sep-16 23:00	3.5	164.4	11.6	2.2	90.9	0.0	0.0	975.0
28-Sep-16 0:00	2.9	113.7	40.2	2.1	91.7	0.0	0.0	975.1
28-Sep-16 1:00	1.8	130.9	31.8	2.2	90.6	0.0	0.0	975.2
28-Sep-16 2:00	1.3	49.5	41.8	2.3	87.3	0.0	0.0	975.1
28-Sep-16 3:00	1.1	40.5	36.3	2.5	85.3	0.0	0.0	975.2
28-Sep-16 4:00	1.1	100.9	34.3	2.6	84.4	0.0	0.0	975.1
28-Sep-16 5:00	1.3	111.6	36.9	2.5	85.9	0.0	0.0	975.1
28-Sep-16 6:00	1.6	84.2	23.6	2.4	87.7	0.0	0.0	975.1
28-Sep-16 7:00	1.5	43.2	13.3	2.5	86.4	1.5	0.0	975.1
28-Sep-16 8:00	1.9	35.3	8.1	2.6	84.8	24.7	0.0	975.3
28-Sep-16 9:00	2.6	30.9	4.4	2.9	84.1	119.2	0.0	975.0
28-Sep-16 10:00	3.2	33.0	5.0	3.2	83.0	144.9	0.0	975.3
28-Sep-16 11:00	1.8	27.0	43.1	4.1	82.2	354.5	0.0	977.6
28-Sep-16 12:00	1.5	259.0	44.9	4.2	88.7	426.7	0.0	975.4

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
28-Sep-16 13:00	1.2	254.6	57.4	4.2	90.7	238.2	0.0	976.0
28-Sep-16 14:00	1.5	253.9	46.7	5.0	86.8	354.4	0.0	976.0
28-Sep-16 15:00	2.0	339.0	50.6	5.7	82.5	368.7	0.0	975.4
28-Sep-16 16:00	3.4	21.2	9.5	5.4	76.7	232.1	0.0	975.4
28-Sep-16 17:00	3.7	11.1	7.8	5.3	78.6	187.7	0.0	975.0
28-Sep-16 18:00	4.0	9.5	9.0	4.6	82.6	74.1	0.0	975.4
28-Sep-16 19:00	5.4	27.0	3.7	4.1	82.2	6.2	0.0	975.1
28-Sep-16 20:00	5.2	39.2	7.0	4.2	78.4	0.0	0.0	975.5
28-Sep-16 21:00	3.6	85.0	28.5	3.8	78.8	0.0	0.0	975.2
28-Sep-16 22:00	3.4	71.1	34.8	3.8	76.3	0.0	0.0	975.2
28-Sep-16 23:00	4.0	80.9	19.4	3.7	76.3	0.0	0.0	974.8
29-Sep-16 0:00	6.6	70.9	12.9	4.4	68.2	0.0	0.0	975.0
29-Sep-16 1:00	7.0	51.3	14.0	3.6	73.2	0.0	0.0	975.5
29-Sep-16 2:00	7.0	57.6	14.3	3.6	72.4	0.0	0.0	976.8
29-Sep-16 3:00	7.3	56.4	13.1	3.5	70.5	0.0	0.0	976.6
29-Sep-16 4:00	7.2	48.9	7.6	3.2	70.7	0.0	0.0	974.9
29-Sep-16 5:00	5.9	55.5	25.8	2.5	74.9	0.0	0.0	974.0
29-Sep-16 6:00	3.4	74.9	30.7	1.9	77.3	0.0	0.0	975.3
29-Sep-16 7:00	5.2	58.3	23.0	1.7	77.1	2.6	0.0	975.4
29-Sep-16 8:00	4.3	61.6	26.0	1.3	81.1	15.8	0.0	976.5
29-Sep-16 9:00	7.0	45.5	10.6	1.9	76.1	89.2	0.0	976.5
29-Sep-16 10:00	7.7	36.9	5.4	3.3	69.8	349.8	0.0	976.7
29-Sep-16 11:00	7.5	37.6	11.5	4.3	65.3	462.4	0.0	977.7
29-Sep-16 12:00	6.4	31.5	11.6	5.0	62.5	542.2	0.0	976.2
29-Sep-16 13:00	4.6	2.0	38.8	5.8	61.3	574.9	0.0	977.3
29-Sep-16 14:00	7.0	42.2	16.0	5.9	57.5	508.2	0.0	976.4
29-Sep-16 15:00	6.6	30.5	13.4	6.0	57.8	461.6	0.0	975.7
29-Sep-16 16:00	6.8	20.7	8.5	5.8	58.3	360.6	0.0	975.1
29-Sep-16 17:00	6.2	23.0	6.3	5.6	56.2	227.9	0.0	974.6
29-Sep-16 18:00	6.4	25.8	4.7	4.8	56.5	86.2	0.0	974.6
29-Sep-16 19:00	6.1	36.9	7.1	4.0	57.4	4.2	0.0	974.8
29-Sep-16 20:00	7.4	30.0	6.7	3.7	57.3	0.0	0.0	975.9
29-Sep-16 21:00	8.7	31.4	6.6	3.5	57.6	0.0	0.0	974.4
29-Sep-16 22:00	9.7	50.6	7.6	3.7	52.6	0.0	0.0	975.3
29-Sep-16 23:00	11.1	51.7	7.3	3.5	52.3	0.0	0.0	975.3
30-Sep-16 0:00	11.5	51.0	4.4	3.1	53.4	0.0	0.0	974.3
30-Sep-16 1:00	11.6	46.1	4.3	2.9	54.9	0.0	0.0	973.2
30-Sep-16 2:00	10.5	55.3	6.2	2.7	55.8	0.0	0.0	974.0
30-Sep-16 3:00	10.3	56.0	6.4	2.6	55.8	0.0	0.0	972.9
30-Sep-16 4:00	12.3	62.3	6.9	2.9	53.4	0.0	0.0	973.0
30-Sep-16 5:00	13.4	67.6	7.9	2.7	55.3	0.0	0.0	973.6
30-Sep-16 6:00	15.1	59.5	8.2	1.6	66.4	0.0	0.0	974.9
30-Sep-16 7:00	13.3	55.2	6.4	0.0	88.4	0.3	0.0	974.8
30-Sep-16 8:00	13.2	60.5	7.6	0.3	84.2	15.7	0.0	971.4
30-Sep-16 9:00	14.2	66.2	9.0	0.9	75.3	61.6	0.0	975.2
30-Sep-16 10:00	14.1	61.7	6.0	0.5	80.0	126.5	0.0	976.2
30-Sep-16 11:00	13.9	63.7	8.3	0.5	79.4	201.7	0.0	974.9
30-Sep-16 12:00	16.3	62.0	5.6	0.4	82.2	318.0	0.0	977.3
30-Sep-16 13:00	18.7	61.5	5.4	0.5	82.6	207.3	0.0	975.1
30-Sep-16 14:00	16.7	63.6	9.2	1.5	72.4	205.3	0.0	972.9
30-Sep-16 15:00	13.8	62.2	9.4	2.0	71.0	147.7	0.0	972.8
30-Sep-16 16:00	13.5	68.3	8.8	2.4	69.0	155.9	0.0	974.4
30-Sep-16 17:00	13.1	62.7	8.1	2.6	69.2	84.5	0.0	973.2

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
30-Sep-16 18:00	11.7	61.0	7.1	2.6	69.4	30.6	0.0	973.4
30-Sep-16 19:00	12.7	57.8	7.1	2.8	68.6	2.0	0.0	975.5
30-Sep-16 20:00	13.7	67.6	8.0	2.9	67.9	0.0	0.0	974.6
30-Sep-16 21:00	14.4	64.1	8.2	3.2	64.2	0.0	0.0	971.6
30-Sep-16 22:00	13.2	59.7	8.9	3.0	64.9	0.0	0.0	972.4
30-Sep-16 23:00	12.3	64.4	8.9	2.9	64.8	0.0	0.0	976.8
01-Oct-16 0:00	10.8	58.5	9.4	2.8	64.7	0.0	0.0	972.9
01-Oct-16 1:00	8.6	49.0	8.1	2.2	68.4	0.0	0.0	973.9
01-Oct-16 2:00	7.8	49.9	12.7	2.2	67.3	0.0	0.0	976.6
01-Oct-16 3:00	8.3	55.3	11.6	2.4	64.4	0.0	0.0	974.0
01-Oct-16 4:00	8.5	48.8	10.5	2.1	66.2	0.0	0.0	975.3
01-Oct-16 5:00	7.2	42.9	7.4	1.8	68.1	0.0	0.0	975.0
01-Oct-16 6:00	7.2	40.7	6.9	1.5	70.1	0.0	0.0	975.9
01-Oct-16 7:00	8.9	51.3	6.9	1.5	69.0	1.1	0.0	977.3
01-Oct-16 8:00	9.3	49.2	6.5	1.4	68.1	17.7	0.0	975.7
01-Oct-16 9:00	8.9	52.2	7.8	1.7	65.5	44.6	0.0	975.3
01-Oct-16 10:00	8.7	57.8	8.7	2.3	61.2	267.1	0.0	976.6
01-Oct-16 11:00	7.0	53.9	13.5	2.8	59.5	314.3	0.0	976.5
01-Oct-16 12:00	6.3	55.1	12.4	3.5	59.2	585.5	0.0	977.1
01-Oct-16 13:00	6.3	64.7	15.0	3.9	56.9	595.8	0.0	976.2
01-Oct-16 14:00	6.6	39.5	13.1	4.1	57.4	566.1	0.0	976.6
01-Oct-16 15:00	6.7	40.2	10.4	3.7	57.3	327.8	0.0	975.1
01-Oct-16 16:00	7.7	52.4	9.4	3.7	56.9	306.3	0.0	974.9
01-Oct-16 17:00	7.1	61.7	7.3	3.3	57.0	160.7	0.0	974.8
01-Oct-16 18:00	6.6	66.7	7.1	3.0	57.9	46.5	0.0	975.6
01-Oct-16 19:00	4.5	43.7	14.1	2.5	58.6	2.6	0.0	975.1
01-Oct-16 20:00	4.4	24.7	6.1	2.2	58.8	0.0	0.0	975.1
01-Oct-16 21:00	4.2	38.8	5.6	1.8	59.7	0.0	0.0	975.1
01-Oct-16 22:00	1.7	156.8	47.7	1.5	64.5	0.0	0.0	975.1
01-Oct-16 23:00	1.3	234.2	27.5	1.5	64.5	0.0	0.0	975.2
02-Oct-16 0:00	0.9	106.9	20.7	1.4	61.5	0.0	0.0	975.1
02-Oct-16 1:00	0.7	167.0	40.0	1.3	61.9	0.0	0.0	975.2
02-Oct-16 2:00	0.9	164.1	15.6	1.2	63.9	0.0	0.0	975.3
02-Oct-16 3:00	0.9	171.9	26.2	1.3	64.5	0.0	0.0	975.2
02-Oct-16 4:00	0.6	227.2	26.8	1.0	66.4	0.0	0.0	975.2
02-Oct-16 5:00	1.6	176.7	14.7	1.2	65.5	0.0	0.0	975.4
02-Oct-16 6:00	1.7	202.4	20.3	1.1	65.7	0.0	0.0	975.3
02-Oct-16 7:00	2.6	207.0	9.5	1.3	64.3	2.1	0.0	974.9
02-Oct-16 8:00	3.1	206.1	6.9	1.5	62.8	37.0	0.0	974.9
02-Oct-16 9:00	2.9	210.4	5.3	1.6	63.7	104.2	0.0	975.6
02-Oct-16 10:00	3.3	206.8	10.0	2.7	61.9	344.0	0.0	976.9
02-Oct-16 11:00	3.2	212.5	15.1	3.2	63.5	460.2	0.0	976.5
02-Oct-16 12:00	4.2	214.1	12.1	3.8	63.9	460.3	0.0	975.9
02-Oct-16 13:00	4.4	198.3	15.3	4.3	62.8	388.4	0.0	974.9
02-Oct-16 14:00	4.8	196.4	14.5	4.5	62.6	295.1	0.0	974.9
02-Oct-16 15:00	4.0	217.3	11.6	4.5	63.4	264.9	0.0	974.9
02-Oct-16 16:00	3.8	217.8	11.0	4.3	65.4	173.7	0.0	975.2
02-Oct-16 17:00	3.7	202.9	10.6	4.0	65.0	95.4	0.0	975.8
02-Oct-16 18:00	4.8	188.8	7.3	3.8	63.6	29.5	0.0	975.1
02-Oct-16 19:00	4.1	188.4	6.2	3.5	63.9	1.1	0.0	975.9
02-Oct-16 20:00	4.2	183.3	6.5	3.3	63.9	0.0	0.0	975.3
02-Oct-16 21:00	4.5	179.4	6.5	3.1	60.7	0.0	0.0	975.8
02-Oct-16 22:00	2.7	139.3	14.8	3.2	56.6	0.0	0.0	975.0

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
02-Oct-16 23:00	1.3	75.9	43.8	3.3	59.4	0.0	0.0	975.3
03-Oct-16 0:00	2.1	143.5	17.8	3.1	59.5	0.0	0.0	975.4
03-Oct-16 1:00	1.3	146.9	45.7	3.2	59.9	0.0	0.0	975.3
03-Oct-16 2:00	1.2	93.4	20.6	2.9	59.8	0.0	0.0	975.2
03-Oct-16 3:00	2.2	55.1	10.0	3.1	59.7	0.0	0.0	975.1
03-Oct-16 4:00	1.9	42.6	11.6	3.2	58.7	0.0	0.0	975.2
03-Oct-16 5:00	2.6	37.8	4.9	3.1	58.3	0.0	0.0	975.2
03-Oct-16 6:00	2.0	78.4	31.1	2.9	68.7	0.0	0.0	975.2
03-Oct-16 7:00	1.8	359.1	29.3	3.1	66.9	0.4	0.0	975.1
03-Oct-16 8:00	2.9	35.1	10.3	2.9	66.4	9.5	0.0	975.3
03-Oct-16 9:00	3.2	33.6	7.9	3.0	66.3	33.5	0.0	975.0
03-Oct-16 10:00	3.4	33.7	10.5	3.4	64.8	69.7	0.0	975.0
03-Oct-16 11:00	1.5	224.0	37.0	3.3	71.8	118.5	0.0	975.1
03-Oct-16 12:00	2.4	32.6	45.4	3.4	73.6	171.1	0.0	974.8
03-Oct-16 13:00	2.8	172.8	48.1	2.8	79.7	151.3	0.0	975.0
03-Oct-16 14:00	1.8	250.3	51.2	2.3	89.6	82.1	0.0	975.5
03-Oct-16 15:00	3.1	343.5	17.8	1.8	92.1	121.9	0.0	975.2
03-Oct-16 16:00	3.0	20.0	8.2	1.7	89.8	83.2	0.0	975.7
03-Oct-16 17:00	2.0	19.0	20.3	1.6	90.8	48.1	0.0	975.4
03-Oct-16 18:00	1.7	315.6	51.4	1.3	92.7	26.9	0.0	975.4
03-Oct-16 19:00	2.6	62.2	39.7	1.9	86.4	1.0	0.0	975.3
03-Oct-16 20:00	5.4	66.9	13.4	3.4	73.3	0.0	0.0	974.8
03-Oct-16 21:00	6.3	56.8	20.1	4.1	67.2	0.0	0.0	974.4
03-Oct-16 22:00	7.6	57.9	8.4	4.0	68.2	0.0	0.0	975.9
03-Oct-16 23:00	7.5	55.6	9.8	4.2	65.6	0.0	0.0	975.9
04-Oct-16 0:00	4.5	82.6	43.7	3.8	69.2	0.0	0.0	975.3
04-Oct-16 1:00	2.6	96.5	43.7	3.0	74.3	0.0	0.0	975.2
04-Oct-16 2:00	2.0	103.8	50.2	3.1	72.0	0.0	0.0	975.4
04-Oct-16 3:00	1.4	129.7	68.0	2.8	73.2	0.0	0.0	975.4
04-Oct-16 4:00	1.8	147.7	71.4	2.7	72.8	0.0	0.0	975.4
04-Oct-16 5:00	1.5	215.7	60.0	2.6	73.9	0.0	0.0	975.5
04-Oct-16 6:00	1.5	248.3	62.6	2.5	73.3	0.0	0.0	975.2
04-Oct-16 7:00	2.2	37.2	44.3	2.3	72.2	0.5	0.0	974.9
04-Oct-16 8:00	2.0	62.0	45.4	1.9	75.0	25.6	0.0	975.4
04-Oct-16 9:00	2.3	56.5	32.5	2.5	71.8	91.2	0.0	975.5
04-Oct-16 10:00	1.9	348.6	33.5	3.0	72.8	181.3	0.0	975.6
04-Oct-16 11:00	1.4	253.0	37.7	2.9	77.6	237.9	0.0	976.1
04-Oct-16 12:00	0.9	278.7	42.2	3.8	76.4	289.2	0.0	976.3
04-Oct-16 13:00	1.5	291.8	54.1	4.2	74.1	261.2	0.0	975.7
04-Oct-16 14:00	2.3	348.6	41.7	4.2	70.5	194.1	0.0	975.2
04-Oct-16 15:00	1.4	315.8	47.2	4.2	74.7	188.5	0.0	975.3
04-Oct-16 16:00	1.2	268.1	27.1	4.2	79.4	212.1	0.0	975.3
04-Oct-16 17:00	2.6	355.4	31.7	4.3	73.8	129.3	0.0	975.3
04-Oct-16 18:00	2.6	28.9	9.8	3.5	76.0	35.3	0.0	975.4
04-Oct-16 19:00	2.4	39.0	19.3	3.3	76.0	0.9	0.0	975.3
04-Oct-16 20:00	0.8	194.4	38.6	3.0	77.2	0.0	0.0	975.3
04-Oct-16 21:00	0.4	307.9	38.8	3.0	77.5	0.0	0.0	975.4
04-Oct-16 22:00	0.4	124.3	46.2	2.9	78.0	0.0	0.0	975.3
04-Oct-16 23:00	0.8	28.5	12.9	3.1	75.8	0.0	0.0	975.3
05-Oct-16 0:00	0.7	19.1	36.4	2.8	78.1	0.0	0.0	975.4
05-Oct-16 1:00	0.6	343.5	41.9	2.6	81.5	0.0	0.0	975.4
05-Oct-16 2:00	0.6	252.5	21.2	2.5	81.8	0.0	0.0	975.3
05-Oct-16 3:00	1.1	217.9	18.9	1.9	89.0	0.0	0.0	975.4

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
05-Oct-16 4:00	0.8	166.5	34.3	2.0	87.3	0.0	0.0	975.4
05-Oct-16 5:00	0.7	258.4	24.3	1.9	88.0	0.0	0.0	975.4
05-Oct-16 6:00	0.7	299.6	37.8	1.9	88.3	0.0	0.0	975.4
05-Oct-16 7:00	0.4	271.0	36.1	1.7	90.3	0.5	0.0	975.4
05-Oct-16 8:00	0.8	3.6	37.1	1.5	92.2	24.9	0.0	975.4
05-Oct-16 9:00	0.4	275.7	49.3	1.6	94.4	80.2	0.0	975.5
05-Oct-16 10:00	0.7	281.6	34.3	1.7	96.4	111.1	0.0	975.4
05-Oct-16 11:00	0.8	283.1	45.7	1.5	99.0	89.9	0.0	975.4
05-Oct-16 12:00	1.5	218.8	18.3	1.3	99.2	110.7	0.0	975.4
05-Oct-16 13:00	1.2	236.4	19.7	1.2	99.2	107.0	0.0	975.5
05-Oct-16 14:00	1.2	297.0	19.6	1.5	99.2	90.4	0.0	975.6
05-Oct-16 15:00	0.9	282.9	28.8	1.4	99.2	96.8	0.0	975.9
05-Oct-16 16:00	0.8	302.6	39.7	2.1	98.7	148.7	0.0	975.8
05-Oct-16 17:00	1.6	0.1	18.0	2.0	97.2	59.6	0.0	975.5
05-Oct-16 18:00	2.4	13.9	7.0	1.5	95.0	24.3	0.0	976.2
05-Oct-16 19:00	3.8	29.3	4.5	0.9	98.0	0.7	0.0	976.1
05-Oct-16 20:00	3.6	22.9	5.5	0.9	99.3	0.0	0.0	976.9
05-Oct-16 21:00	3.1	53.5	8.1	0.7	99.3	0.0	0.0	976.8
05-Oct-16 22:00	1.6	135.8	41.0	0.6	99.3	0.0	0.0	976.8
05-Oct-16 23:00	1.9	56.6	11.8	0.7	97.9	0.0	0.0	976.8
06-Oct-16 0:00	1.1	151.9	25.5	0.8	97.0	0.0	0.0	976.8
06-Oct-16 1:00	0.9	201.9	31.5	0.7	98.4	0.0	0.0	976.8
06-Oct-16 2:00	0.7	255.5	34.3	0.8	96.7	0.0	0.0	976.8
06-Oct-16 3:00	0.8	315.0	28.5	0.7	95.9	0.0	0.0	976.9
06-Oct-16 4:00	1.3	67.7	54.1	0.7	95.0	0.0	0.0	976.8
06-Oct-16 5:00	2.0	344.7	64.6	0.7	95.3	0.0	0.0	976.7
06-Oct-16 6:00	3.9	31.3	31.7	0.8	92.0	0.0	0.0	976.8
06-Oct-16 7:00	2.4	47.9	30.6	0.6	92.2	0.5	0.0	977.1
06-Oct-16 8:00	2.9	341.3	27.7	1.0	88.9	19.5	0.0	976.8
06-Oct-16 9:00	2.6	359.1	37.5	0.7	91.8	49.1	0.0	976.8
06-Oct-16 10:00	5.8	35.7	11.9	1.3	87.2	97.1	0.0	976.5
06-Oct-16 11:00	7.0	30.4	4.4	1.4	89.9	155.2	0.0	976.5
06-Oct-16 12:00	5.5	17.4	5.0	2.2	85.3	287.1	0.0	977.2
06-Oct-16 13:00	6.6	33.4	6.3	2.6	83.2	208.7	0.0	976.1
06-Oct-16 14:00	7.5	31.0	6.9	2.7	82.7	126.2	0.0	976.8
06-Oct-16 15:00	7.8	39.9	7.6	3.0	80.7	113.6	0.0	975.2
06-Oct-16 16:00	6.9	36.9	8.3	2.6	83.4	86.8	0.0	976.5
06-Oct-16 17:00	7.0	37.0	7.1	2.6	83.4	74.7	0.0	976.0
06-Oct-16 18:00	9.8	48.3	6.3	2.7	80.0	24.3	0.0	976.8
06-Oct-16 19:00	10.9	63.3	7.2	3.3	72.0	1.2	0.0	976.9
06-Oct-16 20:00	10.3	45.5	7.6	2.7	78.0	0.0	0.0	977.5
06-Oct-16 21:00	10.0	47.0	11.0	2.8	74.7	0.0	0.0	976.2
06-Oct-16 22:00	11.8	57.8	7.4	3.1	69.9	0.0	0.0	976.7
06-Oct-16 23:00	11.5	51.2	11.8	3.2	68.1	0.0	0.0	975.9
07-Oct-16 0:00	10.9	56.4	15.0	3.3	66.4	0.0	0.0	976.7
07-Oct-16 1:00	12.6	56.8	12.3	3.1	66.6	0.0	0.0	977.5
07-Oct-16 2:00	13.3	67.8	13.3	2.8	67.1	0.0	0.0	976.1
07-Oct-16 3:00	16.7	67.3	6.2	2.9	63.2	0.0	0.0	978.1
07-Oct-16 4:00	16.8	63.7	5.6	2.8	61.8	0.0	0.0	976.6
07-Oct-16 5:00	17.2	64.4	7.1	2.9	61.2	0.0	0.0	979.6
07-Oct-16 6:00	17.6	67.6	6.8	2.8	61.0	0.0	0.0	979.0
07-Oct-16 7:00	17.0	66.6	8.1	2.8	60.5	0.3	0.0	978.1
07-Oct-16 8:00	15.0	69.9	9.2	2.7	60.4	9.9	0.0	979.8

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
07-Oct-16 9:00	14.9	67.1	7.5	2.5	60.6	35.3	0.0	979.0
07-Oct-16 10:00	13.3	75.0	9.9	2.5	59.9	155.7	0.0	977.4
07-Oct-16 11:00	12.9	80.3	10.0	2.8	58.2	374.8	0.0	980.3
07-Oct-16 12:00	10.0	70.6	11.1	3.2	56.4	458.2	0.0	976.4
07-Oct-16 13:00	11.0	64.1	9.6	3.5	55.1	429.8	0.0	976.2
07-Oct-16 14:00	9.5	82.8	11.9	3.5	55.0	370.4	0.0	978.0
07-Oct-16 15:00	8.4	76.9	17.1	3.5	54.9	217.1	0.0	974.3
07-Oct-16 16:00	7.8	79.4	16.0	3.2	56.1	145.8	0.0	976.3
07-Oct-16 17:00	8.2	78.7	14.7	2.8	58.5	82.8	0.0	975.7
07-Oct-16 18:00	8.4	78.5	9.4	2.5	59.9	19.4	0.0	976.4
07-Oct-16 19:00	7.7	92.3	9.9	2.5	59.7	0.2	0.0	975.9
07-Oct-16 20:00	6.2	66.7	13.9	2.4	59.8	0.0	0.0	977.0
07-Oct-16 21:00	6.5	43.9	12.2	2.0	62.7	0.0	0.0	976.5
07-Oct-16 22:00	6.9	35.3	4.4	1.8	64.4	0.0	0.0	977.0
07-Oct-16 23:00	6.5	47.5	5.3	1.6	65.9	0.0	0.0	976.3
08-Oct-16 0:00	5.2	43.8	5.8	1.6	66.0	0.0	0.0	976.5
08-Oct-16 1:00	5.1	62.0	14.1	1.8	64.3	0.0	0.0	976.6
08-Oct-16 2:00	4.1	86.6	28.1	1.6	66.3	0.0	0.0	977.5
08-Oct-16 3:00	5.7	80.2	16.0	1.6	65.8	0.0	0.0	977.1
08-Oct-16 4:00	3.3	89.1	24.3	1.2	69.1	0.0	0.0	977.5
08-Oct-16 5:00	6.1	84.3	15.5	1.1	68.5	0.0	0.0	977.7
08-Oct-16 6:00	4.2	97.6	40.2	0.9	69.7	0.0	0.0	976.5
08-Oct-16 7:00	1.7	97.2	74.4	0.6	72.1	0.1	0.0	976.3
08-Oct-16 8:00	2.1	66.9	33.5	0.3	74.7	6.1	0.0	976.8
08-Oct-16 9:00	2.1	125.9	61.4	0.2	75.3	27.5	0.0	976.8
08-Oct-16 10:00	5.5	63.8	32.0	0.3	74.0	73.9	0.0	976.1
08-Oct-16 11:00	9.6	52.5	7.5	0.7	67.6	125.4	0.0	976.5
08-Oct-16 12:00	9.4	47.3	5.5	0.7	67.9	145.7	0.0	976.7
08-Oct-16 13:00	8.3	49.4	6.9	1.2	62.4	174.6	0.0	978.1
08-Oct-16 14:00	9.3	47.3	7.0	1.3	59.9	191.8	0.0	973.7
08-Oct-16 15:00	10.6	45.7	5.5	1.0	64.6	164.6	0.0	976.4
08-Oct-16 16:00	8.5	47.7	6.4	0.8	68.5	108.2	0.0	975.6
08-Oct-16 17:00	8.2	41.4	6.5	0.5	69.9	28.1	0.0	978.1
08-Oct-16 18:00	8.7	46.5	6.0	0.5	64.6	5.7	0.0	978.0
08-Oct-16 19:00	7.6	47.9	9.9	0.4	61.2	0.2	0.0	977.0
08-Oct-16 20:00	6.2	44.8	11.6	0.3	60.6	0.0	0.0	977.2
08-Oct-16 21:00	5.8	37.0	13.1	0.1	63.0	0.0	0.0	976.9
08-Oct-16 22:00	5.9	39.7	13.1	0.1	62.6	0.0	0.0	977.3
08-Oct-16 23:00	6.7	45.2	13.1	0.1	61.3	0.0	0.0	976.9
09-Oct-16 0:00	7.5	51.3	11.1	0.1	59.0	0.0	0.0	976.5
09-Oct-16 1:00	6.3	48.7	13.1	-0.1	60.3	0.0	0.0	977.1
09-Oct-16 2:00	6.6	43.7	10.6	-0.2	61.2	0.0	0.0	977.2
09-Oct-16 3:00	6.6	33.2	12.3	-0.4	62.2	0.0	0.0	975.7
09-Oct-16 4:00	6.9	38.8	10.8	-0.6	62.6	0.0	0.0	976.6
09-Oct-16 5:00	7.8	48.8	9.0	-1.1	64.6	0.0	0.0	976.5
09-Oct-16 6:00	8.1	48.9	8.0	-1.3	64.1	0.0	0.0	976.8
09-Oct-16 7:00	8.4	44.7	7.2	-1.4	63.9	0.5	0.0	977.4
09-Oct-16 8:00	8.1	33.9	6.2	-1.7	65.1	9.5	0.0	977.7
09-Oct-16 9:00	5.8	46.1	11.0	-1.9	67.5	19.1	0.0	976.8
09-Oct-16 10:00	4.9	49.2	13.8	-0.5	62.1	291.8	0.0	978.9
09-Oct-16 11:00	4.4	43.6	14.8	0.4	58.4	401.2	0.0	979.5
09-Oct-16 12:00	4.3	2.7	13.6	1.0	56.0	472.4	0.0	979.7
09-Oct-16 13:00	1.9	334.1	51.4	1.8	58.1	494.7	0.0	979.1



Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
09-Oct-16 14:00	1.7	253.5	37.7	2.2	58.1	467.3	0.0	978.1
09-Oct-16 15:00	1.7	266.9	43.3	2.5	57.0	400.5	0.0	977.6
09-Oct-16 16:00	1.6	317.6	34.4	2.7	58.4	295.1	0.0	977.3
09-Oct-16 17:00	1.3	350.4	22.9	2.5	57.8	169.9	0.0	977.4
09-Oct-16 18:00	0.8	32.8	16.7	1.9	59.7	40.9	0.0	977.2
09-Oct-16 19:00	0.9	17.7	15.6	1.4	62.6	0.7	0.0	977.1
09-Oct-16 20:00	0.6	42.5	25.3	0.9	64.6	0.0	0.0	977.1
09-Oct-16 21:00	1.6	37.6	7.3	0.8	65.4	0.0	0.0	977.1
09-Oct-16 22:00	1.2	49.4	7.1	0.6	65.3	0.0	0.0	977.1
09-Oct-16 23:00	1.2	342.9	25.2	0.2	67.3	0.0	0.0	977.2
10-Oct-16 0:00	1.2	207.7	20.4	0.2	67.2	0.0	0.0	977.2
10-Oct-16 1:00	1.6	192.4	8.7	0.4	66.8	0.0	0.0	977.2
10-Oct-16 2:00	1.3	197.7	11.8	0.0	69.3	0.0	0.0	977.2
10-Oct-16 3:00	1.0	201.9	11.0	0.0	68.2	0.0	0.0	977.3
10-Oct-16 4:00	1.2	228.9	15.2	-0.1	67.4	0.0	0.0	977.3
10-Oct-16 5:00	2.2	186.2	5.3	-0.6	69.2	0.0	0.0	977.2
10-Oct-16 6:00	2.1	173.5	12.9	-0.4	67.4	0.0	0.0	977.3
10-Oct-16 7:00	2.5	189.5	12.8	-1.1	72.4	0.4	0.0	977.4
10-Oct-16 8:00	2.7	186.8	5.9	-1.5	72.8	9.5	0.0	977.3
10-Oct-16 9:00	2.6	192.7	5.7	-1.1	66.1	17.9	0.0	977.3
10-Oct-16 10:00	2.2	173.3	8.6	0.4	64.2	287.8	0.0	979.0
10-Oct-16 11:00	1.8	189.5	9.8	1.3	61.2	400.7	0.0	978.9
10-Oct-16 12:00	1.7	211.6	12.5	2.1	58.4	471.9	0.0	978.8
10-Oct-16 13:00	1.7	210.2	19.3	3.5	51.1	495.9	0.0	978.4
10-Oct-16 14:00	1.8	221.1	17.4	4.0	54.7	466.7	0.0	978.1
10-Oct-16 15:00	1.7	215.8	22.5	4.4	53.5	398.4	0.0	977.6
10-Oct-16 16:00	1.2	259.1	28.9	5.1	54.3	292.8	0.0	977.3
10-Oct-16 17:00	1.1	209.0	22.8	4.9	54.3	167.7	0.0	977.1
10-Oct-16 18:00	0.2	300.2	24.3	4.1	59.6	38.8	0.0	977.2
10-Oct-16 19:00	0.4	271.1	19.7	3.2	56.6	0.5	0.0	977.2
10-Oct-16 20:00	0.7	66.8	44.5	3.1	55.4	0.0	0.0	977.2
10-Oct-16 21:00	0.9	202.1	42.1	3.2	53.9	0.0	0.0	977.1
10-Oct-16 22:00	1.1	250.2	20.4	2.9	54.0	0.0	0.0	977.4
10-Oct-16 23:00	1.9	175.9	7.4	2.1	56.9	0.0	0.0	977.3
11-Oct-16 0:00	2.4	183.0	6.2	2.0	60.5	0.0	0.0	977.3
11-Oct-16 1:00	2.1	193.3	10.8	1.7	58.2	0.0	0.0	977.2
11-Oct-16 2:00	1.4	191.0	18.0	1.3	57.9	0.0	0.0	977.3
11-Oct-16 3:00	1.7	175.2	7.1	1.4	55.6	0.0	0.0	977.4
11-Oct-16 4:00	1.7	165.0	14.8	1.3	55.4	0.0	0.0	977.3
11-Oct-16 5:00	0.9	22.2	26.4	1.8	49.9	0.0	0.0	977.1
11-Oct-16 6:00	1.0	79.5	30.5	1.4	51.2	0.0	0.0	977.4
11-Oct-16 7:00	2.2	182.2	6.0	0.9	55.0	0.3	0.0	977.3
11-Oct-16 8:00	1.6	193.3	8.2	0.6	55.9	8.8	0.0	977.2
11-Oct-16 9:00	1.4	152.8	13.2	1.0	52.0	17.6	0.0	977.2
11-Oct-16 10:00	0.8	116.0	39.0	3.0	45.9	275.0	0.0	979.8
11-Oct-16 11:00	0.9	271.7	52.7	3.8	47.9	391.2	0.0	979.0
11-Oct-16 12:00	1.5	190.3	17.9	4.6	43.8	461.3	0.0	978.8
11-Oct-16 13:00	1.9	212.2	13.1	4.9	41.4	482.9	0.0	978.5
11-Oct-16 14:00	3.2	213.9	12.2	5.0	42.9	453.6	0.0	977.9
11-Oct-16 15:00	3.9	214.9	13.0	5.4	43.3	385.6	0.0	977.9
11-Oct-16 16:00	3.5	212.0	14.1	5.5	43.9	281.2	0.0	977.3
11-Oct-16 17:00	3.5	221.8	9.7	5.4	43.2	158.3	0.0	976.9
11-Oct-16 18:00	2.7	205.1	11.2	4.6	44.7	34.3	0.0	977.2

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
11-Oct-16 19:00	1.4	183.5	15.5	4.1	43.0	0.4	0.0	977.3
11-Oct-16 20:00	2.1	205.1	10.2	3.6	45.3	0.0	0.0	978.0
11-Oct-16 21:00	3.4	196.2	11.8	2.7	48.1	0.0	0.0	977.5
11-Oct-16 22:00	3.5	185.6	17.8	2.2	49.7	0.0	0.0	976.8
11-Oct-16 23:00	3.3	181.1	14.1	1.9	52.0	0.0	0.0	977.5
12-Oct-16 0:00	2.3	168.0	12.3	1.7	53.5	0.0	0.0	977.3
12-Oct-16 1:00	1.5	170.3	14.0	1.7	53.7	0.0	0.0	977.3
12-Oct-16 2:00	0.9	89.6	25.3	1.6	51.9	0.0	0.0	977.1
12-Oct-16 3:00	1.7	32.8	50.9	1.7	49.1	0.0	0.0	977.2
12-Oct-16 4:00	1.5	222.4	15.6	1.0	55.5	0.0	0.0	977.2
12-Oct-16 5:00	1.4	187.6	20.8	0.8	55.7	0.0	0.0	977.3
12-Oct-16 6:00	1.1	93.6	28.2	0.9	52.6	0.0	0.0	977.3
12-Oct-16 7:00	1.4	140.4	46.6	1.2	47.8	0.2	0.0	977.2
12-Oct-16 8:00	0.9	124.8	25.8	1.1	45.8	8.6	0.0	977.3
12-Oct-16 9:00	1.6	74.1	11.3	1.0	47.9	17.7	0.0	977.3
12-Oct-16 10:00	1.6	53.4	21.1	2.4	44.8	266.2	0.0	979.2
12-Oct-16 11:00	1.2	54.0	48.1	4.0	37.8	388.6	0.0	979.3
12-Oct-16 12:00	1.9	52.6	38.0	4.2	36.2	458.8	0.0	979.4
12-Oct-16 13:00	1.0	316.3	62.8	5.4	35.7	473.9	0.0	978.9
12-Oct-16 14:00	1.0	339.0	61.9	6.0	34.9	442.9	0.0	978.5
12-Oct-16 15:00	1.8	3.2	25.6	5.3	36.3	305.4	0.0	977.5
12-Oct-16 16:00	1.6	36.9	15.4	5.2	35.4	211.6	0.0	977.5
12-Oct-16 17:00	3.9	26.9	5.2	4.6	37.5	169.5	0.0	977.4
12-Oct-16 18:00	5.1	36.3	6.7	3.4	43.5	18.7	0.0	977.2
12-Oct-16 19:00	5.5	33.5	4.2	3.0	44.3	0.1	0.0	977.1
12-Oct-16 20:00	4.6	40.7	14.5	2.9	45.0	0.0	0.0	977.2
12-Oct-16 21:00	4.0	48.9	8.4	3.0	43.3	0.0	0.0	976.0
12-Oct-16 22:00	3.9	75.5	39.1	3.0	42.7	0.0	0.0	977.3
12-Oct-16 23:00	1.7	98.0	50.6	2.6	45.6	0.0	0.0	977.3
13-Oct-16 0:00	5.5	58.2	22.3	3.1	41.2	0.0	0.0	977.3
13-Oct-16 1:00	3.0	49.6	64.6	3.1	41.4	0.0	0.0	976.8
13-Oct-16 2:00	5.6	63.1	36.5	2.3	44.8	0.0	0.0	978.1
13-Oct-16 3:00	8.2	41.1	38.9	3.1	40.3	0.0	0.0	977.1
13-Oct-16 4:00	2.1	248.0	68.0	2.2	45.8	0.0	0.0	977.2
13-Oct-16 5:00	4.8	60.5	41.3	2.5	44.3	0.0	0.0	977.6
13-Oct-16 6:00	7.7	73.1	22.7	2.2	44.9	0.0	0.0	977.0
13-Oct-16 7:00	11.9	51.3	10.8	2.1	47.4	0.0	0.0	978.5
13-Oct-16 8:00	11.0	41.0	8.5	1.7	53.5	4.8	0.0	974.5
13-Oct-16 9:00	10.0	62.7	16.8	1.3	58.2	16.8	0.0	975.9
13-Oct-16 10:00	4.2	33.2	77.6	0.3	68.1	49.3	0.0	977.2
13-Oct-16 11:00	5.2	74.9	35.8	-1.0	87.7	94.4	0.0	978.3
13-Oct-16 12:00	8.0	55.0	28.5	-0.8	88.4	136.0	0.0	977.0
13-Oct-16 13:00	2.3	90.8	30.4	-0.8	89.1	110.7	0.0	977.2
13-Oct-16 14:00	6.1	41.5	16.0	-1.1	90.3	114.4	0.0	977.8
13-Oct-16 15:00	6.1	36.5	7.3	-1.2	94.0	102.2	0.0	977.3
13-Oct-16 16:00	7.0	33.7	6.6	-1.2	93.1	78.5	0.0	976.8
13-Oct-16 17:00	5.8	34.9	7.0	-1.4	95.3	35.7	0.0	977.5
13-Oct-16 18:00	5.3	38.4	8.0	-1.7	97.3	6.4	0.0	977.8
13-Oct-16 19:00	4.4	44.3	9.9	-1.9	98.2	0.0	0.0	977.9
13-Oct-16 20:00	4.3	39.8	6.8	-1.9	98.6	0.0	0.0	977.9
13-Oct-16 21:00	4.9	40.4	6.4	-1.9	98.7	0.0	0.0	978.4
13-Oct-16 22:00	4.6	42.5	7.1	-1.9	98.8	0.0	0.0	978.2
13-Oct-16 23:00	4.6	44.4	9.9	-2.0	98.8	0.0	0.0	978.4

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
14-Oct-16 0:00	3.8	63.2	18.6	-1.9	98.3	0.0	0.0	978.3
14-Oct-16 1:00	2.3	67.3	29.8	-2.0	98.2	0.0	0.0	978.5
14-Oct-16 2:00	3.2	72.1	42.9	-2.2	98.0	0.0	0.0	978.6
14-Oct-16 3:00	4.0	62.5	58.3	-2.2	97.6	0.0	0.0	978.5
14-Oct-16 4:00	4.0	75.7	39.6	-2.2	97.1	0.0	0.0	977.8
14-Oct-16 5:00	2.1	82.9	71.2	-2.3	98.2	0.0	0.0	978.5
14-Oct-16 6:00	6.9	50.8	21.6	-2.2	97.2	0.0	0.0	978.6
14-Oct-16 7:00	7.9	40.4	15.1	-2.4	96.9	0.0	0.0	978.7
14-Oct-16 8:00	6.1	21.0	47.5	-2.3	93.9	15.4	0.0	978.5
14-Oct-16 9:00	1.9	322.2	57.1	-2.4	96.5	64.1	0.0	978.9
14-Oct-16 10:00	4.2	74.3	28.0	-2.0	92.6	189.3	0.0	979.3
14-Oct-16 11:00	1.9	141.9	64.1	-1.2	89.7	402.5	0.0	980.4
14-Oct-16 12:00	1.7	177.8	56.3	-1.8	94.2	237.7	0.0	978.6
14-Oct-16 13:00	2.9	71.0	35.0	-1.3	89.8	211.5	0.0	978.8
14-Oct-16 14:00	5.3	24.4	9.3	-0.9	82.4	274.1	0.0	978.5
14-Oct-16 15:00	4.2	39.0	13.4	-1.2	85.6	168.2	0.0	978.6
14-Oct-16 16:00	4.0	38.1	8.0	-1.8	90.0	89.8	0.0	978.5
14-Oct-16 17:00	4.4	34.5	5.4	-2.3	95.6	51.6	0.0	978.1
14-Oct-16 18:00	3.8	34.2	5.6	-2.5	97.3	14.3	0.0	978.8
14-Oct-16 19:00	2.5	28.7	6.2	-2.5	97.4	0.0	0.0	979.3
14-Oct-16 20:00	0.7	9.2	29.7	-2.3	97.8	0.0	0.0	979.5
14-Oct-16 21:00	0.6	329.9	51.8	-2.2	97.2	0.0	0.0	979.6
14-Oct-16 22:00	0.5	297.4	20.9	-2.2	97.6	0.0	0.0	979.9
14-Oct-16 23:00	0.6	339.0	27.2	-2.2	98.0	0.0	0.0	980.1
15-Oct-16 0:00	1.1	28.5	34.6	-2.3	97.6	0.0	0.0	980.4
15-Oct-16 1:00	0.9	23.1	14.7	-2.4	97.3	0.0	0.0	980.8
15-Oct-16 2:00	2.1	39.9	15.6	-2.5	98.5	0.0	0.0	981.2
15-Oct-16 3:00	1.0	18.1	31.3	-2.4	98.7	0.0	0.0	981.5
15-Oct-16 4:00	2.1	33.8	7.0	-2.5	98.4	0.0	0.0	981.9
15-Oct-16 5:00	1.6	23.6	11.1	-2.3	98.4	0.0	0.0	982.7
15-Oct-16 6:00	1.6	17.9	19.0	-2.2	98.5	0.0	0.0	983.0
15-Oct-16 7:00	1.4	18.6	20.1	-2.1	98.2	0.0	0.0	983.5
15-Oct-16 8:00	1.7	19.1	34.5	-1.9	98.3	6.2	0.0	983.7
15-Oct-16 9:00	1.6	142.8	57.7	-1.3	97.3	40.8	0.0	983.5
15-Oct-16 10:00	2.7	183.7	20.7	-0.6	96.0	124.7	0.0	983.6
15-Oct-16 11:00	4.0	181.9	13.7	-0.3	95.5	176.6	0.0	983.4
15-Oct-16 12:00	3.6	187.5	19.6	0.1	93.5	189.0	0.0	983.7
15-Oct-16 13:00	4.0	185.1	12.1	0.3	93.3	211.3	0.0	983.7
15-Oct-16 14:00	3.8	180.2	26.3	0.1	96.2	134.2	0.0	983.4
15-Oct-16 15:00	2.2	168.7	49.1	0.6	93.0	142.9	0.0	983.7
15-Oct-16 16:00	3.6	203.1	9.5	0.3	97.4	99.3	0.0	983.8
15-Oct-16 17:00	3.0	183.6	8.6	0.3	97.6	34.2	0.0	983.7
15-Oct-16 18:00	1.4	185.1	20.5	0.4	96.2	5.1	0.0	983.8
15-Oct-16 19:00	1.0	140.5	30.8	0.3	96.4	0.0	0.0	983.9
15-Oct-16 20:00	1.0	109.6	40.6	0.2	97.0	0.0	0.0	984.0
15-Oct-16 21:00	2.8	29.6	5.4	-0.3	95.7	0.0	0.0	983.9
15-Oct-16 22:00	4.1	31.3	4.7	-0.4	94.0	0.0	0.0	983.8
15-Oct-16 23:00	2.8	50.1	19.8	-0.7	90.5	0.0	0.0	984.0
16-Oct-16 0:00	2.2	43.3	40.8	-1.1	90.9	0.0	0.0	984.0
16-Oct-16 1:00	3.3	71.5	26.7	-1.6	89.4	0.0	0.0	984.0
16-Oct-16 2:00	1.7	142.5	23.1	-2.3	96.5	0.0	0.0	984.1
16-Oct-16 3:00	2.7	106.0	15.8	-2.3	96.3	0.0	0.0	983.9
16-Oct-16 4:00	2.3	102.3	52.8	-2.2	91.1	0.0	0.0	984.2

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
16-Oct-16 5:00	0.9	115.5	30.6	-1.9	90.8	0.0	0.0	984.2
16-Oct-16 6:00	0.7	161.4	40.0	-2.5	95.1	0.0	0.0	984.2
16-Oct-16 7:00	0.9	168.5	19.5	-2.5	94.2	0.0	0.0	984.2
16-Oct-16 8:00	1.1	179.1	10.6	-2.5	93.8	6.1	0.0	984.3
16-Oct-16 9:00	1.0	190.7	19.9	-2.1	89.6	22.6	0.0	984.2
16-Oct-16 10:00	1.0	210.8	18.1	-1.6	85.9	100.8	0.0	984.7
16-Oct-16 11:00	0.5	69.0	34.8	-0.5	74.6	147.4	0.0	985.2
16-Oct-16 12:00	0.6	241.1	15.2	-0.4	76.4	210.0	0.0	985.1
16-Oct-16 13:00	0.9	35.8	21.0	0.7	71.0	313.4	0.0	984.7
16-Oct-16 14:00	1.3	33.6	18.8	0.7	74.0	229.7	0.0	984.4
16-Oct-16 15:00	2.3	31.0	5.9	0.6	74.2	163.7	0.0	984.0
16-Oct-16 16:00	2.6	27.9	4.8	0.5	74.5	113.2	0.0	984.2
16-Oct-16 17:00	2.9	32.7	6.1	0.3	75.3	42.7	0.0	984.0
16-Oct-16 18:00	3.2	32.7	6.9	0.1	76.3	6.8	0.0	983.9
16-Oct-16 19:00	3.3	32.2	4.6	0.0	77.6	0.0	0.0	984.0
16-Oct-16 20:00	3.3	42.8	9.0	-0.1	79.3	0.0	0.0	983.9
16-Oct-16 21:00	3.2	41.8	5.8	-0.1	78.5	0.0	0.0	983.9
16-Oct-16 22:00	3.2	38.8	4.3	0.0	77.5	0.0	0.0	983.9
16-Oct-16 23:00	2.8	30.9	16.3	0.1	77.2	0.0	0.0	984.0
17-Oct-16 0:00	2.7	20.0	15.5	0.5	76.1	0.0	0.0	984.0
17-Oct-16 1:00	3.1	26.5	17.6	0.5	77.0	0.0	0.0	983.9
17-Oct-16 2:00	3.3	34.1	18.0	0.4	77.3	0.0	0.0	984.0
17-Oct-16 3:00	2.9	29.6	7.8	0.5	77.6	0.0	0.0	984.0
17-Oct-16 4:00	2.9	33.6	15.3	0.5	78.7	0.0	0.0	984.1
17-Oct-16 5:00	3.0	33.8	17.4	0.7	78.9	0.0	0.0	984.1
17-Oct-16 6:00	2.9	25.5	10.6	0.8	77.9	0.0	0.0	984.0
17-Oct-16 7:00	1.6	41.3	46.3	1.1	77.5	0.0	0.0	984.1
17-Oct-16 8:00	1.1	89.4	46.4	1.4	77.1	13.8	0.0	984.1
17-Oct-16 9:00	2.9	165.5	18.0	1.4	80.7	32.0	0.0	984.2
17-Oct-16 10:00	1.9	163.4	28.9	1.5	82.4	80.2	0.0	984.1
17-Oct-16 11:00	2.4	170.0	17.8	1.3	87.4	95.0	0.0	983.9
17-Oct-16 12:00	2.3	184.7	35.4	1.3	91.5	128.6	0.0	983.7
17-Oct-16 13:00	1.7	187.0	14.4	1.3	92.9	96.5	0.0	983.8
17-Oct-16 14:00	1.9	192.6	17.5	1.6	93.6	144.4	0.0	983.9
17-Oct-16 15:00	1.3	219.5	57.4	1.4	95.8	86.9	0.0	984.1
17-Oct-16 16:00	1.1	117.3	53.9	2.0	92.4	76.2	0.0	984.0
17-Oct-16 17:00	2.1	60.1	32.3	2.1	89.7	32.0	0.0	984.1
17-Oct-16 18:00	1.4	162.2	28.4	2.4	86.8	4.6	0.0	984.2
17-Oct-16 19:00	0.9	67.0	28.3	2.0	90.3	0.0	0.0	984.1
17-Oct-16 20:00	2.1	45.3	14.4	2.2	85.8	0.0	0.0	984.1
17-Oct-16 21:00	1.4	57.7	25.7	2.6	81.2	0.0	0.0	984.1
17-Oct-16 22:00	0.7	126.3	28.8	2.6	81.3	0.0	0.0	984.2
17-Oct-16 23:00	1.3	207.8	21.0	2.9	77.0	0.0	0.0	984.2
18-Oct-16 0:00	1.1	189.5	31.0	2.8	77.8	0.0	0.0	984.2
18-Oct-16 1:00	0.7	188.8	19.4	3.0	75.9	0.0	0.0	984.2
18-Oct-16 2:00	1.1	225.4	12.9	2.9	74.5	0.0	0.0	984.2
18-Oct-16 3:00	1.4	201.2	11.5	2.6	76.1	0.0	0.0	984.1
18-Oct-16 4:00	2.0	207.4	13.1	2.5	79.3	0.0	0.0	984.1
18-Oct-16 5:00	3.0	190.0	11.1	2.4	78.2	0.0	0.0	984.1
18-Oct-16 6:00	3.3	198.0	9.2	2.3	78.5	0.0	0.0	984.1
18-Oct-16 7:00	3.6	196.2	13.2	2.2	78.5	0.0	0.0	983.6
18-Oct-16 8:00	3.1	152.9	19.8	2.0	77.7	10.5	0.0	983.9
18-Oct-16 9:00	4.1	170.4	12.8	2.4	76.1	35.0	0.0	984.3

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
18-Oct-16 10:00	2.3	158.5	19.4	2.6	78.5	90.0	0.0	983.9
18-Oct-16 11:00	3.3	172.2	16.3	2.8	78.0	142.1	0.0	984.0
18-Oct-16 12:00	3.6	166.1	14.6	2.8	80.3	138.8	0.0	984.2
18-Oct-16 13:00	4.5	188.6	13.5	2.9	82.1	279.3	0.0	985.8
18-Oct-16 14:00	1.8	230.1	36.7	3.5	80.3	174.8	0.0	984.3
18-Oct-16 15:00	1.8	184.3	29.4	3.1	79.1	83.5	0.0	984.2
18-Oct-16 16:00	2.0	345.1	35.2	2.3	84.7	36.7	0.0	984.3
18-Oct-16 17:00	1.8	38.4	49.5	1.1	92.8	13.7	0.0	985.3
18-Oct-16 18:00	1.1	35.4	32.2	0.7	96.0	1.0	0.0	986.6
18-Oct-16 19:00	1.1	35.1	9.8	0.4	97.6	0.0	0.0	987.6
18-Oct-16 20:00	1.6	230.0	48.2	0.6	99.0	0.0	0.0	988.8
18-Oct-16 21:00	2.3	218.3	28.2	0.8	99.3	0.0	0.0	988.5
18-Oct-16 22:00	3.2	202.9	15.6	0.7	99.3	0.0	0.0	988.9
18-Oct-16 23:00	2.3	209.2	14.5	0.6	99.3	0.0	0.0	989.7
19-Oct-16 0:00	2.8	197.3	13.1	0.6	99.2	0.0	0.0	988.9
19-Oct-16 1:00	2.0	79.1	33.0	0.6	97.5	0.0	0.0	988.8
19-Oct-16 2:00	2.4	154.5	34.3	1.0	93.8	0.0	0.0	989.0
19-Oct-16 3:00	2.1	178.6	37.2	1.1	91.8	0.0	0.0	989.6
19-Oct-16 4:00	2.1	235.4	66.6	1.2	89.2	0.0	0.0	989.6
19-Oct-16 5:00	4.4	152.0	29.3	2.4	74.8	0.0	0.0	988.5
19-Oct-16 6:00	2.3	195.8	44.8	2.1	77.8	0.0	0.0	988.9
19-Oct-16 7:00	2.2	178.1	53.2	1.2	90.2	0.0	0.0	988.9
19-Oct-16 8:00	1.9	17.5	20.1	0.5	95.2	1.3	0.0	989.3
19-Oct-16 9:00	2.0	7.2	16.6	0.4	96.8	11.4	0.0	989.6
19-Oct-16 10:00	2.0	359.9	19.0	0.4	97.2	24.0	0.0	990.3
19-Oct-16 11:00	2.2	348.3	16.3	0.3	98.4	18.7	0.0	991.4
19-Oct-16 12:00	1.8	337.6	27.6	0.7	96.4	50.5	0.0	993.1
19-Oct-16 13:00	2.0	19.1	33.6	0.9	95.5	106.7	0.0	995.0
19-Oct-16 14:00	1.9	2.3	54.5	0.7	96.4	63.9	0.0	997.0
19-Oct-16 15:00	1.6	350.1	48.0	0.9	96.3	72.8	0.0	997.4
19-Oct-16 16:00	1.2	207.6	43.7	0.9	97.8	41.7	0.0	998.2
19-Oct-16 17:00	1.3	126.5	67.8	0.7	97.4	18.4	0.0	999.5
19-Oct-16 18:00	3.9	212.7	9.4	0.1	99.3	1.1	0.0	1001.6
19-Oct-16 19:00	2.5	169.1	17.6	-0.1	99.3	0.0	0.0	1002.7
19-Oct-16 20:00	2.8	174.1	28.1	-0.1	99.3	0.0	0.0	1002.5
19-Oct-16 21:00	2.5	220.3	19.4	0.0	99.3	0.0	0.0	1002.4
19-Oct-16 22:00	3.4	169.7	19.9	0.0	99.2	0.0	0.0	1002.5
19-Oct-16 23:00	2.8	124.3	22.4	0.0	98.4	0.0	0.0	1002.5
20-Oct-16 0:00	1.6	74.0	30.4	0.4	95.9	0.0	0.0	1002.4
20-Oct-16 1:00	0.4	346.0	15.0	0.6	95.2	0.0	0.0	1002.4
20-Oct-16 2:00	0.0	0.0	0.0	0.6	95.0	0.0	0.0	1002.4
20-Oct-16 3:00	0.0	0.0	0.0	0.8	94.1	0.0	0.0	1002.4
20-Oct-16 4:00	0.0	0.0	0.0	1.0	91.5	0.0	0.0	1002.4
20-Oct-16 5:00	0.8	69.0	22.7	1.2	89.9	0.0	0.0	1002.5
20-Oct-16 6:00	0.7	10.1	17.7	0.6	95.4	0.0	0.0	1003.1
20-Oct-16 7:00	1.0	8.8	22.3	0.2	97.3	0.0	0.0	1003.2
20-Oct-16 8:00	1.6	19.2	15.3	0.2	95.9	2.0	0.0	1003.2
20-Oct-16 9:00	2.3	24.4	9.1	0.2	95.0	17.5	0.0	1003.2
20-Oct-16 10:00	1.1	41.5	11.4	0.3	95.3	33.0	0.0	1003.2
20-Oct-16 11:00	1.8	63.5	19.0	0.2	96.6	47.5	0.0	1002.9
20-Oct-16 12:00	1.5	34.3	18.2	0.2	97.5	56.8	0.0	1004.1
20-Oct-16 13:00	1.6	28.8	5.1	0.4	97.4	54.1	0.0	1004.8
20-Oct-16 14:00	1.4	30.6	7.9	0.5	97.0	37.1	0.0	1005.1

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
20-Oct-16 15:00	1.4	178.6	29.3	0.3	97.4	30.6	0.0	1005.8
20-Oct-16 16:00	2.7	205.3	17.5	0.0	98.6	19.3	0.0	1006.2
20-Oct-16 17:00	3.7	206.0	8.8	0.0	99.2	7.7	0.0	1006.6
20-Oct-16 18:00	3.8	205.6	9.1	0.0	99.3	1.1	0.0	1006.4
20-Oct-16 19:00	3.7	212.7	10.3	0.0	99.3	0.0	0.0	1006.4
20-Oct-16 20:00	4.0	207.9	14.1	0.0	99.3	0.0	0.0	1006.7
20-Oct-16 21:00	2.7	204.6	20.4	0.1	99.3	0.0	0.0	1006.5
20-Oct-16 22:00	3.1	181.3	14.3	0.1	98.3	0.0	0.0	1006.4
20-Oct-16 23:00	0.3	284.3	32.1	0.7	92.4	0.0	0.0	1006.4
21-Oct-16 0:00	2.3	144.4	48.0	0.7	92.7	0.0	0.0	1006.4
21-Oct-16 1:00	2.3	124.6	34.8	0.9	91.3	0.0	0.0	1006.2
21-Oct-16 2:00	2.3	34.1	27.4	0.8	91.0	0.0	0.0	1006.4
21-Oct-16 3:00	1.4	47.7	55.1	0.9	91.7	0.0	0.0	1006.4
21-Oct-16 4:00	1.6	27.3	33.2	0.6	94.9	0.0	0.0	1006.6
21-Oct-16 5:00	1.9	329.9	12.2	0.2	98.3	0.0	0.0	1006.7
21-Oct-16 6:00	1.7	325.0	36.8	0.2	98.3	0.0	0.0	1006.8
21-Oct-16 7:00	1.4	4.1	32.3	0.8	94.0	0.0	0.0	1006.8
21-Oct-16 8:00	2.2	17.7	10.7	0.4	96.0	2.2	0.0	1006.9
21-Oct-16 9:00	1.8	328.8	39.3	1.2	88.7	27.6	0.0	1007.2
21-Oct-16 10:00	0.8	261.3	53.2	1.4	88.3	38.6	0.0	1011.6
21-Oct-16 11:00	1.0	160.3	58.1	0.8	94.7	68.2	0.0	1012.1
21-Oct-16 12:00	2.5	347.2	16.5	0.6	96.1	198.1	0.0	1017.0
21-Oct-16 13:00	2.4	15.1	18.7	0.9	93.9	165.3	0.0	1017.2
21-Oct-16 14:00	2.6	3.8	23.9	1.3	89.0	97.4	0.0	1017.5
21-Oct-16 15:00	1.9	314.9	20.2	1.0	92.8	121.1	0.0	1018.0
21-Oct-16 16:00	1.6	106.5	63.4	1.5	87.8	75.7	0.0	1017.6
21-Oct-16 17:00	1.5	120.0	58.8	1.8	83.7	23.3	0.0	1017.6
21-Oct-16 18:00	1.7	169.7	44.8	1.8	81.9	3.0	0.0	1017.8
21-Oct-16 19:00	1.7	26.8	43.2	1.8	80.7	0.0	0.0	1017.7
21-Oct-16 20:00	1.9	218.4	53.2	2.0	78.0	0.0	0.0	1017.8
21-Oct-16 21:00	2.7	205.4	25.4	1.9	78.2	0.0	0.0	1017.5
21-Oct-16 22:00	3.7	200.2	18.3	1.7	82.3	0.0	0.0	1017.7
21-Oct-16 23:00	3.5	189.8	30.1	1.5	84.5	0.0	0.0	1017.7
22-Oct-16 0:00	3.1	142.0	34.6	1.4	84.3	0.0	0.0	1017.4
22-Oct-16 1:00	3.3	180.3	26.6	1.5	83.7	0.0	0.0	1017.6
22-Oct-16 2:00	2.6	151.2	26.4	1.2	86.1	0.0	0.0	1017.8
22-Oct-16 3:00	2.7	130.0	26.5	0.4	95.5	0.0	0.0	1018.3
22-Oct-16 4:00	2.3	84.9	35.7	0.3	96.2	0.0	0.0	1018.6
22-Oct-16 5:00	3.2	158.0	17.0	0.2	97.8	0.0	0.9	1018.6
22-Oct-16 6:00	4.4	186.2	16.8	0.0	99.3	0.0	0.8	1019.0
22-Oct-16 7:00	4.7	185.1	13.2	0.0	99.3	0.0	0.5	1018.6
22-Oct-16 8:00	3.1	175.4	28.2	0.0	99.0	2.2	2.1	1018.9
22-Oct-16 9:00	3.8	158.4	20.4	0.2	95.4	26.0	-	1018.9
22-Oct-16 10:00	3.3	135.8	22.0	0.4	93.4	64.3	0.2	1018.5
22-Oct-16 11:00	4.1	156.0	8.3	0.7	94.5	112.9	-	1019.0
22-Oct-16 12:00	2.4	168.4	22.2	1.4	93.7	271.2	-	1021.7
22-Oct-16 13:00	1.6	111.4	41.6	1.9	87.0	245.1	6.4	1020.2
22-Oct-16 14:00	1.5	80.8	15.8	2.1	83.0	210.2	-	1020.1
22-Oct-16 15:00	0.9	177.3	28.5	2.7	81.0	151.9	6.2	1020.0
22-Oct-16 16:00	0.9	37.0	9.9	2.6	84.1	111.7	1.1	1020.1
22-Oct-16 17:00	0.6	16.1	15.4	1.9	85.9	46.4	-	1020.1
22-Oct-16 18:00	1.1	11.6	17.3	1.5	89.2	3.7	-	1020.0
22-Oct-16 19:00	1.0	171.8	47.2	1.1	90.0	0.0	3.1	1020.0

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
22-Oct-16 20:00	4.0	54.2	14.2	1.0	85.6	0.0	-	1019.6
22-Oct-16 21:00	5.2	46.4	11.4	1.7	77.1	0.0	-	1019.9
22-Oct-16 22:00	7.0	52.1	8.0	1.9	74.4	0.0	3.2	1018.7
22-Oct-16 23:00	8.6	54.8	6.8	1.7	74.9	0.0	3.5	1019.1
23-Oct-16 0:00	9.3	51.2	7.0	1.9	70.8	0.0	3.0	1020.3
23-Oct-16 1:00	11.6	59.7	6.0	2.1	69.8	0.0	7.9	1020.9
23-Oct-16 2:00	11.0	59.3	9.1	2.0	67.1	0.0	8.0	1017.4
23-Oct-16 3:00	12.5	57.4	6.5	2.1	64.9	0.0	7.6	1020.1
23-Oct-16 4:00	11.4	67.4	10.4	2.2	62.7	0.0	-	1017.9
23-Oct-16 5:00	11.8	64.0	9.3	1.9	65.0	0.0	-	1022.8
23-Oct-16 6:00	12.2	59.7	7.8	2.0	64.8	0.0	8.9	1021.1
23-Oct-16 7:00	12.3	63.7	9.1	1.9	65.4	0.0	0.9	1017.4
23-Oct-16 8:00	12.4	63.2	7.5	2.1	64.1	2.9	5.8	1019.1
23-Oct-16 9:00	12.9	65.2	7.8	2.2	63.9	30.3	6.6	1015.9
23-Oct-16 10:00	13.6	63.0	6.4	2.5	62.9	99.3	-	1020.8
23-Oct-16 11:00	15.0	63.5	6.4	2.5	63.2	88.6	4.1	1022.5
23-Oct-16 12:00	10.2	72.6	9.7	1.9	73.0	92.0	6.2	1019.0
23-Oct-16 13:00	3.7	51.5	44.3	1.7	79.4	100.7	6.3	1019.9
23-Oct-16 14:00	1.5	277.3	24.2	1.5	85.0	128.2	6.2	1020.0
23-Oct-16 15:00	1.2	69.7	27.4	0.9	92.0	112.3	6.4	1020.3
23-Oct-16 16:00	2.9	38.2	9.8	0.8	92.2	104.2	5.6	1020.5
23-Oct-16 17:00	3.2	35.0	10.3	1.0	89.2	29.4	5.9	1019.8
23-Oct-16 18:00	4.8	31.4	5.5	1.0	87.5	2.4	5.6	1020.2
23-Oct-16 19:00	4.8	30.4	9.0	1.2	85.7	0.0	5.1	1020.2
23-Oct-16 20:00	4.3	35.8	9.0	1.4	83.0	0.0	5.3	1020.3
23-Oct-16 21:00	3.8	41.9	44.1	1.5	82.9	0.0	4.1	1019.6
23-Oct-16 22:00	3.5	14.3	13.4	1.9	79.5	0.0	4.6	1020.0
23-Oct-16 23:00	1.3	83.9	47.8	1.9	80.4	0.0	3.5	1020.3
24-Oct-16 0:00	1.3	291.9	42.6	1.1	90.1	0.0	0.4	1020.4
24-Oct-16 1:00	1.3	85.4	42.5	1.0	89.9	0.0	0.7	1020.1
24-Oct-16 2:00	3.7	51.5	16.0	1.2	86.7	0.0	0.5	1020.6
24-Oct-16 3:00	5.5	48.8	17.9	1.1	85.9	0.0	0.0	1020.0
24-Oct-16 4:00	6.1	59.5	20.8	1.0	84.4	0.0	-	1020.8
24-Oct-16 5:00	9.5	57.4	11.9	1.7	75.8	0.0	-	1020.8
24-Oct-16 6:00	7.3	68.1	42.7	1.6	75.3	0.0	3.4	1020.3
24-Oct-16 7:00	6.7	57.1	64.1	1.4	75.3	0.0	-	1016.7
24-Oct-16 8:00	8.3	79.6	24.9	1.5	72.7	2.8	5.2	1018.4
24-Oct-16 9:00	3.8	97.1	55.8	1.6	72.0	36.4	6.0	1020.6
24-Oct-16 10:00	5.1	76.9	48.9	1.9	69.5	130.5	4.3	1021.1
24-Oct-16 11:00	4.0	51.1	47.0	2.9	64.2	263.2	6.5	1022.1
24-Oct-16 12:00	1.4	125.3	65.0	2.6	68.7	243.6	4.1	1021.5
24-Oct-16 13:00	1.8	266.4	54.9	3.6	65.9	342.5	4.8	1021.9
24-Oct-16 14:00	2.5	67.3	61.4	3.7	68.5	330.0	5.5	1021.3
24-Oct-16 15:00	6.3	73.8	21.7	3.8	64.1	225.6	5.6	1019.9
24-Oct-16 16:00	6.7	78.0	31.1	3.6	64.7	125.7	5.3	1020.3
24-Oct-16 17:00	8.6	74.0	26.8	3.7	63.8	64.6	0.0	1020.8
24-Oct-16 18:00	10.2	61.1	7.0	3.5	65.2	4.5	0.0	1020.6
24-Oct-16 19:00	10.0	46.8	7.1	3.4	65.6	0.0	0.0	1021.8
24-Oct-16 20:00	11.1	45.4	6.3	3.5	64.9	0.0	0.0	1019.2
24-Oct-16 21:00	10.8	67.6	10.1	3.4	66.3	0.0	0.0	1019.4
24-Oct-16 22:00	11.9	69.8	8.1	3.3	66.6	0.0	0.0	1021.4
24-Oct-16 23:00	13.1	62.9	7.7	3.2	66.5	0.0	0.0	1020.9
25-Oct-16 0:00	13.6	60.7	7.3	3.2	65.7	0.0	0.0	1020.1

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
25-Oct-16 1:00	14.1	65.3	6.5	3.0	66.7	0.0	0.0	1018.6
25-Oct-16 2:00	9.7	68.1	23.0	2.6	72.9	0.0	0.0	1020.5
25-Oct-16 3:00	9.4	77.3	22.7	2.4	75.2	0.0	0.0	1019.7
25-Oct-16 4:00	10.2	78.6	18.0	2.4	74.9	0.0	0.0	1021.0
25-Oct-16 5:00	11.3	72.9	14.0	2.2	73.8	0.0	0.0	1021.5
25-Oct-16 6:00	13.3	66.7	7.8	2.3	71.9	0.0	0.0	1019.7
25-Oct-16 7:00	11.9	83.0	9.4	2.5	70.6	0.0	0.0	1018.7
25-Oct-16 8:00	10.9	71.5	12.0	2.3	70.6	2.6	0.0	1018.3
25-Oct-16 9:00	12.7	71.7	10.4	2.1	71.5	47.6	0.0	1021.7
25-Oct-16 10:00	12.5	75.7	11.0	2.4	69.9	153.6	0.0	1022.1
25-Oct-16 11:00	12.1	72.0	9.0	2.5	69.3	271.4	0.0	1022.8
25-Oct-16 12:00	11.8	76.2	13.3	2.8	68.7	334.9	0.0	1023.0
25-Oct-16 13:00	11.5	75.3	12.2	2.9	68.0	354.1	0.0	1018.9
25-Oct-16 14:00	10.7	68.2	13.3	3.1	67.5	336.4	0.0	1018.5
25-Oct-16 15:00	10.2	69.5	13.7	3.1	66.7	275.3	0.0	1021.1
25-Oct-16 16:00	8.3	74.9	19.8	3.1	66.8	192.0	0.0	1020.7
25-Oct-16 17:00	8.6	70.0	16.7	2.8	68.0	86.5	0.0	1020.6
25-Oct-16 18:00	8.5	72.3	21.4	2.4	69.8	3.5	0.0	1019.9
25-Oct-16 19:00	7.3	96.2	22.5	2.0	72.4	0.0	0.0	1021.1
25-Oct-16 20:00	4.6	89.9	37.9	1.9	72.5	0.0	0.0	1020.8
25-Oct-16 21:00	2.0	255.9	67.8	1.7	73.5	0.0	0.0	1020.6
25-Oct-16 22:00	1.6	61.3	58.5	1.5	74.2	0.0	0.0	1020.7
25-Oct-16 23:00	3.2	65.6	14.7	1.6	74.0	0.0	0.0	1020.3
26-Oct-16 0:00	2.0	64.4	53.8	1.4	76.4	0.0	0.0	1020.7
26-Oct-16 1:00	1.5	63.0	11.3	1.5	75.2	0.0	0.0	1020.6
26-Oct-16 2:00	0.6	215.8	33.1	1.4	76.5	0.0	0.0	1020.6
26-Oct-16 3:00	0.9	195.8	42.4	1.1	80.2	0.0	0.0	1020.7
26-Oct-16 4:00	1.2	16.9	23.2	0.3	90.7	0.0	0.0	1021.0
26-Oct-16 5:00	3.1	33.1	4.8	-0.3	96.4	0.0	0.0	1021.1
26-Oct-16 6:00	0.9	36.5	38.2	-0.2	98.0	0.0	0.0	1021.7
26-Oct-16 7:00	1.1	343.7	16.5	-0.2	99.0	0.0	0.0	1021.8
26-Oct-16 8:00	0.5	279.6	19.3	-0.3	99.2	2.8	0.0	1022.0
26-Oct-16 9:00	0.7	303.7	52.6	-0.2	99.0	22.6	0.0	1022.0
26-Oct-16 10:00	0.8	252.9	34.5	-0.1	98.2	55.0	0.0	1022.1
26-Oct-16 11:00	0.7	251.2	24.3	0.1	97.7	132.9	0.0	1022.1
26-Oct-16 12:00	0.5	46.1	32.3	0.9	94.5	169.4	0.0	1022.4
26-Oct-16 13:00	1.7	22.0	44.9	1.1	95.9	200.8	0.0	1022.2
26-Oct-16 14:00	1.6	17.8	41.9	1.2	96.2	162.9	0.0	1022.3
26-Oct-16 15:00	4.0	28.5	6.0	1.2	95.7	264.1	0.0	1022.5
26-Oct-16 16:00	1.7	152.9	41.8	0.5	97.9	111.5	0.0	1022.1
26-Oct-16 17:00	1.0	249.9	35.4	-0.1	99.2	15.9	0.0	1022.1
26-Oct-16 18:00	1.3	182.1	49.1	-0.2	99.3	1.7	0.0	1022.1
26-Oct-16 19:00	3.5	25.7	17.6	0.1	99.3	0.0	0.0	1021.8
26-Oct-16 20:00	3.4	4.8	43.2	-0.1	99.2	0.0	0.0	1022.1
26-Oct-16 21:00	1.8	94.7	50.3	-0.2	99.3	0.0	0.0	1022.1
26-Oct-16 22:00	1.9	87.2	41.4	-0.4	99.3	0.0	0.0	1022.1
26-Oct-16 23:00	3.8	38.4	15.8	-0.3	98.0	0.0	0.0	1022.4
27-Oct-16 0:00	3.6	57.9	26.8	-0.4	97.0	0.0	0.0	1022.3
27-Oct-16 1:00	1.6	81.8	62.4	-0.8	98.6	0.0	0.0	1022.3
27-Oct-16 2:00	2.9	37.4	31.8	-0.5	95.4	0.0	0.0	1022.1
27-Oct-16 3:00	1.4	84.2	56.8	-1.2	98.3	0.0	0.0	1022.2
27-Oct-16 4:00	2.6	53.9	49.4	-0.5	94.7	0.0	0.0	1022.2
27-Oct-16 5:00	1.7	59.1	70.2	-0.3	94.0	0.0	0.0	1022.3



Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
27-Oct-16 6:00	1.3	234.6	72.6	0.6	89.4	0.0	0.0	1022.2
27-Oct-16 7:00	1.4	228.6	63.0	0.3	92.2	0.0	0.0	1022.2
27-Oct-16 8:00	2.4	115.9	57.0	0.4	88.4	1.8	0.0	1022.2
27-Oct-16 9:00	1.8	241.7	66.4	0.7	85.7	13.7	0.0	1022.2
27-Oct-16 10:00	1.3	186.4	32.8	1.4	81.8	104.2	0.0	1024.6
27-Oct-16 11:00	0.6	238.4	53.7	3.2	72.2	285.1	0.0	1024.8
27-Oct-16 12:00	0.5	92.1	39.4	4.1	67.3	348.1	0.0	1024.0
27-Oct-16 13:00	1.2	185.6	13.3	2.2	82.8	142.6	0.0	1021.8
27-Oct-16 14:00	0.8	204.3	15.4	2.6	77.1	89.8	0.0	1022.0
27-Oct-16 15:00	0.5	283.6	34.5	2.9	73.4	74.3	0.0	1022.1
27-Oct-16 16:00	0.6	285.1	38.6	2.8	72.6	53.3	0.0	1022.1
27-Oct-16 17:00	0.6	52.8	39.8	2.7	73.2	20.3	0.0	1022.1
27-Oct-16 18:00	1.5	41.0	19.7	2.7	74.1	0.8	0.0	1022.0
27-Oct-16 19:00	0.6	20.7	51.9	2.9	72.8	0.0	0.0	1022.0
27-Oct-16 20:00	2.6	208.4	12.2	1.8	84.7	0.0	0.0	1021.3
27-Oct-16 21:00	1.1	127.8	19.5	1.9	85.2	0.0	0.0	1022.1
27-Oct-16 22:00	1.4	124.5	23.9	1.7	88.8	0.0	0.0	1022.0
27-Oct-16 23:00	1.3	46.8	13.2	1.4	89.8	0.0	0.0	1022.1
28-Oct-16 0:00	1.7	64.5	17.1	1.8	84.1	0.0	0.0	1022.0
28-Oct-16 1:00	1.7	56.1	16.8	1.8	82.3	0.0	0.0	1022.0
28-Oct-16 2:00	1.9	24.9	10.4	2.0	80.0	0.0	0.0	1022.0
28-Oct-16 3:00	1.5	77.4	18.2	1.4	81.3	0.0	0.0	1022.2
28-Oct-16 4:00	1.6	190.7	5.7	1.4	88.6	0.0	0.0	1022.2
28-Oct-16 5:00	1.0	178.8	16.3	1.3	88.0	0.0	0.0	1022.2
28-Oct-16 6:00	0.7	147.3	18.1	1.2	84.0	0.0	0.0	1022.1
28-Oct-16 7:00	0.8	206.1	43.2	0.9	86.5	0.0	0.0	1022.3
28-Oct-16 8:00	1.1	165.8	7.1	1.0	88.8	1.8	0.0	1022.2
28-Oct-16 9:00	1.4	191.8	11.9	0.9	86.7	12.8	0.0	1022.2
28-Oct-16 10:00	0.8	50.8	19.9	1.8	77.8	114.4	0.0	1024.8
28-Oct-16 11:00	0.8	172.6	24.0	3.1	72.1	278.6	0.0	1024.5
28-Oct-16 12:00	1.7	175.6	14.7	2.5	81.7	343.3	0.0	1024.0
28-Oct-16 13:00	0.9	85.0	21.1	3.3	74.3	364.5	0.0	1024.7
28-Oct-16 14:00	1.1	177.1	30.1	3.6	79.3	300.5	0.0	1022.7
28-Oct-16 15:00	0.7	32.4	31.7	3.6	78.4	216.0	0.0	1022.9
28-Oct-16 16:00	0.6	207.7	42.0	3.9	79.5	174.7	0.0	1022.5
28-Oct-16 17:00	0.6	192.2	36.7	2.9	84.5	63.7	0.0	1022.1
28-Oct-16 18:00	1.0	301.6	40.8	2.0	84.6	2.1	0.0	1022.2
28-Oct-16 19:00	2.1	177.8	12.4	1.2	89.5	0.0	0.0	1022.2
28-Oct-16 20:00	1.3	171.7	26.0	1.1	89.7	0.0	0.0	1022.2
28-Oct-16 21:00	0.6	173.5	36.7	1.4	82.8	0.0	0.0	1022.2
28-Oct-16 22:00	0.7	191.8	28.4	1.2	82.0	0.0	0.0	1022.3
28-Oct-16 23:00	1.2	178.6	21.4	0.8	85.9	0.0	0.0	1022.2
29-Oct-16 0:00	1.4	189.2	11.7	0.6	88.5	0.0	0.0	1022.3
29-Oct-16 1:00	1.5	168.5	35.9	0.5	89.6	0.0	0.0	1022.2
29-Oct-16 2:00	1.4	5.8	26.6	0.7	84.1	0.0	0.0	1022.2
29-Oct-16 3:00	0.7	108.8	36.8	0.5	87.4	0.0	0.0	1022.2
29-Oct-16 4:00	1.1	191.1	27.9	0.1	89.2	0.0	0.0	1022.3
29-Oct-16 5:00	1.3	172.6	13.0	-0.6	93.9	0.0	0.0	1022.2
29-Oct-16 6:00	0.5	239.4	44.5	-0.4	87.2	0.0	0.0	1022.1
29-Oct-16 7:00	1.0	299.6	39.0	-0.7	88.2	0.0	0.0	1022.2
29-Oct-16 8:00	1.4	264.2	14.8	-0.9	88.4	2.0	0.0	1022.2
29-Oct-16 9:00	1.1	301.9	28.3	-1.0	87.1	17.3	0.0	1022.3
29-Oct-16 10:00	0.9	295.7	18.7	-0.6	85.1	90.6	0.0	1024.5

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
29-Oct-16 11:00	0.6	221.4	31.9	1.0	75.2	306.6	0.0	1024.9
29-Oct-16 12:00	1.1	90.1	32.3	1.5	71.4	393.6	0.0	1024.6
29-Oct-16 13:00	1.3	84.7	42.8	1.4	70.9	343.8	0.0	1023.7
29-Oct-16 14:00	2.0	75.1	29.7	1.2	72.3	311.1	0.0	1023.1
29-Oct-16 15:00	6.0	46.2	9.8	0.7	73.3	242.4	0.0	1022.4
29-Oct-16 16:00	6.5	43.8	9.8	0.4	74.0	141.8	0.0	1023.2
29-Oct-16 17:00	6.6	42.2	8.3	-0.3	75.7	33.6	0.0	1021.9
29-Oct-16 18:00	6.8	44.6	7.5	-0.8	77.5	1.7	0.0	1022.4
29-Oct-16 19:00	6.1	45.9	7.8	-1.0	77.4	0.0	0.0	1020.9
29-Oct-16 20:00	6.3	49.2	8.4	-1.2	77.2	0.0	0.0	1022.5
29-Oct-16 21:00	5.3	60.8	11.8	-1.4	77.4	0.0	0.0	1022.1
29-Oct-16 22:00	3.0	74.9	16.7	-1.5	78.7	0.0	0.0	1022.4
29-Oct-16 23:00	2.4	87.6	18.4	-1.4	81.1	0.0	0.0	1022.4
30-Oct-16 0:00	1.4	166.9	52.8	-1.4	83.1	0.0	0.0	1022.2
30-Oct-16 1:00	0.7	117.4	26.8	-1.5	87.8	0.0	0.0	1022.1
30-Oct-16 2:00	0.8	40.0	27.9	-1.7	80.9	0.0	0.0	1022.2
30-Oct-16 3:00	0.5	240.6	37.5	-1.8	85.1	0.0	0.0	1022.2
30-Oct-16 4:00	0.7	172.8	28.9	-1.9	85.2	0.0	0.0	1022.2
30-Oct-16 5:00	1.3	41.1	21.9	-1.7	76.4	0.0	0.0	1022.2
30-Oct-16 6:00	2.7	61.3	21.1	-2.1	79.9	0.0	0.0	1022.3
30-Oct-16 7:00	1.7	180.2	26.8	-2.8	89.6	0.0	0.0	1022.3
30-Oct-16 8:00	2.0	185.5	7.7	-2.4	87.2	1.7	0.0	1022.3
30-Oct-16 9:00	2.2	185.7	21.2	-2.7	88.9	12.6	0.0	1022.3
30-Oct-16 10:00	1.1	208.2	36.3	-1.6	84.5	87.8	0.0	1024.6
30-Oct-16 11:00	1.4	201.9	12.6	-0.4	76.5	267.3	0.0	1024.8
30-Oct-16 12:00	0.6	344.8	41.2	1.0	68.4	329.2	0.0	1025.0
30-Oct-16 13:00	0.7	153.0	33.7	1.6	70.2	361.5	0.0	1024.3
30-Oct-16 14:00	0.8	196.5	18.6	1.7	72.8	270.3	0.0	1022.3
30-Oct-16 15:00	0.4	190.8	31.2	0.8	78.1	116.5	0.0	1022.3
30-Oct-16 16:00	0.8	59.3	25.6	0.7	73.5	77.0	0.0	1022.4
30-Oct-16 17:00	0.8	199.7	17.1	0.5	76.1	43.6	0.0	1022.2
30-Oct-16 18:00	0.8	227.1	11.7	-0.3	78.3	1.4	0.0	1022.2
30-Oct-16 19:00	0.8	281.1	11.9	-0.3	76.5	0.0	0.0	1022.2
30-Oct-16 20:00	1.0	215.7	9.5	-0.6	78.7	0.0	0.0	1022.3
30-Oct-16 21:00	1.0	186.5	11.4	-0.7	77.9	0.0	0.0	1022.3
30-Oct-16 22:00	0.3	182.5	7.1	-0.8	79.4	0.0	0.0	1022.3
30-Oct-16 23:00	0.4	224.4	10.3	-0.8	78.3	0.0	0.0	1022.3
31-Oct-16 0:00	0.5	292.8	9.8	-1.0	79.9	0.0	0.0	1022.2
31-Oct-16 1:00	0.7	245.4	19.3	-1.4	82.0	0.0	0.0	1022.2
31-Oct-16 2:00	0.6	290.7	21.8	-1.6	82.5	0.0	0.0	1022.3
31-Oct-16 3:00	0.5	319.9	31.0	-1.7	83.0	0.0	0.0	1022.2
31-Oct-16 4:00	0.4	279.0	25.4	-1.9	84.5	0.0	0.0	1022.3
31-Oct-16 5:00	0.7	202.4	13.0	-2.0	84.7	0.0	0.0	1022.4
31-Oct-16 6:00	0.7	206.7	42.1	-2.3	87.4	0.0	0.0	1022.4
31-Oct-16 7:00	0.7	335.2	21.8	-2.2	86.2	0.0	0.0	1022.4
31-Oct-16 8:00	1.0	208.8	17.5	-2.5	88.8	1.6	0.0	1022.3
31-Oct-16 9:00	0.8	207.0	15.2	-2.4	88.8	19.1	0.0	1022.4
31-Oct-16 10:00	0.5	322.7	50.6	-1.7	85.1	104.1	0.0	1022.8
31-Oct-16 11:00	1.0	218.8	49.2	-1.0	81.1	208.9	0.0	1025.3
31-Oct-16 12:00	1.1	3.6	13.5	-0.2	76.8	323.2	0.0	1024.9
31-Oct-16 13:00	0.4	229.2	38.9	0.9	75.9	374.9	0.0	1024.2
31-Oct-16 14:00	0.9	177.8	25.4	0.5	79.6	212.4	0.0	1022.3
31-Oct-16 15:00	2.1	196.2	9.9	0.6	75.9	160.6	0.0	1022.9

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
31-Oct-16 16:00	2.8	207.0	9.5	1.3	74.3	174.7	0.0	1022.8
31-Oct-16 17:00	3.6	196.0	6.8	0.8	76.3	50.9	0.0	1022.4
31-Oct-16 18:00	3.2	208.1	10.6	0.4	77.8	1.3	0.0	1022.4
31-Oct-16 19:00	2.6	217.0	9.1	0.2	82.1	0.0	0.0	1022.4
31-Oct-16 20:00	2.9	211.8	11.3	0.2	86.8	0.0	0.0	1022.0
31-Oct-16 21:00	2.3	196.5	11.9	-0.1	92.7	0.0	0.0	1022.2
31-Oct-16 22:00	2.4	205.3	8.0	0.2	90.6	0.0	0.0	1022.5
31-Oct-16 23:00	2.9	194.6	7.1	0.3	87.2	0.0	0.0	1022.5
01-Nov-16 0:00	2.3	210.3	12.9	0.3	84.5	0.0	0.0	1022.2
01-Nov-16 1:00	2.8	185.6	11.4	0.2	84.2	0.0	0.0	1022.3
01-Nov-16 2:00	2.0	176.9	16.0	-0.1	86.8	0.0	0.0	1022.1
01-Nov-16 3:00	1.8	179.7	21.1	0.0	85.8	0.0	0.0	1022.3
01-Nov-16 4:00	2.7	47.7	53.1	0.0	82.7	0.0	0.0	1022.4
01-Nov-16 5:00	2.0	90.7	17.0	0.2	75.6	0.0	0.0	1022.3
01-Nov-16 6:00	1.9	52.0	29.6	0.1	79.4	0.0	0.0	1022.3
01-Nov-16 7:00	1.3	66.8	28.4	-0.2	81.7	0.0	0.0	1022.4
01-Nov-16 8:00	1.5	44.6	17.3	-0.2	81.2	0.7	0.0	1022.4
01-Nov-16 9:00	3.0	36.4	7.1	-0.6	85.0	28.8	0.0	1022.5
01-Nov-16 10:00	3.9	35.0	5.2	-0.6	86.8	73.4	0.0	1022.3
01-Nov-16 11:00	4.6	29.6	4.5	-0.7	88.6	84.9	0.0	1022.1
01-Nov-16 12:00	4.6	32.6	4.7	-0.5	88.2	112.0	0.0	1022.6
01-Nov-16 13:00	4.0	34.2	5.1	-0.2	87.7	124.5	0.0	1022.7
01-Nov-16 14:00	4.2	24.2	6.4	-0.1	88.8	111.0	0.0	1022.5
01-Nov-16 15:00	4.0	25.3	4.9	-0.2	89.6	64.0	0.0	1022.0
01-Nov-16 16:00	5.4	26.8	4.7	-0.5	94.1	50.3	0.0	1022.8
01-Nov-16 17:00	4.6	30.8	6.8	-0.6	96.0	6.7	0.0	1023.3
01-Nov-16 18:00	5.2	27.4	6.0	-0.8	97.1	0.4	0.0	1023.0
01-Nov-16 19:00	4.5	28.0	3.9	-0.7	97.0	0.0	0.0	1023.4
01-Nov-16 20:00	4.5	26.1	5.2	-0.2	93.6	0.0	0.0	1023.1
01-Nov-16 21:00	4.2	28.0	5.4	-0.4	94.9	0.0	0.0	1023.1
01-Nov-16 22:00	2.5	26.4	14.5	-0.3	96.6	0.0	0.0	1023.6
01-Nov-16 23:00	2.5	28.0	8.3	-0.3	98.1	0.0	0.0	1024.2
02-Nov-16 0:00	2.3	270.4	30.1	-1.2	99.0	0.0	0.0	1025.2
02-Nov-16 1:00	4.0	199.2	11.3	-1.3	99.3	0.0	2.0	1025.8
02-Nov-16 2:00	4.0	204.0	7.8	-1.3	99.2	0.0	3.6	1026.9
02-Nov-16 3:00	4.0	211.6	6.6	-1.3	99.2	0.0	4.0	1027.1
02-Nov-16 4:00	3.5	204.2	7.1	-1.2	99.2	0.0	3.6	1027.3
02-Nov-16 5:00	3.2	204.1	11.0	-1.2	99.2	0.0	4.0	1027.3
02-Nov-16 6:00	2.6	207.5	6.3	-1.3	99.1	0.0	3.7	1027.6
02-Nov-16 7:00	2.4	221.1	12.4	-1.4	99.1	0.0	3.5	1027.5
02-Nov-16 8:00	1.1	169.0	24.3	-1.9	98.7	1.2	4.0	1027.4
02-Nov-16 9:00	0.7	126.5	0.3	-2.2	97.9	19.2	3.7	1027.6
02-Nov-16 10:00	0.7	123.8	48.3	-1.9	95.4	83.4	3.6	1027.7
02-Nov-16 11:00	1.0	58.1	32.7	-1.8	92.5	129.4	3.3	1027.8
02-Nov-16 12:00	5.9	61.6	20.9	-1.4	87.8	161.4	3.4	1024.5
02-Nov-16 13:00	10.9	32.1	10.1	-0.5	78.7	173.9	7.3	1027.2
02-Nov-16 14:00	9.5	63.4	29.3	-0.2	73.3	121.5	0.1	1026.6
02-Nov-16 15:00	11.2	64.0	25.6	0.2	68.7	66.4	1.2	1026.9
02-Nov-16 16:00	12.8	57.8	15.1	0.3	67.7	39.7	-	1028.3
02-Nov-16 17:00	14.1	79.5	12.7	0.5	66.1	7.5	1.6	1028.4
02-Nov-16 18:00	12.4	88.5	11.1	0.7	67.8	0.1	1.6	1025.0
02-Nov-16 19:00	2.6	230.8	31.0	-0.3	88.9	0.0	0.0	1027.6
02-Nov-16 20:00	1.5	20.5	47.1	-1.0	98.2	0.0	0.0	1028.4

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
02-Nov-16 21:00	4.8	21.2	5.9	-0.9	97.8	0.0	0.0	1028.8
02-Nov-16 22:00	4.2	30.6	11.7	-0.6	98.6	0.0	0.0	1030.2
02-Nov-16 23:00	3.3	213.6	41.7	1.1	92.6	0.0	0.0	1030.2
03-Nov-16 0:00	1.9	206.6	71.7	1.6	86.4	0.0	0.0	1030.2
03-Nov-16 1:00	1.9	188.8	58.2	0.8	94.7	0.0	0.0	1030.9
03-Nov-16 2:00	3.2	175.9	30.3	0.8	95.8	0.0	0.0	1031.1
03-Nov-16 3:00	6.1	177.7	14.8	1.4	93.2	0.0	0.0	1032.5
03-Nov-16 4:00	7.0	168.8	23.3	2.5	84.5	0.0	0.0	1031.5
03-Nov-16 5:00	4.6	171.2	25.5	1.3	94.9	0.0	0.0	1033.6
03-Nov-16 6:00	1.3	267.0	60.9	0.5	98.2	0.0	0.0	1034.5
03-Nov-16 7:00	1.7	81.7	42.5	0.4	98.1	0.0	0.0	1035.9
03-Nov-16 8:00	5.3	181.7	14.1	0.7	99.0	0.1	0.0	1036.1
03-Nov-16 9:00	5.2	180.0	12.1	0.6	99.0	6.0	0.0	1037.9
03-Nov-16 10:00	6.3	171.2	12.5	0.3	99.2	20.0	0.0	1036.5
03-Nov-16 11:00	7.7	179.5	12.0	0.3	99.0	68.3	0.0	1042.2
03-Nov-16 12:00	11.0	173.9	11.5	1.4	92.3	84.8	0.0	1042.3
03-Nov-16 13:00	13.1	179.0	10.2	2.4	86.1	141.8	0.0	1041.4
03-Nov-16 14:00	12.9	177.0	10.1	2.2	88.3	108.9	0.0	1040.1
03-Nov-16 15:00	12.8	179.8	10.4	2.4	83.8	49.0	0.0	1041.2
03-Nov-16 16:00	6.8	202.5	19.0	1.5	95.4	53.5	0.0	1043.7
03-Nov-16 17:00	8.0	191.5	9.1	1.1	97.5	13.9	0.0	1041.5
03-Nov-16 18:00	6.1	195.2	12.1	0.8	98.2	0.4	0.0	1040.7
03-Nov-16 19:00	5.6	196.3	10.9	0.6	96.6	0.0	0.0	1042.5
03-Nov-16 20:00	2.6	182.3	28.6	0.5	96.9	0.0	0.0	1042.4
03-Nov-16 21:00	2.3	24.2	16.6	0.0	99.2	0.0	0.0	1043.9
03-Nov-16 22:00	1.7	36.4	51.0	0.6	97.0	0.0	0.0	1044.0
03-Nov-16 23:00	1.9	105.1	27.7	0.5	96.8	0.0	0.0	1044.3
04-Nov-16 0:00	1.2	10.9	38.1	0.3	98.1	0.0	0.0	1044.5
04-Nov-16 1:00	2.9	30.4	48.7	0.2	98.5	0.0	0.0	1044.8
04-Nov-16 2:00	1.7	180.4	66.7	0.1	99.0	0.0	0.0	1045.4
04-Nov-16 3:00	1.9	4.1	34.9	0.2	98.6	0.0	0.0	1045.7
04-Nov-16 4:00	2.8	25.6	43.9	0.8	96.8	0.0	0.0	1046.6
04-Nov-16 5:00	4.1	25.5	18.7	1.0	96.4	0.0	0.0	1048.9
04-Nov-16 6:00	3.2	96.3	34.2	2.1	95.4	0.0	0.0	1050.4
04-Nov-16 7:00	4.4	164.9	16.7	3.0	95.9	0.0	0.0	1051.5
04-Nov-16 8:00	2.6	188.2	37.9	2.5	96.9	0.0	0.0	1052.7
04-Nov-16 9:00	2.1	208.9	43.3	2.1	98.2	4.2	0.0	1054.4
04-Nov-16 10:00	2.4	335.1	68.5	1.5	97.6	14.0	0.0	1056.5
04-Nov-16 11:00	1.8	5.0	54.0	1.3	97.5	22.4	0.0	1059.7
04-Nov-16 12:00	2.2	350.5	38.4	1.3	96.5	102.6	0.0	1061.0
04-Nov-16 13:00	3.2	243.0	29.6	1.9	97.4	82.3	0.0	1061.6
04-Nov-16 14:00	3.4	203.0	17.9	2.1	96.3	53.4	0.0	1061.5
04-Nov-16 15:00	1.8	134.4	49.8	2.3	94.9	37.6	0.0	1062.1
04-Nov-16 16:00	3.6	187.0	21.1	2.5	93.9	33.5	0.0	1063.5
04-Nov-16 17:00	4.2	169.2	17.5	1.9	96.5	2.9	0.0	1064.5
04-Nov-16 18:00	4.1	166.5	13.5	1.5	98.0	0.1	0.0	1066.3
04-Nov-16 19:00	7.4	175.6	14.2	1.6	96.0	0.0	0.0	1065.7
04-Nov-16 20:00	7.2	172.5	12.8	1.6	91.8	0.0	0.0	1068.7
04-Nov-16 21:00	7.4	169.5	15.9	1.5	89.8	0.0	0.0	1066.7
04-Nov-16 22:00	10.0	158.3	14.1	2.4	77.6	0.0	0.0	1064.1
04-Nov-16 23:00	7.6	170.7	15.3	1.6	87.0	0.0	0.0	1067.3
05-Nov-16 0:00	6.2	172.0	10.7	0.8	95.3	0.0	0.0	1067.4
05-Nov-16 1:00	7.9	179.0	13.4	0.2	98.8	0.0	0.0	1068.4

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
05-Nov-16 2:00	7.7	188.4	11.9	0.3	98.8	0.0	0.0	1068.0
05-Nov-16 3:00	7.5	186.9	12.6	0.3	98.5	0.0	0.0	1068.6
05-Nov-16 4:00	8.4	186.4	9.9	0.3	98.4	0.0	0.0	1067.4
05-Nov-16 5:00	7.6	176.6	8.7	0.5	96.9	0.0	0.0	1069.0
05-Nov-16 6:00	7.8	180.6	8.6	0.4	96.5	0.0	0.0	1068.5
05-Nov-16 7:00	7.4	189.4	9.9	0.8	90.8	0.0	0.0	1066.9
05-Nov-16 8:00	8.1	189.4	7.7	0.3	96.7	0.1	0.0	1070.5
05-Nov-16 9:00	8.2	185.5	7.9	0.1	98.7	6.5	0.0	1068.8
05-Nov-16 10:00	8.2	190.5	7.7	0.2	98.2	38.2	0.0	1067.8
05-Nov-16 11:00	7.0	192.6	8.9	0.3	98.5	79.0	0.0	1069.1
05-Nov-16 12:00	6.0	199.1	14.0	0.4	98.4	141.4	0.0	1068.8
05-Nov-16 13:00	5.1	205.1	11.4	0.6	98.3	197.6	0.0	1069.3
05-Nov-16 14:00	3.9	196.2	12.9	0.6	98.6	128.3	0.0	1069.0
05-Nov-16 15:00	3.4	161.4	19.4	0.6	98.0	101.4	0.0	1068.9
05-Nov-16 16:00	2.1	70.7	64.2	0.7	96.7	55.4	0.0	1069.3
05-Nov-16 17:00	1.7	34.2	25.0	0.4	98.2	12.8	0.0	1069.1
05-Nov-16 18:00	2.1	30.4	12.4	0.2	98.9	0.1	0.0	1069.5
05-Nov-16 19:00	1.4	75.1	36.7	0.0	99.2	0.0	0.0	1069.6
05-Nov-16 20:00	1.8	47.6	35.8	0.1	99.1	0.0	0.0	1069.8
05-Nov-16 21:00	2.9	29.0	22.6	0.1	99.1	0.0	0.0	1070.1
05-Nov-16 22:00	2.8	23.8	10.8	0.1	99.3	0.0	0.0	1070.5
05-Nov-16 23:00	2.9	27.9	6.6	0.0	99.3	0.0	0.0	1070.7
06-Nov-16 0:00	2.4	15.7	7.2	-0.1	99.3	0.0	6.4	1071.2
06-Nov-16 1:00	0.5	350.8	15.9	0.1	99.3	0.0	3.5	1071.4
06-Nov-16 2:00	1.6	209.6	20.2	-0.2	99.2	0.0	6.6	1071.4
06-Nov-16 3:00	3.4	201.1	9.6	-0.4	99.3	0.0	1.7	1071.4
06-Nov-16 4:00	3.5	204.3	9.6	0.0	99.3	0.0	4.8	1071.8
06-Nov-16 5:00	4.2	207.5	7.9	0.0	99.3	0.0	8.5	1071.4
06-Nov-16 6:00	4.7	207.8	11.5	0.1	99.3	0.0	7.2	1072.3
06-Nov-16 7:00	5.3	207.7	11.0	0.1	99.3	0.0	5.4	1075.9
06-Nov-16 8:00	4.7	208.3	9.0	-0.2	99.3	0.0	6.3	1077.0
06-Nov-16 9:00	5.3	218.4	9.5	-0.3	99.3	2.2	5.9	1077.5
06-Nov-16 10:00	5.5	205.2	11.0	-0.7	99.3	16.2	7.1	1079.2
06-Nov-16 11:00	3.6	203.2	12.0	-0.6	99.0	40.7	6.8	1078.7
06-Nov-16 12:00	3.0	198.6	13.5	-0.5	98.5	56.3	8.2	1078.8
06-Nov-16 13:00	2.1	204.7	16.5	-0.5	98.2	49.0	6.9	1078.9
06-Nov-16 14:00	3.4	163.1	21.1	-0.3	98.3	41.9	6.8	1079.2
06-Nov-16 15:00	2.5	207.7	21.9	-0.3	98.5	28.7	6.5	1079.1
06-Nov-16 16:00	2.0	200.7	62.8	-0.1	95.3	19.9	7.1	1078.9
06-Nov-16 17:00	3.1	151.2	45.0	-0.1	93.2	3.6	7.8	1079.5
06-Nov-16 18:00	2.7	148.8	55.5	0.1	90.8	0.0	7.6	1079.0
06-Nov-16 19:00	1.8	105.2	54.0	0.4	88.5	0.0	7.4	1079.0
06-Nov-16 20:00	2.0	37.8	31.7	0.7	84.0	0.0	7.5	1079.2
06-Nov-16 21:00	7.0	97.0	47.2	1.6	71.2	0.0	7.7	1077.4
06-Nov-16 22:00	5.5	119.6	34.0	1.8	68.1	0.0	7.8	1078.4
06-Nov-16 23:00	13.1	81.4	8.8	2.1	64.6	0.0	6.7	1080.4
07-Nov-16 0:00	14.9	82.8	8.2	1.9	67.3	0.0	5.3	1076.4
07-Nov-16 1:00	14.3	75.2	9.1	1.5	70.5	0.0	5.8	1078.7
07-Nov-16 2:00	12.3	96.8	22.1	1.2	75.8	0.0	5.3	1079.3
07-Nov-16 3:00	2.8	156.7	67.0	0.2	90.1	0.0	5.6	1079.9
07-Nov-16 4:00	1.6	206.0	53.2	-0.2	96.3	0.0	5.6	1080.3
07-Nov-16 5:00	1.4	246.3	51.0	0.3	93.0	0.0	5.1	1080.5
07-Nov-16 6:00	1.8	286.9	62.4	0.2	95.7	0.0	6.9	1081.3

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
07-Nov-16 7:00	1.7	195.5	32.2	-0.3	99.3	0.0	7.2	1081.9
07-Nov-16 8:00	2.4	283.3	23.4	0.0	99.3	0.0	8.1	1082.9
07-Nov-16 9:00	4.1	2.1	12.1	-0.1	99.0	1.5	-	1084.1
07-Nov-16 10:00	3.1	357.3	14.2	0.0	99.3	6.9	9.8	1085.0
07-Nov-16 11:00	0.9	357.4	17.5	0.1	99.3	12.6	11.7	1087.0
07-Nov-16 12:00	1.9	131.3	43.5	0.5	98.6	20.3	13.1	1087.6
07-Nov-16 13:00	2.1	168.1	59.4	1.2	97.8	52.8	11.3	1090.0
07-Nov-16 14:00	1.7	34.4	59.9	1.2	97.1	70.6	11.2	1090.0
07-Nov-16 15:00	2.4	44.2	24.2	1.3	96.2	31.3	10.6	1090.5
07-Nov-16 16:00	1.7	74.3	51.6	1.2	95.7	14.5	11.1	1091.7
07-Nov-16 17:00	1.4	53.6	39.3	0.5	98.5	2.8	9.6	1092.7
07-Nov-16 18:00	1.8	39.2	9.6	0.1	99.2	0.0	9.1	1093.5
07-Nov-16 19:00	1.5	197.2	36.0	0.2	99.0	0.0	10.3	1094.2
07-Nov-16 20:00	2.3	175.3	29.2	0.1	99.3	0.0	9.8	1094.7
07-Nov-16 21:00	4.6	184.6	13.3	0.1	99.3	0.0	11.8	1095.1
07-Nov-16 22:00	4.9	198.3	18.3	0.2	99.3	0.0	11.4	1095.9
07-Nov-16 23:00	5.1	188.6	9.5	0.6	98.3	0.0	11.7	1096.9
08-Nov-16 0:00	5.1	177.7	7.2	0.6	97.6	0.0	10.5	1100.2
08-Nov-16 1:00	4.9	179.2	8.9	0.1	99.2	0.0	10.4	1100.6
08-Nov-16 2:00	4.4	176.6	9.2	0.3	99.2	0.0	9.9	1100.8
08-Nov-16 3:00	4.6	183.0	12.6	0.3	98.6	0.0	10.2	1100.8
08-Nov-16 4:00	4.4	173.2	7.5	0.2	99.2	0.0	12.6	1101.4
08-Nov-16 5:00	3.9	174.2	16.4	0.5	99.2	0.0	12.7	1102.5
08-Nov-16 6:00	1.6	114.0	51.4	0.9	97.0	0.0	12.8	1102.4
08-Nov-16 7:00	4.9	177.6	13.3	1.4	93.8	0.0	12.5	1104.0
08-Nov-16 8:00	5.5	173.3	11.9	1.3	95.7	0.1	12.0	1103.5
08-Nov-16 9:00	6.6	164.6	15.8	1.3	95.3	6.1	11.5	1103.1
08-Nov-16 10:00	6.3	181.0	10.8	1.3	95.7	9.6	10.8	1104.2
08-Nov-16 11:00	4.8	190.4	9.5	1.0	98.9	73.2	11.1	1103.9
08-Nov-16 12:00	4.5	196.1	17.8	1.3	98.1	105.0	10.2	1104.4
08-Nov-16 13:00	5.2	181.0	13.1	1.7	96.0	122.2	9.9	1104.3
08-Nov-16 14:00	5.5	183.9	10.7	1.6	96.9	89.1	9.9	1105.5
08-Nov-16 15:00	6.0	172.2	9.5	1.8	93.7	70.5	9.4	1104.8
08-Nov-16 16:00	4.3	173.1	25.8	1.8	93.3	76.1	9.7	1106.0
08-Nov-16 17:00	6.1	182.1	11.3	1.7	90.2	8.9	10.5	1106.5
08-Nov-16 18:00	5.9	178.4	8.4	1.7	89.4	0.1	10.4	1105.0
08-Nov-16 19:00	3.6	128.8	29.9	0.9	96.1	0.0	10.1	1106.3
08-Nov-16 20:00	3.1	174.5	46.5	1.2	95.3	0.0	9.9	1104.6
08-Nov-16 21:00	6.6	179.2	10.5	1.0	97.2	0.0	9.7	1107.1
08-Nov-16 22:00	5.1	180.0	12.2	0.6	99.2	0.0	9.6	1105.8
08-Nov-16 23:00	5.3	174.4	17.2	0.8	96.4	0.0	8.7	1106.3
09-Nov-16 0:00	7.2	176.6	9.3	0.7	96.9	0.0	6.8	1109.0
09-Nov-16 1:00	7.3	173.7	8.3	0.6	97.6	0.0	8.4	1109.0
09-Nov-16 2:00	7.7	185.6	9.2	0.9	96.4	0.0	8.6	1112.1
09-Nov-16 3:00	5.9	191.3	13.5	0.5	99.0	0.0	9.3	1109.4
09-Nov-16 4:00	2.8	228.3	16.8	0.4	99.3	0.0	8.0	1109.7
09-Nov-16 5:00	2.6	172.2	23.0	0.3	99.3	0.0	7.1	1110.2
09-Nov-16 6:00	2.6	161.1	30.3	0.3	99.3	0.0	9.9	1111.0
09-Nov-16 7:00	2.4	200.0	26.4	0.1	99.3	0.0	7.2	1112.3
09-Nov-16 8:00	2.4	201.8	23.1	0.1	99.3	0.0	11.2	1112.5
09-Nov-16 9:00	3.7	209.4	15.6	0.3	99.3	6.6	10.5	1113.4
09-Nov-16 10:00	3.6	215.5	13.4	0.6	99.3	42.5	9.3	1115.4
09-Nov-16 11:00	4.1	210.6	21.9	1.1	98.9	100.8	12.4	1114.2

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
09-Nov-16 12:00	4.8	188.1	12.1	1.7	97.2	142.8	8.1	1115.8
09-Nov-16 13:00	4.7	197.0	15.9	2.1	94.6	140.6	9.9	1116.1
09-Nov-16 14:00	4.8	184.7	15.4	2.2	94.7	150.5	10.2	1115.9
09-Nov-16 15:00	4.8	191.0	12.1	2.5	92.4	87.3	9.5	1115.8
09-Nov-16 16:00	5.0	172.0	18.6	2.8	87.4	43.7	8.7	1117.1
09-Nov-16 17:00	6.6	133.4	42.3	3.0	81.3	9.4	8.8	1115.5
09-Nov-16 18:00	2.0	76.6	53.7	2.5	84.6	0.0	9.1	1115.9
09-Nov-16 19:00	2.0	42.1	50.8	2.9	79.3	0.0	7.2	1115.6
09-Nov-16 20:00	1.7	324.4	71.3	3.3	74.8	0.0	7.8	1115.8
09-Nov-16 21:00	1.5	25.2	36.6	3.8	68.1	0.0	7.5	1115.1
09-Nov-16 22:00	1.9	14.1	30.7	4.0	64.4	0.0	7.7	1115.7
09-Nov-16 23:00	1.8	21.9	55.7	4.6	55.8	0.0	8.0	1115.9
10-Nov-16 0:00	2.4	26.3	30.6	4.3	57.8	0.0	8.2	1115.8
10-Nov-16 1:00	3.6	17.9	10.5	3.6	64.6	0.0	8.0	1115.5
10-Nov-16 2:00	3.8	20.5	13.8	3.5	65.0	0.0	7.5	1115.7
10-Nov-16 3:00	3.1	29.6	19.4	3.5	63.5	0.0	7.2	1116.2
10-Nov-16 4:00	2.4	142.0	46.0	4.8	52.7	0.0	10.0	1115.3
10-Nov-16 5:00	3.4	333.7	32.9	5.1	52.3	0.0	7.3	1115.9
10-Nov-16 6:00	2.3	305.4	57.5	5.2	53.2	0.0	7.5	1115.6
10-Nov-16 7:00	2.4	293.2	34.2	5.0	57.8	0.0	8.5	1115.8
10-Nov-16 8:00	2.0	347.2	26.6	4.8	61.2	0.0	9.2	1115.8
10-Nov-16 9:00	2.2	282.2	37.6	5.1	59.6	4.2	8.5	1115.7
10-Nov-16 10:00	3.4	201.7	23.7	4.9	63.5	29.4	8.8	1115.6
10-Nov-16 11:00	2.6	166.1	31.5	4.5	69.3	45.7	9.2	1116.4
10-Nov-16 12:00	3.5	181.6	17.8	3.6	81.3	51.3	8.7	1115.0
10-Nov-16 13:00	5.7	186.9	11.3	2.7	92.9	43.2	7.2	1115.2
10-Nov-16 14:00	6.5	181.0	8.6	2.2	96.7	44.1	7.4	1116.1
10-Nov-16 15:00	6.9	176.0	10.4	1.9	98.9	38.4	6.2	1118.6
10-Nov-16 16:00	5.5	197.5	14.7	1.7	99.2	27.9	5.2	1117.4
10-Nov-16 17:00	5.8	195.9	14.0	1.4	99.1	3.5	6.7	1120.2
10-Nov-16 18:00	6.9	171.1	10.4	1.2	98.7	0.0	7.2	1123.7
10-Nov-16 19:00	8.3	176.6	9.3	0.8	97.9	0.0	6.7	1124.4
10-Nov-16 20:00	8.4	175.3	11.4	1.0	96.7	0.0	6.3	1126.7
10-Nov-16 21:00	4.6	199.5	18.1	1.1	98.1	0.0	7.3	1126.0
10-Nov-16 22:00	6.2	186.6	14.8	0.9	98.1	0.0	5.8	1126.4
10-Nov-16 23:00	9.3	169.7	9.7	1.1	93.4	0.0	6.4	1128.2
11-Nov-16 0:00	8.2	171.0	7.9	1.6	87.2	0.0	6.3	1126.9
11-Nov-16 1:00	8.7	167.6	8.4	1.6	85.1	0.0	6.4	1128.8
11-Nov-16 2:00	6.6	175.8	9.6	1.5	87.2	0.0	6.0	1129.2
11-Nov-16 3:00	6.1	183.4	14.6	0.8	92.0	0.0	6.0	1128.2
11-Nov-16 4:00	4.2	191.6	18.3	0.6	94.7	0.0	6.0	1129.4
11-Nov-16 5:00	4.1	196.4	25.8	0.2	98.0	0.0	6.1	1129.4
11-Nov-16 6:00	7.0	179.2	9.4	1.1	87.0	0.0	5.3	1129.7
11-Nov-16 7:00	10.2	170.8	8.3	2.1	74.8	0.0	5.5	1127.2
11-Nov-16 8:00	7.7	183.2	13.8	1.7	79.3	0.0	5.5	1128.0
11-Nov-16 9:00	5.4	210.5	15.8	0.5	95.4	4.7	5.9	1127.9
11-Nov-16 10:00	4.7	205.4	19.0	0.6	95.5	40.4	6.1	1128.0
11-Nov-16 11:00	5.3	189.4	18.4	1.4	84.6	89.0	5.3	1128.1
11-Nov-16 12:00	8.8	182.3	8.3	2.2	75.0	107.2	5.3	1134.4
11-Nov-16 13:00	9.3	177.6	9.2	1.4	86.3	119.3	5.3	1129.3
11-Nov-16 14:00	9.8	183.0	8.1	1.5	86.2	116.5	5.1	1125.7
11-Nov-16 15:00	9.5	180.4	7.9	2.0	78.5	81.0	5.3	1130.4
11-Nov-16 16:00	9.5	176.3	7.1	2.1	78.2	41.2	5.2	1129.0

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
11-Nov-16 17:00	9.2	175.7	6.6	2.3	73.1	6.0	5.3	1130.6
11-Nov-16 18:00	8.8	183.6	6.6	1.9	79.0	0.0	5.5	1125.0
11-Nov-16 19:00	8.6	182.6	7.5	1.3	85.6	0.0	5.4	1126.9
11-Nov-16 20:00	8.1	182.0	7.7	0.7	91.2	0.0	5.6	1128.8
11-Nov-16 21:00	7.2	184.2	7.9	0.7	90.4	0.0	5.4	1128.0
11-Nov-16 22:00	6.9	180.6	9.8	0.5	93.6	0.0	5.2	1128.7
11-Nov-16 23:00	7.3	189.4	8.3	0.5	92.8	0.0	5.1	1127.3
12-Nov-16 0:00	4.2	195.6	11.5	-0.1	99.2	0.0	5.5	1128.5
12-Nov-16 1:00	2.5	203.7	9.2	0.0	99.3	0.0	5.4	1128.6
12-Nov-16 2:00	1.3	132.4	47.4	-0.1	99.3	0.0	4.8	1128.9
12-Nov-16 3:00	2.5	142.6	34.3	-0.1	98.7	0.0	5.2	1128.7
12-Nov-16 4:00	2.1	138.7	38.9	0.1	95.2	0.0	5.2	1129.7
12-Nov-16 5:00	1.9	75.8	55.1	0.2	92.7	0.0	4.7	1128.8
12-Nov-16 6:00	1.4	69.4	37.3	0.4	90.0	0.0	4.8	1128.8
12-Nov-16 7:00	1.1	139.9	23.6	0.2	83.9	0.0	4.8	1128.9
12-Nov-16 8:00	1.6	88.5	33.7	0.0	81.5	0.0	4.4	1128.8
12-Nov-16 9:00	1.3	76.8	20.3	0.0	80.2	9.5	4.0	1128.8
12-Nov-16 10:00	0.9	113.6	12.8	0.5	78.3	50.6	4.1	1129.1
12-Nov-16 11:00	0.9	95.5	11.4	1.4	67.0	182.1	3.6	1130.4
12-Nov-16 12:00	0.3	92.0	43.3	2.7	61.1	233.4	3.9	1129.9
12-Nov-16 13:00	0.5	183.3	29.1	1.8	70.9	190.8	3.4	1129.5
12-Nov-16 14:00	0.8	54.7	30.7	1.5	67.6	172.2	4.1	1129.6
12-Nov-16 15:00	0.5	333.9	49.4	1.7	66.0	128.4	4.0	1129.1
12-Nov-16 16:00	0.7	304.7	59.4	1.1	69.1	60.1	4.1	1129.0
12-Nov-16 17:00	1.3	151.2	37.2	1.2	68.7	8.7	4.0	1129.0
12-Nov-16 18:00	3.0	178.0	15.9	1.4	70.0	0.0	4.0	1129.3
12-Nov-16 19:00	3.2	191.4	15.9	1.3	72.7	0.0	4.3	1128.3
12-Nov-16 20:00	4.9	173.1	12.3	0.6	83.8	0.0	4.4	1128.8
12-Nov-16 21:00	4.3	164.7	26.0	0.4	88.7	0.0	4.2	1127.9
12-Nov-16 22:00	4.0	157.3	22.3	0.1	92.8	0.0	3.7	1128.9
12-Nov-16 23:00	3.3	15.2	11.4	-0.4	89.6	0.0	3.8	1129.3
13-Nov-16 0:00	2.9	23.7	13.2	-0.7	95.5	0.0	5.1	1129.3
13-Nov-16 1:00	3.7	19.7	10.5	-1.0	98.9	0.0	6.6	1130.5
13-Nov-16 2:00	3.4	21.4	13.9	-1.0	99.3	0.0	5.6	1131.3
13-Nov-16 3:00	3.8	26.1	9.6	-0.8	99.2	0.0	6.6	1131.4
13-Nov-16 4:00	3.6	24.3	7.2	-0.7	99.3	0.0	6.2	1131.3
13-Nov-16 5:00	3.6	26.0	15.9	-0.4	99.3	0.0	7.7	1132.3
13-Nov-16 6:00	3.9	19.7	11.5	-0.2	99.3	0.0	5.7	1132.4
13-Nov-16 7:00	3.6	10.7	12.3	-0.1	99.3	0.0	9.1	1132.8
13-Nov-16 8:00	2.9	22.7	16.3	0.0	99.3	0.0	8.4	1133.5
13-Nov-16 9:00	3.3	8.2	11.4	0.0	99.3	1.8	10.4	1134.6
13-Nov-16 10:00	3.2	6.4	12.8	0.1	99.3	10.5	10.0	1135.7
13-Nov-16 11:00	1.6	267.8	58.9	0.4	99.3	18.6	11.9	1142.7
13-Nov-16 12:00	5.0	200.5	16.8	0.9	99.1	77.5	11.2	1142.7
13-Nov-16 13:00	6.5	199.2	13.1	1.0	98.4	121.5	10.6	1143.3
13-Nov-16 14:00	5.4	204.8	15.4	0.8	99.0	101.5	10.5	1143.6
13-Nov-16 15:00	6.9	198.9	11.1	0.7	99.2	38.5	9.9	1144.6
13-Nov-16 16:00	10.1	186.7	16.7	0.2	96.8	29.5	10.1	1148.4
13-Nov-16 17:00	10.1	187.8	12.2	0.1	85.5	6.8	9.8	1144.9
13-Nov-16 18:00	7.1	224.9	11.3	-1.1	98.0	0.0	9.4	1145.7
13-Nov-16 19:00	6.3	207.2	11.7	-1.7	99.1	0.0	10.2	1144.5
13-Nov-16 20:00	5.0	201.4	13.7	-1.7	98.9	0.0	9.6	1143.1
13-Nov-16 21:00	5.7	192.6	12.2	-1.6	97.3	0.0	9.9	1145.5



Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
13-Nov-16 22:00	4.0	218.4	9.8	-1.8	99.2	0.0	9.9	1145.4
13-Nov-16 23:00	3.8	220.8	10.3	-1.8	99.2	0.0	9.4	1146.3
14-Nov-16 0:00	2.6	221.8	10.8	-1.8	99.1	0.0	9.4	1145.8
14-Nov-16 1:00	3.2	218.6	7.2	-1.8	99.1	0.0	13.2	1148.0
14-Nov-16 2:00	3.5	202.2	7.8	-1.7	99.2	0.0	16.8	1149.4
14-Nov-16 3:00	3.3	201.7	9.7	-1.7	99.2	0.0	18.1	1148.6
14-Nov-16 4:00	2.4	206.0	10.8	-1.8	99.1	0.0	18.4	1148.2
14-Nov-16 5:00	1.5	201.2	9.5	-1.8	99.1	0.0	18.1	1149.3
14-Nov-16 6:00	1.2	188.5	20.6	-1.9	99.0	0.0	18.7	1149.4
14-Nov-16 7:00	2.4	197.6	13.4	-1.9	99.0	0.0	20.4	1150.3
14-Nov-16 8:00	4.1	195.3	12.4	-1.8	99.1	0.0	20.2	1150.3
14-Nov-16 9:00	4.4	206.2	13.6	-1.8	99.0	9.4	19.6	1150.4
14-Nov-16 10:00	3.9	212.2	11.3	-1.8	98.7	46.2	19.5	1150.0
14-Nov-16 11:00	3.1	216.8	10.6	-1.6	98.6	88.6	19.2	1150.4
14-Nov-16 12:00	1.6	211.2	18.0	-0.7	98.1	178.2	18.9	1150.2
14-Nov-16 13:00	2.8	194.3	13.9	-2.0	98.3	71.3	19.3	1150.2
14-Nov-16 14:00	1.9	191.9	16.2	-1.8	98.2	107.3	16.6	1150.5
14-Nov-16 15:00	0.3	95.3	15.6	-2.0	98.4	63.6	18.5	1150.5
14-Nov-16 16:00	0.2	260.9	2.4	-2.1	98.3	31.9	18.6	1150.6
14-Nov-16 17:00	0.3	76.2	18.7	-2.2	97.8	4.8	18.6	1150.6
14-Nov-16 18:00	0.2	9.6	9.1	-2.1	96.9	0.0	18.3	1150.6
14-Nov-16 19:00	1.0	250.2	0.1	-2.1	94.6	0.0	18.9	1150.6
14-Nov-16 20:00	1.1	18.4	31.5	-2.1	92.9	0.0	18.4	1150.6
14-Nov-16 21:00	0.6	22.0	16.7	-2.1	91.7	0.0	19.2	1150.6
14-Nov-16 22:00	1.1	149.6	45.1	-1.9	94.4	0.0	19.1	1150.7
14-Nov-16 23:00	1.4	38.1	46.7	-1.9	93.6	0.0	19.2	1150.7
15-Nov-16 0:00	0.5	329.0	12.3	-1.9	97.1	0.0	18.9	1151.3
15-Nov-16 1:00	1.4	24.1	35.3	-2.2	99.0	0.0	18.3	1151.5
15-Nov-16 2:00	1.2	36.5	34.2	-2.2	98.2	0.0	20.2	1151.7
15-Nov-16 3:00	0.0	0.0	0.0	-2.0	98.4	0.0	20.7	1152.4
15-Nov-16 4:00	1.3	168.8	18.6	-2.0	98.5	0.0	21.8	1154.2
15-Nov-16 5:00	1.1	130.1	34.7	-2.1	98.5	0.0	23.0	1155.0
15-Nov-16 6:00	2.9	207.1	9.8	-2.0	98.7	0.0	27.0	1156.6
15-Nov-16 7:00	3.3	223.8	7.4	-2.2	98.7	0.0	28.9	1158.1
15-Nov-16 8:00	2.1	211.4	8.9	-2.4	98.5	0.0	28.6	1158.2
15-Nov-16 9:00	1.5	204.9	11.0	-2.6	98.0	5.4	28.5	1158.1
15-Nov-16 10:00	0.6	164.3	15.8	-3.1	96.7	15.5	28.5	1158.1
15-Nov-16 11:00	0.8	125.8	19.5	-2.9	93.4	121.1	27.3	1160.6
15-Nov-16 12:00	1.0	127.8	12.8	-2.3	87.9	254.5	28.0	1159.4
15-Nov-16 13:00	1.1	46.8	12.9	-2.3	87.3	175.1	27.2	1159.8
15-Nov-16 14:00	0.9	6.7	29.0	-2.6	88.0	143.8	26.8	1159.5
15-Nov-16 15:00	0.3	330.4	11.3	-2.2	87.6	142.3	26.5	1159.2
15-Nov-16 16:00	0.6	264.7	7.7	-2.9	91.9	73.6	26.0	1158.7
15-Nov-16 17:00	0.5	138.3	11.7	-3.6	94.4	9.2	26.7	1158.5
15-Nov-16 18:00	0.6	135.2	25.3	-4.0	95.2	0.0	26.6	1158.5
15-Nov-16 19:00	1.3	207.5	8.7	-4.7	96.6	0.0	26.8	1158.6
15-Nov-16 20:00	0.6	173.7	28.3	-4.7	94.0	0.0	26.1	1158.4
15-Nov-16 21:00	1.2	257.9	28.7	-4.6	94.1	0.0	25.4	1158.6
15-Nov-16 22:00	0.8	158.3	17.6	-4.9	97.4	0.0	25.3	1158.5
15-Nov-16 23:00	1.3	266.0	43.1	-5.2	96.1	0.0	24.8	1158.7
16-Nov-16 0:00	0.9	200.9	50.5	-5.4	96.9	0.0	25.2	1158.6
16-Nov-16 1:00	1.2	189.0	15.4	-5.3	97.4	0.0	24.5	1158.6
16-Nov-16 2:00	1.3	111.0	22.3	-5.2	95.0	0.0	24.4	1158.6

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
16-Nov-16 3:00	1.5	78.4	24.0	-4.9	88.1	0.0	23.7	1158.7
16-Nov-16 4:00	2.8	75.2	19.2	-5.0	84.4	0.0	24.5	1158.7
16-Nov-16 5:00	6.0	33.5	10.0	-4.0	78.5	0.0	20.4	1157.8
16-Nov-16 6:00	6.6	27.1	4.6	-4.1	82.3	0.0	22.9	1158.1
16-Nov-16 7:00	6.4	33.7	6.3	-3.9	79.0	0.0	22.5	1158.2
16-Nov-16 8:00	6.1	32.2	8.1	-3.8	75.2	0.0	22.9	1158.5
16-Nov-16 9:00	5.5	35.8	14.6	-3.7	75.5	4.8	22.7	1158.4
16-Nov-16 10:00	5.9	33.8	11.8	-3.7	78.1	18.1	23.4	1158.9
16-Nov-16 11:00	4.9	61.9	21.0	-2.3	64.6	152.0	21.5	1160.8
16-Nov-16 12:00	5.8	77.0	14.8	-1.7	59.5	254.4	22.0	1162.2
16-Nov-16 13:00	6.5	54.5	15.7	-2.0	63.2	274.4	23.2	1160.5
16-Nov-16 14:00	7.0	38.2	8.1	-3.0	72.5	241.6	23.7	1160.9
16-Nov-16 15:00	8.2	54.2	11.0	-2.6	66.0	182.1	23.3	1157.4
16-Nov-16 16:00	9.0	57.3	8.4	-2.7	65.0	99.2	24.4	1157.9
16-Nov-16 17:00	9.6	60.2	8.8	-3.1	67.8	17.2	25.5	1158.2
16-Nov-16 18:00	10.2	62.5	7.8	-3.1	66.9	0.0	34.9	1156.7
16-Nov-16 19:00	10.5	63.5	7.5	-3.0	63.2	0.0	28.5	1158.8
16-Nov-16 20:00	10.4	65.3	9.5	-3.1	63.2	0.0	22.8	1158.9
16-Nov-16 21:00	9.4	77.1	11.6	-3.3	63.1	0.0	22.6	1158.8
16-Nov-16 22:00	8.9	80.0	11.6	-3.6	64.6	0.0	22.3	1160.6
16-Nov-16 23:00	8.9	66.6	8.2	-3.8	65.0	0.0	22.2	1159.3
17-Nov-16 0:00	8.1	55.6	8.7	-4.1	66.7	0.0	22.2	1157.4
17-Nov-16 1:00	6.8	58.6	10.4	-4.2	65.3	0.0	22.5	1159.9
17-Nov-16 2:00	6.1	71.7	9.7	-4.3	63.9	0.0	22.1	1159.0
17-Nov-16 3:00	5.7	55.0	15.0	-5.2	71.2	0.0	22.0	1158.3
17-Nov-16 4:00	5.1	47.6	13.0	-5.4	73.4	0.0	22.1	1157.9
17-Nov-16 5:00	4.2	52.9	13.6	-5.9	77.1	0.0	22.0	1158.2
17-Nov-16 6:00	5.7	51.0	19.4	-6.0	76.4	0.0	21.3	1158.5
17-Nov-16 7:00	4.0	76.7	27.4	-6.5	79.9	0.0	21.1	1158.5
17-Nov-16 8:00	2.8	80.8	29.8	-6.9	86.1	0.0	21.8	1158.3
17-Nov-16 9:00	2.3	85.2	31.2	-6.6	83.2	4.8	22.0	1158.3
17-Nov-16 10:00	2.0	77.1	35.4	-6.5	82.4	20.1	21.6	1158.6
17-Nov-16 11:00	2.7	83.1	18.5	-6.3	79.7	122.0	21.8	1160.5
17-Nov-16 12:00	2.9	80.2	26.2	-5.4	74.1	223.6	21.2	1160.9
17-Nov-16 13:00	2.4	94.2	27.0	-6.2	77.8	109.6	22.2	1159.4
17-Nov-16 14:00	3.1	73.8	17.7	-5.3	73.1	156.3	22.3	1159.6
17-Nov-16 15:00	1.5	61.6	53.1	-4.9	75.3	152.2	22.0	1159.5
17-Nov-16 16:00	1.8	75.0	43.7	-5.6	82.3	64.1	21.7	1158.6
17-Nov-16 17:00	1.4	70.8	47.5	-5.7	82.0	13.7	21.8	1158.5
17-Nov-16 18:00	2.3	81.3	30.7	-5.9	82.7	0.0	22.0	1158.5
17-Nov-16 19:00	0.9	179.4	65.6	-6.2	85.2	0.0	21.6	1158.5
17-Nov-16 20:00	1.3	34.9	31.7	-6.2	85.8	0.0	21.6	1158.5
17-Nov-16 21:00	0.8	193.6	37.4	-6.5	89.1	0.0	21.6	1158.6
17-Nov-16 22:00	0.8	235.1	23.5	-6.6	88.8	0.0	21.7	1158.6
17-Nov-16 23:00	1.0	321.9	31.7	-6.4	88.3	0.0	21.5	1158.6
18-Nov-16 0:00	0.7	253.8	29.3	-6.5	90.2	0.0	21.6	1158.6
18-Nov-16 1:00	0.9	211.9	29.4	-6.5	90.5	0.0	21.6	1158.7
18-Nov-16 2:00	1.0	183.5	21.3	-6.7	92.1	0.0	21.5	1158.6
18-Nov-16 3:00	0.7	212.7	30.7	-6.5	91.5	0.0	21.5	1158.6
18-Nov-16 4:00	0.9	249.8	37.4	-6.5	91.6	0.0	21.4	1158.5
18-Nov-16 5:00	1.0	283.3	16.4	-6.8	93.9	0.0	21.3	1158.6
18-Nov-16 6:00	1.2	185.1	28.7	-7.2	97.3	0.0	21.0	1158.8
18-Nov-16 7:00	1.2	165.9	17.9	-7.2	96.5	0.0	21.2	1158.7

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
18-Nov-16 8:00	1.4	219.9	25.9	-7.3	96.3	0.0	20.7	1158.6
18-Nov-16 9:00	1.3	188.5	21.8	-7.6	98.3	3.7	20.9	1158.8
18-Nov-16 10:00	1.1	157.7	31.4	-7.8	98.1	13.5	20.3	1158.8
18-Nov-16 11:00	1.0	241.5	32.9	-7.0	93.5	108.7	19.4	1162.3
18-Nov-16 12:00	1.1	279.0	29.7	-7.1	93.3	116.4	19.9	1159.3
18-Nov-16 13:00	0.9	179.0	40.8	-7.3	94.3	129.0	20.0	1159.8
18-Nov-16 14:00	0.9	219.1	22.0	-7.3	94.7	103.8	20.2	1159.0
18-Nov-16 15:00	1.2	197.1	43.5	-7.6	95.8	72.9	20.2	1158.9
18-Nov-16 16:00	0.8	224.1	41.2	-7.7	95.9	38.3	20.4	1158.8
18-Nov-16 17:00	1.7	38.5	40.9	-7.9	96.1	4.5	20.7	1158.7
18-Nov-16 18:00	1.4	31.9	46.6	-7.9	95.9	0.0	20.5	1158.8
18-Nov-16 19:00	2.2	49.0	24.7	-7.9	96.0	0.0	20.8	1158.9
18-Nov-16 20:00	1.7	49.2	61.1	-7.7	94.8	0.0	20.5	1158.7
18-Nov-16 21:00	1.2	142.3	57.2	-8.1	96.0	0.0	20.7	1158.8
18-Nov-16 22:00	1.6	81.4	53.2	-7.6	94.6	0.0	20.1	1158.8
18-Nov-16 23:00	1.4	89.4	50.2	-7.7	95.1	0.0	20.8	1158.7
19-Nov-16 0:00	1.4	86.8	56.4	-7.6	94.4	0.0	20.7	1158.8
19-Nov-16 1:00	1.2	56.8	65.1	-7.5	94.3	0.0	20.4	1158.6
19-Nov-16 2:00	0.8	180.4	57.7	-7.7	95.0	0.0	20.7	1158.8
19-Nov-16 3:00	1.1	24.8	63.2	-7.6	94.2	0.0	20.9	1158.8
19-Nov-16 4:00	0.7	171.0	61.5	-7.8	95.4	0.0	20.4	1158.8
19-Nov-16 5:00	1.2	281.0	36.4	-7.9	96.8	0.0	20.4	1158.8
19-Nov-16 6:00	0.9	265.6	34.3	-8.1	96.5	0.0	20.3	1158.8
19-Nov-16 7:00	1.0	248.2	33.6	-7.9	96.4	0.0	20.3	1158.8
19-Nov-16 8:00	0.8	230.4	35.7	-8.0	95.9	0.0	20.3	1158.9
19-Nov-16 9:00	1.0	230.6	17.4	-8.1	95.5	2.3	20.4	1158.9
19-Nov-16 10:00	0.7	258.6	31.8	-8.1	95.5	10.2	20.4	1158.9
19-Nov-16 11:00	0.8	230.6	26.0	-8.0	95.1	53.3	20.2	1158.8
19-Nov-16 12:00	1.3	171.1	19.2	-8.0	94.7	89.3	20.4	1158.8
19-Nov-16 13:00	1.1	210.2	21.0	-7.8	94.3	97.4	20.2	1158.9
19-Nov-16 14:00	0.5	165.8	22.4	-7.7	94.2	91.4	20.1	1158.9
19-Nov-16 15:00	0.7	202.7	25.3	-8.0	94.5	58.4	20.2	1158.9
19-Nov-16 16:00	0.5	296.7	13.7	-8.2	95.0	21.8	20.3	1158.9
19-Nov-16 17:00	0.7	236.9	21.6	-8.6	94.5	4.5	20.3	1158.9
19-Nov-16 18:00	0.9	272.5	10.8	-8.9	94.6	0.0	20.1	1158.8
19-Nov-16 19:00	0.8	300.5	10.6	-9.0	94.7	0.0	20.1	1158.9
19-Nov-16 20:00	1.0	217.5	17.9	-9.4	94.1	0.0	19.8	1159.0
19-Nov-16 21:00	0.8	177.9	12.0	-9.4	94.1	0.0	19.7	1159.0
19-Nov-16 22:00	0.9	197.2	8.3	-9.5	93.9	0.0	19.8	1159.0
19-Nov-16 23:00	0.5	196.8	13.3	-9.5	93.8	0.0	20.0	1159.0
20-Nov-16 0:00	0.5	190.5	11.7	-9.7	93.6	0.0	19.5	1159.1
20-Nov-16 1:00	1.0	185.6	14.2	-9.9	93.5	0.0	18.4	1159.1
20-Nov-16 2:00	1.0	175.1	10.5	-9.8	93.7	0.0	19.8	1159.1
20-Nov-16 3:00	0.1	156.7	9.6	-9.6	93.7	0.0	19.5	1159.0
20-Nov-16 4:00	0.2	264.9	16.1	-9.9	93.6	0.0	19.0	1159.0
20-Nov-16 5:00	0.4	178.3	17.9	-10.3	93.1	0.0	20.0	1159.1
20-Nov-16 6:00	0.6	200.0	14.4	-10.4	92.9	0.0	20.0	1159.1
20-Nov-16 7:00	0.9	206.2	13.0	-10.5	93.0	0.0	19.3	1159.0
20-Nov-16 8:00	1.0	215.8	9.5	-11.0	92.4	0.0	18.8	1159.0
20-Nov-16 9:00	0.9	185.9	13.2	-11.3	92.1	1.9	18.9	1159.1
20-Nov-16 10:00	0.8	209.6	11.5	-11.2	92.1	7.7	19.9	1159.1
20-Nov-16 11:00	1.0	188.6	11.8	-11.3	91.6	42.5	18.7	1159.4
20-Nov-16 12:00	0.8	172.6	10.7	-10.6	91.4	90.7	18.6	1159.3

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
	Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
20-Nov-16 13:00	0.5	181.6	14.3	-10.0	91.5	130.8	-	1160.3
20-Nov-16 14:00	-	-	-	-10.4	92.2	68.8	19.4	1159.2
20-Nov-16 15:00	-	-	-	-10.3	92.5	39.4	20.3	1159.1
20-Nov-16 16:00	-	-	-	-10.5	92.7	12.3	18.7	1159.1
20-Nov-16 17:00	-	-	-	-11.1	92.1	4.8	18.6	1159.1
20-Nov-16 18:00	-	-	-	-11.6	91.7	0.0	19.2	1159.2
20-Nov-16 19:00	-	-	-	-11.7	91.6	0.0	18.9	1159.1
20-Nov-16 20:00	-	-	-	-11.7	91.7	0.0	18.7	1159.2
20-Nov-16 21:00	-	-	-	-11.8	91.5	0.0	18.7	1159.2
20-Nov-16 22:00	-	-	-	-12.2	91.2	0.0	19.0	1159.1
20-Nov-16 23:00	-	-	-	-12.2	91.2	0.0	19.4	1159.1
21-Nov-16 0:00	-	-	-	-12.4	91.0	0.0	18.3	1159.1
21-Nov-16 1:00	-	-	-	-12.4	90.9	0.0	18.5	1159.3
21-Nov-16 2:00	-	-	-	-12.5	90.9	0.0	18.7	1159.2
21-Nov-16 3:00	-	-	-	-12.7	90.7	0.0	18.7	1159.2
21-Nov-16 4:00	-	-	-	-12.8	90.5	0.0	19.5	1159.2
21-Nov-16 5:00	-	-	-	-13.0	90.3	0.0	19.3	1159.2
21-Nov-16 6:00	-	-	-	-13.2	89.9	0.0	20.9	1159.2
21-Nov-16 7:00	-	-	-	-13.2	90.0	0.0	19.3	1159.3
21-Nov-16 8:00	-	-	-	-12.9	90.4	0.0	19.7	1159.2
21-Nov-16 9:00	-	-	-	-12.8	90.4	3.7	18.8	1159.2
21-Nov-16 10:00	-	-	-	-12.4	90.5	23.4	19.3	1159.3
21-Nov-16 11:00	-	-	-	-11.9	90.6	61.1	17.4	1159.5
21-Nov-16 12:00	-	-	-	-10.8	91.1	91.9	-	1160.2
21-Nov-16 13:00	-	-	-	-8.7	92.0	104.1	-	1160.0
21-Nov-16 14:00	-	-	-	-8.4	91.5	87.3	20.7	1159.6
21-Nov-16 15:00	-	-	-	-10.1	87.2	56.0	20.5	1159.4
21-Nov-16 16:00	-	-	-	-10.2	86.6	23.7	20.2	1158.8
21-Nov-16 17:00	1.9	33.3	45.4	-10.1	83.2	2.4	19.7	1159.1
21-Nov-16 18:00	1.2	26.1	47.3	-10.4	84.1	0.0	19.9	1159.2
21-Nov-16 19:00	2.9	20.1	51.0	-9.8	78.3	0.0	18.8	1159.3
21-Nov-16 20:00	3.0	27.8	33.6	-9.5	75.5	0.0	20.4	1156.8
21-Nov-16 21:00	3.7	355.7	62.0	-8.9	72.4	0.0	19.6	1159.3
21-Nov-16 22:00	5.5	23.8	16.7	-7.5	63.4	0.0	19.1	1158.5
21-Nov-16 23:00	2.1	312.1	54.4	-8.6	72.6	0.0	18.7	1159.0
22-Nov-16 0:00	2.7	196.4	35.3	-9.0	75.9	0.0	18.6	1159.2
22-Nov-16 1:00	5.8	30.1	7.4	-7.8	91.0	0.0	20.1	1158.9
22-Nov-16 2:00	8.0	27.2	6.1	-7.6	95.4	0.0	21.0	1158.0
22-Nov-16 3:00	7.5	37.6	9.0	-7.6	95.3	0.0	21.2	1160.3
22-Nov-16 4:00	7.7	32.9	6.8	-7.3	93.2	0.0	20.8	1158.9
22-Nov-16 5:00	6.2	32.9	6.5	-7.2	95.3	0.0	20.8	1159.4
22-Nov-16 6:00	5.8	36.0	6.0	-7.0	95.8	0.0	21.0	1159.5
22-Nov-16 7:00	5.9	34.5	7.7	-6.6	95.3	0.0	21.1	1159.8
22-Nov-16 8:00	4.3	45.0	20.7	-6.5	95.0	0.0	20.5	1160.2
22-Nov-16 9:00	1.5	45.9	40.5	-7.0	95.7	1.8	20.0	1161.0
22-Nov-16 10:00	3.6	32.1	6.7	-6.4	95.5	33.5	22.3	1161.4
22-Nov-16 11:00	2.7	32.3	13.3	-6.0	94.3	109.8	-	1161.6
22-Nov-16 12:00	4.0	37.8	22.8	-5.6	93.4	111.5	22.6	1161.2
22-Nov-16 13:00	3.6	28.3	16.2	-5.1	92.7	110.9	-	1161.4
22-Nov-16 14:00	3.9	26.4	4.6	-4.5	89.9	116.8	-	1161.9
22-Nov-16 15:00	2.9	22.6	16.5	-3.9	88.1	91.3	-	1161.4
22-Nov-16 16:00	3.0	33.7	9.3	-4.0	87.0	15.8	23.0	1161.4
22-Nov-16 17:00	3.2	27.6	6.5	-4.1	86.2	2.1	18.7	1161.6

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
22-Nov-16 18:00	3.2	33.8	5.4	-4.1	86.3	0.0	23.2	1161.3
22-Nov-16 19:00	3.1	30.3	5.5	-4.0	87.9	0.0	22.8	1161.5
22-Nov-16 20:00	2.9	33.7	5.1	-3.7	88.4	0.0	23.2	1161.6
22-Nov-16 21:00	3.5	27.8	4.4	-4.0	90.3	0.0	22.3	1161.7
22-Nov-16 22:00	3.6	29.3	9.1	-4.0	92.5	0.0	24.7	1162.1
22-Nov-16 23:00	3.6	30.3	5.4	-4.1	92.4	0.0	24.7	1161.8
23-Nov-16 0:00	4.0	29.3	3.8	-4.0	91.3	0.0	25.0	1161.7
23-Nov-16 1:00	3.2	28.2	4.1	-3.8	92.5	0.0	23.2	1161.8
23-Nov-16 2:00	4.1	32.0	5.2	-4.0	92.8	0.0	24.5	1161.8
23-Nov-16 3:00	4.1	27.8	4.0	-3.9	92.8	0.0	25.3	1161.6
23-Nov-16 4:00	4.1	27.5	4.2	-4.0	95.7	0.0	25.6	1162.4
23-Nov-16 5:00	4.3	30.3	4.6	-4.0	95.4	0.0	25.2	1161.9
23-Nov-16 6:00	3.8	31.0	5.0	-3.9	95.0	0.0	27.2	1161.6
23-Nov-16 7:00	3.5	31.5	5.2	-3.9	97.7	0.0	26.5	1162.9
23-Nov-16 8:00	3.3	28.0	9.3	-3.8	95.3	0.0	25.8	1162.7
23-Nov-16 9:00	3.0	34.0	6.9	-3.7	91.8	2.3	25.6	1162.9
23-Nov-16 10:00	2.3	17.6	18.9	-3.2	91.5	27.4	25.1	1163.0
23-Nov-16 11:00	2.7	17.8	11.8	-3.3	90.2	76.4	24.4	1163.5
23-Nov-16 12:00	1.6	78.7	40.0	-2.3	83.8	125.2	25.1	1163.3
23-Nov-16 13:00	2.8	111.1	45.7	-1.6	75.8	102.2	26.1	1162.9
23-Nov-16 14:00	1.7	218.5	52.9	-2.5	89.4	88.9	26.7	1163.0
23-Nov-16 15:00	1.5	81.1	32.6	-3.1	94.6	39.0	21.9	1163.3
23-Nov-16 16:00	1.5	9.7	33.4	-2.9	91.4	17.6	26.6	1163.6
23-Nov-16 17:00	1.8	24.8	21.7	-3.4	96.8	1.5	25.9	1164.4
23-Nov-16 18:00	1.4	306.8	51.1	-3.0	96.7	0.0	28.2	1164.7
23-Nov-16 19:00	2.9	7.1	34.1	-3.1	94.4	0.0	27.9	1164.7
23-Nov-16 20:00	2.7	22.4	17.7	-2.9	88.1	0.0	28.0	1164.7
23-Nov-16 21:00	1.2	83.4	26.4	-2.2	79.8	0.0	27.5	1164.7
23-Nov-16 22:00	1.3	325.2	55.3	-2.1	79.2	0.0	27.4	1164.7
23-Nov-16 23:00	2.3	45.0	55.4	-3.0	87.8	0.0	27.3	1164.7
24-Nov-16 0:00	7.3	84.7	40.0	-1.8	74.3	0.0	22.3	1165.3
24-Nov-16 1:00	8.7	77.8	10.2	-1.5	69.7	0.0	21.0	1163.6
24-Nov-16 2:00	9.4	78.0	10.8	-1.5	69.8	0.0	22.5	1168.2
24-Nov-16 3:00	9.3	89.9	11.3	-0.9	66.0	0.0	21.1	1166.3
24-Nov-16 4:00	5.8	94.1	36.7	-0.8	65.0	0.0	20.9	1164.6
24-Nov-16 5:00	4.0	139.8	39.2	-2.2	79.7	0.0	21.0	1164.5
24-Nov-16 6:00	1.8	242.8	24.9	-2.6	92.3	0.0	21.0	1164.5
24-Nov-16 7:00	1.1	60.7	46.3	-3.0	95.4	0.0	20.8	1164.7
24-Nov-16 8:00	2.0	31.6	7.4	-2.9	93.2	0.0	20.9	1165.0
24-Nov-16 9:00	1.6	34.5	8.9	-3.2	97.2	1.4	21.1	1165.2
24-Nov-16 10:00	1.5	44.2	9.4	-3.0	97.4	28.1	20.3	1165.3
24-Nov-16 11:00	0.8	18.8	23.2	-2.7	95.5	67.0	20.4	1165.7
24-Nov-16 12:00	0.6	0.9	44.2	-2.4	94.3	111.2	20.9	1165.9
24-Nov-16 13:00	1.8	31.6	17.3	-2.3	91.4	160.9	20.5	1166.2
24-Nov-16 14:00	0.6	24.7	52.4	-2.4	92.3	107.7	21.2	1165.9
24-Nov-16 15:00	0.6	352.1	29.8	-2.8	96.1	26.5	21.9	1166.3
24-Nov-16 16:00	0.7	32.2	27.9	-2.9	97.1	6.7	23.8	1166.6
24-Nov-16 17:00	1.0	33.0	9.5	-3.1	96.0	1.6	20.5	1166.6
24-Nov-16 18:00	1.1	33.4	24.6	-3.6	92.7	0.0	21.6	1166.6
24-Nov-16 19:00	1.6	184.4	30.9	-4.7	97.0	0.0	19.7	1166.6
24-Nov-16 20:00	1.5	194.4	16.7	-4.5	98.3	0.0	18.4	1166.6
24-Nov-16 21:00	0.9	208.4	16.2	-4.2	98.0	0.0	-	1166.6
24-Nov-16 22:00	0.6	143.9	52.9	-4.2	97.9	0.0	21.5	1166.6

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
24-Nov-16 23:00	0.6	253.6	30.3	-4.2	97.8	0.0	21.3	1166.6
25-Nov-16 0:00	1.1	177.8	46.7	-4.1	97.0	0.0	21.0	1166.6
25-Nov-16 1:00	1.2	196.5	13.3	-3.8	94.4	0.0	19.4	1166.6
25-Nov-16 2:00	2.2	198.2	6.4	-3.7	92.5	0.0	19.8	1166.7
25-Nov-16 3:00	2.7	194.9	5.2	-3.7	92.4	0.0	21.4	1166.7
25-Nov-16 4:00	3.0	199.2	6.7	-3.7	90.8	0.0	21.7	1166.6
25-Nov-16 5:00	3.3	200.2	7.6	-3.5	88.7	0.0	22.6	1166.8
25-Nov-16 6:00	3.8	184.0	12.9	-3.4	82.7	0.0	-	1166.6
25-Nov-16 7:00	3.7	202.5	7.7	-3.8	88.3	0.0	22.7	1166.8
25-Nov-16 8:00	4.7	198.2	6.2	-3.7	84.6	0.0	24.0	1166.5
25-Nov-16 9:00	4.3	198.1	6.7	-3.7	85.9	1.7	24.0	1166.4
25-Nov-16 10:00	5.0	196.9	8.7	-4.0	93.9	25.9	23.2	1166.3
25-Nov-16 11:00	4.0	206.9	8.2	-4.1	97.5	56.2	24.6	1166.7
25-Nov-16 12:00	4.6	204.7	6.9	-3.7	97.4	89.3	25.0	1166.7
25-Nov-16 13:00	4.6	207.0	8.6	-3.4	97.2	91.1	26.6	1166.8
25-Nov-16 14:00	5.0	205.2	8.2	-3.4	97.4	82.3	25.7	1167.7
25-Nov-16 15:00	3.6	211.8	8.2	-3.4	97.6	57.4	25.6	1166.6
25-Nov-16 16:00	3.8	208.1	8.4	-3.6	97.9	18.4	25.8	1167.1
25-Nov-16 17:00	5.2	189.2	12.7	-3.8	97.6	1.4	25.0	1166.5
25-Nov-16 18:00	5.7	178.8	8.0	-3.6	94.8	0.0	24.7	1166.9
25-Nov-16 19:00	4.3	189.2	9.4	-3.5	95.2	0.0	24.5	1167.0
25-Nov-16 20:00	2.5	166.9	32.0	-3.6	97.2	0.0	24.4	1167.1
25-Nov-16 21:00	1.8	127.4	57.8	-3.5	93.0	0.0	24.4	1167.0
25-Nov-16 22:00	2.3	153.9	43.0	-3.3	88.4	0.0	23.7	1167.0
25-Nov-16 23:00	2.4	116.5	49.0	-3.3	84.1	0.0	23.9	1167.2
26-Nov-16 0:00	2.4	105.6	43.9	-3.0	77.0	0.0	24.0	1167.1
26-Nov-16 1:00	1.1	338.4	43.2	-3.0	77.9	0.0	23.9	1167.0
26-Nov-16 2:00	1.0	241.7	48.2	-3.2	77.9	0.0	23.3	1167.0
26-Nov-16 3:00	1.5	83.4	22.7	-3.5	73.2	0.0	23.6	1167.0
26-Nov-16 4:00	1.9	39.2	16.0	-3.8	73.8	0.0	23.6	1166.9
26-Nov-16 5:00	3.3	38.1	8.3	-4.1	73.2	0.0	23.0	1166.9
26-Nov-16 6:00	3.4	30.9	6.5	-4.3	74.4	0.0	23.6	1167.0
26-Nov-16 7:00	3.4	33.9	6.0	-4.7	75.5	0.0	23.2	1166.8
26-Nov-16 8:00	3.4	39.6	6.1	-4.8	72.6	0.0	23.9	1167.0
26-Nov-16 9:00	3.9	36.9	7.4	-5.1	73.2	2.2	23.1	1167.1
26-Nov-16 10:00	5.4	39.8	8.1	-5.5	75.3	19.1	23.3	1167.4
26-Nov-16 11:00	4.5	64.7	23.6	-5.3	73.9	76.9	22.8	1168.6
26-Nov-16 12:00	2.8	79.4	20.3	-4.8	67.5	164.7	21.8	1170.1
26-Nov-16 13:00	3.9	61.4	10.8	-4.7	65.6	214.3	23.0	1169.0
26-Nov-16 14:00	2.9	64.8	11.5	-4.6	64.3	187.2	22.9	1169.1
26-Nov-16 15:00	1.8	107.6	48.3	-4.7	69.6	139.0	23.5	1167.3
26-Nov-16 16:00	1.4	86.9	50.6	-5.0	70.1	58.3	23.2	1167.3
26-Nov-16 17:00	0.9	153.7	40.3	-5.9	84.5	5.0	23.5	1167.1
26-Nov-16 18:00	2.0	53.3	13.0	-6.1	70.7	0.0	22.5	1167.1
26-Nov-16 19:00	1.9	44.6	6.5	-6.2	70.5	0.0	23.2	1166.9
26-Nov-16 20:00	1.5	49.6	9.5	-6.3	68.9	0.0	22.9	1166.9
26-Nov-16 21:00	2.3	47.3	8.3	-6.4	69.1	0.0	22.8	1167.0
26-Nov-16 22:00	0.9	62.5	42.7	-6.3	69.7	0.0	23.1	1167.0
26-Nov-16 23:00	1.4	21.9	24.3	-6.0	67.0	0.0	22.6	1167.0
27-Nov-16 0:00	1.5	36.9	39.0	-5.7	66.1	0.0	22.9	1167.0
27-Nov-16 1:00	2.3	196.4	46.0	-5.2	66.4	0.0	22.8	1167.0
27-Nov-16 2:00	4.1	188.7	17.9	-5.4	79.2	0.0	22.7	1167.3
27-Nov-16 3:00	2.6	187.2	31.8	-5.5	89.4	0.0	22.8	1167.0

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
27-Nov-16 4:00	1.6	169.4	48.6	-5.7	90.8	0.0	22.3	1167.1
27-Nov-16 5:00	2.4	59.1	60.4	-5.9	93.1	0.0	22.6	1167.6
27-Nov-16 6:00	1.9	111.4	54.2	-5.3	95.7	0.0	23.7	1167.9
27-Nov-16 7:00	2.2	141.1	56.7	-5.0	97.1	0.0	24.8	1168.1
27-Nov-16 8:00	2.1	329.1	66.6	-4.9	95.2	0.0	24.6	1168.3
27-Nov-16 9:00	1.3	252.5	57.4	-4.6	95.6	1.9	23.9	1169.0
27-Nov-16 10:00	2.1	13.0	35.7	-4.7	93.9	20.2	23.3	1169.2
27-Nov-16 11:00	4.3	21.7	9.4	-5.5	95.6	40.4	27.9	1170.1
27-Nov-16 12:00	3.9	23.4	3.4	-5.6	96.0	61.6	28.8	1170.5
27-Nov-16 13:00	3.4	28.0	4.1	-5.6	96.0	57.7	30.2	1171.9
27-Nov-16 14:00	3.3	27.4	3.3	-5.4	95.7	89.5	31.2	1171.9
27-Nov-16 15:00	3.1	26.0	3.7	-5.5	95.9	62.6	31.2	1172.2
27-Nov-16 16:00	2.8	22.4	5.8	-5.3	94.9	34.6	31.2	1172.3
27-Nov-16 17:00	3.4	32.1	4.5	-5.2	94.6	1.8	31.0	1172.5
27-Nov-16 18:00	3.5	27.8	5.4	-5.2	94.9	0.0	30.8	1171.0
27-Nov-16 19:00	2.9	24.5	10.2	-5.0	94.5	0.0	30.7	1172.4
27-Nov-16 20:00	3.3	29.1	5.7	-5.1	94.8	0.0	30.2	1171.9
27-Nov-16 21:00	2.5	30.4	6.6	-4.8	94.3	0.0	30.4	1172.2
27-Nov-16 22:00	2.2	25.9	7.1	-4.8	93.4	0.0	30.0	1172.4
27-Nov-16 23:00	1.6	43.4	14.8	-4.7	92.3	0.0	29.9	1172.3
28-Nov-16 0:00	1.4	45.5	45.9	-4.6	92.3	0.0	29.6	1172.6
28-Nov-16 1:00	1.8	39.7	35.7	-5.0	92.9	0.0	29.7	1172.4
28-Nov-16 2:00	1.1	81.9	52.1	-4.8	92.3	0.0	29.5	1172.4
28-Nov-16 3:00	1.1	215.6	59.0	-5.3	97.1	0.0	30.0	1172.4
28-Nov-16 4:00	1.4	73.6	50.2	-5.3	95.8	0.0	29.4	1172.4
28-Nov-16 5:00	1.5	215.1	12.9	-5.8	98.2	0.0	29.4	1172.4
28-Nov-16 6:00	1.0	215.4	20.5	-5.6	96.5	0.0	29.2	1172.4
28-Nov-16 7:00	0.6	162.9	44.9	-5.4	95.2	0.0	29.4	1172.4
28-Nov-16 8:00	1.0	197.7	41.2	-5.3	94.7	0.0	29.0	1172.4
28-Nov-16 9:00	1.4	186.6	23.8	-4.7	92.7	1.7	28.8	1172.2
28-Nov-16 10:00	2.8	191.9	7.9	-3.9	89.1	16.4	28.7	1172.6
28-Nov-16 11:00	3.1	199.0	8.7	-3.7	87.5	83.2	28.3	1174.8
28-Nov-16 12:00	4.4	198.0	8.3	-4.1	90.8	131.5	28.5	1173.0
28-Nov-16 13:00	4.0	196.3	8.9	-3.5	85.2	117.0	28.6	1172.7
28-Nov-16 14:00	4.8	198.9	6.8	-3.3	86.7	67.6	28.7	1172.6
28-Nov-16 15:00	4.8	201.3	6.7	-3.4	91.6	38.3	28.6	1172.2
28-Nov-16 16:00	4.8	200.4	8.9	-3.8	98.8	13.6	28.5	1172.6
28-Nov-16 17:00	3.5	200.1	9.9	-3.7	99.2	1.0	28.5	1172.5
28-Nov-16 18:00	4.1	204.4	6.3	-3.8	98.8	0.0	28.3	1172.3
28-Nov-16 19:00	4.7	200.2	7.8	-3.6	99.0	0.0	28.4	1172.0
28-Nov-16 20:00	4.4	211.3	7.3	-3.6	98.5	0.0	28.5	1171.7
28-Nov-16 21:00	4.3	205.3	9.6	-3.7	98.3	0.0	28.4	1172.4
28-Nov-16 22:00	2.7	202.8	10.8	-3.4	98.1	0.0	28.4	1172.5
28-Nov-16 23:00	2.9	203.9	10.5	-3.3	98.4	0.0	29.9	1172.7
29-Nov-16 0:00	4.4	202.5	8.2	-3.2	98.4	0.0	35.6	1174.4
29-Nov-16 1:00	4.9	198.6	8.9	-3.3	98.3	0.0	34.7	1173.8
29-Nov-16 2:00	3.9	208.7	11.8	-3.3	98.2	0.0	37.0	1174.4
29-Nov-16 3:00	3.2	201.9	12.5	-3.3	98.2	0.0	38.1	1175.9
29-Nov-16 4:00	2.5	232.3	26.9	-3.2	98.3	0.0	38.7	1176.8
29-Nov-16 5:00	2.9	245.9	26.6	-3.1	98.3	0.0	38.0	1179.5
29-Nov-16 6:00	3.9	219.1	20.0	-2.8	98.5	0.0	42.5	1180.3
29-Nov-16 7:00	5.4	204.7	16.3	-2.2	98.8	0.0	42.6	1181.6
29-Nov-16 8:00	3.8	225.1	25.4	-1.8	99.0	0.0	43.3	1183.0

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
29-Nov-16 9:00	4.9	211.4	25.0	-1.3	99.2	0.3	44.7	1183.3
29-Nov-16 10:00	4.5	214.6	26.4	-1.0	99.3	16.0	44.5	1182.4
29-Nov-16 11:00	4.4	219.3	38.5	-0.5	99.3	35.6	42.6	1184.2
29-Nov-16 12:00	8.3	179.0	25.0	0.0	99.3	44.4	45.0	1183.2
29-Nov-16 13:00	10.4	170.9	15.3	0.8	93.1	52.1	43.9	1181.8
29-Nov-16 14:00	8.3	179.5	14.4	1.0	91.7	43.3	43.4	1181.2
29-Nov-16 15:00	11.4	168.0	13.7	1.9	83.2	31.1	42.7	1182.6
29-Nov-16 16:00	8.4	178.0	14.5	1.1	90.7	14.4	42.5	1184.5
29-Nov-16 17:00	7.3	183.3	15.6	1.1	91.8	0.7	41.8	1182.6
29-Nov-16 18:00	8.2	180.5	10.4	0.8	94.4	0.0	41.8	1186.3
29-Nov-16 19:00	6.9	191.0	9.2	0.3	98.6	0.0	42.3	1184.0
29-Nov-16 20:00	7.0	190.4	11.8	0.1	99.3	0.0	42.3	1186.0
29-Nov-16 21:00	7.8	190.0	11.8	0.1	99.0	0.0	42.4	1185.5
29-Nov-16 22:00	6.3	202.2	9.3	-0.2	99.3	0.0	42.0	1185.0
29-Nov-16 23:00	4.9	222.2	8.4	-0.8	99.3	0.0	41.6	1184.0
30-Nov-16 0:00	2.7	208.7	7.4	-1.1	99.3	0.0	42.0	1186.7
30-Nov-16 1:00	2.8	183.7	8.2	-1.2	99.3	0.0	41.5	1186.5
30-Nov-16 2:00	2.1	195.7	8.7	-1.2	99.3	0.0	41.5	1186.0
30-Nov-16 3:00	1.5	211.7	8.4	-1.5	99.2	0.0	40.8	1186.2
30-Nov-16 4:00	1.3	231.8	8.2	-1.8	99.1	0.0	41.2	1186.9
30-Nov-16 5:00	1.0	209.5	9.6	-2.4	98.8	0.0	41.1	1186.9
30-Nov-16 6:00	0.9	210.5	10.2	-3.0	98.4	0.0	41.2	1186.8
30-Nov-16 7:00	0.6	205.8	11.2	-3.0	98.4	0.0	40.8	1186.4
30-Nov-16 8:00	0.9	217.1	11.0	-3.2	98.3	0.0	41.2	1186.7
30-Nov-16 9:00	0.7	215.8	14.7	-3.8	98.0	0.9	41.2	1186.9
30-Nov-16 10:00	-	-	-	-3.7	97.9	8.8	40.4	1187.3
30-Nov-16 11:00	-	-	-	-3.9	97.7	35.3	40.5	1186.2
30-Nov-16 12:00	-	-	-	-3.8	97.5	80.9	39.9	1186.8
30-Nov-16 13:00	-	-	-	-3.7	97.2	116.0	40.6	1186.9
30-Nov-16 14:00	-	-	-	-3.5	96.8	204.3	40.4	1186.8
30-Nov-16 15:00	-	-	-	-4.1	96.6	100.5	40.8	1187.0
30-Nov-16 16:00	-	-	-	-4.6	97.0	37.8	40.4	1186.7
30-Nov-16 17:00	-	-	-	-5.3	97.1	2.1	40.2	1186.8
30-Nov-16 18:00	-	-	-	-6.5	96.2	0.0	41.0	1186.8
30-Nov-16 19:00	-	-	-	-6.3	96.4	0.0	41.0	1186.9
30-Nov-16 20:00	-	-	-	-6.1	96.5	0.0	40.6	1186.5
30-Nov-16 21:00	-	-	-	-6.0	96.5	0.0	40.3	1186.6
30-Nov-16 22:00	-	-	-	-6.0	96.1	0.0	41.0	1186.7
30-Nov-16 23:00	-	-	-	-6.1	95.7	0.0	41.0	1186.7
01-Dec-16 0:00	-	-	-	-5.9	93.9	0.0	40.5	1186.8
01-Dec-16 1:00	-	-	-	-6.0	92.0	0.0	41.5	1186.7
01-Dec-16 2:00	-	-	-	-5.3	91.6	0.0	40.8	1186.7
01-Dec-16 3:00	-	-	-	-5.3	87.7	0.0	41.0	1186.6
01-Dec-16 4:00	-	-	-	-5.0	88.7	0.0	40.1	1186.6
01-Dec-16 5:00	-	-	-	-5.3	93.3	0.0	39.3	1187.0
01-Dec-16 6:00	-	-	-	-5.4	94.3	0.0	40.7	1187.5
01-Dec-16 7:00	-	-	-	-5.5	96.9	0.0	39.6	1188.2
01-Dec-16 8:00	-	-	-	-5.2	97.2	0.0	40.1	1189.6
01-Dec-16 9:00	-	-	-	-5.0	97.3	0.6	40.1	1189.9
01-Dec-16 10:00	-	-	-	-4.5	97.5	11.3	38.4	1190.7
01-Dec-16 11:00	-	-	-	-3.4	98.0	32.2	40.8	1191.0
01-Dec-16 12:00	-	-	-	-2.8	98.0	67.9	40.5	1191.5
01-Dec-16 13:00	-	-	-	-2.7	98.1	60.1	41.4	1191.5



Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
01-Dec-16 14:00	1.6	186.1	12.2	-2.7	98.1	56.1	42.3	1191.9
01-Dec-16 15:00	1.6	201.4	11.9	-2.5	98.4	33.4	44.6	1192.5
01-Dec-16 16:00	1.6	200.5	10.7	-2.4	98.6	10.3	44.5	1193.0
01-Dec-16 17:00	1.5	207.0	15.2	-2.3	98.7	0.8	45.0	1193.3
01-Dec-16 18:00	1.5	203.9	19.9	-2.4	98.7	0.0	44.9	1193.4
01-Dec-16 19:00	1.4	183.3	14.5	-2.6	98.4	0.0	44.2	1193.4
01-Dec-16 20:00	3.1	174.6	19.2	-2.5	98.4	0.0	44.0	1193.7
01-Dec-16 21:00	3.5	190.1	27.9	-2.1	97.5	0.0	43.5	1193.3
01-Dec-16 22:00	3.2	210.3	24.9	-2.3	97.9	0.0	42.8	1193.6
01-Dec-16 23:00	3.6	218.3	50.4	-2.5	97.0	0.0	43.6	1194.6
02-Dec-16 0:00	3.3	314.6	42.4	-3.0	98.5	0.0	42.7	1195.2
02-Dec-16 1:00	2.5	238.9	64.7	-2.6	98.2	0.0	43.3	1195.9
02-Dec-16 2:00	2.9	293.0	49.9	-2.4	98.3	0.0	43.8	1197.1
02-Dec-16 3:00	2.6	241.4	61.7	-2.4	98.7	0.0	45.4	1199.2
02-Dec-16 4:00	4.7	188.7	15.9	-2.2	98.9	0.0	45.4	1200.1
02-Dec-16 5:00	5.8	188.1	22.2	-1.9	99.0	0.0	52.2	1199.7
02-Dec-16 6:00	8.6	179.2	11.0	-1.5	99.1	0.0	44.9	1203.2
02-Dec-16 7:00	7.5	181.3	13.1	-1.5	99.2	0.0	39.2	1201.2
02-Dec-16 8:00	5.2	197.9	14.2	-1.6	99.1	0.0	40.3	1203.4
02-Dec-16 9:00	6.1	201.0	14.4	-1.6	99.2	0.2	40.3	1203.1
02-Dec-16 10:00	5.8	195.8	12.6	-1.5	99.2	6.2	41.3	1203.1
02-Dec-16 11:00	6.6	194.5	11.1	-1.4	99.2	25.2	41.4	1203.6
02-Dec-16 12:00	7.3	184.9	9.6	-1.4	99.1	41.2	41.7	1203.5
02-Dec-16 13:00	7.4	185.8	10.8	-1.5	99.0	47.6	41.5	1204.3
02-Dec-16 14:00	7.8	190.7	13.9	-1.5	99.1	39.7	41.4	1205.5
02-Dec-16 15:00	5.9	196.7	10.7	-1.5	99.1	27.5	41.2	1205.1
02-Dec-16 16:00	6.4	198.9	12.6	-1.6	99.1	9.8	41.1	1204.2
02-Dec-16 17:00	8.0	195.5	13.8	-1.7	99.1	0.6	41.3	1205.2
02-Dec-16 18:00	6.3	206.1	17.1	-1.9	99.0	0.0	41.6	1204.7
02-Dec-16 19:00	5.1	211.9	18.3	-2.0	98.9	0.0	41.0	1204.4
02-Dec-16 20:00	7.0	208.9	11.8	-2.1	98.9	0.0	40.7	1204.8
02-Dec-16 21:00	5.3	223.6	11.5	-2.3	98.8	0.0	40.5	1205.0
02-Dec-16 22:00	6.0	216.4	17.2	-2.8	98.5	0.0	40.4	1204.0
02-Dec-16 23:00	8.9	192.5	12.1	-3.5	98.1	0.0	41.2	1205.5
03-Dec-16 0:00	9.4	198.8	11.7	-4.7	97.4	0.0	41.1	1205.1
03-Dec-16 1:00	6.7	210.5	10.2	-4.9	97.3	0.0	40.6	1204.9
03-Dec-16 2:00	6.4	196.7	10.0	-4.6	97.5	0.0	40.4	1204.1
03-Dec-16 3:00	7.0	194.3	9.1	-4.8	97.3	0.0	40.7	1205.0
03-Dec-16 4:00	5.6	209.6	9.1	-5.1	97.2	0.0	40.3	1204.3
03-Dec-16 5:00	6.4	211.2	8.8	-5.1	97.2	0.0	40.0	1205.0
03-Dec-16 6:00	6.2	194.1	7.8	-5.4	97.0	0.0	41.0	1205.1
03-Dec-16 7:00	5.7	203.0	11.6	-5.3	97.1	0.0	40.7	1205.3
03-Dec-16 8:00	3.5	214.0	9.6	-5.3	97.0	0.0	40.3	1204.9
03-Dec-16 9:00	3.6	208.9	10.7	-5.5	96.9	0.6	40.5	1205.0
03-Dec-16 10:00	3.8	195.4	9.9	-5.5	96.8	7.8	40.6	1205.4
03-Dec-16 11:00	5.3	210.8	11.4	-5.7	96.6	48.4	40.6	1205.5
03-Dec-16 12:00	3.6	217.5	9.8	-5.5	96.4	113.2	38.9	1205.0
03-Dec-16 13:00	3.8	202.1	13.5	-5.9	96.5	60.2	40.1	1205.2
03-Dec-16 14:00	3.2	195.4	12.6	-5.8	96.4	76.4	40.6	1205.3
03-Dec-16 15:00	5.2	185.3	11.7	-5.9	96.5	46.7	41.5	1207.3
03-Dec-16 16:00	6.1	180.2	12.2	-6.2	96.4	16.4	40.5	1206.1
03-Dec-16 17:00	4.1	199.1	9.2	-6.1	96.5	0.7	40.5	1205.9
03-Dec-16 18:00	5.4	188.8	10.2	-6.3	96.4	0.0	40.1	1205.6

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
03-Dec-16 19:00	3.9	195.8	14.9	-6.3	96.4	0.0	40.5	1205.7
03-Dec-16 20:00	4.2	188.5	13.5	-6.3	96.4	0.0	41.0	1205.7
03-Dec-16 21:00	3.5	198.5	17.0	-6.3	96.4	0.0	39.7	1206.8
03-Dec-16 22:00	2.6	218.6	9.6	-6.4	96.3	0.0	40.4	1206.3
03-Dec-16 23:00	3.5	221.0	11.6	-6.6	96.1	0.0	40.5	1206.3
04-Dec-16 0:00	2.8	222.0	10.1	-6.9	95.9	0.0	40.2	1206.0
04-Dec-16 1:00	1.9	228.3	14.9	-7.2	95.7	0.0	40.2	1206.0
04-Dec-16 2:00	1.8	218.6	9.1	-7.4	95.6	0.0	39.9	1206.0
04-Dec-16 3:00	2.1	208.5	11.5	-7.7	95.4	0.0	39.8	1206.1
04-Dec-16 4:00	1.9	205.0	8.5	-7.9	95.2	0.0	39.5	1206.0
04-Dec-16 5:00	2.3	198.0	7.3	-8.3	95.0	0.0	40.0	1205.9
04-Dec-16 6:00	2.4	194.5	6.4	-9.0	94.4	0.0	40.1	1206.0
04-Dec-16 7:00	1.6	91.1	18.3	-9.6	94.0	0.0	40.2	1205.8
04-Dec-16 8:00	-	-	-	-9.5	94.1	0.0	40.4	1205.8
04-Dec-16 9:00	-	-	-	-9.7	93.9	0.8	39.5	1205.9
04-Dec-16 10:00	-	-	-	-10.4	93.2	7.0	40.6	1206.0
04-Dec-16 11:00	-	-	-	-10.4	93.1	52.6	39.5	1207.4
04-Dec-16 12:00	-	-	-	-7.8	94.2	179.2	38.8	1207.8
04-Dec-16 13:00	-	-	-	-6.8	94.7	195.3	38.7	1207.1
04-Dec-16 14:00	-	-	-	-6.9	94.7	175.6	37.5	1206.7
04-Dec-16 15:00	3.6	63.5	15.6	-10.1	92.5	78.0	39.7	1206.2
04-Dec-16 16:00	3.3	58.0	17.8	-10.5	92.9	20.4	40.6	1206.1
04-Dec-16 17:00	2.5	73.7	30.8	-10.3	93.1	1.4	41.1	1206.3
04-Dec-16 18:00	3.0	50.3	47.9	-10.2	92.9	0.0	40.6	1206.2
04-Dec-16 19:00	3.7	85.3	37.7	-10.2	93.2	0.0	40.8	1206.1
04-Dec-16 20:00	3.3	73.0	53.7	-10.2	93.0	0.0	40.2	1206.1
04-Dec-16 21:00	1.5	91.7	56.7	-10.6	92.9	0.0	39.1	1206.2
04-Dec-16 22:00	8.2	58.6	11.8	-10.1	93.3	0.0	40.6	1206.6
04-Dec-16 23:00	10.1	43.2	9.2	-10.1	92.7	0.0	40.6	1206.5
05-Dec-16 0:00	10.0	45.2	11.4	-10.5	89.8	0.0	39.5	1206.1
05-Dec-16 1:00	10.3	39.4	4.8	-10.8	87.6	0.0	39.8	1204.9
05-Dec-16 2:00	11.9	40.9	4.8	-10.9	84.5	0.0	39.3	1205.9
05-Dec-16 3:00	11.6	41.1	5.7	-11.2	83.7	0.0	38.9	1206.3
05-Dec-16 4:00	11.1	35.2	4.5	-11.6	84.3	0.0	38.7	1206.7
05-Dec-16 5:00	11.5	35.7	4.8	-11.8	82.5	0.0	38.8	1206.4
05-Dec-16 6:00	12.2	38.9	4.8	-12.1	80.2	0.0	39.0	1204.1
05-Dec-16 7:00	13.0	39.1	4.4	-12.3	77.8	0.0	39.1	1206.7
05-Dec-16 8:00	12.8	33.8	4.9	-12.8	79.3	0.0	38.7	1208.1
05-Dec-16 9:00	12.7	34.4	4.8	-13.0	78.9	1.0	39.0	1206.3
05-Dec-16 10:00	11.7	33.8	4.8	-13.3	79.3	10.0	39.3	1204.0
05-Dec-16 11:00	10.1	41.5	8.9	-13.8	79.9	65.5	39.4	1207.4
05-Dec-16 12:00	11.0	30.3	4.0	-13.7	76.9	233.7	38.8	1208.7
05-Dec-16 13:00	10.6	37.5	5.7	-13.9	76.2	252.0	38.7	1207.2
05-Dec-16 14:00	9.4	42.2	12.6	-14.2	76.3	225.5	39.2	1206.2
05-Dec-16 15:00	6.6	58.6	17.9	-14.7	78.2	138.0	39.0	1206.1
05-Dec-16 16:00	5.4	68.7	17.3	-15.2	78.5	27.8	39.0	1206.3
05-Dec-16 17:00	6.7	62.9	13.2	-15.7	76.9	2.3	39.4	1206.1
05-Dec-16 18:00	4.3	72.4	29.7	-16.1	76.7	0.0	39.8	1206.2
05-Dec-16 19:00	5.2	78.5	36.7	-16.3	77.0	0.0	39.2	1206.1
05-Dec-16 20:00	4.1	81.9	19.3	-16.6	77.5	0.0	39.2	1206.1
05-Dec-16 21:00	2.4	90.0	29.8	-16.9	78.9	0.0	39.3	1206.0
05-Dec-16 22:00	1.6	145.6	49.8	-17.4	82.6	0.0	39.5	1206.1
05-Dec-16 23:00	1.9	175.6	19.1	-17.6	87.7	0.0	39.3	1206.2

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
06-Dec-16 0:00	2.0	183.0	15.1	-17.8	87.3	0.0	39.3	1206.1
06-Dec-16 1:00	2.1	196.6	12.0	-18.0	86.8	0.0	39.1	1206.2
06-Dec-16 2:00	2.4	189.5	8.5	-18.1	86.7	0.0	39.0	1206.2
06-Dec-16 3:00	1.9	189.9	6.5	-18.1	86.3	0.0	38.8	1206.2
06-Dec-16 4:00	1.3	195.0	3.7	-18.0	86.1	0.0	38.8	1206.2
06-Dec-16 5:00	1.2	192.0	4.6	-18.3	85.9	0.0	38.9	1206.2
06-Dec-16 6:00	0.9	203.4	9.7	-18.4	85.9	0.0	39.1	1206.2
06-Dec-16 7:00	0.6	209.6	9.5	-18.7	85.2	0.0	39.0	1206.2
06-Dec-16 8:00	0.4	245.8	12.4	-18.5	85.1	0.0	39.1	1206.1
06-Dec-16 9:00	0.2	279.7	27.2	-17.9	85.3	1.4	39.1	1206.2
06-Dec-16 10:00	0.1	136.0	15.6	-17.9	85.2	8.0	38.9	1206.2
06-Dec-16 11:00	0.4	195.5	27.3	-17.2	85.7	44.7	37.8	1207.8
06-Dec-16 12:00	0.5	185.0	19.0	-14.9	85.1	141.3	38.2	1207.4
06-Dec-16 13:00	1.7	200.5	21.0	-15.9	84.8	119.5	38.6	1206.7
06-Dec-16 14:00	1.9	193.6	15.5	-16.2	85.1	83.3	39.2	1206.3
06-Dec-16 15:00	1.2	244.3	14.8	-15.5	83.0	66.0	39.3	1206.4
06-Dec-16 16:00	1.4	232.6	22.4	-15.6	80.9	33.5	39.7	1206.3
06-Dec-16 17:00	1.6	208.4	12.4	-16.4	83.7	1.2	39.3	1206.2
06-Dec-16 18:00	1.5	186.8	10.9	-16.4	85.6	0.0	39.5	1206.4
06-Dec-16 19:00	1.8	194.5	7.7	-16.3	84.9	0.0	39.3	1206.3
06-Dec-16 20:00	1.6	192.7	9.5	-16.5	84.7	0.0	39.4	1206.4
06-Dec-16 21:00	1.5	189.3	23.8	-16.3	84.6	0.0	39.4	1206.4
06-Dec-16 22:00	1.2	176.8	19.5	-16.1	84.8	0.0	39.5	1206.4
06-Dec-16 23:00	1.3	218.7	17.9	-15.9	82.2	0.0	39.0	1206.3
07-Dec-16 0:00	1.1	224.2	18.7	-15.8	81.0	0.0	39.8	1206.4
07-Dec-16 1:00	1.2	182.0	33.9	-15.9	83.4	0.0	39.4	1206.4
07-Dec-16 2:00	0.6	209.5	55.7	-15.8	81.6	0.0	39.0	1206.4
07-Dec-16 3:00	0.7	1.3	56.9	-15.6	78.7	0.0	40.1	1206.4
07-Dec-16 4:00	1.3	25.6	33.0	-14.9	74.1	0.0	38.6	1206.3
07-Dec-16 5:00	1.9	42.0	14.4	-14.9	73.6	0.0	38.7	1206.4
07-Dec-16 6:00	1.7	33.5	47.1	-15.1	74.7	0.0	39.3	1206.3
07-Dec-16 7:00	1.3	30.4	48.4	-15.8	77.7	0.0	38.8	1206.3
07-Dec-16 8:00	0.9	264.8	39.9	-15.7	77.2	0.0	39.1	1206.3
07-Dec-16 9:00	1.7	200.5	22.9	-16.0	79.0	1.0	38.6	1206.3
07-Dec-16 10:00	2.0	185.7	16.3	-16.8	84.2	24.5	39.3	1206.4
07-Dec-16 11:00	1.6	169.5	16.8	-15.9	79.9	58.9	38.4	1206.6
07-Dec-16 12:00	1.8	193.3	13.5	-15.3	78.8	85.4	38.3	1206.5
07-Dec-16 13:00	1.8	186.6	20.3	-15.7	80.0	88.3	38.2	1206.4
07-Dec-16 14:00	2.0	189.1	14.8	-15.7	80.0	82.3	38.4	1206.3
07-Dec-16 15:00	2.3	186.7	13.3	-15.9	82.2	54.3	39.2	1206.3
07-Dec-16 16:00	2.2	191.2	14.9	-15.6	80.6	19.5	39.5	1206.4
07-Dec-16 17:00	1.8	185.9	26.8	-15.5	78.6	0.9	39.4	1206.4
07-Dec-16 18:00	2.0	194.4	13.9	-15.7	77.8	0.0	38.8	1206.3
07-Dec-16 19:00	1.9	181.8	23.4	-15.4	76.5	0.0	38.7	1206.5
07-Dec-16 20:00	1.7	175.3	36.4	-15.3	74.7	0.0	38.8	1206.4
07-Dec-16 21:00	2.0	193.0	40.0	-15.2	74.0	0.0	39.4	1206.4
07-Dec-16 22:00	1.6	167.4	47.4	-15.3	73.6	0.0	39.4	1206.4
07-Dec-16 23:00	1.6	199.3	50.6	-14.8	69.8	0.0	39.4	1206.4
08-Dec-16 0:00	1.4	229.2	47.5	-14.5	67.7	0.0	38.6	1206.3
08-Dec-16 1:00	1.6	142.1	67.6	-14.6	67.4	0.0	39.2	1206.3
08-Dec-16 2:00	1.1	113.8	75.8	-14.8	68.1	0.0	38.2	1206.4
08-Dec-16 3:00	2.6	49.8	27.5	-13.7	60.9	0.0	39.2	1206.4
08-Dec-16 4:00	3.8	47.0	13.3	-13.1	57.8	0.0	38.9	1206.3

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
08-Dec-16 5:00	6.4	43.6	14.7	-12.6	56.1	0.0	39.0	1205.8
08-Dec-16 6:00	5.5	44.6	14.8	-12.5	55.5	0.0	39.2	1206.1
08-Dec-16 7:00	3.2	41.5	17.7	-12.9	57.0	0.0	39.1	1206.2
08-Dec-16 8:00	3.0	42.4	17.1	-12.9	55.4	0.0	39.3	1206.1
08-Dec-16 9:00	2.2	57.0	46.8	-13.6	58.9	1.3	38.2	1206.2
08-Dec-16 10:00	1.4	65.2	52.3	-14.1	62.1	28.9	39.5	1206.3
08-Dec-16 11:00	1.5	53.6	48.3	-13.3	57.3	72.4	38.7	1207.0
08-Dec-16 12:00	3.7	50.6	13.8	-12.5	52.3	169.1	38.3	1207.5
08-Dec-16 13:00	4.4	47.2	13.5	-12.1	51.1	236.4	38.1	1207.3
08-Dec-16 14:00	4.7	51.3	13.0	-12.2	52.6	226.7	38.6	1206.8
08-Dec-16 15:00	3.0	58.9	19.7	-12.6	55.5	129.1	38.9	1206.4
08-Dec-16 16:00	2.9	54.8	25.2	-12.7	54.1	28.3	39.2	1206.3
08-Dec-16 17:00	4.4	55.9	19.0	-13.2	55.1	1.4	38.8	1206.2
08-Dec-16 18:00	4.3	52.8	14.7	-13.3	54.4	0.0	39.3	1206.3
08-Dec-16 19:00	2.9	66.2	19.6	-13.7	55.8	0.0	38.3	1206.4
08-Dec-16 20:00	3.2	67.7	20.9	-14.2	57.2	0.0	38.3	1206.3
08-Dec-16 21:00	2.9	71.4	25.9	-14.1	56.3	0.0	38.3	1206.3
08-Dec-16 22:00	2.4	69.1	41.8	-14.3	57.0	0.0	38.7	1206.2
08-Dec-16 23:00	5.6	57.4	19.9	-14.2	55.0	0.0	38.2	1206.0
09-Dec-16 0:00	5.1	54.8	19.0	-14.5	56.3	0.0	38.0	1206.4
09-Dec-16 1:00	5.3	50.4	14.9	-14.8	56.2	0.0	39.6	1206.1
09-Dec-16 2:00	4.0	43.8	31.6	-14.7	54.9	0.0	38.8	1206.4
09-Dec-16 3:00	3.9	40.4	48.3	-15.1	56.8	0.0	38.0	1206.2
09-Dec-16 4:00	4.5	51.4	45.6	-15.4	58.0	0.0	38.8	1206.4
09-Dec-16 5:00	3.2	61.1	43.9	-15.2	57.7	0.0	38.9	1206.0
09-Dec-16 6:00	3.0	54.5	38.9	-15.4	57.8	0.0	38.9	1206.2
09-Dec-16 7:00	2.9	33.2	58.1	-15.7	58.1	0.0	37.5	1206.5
09-Dec-16 8:00	2.4	359.2	40.2	-15.9	58.4	0.0	38.0	1206.1
09-Dec-16 9:00	1.7	239.8	71.2	-17.0	65.6	0.6	38.5	1206.3
09-Dec-16 10:00	2.1	260.4	58.4	-16.7	62.5	9.0	38.0	1206.2
09-Dec-16 11:00	2.2	275.5	66.3	-17.2	65.8	50.1	37.2	1207.8
09-Dec-16 12:00	2.0	269.1	61.7	-16.8	63.6	215.3	37.6	1208.1
09-Dec-16 13:00	1.8	248.6	61.6	-17.2	66.0	236.2	37.1	1207.5
09-Dec-16 14:00	1.7	182.4	44.1	-18.6	75.4	213.1	38.0	1207.1
09-Dec-16 15:00	1.9	177.3	35.7	-18.9	75.2	152.1	37.8	1206.6
09-Dec-16 16:00	1.2	196.2	58.8	-19.9	78.0	45.8	37.8	1206.3
09-Dec-16 17:00	1.7	298.3	44.8	-20.8	80.6	2.1	37.5	1206.2
09-Dec-16 18:00	1.5	325.7	31.7	-21.1	78.9	0.0	37.1	1206.2
09-Dec-16 19:00	1.9	15.8	33.1	-21.6	78.8	0.0	37.9	1206.2
09-Dec-16 20:00	1.6	69.5	32.3	-21.9	76.1	0.0	37.0	1206.2
09-Dec-16 21:00	1.5	123.9	54.2	-22.3	79.2	0.0	37.4	1206.3
09-Dec-16 22:00	2.3	72.9	30.5	-22.4	75.9	0.0	37.4	1206.3
09-Dec-16 23:00	4.1	71.4	15.8	-22.4	73.0	0.0	37.6	1206.4
10-Dec-16 0:00	5.9	49.2	14.2	-22.6	71.7	0.0	38.4	1206.4
10-Dec-16 1:00	1.8	130.7	49.8	-23.3	78.1	0.0	38.2	1206.2
10-Dec-16 2:00	1.7	165.1	49.2	-23.7	79.5	0.0	38.2	1206.3
10-Dec-16 3:00	1.3	132.6	54.6	-23.9	78.5	0.0	38.7	1206.3
10-Dec-16 4:00	1.9	154.2	53.4	-24.1	78.1	0.0	38.3	1206.3
10-Dec-16 5:00	1.6	152.3	47.5	-24.4	80.5	0.0	38.5	1206.3
10-Dec-16 6:00	2.7	74.4	40.4	-24.3	75.8	0.0	38.0	1206.3
10-Dec-16 7:00	2.0	85.3	51.4	-24.4	75.6	0.0	38.4	1206.3
10-Dec-16 8:00	2.2	98.9	57.9	-24.6	75.1	0.0	38.0	1206.4
10-Dec-16 9:00	2.3	99.4	54.4	-24.5	74.9	0.6	38.3	1206.3

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
10-Dec-16 10:00	2.2	93.9	49.0	-24.7	77.3	9.5	38.1	1206.3
10-Dec-16 11:00	4.8	64.0	26.7	-24.7	73.4	47.2	37.9	1207.7
10-Dec-16 12:00	3.9	76.2	31.4	-23.7	68.6	206.1	37.9	1208.2
10-Dec-16 13:00	5.2	63.9	34.7	-22.8	66.5	228.1	37.0	1207.5
10-Dec-16 14:00	6.2	50.7	19.8	-22.4	64.5	209.2	37.9	1207.1
10-Dec-16 15:00	8.6	43.7	12.8	-22.4	65.4	149.9	37.3	1206.1
10-Dec-16 16:00	8.9	54.9	15.7	-22.7	68.8	47.8	39.0	1206.4
10-Dec-16 17:00	12.9	32.0	6.3	-22.2	67.9	1.9	38.5	1203.6
10-Dec-16 18:00	13.7	29.9	7.9	-22.4	69.0	0.0	36.9	1205.2
10-Dec-16 19:00	15.1	29.3	4.7	-21.7	67.6	0.0	38.0	1208.0
10-Dec-16 20:00	14.6	30.1	5.7	-20.9	65.9	0.0	37.7	1204.6
10-Dec-16 21:00	13.8	46.3	18.3	-20.2	65.9	0.0	37.9	1205.5
10-Dec-16 22:00	13.4	64.9	23.9	-18.5	63.4	0.0	-	1201.0
10-Dec-16 23:00	15.1	61.4	13.3	-17.7	60.2	0.0	-	1203.5
11-Dec-16 0:00	16.8	73.7	12.7	-17.3	57.5	0.0	-	1206.2
11-Dec-16 1:00	18.3	78.7	8.2	-18.1	58.9	0.0	-	1206.0
11-Dec-16 2:00	17.2	80.5	11.9	-17.9	58.6	0.0	-	1209.7
11-Dec-16 3:00	16.8	77.3	16.0	-17.9	58.6	0.0	-	1213.5
11-Dec-16 4:00	17.2	75.0	12.9	-17.7	57.7	0.0	-	1212.1
11-Dec-16 5:00	17.7	76.7	11.3	-17.8	59.1	0.0	-	1200.9
11-Dec-16 6:00	16.5	76.4	15.9	-17.5	57.7	0.0	35.1	1206.8
11-Dec-16 7:00	12.3	86.7	26.4	-17.0	57.8	0.0	34.8	1206.7
11-Dec-16 8:00	8.8	72.9	45.5	-16.8	55.3	0.0	-	1211.6
11-Dec-16 9:00	8.9	69.4	31.6	-17.0	55.7	0.4	35.7	1204.7
11-Dec-16 10:00	5.8	81.6	61.1	-16.8	53.8	8.5	34.3	1207.0
11-Dec-16 11:00	7.5	74.2	38.6	-16.6	53.1	40.8	35.3	1213.6
11-Dec-16 12:00	12.1	64.6	23.9	-15.9	51.5	190.0	-	1213.0
11-Dec-16 13:00	6.1	89.9	66.4	-15.8	51.1	211.7	35.0	1208.4
11-Dec-16 14:00	3.2	175.6	76.1	-14.6	46.1	194.1	35.4	1207.9
11-Dec-16 15:00	6.3	73.4	33.0	-14.9	45.8	139.8	35.7	1207.4
11-Dec-16 16:00	11.6	55.8	17.4	-14.3	40.7	58.0	34.3	1204.6
11-Dec-16 17:00	9.8	52.3	48.0	-14.3	39.4	2.0	34.7	1207.1
11-Dec-16 18:00	3.8	59.9	47.4	-14.9	40.4	0.0	35.8	1208.4
11-Dec-16 19:00	4.0	76.3	55.2	-15.0	40.1	0.0	34.4	1207.1
11-Dec-16 20:00	2.8	230.3	61.4	-15.4	42.6	0.0	36.5	1207.1
11-Dec-16 21:00	3.9	10.7	31.1	-15.1	38.9	0.0	34.8	1206.7
11-Dec-16 22:00	3.5	39.4	28.6	-15.8	40.8	0.0	35.3	1207.1
11-Dec-16 23:00	5.4	39.7	18.0	-16.2	42.5	0.0	35.6	1206.6
12-Dec-16 0:00	3.7	54.1	25.6	-16.9	47.5	0.0	35.3	1207.1
12-Dec-16 1:00	6.6	33.3	17.3	-17.2	51.4	0.0	34.5	1207.3
12-Dec-16 2:00	5.5	18.3	39.0	-17.2	53.5	0.0	35.0	1207.2
12-Dec-16 3:00	1.4	160.6	54.5	-18.9	61.2	0.0	35.8	1207.3
12-Dec-16 4:00	3.4	60.6	21.6	-17.3	56.2	0.0	34.8	1207.3
12-Dec-16 5:00	1.9	68.8	70.6	-17.1	56.9	0.0	36.1	1207.2
12-Dec-16 6:00	1.7	9.1	46.8	-17.6	58.9	0.0	36.2	1207.2
12-Dec-16 7:00	1.8	285.6	33.7	-18.2	61.4	0.0	35.5	1207.2
12-Dec-16 8:00	1.5	279.7	65.8	-18.3	62.7	0.0	35.2	1207.2
12-Dec-16 9:00	1.6	221.8	51.3	-18.6	64.0	0.5	35.2	1207.3
12-Dec-16 10:00	2.1	217.7	19.1	-19.2	67.2	9.0	35.6	1207.2
12-Dec-16 11:00	2.1	219.9	14.0	-18.9	67.6	39.8	34.8	1208.9
12-Dec-16 12:00	2.5	197.9	13.5	-17.4	64.1	176.2	34.9	1209.0
12-Dec-16 13:00	2.4	215.2	11.6	-16.8	62.7	200.1	34.6	1208.4
12-Dec-16 14:00	2.4	197.3	10.7	-16.6	66.6	183.9	34.8	1208.1

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
12-Dec-16 15:00	2.6	198.6	7.4	-16.9	67.9	129.3	35.2	1207.5
12-Dec-16 16:00	2.1	209.9	15.9	-17.2	69.1	51.4	35.7	1207.3
12-Dec-16 17:00	2.3	180.9	12.4	-17.6	69.2	1.9	35.7	1207.4
12-Dec-16 18:00	2.4	181.0	8.6	-17.4	69.4	0.0	35.8	1207.3
12-Dec-16 19:00	2.5	183.8	14.3	-17.4	68.9	0.0	35.8	1207.3
12-Dec-16 20:00	2.0	187.2	20.1	-17.3	68.1	0.0	35.8	1207.3
12-Dec-16 21:00	2.3	179.1	11.2	-17.3	68.8	0.0	35.8	1207.3
12-Dec-16 22:00	2.2	188.8	22.1	-17.5	70.0	0.0	35.3	1207.3
12-Dec-16 23:00	2.7	183.3	12.6	-17.2	69.3	0.0	35.0	1207.4
13-Dec-16 0:00	2.2	175.5	11.3	-16.7	67.7	0.0	34.7	1207.5
13-Dec-16 1:00	2.1	194.0	13.6	-16.5	68.9	0.0	35.3	1207.4
13-Dec-16 2:00	2.6	182.2	8.5	-16.3	67.5	0.0	35.6	1207.4
13-Dec-16 3:00	2.5	171.8	9.0	-16.1	66.2	0.0	35.0	1207.4
13-Dec-16 4:00	2.6	188.0	10.9	-16.0	67.0	0.0	35.2	1207.3
13-Dec-16 5:00	2.6	177.0	7.5	-15.4	64.3	0.0	35.0	1207.3
13-Dec-16 6:00	2.5	192.8	11.5	-15.4	65.7	0.0	34.9	1207.4
13-Dec-16 7:00	3.3	184.3	9.9	-15.7	65.7	0.0	35.3	1207.3
13-Dec-16 8:00	2.6	188.6	9.7	-14.5	60.6	0.0	35.1	1207.4
13-Dec-16 9:00	1.8	176.0	10.5	-12.9	52.4	0.5	35.0	1207.4
13-Dec-16 10:00	1.3	256.8	38.3	-12.7	50.7	7.9	35.0	1207.3
13-Dec-16 11:00	1.7	178.2	8.2	-12.4	50.0	34.6	34.5	1209.2
13-Dec-16 12:00	1.4	181.7	15.7	-9.7	43.6	180.5	34.4	1209.5
13-Dec-16 13:00	1.1	184.6	19.9	-8.3	42.1	202.1	34.2	1208.9
13-Dec-16 14:00	0.6	43.3	32.0	-8.4	35.2	184.8	34.5	1208.6
13-Dec-16 15:00	0.8	41.0	71.8	-9.0	36.2	133.0	34.4	1207.7
13-Dec-16 16:00	0.4	250.1	48.9	-9.5	36.8	55.4	35.0	1207.3
13-Dec-16 17:00	0.2	48.1	33.4	-10.3	38.8	2.0	35.5	1207.2
13-Dec-16 18:00	0.2	71.3	31.4	-10.3	36.2	0.0	34.8	1207.1
13-Dec-16 19:00	0.4	36.4	51.0	-10.3	37.9	0.0	35.5	1207.1
13-Dec-16 20:00	0.5	312.2	33.5	-10.1	36.3	0.0	36.2	1207.2
13-Dec-16 21:00	0.4	255.8	46.6	-10.1	37.5	0.0	34.8	1207.2
13-Dec-16 22:00	1.1	211.6	28.7	-10.7	40.4	0.0	34.7	1207.3
13-Dec-16 23:00	2.1	174.8	8.4	-12.1	47.9	0.0	35.7	1207.2
14-Dec-16 0:00	1.3	159.2	13.8	-11.8	46.8	0.0	35.0	1207.3
14-Dec-16 1:00	0.6	85.5	34.9	-11.4	44.8	0.0	35.4	1207.1
14-Dec-16 2:00	0.6	54.5	38.3	-11.5	43.9	0.0	35.8	1207.2
14-Dec-16 3:00	0.6	243.3	68.9	-11.4	43.7	0.0	35.0	1207.3
14-Dec-16 4:00	1.1	198.5	36.5	-12.2	47.2	0.0	34.4	1207.3
14-Dec-16 5:00	0.6	33.2	25.6	-11.8	46.5	0.0	35.2	1207.2
14-Dec-16 6:00	1.2	42.3	28.9	-12.1	45.5	0.0	35.0	1207.3
14-Dec-16 7:00	0.9	205.4	36.8	-13.7	53.1	0.0	34.3	1207.3
14-Dec-16 8:00	1.2	173.2	20.9	-14.9	60.2	0.0	35.0	1207.2
14-Dec-16 9:00	1.7	259.9	18.1	-14.7	58.9	0.6	35.2	1207.3
14-Dec-16 10:00	1.2	189.7	25.9	-14.8	58.9	12.3	34.8	1207.3
14-Dec-16 11:00	0.8	198.6	27.1	-14.5	56.8	35.7	34.3	1209.1
14-Dec-16 12:00	1.1	301.9	41.4	-13.1	52.0	173.4	34.5	1209.6
14-Dec-16 13:00	2.6	180.3	16.3	-16.6	68.5	202.8	34.8	1208.6
14-Dec-16 14:00	1.7	156.6	29.5	-15.9	65.8	179.5	34.5	1208.2
14-Dec-16 15:00	1.9	172.8	22.9	-14.7	59.3	106.7	34.9	1207.6
14-Dec-16 16:00	1.7	273.7	27.2	-16.3	66.4	40.4	34.1	1207.3
14-Dec-16 17:00	2.0	192.8	26.1	-17.3	71.0	1.6	34.4	1207.2
14-Dec-16 18:00	6.0	0.8	32.9	-14.0	51.2	0.0	35.5	1206.3
14-Dec-16 19:00	9.7	20.6	6.8	-12.5	43.3	0.0	33.9	1206.8

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
14-Dec-16 20:00	11.7	29.9	3.8	-12.5	44.5	0.0	-	1204.9
14-Dec-16 21:00	13.4	26.5	4.2	-11.4	41.0	0.0	34.5	1205.7
14-Dec-16 22:00	12.0	21.7	4.5	-11.6	42.3	0.0	34.5	1205.7
14-Dec-16 23:00	11.8	24.7	4.2	-12.2	45.2	0.0	34.6	1206.8
15-Dec-16 0:00	11.9	24.3	5.0	-12.7	48.6	0.0	35.2	1208.2
15-Dec-16 1:00	12.3	30.3	5.4	-12.5	49.8	0.0	34.6	1206.4
15-Dec-16 2:00	12.9	35.4	4.0	-13.2	52.6	0.0	34.6	1205.3
15-Dec-16 3:00	13.9	38.7	6.0	-12.7	51.9	0.0	34.1	1208.4
15-Dec-16 4:00	10.6	29.8	5.5	-13.4	54.7	0.0	34.2	1206.2
15-Dec-16 5:00	11.1	33.8	7.5	-14.1	57.8	0.0	33.8	1206.8
15-Dec-16 6:00	12.6	41.0	7.4	-13.4	55.4	0.0	34.6	1206.2
15-Dec-16 7:00	12.0	28.5	5.5	-13.8	56.2	0.0	34.4	1206.8
15-Dec-16 8:00	11.7	30.6	5.7	-14.2	57.5	0.0	34.3	1207.1
15-Dec-16 9:00	10.7	28.1	5.0	-14.0	56.0	0.4	34.2	1207.5
15-Dec-16 10:00	9.9	33.2	8.9	-13.9	55.1	8.9	33.7	1208.6
15-Dec-16 11:00	9.9	38.5	6.8	-14.5	58.0	31.8	34.0	1210.8
15-Dec-16 12:00	10.3	37.1	5.1	-13.3	51.5	170.8	34.3	1209.5
15-Dec-16 13:00	10.9	29.6	4.4	-12.9	48.3	194.0	34.5	1206.1
15-Dec-16 14:00	9.9	22.1	4.6	-12.9	46.6	180.8	33.9	1209.2
15-Dec-16 15:00	9.9	17.0	5.2	-12.8	44.8	130.2	33.7	1208.5
15-Dec-16 16:00	10.3	22.1	4.8	-12.9	44.1	56.5	34.3	1204.7
15-Dec-16 17:00	9.7	15.4	5.0	-13.8	48.1	2.0	34.3	1207.4
15-Dec-16 18:00	4.5	35.8	41.9	-15.0	54.4	0.0	34.7	1207.3
15-Dec-16 19:00	1.9	62.5	32.8	-15.3	55.6	0.0	34.7	1207.3
15-Dec-16 20:00	1.5	163.9	32.0	-16.4	62.8	0.0	35.0	1207.4
15-Dec-16 21:00	1.9	193.3	18.5	-16.8	66.6	0.0	35.0	1207.4
15-Dec-16 22:00	2.2	201.9	11.8	-16.8	65.1	0.0	34.4	1207.4
15-Dec-16 23:00	2.1	191.6	14.5	-16.4	62.2	0.0	34.9	1207.4
16-Dec-16 0:00	2.3	190.8	9.7	-16.4	61.1	0.0	34.5	1207.5
16-Dec-16 1:00	2.0	187.2	13.8	-15.9	56.8	0.0	35.0	1207.5
16-Dec-16 2:00	2.3	179.2	12.1	-15.7	54.4	0.0	35.0	1207.3
16-Dec-16 3:00	1.9	203.1	22.3	-15.5	53.4	0.0	35.1	1207.4
16-Dec-16 4:00	1.5	191.6	21.7	-15.2	50.3	0.0	34.7	1207.5
16-Dec-16 5:00	2.3	200.0	19.0	-15.8	55.3	0.0	34.7	1207.3
16-Dec-16 6:00	1.7	194.8	30.3	-15.5	51.9	0.0	34.5	1207.5
16-Dec-16 7:00	1.5	203.0	21.4	-15.2	49.9	0.0	34.4	1207.3
16-Dec-16 8:00	1.9	178.1	19.9	-14.3	43.9	0.0	34.5	1207.4
16-Dec-16 9:00	0.6	93.5	60.3	-14.0	41.9	0.4	35.2	1207.3
16-Dec-16 10:00	1.0	354.0	44.8	-12.9	37.4	12.2	35.0	1207.2
16-Dec-16 11:00	1.3	207.2	45.0	-12.3	34.2	55.8	34.6	1207.9
16-Dec-16 12:00	1.4	205.0	28.5	-12.3	32.5	100.3	35.0	1207.4
16-Dec-16 13:00	3.4	220.4	10.3	-12.9	36.9	82.2	34.4	1207.8
16-Dec-16 14:00	5.5	203.5	8.1	-10.7	32.5	56.1	34.7	1208.0
16-Dec-16 15:00	5.0	196.5	7.4	-10.0	33.2	42.6	34.9	1207.0
16-Dec-16 16:00	4.7	201.2	9.2	-10.0	45.4	21.4	35.1	1207.2
16-Dec-16 17:00	4.3	208.5	7.8	-10.1	48.4	0.9	35.0	1207.8
16-Dec-16 18:00	4.6	209.9	9.1	-9.8	55.0	0.0	35.0	1207.1
16-Dec-16 19:00	3.8	219.2	13.7	-9.8	72.7	0.0	35.9	1207.6
16-Dec-16 20:00	3.8	228.9	12.2	-10.2	86.4	0.0	35.3	1207.3
16-Dec-16 21:00	4.3	213.2	7.8	-8.6	94.2	0.0	35.0	1207.5
16-Dec-16 22:00	4.3	204.9	9.7	-8.5	95.6	0.0	35.8	1207.0
16-Dec-16 23:00	4.9	195.8	9.4	-7.8	95.5	0.0	35.7	1207.4
17-Dec-16 0:00	3.5	205.5	18.0	-7.5	95.5	0.0	35.7	1207.2

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
17-Dec-16 1:00	3.5	209.7	11.9	-7.4	95.5	0.0	35.5	1207.3
17-Dec-16 2:00	3.4	220.4	13.2	-7.1	95.6	0.0	36.0	1207.7
17-Dec-16 3:00	3.4	209.2	10.1	-7.0	95.7	0.0	35.8	1207.7
17-Dec-16 4:00	3.6	211.6	9.2	-7.2	95.6	0.0	35.8	1207.8
17-Dec-16 5:00	3.8	196.8	7.4	-6.9	95.8	0.0	35.8	1207.8
17-Dec-16 6:00	3.9	196.5	10.6	-6.8	95.9	0.0	35.5	1206.1
17-Dec-16 7:00	4.4	209.2	10.4	-6.9	95.9	0.0	35.3	1207.5
17-Dec-16 8:00	4.5	209.6	6.7	-6.7	95.9	0.0	37.5	1208.1
17-Dec-16 9:00	4.5	205.0	8.6	-6.6	96.0	0.1	37.7	1206.9
17-Dec-16 10:00	4.8	192.8	8.4	-6.4	96.1	4.9	37.2	1207.0
17-Dec-16 11:00	5.5	204.4	8.0	-6.3	96.0	32.9	36.5	1208.2
17-Dec-16 12:00	5.7	203.6	7.9	-5.6	96.3	50.7	36.1	1208.2
17-Dec-16 13:00	4.8	211.5	8.7	-5.2	96.5	52.4	36.9	1207.7
17-Dec-16 14:00	4.6	210.0	9.8	-5.2	96.6	40.8	40.7	1208.5
17-Dec-16 15:00	4.6	208.1	9.9	-5.1	96.7	33.4	39.7	1208.8
17-Dec-16 16:00	5.4	209.5	8.2	-4.9	97.0	7.7	43.8	1208.6
17-Dec-16 17:00	5.2	206.4	8.5	-4.7	97.2	0.4	37.7	1208.2
17-Dec-16 18:00	4.6	209.0	8.0	-4.4	97.4	0.0	44.2	1209.7
17-Dec-16 19:00	5.0	202.4	7.6	-4.2	97.6	0.0	46.6	1208.4
17-Dec-16 20:00	5.7	201.1	7.8	-3.9	97.8	0.0	47.3	1211.9
17-Dec-16 21:00	4.7	210.5	9.9	-3.9	97.8	0.0	46.4	1212.9
17-Dec-16 22:00	4.4	207.3	10.1	-3.9	97.7	0.0	45.5	1211.6
17-Dec-16 23:00	6.7	199.8	8.0	-4.0	97.7	0.0	44.0	1212.6
18-Dec-16 0:00	6.2	199.4	8.0	-3.8	97.8	0.0	44.6	1212.1
18-Dec-16 1:00	5.9	204.8	8.4	-3.7	97.9	0.0	44.7	1212.1
18-Dec-16 2:00	5.9	212.9	8.0	-3.5	98.0	0.0	45.3	1211.7
18-Dec-16 3:00	7.1	220.6	8.0	-3.4	98.0	0.0	51.7	1216.1
18-Dec-16 4:00	5.6	212.7	7.9	-3.0	98.2	0.0	46.9	1213.7
18-Dec-16 5:00	4.2	222.7	9.0	-2.8	98.3	0.0	52.2	1214.9
18-Dec-16 6:00	3.9	223.3	6.6	-3.1	98.2	0.0	55.5	1216.2
18-Dec-16 7:00	3.2	223.8	7.9	-2.6	98.4	0.0	56.4	1217.3
18-Dec-16 8:00	3.1	227.2	5.5	-2.8	98.4	0.0	58.3	1219.1
18-Dec-16 9:00	4.1	223.0	5.7	-2.6	98.5	0.0	57.9	1220.3
18-Dec-16 10:00	5.1	217.8	6.5	-2.2	98.7	2.6	55.3	1220.8
18-Dec-16 11:00	4.4	206.2	8.1	-2.1	98.7	13.2	56.0	1221.1
18-Dec-16 12:00	5.5	197.3	9.8	-2.3	98.7	20.9	56.6	1223.2
18-Dec-16 13:00	5.9	194.2	10.3	-2.5	98.6	20.2	56.2	1223.2
18-Dec-16 14:00	5.7	194.2	12.4	-2.5	98.6	19.5	58.5	1222.9
18-Dec-16 15:00	5.1	199.0	14.5	-2.6	98.5	10.9	57.5	1222.4
18-Dec-16 16:00	6.4	188.1	17.6	-2.6	98.6	5.2	55.6	1225.1
18-Dec-16 17:00	9.0	185.2	14.8	-2.5	98.6	0.2	55.6	1226.2
18-Dec-16 18:00	7.3	197.8	12.5	-2.7	98.5	0.0	54.9	1225.6
18-Dec-16 19:00	5.4	209.0	9.9	-2.8	98.5	0.0	55.3	1221.1
18-Dec-16 20:00	7.3	229.3	10.0	-3.1	98.3	0.0	54.9	1226.6
18-Dec-16 21:00	-	-	-	-3.6	98.0	0.0	55.0	1227.1
18-Dec-16 22:00	-	-	-	-4.2	97.7	0.0	55.0	1224.4
18-Dec-16 23:00	-	-	-	-4.4	97.5	0.0	55.3	1226.6
19-Dec-16 0:00	-	-	-	-4.8	97.4	0.0	55.5	1227.6
19-Dec-16 1:00	-	-	-	-4.8	97.3	0.0	55.2	1225.2
19-Dec-16 2:00	-	-	-	-4.7	97.4	0.0	55.4	1225.7
19-Dec-16 3:00	-	-	-	-4.8	97.3	0.0	54.7	1224.4
19-Dec-16 4:00	-	-	-	-5.0	97.2	0.0	55.8	1226.5
19-Dec-16 5:00	-	-	-	-4.9	97.2	0.0	56.4	1227.7



Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
19-Dec-16 6:00	-	-	-	-4.7	97.3	0.0	55.9	1228.3
19-Dec-16 7:00	-	-	-	-4.8	97.2	0.0	55.0	1228.5
19-Dec-16 8:00	-	-	-	-4.9	97.2	0.0	55.3	1229.0
19-Dec-16 9:00	-	-	-	-4.8	97.2	0.1	54.3	1229.4
19-Dec-16 10:00	-	-	-	-4.9	97.2	11.0	54.8	1229.2
19-Dec-16 11:00	-	-	-	-4.7	97.3	14.7	54.9	1229.2
19-Dec-16 12:00	-	-	-	-4.7	97.3	32.3	54.8	1228.2
19-Dec-16 13:00	-	-	-	-4.6	97.4	43.8	54.5	1228.0
19-Dec-16 14:00	-	-	-	-4.3	97.5	30.4	55.0	1227.8
19-Dec-16 15:00	-	-	-	-4.2	97.6	27.3	53.8	1228.7
19-Dec-16 16:00	-	-	-	-4.2	97.6	7.3	54.3	1229.7
19-Dec-16 17:00	-	-	-	-4.3	97.6	0.5	54.7	1228.0
19-Dec-16 18:00	-	-	-	-4.3	97.6	0.0	54.8	1231.4
19-Dec-16 19:00	-	-	-	-4.4	97.5	0.0	54.8	1229.9
19-Dec-16 20:00	-	-	-	-4.4	97.5	0.0	53.9	1229.1
19-Dec-16 21:00	-	-	-	-4.7	97.3	0.0	54.7	1229.1
19-Dec-16 22:00	-	-	-	-4.7	97.3	0.0	55.2	1229.1
19-Dec-16 23:00	-	-	-	-4.8	97.3	0.0	56.1	1228.9
20-Dec-16 0:00	-	-	-	-4.9	97.2	0.0	55.0	1229.2
20-Dec-16 1:00	-	-	-	-5.0	97.2	0.0	54.9	1229.0
20-Dec-16 2:00	-	-	-	-4.9	97.2	0.0	55.3	1229.1
20-Dec-16 3:00	-	-	-	-5.0	97.1	0.0	55.2	1229.0
20-Dec-16 4:00	-	-	-	-5.2	97.0	0.0	55.4	1229.0
20-Dec-16 5:00	-	-	-	-5.4	96.9	0.0	54.7	1229.0
20-Dec-16 6:00	-	-	-	-5.5	96.8	0.0	55.0	1229.0
20-Dec-16 7:00	-	-	-	-5.6	96.8	0.0	54.8	1229.0
20-Dec-16 8:00	-	-	-	-5.6	96.8	0.0	55.1	1229.6
20-Dec-16 9:00	-	-	-	-5.3	97.0	0.0	56.6	1230.9
20-Dec-16 10:00	-	-	-	-5.0	97.1	3.3	54.6	1231.7
20-Dec-16 11:00	-	-	-	-4.8	97.3	14.6	57.4	1231.7
20-Dec-16 12:00	-	-	-	-4.5	97.4	39.0	54.9	1231.6
20-Dec-16 13:00	-	-	-	-4.1	97.5	67.2	55.4	1232.4
20-Dec-16 14:00	-	-	-	-4.1	97.5	49.5	54.9	1232.3
20-Dec-16 15:00	-	-	-	-4.5	97.4	23.4	55.2	1230.8
20-Dec-16 16:00	-	-	-	-4.4	97.5	6.2	54.9	1230.4
20-Dec-16 17:00	-	-	-	-4.4	97.5	0.3	54.6	1231.0
20-Dec-16 18:00	-	-	-	-4.2	97.7	0.0	54.8	1233.0
20-Dec-16 19:00	-	-	-	-3.8	97.9	0.0	54.3	1236.3
20-Dec-16 20:00	-	-	-	-3.6	98.0	0.0	52.6	1234.0
20-Dec-16 21:00	-	-	-	-3.6	98.0	0.0	56.2	1233.7
20-Dec-16 22:00	-	-	-	-3.7	97.9	0.0	54.5	1234.4
20-Dec-16 23:00	-	-	-	-3.8	97.9	0.0	54.6	1238.9
21-Dec-16 0:00	-	-	-	-3.8	97.9	0.0	54.3	1234.7
21-Dec-16 1:00	-	-	-	-4.2	97.7	0.0	54.9	1235.2
21-Dec-16 2:00	-	-	-	-4.2	97.6	0.0	54.4	1235.3
21-Dec-16 3:00	-	-	-	-4.2	97.7	0.0	54.3	1236.0
21-Dec-16 4:00	-	-	-	-4.1	97.7	0.0	54.3	1236.8
21-Dec-16 5:00	-	-	-	-4.2	97.6	0.0	54.5	1236.2
21-Dec-16 6:00	-	-	-	-4.4	97.5	0.0	55.4	1236.3
21-Dec-16 7:00	-	-	-	-4.5	97.4	0.0	54.7	1236.4
21-Dec-16 8:00	-	-	-	-4.7	97.3	0.0	55.2	1236.6
21-Dec-16 9:00	-	-	-	-4.7	97.3	0.0	56.7	1238.0
21-Dec-16 10:00	-	-	-	-4.8	97.2	2.2	-	1239.3

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
21-Dec-16 11:00	-	-	-	-4.5	97.4	5.9	56.6	1239.8
21-Dec-16 12:00	-	-	-	-4.4	97.4	8.7	61.0	1239.4
21-Dec-16 13:00	-	-	-	-4.4	97.5	21.9	56.6	1241.4
21-Dec-16 14:00	-	-	-	-4.4	97.4	24.5	56.9	1241.5
21-Dec-16 15:00	-	-	-	-4.5	97.3	20.1	55.5	1241.3
21-Dec-16 16:00	-	-	-	-4.7	97.3	5.4	54.8	1241.0
21-Dec-16 17:00	-	-	-	-4.9	97.1	0.4	55.1	1241.8
21-Dec-16 18:00	-	-	-	-5.0	97.2	0.0	55.0	1240.6
21-Dec-16 19:00	-	-	-	-5.0	97.1	0.0	55.1	1240.7
21-Dec-16 20:00	-	-	-	-5.1	97.1	0.0	55.2	1240.8
21-Dec-16 21:00	-	-	-	-5.0	97.1	0.0	55.2	1240.6
21-Dec-16 22:00	-	-	-	-5.0	97.1	0.0	55.1	1241.2
21-Dec-16 23:00	-	-	-	-4.9	97.1	0.0	54.8	1241.4
22-Dec-16 0:00	-	-	-	-5.0	97.1	0.0	54.5	1241.0
22-Dec-16 1:00	-	-	-	-5.0	97.1	0.0	53.5	1241.4
22-Dec-16 2:00	-	-	-	-4.9	97.1	0.0	54.6	1241.2
22-Dec-16 3:00	-	-	-	-5.0	97.1	0.0	55.3	1241.2
22-Dec-16 4:00	-	-	-	-5.0	97.0	0.0	55.1	1241.2
22-Dec-16 5:00	-	-	-	-5.2	96.9	0.0	55.7	1241.2
22-Dec-16 6:00	-	-	-	-5.3	96.9	0.0	55.6	1241.1
22-Dec-16 7:00	-	-	-	-5.4	96.8	0.0	55.2	1241.1
22-Dec-16 8:00	-	-	-	-5.5	96.7	0.0	55.1	1241.1
22-Dec-16 9:00	-	-	-	-5.7	96.6	0.0	54.1	1241.1
22-Dec-16 10:00	-	-	-	-5.9	96.5	2.7	54.1	1241.0
22-Dec-16 11:00	-	-	-	-6.8	96.0	8.5	54.5	1241.2
22-Dec-16 12:00	-	-	-	-6.5	95.9	72.1	54.2	1242.5
22-Dec-16 13:00	-	-	-	-4.6	97.0	65.7	53.7	1242.5
22-Dec-16 14:00	-	-	-	-2.7	98.0	59.9	53.6	1241.8
22-Dec-16 15:00	-	-	-	-2.6	98.1	51.7	52.5	1241.4
22-Dec-16 16:00	-	-	-	-4.0	97.5	18.7	54.0	1241.0
22-Dec-16 17:00	-	-	-	-5.9	96.5	1.5	53.9	1240.9
22-Dec-16 18:00	-	-	-	-7.0	95.7	0.0	54.0	1240.7
22-Dec-16 19:00	-	-	-	-7.6	95.4	0.0	54.1	1240.7
22-Dec-16 20:00	-	-	-	-8.1	95.1	0.0	53.8	1240.7
22-Dec-16 21:00	-	-	-	-8.4	94.8	0.0	53.9	1240.7
22-Dec-16 22:00	-	-	-	-8.7	94.6	0.0	54.8	1240.6
22-Dec-16 23:00	-	-	-	-9.0	94.3	0.0	54.4	1240.8
23-Dec-16 0:00	-	-	-	-9.4	94.1	0.0	55.3	1240.8
23-Dec-16 1:00	-	-	-	-9.5	94.0	0.0	55.0	1240.8
23-Dec-16 2:00	-	-	-	-9.7	93.8	0.0	54.7	1240.8
23-Dec-16 3:00	-	-	-	-10.0	93.6	0.0	55.0	1240.8
23-Dec-16 4:00	-	-	-	-10.1	93.5	0.0	54.9	1240.8
23-Dec-16 5:00	-	-	-	-10.3	93.3	0.0	54.8	1240.8
23-Dec-16 6:00	-	-	-	-10.5	93.1	0.0	54.7	1240.8
23-Dec-16 7:00	-	-	-	-10.8	92.8	0.0	54.8	1240.8
23-Dec-16 8:00	-	-	-	-11.0	92.6	0.0	55.8	1240.7
23-Dec-16 9:00	-	-	-	-11.1	92.5	0.1	54.7	1240.6
23-Dec-16 10:00	-	-	-	-11.4	92.2	4.6	55.0	1240.6
23-Dec-16 11:00	-	-	-	-11.6	92.0	13.6	54.4	1240.9
23-Dec-16 12:00	-	-	-	-10.6	92.7	91.5	53.6	1242.5
23-Dec-16 13:00	-	-	-	-11.1	92.2	71.6	55.1	1242.3
23-Dec-16 14:00	-	-	-	-10.9	92.4	55.7	53.6	1241.7
23-Dec-16 15:00	-	-	-	-10.7	92.6	42.9	53.1	1241.4

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
23-Dec-16 16:00	-	-	-	-9.4	93.8	21.3	53.8	1241.1
23-Dec-16 17:00	-	-	-	-11.1	92.4	1.4	54.9	1240.7
23-Dec-16 18:00	-	-	-	-11.9	91.7	0.0	54.3	1240.6
23-Dec-16 19:00	-	-	-	-11.7	91.9	0.0	55.0	1240.9
23-Dec-16 20:00	-	-	-	-12.0	91.5	0.0	54.0	1240.7
23-Dec-16 21:00	-	-	-	-12.6	91.0	0.0	54.8	1240.7
23-Dec-16 22:00	-	-	-	-12.8	90.8	0.0	54.0	1240.7
23-Dec-16 23:00	-	-	-	-13.0	90.5	0.0	54.5	1240.8
24-Dec-16 0:00	-	-	-	-13.2	90.4	0.0	55.2	1240.8
24-Dec-16 1:00	-	-	-	-13.3	90.2	0.0	54.0	1240.8
24-Dec-16 2:00	-	-	-	-13.6	90.0	0.0	54.1	1240.9
24-Dec-16 3:00	-	-	-	-13.7	89.9	0.0	55.3	1240.9
24-Dec-16 4:00	-	-	-	-13.7	89.9	0.0	54.5	1241.0
24-Dec-16 5:00	-	-	-	-13.6	90.0	0.0	55.2	1241.0
24-Dec-16 6:00	-	-	-	-13.5	90.0	0.0	54.6	1241.1
24-Dec-16 7:00	-	-	-	-13.8	89.8	0.0	55.4	1241.0
24-Dec-16 8:00	-	-	-	-13.4	90.2	0.0	55.2	1241.1
24-Dec-16 9:00	-	-	-	-13.2	90.4	0.2	54.6	1241.1
24-Dec-16 10:00	-	-	-	-13.3	90.2	15.6	54.7	1241.2
24-Dec-16 11:00	-	-	-	-13.0	90.4	34.5	54.5	1241.3
24-Dec-16 12:00	-	-	-	-12.5	91.0	56.5	54.7	1241.4
24-Dec-16 13:00	-	-	-	-11.7	91.7	73.9	54.5	1241.4
24-Dec-16 14:00	-	-	-	-11.5	91.8	68.9	54.0	1241.3
24-Dec-16 15:00	-	-	-	-11.8	91.6	44.6	54.8	1241.3
24-Dec-16 16:00	-	-	-	-11.8	91.7	16.5	55.2	1241.3
24-Dec-16 17:00	-	-	-	-11.9	91.6	0.7	55.4	1241.3
24-Dec-16 18:00	-	-	-	-12.0	91.5	0.0	55.2	1241.3
24-Dec-16 19:00	-	-	-	-12.1	91.4	0.0	55.9	1241.4
24-Dec-16 20:00	-	-	-	-11.9	91.6	0.0	55.6	1241.4
24-Dec-16 21:00	-	-	-	-11.7	91.9	0.0	55.5	1241.4
24-Dec-16 22:00	-	-	-	-11.6	91.9	0.0	54.8	1241.3
24-Dec-16 23:00	-	-	-	-12.0	91.5	0.0	56.4	1241.3
25-Dec-16 0:00	-	-	-	-11.7	91.8	0.0	55.7	1241.4
25-Dec-16 1:00	-	-	-	-11.6	91.9	0.0	56.1	1241.4
25-Dec-16 2:00	-	-	-	-11.5	92.0	0.0	56.3	1241.4
25-Dec-16 3:00	-	-	-	-11.2	92.0	0.0	55.8	1241.3
25-Dec-16 4:00	-	-	-	-10.3	88.8	0.0	55.7	1241.4
25-Dec-16 5:00	-	-	-	-10.2	88.6	0.0	55.3	1241.3
25-Dec-16 6:00	-	-	-	-10.2	91.3	0.0	55.2	1241.3
25-Dec-16 7:00	-	-	-	-11.1	91.0	0.0	55.5	1241.3
25-Dec-16 8:00	-	-	-	-10.5	90.6	0.0	55.8	1241.3
25-Dec-16 9:00	-	-	-	-9.9	89.9	0.0	55.8	1241.3
25-Dec-16 10:00	-	-	-	-9.7	90.1	4.0	56.1	1241.4
25-Dec-16 11:00	-	-	-	-9.9	90.9	26.9	55.9	1241.3
25-Dec-16 12:00	-	-	-	-10.1	86.6	84.9	55.1	1241.5
25-Dec-16 13:00	-	-	-	-9.8	83.9	87.1	55.7	1241.2
25-Dec-16 14:00	-	-	-	-9.8	84.0	85.7	55.0	1241.3
25-Dec-16 15:00	-	-	-	-9.3	82.6	37.5	55.4	1241.5
25-Dec-16 16:00	-	-	-	-9.3	84.7	18.2	55.4	1241.5
25-Dec-16 17:00	-	-	-	-9.5	88.2	1.1	55.5	1241.3
25-Dec-16 18:00	-	-	-	-10.3	89.1	0.0	55.2	1241.1
25-Dec-16 19:00	-	-	-	-10.3	91.5	0.0	55.6	1241.0
25-Dec-16 20:00	-	-	-	-10.3	93.0	0.0	55.6	1240.7

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
25-Dec-16 21:00	-	-	-	-10.3	93.4	0.0	55.8	1241.1
25-Dec-16 22:00	-	-	-	-10.1	93.6	0.0	59.3	1241.6
25-Dec-16 23:00	-	-	-	-9.8	93.9	0.0	55.3	1241.5
26-Dec-16 0:00	-	-	-	-9.5	94.1	0.0	56.6	1241.7
26-Dec-16 1:00	-	-	-	-9.2	94.3	0.0	60.5	1242.0
26-Dec-16 2:00	-	-	-	-9.1	94.4	0.0	61.4	1242.6
26-Dec-16 3:00	-	-	-	-8.5	94.7	0.0	61.6	1242.9
26-Dec-16 4:00	-	-	-	-8.4	94.9	0.0	62.9	1243.2
26-Dec-16 5:00	-	-	-	-7.9	95.2	0.0	61.2	1243.7
26-Dec-16 6:00	-	-	-	-7.8	95.3	0.0	64.7	1243.9
26-Dec-16 7:00	-	-	-	-7.7	95.3	0.0	64.4	1244.1
26-Dec-16 8:00	-	-	-	-7.9	95.2	0.0	65.4	1244.3
26-Dec-16 9:00	-	-	-	-8.1	95.1	0.0	65.5	1244.1
26-Dec-16 10:00	-	-	-	-8.1	95.1	3.6	65.1	1244.7
26-Dec-16 11:00	-	-	-	-8.1	95.1	12.2	64.6	1244.1
26-Dec-16 12:00	-	-	-	-8.0	95.0	42.6	-	1244.5
26-Dec-16 13:00	-	-	-	-8.0	95.0	63.2	69.0	1244.6
26-Dec-16 14:00	-	-	-	-7.8	95.2	59.4	64.9	1245.4
26-Dec-16 15:00	-	-	-	-7.6	95.3	45.8	69.9	1243.8
26-Dec-16 16:00	-	-	-	-7.7	95.4	6.5	66.1	1244.3
26-Dec-16 17:00	-	-	-	-7.5	95.5	0.7	76.1	1245.2
26-Dec-16 18:00	-	-	-	-7.6	95.4	0.0	76.5	1244.8
26-Dec-16 19:00	-	-	-	-7.6	95.4	0.0	78.6	1245.8
26-Dec-16 20:00	-	-	-	-7.5	95.5	0.0	81.0	1245.7
26-Dec-16 21:00	-	-	-	-7.2	95.7	0.0	80.6	1245.7
26-Dec-16 22:00	-	-	-	-7.0	95.7	0.0	83.1	1246.6
26-Dec-16 23:00	-	-	-	-6.6	96.0	0.0	85.7	1249.0
27-Dec-16 0:00	-	-	-	-6.4	96.2	0.0	88.2	1251.0
27-Dec-16 1:00	-	-	-	-5.5	96.8	0.0	82.3	1248.4
27-Dec-16 2:00	-	-	-	-4.8	97.2	0.0	82.4	1252.2
27-Dec-16 3:00	-	-	-	-4.4	97.4	0.0	81.4	1250.0
27-Dec-16 4:00	-	-	-	-4.1	97.6	0.0	80.4	1250.8
27-Dec-16 5:00	-	-	-	-3.9	97.7	0.0	77.9	1251.2
27-Dec-16 6:00	-	-	-	-3.8	97.8	0.0	80.1	1251.6
27-Dec-16 7:00	-	-	-	-3.8	97.8	0.0	79.1	1251.8
27-Dec-16 8:00	-	-	-	-3.8	97.7	0.0	78.6	1253.1
27-Dec-16 9:00	-	-	-	-3.9	97.7	0.1	77.0	1251.9
27-Dec-16 10:00	-	-	-	-3.9	97.6	6.8	79.7	1252.2
27-Dec-16 11:00	-	-	-	-3.9	97.6	31.2	80.0	1252.6
27-Dec-16 12:00	-	-	-	-3.8	97.7	51.1	79.6	1252.4
27-Dec-16 13:00	-	-	-	-3.6	97.7	71.2	79.0	1252.3
27-Dec-16 14:00	-	-	-	-3.6	97.7	45.1	80.4	1252.7
27-Dec-16 15:00	-	-	-	-3.8	97.7	24.0	80.6	1253.2
27-Dec-16 16:00	-	-	-	-3.9	97.6	10.1	79.9	1253.2
27-Dec-16 17:00	-	-	-	-4.0	97.5	0.9	79.8	1253.3
27-Dec-16 18:00	-	-	-	-4.1	97.5	0.0	79.8	1254.1
27-Dec-16 19:00	-	-	-	-4.1	97.5	0.0	79.8	1254.1
27-Dec-16 20:00	-	-	-	-4.1	97.5	0.0	79.9	1254.5
27-Dec-16 21:00	-	-	-	-4.3	97.3	0.0	79.1	1253.7
27-Dec-16 22:00	-	-	-	-4.6	97.2	0.0	79.4	1254.3
27-Dec-16 23:00	-	-	-	-4.7	97.1	0.0	79.3	1253.7
28-Dec-16 0:00	-	-	-	-4.8	97.1	0.0	80.0	1254.2
28-Dec-16 1:00	-	-	-	-4.9	96.9	0.0	80.3	1254.2

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
28-Dec-16 2:00	-	-	-	-5.0	97.0	0.0	79.0	1253.7
28-Dec-16 3:00	-	-	-	-5.0	96.9	0.0	78.5	1254.8
28-Dec-16 4:00	-	-	-	-5.0	96.9	0.0	78.3	1253.8
28-Dec-16 5:00	-	-	-	-5.0	96.9	0.0	79.7	1254.9
28-Dec-16 6:00	-	-	-	-4.9	97.1	0.0	79.0	1255.0
28-Dec-16 7:00	-	-	-	-4.7	97.1	0.0	77.5	1254.8
28-Dec-16 8:00	-	-	-	-4.8	97.0	0.0	78.2	1255.3
28-Dec-16 9:00	-	-	-	-4.9	97.0	0.0	78.0	1255.5
28-Dec-16 10:00	-	-	-	-5.0	96.9	3.1	77.5	1254.5
28-Dec-16 11:00	-	-	-	-4.8	97.0	19.6	77.8	1254.6
28-Dec-16 12:00	-	-	-	-4.5	97.1	37.1	80.5	1256.7
28-Dec-16 13:00	-	-	-	-4.3	97.3	64.7	76.3	1254.5
28-Dec-16 14:00	-	-	-	-4.1	97.4	51.1	78.2	1254.8
28-Dec-16 15:00	-	-	-	-4.2	97.3	38.2	78.1	1255.0
28-Dec-16 16:00	-	-	-	-4.2	97.3	13.4	78.2	1255.4
28-Dec-16 17:00	-	-	-	-4.3	97.2	1.3	78.3	1255.4
28-Dec-16 18:00	-	-	-	-4.6	97.1	0.0	78.5	1255.5
28-Dec-16 19:00	-	-	-	-4.8	96.9	0.0	77.9	1255.4
28-Dec-16 20:00	-	-	-	-5.1	96.7	0.0	77.0	1255.4
28-Dec-16 21:00	-	-	-	-5.4	96.5	0.0	76.9	1255.4
28-Dec-16 22:00	-	-	-	-5.7	96.3	0.0	77.7	1255.4
28-Dec-16 23:00	-	-	-	-5.9	96.2	0.0	77.9	1255.3
29-Dec-16 0:00	-	-	-	-6.2	96.1	0.0	77.3	1255.3
29-Dec-16 1:00	-	-	-	-6.1	96.1	0.0	78.3	1255.3
29-Dec-16 2:00	-	-	-	-6.6	95.9	0.0	77.6	1255.0
29-Dec-16 3:00	-	-	-	-7.1	95.6	0.0	77.8	1255.1
29-Dec-16 4:00	-	-	-	-7.3	95.5	0.0	77.0	1254.3
29-Dec-16 5:00	-	-	-	-7.3	95.5	0.0	79.9	1255.7
29-Dec-16 6:00	-	-	-	-7.4	95.4	0.0	77.9	1255.1
29-Dec-16 7:00	-	-	-	-7.7	95.1	0.0	76.8	1255.0
29-Dec-16 8:00	-	-	-	-8.2	94.9	0.0	78.4	1254.4
29-Dec-16 9:00	-	-	-	-8.5	94.7	0.1	77.7	1255.6
29-Dec-16 10:00	-	-	-	-8.4	94.8	5.1	79.4	1254.2
29-Dec-16 11:00	-	-	-	-8.8	94.4	15.6	79.3	1254.4
29-Dec-16 12:00	-	-	-	-8.1	93.7	145.6	79.3	1256.6
29-Dec-16 13:00	-	-	-	-8.0	93.3	116.0	78.3	1256.4
29-Dec-16 14:00	-	-	-	-8.0	93.2	82.6	78.5	1255.9
29-Dec-16 15:00	-	-	-	-8.6	93.4	57.4	78.3	1255.5
29-Dec-16 16:00	-	-	-	-8.1	93.9	29.6	78.4	1255.3
29-Dec-16 17:00	-	-	-	-8.3	94.3	3.2	78.6	1255.0
29-Dec-16 18:00	-	-	-	-8.8	94.0	0.0	78.4	1254.9
29-Dec-16 19:00	-	-	-	-9.1	93.9	0.0	78.1	1254.9
29-Dec-16 20:00	-	-	-	-9.2	93.9	0.0	77.9	1254.9
29-Dec-16 21:00	-	-	-	-9.3	93.9	0.0	78.0	1255.0
29-Dec-16 22:00	-	-	-	-9.2	93.9	0.0	78.0	1255.0
29-Dec-16 23:00	-	-	-	-9.1	94.0	0.0	78.0	1255.2
30-Dec-16 0:00	-	-	-	-9.1	93.8	0.0	78.4	1255.2
30-Dec-16 1:00	-	-	-	-8.3	94.6	0.0	78.2	1255.7
30-Dec-16 2:00	-	-	-	-7.9	94.8	0.0	77.8	1255.5
30-Dec-16 3:00	-	-	-	-7.2	95.5	0.0	77.8	1255.7
30-Dec-16 4:00	-	-	-	-6.6	95.4	0.0	77.0	1254.7
30-Dec-16 5:00	-	-	-	-6.7	95.4	0.0	76.4	1255.6
30-Dec-16 6:00	-	-	-	-6.9	95.3	0.0	75.9	1255.2

Appendix C1: Johnny Mountain 2016 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
30-Dec-16 7:00	-	-	-	-7.1	95.5	0.0	75.4	1255.3
30-Dec-16 8:00	-	-	-	-7.0	95.8	0.0	75.2	1255.7
30-Dec-16 9:00	-	-	-	-6.9	95.7	0.1	75.2	1254.5
30-Dec-16 10:00	-	-	-	-6.8	95.8	11.7	75.2	1254.6
30-Dec-16 11:00	-	-	-	-6.4	95.9	41.6	74.5	1256.6
30-Dec-16 12:00	-	-	-	-6.1	96.1	54.3	74.4	1254.7
30-Dec-16 13:00	-	-	-	-5.9	96.2	69.0	74.0	1256.2
30-Dec-16 14:00	-	-	-	-5.7	96.4	54.5	73.6	1257.0
30-Dec-16 15:00	-	-	-	-5.4	96.5	32.7	73.9	1254.7
30-Dec-16 16:00	-	-	-	-5.4	96.6	12.4	74.3	1255.5
30-Dec-16 17:00	-	-	-	-5.2	96.8	1.7	72.7	1255.4
30-Dec-16 18:00	-	-	-	-5.0	96.9	0.0	73.7	1255.3
30-Dec-16 19:00	-	-	-	-4.8	97.1	0.0	74.2	1255.6
30-Dec-16 20:00	-	-	-	-4.4	97.2	0.0	74.2	1257.1
30-Dec-16 21:00	-	-	-	-4.3	97.3	0.0	74.2	1255.1
30-Dec-16 22:00	-	-	-	-4.2	97.4	0.0	74.0	1257.4
30-Dec-16 23:00	-	-	-	-4.0	97.6	0.0	75.3	1256.8
31-Dec-16 0:00	-	-	-	-3.8	97.7	0.0	74.5	1256.7
31-Dec-16 1:00	-	-	-	-3.7	97.6	0.0	75.9	1258.1
31-Dec-16 2:00	-	-	-	-3.9	97.4	0.0	75.4	1257.0
31-Dec-16 3:00	-	-	-	-4.5	97.0	0.0	74.2	1257.4
31-Dec-16 4:00	-	-	-	-4.8	96.8	0.0	74.3	1257.8
31-Dec-16 5:00	-	-	-	-5.1	96.8	0.0	73.7	1257.2
31-Dec-16 6:00	-	-	-	-5.8	96.5	0.0	80.5	1255.1
31-Dec-16 7:00	-	-	-	-6.9	85.7	0.0	82.0	1255.8
31-Dec-16 8:00	-	-	-	-7.5	73.5	0.0	77.6	1257.2
31-Dec-16 9:00	-	-	-	-8.2	66.2	0.2	79.3	1254.1
31-Dec-16 10:00	-	-	-	-8.5	61.0	7.5	74.0	1259.6
31-Dec-16 11:00	-	-	-	-8.6	56.0	21.8	72.1	1255.6
31-Dec-16 12:00	-	-	-	-8.5	52.3	216.4	72.5	1258.5
31-Dec-16 13:00	-	-	-	-8.1	50.9	262.2	71.3	1257.4
31-Dec-16 14:00	8.8	35.0	8.5	-7.6	53.0	234.2	73.5	1256.8
31-Dec-16 15:00	6.2	47.4	8.0	-7.4	54.2	192.6	73.9	1256.4
31-Dec-16 16:00	7.2	43.9	6.3	-7.6	59.5	106.6	74.1	1257.8
31-Dec-16 17:00	7.5	35.7	9.0	-7.9	62.1	8.9	73.6	1256.5
31-Dec-16 18:00	12.4	43.4	8.5	-7.8	68.5	0.0	72.4	1257.4
31-Dec-16 19:00	15.1	31.3	8.6	-7.7	73.6	0.0	71.3	1258.0
31-Dec-16 20:00	15.3	39.2	8.5	-7.4	68.2	0.0	71.8	1255.1
31-Dec-16 21:00	15.0	41.7	7.2	-7.2	65.0	0.0	72.0	1260.2
31-Dec-16 22:00	14.2	38.6	7.0	-7.3	67.1	0.0	70.8	1252.4
31-Dec-16 23:00	14.8	35.7	7.1	-7.2	65.2	0.0	71.5	1250.2

Note: dash (-) = Missing or erroneous data that were removed.

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
01-Nov-16 0:00	2.3	210.3	12.9	0.3	84.5	0.0	0.0	1022.2
01-Nov-16 1:00	2.8	185.6	11.4	0.2	84.2	0.0	0.0	1022.3
01-Nov-16 2:00	2.0	176.9	16.0	-0.1	86.8	0.0	0.0	1022.1
01-Nov-16 3:00	1.8	179.7	21.1	0.0	85.8	0.0	0.0	1022.3
01-Nov-16 4:00	2.7	47.7	53.1	0.0	82.7	0.0	0.0	1022.4
01-Nov-16 5:00	2.0	90.7	17.0	0.2	75.6	0.0	0.0	1022.3
01-Nov-16 6:00	1.9	52.0	29.6	0.1	79.4	0.0	0.0	1022.3
01-Nov-16 7:00	1.3	66.8	28.4	-0.2	81.7	0.0	0.0	1022.4
01-Nov-16 8:00	1.5	44.6	17.3	-0.2	81.2	0.7	0.0	1022.4
01-Nov-16 9:00	3.0	36.4	7.1	-0.6	85.0	28.8	0.0	1022.5
01-Nov-16 10:00	3.9	35.0	5.2	-0.6	86.8	73.4	0.0	1022.3
01-Nov-16 11:00	4.6	29.6	4.5	-0.7	88.6	84.9	0.0	1022.1
01-Nov-16 12:00	4.6	32.6	4.7	-0.5	88.2	112.0	0.0	1022.6
01-Nov-16 13:00	4.0	34.2	5.1	-0.2	87.7	124.5	0.0	1022.7
01-Nov-16 14:00	4.2	24.2	6.4	-0.1	88.8	111.0	0.0	1022.5
01-Nov-16 15:00	4.0	25.3	4.9	-0.2	89.6	64.0	0.0	1022.0
01-Nov-16 16:00	5.4	26.8	4.7	-0.5	94.1	50.3	0.0	1022.8
01-Nov-16 17:00	4.6	30.8	6.8	-0.6	96.0	6.7	0.0	1023.3
01-Nov-16 18:00	5.2	27.4	6.0	-0.8	97.1	0.4	0.0	1023.0
01-Nov-16 19:00	4.5	28.0	3.9	-0.7	97.0	0.0	0.0	1023.4
01-Nov-16 20:00	4.5	26.1	5.2	-0.2	93.6	0.0	0.0	1023.1
01-Nov-16 21:00	4.2	28.0	5.4	-0.4	94.9	0.0	0.0	1023.1
01-Nov-16 22:00	2.5	26.4	14.5	-0.3	96.6	0.0	0.0	1023.6
01-Nov-16 23:00	2.5	28.0	8.3	-0.3	98.1	0.0	0.0	1024.2
02-Nov-16 0:00	2.3	270.4	30.1	-1.2	99.0	0.0	0.0	1025.2
02-Nov-16 1:00	4.0	199.2	11.3	-1.3	99.3	0.0	2.0	1025.8
02-Nov-16 2:00	4.0	204.0	7.8	-1.3	99.2	0.0	3.6	1026.9
02-Nov-16 3:00	4.0	211.6	6.6	-1.3	99.2	0.0	4.0	1027.1
02-Nov-16 4:00	3.5	204.2	7.1	-1.2	99.2	0.0	3.6	1027.3
02-Nov-16 5:00	3.2	204.1	11.0	-1.2	99.2	0.0	4.0	1027.3
02-Nov-16 6:00	2.6	207.5	6.3	-1.3	99.1	0.0	3.7	1027.6
02-Nov-16 7:00	2.4	221.1	12.4	-1.4	99.1	0.0	3.5	1027.5
02-Nov-16 8:00	1.1	169.0	24.3	-1.9	98.7	1.2	4.0	1027.4
02-Nov-16 9:00	0.7	126.5	0.3	-2.2	97.9	19.2	3.7	1027.6
02-Nov-16 10:00	0.7	123.8	48.3	-1.9	95.4	83.4	3.6	1027.7
02-Nov-16 11:00	1.0	58.1	32.7	-1.8	92.5	129.4	3.3	1027.8
02-Nov-16 12:00	5.9	61.6	20.9	-1.4	87.8	161.4	3.4	1024.5
02-Nov-16 13:00	10.9	32.1	10.1	-0.5	78.7	173.9	7.3	1027.2
02-Nov-16 14:00	9.5	63.4	29.3	-0.2	73.3	121.5	0.1	1026.6
02-Nov-16 15:00	11.2	64.0	25.6	0.2	68.7	66.4	1.2	1026.9
02-Nov-16 16:00	12.8	57.8	15.1	0.3	67.7	39.7	-	1028.3
02-Nov-16 17:00	14.1	79.5	12.7	0.5	66.1	7.5	1.6	1028.4
02-Nov-16 18:00	12.4	88.5	11.1	0.7	67.8	0.1	1.6	1025.0
02-Nov-16 19:00	2.6	230.8	31.0	-0.3	88.9	0.0	0.0	1027.6
02-Nov-16 20:00	1.5	20.5	47.1	-1.0	98.2	0.0	0.0	1028.4
02-Nov-16 21:00	4.8	21.2	5.9	-0.9	97.8	0.0	0.0	1028.8
02-Nov-16 22:00	4.2	30.6	11.7	-0.6	98.6	0.0	0.0	1030.2
02-Nov-16 23:00	3.3	213.6	41.7	1.1	92.6	0.0	0.0	1030.2
03-Nov-16 0:00	1.9	206.6	71.7	1.6	86.4	0.0	0.0	1030.2
03-Nov-16 1:00	1.9	188.8	58.2	0.8	94.7	0.0	0.0	1030.9
03-Nov-16 2:00	3.2	175.9	30.3	0.8	95.8	0.0	0.0	1031.1
03-Nov-16 3:00	6.1	177.7	14.8	1.4	93.2	0.0	0.0	1032.5
03-Nov-16 4:00	7.0	168.8	23.3	2.5	84.5	0.0	0.0	1031.5
03-Nov-16 5:00	4.6	171.2	25.5	1.3	94.9	0.0	0.0	1033.6

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
03-Nov-16 6:00	1.3	267.0	60.9	0.5	98.2	0.0	0.0	1034.5
03-Nov-16 7:00	1.7	81.7	42.5	0.4	98.1	0.0	0.0	1035.9
03-Nov-16 8:00	5.3	181.7	14.1	0.7	99.0	0.1	0.0	1036.1
03-Nov-16 9:00	5.2	180.0	12.1	0.6	99.0	6.0	0.0	1037.9
03-Nov-16 10:00	6.3	171.2	12.5	0.3	99.2	20.0	0.0	1036.5
03-Nov-16 11:00	7.7	179.5	12.0	0.3	99.0	68.3	0.0	1042.2
03-Nov-16 12:00	11.0	173.9	11.5	1.4	92.3	84.8	0.0	1042.3
03-Nov-16 13:00	13.1	179.0	10.2	2.4	86.1	141.8	0.0	1041.4
03-Nov-16 14:00	12.9	177.0	10.1	2.2	88.3	108.9	0.0	1040.1
03-Nov-16 15:00	12.8	179.8	10.4	2.4	83.8	49.0	0.0	1041.2
03-Nov-16 16:00	6.8	202.5	19.0	1.5	95.4	53.5	0.0	1043.7
03-Nov-16 17:00	8.0	191.5	9.1	1.1	97.5	13.9	0.0	1041.5
03-Nov-16 18:00	6.1	195.2	12.1	0.8	98.2	0.4	0.0	1040.7
03-Nov-16 19:00	5.6	196.3	10.9	0.6	96.6	0.0	0.0	1042.5
03-Nov-16 20:00	2.6	182.3	28.6	0.5	96.9	0.0	0.0	1042.4
03-Nov-16 21:00	2.3	24.2	16.6	0.0	99.2	0.0	0.0	1043.9
03-Nov-16 22:00	1.7	36.4	51.0	0.6	97.0	0.0	0.0	1044.0
03-Nov-16 23:00	1.9	105.1	27.7	0.5	96.8	0.0	0.0	1044.3
04-Nov-16 0:00	1.2	10.9	38.1	0.3	98.1	0.0	0.0	1044.5
04-Nov-16 1:00	2.9	30.4	48.7	0.2	98.5	0.0	0.0	1044.8
04-Nov-16 2:00	1.7	180.4	66.7	0.1	99.0	0.0	0.0	1045.4
04-Nov-16 3:00	1.9	4.1	34.9	0.2	98.6	0.0	0.0	1045.7
04-Nov-16 4:00	2.8	25.6	43.9	0.8	96.8	0.0	0.0	1046.6
04-Nov-16 5:00	4.1	25.5	18.7	1.0	96.4	0.0	0.0	1048.9
04-Nov-16 6:00	3.2	96.3	34.2	2.1	95.4	0.0	0.0	1050.4
04-Nov-16 7:00	4.4	164.9	16.7	3.0	95.9	0.0	0.0	1051.5
04-Nov-16 8:00	2.6	188.2	37.9	2.5	96.9	0.0	0.0	1052.7
04-Nov-16 9:00	2.1	208.9	43.3	2.1	98.2	4.2	0.0	1054.4
04-Nov-16 10:00	2.4	335.1	68.5	1.5	97.6	14.0	0.0	1056.5
04-Nov-16 11:00	1.8	5.0	54.0	1.3	97.5	22.4	0.0	1059.7
04-Nov-16 12:00	2.2	350.5	38.4	1.3	96.5	102.6	0.0	1061.0
04-Nov-16 13:00	3.2	243.0	29.6	1.9	97.4	82.3	0.0	1061.6
04-Nov-16 14:00	3.4	203.0	17.9	2.1	96.3	53.4	0.0	1061.5
04-Nov-16 15:00	1.8	134.4	49.8	2.3	94.9	37.6	0.0	1062.1
04-Nov-16 16:00	3.6	187.0	21.1	2.5	93.9	33.5	0.0	1063.5
04-Nov-16 17:00	4.2	169.2	17.5	1.9	96.5	2.9	0.0	1064.5
04-Nov-16 18:00	4.1	166.5	13.5	1.5	98.0	0.1	0.0	1066.3
04-Nov-16 19:00	7.4	175.6	14.2	1.6	96.0	0.0	0.0	1065.7
04-Nov-16 20:00	7.2	172.5	12.8	1.6	91.8	0.0	0.0	1068.7
04-Nov-16 21:00	7.4	169.5	15.9	1.5	89.8	0.0	0.0	1066.7
04-Nov-16 22:00	10.0	158.3	14.1	2.4	77.6	0.0	0.0	1064.1
04-Nov-16 23:00	7.6	170.7	15.3	1.6	87.0	0.0	0.0	1067.3
05-Nov-16 0:00	6.2	172.0	10.7	0.8	95.3	0.0	0.0	1067.4
05-Nov-16 1:00	7.9	179.0	13.4	0.2	98.8	0.0	0.0	1068.4
05-Nov-16 2:00	7.7	188.4	11.9	0.3	98.8	0.0	0.0	1068.0
05-Nov-16 3:00	7.5	186.9	12.6	0.3	98.5	0.0	0.0	1068.6
05-Nov-16 4:00	8.4	186.4	9.9	0.3	98.4	0.0	0.0	1067.4
05-Nov-16 5:00	7.6	176.6	8.7	0.5	96.9	0.0	0.0	1069.0
05-Nov-16 6:00	7.8	180.6	8.6	0.4	96.5	0.0	0.0	1068.5
05-Nov-16 7:00	7.4	189.4	9.9	0.8	90.8	0.0	0.0	1066.9
05-Nov-16 8:00	8.1	189.4	7.7	0.3	96.7	0.1	0.0	1070.5
05-Nov-16 9:00	8.2	185.5	7.9	0.1	98.7	6.5	0.0	1068.8
05-Nov-16 10:00	8.2	190.5	7.7	0.2	98.2	38.2	0.0	1067.8
05-Nov-16 11:00	7.0	192.6	8.9	0.3	98.5	79.0	0.0	1069.1



Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
05-Nov-16 12:00	6.0	199.1	14.0	0.4	98.4	141.4	0.0	1068.8
05-Nov-16 13:00	5.1	205.1	11.4	0.6	98.3	197.6	0.0	1069.3
05-Nov-16 14:00	3.9	196.2	12.9	0.6	98.6	128.3	0.0	1069.0
05-Nov-16 15:00	3.4	161.4	19.4	0.6	98.0	101.4	0.0	1068.9
05-Nov-16 16:00	2.1	70.7	64.2	0.7	96.7	55.4	0.0	1069.3
05-Nov-16 17:00	1.7	34.2	25.0	0.4	98.2	12.8	0.0	1069.1
05-Nov-16 18:00	2.1	30.4	12.4	0.2	98.9	0.1	0.0	1069.5
05-Nov-16 19:00	1.4	75.1	36.7	0.0	99.2	0.0	0.0	1069.6
05-Nov-16 20:00	1.8	47.6	35.8	0.1	99.1	0.0	0.0	1069.8
05-Nov-16 21:00	2.9	29.0	22.6	0.1	99.1	0.0	0.0	1070.1
05-Nov-16 22:00	2.8	23.8	10.8	0.1	99.3	0.0	0.0	1070.5
05-Nov-16 23:00	2.9	27.9	6.6	0.0	99.3	0.0	0.0	1070.7
06-Nov-16 0:00	2.4	15.7	7.2	-0.1	99.3	0.0	6.4	1071.2
06-Nov-16 1:00	0.5	350.8	15.9	0.1	99.3	0.0	3.5	1071.4
06-Nov-16 2:00	1.6	209.6	20.2	-0.2	99.2	0.0	6.6	1071.4
06-Nov-16 3:00	3.4	201.1	9.6	-0.4	99.3	0.0	1.7	1071.4
06-Nov-16 4:00	3.5	204.3	9.6	0.0	99.3	0.0	4.8	1071.8
06-Nov-16 5:00	4.2	207.5	7.9	0.0	99.3	0.0	8.5	1071.4
06-Nov-16 6:00	4.7	207.8	11.5	0.1	99.3	0.0	7.2	1072.3
06-Nov-16 7:00	5.3	207.7	11.0	0.1	99.3	0.0	5.4	1075.9
06-Nov-16 8:00	4.7	208.3	9.0	-0.2	99.3	0.0	6.3	1077.0
06-Nov-16 9:00	5.3	218.4	9.5	-0.3	99.3	2.2	5.9	1077.5
06-Nov-16 10:00	5.5	205.2	11.0	-0.7	99.3	16.2	7.1	1079.2
06-Nov-16 11:00	3.6	203.2	12.0	-0.6	99.0	40.7	6.8	1078.7
06-Nov-16 12:00	3.0	198.6	13.5	-0.5	98.5	56.3	8.2	1078.8
06-Nov-16 13:00	2.1	204.7	16.5	-0.5	98.2	49.0	6.9	1078.9
06-Nov-16 14:00	3.4	163.1	21.1	-0.3	98.3	41.9	6.8	1079.2
06-Nov-16 15:00	2.5	207.7	21.9	-0.3	98.5	28.7	6.5	1079.1
06-Nov-16 16:00	2.0	200.7	62.8	-0.1	95.3	19.9	7.1	1078.9
06-Nov-16 17:00	3.1	151.2	45.0	-0.1	93.2	3.6	7.8	1079.5
06-Nov-16 18:00	2.7	148.8	55.5	0.1	90.8	0.0	7.6	1079.0
06-Nov-16 19:00	1.8	105.2	54.0	0.4	88.5	0.0	7.4	1079.0
06-Nov-16 20:00	2.0	37.8	31.7	0.7	84.0	0.0	7.5	1079.2
06-Nov-16 21:00	7.0	97.0	47.2	1.6	71.2	0.0	7.7	1077.4
06-Nov-16 22:00	5.5	119.6	34.0	1.8	68.1	0.0	7.8	1078.4
06-Nov-16 23:00	13.1	81.4	8.8	2.1	64.6	0.0	6.7	1080.4
07-Nov-16 0:00	14.9	82.8	8.2	1.9	67.3	0.0	5.3	1076.4
07-Nov-16 1:00	14.3	75.2	9.1	1.5	70.5	0.0	5.8	1078.7
07-Nov-16 2:00	12.3	96.8	22.1	1.2	75.8	0.0	5.3	1079.3
07-Nov-16 3:00	2.8	156.7	67.0	0.2	90.1	0.0	5.6	1079.9
07-Nov-16 4:00	1.6	206.0	53.2	-0.2	96.3	0.0	5.6	1080.3
07-Nov-16 5:00	1.4	246.3	51.0	0.3	93.0	0.0	5.1	1080.5
07-Nov-16 6:00	1.8	286.9	62.4	0.2	95.7	0.0	6.9	1081.3
07-Nov-16 7:00	1.7	195.5	32.2	-0.3	99.3	0.0	7.2	1081.9
07-Nov-16 8:00	2.4	283.3	23.4	0.0	99.3	0.0	8.1	1082.9
07-Nov-16 9:00	4.1	2.1	12.1	-0.1	99.0	1.5	-	1084.1
07-Nov-16 10:00	3.1	357.3	14.2	0.0	99.3	6.9	9.8	1085.0
07-Nov-16 11:00	0.9	357.4	17.5	0.1	99.3	12.6	11.7	1087.0
07-Nov-16 12:00	1.9	131.3	43.5	0.5	98.6	20.3	13.1	1087.6
07-Nov-16 13:00	2.1	168.1	59.4	1.2	97.8	52.8	11.3	1090.0
07-Nov-16 14:00	1.7	34.4	59.9	1.2	97.1	70.6	11.2	1090.0
07-Nov-16 15:00	2.4	44.2	24.2	1.3	96.2	31.3	10.6	1090.5
07-Nov-16 16:00	1.7	74.3	51.6	1.2	95.7	14.5	11.1	1091.7
07-Nov-16 17:00	1.4	53.6	39.3	0.5	98.5	2.8	9.6	1092.7

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
07-Nov-16 18:00	1.8	39.2	9.6	0.1	99.2	0.0	9.1	1093.5
07-Nov-16 19:00	1.5	197.2	36.0	0.2	99.0	0.0	10.3	1094.2
07-Nov-16 20:00	2.3	175.3	29.2	0.1	99.3	0.0	9.8	1094.7
07-Nov-16 21:00	4.6	184.6	13.3	0.1	99.3	0.0	11.8	1095.1
07-Nov-16 22:00	4.9	198.3	18.3	0.2	99.3	0.0	11.4	1095.9
07-Nov-16 23:00	5.1	188.6	9.5	0.6	98.3	0.0	11.7	1096.9
08-Nov-16 0:00	5.1	177.7	7.2	0.6	97.6	0.0	10.5	1100.2
08-Nov-16 1:00	4.9	179.2	8.9	0.1	99.2	0.0	10.4	1100.6
08-Nov-16 2:00	4.4	176.6	9.2	0.3	99.2	0.0	9.9	1100.8
08-Nov-16 3:00	4.6	183.0	12.6	0.3	98.6	0.0	10.2	1100.8
08-Nov-16 4:00	4.4	173.2	7.5	0.2	99.2	0.0	12.6	1101.4
08-Nov-16 5:00	3.9	174.2	16.4	0.5	99.2	0.0	12.7	1102.5
08-Nov-16 6:00	1.6	114.0	51.4	0.9	97.0	0.0	12.8	1102.4
08-Nov-16 7:00	4.9	177.6	13.3	1.4	93.8	0.0	12.5	1104.0
08-Nov-16 8:00	5.5	173.3	11.9	1.3	95.7	0.1	12.0	1103.5
08-Nov-16 9:00	6.6	164.6	15.8	1.3	95.3	6.1	11.5	1103.1
08-Nov-16 10:00	6.3	181.0	10.8	1.3	95.7	9.6	10.8	1104.2
08-Nov-16 11:00	4.8	190.4	9.5	1.0	98.9	73.2	11.1	1103.9
08-Nov-16 12:00	4.5	196.1	17.8	1.3	98.1	105.0	10.2	1104.4
08-Nov-16 13:00	5.2	181.0	13.1	1.7	96.0	122.2	9.9	1104.3
08-Nov-16 14:00	5.5	183.9	10.7	1.6	96.9	89.1	9.9	1105.5
08-Nov-16 15:00	6.0	172.2	9.5	1.8	93.7	70.5	9.4	1104.8
08-Nov-16 16:00	4.3	173.1	25.8	1.8	93.3	76.1	9.7	1106.0
08-Nov-16 17:00	6.1	182.1	11.3	1.7	90.2	8.9	10.5	1106.5
08-Nov-16 18:00	5.9	178.4	8.4	1.7	89.4	0.1	10.4	1105.0
08-Nov-16 19:00	3.6	128.8	29.9	0.9	96.1	0.0	10.1	1106.3
08-Nov-16 20:00	3.1	174.5	46.5	1.2	95.3	0.0	9.9	1104.6
08-Nov-16 21:00	6.6	179.2	10.5	1.0	97.2	0.0	9.7	1107.1
08-Nov-16 22:00	5.1	180.0	12.2	0.6	99.2	0.0	9.6	1105.8
08-Nov-16 23:00	5.3	174.4	17.2	0.8	96.4	0.0	8.7	1106.3
09-Nov-16 0:00	7.2	176.6	9.3	0.7	96.9	0.0	6.8	1109.0
09-Nov-16 1:00	7.3	173.7	8.3	0.6	97.6	0.0	8.4	1109.0
09-Nov-16 2:00	7.7	185.6	9.2	0.9	96.4	0.0	8.6	1112.1
09-Nov-16 3:00	5.9	191.3	13.5	0.5	99.0	0.0	9.3	1109.4
09-Nov-16 4:00	2.8	228.3	16.8	0.4	99.3	0.0	8.0	1109.7
09-Nov-16 5:00	2.6	172.2	23.0	0.3	99.3	0.0	7.1	1110.2
09-Nov-16 6:00	2.6	161.1	30.3	0.3	99.3	0.0	9.9	1111.0
09-Nov-16 7:00	2.4	200.0	26.4	0.1	99.3	0.0	7.2	1112.3
09-Nov-16 8:00	2.4	201.8	23.1	0.1	99.3	0.0	11.2	1112.5
09-Nov-16 9:00	3.7	209.4	15.6	0.3	99.3	6.6	10.5	1113.4
09-Nov-16 10:00	3.6	215.5	13.4	0.6	99.3	42.5	9.3	1115.4
09-Nov-16 11:00	4.1	210.6	21.9	1.1	98.9	100.8	12.4	1114.2
09-Nov-16 12:00	4.8	188.1	12.1	1.7	97.2	142.8	8.1	1115.8
09-Nov-16 13:00	4.7	197.0	15.9	2.1	94.6	140.6	9.9	1116.1
09-Nov-16 14:00	4.8	184.7	15.4	2.2	94.7	150.5	10.2	1115.9
09-Nov-16 15:00	4.8	191.0	12.1	2.5	92.4	87.3	9.5	1115.8
09-Nov-16 16:00	5.0	172.0	18.6	2.8	87.4	43.7	8.7	1117.1
09-Nov-16 17:00	6.6	133.4	42.3	3.0	81.3	9.4	8.8	1115.5
09-Nov-16 18:00	2.0	76.6	53.7	2.5	84.6	0.0	9.1	1115.9
09-Nov-16 19:00	2.0	42.1	50.8	2.9	79.3	0.0	7.2	1115.6
09-Nov-16 20:00	1.7	324.4	71.3	3.3	74.8	0.0	7.8	1115.8
09-Nov-16 21:00	1.5	25.2	36.6	3.8	68.1	0.0	7.5	1115.1
09-Nov-16 22:00	1.9	14.1	30.7	4.0	64.4	0.0	7.7	1115.7
09-Nov-16 23:00	1.8	21.9	55.7	4.6	55.8	0.0	8.0	1115.9

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
10-Nov-16 0:00	2.4	26.3	30.6	4.3	57.8	0.0	8.2	1115.8
10-Nov-16 1:00	3.6	17.9	10.5	3.6	64.6	0.0	8.0	1115.5
10-Nov-16 2:00	3.8	20.5	13.8	3.5	65.0	0.0	7.5	1115.7
10-Nov-16 3:00	3.1	29.6	19.4	3.5	63.5	0.0	7.2	1116.2
10-Nov-16 4:00	2.4	142.0	46.0	4.8	52.7	0.0	10.0	1115.3
10-Nov-16 5:00	3.4	333.7	32.9	5.1	52.3	0.0	7.3	1115.9
10-Nov-16 6:00	2.3	305.4	57.5	5.2	53.2	0.0	7.5	1115.6
10-Nov-16 7:00	2.4	293.2	34.2	5.0	57.8	0.0	8.5	1115.8
10-Nov-16 8:00	2.0	347.2	26.6	4.8	61.2	0.0	9.2	1115.8
10-Nov-16 9:00	2.2	282.2	37.6	5.1	59.6	4.2	8.5	1115.7
10-Nov-16 10:00	3.4	201.7	23.7	4.9	63.5	29.4	8.8	1115.6
10-Nov-16 11:00	2.6	166.1	31.5	4.5	69.3	45.7	9.2	1116.4
10-Nov-16 12:00	3.5	181.6	17.8	3.6	81.3	51.3	8.7	1115.0
10-Nov-16 13:00	5.7	186.9	11.3	2.7	92.9	43.2	7.2	1115.2
10-Nov-16 14:00	6.5	181.0	8.6	2.2	96.7	44.1	7.4	1116.1
10-Nov-16 15:00	6.9	176.0	10.4	1.9	98.9	38.4	6.2	1118.6
10-Nov-16 16:00	5.5	197.5	14.7	1.7	99.2	27.9	5.2	1117.4
10-Nov-16 17:00	5.8	195.9	14.0	1.4	99.1	3.5	6.7	1120.2
10-Nov-16 18:00	6.9	171.1	10.4	1.2	98.7	0.0	7.2	1123.7
10-Nov-16 19:00	8.3	176.6	9.3	0.8	97.9	0.0	6.7	1124.4
10-Nov-16 20:00	8.4	175.3	11.4	1.0	96.7	0.0	6.3	1126.7
10-Nov-16 21:00	4.6	199.5	18.1	1.1	98.1	0.0	7.3	1126.0
10-Nov-16 22:00	6.2	186.6	14.8	0.9	98.1	0.0	5.8	1126.4
10-Nov-16 23:00	9.3	169.7	9.7	1.1	93.4	0.0	6.4	1128.2
11-Nov-16 0:00	8.2	171.0	7.9	1.6	87.2	0.0	6.3	1126.9
11-Nov-16 1:00	8.7	167.6	8.4	1.6	85.1	0.0	6.4	1128.8
11-Nov-16 2:00	6.6	175.8	9.6	1.5	87.2	0.0	6.0	1129.2
11-Nov-16 3:00	6.1	183.4	14.6	0.8	92.0	0.0	6.0	1128.2
11-Nov-16 4:00	4.2	191.6	18.3	0.6	94.7	0.0	6.0	1129.4
11-Nov-16 5:00	4.1	196.4	25.8	0.2	98.0	0.0	6.1	1129.4
11-Nov-16 6:00	7.0	179.2	9.4	1.1	87.0	0.0	5.3	1129.7
11-Nov-16 7:00	10.2	170.8	8.3	2.1	74.8	0.0	5.5	1127.2
11-Nov-16 8:00	7.7	183.2	13.8	1.7	79.3	0.0	5.5	1128.0
11-Nov-16 9:00	5.4	210.5	15.8	0.5	95.4	4.7	5.9	1127.9
11-Nov-16 10:00	4.7	205.4	19.0	0.6	95.5	40.4	6.1	1128.0
11-Nov-16 11:00	5.3	189.4	18.4	1.4	84.6	89.0	5.3	1128.1
11-Nov-16 12:00	8.8	182.3	8.3	2.2	75.0	107.2	5.3	1134.4
11-Nov-16 13:00	9.3	177.6	9.2	1.4	86.3	119.3	5.3	1129.3
11-Nov-16 14:00	9.8	183.0	8.1	1.5	86.2	116.5	5.1	1125.7
11-Nov-16 15:00	9.5	180.4	7.9	2.0	78.5	81.0	5.3	1130.4
11-Nov-16 16:00	9.5	176.3	7.1	2.1	78.2	41.2	5.2	1129.0
11-Nov-16 17:00	9.2	175.7	6.6	2.3	73.1	6.0	5.3	1130.6
11-Nov-16 18:00	8.8	183.6	6.6	1.9	79.0	0.0	5.5	1125.0
11-Nov-16 19:00	8.6	182.6	7.5	1.3	85.6	0.0	5.4	1126.9
11-Nov-16 20:00	8.1	182.0	7.7	0.7	91.2	0.0	5.6	1128.8
11-Nov-16 21:00	7.2	184.2	7.9	0.7	90.4	0.0	5.4	1128.0
11-Nov-16 22:00	6.9	180.6	9.8	0.5	93.6	0.0	5.2	1128.7
11-Nov-16 23:00	7.3	189.4	8.3	0.5	92.8	0.0	5.1	1127.3
12-Nov-16 0:00	4.2	195.6	11.5	-0.1	99.2	0.0	5.5	1128.5
12-Nov-16 1:00	2.5	203.7	9.2	0.0	99.3	0.0	5.4	1128.6
12-Nov-16 2:00	1.3	132.4	47.4	-0.1	99.3	0.0	4.8	1128.9
12-Nov-16 3:00	2.5	142.6	34.3	-0.1	98.7	0.0	5.2	1128.7
12-Nov-16 4:00	2.1	138.7	38.9	0.1	95.2	0.0	5.2	1129.7
12-Nov-16 5:00	1.9	75.8	55.1	0.2	92.7	0.0	4.7	1128.8

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
12-Nov-16 6:00	1.4	69.4	37.3	0.4	90.0	0.0	4.8	1128.8
12-Nov-16 7:00	1.1	139.9	23.6	0.2	83.9	0.0	4.8	1128.9
12-Nov-16 8:00	1.6	88.5	33.7	0.0	81.5	0.0	4.4	1128.8
12-Nov-16 9:00	1.3	76.8	20.3	0.0	80.2	9.5	4.0	1128.8
12-Nov-16 10:00	0.9	113.6	12.8	0.5	78.3	50.6	4.1	1129.1
12-Nov-16 11:00	0.9	95.5	11.4	1.4	67.0	182.1	3.6	1130.4
12-Nov-16 12:00	0.3	92.0	43.3	2.7	61.1	233.4	3.9	1129.9
12-Nov-16 13:00	0.5	183.3	29.1	1.8	70.9	190.8	3.4	1129.5
12-Nov-16 14:00	0.8	54.7	30.7	1.5	67.6	172.2	4.1	1129.6
12-Nov-16 15:00	0.5	333.9	49.4	1.7	66.0	128.4	4.0	1129.1
12-Nov-16 16:00	0.7	304.7	59.4	1.1	69.1	60.1	4.1	1129.0
12-Nov-16 17:00	1.3	151.2	37.2	1.2	68.7	8.7	4.0	1129.0
12-Nov-16 18:00	3.0	178.0	15.9	1.4	70.0	0.0	4.0	1129.3
12-Nov-16 19:00	3.2	191.4	15.9	1.3	72.7	0.0	4.3	1128.3
12-Nov-16 20:00	4.9	173.1	12.3	0.6	83.8	0.0	4.4	1128.8
12-Nov-16 21:00	4.3	164.7	26.0	0.4	88.7	0.0	4.2	1127.9
12-Nov-16 22:00	4.0	157.3	22.3	0.1	92.8	0.0	3.7	1128.9
12-Nov-16 23:00	3.3	15.2	11.4	-0.4	89.6	0.0	3.8	1129.3
13-Nov-16 0:00	2.9	23.7	13.2	-0.7	95.5	0.0	5.1	1129.3
13-Nov-16 1:00	3.7	19.7	10.5	-1.0	98.9	0.0	6.6	1130.5
13-Nov-16 2:00	3.4	21.4	13.9	-1.0	99.3	0.0	5.6	1131.3
13-Nov-16 3:00	3.8	26.1	9.6	-0.8	99.2	0.0	6.6	1131.4
13-Nov-16 4:00	3.6	24.3	7.2	-0.7	99.3	0.0	6.2	1131.3
13-Nov-16 5:00	3.6	26.0	15.9	-0.4	99.3	0.0	7.7	1132.3
13-Nov-16 6:00	3.9	19.7	11.5	-0.2	99.3	0.0	5.7	1132.4
13-Nov-16 7:00	3.6	10.7	12.3	-0.1	99.3	0.0	9.1	1132.8
13-Nov-16 8:00	2.9	22.7	16.3	0.0	99.3	0.0	8.4	1133.5
13-Nov-16 9:00	3.3	8.2	11.4	0.0	99.3	1.8	10.4	1134.6
13-Nov-16 10:00	3.2	6.4	12.8	0.1	99.3	10.5	10.0	1135.7
13-Nov-16 11:00	1.6	267.8	58.9	0.4	99.3	18.6	11.9	1142.7
13-Nov-16 12:00	5.0	200.5	16.8	0.9	99.1	77.5	11.2	1142.7
13-Nov-16 13:00	6.5	199.2	13.1	1.0	98.4	121.5	10.6	1143.3
13-Nov-16 14:00	5.4	204.8	15.4	0.8	99.0	101.5	10.5	1143.6
13-Nov-16 15:00	6.9	198.9	11.1	0.7	99.2	38.5	9.9	1144.6
13-Nov-16 16:00	10.1	186.7	16.7	0.2	96.8	29.5	10.1	1148.4
13-Nov-16 17:00	10.1	187.8	12.2	0.1	85.5	6.8	9.8	1144.9
13-Nov-16 18:00	7.1	224.9	11.3	-1.1	98.0	0.0	9.4	1145.7
13-Nov-16 19:00	6.3	207.2	11.7	-1.7	99.1	0.0	10.2	1144.5
13-Nov-16 20:00	5.0	201.4	13.7	-1.7	98.9	0.0	9.6	1143.1
13-Nov-16 21:00	5.7	192.6	12.2	-1.6	97.3	0.0	9.9	1145.5
13-Nov-16 22:00	4.0	218.4	9.8	-1.8	99.2	0.0	9.9	1145.4
13-Nov-16 23:00	3.8	220.8	10.3	-1.8	99.2	0.0	9.4	1146.3
14-Nov-16 0:00	2.6	221.8	10.8	-1.8	99.1	0.0	9.4	1145.8
14-Nov-16 1:00	3.2	218.6	7.2	-1.8	99.1	0.0	13.2	1148.0
14-Nov-16 2:00	3.5	202.2	7.8	-1.7	99.2	0.0	16.8	1149.4
14-Nov-16 3:00	3.3	201.7	9.7	-1.7	99.2	0.0	18.1	1148.6
14-Nov-16 4:00	2.4	206.0	10.8	-1.8	99.1	0.0	18.4	1148.2
14-Nov-16 5:00	1.5	201.2	9.5	-1.8	99.1	0.0	18.1	1149.3
14-Nov-16 6:00	1.2	188.5	20.6	-1.9	99.0	0.0	18.7	1149.4
14-Nov-16 7:00	2.4	197.6	13.4	-1.9	99.0	0.0	20.4	1150.3
14-Nov-16 8:00	4.1	195.3	12.4	-1.8	99.1	0.0	20.2	1150.3
14-Nov-16 9:00	4.4	206.2	13.6	-1.8	99.0	9.4	19.6	1150.4
14-Nov-16 10:00	3.9	212.2	11.3	-1.8	98.7	46.2	19.5	1150.0
14-Nov-16 11:00	3.1	216.8	10.6	-1.6	98.6	88.6	19.2	1150.4

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
14-Nov-16 12:00	1.6	211.2	18.0	-0.7	98.1	178.2	18.9	1150.2
14-Nov-16 13:00	2.8	194.3	13.9	-2.0	98.3	71.3	19.3	1150.2
14-Nov-16 14:00	1.9	191.9	16.2	-1.8	98.2	107.3	16.6	1150.5
14-Nov-16 15:00	0.3	95.3	15.6	-2.0	98.4	63.6	18.5	1150.5
14-Nov-16 16:00	0.2	260.9	2.4	-2.1	98.3	31.9	18.6	1150.6
14-Nov-16 17:00	0.3	76.2	18.7	-2.2	97.8	4.8	18.6	1150.6
14-Nov-16 18:00	0.2	9.6	9.1	-2.1	96.9	0.0	18.3	1150.6
14-Nov-16 19:00	1.0	250.2	0.1	-2.1	94.6	0.0	18.9	1150.6
14-Nov-16 20:00	1.1	18.4	31.5	-2.1	92.9	0.0	18.4	1150.6
14-Nov-16 21:00	0.6	22.0	16.7	-2.1	91.7	0.0	19.2	1150.6
14-Nov-16 22:00	1.1	149.6	45.1	-1.9	94.4	0.0	19.1	1150.7
14-Nov-16 23:00	1.4	38.1	46.7	-1.9	93.6	0.0	19.2	1150.7
15-Nov-16 0:00	0.5	329.0	12.3	-1.9	97.1	0.0	18.9	1151.3
15-Nov-16 1:00	1.4	24.1	35.3	-2.2	99.0	0.0	18.3	1151.5
15-Nov-16 2:00	1.2	36.5	34.2	-2.2	98.2	0.0	20.2	1151.7
15-Nov-16 3:00	0.0	0.0	0.0	-2.0	98.4	0.0	20.7	1152.4
15-Nov-16 4:00	1.3	168.8	18.6	-2.0	98.5	0.0	21.8	1154.2
15-Nov-16 5:00	1.1	130.1	34.7	-2.1	98.5	0.0	23.0	1155.0
15-Nov-16 6:00	2.9	207.1	9.8	-2.0	98.7	0.0	27.0	1156.6
15-Nov-16 7:00	3.3	223.8	7.4	-2.2	98.7	0.0	28.9	1158.1
15-Nov-16 8:00	2.1	211.4	8.9	-2.4	98.5	0.0	28.6	1158.2
15-Nov-16 9:00	1.5	204.9	11.0	-2.6	98.0	5.4	28.5	1158.1
15-Nov-16 10:00	0.6	164.3	15.8	-3.1	96.7	15.5	28.5	1158.1
15-Nov-16 11:00	0.8	125.8	19.5	-2.9	93.4	121.1	27.3	1160.6
15-Nov-16 12:00	1.0	127.8	12.8	-2.3	87.9	254.5	28.0	1159.4
15-Nov-16 13:00	1.1	46.8	12.9	-2.3	87.3	175.1	27.2	1159.8
15-Nov-16 14:00	0.9	6.7	29.0	-2.6	88.0	143.8	26.8	1159.5
15-Nov-16 15:00	0.3	330.4	11.3	-2.2	87.6	142.3	26.5	1159.2
15-Nov-16 16:00	0.6	264.7	7.7	-2.9	91.9	73.6	26.0	1158.7
15-Nov-16 17:00	0.5	138.3	11.7	-3.6	94.4	9.2	26.7	1158.5
15-Nov-16 18:00	0.6	135.2	25.3	-4.0	95.2	0.0	26.6	1158.5
15-Nov-16 19:00	1.3	207.5	8.7	-4.7	96.6	0.0	26.8	1158.6
15-Nov-16 20:00	0.6	173.7	28.3	-4.7	94.0	0.0	26.1	1158.4
15-Nov-16 21:00	1.2	257.9	28.7	-4.6	94.1	0.0	25.4	1158.6
15-Nov-16 22:00	0.8	158.3	17.6	-4.9	97.4	0.0	25.3	1158.5
15-Nov-16 23:00	1.3	266.0	43.1	-5.2	96.1	0.0	24.8	1158.7
16-Nov-16 0:00	0.9	200.9	50.5	-5.4	96.9	0.0	25.2	1158.6
16-Nov-16 1:00	1.2	189.0	15.4	-5.3	97.4	0.0	24.5	1158.6
16-Nov-16 2:00	1.3	111.0	22.3	-5.2	95.0	0.0	24.4	1158.6
16-Nov-16 3:00	1.5	78.4	24.0	-4.9	88.1	0.0	23.7	1158.7
16-Nov-16 4:00	2.8	75.2	19.2	-5.0	84.4	0.0	24.5	1158.7
16-Nov-16 5:00	6.0	33.5	10.0	-4.0	78.5	0.0	20.4	1157.8
16-Nov-16 6:00	6.6	27.1	4.6	-4.1	82.3	0.0	22.9	1158.1
16-Nov-16 7:00	6.4	33.7	6.3	-3.9	79.0	0.0	22.5	1158.2
16-Nov-16 8:00	6.1	32.2	8.1	-3.8	75.2	0.0	22.9	1158.5
16-Nov-16 9:00	5.5	35.8	14.6	-3.7	75.5	4.8	22.7	1158.4
16-Nov-16 10:00	5.9	33.8	11.8	-3.7	78.1	18.1	23.4	1158.9
16-Nov-16 11:00	4.9	61.9	21.0	-2.3	64.6	152.0	21.5	1160.8
16-Nov-16 12:00	5.8	77.0	14.8	-1.7	59.5	254.4	22.0	1162.2
16-Nov-16 13:00	6.5	54.5	15.7	-2.0	63.2	274.4	23.2	1160.5
16-Nov-16 14:00	7.0	38.2	8.1	-3.0	72.5	241.6	23.7	1160.9
16-Nov-16 15:00	8.2	54.2	11.0	-2.6	66.0	182.1	23.3	1157.4
16-Nov-16 16:00	9.0	57.3	8.4	-2.7	65.0	99.2	24.4	1157.9
16-Nov-16 17:00	9.6	60.2	8.8	-3.1	67.8	17.2	25.5	1158.2

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
16-Nov-16 18:00	10.2	62.5	7.8	-3.1	66.9	0.0	34.9	1156.7
16-Nov-16 19:00	10.5	63.5	7.5	-3.0	63.2	0.0	28.5	1158.8
16-Nov-16 20:00	10.4	65.3	9.5	-3.1	63.2	0.0	22.8	1158.9
16-Nov-16 21:00	9.4	77.1	11.6	-3.3	63.1	0.0	22.6	1158.8
16-Nov-16 22:00	8.9	80.0	11.6	-3.6	64.6	0.0	22.3	1160.6
16-Nov-16 23:00	8.9	66.6	8.2	-3.8	65.0	0.0	22.2	1159.3
17-Nov-16 0:00	8.1	55.6	8.7	-4.1	66.7	0.0	22.2	1157.4
17-Nov-16 1:00	6.8	58.6	10.4	-4.2	65.3	0.0	22.5	1159.9
17-Nov-16 2:00	6.1	71.7	9.7	-4.3	63.9	0.0	22.1	1159.0
17-Nov-16 3:00	5.7	55.0	15.0	-5.2	71.2	0.0	22.0	1158.3
17-Nov-16 4:00	5.1	47.6	13.0	-5.4	73.4	0.0	22.1	1157.9
17-Nov-16 5:00	4.2	52.9	13.6	-5.9	77.1	0.0	22.0	1158.2
17-Nov-16 6:00	5.7	51.0	19.4	-6.0	76.4	0.0	21.3	1158.5
17-Nov-16 7:00	4.0	76.7	27.4	-6.5	79.9	0.0	21.1	1158.5
17-Nov-16 8:00	2.8	80.8	29.8	-6.9	86.1	0.0	21.8	1158.3
17-Nov-16 9:00	2.3	85.2	31.2	-6.6	83.2	4.8	22.0	1158.3
17-Nov-16 10:00	2.0	77.1	35.4	-6.5	82.4	20.1	21.6	1158.6
17-Nov-16 11:00	2.7	83.1	18.5	-6.3	79.7	122.0	21.8	1160.5
17-Nov-16 12:00	2.9	80.2	26.2	-5.4	74.1	223.6	21.2	1160.9
17-Nov-16 13:00	2.4	94.2	27.0	-6.2	77.8	109.6	22.2	1159.4
17-Nov-16 14:00	3.1	73.8	17.7	-5.3	73.1	156.3	22.3	1159.6
17-Nov-16 15:00	1.5	61.6	53.1	-4.9	75.3	152.2	22.0	1159.5
17-Nov-16 16:00	1.8	75.0	43.7	-5.6	82.3	64.1	21.7	1158.6
17-Nov-16 17:00	1.4	70.8	47.5	-5.7	82.0	13.7	21.8	1158.5
17-Nov-16 18:00	2.3	81.3	30.7	-5.9	82.7	0.0	22.0	1158.5
17-Nov-16 19:00	0.9	179.4	65.6	-6.2	85.2	0.0	21.6	1158.5
17-Nov-16 20:00	1.3	34.9	31.7	-6.2	85.8	0.0	21.6	1158.5
17-Nov-16 21:00	0.8	193.6	37.4	-6.5	89.1	0.0	21.6	1158.6
17-Nov-16 22:00	0.8	235.1	23.5	-6.6	88.8	0.0	21.7	1158.6
17-Nov-16 23:00	1.0	321.9	31.7	-6.4	88.3	0.0	21.5	1158.6
18-Nov-16 0:00	0.7	253.8	29.3	-6.5	90.2	0.0	21.6	1158.6
18-Nov-16 1:00	0.9	211.9	29.4	-6.5	90.5	0.0	21.6	1158.7
18-Nov-16 2:00	1.0	183.5	21.3	-6.7	92.1	0.0	21.5	1158.6
18-Nov-16 3:00	0.7	212.7	30.7	-6.5	91.5	0.0	21.5	1158.6
18-Nov-16 4:00	0.9	249.8	37.4	-6.5	91.6	0.0	21.4	1158.5
18-Nov-16 5:00	1.0	283.3	16.4	-6.8	93.9	0.0	21.3	1158.6
18-Nov-16 6:00	1.2	185.1	28.7	-7.2	97.3	0.0	21.0	1158.8
18-Nov-16 7:00	1.2	165.9	17.9	-7.2	96.5	0.0	21.2	1158.7
18-Nov-16 8:00	1.4	219.9	25.9	-7.3	96.3	0.0	20.7	1158.6
18-Nov-16 9:00	1.3	188.5	21.8	-7.6	98.3	3.7	20.9	1158.8
18-Nov-16 10:00	1.1	157.7	31.4	-7.8	98.1	13.5	20.3	1158.8
18-Nov-16 11:00	1.0	241.5	32.9	-7.0	93.5	108.7	19.4	1162.3
18-Nov-16 12:00	1.1	279.0	29.7	-7.1	93.3	116.4	19.9	1159.3
18-Nov-16 13:00	0.9	179.0	40.8	-7.3	94.3	129.0	20.0	1159.8
18-Nov-16 14:00	0.9	219.1	22.0	-7.3	94.7	103.8	20.2	1159.0
18-Nov-16 15:00	1.2	197.1	43.5	-7.6	95.8	72.9	20.2	1158.9
18-Nov-16 16:00	0.8	224.1	41.2	-7.7	95.9	38.3	20.4	1158.8
18-Nov-16 17:00	1.7	38.5	40.9	-7.9	96.1	4.5	20.7	1158.7
18-Nov-16 18:00	1.4	31.9	46.6	-7.9	95.9	0.0	20.5	1158.8
18-Nov-16 19:00	2.2	49.0	24.7	-7.9	96.0	0.0	20.8	1158.9
18-Nov-16 20:00	1.7	49.2	61.1	-7.7	94.8	0.0	20.5	1158.7
18-Nov-16 21:00	1.2	142.3	57.2	-8.1	96.0	0.0	20.7	1158.8
18-Nov-16 22:00	1.6	81.4	53.2	-7.6	94.6	0.0	20.1	1158.8
18-Nov-16 23:00	1.4	89.4	50.2	-7.7	95.1	0.0	20.8	1158.7

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
19-Nov-16 0:00	1.4	86.8	56.4	-7.6	94.4	0.0	20.7	1158.8
19-Nov-16 1:00	1.2	56.8	65.1	-7.5	94.3	0.0	20.4	1158.6
19-Nov-16 2:00	0.8	180.4	57.7	-7.7	95.0	0.0	20.7	1158.8
19-Nov-16 3:00	1.1	24.8	63.2	-7.6	94.2	0.0	20.9	1158.8
19-Nov-16 4:00	0.7	171.0	61.5	-7.8	95.4	0.0	20.4	1158.8
19-Nov-16 5:00	1.2	281.0	36.4	-7.9	96.8	0.0	20.4	1158.8
19-Nov-16 6:00	0.9	265.6	34.3	-8.1	96.5	0.0	20.3	1158.8
19-Nov-16 7:00	1.0	248.2	33.6	-7.9	96.4	0.0	20.3	1158.8
19-Nov-16 8:00	0.8	230.4	35.7	-8.0	95.9	0.0	20.3	1158.9
19-Nov-16 9:00	1.0	230.6	17.4	-8.1	95.5	2.3	20.4	1158.9
19-Nov-16 10:00	0.7	258.6	31.8	-8.1	95.5	10.2	20.4	1158.9
19-Nov-16 11:00	0.8	230.6	26.0	-8.0	95.1	53.3	20.2	1158.8
19-Nov-16 12:00	1.3	171.1	19.2	-8.0	94.7	89.3	20.4	1158.8
19-Nov-16 13:00	1.1	210.2	21.0	-7.8	94.3	97.4	20.2	1158.9
19-Nov-16 14:00	0.5	165.8	22.4	-7.7	94.2	91.4	20.1	1158.9
19-Nov-16 15:00	0.7	202.7	25.3	-8.0	94.5	58.4	20.2	1158.9
19-Nov-16 16:00	0.5	296.7	13.7	-8.2	95.0	21.8	20.3	1158.9
19-Nov-16 17:00	0.7	236.9	21.6	-8.6	94.5	4.5	20.3	1158.9
19-Nov-16 18:00	0.9	272.5	10.8	-8.9	94.6	0.0	20.1	1158.8
19-Nov-16 19:00	0.8	300.5	10.6	-9.0	94.7	0.0	20.1	1158.9
19-Nov-16 20:00	1.0	217.5	17.9	-9.4	94.1	0.0	19.8	1159.0
19-Nov-16 21:00	0.8	177.9	12.0	-9.4	94.1	0.0	19.7	1159.0
19-Nov-16 22:00	0.9	197.2	8.3	-9.5	93.9	0.0	19.8	1159.0
19-Nov-16 23:00	0.5	196.8	13.3	-9.5	93.8	0.0	20.0	1159.0
20-Nov-16 0:00	0.5	190.5	11.7	-9.7	93.6	0.0	19.5	1159.1
20-Nov-16 1:00	1.0	185.6	14.2	-9.9	93.5	0.0	18.4	1159.1
20-Nov-16 2:00	1.0	175.1	10.5	-9.8	93.7	0.0	19.8	1159.1
20-Nov-16 3:00	0.1	156.7	9.6	-9.6	93.7	0.0	19.5	1159.0
20-Nov-16 4:00	0.2	264.9	16.1	-9.9	93.6	0.0	19.0	1159.0
20-Nov-16 5:00	0.4	178.3	17.9	-10.3	93.1	0.0	20.0	1159.1
20-Nov-16 6:00	0.6	200.0	14.4	-10.4	92.9	0.0	20.0	1159.1
20-Nov-16 7:00	0.9	206.2	13.0	-10.5	93.0	0.0	19.3	1159.0
20-Nov-16 8:00	1.0	215.8	9.5	-11.0	92.4	0.0	18.8	1159.0
20-Nov-16 9:00	0.9	185.9	13.2	-11.3	92.1	1.9	18.9	1159.1
20-Nov-16 10:00	0.8	209.6	11.5	-11.2	92.1	7.7	19.9	1159.1
20-Nov-16 11:00	1.0	188.6	11.8	-11.3	91.6	42.5	18.7	1159.4
20-Nov-16 12:00	0.8	172.6	10.7	-10.6	91.4	90.7	18.6	1159.3
20-Nov-16 13:00	0.5	181.6	14.3	-10.0	91.5	130.8	-	1160.3
20-Nov-16 14:00	-	-	-	-10.4	92.2	68.8	19.4	1159.2
20-Nov-16 15:00	-	-	-	-10.3	92.5	39.4	20.3	1159.1
20-Nov-16 16:00	-	-	-	-10.5	92.7	12.3	18.7	1159.1
20-Nov-16 17:00	-	-	-	-11.1	92.1	4.8	18.6	1159.1
20-Nov-16 18:00	-	-	-	-11.6	91.7	0.0	19.2	1159.2
20-Nov-16 19:00	-	-	-	-11.7	91.6	0.0	18.9	1159.1
20-Nov-16 20:00	-	-	-	-11.7	91.7	0.0	18.7	1159.2
20-Nov-16 21:00	-	-	-	-11.8	91.5	0.0	18.7	1159.2
20-Nov-16 22:00	-	-	-	-12.2	91.2	0.0	19.0	1159.1
20-Nov-16 23:00	-	-	-	-12.2	91.2	0.0	19.4	1159.1
21-Nov-16 0:00	-	-	-	-12.4	91.0	0.0	18.3	1159.1
21-Nov-16 1:00	-	-	-	-12.4	90.9	0.0	18.5	1159.3
21-Nov-16 2:00	-	-	-	-12.5	90.9	0.0	18.7	1159.2
21-Nov-16 3:00	-	-	-	-12.7	90.7	0.0	18.7	1159.2
21-Nov-16 4:00	-	-	-	-12.8	90.5	0.0	19.5	1159.2
21-Nov-16 5:00	-	-	-	-13.0	90.3	0.0	19.3	1159.2

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
	Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
21-Nov-16 6:00	-	-	-	-13.2	89.9	0.0	20.9	1159.2
21-Nov-16 7:00	-	-	-	-13.2	90.0	0.0	19.3	1159.3
21-Nov-16 8:00	-	-	-	-12.9	90.4	0.0	19.7	1159.2
21-Nov-16 9:00	-	-	-	-12.8	90.4	3.7	18.8	1159.2
21-Nov-16 10:00	-	-	-	-12.4	90.5	23.4	19.3	1159.3
21-Nov-16 11:00	-	-	-	-11.9	90.6	61.1	17.4	1159.5
21-Nov-16 12:00	-	-	-	-10.8	91.1	91.9	-	1160.2
21-Nov-16 13:00	-	-	-	-8.7	92.0	104.1	-	1160.0
21-Nov-16 14:00	-	-	-	-8.4	91.5	87.3	20.7	1159.6
21-Nov-16 15:00	-	-	-	-10.1	87.2	56.0	20.5	1159.4
21-Nov-16 16:00	-	-	-	-10.2	86.6	23.7	20.2	1158.8
21-Nov-16 17:00	1.9	33.3	45.4	-10.1	83.2	2.4	19.7	1159.1
21-Nov-16 18:00	1.2	26.1	47.3	-10.4	84.1	0.0	19.9	1159.2
21-Nov-16 19:00	2.9	20.1	51.0	-9.8	78.3	0.0	18.8	1159.3
21-Nov-16 20:00	3.0	27.8	33.6	-9.5	75.5	0.0	20.4	1156.8
21-Nov-16 21:00	3.7	355.7	62.0	-8.9	72.4	0.0	19.6	1159.3
21-Nov-16 22:00	5.5	23.8	16.7	-7.5	63.4	0.0	19.1	1158.5
21-Nov-16 23:00	2.1	312.1	54.4	-8.6	72.6	0.0	18.7	1159.0
22-Nov-16 0:00	2.7	196.4	35.3	-9.0	75.9	0.0	18.6	1159.2
22-Nov-16 1:00	5.8	30.1	7.4	-7.8	91.0	0.0	20.1	1158.9
22-Nov-16 2:00	8.0	27.2	6.1	-7.6	95.4	0.0	21.0	1158.0
22-Nov-16 3:00	7.5	37.6	9.0	-7.6	95.3	0.0	21.2	1160.3
22-Nov-16 4:00	7.7	32.9	6.8	-7.3	93.2	0.0	20.8	1158.9
22-Nov-16 5:00	6.2	32.9	6.5	-7.2	95.3	0.0	20.8	1159.4
22-Nov-16 6:00	5.8	36.0	6.0	-7.0	95.8	0.0	21.0	1159.5
22-Nov-16 7:00	5.9	34.5	7.7	-6.6	95.3	0.0	21.1	1159.8
22-Nov-16 8:00	4.3	45.0	20.7	-6.5	95.0	0.0	20.5	1160.2
22-Nov-16 9:00	1.5	45.9	40.5	-7.0	95.7	1.8	20.0	1161.0
22-Nov-16 10:00	3.6	32.1	6.7	-6.4	95.5	33.5	22.3	1161.4
22-Nov-16 11:00	2.7	32.3	13.3	-6.0	94.3	109.8	-	1161.6
22-Nov-16 12:00	4.0	37.8	22.8	-5.6	93.4	111.5	22.6	1161.2
22-Nov-16 13:00	3.6	28.3	16.2	-5.1	92.7	110.9	-	1161.4
22-Nov-16 14:00	3.9	26.4	4.6	-4.5	89.9	116.8	-	1161.9
22-Nov-16 15:00	2.9	22.6	16.5	-3.9	88.1	91.3	-	1161.4
22-Nov-16 16:00	3.0	33.7	9.3	-4.0	87.0	15.8	23.0	1161.4
22-Nov-16 17:00	3.2	27.6	6.5	-4.1	86.2	2.1	18.7	1161.6
22-Nov-16 18:00	3.2	33.8	5.4	-4.1	86.3	0.0	23.2	1161.3
22-Nov-16 19:00	3.1	30.3	5.5	-4.0	87.9	0.0	22.8	1161.5
22-Nov-16 20:00	2.9	33.7	5.1	-3.7	88.4	0.0	23.2	1161.6
22-Nov-16 21:00	3.5	27.8	4.4	-4.0	90.3	0.0	22.3	1161.7
22-Nov-16 22:00	3.6	29.3	9.1	-4.0	92.5	0.0	24.7	1162.1
22-Nov-16 23:00	3.6	30.3	5.4	-4.1	92.4	0.0	24.7	1161.8
23-Nov-16 0:00	4.0	29.3	3.8	-4.0	91.3	0.0	25.0	1161.7
23-Nov-16 1:00	3.2	28.2	4.1	-3.8	92.5	0.0	23.2	1161.8
23-Nov-16 2:00	4.1	32.0	5.2	-4.0	92.8	0.0	24.5	1161.8
23-Nov-16 3:00	4.1	27.8	4.0	-3.9	92.8	0.0	25.3	1161.6
23-Nov-16 4:00	4.1	27.5	4.2	-4.0	95.7	0.0	25.6	1162.4
23-Nov-16 5:00	4.3	30.3	4.6	-4.0	95.4	0.0	25.2	1161.9
23-Nov-16 6:00	3.8	31.0	5.0	-3.9	95.0	0.0	27.2	1161.6
23-Nov-16 7:00	3.5	31.5	5.2	-3.9	97.7	0.0	26.5	1162.9
23-Nov-16 8:00	3.3	28.0	9.3	-3.8	95.3	0.0	25.8	1162.7
23-Nov-16 9:00	3.0	34.0	6.9	-3.7	91.8	2.3	25.6	1162.9
23-Nov-16 10:00	2.3	17.6	18.9	-3.2	91.5	27.4	25.1	1163.0
23-Nov-16 11:00	2.7	17.8	11.8	-3.3	90.2	76.4	24.4	1163.5



Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
23-Nov-16 12:00	1.6	78.7	40.0	-2.3	83.8	125.2	25.1	1163.3
23-Nov-16 13:00	2.8	111.1	45.7	-1.6	75.8	102.2	26.1	1162.9
23-Nov-16 14:00	1.7	218.5	52.9	-2.5	89.4	88.9	26.7	1163.0
23-Nov-16 15:00	1.5	81.1	32.6	-3.1	94.6	39.0	21.9	1163.3
23-Nov-16 16:00	1.5	9.7	33.4	-2.9	91.4	17.6	26.6	1163.6
23-Nov-16 17:00	1.8	24.8	21.7	-3.4	96.8	1.5	25.9	1164.4
23-Nov-16 18:00	1.4	306.8	51.1	-3.0	96.7	0.0	28.2	1164.7
23-Nov-16 19:00	2.9	7.1	34.1	-3.1	94.4	0.0	27.9	1164.7
23-Nov-16 20:00	2.7	22.4	17.7	-2.9	88.1	0.0	28.0	1164.7
23-Nov-16 21:00	1.2	83.4	26.4	-2.2	79.8	0.0	27.5	1164.7
23-Nov-16 22:00	1.3	325.2	55.3	-2.1	79.2	0.0	27.4	1164.7
23-Nov-16 23:00	2.3	45.0	55.4	-3.0	87.8	0.0	27.3	1164.7
24-Nov-16 0:00	7.3	84.7	40.0	-1.8	74.3	0.0	22.3	1165.3
24-Nov-16 1:00	8.7	77.8	10.2	-1.5	69.7	0.0	21.0	1163.6
24-Nov-16 2:00	9.4	78.0	10.8	-1.5	69.8	0.0	22.5	1168.2
24-Nov-16 3:00	9.3	89.9	11.3	-0.9	66.0	0.0	21.1	1166.3
24-Nov-16 4:00	5.8	94.1	36.7	-0.8	65.0	0.0	20.9	1164.6
24-Nov-16 5:00	4.0	139.8	39.2	-2.2	79.7	0.0	21.0	1164.5
24-Nov-16 6:00	1.8	242.8	24.9	-2.6	92.3	0.0	21.0	1164.5
24-Nov-16 7:00	1.1	60.7	46.3	-3.0	95.4	0.0	20.8	1164.7
24-Nov-16 8:00	2.0	31.6	7.4	-2.9	93.2	0.0	20.9	1165.0
24-Nov-16 9:00	1.6	34.5	8.9	-3.2	97.2	1.4	21.1	1165.2
24-Nov-16 10:00	1.5	44.2	9.4	-3.0	97.4	28.1	20.3	1165.3
24-Nov-16 11:00	0.8	18.8	23.2	-2.7	95.5	67.0	20.4	1165.7
24-Nov-16 12:00	0.6	0.9	44.2	-2.4	94.3	111.2	20.9	1165.9
24-Nov-16 13:00	1.8	31.6	17.3	-2.3	91.4	160.9	20.5	1166.2
24-Nov-16 14:00	0.6	24.7	52.4	-2.4	92.3	107.7	21.2	1165.9
24-Nov-16 15:00	0.6	352.1	29.8	-2.8	96.1	26.5	21.9	1166.3
24-Nov-16 16:00	0.7	32.2	27.9	-2.9	97.1	6.7	23.8	1166.6
24-Nov-16 17:00	1.0	33.0	9.5	-3.1	96.0	1.6	20.5	1166.6
24-Nov-16 18:00	1.1	33.4	24.6	-3.6	92.7	0.0	21.6	1166.6
24-Nov-16 19:00	1.6	184.4	30.9	-4.7	97.0	0.0	19.7	1166.6
24-Nov-16 20:00	1.5	194.4	16.7	-4.5	98.3	0.0	18.4	1166.6
24-Nov-16 21:00	0.9	208.4	16.2	-4.2	98.0	0.0	-	1166.6
24-Nov-16 22:00	0.6	143.9	52.9	-4.2	97.9	0.0	21.5	1166.6
24-Nov-16 23:00	0.6	253.6	30.3	-4.2	97.8	0.0	21.3	1166.6
25-Nov-16 0:00	1.1	177.8	46.7	-4.1	97.0	0.0	21.0	1166.6
25-Nov-16 1:00	1.2	196.5	13.3	-3.8	94.4	0.0	19.4	1166.6
25-Nov-16 2:00	2.2	198.2	6.4	-3.7	92.5	0.0	19.8	1166.7
25-Nov-16 3:00	2.7	194.9	5.2	-3.7	92.4	0.0	21.4	1166.7
25-Nov-16 4:00	3.0	199.2	6.7	-3.7	90.8	0.0	21.7	1166.6
25-Nov-16 5:00	3.3	200.2	7.6	-3.5	88.7	0.0	22.6	1166.8
25-Nov-16 6:00	3.8	184.0	12.9	-3.4	82.7	0.0	-	1166.6
25-Nov-16 7:00	3.7	202.5	7.7	-3.8	88.3	0.0	22.7	1166.8
25-Nov-16 8:00	4.7	198.2	6.2	-3.7	84.6	0.0	24.0	1166.5
25-Nov-16 9:00	4.3	198.1	6.7	-3.7	85.9	1.7	24.0	1166.4
25-Nov-16 10:00	5.0	196.9	8.7	-4.0	93.9	25.9	23.2	1166.3
25-Nov-16 11:00	4.0	206.9	8.2	-4.1	97.5	56.2	24.6	1166.7
25-Nov-16 12:00	4.6	204.7	6.9	-3.7	97.4	89.3	25.0	1166.7
25-Nov-16 13:00	4.6	207.0	8.6	-3.4	97.2	91.1	26.6	1166.8
25-Nov-16 14:00	5.0	205.2	8.2	-3.4	97.4	82.3	25.7	1167.7
25-Nov-16 15:00	3.6	211.8	8.2	-3.4	97.6	57.4	25.6	1166.6
25-Nov-16 16:00	3.8	208.1	8.4	-3.6	97.9	18.4	25.8	1167.1
25-Nov-16 17:00	5.2	189.2	12.7	-3.8	97.6	1.4	25.0	1166.5

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
25-Nov-16 18:00	5.7	178.8	8.0	-3.6	94.8	0.0	24.7	1166.9
25-Nov-16 19:00	4.3	189.2	9.4	-3.5	95.2	0.0	24.5	1167.0
25-Nov-16 20:00	2.5	166.9	32.0	-3.6	97.2	0.0	24.4	1167.1
25-Nov-16 21:00	1.8	127.4	57.8	-3.5	93.0	0.0	24.4	1167.0
25-Nov-16 22:00	2.3	153.9	43.0	-3.3	88.4	0.0	23.7	1167.0
25-Nov-16 23:00	2.4	116.5	49.0	-3.3	84.1	0.0	23.9	1167.2
26-Nov-16 0:00	2.4	105.6	43.9	-3.0	77.0	0.0	24.0	1167.1
26-Nov-16 1:00	1.1	338.4	43.2	-3.0	77.9	0.0	23.9	1167.0
26-Nov-16 2:00	1.0	241.7	48.2	-3.2	77.9	0.0	23.3	1167.0
26-Nov-16 3:00	1.5	83.4	22.7	-3.5	73.2	0.0	23.6	1167.0
26-Nov-16 4:00	1.9	39.2	16.0	-3.8	73.8	0.0	23.6	1166.9
26-Nov-16 5:00	3.3	38.1	8.3	-4.1	73.2	0.0	23.0	1166.9
26-Nov-16 6:00	3.4	30.9	6.5	-4.3	74.4	0.0	23.6	1167.0
26-Nov-16 7:00	3.4	33.9	6.0	-4.7	75.5	0.0	23.2	1166.8
26-Nov-16 8:00	3.4	39.6	6.1	-4.8	72.6	0.0	23.9	1167.0
26-Nov-16 9:00	3.9	36.9	7.4	-5.1	73.2	2.2	23.1	1167.1
26-Nov-16 10:00	5.4	39.8	8.1	-5.5	75.3	19.1	23.3	1167.4
26-Nov-16 11:00	4.5	64.7	23.6	-5.3	73.9	76.9	22.8	1168.6
26-Nov-16 12:00	2.8	79.4	20.3	-4.8	67.5	164.7	21.8	1170.1
26-Nov-16 13:00	3.9	61.4	10.8	-4.7	65.6	214.3	23.0	1169.0
26-Nov-16 14:00	2.9	64.8	11.5	-4.6	64.3	187.2	22.9	1169.1
26-Nov-16 15:00	1.8	107.6	48.3	-4.7	69.6	139.0	23.5	1167.3
26-Nov-16 16:00	1.4	86.9	50.6	-5.0	70.1	58.3	23.2	1167.3
26-Nov-16 17:00	0.9	153.7	40.3	-5.9	84.5	5.0	23.5	1167.1
26-Nov-16 18:00	2.0	53.3	13.0	-6.1	70.7	0.0	22.5	1167.1
26-Nov-16 19:00	1.9	44.6	6.5	-6.2	70.5	0.0	23.2	1166.9
26-Nov-16 20:00	1.5	49.6	9.5	-6.3	68.9	0.0	22.9	1166.9
26-Nov-16 21:00	2.3	47.3	8.3	-6.4	69.1	0.0	22.8	1167.0
26-Nov-16 22:00	0.9	62.5	42.7	-6.3	69.7	0.0	23.1	1167.0
26-Nov-16 23:00	1.4	21.9	24.3	-6.0	67.0	0.0	22.6	1167.0
27-Nov-16 0:00	1.5	36.9	39.0	-5.7	66.1	0.0	22.9	1167.0
27-Nov-16 1:00	2.3	196.4	46.0	-5.2	66.4	0.0	22.8	1167.0
27-Nov-16 2:00	4.1	188.7	17.9	-5.4	79.2	0.0	22.7	1167.3
27-Nov-16 3:00	2.6	187.2	31.8	-5.5	89.4	0.0	22.8	1167.0
27-Nov-16 4:00	1.6	169.4	48.6	-5.7	90.8	0.0	22.3	1167.1
27-Nov-16 5:00	2.4	59.1	60.4	-5.9	93.1	0.0	22.6	1167.6
27-Nov-16 6:00	1.9	111.4	54.2	-5.3	95.7	0.0	23.7	1167.9
27-Nov-16 7:00	2.2	141.1	56.7	-5.0	97.1	0.0	24.8	1168.1
27-Nov-16 8:00	2.1	329.1	66.6	-4.9	95.2	0.0	24.6	1168.3
27-Nov-16 9:00	1.3	252.5	57.4	-4.6	95.6	1.9	23.9	1169.0
27-Nov-16 10:00	2.1	13.0	35.7	-4.7	93.9	20.2	23.3	1169.2
27-Nov-16 11:00	4.3	21.7	9.4	-5.5	95.6	40.4	27.9	1170.1
27-Nov-16 12:00	3.9	23.4	3.4	-5.6	96.0	61.6	28.8	1170.5
27-Nov-16 13:00	3.4	28.0	4.1	-5.6	96.0	57.7	30.2	1171.9
27-Nov-16 14:00	3.3	27.4	3.3	-5.4	95.7	89.5	31.2	1171.9
27-Nov-16 15:00	3.1	26.0	3.7	-5.5	95.9	62.6	31.2	1172.2
27-Nov-16 16:00	2.8	22.4	5.8	-5.3	94.9	34.6	31.2	1172.3
27-Nov-16 17:00	3.4	32.1	4.5	-5.2	94.6	1.8	31.0	1172.5
27-Nov-16 18:00	3.5	27.8	5.4	-5.2	94.9	0.0	30.8	1171.0
27-Nov-16 19:00	2.9	24.5	10.2	-5.0	94.5	0.0	30.7	1172.4
27-Nov-16 20:00	3.3	29.1	5.7	-5.1	94.8	0.0	30.2	1171.9
27-Nov-16 21:00	2.5	30.4	6.6	-4.8	94.3	0.0	30.4	1172.2
27-Nov-16 22:00	2.2	25.9	7.1	-4.8	93.4	0.0	30.0	1172.4
27-Nov-16 23:00	1.6	43.4	14.8	-4.7	92.3	0.0	29.9	1172.3

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
28-Nov-16 0:00	1.4	45.5	45.9	-4.6	92.3	0.0	29.6	1172.6
28-Nov-16 1:00	1.8	39.7	35.7	-5.0	92.9	0.0	29.7	1172.4
28-Nov-16 2:00	1.1	81.9	52.1	-4.8	92.3	0.0	29.5	1172.4
28-Nov-16 3:00	1.1	215.6	59.0	-5.3	97.1	0.0	30.0	1172.4
28-Nov-16 4:00	1.4	73.6	50.2	-5.3	95.8	0.0	29.4	1172.4
28-Nov-16 5:00	1.5	215.1	12.9	-5.8	98.2	0.0	29.4	1172.4
28-Nov-16 6:00	1.0	215.4	20.5	-5.6	96.5	0.0	29.2	1172.4
28-Nov-16 7:00	0.6	162.9	44.9	-5.4	95.2	0.0	29.4	1172.4
28-Nov-16 8:00	1.0	197.7	41.2	-5.3	94.7	0.0	29.0	1172.4
28-Nov-16 9:00	1.4	186.6	23.8	-4.7	92.7	1.7	28.8	1172.2
28-Nov-16 10:00	2.8	191.9	7.9	-3.9	89.1	16.4	28.7	1172.6
28-Nov-16 11:00	3.1	199.0	8.7	-3.7	87.5	83.2	28.3	1174.8
28-Nov-16 12:00	4.4	198.0	8.3	-4.1	90.8	131.5	28.5	1173.0
28-Nov-16 13:00	4.0	196.3	8.9	-3.5	85.2	117.0	28.6	1172.7
28-Nov-16 14:00	4.8	198.9	6.8	-3.3	86.7	67.6	28.7	1172.6
28-Nov-16 15:00	4.8	201.3	6.7	-3.4	91.6	38.3	28.6	1172.2
28-Nov-16 16:00	4.8	200.4	8.9	-3.8	98.8	13.6	28.5	1172.6
28-Nov-16 17:00	3.5	200.1	9.9	-3.7	99.2	1.0	28.5	1172.5
28-Nov-16 18:00	4.1	204.4	6.3	-3.8	98.8	0.0	28.3	1172.3
28-Nov-16 19:00	4.7	200.2	7.8	-3.6	99.0	0.0	28.4	1172.0
28-Nov-16 20:00	4.4	211.3	7.3	-3.6	98.5	0.0	28.5	1171.7
28-Nov-16 21:00	4.3	205.3	9.6	-3.7	98.3	0.0	28.4	1172.4
28-Nov-16 22:00	2.7	202.8	10.8	-3.4	98.1	0.0	28.4	1172.5
28-Nov-16 23:00	2.9	203.9	10.5	-3.3	98.4	0.0	29.9	1172.7
29-Nov-16 0:00	4.4	202.5	8.2	-3.2	98.4	0.0	35.6	1174.4
29-Nov-16 1:00	4.9	198.6	8.9	-3.3	98.3	0.0	34.7	1173.8
29-Nov-16 2:00	3.9	208.7	11.8	-3.3	98.2	0.0	37.0	1174.4
29-Nov-16 3:00	3.2	201.9	12.5	-3.3	98.2	0.0	38.1	1175.9
29-Nov-16 4:00	2.5	232.3	26.9	-3.2	98.3	0.0	38.7	1176.8
29-Nov-16 5:00	2.9	245.9	26.6	-3.1	98.3	0.0	38.0	1179.5
29-Nov-16 6:00	3.9	219.1	20.0	-2.8	98.5	0.0	42.5	1180.3
29-Nov-16 7:00	5.4	204.7	16.3	-2.2	98.8	0.0	42.6	1181.6
29-Nov-16 8:00	3.8	225.1	25.4	-1.8	99.0	0.0	43.3	1183.0
29-Nov-16 9:00	4.9	211.4	25.0	-1.3	99.2	0.3	44.7	1183.3
29-Nov-16 10:00	4.5	214.6	26.4	-1.0	99.3	16.0	44.5	1182.4
29-Nov-16 11:00	4.4	219.3	38.5	-0.5	99.3	35.6	42.6	1184.2
29-Nov-16 12:00	8.3	179.0	25.0	0.0	99.3	44.4	45.0	1183.2
29-Nov-16 13:00	10.4	170.9	15.3	0.8	93.1	52.1	43.9	1181.8
29-Nov-16 14:00	8.3	179.5	14.4	1.0	91.7	43.3	43.4	1181.2
29-Nov-16 15:00	11.4	168.0	13.7	1.9	83.2	31.1	42.7	1182.6
29-Nov-16 16:00	8.4	178.0	14.5	1.1	90.7	14.4	42.5	1184.5
29-Nov-16 17:00	7.3	183.3	15.6	1.1	91.8	0.7	41.8	1182.6
29-Nov-16 18:00	8.2	180.5	10.4	0.8	94.4	0.0	41.8	1186.3
29-Nov-16 19:00	6.9	191.0	9.2	0.3	98.6	0.0	42.3	1184.0
29-Nov-16 20:00	7.0	190.4	11.8	0.1	99.3	0.0	42.3	1186.0
29-Nov-16 21:00	7.8	190.0	11.8	0.1	99.0	0.0	42.4	1185.5
29-Nov-16 22:00	6.3	202.2	9.3	-0.2	99.3	0.0	42.0	1185.0
29-Nov-16 23:00	4.9	222.2	8.4	-0.8	99.3	0.0	41.6	1184.0
30-Nov-16 0:00	2.7	208.7	7.4	-1.1	99.3	0.0	42.0	1186.7
30-Nov-16 1:00	2.8	183.7	8.2	-1.2	99.3	0.0	41.5	1186.5
30-Nov-16 2:00	2.1	195.7	8.7	-1.2	99.3	0.0	41.5	1186.0
30-Nov-16 3:00	1.5	211.7	8.4	-1.5	99.2	0.0	40.8	1186.2
30-Nov-16 4:00	1.3	231.8	8.2	-1.8	99.1	0.0	41.2	1186.9
30-Nov-16 5:00	1.0	209.5	9.6	-2.4	98.8	0.0	41.1	1186.9

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
30-Nov-16 6:00	0.9	210.5	10.2	-3.0	98.4	0.0	41.2	1186.8
30-Nov-16 7:00	0.6	205.8	11.2	-3.0	98.4	0.0	40.8	1186.4
30-Nov-16 8:00	0.9	217.1	11.0	-3.2	98.3	0.0	41.2	1186.7
30-Nov-16 9:00	0.7	215.8	14.7	-3.8	98.0	0.9	41.2	1186.9
30-Nov-16 10:00	-	-	-	-3.7	97.9	8.8	40.4	1187.3
30-Nov-16 11:00	-	-	-	-3.9	97.7	35.3	40.5	1186.2
30-Nov-16 12:00	-	-	-	-3.8	97.5	80.9	39.9	1186.8
30-Nov-16 13:00	-	-	-	-3.7	97.2	116.0	40.6	1186.9
30-Nov-16 14:00	-	-	-	-3.5	96.8	204.3	40.4	1186.8
30-Nov-16 15:00	-	-	-	-4.1	96.6	100.5	40.8	1187.0
30-Nov-16 16:00	-	-	-	-4.6	97.0	37.8	40.4	1186.7
30-Nov-16 17:00	-	-	-	-5.3	97.1	2.1	40.2	1186.8
30-Nov-16 18:00	-	-	-	-6.5	96.2	0.0	41.0	1186.8
30-Nov-16 19:00	-	-	-	-6.3	96.4	0.0	41.0	1186.9
30-Nov-16 20:00	-	-	-	-6.1	96.5	0.0	40.6	1186.5
30-Nov-16 21:00	-	-	-	-6.0	96.5	0.0	40.3	1186.6
30-Nov-16 22:00	-	-	-	-6.0	96.1	0.0	41.0	1186.7
30-Nov-16 23:00	-	-	-	-6.1	95.7	0.0	41.0	1186.7
01-Dec-16 0:00	-	-	-	-5.9	93.9	0.0	40.5	1186.8
01-Dec-16 1:00	-	-	-	-6.0	92.0	0.0	41.5	1186.7
01-Dec-16 2:00	-	-	-	-5.3	91.6	0.0	40.8	1186.7
01-Dec-16 3:00	-	-	-	-5.3	87.7	0.0	41.0	1186.6
01-Dec-16 4:00	-	-	-	-5.0	88.7	0.0	40.1	1186.6
01-Dec-16 5:00	-	-	-	-5.3	93.3	0.0	39.3	1187.0
01-Dec-16 6:00	-	-	-	-5.4	94.3	0.0	40.7	1187.5
01-Dec-16 7:00	-	-	-	-5.5	96.9	0.0	39.6	1188.2
01-Dec-16 8:00	-	-	-	-5.2	97.2	0.0	40.1	1189.6
01-Dec-16 9:00	-	-	-	-5.0	97.3	0.6	40.1	1189.9
01-Dec-16 10:00	-	-	-	-4.5	97.5	11.3	38.4	1190.7
01-Dec-16 11:00	-	-	-	-3.4	98.0	32.2	40.8	1191.0
01-Dec-16 12:00	-	-	-	-2.8	98.0	67.9	40.5	1191.5
01-Dec-16 13:00	-	-	-	-2.7	98.1	60.1	41.4	1191.5
01-Dec-16 14:00	1.6	186.1	12.2	-2.7	98.1	56.1	42.3	1191.9
01-Dec-16 15:00	1.6	201.4	11.9	-2.5	98.4	33.4	44.6	1192.5
01-Dec-16 16:00	1.6	200.5	10.7	-2.4	98.6	10.3	44.5	1193.0
01-Dec-16 17:00	1.5	207.0	15.2	-2.3	98.7	0.8	45.0	1193.3
01-Dec-16 18:00	1.5	203.9	19.9	-2.4	98.7	0.0	44.9	1193.4
01-Dec-16 19:00	1.4	183.3	14.5	-2.6	98.4	0.0	44.2	1193.4
01-Dec-16 20:00	3.1	174.6	19.2	-2.5	98.4	0.0	44.0	1193.7
01-Dec-16 21:00	3.5	190.1	27.9	-2.1	97.5	0.0	43.5	1193.3
01-Dec-16 22:00	3.2	210.3	24.9	-2.3	97.9	0.0	42.8	1193.6
01-Dec-16 23:00	3.6	218.3	50.4	-2.5	97.0	0.0	43.6	1194.6
02-Dec-16 0:00	3.3	314.6	42.4	-3.0	98.5	0.0	42.7	1195.2
02-Dec-16 1:00	2.5	238.9	64.7	-2.6	98.2	0.0	43.3	1195.9
02-Dec-16 2:00	2.9	293.0	49.9	-2.4	98.3	0.0	43.8	1197.1
02-Dec-16 3:00	2.6	241.4	61.7	-2.4	98.7	0.0	45.4	1199.2
02-Dec-16 4:00	4.7	188.7	15.9	-2.2	98.9	0.0	45.4	1200.1
02-Dec-16 5:00	5.8	188.1	22.2	-1.9	99.0	0.0	52.2	1199.7
02-Dec-16 6:00	8.6	179.2	11.0	-1.5	99.1	0.0	44.9	1203.2
02-Dec-16 7:00	7.5	181.3	13.1	-1.5	99.2	0.0	39.2	1201.2
02-Dec-16 8:00	5.2	197.9	14.2	-1.6	99.1	0.0	40.3	1203.4
02-Dec-16 9:00	6.1	201.0	14.4	-1.6	99.2	0.2	40.3	1203.1
02-Dec-16 10:00	5.8	195.8	12.6	-1.5	99.2	6.2	41.3	1203.1
02-Dec-16 11:00	6.6	194.5	11.1	-1.4	99.2	25.2	41.4	1203.6

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
02-Dec-16 12:00	7.3	184.9	9.6	-1.4	99.1	41.2	41.7	1203.5
02-Dec-16 13:00	7.4	185.8	10.8	-1.5	99.0	47.6	41.5	1204.3
02-Dec-16 14:00	7.8	190.7	13.9	-1.5	99.1	39.7	41.4	1205.5
02-Dec-16 15:00	5.9	196.7	10.7	-1.5	99.1	27.5	41.2	1205.1
02-Dec-16 16:00	6.4	198.9	12.6	-1.6	99.1	9.8	41.1	1204.2
02-Dec-16 17:00	8.0	195.5	13.8	-1.7	99.1	0.6	41.3	1205.2
02-Dec-16 18:00	6.3	206.1	17.1	-1.9	99.0	0.0	41.6	1204.7
02-Dec-16 19:00	5.1	211.9	18.3	-2.0	98.9	0.0	41.0	1204.4
02-Dec-16 20:00	7.0	208.9	11.8	-2.1	98.9	0.0	40.7	1204.8
02-Dec-16 21:00	5.3	223.6	11.5	-2.3	98.8	0.0	40.5	1205.0
02-Dec-16 22:00	6.0	216.4	17.2	-2.8	98.5	0.0	40.4	1204.0
02-Dec-16 23:00	8.9	192.5	12.1	-3.5	98.1	0.0	41.2	1205.5
03-Dec-16 0:00	9.4	198.8	11.7	-4.7	97.4	0.0	41.1	1205.1
03-Dec-16 1:00	6.7	210.5	10.2	-4.9	97.3	0.0	40.6	1204.9
03-Dec-16 2:00	6.4	196.7	10.0	-4.6	97.5	0.0	40.4	1204.1
03-Dec-16 3:00	7.0	194.3	9.1	-4.8	97.3	0.0	40.7	1205.0
03-Dec-16 4:00	5.6	209.6	9.1	-5.1	97.2	0.0	40.3	1204.3
03-Dec-16 5:00	6.4	211.2	8.8	-5.1	97.2	0.0	40.0	1205.0
03-Dec-16 6:00	6.2	194.1	7.8	-5.4	97.0	0.0	41.0	1205.1
03-Dec-16 7:00	5.7	203.0	11.6	-5.3	97.1	0.0	40.7	1205.3
03-Dec-16 8:00	3.5	214.0	9.6	-5.3	97.0	0.0	40.3	1204.9
03-Dec-16 9:00	3.6	208.9	10.7	-5.5	96.9	0.6	40.5	1205.0
03-Dec-16 10:00	3.8	195.4	9.9	-5.5	96.8	7.8	40.6	1205.4
03-Dec-16 11:00	5.3	210.8	11.4	-5.7	96.6	48.4	40.6	1205.5
03-Dec-16 12:00	3.6	217.5	9.8	-5.5	96.4	113.2	38.9	1205.0
03-Dec-16 13:00	3.8	202.1	13.5	-5.9	96.5	60.2	40.1	1205.2
03-Dec-16 14:00	3.2	195.4	12.6	-5.8	96.4	76.4	40.6	1205.3
03-Dec-16 15:00	5.2	185.3	11.7	-5.9	96.5	46.7	41.5	1207.3
03-Dec-16 16:00	6.1	180.2	12.2	-6.2	96.4	16.4	40.5	1206.1
03-Dec-16 17:00	4.1	199.1	9.2	-6.1	96.5	0.7	40.5	1205.9
03-Dec-16 18:00	5.4	188.8	10.2	-6.3	96.4	0.0	40.1	1205.6
03-Dec-16 19:00	3.9	195.8	14.9	-6.3	96.4	0.0	40.5	1205.7
03-Dec-16 20:00	4.2	188.5	13.5	-6.3	96.4	0.0	41.0	1205.7
03-Dec-16 21:00	3.5	198.5	17.0	-6.3	96.4	0.0	39.7	1206.8
03-Dec-16 22:00	2.6	218.6	9.6	-6.4	96.3	0.0	40.4	1206.3
03-Dec-16 23:00	3.5	221.0	11.6	-6.6	96.1	0.0	40.5	1206.3
04-Dec-16 0:00	2.8	222.0	10.1	-6.9	95.9	0.0	40.2	1206.0
04-Dec-16 1:00	1.9	228.3	14.9	-7.2	95.7	0.0	40.2	1206.0
04-Dec-16 2:00	1.8	218.6	9.1	-7.4	95.6	0.0	39.9	1206.0
04-Dec-16 3:00	2.1	208.5	11.5	-7.7	95.4	0.0	39.8	1206.1
04-Dec-16 4:00	1.9	205.0	8.5	-7.9	95.2	0.0	39.5	1206.0
04-Dec-16 5:00	2.3	198.0	7.3	-8.3	95.0	0.0	40.0	1205.9
04-Dec-16 6:00	2.4	194.5	6.4	-9.0	94.4	0.0	40.1	1206.0
04-Dec-16 7:00	1.6	91.1	18.3	-9.6	94.0	0.0	40.2	1205.8
04-Dec-16 8:00	-	-	-	-9.5	94.1	0.0	40.4	1205.8
04-Dec-16 9:00	-	-	-	-9.7	93.9	0.8	39.5	1205.9
04-Dec-16 10:00	-	-	-	-10.4	93.2	7.0	40.6	1206.0
04-Dec-16 11:00	-	-	-	-10.4	93.1	52.6	39.5	1207.4
04-Dec-16 12:00	-	-	-	-7.8	94.2	179.2	38.8	1207.8
04-Dec-16 13:00	-	-	-	-6.8	94.7	195.3	38.7	1207.1
04-Dec-16 14:00	-	-	-	-6.9	94.7	175.6	37.5	1206.7
04-Dec-16 15:00	3.6	63.5	15.6	-10.1	92.5	78.0	39.7	1206.2
04-Dec-16 16:00	3.3	58.0	17.8	-10.5	92.9	20.4	40.6	1206.1
04-Dec-16 17:00	2.5	73.7	30.8	-10.3	93.1	1.4	41.1	1206.3

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
04-Dec-16 18:00	3.0	50.3	47.9	-10.2	92.9	0.0	40.6	1206.2
04-Dec-16 19:00	3.7	85.3	37.7	-10.2	93.2	0.0	40.8	1206.1
04-Dec-16 20:00	3.3	73.0	53.7	-10.2	93.0	0.0	40.2	1206.1
04-Dec-16 21:00	1.5	91.7	56.7	-10.6	92.9	0.0	39.1	1206.2
04-Dec-16 22:00	8.2	58.6	11.8	-10.1	93.3	0.0	40.6	1206.6
04-Dec-16 23:00	10.1	43.2	9.2	-10.1	92.7	0.0	40.6	1206.5
05-Dec-16 0:00	10.0	45.2	11.4	-10.5	89.8	0.0	39.5	1206.1
05-Dec-16 1:00	10.3	39.4	4.8	-10.8	87.6	0.0	39.8	1204.9
05-Dec-16 2:00	11.9	40.9	4.8	-10.9	84.5	0.0	39.3	1205.9
05-Dec-16 3:00	11.6	41.1	5.7	-11.2	83.7	0.0	38.9	1206.3
05-Dec-16 4:00	11.1	35.2	4.5	-11.6	84.3	0.0	38.7	1206.7
05-Dec-16 5:00	11.5	35.7	4.8	-11.8	82.5	0.0	38.8	1206.4
05-Dec-16 6:00	12.2	38.9	4.8	-12.1	80.2	0.0	39.0	1204.1
05-Dec-16 7:00	13.0	39.1	4.4	-12.3	77.8	0.0	39.1	1206.7
05-Dec-16 8:00	12.8	33.8	4.9	-12.8	79.3	0.0	38.7	1208.1
05-Dec-16 9:00	12.7	34.4	4.8	-13.0	78.9	1.0	39.0	1206.3
05-Dec-16 10:00	11.7	33.8	4.8	-13.3	79.3	10.0	39.3	1204.0
05-Dec-16 11:00	10.1	41.5	8.9	-13.8	79.9	65.5	39.4	1207.4
05-Dec-16 12:00	11.0	30.3	4.0	-13.7	76.9	233.7	38.8	1208.7
05-Dec-16 13:00	10.6	37.5	5.7	-13.9	76.2	252.0	38.7	1207.2
05-Dec-16 14:00	9.4	42.2	12.6	-14.2	76.3	225.5	39.2	1206.2
05-Dec-16 15:00	6.6	58.6	17.9	-14.7	78.2	138.0	39.0	1206.1
05-Dec-16 16:00	5.4	68.7	17.3	-15.2	78.5	27.8	39.0	1206.3
05-Dec-16 17:00	6.7	62.9	13.2	-15.7	76.9	2.3	39.4	1206.1
05-Dec-16 18:00	4.3	72.4	29.7	-16.1	76.7	0.0	39.8	1206.2
05-Dec-16 19:00	5.2	78.5	36.7	-16.3	77.0	0.0	39.2	1206.1
05-Dec-16 20:00	4.1	81.9	19.3	-16.6	77.5	0.0	39.2	1206.1
05-Dec-16 21:00	2.4	90.0	29.8	-16.9	78.9	0.0	39.3	1206.0
05-Dec-16 22:00	1.6	145.6	49.8	-17.4	82.6	0.0	39.5	1206.1
05-Dec-16 23:00	1.9	175.6	19.1	-17.6	87.7	0.0	39.3	1206.2
06-Dec-16 0:00	2.0	183.0	15.1	-17.8	87.3	0.0	39.3	1206.1
06-Dec-16 1:00	2.1	196.6	12.0	-18.0	86.8	0.0	39.1	1206.2
06-Dec-16 2:00	2.4	189.5	8.5	-18.1	86.7	0.0	39.0	1206.2
06-Dec-16 3:00	1.9	189.9	6.5	-18.1	86.3	0.0	38.8	1206.2
06-Dec-16 4:00	1.3	195.0	3.7	-18.0	86.1	0.0	38.8	1206.2
06-Dec-16 5:00	1.2	192.0	4.6	-18.3	85.9	0.0	38.9	1206.2
06-Dec-16 6:00	0.9	203.4	9.7	-18.4	85.9	0.0	39.1	1206.2
06-Dec-16 7:00	0.6	209.6	9.5	-18.7	85.2	0.0	39.0	1206.2
06-Dec-16 8:00	0.4	245.8	12.4	-18.5	85.1	0.0	39.1	1206.1
06-Dec-16 9:00	0.2	279.7	27.2	-17.9	85.3	1.4	39.1	1206.2
06-Dec-16 10:00	0.1	136.0	15.6	-17.9	85.2	8.0	38.9	1206.2
06-Dec-16 11:00	0.4	195.5	27.3	-17.2	85.7	44.7	37.8	1207.8
06-Dec-16 12:00	0.5	185.0	19.0	-14.9	85.1	141.3	38.2	1207.4
06-Dec-16 13:00	1.7	200.5	21.0	-15.9	84.8	119.5	38.6	1206.7
06-Dec-16 14:00	1.9	193.6	15.5	-16.2	85.1	83.3	39.2	1206.3
06-Dec-16 15:00	1.2	244.3	14.8	-15.5	83.0	66.0	39.3	1206.4
06-Dec-16 16:00	1.4	232.6	22.4	-15.6	80.9	33.5	39.7	1206.3
06-Dec-16 17:00	1.6	208.4	12.4	-16.4	83.7	1.2	39.3	1206.2
06-Dec-16 18:00	1.5	186.8	10.9	-16.4	85.6	0.0	39.5	1206.4
06-Dec-16 19:00	1.8	194.5	7.7	-16.3	84.9	0.0	39.3	1206.3
06-Dec-16 20:00	1.6	192.7	9.5	-16.5	84.7	0.0	39.4	1206.4
06-Dec-16 21:00	1.5	189.3	23.8	-16.3	84.6	0.0	39.4	1206.4
06-Dec-16 22:00	1.2	176.8	19.5	-16.1	84.8	0.0	39.5	1206.4
06-Dec-16 23:00	1.3	218.7	17.9	-15.9	82.2	0.0	39.0	1206.3

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
07-Dec-16 0:00	1.1	224.2	18.7	-15.8	81.0	0.0	39.8	1206.4
07-Dec-16 1:00	1.2	182.0	33.9	-15.9	83.4	0.0	39.4	1206.4
07-Dec-16 2:00	0.6	209.5	55.7	-15.8	81.6	0.0	39.0	1206.4
07-Dec-16 3:00	0.7	1.3	56.9	-15.6	78.7	0.0	40.1	1206.4
07-Dec-16 4:00	1.3	25.6	33.0	-14.9	74.1	0.0	38.6	1206.3
07-Dec-16 5:00	1.9	42.0	14.4	-14.9	73.6	0.0	38.7	1206.4
07-Dec-16 6:00	1.7	33.5	47.1	-15.1	74.7	0.0	39.3	1206.3
07-Dec-16 7:00	1.3	30.4	48.4	-15.8	77.7	0.0	38.8	1206.3
07-Dec-16 8:00	0.9	264.8	39.9	-15.7	77.2	0.0	39.1	1206.3
07-Dec-16 9:00	1.7	200.5	22.9	-16.0	79.0	1.0	38.6	1206.3
07-Dec-16 10:00	2.0	185.7	16.3	-16.8	84.2	24.5	39.3	1206.4
07-Dec-16 11:00	1.6	169.5	16.8	-15.9	79.9	58.9	38.4	1206.6
07-Dec-16 12:00	1.8	193.3	13.5	-15.3	78.8	85.4	38.3	1206.5
07-Dec-16 13:00	1.8	186.6	20.3	-15.7	80.0	88.3	38.2	1206.4
07-Dec-16 14:00	2.0	189.1	14.8	-15.7	80.0	82.3	38.4	1206.3
07-Dec-16 15:00	2.3	186.7	13.3	-15.9	82.2	54.3	39.2	1206.3
07-Dec-16 16:00	2.2	191.2	14.9	-15.6	80.6	19.5	39.5	1206.4
07-Dec-16 17:00	1.8	185.9	26.8	-15.5	78.6	0.9	39.4	1206.4
07-Dec-16 18:00	2.0	194.4	13.9	-15.7	77.8	0.0	38.8	1206.3
07-Dec-16 19:00	1.9	181.8	23.4	-15.4	76.5	0.0	38.7	1206.5
07-Dec-16 20:00	1.7	175.3	36.4	-15.3	74.7	0.0	38.8	1206.4
07-Dec-16 21:00	2.0	193.0	40.0	-15.2	74.0	0.0	39.4	1206.4
07-Dec-16 22:00	1.6	167.4	47.4	-15.3	73.6	0.0	39.4	1206.4
07-Dec-16 23:00	1.6	199.3	50.6	-14.8	69.8	0.0	39.4	1206.4
08-Dec-16 0:00	1.4	229.2	47.5	-14.5	67.7	0.0	38.6	1206.3
08-Dec-16 1:00	1.6	142.1	67.6	-14.6	67.4	0.0	39.2	1206.3
08-Dec-16 2:00	1.1	113.8	75.8	-14.8	68.1	0.0	38.2	1206.4
08-Dec-16 3:00	2.6	49.8	27.5	-13.7	60.9	0.0	39.2	1206.4
08-Dec-16 4:00	3.8	47.0	13.3	-13.1	57.8	0.0	38.9	1206.3
08-Dec-16 5:00	6.4	43.6	14.7	-12.6	56.1	0.0	39.0	1205.8
08-Dec-16 6:00	5.5	44.6	14.8	-12.5	55.5	0.0	39.2	1206.1
08-Dec-16 7:00	3.2	41.5	17.7	-12.9	57.0	0.0	39.1	1206.2
08-Dec-16 8:00	3.0	42.4	17.1	-12.9	55.4	0.0	39.3	1206.1
08-Dec-16 9:00	2.2	57.0	46.8	-13.6	58.9	1.3	38.2	1206.2
08-Dec-16 10:00	1.4	65.2	52.3	-14.1	62.1	28.9	39.5	1206.3
08-Dec-16 11:00	1.5	53.6	48.3	-13.3	57.3	72.4	38.7	1207.0
08-Dec-16 12:00	3.7	50.6	13.8	-12.5	52.3	169.1	38.3	1207.5
08-Dec-16 13:00	4.4	47.2	13.5	-12.1	51.1	236.4	38.1	1207.3
08-Dec-16 14:00	4.7	51.3	13.0	-12.2	52.6	226.7	38.6	1206.8
08-Dec-16 15:00	3.0	58.9	19.7	-12.6	55.5	129.1	38.9	1206.4
08-Dec-16 16:00	2.9	54.8	25.2	-12.7	54.1	28.3	39.2	1206.3
08-Dec-16 17:00	4.4	55.9	19.0	-13.2	55.1	1.4	38.8	1206.2
08-Dec-16 18:00	4.3	52.8	14.7	-13.3	54.4	0.0	39.3	1206.3
08-Dec-16 19:00	2.9	66.2	19.6	-13.7	55.8	0.0	38.3	1206.4
08-Dec-16 20:00	3.2	67.7	20.9	-14.2	57.2	0.0	38.3	1206.3
08-Dec-16 21:00	2.9	71.4	25.9	-14.1	56.3	0.0	38.3	1206.3
08-Dec-16 22:00	2.4	69.1	41.8	-14.3	57.0	0.0	38.7	1206.2
08-Dec-16 23:00	5.6	57.4	19.9	-14.2	55.0	0.0	38.2	1206.0
09-Dec-16 0:00	5.1	54.8	19.0	-14.5	56.3	0.0	38.0	1206.4
09-Dec-16 1:00	5.3	50.4	14.9	-14.8	56.2	0.0	39.6	1206.1
09-Dec-16 2:00	4.0	43.8	31.6	-14.7	54.9	0.0	38.8	1206.4
09-Dec-16 3:00	3.9	40.4	48.3	-15.1	56.8	0.0	38.0	1206.2
09-Dec-16 4:00	4.5	51.4	45.6	-15.4	58.0	0.0	38.8	1206.4
09-Dec-16 5:00	3.2	61.1	43.9	-15.2	57.7	0.0	38.9	1206.0

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
09-Dec-16 6:00	3.0	54.5	38.9	-15.4	57.8	0.0	38.9	1206.2
09-Dec-16 7:00	2.9	33.2	58.1	-15.7	58.1	0.0	37.5	1206.5
09-Dec-16 8:00	2.4	359.2	40.2	-15.9	58.4	0.0	38.0	1206.1
09-Dec-16 9:00	1.7	239.8	71.2	-17.0	65.6	0.6	38.5	1206.3
09-Dec-16 10:00	2.1	260.4	58.4	-16.7	62.5	9.0	38.0	1206.2
09-Dec-16 11:00	2.2	275.5	66.3	-17.2	65.8	50.1	37.2	1207.8
09-Dec-16 12:00	2.0	269.1	61.7	-16.8	63.6	215.3	37.6	1208.1
09-Dec-16 13:00	1.8	248.6	61.6	-17.2	66.0	236.2	37.1	1207.5
09-Dec-16 14:00	1.7	182.4	44.1	-18.6	75.4	213.1	38.0	1207.1
09-Dec-16 15:00	1.9	177.3	35.7	-18.9	75.2	152.1	37.8	1206.6
09-Dec-16 16:00	1.2	196.2	58.8	-19.9	78.0	45.8	37.8	1206.3
09-Dec-16 17:00	1.7	298.3	44.8	-20.8	80.6	2.1	37.5	1206.2
09-Dec-16 18:00	1.5	325.7	31.7	-21.1	78.9	0.0	37.1	1206.2
09-Dec-16 19:00	1.9	15.8	33.1	-21.6	78.8	0.0	37.9	1206.2
09-Dec-16 20:00	1.6	69.5	32.3	-21.9	76.1	0.0	37.0	1206.2
09-Dec-16 21:00	1.5	123.9	54.2	-22.3	79.2	0.0	37.4	1206.3
09-Dec-16 22:00	2.3	72.9	30.5	-22.4	75.9	0.0	37.4	1206.3
09-Dec-16 23:00	4.1	71.4	15.8	-22.4	73.0	0.0	37.6	1206.4
10-Dec-16 0:00	5.9	49.2	14.2	-22.6	71.7	0.0	38.4	1206.4
10-Dec-16 1:00	1.8	130.7	49.8	-23.3	78.1	0.0	38.2	1206.2
10-Dec-16 2:00	1.7	165.1	49.2	-23.7	79.5	0.0	38.2	1206.3
10-Dec-16 3:00	1.3	132.6	54.6	-23.9	78.5	0.0	38.7	1206.3
10-Dec-16 4:00	1.9	154.2	53.4	-24.1	78.1	0.0	38.3	1206.3
10-Dec-16 5:00	1.6	152.3	47.5	-24.4	80.5	0.0	38.5	1206.3
10-Dec-16 6:00	2.7	74.4	40.4	-24.3	75.8	0.0	38.0	1206.3
10-Dec-16 7:00	2.0	85.3	51.4	-24.4	75.6	0.0	38.4	1206.3
10-Dec-16 8:00	2.2	98.9	57.9	-24.6	75.1	0.0	38.0	1206.4
10-Dec-16 9:00	2.3	99.4	54.4	-24.5	74.9	0.6	38.3	1206.3
10-Dec-16 10:00	2.2	93.9	49.0	-24.7	77.3	9.5	38.1	1206.3
10-Dec-16 11:00	4.8	64.0	26.7	-24.7	73.4	47.2	37.9	1207.7
10-Dec-16 12:00	3.9	76.2	31.4	-23.7	68.6	206.1	37.9	1208.2
10-Dec-16 13:00	5.2	63.9	34.7	-22.8	66.5	228.1	37.0	1207.5
10-Dec-16 14:00	6.2	50.7	19.8	-22.4	64.5	209.2	37.9	1207.1
10-Dec-16 15:00	8.6	43.7	12.8	-22.4	65.4	149.9	37.3	1206.1
10-Dec-16 16:00	8.9	54.9	15.7	-22.7	68.8	47.8	39.0	1206.4
10-Dec-16 17:00	12.9	32.0	6.3	-22.2	67.9	1.9	38.5	1203.6
10-Dec-16 18:00	13.7	29.9	7.9	-22.4	69.0	0.0	36.9	1205.2
10-Dec-16 19:00	15.1	29.3	4.7	-21.7	67.6	0.0	38.0	1208.0
10-Dec-16 20:00	14.6	30.1	5.7	-20.9	65.9	0.0	37.7	1204.6
10-Dec-16 21:00	13.8	46.3	18.3	-20.2	65.9	0.0	37.9	1205.5
10-Dec-16 22:00	13.4	64.9	23.9	-18.5	63.4	0.0	-	1201.0
10-Dec-16 23:00	15.1	61.4	13.3	-17.7	60.2	0.0	-	1203.5
11-Dec-16 0:00	16.8	73.7	12.7	-17.3	57.5	0.0	-	1206.2
11-Dec-16 1:00	18.3	78.7	8.2	-18.1	58.9	0.0	-	1206.0
11-Dec-16 2:00	17.2	80.5	11.9	-17.9	58.6	0.0	-	1209.7
11-Dec-16 3:00	16.8	77.3	16.0	-17.9	58.6	0.0	-	1213.5
11-Dec-16 4:00	17.2	75.0	12.9	-17.7	57.7	0.0	-	1212.1
11-Dec-16 5:00	17.7	76.7	11.3	-17.8	59.1	0.0	-	1200.9
11-Dec-16 6:00	16.5	76.4	15.9	-17.5	57.7	0.0	35.1	1206.8
11-Dec-16 7:00	12.3	86.7	26.4	-17.0	57.8	0.0	34.8	1206.7
11-Dec-16 8:00	8.8	72.9	45.5	-16.8	55.3	0.0	-	1211.6
11-Dec-16 9:00	8.9	69.4	31.6	-17.0	55.7	0.4	35.7	1204.7
11-Dec-16 10:00	5.8	81.6	61.1	-16.8	53.8	8.5	34.3	1207.0
11-Dec-16 11:00	7.5	74.2	38.6	-16.6	53.1	40.8	35.3	1213.6



Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
11-Dec-16 12:00	12.1	64.6	23.9	-15.9	51.5	190.0	-	1213.0
11-Dec-16 13:00	6.1	89.9	66.4	-15.8	51.1	211.7	35.0	1208.4
11-Dec-16 14:00	3.2	175.6	76.1	-14.6	46.1	194.1	35.4	1207.9
11-Dec-16 15:00	6.3	73.4	33.0	-14.9	45.8	139.8	35.7	1207.4
11-Dec-16 16:00	11.6	55.8	17.4	-14.3	40.7	58.0	34.3	1204.6
11-Dec-16 17:00	9.8	52.3	48.0	-14.3	39.4	2.0	34.7	1207.1
11-Dec-16 18:00	3.8	59.9	47.4	-14.9	40.4	0.0	35.8	1208.4
11-Dec-16 19:00	4.0	76.3	55.2	-15.0	40.1	0.0	34.4	1207.1
11-Dec-16 20:00	2.8	230.3	61.4	-15.4	42.6	0.0	36.5	1207.1
11-Dec-16 21:00	3.9	10.7	31.1	-15.1	38.9	0.0	34.8	1206.7
11-Dec-16 22:00	3.5	39.4	28.6	-15.8	40.8	0.0	35.3	1207.1
11-Dec-16 23:00	5.4	39.7	18.0	-16.2	42.5	0.0	35.6	1206.6
12-Dec-16 0:00	3.7	54.1	25.6	-16.9	47.5	0.0	35.3	1207.1
12-Dec-16 1:00	6.6	33.3	17.3	-17.2	51.4	0.0	34.5	1207.3
12-Dec-16 2:00	5.5	18.3	39.0	-17.2	53.5	0.0	35.0	1207.2
12-Dec-16 3:00	1.4	160.6	54.5	-18.9	61.2	0.0	35.8	1207.3
12-Dec-16 4:00	3.4	60.6	21.6	-17.3	56.2	0.0	34.8	1207.3
12-Dec-16 5:00	1.9	68.8	70.6	-17.1	56.9	0.0	36.1	1207.2
12-Dec-16 6:00	1.7	9.1	46.8	-17.6	58.9	0.0	36.2	1207.2
12-Dec-16 7:00	1.8	285.6	33.7	-18.2	61.4	0.0	35.5	1207.2
12-Dec-16 8:00	1.5	279.7	65.8	-18.3	62.7	0.0	35.2	1207.2
12-Dec-16 9:00	1.6	221.8	51.3	-18.6	64.0	0.5	35.2	1207.3
12-Dec-16 10:00	2.1	217.7	19.1	-19.2	67.2	9.0	35.6	1207.2
12-Dec-16 11:00	2.1	219.9	14.0	-18.9	67.6	39.8	34.8	1208.9
12-Dec-16 12:00	2.5	197.9	13.5	-17.4	64.1	176.2	34.9	1209.0
12-Dec-16 13:00	2.4	215.2	11.6	-16.8	62.7	200.1	34.6	1208.4
12-Dec-16 14:00	2.4	197.3	10.7	-16.6	66.6	183.9	34.8	1208.1
12-Dec-16 15:00	2.6	198.6	7.4	-16.9	67.9	129.3	35.2	1207.5
12-Dec-16 16:00	2.1	209.9	15.9	-17.2	69.1	51.4	35.7	1207.3
12-Dec-16 17:00	2.3	180.9	12.4	-17.6	69.2	1.9	35.7	1207.4
12-Dec-16 18:00	2.4	181.0	8.6	-17.4	69.4	0.0	35.8	1207.3
12-Dec-16 19:00	2.5	183.8	14.3	-17.4	68.9	0.0	35.8	1207.3
12-Dec-16 20:00	2.0	187.2	20.1	-17.3	68.1	0.0	35.8	1207.3
12-Dec-16 21:00	2.3	179.1	11.2	-17.3	68.8	0.0	35.8	1207.3
12-Dec-16 22:00	2.2	188.8	22.1	-17.5	70.0	0.0	35.3	1207.3
12-Dec-16 23:00	2.7	183.3	12.6	-17.2	69.3	0.0	35.0	1207.4
13-Dec-16 0:00	2.2	175.5	11.3	-16.7	67.7	0.0	34.7	1207.5
13-Dec-16 1:00	2.1	194.0	13.6	-16.5	68.9	0.0	35.3	1207.4
13-Dec-16 2:00	2.6	182.2	8.5	-16.3	67.5	0.0	35.6	1207.4
13-Dec-16 3:00	2.5	171.8	9.0	-16.1	66.2	0.0	35.0	1207.4
13-Dec-16 4:00	2.6	188.0	10.9	-16.0	67.0	0.0	35.2	1207.3
13-Dec-16 5:00	2.6	177.0	7.5	-15.4	64.3	0.0	35.0	1207.3
13-Dec-16 6:00	2.5	192.8	11.5	-15.4	65.7	0.0	34.9	1207.4
13-Dec-16 7:00	3.3	184.3	9.9	-15.7	65.7	0.0	35.3	1207.3
13-Dec-16 8:00	2.6	188.6	9.7	-14.5	60.6	0.0	35.1	1207.4
13-Dec-16 9:00	1.8	176.0	10.5	-12.9	52.4	0.5	35.0	1207.4
13-Dec-16 10:00	1.3	256.8	38.3	-12.7	50.7	7.9	35.0	1207.3
13-Dec-16 11:00	1.7	178.2	8.2	-12.4	50.0	34.6	34.5	1209.2
13-Dec-16 12:00	1.4	181.7	15.7	-9.7	43.6	180.5	34.4	1209.5
13-Dec-16 13:00	1.1	184.6	19.9	-8.3	42.1	202.1	34.2	1208.9
13-Dec-16 14:00	0.6	43.3	32.0	-8.4	35.2	184.8	34.5	1208.6
13-Dec-16 15:00	0.8	41.0	71.8	-9.0	36.2	133.0	34.4	1207.7
13-Dec-16 16:00	0.4	250.1	48.9	-9.5	36.8	55.4	35.0	1207.3
13-Dec-16 17:00	0.2	48.1	33.4	-10.3	38.8	2.0	35.5	1207.2

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
13-Dec-16 18:00	0.2	71.3	31.4	-10.3	36.2	0.0	34.8	1207.1
13-Dec-16 19:00	0.4	36.4	51.0	-10.3	37.9	0.0	35.5	1207.1
13-Dec-16 20:00	0.5	312.2	33.5	-10.1	36.3	0.0	36.2	1207.2
13-Dec-16 21:00	0.4	255.8	46.6	-10.1	37.5	0.0	34.8	1207.2
13-Dec-16 22:00	1.1	211.6	28.7	-10.7	40.4	0.0	34.7	1207.3
13-Dec-16 23:00	2.1	174.8	8.4	-12.1	47.9	0.0	35.7	1207.2
14-Dec-16 0:00	1.3	159.2	13.8	-11.8	46.8	0.0	35.0	1207.3
14-Dec-16 1:00	0.6	85.5	34.9	-11.4	44.8	0.0	35.4	1207.1
14-Dec-16 2:00	0.6	54.5	38.3	-11.5	43.9	0.0	35.8	1207.2
14-Dec-16 3:00	0.6	243.3	68.9	-11.4	43.7	0.0	35.0	1207.3
14-Dec-16 4:00	1.1	198.5	36.5	-12.2	47.2	0.0	34.4	1207.3
14-Dec-16 5:00	0.6	33.2	25.6	-11.8	46.5	0.0	35.2	1207.2
14-Dec-16 6:00	1.2	42.3	28.9	-12.1	45.5	0.0	35.0	1207.3
14-Dec-16 7:00	0.9	205.4	36.8	-13.7	53.1	0.0	34.3	1207.3
14-Dec-16 8:00	1.2	173.2	20.9	-14.9	60.2	0.0	35.0	1207.2
14-Dec-16 9:00	1.7	259.9	18.1	-14.7	58.9	0.6	35.2	1207.3
14-Dec-16 10:00	1.2	189.7	25.9	-14.8	58.9	12.3	34.8	1207.3
14-Dec-16 11:00	0.8	198.6	27.1	-14.5	56.8	35.7	34.3	1209.1
14-Dec-16 12:00	1.1	301.9	41.4	-13.1	52.0	173.4	34.5	1209.6
14-Dec-16 13:00	2.6	180.3	16.3	-16.6	68.5	202.8	34.8	1208.6
14-Dec-16 14:00	1.7	156.6	29.5	-15.9	65.8	179.5	34.5	1208.2
14-Dec-16 15:00	1.9	172.8	22.9	-14.7	59.3	106.7	34.9	1207.6
14-Dec-16 16:00	1.7	273.7	27.2	-16.3	66.4	40.4	34.1	1207.3
14-Dec-16 17:00	2.0	192.8	26.1	-17.3	71.0	1.6	34.4	1207.2
14-Dec-16 18:00	6.0	0.8	32.9	-14.0	51.2	0.0	35.5	1206.3
14-Dec-16 19:00	9.7	20.6	6.8	-12.5	43.3	0.0	33.9	1206.8
14-Dec-16 20:00	11.7	29.9	3.8	-12.5	44.5	0.0	-	1204.9
14-Dec-16 21:00	13.4	26.5	4.2	-11.4	41.0	0.0	34.5	1205.7
14-Dec-16 22:00	12.0	21.7	4.5	-11.6	42.3	0.0	34.5	1205.7
14-Dec-16 23:00	11.8	24.7	4.2	-12.2	45.2	0.0	34.6	1206.8
15-Dec-16 0:00	11.9	24.3	5.0	-12.7	48.6	0.0	35.2	1208.2
15-Dec-16 1:00	12.3	30.3	5.4	-12.5	49.8	0.0	34.6	1206.4
15-Dec-16 2:00	12.9	35.4	4.0	-13.2	52.6	0.0	34.6	1205.3
15-Dec-16 3:00	13.9	38.7	6.0	-12.7	51.9	0.0	34.1	1208.4
15-Dec-16 4:00	10.6	29.8	5.5	-13.4	54.7	0.0	34.2	1206.2
15-Dec-16 5:00	11.1	33.8	7.5	-14.1	57.8	0.0	33.8	1206.8
15-Dec-16 6:00	12.6	41.0	7.4	-13.4	55.4	0.0	34.6	1206.2
15-Dec-16 7:00	12.0	28.5	5.5	-13.8	56.2	0.0	34.4	1206.8
15-Dec-16 8:00	11.7	30.6	5.7	-14.2	57.5	0.0	34.3	1207.1
15-Dec-16 9:00	10.7	28.1	5.0	-14.0	56.0	0.4	34.2	1207.5
15-Dec-16 10:00	9.9	33.2	8.9	-13.9	55.1	8.9	33.7	1208.6
15-Dec-16 11:00	9.9	38.5	6.8	-14.5	58.0	31.8	34.0	1210.8
15-Dec-16 12:00	10.3	37.1	5.1	-13.3	51.5	170.8	34.3	1209.5
15-Dec-16 13:00	10.9	29.6	4.4	-12.9	48.3	194.0	34.5	1206.1
15-Dec-16 14:00	9.9	22.1	4.6	-12.9	46.6	180.8	33.9	1209.2
15-Dec-16 15:00	9.9	17.0	5.2	-12.8	44.8	130.2	33.7	1208.5
15-Dec-16 16:00	10.3	22.1	4.8	-12.9	44.1	56.5	34.3	1204.7
15-Dec-16 17:00	9.7	15.4	5.0	-13.8	48.1	2.0	34.3	1207.4
15-Dec-16 18:00	4.5	35.8	41.9	-15.0	54.4	0.0	34.7	1207.3
15-Dec-16 19:00	1.9	62.5	32.8	-15.3	55.6	0.0	34.7	1207.3
15-Dec-16 20:00	1.5	163.9	32.0	-16.4	62.8	0.0	35.0	1207.4
15-Dec-16 21:00	1.9	193.3	18.5	-16.8	66.6	0.0	35.0	1207.4
15-Dec-16 22:00	2.2	201.9	11.8	-16.8	65.1	0.0	34.4	1207.4
15-Dec-16 23:00	2.1	191.6	14.5	-16.4	62.2	0.0	34.9	1207.4

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
16-Dec-16 0:00	2.3	190.8	9.7	-16.4	61.1	0.0	34.5	1207.5
16-Dec-16 1:00	2.0	187.2	13.8	-15.9	56.8	0.0	35.0	1207.5
16-Dec-16 2:00	2.3	179.2	12.1	-15.7	54.4	0.0	35.0	1207.3
16-Dec-16 3:00	1.9	203.1	22.3	-15.5	53.4	0.0	35.1	1207.4
16-Dec-16 4:00	1.5	191.6	21.7	-15.2	50.3	0.0	34.7	1207.5
16-Dec-16 5:00	2.3	200.0	19.0	-15.8	55.3	0.0	34.7	1207.3
16-Dec-16 6:00	1.7	194.8	30.3	-15.5	51.9	0.0	34.5	1207.5
16-Dec-16 7:00	1.5	203.0	21.4	-15.2	49.9	0.0	34.4	1207.3
16-Dec-16 8:00	1.9	178.1	19.9	-14.3	43.9	0.0	34.5	1207.4
16-Dec-16 9:00	0.6	93.5	60.3	-14.0	41.9	0.4	35.2	1207.3
16-Dec-16 10:00	1.0	354.0	44.8	-12.9	37.4	12.2	35.0	1207.2
16-Dec-16 11:00	1.3	207.2	45.0	-12.3	34.2	55.8	34.6	1207.9
16-Dec-16 12:00	1.4	205.0	28.5	-12.3	32.5	100.3	35.0	1207.4
16-Dec-16 13:00	3.4	220.4	10.3	-12.9	36.9	82.2	34.4	1207.8
16-Dec-16 14:00	5.5	203.5	8.1	-10.7	32.5	56.1	34.7	1208.0
16-Dec-16 15:00	5.0	196.5	7.4	-10.0	33.2	42.6	34.9	1207.0
16-Dec-16 16:00	4.7	201.2	9.2	-10.0	45.4	21.4	35.1	1207.2
16-Dec-16 17:00	4.3	208.5	7.8	-10.1	48.4	0.9	35.0	1207.8
16-Dec-16 18:00	4.6	209.9	9.1	-9.8	55.0	0.0	35.0	1207.1
16-Dec-16 19:00	3.8	219.2	13.7	-9.8	72.7	0.0	35.9	1207.6
16-Dec-16 20:00	3.8	228.9	12.2	-10.2	86.4	0.0	35.3	1207.3
16-Dec-16 21:00	4.3	213.2	7.8	-8.6	94.2	0.0	35.0	1207.5
16-Dec-16 22:00	4.3	204.9	9.7	-8.5	95.6	0.0	35.8	1207.0
16-Dec-16 23:00	4.9	195.8	9.4	-7.8	95.5	0.0	35.7	1207.4
17-Dec-16 0:00	3.5	205.5	18.0	-7.5	95.5	0.0	35.7	1207.2
17-Dec-16 1:00	3.5	209.7	11.9	-7.4	95.5	0.0	35.5	1207.3
17-Dec-16 2:00	3.4	220.4	13.2	-7.1	95.6	0.0	36.0	1207.7
17-Dec-16 3:00	3.4	209.2	10.1	-7.0	95.7	0.0	35.8	1207.7
17-Dec-16 4:00	3.6	211.6	9.2	-7.2	95.6	0.0	35.8	1207.8
17-Dec-16 5:00	3.8	196.8	7.4	-6.9	95.8	0.0	35.8	1207.8
17-Dec-16 6:00	3.9	196.5	10.6	-6.8	95.9	0.0	35.5	1206.1
17-Dec-16 7:00	4.4	209.2	10.4	-6.9	95.9	0.0	35.3	1207.5
17-Dec-16 8:00	4.5	209.6	6.7	-6.7	95.9	0.0	37.5	1208.1
17-Dec-16 9:00	4.5	205.0	8.6	-6.6	96.0	0.1	37.7	1206.9
17-Dec-16 10:00	4.8	192.8	8.4	-6.4	96.1	4.9	37.2	1207.0
17-Dec-16 11:00	5.5	204.4	8.0	-6.3	96.0	32.9	36.5	1208.2
17-Dec-16 12:00	5.7	203.6	7.9	-5.6	96.3	50.7	36.1	1208.2
17-Dec-16 13:00	4.8	211.5	8.7	-5.2	96.5	52.4	36.9	1207.7
17-Dec-16 14:00	4.6	210.0	9.8	-5.2	96.6	40.8	40.7	1208.5
17-Dec-16 15:00	4.6	208.1	9.9	-5.1	96.7	33.4	39.7	1208.8
17-Dec-16 16:00	5.4	209.5	8.2	-4.9	97.0	7.7	43.8	1208.6
17-Dec-16 17:00	5.2	206.4	8.5	-4.7	97.2	0.4	37.7	1208.2
17-Dec-16 18:00	4.6	209.0	8.0	-4.4	97.4	0.0	44.2	1209.7
17-Dec-16 19:00	5.0	202.4	7.6	-4.2	97.6	0.0	46.6	1208.4
17-Dec-16 20:00	5.7	201.1	7.8	-3.9	97.8	0.0	47.3	1211.9
17-Dec-16 21:00	4.7	210.5	9.9	-3.9	97.8	0.0	46.4	1212.9
17-Dec-16 22:00	4.4	207.3	10.1	-3.9	97.7	0.0	45.5	1211.6
17-Dec-16 23:00	6.7	199.8	8.0	-4.0	97.7	0.0	44.0	1212.6
18-Dec-16 0:00	6.2	199.4	8.0	-3.8	97.8	0.0	44.6	1212.1
18-Dec-16 1:00	5.9	204.8	8.4	-3.7	97.9	0.0	44.7	1212.1
18-Dec-16 2:00	5.9	212.9	8.0	-3.5	98.0	0.0	45.3	1211.7
18-Dec-16 3:00	7.1	220.6	8.0	-3.4	98.0	0.0	51.7	1216.1
18-Dec-16 4:00	5.6	212.7	7.9	-3.0	98.2	0.0	46.9	1213.7
18-Dec-16 5:00	4.2	222.7	9.0	-2.8	98.3	0.0	52.2	1214.9

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
18-Dec-16 6:00	3.9	223.3	6.6	-3.1	98.2	0.0	55.5	1216.2
18-Dec-16 7:00	3.2	223.8	7.9	-2.6	98.4	0.0	56.4	1217.3
18-Dec-16 8:00	3.1	227.2	5.5	-2.8	98.4	0.0	58.3	1219.1
18-Dec-16 9:00	4.1	223.0	5.7	-2.6	98.5	0.0	57.9	1220.3
18-Dec-16 10:00	5.1	217.8	6.5	-2.2	98.7	2.6	55.3	1220.8
18-Dec-16 11:00	4.4	206.2	8.1	-2.1	98.7	13.2	56.0	1221.1
18-Dec-16 12:00	5.5	197.3	9.8	-2.3	98.7	20.9	56.6	1223.2
18-Dec-16 13:00	5.9	194.2	10.3	-2.5	98.6	20.2	56.2	1223.2
18-Dec-16 14:00	5.7	194.2	12.4	-2.5	98.6	19.5	58.5	1222.9
18-Dec-16 15:00	5.1	199.0	14.5	-2.6	98.5	10.9	57.5	1222.4
18-Dec-16 16:00	6.4	188.1	17.6	-2.6	98.6	5.2	55.6	1225.1
18-Dec-16 17:00	9.0	185.2	14.8	-2.5	98.6	0.2	55.6	1226.2
18-Dec-16 18:00	7.3	197.8	12.5	-2.7	98.5	0.0	54.9	1225.6
18-Dec-16 19:00	5.4	209.0	9.9	-2.8	98.5	0.0	55.3	1221.1
18-Dec-16 20:00	7.3	229.3	10.0	-3.1	98.3	0.0	54.9	1226.6
18-Dec-16 21:00	-	-	-	-3.6	98.0	0.0	55.0	1227.1
18-Dec-16 22:00	-	-	-	-4.2	97.7	0.0	55.0	1224.4
18-Dec-16 23:00	-	-	-	-4.4	97.5	0.0	55.3	1226.6
19-Dec-16 0:00	-	-	-	-4.8	97.4	0.0	55.5	1227.6
19-Dec-16 1:00	-	-	-	-4.8	97.3	0.0	55.2	1225.2
19-Dec-16 2:00	-	-	-	-4.7	97.4	0.0	55.4	1225.7
19-Dec-16 3:00	-	-	-	-4.8	97.3	0.0	54.7	1224.4
19-Dec-16 4:00	-	-	-	-5.0	97.2	0.0	55.8	1226.5
19-Dec-16 5:00	-	-	-	-4.9	97.2	0.0	56.4	1227.7
19-Dec-16 6:00	-	-	-	-4.7	97.3	0.0	55.9	1228.3
19-Dec-16 7:00	-	-	-	-4.8	97.2	0.0	55.0	1228.5
19-Dec-16 8:00	-	-	-	-4.9	97.2	0.0	55.3	1229.0
19-Dec-16 9:00	-	-	-	-4.8	97.2	0.1	54.3	1229.4
19-Dec-16 10:00	-	-	-	-4.9	97.2	11.0	54.8	1229.2
19-Dec-16 11:00	-	-	-	-4.7	97.3	14.7	54.9	1229.2
19-Dec-16 12:00	-	-	-	-4.7	97.3	32.3	54.8	1228.2
19-Dec-16 13:00	-	-	-	-4.6	97.4	43.8	54.5	1228.0
19-Dec-16 14:00	-	-	-	-4.3	97.5	30.4	55.0	1227.8
19-Dec-16 15:00	-	-	-	-4.2	97.6	27.3	53.8	1228.7
19-Dec-16 16:00	-	-	-	-4.2	97.6	7.3	54.3	1229.7
19-Dec-16 17:00	-	-	-	-4.3	97.6	0.5	54.7	1228.0
19-Dec-16 18:00	-	-	-	-4.3	97.6	0.0	54.8	1231.4
19-Dec-16 19:00	-	-	-	-4.4	97.5	0.0	54.8	1229.9
19-Dec-16 20:00	-	-	-	-4.4	97.5	0.0	53.9	1229.1
19-Dec-16 21:00	-	-	-	-4.7	97.3	0.0	54.7	1229.1
19-Dec-16 22:00	-	-	-	-4.7	97.3	0.0	55.2	1229.1
19-Dec-16 23:00	-	-	-	-4.8	97.3	0.0	56.1	1228.9
20-Dec-16 0:00	-	-	-	-4.9	97.2	0.0	55.0	1229.2
20-Dec-16 1:00	-	-	-	-5.0	97.2	0.0	54.9	1229.0
20-Dec-16 2:00	-	-	-	-4.9	97.2	0.0	55.3	1229.1
20-Dec-16 3:00	-	-	-	-5.0	97.1	0.0	55.2	1229.0
20-Dec-16 4:00	-	-	-	-5.2	97.0	0.0	55.4	1229.0
20-Dec-16 5:00	-	-	-	-5.4	96.9	0.0	54.7	1229.0
20-Dec-16 6:00	-	-	-	-5.5	96.8	0.0	55.0	1229.0
20-Dec-16 7:00	-	-	-	-5.6	96.8	0.0	54.8	1229.0
20-Dec-16 8:00	-	-	-	-5.6	96.8	0.0	55.1	1229.6
20-Dec-16 9:00	-	-	-	-5.3	97.0	0.0	56.6	1230.9
20-Dec-16 10:00	-	-	-	-5.0	97.1	3.3	54.6	1231.7
20-Dec-16 11:00	-	-	-	-4.8	97.3	14.6	57.4	1231.7

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
20-Dec-16 12:00	-	-	-	-4.5	97.4	39.0	54.9	1231.6
20-Dec-16 13:00	-	-	-	-4.1	97.5	67.2	55.4	1232.4
20-Dec-16 14:00	-	-	-	-4.1	97.5	49.5	54.9	1232.3
20-Dec-16 15:00	-	-	-	-4.5	97.4	23.4	55.2	1230.8
20-Dec-16 16:00	-	-	-	-4.4	97.5	6.2	54.9	1230.4
20-Dec-16 17:00	-	-	-	-4.4	97.5	0.3	54.6	1231.0
20-Dec-16 18:00	-	-	-	-4.2	97.7	0.0	54.8	1233.0
20-Dec-16 19:00	-	-	-	-3.8	97.9	0.0	54.3	1236.3
20-Dec-16 20:00	-	-	-	-3.6	98.0	0.0	52.6	1234.0
20-Dec-16 21:00	-	-	-	-3.6	98.0	0.0	56.2	1233.7
20-Dec-16 22:00	-	-	-	-3.7	97.9	0.0	54.5	1234.4
20-Dec-16 23:00	-	-	-	-3.8	97.9	0.0	54.6	1238.9
21-Dec-16 0:00	-	-	-	-3.8	97.9	0.0	54.3	1234.7
21-Dec-16 1:00	-	-	-	-4.2	97.7	0.0	54.9	1235.2
21-Dec-16 2:00	-	-	-	-4.2	97.6	0.0	54.4	1235.3
21-Dec-16 3:00	-	-	-	-4.2	97.7	0.0	54.3	1236.0
21-Dec-16 4:00	-	-	-	-4.1	97.7	0.0	54.3	1236.8
21-Dec-16 5:00	-	-	-	-4.2	97.6	0.0	54.5	1236.2
21-Dec-16 6:00	-	-	-	-4.4	97.5	0.0	55.4	1236.3
21-Dec-16 7:00	-	-	-	-4.5	97.4	0.0	54.7	1236.4
21-Dec-16 8:00	-	-	-	-4.7	97.3	0.0	55.2	1236.6
21-Dec-16 9:00	-	-	-	-4.7	97.3	0.0	56.7	1238.0
21-Dec-16 10:00	-	-	-	-4.8	97.2	2.2	-	1239.3
21-Dec-16 11:00	-	-	-	-4.5	97.4	5.9	56.6	1239.8
21-Dec-16 12:00	-	-	-	-4.4	97.4	8.7	61.0	1239.4
21-Dec-16 13:00	-	-	-	-4.4	97.5	21.9	56.6	1241.4
21-Dec-16 14:00	-	-	-	-4.4	97.4	24.5	56.9	1241.5
21-Dec-16 15:00	-	-	-	-4.5	97.3	20.1	55.5	1241.3
21-Dec-16 16:00	-	-	-	-4.7	97.3	5.4	54.8	1241.0
21-Dec-16 17:00	-	-	-	-4.9	97.1	0.4	55.1	1241.8
21-Dec-16 18:00	-	-	-	-5.0	97.2	0.0	55.0	1240.6
21-Dec-16 19:00	-	-	-	-5.0	97.1	0.0	55.1	1240.7
21-Dec-16 20:00	-	-	-	-5.1	97.1	0.0	55.2	1240.8
21-Dec-16 21:00	-	-	-	-5.0	97.1	0.0	55.2	1240.6
21-Dec-16 22:00	-	-	-	-5.0	97.1	0.0	55.1	1241.2
21-Dec-16 23:00	-	-	-	-4.9	97.1	0.0	54.8	1241.4
22-Dec-16 0:00	-	-	-	-5.0	97.1	0.0	54.5	1241.0
22-Dec-16 1:00	-	-	-	-5.0	97.1	0.0	53.5	1241.4
22-Dec-16 2:00	-	-	-	-4.9	97.1	0.0	54.6	1241.2
22-Dec-16 3:00	-	-	-	-5.0	97.1	0.0	55.3	1241.2
22-Dec-16 4:00	-	-	-	-5.0	97.0	0.0	55.1	1241.2
22-Dec-16 5:00	-	-	-	-5.2	96.9	0.0	55.7	1241.2
22-Dec-16 6:00	-	-	-	-5.3	96.9	0.0	55.6	1241.1
22-Dec-16 7:00	-	-	-	-5.4	96.8	0.0	55.2	1241.1
22-Dec-16 8:00	-	-	-	-5.5	96.7	0.0	55.1	1241.1
22-Dec-16 9:00	-	-	-	-5.7	96.6	0.0	54.1	1241.1
22-Dec-16 10:00	-	-	-	-5.9	96.5	2.7	54.1	1241.0
22-Dec-16 11:00	-	-	-	-6.8	96.0	8.5	54.5	1241.2
22-Dec-16 12:00	-	-	-	-6.5	95.9	72.1	54.2	1242.5
22-Dec-16 13:00	-	-	-	-4.6	97.0	65.7	53.7	1242.5
22-Dec-16 14:00	-	-	-	-2.7	98.0	59.9	53.6	1241.8
22-Dec-16 15:00	-	-	-	-2.6	98.1	51.7	52.5	1241.4
22-Dec-16 16:00	-	-	-	-4.0	97.5	18.7	54.0	1241.0
22-Dec-16 17:00	-	-	-	-5.9	96.5	1.5	53.9	1240.9

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
22-Dec-16 18:00	-	-	-	-7.0	95.7	0.0	54.0	1240.7
22-Dec-16 19:00	-	-	-	-7.6	95.4	0.0	54.1	1240.7
22-Dec-16 20:00	-	-	-	-8.1	95.1	0.0	53.8	1240.7
22-Dec-16 21:00	-	-	-	-8.4	94.8	0.0	53.9	1240.7
22-Dec-16 22:00	-	-	-	-8.7	94.6	0.0	54.8	1240.6
22-Dec-16 23:00	-	-	-	-9.0	94.3	0.0	54.4	1240.8
23-Dec-16 0:00	-	-	-	-9.4	94.1	0.0	55.3	1240.8
23-Dec-16 1:00	-	-	-	-9.5	94.0	0.0	55.0	1240.8
23-Dec-16 2:00	-	-	-	-9.7	93.8	0.0	54.7	1240.8
23-Dec-16 3:00	-	-	-	-10.0	93.6	0.0	55.0	1240.8
23-Dec-16 4:00	-	-	-	-10.1	93.5	0.0	54.9	1240.8
23-Dec-16 5:00	-	-	-	-10.3	93.3	0.0	54.8	1240.8
23-Dec-16 6:00	-	-	-	-10.5	93.1	0.0	54.7	1240.8
23-Dec-16 7:00	-	-	-	-10.8	92.8	0.0	54.8	1240.8
23-Dec-16 8:00	-	-	-	-11.0	92.6	0.0	55.8	1240.7
23-Dec-16 9:00	-	-	-	-11.1	92.5	0.1	54.7	1240.6
23-Dec-16 10:00	-	-	-	-11.4	92.2	4.6	55.0	1240.6
23-Dec-16 11:00	-	-	-	-11.6	92.0	13.6	54.4	1240.9
23-Dec-16 12:00	-	-	-	-10.6	92.7	91.5	53.6	1242.5
23-Dec-16 13:00	-	-	-	-11.1	92.2	71.6	55.1	1242.3
23-Dec-16 14:00	-	-	-	-10.9	92.4	55.7	53.6	1241.7
23-Dec-16 15:00	-	-	-	-10.7	92.6	42.9	53.1	1241.4
23-Dec-16 16:00	-	-	-	-9.4	93.8	21.3	53.8	1241.1
23-Dec-16 17:00	-	-	-	-11.1	92.4	1.4	54.9	1240.7
23-Dec-16 18:00	-	-	-	-11.9	91.7	0.0	54.3	1240.6
23-Dec-16 19:00	-	-	-	-11.7	91.9	0.0	55.0	1240.9
23-Dec-16 20:00	-	-	-	-12.0	91.5	0.0	54.0	1240.7
23-Dec-16 21:00	-	-	-	-12.6	91.0	0.0	54.8	1240.7
23-Dec-16 22:00	-	-	-	-12.8	90.8	0.0	54.0	1240.7
23-Dec-16 23:00	-	-	-	-13.0	90.5	0.0	54.5	1240.8
24-Dec-16 0:00	-	-	-	-13.2	90.4	0.0	55.2	1240.8
24-Dec-16 1:00	-	-	-	-13.3	90.2	0.0	54.0	1240.8
24-Dec-16 2:00	-	-	-	-13.6	90.0	0.0	54.1	1240.9
24-Dec-16 3:00	-	-	-	-13.7	89.9	0.0	55.3	1240.9
24-Dec-16 4:00	-	-	-	-13.7	89.9	0.0	54.5	1241.0
24-Dec-16 5:00	-	-	-	-13.6	90.0	0.0	55.2	1241.0
24-Dec-16 6:00	-	-	-	-13.5	90.0	0.0	54.6	1241.1
24-Dec-16 7:00	-	-	-	-13.8	89.8	0.0	55.4	1241.0
24-Dec-16 8:00	-	-	-	-13.4	90.2	0.0	55.2	1241.1
24-Dec-16 9:00	-	-	-	-13.2	90.4	0.2	54.6	1241.1
24-Dec-16 10:00	-	-	-	-13.3	90.2	15.6	54.7	1241.2
24-Dec-16 11:00	-	-	-	-13.0	90.4	34.5	54.5	1241.3
24-Dec-16 12:00	-	-	-	-12.5	91.0	56.5	54.7	1241.4
24-Dec-16 13:00	-	-	-	-11.7	91.7	73.9	54.5	1241.4
24-Dec-16 14:00	-	-	-	-11.5	91.8	68.9	54.0	1241.3
24-Dec-16 15:00	-	-	-	-11.8	91.6	44.6	54.8	1241.3
24-Dec-16 16:00	-	-	-	-11.8	91.7	16.5	55.2	1241.3
24-Dec-16 17:00	-	-	-	-11.9	91.6	0.7	55.4	1241.3
24-Dec-16 18:00	-	-	-	-12.0	91.5	0.0	55.2	1241.3
24-Dec-16 19:00	-	-	-	-12.1	91.4	0.0	55.9	1241.4
24-Dec-16 20:00	-	-	-	-11.9	91.6	0.0	55.6	1241.4
24-Dec-16 21:00	-	-	-	-11.7	91.9	0.0	55.5	1241.4
24-Dec-16 22:00	-	-	-	-11.6	91.9	0.0	54.8	1241.3
24-Dec-16 23:00	-	-	-	-12.0	91.5	0.0	56.4	1241.3

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
25-Dec-16 0:00	-	-	-	-11.7	91.8	0.0	55.7	1241.4
25-Dec-16 1:00	-	-	-	-11.6	91.9	0.0	56.1	1241.4
25-Dec-16 2:00	-	-	-	-11.5	92.0	0.0	56.3	1241.4
25-Dec-16 3:00	-	-	-	-11.2	92.0	0.0	55.8	1241.3
25-Dec-16 4:00	-	-	-	-10.3	88.8	0.0	55.7	1241.4
25-Dec-16 5:00	-	-	-	-10.2	88.6	0.0	55.3	1241.3
25-Dec-16 6:00	-	-	-	-10.2	91.3	0.0	55.2	1241.3
25-Dec-16 7:00	-	-	-	-11.1	91.0	0.0	55.5	1241.3
25-Dec-16 8:00	-	-	-	-10.5	90.6	0.0	55.8	1241.3
25-Dec-16 9:00	-	-	-	-9.9	89.9	0.0	55.8	1241.3
25-Dec-16 10:00	-	-	-	-9.7	90.1	4.0	56.1	1241.4
25-Dec-16 11:00	-	-	-	-9.9	90.9	26.9	55.9	1241.3
25-Dec-16 12:00	-	-	-	-10.1	86.6	84.9	55.1	1241.5
25-Dec-16 13:00	-	-	-	-9.8	83.9	87.1	55.7	1241.2
25-Dec-16 14:00	-	-	-	-9.8	84.0	85.7	55.0	1241.3
25-Dec-16 15:00	-	-	-	-9.3	82.6	37.5	55.4	1241.5
25-Dec-16 16:00	-	-	-	-9.3	84.7	18.2	55.4	1241.5
25-Dec-16 17:00	-	-	-	-9.5	88.2	1.1	55.5	1241.3
25-Dec-16 18:00	-	-	-	-10.3	89.1	0.0	55.2	1241.1
25-Dec-16 19:00	-	-	-	-10.3	91.5	0.0	55.6	1241.0
25-Dec-16 20:00	-	-	-	-10.3	93.0	0.0	55.6	1240.7
25-Dec-16 21:00	-	-	-	-10.3	93.4	0.0	55.8	1241.1
25-Dec-16 22:00	-	-	-	-10.1	93.6	0.0	59.3	1241.6
25-Dec-16 23:00	-	-	-	-9.8	93.9	0.0	55.3	1241.5
26-Dec-16 0:00	-	-	-	-9.5	94.1	0.0	56.6	1241.7
26-Dec-16 1:00	-	-	-	-9.2	94.3	0.0	60.5	1242.0
26-Dec-16 2:00	-	-	-	-9.1	94.4	0.0	61.4	1242.6
26-Dec-16 3:00	-	-	-	-8.5	94.7	0.0	61.6	1242.9
26-Dec-16 4:00	-	-	-	-8.4	94.9	0.0	62.9	1243.2
26-Dec-16 5:00	-	-	-	-7.9	95.2	0.0	61.2	1243.7
26-Dec-16 6:00	-	-	-	-7.8	95.3	0.0	64.7	1243.9
26-Dec-16 7:00	-	-	-	-7.7	95.3	0.0	64.4	1244.1
26-Dec-16 8:00	-	-	-	-7.9	95.2	0.0	65.4	1244.3
26-Dec-16 9:00	-	-	-	-8.1	95.1	0.0	65.5	1244.1
26-Dec-16 10:00	-	-	-	-8.1	95.1	3.6	65.1	1244.7
26-Dec-16 11:00	-	-	-	-8.1	95.1	12.2	64.6	1244.1
26-Dec-16 12:00	-	-	-	-8.0	95.0	42.6	-	1244.5
26-Dec-16 13:00	-	-	-	-8.0	95.0	63.2	69.0	1244.6
26-Dec-16 14:00	-	-	-	-7.8	95.2	59.4	64.9	1245.4
26-Dec-16 15:00	-	-	-	-7.6	95.3	45.8	69.9	1243.8
26-Dec-16 16:00	-	-	-	-7.7	95.4	6.5	66.1	1244.3
26-Dec-16 17:00	-	-	-	-7.5	95.5	0.7	76.1	1245.2
26-Dec-16 18:00	-	-	-	-7.6	95.4	0.0	76.5	1244.8
26-Dec-16 19:00	-	-	-	-7.6	95.4	0.0	78.6	1245.8
26-Dec-16 20:00	-	-	-	-7.5	95.5	0.0	81.0	1245.7
26-Dec-16 21:00	-	-	-	-7.2	95.7	0.0	80.6	1245.7
26-Dec-16 22:00	-	-	-	-7.0	95.7	0.0	83.1	1246.6
26-Dec-16 23:00	-	-	-	-6.6	96.0	0.0	85.7	1249.0
27-Dec-16 0:00	-	-	-	-6.4	96.2	0.0	88.2	1251.0
27-Dec-16 1:00	-	-	-	-5.5	96.8	0.0	82.3	1248.4
27-Dec-16 2:00	-	-	-	-4.8	97.2	0.0	82.4	1252.2
27-Dec-16 3:00	-	-	-	-4.4	97.4	0.0	81.4	1250.0
27-Dec-16 4:00	-	-	-	-4.1	97.6	0.0	80.4	1250.8
27-Dec-16 5:00	-	-	-	-3.9	97.7	0.0	77.9	1251.2

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
	Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
27-Dec-16 6:00	-	-	-	-3.8	97.8	0.0	80.1	1251.6
27-Dec-16 7:00	-	-	-	-3.8	97.8	0.0	79.1	1251.8
27-Dec-16 8:00	-	-	-	-3.8	97.7	0.0	78.6	1253.1
27-Dec-16 9:00	-	-	-	-3.9	97.7	0.1	77.0	1251.9
27-Dec-16 10:00	-	-	-	-3.9	97.6	6.8	79.7	1252.2
27-Dec-16 11:00	-	-	-	-3.9	97.6	31.2	80.0	1252.6
27-Dec-16 12:00	-	-	-	-3.8	97.7	51.1	79.6	1252.4
27-Dec-16 13:00	-	-	-	-3.6	97.7	71.2	79.0	1252.3
27-Dec-16 14:00	-	-	-	-3.6	97.7	45.1	80.4	1252.7
27-Dec-16 15:00	-	-	-	-3.8	97.7	24.0	80.6	1253.2
27-Dec-16 16:00	-	-	-	-3.9	97.6	10.1	79.9	1253.2
27-Dec-16 17:00	-	-	-	-4.0	97.5	0.9	79.8	1253.3
27-Dec-16 18:00	-	-	-	-4.1	97.5	0.0	79.8	1254.1
27-Dec-16 19:00	-	-	-	-4.1	97.5	0.0	79.8	1254.1
27-Dec-16 20:00	-	-	-	-4.1	97.5	0.0	79.9	1254.5
27-Dec-16 21:00	-	-	-	-4.3	97.3	0.0	79.1	1253.7
27-Dec-16 22:00	-	-	-	-4.6	97.2	0.0	79.4	1254.3
27-Dec-16 23:00	-	-	-	-4.7	97.1	0.0	79.3	1253.7
28-Dec-16 0:00	-	-	-	-4.8	97.1	0.0	80.0	1254.2
28-Dec-16 1:00	-	-	-	-4.9	96.9	0.0	80.3	1254.2
28-Dec-16 2:00	-	-	-	-5.0	97.0	0.0	79.0	1253.7
28-Dec-16 3:00	-	-	-	-5.0	96.9	0.0	78.5	1254.8
28-Dec-16 4:00	-	-	-	-5.0	96.9	0.0	78.3	1253.8
28-Dec-16 5:00	-	-	-	-5.0	96.9	0.0	79.7	1254.9
28-Dec-16 6:00	-	-	-	-4.9	97.1	0.0	79.0	1255.0
28-Dec-16 7:00	-	-	-	-4.7	97.1	0.0	77.5	1254.8
28-Dec-16 8:00	-	-	-	-4.8	97.0	0.0	78.2	1255.3
28-Dec-16 9:00	-	-	-	-4.9	97.0	0.0	78.0	1255.5
28-Dec-16 10:00	-	-	-	-5.0	96.9	3.1	77.5	1254.5
28-Dec-16 11:00	-	-	-	-4.8	97.0	19.6	77.8	1254.6
28-Dec-16 12:00	-	-	-	-4.5	97.1	37.1	80.5	1256.7
28-Dec-16 13:00	-	-	-	-4.3	97.3	64.7	76.3	1254.5
28-Dec-16 14:00	-	-	-	-4.1	97.4	51.1	78.2	1254.8
28-Dec-16 15:00	-	-	-	-4.2	97.3	38.2	78.1	1255.0
28-Dec-16 16:00	-	-	-	-4.2	97.3	13.4	78.2	1255.4
28-Dec-16 17:00	-	-	-	-4.3	97.2	1.3	78.3	1255.4
28-Dec-16 18:00	-	-	-	-4.6	97.1	0.0	78.5	1255.5
28-Dec-16 19:00	-	-	-	-4.8	96.9	0.0	77.9	1255.4
28-Dec-16 20:00	-	-	-	-5.1	96.7	0.0	77.0	1255.4
28-Dec-16 21:00	-	-	-	-5.4	96.5	0.0	76.9	1255.4
28-Dec-16 22:00	-	-	-	-5.7	96.3	0.0	77.7	1255.4
28-Dec-16 23:00	-	-	-	-5.9	96.2	0.0	77.9	1255.3
29-Dec-16 0:00	-	-	-	-6.2	96.1	0.0	77.3	1255.3
29-Dec-16 1:00	-	-	-	-6.1	96.1	0.0	78.3	1255.3
29-Dec-16 2:00	-	-	-	-6.6	95.9	0.0	77.6	1255.0
29-Dec-16 3:00	-	-	-	-7.1	95.6	0.0	77.8	1255.1
29-Dec-16 4:00	-	-	-	-7.3	95.5	0.0	77.0	1254.3
29-Dec-16 5:00	-	-	-	-7.3	95.5	0.0	79.9	1255.7
29-Dec-16 6:00	-	-	-	-7.4	95.4	0.0	77.9	1255.1
29-Dec-16 7:00	-	-	-	-7.7	95.1	0.0	76.8	1255.0
29-Dec-16 8:00	-	-	-	-8.2	94.9	0.0	78.4	1254.4
29-Dec-16 9:00	-	-	-	-8.5	94.7	0.1	77.7	1255.6
29-Dec-16 10:00	-	-	-	-8.4	94.8	5.1	79.4	1254.2
29-Dec-16 11:00	-	-	-	-8.8	94.4	15.6	79.3	1254.4



Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
29-Dec-16 12:00	-	-	-	-8.1	93.7	145.6	79.3	1256.6
29-Dec-16 13:00	-	-	-	-8.0	93.3	116.0	78.3	1256.4
29-Dec-16 14:00	-	-	-	-8.0	93.2	82.6	78.5	1255.9
29-Dec-16 15:00	-	-	-	-8.6	93.4	57.4	78.3	1255.5
29-Dec-16 16:00	-	-	-	-8.1	93.9	29.6	78.4	1255.3
29-Dec-16 17:00	-	-	-	-8.3	94.3	3.2	78.6	1255.0
29-Dec-16 18:00	-	-	-	-8.8	94.0	0.0	78.4	1254.9
29-Dec-16 19:00	-	-	-	-9.1	93.9	0.0	78.1	1254.9
29-Dec-16 20:00	-	-	-	-9.2	93.9	0.0	77.9	1254.9
29-Dec-16 21:00	-	-	-	-9.3	93.9	0.0	78.0	1255.0
29-Dec-16 22:00	-	-	-	-9.2	93.9	0.0	78.0	1255.0
29-Dec-16 23:00	-	-	-	-9.1	94.0	0.0	78.0	1255.2
30-Dec-16 0:00	-	-	-	-9.1	93.8	0.0	78.4	1255.2
30-Dec-16 1:00	-	-	-	-8.3	94.6	0.0	78.2	1255.7
30-Dec-16 2:00	-	-	-	-7.9	94.8	0.0	77.8	1255.5
30-Dec-16 3:00	-	-	-	-7.2	95.5	0.0	77.8	1255.7
30-Dec-16 4:00	-	-	-	-6.6	95.4	0.0	77.0	1254.7
30-Dec-16 5:00	-	-	-	-6.7	95.4	0.0	76.4	1255.6
30-Dec-16 6:00	-	-	-	-6.9	95.3	0.0	75.9	1255.2
30-Dec-16 7:00	-	-	-	-7.1	95.5	0.0	75.4	1255.3
30-Dec-16 8:00	-	-	-	-7.0	95.8	0.0	75.2	1255.7
30-Dec-16 9:00	-	-	-	-6.9	95.7	0.1	75.2	1254.5
30-Dec-16 10:00	-	-	-	-6.8	95.8	11.7	75.2	1254.6
30-Dec-16 11:00	-	-	-	-6.4	95.9	41.6	74.5	1256.6
30-Dec-16 12:00	-	-	-	-6.1	96.1	54.3	74.4	1254.7
30-Dec-16 13:00	-	-	-	-5.9	96.2	69.0	74.0	1256.2
30-Dec-16 14:00	-	-	-	-5.7	96.4	54.5	73.6	1257.0
30-Dec-16 15:00	-	-	-	-5.4	96.5	32.7	73.9	1254.7
30-Dec-16 16:00	-	-	-	-5.4	96.6	12.4	74.3	1255.5
30-Dec-16 17:00	-	-	-	-5.2	96.8	1.7	72.7	1255.4
30-Dec-16 18:00	-	-	-	-5.0	96.9	0.0	73.7	1255.3
30-Dec-16 19:00	-	-	-	-4.8	97.1	0.0	74.2	1255.6
30-Dec-16 20:00	-	-	-	-4.4	97.2	0.0	74.2	1257.1
30-Dec-16 21:00	-	-	-	-4.3	97.3	0.0	74.2	1255.1
30-Dec-16 22:00	-	-	-	-4.2	97.4	0.0	74.0	1257.4
30-Dec-16 23:00	-	-	-	-4.0	97.6	0.0	75.3	1256.8
31-Dec-16 0:00	-	-	-	-3.8	97.7	0.0	74.5	1256.7
31-Dec-16 1:00	-	-	-	-3.7	97.6	0.0	75.9	1258.1
31-Dec-16 2:00	-	-	-	-3.9	97.4	0.0	75.4	1257.0
31-Dec-16 3:00	-	-	-	-4.5	97.0	0.0	74.2	1257.4
31-Dec-16 4:00	-	-	-	-4.8	96.8	0.0	74.3	1257.8
31-Dec-16 5:00	-	-	-	-5.1	96.8	0.0	73.7	1257.2
31-Dec-16 6:00	-	-	-	-5.8	96.5	0.0	80.5	1255.1
31-Dec-16 7:00	-	-	-	-6.9	85.7	0.0	82.0	1255.8
31-Dec-16 8:00	-	-	-	-7.5	73.5	0.0	77.6	1257.2
31-Dec-16 9:00	-	-	-	-8.2	66.2	0.2	79.3	1254.1
31-Dec-16 10:00	-	-	-	-8.5	61.0	7.5	74.0	1259.6
31-Dec-16 11:00	-	-	-	-8.6	56.0	21.8	72.1	1255.6
31-Dec-16 12:00	-	-	-	-8.5	52.3	216.4	72.5	1258.5
31-Dec-16 13:00	-	-	-	-8.1	50.9	262.2	71.3	1257.4
31-Dec-16 14:00	8.8	35.0	8.5	-7.6	53.0	234.2	73.5	1256.8
31-Dec-16 15:00	6.2	47.4	8.0	-7.4	54.2	192.6	73.9	1256.4
31-Dec-16 16:00	7.2	43.9	6.3	-7.6	59.5	106.6	74.1	1257.8
31-Dec-16 17:00	7.5	35.7	9.0	-7.9	62.1	8.9	73.6	1256.5

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
31-Dec-16 18:00	12.4	43.4	8.5	-7.8	68.5	0.0	72.4	1257.4
31-Dec-16 19:00	15.1	31.3	8.6	-7.7	73.6	0.0	71.3	1258.0
31-Dec-16 20:00	15.3	39.2	8.5	-7.4	68.2	0.0	71.8	1255.1
31-Dec-16 21:00	15.0	41.7	7.2	-7.2	65.0	0.0	72.0	1260.2
31-Dec-16 22:00	14.2	38.6	7.0	-7.3	67.1	0.0	70.8	1252.4
31-Dec-16 23:00	14.8	35.7	7.1	-7.2	65.2	0.0	71.5	1250.2
01-Jan-17 0:00	14.1	29.6	7.1	-7.3	64.3	0.0	71.6	1258.1
01-Jan-17 1:00	13.6	37.4	5.9	-7.3	64.0	0.0	70.7	1254.4
01-Jan-17 2:00	13.2	36.5	6.7	-6.9	62.7	0.0	71.4	1255.5
01-Jan-17 3:00	10.0	39.2	7.1	-6.8	63.0	0.0	71.3	1256.6
01-Jan-17 4:00	7.7	36.1	6.2	-7.0	66.9	0.0	70.8	1257.0
01-Jan-17 5:00	6.7	23.1	7.0	-6.9	67.4	0.0	70.2	1256.2
01-Jan-17 6:00	5.8	24.6	7.6	-6.8	64.8	0.0	70.9	1256.9
01-Jan-17 7:00	5.6	25.3	6.6	-6.5	62.2	0.0	70.6	1257.4
01-Jan-17 8:00	6.2	22.8	4.0	-7.4	68.7	0.0	70.7	1257.2
01-Jan-17 9:00	7.1	37.2	5.8	-6.7	63.1	0.2	70.4	1257.0
01-Jan-17 10:00	7.0	38.1	5.4	-6.1	59.9	6.9	70.2	1256.5
01-Jan-17 11:00	7.5	39.4	6.0	-5.9	59.1	22.0	70.4	1255.3
01-Jan-17 12:00	6.7	34.1	5.9	-4.9	55.7	155.1	70.4	1259.9
01-Jan-17 13:00	7.5	34.3	6.0	-4.5	56.7	187.0	69.9	1258.9
01-Jan-17 14:00	8.7	42.5	6.6	-3.8	55.2	177.5	69.6	1256.6
01-Jan-17 15:00	10.9	44.9	6.6	-3.6	54.4	134.5	69.5	1258.6
01-Jan-17 16:00	11.8	54.3	6.5	-3.7	56.6	69.0	69.4	1256.5
01-Jan-17 17:00	10.8	59.9	10.4	-3.8	58.3	5.9	69.7	1258.8
01-Jan-17 18:00	12.7	60.4	10.0	-4.0	60.7	0.0	69.4	1255.5
01-Jan-17 19:00	13.0	52.5	11.0	-4.1	61.9	0.0	69.0	1252.9
01-Jan-17 20:00	11.0	37.5	8.9	-4.3	63.0	0.0	70.1	1259.3
01-Jan-17 21:00	10.5	29.4	9.2	-4.4	65.7	0.0	68.9	1248.2
01-Jan-17 22:00	13.7	27.8	7.4	-4.2	67.7	0.0	68.5	1256.3
01-Jan-17 23:00	10.1	25.0	10.7	-4.3	70.5	0.0	69.4	1257.3
02-Jan-17 0:00	8.5	24.9	9.4	-4.2	70.0	0.0	69.4	1256.7
02-Jan-17 1:00	7.8	23.2	10.1	-4.1	67.9	0.0	68.6	1256.8
02-Jan-17 2:00	9.7	28.7	7.5	-3.8	65.9	0.0	69.3	1255.6
02-Jan-17 3:00	9.2	35.3	6.9	-3.6	65.2	0.0	69.2	1258.6
02-Jan-17 4:00	9.6	29.4	5.5	-3.7	66.3	0.0	69.1	1258.9
02-Jan-17 5:00	9.2	22.3	4.6	-3.7	66.2	0.0	68.9	1261.2
02-Jan-17 6:00	10.4	30.3	5.5	-3.6	64.5	0.0	69.3	1259.0
02-Jan-17 7:00	11.2	35.8	6.2	-3.4	63.3	0.0	68.8	1257.5
02-Jan-17 8:00	10.5	43.6	7.4	-3.2	62.5	0.0	69.2	1259.3
02-Jan-17 9:00	9.7	42.8	8.3	-2.9	62.2	0.2	68.9	1257.2
02-Jan-17 10:00	10.6	42.1	6.1	-2.6	61.3	7.0	68.9	1256.3
02-Jan-17 11:00	11.9	35.1	5.2	-2.3	60.1	19.8	69.2	1259.5
02-Jan-17 12:00	11.7	39.2	5.2	-1.7	57.4	156.6	68.6	1261.6
02-Jan-17 13:00	9.5	36.5	9.2	-1.4	56.9	185.9	69.0	1261.5
02-Jan-17 14:00	7.0	30.8	6.1	-1.3	57.6	175.8	68.6	1258.9
02-Jan-17 15:00	7.4	21.0	6.1	-2.0	60.7	132.3	69.2	1259.0
02-Jan-17 16:00	8.2	23.7	5.0	-2.7	64.6	65.5	67.8	1260.0
02-Jan-17 17:00	8.5	23.2	6.1	-1.6	58.4	6.1	67.9	1258.2
02-Jan-17 18:00	10.2	31.1	5.0	-1.1	53.4	0.0	68.3	1259.2
02-Jan-17 19:00	10.0	30.9	7.8	-0.3	46.5	0.0	67.9	1261.4
02-Jan-17 20:00	8.8	38.9	10.9	-0.2	44.9	0.0	67.3	1259.6
02-Jan-17 21:00	7.5	31.1	9.8	-0.8	47.1	0.0	68.3	1258.0
02-Jan-17 22:00	7.9	35.2	10.1	-0.8	46.2	0.0	67.6	1259.1
02-Jan-17 23:00	7.7	23.2	11.3	-1.0	46.8	0.0	67.0	1259.0

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation					
03-Jan-17 0:00	9.3	29.0	6.5	-0.7	45.2	0.0	67.9	1259.0
03-Jan-17 1:00	7.6	19.4	5.2	-1.1	46.6	0.0	68.0	1259.8
03-Jan-17 2:00	7.5	24.4	3.2	-1.7	49.2	0.0	68.2	1260.4
03-Jan-17 3:00	7.1	28.1	4.1	-2.0	50.7	0.0	67.0	1259.4
03-Jan-17 4:00	7.2	27.2	3.5	-2.1	51.0	0.0	67.3	1259.6
03-Jan-17 5:00	6.0	24.3	5.9	-2.3	51.3	0.0	67.5	1258.4
03-Jan-17 6:00	5.9	16.4	11.9	-2.3	50.8	0.0	67.3	1259.5
03-Jan-17 7:00	6.1	32.0	9.4	-2.1	49.3	0.0	67.4	1258.0
03-Jan-17 8:00	5.4	37.0	7.5	-1.2	45.1	0.0	67.2	1259.6
03-Jan-17 9:00	6.0	19.9	5.8	-1.0	44.5	0.2	66.8	1260.8
03-Jan-17 10:00	7.3	18.0	4.7	-0.9	44.3	13.0	67.3	1260.1
03-Jan-17 11:00	2.4	34.0	45.5	-2.8	52.6	38.9	67.1	1259.7
03-Jan-17 12:00	1.9	60.6	24.5	-3.5	56.4	67.5	67.7	1259.5
03-Jan-17 13:00	1.6	125.5	32.0	-5.7	68.4	65.1	67.3	1261.2
03-Jan-17 14:00	2.4	211.3	12.9	-5.0	64.9	175.4	66.9	1260.9
03-Jan-17 15:00	2.1	184.3	14.7	-4.7	65.5	134.5	67.1	1260.4
03-Jan-17 16:00	0.7	187.9	49.1	-3.4	58.8	68.4	67.1	1260.0
03-Jan-17 17:00	2.0	192.7	9.6	-4.9	67.3	6.5	67.6	1259.7
03-Jan-17 18:00	1.5	204.7	18.6	-4.8	63.1	0.0	67.4	1259.9
03-Jan-17 19:00	1.7	207.8	15.8	-4.9	63.3	0.0	67.2	1259.7
03-Jan-17 20:00	1.8	180.2	16.2	-4.7	62.8	0.0	67.8	1259.8
03-Jan-17 21:00	2.4	193.5	10.6	-5.1	64.5	0.0	67.7	1259.8
03-Jan-17 22:00	1.8	186.6	10.1	-4.4	60.4	0.0	67.8	1259.9
03-Jan-17 23:00	1.4	202.8	16.0	-3.8	56.5	0.0	67.4	1259.8
04-Jan-17 0:00	0.4	197.7	38.7	-3.6	54.9	0.0	67.0	1259.8
04-Jan-17 1:00	0.8	324.8	25.9	-3.3	52.9	0.0	67.4	1259.6
04-Jan-17 2:00	1.2	218.0	27.9	-3.9	56.0	0.0	67.4	1259.9
04-Jan-17 3:00	1.1	191.2	25.9	-3.6	54.8	0.0	67.4	1259.7
04-Jan-17 4:00	0.8	201.3	24.9	-3.5	54.0	0.0	66.9	1259.8
04-Jan-17 5:00	0.6	344.8	42.6	-2.9	50.6	0.0	66.7	1259.7
04-Jan-17 6:00	0.4	232.1	22.6	-3.1	51.3	0.0	67.0	1259.8
04-Jan-17 7:00	2.0	188.9	12.3	-4.3	56.8	0.0	66.6	1259.8
04-Jan-17 8:00	1.2	172.2	12.2	-3.1	51.1	0.0	67.1	1259.9
04-Jan-17 9:00	0.8	176.7	53.9	-2.9	48.6	0.8	67.6	1259.9
04-Jan-17 10:00	1.5	229.9	34.4	-3.8	53.1	14.7	67.0	1259.8
04-Jan-17 11:00	1.2	183.2	42.2	-3.2	50.1	49.1	67.0	1260.2
04-Jan-17 12:00	1.1	217.3	30.8	-2.8	48.4	171.8	66.6	1261.9
04-Jan-17 13:00	0.9	192.4	26.5	-2.0	45.1	185.8	66.3	1260.9
04-Jan-17 14:00	0.9	206.1	30.4	-1.5	41.7	141.8	66.5	1260.3
04-Jan-17 15:00	1.4	197.9	27.5	-2.4	46.3	122.0	67.0	1260.3
04-Jan-17 16:00	0.7	47.6	45.4	-2.7	49.0	77.6	67.1	1260.1
04-Jan-17 17:00	1.0	151.0	48.2	-3.5	52.6	11.1	67.9	1259.7
04-Jan-17 18:00	1.6	211.0	26.5	-3.9	54.9	0.0	67.8	1259.9
04-Jan-17 19:00	1.3	222.7	62.9	-3.7	52.4	0.0	67.2	1259.9
04-Jan-17 20:00	0.6	221.0	27.1	-4.2	52.5	0.0	67.3	1259.9
04-Jan-17 21:00	1.1	213.5	42.3	-4.3	52.5	0.0	67.9	1259.8
04-Jan-17 22:00	0.7	177.7	33.3	-4.8	54.0	0.0	67.5	1260.0
04-Jan-17 23:00	1.4	159.2	36.2	-6.3	62.3	0.0	67.1	1259.8
05-Jan-17 0:00	2.1	199.6	9.6	-6.8	65.3	0.0	67.0	1259.8
05-Jan-17 1:00	1.1	169.8	21.7	-6.2	61.9	0.0	67.8	1259.8
05-Jan-17 2:00	1.4	190.8	22.7	-7.2	67.5	0.0	67.4	1259.8
05-Jan-17 3:00	1.7	177.9	14.8	-6.8	67.2	0.0	68.3	1259.9
05-Jan-17 4:00	2.3	181.2	11.5	-8.2	73.8	0.0	67.2	1260.1
05-Jan-17 5:00	2.1	161.4	8.9	-7.8	70.1	0.0	67.3	1259.8

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
05-Jan-17 6:00	2.0	195.3	22.6	-9.0	74.8	0.0	67.5	1259.8
05-Jan-17 7:00	0.9	263.9	52.8	-7.8	67.2	0.0	67.7	1259.9
05-Jan-17 8:00	1.8	192.2	19.4	-8.4	69.7	0.0	67.5	1260.0
05-Jan-17 9:00	1.0	206.7	31.6	-8.4	66.4	0.1	67.4	1259.9
05-Jan-17 10:00	1.2	239.7	23.0	-8.4	66.2	6.8	67.3	1259.9
05-Jan-17 11:00	0.7	237.4	29.3	-8.5	67.7	32.9	67.2	1259.9
05-Jan-17 12:00	0.7	136.5	37.4	-8.2	68.1	62.8	67.1	1259.9
05-Jan-17 13:00	0.6	193.1	38.4	-8.5	69.2	105.9	67.0	1261.3
05-Jan-17 14:00	0.7	305.5	19.9	-7.9	69.6	135.3	67.3	1260.0
05-Jan-17 15:00	1.0	210.7	30.8	-8.9	75.1	53.1	67.5	1259.7
05-Jan-17 16:00	1.1	116.5	29.9	-9.3	82.0	35.5	67.2	1260.0
05-Jan-17 17:00	1.4	51.0	37.5	-9.4	83.7	7.6	67.3	1259.9
05-Jan-17 18:00	1.6	68.2	42.6	-10.3	82.5	0.0	67.4	1259.3
05-Jan-17 19:00	8.8	29.2	4.9	-9.8	80.3	0.0	67.1	1259.6
05-Jan-17 20:00	8.2	31.6	4.5	-10.7	85.9	0.0	67.1	1259.0
05-Jan-17 21:00	8.8	33.1	4.1	-11.0	86.6	0.0	67.0	1258.8
05-Jan-17 22:00	9.4	30.3	4.8	-11.3	85.3	0.0	67.2	1259.2
05-Jan-17 23:00	11.9	35.6	6.8	-10.9	74.2	0.0	67.2	1260.3
06-Jan-17 0:00	11.6	46.9	6.3	-10.9	71.4	0.0	66.4	1260.0
06-Jan-17 1:00	11.1	46.0	5.5	-11.3	73.8	0.0	66.9	1262.0
06-Jan-17 2:00	12.2	46.9	5.4	-11.3	72.9	0.0	66.6	1258.2
06-Jan-17 3:00	12.7	44.8	5.2	-11.5	76.5	0.0	66.1	1261.6
06-Jan-17 4:00	12.3	49.7	5.6	-11.6	74.2	0.0	66.3	1259.6
06-Jan-17 5:00	13.1	62.3	7.4	-11.1	68.7	0.0	66.0	1256.2
06-Jan-17 6:00	12.8	61.6	8.5	-11.0	69.3	0.0	67.7	1258.1
06-Jan-17 7:00	12.8	60.5	8.7	-11.1	67.8	0.0	67.2	1261.3
06-Jan-17 8:00	14.5	65.1	8.4	-11.2	69.0	0.0	66.3	1262.9
06-Jan-17 9:00	14.8	67.3	8.9	-11.3	70.3	0.1	65.8	1259.2
06-Jan-17 10:00	16.3	66.0	7.8	-11.2	71.2	10.1	68.5	1260.9
06-Jan-17 11:00	16.4	68.3	7.4	-11.2	73.0	30.4	68.5	1258.0
06-Jan-17 12:00	16.7	62.6	7.2	-11.2	76.2	80.7	65.7	1259.1
06-Jan-17 13:00	15.9	65.1	9.0	-11.0	75.8	77.7	66.5	1258.4
06-Jan-17 14:00	16.9	67.2	8.0	-10.9	74.0	147.8	67.0	1261.1
06-Jan-17 15:00	17.3	65.6	9.3	-10.5	70.7	153.2	64.4	1265.1
06-Jan-17 16:00	19.1	61.9	8.3	-10.7	74.7	76.8	62.0	1258.1
06-Jan-17 17:00	22.6	63.0	6.9	-10.6	75.2	5.4	-	1256.1
06-Jan-17 18:00	24.3	66.3	6.2	-10.3	70.9	0.0	-	1259.2
06-Jan-17 19:00	24.2	56.9	7.6	-10.2	69.2	0.0	-	1260.3
06-Jan-17 20:00	23.1	64.7	7.8	-10.3	71.4	0.0	54.7	1268.8
06-Jan-17 21:00	21.5	68.7	10.4	-10.3	74.6	0.0	-	1262.8
06-Jan-17 22:00	21.9	62.9	7.5	-10.6	76.1	0.0	-	1256.8
06-Jan-17 23:00	22.2	68.6	7.6	-10.6	75.2	0.0	52.1	1264.4
07-Jan-17 0:00	20.3	70.1	8.7	-10.6	72.0	0.0	54.9	1263.7
07-Jan-17 1:00	20.3	67.3	8.6	-10.9	71.4	0.0	52.4	1261.2
07-Jan-17 2:00	19.9	74.3	8.8	-11.0	71.8	0.0	52.2	1260.2
07-Jan-17 3:00	20.2	67.3	10.4	-11.2	71.2	0.0	53.4	1258.0
07-Jan-17 4:00	19.2	66.2	9.1	-11.4	68.5	0.0	51.4	1269.6
07-Jan-17 5:00	19.5	65.7	8.4	-11.6	67.5	0.0	53.4	1266.7
07-Jan-17 6:00	19.8	69.6	8.8	-12.1	69.7	0.0	51.5	1246.2
07-Jan-17 7:00	20.4	75.3	8.2	-12.5	74.0	0.0	53.1	1263.3
07-Jan-17 8:00	19.0	63.4	9.9	-12.7	68.0	0.0	52.8	1253.6
07-Jan-17 9:00	20.5	59.4	10.6	-12.7	66.9	0.1	52.4	1268.4
07-Jan-17 10:00	22.3	64.3	9.5	-12.8	67.5	15.9	51.5	1258.0
07-Jan-17 11:00	22.1	65.0	7.7	-13.1	65.9	25.5	52.3	1252.9

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation					
07-Jan-17 12:00	21.7	60.9	7.9	-13.0	64.9	106.7	-	1262.2
07-Jan-17 13:00	19.7	51.1	6.9	-13.0	64.1	181.4	53.7	1262.7
07-Jan-17 14:00	20.2	55.0	8.4	-13.3	62.7	119.7	53.2	1259.2
07-Jan-17 15:00	18.8	58.1	9.4	-13.5	63.9	120.0	53.8	1261.8
07-Jan-17 16:00	16.9	48.8	9.7	-13.6	63.0	82.2	53.7	1260.1
07-Jan-17 17:00	14.9	54.3	13.3	-13.8	63.3	8.2	53.7	1262.8
07-Jan-17 18:00	16.2	48.6	11.2	-14.0	63.8	0.0	53.0	1262.7
07-Jan-17 19:00	15.2	34.7	9.2	-14.6	63.6	0.0	53.5	1256.8
07-Jan-17 20:00	15.2	30.6	6.7	-15.2	64.8	0.0	54.2	1265.0
07-Jan-17 21:00	15.9	27.3	6.0	-15.7	64.8	0.0	-	1262.3
07-Jan-17 22:00	16.3	25.8	5.8	-16.2	65.3	0.0	-	1260.2
07-Jan-17 23:00	18.1	30.5	5.6	-15.1	62.9	0.0	53.4	1256.2
08-Jan-17 0:00	19.5	37.2	5.5	-14.3	60.0	0.0	51.7	1255.4
08-Jan-17 1:00	14.1	36.7	10.8	-14.8	59.8	0.0	51.6	1259.9
08-Jan-17 2:00	14.9	29.1	5.8	-16.3	61.3	0.0	53.7	1261.3
08-Jan-17 3:00	13.9	32.8	7.3	-16.6	60.9	0.0	53.5	1261.2
08-Jan-17 4:00	13.6	26.6	5.7	-15.7	55.5	0.0	52.8	1259.5
08-Jan-17 5:00	13.8	29.4	6.4	-16.6	57.1	0.0	53.3	1260.6
08-Jan-17 6:00	12.3	33.5	7.0	-16.5	54.4	0.0	52.1	1261.9
08-Jan-17 7:00	6.7	63.0	39.7	-14.5	49.4	0.0	52.8	1260.7
08-Jan-17 8:00	6.0	55.0	27.6	-15.4	48.9	0.0	54.1	1261.8
08-Jan-17 9:00	8.3	57.1	36.1	-15.3	45.6	0.3	51.9	1261.4
08-Jan-17 10:00	17.0	41.0	7.1	-11.2	29.7	7.3	51.8	1265.7
08-Jan-17 11:00	16.8	45.4	8.3	-10.5	29.1	19.1	53.3	1258.3
08-Jan-17 12:00	20.5	50.5	7.7	-9.2	33.2	161.1	50.0	1268.7
08-Jan-17 13:00	20.0	64.7	9.7	-7.1	38.1	198.3	52.3	1263.6
08-Jan-17 14:00	23.9	61.9	11.3	-7.9	43.6	193.0	49.5	1269.0
08-Jan-17 15:00	24.6	55.2	10.0	-7.8	44.4	153.3	-	1252.8
08-Jan-17 16:00	26.1	63.5	11.5	-8.7	52.2	84.2	50.1	1263.0
08-Jan-17 17:00	21.8	53.6	10.8	-9.3	44.7	12.7	49.7	1257.5
08-Jan-17 18:00	18.3	59.6	14.5	-9.9	45.6	0.0	50.2	1265.8
08-Jan-17 19:00	17.5	52.4	14.7	-10.7	45.7	0.0	50.5	1256.9
08-Jan-17 20:00	18.9	53.9	14.9	-10.6	47.0	0.0	50.1	1259.0
08-Jan-17 21:00	22.3	50.9	11.6	-10.9	53.3	0.0	49.8	1257.3
08-Jan-17 22:00	22.6	57.7	13.2	-11.1	54.3	0.0	49.7	1254.3
08-Jan-17 23:00	23.3	61.6	14.4	-11.5	56.2	0.0	-	1256.2
09-Jan-17 0:00	25.4	59.1	12.0	-12.4	57.8	0.0	44.9	1267.4
09-Jan-17 1:00	25.4	56.6	11.0	-12.6	59.7	0.0	-	1266.8
09-Jan-17 2:00	24.3	57.7	10.1	-12.7	57.8	0.0	47.8	1257.9
09-Jan-17 3:00	24.6	57.1	10.6	-12.8	56.6	0.0	48.2	1260.6
09-Jan-17 4:00	23.7	59.4	8.3	-12.9	55.6	0.0	47.9	1262.9
09-Jan-17 5:00	23.3	62.2	9.9	-13.0	54.5	0.0	-	1255.0
09-Jan-17 6:00	22.7	63.0	8.9	-13.3	54.7	0.0	47.8	1266.4
09-Jan-17 7:00	22.2	52.9	8.0	-13.2	52.2	0.0	-	1261.1
09-Jan-17 8:00	23.8	50.2	7.9	-12.9	52.6	0.0	-	1260.0
09-Jan-17 9:00	23.2	47.9	6.6	-12.7	50.4	0.2	44.8	1264.0
09-Jan-17 10:00	21.9	51.5	9.3	-12.5	47.6	7.6	47.5	1263.0
09-Jan-17 11:00	21.0	53.3	8.2	-12.7	47.0	23.6	46.2	1257.7
09-Jan-17 12:00	18.3	47.5	9.5	-12.4	44.5	165.2	47.6	1263.9
09-Jan-17 13:00	13.5	47.7	9.0	-12.5	42.0	210.4	46.3	1262.7
09-Jan-17 14:00	19.4	62.3	7.2	-12.5	43.5	198.1	43.9	1263.2
09-Jan-17 15:00	19.3	59.7	11.8	-12.0	41.9	159.5	45.3	1259.8
09-Jan-17 16:00	16.7	51.8	13.1	-11.7	37.9	90.1	45.9	1262.4
09-Jan-17 17:00	13.8	52.0	13.6	-11.4	36.8	14.9	46.0	1259.6

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
09-Jan-17 18:00	13.4	69.4	16.6	-11.1	34.8	0.0	45.8	1271.9
09-Jan-17 19:00	17.8	57.7	10.4	-10.9	36.1	0.0	46.4	1259.3
09-Jan-17 20:00	17.3	49.1	5.0	-11.7	39.6	0.0	46.4	1262.0
09-Jan-17 21:00	12.9	43.0	5.4	-12.2	41.1	0.0	45.2	1260.0
09-Jan-17 22:00	9.0	39.4	5.8	-12.7	43.2	0.0	46.9	1261.9
09-Jan-17 23:00	8.8	42.6	7.2	-12.4	46.9	0.0	46.2	1261.9
10-Jan-17 0:00	8.5	39.5	8.1	-12.0	47.3	0.0	45.3	1260.7
10-Jan-17 1:00	11.0	43.8	6.0	-11.6	53.9	0.0	45.3	1265.1
10-Jan-17 2:00	10.6	45.5	7.4	-11.4	59.3	0.0	46.0	1261.5
10-Jan-17 3:00	9.2	46.0	7.4	-11.7	61.2	0.0	45.9	1263.5
10-Jan-17 4:00	12.2	52.0	8.8	-11.0	60.4	0.0	45.8	1267.1
10-Jan-17 5:00	15.4	50.6	7.8	-10.3	59.4	0.0	46.1	1258.3
10-Jan-17 6:00	15.5	41.2	6.3	-10.4	59.7	0.0	45.2	1260.8
10-Jan-17 7:00	14.2	44.2	7.0	-10.5	59.1	0.0	45.4	1259.1
10-Jan-17 8:00	15.0	63.4	11.7	-9.8	57.2	0.0	45.6	1260.4
10-Jan-17 9:00	15.4	54.0	6.4	-10.3	58.3	0.3	45.4	1257.7
10-Jan-17 10:00	13.9	49.3	4.9	-10.3	57.5	7.5	46.0	1261.9
10-Jan-17 11:00	13.8	42.2	5.3	-10.7	58.6	23.3	46.5	1260.0
10-Jan-17 12:00	11.3	37.5	4.6	-10.6	57.6	173.1	46.5	1267.2
10-Jan-17 13:00	10.6	36.2	4.5	-10.5	58.1	209.4	-	1263.1
10-Jan-17 14:00	12.2	37.8	4.2	-9.9	55.7	204.5	-	1262.4
10-Jan-17 15:00	14.0	39.0	4.8	-9.2	53.6	163.1	46.6	1263.7
10-Jan-17 16:00	13.4	39.1	4.1	-8.9	51.9	74.4	45.4	1259.9
10-Jan-17 17:00	13.1	32.2	4.0	-9.4	53.9	17.4	45.7	1261.8
10-Jan-17 18:00	12.3	22.6	4.4	-10.6	58.9	0.1	45.8	1260.9
10-Jan-17 19:00	10.3	20.0	4.9	-10.0	57.4	0.0	46.1	1261.5
10-Jan-17 20:00	2.0	287.1	57.2	-12.8	67.7	0.0	45.8	1261.0
10-Jan-17 21:00	2.1	208.5	27.0	-14.3	74.1	0.0	46.1	1261.0
10-Jan-17 22:00	2.1	190.4	26.2	-13.8	72.4	0.0	46.1	1261.1
10-Jan-17 23:00	1.5	193.2	16.9	-12.8	68.6	0.0	46.4	1261.1
11-Jan-17 0:00	0.4	136.3	51.6	-11.5	62.9	0.0	46.6	1261.1
11-Jan-17 1:00	0.8	165.0	38.4	-10.9	60.7	0.0	46.4	1261.1
11-Jan-17 2:00	0.6	235.9	45.0	-10.1	57.5	0.0	46.5	1260.9
11-Jan-17 3:00	1.6	197.6	36.1	-10.9	60.5	0.0	46.3	1261.1
11-Jan-17 4:00	1.2	355.0	41.3	-10.3	58.0	0.0	46.4	1260.9
11-Jan-17 5:00	0.9	170.2	22.0	-10.2	57.8	0.0	46.2	1261.1
11-Jan-17 6:00	1.3	228.1	37.2	-10.1	56.8	0.0	46.1	1261.4
11-Jan-17 7:00	1.7	164.3	41.5	-10.4	58.0	0.0	46.0	1260.9
11-Jan-17 8:00	2.2	217.6	28.4	-10.2	57.1	0.0	46.1	1261.0
11-Jan-17 9:00	1.1	199.3	47.0	-8.3	49.5	0.3	46.3	1261.0
11-Jan-17 10:00	0.9	166.3	23.0	-7.8	47.3	11.6	46.5	1261.0
11-Jan-17 11:00	0.9	160.9	44.9	-7.4	45.2	47.9	45.6	1261.1
11-Jan-17 12:00	1.2	36.0	54.4	-7.2	44.7	107.8	45.2	1264.1
11-Jan-17 13:00	1.0	247.3	17.3	-6.8	43.9	167.6	45.8	1262.9
11-Jan-17 14:00	1.6	196.3	17.1	-5.8	40.4	204.6	46.0	1263.2
11-Jan-17 15:00	1.8	229.9	27.7	-7.7	48.2	166.9	46.4	1262.3
11-Jan-17 16:00	3.4	210.5	15.8	-7.2	46.1	96.2	46.2	1261.4
11-Jan-17 17:00	3.1	207.9	12.0	-8.3	50.7	17.9	46.4	1261.2
11-Jan-17 18:00	2.3	212.8	9.7	-7.9	49.3	0.1	45.9	1261.1
11-Jan-17 19:00	1.7	163.3	20.3	-8.3	51.4	0.0	45.5	1261.1
11-Jan-17 20:00	2.6	201.3	13.8	-8.2	52.1	0.0	45.9	1261.1
11-Jan-17 21:00	3.1	198.3	9.1	-8.8	56.4	0.0	46.3	1261.1
11-Jan-17 22:00	3.0	216.0	9.2	-9.6	59.4	0.0	46.0	1261.2
11-Jan-17 23:00	4.5	211.1	7.6	-10.1	64.7	0.0	46.2	1261.4

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation					
12-Jan-17 0:00	4.5	209.6	11.0	-10.2	69.5	0.0	46.3	1261.1
12-Jan-17 1:00	4.3	206.9	14.5	-10.0	74.0	0.0	46.4	1261.7
12-Jan-17 2:00	4.8	206.3	11.8	-10.2	81.1	0.0	45.9	1261.3
12-Jan-17 3:00	6.0	194.9	13.0	-8.5	75.6	0.0	46.5	1260.0
12-Jan-17 4:00	6.2	206.1	6.7	-8.9	74.0	0.0	46.6	1261.3
12-Jan-17 5:00	5.8	195.6	6.2	-7.9	88.1	0.0	46.6	1260.6
12-Jan-17 6:00	4.5	205.5	9.2	-7.7	92.8	0.0	46.7	1260.4
12-Jan-17 7:00	4.9	207.8	7.7	-7.4	96.1	0.0	46.6	1260.8
12-Jan-17 8:00	4.1	211.7	8.1	-7.2	95.4	0.0	46.5	1260.4
12-Jan-17 9:00	4.4	210.4	8.7	-6.9	95.5	0.3	46.4	1260.1
12-Jan-17 10:00	5.5	210.9	7.6	-6.7	95.5	5.6	46.6	1261.9
12-Jan-17 11:00	5.0	214.1	6.9	-6.6	95.4	25.2	46.5	1261.2
12-Jan-17 12:00	4.6	214.7	7.9	-6.4	95.4	49.8	46.5	1260.8
12-Jan-17 13:00	4.0	217.8	8.4	-6.1	95.5	75.3	46.5	1261.4
12-Jan-17 14:00	3.9	217.6	7.9	-5.9	95.6	75.7	46.4	1261.2
12-Jan-17 15:00	5.6	219.5	7.3	-5.9	95.8	50.0	46.5	1261.6
12-Jan-17 16:00	4.6	215.1	10.5	-5.9	96.0	27.0	46.2	1261.4
12-Jan-17 17:00	4.2	216.3	9.2	-5.9	96.1	4.6	46.4	1261.9
12-Jan-17 18:00	4.0	214.5	9.7	-5.8	96.3	0.0	46.3	1261.1
12-Jan-17 19:00	4.6	209.0	8.9	-5.7	96.4	0.0	48.6	1262.6
12-Jan-17 20:00	4.4	205.1	8.8	-5.6	96.4	0.0	50.0	1261.4
12-Jan-17 21:00	4.5	212.0	7.5	-5.7	96.4	0.0	50.7	1262.6
12-Jan-17 22:00	3.9	209.5	9.6	-5.4	96.5	0.0	49.6	1260.4
12-Jan-17 23:00	3.9	213.5	9.0	-5.4	96.6	0.0	49.0	1261.7
13-Jan-17 0:00	4.3	214.3	8.9	-5.4	96.6	0.0	48.7	1263.0
13-Jan-17 1:00	4.4	216.5	8.7	-5.3	96.6	0.0	47.6	1260.5
13-Jan-17 2:00	3.7	214.3	7.4	-5.1	96.7	0.0	48.2	1262.8
13-Jan-17 3:00	4.1	216.1	9.3	-5.0	96.8	0.0	48.2	1262.8
13-Jan-17 4:00	3.9	208.0	12.4	-5.1	96.8	0.0	48.3	1262.3
13-Jan-17 5:00	4.0	205.0	9.0	-5.2	96.8	0.0	47.2	1262.2
13-Jan-17 6:00	4.1	201.9	8.2	-5.1	96.8	0.0	47.6	1262.0
13-Jan-17 7:00	4.1	192.7	9.5	-4.9	96.9	0.0	50.5	1264.1
13-Jan-17 8:00	3.4	201.3	8.6	-4.8	97.0	0.0	51.9	1262.9
13-Jan-17 9:00	3.7	210.2	7.7	-4.5	97.2	0.1	50.3	1261.1
13-Jan-17 10:00	4.0	205.9	7.3	-4.2	97.3	6.0	56.1	1265.8
13-Jan-17 11:00	5.3	207.1	9.0	-3.9	97.4	38.9	55.5	1265.7
13-Jan-17 12:00	4.9	215.1	8.1	-3.7	97.5	47.5	54.5	1265.2
13-Jan-17 13:00	5.5	212.5	7.1	-3.3	97.7	60.1	55.4	1264.9
13-Jan-17 14:00	4.4	214.2	8.9	-3.1	97.9	52.4	53.1	1267.8
13-Jan-17 15:00	4.3	208.6	11.2	-3.2	97.9	29.9	59.4	1271.8
13-Jan-17 16:00	5.3	213.7	11.1	-2.9	98.1	16.8	61.9	1270.3
13-Jan-17 17:00	5.0	208.8	16.3	-2.6	98.3	1.5	56.8	1269.4
13-Jan-17 18:00	5.5	206.9	17.2	-2.3	98.5	0.0	57.0	1271.1
13-Jan-17 19:00	5.7	205.0	19.7	-2.3	98.5	0.0	57.9	1273.1
13-Jan-17 20:00	6.5	196.5	17.7	-2.3	98.5	0.0	55.6	1274.0
13-Jan-17 21:00	8.6	190.3	15.0	-2.2	98.6	0.0	53.2	1269.3
13-Jan-17 22:00	8.7	190.8	16.1	-2.2	98.6	0.0	50.6	1274.1
13-Jan-17 23:00	7.0	202.8	18.2	-2.4	98.5	0.0	52.0	1276.5
14-Jan-17 0:00	6.7	213.8	18.1	-2.3	98.5	0.0	51.1	1275.2
14-Jan-17 1:00	7.8	209.7	14.5	-2.2	98.6	0.0	51.0	1273.3
14-Jan-17 2:00	8.1	208.2	16.6	-1.9	98.8	0.0	50.2	1274.5
14-Jan-17 3:00	5.2	223.5	13.1	-1.8	98.8	0.0	51.4	1275.8
14-Jan-17 4:00	5.2	219.4	14.6	-1.7	98.9	0.0	51.5	1277.4
14-Jan-17 5:00	5.3	206.8	13.3	-1.6	98.9	0.0	51.6	1276.0

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
14-Jan-17 6:00	6.1	196.2	10.2	-1.4	99.1	0.0	51.5	1276.5
14-Jan-17 7:00	5.6	193.8	10.3	-1.4	99.1	0.0	53.4	1277.1
14-Jan-17 8:00	4.8	201.9	11.8	-1.6	99.0	0.0	55.2	1280.0
14-Jan-17 9:00	4.8	204.0	11.1	-1.8	98.9	0.0	55.0	1280.7
14-Jan-17 10:00	3.8	214.5	9.0	-1.7	98.9	5.2	56.5	1283.1
14-Jan-17 11:00	4.7	213.9	9.2	-1.5	99.0	23.0	57.9	1283.7
14-Jan-17 12:00	5.1	220.1	9.8	-1.5	99.0	36.4	59.1	1283.8
14-Jan-17 13:00	5.1	222.2	9.8	-1.4	99.0	59.8	61.7	1283.4
14-Jan-17 14:00	5.0	231.6	9.6	-1.3	99.0	63.9	60.2	1283.1
14-Jan-17 15:00	5.3	225.3	9.7	-1.1	99.2	46.2	60.2	1284.4
14-Jan-17 16:00	5.4	223.7	10.2	-1.0	99.3	12.7	61.3	1285.3
14-Jan-17 17:00	4.5	220.0	9.3	-1.0	99.3	3.1	60.3	1286.9
14-Jan-17 18:00	2.2	214.4	8.3	-0.9	99.3	0.0	60.6	1284.5
14-Jan-17 19:00	1.5	217.2	7.9	-1.0	99.3	0.0	61.4	1285.9
14-Jan-17 20:00	3.0	209.7	7.2	-1.0	99.3	0.0	61.3	1287.5
14-Jan-17 21:00	4.6	202.0	7.4	-1.1	99.3	0.0	62.2	1287.8
14-Jan-17 22:00	5.0	204.9	9.2	-1.2	99.3	0.0	61.9	1288.8
14-Jan-17 23:00	3.5	212.1	8.7	-1.2	99.2	0.0	62.6	1288.7
15-Jan-17 0:00	5.0	210.2	11.5	-1.3	99.2	0.0	62.8	1289.4
15-Jan-17 1:00	5.2	208.2	8.5	-1.3	99.2	0.0	61.9	1290.3
15-Jan-17 2:00	4.4	215.0	7.8	-1.3	99.2	0.0	61.6	1288.6
15-Jan-17 3:00	5.7	220.3	7.1	-1.4	99.2	0.0	64.0	1293.9
15-Jan-17 4:00	4.6	218.5	9.2	-1.5	99.1	0.0	63.5	1291.3
15-Jan-17 5:00	4.1	221.0	9.0	-1.5	99.1	0.0	62.4	1294.2
15-Jan-17 6:00	4.6	222.9	8.1	-1.6	99.1	0.0	61.2	1291.5
15-Jan-17 7:00	5.4	217.5	7.9	-1.7	99.1	0.0	62.0	1292.8
15-Jan-17 8:00	4.8	214.5	7.2	-1.7	99.0	0.0	61.1	1290.3
15-Jan-17 9:00	6.3	217.8	8.3	-1.9	98.9	0.3	61.9	1289.9
15-Jan-17 10:00	5.6	214.9	10.6	-2.0	98.9	9.4	60.9	1293.4
15-Jan-17 11:00	4.0	217.9	10.3	-1.9	98.8	31.2	60.8	1294.5
15-Jan-17 12:00	4.1	216.8	11.4	-1.9	98.8	49.4	60.5	1293.2
15-Jan-17 13:00	5.0	207.2	9.1	-1.7	98.8	90.2	59.6	1295.4
15-Jan-17 14:00	4.9	202.8	14.5	-1.7	98.9	50.3	60.9	1292.8
15-Jan-17 15:00	3.6	211.5	10.6	-1.7	99.0	33.1	61.3	1292.8
15-Jan-17 16:00	-	-	-	-1.7	99.0	13.9	63.0	1290.9
15-Jan-17 17:00	-	-	-	-1.7	99.0	1.6	61.9	1294.8
15-Jan-17 18:00	-	-	-	-1.7	99.0	0.0	62.6	1293.6
15-Jan-17 19:00	-	-	-	-1.6	99.0	0.0	63.4	1298.8
15-Jan-17 20:00	-	-	-	-0.9	99.2	0.0	62.0	1298.7
15-Jan-17 21:00	-	-	-	-0.5	99.3	0.0	62.9	1299.9
15-Jan-17 22:00	6.8	203.6	26.3	-0.1	99.3	0.0	60.7	1300.2
15-Jan-17 23:00	8.7	199.3	19.3	-0.1	99.3	0.0	60.5	1297.2
16-Jan-17 0:00	9.5	196.7	19.5	-0.2	99.3	0.0	61.4	1304.4
16-Jan-17 1:00	8.3	197.7	18.9	-0.4	99.3	0.0	61.0	1290.9
16-Jan-17 2:00	11.5	183.5	14.1	-0.4	99.3	0.0	61.2	1293.9
16-Jan-17 3:00	12.2	188.8	12.8	-0.3	99.3	0.0	61.5	1303.4
16-Jan-17 4:00	13.0	180.1	10.3	-0.3	99.3	0.0	60.5	1301.7
16-Jan-17 5:00	12.4	173.6	9.3	-0.5	99.3	0.0	61.0	1306.0
16-Jan-17 6:00	13.4	169.6	10.7	-0.6	99.3	0.0	60.9	1299.9
16-Jan-17 7:00	12.7	176.7	9.8	-0.6	99.3	0.0	60.7	1298.7
16-Jan-17 8:00	11.7	176.6	9.8	-0.6	99.3	0.0	61.2	1301.7
16-Jan-17 9:00	11.5	179.7	10.5	-0.7	99.3	0.2	61.1	1297.9
16-Jan-17 10:00	10.7	184.9	11.3	-0.7	99.3	7.2	61.1	1298.0
16-Jan-17 11:00	9.7	183.8	12.7	-0.7	99.3	35.5	61.3	1297.1



Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
	Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
16-Jan-17 12:00	10.3	178.3	10.5	-0.7	99.3	46.9	61.5	1300.7
16-Jan-17 13:00	9.3	182.4	11.5	-0.8	99.3	53.1	62.0	1301.3
16-Jan-17 14:00	9.6	185.9	12.7	-0.8	99.3	51.0	61.9	1298.4
16-Jan-17 15:00	6.7	210.1	16.0	-0.8	99.3	56.9	62.0	1301.1
16-Jan-17 16:00	5.0	217.7	24.4	-0.8	99.3	47.3	62.1	1300.7
16-Jan-17 17:00	6.9	182.2	18.3	-1.1	99.3	9.3	61.8	1300.9
16-Jan-17 18:00	9.6	180.7	11.2	-1.4	99.1	0.1	62.2	1303.8
16-Jan-17 19:00	8.5	198.2	8.6	-1.8	99.1	0.0	62.0	1300.7
16-Jan-17 20:00	7.5	215.4	8.6	-1.8	99.1	0.0	61.3	1300.1
16-Jan-17 21:00	7.1	219.4	7.7	-1.9	99.0	0.0	61.0	1302.4
16-Jan-17 22:00	5.1	214.6	9.5	-1.9	99.0	0.0	61.5	1301.6
16-Jan-17 23:00	5.0	215.7	8.0	-1.9	99.0	0.0	60.9	1301.1
17-Jan-17 0:00	4.0	219.6	10.2	-1.9	99.0	0.0	61.2	1301.2
17-Jan-17 1:00	4.8	224.5	10.3	-1.9	99.0	0.0	60.7	1300.8
17-Jan-17 2:00	4.5	226.6	7.4	-1.8	99.0	0.0	60.9	1301.4
17-Jan-17 3:00	3.8	216.8	8.1	-1.8	99.0	0.0	60.9	1300.9
17-Jan-17 4:00	3.9	206.4	8.8	-1.8	99.1	0.0	60.8	1300.8
17-Jan-17 5:00	3.5	213.3	7.9	-1.8	99.0	0.0	60.9	1301.1
17-Jan-17 6:00	2.2	217.6	15.5	-1.8	99.0	0.0	60.7	1301.0
17-Jan-17 7:00	2.3	194.0	18.7	-2.0	98.9	0.0	61.0	1300.9
17-Jan-17 8:00	1.2	145.7	12.4	-2.0	98.8	0.0	60.8	1301.0
17-Jan-17 9:00	1.2	63.4	11.6	-1.8	98.9	0.2	60.1	1301.0
17-Jan-17 10:00	1.9	41.6	7.0	-1.7	98.9	10.3	60.4	1301.0
17-Jan-17 11:00	1.2	50.3	13.0	-1.4	98.9	44.3	60.4	1301.1
17-Jan-17 12:00	2.1	31.1	4.7	-1.4	98.9	73.1	60.9	1301.1
17-Jan-17 13:00	2.1	41.1	8.5	-1.3	98.7	89.0	61.1	1301.1
17-Jan-17 14:00	2.0	49.9	13.9	-0.7	98.9	96.8	60.9	1301.0
17-Jan-17 15:00	2.8	31.6	8.2	-0.8	99.0	69.2	61.0	1301.0
17-Jan-17 16:00	2.7	30.7	4.0	-0.8	99.1	36.9	60.8	1300.9
17-Jan-17 17:00	1.6	42.4	21.2	-0.6	99.1	9.0	61.1	1301.0
17-Jan-17 18:00	1.3	70.4	41.9	0.0	99.2	0.2	60.7	1300.9
17-Jan-17 19:00	3.1	38.2	7.4	-0.3	99.3	0.0	61.0	1300.9
17-Jan-17 20:00	3.1	28.9	5.8	-0.4	99.1	0.0	60.9	1301.0
17-Jan-17 21:00	2.8	30.0	8.5	-0.2	99.0	0.0	60.7	1300.9
17-Jan-17 22:00	3.2	30.4	5.3	-0.2	98.9	0.0	60.1	1301.0
17-Jan-17 23:00	3.3	34.3	15.0	-0.2	98.5	0.0	61.1	1300.9
18-Jan-17 0:00	2.9	29.6	9.1	-0.2	98.0	0.0	61.0	1301.0
18-Jan-17 1:00	2.0	32.9	16.3	0.0	98.4	0.0	58.3	1301.0
18-Jan-17 2:00	3.3	29.2	9.2	-0.1	98.1	0.0	60.7	1300.9
18-Jan-17 3:00	2.8	27.9	6.1	-0.1	98.9	0.0	59.4	1300.9
18-Jan-17 4:00	2.9	34.7	6.1	-0.2	99.2	0.0	60.8	1300.9
18-Jan-17 5:00	3.1	31.4	7.0	-0.2	99.2	0.0	61.7	1301.1
18-Jan-17 6:00	3.1	27.6	6.8	-0.1	99.3	0.0	60.7	1301.0
18-Jan-17 7:00	3.5	26.0	3.9	-0.2	99.3	0.0	61.5	1301.1
18-Jan-17 8:00	2.9	32.2	8.6	-0.2	99.3	0.0	62.4	1301.3
18-Jan-17 9:00	1.9	41.2	16.0	0.0	99.3	0.3	63.5	1301.3
18-Jan-17 10:00	1.4	54.3	26.7	0.1	99.3	20.3	63.9	1301.4
18-Jan-17 11:00	1.3	5.4	41.3	0.2	99.2	66.4	63.4	1302.5
18-Jan-17 12:00	1.9	10.9	13.9	0.3	98.8	64.7	62.4	1302.6
18-Jan-17 13:00	2.5	235.3	47.3	0.3	98.6	77.5	63.2	1311.1
18-Jan-17 14:00	5.6	188.0	11.2	0.1	98.9	92.4	62.7	1313.3
18-Jan-17 15:00	4.6	208.0	14.3	-0.1	99.0	61.7	62.9	1311.4
18-Jan-17 16:00	4.7	187.2	15.6	-0.8	99.3	44.7	63.8	1311.5
18-Jan-17 17:00	3.0	204.0	18.7	-1.1	99.2	7.7	63.5	1311.5

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
18-Jan-17 18:00	2.5	144.2	14.7	-1.0	99.3	0.1	63.4	1311.8
18-Jan-17 19:00	2.6	101.4	43.4	-0.7	97.8	0.0	63.9	1312.0
18-Jan-17 20:00	2.8	157.6	24.3	-0.5	97.4	0.0	63.9	1312.0
18-Jan-17 21:00	3.1	169.7	15.1	-0.7	99.2	0.0	64.0	1312.0
18-Jan-17 22:00	2.4	189.8	25.5	-0.7	99.3	0.0	64.2	1312.3
18-Jan-17 23:00	3.3	220.5	11.6	-0.7	99.3	0.0	63.8	1312.5
19-Jan-17 0:00	4.2	215.8	8.7	-0.8	99.3	0.0	64.1	1312.9
19-Jan-17 1:00	4.0	214.7	9.6	-0.8	99.3	0.0	63.7	1312.6
19-Jan-17 2:00	3.7	216.6	10.6	-1.0	99.3	0.0	63.9	1313.9
19-Jan-17 3:00	4.7	218.0	10.7	-1.2	99.3	0.0	64.8	1313.0
19-Jan-17 4:00	4.1	211.8	6.8	-1.2	99.3	0.0	64.8	1313.7
19-Jan-17 5:00	3.3	209.7	10.5	-1.4	99.2	0.0	64.8	1313.6
19-Jan-17 6:00	3.5	214.9	9.7	-1.7	98.9	0.0	64.9	1313.0
19-Jan-17 7:00	2.9	208.9	8.9	-1.8	99.0	0.0	64.8	1313.4
19-Jan-17 8:00	3.0	205.5	7.5	-1.9	99.1	0.0	64.6	1313.2
19-Jan-17 9:00	2.7	207.6	7.7	-2.0	99.0	0.2	64.2	1313.6
19-Jan-17 10:00	2.7	216.7	7.1	-2.0	98.9	11.1	65.0	1313.8
19-Jan-17 11:00	2.6	221.2	5.9	-1.9	98.7	35.3	65.5	1314.3
19-Jan-17 12:00	3.1	232.6	9.0	-2.2	98.4	58.3	65.7	1314.7
19-Jan-17 13:00	3.5	232.4	13.8	-2.5	98.2	68.8	66.7	1316.1
19-Jan-17 14:00	3.6	235.0	13.5	-2.9	98.0	62.3	70.6	1317.4
19-Jan-17 15:00	5.6	242.2	13.5	-3.5	97.9	42.6	73.6	1315.0
19-Jan-17 16:00	5.9	242.3	8.4	-3.9	97.8	30.4	77.9	1316.4
19-Jan-17 17:00	4.1	231.6	9.8	-4.1	97.7	12.8	77.4	1316.4
19-Jan-17 18:00	3.8	236.2	9.0	-4.5	97.5	0.1	77.1	1316.2
19-Jan-17 19:00	2.9	227.7	6.8	-4.8	97.4	0.0	79.5	1316.1
19-Jan-17 20:00	2.5	230.9	10.7	-5.0	97.3	0.0	78.6	1317.0
19-Jan-17 21:00	2.0	238.0	10.8	-5.3	97.1	0.0	-	1316.8
19-Jan-17 22:00	1.3	214.8	9.3	-5.5	96.9	0.0	74.9	1317.1
19-Jan-17 23:00	1.4	205.1	13.1	-5.8	96.8	0.0	79.1	1316.9
20-Jan-17 0:00	1.1	207.4	7.5	-5.9	96.7	0.0	79.2	1317.2
20-Jan-17 1:00	1.0	206.6	6.4	-6.0	96.6	0.0	79.3	1316.9
20-Jan-17 2:00	1.2	217.3	9.3	-6.0	96.5	0.0	79.3	1317.2
20-Jan-17 3:00	0.8	212.8	4.4	-6.1	96.5	0.0	78.9	1317.4
20-Jan-17 4:00	0.6	211.3	0.2	-6.1	96.4	0.0	78.7	1317.4
20-Jan-17 5:00	0.6	211.3	0.2	-6.1	96.4	0.0	78.6	1317.5
20-Jan-17 6:00	0.7	211.3	0.1	-6.2	96.4	0.0	78.3	1317.5
20-Jan-17 7:00	0.6	211.2	0.1	-6.5	96.0	0.0	78.0	1317.4
20-Jan-17 8:00	0.4	210.9	0.1	-7.4	95.0	0.0	78.1	1317.4
20-Jan-17 9:00	0.3	210.9	0.1	-7.4	95.2	0.5	77.4	1317.4
20-Jan-17 10:00	0.3	210.8	0.1	-7.9	93.9	6.5	77.8	1317.3
20-Jan-17 11:00	-	-	-	-7.3	94.6	46.0	77.9	1318.6
20-Jan-17 12:00	-	-	-	-7.3	93.6	71.0	78.4	1317.8
20-Jan-17 13:00	-	-	-	-7.7	96.0	58.5	78.6	1317.3
20-Jan-17 14:00	0.3	43.6	2.5	-7.2	97.0	63.4	78.7	1317.4
20-Jan-17 15:00	5.9	35.9	4.5	-7.3	95.5	37.4	78.8	1317.1
20-Jan-17 16:00	9.8	34.0	4.9	-7.5	92.6	22.3	78.4	1316.8
20-Jan-17 17:00	11.7	40.0	7.4	-7.5	95.4	7.0	-	1314.9
20-Jan-17 18:00	12.9	52.2	10.1	-7.4	88.0	0.1	69.9	1315.0
20-Jan-17 19:00	14.8	62.5	9.9	-7.3	75.8	0.0	62.2	1317.2
20-Jan-17 20:00	14.7	68.4	10.1	-7.3	71.9	0.0	62.8	1314.4
20-Jan-17 21:00	12.1	63.4	11.6	-7.9	73.7	0.0	61.8	1318.0
20-Jan-17 22:00	12.5	55.4	15.0	-8.5	75.7	0.0	-	1318.6
20-Jan-17 23:00	11.1	63.3	22.4	-8.9	77.4	0.0	61.6	1318.0

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean
21-Jan-17 0:00	7.3	79.8	43.6	-9.6	80.9	0.0	61.7	1317.6
21-Jan-17 1:00	4.4	88.8	67.8	-10.3	83.6	0.0	60.0	1317.5
21-Jan-17 2:00	4.4	84.7	56.3	-10.6	82.6	0.0	61.2	1317.9
21-Jan-17 3:00	5.1	73.6	25.5	-11.3	84.1	0.0	60.7	1315.4
21-Jan-17 4:00	4.5	60.6	21.9	-12.2	87.4	0.0	61.2	1317.8
21-Jan-17 5:00	3.8	55.4	19.7	-12.6	87.9	0.0	61.7	1317.6
21-Jan-17 6:00	2.6	80.2	26.4	-13.0	89.5	0.0	61.4	1317.6
21-Jan-17 7:00	1.5	200.7	40.8	-13.4	91.6	0.0	61.2	1317.7
21-Jan-17 8:00	1.5	302.1	34.2	-13.1	90.3	0.0	61.4	1317.6
21-Jan-17 9:00	1.4	261.5	40.0	-13.9	89.9	1.9	60.7	1317.6
21-Jan-17 10:00	0.9	285.0	53.6	-13.5	89.9	19.4	61.3	1317.8
21-Jan-17 11:00	0.7	271.1	43.6	-12.9	89.9	56.6	60.7	1319.5
21-Jan-17 12:00	1.4	219.7	18.6	-10.2	88.6	202.8	60.7	1319.9
21-Jan-17 13:00	1.5	242.4	24.5	-7.9	83.5	345.4	58.7	1320.1
21-Jan-17 14:00	2.0	208.9	17.7	-11.4	81.8	295.5	60.4	1318.8
21-Jan-17 15:00	1.7	228.9	23.4	-10.2	79.1	243.2	60.0	1318.3
21-Jan-17 16:00	2.1	199.4	16.9	-12.5	86.6	144.1	60.7	1318.1
21-Jan-17 17:00	1.7	211.0	40.3	-13.2	88.9	37.1	61.5	1318.0
21-Jan-17 18:00	2.0	197.2	14.9	-14.0	90.3	0.3	61.4	1318.0
21-Jan-17 19:00	1.4	193.1	20.1	-13.3	89.9	0.0	62.0	1318.0
21-Jan-17 20:00	1.6	212.3	15.2	-13.2	90.0	0.0	61.4	1318.1
21-Jan-17 21:00	2.0	192.6	21.8	-12.7	90.0	0.0	62.4	1318.2
21-Jan-17 22:00	2.1	199.5	15.9	-12.4	89.6	0.0	61.4	1318.2
21-Jan-17 23:00	2.5	195.2	13.0	-12.2	89.2	0.0	61.6	1318.2
22-Jan-17 0:00	2.4	198.6	12.6	-12.3	89.3	0.0	61.6	1318.3
22-Jan-17 1:00	1.8	193.2	19.7	-11.0	85.6	0.0	61.5	1318.4
22-Jan-17 2:00	2.9	188.7	10.7	-11.0	84.2	0.0	61.5	1318.4
22-Jan-17 3:00	1.7	191.8	17.3	-9.9	82.7	0.0	62.1	1318.5
22-Jan-17 4:00	2.1	194.6	21.1	-9.4	81.8	0.0	61.9	1318.4
22-Jan-17 5:00	1.7	179.4	31.4	-8.9	81.7	0.0	62.2	1318.5
22-Jan-17 6:00	1.6	133.8	55.3	-8.5	82.8	0.0	61.5	1318.4
22-Jan-17 7:00	1.3	342.4	46.8	-7.8	85.2	0.0	61.0	1318.4
22-Jan-17 8:00	2.2	200.8	35.5	-8.8	85.8	0.0	61.7	1318.5
22-Jan-17 9:00	1.6	72.6	49.9	-7.2	83.9	0.9	61.0	1318.5
22-Jan-17 10:00	1.9	55.3	47.1	-6.5	85.2	18.8	62.0	1318.4
22-Jan-17 11:00	3.1	25.4	48.4	-5.5	83.0	67.3	61.6	1318.4
22-Jan-17 12:00	3.2	34.6	10.2	-5.7	84.7	115.7	62.2	1318.6
22-Jan-17 13:00	4.9	33.5	8.2	-5.4	83.4	124.1	61.8	1318.7
22-Jan-17 14:00	2.6	70.8	29.9	-5.7	85.8	133.3	62.1	1318.2
22-Jan-17 15:00	2.6	79.3	38.3	-5.8	85.5	129.7	61.6	1318.4
22-Jan-17 16:00	1.7	202.1	50.5	-6.1	87.2	59.6	61.2	1318.4
22-Jan-17 17:00	1.2	203.4	46.6	-6.0	87.6	15.4	62.2	1318.4
22-Jan-17 18:00	0.9	217.5	46.6	-6.3	90.0	0.3	61.7	1318.5
22-Jan-17 19:00	1.2	282.5	63.4	-5.9	87.5	0.0	61.6	1318.5
22-Jan-17 20:00	1.3	176.4	32.0	-6.6	92.6	0.0	61.6	1318.5
22-Jan-17 21:00	1.7	177.5	15.7	-6.9	89.7	0.0	61.8	1318.5
22-Jan-17 22:00	1.3	187.3	27.2	-6.1	85.4	0.0	61.4	1318.6
22-Jan-17 23:00	1.5	186.6	16.8	-5.9	85.6	0.0	62.0	1318.6
23-Jan-17 0:00	1.2	207.5	31.6	-5.6	84.8	0.0	62.0	1318.6
23-Jan-17 1:00	1.0	168.0	12.9	-5.6	83.3	0.0	62.0	1318.7
23-Jan-17 2:00	1.2	181.6	13.0	-5.7	85.2	0.0	62.0	1318.7
23-Jan-17 3:00	0.3	128.1	10.6	-5.3	89.8	0.0	61.7	1318.8
23-Jan-17 4:00	1.8	7.4	27.5	-4.9	92.7	0.0	61.8	1318.8
23-Jan-17 5:00	0.7	212.5	16.0	-5.3	95.1	0.0	61.9	1318.9

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation					
23-Jan-17 6:00	0.6	4.1	19.8	-4.9	94.6	0.0	62.2	1319.0
23-Jan-17 7:00	1.3	39.9	8.7	-4.7	94.4	0.0	62.3	1319.0
23-Jan-17 8:00	2.5	34.1	5.0	-4.6	91.5	0.0	62.2	1319.0
23-Jan-17 9:00	1.4	24.9	11.4	-4.3	89.9	0.4	61.9	1319.1
23-Jan-17 10:00	1.5	60.2	23.2	-4.1	88.5	7.6	62.0	1319.0
23-Jan-17 11:00	1.2	159.0	45.7	-3.9	88.1	39.9	62.1	1318.9
23-Jan-17 12:00	3.5	186.2	13.8	-4.0	89.5	46.1	62.6	1318.9
23-Jan-17 13:00	4.9	195.1	9.6	-4.0	95.3	92.4	62.5	1319.5
23-Jan-17 14:00	3.0	161.9	23.6	-3.7	91.8	107.0	62.5	1319.2
23-Jan-17 15:00	3.5	182.2	27.8	-3.9	95.0	58.4	62.9	1319.4
23-Jan-17 16:00	4.1	204.4	9.1	-3.9	97.7	29.6	61.7	1320.3
23-Jan-17 17:00	2.9	202.7	12.6	-3.8	97.8	8.9	62.4	1320.0
23-Jan-17 18:00	3.3	204.5	9.2	-3.7	97.9	0.2	61.5	1320.3
23-Jan-17 19:00	3.5	206.3	10.1	-3.8	97.9	0.0	61.8	1320.5
23-Jan-17 20:00	3.9	209.2	10.6	-4.0	97.8	0.0	64.4	1320.3
23-Jan-17 21:00	4.6	213.1	8.3	-4.2	97.7	0.0	64.1	1319.9
23-Jan-17 22:00	3.6	217.4	8.4	-4.1	97.7	0.0	63.9	1320.9
23-Jan-17 23:00	4.0	217.1	8.5	-4.5	97.5	0.0	64.7	1320.4
24-Jan-17 0:00	3.9	216.9	9.1	-4.5	97.5	0.0	62.4	1319.9
24-Jan-17 1:00	3.9	215.5	9.4	-4.7	97.4	0.0	63.3	1320.3
24-Jan-17 2:00	3.5	208.4	9.3	-4.8	97.3	0.0	63.5	1320.2
24-Jan-17 3:00	4.3	208.0	10.0	-4.7	97.4	0.0	63.6	1321.8
24-Jan-17 4:00	3.5	210.4	8.4	-4.7	97.3	0.0	63.3	1320.8
24-Jan-17 5:00	2.9	213.0	9.5	-4.6	97.4	0.0	63.4	1320.7
24-Jan-17 6:00	2.5	221.4	10.6	-4.5	97.5	0.0	64.1	1321.5
24-Jan-17 7:00	2.6	209.2	12.0	-4.3	97.6	0.0	63.2	1321.8
24-Jan-17 8:00	2.7	215.5	10.1	-4.0	97.7	0.0	63.7	1322.3
24-Jan-17 9:00	2.7	210.8	8.5	-3.8	97.9	0.3	64.4	1322.0
24-Jan-17 10:00	2.9	193.5	9.9	-3.6	98.0	12.6	63.2	1322.7
24-Jan-17 11:00	2.9	196.8	8.2	-3.2	98.0	41.2	64.4	1322.5
24-Jan-17 12:00	3.0	207.9	9.3	-2.9	98.1	66.3	64.4	1321.5
24-Jan-17 13:00	3.3	206.6	11.2	-2.6	98.2	75.5	64.6	1322.3
24-Jan-17 14:00	2.2	238.7	17.7	-1.9	98.4	95.9	64.2	1322.2
24-Jan-17 15:00	1.1	196.6	50.0	-1.9	98.5	58.7	64.7	1322.3
24-Jan-17 16:00	3.8	194.8	18.1	-2.0	98.7	29.3	63.9	1324.3
24-Jan-17 17:00	7.0	193.0	9.3	-1.9	98.8	11.5	63.6	1322.3
24-Jan-17 18:00	5.2	210.3	8.5	-1.9	98.9	0.2	63.8	1322.9
24-Jan-17 19:00	5.9	197.9	9.0	-1.9	98.9	0.0	63.9	1320.6
24-Jan-17 20:00	6.6	194.8	8.4	-1.8	98.9	0.0	63.9	1319.3
24-Jan-17 21:00	6.0	205.9	13.3	-1.8	98.8	0.0	63.9	1322.1
24-Jan-17 22:00	6.8	196.0	19.0	-1.5	98.2	0.0	64.1	1323.8
24-Jan-17 23:00	9.7	184.6	10.1	-1.0	94.0	0.0	64.1	1322.2
25-Jan-17 0:00	9.6	176.7	15.2	-0.1	82.8	0.0	63.5	1323.5
25-Jan-17 1:00	8.9	192.8	10.1	-0.8	90.9	0.0	63.5	1322.7
25-Jan-17 2:00	8.1	193.2	10.2	-1.5	98.3	0.0	63.7	1322.1
25-Jan-17 3:00	6.9	195.7	10.5	-1.5	98.8	0.0	63.4	1323.7
25-Jan-17 4:00	5.1	204.9	12.2	-1.6	99.2	0.0	63.5	1323.7
25-Jan-17 5:00	4.0	217.0	11.1	-1.7	99.1	0.0	64.3	1324.7
25-Jan-17 6:00	3.9	215.7	13.9	-1.7	99.1	0.0	66.3	1324.5
25-Jan-17 7:00	5.0	201.5	12.2	-1.7	99.1	0.0	69.3	1324.5
25-Jan-17 8:00	5.5	190.7	10.6	-1.8	99.1	0.0	65.0	1327.6
25-Jan-17 9:00	3.9	202.0	11.2	-1.9	99.0	0.6	65.3	1326.5
25-Jan-17 10:00	3.1	215.9	10.6	-1.9	98.9	17.4	63.6	1327.1
25-Jan-17 11:00	3.4	214.2	9.2	-1.9	98.9	35.5	65.9	1327.3

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
25-Jan-17 12:00	3.2	213.5	8.9	-1.8	98.8	71.7	66.1	1326.9
25-Jan-17 13:00	3.5	227.9	9.1	-1.8	98.8	83.2	65.9	1327.1
25-Jan-17 14:00	3.0	222.9	11.6	-1.8	98.8	70.2	66.7	1327.2
25-Jan-17 15:00	3.4	217.9	11.4	-1.9	98.8	59.6	66.9	1327.0
25-Jan-17 16:00	4.1	220.2	11.9	-1.9	98.9	34.5	67.0	1329.0
25-Jan-17 17:00	3.4	225.9	12.6	-2.0	98.9	8.5	66.8	1326.9
25-Jan-17 18:00	3.1	218.4	12.8	-2.2	98.8	0.4	66.7	1327.5
25-Jan-17 19:00	3.3	213.0	13.0	-2.3	98.8	0.0	66.3	1328.0
25-Jan-17 20:00	2.8	208.9	12.3	-2.5	98.7	0.0	66.4	1327.6
25-Jan-17 21:00	2.6	200.0	19.6	-2.5	98.6	0.0	66.8	1327.6
25-Jan-17 22:00	4.3	174.2	17.7	-2.5	98.7	0.0	65.7	1328.8
25-Jan-17 23:00	4.6	190.1	14.7	-2.8	98.3	0.0	66.9	1327.5
26-Jan-17 0:00	2.6	219.0	43.2	-2.8	98.2	0.0	65.0	1327.5
26-Jan-17 1:00	2.0	211.6	37.4	-2.4	98.3	0.0	66.1	1327.8
26-Jan-17 2:00	2.3	188.3	27.8	-2.3	98.3	0.0	64.8	1327.8
26-Jan-17 3:00	5.3	182.4	13.6	-1.9	98.0	0.0	65.1	1328.2
26-Jan-17 4:00	7.6	182.7	10.8	-1.7	98.0	0.0	63.7	1328.6
26-Jan-17 5:00	6.6	178.4	13.3	-1.9	96.0	0.0	63.2	1328.0
26-Jan-17 6:00	3.3	182.1	27.7	-2.0	95.5	0.0	63.5	1328.3
26-Jan-17 7:00	5.3	184.8	18.0	-1.7	94.8	0.0	63.1	1329.1
26-Jan-17 8:00	6.9	185.6	12.9	-1.7	95.9	0.0	63.0	1327.3
26-Jan-17 9:00	5.0	213.3	15.7	-2.1	99.0	0.5	62.6	1328.5
26-Jan-17 10:00	5.2	204.8	15.7	-2.1	98.9	12.3	62.8	1328.7
26-Jan-17 11:00	5.3	215.5	13.6	-2.1	98.8	37.5	62.7	1330.4
26-Jan-17 12:00	5.3	212.5	15.3	-2.0	98.8	56.3	62.8	1330.0
26-Jan-17 13:00	6.6	222.3	12.2	-2.1	98.6	94.8	-	1330.8
26-Jan-17 14:00	4.8	214.9	16.8	-2.2	98.5	103.1	62.7	1332.5
26-Jan-17 15:00	4.0	216.6	14.8	-2.2	98.6	66.4	61.7	1332.2
26-Jan-17 16:00	2.6	207.9	15.1	-2.2	98.6	58.1	62.7	1333.3
26-Jan-17 17:00	5.7	179.6	11.1	-2.3	98.1	17.6	63.3	1333.3
26-Jan-17 18:00	6.3	192.4	7.9	-2.1	98.1	0.5	63.4	1331.3
26-Jan-17 19:00	3.8	190.3	24.8	-1.8	98.0	0.0	63.5	1332.3
26-Jan-17 20:00	2.3	197.3	54.4	-1.5	98.3	0.0	63.6	1331.8
26-Jan-17 21:00	2.0	127.5	57.9	-1.3	97.7	0.0	63.6	1332.2
26-Jan-17 22:00	2.6	133.0	27.3	-1.0	97.4	0.0	63.1	1332.2
26-Jan-17 23:00	1.8	74.2	58.0	-1.0	98.3	0.0	62.7	1332.8
27-Jan-17 0:00	1.9	357.8	30.9	-1.4	99.0	0.0	63.1	1333.0
27-Jan-17 1:00	1.9	303.1	63.1	-1.1	99.1	0.0	65.4	1335.4
27-Jan-17 2:00	2.4	236.6	56.6	-1.0	99.0	0.0	68.7	1336.7
27-Jan-17 3:00	4.8	204.8	36.5	-0.9	99.2	0.0	70.2	1337.2
27-Jan-17 4:00	5.8	206.8	21.9	-0.9	99.3	0.0	67.9	1338.6
27-Jan-17 5:00	4.9	207.4	30.7	-0.9	99.2	0.0	62.7	1338.1
27-Jan-17 6:00	5.0	211.6	22.3	-0.9	99.2	0.0	62.9	1338.1
27-Jan-17 7:00	6.3	198.9	15.9	-0.9	99.2	0.0	62.7	1339.0
27-Jan-17 8:00	5.6	218.0	11.8	-1.0	99.3	0.0	62.7	1339.2
27-Jan-17 9:00	5.4	212.4	11.4	-0.8	99.3	0.8	62.3	1339.5
27-Jan-17 10:00	5.7	208.3	10.5	-0.6	99.3	18.4	62.6	1340.9
27-Jan-17 11:00	5.0	216.9	9.3	-0.4	99.3	50.6	62.5	1338.3
27-Jan-17 12:00	4.5	219.9	9.9	-0.2	99.2	100.6	62.7	1340.5
27-Jan-17 13:00	4.0	213.2	13.1	-0.1	99.1	122.1	63.3	1340.7
27-Jan-17 14:00	3.0	198.4	19.5	-0.1	99.0	94.6	63.1	1345.8
27-Jan-17 15:00	3.9	197.9	14.9	0.0	99.2	71.5	62.5	1346.4
27-Jan-17 16:00	4.7	169.1	17.3	-0.1	99.2	44.6	62.9	1346.7
27-Jan-17 17:00	3.8	168.0	22.9	-0.2	99.2	8.3	62.6	1345.8

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean
27-Jan-17 18:00	2.7	110.7	32.5	-0.3	99.3	0.2	61.7	1347.0
27-Jan-17 19:00	2.8	298.6	14.2	-0.3	99.3	0.0	63.6	1347.6
27-Jan-17 20:00	2.0	290.5	28.6	-0.5	99.3	0.0	64.3	1350.6
27-Jan-17 21:00	2.8	331.5	17.2	-0.7	99.3	0.0	67.8	1351.9
27-Jan-17 22:00	3.3	323.1	14.4	-0.7	99.3	0.0	70.3	1354.2
27-Jan-17 23:00	4.3	317.4	23.9	-0.7	99.3	0.0	69.6	1355.2
28-Jan-17 0:00	3.2	259.9	37.8	-0.5	99.3	0.0	69.6	1357.2
28-Jan-17 1:00	3.4	232.6	34.3	-0.4	99.3	0.0	68.9	1357.9
28-Jan-17 2:00	3.5	221.8	30.1	-0.4	99.3	0.0	72.6	1360.0
28-Jan-17 3:00	3.4	219.9	28.7	-0.3	99.3	0.0	74.3	1361.7
28-Jan-17 4:00	3.9	208.7	26.2	-0.2	99.3	0.0	78.4	1362.1
28-Jan-17 5:00	5.2	201.3	17.6	-0.2	99.3	0.0	79.4	1360.8
28-Jan-17 6:00	4.0	205.6	12.9	-0.5	99.3	0.0	81.9	1365.1
28-Jan-17 7:00	2.7	196.5	0.2	-0.7	99.3	0.0	84.3	1365.5
28-Jan-17 8:00	2.7	196.0	0.1	-0.5	99.3	0.0	82.8	1365.6
28-Jan-17 9:00	3.2	196.2	0.2	-0.3	99.3	1.0	84.5	1364.9
28-Jan-17 10:00	2.8	196.2	0.1	-0.3	99.3	21.7	82.3	1366.2
28-Jan-17 11:00	3.3	196.3	0.2	-0.8	99.3	35.6	76.6	1365.4
28-Jan-17 12:00	2.2	196.6	0.3	-0.9	99.2	89.0	74.4	1365.7
28-Jan-17 13:00	6.2	219.0	6.9	-0.9	99.1	107.1	74.3	1365.8
28-Jan-17 14:00	4.6	216.3	1.1	-1.0	99.1	96.5	73.0	1365.1
28-Jan-17 15:00	4.7	214.3	4.6	-0.8	99.0	128.7	73.0	1365.3
28-Jan-17 16:00	4.7	209.0	0.1	-1.0	99.2	24.3	73.9	1366.8
28-Jan-17 17:00	4.8	217.1	11.3	-1.3	99.2	13.3	74.9	1367.5
28-Jan-17 18:00	4.9	230.6	8.7	-1.6	99.0	0.3	76.5	1371.9
28-Jan-17 19:00	6.1	223.9	5.6	-1.6	99.0	0.0	81.4	1367.1
28-Jan-17 20:00	4.7	212.2	10.0	-2.0	98.8	0.0	79.5	1370.9
28-Jan-17 21:00	4.5	223.0	7.8	-2.1	98.7	0.0	78.6	1370.4
28-Jan-17 22:00	3.3	210.7	0.2	-2.3	98.6	0.0	79.1	1370.3
28-Jan-17 23:00	2.7	211.5	2.7	-2.3	98.6	0.0	78.4	1370.2
29-Jan-17 0:00	2.9	209.9	2.8	-2.3	98.6	0.0	79.5	1371.3
29-Jan-17 1:00	2.0	209.1	2.5	-2.3	98.5	0.0	78.9	1371.5
29-Jan-17 2:00	2.4	211.0	5.6	-2.4	98.5	0.0	79.3	1372.0
29-Jan-17 3:00	2.9	200.4	13.0	-2.5	98.4	0.0	79.0	1371.2
29-Jan-17 4:00	2.9	202.3	5.5	-2.7	98.3	0.0	79.3	1373.0
29-Jan-17 5:00	3.6	195.2	6.4	-2.9	98.2	0.0	78.3	1370.8
29-Jan-17 6:00	1.9	211.2	5.8	-2.8	98.3	0.0	78.2	1372.3
29-Jan-17 7:00	2.6	217.9	6.5	-2.9	98.1	0.0	83.8	1374.8
29-Jan-17 8:00	3.7	207.4	10.9	-2.8	98.3	0.0	84.1	1375.2
29-Jan-17 9:00	3.0	230.6	8.0	-3.1	98.0	1.1	83.8	1375.9
29-Jan-17 10:00	3.3	237.2	8.1	-3.5	97.8	6.8	84.1	1375.9
29-Jan-17 11:00	3.7	230.4	6.5	-3.6	97.7	42.4	84.4	1375.8
29-Jan-17 12:00	3.8	212.5	8.0	-4.1	97.0	72.2	84.6	1376.3
29-Jan-17 13:00	3.9	206.6	9.2	-5.2	96.5	109.5	84.4	1375.8
29-Jan-17 14:00	3.9	213.2	10.2	-5.2	96.2	198.4	84.2	1375.3
29-Jan-17 15:00	4.3	218.8	9.5	-5.9	96.0	184.4	83.8	1375.5
29-Jan-17 16:00	4.1	210.2	10.0	-6.2	95.6	150.1	83.7	1375.7
29-Jan-17 17:00	3.5	203.9	9.9	-6.6	95.7	41.0	84.0	1376.0
29-Jan-17 18:00	3.0	199.8	12.5	-7.2	95.4	1.6	84.0	1376.5
29-Jan-17 19:00	3.3	187.4	13.7	-8.0	94.8	0.0	84.3	1376.2
29-Jan-17 20:00	4.0	200.9	7.9	-7.9	95.1	0.0	83.6	1375.6
29-Jan-17 21:00	3.6	203.7	7.5	-7.5	95.4	0.0	83.8	1376.3
29-Jan-17 22:00	3.8	197.0	20.3	-7.4	95.5	0.0	83.6	1376.5
29-Jan-17 23:00	3.7	203.2	10.3	-7.2	95.5	0.0	83.8	1376.1

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean
30-Jan-17 0:00	4.7	203.7	8.5	-7.3	95.4	0.0	83.4	1377.9
30-Jan-17 1:00	5.4	208.0	9.7	-7.3	95.4	0.0	83.9	1375.0
30-Jan-17 2:00	5.0	212.0	8.7	-7.5	95.3	0.0	83.2	1375.0
30-Jan-17 3:00	4.4	208.0	9.3	-7.2	95.6	0.0	83.2	1375.7
30-Jan-17 4:00	5.8	216.9	7.9	-7.2	95.4	0.0	83.4	1376.9
30-Jan-17 5:00	6.0	213.0	10.1	-7.6	95.0	0.0	83.2	1376.3
30-Jan-17 6:00	5.2	200.4	9.1	-7.7	95.0	0.0	83.0	1375.8
30-Jan-17 7:00	3.0	199.9	18.2	-7.6	95.2	0.0	83.0	1376.3
30-Jan-17 8:00	2.6	189.9	11.1	-7.7	95.0	0.0	82.9	1376.1
30-Jan-17 9:00	2.4	208.4	9.4	-7.8	95.0	2.3	82.6	1376.1
30-Jan-17 10:00	1.6	195.4	16.9	-8.0	94.7	15.9	82.6	1376.0
30-Jan-17 11:00	1.3	195.6	20.5	-8.0	94.6	53.0	82.3	1376.0
30-Jan-17 12:00	1.0	200.8	23.3	-7.6	94.7	89.4	81.9	1376.1
30-Jan-17 13:00	1.1	200.8	16.6	-6.8	94.8	233.0	81.0	1377.2
30-Jan-17 14:00	1.9	194.4	6.8	-5.8	94.3	402.3	81.1	1376.5
30-Jan-17 15:00	2.1	204.9	12.3	-6.2	94.5	315.4	80.8	1376.4
30-Jan-17 16:00	1.6	206.0	25.5	-6.1	94.9	225.5	81.1	1375.9
30-Jan-17 17:00	1.2	175.7	20.8	-7.3	94.6	103.5	81.5	1376.1
30-Jan-17 18:00	0.3	123.3	15.3	-8.7	94.0	2.4	82.1	1376.0
30-Jan-17 19:00	1.9	43.6	17.1	-9.5	93.5	0.0	80.9	1375.9
30-Jan-17 20:00	2.9	45.2	10.7	-9.5	94.1	0.0	81.6	1376.1
30-Jan-17 21:00	2.7	42.8	9.5	-9.4	94.0	0.0	80.7	1376.0
30-Jan-17 22:00	4.1	23.6	11.0	-9.5	94.0	0.0	80.9	1376.5
30-Jan-17 23:00	3.4	11.6	9.2	-9.6	93.9	0.0	81.1	1376.1
31-Jan-17 0:00	3.1	15.3	7.1	-9.8	93.8	0.0	80.3	1376.1
31-Jan-17 1:00	3.0	16.1	5.8	-10.2	93.3	0.0	80.4	1376.0
31-Jan-17 2:00	1.8	342.6	23.9	-10.4	93.0	0.0	81.0	1376.1
31-Jan-17 3:00	0.4	0.1	25.4	-11.0	92.1	0.0	80.8	1376.0
31-Jan-17 4:00	0.8	245.2	12.8	-11.2	92.1	0.0	80.6	1376.0
31-Jan-17 5:00	1.1	260.3	8.5	-11.3	92.0	0.0	80.4	1376.0
31-Jan-17 6:00	0.9	233.8	48.7	-11.6	91.5	0.0	79.4	1376.1
31-Jan-17 7:00	1.2	200.5	14.5	-11.6	91.7	0.0	79.9	1376.1
31-Jan-17 8:00	0.9	239.3	38.3	-12.0	91.2	0.0	79.3	1375.9
31-Jan-17 9:00	1.2	54.1	16.7	-13.0	90.3	3.1	80.0	1375.9
31-Jan-17 10:00	0.2	239.0	3.5	-12.8	90.4	16.0	80.0	1375.8
31-Jan-17 11:00	1.0	210.1	14.6	-11.1	91.8	181.1	77.9	1378.6
31-Jan-17 12:00	1.1	205.6	22.1	-8.3	92.7	336.3	78.3	1379.1
31-Jan-17 13:00	0.5	217.7	11.0	-6.7	93.8	382.4	77.6	1378.3
31-Jan-17 14:00	0.6	267.8	14.2	-4.9	94.9	455.7	74.9	1377.8
31-Jan-17 15:00	1.1	206.2	25.4	-6.2	93.6	385.3	77.8	1376.9
31-Jan-17 16:00	0.8	201.3	14.1	-8.1	93.4	229.9	78.4	1376.5
31-Jan-17 17:00	1.7	15.4	24.3	-11.4	90.5	46.5	79.7	1376.6
31-Jan-17 18:00	0.9	269.9	24.8	-13.0	90.4	2.4	80.0	1376.5
31-Jan-17 19:00	0.7	198.0	38.2	-12.6	90.7	0.0	79.9	1376.4
31-Jan-17 20:00	0.7	192.7	29.4	-12.7	90.4	0.0	79.9	1376.3
31-Jan-17 21:00	1.9	184.1	13.7	-12.8	90.5	0.0	78.9	1376.3
31-Jan-17 22:00	1.9	207.8	7.7	-13.0	90.3	0.0	78.5	1376.4
31-Jan-17 23:00	1.4	197.9	8.5	-13.0	90.2	0.0	79.2	1376.4
01-Feb-17 0:00	2.2	194.7	8.5	-13.2	90.1	0.0	79.4	1376.4
01-Feb-17 1:00	2.2	205.0	12.1	-13.2	90.0	0.0	79.5	1376.4
01-Feb-17 2:00	2.4	200.9	14.0	-13.4	89.9	0.0	79.2	1376.4
01-Feb-17 3:00	2.0	199.1	13.3	-13.6	89.7	0.0	79.1	1376.3
01-Feb-17 4:00	1.9	211.0	12.5	-13.7	89.7	0.0	79.3	1376.3
01-Feb-17 5:00	2.3	196.1	18.3	-13.6	89.5	0.0	78.7	1376.2

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
01-Feb-17 6:00	2.3	199.2	14.3	-14.1	89.1	0.0	79.6	1376.3
01-Feb-17 7:00	2.0	191.6	14.4	-13.8	89.4	0.0	78.8	1376.3
01-Feb-17 8:00	2.0	195.5	16.5	-14.0	89.1	0.0	79.2	1376.4
01-Feb-17 9:00	2.0	207.1	22.8	-14.1	89.1	3.1	79.2	1376.4
01-Feb-17 10:00	2.1	216.1	11.2	-14.0	88.1	18.4	79.4	1376.4
01-Feb-17 11:00	1.9	204.8	26.4	-12.9	70.3	149.4	78.8	690.7
01-Feb-17 12:00	1.6	206.5	23.9	-11.3	61.3	279.4	78.9	690.6
01-Feb-17 13:00	1.7	209.7	16.7	-11.1	64.0	313.5	78.9	690.2
01-Feb-17 14:00	1.2	238.3	33.9	-10.4	64.0	299.1	78.8	690.0
01-Feb-17 15:00	1.4	229.9	26.8	-10.6	70.6	245.1	78.5	689.8
01-Feb-17 16:00	1.2	34.8	56.2	-10.2	64.9	126.1	78.8	689.5
01-Feb-17 17:00	1.5	206.8	20.7	-11.4	74.5	64.7	79.2	689.5
01-Feb-17 18:00	1.7	187.8	24.8	-11.8	74.9	4.9	79.1	689.6
01-Feb-17 19:00	1.4	194.2	42.7	-11.6	71.7	0.0	79.2	689.6
01-Feb-17 20:00	1.1	282.3	77.6	-11.0	65.9	0.0	78.6	689.5
01-Feb-17 21:00	2.2	42.1	50.4	-11.0	65.0	0.0	79.0	689.5
01-Feb-17 22:00	5.4	30.6	12.1	-10.9	64.8	0.0	78.6	689.6
01-Feb-17 23:00	8.1	17.8	6.1	-10.0	60.9	0.0	78.9	689.7
02-Feb-17 0:00	6.3	31.5	11.2	-10.7	64.7	0.0	79.2	689.5
02-Feb-17 1:00	3.8	30.3	18.1	-9.7	59.3	0.0	78.3	689.4
02-Feb-17 2:00	3.9	62.6	21.0	-9.7	59.1	0.0	79.1	689.5
02-Feb-17 3:00	8.4	30.7	15.5	-10.2	61.3	0.0	77.9	689.4
02-Feb-17 4:00	10.7	20.8	4.7	-9.9	59.4	0.0	77.6	689.1
02-Feb-17 5:00	11.2	25.1	3.6	-10.6	63.2	0.0	77.5	689.4
02-Feb-17 6:00	11.4	30.1	4.8	-9.9	58.6	0.0	77.8	689.6
02-Feb-17 7:00	10.4	33.4	4.3	-10.1	59.9	0.0	77.8	689.3
02-Feb-17 8:00	12.6	34.2	4.9	-9.7	58.1	0.0	77.9	689.1
02-Feb-17 9:00	12.1	31.4	4.8	-9.4	56.3	2.9	77.7	689.3
02-Feb-17 10:00	12.3	33.0	4.2	-10.0	60.1	37.7	78.3	689.6
02-Feb-17 11:00	13.1	34.1	3.4	-9.3	57.0	118.3	77.8	689.9
02-Feb-17 12:00	12.9	37.0	4.9	-9.1	56.7	244.6	77.9	-
02-Feb-17 13:00	13.7	37.8	5.5	-8.4	55.9	318.0	78.1	-
02-Feb-17 14:00	13.3	37.7	7.0	-8.2	55.8	317.6	77.7	688.6
02-Feb-17 15:00	12.2	35.6	6.4	-8.3	57.1	271.0	77.7	689.8
02-Feb-17 16:00	14.8	36.1	5.1	-8.1	55.8	189.0	78.5	689.5
02-Feb-17 17:00	15.2	40.7	6.3	-8.5	57.5	88.5	76.9	688.9
02-Feb-17 18:00	16.3	39.8	7.1	-9.3	62.5	5.2	77.2	689.4
02-Feb-17 19:00	15.5	36.7	5.7	-9.4	61.3	0.0	77.7	688.1
02-Feb-17 20:00	15.4	46.7	8.2	-9.2	54.5	0.0	79.9	689.1
02-Feb-17 21:00	14.4	37.8	8.3	-10.3	60.2	0.0	77.4	688.6
02-Feb-17 22:00	16.3	42.0	10.1	-10.7	62.0	0.0	77.0	689.7
02-Feb-17 23:00	16.5	45.8	8.0	-11.3	64.3	0.0	80.2	688.5
03-Feb-17 0:00	17.5	33.3	7.4	-11.9	68.4	0.0	81.7	689.3
03-Feb-17 1:00	19.0	29.8	6.1	-12.6	71.0	0.0	77.2	688.9
03-Feb-17 2:00	16.8	25.9	7.4	-13.1	65.6	0.0	73.9	688.9
03-Feb-17 3:00	15.0	26.0	8.3	-13.5	64.6	0.0	72.0	689.3
03-Feb-17 4:00	16.7	29.7	7.9	-13.9	65.6	0.0	69.4	689.0
03-Feb-17 5:00	15.8	41.3	10.1	-14.3	67.1	0.0	56.7	688.3
03-Feb-17 6:00	14.7	53.9	10.4	-14.5	64.6	0.0	65.6	689.1
03-Feb-17 7:00	15.0	52.3	8.5	-14.6	63.1	0.0	-	688.8
03-Feb-17 8:00	18.4	51.6	7.6	-14.2	59.7	0.0	-	690.4
03-Feb-17 9:00	16.9	50.7	6.9	-14.2	57.2	3.1	63.5	689.5
03-Feb-17 10:00	14.1	53.6	8.2	-14.3	55.4	16.0	63.7	689.0
03-Feb-17 11:00	15.1	52.5	8.5	-14.2	53.6	38.4	63.5	688.6



Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
03-Feb-17 12:00	19.6	59.4	7.5	-13.9	54.7	61.0	-	689.5
03-Feb-17 13:00	20.8	54.0	5.7	-13.6	51.9	163.6	60.8	688.3
03-Feb-17 14:00	21.7	55.7	6.2	-13.1	48.3	270.4	-	678.1
03-Feb-17 15:00	22.4	54.8	6.1	-12.6	47.6	260.7	-	689.1
03-Feb-17 16:00	22.3	53.1	6.7	-12.3	48.5	183.4	62.1	682.7
03-Feb-17 17:00	21.1	51.3	7.1	-12.2	48.2	90.2	64.4	688.4
03-Feb-17 18:00	20.1	52.5	7.5	-12.3	48.7	5.3	-	688.3
03-Feb-17 19:00	18.5	55.5	8.5	-12.3	48.1	0.0	65.3	688.7
03-Feb-17 20:00	16.8	59.0	11.2	-12.2	47.3	0.0	65.6	688.0
03-Feb-17 21:00	20.0	51.0	7.5	-12.1	47.0	0.0	-	687.9
03-Feb-17 22:00	21.8	51.2	7.7	-12.2	50.5	0.0	64.4	688.0
03-Feb-17 23:00	23.0	50.0	7.0	-12.0	50.2	0.0	64.8	688.2
04-Feb-17 0:00	22.1	53.5	10.2	-12.1	50.4	0.0	61.5	689.3
04-Feb-17 1:00	21.2	69.1	13.8	-12.2	51.0	0.0	60.0	688.5
04-Feb-17 2:00	18.2	59.1	12.3	-12.0	45.8	0.0	62.1	687.2
04-Feb-17 3:00	16.9	54.2	10.2	-12.1	44.2	0.0	60.8	688.2
04-Feb-17 4:00	16.0	51.8	10.1	-12.3	45.6	0.0	61.1	688.2
04-Feb-17 5:00	18.6	51.6	7.2	-12.5	46.9	0.0	60.9	688.0
04-Feb-17 6:00	21.0	61.7	8.5	-12.5	48.8	0.0	60.9	688.0
04-Feb-17 7:00	26.0	65.3	7.7	-12.3	56.1	0.0	61.0	688.8
04-Feb-17 8:00	25.9	63.4	7.9	-11.6	53.5	0.0	60.9	690.1
04-Feb-17 9:00	25.2	62.5	8.2	-10.7	51.3	4.2	61.7	687.6
04-Feb-17 10:00	23.4	61.8	9.2	-9.9	48.1	17.6	59.3	688.5
04-Feb-17 11:00	17.8	70.5	20.7	-8.8	40.9	135.9	61.0	687.0
04-Feb-17 12:00	13.1	69.2	29.5	-8.3	42.3	262.5	61.1	688.1
04-Feb-17 13:00	10.9	51.6	40.2	-8.3	44.4	327.0	60.8	688.5
04-Feb-17 14:00	15.7	44.3	12.0	-8.6	48.8	216.7	59.5	687.1
04-Feb-17 15:00	17.0	47.4	5.3	-8.6	51.5	119.5	61.2	686.9
04-Feb-17 16:00	16.1	53.0	6.1	-8.8	52.5	107.7	59.9	687.4
04-Feb-17 17:00	16.7	57.8	6.4	-8.9	54.4	81.4	60.6	687.4
04-Feb-17 18:00	17.2	59.7	5.9	-9.2	55.7	7.1	59.3	687.9
04-Feb-17 19:00	15.2	52.7	4.9	-9.3	55.6	0.0	59.9	687.4
04-Feb-17 20:00	12.0	33.1	9.2	-9.5	55.7	0.0	61.9	686.6
04-Feb-17 21:00	10.9	17.9	7.8	-9.7	56.2	0.0	61.3	687.2
04-Feb-17 22:00	11.8	38.0	9.7	-9.3	53.4	0.0	59.9	687.3
04-Feb-17 23:00	15.1	51.3	6.0	-8.4	47.5	0.0	59.5	687.3
05-Feb-17 0:00	13.8	45.1	6.8	-8.6	47.0	0.0	59.3	687.6
05-Feb-17 1:00	15.0	36.2	8.0	-8.9	51.4	0.0	58.8	686.5
05-Feb-17 2:00	15.8	45.8	8.9	-9.0	51.8	0.0	59.3	686.8
05-Feb-17 3:00	13.1	56.4	11.6	-8.7	46.2	0.0	59.3	687.2
05-Feb-17 4:00	14.2	52.4	10.1	-9.1	47.0	0.0	59.8	688.3
05-Feb-17 5:00	17.3	61.7	7.7	-9.5	48.6	0.0	60.3	687.4
05-Feb-17 6:00	18.9	57.9	6.7	-9.8	49.1	0.0	59.5	688.7
05-Feb-17 7:00	17.3	57.7	7.0	-10.1	48.9	0.0	60.7	685.8
05-Feb-17 8:00	17.2	59.9	6.8	-10.2	47.9	0.0	59.1	685.6
05-Feb-17 9:00	15.2	58.1	8.2	-10.4	47.6	4.5	59.8	687.1
05-Feb-17 10:00	16.1	60.5	8.9	-10.5	47.4	18.1	58.8	687.9
05-Feb-17 11:00	15.6	60.6	9.8	-10.1	44.3	88.0	58.9	687.1
05-Feb-17 12:00	15.7	61.5	9.3	-9.7	42.2	274.7	59.0	687.5
05-Feb-17 13:00	16.4	57.0	8.1	-9.6	41.9	335.8	58.9	688.2
05-Feb-17 14:00	14.5	58.2	10.5	-9.4	41.3	336.2	58.8	687.5
05-Feb-17 15:00	14.4	54.7	11.1	-9.3	42.1	261.2	60.0	686.8
05-Feb-17 16:00	14.1	58.2	16.6	-9.2	41.2	180.3	59.1	687.4
05-Feb-17 17:00	13.8	53.1	10.0	-9.3	42.4	99.7	59.2	688.0

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
05-Feb-17 18:00	13.8	55.4	9.0	-9.6	44.3	8.9	58.9	688.3
05-Feb-17 19:00	14.1	55.8	9.1	-9.6	44.0	0.0	60.2	686.6
05-Feb-17 20:00	12.9	61.6	11.7	-9.7	44.0	0.0	59.0	687.6
05-Feb-17 21:00	13.6	62.7	10.8	-9.8	43.9	0.0	59.0	687.2
05-Feb-17 22:00	15.1	59.9	7.7	-9.9	44.1	0.0	58.4	686.3
05-Feb-17 23:00	14.1	57.3	8.6	-9.9	43.8	0.0	59.1	688.7
06-Feb-17 0:00	14.6	54.6	7.4	-9.9	43.9	0.0	58.5	687.0
06-Feb-17 1:00	15.3	61.2	8.4	-9.9	44.6	0.0	58.9	687.1
06-Feb-17 2:00	12.2	59.8	12.8	-9.9	43.1	0.0	59.1	687.4
06-Feb-17 3:00	10.9	52.7	15.0	-9.9	41.3	0.0	58.9	686.9
06-Feb-17 4:00	8.5	51.7	20.5	-10.3	42.7	0.0	58.8	687.2
06-Feb-17 5:00	13.7	63.7	15.7	-10.0	41.0	0.0	57.9	687.5
06-Feb-17 6:00	17.8	57.2	10.1	-10.2	43.1	0.0	58.4	687.9
06-Feb-17 7:00	16.6	64.4	9.7	-10.4	42.9	0.0	58.6	687.0
06-Feb-17 8:00	14.8	63.8	11.7	-10.8	44.8	0.0	58.4	687.6
06-Feb-17 9:00	16.4	60.8	9.6	-11.2	46.2	5.8	58.2	687.3
06-Feb-17 10:00	13.4	57.6	11.9	-11.4	44.0	23.6	59.0	686.9
06-Feb-17 11:00	9.8	47.2	9.8	-11.6	44.5	154.3	59.0	688.1
06-Feb-17 12:00	10.3	48.5	9.9	-11.9	46.6	134.8	59.2	687.8
06-Feb-17 13:00	14.5	52.1	6.3	-11.6	44.0	217.0	58.8	687.3
06-Feb-17 14:00	13.5	50.4	6.5	-11.7	44.7	184.1	59.2	687.8
06-Feb-17 15:00	14.9	55.1	8.1	-11.8	43.8	169.9	58.8	687.2
06-Feb-17 16:00	16.4	51.3	7.3	-12.0	43.8	145.4	58.8	687.6
06-Feb-17 17:00	16.7	50.2	5.9	-12.4	44.3	66.8	59.1	687.1
06-Feb-17 18:00	16.5	51.7	9.0	-12.9	45.0	6.3	57.7	687.3
06-Feb-17 19:00	18.8	53.0	9.3	-13.5	47.4	0.0	59.0	688.9
06-Feb-17 20:00	15.7	58.7	12.0	-13.9	47.1	0.0	58.1	687.6
06-Feb-17 21:00	17.3	58.9	10.7	-14.3	47.5	0.0	57.4	687.6
06-Feb-17 22:00	19.5	60.5	10.4	-14.8	47.7	0.0	59.0	686.8
06-Feb-17 23:00	17.9	61.9	9.4	-15.1	46.5	0.0	-	687.3
07-Feb-17 0:00	15.7	75.6	12.0	-15.5	43.9	0.0	58.7	687.4
07-Feb-17 1:00	20.9	68.8	9.6	-15.6	44.2	0.0	56.2	683.7
07-Feb-17 2:00	23.5	61.6	7.0	-16.1	46.5	0.0	-	689.0
07-Feb-17 3:00	21.8	63.7	6.7	-16.1	45.3	0.0	57.2	686.9
07-Feb-17 4:00	17.3	65.4	6.7	-16.4	43.9	0.0	58.1	688.3
07-Feb-17 5:00	18.1	54.4	5.0	-16.4	42.5	0.0	58.3	686.6
07-Feb-17 6:00	18.8	65.1	5.1	-16.5	41.9	0.0	57.7	687.3
07-Feb-17 7:00	17.9	58.3	5.4	-16.3	40.5	0.0	58.1	687.9
07-Feb-17 8:00	18.2	50.5	3.7	-16.3	41.1	0.0	57.8	688.5
07-Feb-17 9:00	18.3	65.8	10.9	-15.5	38.7	5.3	56.8	687.5
07-Feb-17 10:00	20.5	78.9	8.0	-15.4	42.0	16.5	57.0	686.9
07-Feb-17 11:00	14.5	85.4	20.1	-15.5	44.0	187.7	58.3	688.6
07-Feb-17 12:00	6.9	82.1	45.0	-15.0	39.4	304.4	58.5	687.9
07-Feb-17 13:00	3.9	91.2	62.8	-14.2	37.2	350.6	57.8	688.1
07-Feb-17 14:00	9.3	46.8	14.7	-14.2	35.0	350.1	58.3	687.7
07-Feb-17 15:00	12.7	44.7	9.9	-14.1	34.4	301.0	58.4	687.0
07-Feb-17 16:00	15.1	51.0	12.6	-13.8	33.2	214.8	57.6	687.3
07-Feb-17 17:00	12.6	52.7	16.8	-13.9	33.5	110.2	57.9	687.1
07-Feb-17 18:00	11.6	55.3	31.9	-14.3	35.4	12.0	59.8	687.2
07-Feb-17 19:00	4.1	104.9	46.0	-14.7	36.1	0.0	58.4	687.2
07-Feb-17 20:00	5.4	97.6	54.7	-15.1	38.2	0.0	58.5	687.1
07-Feb-17 21:00	2.0	183.4	74.3	-15.1	37.9	0.0	58.5	687.2
07-Feb-17 22:00	2.0	248.3	56.4	-15.1	36.7	0.0	56.9	687.2
07-Feb-17 23:00	2.3	79.6	60.4	-15.1	35.1	0.0	57.8	687.0

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
08-Feb-17 0:00	5.7	45.7	37.3	-15.4	36.0	0.0	58.2	687.2
08-Feb-17 1:00	2.2	74.9	31.3	-15.8	37.1	0.0	58.3	687.2
08-Feb-17 2:00	1.9	115.5	39.7	-15.6	36.8	0.0	57.8	687.2
08-Feb-17 3:00	1.4	171.0	41.9	-16.2	40.7	0.0	58.3	687.2
08-Feb-17 4:00	2.0	200.4	28.0	-16.3	41.0	0.0	58.4	687.3
08-Feb-17 5:00	2.1	178.5	10.8	-17.1	45.2	0.0	58.3	687.3
08-Feb-17 6:00	2.3	180.0	12.6	-16.9	42.9	0.0	58.5	687.3
08-Feb-17 7:00	2.5	192.9	8.9	-17.3	45.4	0.0	58.5	687.3
08-Feb-17 8:00	2.1	189.4	4.8	-17.2	44.1	0.0	58.3	687.3
08-Feb-17 9:00	1.5	169.7	7.8	-16.6	39.9	5.6	58.0	687.3
08-Feb-17 10:00	2.5	180.1	9.0	-17.3	44.1	16.4	57.9	687.3
08-Feb-17 11:00	1.5	199.8	12.4	-15.8	38.3	198.6	57.7	688.3
08-Feb-17 12:00	1.7	176.5	8.8	-14.9	35.4	309.0	58.3	688.2
08-Feb-17 13:00	1.2	189.2	12.8	-14.6	39.3	355.7	57.9	688.0
08-Feb-17 14:00	1.3	196.1	8.1	-14.3	43.0	355.2	57.8	687.7
08-Feb-17 15:00	1.2	189.9	15.7	-14.0	43.0	306.3	57.4	687.6
08-Feb-17 16:00	0.5	293.5	5.8	-13.4	40.5	220.4	57.8	687.3
08-Feb-17 17:00	0.7	185.4	18.7	-14.2	46.5	114.6	58.1	687.2
08-Feb-17 18:00	1.0	195.8	9.3	-15.6	49.7	13.4	58.4	687.3
08-Feb-17 19:00	1.2	180.8	10.9	-15.8	48.5	0.0	58.4	687.3
08-Feb-17 20:00	1.6	198.9	12.4	-15.7	50.6	0.0	58.4	687.3
08-Feb-17 21:00	1.0	147.7	40.1	-15.7	47.7	0.0	58.4	687.3
08-Feb-17 22:00	1.3	217.0	38.0	-15.4	46.5	0.0	58.0	687.3
08-Feb-17 23:00	1.2	180.2	15.9	-16.1	49.0	0.0	58.3	687.3
09-Feb-17 0:00	2.2	197.7	46.5	-16.4	48.4	0.0	58.3	687.3
09-Feb-17 1:00	2.4	176.7	12.2	-17.5	54.4	0.0	58.4	687.3
09-Feb-17 2:00	1.9	193.3	10.8	-17.5	53.6	0.0	58.3	687.3
09-Feb-17 3:00	1.8	148.4	36.7	-17.1	50.5	0.0	58.4	687.3
09-Feb-17 4:00	1.6	222.1	29.9	-17.0	50.1	0.0	58.3	687.3
09-Feb-17 5:00	1.9	178.2	41.2	-18.0	55.9	0.0	58.1	687.3
09-Feb-17 6:00	2.3	190.7	22.5	-18.3	56.0	0.0	58.7	687.3
09-Feb-17 7:00	2.4	177.9	10.3	-18.6	57.3	0.0	58.2	687.3
09-Feb-17 8:00	3.2	189.9	6.4	-18.6	57.2	0.0	58.1	687.3
09-Feb-17 9:00	2.1	188.8	8.9	-18.5	56.3	5.6	58.1	687.4
09-Feb-17 10:00	2.4	185.2	9.7	-18.6	57.0	16.7	58.0	687.3
09-Feb-17 11:00	2.3	189.3	7.8	-17.5	52.4	210.6	58.1	688.3
09-Feb-17 12:00	2.4	194.2	10.1	-16.6	49.2	317.6	57.9	688.2
09-Feb-17 13:00	2.0	209.2	14.3	-15.9	49.4	365.3	58.2	688.0
09-Feb-17 14:00	1.6	196.2	9.2	-14.9	49.6	365.3	57.9	687.8
09-Feb-17 15:00	1.3	184.6	15.9	-14.2	51.5	316.3	57.8	687.6
09-Feb-17 16:00	1.4	178.2	14.5	-13.6	48.4	228.4	58.1	687.3
09-Feb-17 17:00	1.0	168.0	18.4	-13.1	43.6	120.5	58.3	687.3
09-Feb-17 18:00	0.8	186.7	14.6	-13.7	48.3	15.1	58.5	687.3
09-Feb-17 19:00	1.0	168.3	34.0	-13.8	44.2	0.0	57.9	687.3
09-Feb-17 20:00	0.3	302.3	19.1	-12.8	37.7	0.0	58.7	687.3
09-Feb-17 21:00	1.0	207.4	15.9	-13.4	42.3	0.0	58.2	687.3
09-Feb-17 22:00	1.4	184.7	18.1	-13.1	39.0	0.0	57.9	687.3
09-Feb-17 23:00	0.9	151.3	12.8	-12.0	35.0	0.0	58.8	687.3
10-Feb-17 0:00	1.6	186.7	16.3	-12.3	35.3	0.0	58.7	687.3
10-Feb-17 1:00	3.8	182.6	6.9	-11.3	34.2	0.0	58.0	687.3
10-Feb-17 2:00	4.5	182.0	6.4	-10.8	36.0	0.0	58.3	687.3
10-Feb-17 3:00	4.5	185.2	6.5	-10.8	39.4	0.0	58.3	687.3
10-Feb-17 4:00	5.0	193.8	11.8	-11.3	43.4	0.0	58.2	687.3
10-Feb-17 5:00	4.5	207.5	19.7	-10.8	46.0	0.0	58.6	687.2

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
10-Feb-17 6:00	4.2	185.1	19.1	-10.5	50.6	0.0	58.6	687.2
10-Feb-17 7:00	2.2	99.2	25.0	-10.7	52.8	0.0	58.5	687.2
10-Feb-17 8:00	1.6	172.9	21.0	-11.1	61.0	0.0	58.7	687.2
10-Feb-17 9:00	1.5	156.3	21.8	-11.3	72.5	8.2	58.4	687.2
10-Feb-17 10:00	1.0	292.4	47.1	-11.1	86.5	39.5	58.1	687.6
10-Feb-17 11:00	1.8	204.6	42.6	-10.7	90.6	71.5	-	688.5
10-Feb-17 12:00	5.1	193.7	10.5	-10.1	92.0	118.1	59.1	688.7
10-Feb-17 13:00	5.2	200.6	7.8	-9.6	92.3	119.9	61.7	688.7
10-Feb-17 14:00	4.3	214.5	14.2	-9.2	92.1	175.0	61.5	688.7
10-Feb-17 15:00	4.5	204.3	8.4	-9.2	92.8	118.4	62.2	688.8
10-Feb-17 16:00	4.5	208.6	7.2	-9.0	93.3	78.4	63.8	688.9
10-Feb-17 17:00	4.9	203.8	8.2	-8.8	93.8	42.3	63.8	688.9
10-Feb-17 18:00	5.1	205.6	9.2	-8.6	94.4	5.4	63.5	689.1
10-Feb-17 19:00	5.1	207.7	8.3	-8.4	94.5	0.0	64.3	689.0
10-Feb-17 20:00	5.2	208.1	10.1	-8.1	94.8	0.0	64.3	689.0
10-Feb-17 21:00	5.0	210.2	11.0	-8.0	94.9	0.0	62.7	688.9
10-Feb-17 22:00	5.1	216.0	12.1	-7.6	95.1	0.0	63.8	689.0
10-Feb-17 23:00	4.2	223.8	9.6	-7.4	95.3	0.0	63.9	689.0
11-Feb-17 0:00	5.3	213.3	12.1	-7.4	95.3	0.0	64.7	689.2
11-Feb-17 1:00	5.5	208.0	8.9	-7.2	95.5	0.0	64.3	689.2
11-Feb-17 2:00	5.4	214.9	9.6	-7.0	95.6	0.0	61.0	689.4
11-Feb-17 3:00	6.1	216.8	11.3	-6.8	95.8	0.0	60.7	689.2
11-Feb-17 4:00	5.6	220.6	7.4	-6.5	96.0	0.0	67.3	689.2
11-Feb-17 5:00	5.9	218.9	9.6	-6.3	96.1	0.0	66.8	689.3
11-Feb-17 6:00	5.5	206.8	9.8	-6.0	96.3	0.0	-	689.3
11-Feb-17 7:00	5.9	201.2	9.6	-5.6	96.6	0.0	62.9	689.3
11-Feb-17 8:00	5.8	200.4	9.9	-5.4	96.7	0.0	-	689.5
11-Feb-17 9:00	6.2	197.8	8.5	-5.2	96.8	5.8	65.0	689.5
11-Feb-17 10:00	5.9	195.9	10.4	-4.7	97.1	36.3	-	689.6
11-Feb-17 11:00	5.8	210.6	11.3	-4.3	97.3	74.0	65.0	689.8
11-Feb-17 12:00	5.5	205.4	11.6	-3.9	97.5	90.0	64.9	689.7
11-Feb-17 13:00	6.4	208.1	11.7	-3.3	97.8	112.9	65.0	690.6
11-Feb-17 14:00	7.2	200.1	10.2	-2.9	98.0	95.4	64.1	690.2
11-Feb-17 15:00	9.0	190.7	10.2	-3.0	98.1	71.1	64.0	690.6
11-Feb-17 16:00	8.9	186.9	8.7	-3.0	98.2	44.0	64.3	690.2
11-Feb-17 17:00	9.4	184.3	10.2	-2.9	98.3	13.7	64.9	691.8
11-Feb-17 18:00	10.5	179.2	12.5	-2.6	98.5	1.9	65.0	690.4
11-Feb-17 19:00	9.4	185.8	13.8	-2.4	98.6	0.0	65.3	691.0
11-Feb-17 20:00	9.3	189.2	14.3	-2.2	98.7	0.0	64.1	691.6
11-Feb-17 21:00	9.4	190.7	14.4	-2.1	98.8	0.0	64.3	690.9
11-Feb-17 22:00	9.6	193.6	14.1	-2.0	98.8	0.0	64.2	691.6
11-Feb-17 23:00	9.9	196.0	14.1	-1.9	98.9	0.0	65.1	691.6
12-Feb-17 0:00	7.5	201.8	13.9	-1.9	98.9	0.0	65.1	691.4
12-Feb-17 1:00	6.8	203.4	17.2	-1.8	99.0	0.0	65.3	691.8
12-Feb-17 2:00	9.5	193.0	14.7	-1.6	99.1	0.0	65.1	693.3
12-Feb-17 3:00	10.7	190.0	13.8	-1.5	99.1	0.0	64.9	692.7
12-Feb-17 4:00	10.5	190.4	12.7	-1.6	99.2	0.0	64.6	693.0
12-Feb-17 5:00	7.9	196.6	16.0	-1.7	99.1	0.0	63.6	691.9
12-Feb-17 6:00	6.7	201.6	14.1	-1.7	99.1	0.0	62.9	692.4
12-Feb-17 7:00	6.8	208.9	12.9	-1.8	99.0	0.0	63.6	692.6
12-Feb-17 8:00	6.1	207.7	11.1	-1.6	99.1	0.0	65.0	692.9
12-Feb-17 9:00	1.5	208.0	6.0	-1.4	99.2	2.7	65.8	693.0
12-Feb-17 10:00	-	-	-	-1.2	99.2	8.7	68.8	693.9
12-Feb-17 11:00	-	-	-	-1.2	99.3	28.7	73.9	695.5

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
12-Feb-17 12:00	-	-	-	-1.7	99.1	41.1	80.3	697.8
12-Feb-17 13:00	-	-	-	-1.9	99.0	49.8	84.7	699.2
12-Feb-17 14:00	-	-	-	-1.5	99.1	53.2	83.0	699.5
12-Feb-17 15:00	-	-	-	-1.5	99.2	41.7	79.6	700.0
12-Feb-17 16:00	-	-	-	-1.3	99.2	41.6	79.5	700.1
12-Feb-17 17:00	-	-	-	-1.3	99.3	23.9	77.0	700.2
12-Feb-17 18:00	-	-	-	-1.4	99.3	3.8	76.4	700.6
12-Feb-17 19:00	-	-	-	-1.5	99.2	0.0	77.0	700.8
12-Feb-17 20:00	-	-	-	-1.4	99.3	0.0	76.9	701.1
12-Feb-17 21:00	-	-	-	-1.2	99.3	0.0	75.1	701.5
12-Feb-17 22:00	-	-	-	-1.3	99.3	0.0	80.0	703.4
12-Feb-17 23:00	-	-	-	-1.1	99.3	0.0	80.2	705.1
13-Feb-17 0:00	-	-	-	-0.8	99.3	0.0	78.2	705.1
13-Feb-17 1:00	-	-	-	-0.7	99.3	0.0	77.1	705.3
13-Feb-17 2:00	-	-	-	-0.5	99.3	0.0	78.6	705.5
13-Feb-17 3:00	-	-	-	-0.5	99.3	0.0	78.7	707.1
13-Feb-17 4:00	-	-	-	-0.5	99.3	0.0	78.7	708.4
13-Feb-17 5:00	-	-	-	-0.4	99.3	0.0	78.1	708.6
13-Feb-17 6:00	-	-	-	-0.2	99.3	0.0	78.1	708.7
13-Feb-17 7:00	-	-	-	-0.1	99.3	0.0	80.7	709.1
13-Feb-17 8:00	-	-	-	-0.1	99.3	0.0	76.2	709.3
13-Feb-17 9:00	-	-	-	0.0	99.3	5.5	78.3	709.3
13-Feb-17 10:00	-	-	-	0.0	99.3	31.3	78.1	713.3
13-Feb-17 11:00	-	-	-	0.1	99.3	69.9	74.9	722.1
13-Feb-17 12:00	1.1	207.7	4.5	1.1	99.3	86.6	76.8	723.7
13-Feb-17 13:00	7.2	205.6	9.9	1.1	99.3	85.7	78.7	723.9
13-Feb-17 14:00	6.4	205.1	13.1	1.3	99.3	89.4	75.7	723.7
13-Feb-17 15:00	7.9	192.1	9.7	1.7	99.3	74.0	77.9	723.8
13-Feb-17 16:00	5.9	218.8	13.8	1.8	99.3	77.2	76.4	723.8
13-Feb-17 17:00	6.0	219.6	12.2	2.0	99.3	51.6	77.5	724.2
13-Feb-17 18:00	6.9	209.7	11.1	2.3	98.4	7.9	78.0	724.2
13-Feb-17 19:00	6.9	198.1	9.7	3.1	87.0	0.0	78.4	724.0
13-Feb-17 20:00	4.7	198.8	10.6	3.2	78.5	0.0	78.4	724.1
13-Feb-17 21:00	4.4	201.2	12.8	3.6	63.8	0.0	78.2	724.0
13-Feb-17 22:00	3.3	219.1	32.0	3.6	55.1	0.0	78.0	723.6
13-Feb-17 23:00	3.7	232.1	37.3	3.9	50.1	0.0	78.0	723.8
14-Feb-17 0:00	6.8	182.1	16.4	4.8	38.9	0.0	78.0	723.8
14-Feb-17 1:00	6.7	181.7	18.5	5.0	36.6	0.0	78.4	723.6
14-Feb-17 2:00	7.2	177.3	15.3	5.4	36.1	0.0	77.8	723.8
14-Feb-17 3:00	7.0	181.5	21.0	5.3	37.3	0.0	77.7	723.9
14-Feb-17 4:00	4.5	200.4	27.8	5.2	40.0	0.0	78.0	723.4
14-Feb-17 5:00	6.4	187.6	19.6	5.2	45.5	0.0	78.0	722.7
14-Feb-17 6:00	9.3	171.6	18.6	4.4	56.5	0.0	78.0	723.2
14-Feb-17 7:00	7.6	170.9	20.6	4.2	59.3	0.0	77.0	723.3
14-Feb-17 8:00	6.1	183.2	10.4	2.1	80.9	0.0	76.8	723.3
14-Feb-17 9:00	4.3	183.9	26.8	1.7	87.0	7.0	76.8	723.3
14-Feb-17 10:00	4.4	214.2	23.0	1.4	93.8	59.4	77.1	723.4
14-Feb-17 11:00	5.9	199.3	12.5	1.3	95.6	42.8	77.1	723.7
14-Feb-17 12:00	5.2	212.7	14.6	0.8	98.7	84.0	76.4	724.0
14-Feb-17 13:00	6.5	212.1	9.8	0.9	98.3	100.4	76.3	724.2
14-Feb-17 14:00	4.5	218.3	13.3	0.9	97.9	111.8	76.5	724.3
14-Feb-17 15:00	3.6	219.2	16.3	1.3	95.5	99.2	76.4	724.2
14-Feb-17 16:00	2.6	197.8	25.9	1.5	92.9	41.9	76.7	724.3
14-Feb-17 17:00	2.8	184.2	26.8	0.7	97.8	19.4	77.8	725.4

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
14-Feb-17 18:00	1.8	338.6	43.9	0.3	98.8	3.0	77.5	726.1
14-Feb-17 19:00	1.5	311.3	47.4	0.4	98.3	0.0	77.1	726.6
14-Feb-17 20:00	1.1	251.0	46.4	0.4	98.7	0.0	77.5	727.1
14-Feb-17 21:00	1.8	293.0	46.5	0.4	99.0	0.0	78.2	727.9
14-Feb-17 22:00	2.3	241.6	27.2	0.5	99.3	0.0	78.2	729.0
14-Feb-17 23:00	2.3	242.4	29.6	0.6	99.3	0.0	78.3	729.7
15-Feb-17 0:00	2.5	267.3	17.2	0.7	99.3	0.0	78.0	730.0
15-Feb-17 1:00	1.7	250.1	24.4	0.8	98.5	0.0	78.3	730.5
15-Feb-17 2:00	2.0	230.6	40.9	0.9	98.0	0.0	77.9	730.9
15-Feb-17 3:00	1.1	222.2	50.5	1.0	97.1	0.0	77.9	731.2
15-Feb-17 4:00	0.8	273.2	51.8	0.9	97.3	0.0	76.3	732.2
15-Feb-17 5:00	2.2	19.6	11.3	0.2	98.7	0.0	75.0	732.6
15-Feb-17 6:00	1.6	3.7	17.3	0.2	98.8	0.0	77.2	733.1
15-Feb-17 7:00	1.2	51.7	47.7	0.1	98.9	0.0	78.5	733.7
15-Feb-17 8:00	1.2	148.0	21.9	0.1	98.8	0.0	-	734.7
15-Feb-17 9:00	1.7	235.7	24.5	-0.3	99.2	2.1	80.6	735.9
15-Feb-17 10:00	3.5	215.9	7.9	-0.4	99.3	11.7	82.0	736.4
15-Feb-17 11:00	3.9	218.8	8.6	-0.5	99.3	27.6	90.1	737.1
15-Feb-17 12:00	3.6	225.2	8.5	-0.6	99.2	40.2	87.7	737.7
15-Feb-17 13:00	1.3	217.5	7.4	-0.8	98.8	63.2	88.8	738.0
15-Feb-17 14:00	2.1	221.4	8.1	-0.8	98.5	80.2	88.6	738.2
15-Feb-17 15:00	4.2	228.3	9.6	-0.6	98.5	74.6	85.6	738.4
15-Feb-17 16:00	1.4	220.1	4.0	-0.8	98.8	53.4	-	738.6
15-Feb-17 17:00	4.9	222.8	9.6	-1.3	98.7	34.3	-	738.5
15-Feb-17 18:00	4.0	235.5	10.1	-1.7	98.9	5.7	-	738.5
15-Feb-17 19:00	2.3	287.7	13.2	-2.5	98.7	0.1	-	738.6
15-Feb-17 20:00	0.9	341.2	3.5	-3.2	98.1	0.0	-	738.6
15-Feb-17 21:00	-	-	-	-4.1	96.3	0.0	-	738.7
15-Feb-17 22:00	-	-	-	-4.0	98.1	0.0	-	738.7
15-Feb-17 23:00	-	-	-	-4.6	97.3	0.0	-	738.8
16-Feb-17 0:00	-	-	-	-4.2	96.9	0.0	-	738.7
16-Feb-17 1:00	-	-	-	-4.8	97.3	0.0	-	738.8
16-Feb-17 2:00	-	-	-	-4.7	97.1	0.0	-	738.8
16-Feb-17 3:00	-	-	-	-5.1	96.9	0.0	-	738.8
16-Feb-17 4:00	-	-	-	-4.9	97.1	0.0	-	738.9
16-Feb-17 5:00	-	-	-	-5.1	96.7	0.0	-	738.9
16-Feb-17 6:00	-	-	-	-5.4	96.7	0.0	-	738.9
16-Feb-17 7:00	-	-	-	-5.5	96.6	0.0	-	738.9
16-Feb-17 8:00	-	-	-	-5.8	96.3	0.1	-	738.9
16-Feb-17 9:00	-	-	-	-5.7	96.3	7.6	-	738.9
16-Feb-17 10:00	-	-	-	-5.2	96.2	34.0	-	738.9
16-Feb-17 11:00	-	-	-	-4.4	96.4	67.9	-	739.3
16-Feb-17 12:00	-	-	-	-3.5	96.0	84.2	-	739.0
16-Feb-17 13:00	-	-	-	-2.6	96.5	111.9	-	739.1
16-Feb-17 14:00	-	-	-	-2.2	96.6	84.9	-	738.9
16-Feb-17 15:00	-	-	-	-2.8	95.7	87.1	-	738.9
16-Feb-17 16:00	-	-	-	-3.3	95.9	63.1	-	739.2
16-Feb-17 17:00	-	-	-	-3.7	95.9	61.3	-	739.1
16-Feb-17 18:00	-	-	-	-4.6	97.0	8.1	-	739.2
16-Feb-17 19:00	-	-	-	-4.8	97.0	0.1	-	739.2
16-Feb-17 20:00	-	-	-	-5.0	96.7	0.0	-	739.3
16-Feb-17 21:00	-	-	-	-5.3	96.8	0.0	-	739.2
16-Feb-17 22:00	-	-	-	-5.4	96.7	0.0	-	739.2
16-Feb-17 23:00	-	-	-	-5.7	96.5	0.0	-	739.3

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
	Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
17-Feb-17 0:00	-	-	-	-5.9	96.4	0.0	-	739.3
17-Feb-17 1:00	-	-	-	-6.0	96.2	0.0	-	739.5
17-Feb-17 2:00	-	-	-	-6.2	95.9	0.0	-	739.6
17-Feb-17 3:00	-	-	-	-6.5	95.6	0.0	-	739.6
17-Feb-17 4:00	-	-	-	-7.0	95.1	0.0	-	739.5
17-Feb-17 5:00	-	-	-	-7.1	94.9	0.0	-	739.5
17-Feb-17 6:00	-	-	-	-7.2	94.9	0.0	-	739.6
17-Feb-17 7:00	-	-	-	-7.3	94.8	0.0	-	739.6
17-Feb-17 8:00	-	-	-	-7.3	94.8	0.3	-	739.6
17-Feb-17 9:00	-	-	-	-7.2	93.6	15.0	82.0	739.6
17-Feb-17 10:00	-	-	-	-6.8	92.7	83.2	81.1	739.5
17-Feb-17 11:00	-	-	-	-6.1	91.1	175.6	80.9	739.5
17-Feb-17 12:00	-	-	-	-5.2	90.1	285.7	79.5	739.6
17-Feb-17 13:00	-	-	-	-3.8	90.3	382.0	82.9	739.5
17-Feb-17 14:00	-	-	-	-4.7	91.2	218.0	83.3	739.5
17-Feb-17 15:00	-	-	-	-4.8	92.0	184.2	-	739.5
17-Feb-17 16:00	-	-	-	-5.0	91.6	155.1	83.3	739.4
17-Feb-17 17:00	-	-	-	-5.1	90.3	147.0	83.4	739.4
17-Feb-17 18:00	-	-	-	-5.9	84.8	22.1	72.7	739.4
17-Feb-17 19:00	-	-	-	-6.4	85.9	0.3	-	739.5
17-Feb-17 20:00	-	-	-	-6.9	81.8	0.0	-	739.5
17-Feb-17 21:00	-	-	-	-6.8	89.0	0.0	-	739.5
17-Feb-17 22:00	-	-	-	-7.1	86.4	0.0	-	739.6
17-Feb-17 23:00	-	-	-	-7.3	83.5	0.0	-	739.6
18-Feb-17 0:00	-	-	-	-7.0	85.6	0.0	-	739.6
18-Feb-17 1:00	-	-	-	-7.2	83.6	0.0	-	739.6
18-Feb-17 2:00	-	-	-	-8.0	92.5	0.0	-	739.6
18-Feb-17 3:00	-	-	-	-8.1	92.5	0.0	-	739.6
18-Feb-17 4:00	-	-	-	-8.4	90.3	0.0	-	739.7
18-Feb-17 5:00	-	-	-	-8.5	89.7	0.0	-	739.7
18-Feb-17 6:00	-	-	-	-9.3	92.8	0.0	-	739.7
18-Feb-17 7:00	-	-	-	-9.4	92.9	0.0	-	739.7
18-Feb-17 8:00	-	-	-	-9.6	92.8	0.6	-	739.7
18-Feb-17 9:00	-	-	-	-9.3	89.8	10.1	-	739.7
18-Feb-17 10:00	-	-	-	-8.5	79.5	72.9	-	740.5
18-Feb-17 11:00	-	-	-	-7.3	70.3	343.4	83.4	740.8
18-Feb-17 12:00	-	-	-	-6.7	65.0	455.3	84.1	740.5
18-Feb-17 13:00	-	-	-	-6.3	65.2	488.4	80.5	740.0
18-Feb-17 14:00	5.1	74.7	8.9	-5.8	53.5	456.7	84.2	739.9
18-Feb-17 15:00	11.5	72.9	10.5	-5.7	52.6	394.1	84.6	740.2
18-Feb-17 16:00	12.9	72.8	9.6	-6.0	55.0	288.1	83.6	739.5
18-Feb-17 17:00	14.2	68.8	6.2	-6.3	56.5	174.3	84.1	740.4
18-Feb-17 18:00	14.3	70.1	9.1	-6.5	57.2	42.5	83.6	739.9
18-Feb-17 19:00	14.1	70.3	8.5	-6.6	56.5	0.7	82.8	739.5
18-Feb-17 20:00	13.9	76.3	9.9	-6.6	56.2	0.0	82.3	739.9
18-Feb-17 21:00	14.1	69.4	8.7	-6.6	55.7	0.0	80.0	739.7
18-Feb-17 22:00	13.0	67.8	7.9	-6.8	55.6	0.0	77.3	739.6
18-Feb-17 23:00	12.7	70.1	7.6	-6.6	53.3	0.0	75.2	740.0
19-Feb-17 0:00	11.2	67.4	8.6	-6.7	53.2	0.0	75.3	739.6
19-Feb-17 1:00	10.0	68.6	13.8	-7.0	53.4	0.0	73.2	739.6
19-Feb-17 2:00	9.6	70.9	11.2	-6.9	52.9	0.0	75.8	739.7
19-Feb-17 3:00	8.6	82.8	18.2	-7.2	54.1	0.0	75.1	739.4
19-Feb-17 4:00	6.4	96.1	20.3	-7.7	56.2	0.0	75.5	739.9
19-Feb-17 5:00	2.9	107.0	37.6	-8.2	58.5	0.0	76.5	739.9

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
19-Feb-17 6:00	1.3	99.6	48.6	-8.6	60.3	0.0	76.2	739.9
19-Feb-17 7:00	1.1	171.8	63.5	-8.7	61.1	0.0	76.8	739.9
19-Feb-17 8:00	1.0	257.7	47.5	-8.6	61.0	0.8	75.7	739.9
19-Feb-17 9:00	1.1	227.1	44.8	-8.6	61.3	11.3	76.0	740.0
19-Feb-17 10:00	0.8	254.7	39.7	-8.4	59.3	72.6	76.1	741.1
19-Feb-17 11:00	0.8	201.4	29.8	-6.7	52.3	301.6	75.5	741.2
19-Feb-17 12:00	0.5	143.2	24.2	-5.8	48.0	393.5	75.0	740.9
19-Feb-17 13:00	0.6	181.6	12.1	-4.8	51.4	443.4	75.2	740.7
19-Feb-17 14:00	0.7	181.0	24.7	-5.3	58.6	441.9	75.1	740.4
19-Feb-17 15:00	0.5	147.9	40.7	-5.3	56.6	390.0	75.6	740.2
19-Feb-17 16:00	0.8	222.7	31.0	-5.0	57.7	288.5	76.5	739.9
19-Feb-17 17:00	0.7	278.9	32.9	-5.4	59.2	171.0	76.4	739.7
19-Feb-17 18:00	0.3	109.4	38.7	-6.6	64.8	56.1	77.1	739.7
19-Feb-17 19:00	0.4	246.2	27.6	-7.4	69.4	0.9	75.9	739.8
19-Feb-17 20:00	1.0	189.8	26.7	-7.4	68.6	0.0	76.7	739.9
19-Feb-17 21:00	0.8	184.5	41.2	-7.6	68.6	0.0	76.1	739.9
19-Feb-17 22:00	0.5	192.9	22.6	-7.6	68.6	0.0	75.8	740.0
19-Feb-17 23:00	1.6	183.3	17.5	-7.8	65.7	0.0	76.3	740.0
20-Feb-17 0:00	1.4	184.6	9.6	-7.9	67.7	0.0	77.4	740.0
20-Feb-17 1:00	1.0	207.7	16.7	-7.9	69.3	0.0	76.3	740.0
20-Feb-17 2:00	0.9	164.0	11.3	-7.9	68.6	0.0	76.6	740.0
20-Feb-17 3:00	0.7	211.5	17.5	-7.8	63.6	0.0	76.8	740.0
20-Feb-17 4:00	1.1	180.7	10.9	-8.3	69.1	0.0	76.3	740.0
20-Feb-17 5:00	0.4	199.1	23.1	-8.1	64.1	0.0	75.8	740.1
20-Feb-17 6:00	0.3	195.2	10.5	-8.3	66.3	0.0	76.2	740.1
20-Feb-17 7:00	1.0	177.0	8.2	-8.6	70.6	0.0	76.8	740.1
20-Feb-17 8:00	1.5	181.8	9.9	-8.9	72.6	0.7	76.8	740.1
20-Feb-17 9:00	0.7	158.9	48.2	-8.1	65.8	20.0	76.5	740.0
20-Feb-17 10:00	0.9	183.1	13.6	-8.0	68.6	82.6	76.1	741.1
20-Feb-17 11:00	1.4	184.8	10.0	-6.7	62.0	307.9	76.0	741.0
20-Feb-17 12:00	1.4	179.3	6.6	-6.2	59.7	399.7	75.7	741.0
20-Feb-17 13:00	0.9	190.5	11.7	-5.3	60.8	449.6	75.6	740.6
20-Feb-17 14:00	1.1	179.0	10.3	-6.0	67.6	362.0	76.4	739.7
20-Feb-17 15:00	0.2	177.6	9.6	-5.1	65.6	271.6	75.7	739.8
20-Feb-17 16:00	0.8	348.0	18.0	-5.7	65.8	179.3	76.5	739.8
20-Feb-17 17:00	0.5	58.2	50.5	-6.3	68.4	70.9	76.8	739.7
20-Feb-17 18:00	0.7	204.1	16.0	-6.5	68.2	19.1	77.1	739.7
20-Feb-17 19:00	0.9	168.4	17.4	-6.2	65.7	0.7	77.0	739.7
20-Feb-17 20:00	0.2	13.1	40.9	-6.3	65.3	0.0	76.7	739.8
20-Feb-17 21:00	1.0	19.5	20.1	-6.2	63.6	0.0	77.0	739.7
20-Feb-17 22:00	0.7	295.0	41.8	-6.6	65.9	0.0	76.7	739.8
20-Feb-17 23:00	1.2	248.8	20.9	-6.5	67.6	0.0	76.9	739.8
21-Feb-17 0:00	1.4	217.1	14.0	-6.8	70.5	0.0	76.7	739.8
21-Feb-17 1:00	1.8	191.1	10.0	-6.6	82.3	0.0	75.6	739.8
21-Feb-17 2:00	2.3	198.4	9.9	-6.9	84.9	0.0	76.4	739.9
21-Feb-17 3:00	2.5	194.7	12.0	-6.6	91.4	0.0	76.3	739.9
21-Feb-17 4:00	2.6	197.7	10.2	-6.9	91.7	0.0	76.1	739.9
21-Feb-17 5:00	2.4	212.2	9.7	-7.2	95.4	0.0	76.3	739.9
21-Feb-17 6:00	2.6	209.0	10.2	-7.4	96.2	0.0	76.6	740.0
21-Feb-17 7:00	2.3	202.7	12.4	-7.5	95.8	0.0	75.8	740.0
21-Feb-17 8:00	2.0	206.7	12.0	-7.7	95.8	0.6	75.9	740.0
21-Feb-17 9:00	1.3	205.3	18.7	-7.8	95.3	14.0	76.0	740.0
21-Feb-17 10:00	1.4	191.2	30.0	-7.9	94.4	58.6	76.0	740.0
21-Feb-17 11:00	1.8	202.8	14.5	-8.1	93.5	109.8	76.3	740.0



Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
21-Feb-17 12:00	2.5	226.0	10.6	-8.0	92.9	154.9	75.6	740.0
21-Feb-17 13:00	2.8	211.7	15.0	-7.9	88.8	195.0	75.3	740.0
21-Feb-17 14:00	3.3	219.3	9.0	-7.5	81.1	232.9	75.2	740.0
21-Feb-17 15:00	2.6	215.8	14.7	-7.3	77.6	250.8	73.0	740.2
21-Feb-17 16:00	1.8	259.5	39.8	-6.9	72.8	246.2	73.7	740.3
21-Feb-17 17:00	1.1	225.1	42.2	-7.0	69.3	166.7	75.4	740.0
21-Feb-17 18:00	1.9	189.9	12.7	-7.8	71.5	59.6	75.9	740.0
21-Feb-17 19:00	2.3	172.3	7.2	-8.4	72.7	0.7	75.9	740.0
21-Feb-17 20:00	1.9	161.4	9.5	-8.6	71.9	0.0	76.3	740.0
21-Feb-17 21:00	1.8	58.5	14.6	-9.6	73.6	0.0	76.5	740.1
21-Feb-17 22:00	2.5	77.0	9.6	-10.0	77.7	0.0	76.2	740.2
21-Feb-17 23:00	2.9	83.9	6.3	-9.8	80.4	0.0	76.3	740.2
22-Feb-17 0:00	2.4	70.6	7.4	-10.0	83.9	0.0	76.2	740.2
22-Feb-17 1:00	2.2	35.2	8.8	-9.8	84.0	0.0	77.0	740.1
22-Feb-17 2:00	3.0	22.0	3.3	-9.5	81.4	0.0	76.7	740.1
22-Feb-17 3:00	2.8	345.7	9.2	-9.5	76.7	0.0	76.8	740.1
22-Feb-17 4:00	2.1	343.1	12.1	-10.0	79.5	0.0	76.6	740.2
22-Feb-17 5:00	1.2	42.1	16.9	-10.6	84.1	0.0	77.0	740.2
22-Feb-17 6:00	0.9	65.4	23.2	-10.8	84.1	0.0	76.4	740.3
22-Feb-17 7:00	0.6	353.0	22.1	-11.1	84.1	0.0	76.0	740.3
22-Feb-17 8:00	1.2	297.2	23.9	-10.8	83.3	1.5	75.3	740.3
22-Feb-17 9:00	1.3	204.2	8.2	-10.8	84.9	13.6	75.8	740.3
22-Feb-17 10:00	1.3	204.2	17.9	-10.1	79.7	98.0	75.8	741.4
22-Feb-17 11:00	0.7	125.2	56.0	-8.7	66.5	320.4	75.1	741.9
22-Feb-17 12:00	1.5	191.9	17.4	-7.9	67.3	419.0	75.9	741.2
22-Feb-17 13:00	1.6	194.5	21.2	-7.6	69.6	465.2	75.6	741.0
22-Feb-17 14:00	2.6	220.9	10.3	-7.8	78.0	462.5	76.1	740.6
22-Feb-17 15:00	3.9	220.4	7.9	-7.7	71.7	397.6	76.6	740.3
22-Feb-17 16:00	3.8	223.0	8.4	-7.5	67.4	294.1	76.2	740.2
22-Feb-17 17:00	3.7	220.3	6.1	-7.4	66.1	187.5	76.9	740.1
22-Feb-17 18:00	3.4	206.4	6.2	-8.0	68.7	43.9	76.4	740.1
22-Feb-17 19:00	3.4	195.8	7.9	-8.3	67.3	0.8	76.6	740.1
22-Feb-17 20:00	3.1	213.0	8.8	-8.3	65.9	0.0	76.4	740.1
22-Feb-17 21:00	2.7	191.9	11.1	-8.2	66.5	0.0	76.4	740.1
22-Feb-17 22:00	2.7	199.9	12.8	-8.2	71.4	0.0	76.6	740.1
22-Feb-17 23:00	2.1	210.0	10.3	-8.3	77.7	0.0	76.4	740.1
23-Feb-17 0:00	2.0	214.5	7.4	-8.4	80.7	0.0	77.0	740.1
23-Feb-17 1:00	2.2	200.2	6.4	-8.5	83.7	0.0	76.6	740.1
23-Feb-17 2:00	1.6	223.6	15.5	-8.3	86.2	0.0	76.0	740.1
23-Feb-17 3:00	1.0	281.5	18.6	-8.2	88.1	0.0	75.4	740.1
23-Feb-17 4:00	1.3	41.1	39.5	-8.5	88.6	0.0	76.3	740.1
23-Feb-17 5:00	1.0	183.8	32.8	-9.1	86.7	0.0	76.8	740.2
23-Feb-17 6:00	0.3	231.2	36.2	-8.7	90.6	0.0	75.9	740.3
23-Feb-17 7:00	1.7	339.6	12.2	-9.1	93.0	0.0	76.4	740.4
23-Feb-17 8:00	1.8	45.0	10.3	-9.4	93.5	1.2	76.4	740.4
23-Feb-17 9:00	2.1	21.7	9.2	-8.9	92.2	16.7	77.0	740.5
23-Feb-17 10:00	2.9	0.2	7.2	-9.6	93.9	70.9	77.3	740.5
23-Feb-17 11:00	4.8	11.1	4.5	-9.6	91.5	226.3	76.7	741.8
23-Feb-17 12:00	4.7	4.2	6.9	-8.8	85.5	419.8	77.3	741.7
23-Feb-17 13:00	4.6	352.0	4.8	-8.1	78.8	467.2	77.3	741.6
23-Feb-17 14:00	2.9	345.5	9.6	-7.3	75.9	467.3	77.3	741.3
23-Feb-17 15:00	3.0	357.8	12.2	-6.3	63.9	411.8	76.9	741.0
23-Feb-17 16:00	4.9	42.6	10.5	-6.5	60.7	298.0	77.5	740.5
23-Feb-17 17:00	6.9	55.1	10.4	-6.6	56.4	166.5	78.0	740.8

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation					
23-Feb-17 18:00	8.2	48.5	8.0	-7.0	57.2	59.3	76.4	740.0
23-Feb-17 19:00	10.6	44.1	6.5	-7.2	56.3	1.5	76.0	740.3
23-Feb-17 20:00	9.8	41.0	7.1	-7.7	57.9	0.0	76.2	740.3
23-Feb-17 21:00	11.2	50.3	7.9	-7.7	57.1	0.0	75.1	739.6
23-Feb-17 22:00	10.9	46.6	10.6	-7.9	57.0	0.0	76.1	740.4
23-Feb-17 23:00	11.4	38.9	8.2	-8.1	56.4	0.0	76.0	740.5
24-Feb-17 0:00	10.4	40.4	6.4	-8.1	54.7	0.0	76.4	739.9
24-Feb-17 1:00	10.9	35.1	5.9	-8.2	53.3	0.0	76.3	740.5
24-Feb-17 2:00	12.0	40.7	5.5	-8.1	54.0	0.0	76.0	740.3
24-Feb-17 3:00	11.2	48.0	6.5	-8.3	53.7	0.0	76.2	740.0
24-Feb-17 4:00	13.0	40.3	5.5	-8.3	54.8	0.0	76.1	740.0
24-Feb-17 5:00	12.3	46.0	5.1	-8.5	56.8	0.0	76.1	740.4
24-Feb-17 6:00	9.8	45.2	5.8	-9.3	58.3	0.0	76.5	740.2
24-Feb-17 7:00	5.5	17.7	15.1	-9.5	59.6	0.0	76.1	740.3
24-Feb-17 8:00	7.2	40.8	41.4	-9.0	56.1	2.0	76.8	740.3
24-Feb-17 9:00	3.1	114.1	28.5	-9.6	60.1	16.8	76.4	740.2
24-Feb-17 10:00	2.8	137.3	24.0	-9.5	60.7	97.6	76.4	741.1
24-Feb-17 11:00	1.4	172.2	18.2	-8.1	56.9	318.1	75.7	741.4
24-Feb-17 12:00	0.8	202.6	41.8	-7.0	53.1	410.5	75.6	741.3
24-Feb-17 13:00	0.8	160.9	26.8	-6.2	51.1	459.4	75.7	740.9
24-Feb-17 14:00	2.1	204.1	20.4	-6.4	57.9	457.1	76.3	740.6
24-Feb-17 15:00	3.7	231.9	12.5	-6.6	58.9	406.2	76.3	740.5
24-Feb-17 16:00	4.2	234.4	9.1	-6.2	56.6	313.3	76.5	740.2
24-Feb-17 17:00	4.7	223.7	11.1	-6.2	54.6	192.3	76.5	740.1
24-Feb-17 18:00	4.2	219.8	6.1	-6.6	57.0	64.0	76.6	740.1
24-Feb-17 19:00	5.1	212.1	5.8	-6.9	56.9	2.2	76.3	740.2
24-Feb-17 20:00	5.3	222.9	9.3	-6.9	55.9	0.0	76.6	740.1
24-Feb-17 21:00	5.3	223.1	6.4	-7.1	57.1	0.0	76.5	740.2
24-Feb-17 22:00	4.2	200.5	11.1	-7.4	59.2	0.0	76.6	740.2
24-Feb-17 23:00	4.3	217.3	7.9	-7.6	60.5	0.0	76.4	740.2
25-Feb-17 0:00	5.3	210.6	9.6	-7.7	62.2	0.0	76.6	740.1
25-Feb-17 1:00	6.1	219.5	7.5	-7.7	64.6	0.0	76.7	740.3
25-Feb-17 2:00	6.5	216.6	9.0	-7.8	67.4	0.0	76.8	740.1
25-Feb-17 3:00	7.0	214.8	8.9	-7.3	69.4	0.0	76.8	740.1
25-Feb-17 4:00	5.9	217.5	5.9	-7.4	69.7	0.0	76.8	740.2
25-Feb-17 5:00	5.9	214.7	7.6	-7.4	82.7	0.0	76.9	740.1
25-Feb-17 6:00	4.9	223.6	8.4	-7.7	95.0	0.0	73.8	740.4
25-Feb-17 7:00	4.5	214.2	5.7	-7.1	95.4	0.0	-	740.5
25-Feb-17 8:00	4.0	211.9	5.8	-6.8	95.5	1.4	80.2	740.5
25-Feb-17 9:00	3.1	210.7	7.7	-6.5	95.6	22.0	80.2	740.6
25-Feb-17 10:00	3.1	216.9	4.6	-6.1	95.5	77.4	-	740.7
25-Feb-17 11:00	2.4	217.9	5.8	-5.6	95.5	149.3	83.3	740.7
25-Feb-17 12:00	3.9	259.3	25.3	-5.6	95.4	177.0	81.8	740.8
25-Feb-17 13:00	12.9	44.3	8.7	-5.3	80.3	277.9	76.3	741.2
25-Feb-17 14:00	11.3	39.9	8.1	-5.3	72.7	323.7	76.3	741.1
25-Feb-17 15:00	11.6	32.3	9.6	-5.3	70.8	378.1	76.0	741.6
25-Feb-17 16:00	15.8	37.7	7.4	-5.3	67.5	265.2	76.3	739.4
25-Feb-17 17:00	13.2	32.6	8.5	-5.4	64.7	171.8	76.6	740.4
25-Feb-17 18:00	16.0	26.1	5.9	-5.7	65.3	73.8	76.7	740.5
25-Feb-17 19:00	15.4	22.8	7.6	-5.8	63.8	2.0	76.2	740.1
25-Feb-17 20:00	12.7	31.8	12.4	-6.0	63.6	0.0	76.5	741.3
25-Feb-17 21:00	11.4	38.0	13.9	-6.0	59.4	0.0	76.2	740.7
25-Feb-17 22:00	13.7	30.2	8.3	-6.2	58.3	0.0	75.7	740.8
25-Feb-17 23:00	12.5	29.5	9.7	-6.3	56.0	0.0	76.0	740.7

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
26-Feb-17 0:00	9.9	30.2	9.7	-6.6	54.2	0.0	76.7	740.5
26-Feb-17 1:00	9.9	29.4	8.8	-6.6	53.0	0.0	76.0	740.8
26-Feb-17 2:00	12.7	32.5	6.0	-6.8	53.0	0.0	75.2	740.3
26-Feb-17 3:00	9.2	50.1	12.9	-7.4	54.4	0.0	75.5	740.4
26-Feb-17 4:00	11.6	42.3	9.1	-7.2	50.5	0.0	75.5	740.4
26-Feb-17 5:00	9.5	41.1	8.9	-7.3	48.8	0.0	74.9	740.7
26-Feb-17 6:00	9.0	47.7	5.8	-7.5	49.4	0.0	75.5	740.8
26-Feb-17 7:00	6.8	38.8	7.1	-7.9	51.6	0.0	75.4	740.6
26-Feb-17 8:00	3.6	42.4	43.1	-8.4	51.0	3.8	75.7	740.6
26-Feb-17 9:00	0.7	223.1	38.0	-8.5	56.7	50.5	75.7	740.7
26-Feb-17 10:00	0.7	169.5	10.1	-7.9	52.7	129.4	75.4	740.8
26-Feb-17 11:00	1.5	202.0	14.9	-7.6	52.3	226.0	75.4	740.8
26-Feb-17 12:00	2.0	219.0	13.1	-7.5	56.5	295.7	75.4	740.8
26-Feb-17 13:00	2.9	222.7	8.3	-7.3	59.6	334.9	75.7	740.8
26-Feb-17 14:00	3.2	221.1	7.7	-7.1	58.1	312.7	75.6	740.9
26-Feb-17 15:00	4.3	217.3	6.5	-6.6	55.2	312.7	75.8	740.5
26-Feb-17 16:00	4.2	223.6	6.7	-6.8	56.0	193.1	75.8	740.5
26-Feb-17 17:00	3.2	244.5	13.3	-6.9	55.7	132.4	75.8	740.5
26-Feb-17 18:00	2.0	320.5	35.2	-7.5	58.2	58.5	75.9	740.5
26-Feb-17 19:00	2.5	353.4	21.1	-7.9	61.9	1.9	75.9	740.5
26-Feb-17 20:00	1.9	30.9	17.9	-8.4	66.5	0.0	75.9	740.6
26-Feb-17 21:00	2.2	55.6	19.1	-9.1	70.9	0.0	75.5	740.6
26-Feb-17 22:00	3.0	40.4	10.0	-9.5	73.2	0.0	75.8	740.6
26-Feb-17 23:00	4.0	7.4	8.9	-9.3	75.7	0.0	75.4	740.6
27-Feb-17 0:00	2.7	15.0	12.8	-9.6	76.4	0.0	75.7	740.6
27-Feb-17 1:00	3.9	15.0	9.1	-9.6	76.1	0.0	75.7	740.6
27-Feb-17 2:00	4.1	1.8	7.7	-9.6	74.3	0.0	75.9	740.6
27-Feb-17 3:00	3.6	9.0	16.5	-10.1	74.7	0.0	76.2	740.7
27-Feb-17 4:00	4.8	23.9	8.0	-10.0	72.3	0.0	75.7	740.6
27-Feb-17 5:00	4.9	26.1	8.2	-10.0	71.1	0.0	75.8	740.5
27-Feb-17 6:00	9.5	35.8	5.7	-8.9	63.8	0.0	75.7	740.4
27-Feb-17 7:00	9.8	39.0	5.5	-8.9	63.9	0.0	75.4	740.2
27-Feb-17 8:00	7.4	41.7	9.1	-9.4	65.2	2.8	75.7	740.6
27-Feb-17 9:00	7.7	47.2	8.1	-9.0	61.4	21.4	75.4	740.6
27-Feb-17 10:00	8.1	36.1	7.1	-8.7	58.1	128.8	75.3	741.7
27-Feb-17 11:00	4.6	19.4	7.9	-8.2	57.6	321.0	75.4	741.7
27-Feb-17 12:00	4.1	41.3	13.4	-7.6	53.8	454.3	75.1	742.0
27-Feb-17 13:00	3.9	57.0	10.4	-7.3	53.2	504.3	75.1	741.7
27-Feb-17 14:00	2.0	33.7	13.2	-6.8	51.7	502.3	75.2	741.6
27-Feb-17 15:00	1.6	63.3	12.3	-6.8	51.7	448.0	75.3	741.2
27-Feb-17 16:00	1.0	44.8	28.6	-6.3	46.7	351.2	74.8	740.9
27-Feb-17 17:00	0.8	78.2	22.1	-7.0	48.1	223.6	75.6	740.6
27-Feb-17 18:00	0.5	88.9	11.0	-7.9	51.2	85.8	75.8	740.5
27-Feb-17 19:00	0.6	184.9	19.7	-8.8	54.6	2.5	76.0	740.6
27-Feb-17 20:00	0.5	146.0	13.8	-9.4	56.1	0.0	75.9	740.7
27-Feb-17 21:00	1.5	179.4	7.6	-9.2	55.7	0.0	76.1	740.7
27-Feb-17 22:00	1.5	192.5	11.8	-9.5	56.1	0.0	75.9	740.7
27-Feb-17 23:00	1.8	184.6	12.9	-9.6	53.3	0.0	76.2	740.7
28-Feb-17 0:00	1.7	184.8	15.5	-9.9	54.6	0.0	75.6	740.7
28-Feb-17 1:00	2.8	200.8	6.4	-10.1	54.1	0.0	76.1	740.7
28-Feb-17 2:00	2.1	201.4	7.7	-10.1	55.0	0.0	75.8	740.7
28-Feb-17 3:00	2.7	201.0	8.0	-10.0	56.9	0.0	76.0	740.7
28-Feb-17 4:00	1.6	143.9	33.8	-10.0	59.0	0.0	76.2	740.7
28-Feb-17 5:00	1.7	131.6	45.4	-9.9	60.7	0.0	76.2	740.6

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
28-Feb-17 6:00	1.9	342.8	44.5	-9.7	58.9	0.0	76.0	740.6
28-Feb-17 7:00	2.0	83.2	34.1	-10.3	74.4	0.0	75.8	740.8
28-Feb-17 8:00	3.5	32.8	12.9	-11.3	84.7	2.7	75.0	741.0
28-Feb-17 9:00	4.3	20.7	5.7	-11.0	91.3	25.9	76.3	741.2
28-Feb-17 10:00	5.3	20.7	7.4	-10.7	91.4	52.4	75.8	741.5
28-Feb-17 11:00	5.7	29.0	4.5	-10.8	90.8	102.9	76.0	741.8
28-Feb-17 12:00	5.1	29.1	4.7	-10.6	90.5	156.7	75.8	742.1
28-Feb-17 13:00	5.1	32.4	4.7	-10.5	90.1	211.5	75.8	742.2
28-Feb-17 14:00	4.0	27.9	4.4	-10.5	90.3	194.4	76.1	742.4
28-Feb-17 15:00	1.8	22.7	8.9	-10.2	90.7	181.4	75.3	743.0
28-Feb-17 16:00	0.9	331.7	25.9	-10.0	91.4	144.0	73.6	743.6
28-Feb-17 17:00	1.0	251.7	40.3	-10.0	92.2	63.5	72.7	744.1
28-Feb-17 18:00	1.4	284.6	34.5	-10.2	92.5	23.1	76.8	744.7
28-Feb-17 19:00	1.6	208.0	33.5	-10.0	92.9	1.7	-	745.0
28-Feb-17 20:00	2.8	219.7	9.3	-9.6	93.3	0.0	78.6	745.2
28-Feb-17 21:00	3.8	208.6	9.7	-9.4	93.5	0.0	78.7	745.4
28-Feb-17 22:00	3.5	204.5	7.3	-8.8	94.0	0.0	80.9	745.4
28-Feb-17 23:00	4.0	210.0	5.1	-8.7	94.1	0.0	88.8	745.5
01-Mar-17 0:00	4.1	214.3	8.0	-8.7	94.1	0.0	88.2	745.7
01-Mar-17 1:00	4.0	208.9	6.9	-8.8	94.0	0.0	87.2	745.6
01-Mar-17 2:00	4.2	202.9	9.5	-8.8	94.0	0.0	85.8	745.6
01-Mar-17 3:00	4.2	200.6	7.1	-8.8	94.0	0.0	83.6	745.8
01-Mar-17 4:00	3.8	196.4	11.7	-8.9	93.9	0.0	80.7	745.7
01-Mar-17 5:00	4.3	195.0	9.8	-9.0	93.9	0.0	78.8	745.7
01-Mar-17 6:00	4.3	188.8	10.1	-9.0	93.9	0.0	78.9	745.7
01-Mar-17 7:00	3.0	188.3	6.8	-8.9	93.9	0.0	78.2	745.7
01-Mar-17 8:00	2.7	194.4	11.1	-8.9	93.9	3.6	77.9	745.8
01-Mar-17 9:00	3.3	185.1	8.5	-8.7	93.8	48.5	79.0	745.7
01-Mar-17 10:00	2.7	203.5	17.8	-8.4	93.5	129.6	77.9	745.7
01-Mar-17 11:00	2.6	207.7	13.0	-8.1	93.5	165.1	78.8	745.9
01-Mar-17 12:00	3.5	201.1	14.9	-7.5	93.2	272.0	79.0	745.8
01-Mar-17 13:00	3.7	198.8	12.5	-7.5	93.7	237.3	78.8	745.8
01-Mar-17 14:00	3.0	214.0	16.8	-7.0	94.1	258.1	78.4	745.9
01-Mar-17 15:00	3.2	216.2	12.5	-6.9	94.5	178.8	78.6	746.0
01-Mar-17 16:00	3.1	217.1	11.4	-6.7	94.6	190.0	78.3	745.9
01-Mar-17 17:00	3.0	209.2	12.0	-7.1	94.6	114.6	78.6	745.9
01-Mar-17 18:00	2.2	198.1	10.7	-7.5	94.7	35.3	79.0	746.0
01-Mar-17 19:00	1.5	133.8	16.5	-7.7	94.8	1.5	-	746.4
01-Mar-17 20:00	2.4	31.5	4.9	-7.8	94.8	0.0	77.7	746.7
01-Mar-17 21:00	3.1	28.7	4.9	-7.9	94.8	0.0	78.8	747.1
01-Mar-17 22:00	3.5	22.3	8.4	-7.8	94.8	0.0	82.5	747.6
01-Mar-17 23:00	3.5	26.7	4.2	-7.7	94.9	0.0	84.8	748.1
02-Mar-17 0:00	3.8	21.5	4.6	-7.6	95.0	0.0	87.8	748.7
02-Mar-17 1:00	3.7	23.0	6.3	-7.4	95.2	0.0	86.9	749.3
02-Mar-17 2:00	2.7	19.0	23.8	-7.0	95.5	0.0	90.4	750.4
02-Mar-17 3:00	2.3	10.7	17.0	-6.5	95.8	0.0	92.7	751.4
02-Mar-17 4:00	1.9	10.4	26.9	-6.0	96.1	0.0	92.7	752.9
02-Mar-17 5:00	1.2	262.5	49.9	-5.4	96.4	0.0	93.9	754.4
02-Mar-17 6:00	1.8	198.9	39.5	-5.0	96.7	0.0	94.2	755.9
02-Mar-17 7:00	3.1	197.8	22.2	-4.7	97.0	0.0	102.6	756.9
02-Mar-17 8:00	5.4	186.9	11.4	-4.0	97.4	1.6	98.1	757.1
02-Mar-17 9:00	4.8	193.6	12.7	-3.8	97.5	21.3	100.1	757.3
02-Mar-17 10:00	4.1	205.2	16.3	-3.4	97.7	53.3	103.0	758.1
02-Mar-17 11:00	3.8	225.8	16.4	-3.1	97.7	92.8	107.6	759.6

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
	Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
02-Mar-17 12:00	5.1	208.5	13.8	-3.0	97.8	115.7	114.8	760.4
02-Mar-17 13:00	6.1	229.2	12.3	-3.1	97.7	120.9	115.7	761.7
02-Mar-17 14:00	5.6	246.1	20.6	-5.2	96.6	106.4	118.0	763.1
02-Mar-17 15:00	3.3	265.6	30.7	-5.8	96.1	182.6	119.7	764.2
02-Mar-17 16:00	5.1	221.3	12.4	-5.6	96.2	146.8	119.5	764.9
02-Mar-17 17:00	4.5	203.4	8.6	-6.7	95.6	106.7	119.1	764.9
02-Mar-17 18:00	4.3	233.5	8.8	-7.2	95.3	19.1	118.8	765.3
02-Mar-17 19:00	3.6	207.3	13.0	-7.6	95.1	1.6	118.8	765.9
02-Mar-17 20:00	3.6	211.1	11.8	-7.9	94.8	0.0	116.5	766.0
02-Mar-17 21:00	4.1	218.8	9.3	-8.4	94.5	0.0	116.6	766.0
02-Mar-17 22:00	3.1	229.5	11.9	-8.6	94.4	0.0	115.7	766.1
02-Mar-17 23:00	1.8	220.2	14.0	-8.7	94.2	0.0	115.7	766.2
03-Mar-17 0:00	1.8	184.8	11.5	-8.8	94.2	0.0	115.7	766.3
03-Mar-17 1:00	1.3	158.7	16.2	-8.9	94.1	0.0	114.6	766.5
03-Mar-17 2:00	1.4	147.1	20.9	-9.0	94.0	0.0	114.4	766.6
03-Mar-17 3:00	1.8	174.9	14.6	-9.3	93.8	0.0	114.5	766.6
03-Mar-17 4:00	0.7	220.2	21.0	-9.6	93.4	0.0	114.4	766.6
03-Mar-17 5:00	1.6	33.0	30.4	-9.6	93.6	0.0	113.9	766.7
03-Mar-17 6:00	0.9	35.3	38.1	-9.6	93.6	0.0	113.4	766.7
03-Mar-17 7:00	1.0	42.4	8.2	-9.7	93.5	0.0	112.0	766.6
03-Mar-17 8:00	1.1	15.1	24.6	-9.6	93.5	4.6	112.2	766.6
03-Mar-17 9:00	2.2	29.9	17.3	-9.6	93.5	26.1	113.1	766.6
03-Mar-17 10:00	1.9	38.0	37.5	-9.3	93.6	60.2	112.4	766.7
03-Mar-17 11:00	2.9	64.9	48.9	-9.2	93.7	108.4	113.1	766.6
03-Mar-17 12:00	2.6	35.7	58.2	-9.0	93.7	121.8	113.0	766.6
03-Mar-17 13:00	5.7	35.5	29.8	-9.1	93.6	208.9	112.1	766.7
03-Mar-17 14:00	7.3	35.6	5.9	-9.3	93.7	174.5	112.4	766.6
03-Mar-17 15:00	8.9	54.2	7.4	-9.5	93.5	196.9	111.1	766.7
03-Mar-17 16:00	9.0	37.7	5.4	-10.0	93.2	156.0	110.2	767.1
03-Mar-17 17:00	9.4	35.8	5.4	-10.9	92.3	113.7	106.5	766.7
03-Mar-17 18:00	10.0	30.0	4.5	-11.7	91.6	39.4	101.9	766.8
03-Mar-17 19:00	10.7	28.3	5.4	-12.3	91.1	2.3	98.3	766.9
03-Mar-17 20:00	12.0	32.5	5.9	-12.9	90.5	0.0	98.0	767.5
03-Mar-17 21:00	14.1	31.9	4.7	-13.4	90.0	0.0	88.7	767.0
03-Mar-17 22:00	14.8	32.7	4.9	-13.9	89.5	0.0	86.4	767.4
03-Mar-17 23:00	15.1	33.0	4.7	-14.4	89.1	0.0	85.9	767.1
04-Mar-17 0:00	14.7	34.2	4.4	-14.5	88.8	0.0	78.9	767.4
04-Mar-17 1:00	16.5	32.6	4.1	-14.7	88.1	0.0	77.5	767.4
04-Mar-17 2:00	16.7	35.2	4.0	-14.8	87.3	0.0	75.4	767.2
04-Mar-17 3:00	15.6	36.7	4.5	-14.8	88.3	0.0	75.6	767.0
04-Mar-17 4:00	14.6	37.7	4.4	-15.0	88.1	0.0	81.2	767.6
04-Mar-17 5:00	14.2	36.6	4.5	-15.4	87.7	0.0	106.2	766.6
04-Mar-17 6:00	14.7	35.0	4.6	-15.8	86.9	0.0	88.8	766.8
04-Mar-17 7:00	14.9	33.7	4.6	-16.3	86.4	0.0	78.2	766.9
04-Mar-17 8:00	14.2	34.3	4.6	-16.4	85.6	5.3	-	767.7
04-Mar-17 9:00	13.7	37.6	4.8	-16.6	85.1	56.2	75.4	767.7
04-Mar-17 10:00	13.0	38.1	4.5	-16.6	84.1	138.1	75.7	767.6
04-Mar-17 11:00	12.5	37.7	5.4	-16.6	82.3	248.4	75.1	767.7
04-Mar-17 12:00	10.4	38.3	6.4	-16.7	81.5	301.8	75.2	767.7
04-Mar-17 13:00	9.5	37.3	6.7	-16.2	81.1	456.7	75.5	768.0
04-Mar-17 14:00	8.9	37.4	7.3	-15.9	78.8	450.9	76.2	768.2
04-Mar-17 15:00	7.7	39.2	7.5	-15.7	79.4	361.0	75.4	767.8
04-Mar-17 16:00	7.4	41.0	7.5	-15.8	80.7	260.8	75.4	767.7
04-Mar-17 17:00	7.6	45.0	8.6	-15.8	79.6	200.3	75.3	767.7

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
04-Mar-17 18:00	6.2	50.2	9.5	-16.3	79.6	45.7	75.1	767.7
04-Mar-17 19:00	6.3	49.2	8.7	-16.6	78.6	4.4	75.1	767.7
04-Mar-17 20:00	7.2	46.0	7.7	-16.9	77.0	0.0	75.0	767.7
04-Mar-17 21:00	7.1	48.3	8.6	-17.0	76.2	0.0	75.0	767.8
04-Mar-17 22:00	4.9	66.9	12.6	-17.4	76.8	0.0	74.8	767.7
04-Mar-17 23:00	4.1	78.6	15.1	-17.5	78.5	0.0	75.0	767.7
05-Mar-17 0:00	3.6	73.4	20.3	-17.5	78.6	0.0	74.9	767.8
05-Mar-17 1:00	2.0	104.1	45.9	-17.6	82.5	0.0	75.2	767.8
05-Mar-17 2:00	2.2	96.9	65.5	-17.8	83.6	0.0	75.6	767.8
05-Mar-17 3:00	1.0	351.4	71.5	-17.8	84.8	0.0	75.5	767.8
05-Mar-17 4:00	1.0	234.6	78.7	-18.1	85.4	0.0	75.2	767.8
05-Mar-17 5:00	1.3	253.9	69.9	-17.9	85.5	0.0	75.2	767.8
05-Mar-17 6:00	1.2	245.3	55.2	-17.8	85.8	0.0	75.2	767.8
05-Mar-17 7:00	1.2	71.2	56.9	-17.7	85.8	0.0	74.9	767.8
05-Mar-17 8:00	1.7	79.8	54.9	-17.7	85.8	5.4	75.0	767.8
05-Mar-17 9:00	1.4	98.8	49.0	-17.3	85.7	47.4	75.0	767.9
05-Mar-17 10:00	2.1	106.1	50.0	-16.8	85.3	149.7	74.8	768.2
05-Mar-17 11:00	2.6	123.5	46.6	-15.8	84.8	264.6	74.5	768.2
05-Mar-17 12:00	3.7	90.4	58.2	-15.2	83.1	468.5	74.7	768.5
05-Mar-17 13:00	2.8	84.0	65.6	-15.0	82.1	394.2	75.3	768.1
05-Mar-17 14:00	2.5	100.1	64.5	-14.7	80.7	287.5	75.4	767.8
05-Mar-17 15:00	5.6	58.4	21.1	-14.8	78.0	266.6	75.4	767.9
05-Mar-17 16:00	6.4	58.0	18.4	-14.7	79.2	205.5	75.3	767.8
05-Mar-17 17:00	8.9	44.0	8.9	-14.9	80.8	116.7	75.5	767.7
05-Mar-17 18:00	6.4	66.9	33.8	-14.9	80.2	50.7	75.4	767.9
05-Mar-17 19:00	9.0	43.5	8.1	-15.2	79.8	4.5	75.5	767.3
05-Mar-17 20:00	8.5	46.5	8.9	-15.4	81.0	0.0	75.5	767.8
05-Mar-17 21:00	8.2	49.4	16.7	-15.8	84.3	0.0	75.3	767.8
05-Mar-17 22:00	8.8	45.2	10.5	-15.9	83.4	0.0	75.4	767.7
05-Mar-17 23:00	8.6	40.9	6.6	-16.0	84.1	0.0	75.6	767.7
06-Mar-17 0:00	8.8	39.8	5.9	-16.3	83.8	0.0	75.5	767.7
06-Mar-17 1:00	9.3	39.2	6.1	-16.6	84.7	0.0	75.1	767.8
06-Mar-17 2:00	9.1	40.9	5.9	-16.6	81.4	0.0	75.4	767.5
06-Mar-17 3:00	9.8	40.3	5.5	-16.8	80.9	0.0	75.3	767.5
06-Mar-17 4:00	9.4	38.8	6.1	-17.1	79.7	0.0	74.8	767.8
06-Mar-17 5:00	9.5	36.6	6.5	-17.3	82.1	0.0	75.4	767.8
06-Mar-17 6:00	9.9	37.0	5.3	-17.5	82.3	0.0	75.3	767.9
06-Mar-17 7:00	10.3	37.9	6.6	-17.7	78.0	0.0	74.9	767.8
06-Mar-17 8:00	10.8	36.6	6.4	-17.7	72.7	10.0	75.3	767.8
06-Mar-17 9:00	10.9	34.3	5.7	-17.8	74.2	66.2	75.1	767.7
06-Mar-17 10:00	11.1	34.7	5.5	-18.0	77.6	160.0	75.8	767.8
06-Mar-17 11:00	10.3	32.3	6.4	-17.9	82.4	263.7	75.2	767.8
06-Mar-17 12:00	9.6	34.2	6.3	-17.7	81.3	353.1	75.1	767.9
06-Mar-17 13:00	9.9	39.1	6.1	-17.2	76.8	460.1	75.0	768.1
06-Mar-17 14:00	8.9	42.5	8.3	-16.8	70.1	415.5	74.9	767.8
06-Mar-17 15:00	8.7	43.7	8.0	-16.8	72.1	296.0	75.0	767.7
06-Mar-17 16:00	9.8	41.8	6.8	-16.8	71.9	205.2	74.8	767.9
06-Mar-17 17:00	8.1	44.0	9.9	-16.8	69.8	108.0	75.6	767.9
06-Mar-17 18:00	8.6	46.6	10.6	-17.1	70.1	64.2	75.2	767.7
06-Mar-17 19:00	6.1	60.2	12.0	-17.6	72.3	4.3	74.9	767.8
06-Mar-17 20:00	6.3	63.3	20.7	-17.4	73.1	0.0	75.0	767.8
06-Mar-17 21:00	10.0	44.3	13.0	-17.2	71.6	0.0	74.5	767.9
06-Mar-17 22:00	10.2	43.1	11.8	-17.1	69.4	0.0	75.2	767.8
06-Mar-17 23:00	10.5	39.2	13.1	-17.0	69.5	0.0	75.0	767.5

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
07-Mar-17 0:00	11.9	36.6	7.5	-16.9	70.1	0.0	75.1	767.6
07-Mar-17 1:00	13.2	37.4	7.7	-16.6	74.8	0.0	75.6	767.6
07-Mar-17 2:00	13.5	39.8	9.5	-16.6	84.9	0.0	74.7	767.4
07-Mar-17 3:00	15.1	25.8	5.6	-16.5	83.8	0.0	75.1	768.4
07-Mar-17 4:00	15.0	21.1	5.3	-16.7	76.8	0.0	74.3	767.7
07-Mar-17 5:00	14.9	25.0	4.4	-16.8	75.2	0.0	74.5	768.0
07-Mar-17 6:00	14.9	24.6	5.3	-16.9	85.3	0.0	75.2	767.7
07-Mar-17 7:00	14.7	22.5	5.3	-16.9	86.3	0.0	75.1	767.5
07-Mar-17 8:00	15.3	27.9	5.3	-16.5	86.1	9.3	75.1	766.9
07-Mar-17 9:00	15.2	32.6	5.6	-16.6	85.9	51.2	74.9	767.5
07-Mar-17 10:00	14.0	36.1	5.8	-16.8	85.8	141.9	74.8	767.6
07-Mar-17 11:00	11.5	32.3	8.4	-17.0	85.7	191.8	75.2	767.5
07-Mar-17 12:00	11.3	31.8	9.4	-17.1	85.7	265.8	75.2	767.8
07-Mar-17 13:00	6.2	54.3	49.8	-16.7	85.2	405.3	74.9	768.0
07-Mar-17 14:00	7.1	55.8	34.7	-16.6	85.1	315.8	75.3	767.9
07-Mar-17 15:00	10.7	34.1	8.2	-15.2	85.8	307.9	75.0	767.4
07-Mar-17 16:00	7.5	45.9	38.1	-15.3	86.0	263.3	75.3	767.8
07-Mar-17 17:00	4.1	81.0	64.8	-15.7	85.9	260.4	75.2	767.9
07-Mar-17 18:00	3.2	65.0	66.0	-16.3	86.9	40.8	75.6	767.8
07-Mar-17 19:00	3.0	50.2	46.1	-16.7	86.7	5.0	75.2	767.8
07-Mar-17 20:00	2.1	23.3	63.0	-16.9	86.5	0.0	75.3	767.8
07-Mar-17 21:00	3.5	45.7	28.1	-16.7	86.7	0.0	75.9	767.8
07-Mar-17 22:00	3.2	26.6	27.8	-16.7	86.6	0.0	75.0	767.8
07-Mar-17 23:00	2.7	33.2	43.3	-16.4	86.8	0.0	75.3	767.8
08-Mar-17 0:00	2.4	47.7	50.5	-17.0	86.4	0.0	75.3	767.9
08-Mar-17 1:00	2.8	22.2	45.8	-17.2	86.4	0.0	75.7	767.9
08-Mar-17 2:00	2.2	57.7	33.5	-17.3	86.2	0.0	74.8	767.9
08-Mar-17 3:00	1.5	35.4	61.4	-17.5	86.0	0.0	75.2	767.9
08-Mar-17 4:00	1.7	58.8	36.8	-17.3	86.2	0.0	75.4	767.9
08-Mar-17 5:00	2.4	146.3	36.2	-17.6	85.9	0.0	75.3	768.0
08-Mar-17 6:00	1.2	188.2	49.1	-17.9	85.6	0.0	75.2	768.0
08-Mar-17 7:00	1.0	250.3	35.3	-17.7	85.7	0.0	75.6	768.1
08-Mar-17 8:00	0.9	169.2	46.1	-17.6	85.7	17.8	75.1	768.2
08-Mar-17 9:00	1.0	193.3	57.9	-17.4	85.4	84.0	75.1	768.2
08-Mar-17 10:00	1.0	3.6	61.5	-16.7	85.6	158.1	74.8	768.2
08-Mar-17 11:00	1.2	238.0	41.0	-16.8	85.2	194.4	74.6	768.2
08-Mar-17 12:00	1.3	187.1	35.8	-16.2	85.2	271.1	74.9	768.1
08-Mar-17 13:00	1.3	111.8	57.7	-15.3	86.0	274.7	75.0	768.2
08-Mar-17 14:00	2.3	46.0	34.8	-15.0	86.4	246.6	75.3	768.3
08-Mar-17 15:00	5.9	18.3	10.3	-14.2	85.3	409.9	75.4	768.5
08-Mar-17 16:00	6.8	20.1	12.4	-13.6	83.3	408.3	74.4	768.4
08-Mar-17 17:00	6.5	55.9	46.7	-13.7	82.9	258.8	75.4	768.3
08-Mar-17 18:00	3.2	127.9	51.0	-14.7	86.6	48.4	75.6	768.0
08-Mar-17 19:00	3.7	72.7	52.8	-14.9	85.0	7.1	75.2	768.1
08-Mar-17 20:00	1.3	184.4	67.3	-15.3	87.7	0.0	75.6	768.1
08-Mar-17 21:00	1.5	77.2	64.4	-15.3	85.3	0.0	75.3	768.1
08-Mar-17 22:00	2.4	88.5	51.0	-15.4	84.8	0.0	75.8	768.1
08-Mar-17 23:00	1.8	127.3	68.9	-16.1	87.0	0.0	74.8	768.2
09-Mar-17 0:00	1.9	135.4	62.2	-16.2	86.5	0.0	74.6	768.2
09-Mar-17 1:00	2.0	193.0	63.0	-16.0	83.7	0.0	76.1	768.2
09-Mar-17 2:00	2.0	226.8	66.5	-15.9	81.2	0.0	75.7	768.2
09-Mar-17 3:00	1.9	121.3	72.5	-16.1	80.3	0.0	75.5	768.2
09-Mar-17 4:00	3.8	47.8	43.7	-16.2	75.5	0.0	74.7	768.2
09-Mar-17 5:00	10.2	31.3	6.8	-15.7	69.7	0.0	75.0	768.0

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
	Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
09-Mar-17 6:00	11.0	35.4	7.7	-15.8	69.0	0.0	75.3	768.4
09-Mar-17 7:00	10.2	37.0	12.5	-16.0	69.0	0.1	75.4	767.9
09-Mar-17 8:00	11.7	34.3	7.5	-16.1	68.0	17.3	75.3	767.6
09-Mar-17 9:00	9.9	46.8	19.1	-16.9	69.9	22.8	75.6	768.1
09-Mar-17 10:00	8.9	68.8	29.2	-16.8	69.0	262.7	75.0	768.6
09-Mar-17 11:00	9.6	48.5	57.7	-15.7	63.7	446.1	74.9	769.4
09-Mar-17 12:00	9.0	60.9	40.7	-15.6	65.1	488.9	74.7	769.0
09-Mar-17 13:00	14.1	53.9	11.6	-15.4	62.6	591.2	74.6	768.6
09-Mar-17 14:00	10.3	61.0	22.4	-14.9	60.9	583.8	74.9	768.5
09-Mar-17 15:00	9.8	61.9	26.9	-14.7	60.3	519.1	74.9	767.6
09-Mar-17 16:00	13.0	54.6	12.7	-14.7	63.1	416.8	74.8	768.3
09-Mar-17 17:00	12.4	64.9	15.9	-14.6	64.0	287.3	73.5	768.2
09-Mar-17 18:00	15.1	62.4	15.3	-14.8	65.8	133.0	74.4	767.7
09-Mar-17 19:00	16.6	68.8	12.4	-15.2	67.5	8.3	73.9	767.7
09-Mar-17 20:00	17.9	74.7	9.9	-15.3	68.0	0.0	74.0	767.9
09-Mar-17 21:00	16.9	73.3	7.8	-15.5	64.7	0.0	73.9	769.1
09-Mar-17 22:00	15.7	73.7	7.8	-15.7	63.1	0.0	74.0	767.8
09-Mar-17 23:00	15.3	70.3	9.2	-15.8	62.3	0.0	72.8	767.4
10-Mar-17 0:00	13.3	68.7	10.5	-16.0	62.1	0.0	73.6	768.0
10-Mar-17 1:00	14.7	70.1	11.1	-16.3	63.2	0.0	73.4	767.6
10-Mar-17 2:00	17.3	62.7	12.4	-16.7	64.7	0.0	74.1	767.0
10-Mar-17 3:00	17.4	59.4	9.2	-16.9	63.6	0.0	71.7	768.0
10-Mar-17 4:00	16.0	68.2	8.2	-17.0	61.0	0.0	72.5	768.3
10-Mar-17 5:00	16.1	70.7	10.3	-17.3	61.6	0.0	73.2	767.8
10-Mar-17 6:00	15.7	70.0	8.3	-17.7	61.4	0.0	71.0	767.8
10-Mar-17 7:00	15.9	63.8	9.5	-17.9	61.1	0.1	72.6	768.4
10-Mar-17 8:00	15.1	59.9	12.4	-18.2	62.8	10.3	71.2	767.9
10-Mar-17 9:00	14.5	59.8	13.1	-18.3	62.8	33.7	72.2	768.5
10-Mar-17 10:00	11.7	66.2	17.4	-18.1	62.0	243.5	71.9	769.1
10-Mar-17 11:00	4.4	79.8	30.6	-17.2	58.2	444.0	73.2	769.0
10-Mar-17 12:00	5.7	64.7	26.8	-16.8	56.7	542.0	73.5	769.2
10-Mar-17 13:00	4.1	86.0	23.7	-16.3	56.4	590.7	73.1	769.0
10-Mar-17 14:00	4.7	65.2	14.8	-16.2	56.1	461.2	73.8	768.5
10-Mar-17 15:00	5.8	49.5	14.9	-16.2	56.5	407.7	73.6	768.5
10-Mar-17 16:00	6.0	52.8	12.6	-15.8	55.9	428.0	73.5	768.3
10-Mar-17 17:00	5.1	61.2	13.1	-15.6	55.9	348.5	73.1	768.1
10-Mar-17 18:00	3.6	51.0	20.6	-16.0	57.6	137.8	74.0	768.1
10-Mar-17 19:00	3.8	70.9	22.3	-17.0	63.1	8.9	73.9	768.1
10-Mar-17 20:00	1.6	61.0	45.5	-17.4	66.0	0.0	73.5	768.2
10-Mar-17 21:00	1.3	256.9	58.7	-17.1	66.3	0.0	73.6	768.2
10-Mar-17 22:00	1.4	41.9	68.9	-17.7	67.4	0.0	74.0	768.2
10-Mar-17 23:00	4.6	67.2	16.7	-17.8	65.6	0.0	73.3	768.2
11-Mar-17 0:00	7.1	50.5	10.1	-17.8	64.9	0.0	73.9	768.1
11-Mar-17 1:00	8.9	46.4	9.7	-17.2	62.2	0.0	73.6	768.2
11-Mar-17 2:00	9.4	43.2	7.3	-17.3	62.1	0.0	73.9	768.1
11-Mar-17 3:00	8.4	51.5	14.5	-17.5	63.2	0.0	73.2	768.0
11-Mar-17 4:00	8.9	52.5	19.9	-17.4	63.8	0.0	73.3	768.2
11-Mar-17 5:00	10.3	46.6	9.4	-17.1	63.0	0.0	73.7	768.2
11-Mar-17 6:00	12.5	37.8	6.8	-16.8	63.4	0.0	73.7	767.8
11-Mar-17 7:00	9.2	53.9	25.9	-17.3	65.2	0.1	74.2	768.2
11-Mar-17 8:00	7.3	68.8	38.1	-17.7	67.4	18.1	74.0	768.1
11-Mar-17 9:00	3.8	101.0	70.6	-17.6	64.7	95.4	73.9	768.2
11-Mar-17 10:00	10.3	62.5	25.9	-16.4	62.2	174.8	73.7	768.2
11-Mar-17 11:00	10.9	58.1	19.1	-16.0	64.7	229.3	73.7	768.4



Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
11-Mar-17 12:00	13.2	38.2	8.1	-15.4	71.6	291.7	73.3	768.1
11-Mar-17 13:00	11.8	45.8	18.2	-15.1	72.6	364.2	73.7	768.2
11-Mar-17 14:00	13.4	36.0	9.1	-14.8	72.9	296.2	73.3	768.4
11-Mar-17 15:00	10.7	47.7	40.4	-14.2	73.8	332.3	73.6	768.9
11-Mar-17 16:00	9.3	55.7	30.8	-13.6	71.7	286.6	73.3	768.2
11-Mar-17 17:00	10.2	52.3	26.5	-13.4	71.7	232.8	73.2	768.0
11-Mar-17 18:00	3.4	123.6	68.8	-13.5	76.3	126.9	73.0	767.8
11-Mar-17 19:00	12.4	38.4	7.1	-13.1	71.7	9.4	72.1	767.9
11-Mar-17 20:00	13.2	32.6	5.6	-12.8	73.3	0.0	72.9	768.2
11-Mar-17 21:00	14.0	33.4	5.7	-12.5	74.3	0.0	72.4	768.9
11-Mar-17 22:00	13.7	34.0	6.1	-12.2	74.7	0.0	72.8	767.6
11-Mar-17 23:00	12.7	36.4	6.3	-12.3	81.7	0.0	72.0	767.6
12-Mar-17 0:00	8.2	56.9	21.1	-12.6	87.4	0.0	72.4	768.0
12-Mar-17 1:00	7.0	56.1	18.1	-12.5	89.3	0.0	72.7	768.0
12-Mar-17 2:00	8.3	41.8	6.2	-12.1	89.3	0.0	72.7	768.0
12-Mar-17 3:00	7.1	40.9	5.6	-12.1	90.5	0.0	73.8	768.1
12-Mar-17 4:00	7.0	30.5	4.9	-12.1	91.0	0.0	73.0	768.1
12-Mar-17 5:00	6.2	29.1	3.5	-12.0	91.1	0.0	73.3	768.3
12-Mar-17 6:00	6.1	28.8	3.6	-11.8	91.3	0.0	73.3	768.3
12-Mar-17 7:00	5.6	29.1	3.4	-11.5	91.7	0.1	73.6	768.5
12-Mar-17 8:00	5.8	31.7	4.6	-11.1	91.9	14.1	72.6	768.6
12-Mar-17 9:00	6.7	30.1	6.1	-10.8	91.9	50.1	72.4	768.7
12-Mar-17 10:00	6.5	31.8	4.5	-10.3	91.9	97.0	73.1	769.0
12-Mar-17 11:00	6.3	32.3	4.6	-9.8	92.0	131.5	73.2	769.3
12-Mar-17 12:00	6.4	28.4	4.0	-9.2	92.1	174.8	74.6	769.5
12-Mar-17 13:00	6.1	30.0	5.5	-8.6	92.6	163.6	75.8	769.9
12-Mar-17 14:00	6.1	28.4	5.7	-8.1	92.7	188.8	72.2	770.1
12-Mar-17 15:00	7.3	27.7	6.0	-7.9	93.4	142.6	71.7	771.2
12-Mar-17 16:00	7.4	23.2	5.6	-7.2	94.4	98.5	73.2	772.6
12-Mar-17 17:00	7.1	24.9	6.5	-6.9	94.9	65.1	73.6	773.1
12-Mar-17 18:00	6.9	23.4	5.0	-6.8	95.3	38.3	72.0	773.5
12-Mar-17 19:00	7.1	23.7	5.1	-6.3	96.0	3.8	73.2	774.1
12-Mar-17 20:00	6.0	19.9	5.9	-6.0	96.3	0.0	74.8	775.1
12-Mar-17 21:00	5.1	19.7	13.2	-5.2	96.8	0.0	77.5	775.6
12-Mar-17 22:00	3.8	19.9	20.4	-4.4	97.3	0.0	79.2	777.1
12-Mar-17 23:00	2.7	25.6	37.0	-3.2	97.9	0.0	80.1	779.1
13-Mar-17 0:00	4.4	185.4	17.3	-2.4	98.5	0.0	81.4	779.5
13-Mar-17 1:00	4.8	195.6	12.1	-2.7	98.3	0.0	82.8	780.1
13-Mar-17 2:00	5.0	202.9	10.6	-2.2	98.6	0.0	81.5	780.5
13-Mar-17 3:00	4.6	205.8	9.7	-2.1	98.6	0.0	85.7	781.4
13-Mar-17 4:00	4.6	200.5	7.2	-2.0	98.7	0.0	85.6	782.7
13-Mar-17 5:00	4.4	205.0	7.2	-1.8	98.8	0.0	88.2	784.1
13-Mar-17 6:00	5.2	203.7	9.0	-1.4	99.0	0.0	88.2	784.7
13-Mar-17 7:00	5.0	210.2	7.5	-1.4	99.0	0.2	89.1	785.2
13-Mar-17 8:00	4.5	209.8	8.0	-1.3	99.0	13.6	89.5	785.7
13-Mar-17 9:00	4.0	210.2	7.9	-1.1	99.0	45.0	90.4	786.9
13-Mar-17 10:00	5.6	217.7	8.7	-1.5	98.7	90.0	94.0	788.8
13-Mar-17 11:00	5.7	222.0	7.1	-1.7	98.5	128.6	96.7	789.3
13-Mar-17 12:00	4.9	217.8	8.4	-1.5	98.4	186.7	96.3	789.6
13-Mar-17 13:00	5.2	208.7	8.9	-1.1	98.4	227.5	96.7	789.9
13-Mar-17 14:00	5.5	215.9	8.4	-1.2	98.4	236.3	97.6	790.7
13-Mar-17 15:00	8.0	210.2	14.2	-1.7	98.4	206.7	96.6	791.3
13-Mar-17 16:00	5.6	227.2	14.1	-1.4	98.4	269.9	96.6	791.6
13-Mar-17 17:00	4.9	224.4	11.1	-2.1	98.4	119.7	97.0	791.6

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
	Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
13-Mar-17 18:00	6.6	189.6	17.7	-2.5	98.3	56.6	97.4	791.8
13-Mar-17 19:00	7.7	196.3	11.4	-2.8	98.3	6.6	97.5	791.6
13-Mar-17 20:00	6.0	208.2	10.3	-3.0	98.2	0.0	97.0	792.5
13-Mar-17 21:00	4.6	215.1	7.9	-3.3	98.0	0.0	99.2	793.6
13-Mar-17 22:00	2.6	217.7	7.0	-3.4	98.0	0.0	99.9	794.5
13-Mar-17 23:00	0.7	215.2	0.0	-3.6	97.9	0.0	99.9	795.1
14-Mar-17 0:00	-	-	-	-3.7	97.8	0.0	100.6	796.1
14-Mar-17 1:00	-	-	-	-3.7	97.8	0.0	-	796.8
14-Mar-17 2:00	-	-	-	-3.7	97.8	0.0	102.9	797.8
14-Mar-17 3:00	-	-	-	-3.7	97.8	0.0	103.0	799.2
14-Mar-17 4:00	-	-	-	-3.6	97.9	0.0	108.8	801.8
14-Mar-17 5:00	-	-	-	-3.4	98.0	0.0	112.0	803.7
14-Mar-17 6:00	-	-	-	-3.1	98.2	0.0	110.7	804.6
14-Mar-17 7:00	-	-	-	-2.9	98.3	0.1	115.3	805.5
14-Mar-17 8:00	-	-	-	-2.6	98.4	7.9	117.5	806.6
14-Mar-17 9:00	-	-	-	-2.3	98.5	51.9	118.8	809.0
14-Mar-17 10:00	-	-	-	-1.8	98.6	121.7	119.9	810.7
14-Mar-17 11:00	-	-	-	-1.5	98.7	164.9	120.1	812.1
14-Mar-17 12:00	-	-	-	-1.2	98.9	182.3	121.3	813.8
14-Mar-17 13:00	-	-	-	-1.2	98.8	216.2	122.8	815.8
14-Mar-17 14:00	-	-	-	-1.8	98.5	200.0	124.6	817.3
14-Mar-17 15:00	-	-	-	-2.5	98.3	172.4	127.5	818.1
14-Mar-17 16:00	-	-	-	-2.8	98.2	133.8	133.8	819.1
14-Mar-17 17:00	-	-	-	-3.1	98.0	107.3	130.6	820.6
14-Mar-17 18:00	6.5	201.2	13.1	-3.8	97.7	52.4	123.7	821.2
14-Mar-17 19:00	4.8	206.3	10.2	-4.5	97.4	9.6	123.3	821.3
14-Mar-17 20:00	4.7	202.9	13.1	-4.7	97.3	0.1	122.7	821.2
14-Mar-17 21:00	4.5	216.6	18.7	-4.6	97.3	0.0	123.2	821.6
14-Mar-17 22:00	5.9	211.8	11.6	-4.8	97.2	0.0	121.8	821.7
14-Mar-17 23:00	5.8	208.8	11.4	-5.3	96.9	0.0	119.5	821.3
15-Mar-17 0:00	5.6	199.6	13.6	-6.3	96.3	0.0	118.0	821.5
15-Mar-17 1:00	3.7	211.3	16.3	-6.2	96.3	0.0	116.8	821.6
15-Mar-17 2:00	3.2	217.2	17.1	-6.1	96.4	0.0	113.0	821.7
15-Mar-17 3:00	3.8	203.0	10.7	-6.0	96.5	0.0	114.8	821.8
15-Mar-17 4:00	4.4	223.2	10.2	-5.9	96.5	0.0	114.6	821.8
15-Mar-17 5:00	4.2	210.7	8.2	-6.0	96.4	0.0	112.9	822.2
15-Mar-17 6:00	2.4	208.2	19.7	-6.0	96.4	0.0	113.9	822.4
15-Mar-17 7:00	2.2	190.5	22.0	-6.1	96.3	0.6	113.4	822.4
15-Mar-17 8:00	2.2	50.8	36.7	-6.3	96.2	22.8	113.2	822.4
15-Mar-17 9:00	0.9	261.8	46.2	-5.8	96.4	82.9	113.4	822.6
15-Mar-17 10:00	1.2	19.6	31.3	-5.3	96.5	152.0	114.0	822.7
15-Mar-17 11:00	1.9	156.5	30.6	-4.8	96.7	206.9	114.7	823.1
15-Mar-17 12:00	2.7	203.6	38.0	-4.1	96.9	330.3	115.1	823.9
15-Mar-17 13:00	1.2	172.7	39.6	-3.6	97.2	345.9	114.4	825.0
15-Mar-17 14:00	-	-	-	-2.4	97.9	315.7	113.1	825.0
15-Mar-17 15:00	-	-	-	-3.4	97.3	277.7	114.5	825.3
15-Mar-17 16:00	-	-	-	-3.2	97.6	223.4	114.7	825.8
15-Mar-17 17:00	-	-	-	-3.9	97.3	163.1	115.6	825.9
15-Mar-17 18:00	-	-	-	-4.8	96.9	81.9	115.8	825.9
15-Mar-17 19:00	-	-	-	-5.0	96.9	17.9	115.8	826.0
15-Mar-17 20:00	-	-	-	-5.4	96.8	0.1	115.8	826.1
15-Mar-17 21:00	-	-	-	-5.5	96.8	0.0	115.3	826.0
15-Mar-17 22:00	-	-	-	-5.6	96.7	0.0	115.3	826.1
15-Mar-17 23:00	-	-	-	-6.2	96.3	0.0	115.6	826.0

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation					
16-Mar-17 0:00	-	-	-	-6.2	96.3	0.0	115.5	826.1
16-Mar-17 1:00	-	-	-	-5.9	96.5	0.0	115.1	826.1
16-Mar-17 2:00	-	-	-	-5.8	96.5	0.0	114.9	826.3
16-Mar-17 3:00	-	-	-	-5.5	96.8	0.0	115.2	826.8
16-Mar-17 4:00	-	-	-	-5.4	96.8	0.0	115.0	826.7
16-Mar-17 5:00	-	-	-	-5.2	96.9	0.0	114.9	826.9
16-Mar-17 6:00	-	-	-	-5.2	96.9	0.0	114.0	827.0
16-Mar-17 7:00	-	-	-	-5.4	96.8	0.7	114.5	827.1
16-Mar-17 8:00	-	-	-	-5.4	96.6	33.2	113.0	827.4
16-Mar-17 9:00	-	-	-	-5.2	96.6	122.2	114.3	827.3
16-Mar-17 10:00	-	-	-	-4.8	96.6	182.2	115.2	827.3
16-Mar-17 11:00	-	-	-	-5.0	96.3	239.1	116.0	827.3
16-Mar-17 12:00	-	-	-	-4.4	96.5	275.4	115.7	827.4
16-Mar-17 13:00	-	-	-	-4.6	96.4	255.9	116.7	827.8
16-Mar-17 14:00	-	-	-	-3.6	97.1	275.9	116.7	828.5
16-Mar-17 15:00	-	-	-	-4.4	96.7	233.5	117.9	828.8
16-Mar-17 16:00	-	-	-	-4.0	96.9	251.7	117.9	828.9
16-Mar-17 17:00	-	-	-	-4.9	96.5	132.6	118.3	828.9
16-Mar-17 18:00	-	-	-	-5.7	96.2	92.3	118.1	829.0
16-Mar-17 19:00	-	-	-	-6.2	96.1	18.5	118.2	829.0
16-Mar-17 20:00	-	-	-	-6.6	96.0	0.2	118.2	829.0
16-Mar-17 21:00	-	-	-	-6.7	95.9	0.0	118.4	829.0
16-Mar-17 22:00	-	-	-	-6.7	95.8	0.0	118.0	829.1
16-Mar-17 23:00	-	-	-	-6.7	95.9	0.0	118.1	829.0
17-Mar-17 0:00	-	-	-	-6.5	96.0	0.0	117.7	829.0
17-Mar-17 1:00	-	-	-	-6.6	95.9	0.0	117.8	829.0
17-Mar-17 2:00	-	-	-	-6.6	95.9	0.0	117.5	829.0
17-Mar-17 3:00	-	-	-	-6.3	96.2	0.0	116.7	829.1
17-Mar-17 4:00	-	-	-	-6.2	96.2	0.0	116.8	829.1
17-Mar-17 5:00	-	-	-	-6.0	96.4	0.0	116.2	829.1
17-Mar-17 6:00	-	-	-	-5.9	96.4	0.0	116.4	829.1
17-Mar-17 7:00	-	-	-	-5.8	96.5	0.4	116.6	829.2
17-Mar-17 8:00	-	-	-	-5.6	96.5	29.6	115.8	829.6
17-Mar-17 9:00	-	-	-	-5.4	96.4	82.0	115.0	829.8
17-Mar-17 10:00	-	-	-	-5.3	96.3	147.7	116.8	829.9
17-Mar-17 11:00	-	-	-	-5.1	96.4	101.4	117.2	830.2
17-Mar-17 12:00	-	-	-	-6.1	95.5	230.6	111.3	830.2
17-Mar-17 13:00	-	-	-	-4.6	90.0	664.0	111.0	830.6
17-Mar-17 14:00	-	-	-	-4.8	84.5	597.3	110.8	830.7
17-Mar-17 15:00	-	-	-	-4.4	87.4	618.5	110.8	830.6
17-Mar-17 16:00	-	-	-	-5.5	86.1	213.4	111.1	830.4
17-Mar-17 17:00	-	-	-	-6.0	84.8	179.6	110.6	830.4
17-Mar-17 18:00	-	-	-	-6.0	87.4	171.1	110.7	830.2
17-Mar-17 19:00	-	-	-	-6.7	87.5	38.1	110.8	830.6
17-Mar-17 20:00	-	-	-	-7.8	85.8	0.3	111.0	830.6
17-Mar-17 21:00	-	-	-	-7.3	88.0	0.0	110.9	830.6
17-Mar-17 22:00	-	-	-	-7.5	84.8	0.0	111.1	830.7
17-Mar-17 23:00	-	-	-	-7.7	74.4	0.0	110.9	830.6
18-Mar-17 0:00	-	-	-	-7.7	75.3	0.0	111.0	830.6
18-Mar-17 1:00	-	-	-	-7.9	75.5	0.0	111.3	830.7
18-Mar-17 2:00	-	-	-	-7.8	77.8	0.0	110.7	830.6
18-Mar-17 3:00	-	-	-	-8.4	74.9	0.0	110.8	830.6
18-Mar-17 4:00	-	-	-	-8.5	79.1	0.0	110.8	830.6
18-Mar-17 5:00	-	-	-	-8.6	79.7	0.0	110.5	830.7

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
18-Mar-17 6:00	-	-	-	-8.1	75.8	0.0	110.6	830.6
18-Mar-17 7:00	-	-	-	-8.9	71.7	2.0	109.9	830.6
18-Mar-17 8:00	-	-	-	-8.4	68.8	59.0	110.4	830.7
18-Mar-17 9:00	-	-	-	-7.4	70.4	151.7	109.9	830.8
18-Mar-17 10:00	-	-	-	-8.4	67.9	130.0	110.1	830.5
18-Mar-17 11:00	-	-	-	-7.2	72.3	234.1	109.5	830.5
18-Mar-17 12:00	-	-	-	-6.0	73.4	385.3	108.9	830.5
18-Mar-17 13:00	0.6	67.0	38.0	-5.1	70.6	443.0	109.1	830.6
18-Mar-17 14:00	0.8	348.9	20.3	-5.9	80.3	389.2	108.7	830.8
18-Mar-17 15:00	0.5	141.6	11.6	-6.0	81.5	328.5	108.3	831.0
18-Mar-17 16:00	2.4	229.8	15.8	-6.4	92.5	322.4	110.2	831.2
18-Mar-17 17:00	2.9	231.9	12.4	-6.8	93.5	186.0	109.7	831.5
18-Mar-17 18:00	2.5	228.6	11.8	-6.8	95.2	126.8	109.7	831.9
18-Mar-17 19:00	3.1	227.2	6.9	-7.0	95.6	40.8	111.8	832.4
18-Mar-17 20:00	2.7	227.0	6.7	-7.1	95.7	0.3	113.2	832.8
18-Mar-17 21:00	1.9	220.7	8.2	-7.4	95.5	0.0	113.1	833.1
18-Mar-17 22:00	2.2	207.7	10.5	-7.4	95.4	0.0	112.7	833.1
18-Mar-17 23:00	2.6	202.6	7.5	-7.4	95.5	0.0	112.6	833.1
19-Mar-17 0:00	2.0	201.4	6.6	-7.6	95.3	0.0	112.8	833.1
19-Mar-17 1:00	2.3	194.1	10.3	-7.7	95.2	0.0	112.4	833.1
19-Mar-17 2:00	2.7	192.2	7.5	-7.9	94.8	0.0	112.6	833.2
19-Mar-17 3:00	2.7	189.9	10.9	-8.3	94.5	0.0	111.8	833.2
19-Mar-17 4:00	2.8	197.9	8.9	-8.2	91.6	0.0	112.0	833.2
19-Mar-17 5:00	3.0	201.4	10.0	-8.3	87.1	0.0	112.3	833.2
19-Mar-17 6:00	3.6	200.6	7.8	-7.9	83.5	0.0	112.0	833.1
19-Mar-17 7:00	2.9	193.6	11.2	-8.1	83.8	2.0	111.8	833.1
19-Mar-17 8:00	3.9	185.3	11.7	-7.9	76.0	25.4	111.4	833.1
19-Mar-17 9:00	3.5	193.6	10.3	-7.4	71.8	152.8	111.3	833.7
19-Mar-17 10:00	3.8	199.0	6.3	-6.6	67.3	391.7	111.6	833.8
19-Mar-17 11:00	3.3	206.2	6.3	-6.2	67.4	514.6	111.7	833.8
19-Mar-17 12:00	4.4	219.2	7.0	-5.9	73.7	578.1	111.9	833.4
19-Mar-17 13:00	4.8	228.9	9.3	-5.3	74.1	650.4	111.7	833.4
19-Mar-17 14:00	5.0	238.1	9.4	-5.2	80.3	476.7	111.8	833.0
19-Mar-17 15:00	5.7	228.3	7.7	-5.1	81.5	370.8	111.9	832.8
19-Mar-17 16:00	4.8	222.5	10.5	-5.1	82.7	257.6	111.8	832.7
19-Mar-17 17:00	4.7	208.2	8.7	-5.3	77.1	183.8	111.2	832.9
19-Mar-17 18:00	6.0	181.7	5.4	-5.6	68.3	79.5	111.1	832.8
19-Mar-17 19:00	4.7	182.5	7.4	-5.9	70.0	20.9	110.6	832.9
19-Mar-17 20:00	4.6	181.5	9.3	-6.4	73.5	0.3	110.5	832.9
19-Mar-17 21:00	4.7	175.8	9.0	-6.3	68.3	0.0	110.8	832.9
19-Mar-17 22:00	4.0	171.0	25.6	-6.0	68.0	0.0	110.3	832.8
19-Mar-17 23:00	2.0	168.6	48.1	-5.8	70.5	0.0	110.5	832.9
20-Mar-17 0:00	3.1	136.4	49.2	-5.8	71.5	0.0	111.0	832.7
20-Mar-17 1:00	4.3	193.5	7.6	-6.0	79.7	0.0	110.6	832.8
20-Mar-17 2:00	2.3	143.8	34.9	-6.0	81.7	0.0	110.9	832.8
20-Mar-17 3:00	2.4	118.9	29.0	-6.2	81.8	0.0	111.3	832.8
20-Mar-17 4:00	2.1	194.4	27.6	-6.1	86.1	0.0	110.9	832.9
20-Mar-17 5:00	1.1	84.9	56.2	-6.5	91.9	0.0	109.5	832.9
20-Mar-17 6:00	1.4	125.8	32.6	-6.4	90.7	0.0	111.0	833.0
20-Mar-17 7:00	1.8	77.3	24.2	-6.3	88.7	1.7	111.0	833.0
20-Mar-17 8:00	1.3	85.1	30.2	-5.9	85.4	37.1	111.0	833.1
20-Mar-17 9:00	1.5	101.8	24.8	-4.9	79.2	205.1	111.1	833.9
20-Mar-17 10:00	1.1	73.2	22.3	-4.2	69.6	364.7	110.6	834.2
20-Mar-17 11:00	1.8	33.5	4.7	-4.0	70.3	503.8	109.1	834.3

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
20-Mar-17 12:00	1.0	45.7	31.0	-3.1	64.9	575.6	109.9	833.8
20-Mar-17 13:00	1.4	98.8	29.5	-3.1	64.2	571.1	109.7	833.1
20-Mar-17 14:00	1.5	131.8	44.4	-2.7	64.9	533.8	109.5	832.8
20-Mar-17 15:00	3.6	88.9	19.9	-3.4	64.4	454.9	109.0	832.7
20-Mar-17 16:00	3.0	81.6	13.4	-3.1	59.9	377.7	109.6	832.6
20-Mar-17 17:00	3.1	104.7	15.0	-3.4	62.8	250.3	109.5	832.6
20-Mar-17 18:00	1.4	105.4	47.8	-3.8	71.1	114.8	109.2	832.6
20-Mar-17 19:00	1.8	104.6	37.5	-4.4	66.4	29.3	109.8	832.7
20-Mar-17 20:00	0.9	201.7	34.6	-4.7	77.4	0.4	109.8	832.8
20-Mar-17 21:00	0.4	147.2	37.1	-5.0	76.1	0.0	109.9	832.8
20-Mar-17 22:00	0.8	97.6	34.8	-5.2	69.2	0.0	109.7	832.8
20-Mar-17 23:00	1.7	47.1	9.4	-5.0	56.9	0.0	109.4	832.8
21-Mar-17 0:00	1.7	66.4	9.8	-5.0	52.0	0.0	109.3	832.9
21-Mar-17 1:00	0.8	126.7	45.5	-5.1	59.6	0.0	109.2	832.9
21-Mar-17 2:00	0.8	178.5	39.7	-5.5	70.4	0.0	109.1	832.9
21-Mar-17 3:00	1.3	171.1	11.0	-5.9	75.4	0.0	109.7	833.0
21-Mar-17 4:00	1.5	174.2	8.1	-6.0	74.2	0.0	109.3	833.0
21-Mar-17 5:00	1.4	174.1	10.2	-6.2	74.3	0.0	108.9	833.0
21-Mar-17 6:00	1.9	176.6	10.8	-6.2	73.3	0.0	109.1	833.0
21-Mar-17 7:00	1.6	187.2	14.1	-6.0	68.8	4.7	109.1	833.0
21-Mar-17 8:00	0.7	237.4	25.6	-5.5	59.9	35.8	109.2	833.0
21-Mar-17 9:00	0.9	248.3	32.4	-4.6	55.3	200.3	108.9	833.8
21-Mar-17 10:00	1.1	146.8	35.2	-3.8	53.9	379.1	108.2	833.8
21-Mar-17 11:00	1.0	248.5	26.1	-2.9	49.0	507.2	108.8	834.4
21-Mar-17 12:00	1.4	86.1	43.6	-2.9	50.9	558.1	108.6	834.1
21-Mar-17 13:00	2.3	92.5	32.8	-2.8	56.1	589.2	109.0	833.3
21-Mar-17 14:00	2.8	56.5	52.9	-1.5	52.9	638.6	109.2	833.2
21-Mar-17 15:00	3.4	64.8	39.7	-1.5	49.2	483.1	108.5	832.8
21-Mar-17 16:00	2.6	81.1	31.2	-1.1	51.1	492.2	108.2	832.6
21-Mar-17 17:00	1.6	108.0	52.1	-0.9	51.1	331.0	108.9	832.4
21-Mar-17 18:00	1.3	109.3	54.6	-1.7	55.1	148.7	108.7	832.4
21-Mar-17 19:00	1.5	53.3	41.5	-2.6	58.7	28.9	109.2	832.4
21-Mar-17 20:00	1.0	146.8	44.0	-3.0	59.7	0.5	109.2	832.5
21-Mar-17 21:00	0.9	184.6	48.0	-3.0	61.4	0.0	109.5	832.5
21-Mar-17 22:00	0.8	274.6	27.5	-2.7	59.4	0.0	109.1	832.6
21-Mar-17 23:00	0.9	208.9	44.5	-2.7	59.4	0.0	109.1	832.5
22-Mar-17 0:00	0.8	280.6	52.1	-2.7	58.4	0.0	109.1	832.5
22-Mar-17 1:00	2.4	57.5	31.8	-2.8	57.9	0.0	108.9	832.5
22-Mar-17 2:00	4.8	45.9	18.8	-3.1	63.6	0.0	108.8	832.4
22-Mar-17 3:00	6.4	37.4	7.5	-3.6	78.3	0.0	108.8	832.5
22-Mar-17 4:00	2.5	32.4	11.4	-3.9	81.2	0.0	108.8	832.5
22-Mar-17 5:00	0.5	178.0	31.7	-4.2	82.8	0.0	108.9	832.6
22-Mar-17 6:00	0.7	206.1	17.1	-4.9	90.7	0.0	108.7	832.7
22-Mar-17 7:00	2.1	26.5	31.5	-4.7	93.6	2.3	108.8	832.8
22-Mar-17 8:00	3.7	40.9	11.9	-4.5	96.0	54.7	108.8	832.9
22-Mar-17 9:00	5.2	31.8	5.6	-3.9	95.3	183.6	111.3	832.9
22-Mar-17 10:00	3.8	46.4	14.9	-3.8	95.5	187.0	111.1	833.0
22-Mar-17 11:00	3.3	34.1	19.5	-3.4	95.3	252.0	110.8	832.9
22-Mar-17 12:00	0.7	207.1	57.2	-3.1	94.5	280.4	110.7	833.0
22-Mar-17 13:00	0.6	208.9	24.7	-2.7	94.3	276.1	110.9	833.2
22-Mar-17 14:00	1.0	217.2	15.6	-2.7	94.3	282.2	111.1	833.5
22-Mar-17 15:00	1.1	216.9	9.9	-2.6	94.3	241.6	111.6	833.9
22-Mar-17 16:00	1.1	222.2	8.6	-2.3	95.1	237.1	111.0	834.4
22-Mar-17 17:00	2.7	204.1	5.2	-2.9	97.0	149.5	111.5	834.8

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
	Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
22-Mar-17 18:00	3.3	206.8	7.0	-3.1	97.5	63.6	114.6	835.6
22-Mar-17 19:00	3.7	220.6	7.8	-3.0	97.9	18.6	115.1	836.1
22-Mar-17 20:00	3.9	230.4	8.5	-3.1	98.1	0.5	115.1	836.3
22-Mar-17 21:00	4.1	223.9	7.0	-3.2	98.0	0.0	115.3	836.4
22-Mar-17 22:00	2.8	223.0	7.2	-3.2	98.0	0.0	115.8	836.9
22-Mar-17 23:00	3.4	220.1	11.1	-3.3	97.9	0.0	118.2	837.3
23-Mar-17 0:00	9.1	175.5	8.5	-4.4	89.1	0.0	106.7	837.1
23-Mar-17 1:00	8.5	188.7	10.0	-4.5	87.6	0.0	106.4	837.4
23-Mar-17 2:00	5.8	207.3	8.5	-5.0	96.8	0.0	106.6	837.4
23-Mar-17 3:00	5.5	200.5	9.6	-5.0	95.3	0.0	107.5	837.5
23-Mar-17 4:00	6.3	198.4	8.4	-5.3	96.8	0.0	105.8	837.6
23-Mar-17 5:00	6.5	184.1	7.6	-5.5	85.3	0.0	106.0	837.5
23-Mar-17 6:00	4.9	191.9	8.0	-5.6	83.3	0.0	106.6	837.5
23-Mar-17 7:00	3.9	185.4	8.2	-5.6	83.1	3.8	106.1	837.5
23-Mar-17 8:00	5.2	185.2	6.3	-5.6	87.0	47.7	106.6	837.6
23-Mar-17 9:00	3.4	184.2	10.3	-5.2	86.2	194.0	106.5	837.9
23-Mar-17 10:00	2.7	181.5	53.8	-4.7	82.4	250.5	106.2	837.7
23-Mar-17 11:00	1.5	164.3	27.4	-4.0	76.1	297.9	105.9	837.6
23-Mar-17 12:00	1.4	57.5	15.4	-3.0	74.4	405.8	106.1	837.1
23-Mar-17 13:00	2.8	162.4	15.3	-3.7	88.0	404.9	106.0	837.4
23-Mar-17 14:00	2.7	212.2	23.3	-2.9	88.1	534.3	104.8	837.7
23-Mar-17 15:00	2.7	237.4	27.0	-2.2	82.6	541.6	105.1	837.4
23-Mar-17 16:00	2.7	198.4	21.7	-2.6	80.8	347.7	104.9	837.3
23-Mar-17 17:00	2.7	175.3	21.0	-2.4	78.9	364.5	105.1	837.1
23-Mar-17 18:00	2.1	146.0	26.6	-2.7	75.0	208.0	104.8	837.2
23-Mar-17 19:00	1.3	50.3	12.4	-3.8	72.4	38.6	104.9	837.4
23-Mar-17 20:00	2.4	164.3	25.2	-4.6	79.3	1.8	105.5	837.5
23-Mar-17 21:00	1.0	149.6	59.8	-4.6	77.8	0.0	105.5	837.5
23-Mar-17 22:00	1.3	176.5	79.5	-4.7	73.4	0.0	105.8	837.5
23-Mar-17 23:00	2.6	45.8	32.4	-4.8	66.6	0.0	105.6	837.5
24-Mar-17 0:00	3.8	53.2	29.3	-4.7	64.8	0.0	105.9	837.4
24-Mar-17 1:00	1.6	268.4	60.0	-4.3	65.1	0.0	105.9	837.5
24-Mar-17 2:00	0.9	217.2	70.1	-4.5	66.1	0.0	105.9	837.5
24-Mar-17 3:00	3.3	53.4	22.0	-4.3	68.7	0.0	105.9	837.5
24-Mar-17 4:00	4.6	41.5	12.6	-4.6	77.9	0.0	105.9	837.5
24-Mar-17 5:00	2.7	51.9	29.4	-4.9	80.5	0.0	106.1	837.5
24-Mar-17 6:00	1.9	21.9	39.2	-5.6	89.8	0.0	106.4	837.6
24-Mar-17 7:00	5.1	36.6	5.8	-5.5	92.9	4.6	106.8	837.6
24-Mar-17 8:00	5.2	30.2	4.7	-5.4	90.7	71.2	107.7	837.7
24-Mar-17 9:00	4.8	28.1	6.3	-4.8	86.7	124.4	107.3	837.7
24-Mar-17 10:00	4.0	36.2	7.6	-4.6	88.8	227.0	107.4	837.9
24-Mar-17 11:00	5.2	29.4	3.3	-4.3	91.8	283.5	108.0	837.9
24-Mar-17 12:00	4.9	31.8	3.9	-3.5	88.5	376.7	107.8	838.1
24-Mar-17 13:00	5.0	22.3	4.7	-3.1	89.8	460.6	108.9	838.1
24-Mar-17 14:00	5.1	27.7	4.7	-3.0	89.3	319.9	107.6	838.2
24-Mar-17 15:00	4.5	29.8	7.5	-2.7	92.5	261.9	108.9	838.0
24-Mar-17 16:00	3.4	29.2	5.3	-2.5	93.7	199.5	111.0	838.7
24-Mar-17 17:00	3.1	21.4	8.0	-2.2	94.6	175.2	111.4	838.7
24-Mar-17 18:00	2.4	11.9	17.7	-2.3	95.2	75.5	112.3	839.0
24-Mar-17 19:00	2.1	29.8	28.7	-2.2	95.0	24.8	113.9	839.1
24-Mar-17 20:00	1.8	34.7	8.5	-2.3	95.3	0.8	114.6	839.3
24-Mar-17 21:00	1.2	26.3	10.4	-2.4	97.0	0.0	114.2	839.7
24-Mar-17 22:00	1.5	24.8	5.5	-2.4	97.4	0.0	116.0	840.1
24-Mar-17 23:00	1.7	28.6	3.6	-2.4	98.3	0.0	115.6	840.5

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
25-Mar-17 0:00	2.6	27.4	2.8	-2.4	98.8	0.0	116.9	840.8
25-Mar-17 1:00	2.7	38.6	4.5	-2.3	98.6	0.0	114.6	841.6
25-Mar-17 2:00	2.2	37.0	5.9	-2.2	98.5	0.0	119.3	842.4
25-Mar-17 3:00	2.1	28.5	5.7	-2.2	98.5	0.0	120.6	843.7
25-Mar-17 4:00	1.5	314.3	26.9	-2.1	98.5	0.0	-	844.8
25-Mar-17 5:00	4.1	199.2	6.5	-2.1	98.7	0.0	125.8	845.9
25-Mar-17 6:00	5.4	197.5	5.9	-2.1	98.6	0.0	124.6	846.0
25-Mar-17 7:00	4.7	200.7	9.2	-2.2	98.5	4.1	122.6	846.0
25-Mar-17 8:00	4.8	196.6	7.4	-2.3	98.2	30.2	121.2	845.9
25-Mar-17 9:00	5.7	208.3	8.3	-1.8	97.8	143.1	121.1	846.1
25-Mar-17 10:00	5.3	208.6	9.1	-2.0	97.4	221.3	120.8	846.1
25-Mar-17 11:00	7.0	218.8	7.3	-2.7	96.9	263.0	120.5	846.8
25-Mar-17 12:00	5.4	226.3	9.5	-3.0	96.4	337.6	120.3	846.8
25-Mar-17 13:00	6.1	225.8	8.8	-2.9	96.5	335.7	120.4	847.2
25-Mar-17 14:00	5.4	226.0	8.3	-2.7	96.3	419.7	120.0	846.9
25-Mar-17 15:00	6.8	229.8	8.6	-2.7	96.3	419.4	119.9	847.1
25-Mar-17 16:00	4.9	230.6	9.5	-3.2	96.8	230.6	119.9	847.2
25-Mar-17 17:00	4.5	223.2	12.1	-3.7	97.1	126.3	120.6	847.7
25-Mar-17 18:00	3.7	207.2	7.9	-3.9	97.1	77.0	123.0	848.0
25-Mar-17 19:00	3.6	217.0	11.5	-4.2	97.1	46.3	122.7	849.0
25-Mar-17 20:00	4.0	205.0	7.6	-4.8	97.0	1.0	126.9	849.2
25-Mar-17 21:00	2.7	197.2	3.7	-4.9	96.9	0.0	126.7	849.3
25-Mar-17 22:00	2.2	187.0	13.5	-5.3	96.7	0.0	126.8	849.3
25-Mar-17 23:00	1.8	197.9	1.7	-5.5	96.6	0.0	127.1	849.4
26-Mar-17 0:00	1.9	197.5	0.2	-5.4	96.6	0.0	126.8	849.3
26-Mar-17 1:00	0.1	197.5	0.0	-5.4	96.6	0.0	126.5	849.3
26-Mar-17 2:00	0.3	197.5	0.1	-5.7	96.4	0.0	126.4	849.4
26-Mar-17 3:00	0.9	197.5	0.1	-5.7	96.4	0.0	126.3	849.4
26-Mar-17 4:00	1.2	197.5	0.2	-5.7	96.3	0.0	126.2	849.4
26-Mar-17 5:00	0.5	197.5	0.1	-5.7	96.1	0.0	126.1	849.4
26-Mar-17 6:00	-	-	-	-5.8	96.1	0.0	125.8	849.4
26-Mar-17 7:00	-	-	-	-5.8	96.2	6.7	125.5	849.5
26-Mar-17 8:00	-	-	-	-5.4	95.8	62.7	125.1	849.5
26-Mar-17 9:00	-	-	-	-4.8	93.4	273.1	124.3	850.5
26-Mar-17 10:00	-	-	-	-4.6	91.1	389.5	124.4	850.7
26-Mar-17 11:00	1.7	131.7	36.2	-3.4	82.6	566.2	123.8	850.3
26-Mar-17 12:00	1.1	203.9	48.7	-1.9	81.7	625.1	119.8	850.0
26-Mar-17 13:00	4.5	60.4	28.4	-2.0	71.8	689.4	122.5	850.0
26-Mar-17 14:00	5.8	74.4	58.0	-1.4	61.4	670.3	121.9	849.5
26-Mar-17 15:00	8.7	80.0	13.9	-1.2	56.9	598.8	121.2	849.0
26-Mar-17 16:00	10.0	73.6	10.9	-1.2	56.9	369.7	121.2	849.0
26-Mar-17 17:00	8.6	93.1	15.2	-1.2	57.1	202.6	121.3	848.8
26-Mar-17 18:00	7.5	105.0	19.2	-0.9	52.7	97.7	120.2	849.1
26-Mar-17 19:00	2.6	119.1	64.6	-1.0	54.9	28.9	120.5	848.9
26-Mar-17 20:00	1.9	248.5	19.6	-1.2	58.3	0.8	119.8	849.0
26-Mar-17 21:00	1.8	227.8	23.7	-1.4	60.6	0.0	119.6	849.0
26-Mar-17 22:00	1.1	138.8	21.6	-2.0	68.8	0.0	120.0	849.0
26-Mar-17 23:00	0.7	166.0	27.0	-2.4	76.9	0.0	120.1	849.0
27-Mar-17 0:00	1.4	72.3	23.1	-3.0	84.6	0.0	119.9	849.1
27-Mar-17 1:00	3.0	29.1	6.2	-2.6	82.2	0.0	119.2	849.1
27-Mar-17 2:00	2.0	28.1	12.7	-3.2	93.6	0.0	123.1	849.8
27-Mar-17 3:00	2.3	29.6	15.5	-3.4	97.4	0.0	123.2	850.0
27-Mar-17 4:00	1.8	15.7	13.9	-3.2	96.4	0.0	121.6	850.1
27-Mar-17 5:00	1.6	28.8	28.1	-3.0	95.3	0.0	123.0	850.2

## Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
	Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
27-Mar-17 6:00	1.0	59.8	47.2	-2.6	93.7	0.0	121.7	850.2
27-Mar-17 7:00	1.7	54.7	46.1	-2.6	95.8	3.8	123.1	850.5
27-Mar-17 8:00	2.0	58.6	19.8	-2.5	96.6	69.2	119.5	850.7
27-Mar-17 9:00	1.4	44.9	24.4	-2.1	94.7	111.4	123.2	851.0
27-Mar-17 10:00	1.2	42.0	36.4	-1.6	93.8	191.9	124.4	851.6
27-Mar-17 11:00	1.4	145.6	42.2	-1.0	93.1	262.6	124.6	852.0
27-Mar-17 12:00	1.2	177.3	40.6	-0.5	92.2	317.2	125.8	852.6
27-Mar-17 13:00	1.6	167.3	37.5	-0.4	92.7	359.6	126.7	853.1
27-Mar-17 14:00	1.2	125.0	61.0	-0.1	91.2	328.2	126.3	853.5
27-Mar-17 15:00	1.6	315.3	33.4	-0.1	91.2	295.3	127.0	854.0
27-Mar-17 16:00	1.4	173.7	38.9	-0.3	92.6	224.9	123.9	854.4
27-Mar-17 17:00	1.6	162.1	32.1	-0.7	96.2	154.7	127.2	854.9
27-Mar-17 18:00	1.5	207.8	34.2	-1.0	97.2	68.6	129.4	855.5
27-Mar-17 19:00	2.8	173.2	14.7	-1.3	98.5	20.1	129.9	856.0
27-Mar-17 20:00	3.8	186.5	9.9	-1.4	99.1	0.9	131.5	856.4
27-Mar-17 21:00	5.2	190.9	7.8	-1.6	99.1	0.0	130.1	856.5
27-Mar-17 22:00	5.8	186.9	7.1	-1.7	98.9	0.0	127.6	856.5
27-Mar-17 23:00	4.8	188.1	7.6	-1.9	98.8	0.0	127.5	856.6
28-Mar-17 0:00	3.7	196.9	7.1	-1.9	98.7	0.0	127.3	856.6
28-Mar-17 1:00	2.9	210.5	5.9	-2.0	98.6	0.0	127.2	856.8
28-Mar-17 2:00	2.4	219.5	6.9	-2.1	98.5	0.0	127.1	856.8
28-Mar-17 3:00	2.0	220.0	5.1	-2.1	98.5	0.0	127.5	856.9
28-Mar-17 4:00	1.9	215.1	5.2	-2.2	98.5	0.0	127.3	857.0
28-Mar-17 5:00	1.7	188.3	6.2	-2.3	98.5	0.0	127.5	857.1
28-Mar-17 6:00	0.8	51.7	26.6	-2.4	98.3	0.0	127.3	857.1
28-Mar-17 7:00	0.7	14.3	15.2	-2.3	98.3	8.8	126.4	857.1
28-Mar-17 8:00	0.8	196.7	34.8	-1.8	98.0	68.4	126.4	857.1
28-Mar-17 9:00	0.8	57.1	6.8	-2.0	97.1	102.0	126.5	857.0
28-Mar-17 10:00	0.5	27.6	15.4	-1.1	96.2	187.6	126.8	857.1
28-Mar-17 11:00	1.0	171.9	14.9	0.3	96.4	340.4	126.4	857.7
28-Mar-17 12:00	0.6	21.7	27.2	0.7	91.6	445.6	125.0	857.7
28-Mar-17 13:00	0.9	62.6	17.1	0.9	88.6	581.8	123.7	857.6
28-Mar-17 14:00	0.8	54.3	10.7	0.6	84.7	410.0	123.3	857.3
28-Mar-17 15:00	0.5	342.5	26.5	0.7	88.8	320.9	122.8	857.7
28-Mar-17 16:00	1.1	175.7	54.5	0.0	93.3	262.0	122.2	857.8
28-Mar-17 17:00	2.8	221.9	9.3	-0.3	97.0	190.8	123.3	858.0
28-Mar-17 18:00	3.1	218.1	8.8	-0.6	98.3	99.2	123.2	858.1
28-Mar-17 19:00	3.5	219.4	9.7	-0.8	99.1	26.1	122.7	858.2
28-Mar-17 20:00	3.1	211.3	8.9	-0.9	99.3	1.5	122.7	858.3
28-Mar-17 21:00	3.3	200.5	8.1	-1.0	99.3	0.0	123.9	858.3
28-Mar-17 22:00	2.7	201.1	14.0	-1.1	99.3	0.0	123.6	858.4
28-Mar-17 23:00	4.2	186.7	7.7	-1.2	99.2	0.0	123.5	858.5
29-Mar-17 0:00	4.4	194.4	8.0	-1.4	99.0	0.0	123.6	858.4
29-Mar-17 1:00	4.0	204.4	8.7	-1.4	99.3	0.0	123.5	858.5
29-Mar-17 2:00	3.1	217.7	11.3	-1.6	99.1	0.0	123.4	858.5
29-Mar-17 3:00	2.0	205.6	11.3	-1.7	98.5	0.0	123.3	858.5
29-Mar-17 4:00	0.9	179.1	10.7	-1.8	98.8	0.0	122.9	858.6
29-Mar-17 5:00	1.7	33.4	10.9	-1.8	98.7	0.0	123.0	858.6
29-Mar-17 6:00	0.8	169.0	25.0	-1.8	98.1	0.0	123.0	858.7
29-Mar-17 7:00	0.8	128.4	21.6	-1.8	98.3	5.9	122.9	859.2
29-Mar-17 8:00	1.2	182.7	35.4	-1.5	98.0	31.2	123.1	859.6
29-Mar-17 9:00	3.3	203.1	10.0	-1.4	97.7	88.0	125.8	859.5
29-Mar-17 10:00	2.5	187.9	13.4	-1.1	96.6	145.0	125.7	859.5
29-Mar-17 11:00	1.5	165.9	22.4	-0.6	95.3	305.0	124.8	859.8



Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
	Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
29-Mar-17 12:00	1.1	55.5	17.0	0.0	92.1	445.6	123.6	859.6
29-Mar-17 13:00	1.2	36.6	14.7	0.1	91.1	394.3	122.7	859.9
29-Mar-17 14:00	1.1	88.6	13.1	0.0	91.2	410.6	122.7	859.6
29-Mar-17 15:00	1.2	68.8	26.8	0.1	90.4	439.3	121.9	860.0
29-Mar-17 16:00	2.3	249.9	12.7	-0.3	95.5	305.8	121.4	859.7
29-Mar-17 17:00	2.7	236.2	13.5	-0.7	97.0	195.5	121.8	860.4
29-Mar-17 18:00	2.3	228.6	14.6	-1.1	98.1	121.5	121.5	861.2
29-Mar-17 19:00	2.4	215.6	6.8	-1.5	98.6	50.0	122.7	861.6
29-Mar-17 20:00	2.3	224.7	7.6	-1.5	99.0	4.2	123.9	861.8
29-Mar-17 21:00	3.0	227.0	6.7	-1.6	99.1	0.0	123.7	861.9
29-Mar-17 22:00	3.1	227.8	5.8	-1.7	99.0	0.0	123.7	861.9
29-Mar-17 23:00	2.8	216.0	7.0	-1.8	99.0	0.0	123.7	861.9
30-Mar-17 0:00	2.6	208.6	11.9	-2.0	98.9	0.0	123.6	862.0
30-Mar-17 1:00	2.7	222.1	11.0	-2.0	98.9	0.0	123.9	862.0
30-Mar-17 2:00	3.2	234.4	6.2	-2.1	98.8	0.0	124.1	863.1
30-Mar-17 3:00	2.7	229.5	6.0	-2.1	98.7	0.0	124.4	863.4
30-Mar-17 4:00	2.1	222.5	7.2	-2.2	98.6	0.0	124.3	863.4
30-Mar-17 5:00	2.0	231.4	7.5	-2.4	98.6	0.0	124.2	863.5
30-Mar-17 6:00	3.5	228.7	8.0	-2.5	98.5	0.0	124.2	863.5
30-Mar-17 7:00	4.2	216.0	7.6	-2.9	98.2	8.7	124.3	863.4
30-Mar-17 8:00	3.4	215.1	8.8	-2.9	97.7	74.4	124.2	863.6
30-Mar-17 9:00	2.3	215.6	9.7	-1.3	96.0	381.3	123.4	863.4
30-Mar-17 10:00	2.9	196.7	8.8	-1.9	95.9	364.1	123.3	864.2
30-Mar-17 11:00	3.2	210.9	11.5	-1.4	95.6	416.0	122.9	863.9
30-Mar-17 12:00	4.7	219.2	11.7	-1.0	95.6	437.7	122.8	863.6
30-Mar-17 13:00	5.6	204.7	13.8	-0.8	94.1	505.1	123.2	863.8
30-Mar-17 14:00	6.8	193.5	11.5	-0.7	86.8	529.3	122.1	863.7
30-Mar-17 15:00	6.3	189.8	11.2	-0.5	80.4	389.0	122.5	863.6
30-Mar-17 16:00	7.6	190.1	8.8	-0.6	78.4	300.0	122.2	863.6
30-Mar-17 17:00	6.7	192.6	12.6	-0.6	79.6	246.1	121.0	863.4
30-Mar-17 18:00	6.5	197.3	10.2	-1.2	83.3	77.3	122.1	863.5
30-Mar-17 19:00	5.0	214.9	8.7	-2.0	94.3	36.5	121.6	863.4
30-Mar-17 20:00	5.4	200.9	13.2	-1.9	88.1	1.4	121.7	863.7
30-Mar-17 21:00	7.7	179.2	12.1	-1.4	77.4	0.0	121.2	863.7
30-Mar-17 22:00	5.1	203.2	14.8	-2.6	95.7	0.0	121.5	864.0
30-Mar-17 23:00	3.7	200.2	14.5	-2.8	98.6	0.0	122.4	864.3
31-Mar-17 0:00	2.7	233.0	26.7	-2.9	98.3	0.0	123.8	866.3
31-Mar-17 1:00	2.7	230.4	31.3	-2.9	98.2	0.0	125.8	867.4
31-Mar-17 2:00	3.7	230.7	12.7	-2.9	98.3	0.0	128.3	868.3
31-Mar-17 3:00	3.3	237.8	20.8	-2.8	98.3	0.0	127.7	869.1
31-Mar-17 4:00	3.5	236.9	15.8	-2.7	98.4	0.0	131.7	870.1
31-Mar-17 5:00	3.7	223.9	23.9	-2.6	98.4	0.0	133.3	870.8
31-Mar-17 6:00	5.8	209.5	10.8	-2.4	98.5	0.0	131.3	871.1
31-Mar-17 7:00	5.5	201.7	11.7	-2.3	98.6	8.1	125.0	871.2
31-Mar-17 8:00	5.8	195.4	13.1	-2.0	98.4	47.2	121.9	871.4
31-Mar-17 9:00	6.0	199.3	15.5	-1.8	98.3	92.3	121.0	871.7
31-Mar-17 10:00	4.6	228.7	12.6	-1.8	98.2	104.1	121.7	872.8
31-Mar-17 11:00	4.1	217.6	11.9	-1.5	98.1	161.5	124.5	873.7
31-Mar-17 12:00	4.0	220.8	11.2	-1.2	97.9	223.1	126.3	874.8
31-Mar-17 13:00	4.1	217.4	7.4	-0.9	97.9	235.3	128.2	875.5
31-Mar-17 14:00	3.4	207.2	8.4	-0.3	98.0	244.4	128.6	875.7
31-Mar-17 15:00	4.6	205.3	13.8	-0.4	98.2	232.7	129.8	876.2
31-Mar-17 16:00	4.8	205.3	8.7	-0.5	98.6	152.9	129.9	876.5
31-Mar-17 17:00	3.6	205.3	11.1	-0.8	98.7	122.1	130.3	877.0

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean
31-Mar-17 18:00	4.4	213.1	9.6	-0.8	98.9	86.7	132.0	877.2
31-Mar-17 19:00	4.6	200.1	13.4	-0.6	99.0	61.8	132.3	877.5
31-Mar-17 20:00	3.6	213.1	13.1	-0.7	99.3	1.5	132.0	877.5
31-Mar-17 21:00	3.4	213.0	7.4	-0.6	99.3	0.0	131.3	877.6
31-Mar-17 22:00	3.3	203.0	21.3	-0.7	99.3	0.0	133.0	878.0
31-Mar-17 23:00	3.0	217.8	11.7	-0.8	99.3	0.0	131.9	878.4
01-Apr-17 0:00	2.8	212.0	10.8	-1.1	99.3	0.0	131.8	879.0
01-Apr-17 1:00	4.3	194.3	19.7	-1.1	99.3	0.0	133.4	879.1
01-Apr-17 2:00	3.6	200.5	10.0	-1.2	99.2	0.0	133.6	879.5
01-Apr-17 3:00	4.3	197.3	7.1	-1.0	99.3	0.0	134.2	879.5
01-Apr-17 4:00	3.7	204.2	7.0	-1.2	99.2	0.0	133.5	879.5
01-Apr-17 5:00	3.3	200.4	10.1	-1.3	99.2	0.0	133.9	879.8
01-Apr-17 6:00	3.8	200.7	8.5	-1.4	99.1	0.1	134.1	880.0
01-Apr-17 7:00	2.5	202.0	12.5	-1.6	99.0	15.5	133.7	880.0
01-Apr-17 8:00	3.7	174.1	13.2	-1.5	98.7	86.9	133.6	880.0
01-Apr-17 9:00	3.2	173.2	9.3	-1.0	98.4	165.9	133.5	879.8
01-Apr-17 10:00	2.8	192.8	17.5	-0.2	98.4	230.1	133.3	880.6
01-Apr-17 11:00	4.2	185.7	14.9	0.0	98.1	326.4	134.5	881.2
01-Apr-17 12:00	4.5	183.2	14.6	0.0	98.0	355.7	133.6	881.4
01-Apr-17 13:00	4.0	204.0	15.9	-0.4	97.0	387.1	133.2	881.7
01-Apr-17 14:00	4.6	218.4	9.4	-0.6	97.4	321.4	134.5	882.4
01-Apr-17 15:00	7.1	228.5	8.4	-0.7	97.7	319.6	134.1	883.1
01-Apr-17 16:00	6.3	237.3	8.8	-1.2	98.1	235.8	133.7	883.3
01-Apr-17 17:00	5.2	227.5	9.7	-1.5	98.3	169.2	133.9	884.0
01-Apr-17 18:00	4.1	222.6	12.6	-1.7	98.1	177.2	133.6	883.9
01-Apr-17 19:00	5.6	230.7	8.7	-2.3	98.4	51.4	134.1	884.9
01-Apr-17 20:00	4.4	233.1	7.2	-2.9	98.3	2.1	135.2	885.9
01-Apr-17 21:00	3.8	211.0	10.2	-3.3	98.2	0.0	136.5	886.1
01-Apr-17 22:00	2.9	214.3	12.9	-3.2	98.1	0.0	136.5	886.2
01-Apr-17 23:00	3.5	217.8	10.3	-3.4	98.1	0.0	135.3	886.3
02-Apr-17 0:00	3.1	213.8	11.2	-3.4	98.1	0.0	135.5	886.7
02-Apr-17 1:00	2.8	214.7	9.2	-3.6	97.9	0.0	136.1	887.0
02-Apr-17 2:00	2.5	221.0	11.2	-3.8	97.8	0.0	135.7	886.9
02-Apr-17 3:00	2.1	229.6	10.0	-3.8	97.8	0.0	135.5	887.0
02-Apr-17 4:00	3.6	222.9	8.3	-3.9	97.7	0.0	135.0	887.3
02-Apr-17 5:00	3.2	219.6	9.9	-4.1	97.6	0.0	135.5	887.4
02-Apr-17 6:00	3.2	231.4	7.2	-4.3	97.5	0.1	134.9	887.4
02-Apr-17 7:00	2.4	220.9	9.2	-4.4	97.4	10.3	134.6	887.4
02-Apr-17 8:00	2.9	226.6	6.5	-4.6	97.1	52.4	134.4	887.5
02-Apr-17 9:00	2.3	216.1	11.1	-4.4	96.9	112.6	134.4	887.7
02-Apr-17 10:00	2.7	200.9	11.0	-4.3	96.4	247.1	133.2	887.7
02-Apr-17 11:00	3.1	224.1	9.9	-3.3	96.6	323.2	133.4	887.7
02-Apr-17 12:00	3.9	219.4	11.0	-2.6	96.7	333.5	133.1	887.6
02-Apr-17 13:00	5.0	210.7	11.6	-2.5	96.0	591.4	133.2	888.1
02-Apr-17 14:00	6.2	236.9	9.3	-2.2	95.7	590.9	133.2	888.0
02-Apr-17 15:00	7.3	218.4	13.1	-3.2	95.2	549.0	133.6	887.8
02-Apr-17 16:00	6.1	226.1	11.9	-3.2	95.4	421.1	133.2	887.8
02-Apr-17 17:00	6.4	233.6	7.0	-3.2	95.7	372.1	132.7	887.8
02-Apr-17 18:00	7.2	234.9	6.4	-3.2	95.8	269.0	132.8	887.8
02-Apr-17 19:00	4.8	213.8	7.5	-4.3	96.8	56.6	133.1	887.9
02-Apr-17 20:00	4.1	216.5	10.9	-4.7	97.1	8.0	132.9	888.0
02-Apr-17 21:00	4.1	222.1	9.3	-4.8	97.2	0.0	132.9	888.0
02-Apr-17 22:00	4.2	219.0	9.8	-4.9	97.2	0.0	132.9	888.1
02-Apr-17 23:00	3.9	222.7	6.9	-5.0	97.0	0.0	132.5	888.2

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
03-Apr-17 0:00	4.1	217.7	5.1	-5.1	97.0	0.0	132.6	888.1
03-Apr-17 1:00	3.6	220.4	6.3	-5.2	96.9	0.0	132.6	888.2
03-Apr-17 2:00	3.4	215.9	5.5	-5.2	96.9	0.0	131.5	888.2
03-Apr-17 3:00	3.4	216.5	4.6	-5.2	96.9	0.0	133.4	888.2
03-Apr-17 4:00	3.1	226.5	6.8	-5.1	96.9	0.0	133.1	888.2
03-Apr-17 5:00	3.6	210.9	6.1	-5.1	96.9	0.0	133.3	888.3
03-Apr-17 6:00	2.6	214.5	5.5	-5.1	96.9	0.2	133.0	888.2
03-Apr-17 7:00	1.9	204.2	17.4	-5.1	96.7	18.4	132.8	888.2
03-Apr-17 8:00	1.6	204.6	23.9	-4.7	96.3	123.6	132.2	888.7
03-Apr-17 9:00	1.6	58.6	34.1	-2.7	94.2	416.8	132.7	889.0
03-Apr-17 10:00	1.2	350.9	17.2	-2.4	94.0	475.8	131.6	889.3
03-Apr-17 11:00	1.2	95.5	39.1	-2.1	92.1	609.5	132.2	889.6
03-Apr-17 12:00	1.8	44.2	27.0	-2.7	89.3	703.6	131.9	889.6
03-Apr-17 13:00	1.7	80.7	15.0	-1.5	81.8	701.0	130.9	888.6
03-Apr-17 14:00	1.8	72.9	11.3	-1.0	77.8	714.0	131.5	888.8
03-Apr-17 15:00	2.3	56.7	7.3	-0.4	72.9	652.5	131.3	888.6
03-Apr-17 16:00	2.1	49.6	9.3	0.2	68.5	548.6	131.1	888.2
03-Apr-17 17:00	1.9	60.2	10.6	0.0	69.4	372.3	131.1	888.1
03-Apr-17 18:00	2.0	87.3	11.5	-0.6	69.7	173.2	131.5	888.0
03-Apr-17 19:00	1.4	105.3	23.0	-1.3	68.8	61.9	131.8	888.1
03-Apr-17 20:00	1.8	72.3	14.6	-1.2	59.3	3.6	131.4	888.2
03-Apr-17 21:00	2.5	52.8	16.5	-1.0	54.0	0.0	131.4	888.1
03-Apr-17 22:00	2.4	37.4	8.8	-1.1	57.1	0.0	131.4	888.2
03-Apr-17 23:00	2.6	40.2	16.9	-0.9	56.8	0.0	131.2	888.2
04-Apr-17 0:00	2.9	36.4	10.7	-0.9	57.7	0.0	131.4	888.2
04-Apr-17 1:00	3.9	31.0	5.1	-1.1	58.3	0.0	131.0	888.2
04-Apr-17 2:00	3.4	38.8	7.0	-0.9	57.0	0.0	131.2	888.2
04-Apr-17 3:00	3.8	33.0	8.9	-1.0	56.1	0.0	131.0	888.2
04-Apr-17 4:00	4.1	27.1	5.3	-1.0	56.3	0.0	130.7	888.1
04-Apr-17 5:00	2.8	28.1	36.4	-0.6	51.6	0.0	131.1	888.2
04-Apr-17 6:00	0.8	94.0	51.6	0.2	44.1	0.2	130.5	888.2
04-Apr-17 7:00	1.1	174.6	52.8	0.5	43.4	23.8	130.5	888.2
04-Apr-17 8:00	6.5	101.1	36.6	1.1	42.6	91.3	130.4	888.3
04-Apr-17 9:00	6.8	102.4	19.8	1.1	46.1	148.0	130.1	887.9
04-Apr-17 10:00	12.7	82.4	8.8	1.4	43.4	258.4	129.6	888.0
04-Apr-17 11:00	11.6	66.6	12.9	2.0	40.7	343.7	129.9	887.7
04-Apr-17 12:00	10.4	83.7	12.7	2.2	40.9	469.8	129.9	888.5
04-Apr-17 13:00	11.7	80.9	12.3	2.1	47.6	499.8	128.8	888.0
04-Apr-17 14:00	13.7	92.4	8.3	1.7	54.8	407.1	129.1	887.8
04-Apr-17 15:00	10.7	96.6	8.9	1.4	60.8	288.6	128.9	887.6
04-Apr-17 16:00	11.1	102.1	9.6	1.3	63.4	168.4	128.8	888.2
04-Apr-17 17:00	13.1	93.0	8.1	1.1	66.3	116.5	128.8	888.2
04-Apr-17 18:00	8.6	99.0	19.5	1.2	67.9	66.2	129.2	887.9
04-Apr-17 19:00	2.0	163.7	47.9	0.5	79.6	28.7	129.1	888.0
04-Apr-17 20:00	1.8	226.1	60.2	-0.5	91.4	2.3	129.0	888.1
04-Apr-17 21:00	2.0	286.3	70.8	-0.6	95.0	0.0	129.0	888.2
04-Apr-17 22:00	1.9	256.5	46.4	-0.4	94.6	0.0	129.2	888.6
04-Apr-17 23:00	1.0	311.1	48.4	-0.3	93.7	0.0	129.1	888.6
05-Apr-17 0:00	2.4	271.8	47.5	0.7	82.0	0.0	128.8	888.7
05-Apr-17 1:00	1.6	225.4	37.4	0.4	86.2	0.0	128.4	888.8
05-Apr-17 2:00	0.5	127.9	40.8	0.2	89.6	0.0	128.9	889.0
05-Apr-17 3:00	1.6	300.6	33.7	-0.2	96.6	0.0	130.3	889.9
05-Apr-17 4:00	2.1	343.5	19.7	-0.3	97.8	0.0	130.7	890.9
05-Apr-17 5:00	2.6	260.7	35.6	-0.3	97.0	0.0	132.0	891.7

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
05-Apr-17 6:00	3.0	181.9	33.3	-0.5	98.2	0.0	135.4	893.0
05-Apr-17 7:00	6.3	186.9	16.3	-0.7	98.3	5.4	133.3	893.3
05-Apr-17 8:00	6.9	195.4	12.3	-1.0	98.9	51.6	128.9	893.4
05-Apr-17 9:00	8.3	192.0	9.1	-1.5	97.4	136.4	128.4	893.1
05-Apr-17 10:00	6.6	204.2	15.5	-1.3	90.4	360.4	128.0	893.6
05-Apr-17 11:00	7.8	181.4	16.4	-0.5	76.1	464.2	128.3	893.0
05-Apr-17 12:00	5.0	187.3	19.8	-0.9	85.9	415.9	128.4	892.9
05-Apr-17 13:00	4.5	194.0	26.1	-0.8	90.1	451.4	128.6	893.1
05-Apr-17 14:00	5.5	202.8	18.2	-0.8	90.0	408.4	128.2	893.1
05-Apr-17 15:00	5.3	214.3	18.0	-0.3	87.4	444.9	128.4	892.9
05-Apr-17 16:00	8.4	181.6	11.6	-0.6	81.8	222.9	128.5	893.2
05-Apr-17 17:00	6.6	198.4	14.5	-1.4	91.9	166.3	128.0	893.1
05-Apr-17 18:00	4.2	209.4	14.9	-1.9	98.0	92.9	128.0	893.5
05-Apr-17 19:00	3.2	181.9	14.5	-2.2	98.2	39.0	131.0	894.3
05-Apr-17 20:00	4.0	170.9	15.5	-2.3	98.4	3.8	131.1	894.7
05-Apr-17 21:00	5.6	172.5	9.2	-2.4	98.4	0.0	128.6	894.7
05-Apr-17 22:00	6.0	165.9	7.7	-2.5	98.3	0.0	128.2	894.7
05-Apr-17 23:00	6.6	166.8	6.9	-2.6	98.3	0.0	128.5	895.0
06-Apr-17 0:00	5.1	184.7	7.5	-2.6	98.3	0.0	128.9	895.0
06-Apr-17 1:00	5.5	181.3	10.9	-2.7	98.3	0.0	128.2	895.2
06-Apr-17 2:00	5.7	184.3	7.2	-2.8	98.1	0.0	128.6	895.1
06-Apr-17 3:00	5.1	189.3	7.4	-3.0	98.0	0.0	128.9	895.2
06-Apr-17 4:00	3.3	179.6	13.1	-2.9	98.1	0.0	129.0	895.3
06-Apr-17 5:00	2.4	161.6	17.5	-2.9	98.1	0.0	129.1	895.5
06-Apr-17 6:00	3.6	180.4	9.3	-3.0	98.1	0.8	130.2	895.5
06-Apr-17 7:00	1.9	187.3	13.6	-3.0	97.8	31.3	130.3	895.5
06-Apr-17 8:00	1.6	158.5	21.3	-3.0	97.2	96.0	129.6	895.5
06-Apr-17 9:00	1.0	93.8	56.1	-2.6	96.0	199.6	129.5	895.6
06-Apr-17 10:00	1.5	65.5	19.9	-2.0	92.6	460.5	128.3	896.9
06-Apr-17 11:00	2.0	5.7	29.0	-0.9	88.1	646.1	127.8	897.2
06-Apr-17 12:00	2.5	93.5	36.9	-0.8	79.3	716.7	128.6	896.4
06-Apr-17 13:00	3.5	101.8	22.8	-0.2	74.8	661.4	127.9	895.8
06-Apr-17 14:00	5.1	84.3	28.6	0.9	56.2	774.3	128.1	895.8
06-Apr-17 15:00	1.6	115.8	22.4	1.5	54.7	594.9	128.1	895.5
06-Apr-17 16:00	2.3	88.5	13.5	1.7	47.9	557.8	128.0	895.1
06-Apr-17 17:00	3.4	93.4	9.3	1.3	46.2	435.1	127.9	895.0
06-Apr-17 18:00	6.1	66.2	9.7	1.2	46.5	264.4	127.2	895.1
06-Apr-17 19:00	5.2	73.0	26.5	0.4	51.2	90.2	127.7	895.1
06-Apr-17 20:00	2.0	65.3	70.5	-0.2	54.1	6.8	129.0	895.2
06-Apr-17 21:00	1.3	63.1	44.1	-0.2	55.5	0.0	128.2	895.3
06-Apr-17 22:00	1.1	141.4	30.5	-0.8	52.8	0.0	128.3	895.4
06-Apr-17 23:00	0.9	53.0	20.5	-0.7	49.4	0.0	128.2	895.4
07-Apr-17 0:00	4.0	52.6	6.5	-1.0	54.3	0.0	127.5	895.4
07-Apr-17 1:00	1.1	148.2	34.6	-1.3	59.3	0.0	128.2	895.5
07-Apr-17 2:00	1.1	178.9	21.7	-1.3	60.2	0.0	128.0	895.5
07-Apr-17 3:00	1.0	148.6	30.6	-1.5	59.9	0.0	128.3	895.6
07-Apr-17 4:00	1.0	133.5	48.5	-1.8	59.8	0.0	128.1	895.6
07-Apr-17 5:00	1.5	93.1	60.4	-1.8	59.0	0.0	127.5	895.6
07-Apr-17 6:00	1.4	103.1	47.4	-2.0	59.8	1.6	128.0	895.6
07-Apr-17 7:00	3.0	31.1	48.1	-1.5	56.3	30.6	128.0	895.5
07-Apr-17 8:00	5.4	56.7	31.1	-1.4	56.0	113.9	127.7	896.0
07-Apr-17 9:00	9.1	24.0	6.4	-0.1	50.4	366.7	127.6	896.1
07-Apr-17 10:00	10.0	30.7	5.0	0.4	49.0	504.4	127.4	895.9
07-Apr-17 11:00	9.8	39.3	10.8	1.0	49.6	604.4	126.5	896.6

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation					
07-Apr-17 12:00	3.1	90.9	55.2	1.9	50.9	678.5	126.7	895.9
07-Apr-17 13:00	8.5	55.3	21.3	2.4	47.0	721.4	126.6	895.8
07-Apr-17 14:00	7.2	80.5	18.7	3.5	44.5	761.5	125.9	895.7
07-Apr-17 15:00	11.5	74.4	8.6	3.5	43.7	601.9	126.6	894.9
07-Apr-17 16:00	11.2	69.0	8.3	4.0	41.9	470.9	126.4	895.1
07-Apr-17 17:00	10.4	77.1	10.4	4.3	40.1	292.9	126.4	894.6
07-Apr-17 18:00	9.0	77.8	7.3	4.4	40.2	231.5	126.5	894.8
07-Apr-17 19:00	9.4	70.4	6.4	4.3	41.1	122.5	126.1	894.9
07-Apr-17 20:00	8.4	67.6	6.1	4.2	41.6	11.1	126.4	895.1
07-Apr-17 21:00	7.1	81.0	8.4	4.1	42.9	0.0	126.6	895.0
07-Apr-17 22:00	6.2	88.9	31.6	3.8	45.7	0.0	126.0	894.9
07-Apr-17 23:00	2.9	12.8	38.2	3.3	47.3	0.0	126.4	895.1
08-Apr-17 0:00	4.4	100.4	42.3	4.0	46.3	0.0	125.9	895.0
08-Apr-17 1:00	2.5	78.5	53.4	3.8	47.7	0.0	126.4	895.0
08-Apr-17 2:00	5.6	107.6	16.3	4.1	49.1	0.0	125.8	895.1
08-Apr-17 3:00	4.4	107.6	43.4	3.1	59.3	0.0	125.8	895.0
08-Apr-17 4:00	3.3	190.6	14.5	2.2	67.2	0.0	125.9	895.0
08-Apr-17 5:00	1.6	270.9	28.5	1.6	74.4	0.0	125.9	895.0
08-Apr-17 6:00	1.0	307.7	16.8	0.9	81.4	0.5	125.9	895.1
08-Apr-17 7:00	0.7	93.9	38.1	0.9	85.1	22.3	125.7	895.2
08-Apr-17 8:00	1.0	33.9	19.1	1.3	86.0	127.3	125.6	895.3
08-Apr-17 9:00	1.8	33.3	6.8	1.6	84.1	242.9	125.3	895.3
08-Apr-17 10:00	1.1	50.4	9.2	2.1	82.5	267.0	125.0	895.1
08-Apr-17 11:00	1.4	47.7	12.0	2.4	84.2	412.7	125.8	895.5
08-Apr-17 12:00	1.3	49.0	8.3	2.9	81.5	358.4	126.3	895.3
08-Apr-17 13:00	0.9	67.4	12.4	2.7	83.7	295.2	125.5	895.5
08-Apr-17 14:00	0.9	183.7	22.3	2.5	88.6	407.0	126.4	895.5
08-Apr-17 15:00	3.6	198.9	23.3	2.0	92.9	416.3	126.2	896.0
08-Apr-17 16:00	4.5	193.8	11.0	1.3	95.7	280.5	125.5	896.3
08-Apr-17 17:00	5.3	191.4	11.0	1.0	95.9	196.6	126.1	896.5
08-Apr-17 18:00	4.8	190.3	7.6	0.7	97.3	151.7	126.0	896.5
08-Apr-17 19:00	4.8	212.2	10.5	0.2	98.6	43.7	126.3	897.1
08-Apr-17 20:00	6.3	208.5	11.8	-0.1	99.2	4.1	125.2	897.2
08-Apr-17 21:00	5.0	212.1	7.9	-0.7	99.3	0.0	126.0	897.2
08-Apr-17 22:00	4.4	214.7	9.7	-1.1	99.3	0.0	125.3	897.4
08-Apr-17 23:00	3.6	217.7	7.8	-1.5	99.0	0.0	125.2	897.4
09-Apr-17 0:00	2.8	219.4	8.4	-1.7	98.7	0.0	124.8	897.5
09-Apr-17 1:00	1.9	211.2	11.0	-1.8	98.6	0.0	124.9	897.5
09-Apr-17 2:00	2.2	210.1	10.7	-2.1	98.5	0.0	124.9	897.6
09-Apr-17 3:00	2.7	202.0	10.5	-2.4	98.2	0.0	124.9	897.6
09-Apr-17 4:00	2.5	196.5	8.4	-2.8	97.6	0.0	125.2	897.6
09-Apr-17 5:00	2.6	179.4	11.6	-2.6	95.0	0.0	125.2	897.7
09-Apr-17 6:00	1.5	157.7	10.1	-2.2	89.9	1.0	125.3	897.6
09-Apr-17 7:00	0.6	207.6	16.0	-2.2	90.2	30.9	125.0	897.6
09-Apr-17 8:00	0.0	135.7	0.0	-1.3	80.5	162.1	124.7	897.6
09-Apr-17 9:00	1.5	50.6	13.2	-0.5	72.9	332.6	124.0	898.7
09-Apr-17 10:00	1.0	53.3	21.8	0.8	65.6	517.8	123.2	899.1
09-Apr-17 11:00	0.8	112.1	19.0	1.8	57.8	639.3	123.2	898.5
09-Apr-17 12:00	1.9	81.1	17.5	1.5	52.6	732.0	123.6	898.1
09-Apr-17 13:00	2.8	73.6	27.1	2.2	47.4	810.0	124.4	898.3
09-Apr-17 14:00	2.6	79.8	14.3	2.4	49.6	747.6	123.8	897.9
09-Apr-17 15:00	2.8	85.0	7.5	2.6	46.9	599.4	123.9	897.3
09-Apr-17 16:00	2.6	75.0	13.3	3.0	41.2	586.4	124.0	897.1
09-Apr-17 17:00	2.4	85.7	20.2	3.2	41.3	446.2	123.8	897.2

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
09-Apr-17 18:00	1.3	306.4	44.6	3.5	40.1	271.7	123.5	896.9
09-Apr-17 19:00	0.9	109.2	32.6	2.2	45.8	94.6	124.2	897.2
09-Apr-17 20:00	1.7	32.3	18.9	1.4	48.3	6.6	124.2	897.2
09-Apr-17 21:00	2.1	63.7	44.1	1.4	47.8	0.0	124.2	897.3
09-Apr-17 22:00	1.6	154.9	37.5	1.0	49.6	0.0	123.7	897.2
09-Apr-17 23:00	1.3	29.8	45.4	1.1	47.2	0.0	124.2	897.3
10-Apr-17 0:00	1.0	154.9	34.2	0.6	50.0	0.0	124.3	897.4
10-Apr-17 1:00	2.0	63.9	35.7	0.3	50.8	0.0	123.9	897.5
10-Apr-17 2:00	1.2	45.5	36.5	0.1	51.8	0.0	124.1	897.5
10-Apr-17 3:00	1.2	72.0	27.4	0.0	52.0	0.0	123.6	897.5
10-Apr-17 4:00	0.7	187.6	33.8	-0.1	53.1	0.0	123.9	897.6
10-Apr-17 5:00	0.6	341.5	31.2	-0.2	53.7	0.0	123.9	897.6
10-Apr-17 6:00	0.8	229.4	18.9	-0.3	55.7	1.8	123.7	897.7
10-Apr-17 7:00	0.6	269.0	21.2	-0.2	54.9	19.6	123.4	897.7
10-Apr-17 8:00	0.8	281.1	35.8	0.0	55.3	139.2	122.9	898.3
10-Apr-17 9:00	0.7	276.9	44.8	1.5	49.4	371.7	122.8	898.6
10-Apr-17 10:00	0.8	282.3	20.6	2.1	48.0	524.2	122.0	898.9
10-Apr-17 11:00	0.5	265.0	21.9	3.3	45.8	624.4	122.6	898.4
10-Apr-17 12:00	1.1	172.2	19.1	3.4	49.3	715.7	122.3	897.9
10-Apr-17 13:00	1.5	68.2	20.6	3.9	47.2	817.0	122.7	898.1
10-Apr-17 14:00	1.0	81.3	33.4	4.9	42.9	827.0	122.0	897.5
10-Apr-17 15:00	1.0	95.1	14.3	5.3	42.4	755.8	122.3	897.3
10-Apr-17 16:00	1.2	37.9	22.6	5.5	43.8	623.7	122.5	897.1
10-Apr-17 17:00	1.2	31.4	20.2	4.9	47.4	459.6	122.4	896.8
10-Apr-17 18:00	1.4	16.3	25.7	4.3	49.6	301.7	123.1	896.7
10-Apr-17 19:00	2.0	21.0	14.7	3.1	54.0	129.0	122.9	896.7
10-Apr-17 20:00	2.4	99.0	22.8	1.1	61.3	9.3	123.6	896.9
10-Apr-17 21:00	2.1	181.4	10.0	1.8	58.3	0.1	123.4	897.0
10-Apr-17 22:00	1.6	195.1	7.6	1.5	61.1	0.0	123.3	897.1
10-Apr-17 23:00	1.2	170.3	11.5	1.2	62.0	0.0	123.3	897.1
11-Apr-17 0:00	1.4	182.1	8.9	0.9	63.0	0.0	123.3	897.2
11-Apr-17 1:00	1.5	177.2	4.9	0.6	66.1	0.0	123.3	897.3
11-Apr-17 2:00	1.0	200.5	7.4	0.4	68.7	0.0	123.1	897.3
11-Apr-17 3:00	0.8	191.7	16.4	-0.1	68.5	0.0	123.1	897.4
11-Apr-17 4:00	0.3	120.0	9.3	-0.5	67.0	0.0	123.3	897.4
11-Apr-17 5:00	0.9	23.7	11.7	-0.8	69.0	0.0	122.9	897.4
11-Apr-17 6:00	1.2	66.4	10.2	-1.3	70.6	2.7	122.9	897.5
11-Apr-17 7:00	1.2	62.5	14.8	-1.5	74.5	20.6	123.0	897.6
11-Apr-17 8:00	1.7	35.6	15.7	-0.4	71.0	149.6	122.4	898.4
11-Apr-17 9:00	1.0	305.6	28.4	1.1	64.0	379.8	121.8	898.5
11-Apr-17 10:00	1.0	180.9	25.6	2.0	61.6	531.7	121.9	898.4
11-Apr-17 11:00	0.6	116.8	25.7	3.2	56.3	656.0	121.4	898.3
11-Apr-17 12:00	0.3	125.4	32.8	4.9	49.9	723.8	120.0	898.0
11-Apr-17 13:00	1.0	96.2	42.1	4.4	53.2	789.5	121.6	897.8
11-Apr-17 14:00	1.3	52.1	22.5	4.2	51.7	735.7	121.6	897.5
11-Apr-17 15:00	2.3	27.3	12.4	4.8	51.2	690.0	121.1	897.4
11-Apr-17 16:00	3.6	359.5	8.9	4.9	51.2	599.5	120.3	897.1
11-Apr-17 17:00	3.4	6.7	7.2	4.9	50.2	458.4	120.5	896.9
11-Apr-17 18:00	3.5	19.5	5.1	4.6	49.7	310.3	120.2	896.8
11-Apr-17 19:00	3.9	8.5	4.0	3.9	53.0	167.9	120.1	896.6
11-Apr-17 20:00	4.4	358.3	5.7	3.0	56.3	30.1	120.1	896.7
11-Apr-17 21:00	6.0	28.1	5.9	2.6	57.4	0.2	119.5	896.5
11-Apr-17 22:00	7.8	37.2	6.8	2.3	58.3	0.0	120.6	896.7
11-Apr-17 23:00	10.1	61.5	7.9	3.5	51.1	0.0	119.4	897.5

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
12-Apr-17 0:00	10.6	63.7	6.6	3.3	51.9	0.0	120.2	897.6
12-Apr-17 1:00	9.4	68.1	12.6	3.5	51.2	0.0	120.2	897.3
12-Apr-17 2:00	8.6	74.9	15.9	3.4	50.6	0.0	120.2	898.2
12-Apr-17 3:00	10.7	69.6	10.8	3.0	51.9	0.0	119.1	897.8
12-Apr-17 4:00	13.7	60.9	6.6	2.4	55.2	0.0	118.8	896.3
12-Apr-17 5:00	15.4	64.4	5.3	2.3	54.9	0.0	118.9	895.7
12-Apr-17 6:00	17.1	62.6	5.5	2.1	55.0	5.5	118.5	896.9
12-Apr-17 7:00	16.6	60.8	5.1	1.9	55.1	52.9	119.3	897.5
12-Apr-17 8:00	15.9	59.1	6.2	2.2	52.6	179.4	118.5	897.8
12-Apr-17 9:00	11.3	47.2	10.3	2.5	51.2	320.4	119.0	897.0
12-Apr-17 10:00	8.6	42.4	15.2	2.9	49.5	361.8	118.0	898.6
12-Apr-17 11:00	12.4	54.7	10.0	3.4	47.4	697.9	118.1	897.4
12-Apr-17 12:00	13.5	62.1	16.7	3.9	46.0	781.6	117.4	897.1
12-Apr-17 13:00	13.8	70.0	16.0	4.5	42.8	852.0	118.3	898.3
12-Apr-17 14:00	15.0	70.6	15.0	4.8	39.6	863.0	117.8	898.7
12-Apr-17 15:00	11.8	69.5	18.9	4.9	39.4	487.7	117.8	896.8
12-Apr-17 16:00	11.1	61.0	19.8	4.7	40.8	236.5	117.7	897.5
12-Apr-17 17:00	9.7	60.1	15.0	4.8	39.5	263.4	116.4	897.5
12-Apr-17 18:00	11.5	68.7	15.7	4.8	37.3	224.2	116.4	897.2
12-Apr-17 19:00	10.8	65.9	13.6	4.5	38.0	79.4	116.6	897.0
12-Apr-17 20:00	11.4	65.5	15.7	4.2	38.1	21.3	116.8	896.6
12-Apr-17 21:00	12.9	69.4	16.7	4.1	37.1	0.2	116.1	898.0
12-Apr-17 22:00	13.3	66.8	11.1	3.7	38.5	0.0	116.7	898.0
12-Apr-17 23:00	14.3	72.2	10.6	3.2	40.5	0.0	116.0	897.4
13-Apr-17 0:00	13.3	70.8	10.8	3.0	41.0	0.0	116.8	896.5
13-Apr-17 1:00	12.9	70.2	14.0	2.7	42.1	0.0	116.8	896.9
13-Apr-17 2:00	12.9	69.6	9.7	2.2	45.1	0.0	116.6	896.5
13-Apr-17 3:00	12.6	74.0	10.8	1.9	47.6	0.0	116.4	897.1
13-Apr-17 4:00	12.0	77.0	9.5	1.6	50.5	0.0	116.4	897.0
13-Apr-17 5:00	12.7	69.6	9.4	1.1	54.3	0.0	115.7	897.6
13-Apr-17 6:00	12.1	77.8	9.9	0.9	55.3	2.2	115.9	897.3
13-Apr-17 7:00	11.3	78.7	11.0	0.9	53.9	41.2	115.4	897.0
13-Apr-17 8:00	9.8	67.3	11.5	0.8	53.6	131.7	115.5	897.4
13-Apr-17 9:00	11.2	66.9	9.0	0.7	53.8	247.6	115.8	897.3
13-Apr-17 10:00	11.3	77.2	9.1	1.4	53.1	552.6	115.9	897.8
13-Apr-17 11:00	10.2	71.8	8.5	2.1	50.9	678.8	115.9	898.7
13-Apr-17 12:00	10.3	82.8	8.4	2.5	48.6	623.1	116.0	896.9
13-Apr-17 13:00	9.8	81.3	9.0	3.0	46.5	638.7	115.8	897.2
13-Apr-17 14:00	9.3	76.4	11.0	3.5	44.3	704.3	115.7	897.4
13-Apr-17 15:00	9.7	77.9	12.2	4.0	42.4	776.8	115.7	897.7
13-Apr-17 16:00	8.7	83.2	14.6	4.2	41.1	518.8	115.5	897.0
13-Apr-17 17:00	8.4	82.8	13.3	4.0	42.2	254.3	115.9	897.2
13-Apr-17 18:00	6.9	84.9	16.6	4.0	42.5	160.8	116.0	897.0
13-Apr-17 19:00	6.4	74.2	15.3	3.9	42.0	71.8	116.6	896.9
13-Apr-17 20:00	6.4	66.4	13.6	3.6	42.5	11.4	116.0	896.8
13-Apr-17 21:00	8.2	80.8	14.1	3.5	42.9	0.2	115.5	897.1
13-Apr-17 22:00	6.0	76.8	15.3	3.5	41.9	0.0	116.0	897.2
13-Apr-17 23:00	6.3	81.3	7.3	2.4	46.7	0.0	116.2	897.2
14-Apr-17 0:00	4.0	106.5	25.5	2.3	46.8	0.0	116.4	897.1
14-Apr-17 1:00	2.6	115.2	26.6	2.1	47.0	0.0	116.0	897.2
14-Apr-17 2:00	3.5	107.5	55.0	2.2	47.3	0.0	116.6	897.2
14-Apr-17 3:00	4.6	84.3	19.9	1.6	49.1	0.0	116.5	897.2
14-Apr-17 4:00	5.5	57.1	9.2	2.6	45.2	0.0	116.0	897.1
14-Apr-17 5:00	5.0	82.7	13.8	2.8	44.2	0.0	116.5	897.2

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean
14-Apr-17 6:00	4.7	66.2	15.5	2.2	48.3	3.0	116.4	897.3
14-Apr-17 7:00	7.4	82.6	14.4	2.2	47.9	43.9	116.4	897.2
14-Apr-17 8:00	7.9	78.8	13.5	2.0	48.5	117.9	116.3	897.6
14-Apr-17 9:00	8.3	69.2	12.3	1.9	50.5	172.8	115.8	897.0
14-Apr-17 10:00	7.7	51.0	4.0	1.8	53.0	253.6	116.1	897.0
14-Apr-17 11:00	6.8	46.3	3.4	2.1	51.7	416.4	115.6	897.6
14-Apr-17 12:00	6.7	44.4	3.7	2.8	49.8	721.7	115.1	898.3
14-Apr-17 13:00	5.2	34.2	7.3	3.6	46.5	812.0	114.6	898.3
14-Apr-17 14:00	2.8	62.4	11.6	3.9	47.9	690.4	114.8	897.1
14-Apr-17 15:00	2.6	19.1	15.7	3.7	47.0	310.7	115.0	897.1
14-Apr-17 16:00	2.3	59.1	13.9	3.7	47.9	325.2	114.1	897.0
14-Apr-17 17:00	2.4	1.6	28.5	3.4	47.7	174.1	114.3	897.0
14-Apr-17 18:00	1.5	329.0	37.6	3.3	46.7	129.4	114.4	896.9
14-Apr-17 19:00	1.1	188.2	24.4	2.7	54.7	50.3	114.4	897.0
14-Apr-17 20:00	1.9	204.8	16.4	2.3	56.5	7.8	114.3	897.0
14-Apr-17 21:00	2.2	226.8	8.6	1.9	62.1	0.1	114.4	897.1
14-Apr-17 22:00	1.4	227.3	17.8	2.0	60.3	0.0	113.7	897.1
14-Apr-17 23:00	1.8	198.0	11.0	1.6	66.6	0.0	113.2	897.1
15-Apr-17 0:00	2.3	198.6	12.3	1.3	72.1	0.0	113.4	897.1
15-Apr-17 1:00	1.9	178.4	18.7	0.9	76.3	0.0	113.0	897.2
15-Apr-17 2:00	2.3	200.0	15.6	0.8	78.8	0.0	113.4	897.3
15-Apr-17 3:00	2.5	202.6	12.3	0.4	84.0	0.0	113.4	897.2
15-Apr-17 4:00	2.4	203.0	11.6	0.1	89.9	0.0	113.3	897.3
15-Apr-17 5:00	2.6	209.5	9.1	-0.1	92.8	0.0	113.3	897.3
15-Apr-17 6:00	2.8	208.8	11.4	-0.2	94.5	1.7	113.6	897.3
15-Apr-17 7:00	2.5	217.7	11.4	-0.3	96.4	18.4	112.9	897.4
15-Apr-17 8:00	2.4	234.3	6.7	-0.3	97.5	68.2	113.3	897.4
15-Apr-17 9:00	2.3	229.3	7.0	-0.1	96.1	158.7	113.2	897.3
15-Apr-17 10:00	2.4	221.1	6.5	0.0	96.3	235.6	113.3	897.3
15-Apr-17 11:00	2.1	215.4	11.1	0.5	95.2	313.1	112.6	897.2
15-Apr-17 12:00	2.5	228.9	11.2	1.0	92.1	388.1	114.2	897.3
15-Apr-17 13:00	3.1	232.7	15.0	0.8	92.5	351.4	113.9	897.2
15-Apr-17 14:00	3.8	208.8	13.2	1.1	88.6	374.5	113.0	897.6
15-Apr-17 15:00	5.9	241.6	7.9	1.6	80.4	371.2	113.0	897.5
15-Apr-17 16:00	6.8	237.1	8.3	1.8	78.5	415.1	113.0	897.4
15-Apr-17 17:00	6.0	227.0	9.7	1.2	84.2	248.8	113.9	897.1
15-Apr-17 18:00	4.3	212.9	10.6	0.6	89.8	114.9	113.9	897.4
15-Apr-17 19:00	3.7	197.4	14.6	0.1	94.0	53.0	113.7	897.4
15-Apr-17 20:00	3.4	208.0	13.9	-0.3	97.3	12.3	113.5	897.4
15-Apr-17 21:00	3.1	212.0	12.3	-0.6	97.9	0.1	112.5	897.7
15-Apr-17 22:00	3.8	207.0	7.5	-0.7	99.0	0.0	113.2	897.6
15-Apr-17 23:00	3.6	206.1	6.8	-0.7	98.7	0.0	113.3	897.6
16-Apr-17 0:00	3.2	206.8	9.2	-0.7	96.4	0.0	113.4	897.7
16-Apr-17 1:00	3.0	213.5	8.1	-0.8	97.2	0.0	113.0	897.7
16-Apr-17 2:00	4.0	215.8	9.7	-0.9	99.0	0.0	112.3	897.7
16-Apr-17 3:00	4.3	222.4	7.9	-0.9	99.2	0.0	112.2	897.6
16-Apr-17 4:00	3.3	212.4	10.5	-1.1	99.2	0.0	111.6	897.7
16-Apr-17 5:00	2.9	217.5	8.8	-1.1	98.5	0.0	111.6	897.8
16-Apr-17 6:00	2.3	206.9	7.9	-1.0	96.3	2.9	111.8	897.8
16-Apr-17 7:00	2.3	203.1	8.0	-1.0	94.8	44.8	111.5	897.8
16-Apr-17 8:00	3.2	201.6	4.4	-0.8	94.4	122.8	111.4	897.8
16-Apr-17 9:00	3.3	206.3	5.1	0.0	90.5	410.5	111.3	898.3
16-Apr-17 10:00	3.2	224.9	7.9	0.5	86.3	504.7	111.8	897.7
16-Apr-17 11:00	1.9	230.6	23.8	1.1	83.0	567.3	112.4	898.1



Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
16-Apr-17 12:00	0.5	82.4	18.7	2.8	73.1	542.1	112.6	897.7
16-Apr-17 13:00	0.4	99.4	19.8	2.7	71.0	428.8	111.8	897.4
16-Apr-17 14:00	0.6	97.6	16.8	2.7	69.8	368.8	112.2	897.2
16-Apr-17 15:00	0.8	353.0	32.6	2.9	65.7	381.6	111.6	897.4
16-Apr-17 16:00	1.2	63.9	36.3	2.5	64.9	269.1	111.3	897.4
16-Apr-17 17:00	1.4	56.1	21.2	2.0	66.5	181.8	111.2	897.2
16-Apr-17 18:00	1.4	91.8	27.0	3.3	59.9	379.6	111.2	897.0
16-Apr-17 19:00	2.5	9.5	17.6	2.3	62.3	172.5	111.0	897.1
16-Apr-17 20:00	3.6	10.7	5.6	1.5	66.8	37.7	111.4	897.4
16-Apr-17 21:00	4.3	6.9	2.9	0.9	68.8	0.6	111.1	897.3
16-Apr-17 22:00	3.7	23.9	10.5	0.0	75.6	0.0	111.4	897.5
16-Apr-17 23:00	3.1	34.4	6.5	-0.3	80.0	0.0	111.6	897.5
17-Apr-17 0:00	4.4	24.2	8.6	-0.4	78.7	0.0	111.3	897.6
17-Apr-17 1:00	1.0	137.6	29.0	-0.8	79.0	0.0	111.3	897.8
17-Apr-17 2:00	0.9	173.2	40.4	-0.6	76.3	0.0	111.3	897.8
17-Apr-17 3:00	1.1	154.9	21.0	-0.9	76.8	0.0	110.8	897.9
17-Apr-17 4:00	1.1	232.7	34.9	-0.5	72.1	0.0	111.3	897.9
17-Apr-17 5:00	1.2	247.6	31.4	-0.6	71.6	0.0	111.3	897.9
17-Apr-17 6:00	1.2	221.8	34.8	-1.0	74.4	5.2	110.5	897.9
17-Apr-17 7:00	0.9	251.7	50.3	-0.9	72.6	20.4	111.2	897.9
17-Apr-17 8:00	0.8	248.8	35.4	0.0	69.9	208.4	110.6	898.6
17-Apr-17 9:00	0.9	274.9	48.9	1.4	62.6	422.1	110.4	899.2
17-Apr-17 10:00	1.3	18.1	30.6	1.9	61.4	572.9	110.3	898.9
17-Apr-17 11:00	0.8	140.2	26.8	3.1	57.7	690.6	109.9	899.0
17-Apr-17 12:00	0.7	119.5	35.7	4.1	53.2	768.8	110.5	898.5
17-Apr-17 13:00	1.0	82.6	24.7	4.6	50.6	835.0	110.5	898.4
17-Apr-17 14:00	2.5	51.3	18.8	4.1	53.3	795.9	110.3	898.2
17-Apr-17 15:00	2.8	33.8	9.7	4.5	51.0	696.4	110.3	897.9
17-Apr-17 16:00	3.2	5.8	11.9	5.2	47.0	634.8	110.4	897.6
17-Apr-17 17:00	3.7	7.3	11.0	4.8	47.5	431.9	110.5	897.0
17-Apr-17 18:00	3.9	351.8	10.3	4.6	47.9	318.1	110.0	896.9
17-Apr-17 19:00	4.0	353.3	5.6	3.8	50.1	159.5	110.1	897.0
17-Apr-17 20:00	3.4	23.1	5.9	3.3	51.8	57.5	110.2	897.2
17-Apr-17 21:00	5.5	55.4	13.6	2.6	54.8	1.2	110.7	897.3
17-Apr-17 22:00	2.5	68.6	62.4	2.1	55.6	0.0	110.8	897.3
17-Apr-17 23:00	6.0	44.8	33.7	1.5	58.8	0.0	109.9	897.4
18-Apr-17 0:00	7.3	47.7	13.3	0.5	63.0	0.0	109.8	897.1
18-Apr-17 1:00	9.0	33.8	5.3	-0.1	65.8	0.0	109.9	897.3
18-Apr-17 2:00	9.4	34.7	4.1	-0.8	67.4	0.0	109.5	897.6
18-Apr-17 3:00	7.8	40.2	5.2	-1.5	70.0	0.0	110.6	897.8
18-Apr-17 4:00	7.8	36.5	5.1	-2.0	71.5	0.0	109.1	897.4
18-Apr-17 5:00	6.4	47.5	7.4	-2.5	73.7	0.0	110.2	897.8
18-Apr-17 6:00	6.4	37.2	5.5	-2.9	80.5	4.1	109.6	897.8
18-Apr-17 7:00	7.2	37.9	5.8	-3.3	77.9	37.8	109.6	897.7
18-Apr-17 8:00	5.6	42.6	5.4	-3.1	78.4	261.2	109.1	898.4
18-Apr-17 9:00	3.9	33.1	6.0	-3.3	80.9	142.6	109.2	898.0
18-Apr-17 10:00	4.8	44.0	12.7	-3.4	91.5	324.5	108.8	898.0
18-Apr-17 11:00	2.6	40.7	13.8	-2.7	87.2	426.4	108.5	898.9
18-Apr-17 12:00	2.7	37.8	6.3	-1.6	80.2	692.7	108.1	899.4
18-Apr-17 13:00	1.9	87.0	11.8	-0.9	78.1	643.0	109.1	898.0
18-Apr-17 14:00	2.6	86.0	10.9	-0.4	74.4	592.1	109.2	897.9
18-Apr-17 15:00	1.4	90.7	19.6	0.8	69.4	532.1	109.1	898.1
18-Apr-17 16:00	0.8	64.7	42.0	1.5	64.3	416.4	109.0	897.7
18-Apr-17 17:00	3.6	16.8	10.8	0.8	68.3	234.1	109.4	897.8

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
	Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
18-Apr-17 18:00	1.3	84.6	43.1	0.6	72.2	132.3	109.5	897.7
18-Apr-17 19:00	2.6	322.4	15.3	-0.6	87.6	47.0	109.3	898.1
18-Apr-17 20:00	4.7	28.2	7.1	-1.4	96.2	11.6	109.3	898.1
18-Apr-17 21:00	4.0	32.5	6.7	-1.7	98.4	0.2	109.5	898.2
18-Apr-17 22:00	3.1	28.6	5.2	-1.7	98.3	0.0	109.3	898.8
18-Apr-17 23:00	2.3	28.5	6.0	-1.8	98.3	0.0	110.1	899.3
19-Apr-17 0:00	1.7	16.2	23.3	-1.8	98.2	0.0	111.6	900.2
19-Apr-17 1:00	1.4	6.2	51.7	-1.7	98.2	0.0	113.5	901.4
19-Apr-17 2:00	2.2	199.9	18.8	-1.4	98.4	0.0	112.6	902.1
19-Apr-17 3:00	3.0	197.4	10.5	-1.3	98.5	0.0	113.1	902.4
19-Apr-17 4:00	3.0	203.2	8.7	-1.2	98.6	0.0	116.1	902.7
19-Apr-17 5:00	2.8	197.1	10.4	-1.1	98.6	0.0	-	902.7
19-Apr-17 6:00	2.1	186.6	15.5	-1.0	98.6	9.7	115.4	902.7
19-Apr-17 7:00	2.6	176.3	10.3	-0.9	98.1	70.4	115.7	902.6
19-Apr-17 8:00	1.1	189.7	40.9	-0.3	96.8	204.5	115.4	902.9
19-Apr-17 9:00	1.7	74.8	34.5	0.2	94.3	361.4	113.1	903.0
19-Apr-17 10:00	1.0	71.1	39.7	0.4	92.2	345.9	113.4	902.5
19-Apr-17 11:00	1.4	19.7	21.1	0.4	93.0	295.4	111.0	903.1
19-Apr-17 12:00	1.2	26.1	12.4	0.6	93.8	363.8	111.4	903.4
19-Apr-17 13:00	0.7	199.5	22.3	1.3	91.6	419.0	110.5	903.4
19-Apr-17 14:00	0.7	60.4	23.6	1.5	90.5	430.9	111.2	903.5
19-Apr-17 15:00	0.8	47.9	14.9	1.9	87.1	401.1	111.2	903.8
19-Apr-17 16:00	1.3	9.4	12.2	1.7	90.7	346.8	109.2	903.5
19-Apr-17 17:00	0.6	355.8	31.8	1.2	94.1	191.6	112.1	904.1
19-Apr-17 18:00	0.3	108.7	29.4	1.4	92.3	155.8	111.4	904.4
19-Apr-17 19:00	1.2	227.8	19.5	0.3	96.9	74.3	111.4	905.0
19-Apr-17 20:00	1.3	168.0	35.0	0.0	98.4	26.9	109.0	905.3
19-Apr-17 21:00	2.7	180.0	11.5	0.3	96.5	1.2	-	905.3
19-Apr-17 22:00	2.7	186.5	8.4	0.4	93.2	0.0	111.8	905.4
19-Apr-17 23:00	1.5	180.7	11.3	0.2	92.4	0.0	111.6	905.5
20-Apr-17 0:00	1.5	181.5	12.4	0.3	89.3	0.0	111.7	905.5
20-Apr-17 1:00	1.2	175.3	18.0	0.4	90.3	0.0	111.7	905.5
20-Apr-17 2:00	1.3	200.3	10.7	0.2	93.6	0.0	111.5	905.5
20-Apr-17 3:00	2.3	216.6	9.0	-0.2	97.7	0.0	111.2	905.5
20-Apr-17 4:00	1.4	178.3	12.3	-0.3	98.9	0.0	111.1	905.6
20-Apr-17 5:00	1.6	193.4	9.8	-0.4	99.1	0.0	111.8	905.8
20-Apr-17 6:00	2.4	210.9	7.9	-0.3	99.2	6.5	110.9	905.8
20-Apr-17 7:00	2.4	209.4	6.9	-0.3	98.9	48.4	109.8	905.7
20-Apr-17 8:00	2.2	211.0	10.6	-0.3	98.6	87.6	109.4	905.7
20-Apr-17 9:00	2.4	195.4	10.4	0.2	96.6	358.6	111.1	905.9
20-Apr-17 10:00	1.8	215.8	13.4	1.2	90.5	619.3	109.3	906.8
20-Apr-17 11:00	1.8	213.6	11.3	2.2	85.5	738.7	-	906.6
20-Apr-17 12:00	1.2	205.5	23.0	2.6	86.1	488.0	110.6	905.5
20-Apr-17 13:00	2.6	265.7	12.0	2.1	90.4	557.1	108.9	905.8
20-Apr-17 14:00	2.4	226.9	15.0	2.4	86.5	419.1	110.0	905.4
20-Apr-17 15:00	3.2	241.1	16.0	2.4	87.2	321.1	110.3	905.4
20-Apr-17 16:00	5.0	233.6	13.5	2.3	86.2	274.9	110.1	905.7
20-Apr-17 17:00	4.2	217.5	14.4	2.3	83.4	238.6	109.6	905.4
20-Apr-17 18:00	3.9	227.5	10.0	2.8	81.1	306.4	109.5	905.0
20-Apr-17 19:00	4.1	219.7	11.0	2.1	84.3	159.7	109.4	905.5
20-Apr-17 20:00	2.9	200.7	13.4	1.5	88.2	16.6	108.8	905.6
20-Apr-17 21:00	3.0	199.8	12.4	1.2	89.5	1.2	108.8	905.7
20-Apr-17 22:00	2.1	209.2	12.3	1.3	87.7	0.0	108.4	905.7
20-Apr-17 23:00	2.2	192.7	8.8	1.3	88.4	0.0	108.3	905.7

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
	Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
21-Apr-17 0:00	2.7	203.2	10.8	1.2	88.1	0.0	108.2	905.8
21-Apr-17 1:00	3.5	202.2	8.8	0.9	90.4	0.0	108.1	905.8
21-Apr-17 2:00	2.7	180.5	14.1	0.7	90.7	0.0	108.4	905.8
21-Apr-17 3:00	2.7	181.9	12.6	0.8	86.9	0.0	107.8	906.1
21-Apr-17 4:00	4.7	196.0	8.2	0.6	86.7	0.0	107.7	905.8
21-Apr-17 5:00	2.0	228.9	20.2	0.4	88.3	0.0	107.7	905.8
21-Apr-17 6:00	1.6	197.3	19.4	0.5	86.2	6.3	107.7	905.8
21-Apr-17 7:00	2.4	184.4	15.6	0.6	86.3	41.4	107.8	905.9
21-Apr-17 8:00	2.2	189.0	27.8	1.3	80.3	164.2	107.9	905.8
21-Apr-17 9:00	1.4	219.0	42.8	1.8	81.5	338.0	107.2	906.0
21-Apr-17 10:00	2.1	89.5	31.9	2.4	77.5	435.8	107.7	906.2
21-Apr-17 11:00	0.8	78.6	27.5	3.7	68.4	476.1	105.9	905.9
21-Apr-17 12:00	1.3	227.2	59.8	3.8	73.4	458.0	106.5	905.7
21-Apr-17 13:00	1.6	36.4	35.1	4.0	70.3	530.6	105.2	906.0
21-Apr-17 14:00	1.8	91.9	45.6	4.2	67.2	402.7	106.7	905.5
21-Apr-17 15:00	3.3	209.5	32.4	4.4	65.0	499.9	106.6	905.3
21-Apr-17 16:00	3.3	227.5	21.0	4.1	63.2	343.5	106.1	905.4
21-Apr-17 17:00	1.4	69.5	32.2	4.4	62.0	383.4	105.4	905.5
21-Apr-17 18:00	1.2	69.9	30.8	4.6	56.9	247.7	105.7	905.3
21-Apr-17 19:00	1.0	205.4	52.8	3.9	65.9	124.3	105.4	905.3
21-Apr-17 20:00	1.3	111.2	58.0	2.9	69.9	40.4	105.4	905.4
21-Apr-17 21:00	1.7	154.1	41.8	2.6	68.7	1.0	105.3	905.5
21-Apr-17 22:00	1.0	195.8	31.4	2.8	62.6	0.0	105.7	905.6
21-Apr-17 23:00	1.6	258.6	47.5	3.0	58.5	0.0	105.6	905.6
22-Apr-17 0:00	1.7	7.6	56.8	2.8	55.7	0.0	105.5	905.7
22-Apr-17 1:00	2.5	46.3	36.7	2.8	51.9	0.0	105.3	905.6
22-Apr-17 2:00	4.2	43.0	14.9	2.3	53.9	0.0	105.6	905.4
22-Apr-17 3:00	4.8	74.7	21.1	2.1	52.9	0.0	105.6	905.7
22-Apr-17 4:00	2.1	75.8	49.0	1.8	54.8	0.0	105.2	905.7
22-Apr-17 5:00	4.9	88.5	35.7	1.8	55.3	0.2	105.0	905.8
22-Apr-17 6:00	2.6	102.5	66.8	1.6	55.8	23.3	105.7	905.8
22-Apr-17 7:00	7.4	51.8	42.3	2.1	54.2	82.9	105.4	905.9
22-Apr-17 8:00	5.6	67.0	50.3	2.3	55.2	215.9	104.9	906.1
22-Apr-17 9:00	2.2	84.2	61.3	3.7	50.0	429.2	104.9	906.7
22-Apr-17 10:00	1.8	210.4	71.4	4.4	49.0	573.4	105.0	906.8
22-Apr-17 11:00	4.3	78.6	51.2	4.9	48.3	684.3	104.7	906.3
22-Apr-17 12:00	7.9	41.2	34.1	5.5	46.1	767.1	102.9	907.1
22-Apr-17 13:00	8.7	44.8	21.9	6.1	44.0	797.5	102.8	906.4
22-Apr-17 14:00	9.0	80.4	15.1	6.3	44.6	761.1	101.8	905.9
22-Apr-17 15:00	9.2	80.6	6.2	6.3	45.9	518.7	102.1	905.0
22-Apr-17 16:00	10.5	90.2	5.5	6.4	43.7	463.1	100.5	905.2
22-Apr-17 17:00	8.2	84.8	8.2	7.0	40.2	355.5	101.4	905.3
22-Apr-17 18:00	8.5	84.4	7.7	7.2	37.9	297.7	100.4	904.6
22-Apr-17 19:00	8.6	78.6	9.8	6.8	40.3	128.5	99.7	905.3
22-Apr-17 20:00	8.1	86.5	7.0	6.8	40.0	27.2	98.6	905.6
22-Apr-17 21:00	7.9	87.9	7.0	6.3	42.6	0.9	99.6	905.7
22-Apr-17 22:00	7.2	79.7	10.2	6.1	43.1	0.0	99.2	905.6
22-Apr-17 23:00	7.1	77.9	9.3	5.1	47.6	0.0	99.2	905.5
23-Apr-17 0:00	4.2	94.4	38.7	5.0	47.3	0.0	98.9	905.3
23-Apr-17 1:00	1.8	325.0	40.2	4.9	46.6	0.0	99.2	905.4
23-Apr-17 2:00	1.5	40.4	30.8	4.6	47.6	0.0	99.9	905.4
23-Apr-17 3:00	0.9	78.8	35.2	4.2	49.3	0.0	99.7	905.4
23-Apr-17 4:00	1.1	270.4	34.7	3.8	50.6	0.0	99.7	905.5
23-Apr-17 5:00	0.7	200.6	52.8	3.3	53.5	0.1	99.8	905.5

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
23-Apr-17 6:00	0.5	212.1	35.4	3.2	52.4	11.5	99.6	905.6
23-Apr-17 7:00	1.8	51.4	9.4	3.1	52.4	77.4	99.1	905.6
23-Apr-17 8:00	1.8	50.2	27.4	3.4	53.5	166.7	99.4	905.7
23-Apr-17 9:00	0.5	65.7	25.2	4.3	50.6	209.6	99.8	905.8
23-Apr-17 10:00	0.6	172.6	24.1	6.1	46.1	566.1	99.2	906.8
23-Apr-17 11:00	0.5	207.6	33.4	6.8	46.7	716.6	100.1	906.8
23-Apr-17 12:00	1.1	93.9	14.5	6.1	47.8	792.3	99.4	907.2
23-Apr-17 13:00	1.7	73.1	8.4	6.1	49.9	775.8	98.9	906.0
23-Apr-17 14:00	2.6	92.6	6.1	5.7	51.4	568.4	97.5	905.9
23-Apr-17 15:00	1.7	103.9	11.0	6.0	49.9	473.0	96.5	905.5
23-Apr-17 16:00	2.2	332.2	46.7	7.4	46.1	692.7	97.1	905.3
23-Apr-17 17:00	4.5	249.0	27.3	6.9	49.1	662.6	95.8	904.4
23-Apr-17 18:00	4.0	258.7	28.5	6.8	49.2	520.2	95.6	904.7
23-Apr-17 19:00	2.9	291.4	19.3	6.3	52.5	352.1	95.2	904.7
23-Apr-17 20:00	1.8	233.0	24.7	5.4	55.3	95.9	96.0	904.9
23-Apr-17 21:00	2.9	207.5	28.6	4.0	66.0	2.0	96.4	905.1
23-Apr-17 22:00	3.2	191.9	17.8	3.1	78.0	0.0	97.4	905.2
23-Apr-17 23:00	2.6	179.5	24.0	2.6	84.2	0.0	97.2	905.3
24-Apr-17 0:00	2.1	176.5	14.0	2.3	85.7	0.0	96.8	905.4
24-Apr-17 1:00	1.6	170.8	15.8	2.4	84.6	0.0	97.4	905.4
24-Apr-17 2:00	2.2	201.8	10.4	2.3	86.1	0.0	96.8	905.5
24-Apr-17 3:00	1.7	185.4	15.9	2.1	87.9	0.0	96.8	905.5
24-Apr-17 4:00	1.7	181.1	6.6	2.1	87.3	0.0	96.9	905.5
24-Apr-17 5:00	1.6	222.1	7.9	1.6	91.5	0.2	95.4	905.5
24-Apr-17 6:00	0.7	162.9	21.6	1.4	90.8	13.7	96.2	905.6
24-Apr-17 7:00	0.4	160.8	28.9	1.6	87.9	27.4	95.0	905.7
24-Apr-17 8:00	0.4	134.0	7.9	3.3	77.9	281.3	95.4	906.3
24-Apr-17 9:00	1.1	197.1	10.0	3.4	80.6	448.1	95.8	906.1
24-Apr-17 10:00	1.6	210.1	13.6	3.6	81.5	611.1	93.0	905.6
24-Apr-17 11:00	1.1	180.6	21.8	4.2	77.1	573.6	94.1	905.8
24-Apr-17 12:00	0.7	64.5	17.6	5.3	69.7	620.5	92.2	906.4
24-Apr-17 13:00	0.7	41.8	45.0	4.4	74.2	355.0	93.6	905.1
24-Apr-17 14:00	1.5	151.1	32.7	5.0	69.2	394.8	93.3	905.0
24-Apr-17 15:00	4.0	234.3	19.9	4.8	68.5	467.8	91.6	905.0
24-Apr-17 16:00	4.3	226.5	16.5	4.7	73.3	553.9	91.8	904.9
24-Apr-17 17:00	4.3	232.4	16.2	4.5	75.5	355.6	91.0	905.0
24-Apr-17 18:00	4.6	231.9	12.0	3.9	78.5	258.0	92.4	904.9
24-Apr-17 19:00	3.0	202.2	13.6	3.4	82.5	144.1	91.9	905.2
24-Apr-17 20:00	2.2	207.8	22.6	2.6	86.7	22.0	92.0	905.2
24-Apr-17 21:00	1.3	199.1	10.2	2.4	88.3	1.5	92.0	905.3
24-Apr-17 22:00	1.7	198.0	12.6	2.3	88.8	0.0	91.8	905.4
24-Apr-17 23:00	0.6	221.5	31.5	2.4	87.1	0.0	91.6	905.4
25-Apr-17 0:00	1.4	230.3	7.1	2.3	89.0	0.0	91.9	905.4
25-Apr-17 1:00	1.4	197.3	21.8	2.3	87.8	0.0	91.5	905.5
25-Apr-17 2:00	1.0	100.2	25.0	2.4	82.9	0.0	91.3	905.5
25-Apr-17 3:00	2.1	52.5	5.3	2.6	79.3	0.0	91.1	905.5
25-Apr-17 4:00	0.7	61.7	47.2	3.1	75.1	0.0	91.2	905.5
25-Apr-17 5:00	0.3	55.3	33.2	3.0	75.1	0.2	91.1	905.5
25-Apr-17 6:00	0.8	50.7	20.3	3.0	74.1	12.1	90.9	905.5
25-Apr-17 7:00	0.7	29.9	33.2	3.3	72.2	64.8	90.8	905.6
25-Apr-17 8:00	0.7	83.1	32.1	4.7	63.5	271.7	89.9	906.2
25-Apr-17 9:00	1.3	75.8	16.3	4.8	60.4	438.1	90.5	906.9
25-Apr-17 10:00	1.2	70.4	10.8	5.6	56.8	614.4	89.2	907.4
25-Apr-17 11:00	1.0	64.4	10.1	6.3	54.5	732.8	88.8	907.2

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
	Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
25-Apr-17 12:00	1.2	94.0	15.1	6.3	54.7	756.6	89.2	906.0
25-Apr-17 13:00	2.0	99.8	16.2	5.8	57.3	543.4	88.1	905.5
25-Apr-17 14:00	2.7	170.5	37.8	7.1	48.0	756.2	85.8	905.4
25-Apr-17 15:00	2.1	185.7	50.3	7.9	44.1	860.0	86.6	904.9
25-Apr-17 16:00	2.4	150.3	22.2	6.5	48.4	519.8	86.0	904.8
25-Apr-17 17:00	1.6	137.5	21.8	6.5	45.4	305.2	85.5	904.6
25-Apr-17 18:00	1.9	93.0	15.1	7.4	37.2	390.1	85.5	904.7
25-Apr-17 19:00	4.8	77.4	14.3	6.7	37.5	192.8	85.4	904.7
25-Apr-17 20:00	5.6	82.8	8.6	5.8	43.7	31.9	85.2	904.9
25-Apr-17 21:00	7.2	81.0	11.0	5.3	46.6	1.6	84.8	905.1
25-Apr-17 22:00	7.6	76.2	8.0	4.9	48.6	0.0	84.2	905.2
25-Apr-17 23:00	8.6	83.2	7.8	4.8	49.8	0.0	84.3	905.1
26-Apr-17 0:00	7.7	92.8	5.9	4.5	53.5	0.0	85.1	905.4
26-Apr-17 1:00	7.8	92.5	7.7	4.6	53.8	0.0	85.0	905.5
26-Apr-17 2:00	8.9	101.5	4.5	5.0	51.2	0.0	85.4	905.2
26-Apr-17 3:00	5.7	106.8	13.7	4.9	50.8	0.0	85.1	905.1
26-Apr-17 4:00	6.8	89.8	11.3	4.5	54.4	0.0	84.7	905.3
26-Apr-17 5:00	4.2	70.9	18.2	4.2	56.1	0.2	85.3	905.1
26-Apr-17 6:00	6.7	39.5	9.7	4.2	55.1	12.1	85.2	905.2
26-Apr-17 7:00	4.4	16.4	10.2	4.5	52.0	90.5	83.6	905.2
26-Apr-17 8:00	1.3	230.4	35.0	5.2	52.3	303.8	84.0	905.4
26-Apr-17 9:00	3.4	202.3	11.9	3.5	62.6	221.9	83.6	905.4
26-Apr-17 10:00	2.6	186.3	17.4	3.6	65.7	182.8	82.7	905.4
26-Apr-17 11:00	0.9	45.6	22.1	5.2	56.6	402.4	82.7	905.6
26-Apr-17 12:00	1.0	13.8	30.7	6.1	52.4	507.0	83.3	904.9
26-Apr-17 13:00	1.9	66.1	17.3	5.6	59.0	611.3	82.4	906.3
26-Apr-17 14:00	0.8	104.6	38.4	6.1	54.0	302.8	83.2	905.4
26-Apr-17 15:00	4.4	120.5	40.0	5.0	58.6	212.5	83.7	906.6
26-Apr-17 16:00	7.5	195.6	13.1	2.0	84.9	341.0	84.1	905.1
26-Apr-17 17:00	4.1	205.2	12.6	3.2	75.3	349.5	83.6	905.3
26-Apr-17 18:00	3.5	171.7	13.6	2.8	79.1	239.7	81.4	905.2
26-Apr-17 19:00	2.1	22.5	11.0	2.6	81.8	126.6	83.7	905.5
26-Apr-17 20:00	1.6	115.9	18.8	2.1	85.1	38.3	84.3	905.4
26-Apr-17 21:00	2.3	152.8	24.0	1.9	85.4	1.9	83.1	905.6
26-Apr-17 22:00	4.7	170.6	9.7	1.0	93.1	0.0	84.2	905.5
26-Apr-17 23:00	6.2	188.5	11.5	0.3	98.0	0.0	83.8	906.0
27-Apr-17 0:00	6.5	198.4	8.9	0.0	98.6	0.0	83.6	906.4
27-Apr-17 1:00	5.6	209.8	7.2	-0.4	98.8	0.0	84.1	906.3
27-Apr-17 2:00	3.4	221.4	8.8	-0.8	99.0	0.0	-	906.7
27-Apr-17 3:00	2.5	227.5	8.6	-1.2	98.8	0.0	83.0	906.8
27-Apr-17 4:00	2.3	227.6	7.9	-1.4	98.5	0.0	83.8	907.2
27-Apr-17 5:00	3.9	228.4	7.9	-1.6	98.2	0.3	86.1	906.7
27-Apr-17 6:00	3.8	208.9	12.7	-2.1	97.9	17.6	-	907.1
27-Apr-17 7:00	2.8	199.5	11.4	-2.3	97.4	58.7	-	907.1
27-Apr-17 8:00	2.6	207.2	10.9	-1.9	97.1	137.0	-	907.1
27-Apr-17 9:00	2.7	200.4	14.5	-0.8	96.1	356.2	84.2	907.2
27-Apr-17 10:00	4.6	203.5	12.3	-0.4	95.4	435.5	84.0	906.7
27-Apr-17 11:00	6.6	239.0	8.8	0.6	93.9	634.8	82.9	907.4
27-Apr-17 12:00	6.0	232.0	9.8	0.3	93.6	518.4	83.5	907.7
27-Apr-17 13:00	6.8	225.2	10.6	0.6	91.8	581.9	84.1	907.6
27-Apr-17 14:00	7.7	239.8	8.8	0.4	91.2	560.9	84.3	906.7
27-Apr-17 15:00	7.0	230.0	11.1	0.0	92.1	390.6	83.5	906.9
27-Apr-17 16:00	4.8	208.4	15.1	0.9	88.7	710.7	83.7	906.4
27-Apr-17 17:00	5.9	220.9	8.4	0.1	92.3	257.6	84.3	906.8

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
	Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
27-Apr-17 18:00	5.2	212.5	10.6	-0.5	95.4	104.5	83.6	907.0
27-Apr-17 19:00	5.1	215.6	7.4	-0.6	95.3	79.8	83.8	907.0
27-Apr-17 20:00	4.9	215.1	7.9	-0.8	97.4	34.6	83.2	907.0
27-Apr-17 21:00	5.1	215.5	7.8	-1.1	98.5	3.8	82.9	907.3
27-Apr-17 22:00	4.3	219.6	7.5	-1.1	98.6	0.0	83.1	907.4
27-Apr-17 23:00	4.3	220.4	9.0	-1.2	98.5	0.0	83.3	907.5
28-Apr-17 0:00	4.3	225.9	9.4	-1.4	98.4	0.0	85.1	907.9
28-Apr-17 1:00	4.3	229.1	6.4	-1.7	98.3	0.0	87.3	908.1
28-Apr-17 2:00	3.6	220.7	6.8	-2.0	98.1	0.0	87.3	908.1
28-Apr-17 3:00	2.9	215.3	9.7	-2.2	98.0	0.0	87.3	908.1
28-Apr-17 4:00	3.3	190.0	12.0	-2.3	98.0	0.0	87.3	908.2
28-Apr-17 5:00	3.0	190.5	9.5	-2.5	97.8	0.4	87.1	908.3
28-Apr-17 6:00	2.9	197.0	5.5	-2.7	97.2	37.4	86.4	908.1
28-Apr-17 7:00	3.0	217.3	7.6	-2.2	97.1	81.2	85.2	908.3
28-Apr-17 8:00	3.1	221.7	9.1	-1.8	96.5	165.7	85.9	908.3
28-Apr-17 9:00	2.8	211.3	13.2	-0.4	94.2	382.0	83.1	909.0
28-Apr-17 10:00	3.1	231.1	11.5	0.5	90.4	484.3	85.2	908.4
28-Apr-17 11:00	3.6	222.5	13.7	0.9	86.6	603.2	84.8	908.2
28-Apr-17 12:00	4.4	226.2	16.4	1.1	81.7	638.5	83.9	908.4
28-Apr-17 13:00	6.2	237.8	10.7	0.7	76.7	547.6	85.7	908.4
28-Apr-17 14:00	5.1	246.3	14.5	0.0	74.9	369.3	84.9	908.2
28-Apr-17 15:00	1.7	291.5	39.6	1.0	72.0	366.6	83.8	908.3
28-Apr-17 16:00	0.8	107.7	54.0	1.7	69.6	311.8	84.4	908.0
28-Apr-17 17:00	4.9	243.2	14.5	1.1	70.7	338.0	84.6	907.9
28-Apr-17 18:00	4.0	273.3	19.3	0.7	72.3	164.1	82.7	908.2
28-Apr-17 19:00	3.9	260.6	18.9	0.6	73.0	143.4	84.0	908.2
28-Apr-17 20:00	2.2	168.6	26.7	-0.2	74.8	30.0	83.8	908.1
28-Apr-17 21:00	2.0	191.3	16.0	-0.8	78.6	3.6	83.4	908.2
28-Apr-17 22:00	1.1	166.7	28.5	-1.2	83.8	0.0	83.8	908.3
28-Apr-17 23:00	1.4	160.2	20.6	-1.5	85.0	0.0	84.4	908.4
29-Apr-17 0:00	0.9	123.3	23.1	-1.8	78.1	0.0	84.4	908.4
29-Apr-17 1:00	0.9	130.4	22.9	-1.8	78.3	0.0	84.3	908.5
29-Apr-17 2:00	0.9	47.4	13.8	-2.0	75.7	0.0	84.6	908.4
29-Apr-17 3:00	0.5	8.6	14.0	-2.0	82.8	0.0	85.0	908.5
29-Apr-17 4:00	1.1	91.5	23.9	-2.1	75.8	0.0	84.8	908.6
29-Apr-17 5:00	0.5	33.5	35.5	-2.0	72.9	1.6	85.1	908.6
29-Apr-17 6:00	2.4	45.8	9.8	-1.9	69.0	29.2	83.9	908.6
29-Apr-17 7:00	2.4	55.1	20.2	-1.6	67.7	106.7	84.8	908.6
29-Apr-17 8:00	2.0	147.4	32.3	-1.4	71.6	207.9	84.5	908.5
29-Apr-17 9:00	5.4	50.7	33.3	-0.6	63.9	343.3	84.1	908.4
29-Apr-17 10:00	4.8	56.6	21.4	-0.3	65.7	403.0	83.6	908.4
29-Apr-17 11:00	3.8	64.6	41.4	0.1	66.3	402.9	83.7	908.1
29-Apr-17 12:00	8.0	74.7	16.4	0.6	53.8	371.9	83.7	908.6
29-Apr-17 13:00	7.8	83.9	13.3	1.3	48.3	396.3	84.1	908.5
29-Apr-17 14:00	7.8	67.0	11.5	1.4	50.3	301.1	84.2	908.5
29-Apr-17 15:00	8.2	77.1	15.0	1.2	54.8	297.5	83.3	908.5
29-Apr-17 16:00	12.6	87.6	6.7	0.9	58.5	254.1	82.3	908.3
29-Apr-17 17:00	11.2	91.1	7.5	1.0	58.2	169.8	83.7	907.1
29-Apr-17 18:00	9.1	89.4	10.7	1.2	58.6	144.7	83.7	908.2
29-Apr-17 19:00	5.0	96.6	18.4	1.0	64.3	87.5	83.7	908.2
29-Apr-17 20:00	1.6	268.8	37.6	0.5	70.5	45.1	84.0	908.2
29-Apr-17 21:00	1.5	284.7	21.6	0.2	73.2	3.7	83.9	908.2
29-Apr-17 22:00	1.2	251.4	12.5	0.1	75.2	0.0	84.0	908.2
29-Apr-17 23:00	0.9	67.9	37.0	-0.1	76.3	0.0	83.9	908.2

## Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
30-Apr-17 0:00	1.2	63.3	14.8	-0.4	82.8	0.0	83.7	908.3
30-Apr-17 1:00	1.8	24.7	5.9	-0.8	89.8	0.0	83.4	908.6
30-Apr-17 2:00	1.5	26.9	9.8	-1.2	96.0	0.0	83.7	908.7
30-Apr-17 3:00	1.0	163.1	13.9	-1.1	94.4	0.0	83.6	908.7
30-Apr-17 4:00	1.6	201.6	14.4	-0.7	88.5	0.0	82.6	908.8
30-Apr-17 5:00	1.2	184.6	17.4	-0.9	92.3	0.6	83.8	908.8
30-Apr-17 6:00	0.7	47.0	25.5	-1.0	89.8	11.8	83.1	908.8
30-Apr-17 7:00	0.5	287.3	11.1	-0.4	87.7	92.0	81.0	909.1
30-Apr-17 8:00	1.1	236.7	11.3	1.0	82.5	329.0	83.2	909.2
30-Apr-17 9:00	2.0	207.0	7.9	1.0	83.6	497.5	82.9	909.5
30-Apr-17 10:00	2.5	224.8	12.7	1.8	78.6	622.1	82.7	909.4
30-Apr-17 11:00	2.9	241.7	18.8	2.2	78.1	573.9	82.3	908.8
30-Apr-17 12:00	2.5	233.7	44.7	2.4	78.7	544.1	83.1	908.6
30-Apr-17 13:00	3.6	240.9	16.2	2.9	71.5	430.1	82.4	908.4
30-Apr-17 14:00	6.8	242.4	10.0	2.9	70.6	344.2	81.8	908.4
30-Apr-17 15:00	6.9	233.3	12.1	2.7	76.2	375.9	82.5	908.9
30-Apr-17 16:00	6.2	220.9	11.2	1.3	87.9	262.6	81.3	908.6
30-Apr-17 17:00	4.7	221.3	10.2	0.5	96.6	183.9	80.9	908.7
30-Apr-17 18:00	5.7	222.5	9.7	0.3	97.8	94.6	81.6	909.4
30-Apr-17 19:00	4.3	196.7	13.4	0.0	94.2	67.1	81.5	909.1
30-Apr-17 20:00	3.3	220.2	12.3	-0.3	94.6	26.0	81.5	909.3
30-Apr-17 21:00	3.7	204.4	10.3	-0.8	96.4	1.2	79.9	909.6
30-Apr-17 22:00	3.0	208.0	8.2	-1.0	97.6	0.0	80.9	909.7
30-Apr-17 23:00	3.6	212.7	8.7	-1.0	98.6	0.0	80.2	909.8
01-May-17 0:00	4.7	223.1	7.1	-1.2	98.9	0.0	81.4	909.8
01-May-17 1:00	4.9	225.4	7.4	-1.4	98.9	0.0	81.9	909.9
01-May-17 2:00	4.2	221.2	8.8	-1.6	98.7	0.0	81.8	910.3
01-May-17 3:00	4.7	219.4	9.6	-1.8	98.4	0.0	89.1	910.9
01-May-17 4:00	3.6	209.8	9.6	-2.0	98.2	0.0	88.6	911.1
01-May-17 5:00	3.5	213.7	6.4	-2.2	98.1	0.5	90.0	911.2
01-May-17 6:00	3.2	207.3	6.3	-2.4	97.8	15.4	90.0	911.2
01-May-17 7:00	2.5	216.1	7.6	-2.2	97.6	65.5	89.7	911.3
01-May-17 8:00	2.8	210.5	8.9	-2.0	97.1	147.2	88.6	911.4
01-May-17 9:00	3.9	224.4	6.3	-1.5	96.7	254.6	90.3	911.8
01-May-17 10:00	3.4	201.7	11.3	-1.6	96.6	293.2	90.7	911.9
01-May-17 11:00	4.7	226.1	11.4	-0.8	96.2	384.3	89.6	912.0
01-May-17 12:00	5.5	224.6	9.7	-1.0	96.3	371.7	90.1	912.6
01-May-17 13:00	4.5	218.0	17.6	-0.5	95.4	552.3	89.4	912.6
01-May-17 14:00	6.1	224.0	9.6	-0.1	94.2	768.3	87.3	912.1
01-May-17 15:00	5.1	234.3	12.1	-0.7	94.4	314.5	88.4	912.2
01-May-17 16:00	4.4	239.3	14.9	-0.4	91.3	234.3	88.0	912.2
01-May-17 17:00	5.3	251.9	11.0	0.1	84.6	201.0	87.9	912.2
01-May-17 18:00	3.9	243.7	18.2	0.3	83.4	195.0	87.6	912.1
01-May-17 19:00	2.9	221.3	20.2	0.2	85.2	134.6	86.9	912.1
01-May-17 20:00	2.9	208.2	13.8	0.1	85.6	79.6	87.4	912.2
01-May-17 21:00	2.1	186.9	15.2	-0.7	89.7	3.8	87.2	912.3
01-May-17 22:00	1.4	180.0	18.3	-1.0	90.8	0.0	87.3	912.3
01-May-17 23:00	2.8	210.6	9.9	-1.2	95.6	0.0	87.3	912.3
02-May-17 0:00	2.1	220.2	19.9	-1.2	95.0	0.0	87.4	912.3
02-May-17 1:00	1.0	132.7	29.3	-1.4	90.6	0.0	87.5	912.4
02-May-17 2:00	0.7	141.5	26.3	-1.8	87.3	0.0	87.2	912.5
02-May-17 3:00	0.7	72.2	10.2	-1.6	82.6	0.0	87.5	912.5
02-May-17 4:00	1.2	56.7	16.1	-1.5	78.7	0.0	87.4	912.5
02-May-17 5:00	1.0	125.0	16.2	-1.4	76.2	1.1	87.4	912.6

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
02-May-17 6:00	1.9	53.3	13.4	-1.3	73.4	33.4	87.2	912.6
02-May-17 7:00	1.8	40.2	10.0	-0.5	69.1	128.5	86.7	912.7
02-May-17 8:00	3.7	30.1	3.2	-0.4	71.7	212.8	86.9	912.8
02-May-17 9:00	4.5	26.5	4.4	0.3	66.4	319.9	86.8	913.2
02-May-17 10:00	4.5	34.1	4.6	1.2	61.4	414.4	86.8	913.2
02-May-17 11:00	5.1	32.8	7.0	2.1	59.7	592.9	86.6	912.6
02-May-17 12:00	6.1	32.6	10.0	2.7	53.6	486.0	86.9	912.3
02-May-17 13:00	3.0	33.6	17.1	4.0	48.0	506.5	86.6	912.6
02-May-17 14:00	1.0	56.1	46.0	4.8	42.6	365.9	86.4	912.1
02-May-17 15:00	0.9	59.7	54.8	5.1	41.2	328.9	86.0	912.2
02-May-17 16:00	2.6	180.0	48.5	4.6	44.8	183.4	86.5	911.9
02-May-17 17:00	4.2	205.3	12.5	2.3	71.7	108.8	86.4	911.8
02-May-17 18:00	1.4	236.1	41.4	0.6	92.5	63.7	84.6	912.6
02-May-17 19:00	1.5	339.1	47.3	0.0	97.1	26.3	82.9	914.1
02-May-17 20:00	3.4	0.3	17.8	0.0	97.8	10.4	88.7	915.1
02-May-17 21:00	2.0	359.5	18.8	0.0	98.4	0.8	91.1	917.3
02-May-17 22:00	2.5	338.2	28.3	0.1	98.6	0.0	92.7	918.7
02-May-17 23:00	1.8	340.3	73.2	0.5	98.4	0.0	92.7	920.1
03-May-17 0:00	2.9	50.0	47.5	1.2	95.1	0.0	93.4	923.5
03-May-17 1:00	4.8	187.0	15.5	1.2	95.3	0.0	92.6	923.3
03-May-17 2:00	5.2	191.5	20.2	1.6	92.5	0.0	91.6	923.4
03-May-17 3:00	6.5	189.9	10.7	1.4	94.5	0.0	89.0	923.6
03-May-17 4:00	6.4	199.4	11.4	1.0	97.5	0.0	89.1	924.4
03-May-17 5:00	8.3	215.8	8.9	0.7	98.9	0.5	87.8	924.5
03-May-17 6:00	8.1	216.0	10.0	0.2	99.0	11.1	88.3	924.4
03-May-17 7:00	6.7	215.7	12.2	-0.4	98.9	67.6	88.9	924.5
03-May-17 8:00	6.2	217.2	10.9	-0.3	98.2	135.7	88.5	924.3
03-May-17 9:00	5.8	206.9	17.3	-0.7	97.7	186.4	89.3	923.8
03-May-17 10:00	7.0	194.1	14.2	-0.3	93.4	503.1	89.3	924.4
03-May-17 11:00	5.7	203.8	18.9	0.0	91.9	498.8	89.0	924.2
03-May-17 12:00	5.3	222.8	10.8	-0.4	95.5	323.2	88.7	924.1
03-May-17 13:00	7.2	214.7	13.4	-0.9	96.6	275.5	88.8	924.5
03-May-17 14:00	6.3	210.0	8.3	-0.6	93.2	329.5	88.2	924.5
03-May-17 15:00	8.2	188.3	14.2	-0.2	84.5	362.2	88.3	924.7
03-May-17 16:00	7.3	193.5	13.1	0.1	79.2	293.3	88.3	924.1
03-May-17 17:00	6.2	236.1	14.2	0.1	88.7	465.6	88.7	924.7
03-May-17 18:00	3.5	245.7	30.9	-0.6	95.0	128.2	88.6	925.1
03-May-17 19:00	4.8	226.1	10.7	-1.4	97.9	65.9	89.5	926.6
03-May-17 20:00	2.2	194.6	25.4	-1.6	97.4	55.8	89.0	926.7
03-May-17 21:00	1.5	208.6	21.0	-1.5	95.4	3.8	90.8	926.9
03-May-17 22:00	3.5	217.9	11.1	-1.8	98.3	0.0	91.2	927.2
03-May-17 23:00	2.9	197.8	9.9	-1.9	96.4	0.0	91.4	927.2
04-May-17 0:00	1.3	176.4	15.2	-1.8	93.7	0.0	91.6	927.2
04-May-17 1:00	1.1	96.4	9.6	-2.5	86.6	0.0	90.9	927.3
04-May-17 2:00	1.5	131.2	11.5	-2.6	82.3	0.0	91.2	927.4
04-May-17 3:00	1.3	85.6	42.0	-2.6	78.7	0.0	90.8	927.3
04-May-17 4:00	1.2	74.8	11.0	-2.8	77.7	0.0	90.7	927.4
04-May-17 5:00	1.2	103.1	24.9	-2.8	80.4	1.7	91.0	927.5
04-May-17 6:00	1.5	204.1	17.0	-2.6	88.3	29.1	90.8	927.5
04-May-17 7:00	0.6	332.8	24.5	-2.2	83.3	133.3	89.9	927.4
04-May-17 8:00	1.1	191.4	19.3	-1.6	81.0	327.6	90.2	927.8
04-May-17 9:00	1.0	174.6	16.8	-0.5	78.2	508.5	89.4	927.8
04-May-17 10:00	1.0	184.4	14.2	0.1	77.8	663.5	88.8	928.2
04-May-17 11:00	1.1	134.6	42.0	1.5	70.1	751.1	88.4	928.7



Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean
04-May-17 12:00	1.8	100.0	48.6	2.1	68.5	720.4	87.0	928.1
04-May-17 13:00	2.4	342.9	37.2	3.0	63.9	822.0	87.2	927.7
04-May-17 14:00	1.1	10.2	33.4	4.0	61.3	744.8	87.3	927.6
04-May-17 15:00	2.9	342.2	19.2	3.7	67.5	687.7	87.6	927.2
04-May-17 16:00	3.1	337.0	12.0	3.7	64.2	430.5	87.8	926.7
04-May-17 17:00	3.2	336.5	10.7	3.5	59.3	327.2	87.7	926.8
04-May-17 18:00	1.5	48.4	23.9	3.6	55.6	220.5	87.6	926.6
04-May-17 19:00	2.7	57.2	15.9	3.1	57.6	147.0	87.6	926.5
04-May-17 20:00	3.4	76.9	9.5	2.6	61.9	51.7	87.8	926.4
04-May-17 21:00	3.1	29.1	13.9	1.9	68.5	3.6	87.9	926.5
04-May-17 22:00	3.4	14.6	6.4	1.6	71.3	0.0	87.8	926.5
04-May-17 23:00	2.3	22.9	7.2	1.1	77.2	0.0	87.8	926.7
05-May-17 0:00	1.9	30.4	11.2	0.3	87.8	0.0	87.7	926.8
05-May-17 1:00	1.4	347.8	16.8	0.0	93.2	0.0	87.6	927.0
05-May-17 2:00	1.5	344.9	14.5	-0.2	95.8	0.0	87.3	927.2
05-May-17 3:00	1.4	27.8	13.0	-0.5	98.3	0.0	86.8	927.2
05-May-17 4:00	0.8	189.7	36.4	-0.5	98.6	0.0	86.7	927.3
05-May-17 5:00	0.8	249.6	21.3	-0.5	98.2	0.6	87.1	927.6
05-May-17 6:00	0.5	280.9	11.5	-0.4	98.3	10.2	88.0	928.5
05-May-17 7:00	1.7	10.1	14.4	-0.4	97.7	44.5	90.5	929.0
05-May-17 8:00	2.1	352.4	9.6	-0.2	96.9	108.3	91.1	929.8
05-May-17 9:00	2.3	342.0	10.1	-0.1	95.7	219.5	89.8	930.5
05-May-17 10:00	3.3	342.6	8.1	0.3	93.7	392.9	89.6	930.8
05-May-17 11:00	1.0	70.2	16.7	1.2	91.4	369.3	86.6	930.2
05-May-17 12:00	1.9	219.4	15.5	0.7	93.3	435.0	89.8	930.3
05-May-17 13:00	3.3	223.7	9.1	0.4	94.6	430.9	86.7	930.6
05-May-17 14:00	3.1	205.4	11.2	0.8	93.9	502.1	88.7	930.7
05-May-17 15:00	3.2	219.9	12.1	0.8	94.4	424.7	87.7	930.9
05-May-17 16:00	3.8	225.0	12.9	0.5	96.4	233.9	89.0	931.1
05-May-17 17:00	4.0	219.3	9.0	0.5	96.7	201.1	89.0	931.3
05-May-17 18:00	3.6	204.2	9.4	0.5	94.9	157.1	89.3	931.3
05-May-17 19:00	4.0	209.4	12.1	0.2	93.3	61.0	89.3	931.3
05-May-17 20:00	4.3	198.3	9.9	0.0	94.3	34.4	87.6	931.5
05-May-17 21:00	3.8	188.1	11.4	0.1	89.8	8.0	88.4	931.5
05-May-17 22:00	4.3	191.5	10.7	0.3	86.5	0.0	88.3	931.6
05-May-17 23:00	4.1	194.4	11.8	0.4	83.4	0.0	88.0	931.5
06-May-17 0:00	3.9	202.8	9.8	0.4	82.1	0.0	87.8	931.5
06-May-17 1:00	3.2	210.1	10.0	0.2	83.3	0.0	87.3	931.6
06-May-17 2:00	3.2	211.1	10.6	0.1	83.0	0.0	86.6	931.6
06-May-17 3:00	3.7	211.9	10.1	-0.2	87.6	0.0	86.8	931.6
06-May-17 4:00	3.3	212.2	14.0	-0.4	90.6	0.0	86.6	931.6
06-May-17 5:00	2.6	198.3	14.4	-0.4	89.7	0.9	86.6	931.7
06-May-17 6:00	3.3	226.3	11.6	-0.4	90.4	16.1	87.8	931.7
06-May-17 7:00	3.1	213.6	13.8	-0.6	93.8	40.7	86.7	931.7
06-May-17 8:00	3.1	216.7	10.1	-0.7	97.1	99.5	87.0	931.7
06-May-17 9:00	2.6	223.7	15.0	-0.1	94.9	239.9	88.5	931.6
06-May-17 10:00	2.7	215.0	9.6	0.8	90.3	441.5	87.8	931.5
06-May-17 11:00	3.9	221.8	8.6	1.2	86.9	480.2	88.7	931.5
06-May-17 12:00	4.6	231.7	11.8	1.4	84.1	386.8	87.9	931.6
06-May-17 13:00	5.8	232.6	9.1	1.4	83.4	286.8	87.0	931.5
06-May-17 14:00	6.7	237.1	7.9	1.3	84.5	258.3	87.5	931.3
06-May-17 15:00	5.7	229.1	8.5	0.9	90.6	259.9	87.6	931.6
06-May-17 16:00	6.3	227.8	8.9	1.5	84.4	271.5	87.6	932.1
06-May-17 17:00	6.6	228.1	10.4	1.4	85.1	219.5	88.0	931.3

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
06-May-17 18:00	5.6	227.3	10.4	1.1	88.5	136.7	88.1	931.9
06-May-17 19:00	4.2	205.0	13.8	0.5	93.9	74.2	88.0	931.7
06-May-17 20:00	3.9	195.6	12.5	0.1	97.0	29.1	87.6	931.7
06-May-17 21:00	4.7	206.6	12.8	-0.1	97.7	4.0	87.7	931.9
06-May-17 22:00	4.4	207.7	11.5	-0.3	98.8	0.0	87.4	931.8
06-May-17 23:00	3.9	215.4	7.7	-0.4	99.0	0.0	87.3	932.1
07-May-17 0:00	4.2	211.8	9.3	-0.4	99.1	0.0	87.3	931.9
07-May-17 1:00	4.9	216.9	8.1	-0.6	99.1	0.0	87.2	932.3
07-May-17 2:00	4.7	218.4	9.9	-0.8	99.2	0.0	87.1	931.7
07-May-17 3:00	5.5	218.8	8.8	-1.0	99.1	0.0	86.9	931.9
07-May-17 4:00	5.0	222.6	8.1	-1.2	98.9	0.0	87.0	932.2
07-May-17 5:00	4.0	224.1	9.1	-1.3	98.8	2.9	86.8	932.0
07-May-17 6:00	4.6	220.0	13.5	-1.4	98.5	29.4	86.8	932.1
07-May-17 7:00	4.1	209.3	12.6	-1.7	97.6	117.8	86.6	931.9
07-May-17 8:00	4.5	225.5	10.7	-1.9	97.0	154.5	86.8	932.2
07-May-17 9:00	3.2	203.7	17.8	-1.6	95.0	334.5	86.2	931.9
07-May-17 10:00	3.1	231.7	12.0	-1.0	92.3	404.6	86.5	932.5
07-May-17 11:00	4.1	228.8	14.9	-0.2	86.1	491.0	86.7	932.0
07-May-17 12:00	6.0	202.6	10.8	0.6	79.0	467.7	86.5	931.8
07-May-17 13:00	6.0	192.4	9.6	0.6	76.6	278.3	86.7	931.8
07-May-17 14:00	5.7	188.4	8.1	0.3	74.5	232.9	86.5	931.9
07-May-17 15:00	3.5	158.7	21.1	0.8	76.1	311.3	86.3	932.1
07-May-17 16:00	1.7	57.2	39.0	0.9	81.5	343.6	86.5	931.9
07-May-17 17:00	2.3	162.6	27.4	0.7	83.0	239.4	85.9	931.8
07-May-17 18:00	1.9	105.2	23.9	0.0	92.9	137.8	87.6	932.4
07-May-17 19:00	2.3	47.6	26.7	-0.4	96.8	68.9	88.1	933.0
07-May-17 20:00	2.2	35.8	14.3	-0.6	97.6	28.2	-	933.1
07-May-17 21:00	1.9	348.5	16.3	-0.6	97.8	2.8	89.5	934.4
07-May-17 22:00	2.0	339.2	26.3	-0.7	98.6	0.0	89.6	934.9
07-May-17 23:00	1.7	347.9	33.7	-0.6	98.5	0.0	91.0	936.2
08-May-17 0:00	1.1	265.6	41.1	-0.6	98.4	0.0	91.7	937.7
08-May-17 1:00	1.2	204.3	32.3	-0.7	98.5	0.0	93.0	939.1
08-May-17 2:00	2.0	197.9	18.4	-0.9	98.7	0.0	94.3	939.8
08-May-17 3:00	2.7	211.0	21.0	-0.8	98.8	0.0	95.4	940.0
08-May-17 4:00	4.6	212.8	7.6	-0.8	98.9	0.0	96.8	940.2
08-May-17 5:00	4.0	213.7	5.9	-1.0	98.8	0.9	-	941.0
08-May-17 6:00	4.6	204.7	5.8	-0.8	98.5	20.7	99.2	941.3
08-May-17 7:00	4.1	210.9	6.4	-0.7	98.3	65.8	99.6	941.2
08-May-17 8:00	4.2	204.8	7.0	-0.3	98.0	131.1	99.9	941.2
08-May-17 9:00	4.5	209.7	5.9	0.1	97.6	196.2	98.5	941.2
08-May-17 10:00	3.8	213.3	4.4	0.4	97.0	240.6	98.5	941.3
08-May-17 11:00	4.4	213.6	5.3	0.4	96.3	299.8	95.3	941.9
08-May-17 12:00	3.8	220.1	6.2	0.7	96.1	357.3	97.9	942.1
08-May-17 13:00	4.4	222.7	6.0	1.2	95.5	440.7	94.6	941.9
08-May-17 14:00	4.5	231.5	10.8	1.5	95.6	423.3	93.9	942.0
08-May-17 15:00	4.0	228.3	11.7	2.1	95.3	448.0	92.4	942.3
08-May-17 16:00	4.7	234.0	12.4	2.1	96.4	323.6	92.6	942.1
08-May-17 17:00	5.3	232.0	12.6	1.8	97.6	195.8	92.6	942.9
08-May-17 18:00	5.4	195.9	9.4	1.4	97.8	182.9	91.7	943.0
08-May-17 19:00	5.6	202.5	7.6	1.4	98.2	128.9	90.9	943.2
08-May-17 20:00	5.8	224.6	10.4	0.8	98.8	34.3	90.9	944.6
08-May-17 21:00	4.6	217.4	8.4	0.2	99.1	4.9	90.5	944.9
08-May-17 22:00	4.3	208.1	10.4	0.2	99.2	0.0	90.9	945.3
08-May-17 23:00	4.3	218.0	8.0	0.1	99.2	0.0	90.6	945.5

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
09-May-17 0:00	3.2	216.9	6.8	0.0	99.3	0.0	90.3	945.8
09-May-17 1:00	2.9	218.5	7.7	-0.2	99.3	0.0	88.6	946.0
09-May-17 2:00	3.5	221.5	6.7	-0.2	99.3	0.0	91.5	947.2
09-May-17 3:00	4.0	213.4	7.0	-0.7	99.3	0.0	92.2	947.4
09-May-17 4:00	3.2	205.6	9.4	-0.9	99.3	0.0	92.1	947.4
09-May-17 5:00	2.2	202.2	15.3	-1.0	99.3	2.0	92.0	947.6
09-May-17 6:00	2.2	197.7	8.4	-0.9	99.1	41.0	91.7	947.6
09-May-17 7:00	1.6	205.2	13.1	-0.2	98.1	152.5	91.4	947.5
09-May-17 8:00	2.0	214.3	12.0	0.4	97.5	271.4	91.8	948.2
09-May-17 9:00	1.7	67.3	24.2	0.5	94.7	579.8	90.3	950.0
09-May-17 10:00	1.3	14.3	7.1	1.2	91.5	663.4	90.8	948.4
09-May-17 11:00	0.9	93.3	12.6	2.0	87.1	794.4	90.0	950.1
09-May-17 12:00	0.5	40.9	26.2	2.9	79.1	641.5	89.6	948.5
09-May-17 13:00	0.4	48.4	30.8	3.1	79.6	429.7	89.6	948.3
09-May-17 14:00	0.8	105.4	10.4	2.8	69.5	387.8	90.3	947.5
09-May-17 15:00	1.2	113.7	35.5	1.6	80.3	341.8	89.5	948.5
09-May-17 16:00	0.8	74.4	12.8	4.1	67.6	525.0	89.3	948.7
09-May-17 17:00	1.8	77.7	12.0	2.4	75.9	288.9	89.5	948.1
09-May-17 18:00	1.9	84.2	10.3	2.1	76.3	262.2	89.0	948.2
09-May-17 19:00	1.0	63.7	8.2	3.0	66.6	195.6	89.0	948.3
09-May-17 20:00	1.2	62.0	13.8	2.8	67.1	107.6	88.8	948.4
09-May-17 21:00	0.6	72.1	11.9	2.1	70.1	18.6	89.4	948.5
09-May-17 22:00	1.0	80.3	23.1	1.5	73.5	0.1	90.0	948.6
09-May-17 23:00	1.0	176.3	18.7	1.4	76.9	0.0	87.7	948.7
10-May-17 0:00	0.8	60.9	9.8	1.3	75.6	0.0	87.9	948.7
10-May-17 1:00	1.3	52.8	6.6	1.1	79.4	0.0	88.2	948.7
10-May-17 2:00	1.7	41.1	7.6	0.9	80.5	0.0	89.3	948.7
10-May-17 3:00	2.1	34.2	7.8	0.8	81.9	0.0	89.1	948.8
10-May-17 4:00	1.8	1.2	8.2	0.6	83.4	0.0	88.8	948.8
10-May-17 5:00	0.8	344.7	10.5	0.4	85.6	2.1	88.6	948.8
10-May-17 6:00	0.8	336.9	19.5	0.6	85.0	41.9	88.4	948.9
10-May-17 7:00	0.9	254.6	33.6	1.2	83.2	162.1	88.3	949.0
10-May-17 8:00	0.9	165.9	32.7	2.7	74.6	411.7	88.9	949.2
10-May-17 9:00	1.1	228.2	30.0	3.3	70.9	579.2	88.0	949.9
10-May-17 10:00	1.6	66.4	19.5	4.8	61.8	677.8	87.9	950.2
10-May-17 11:00	2.8	80.2	38.2	4.7	62.3	766.7	87.9	949.9
10-May-17 12:00	3.3	39.1	13.9	5.5	57.5	881.0	87.1	950.4
10-May-17 13:00	2.7	67.6	20.5	6.5	49.7	876.0	85.9	948.5
10-May-17 14:00	4.8	91.2	16.2	5.6	49.9	399.4	86.0	948.0
10-May-17 15:00	6.0	96.2	13.1	5.7	48.8	393.3	84.7	948.5
10-May-17 16:00	6.7	87.1	9.9	6.3	44.2	536.2	85.3	948.4
10-May-17 17:00	4.5	81.8	16.7	6.7	41.8	376.9	85.7	947.8
10-May-17 18:00	4.6	80.3	8.1	6.8	40.8	310.4	85.9	948.0
10-May-17 19:00	4.3	76.3	7.9	6.5	42.2	184.9	85.6	948.0
10-May-17 20:00	6.2	80.3	7.5	6.2	43.2	61.3	85.3	948.0
10-May-17 21:00	7.0	70.7	5.5	6.0	44.4	8.7	85.3	948.5
10-May-17 22:00	5.5	40.9	7.4	4.9	54.7	0.2	84.0	947.9
10-May-17 23:00	4.8	24.6	7.4	4.5	60.1	0.0	84.5	948.4
11-May-17 0:00	5.7	56.0	8.8	4.7	58.8	0.0	83.7	948.7
11-May-17 1:00	5.1	89.5	24.5	5.4	55.8	0.0	84.2	948.3
11-May-17 2:00	2.6	57.8	44.1	4.8	59.1	0.0	84.3	948.5
11-May-17 3:00	9.4	89.0	9.4	5.2	57.5	0.0	84.4	947.5
11-May-17 4:00	13.7	73.1	7.5	5.8	53.9	0.0	84.0	947.3
11-May-17 5:00	15.5	69.6	5.7	5.9	53.2	5.3	84.1	946.8

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation					
11-May-17 6:00	15.1	65.2	6.0	5.6	55.1	70.5	83.8	945.0
11-May-17 7:00	11.9	72.7	10.1	5.9	54.4	198.0	84.0	947.0
11-May-17 8:00	10.0	76.0	18.4	5.9	55.2	295.9	84.0	947.3
11-May-17 9:00	11.6	72.3	9.8	6.0	54.9	268.5	82.5	948.9
11-May-17 10:00	11.7	81.6	14.3	6.1	54.5	190.5	81.0	944.3
11-May-17 11:00	15.8	64.2	6.6	4.8	67.2	161.5	80.4	947.8
11-May-17 12:00	14.9	60.8	4.2	4.2	74.8	356.2	80.2	948.0
11-May-17 13:00	11.7	47.3	6.3	4.8	74.6	593.5	78.8	949.5
11-May-17 14:00	9.1	34.4	7.0	5.6	74.0	756.8	78.6	949.4
11-May-17 15:00	8.3	43.4	6.5	6.2	70.0	680.9	76.7	948.6
11-May-17 16:00	6.0	51.8	11.9	6.6	68.5	403.5	77.3	948.8
11-May-17 17:00	6.1	47.2	10.7	6.8	68.8	411.9	77.3	949.2
11-May-17 18:00	7.0	51.3	15.2	6.3	72.7	305.5	76.3	948.7
11-May-17 19:00	4.2	56.5	23.4	6.6	72.2	181.1	76.4	948.5
11-May-17 20:00	6.2	45.9	13.7	5.8	77.1	50.4	76.3	948.3
11-May-17 21:00	7.8	39.8	3.5	5.8	82.3	5.3	75.5	948.8
11-May-17 22:00	5.6	34.2	4.2	5.7	84.4	0.0	74.9	948.7
11-May-17 23:00	4.9	19.1	4.6	5.7	84.6	0.0	74.4	948.6
12-May-17 0:00	5.2	24.3	2.8	5.6	84.8	0.0	75.0	948.7
12-May-17 1:00	4.6	27.7	3.6	5.2	88.7	0.0	74.9	948.9
12-May-17 2:00	5.6	11.6	5.3	4.1	97.4	0.0	75.1	948.8
12-May-17 3:00	5.6	25.8	4.9	4.7	91.7	0.0	74.7	948.7
12-May-17 4:00	5.5	32.2	6.8	5.2	86.2	0.0	73.6	949.1
12-May-17 5:00	8.7	47.9	8.3	5.8	79.5	1.6	73.4	950.2
12-May-17 6:00	15.0	65.5	8.0	5.3	81.2	40.7	71.5	948.6
12-May-17 7:00	9.6	50.9	10.4	4.9	83.8	73.9	71.7	949.8
12-May-17 8:00	9.0	51.6	7.7	5.4	80.3	213.0	71.4	949.5
12-May-17 9:00	3.6	60.0	60.9	5.6	80.4	250.2	71.0	950.3
12-May-17 10:00	1.8	72.9	58.0	6.1	77.3	297.1	72.0	950.0
12-May-17 11:00	2.3	210.4	24.6	5.8	85.4	366.9	71.1	949.8
12-May-17 12:00	1.8	216.2	18.0	5.7	90.5	360.2	70.4	949.7
12-May-17 13:00	1.2	189.3	17.0	6.3	88.0	372.7	70.5	949.6
12-May-17 14:00	0.9	309.9	13.8	6.6	87.6	246.1	69.7	949.9
12-May-17 15:00	2.9	327.0	8.2	5.3	92.9	167.8	68.8	949.8
12-May-17 16:00	1.7	202.6	28.8	4.9	94.8	111.6	69.9	949.7
12-May-17 17:00	2.3	191.7	17.2	4.4	97.3	65.0	69.8	949.6
12-May-17 18:00	2.0	204.0	17.9	3.9	98.1	59.8	69.6	949.7
12-May-17 19:00	2.5	227.0	14.3	3.8	98.3	65.7	70.1	950.7
12-May-17 20:00	2.1	212.7	13.0	3.4	98.5	41.6	69.7	951.8
12-May-17 21:00	1.9	192.2	14.5	3.1	98.9	5.4	69.9	952.6
12-May-17 22:00	1.2	175.2	19.2	3.0	99.0	0.0	70.3	953.6
12-May-17 23:00	2.0	198.0	18.9	2.9	99.0	0.0	69.5	954.6
13-May-17 0:00	1.4	185.4	16.9	2.6	99.1	0.0	69.4	955.7
13-May-17 1:00	1.5	161.9	16.7	2.5	99.1	0.0	68.9	956.7
13-May-17 2:00	1.6	146.0	24.0	2.3	99.1	0.0	68.0	958.1
13-May-17 3:00	1.0	119.9	22.0	2.2	99.1	0.0	68.8	959.7
13-May-17 4:00	2.5	37.1	8.9	1.8	99.1	0.0	68.7	960.6
13-May-17 5:00	4.0	13.5	4.6	1.7	99.1	1.3	68.9	961.4
13-May-17 6:00	3.5	358.7	14.5	1.7	99.1	17.2	68.5	961.8
13-May-17 7:00	1.7	311.7	26.0	1.7	98.9	47.4	68.5	962.7
13-May-17 8:00	1.1	217.2	21.4	1.8	98.2	158.7	67.9	963.2
13-May-17 9:00	1.1	182.4	11.7	2.2	97.1	310.7	67.8	963.3
13-May-17 10:00	1.2	165.4	17.7	2.8	96.4	407.5	67.6	963.6
13-May-17 11:00	1.1	175.0	14.0	3.6	95.0	584.6	67.7	964.7

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation					
13-May-17 12:00	2.7	182.1	8.6	3.2	95.1	529.6	66.8	963.7
13-May-17 13:00	3.7	210.6	8.4	2.9	95.0	468.5	65.7	963.4
13-May-17 14:00	3.9	218.9	12.0	2.9	95.9	391.2	66.0	963.6
13-May-17 15:00	4.1	228.7	27.2	2.9	96.2	316.1	66.3	964.7
13-May-17 16:00	3.4	237.3	26.6	2.5	96.9	263.0	65.9	966.1
13-May-17 17:00	4.5	254.6	10.8	2.7	96.9	249.2	66.1	966.4
13-May-17 18:00	6.0	257.7	12.5	2.5	97.3	204.6	64.6	966.6
13-May-17 19:00	4.6	240.4	10.9	1.7	97.1	122.2	65.1	967.7
13-May-17 20:00	3.6	204.8	11.0	1.5	97.8	62.2	65.3	967.7
13-May-17 21:00	3.3	203.1	11.1	1.2	98.6	6.8	64.9	968.1
13-May-17 22:00	3.1	207.8	15.6	0.8	99.0	0.2	64.6	968.1
13-May-17 23:00	3.7	208.6	10.0	0.4	99.1	0.0	65.1	968.2
14-May-17 0:00	3.4	213.9	12.0	0.3	99.1	0.0	64.3	968.5
14-May-17 1:00	4.0	224.2	6.9	0.2	99.2	0.0	63.9	968.6
14-May-17 2:00	4.1	221.1	8.2	0.0	99.2	0.0	64.4	968.6
14-May-17 3:00	4.1	219.0	8.2	-0.1	99.2	0.0	64.5	968.9
14-May-17 4:00	3.9	208.1	10.3	-0.1	99.3	0.0	64.3	969.0
14-May-17 5:00	3.6	210.0	10.0	-0.3	99.3	2.3	64.2	968.8
14-May-17 6:00	3.5	212.2	8.3	-0.5	99.3	25.6	64.2	969.0
14-May-17 7:00	3.0	200.4	9.7	-0.5	99.0	73.2	62.5	969.0
14-May-17 8:00	3.3	218.1	7.4	-0.5	98.7	107.5	65.4	969.4
14-May-17 9:00	3.1	213.5	10.6	-0.4	98.1	168.0	65.4	969.3
14-May-17 10:00	4.4	221.9	8.3	-0.2	97.8	186.3	65.5	968.8
14-May-17 11:00	4.5	219.3	8.3	-0.2	97.7	194.4	65.0	969.3
14-May-17 12:00	4.4	216.8	10.5	0.3	96.9	334.9	63.9	969.5
14-May-17 13:00	4.6	236.7	11.9	0.9	95.7	533.1	64.8	969.6
14-May-17 14:00	5.0	233.2	15.2	1.1	95.4	520.3	63.6	969.9
14-May-17 15:00	4.8	244.2	13.3	1.6	92.8	491.6	63.1	969.9
14-May-17 16:00	6.4	221.9	11.6	2.1	86.8	426.5	64.0	969.6
14-May-17 17:00	5.9	207.4	12.4	2.1	81.5	271.3	62.6	970.5
14-May-17 18:00	6.3	194.9	11.1	1.8	75.9	217.3	63.7	969.8
14-May-17 19:00	7.0	191.7	9.0	1.0	79.1	101.4	63.9	969.3
14-May-17 20:00	5.0	179.0	8.9	0.3	87.6	37.1	64.2	970.0
14-May-17 21:00	3.4	151.2	16.8	-0.4	95.6	7.8	63.9	970.0
14-May-17 22:00	2.2	33.1	22.4	-0.4	98.2	0.2	63.3	970.2
14-May-17 23:00	1.1	304.9	22.7	-0.6	98.9	0.0	64.2	970.4
15-May-17 0:00	0.6	171.3	35.4	-0.6	99.0	0.0	63.7	970.6
15-May-17 1:00	1.9	356.0	18.9	-0.5	98.8	0.0	63.4	971.0
15-May-17 2:00	1.7	336.2	15.7	-0.6	98.5	0.0	60.5	971.4
15-May-17 3:00	1.4	18.1	15.5	-0.5	98.5	0.0	65.7	971.6
15-May-17 4:00	1.7	42.7	6.5	-0.5	98.5	0.0	64.7	971.7
15-May-17 5:00	1.7	48.5	9.9	-0.6	98.5	1.9	64.7	971.9
15-May-17 6:00	3.4	51.1	15.7	-0.4	98.3	12.1	63.3	972.1
15-May-17 7:00	8.6	46.2	4.3	0.0	95.3	60.4	64.7	971.1
15-May-17 8:00	8.4	45.6	5.0	0.7	86.3	117.2	64.4	971.9
15-May-17 9:00	7.8	43.7	5.6	1.3	81.6	218.7	64.3	971.4
15-May-17 10:00	7.1	37.4	9.7	1.9	79.0	317.8	63.3	972.4
15-May-17 11:00	6.0	24.0	14.1	3.2	71.0	542.7	62.3	973.8
15-May-17 12:00	5.7	17.9	14.7	4.0	67.1	683.7	62.6	973.5
15-May-17 13:00	5.4	6.4	10.5	4.3	76.0	950.0	62.3	973.3
15-May-17 14:00	5.2	340.8	8.9	4.5	77.0	985.0	60.7	972.8
15-May-17 15:00	4.9	350.5	12.0	4.2	77.4	664.5	61.5	972.7
15-May-17 16:00	3.9	26.4	9.8	5.1	72.4	721.1	60.6	972.4
15-May-17 17:00	3.7	25.9	17.2	5.7	66.5	604.0	59.8	971.6

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m²)	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
	Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
15-May-17 18:00	5.2	24.2	5.8	5.5	64.8	419.0	58.7	971.1
15-May-17 19:00	3.9	4.8	6.4	5.9	63.5	184.3	60.2	971.3
15-May-17 20:00	3.7	354.2	5.7	6.0	61.9	76.3	60.2	971.2
15-May-17 21:00	3.6	1.0	9.2	5.1	69.5	32.2	60.8	971.4
15-May-17 22:00	3.8	19.0	7.5	4.6	77.0	0.7	60.7	971.4
15-May-17 23:00	3.8	28.9	6.3	4.3	78.4	0.0	60.7	971.5
16-May-17 0:00	4.9	35.3	4.7	4.2	76.6	0.0	60.8	971.5
16-May-17 1:00	3.7	15.9	10.8	3.7	80.1	0.0	60.8	971.5
16-May-17 2:00	4.4	5.1	9.1	3.6	81.9	0.0	60.7	971.6
16-May-17 3:00	6.0	10.5	3.7	3.9	78.6	0.0	61.0	971.1
16-May-17 4:00	5.7	6.6	13.7	3.7	76.0	0.0	60.7	971.5
16-May-17 5:00	5.4	18.3	5.6	4.7	64.2	6.1	61.0	971.5
16-May-17 6:00	6.5	31.6	4.4	5.1	61.4	93.7	60.3	971.2
16-May-17 7:00	6.7	26.8	4.0	5.7	56.1	235.1	60.0	971.8
16-May-17 8:00	6.5	24.9	4.1	5.8	57.3	385.7	59.5	972.3
16-May-17 9:00	5.4	25.2	13.2	6.0	59.7	558.4	60.3	973.4
16-May-17 10:00	3.2	70.8	34.4	7.0	55.8	694.7	58.1	973.4
16-May-17 11:00	3.4	48.8	33.0	7.8	53.0	798.5	55.8	974.1
16-May-17 12:00	2.0	331.0	25.0	8.8	53.8	865.0	55.9	973.0
16-May-17 13:00	1.3	39.6	37.0	9.6	52.9	950.0	52.8	972.9
16-May-17 14:00	2.0	81.5	11.4	9.4	49.5	980.0	55.2	971.9
16-May-17 15:00	2.0	56.7	26.8	10.2	43.8	872.0	54.2	971.8
16-May-17 16:00	2.2	54.2	22.5	9.6	42.8	499.5	54.9	971.3
16-May-17 17:00	2.7	96.9	9.6	8.6	47.0	343.4	55.0	970.7
16-May-17 18:00	2.4	104.0	8.1	9.0	47.0	550.7	53.0	969.9
16-May-17 19:00	0.9	71.4	23.6	10.5	41.0	231.5	52.7	970.5
16-May-17 20:00	0.8	199.6	55.2	10.5	41.3	103.6	54.3	969.9
16-May-17 21:00	0.9	152.1	16.9	8.8	45.4	34.0	54.2	970.8
16-May-17 22:00	0.7	129.3	20.2	8.0	47.3	0.9	54.7	971.0
16-May-17 23:00	1.5	184.0	12.8	8.2	45.9	0.0	54.0	971.1
17-May-17 0:00	1.4	183.8	6.3	8.0	45.9	0.0	54.0	971.1
17-May-17 1:00	1.0	184.8	13.7	7.9	46.3	0.0	54.2	971.1
17-May-17 2:00	0.5	146.5	21.6	7.3	49.1	0.0	54.2	971.2
17-May-17 3:00	1.3	172.8	19.1	7.2	51.0	0.0	54.2	971.2
17-May-17 4:00	0.7	163.9	17.9	6.8	52.0	0.1	54.8	971.2
17-May-17 5:00	0.9	181.6	18.7	6.8	53.4	6.3	54.2	971.3
17-May-17 6:00	1.1	146.9	18.9	7.3	51.6	96.5	53.7	970.8
17-May-17 7:00	0.8	80.9	12.6	8.0	49.3	205.3	53.0	971.5
17-May-17 8:00	0.7	98.6	30.0	9.1	46.7	361.2	53.0	972.0
17-May-17 9:00	0.9	121.1	27.2	9.2	47.3	456.8	53.0	972.7
17-May-17 10:00	0.8	138.7	16.6	9.4	48.0	520.9	52.5	971.9
17-May-17 11:00	0.7	192.5	35.4	11.9	44.1	872.0	51.5	972.3
17-May-17 12:00	1.1	191.2	45.2	10.8	47.3	661.5	50.3	971.0
17-May-17 13:00	1.1	135.3	24.3	9.9	48.1	513.3	51.0	970.4
17-May-17 14:00	2.2	346.1	42.4	9.9	47.8	535.1	47.0	971.5
17-May-17 15:00	5.0	271.5	30.5	10.7	44.3	828.0	49.7	970.9
17-May-17 16:00	6.3	218.8	12.9	10.9	40.7	760.5	49.6	970.2
17-May-17 17:00	6.0	209.2	15.7	10.2	44.7	451.1	47.9	970.2
17-May-17 18:00	5.6	208.4	14.2	9.3	50.0	291.9	47.7	970.4
17-May-17 19:00	3.9	206.9	14.0	7.8	60.9	115.8	47.6	970.8
17-May-17 20:00	3.1	195.1	17.9	6.6	68.9	43.3	47.0	971.1
17-May-17 21:00	2.5	179.0	22.4	5.7	71.7	11.6	48.5	970.8
17-May-17 22:00	2.3	200.1	18.0	6.3	64.9	0.7	48.9	970.8
17-May-17 23:00	3.2	193.6	18.2	5.9	69.6	0.0	45.9	970.8

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation					
18-May-17 0:00	4.1	189.5	14.3	5.4	73.5	0.0	46.4	971.4
18-May-17 1:00	4.0	207.4	12.0	5.0	75.7	0.0	46.3	971.2
18-May-17 2:00	2.9	195.8	15.2	4.7	74.0	0.0	46.1	971.4
18-May-17 3:00	2.4	201.6	16.1	4.5	74.9	0.0	46.5	971.2
18-May-17 4:00	2.3	205.3	14.9	4.2	77.5	0.0	46.9	971.2
18-May-17 5:00	3.1	213.3	11.0	4.0	76.8	4.0	46.5	971.3
18-May-17 6:00	3.7	196.2	11.9	3.6	80.1	22.9	45.4	970.8
18-May-17 7:00	4.3	197.6	12.6	3.2	83.5	64.7	46.5	970.8
18-May-17 8:00	3.6	212.0	8.4	3.4	81.5	127.5	47.8	971.3
18-May-17 9:00	4.6	221.8	9.0	3.6	79.6	245.8	46.7	971.1
18-May-17 10:00	4.2	225.4	12.0	3.5	79.4	261.2	46.1	971.2
18-May-17 11:00	4.4	220.7	11.7	3.8	76.8	367.5	44.4	970.8
18-May-17 12:00	4.9	228.6	10.9	4.1	75.3	404.2	44.9	971.3
18-May-17 13:00	4.1	228.3	13.8	4.8	71.4	561.0	44.3	972.0
18-May-17 14:00	4.4	251.5	11.8	5.2	66.6	483.3	45.0	971.1
18-May-17 15:00	5.7	237.6	14.9	5.3	63.1	387.7	43.8	970.7
18-May-17 16:00	7.6	235.1	11.2	5.3	64.5	354.6	43.1	969.5
18-May-17 17:00	8.1	248.7	9.8	5.2	68.2	615.3	43.1	970.4
18-May-17 18:00	8.1	241.4	8.3	4.5	76.2	233.2	43.1	971.8
18-May-17 19:00	6.9	235.8	9.8	4.2	81.6	258.7	42.6	970.0
18-May-17 20:00	5.2	220.5	10.1	3.6	85.8	177.9	-	971.1
18-May-17 21:00	3.3	182.9	12.1	2.7	90.4	18.1	43.0	971.3
18-May-17 22:00	3.3	196.9	22.1	2.5	90.6	0.6	41.5	971.4
18-May-17 23:00	3.4	204.8	8.3	2.4	91.2	0.0	41.7	971.6
19-May-17 0:00	3.8	205.8	9.7	2.5	89.5	0.0	42.5	971.3
19-May-17 1:00	3.6	195.3	10.9	2.4	90.5	0.0	42.8	971.9
19-May-17 2:00	3.5	210.1	7.6	2.3	92.0	0.0	42.9	971.6
19-May-17 3:00	2.8	200.2	9.4	2.1	94.8	0.0	40.3	971.6
19-May-17 4:00	4.0	214.4	7.2	2.1	93.9	0.0	41.9	972.2
19-May-17 5:00	3.4	204.6	8.6	2.0	94.3	5.6	41.3	971.7
19-May-17 6:00	3.2	203.7	9.5	1.9	95.9	35.5	41.9	971.9
19-May-17 7:00	3.5	203.2	10.7	2.0	94.0	109.4	40.7	971.5
19-May-17 8:00	3.2	204.4	11.8	2.3	92.1	174.4	40.6	971.8
19-May-17 9:00	2.9	210.3	8.3	3.1	86.9	357.7	41.9	971.6
19-May-17 10:00	2.2	234.0	15.6	3.9	85.2	493.1	40.4	971.7
19-May-17 11:00	1.4	230.2	40.1	4.6	81.8	448.2	39.6	971.4
19-May-17 12:00	2.4	211.4	22.2	4.9	76.0	472.4	38.8	971.4
19-May-17 13:00	2.6	221.4	20.3	5.4	74.8	494.9	39.8	971.2
19-May-17 14:00	3.4	234.6	18.3	5.5	74.2	395.2	37.9	971.3
19-May-17 15:00	2.3	214.2	32.2	6.2	69.3	400.6	37.1	971.5
19-May-17 16:00	3.8	242.0	28.1	6.7	68.9	539.2	38.3	970.9
19-May-17 17:00	5.0	249.0	16.8	7.0	66.8	740.8	37.5	970.9
19-May-17 18:00	4.1	270.8	24.2	7.0	67.0	596.3	36.9	970.4
19-May-17 19:00	3.4	292.9	20.4	6.4	71.7	268.6	35.8	970.9
19-May-17 20:00	1.7	351.7	20.3	5.6	76.2	90.4	35.9	971.3
19-May-17 21:00	1.0	54.2	26.9	4.8	79.0	19.1	35.9	971.2
19-May-17 22:00	2.4	214.7	22.9	5.0	74.7	0.4	37.8	971.2
19-May-17 23:00	2.5	188.9	12.2	4.7	76.4	0.0	36.6	971.3
20-May-17 0:00	1.7	201.6	11.8	4.6	78.5	0.0	36.9	971.3
20-May-17 1:00	2.6	190.2	8.3	4.4	79.0	0.0	36.6	971.3
20-May-17 2:00	1.7	178.6	17.0	4.3	79.3	0.0	36.7	971.4
20-May-17 3:00	2.1	212.3	7.3	4.3	78.5	0.0	36.6	971.4
20-May-17 4:00	2.1	224.9	9.3	4.0	79.4	0.0	36.8	971.4
20-May-17 5:00	3.0	203.3	10.2	3.9	81.6	6.0	36.7	971.5

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
20-May-17 6:00	3.4	194.2	8.2	4.1	80.1	46.9	36.3	971.4
20-May-17 7:00	1.8	184.2	18.9	4.9	76.4	240.4	35.4	971.1
20-May-17 8:00	1.1	154.8	33.5	5.2	76.0	326.8	35.7	971.6
20-May-17 9:00	1.1	129.6	30.3	6.2	68.4	523.9	34.9	972.3
20-May-17 10:00	1.7	90.8	33.4	6.3	67.9	641.0	34.6	973.1
20-May-17 11:00	5.2	194.3	24.1	6.9	61.2	706.1	34.1	973.2
20-May-17 12:00	6.1	198.3	13.4	7.4	58.4	780.4	32.7	971.9
20-May-17 13:00	7.3	191.6	10.5	7.3	58.3	564.6	32.4	970.9
20-May-17 14:00	6.9	197.0	11.1	7.8	56.5	543.1	32.3	969.7
20-May-17 15:00	8.5	191.4	9.9	7.8	52.2	347.7	30.5	971.4
20-May-17 16:00	7.4	179.9	12.1	7.7	53.3	221.9	30.6	971.3
20-May-17 17:00	8.5	188.5	10.1	7.4	56.4	162.1	29.6	969.6
20-May-17 18:00	7.2	184.9	13.0	6.5	65.0	143.5	30.7	970.8
20-May-17 19:00	5.7	188.1	12.6	5.1	81.7	73.4	29.7	971.8
20-May-17 20:00	4.5	169.6	19.7	4.7	87.4	31.9	29.6	970.9
20-May-17 21:00	6.1	177.9	11.7	4.3	90.6	8.7	30.1	971.6
20-May-17 22:00	8.5	184.7	6.5	4.5	92.1	0.2	29.9	971.9
20-May-17 23:00	7.9	188.2	7.3	4.7	95.8	0.0	28.4	972.1
21-May-17 0:00	7.3	193.9	8.8	4.8	97.4	0.0	27.6	973.5
21-May-17 1:00	5.5	205.0	11.0	4.9	98.4	0.0	25.2	974.0
21-May-17 2:00	5.9	208.0	12.1	5.1	98.6	0.0	26.6	974.6
21-May-17 3:00	6.1	207.1	12.7	5.2	98.6	0.0	24.5	975.1
21-May-17 4:00	6.9	199.1	9.5	5.2	98.7	0.0	24.9	975.0
21-May-17 5:00	7.5	199.1	9.6	5.3	98.8	3.4	-	975.7
21-May-17 6:00	8.6	192.4	9.5	5.3	98.7	15.9	22.5	977.3
21-May-17 7:00	9.3	193.0	7.5	5.4	98.3	56.0	19.7	976.7
21-May-17 8:00	7.4	203.3	9.6	5.4	98.3	99.3	21.8	978.2
21-May-17 9:00	6.5	209.8	11.3	5.5	98.1	135.6	21.3	979.6
21-May-17 10:00	6.0	210.2	13.6	5.6	98.1	127.0	21.4	980.7
21-May-17 11:00	4.8	207.6	19.8	5.8	97.4	220.1	19.8	981.8
21-May-17 12:00	5.4	206.9	17.4	5.7	97.7	167.4	17.3	983.6
21-May-17 13:00	5.8	194.5	20.4	5.5	97.3	167.0	18.5	985.3
21-May-17 14:00	7.3	192.5	12.9	5.2	96.1	164.3	13.8	987.0
21-May-17 15:00	6.4	196.5	11.0	4.8	98.0	106.0	13.5	988.2
21-May-17 16:00	8.2	190.4	8.5	4.5	96.5	92.6	12.0	990.9
21-May-17 17:00	7.2	187.9	9.7	4.3	95.9	102.6	11.1	992.0
21-May-17 18:00	6.1	190.4	7.4	4.0	98.0	62.5	10.3	992.6
21-May-17 19:00	5.9	181.9	8.5	4.0	98.3	52.5	10.5	993.8
21-May-17 20:00	5.5	189.1	7.9	4.1	98.4	35.3	10.4	993.6
21-May-17 21:00	6.4	187.8	9.6	4.2	98.6	6.0	8.6	994.8
21-May-17 22:00	5.6	197.4	8.7	4.3	98.9	0.6	9.3	995.0
21-May-17 23:00	5.9	198.5	7.7	4.3	99.0	0.0	8.8	996.6
22-May-17 0:00	5.9	201.3	9.8	4.2	99.0	0.0	7.1	996.4
22-May-17 1:00	6.3	196.7	5.2	4.2	99.1	0.0	6.7	996.7
22-May-17 2:00	6.9	191.2	7.0	4.0	99.1	0.0	4.4	998.0
22-May-17 3:00	6.0	186.4	6.3	3.8	99.0	0.0	4.3	999.1
22-May-17 4:00	4.1	158.3	22.1	3.8	98.7	0.0	4.4	999.4
22-May-17 5:00	2.8	186.7	18.4	4.0	98.7	4.0	2.0	999.5
22-May-17 6:00	2.2	212.2	32.8	3.9	98.9	17.3	5.5	1002.2
22-May-17 7:00	1.3	256.4	31.6	4.1	98.8	47.6	3.6	1005.2
22-May-17 8:00	1.3	212.6	31.8	4.1	98.6	69.9	4.8	1007.5
22-May-17 9:00	2.2	232.5	35.6	4.2	98.3	123.4	5.2	1008.3
22-May-17 10:00	1.7	183.5	30.1	4.3	98.1	161.6	5.6	1009.7
22-May-17 11:00	4.0	213.1	10.3	4.6	97.7	229.6	4.0	1010.9



Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
22-May-17 12:00	3.7	213.5	10.8	4.7	97.3	283.0	3.6	1012.0
22-May-17 13:00	4.0	216.6	9.5	4.6	97.6	245.9	3.8	1013.7
22-May-17 14:00	3.2	221.7	14.2	4.5	97.5	241.8	2.8	1015.4
22-May-17 15:00	2.6	202.1	13.3	4.1	97.7	207.0	2.1	1016.7
22-May-17 16:00	1.8	190.1	16.5	3.9	97.8	183.8	-	1017.4
22-May-17 17:00	1.5	89.8	38.9	4.0	98.2	123.4	1.9	1017.9
22-May-17 18:00	1.3	52.4	38.6	4.1	97.6	83.6	2.3	1018.0
22-May-17 19:00	1.4	113.7	28.1	4.1	97.4	72.4	1.6	1018.1
22-May-17 20:00	3.9	169.9	13.0	4.0	98.3	25.0	1.1	1019.0
22-May-17 21:00	4.0	182.7	14.5	4.1	98.5	19.4	1.3	1019.1
22-May-17 22:00	2.7	186.5	19.8	3.9	98.4	1.0	1.4	1019.6
22-May-17 23:00	1.3	134.4	45.2	3.9	97.6	0.0	0.0	1019.6
23-May-17 0:00	2.2	135.1	47.0	3.9	94.9	0.0	0.0	1019.7
23-May-17 1:00	2.3	141.6	30.3	3.9	93.2	0.0	0.0	1019.7
23-May-17 2:00	2.3	113.3	28.0	4.1	92.6	0.0	0.0	1020.1
23-May-17 3:00	1.3	104.4	44.9	4.1	92.3	0.0	0.0	1020.9
23-May-17 4:00	0.8	338.3	15.9	3.8	94.4	0.1	0.0	1021.8
23-May-17 5:00	0.6	45.6	31.9	3.7	94.1	14.4	0.0	1022.6
23-May-17 6:00	0.7	38.8	20.5	3.6	94.6	20.1	0.0	1023.0
23-May-17 7:00	1.0	29.2	40.2	3.4	93.8	24.6	0.0	1025.1
23-May-17 8:00	1.5	88.3	16.3	3.2	92.5	98.7	0.0	1025.5
23-May-17 9:00	0.9	324.3	45.8	3.8	87.6	152.5	0.0	1025.5
23-May-17 10:00	0.8	242.8	23.3	3.6	94.7	199.2	0.0	1026.0
23-May-17 11:00	0.5	138.9	25.8	4.4	90.8	377.4	0.0	1026.0
23-May-17 12:00	1.4	202.5	38.3	4.5	92.7	351.4	0.0	1026.6
23-May-17 13:00	3.7	224.1	9.6	4.0	96.4	340.9	0.0	1026.2
23-May-17 14:00	4.0	240.1	10.5	4.0	97.1	251.6	0.0	1028.3
23-May-17 15:00	5.3	228.0	8.8	4.0	97.1	319.2	0.0	1028.0
23-May-17 16:00	5.3	223.0	9.7	3.6	97.7	211.1	0.0	1028.5
23-May-17 17:00	4.7	218.7	11.4	3.5	97.8	191.3	0.0	1028.0
23-May-17 18:00	4.0	215.5	11.4	3.3	98.1	145.1	0.0	1028.9
23-May-17 19:00	2.7	197.1	15.3	3.4	98.1	132.3	0.0	1029.5
23-May-17 20:00	2.5	200.4	16.2	3.4	98.0	115.8	0.0	1029.8
23-May-17 21:00	3.1	206.1	13.9	3.3	98.4	18.8	0.0	1029.7
23-May-17 22:00	3.2	204.9	11.4	3.3	98.2	1.0	0.0	1029.8
23-May-17 23:00	3.1	212.1	13.8	3.2	98.2	0.0	0.0	1029.9
24-May-17 0:00	2.9	204.2	11.2	3.0	98.7	0.0	0.0	1029.9
24-May-17 1:00	3.3	214.0	12.1	2.8	98.7	0.0	0.0	1029.7
24-May-17 2:00	3.5	210.8	10.6	2.4	98.9	0.0	0.0	1029.9
24-May-17 3:00	2.6	201.4	11.7	2.2	98.6	0.0	0.0	1030.0
24-May-17 4:00	2.5	227.8	11.3	1.9	98.1	0.2	0.0	1030.0
24-May-17 5:00	1.9	238.2	15.5	1.6	97.5	4.8	0.0	1030.0
24-May-17 6:00	0.9	235.5	32.2	1.2	97.6	33.8	0.0	1030.1
24-May-17 7:00	0.9	228.6	37.3	1.2	97.0	90.9	0.0	1030.1
24-May-17 8:00	1.2	67.5	32.1	1.2	96.0	194.6	0.0	1029.9
24-May-17 9:00	1.7	224.2	7.9	1.9	92.7	290.8	0.0	1029.9
24-May-17 10:00	1.5	216.5	10.9	2.5	90.9	428.7	0.0	1029.9
24-May-17 11:00	0.9	224.3	27.1	3.3	90.3	475.2	0.0	1029.7
24-May-17 12:00	0.6	305.5	32.3	4.3	86.8	494.4	0.0	1030.1
24-May-17 13:00	1.1	286.7	37.8	4.0	85.8	433.8	0.0	1029.6
24-May-17 14:00	2.3	234.3	14.2	3.9	86.6	443.2	0.0	1029.7
24-May-17 15:00	2.9	240.1	11.2	4.1	86.0	429.2	0.0	1029.8
24-May-17 16:00	2.3	256.3	18.9	4.0	86.1	288.2	0.0	1030.1
24-May-17 17:00	3.7	241.3	18.1	3.7	86.2	247.4	0.0	1029.8

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
	Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
24-May-17 18:00	3.8	232.6	12.1	3.9	83.4	242.6	0.0	1029.4
24-May-17 19:00	4.3	241.2	9.9	4.0	77.9	190.7	0.0	1028.7
24-May-17 20:00	3.5	234.5	15.0	4.2	75.4	139.7	0.0	1029.1
24-May-17 21:00	2.6	227.3	12.1	3.3	78.8	32.3	0.0	1029.7
24-May-17 22:00	2.3	208.8	11.9	3.0	79.9	1.4	0.0	1029.9
24-May-17 23:00	2.8	213.2	9.1	2.9	78.9	0.0	0.0	1029.8
25-May-17 0:00	2.4	238.5	9.4	2.8	80.7	0.0	0.0	1029.8
25-May-17 1:00	1.7	240.2	13.9	2.5	83.0	0.0	0.0	1029.9
25-May-17 2:00	2.0	218.8	8.8	2.4	84.3	0.0	0.0	1030.0
25-May-17 3:00	2.7	190.7	15.2	2.1	86.4	0.0	0.0	1030.0
25-May-17 4:00	2.1	208.8	13.8	1.9	88.3	0.2	0.0	1029.9
25-May-17 5:00	2.2	195.6	17.0	1.8	89.1	6.6	0.0	1029.9
25-May-17 6:00	2.1	211.0	11.7	1.6	91.6	34.3	0.0	1030.0
25-May-17 7:00	2.4	208.2	9.2	1.6	92.2	76.5	0.0	1030.0
25-May-17 8:00	1.7	213.6	12.3	1.9	90.9	145.7	0.0	1030.0
25-May-17 9:00	2.0	210.5	13.7	2.1	91.6	204.3	0.0	1030.0
25-May-17 10:00	1.8	216.3	19.8	2.4	90.6	300.6	0.0	1029.9
25-May-17 11:00	2.1	223.8	30.5	3.2	87.8	466.6	0.0	1030.0
25-May-17 12:00	2.2	257.0	31.8	3.5	87.2	442.1	0.0	1030.1
25-May-17 13:00	2.5	257.8	23.8	3.7	87.2	449.3	0.0	1030.1
25-May-17 14:00	2.5	245.1	21.0	4.0	86.4	418.2	0.0	1029.9
25-May-17 15:00	2.7	233.1	22.6	4.3	85.8	395.8	0.0	1029.3
25-May-17 16:00	2.8	234.0	19.0	4.7	84.6	383.2	0.0	1030.0
25-May-17 17:00	2.9	240.9	16.0	4.9	84.7	295.2	0.0	1029.7
25-May-17 18:00	2.7	233.0	12.5	4.8	85.3	207.8	0.0	1029.6
25-May-17 19:00	3.1	213.6	9.2	4.6	86.1	121.3	0.0	1029.6
25-May-17 20:00	2.2	216.2	8.7	4.6	86.9	66.2	0.0	1029.7
25-May-17 21:00	2.1	224.0	11.6	4.4	87.3	18.7	0.0	1029.7
25-May-17 22:00	1.5	200.3	14.8	4.2	88.0	1.3	0.0	1029.8
25-May-17 23:00	1.7	218.5	13.7	4.1	88.4	0.0	0.0	1029.8
26-May-17 0:00	1.8	218.0	10.4	3.9	88.1	0.0	0.0	1029.8
26-May-17 1:00	2.3	188.6	9.5	3.6	88.0	0.0	0.0	1029.8
26-May-17 2:00	2.8	211.6	6.8	3.2	89.3	0.0	0.0	1030.0
26-May-17 3:00	2.4	191.8	12.3	3.4	87.4	0.0	0.0	1030.0
26-May-17 4:00	1.3	198.5	12.8	3.1	88.6	0.6	0.0	1030.0
26-May-17 5:00	0.6	177.1	11.7	3.1	88.4	17.9	0.0	1029.7
26-May-17 6:00	0.2	72.4	11.2	4.0	81.6	116.6	0.0	1029.4
26-May-17 7:00	1.0	121.5	13.0	4.4	78.2	255.1	0.0	1029.3
26-May-17 8:00	1.4	211.2	6.2	3.9	85.0	401.5	0.0	1030.1
26-May-17 9:00	1.8	213.3	7.9	4.2	83.7	568.8	0.0	1030.6
26-May-17 10:00	3.0	216.1	13.3	4.8	80.2	704.1	0.0	1031.3
26-May-17 11:00	2.9	237.4	20.3	5.9	75.7	798.8	0.0	1031.0
26-May-17 12:00	3.1	260.3	24.7	6.8	71.4	894.0	0.0	1031.6
26-May-17 13:00	4.3	252.3	20.9	7.4	66.1	903.0	0.0	1030.7
26-May-17 14:00	5.4	253.4	18.7	7.9	61.3	894.0	0.0	1029.6
26-May-17 15:00	7.7	246.1	13.0	8.5	54.2	890.0	0.0	1030.9
26-May-17 16:00	7.7	243.2	10.1	8.6	51.8	797.6	0.0	1028.3
26-May-17 17:00	8.0	244.5	9.8	8.3	52.9	642.9	0.0	1029.7
26-May-17 18:00	6.4	257.3	13.2	8.1	55.8	522.1	0.0	1028.7
26-May-17 19:00	4.5	306.4	17.8	7.3	61.0	206.4	0.0	1029.4
26-May-17 20:00	3.7	338.2	32.6	6.6	63.6	156.2	0.0	1029.1
26-May-17 21:00	3.3	345.9	17.2	5.6	67.9	58.2	0.0	1029.4
26-May-17 22:00	2.6	26.9	27.4	4.7	70.8	3.6	0.0	1029.4
26-May-17 23:00	1.8	48.9	9.8	4.2	72.8	0.0	0.0	1029.5

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
27-May-17 0:00	1.1	277.5	39.4	4.5	73.1	0.0	0.0	1029.6
27-May-17 1:00	0.8	316.4	7.8	4.1	74.8	0.0	0.0	1029.6
27-May-17 2:00	1.3	55.4	11.2	3.6	75.3	0.0	0.0	1029.8
27-May-17 3:00	1.6	63.4	7.2	3.4	74.1	0.0	0.0	1029.8
27-May-17 4:00	1.9	34.5	4.6	3.1	79.3	0.9	0.0	1029.8
27-May-17 5:00	1.6	49.7	7.2	3.0	77.6	27.6	0.0	1029.4
27-May-17 6:00	1.8	45.5	4.2	3.4	74.6	125.4	0.0	1029.7
27-May-17 7:00	2.0	37.7	4.6	4.0	72.4	258.9	0.0	1030.2
27-May-17 8:00	1.8	40.5	7.9	4.6	69.7	395.5	0.0	1030.9
27-May-17 9:00	0.8	73.2	13.3	6.1	65.1	577.7	0.0	1030.9
27-May-17 10:00	0.7	105.5	25.1	7.1	56.1	705.7	0.0	1032.0
27-May-17 11:00	0.7	78.5	18.8	7.8	51.3	810.0	0.0	1032.1
27-May-17 12:00	1.1	75.0	9.5	8.1	55.2	875.0	0.0	1031.7
27-May-17 13:00	1.1	73.1	18.7	9.0	50.9	949.0	0.0	1030.5
27-May-17 14:00	0.9	64.4	39.4	10.6	45.4	961.0	0.0	1030.3
27-May-17 15:00	1.4	63.6	34.4	10.7	43.4	827.0	0.0	1029.9
27-May-17 16:00	1.7	64.4	25.4	10.6	42.7	723.5	0.0	1029.5
27-May-17 17:00	1.7	71.5	20.5	11.1	40.9	585.0	0.0	1029.3
27-May-17 18:00	1.5	64.4	21.8	11.0	41.1	458.9	0.0	1028.5
27-May-17 19:00	1.0	66.2	44.4	11.3	39.9	126.5	0.0	1028.7
27-May-17 20:00	1.4	53.6	14.5	10.8	41.8	125.3	0.0	1028.5
27-May-17 21:00	1.3	59.5	12.6	10.2	44.6	52.7	0.0	1029.0
27-May-17 22:00	1.0	46.9	29.1	9.5	45.5	5.4	0.0	1029.0
27-May-17 23:00	1.1	7.0	19.6	9.4	44.3	0.0	0.0	1029.0
28-May-17 0:00	2.6	48.8	6.9	9.3	43.5	0.0	0.0	1029.0
28-May-17 1:00	1.0	165.0	30.9	8.8	44.4	0.0	0.0	1029.2
28-May-17 2:00	0.7	181.0	21.8	8.9	44.6	0.0	0.0	1029.2
28-May-17 3:00	1.2	163.9	12.8	9.0	43.6	0.0	0.0	1029.3
28-May-17 4:00	0.9	236.4	24.2	9.3	41.0	0.6	0.0	1029.2
28-May-17 5:00	1.3	176.5	14.1	8.8	42.8	17.2	0.0	1029.1
28-May-17 6:00	1.8	178.6	3.9	8.7	42.5	107.7	0.0	1028.6
28-May-17 7:00	1.6	176.9	8.1	9.2	41.1	254.8	0.0	1028.8
28-May-17 8:00	1.2	174.3	15.4	10.1	38.4	375.4	0.0	1029.4
28-May-17 9:00	1.7	182.5	12.2	10.5	37.8	516.6	0.0	1029.5
28-May-17 10:00	1.1	187.4	15.8	12.0	35.4	650.1	0.0	1030.0
28-May-17 11:00	0.7	164.3	21.2	13.0	35.2	753.0	0.0	1030.3
28-May-17 12:00	0.4	102.6	16.0	14.7	30.4	813.0	0.0	1030.4
28-May-17 13:00	0.5	95.7	42.1	15.5	30.4	872.0	0.0	1029.9
28-May-17 14:00	1.1	119.5	15.9	14.8	34.5	864.0	0.0	1029.3
28-May-17 15:00	1.5	76.1	26.9	15.4	35.5	763.9	0.0	1029.2
28-May-17 16:00	1.7	89.1	30.6	15.6	33.6	691.4	0.0	1028.3
28-May-17 17:00	4.2	231.3	50.5	16.6	27.6	553.2	0.0	1028.5
28-May-17 18:00	5.1	221.8	13.8	16.3	27.1	398.0	0.0	1027.9
28-May-17 19:00	2.7	179.9	20.3	14.6	32.4	154.7	0.0	1028.1
28-May-17 20:00	0.8	117.7	12.7	14.1	33.8	91.1	0.0	1028.4
28-May-17 21:00	0.9	83.2	32.4	13.6	35.2	27.2	0.0	1028.5
28-May-17 22:00	1.0	92.1	15.3	13.0	37.0	1.5	0.0	1028.5
28-May-17 23:00	0.7	144.8	29.2	13.0	37.7	0.0	0.0	1028.6
29-May-17 0:00	1.5	234.7	13.7	12.3	41.9	0.0	0.0	1028.6
29-May-17 1:00	1.6	238.9	19.8	11.6	46.9	0.0	0.0	1028.6
29-May-17 2:00	1.0	179.8	37.5	11.1	49.9	0.0	0.0	1028.8
29-May-17 3:00	1.9	165.3	13.4	10.9	49.5	0.0	0.0	1028.7
29-May-17 4:00	3.3	175.4	11.2	10.5	54.5	0.4	0.0	1028.6
29-May-17 5:00	3.5	192.0	10.8	10.1	56.7	20.6	0.0	1028.5

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
	Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
29-May-17 6:00	2.4	206.5	11.4	9.7	55.6	89.8	0.0	1028.7
29-May-17 7:00	1.8	229.1	7.9	10.1	51.7	191.3	0.0	1028.6
29-May-17 8:00	2.2	185.7	13.5	10.9	48.9	451.9	0.0	1029.1
29-May-17 9:00	2.2	193.7	13.0	11.2	47.8	566.7	0.0	1029.6
29-May-17 10:00	2.3	193.3	24.4	11.2	49.7	702.1	0.0	1029.7
29-May-17 11:00	2.0	211.5	29.9	11.9	47.4	704.5	0.0	1029.9
29-May-17 12:00	4.0	238.7	29.2	11.8	47.0	541.8	0.0	1029.2
29-May-17 13:00	5.2	243.0	13.1	12.4	42.4	771.6	0.0	1029.0
29-May-17 14:00	5.6	229.1	10.4	12.8	43.7	722.4	0.0	1028.3
29-May-17 15:00	5.5	207.4	14.9	12.4	47.1	382.6	0.0	1028.6
29-May-17 16:00	5.6	210.6	10.2	12.4	46.8	308.4	0.0	1028.4
29-May-17 17:00	5.2	206.7	12.3	12.7	47.7	381.9	0.0	1028.8
29-May-17 18:00	3.2	174.2	17.6	11.8	51.2	210.8	0.0	1028.1
29-May-17 19:00	2.0	174.5	22.5	11.7	52.5	166.9	0.0	1028.4
29-May-17 20:00	1.8	173.9	15.6	11.4	53.9	97.3	0.0	1028.6
29-May-17 21:00	1.4	173.6	17.0	10.9	55.9	36.3	0.0	1028.7
29-May-17 22:00	1.4	164.1	12.0	10.5	57.3	2.0	0.0	1028.8
29-May-17 23:00	2.2	181.0	6.2	10.6	57.1	0.0	0.0	1028.8
30-May-17 0:00	1.6	190.0	12.8	10.3	58.0	0.0	0.0	1028.8
30-May-17 1:00	1.0	210.9	16.0	9.7	59.4	0.0	0.0	1028.8
30-May-17 2:00	0.7	6.8	27.6	9.7	59.2	0.0	0.0	1028.9
30-May-17 3:00	0.6	251.8	31.8	9.5	60.2	0.0	0.0	1029.0
30-May-17 4:00	0.5	301.6	43.9	9.1	61.1	0.4	0.0	1029.0
30-May-17 5:00	0.2	59.0	4.5	8.9	62.1	10.2	0.0	1029.0
30-May-17 6:00	0.9	69.9	19.0	9.3	58.3	113.6	0.0	1028.9
30-May-17 7:00	0.9	72.5	24.7	10.2	56.8	256.6	0.0	1028.8
30-May-17 8:00	1.0	89.0	23.3	10.4	54.5	396.6	0.0	1030.2
30-May-17 9:00	0.9	157.7	37.7	10.8	56.0	569.1	0.0	1029.9
30-May-17 10:00	0.9	151.6	21.3	11.5	54.4	702.2	0.0	1030.1
30-May-17 11:00	1.1	171.7	20.5	11.6	59.9	798.4	0.0	1030.6
30-May-17 12:00	0.8	85.0	18.6	12.7	51.8	871.0	0.0	1031.1
30-May-17 13:00	1.1	84.0	15.7	12.3	57.0	721.7	0.0	1030.4
30-May-17 14:00	2.0	87.5	15.8	11.9	56.3	647.3	0.0	1028.7
30-May-17 15:00	1.7	79.1	21.4	12.1	54.9	282.8	0.0	1029.1
30-May-17 16:00	1.6	92.5	29.0	12.9	51.0	566.5	0.0	1028.5
30-May-17 17:00	1.6	90.9	33.9	13.2	47.9	631.5	0.0	1028.9
30-May-17 18:00	1.4	9.8	56.3	13.6	48.0	430.4	0.0	1028.5
30-May-17 19:00	4.0	251.0	25.6	12.8	52.3	193.1	0.0	1028.7
30-May-17 20:00	1.6	260.6	39.6	11.8	57.8	78.0	0.0	1028.5
30-May-17 21:00	1.7	171.1	37.4	10.7	61.8	25.9	0.0	1028.6
30-May-17 22:00	2.0	160.0	20.1	10.0	66.6	1.1	0.0	1028.7
30-May-17 23:00	2.9	192.6	11.5	9.4	70.5	0.0	0.0	1029.1
31-May-17 0:00	2.1	178.0	18.0	9.0	73.0	0.0	0.0	1028.8
31-May-17 1:00	1.8	171.5	11.7	8.8	74.2	0.0	0.0	1028.9
31-May-17 2:00	3.0	194.9	8.6	8.0	79.8	0.0	0.0	1028.8
31-May-17 3:00	2.8	206.7	8.1	6.7	91.4	0.0	0.0	1029.4
31-May-17 4:00	4.0	213.7	9.5	5.6	97.9	0.1	0.0	1029.3
31-May-17 5:00	2.7	195.0	20.2	5.3	98.3	4.6	0.0	1029.4
31-May-17 6:00	2.3	216.1	10.9	5.4	98.4	34.5	0.0	1029.7
31-May-17 7:00	3.2	212.8	5.3	5.2	98.4	57.0	0.0	1030.3
31-May-17 8:00	3.8	215.9	5.0	4.9	98.3	88.7	0.0	1030.9
31-May-17 9:00	3.0	212.4	7.1	4.8	98.2	156.3	0.0	1031.4
31-May-17 10:00	2.9	198.0	12.7	5.5	97.3	408.7	0.0	1031.6
31-May-17 11:00	3.3	209.4	14.4	6.4	95.9	774.8	0.0	1032.3

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
31-May-17 12:00	2.8	209.8	32.6	6.8	94.3	499.8	0.0	1031.0
31-May-17 13:00	1.7	227.7	41.3	7.6	90.1	424.2	0.0	1031.3
31-May-17 14:00	3.1	214.2	20.8	8.2	83.2	560.9	0.0	1031.3
31-May-17 15:00	2.9	213.8	27.0	8.3	82.4	455.1	0.0	1031.2
31-May-17 16:00	2.4	243.4	17.5	8.3	80.5	375.5	0.0	1031.2
31-May-17 17:00	1.2	171.4	60.0	8.2	83.1	242.5	0.0	1031.2
31-May-17 18:00	1.0	63.5	49.5	8.3	81.1	221.8	0.0	1031.2
31-May-17 19:00	1.4	168.8	36.9	8.0	84.9	156.0	0.0	1031.1
31-May-17 20:00	0.3	55.1	37.7	7.7	84.7	77.7	0.0	1031.2
31-May-17 21:00	0.9	38.3	32.7	7.3	83.7	15.8	0.0	1031.2
31-May-17 22:00	0.9	37.4	33.7	7.4	84.2	1.4	0.0	1031.2
31-May-17 23:00	1.7	198.2	16.2	6.7	90.7	0.0	0.0	1031.3
01-Jun-17 0:00	1.9	133.0	23.4	6.3	92.2	0.0	0.0	1031.4
01-Jun-17 1:00	2.5	103.4	30.5	5.9	93.8	0.0	0.0	1032.4
01-Jun-17 2:00	4.3	191.9	13.8	5.5	91.5	0.0	0.0	1032.7
01-Jun-17 3:00	3.4	200.8	16.3	5.8	87.1	0.0	0.0	1032.8
01-Jun-17 4:00	2.4	189.6	9.9	6.0	83.8	0.2	0.0	1032.8
01-Jun-17 5:00	2.0	184.0	44.6	5.6	87.1	8.4	0.0	1033.1
01-Jun-17 6:00	1.8	126.5	31.6	5.5	84.9	38.3	0.0	1033.3
01-Jun-17 7:00	1.4	69.0	36.9	5.4	89.0	112.3	0.0	1033.4
01-Jun-17 8:00	0.8	99.0	35.5	5.9	83.4	173.8	0.0	1033.5
01-Jun-17 9:00	2.5	212.6	36.6	5.5	90.6	152.7	0.0	1033.5
01-Jun-17 10:00	6.1	193.7	15.4	4.4	94.1	181.3	0.0	1034.6
01-Jun-17 11:00	5.7	201.3	9.5	4.4	92.8	275.2	0.0	1036.1
01-Jun-17 12:00	5.9	198.8	11.2	4.9	90.7	361.0	0.0	1034.1
01-Jun-17 13:00	3.1	220.4	21.0	6.0	86.0	505.3	0.0	1034.2
01-Jun-17 14:00	3.6	227.5	25.0	6.4	86.3	554.5	0.0	1034.6
01-Jun-17 15:00	3.4	249.2	27.2	7.2	77.0	619.3	0.0	1034.3
01-Jun-17 16:00	4.2	214.3	26.2	7.3	72.0	457.8	0.0	1034.5
01-Jun-17 17:00	5.9	197.1	16.6	7.2	69.2	522.9	0.0	1033.2
01-Jun-17 18:00	5.6	200.4	11.0	4.6	85.6	170.5	0.0	1034.1
01-Jun-17 19:00	4.5	165.1	10.8	4.9	82.9	136.4	0.0	1034.9
01-Jun-17 20:00	3.8	168.4	11.8	5.1	79.5	50.5	0.0	1034.8
01-Jun-17 21:00	2.9	198.9	14.3	4.9	80.7	25.0	0.0	1034.5
01-Jun-17 22:00	3.3	201.8	8.2	4.3	87.8	2.8	0.0	1034.6
01-Jun-17 23:00	4.2	173.3	17.3	4.1	87.9	0.0	0.0	1034.7
02-Jun-17 0:00	1.2	114.3	44.3	4.6	82.4	0.0	0.0	1034.7
02-Jun-17 1:00	1.8	76.7	34.5	4.5	84.0	0.0	0.0	1034.8
02-Jun-17 2:00	1.4	68.2	37.8	4.4	84.8	0.0	0.0	1034.8
02-Jun-17 3:00	0.8	37.2	57.8	4.4	85.8	0.0	0.0	1034.8
02-Jun-17 4:00	1.7	151.9	48.6	4.5	81.7	0.6	0.0	1034.8
02-Jun-17 5:00	2.0	93.5	14.4	4.2	82.5	20.0	0.0	1034.9
02-Jun-17 6:00	1.2	58.7	46.5	4.6	79.8	62.7	0.0	1034.9
02-Jun-17 7:00	0.5	203.2	27.1	5.1	79.1	123.2	0.0	1035.0
02-Jun-17 8:00	1.4	164.8	21.4	5.3	79.3	197.2	0.0	1034.7
02-Jun-17 9:00	1.6	32.2	28.0	5.5	82.8	354.8	0.0	1035.2
02-Jun-17 10:00	1.2	47.1	21.0	6.5	79.0	456.3	0.0	1035.5
02-Jun-17 11:00	1.3	338.7	37.8	7.4	80.1	530.8	0.0	1035.3
02-Jun-17 12:00	2.4	210.9	47.3	7.1	79.0	372.6	0.0	1034.7
02-Jun-17 13:00	3.1	186.1	14.0	6.4	81.0	327.7	0.0	1034.7
02-Jun-17 14:00	6.5	184.1	17.3	6.1	80.9	556.9	0.0	1035.3
02-Jun-17 15:00	8.7	191.5	17.2	5.0	81.9	173.2	0.0	1036.0
02-Jun-17 16:00	6.1	195.1	11.5	4.6	81.5	288.5	0.0	1035.9
02-Jun-17 17:00	7.1	182.1	11.6	4.7	82.8	245.8	0.0	1037.3

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
02-Jun-17 18:00	6.9	187.2	10.1	4.8	75.1	162.7	0.0	1034.8
02-Jun-17 19:00	6.9	189.1	12.4	4.4	75.0	140.8	0.0	1036.2
02-Jun-17 20:00	4.7	203.1	13.5	4.3	75.7	120.5	0.0	1036.1
02-Jun-17 21:00	6.9	185.8	11.0	3.4	78.5	35.8	0.0	1038.1
02-Jun-17 22:00	5.8	164.3	16.2	2.1	84.2	1.3	0.0	1036.8
02-Jun-17 23:00	6.8	184.4	8.3	2.2	75.9	0.0	0.0	1036.9
03-Jun-17 0:00	5.2	162.9	7.9	2.1	69.0	0.0	0.0	1037.0
03-Jun-17 1:00	2.1	64.4	24.9	2.3	73.2	0.0	0.0	1036.7
03-Jun-17 2:00	1.5	70.0	11.1	2.2	78.4	0.0	0.0	1036.8
03-Jun-17 3:00	0.8	111.5	20.4	2.6	70.7	0.0	0.0	1036.8
03-Jun-17 4:00	0.7	183.8	26.4	2.4	68.2	0.5	0.0	1036.8
03-Jun-17 5:00	0.8	194.7	29.3	2.4	68.5	11.2	0.0	1036.9
03-Jun-17 6:00	0.5	151.8	16.6	2.4	68.4	25.4	0.0	1036.9
03-Jun-17 7:00	0.6	186.2	39.2	1.9	78.9	66.8	0.0	1037.1
03-Jun-17 8:00	1.3	191.9	29.4	1.4	86.9	215.3	0.0	1037.1
03-Jun-17 9:00	3.0	203.3	13.5	1.1	92.0	236.8	0.0	1036.7
03-Jun-17 10:00	4.0	183.3	9.1	0.5	96.6	200.9	0.0	1037.3
03-Jun-17 11:00	3.9	217.0	15.3	1.4	94.8	567.6	0.0	1037.5
03-Jun-17 12:00	2.9	216.9	16.0	1.9	91.8	462.8	0.0	1038.4
03-Jun-17 13:00	4.5	214.8	22.0	3.7	77.0	929.0	0.0	1036.8
03-Jun-17 14:00	6.3	199.2	11.9	4.4	63.1	815.0	0.0	1037.4
03-Jun-17 15:00	7.4	185.7	12.7	4.3	61.0	678.9	0.0	1037.9
03-Jun-17 16:00	7.2	188.2	13.3	4.6	59.7	738.5	0.0	1036.5
03-Jun-17 17:00	7.2	190.7	11.3	4.2	60.7	454.9	0.0	1036.7
03-Jun-17 18:00	6.5	188.4	10.7	3.6	62.8	345.1	0.0	1036.0
03-Jun-17 19:00	5.9	197.4	10.9	3.9	62.5	127.9	0.0	1036.8
03-Jun-17 20:00	5.8	179.7	10.3	2.9	71.1	109.5	0.0	1037.3
03-Jun-17 21:00	5.9	184.6	9.0	2.5	75.5	46.6	0.0	1037.1
03-Jun-17 22:00	4.4	176.8	8.2	2.3	76.4	4.3	0.0	1037.3
03-Jun-17 23:00	1.8	154.5	27.0	2.4	75.0	0.0	0.0	1037.4
04-Jun-17 0:00	1.4	76.2	28.2	2.7	70.3	0.0	0.0	1037.4
04-Jun-17 1:00	1.3	68.7	33.6	2.5	71.3	0.0	0.0	1037.4
04-Jun-17 2:00	1.0	140.6	43.4	2.6	70.2	0.0	0.0	1037.4
04-Jun-17 3:00	2.0	134.9	15.8	2.6	69.7	0.0	0.0	1037.6
04-Jun-17 4:00	2.3	163.7	30.2	2.1	76.2	0.8	0.0	1037.4
04-Jun-17 5:00	1.6	147.9	25.5	2.1	76.2	20.5	0.0	1037.5
04-Jun-17 6:00	0.9	78.5	26.0	2.4	75.0	84.4	0.0	1037.5
04-Jun-17 7:00	0.5	62.2	28.7	2.3	78.1	130.7	0.0	1037.6
04-Jun-17 8:00	1.0	20.8	40.0	2.3	82.5	195.8	0.0	1037.6
04-Jun-17 9:00	0.6	47.7	42.9	3.0	81.2	295.7	0.0	1037.5
04-Jun-17 10:00	1.1	123.0	12.4	2.6	85.5	363.3	0.0	1037.3
04-Jun-17 11:00	1.0	159.4	43.9	3.1	88.0	433.5	0.0	1037.4
04-Jun-17 12:00	1.2	214.3	29.5	2.5	91.1	233.3	0.0	1038.5
04-Jun-17 13:00	1.9	320.0	26.4	2.5	93.6	256.5	0.0	1039.0
04-Jun-17 14:00	1.6	218.0	18.2	2.1	95.8	212.6	0.0	1039.9
04-Jun-17 15:00	1.0	151.1	41.7	2.3	91.8	259.6	0.0	1041.1
04-Jun-17 16:00	0.7	160.0	33.4	2.2	91.4	215.2	0.0	1041.7
04-Jun-17 17:00	1.3	141.6	59.4	2.2	92.6	192.0	0.0	1043.1
04-Jun-17 18:00	1.0	67.4	42.5	2.3	91.7	161.5	0.0	1043.9
04-Jun-17 19:00	1.5	67.2	42.3	2.2	92.8	106.8	0.0	1044.0
04-Jun-17 20:00	1.6	97.5	53.8	2.6	90.2	78.7	0.0	1044.0
04-Jun-17 21:00	1.7	96.3	32.3	2.6	91.6	24.8	0.0	1044.1
04-Jun-17 22:00	2.0	117.0	66.5	2.6	90.1	2.2	0.0	1044.2
04-Jun-17 23:00	2.2	121.0	32.8	2.5	89.6	0.0	0.0	1044.2

## Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
05-Jun-17 0:00	3.4	149.1	16.9	2.5	88.8	0.0	0.0	1044.4
05-Jun-17 1:00	2.1	76.3	28.4	2.2	91.9	0.0	0.0	1044.8
05-Jun-17 2:00	2.0	129.5	32.9	2.3	89.9	0.0	0.0	1044.9
05-Jun-17 3:00	3.2	118.9	24.2	2.2	90.0	0.0	0.0	1044.7
05-Jun-17 4:00	2.3	135.8	20.7	2.3	89.1	0.6	0.0	1044.9
05-Jun-17 5:00	3.3	142.0	18.3	2.4	88.3	15.8	0.0	1044.5
05-Jun-17 6:00	2.1	100.6	20.0	2.4	88.8	60.7	0.0	1045.0
05-Jun-17 7:00	3.2	158.8	20.1	2.8	85.6	126.4	0.0	1044.8
05-Jun-17 8:00	2.1	122.0	17.3	2.6	90.1	165.5	0.0	1044.9
05-Jun-17 9:00	1.5	79.8	52.1	2.7	90.2	159.8	0.0	1045.1
05-Jun-17 10:00	1.6	98.5	23.4	2.9	89.5	265.0	0.0	1045.2
05-Jun-17 11:00	1.6	115.8	44.9	3.4	87.5	313.1	0.0	1045.6
05-Jun-17 12:00	0.9	47.6	27.7	3.7	87.7	288.3	0.0	1046.3
05-Jun-17 13:00	1.0	210.8	55.0	3.9	87.5	277.7	0.0	1046.6
05-Jun-17 14:00	0.9	314.3	32.5	4.2	90.7	294.7	0.0	1046.8
05-Jun-17 15:00	1.9	331.2	44.2	4.3	89.4	289.0	0.0	1047.1
05-Jun-17 16:00	1.4	148.6	56.8	4.6	86.2	234.3	0.0	1046.8
05-Jun-17 17:00	1.4	167.3	37.5	4.5	87.9	199.5	0.0	1047.0
05-Jun-17 18:00	1.6	152.6	35.8	4.4	86.8	160.5	0.0	1047.2
05-Jun-17 19:00	2.6	164.3	34.5	4.2	86.2	106.7	0.0	1047.4
05-Jun-17 20:00	1.5	132.2	39.6	4.2	85.6	51.8	0.0	1047.5
05-Jun-17 21:00	3.8	151.9	11.3	4.1	85.4	16.7	0.0	1047.4
05-Jun-17 22:00	3.0	142.1	20.4	3.9	84.3	1.4	0.0	1047.4
05-Jun-17 23:00	2.5	108.5	33.9	4.0	84.5	0.0	0.0	1047.3
06-Jun-17 0:00	2.1	168.8	26.3	4.3	80.6	0.0	0.0	1047.4
06-Jun-17 1:00	2.3	134.4	27.4	4.2	81.8	0.0	0.0	1047.4
06-Jun-17 2:00	1.6	66.3	16.8	4.1	82.0	0.0	0.0	1047.4
06-Jun-17 3:00	1.1	70.9	9.9	4.2	80.4	0.0	0.0	1047.4
06-Jun-17 4:00	1.5	73.7	13.6	4.3	78.8	1.0	0.0	1047.3
06-Jun-17 5:00	1.2	67.7	10.3	4.4	76.9	14.8	0.0	1047.4
06-Jun-17 6:00	1.3	78.2	19.9	4.8	74.3	83.5	0.0	1047.3
06-Jun-17 7:00	1.3	78.8	24.8	5.7	71.0	212.9	0.0	1047.6
06-Jun-17 8:00	1.9	126.0	18.9	5.8	73.5	324.3	0.0	1047.7
06-Jun-17 9:00	1.4	24.2	41.8	7.1	68.7	559.7	0.0	1048.0
06-Jun-17 10:00	1.9	133.5	30.1	7.6	65.2	682.7	0.0	1048.1
06-Jun-17 11:00	1.6	92.1	41.9	8.9	61.8	741.1	0.0	1048.5
06-Jun-17 12:00	3.6	97.8	47.6	9.1	61.4	737.4	0.0	1047.2
06-Jun-17 13:00	7.9	97.5	11.9	8.8	61.3	733.2	0.0	1046.9
06-Jun-17 14:00	7.5	93.7	10.0	9.5	58.8	577.9	0.0	1047.9
06-Jun-17 15:00	3.9	98.1	16.4	10.1	57.7	546.8	0.0	1046.8
06-Jun-17 16:00	5.8	94.9	12.3	10.3	55.4	450.5	0.0	1046.5
06-Jun-17 17:00	4.8	92.7	15.4	10.5	54.3	357.5	0.0	1046.8
06-Jun-17 18:00	1.9	95.5	26.4	11.4	52.1	369.8	0.0	1046.4
06-Jun-17 19:00	1.6	65.5	30.3	11.3	50.3	152.4	0.0	1046.3
06-Jun-17 20:00	1.2	115.3	36.2	10.7	53.4	66.4	0.0	1046.5
06-Jun-17 21:00	1.6	319.8	36.1	10.5	54.5	19.3	0.0	1046.5
06-Jun-17 22:00	1.1	124.4	57.9	10.3	55.1	2.0	0.0	1046.5
06-Jun-17 23:00	1.4	124.6	33.9	10.4	56.4	0.0	0.0	1046.7
07-Jun-17 0:00	4.1	182.8	6.0	9.3	66.1	0.0	0.0	1046.8
07-Jun-17 1:00	3.7	182.2	12.2	8.2	80.8	0.0	0.0	1046.7
07-Jun-17 2:00	1.9	21.8	42.7	8.3	79.1	0.0	0.0	1046.9
07-Jun-17 3:00	2.2	61.5	13.1	8.1	77.3	0.0	0.0	1046.9
07-Jun-17 4:00	1.4	126.5	32.4	8.0	78.7	0.3	0.0	1046.9
07-Jun-17 5:00	0.8	68.5	27.4	8.2	73.9	13.6	0.0	1046.9

## Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
07-Jun-17 6:00	1.1	124.3	21.2	8.7	70.3	60.6	0.0	1046.9
07-Jun-17 7:00	4.6	29.5	10.4	8.7	71.6	182.0	0.0	1047.1
07-Jun-17 8:00	2.2	344.2	28.8	9.0	71.1	255.1	0.0	1047.3
07-Jun-17 9:00	1.9	14.6	34.9	10.1	71.2	525.7	0.0	1048.2
07-Jun-17 10:00	2.5	12.2	50.5	11.3	66.7	728.6	0.0	1048.9
07-Jun-17 11:00	4.2	37.0	35.9	11.9	61.4	761.0	0.0	1048.7
07-Jun-17 12:00	2.0	289.8	33.8	13.1	63.1	857.0	0.0	1048.7
07-Jun-17 13:00	1.6	342.6	45.0	14.7	52.7	808.0	0.0	1048.0
07-Jun-17 14:00	3.7	88.6	26.2	14.7	46.4	410.9	0.0	1046.8
07-Jun-17 15:00	4.0	63.3	17.5	15.8	41.6	610.5	0.0	1046.2
07-Jun-17 16:00	4.6	110.3	20.8	15.4	41.4	437.2	0.0	1046.4
07-Jun-17 17:00	6.4	93.6	12.3	15.9	39.6	347.4	0.0	1045.4
07-Jun-17 18:00	8.3	84.1	10.6	16.5	37.4	341.8	0.0	1044.7
07-Jun-17 19:00	9.1	70.2	12.0	16.9	36.3	136.7	0.0	1046.2
07-Jun-17 20:00	8.1	56.2	6.1	16.7	37.6	61.2	0.0	1044.9
07-Jun-17 21:00	7.1	51.0	6.2	16.4	38.4	21.3	0.0	1046.5
07-Jun-17 22:00	2.1	346.5	40.6	15.3	42.5	2.0	0.0	1046.1
07-Jun-17 23:00	3.0	64.4	36.5	13.8	49.0	0.0	0.0	1046.3
08-Jun-17 0:00	7.4	49.1	14.5	14.7	45.5	0.0	0.0	1046.2
08-Jun-17 1:00	9.1	46.5	4.9	15.7	40.1	0.0	0.0	1045.7
08-Jun-17 2:00	10.9	62.8	9.3	16.5	36.8	0.0	0.0	1045.5
08-Jun-17 3:00	7.3	47.2	25.1	16.6	37.2	0.0	0.0	1046.3
08-Jun-17 4:00	6.6	46.2	13.4	15.1	42.4	0.4	0.0	1046.0
08-Jun-17 5:00	10.4	55.2	5.4	15.5	40.2	7.1	0.0	1047.6
08-Jun-17 6:00	8.0	49.4	10.5	16.0	40.0	42.0	0.0	1045.1
08-Jun-17 7:00	10.6	62.1	6.0	16.0	40.6	121.3	0.0	1047.8
08-Jun-17 8:00	11.2	60.7	5.7	16.4	40.6	241.5	0.0	1045.4
08-Jun-17 9:00	9.4	49.6	6.1	16.2	42.4	265.1	0.0	1046.6
08-Jun-17 10:00	7.7	40.2	6.1	15.8	45.2	270.9	0.0	1047.0
08-Jun-17 11:00	5.9	28.6	6.6	15.8	46.9	396.2	0.0	1046.4
08-Jun-17 12:00	1.4	200.9	68.3	13.5	64.0	540.9	0.0	1046.1
08-Jun-17 13:00	1.1	223.5	69.6	13.0	67.9	601.4	0.0	1046.7
08-Jun-17 14:00	1.8	228.6	26.4	13.2	70.8	744.5	0.0	1046.1
08-Jun-17 15:00	4.3	222.9	11.6	12.7	70.3	676.4	0.0	1046.1
08-Jun-17 16:00	6.7	225.6	10.8	12.4	70.0	480.9	0.0	1046.8
08-Jun-17 17:00	8.7	214.8	11.6	10.1	81.3	71.0	0.0	1047.3
08-Jun-17 18:00	6.2	211.0	11.4	8.2	94.5	41.9	0.0	1046.8
08-Jun-17 19:00	3.4	187.0	13.9	7.8	96.4	57.2	0.0	1047.0
08-Jun-17 20:00	2.9	201.1	17.3	7.7	97.5	30.5	0.0	1047.5
08-Jun-17 21:00	3.3	218.1	8.6	7.5	98.1	4.2	0.0	1049.8
08-Jun-17 22:00	3.5	202.4	12.1	7.0	98.3	0.7	0.0	1050.5
08-Jun-17 23:00	4.3	217.5	11.2	6.7	98.4	0.0	0.0	1050.2
09-Jun-17 0:00	5.1	209.7	9.0	6.4	98.5	0.0	0.0	1051.5
09-Jun-17 1:00	6.3	224.5	6.6	6.2	98.6	0.0	0.0	1054.4
09-Jun-17 2:00	5.3	207.3	9.9	5.7	98.7	0.0	0.0	1054.4
09-Jun-17 3:00	4.3	206.4	8.8	5.6	98.6	0.0	0.0	1055.6
09-Jun-17 4:00	6.5	221.4	8.7	5.1	98.7	0.2	0.0	1058.2
09-Jun-17 5:00	7.7	219.9	7.5	4.5	98.7	2.5	0.0	1058.3
09-Jun-17 6:00	7.1	218.3	8.6	3.9	98.8	10.5	0.0	1062.6
09-Jun-17 7:00	6.3	213.9	11.4	3.2	98.8	21.8	0.0	1067.1
09-Jun-17 8:00	5.5	214.9	10.2	2.6	98.8	42.1	0.0	1068.3
09-Jun-17 9:00	5.6	224.9	8.4	2.3	98.8	38.2	0.0	1069.4
09-Jun-17 10:00	5.0	218.4	7.6	1.9	98.8	40.8	0.0	1070.1
09-Jun-17 11:00	4.8	215.0	10.5	1.8	98.8	35.5	0.0	1071.0



Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
09-Jun-17 12:00	4.3	213.4	11.3	1.7	98.8	47.5	0.0	1071.2
09-Jun-17 13:00	4.1	216.9	10.1	1.7	98.8	66.6	0.0	1072.0
09-Jun-17 14:00	4.2	213.6	9.8	1.7	98.7	124.4	0.0	1072.4
09-Jun-17 15:00	4.5	221.9	8.3	1.8	98.6	171.6	0.0	1072.3
09-Jun-17 16:00	3.9	212.3	10.6	1.9	98.4	224.5	0.0	1072.4
09-Jun-17 17:00	4.3	217.4	10.2	2.1	98.0	399.5	0.0	1072.4
09-Jun-17 18:00	3.6	206.6	15.0	2.1	98.2	205.1	0.0	1072.2
09-Jun-17 19:00	3.4	210.2	13.2	2.0	98.6	107.2	0.0	1072.4
09-Jun-17 20:00	3.5	207.1	13.4	2.1	98.6	60.5	0.0	1072.5
09-Jun-17 21:00	3.1	206.5	10.4	2.0	98.8	13.9	0.0	1072.5
09-Jun-17 22:00	2.7	201.4	8.7	1.8	98.9	3.9	0.0	1072.5
09-Jun-17 23:00	2.1	203.5	18.1	1.7	98.9	0.0	0.0	1072.5
10-Jun-17 0:00	1.6	181.5	14.5	1.7	98.9	0.0	0.0	1072.5
10-Jun-17 1:00	1.4	175.3	12.0	1.7	98.9	0.0	0.0	1072.6
10-Jun-17 2:00	1.0	157.6	9.2	1.7	98.8	0.0	0.0	1072.6
10-Jun-17 3:00	1.6	181.8	6.3	1.6	98.8	0.0	0.0	1072.7
10-Jun-17 4:00	1.6	197.4	8.1	1.6	98.8	1.0	0.0	1072.7
10-Jun-17 5:00	1.3	198.6	11.6	1.5	98.9	9.2	0.0	1072.7
10-Jun-17 6:00	1.9	213.6	6.4	1.5	98.8	36.4	0.0	1072.6
10-Jun-17 7:00	2.6	223.0	6.0	1.6	98.4	192.8	0.0	1072.5
10-Jun-17 8:00	3.3	230.4	8.9	1.5	98.5	152.7	0.0	1072.7
10-Jun-17 9:00	3.2	225.5	12.5	1.9	98.0	388.4	0.0	1072.3
10-Jun-17 10:00	3.6	220.3	10.3	2.4	97.9	411.1	0.0	1072.6
10-Jun-17 11:00	2.9	219.7	16.1	2.9	98.0	279.1	0.0	1072.2
10-Jun-17 12:00	3.7	233.8	12.1	3.4	97.7	413.3	0.0	1072.3
10-Jun-17 13:00	3.4	236.3	17.0	3.7	97.6	342.6	0.0	1072.2
10-Jun-17 14:00	4.0	227.4	15.6	3.9	97.4	334.4	0.0	1072.9
10-Jun-17 15:00	4.6	219.6	12.2	3.9	97.1	255.0	0.0	1072.2
10-Jun-17 16:00	5.2	222.6	11.8	4.2	96.2	221.6	0.0	1072.4
10-Jun-17 17:00	4.5	226.8	9.5	4.5	95.4	225.2	0.0	1072.6
10-Jun-17 18:00	4.2	229.6	11.2	4.4	96.4	120.8	0.0	1072.8
10-Jun-17 19:00	4.4	227.9	12.7	4.1	98.0	66.7	0.0	1072.1
10-Jun-17 20:00	4.3	215.6	11.1	4.0	98.5	22.4	0.0	1072.3
10-Jun-17 21:00	4.9	220.8	9.2	3.9	98.7	10.6	0.0	1071.8
10-Jun-17 22:00	5.1	222.6	8.0	3.8	98.8	2.4	0.0	1072.5
10-Jun-17 23:00	5.6	221.9	8.0	3.7	98.9	0.0	0.0	1072.4
11-Jun-17 0:00	5.4	222.6	6.2	3.6	98.9	0.0	0.0	1071.1
11-Jun-17 1:00	5.7	219.2	6.7	3.6	99.0	0.0	0.0	1072.1
11-Jun-17 2:00	4.9	217.0	7.7	3.5	99.0	0.0	0.0	1072.0
11-Jun-17 3:00	6.3	230.3	6.6	3.4	99.0	0.0	0.0	1074.3
11-Jun-17 4:00	6.8	218.8	6.7	3.2	99.0	0.6	0.0	1071.8
11-Jun-17 5:00	5.2	215.0	7.3	2.9	99.0	25.3	0.0	1072.6
11-Jun-17 6:00	3.9	220.4	9.6	2.8	98.9	62.4	0.0	1072.3
11-Jun-17 7:00	3.3	217.3	10.8	2.6	98.8	93.7	0.0	1072.5
11-Jun-17 8:00	3.9	210.6	10.2	2.9	96.7	221.0	0.0	1071.9
11-Jun-17 9:00	4.7	233.7	12.1	3.7	89.3	469.1	0.0	1073.6
11-Jun-17 10:00	5.0	248.6	18.8	4.2	84.8	449.4	0.0	1072.4
11-Jun-17 11:00	5.4	252.1	22.1	4.7	80.7	505.8	0.0	1072.9
11-Jun-17 12:00	5.3	252.8	19.0	4.8	79.7	494.4	0.0	1073.1
11-Jun-17 13:00	6.4	245.0	12.9	4.4	82.1	282.5	0.0	1072.6
11-Jun-17 14:00	7.2	247.0	8.4	4.5	82.9	295.2	0.0	1072.5
11-Jun-17 15:00	8.4	244.7	8.1	5.1	77.6	454.9	0.0	1071.8
11-Jun-17 16:00	8.5	237.4	8.6	5.3	75.8	460.9	0.0	1070.8
11-Jun-17 17:00	9.2	222.9	6.6	4.3	83.6	364.1	0.0	1073.1

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation					
11-Jun-17 18:00	6.8	221.9	8.0	3.7	88.3	148.0	0.0	1070.4
11-Jun-17 19:00	6.8	232.6	8.1	3.3	90.4	65.0	0.0	1072.0
11-Jun-17 20:00	6.0	235.9	7.7	2.9	93.4	27.5	0.0	1072.8
11-Jun-17 21:00	5.2	224.0	9.1	2.5	96.6	13.6	0.0	1071.7
11-Jun-17 22:00	5.6	217.8	9.0	2.3	97.8	2.4	0.0	1072.7
11-Jun-17 23:00	5.4	209.6	9.7	2.2	98.4	0.0	0.0	1072.3
12-Jun-17 0:00	5.1	212.8	9.9	2.0	98.5	0.0	0.0	1072.7
12-Jun-17 1:00	5.0	217.0	6.5	1.9	98.7	0.0	0.0	1071.7
12-Jun-17 2:00	4.4	213.2	7.7	1.8	98.8	0.0	0.0	1072.4
12-Jun-17 3:00	4.2	204.2	12.9	1.7	98.8	0.0	0.0	1073.1
12-Jun-17 4:00	3.9	206.5	13.8	1.6	98.8	1.2	0.0	1072.6
12-Jun-17 5:00	5.2	222.9	10.4	1.6	98.9	12.4	0.0	1073.0
12-Jun-17 6:00	4.8	223.6	7.5	1.7	98.8	36.6	0.0	1072.8
12-Jun-17 7:00	4.8	222.2	6.9	1.6	98.8	56.3	0.0	1072.5
12-Jun-17 8:00	4.5	228.0	6.9	1.7	98.6	184.3	0.0	1072.7
12-Jun-17 9:00	4.2	228.0	8.2	2.0	98.2	331.1	0.0	1072.9
12-Jun-17 10:00	4.3	229.4	10.2	2.2	98.2	333.1	0.0	1072.6
12-Jun-17 11:00	5.2	232.8	14.8	2.5	97.3	343.3	0.0	1073.0
12-Jun-17 12:00	5.6	228.5	11.7	2.8	93.6	339.4	0.0	1072.7
12-Jun-17 13:00	6.1	237.5	11.6	4.1	81.8	551.8	0.0	1073.6
12-Jun-17 14:00	6.6	239.4	9.5	4.5	78.2	525.5	0.0	1072.3
12-Jun-17 15:00	7.1	250.7	7.6	4.7	77.8	424.8	0.0	1073.0
12-Jun-17 16:00	5.8	264.6	16.4	4.5	80.9	239.1	0.0	1073.6
12-Jun-17 17:00	6.5	261.2	14.3	4.6	80.2	213.1	0.0	1072.7
12-Jun-17 18:00	6.9	253.6	11.1	4.2	80.3	132.9	0.0	1073.6
12-Jun-17 19:00	6.6	248.0	8.0	3.6	85.8	89.1	0.0	1072.8
12-Jun-17 20:00	5.3	246.8	6.5	3.2	89.4	75.9	0.0	1072.7
12-Jun-17 21:00	4.1	227.1	10.7	2.3	96.6	14.6	0.0	1072.7
12-Jun-17 22:00	3.9	225.2	10.3	2.0	98.3	2.7	0.0	1072.0
12-Jun-17 23:00	3.6	220.5	9.8	1.7	98.5	0.0	0.0	1072.8
13-Jun-17 0:00	3.2	223.1	8.6	1.6	98.6	0.0	0.0	1072.8
13-Jun-17 1:00	4.2	225.0	7.7	1.4	98.7	0.0	0.0	1073.4
13-Jun-17 2:00	3.3	212.2	8.6	1.3	98.7	0.0	0.0	1073.2
13-Jun-17 3:00	2.8	213.9	9.7	1.3	98.8	0.0	0.0	1073.1
13-Jun-17 4:00	3.3	232.6	13.2	1.1	98.8	0.3	0.0	1073.4
13-Jun-17 5:00	3.1	199.5	12.1	0.6	98.8	6.6	0.0	1074.3
13-Jun-17 6:00	3.6	221.4	7.3	0.8	98.8	22.1	0.0	1074.4
13-Jun-17 7:00	3.6	236.5	8.4	0.7	98.8	60.4	0.0	1075.2
13-Jun-17 8:00	2.2	229.9	11.3	0.9	98.7	112.2	0.0	1075.2
13-Jun-17 9:00	2.1	205.4	20.6	0.7	98.6	151.2	0.0	1075.8
13-Jun-17 10:00	2.5	203.6	15.8	1.0	98.3	282.9	0.0	1076.8
13-Jun-17 11:00	2.9	226.8	10.5	1.8	97.6	388.5	0.0	1076.6
13-Jun-17 12:00	3.1	228.9	11.6	2.3	96.2	564.3	0.0	1077.3
13-Jun-17 13:00	3.8	235.2	12.7	3.6	89.4	838.0	0.0	1077.2
13-Jun-17 14:00	3.7	248.9	13.5	4.5	78.7	667.7	0.0	1077.0
13-Jun-17 15:00	3.0	238.7	19.1	5.0	73.7	421.2	0.0	1076.7
13-Jun-17 16:00	3.8	241.9	17.6	4.7	78.4	436.3	0.0	1076.4
13-Jun-17 17:00	3.3	232.0	21.8	5.6	71.2	511.2	0.0	1076.8
13-Jun-17 18:00	2.1	187.0	27.8	4.7	77.5	223.0	0.0	1076.2
13-Jun-17 19:00	2.3	225.0	28.3	4.9	76.1	135.2	0.0	1076.7
13-Jun-17 20:00	2.1	179.2	30.4	4.1	82.4	84.5	0.0	1077.0
13-Jun-17 21:00	3.5	201.3	13.5	3.3	89.7	25.8	0.0	1077.1
13-Jun-17 22:00	4.4	219.4	9.4	2.0	98.1	3.8	0.0	1077.2
13-Jun-17 23:00	3.7	211.2	9.6	1.6	98.1	0.0	0.0	1077.6

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
14-Jun-17 0:00	2.5	209.7	9.4	1.7	95.8	0.0	0.0	1077.5
14-Jun-17 1:00	1.3	204.0	12.5	1.9	94.7	0.0	0.0	1077.7
14-Jun-17 2:00	0.5	178.7	16.8	2.1	94.4	0.0	0.0	1077.9
14-Jun-17 3:00	0.3	318.4	6.4	2.0	94.8	0.0	0.0	1078.0
14-Jun-17 4:00	0.0	0.0	0.0	1.8	96.8	0.5	0.0	1078.3
14-Jun-17 5:00	0.5	173.6	5.2	1.6	96.9	10.9	0.0	1078.6
14-Jun-17 6:00	0.1	184.5	3.1	1.7	94.8	52.4	0.0	1078.8
14-Jun-17 7:00	1.9	212.5	11.1	1.4	97.4	87.8	0.0	1078.9
14-Jun-17 8:00	2.5	207.2	13.5	1.3	98.1	172.4	0.0	1079.0
14-Jun-17 9:00	0.9	47.7	23.3	2.5	96.1	315.2	0.0	1079.7
14-Jun-17 10:00	1.0	142.9	37.0	3.4	91.2	436.3	0.0	1079.4
14-Jun-17 11:00	1.5	15.9	28.9	4.1	87.4	414.7	0.0	1079.3
14-Jun-17 12:00	1.3	339.9	30.4	4.7	86.5	391.0	0.0	1078.9
14-Jun-17 13:00	2.3	239.0	20.6	4.1	89.9	277.8	0.0	1078.9
14-Jun-17 14:00	1.6	164.4	41.1	4.6	90.0	501.7	0.0	1079.8
14-Jun-17 15:00	2.1	323.1	34.6	5.6	82.7	400.8	0.0	1079.3
14-Jun-17 16:00	2.9	342.5	20.4	6.6	69.8	414.1	0.0	1079.5
14-Jun-17 17:00	1.8	280.1	52.4	6.8	67.1	251.4	0.0	1079.0
14-Jun-17 18:00	5.6	202.8	15.9	3.3	94.2	98.8	0.0	1081.4
14-Jun-17 19:00	2.3	170.7	16.0	3.4	93.3	106.2	0.0	1081.6
14-Jun-17 20:00	2.8	256.9	41.2	3.5	91.5	53.3	0.0	1082.1
14-Jun-17 21:00	6.7	192.3	17.1	1.5	97.9	3.4	0.0	1085.3
14-Jun-17 22:00	3.0	137.5	28.5	1.8	94.9	2.8	0.0	1086.2
14-Jun-17 23:00	1.9	103.5	37.1	2.1	94.1	0.0	0.0	1086.7
15-Jun-17 0:00	2.8	209.8	19.2	1.1	97.0	0.0	0.0	1089.2
15-Jun-17 1:00	2.5	85.4	54.7	0.9	96.9	0.0	0.0	1089.9
15-Jun-17 2:00	2.9	42.1	18.3	1.1	96.0	0.0	0.0	1089.9
15-Jun-17 3:00	2.6	43.7	17.4	1.6	92.0	0.0	0.0	1089.9
15-Jun-17 4:00	1.7	56.4	30.0	1.7	90.0	0.5	0.0	1090.0
15-Jun-17 5:00	1.1	333.6	30.4	2.2	85.9	8.3	0.0	1090.2
15-Jun-17 6:00	0.3	67.5	15.0	1.8	90.0	38.1	0.0	1090.4
15-Jun-17 7:00	1.0	93.5	20.7	2.0	90.9	63.2	0.0	1090.5
15-Jun-17 8:00	0.8	268.2	26.8	2.6	89.4	102.8	0.0	1090.5
15-Jun-17 9:00	0.6	114.1	40.7	2.9	89.9	223.6	0.0	1090.9
15-Jun-17 10:00	0.8	81.2	34.9	3.8	86.9	321.1	0.0	1091.0
15-Jun-17 11:00	0.8	217.5	28.3	3.7	89.9	224.2	0.0	1090.8
15-Jun-17 12:00	0.9	247.8	24.6	3.5	89.6	234.3	0.0	1091.5
15-Jun-17 13:00	1.3	214.1	18.6	3.4	93.4	259.7	0.0	1091.4
15-Jun-17 14:00	1.0	212.0	24.5	3.9	88.7	245.7	0.0	1092.0
15-Jun-17 15:00	1.0	140.1	25.4	4.0	90.8	245.9	0.0	1092.4
15-Jun-17 16:00	0.8	170.2	41.9	4.1	94.1	248.5	0.0	1092.9
15-Jun-17 17:00	0.9	238.2	18.3	4.2	94.4	195.5	0.0	1093.7
15-Jun-17 18:00	1.0	244.2	19.8	4.0	92.2	161.0	0.0	1094.3
15-Jun-17 19:00	0.8	233.9	30.9	4.1	93.7	109.0	0.0	1094.5
15-Jun-17 20:00	3.0	177.6	19.1	3.6	94.5	78.0	0.0	1094.8
15-Jun-17 21:00	3.2	169.4	8.9	3.3	96.5	36.8	0.0	1095.2
15-Jun-17 22:00	4.4	206.7	12.0	3.1	98.2	3.0	0.0	1095.5
15-Jun-17 23:00	5.6	222.0	9.1	2.5	98.5	0.0	0.0	1096.2
16-Jun-17 0:00	4.3	212.6	8.0	2.3	98.7	0.0	0.0	1096.9
16-Jun-17 1:00	3.7	209.9	7.9	2.4	98.7	0.0	0.0	1097.9
16-Jun-17 2:00	4.0	202.3	9.2	2.4	98.8	0.0	0.0	1097.7
16-Jun-17 3:00	5.6	217.3	9.8	2.4	98.8	0.0	0.0	1097.8
16-Jun-17 4:00	4.3	217.0	10.5	1.8	98.8	0.4	0.0	1098.2
16-Jun-17 5:00	5.6	220.6	19.4	1.7	98.9	4.0	0.0	1098.8

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
16-Jun-17 6:00	5.8	211.2	10.6	1.3	98.8	15.0	0.0	1100.4
16-Jun-17 7:00	7.2	220.3	12.3	0.9	98.8	52.0	0.0	1100.3
16-Jun-17 8:00	5.4	214.7	12.1	0.4	98.7	87.2	0.0	1101.3
16-Jun-17 9:00	4.5	207.0	13.8	0.9	98.4	254.4	0.0	1101.1
16-Jun-17 10:00	5.3	216.7	9.7	1.1	98.2	243.2	0.0	1102.1
16-Jun-17 11:00	5.7	229.7	8.3	1.2	98.3	262.8	0.0	1101.1
16-Jun-17 12:00	6.8	229.9	11.8	1.4	98.4	246.5	0.0	1100.4
16-Jun-17 13:00	6.8	224.1	7.8	1.8	98.2	343.0	0.0	1101.4
16-Jun-17 14:00	5.4	222.7	13.0	1.8	98.3	206.6	0.0	1101.8
16-Jun-17 15:00	6.5	207.8	13.4	1.7	97.6	316.7	0.0	1103.3
16-Jun-17 16:00	5.8	221.1	14.5	2.3	97.0	360.6	0.0	1099.0
16-Jun-17 17:00	6.1	218.8	20.7	2.0	97.2	173.8	0.0	1103.4
16-Jun-17 18:00	5.0	216.5	12.5	1.6	96.3	182.4	0.0	1103.3
16-Jun-17 19:00	4.2	225.1	17.2	1.2	98.1	60.0	0.0	1104.7
16-Jun-17 20:00	4.7	202.8	15.7	1.3	97.2	51.2	0.0	1104.5
16-Jun-17 21:00	4.3	205.4	14.4	1.1	98.4	10.5	0.0	1104.5
16-Jun-17 22:00	4.5	209.2	7.9	0.8	98.7	2.3	0.0	1104.8
16-Jun-17 23:00	4.6	206.8	8.6	0.8	98.8	0.0	0.0	1104.6
17-Jun-17 0:00	5.8	214.0	8.3	0.8	98.9	0.0	0.0	1106.7
17-Jun-17 1:00	5.8	209.3	7.8	0.8	98.9	0.0	0.0	1102.6
17-Jun-17 2:00	5.9	213.6	8.7	0.8	99.0	0.0	0.0	1104.4
17-Jun-17 3:00	4.7	208.8	12.0	0.8	99.0	0.0	0.0	1104.9
17-Jun-17 4:00	4.1	224.1	9.4	0.7	99.0	0.2	0.0	1105.1
17-Jun-17 5:00	4.1	208.9	11.6	0.5	99.0	6.8	0.0	1105.5
17-Jun-17 6:00	4.6	204.6	9.5	0.3	98.6	43.9	0.0	1104.3
17-Jun-17 7:00	4.3	208.5	8.1	0.5	97.8	95.0	0.0	1105.3
17-Jun-17 8:00	4.6	213.2	11.3	0.6	97.4	110.7	0.0	1105.1
17-Jun-17 9:00	5.6	228.4	10.2	0.7	98.4	112.3	0.0	1104.7
17-Jun-17 10:00	4.9	233.3	11.8	0.9	98.4	174.7	0.0	1104.9
17-Jun-17 11:00	3.5	234.5	13.2	1.3	96.1	248.6	0.0	1104.5
17-Jun-17 12:00	4.2	224.1	15.1	1.6	96.3	316.4	0.0	1104.9
17-Jun-17 13:00	4.9	218.1	14.5	2.2	94.1	492.6	0.0	1104.9
17-Jun-17 14:00	5.7	238.2	16.2	3.2	85.4	345.8	0.0	1104.8
17-Jun-17 15:00	7.8	237.6	11.5	3.8	80.6	464.5	0.0	1103.5
17-Jun-17 16:00	8.3	246.2	9.4	4.3	74.4	318.0	0.0	1103.6
17-Jun-17 17:00	8.8	241.1	9.0	3.9	80.0	295.3	0.0	1104.7
17-Jun-17 18:00	8.2	238.2	10.3	4.1	77.3	268.6	0.0	1103.9
17-Jun-17 19:00	7.0	230.5	8.4	3.5	79.6	125.3	0.0	1104.1
17-Jun-17 20:00	5.4	219.9	9.3	3.4	78.6	80.7	0.0	1103.2
17-Jun-17 21:00	4.4	227.6	9.3	3.0	81.2	26.7	0.0	1104.7
17-Jun-17 22:00	4.6	215.6	9.7	2.9	78.0	5.3	0.0	1104.5
17-Jun-17 23:00	3.5	210.1	9.2	2.8	77.1	0.0	0.0	1104.7
18-Jun-17 0:00	2.6	215.6	9.8	2.7	78.8	0.0	0.0	1104.8
18-Jun-17 1:00	2.4	206.8	12.9	2.7	74.6	0.0	0.0	1104.8
18-Jun-17 2:00	1.7	212.3	12.6	2.5	75.2	0.0	0.0	1104.8
18-Jun-17 3:00	1.8	338.1	30.1	2.2	82.7	0.0	0.0	1104.7
18-Jun-17 4:00	1.3	51.3	14.9	1.8	83.2	1.4	0.0	1104.7
18-Jun-17 5:00	0.4	59.2	21.2	2.2	81.1	49.2	0.0	1103.9
18-Jun-17 6:00	1.3	205.2	26.0	2.5	79.8	143.1	0.0	1103.8
18-Jun-17 7:00	1.9	211.4	12.1	2.5	76.9	154.8	0.0	1104.7
18-Jun-17 8:00	1.3	41.6	42.1	4.0	71.8	399.2	0.0	1105.9
18-Jun-17 9:00	1.7	49.7	29.0	4.9	71.8	586.7	0.0	1105.6
18-Jun-17 10:00	1.2	61.4	50.8	6.1	71.6	706.6	0.0	1106.6
18-Jun-17 11:00	3.1	25.2	21.1	6.8	69.6	809.0	0.0	1106.9

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
18-Jun-17 12:00	1.8	289.5	29.0	8.1	66.2	882.0	0.0	1105.9
18-Jun-17 13:00	1.4	307.9	60.6	9.5	61.9	940.0	0.0	1105.6
18-Jun-17 14:00	2.0	333.5	54.5	11.0	55.7	981.0	0.0	1104.6
18-Jun-17 15:00	2.1	287.6	54.1	11.8	53.6	845.0	0.0	1104.2
18-Jun-17 16:00	1.9	323.1	67.1	12.6	50.0	770.5	0.0	1103.9
18-Jun-17 17:00	2.1	299.8	49.1	12.2	50.4	416.4	0.0	1103.7
18-Jun-17 18:00	1.6	277.9	41.3	12.7	49.3	449.9	0.0	1102.7
18-Jun-17 19:00	2.0	230.2	46.6	12.6	48.8	185.9	0.0	1103.0
18-Jun-17 20:00	3.7	191.8	10.7	11.3	50.2	108.3	0.0	1104.1
18-Jun-17 21:00	4.0	171.5	10.8	10.5	52.1	44.1	0.0	1103.8
18-Jun-17 22:00	2.1	152.0	15.2	10.4	48.4	5.8	0.0	1103.6
18-Jun-17 23:00	1.6	186.1	36.1	10.6	46.3	0.1	0.0	1103.5
19-Jun-17 0:00	0.8	28.6	29.4	10.1	48.9	0.0	0.0	1103.5
19-Jun-17 1:00	1.1	85.7	24.6	10.2	45.6	0.0	0.0	1103.6
19-Jun-17 2:00	3.8	178.6	9.8	9.4	52.3	0.0	0.0	1103.4
19-Jun-17 3:00	3.3	168.3	13.5	8.5	62.3	0.0	0.0	1102.9
19-Jun-17 4:00	3.8	166.2	15.2	7.6	72.1	0.2	0.0	1103.5
19-Jun-17 5:00	2.4	159.4	20.1	6.6	81.4	5.3	0.0	1104.1
19-Jun-17 6:00	1.8	17.6	37.5	6.1	85.6	19.8	0.0	1105.0
19-Jun-17 7:00	1.0	76.0	37.6	6.2	86.1	71.7	0.0	1105.2
19-Jun-17 8:00	1.8	67.1	48.6	6.3	86.8	84.2	0.0	1105.6
19-Jun-17 9:00	1.2	245.5	47.7	6.8	87.4	174.0	0.0	1105.6
19-Jun-17 10:00	2.2	187.9	51.0	6.9	90.8	229.4	0.0	1105.5
19-Jun-17 11:00	3.2	214.6	24.9	6.8	94.1	347.7	0.0	1105.4
19-Jun-17 12:00	4.5	216.2	16.9	6.5	96.9	279.3	0.0	1105.5
19-Jun-17 13:00	4.5	204.3	16.1	7.6	82.8	720.4	0.0	1107.2
19-Jun-17 14:00	3.2	223.3	18.9	8.6	76.4	662.4	0.0	1106.4
19-Jun-17 15:00	2.3	204.3	26.5	8.9	70.2	425.6	0.0	1106.1
19-Jun-17 16:00	2.1	223.5	37.0	9.5	68.3	489.4	0.0	1105.9
19-Jun-17 17:00	3.1	188.6	19.3	8.4	78.6	364.5	0.0	1106.1
19-Jun-17 18:00	1.6	111.7	48.5	9.4	72.5	414.0	0.0	1105.9
19-Jun-17 19:00	1.5	43.0	25.3	8.8	77.6	163.4	0.0	1106.4
19-Jun-17 20:00	3.6	204.3	15.2	7.0	89.8	15.0	0.0	1107.6
19-Jun-17 21:00	4.7	188.3	12.0	5.4	96.8	7.7	0.0	1110.1
19-Jun-17 22:00	6.0	226.6	9.3	4.8	97.7	1.2	0.0	1113.9
19-Jun-17 23:00	3.4	218.8	12.7	3.8	98.1	0.0	0.0	1114.6
20-Jun-17 0:00	6.1	216.9	9.9	3.8	98.3	0.0	0.0	1115.8
20-Jun-17 1:00	4.0	206.5	8.7	3.0	98.1	0.0	0.0	1116.9
20-Jun-17 2:00	6.1	218.6	9.8	3.3	98.2	0.0	0.0	1116.3
20-Jun-17 3:00	6.3	232.5	8.8	2.8	98.5	0.0	0.0	1117.2
20-Jun-17 4:00	4.0	210.7	9.0	2.3	98.5	0.5	0.0	1117.3
20-Jun-17 5:00	5.9	229.8	9.7	1.9	98.5	4.5	0.0	1117.5
20-Jun-17 6:00	4.1	201.3	11.8	1.9	98.5	47.9	0.0	1117.5
20-Jun-17 7:00	3.1	203.0	13.3	2.0	96.9	155.0	0.0	1117.5
20-Jun-17 8:00	3.2	216.8	7.7	1.9	95.7	225.5	0.0	1116.9
20-Jun-17 9:00	3.9	209.3	6.9	2.1	95.6	259.2	0.0	1117.0
20-Jun-17 10:00	4.4	204.1	9.6	2.5	95.0	248.5	0.0	1117.6
20-Jun-17 11:00	4.2	219.1	11.3	1.8	97.7	175.5	0.0	1118.1
20-Jun-17 12:00	3.5	226.5	9.7	2.4	96.4	412.4	0.0	1118.6
20-Jun-17 13:00	3.7	224.8	12.4	2.8	94.6	295.3	0.0	1119.1
20-Jun-17 14:00	3.7	219.5	9.9	2.8	96.9	253.6	0.0	1119.2
20-Jun-17 15:00	3.6	221.4	9.9	2.8	96.6	302.0	0.0	1119.6
20-Jun-17 16:00	3.8	217.0	11.3	3.3	96.3	343.0	0.0	1119.4
20-Jun-17 17:00	4.0	227.5	10.5	3.5	96.6	176.6	0.0	1119.1

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
	Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
20-Jun-17 18:00	4.9	205.8	12.8	3.3	96.8	138.6	0.0	1120.5
20-Jun-17 19:00	5.1	214.6	12.0	3.6	95.8	101.1	0.0	1120.0
20-Jun-17 20:00	4.7	219.3	9.9	3.1	97.9	40.2	0.0	1120.6
20-Jun-17 21:00	4.2	221.0	10.3	2.8	98.3	15.6	0.0	1120.0
20-Jun-17 22:00	3.7	214.6	7.6	2.8	98.0	4.9	0.0	1120.1
20-Jun-17 23:00	4.2	198.8	7.3	2.6	98.1	0.0	0.0	1120.3
21-Jun-17 0:00	3.5	205.9	9.0	2.6	96.4	0.0	0.0	1120.5
21-Jun-17 1:00	3.2	209.4	10.6	2.6	95.9	0.0	0.0	1120.4
21-Jun-17 2:00	2.7	220.3	8.3	2.5	96.8	0.0	0.0	1120.1
21-Jun-17 3:00	3.9	205.9	9.1	2.1	98.2	0.0	0.0	1120.9
21-Jun-17 4:00	4.3	189.6	5.1	2.1	96.2	0.4	0.0	1121.7
21-Jun-17 5:00	3.7	212.2	8.1	1.9	98.3	10.1	0.0	1121.7
21-Jun-17 6:00	3.1	219.0	6.5	1.9	98.5	57.0	0.0	1121.7
21-Jun-17 7:00	3.5	202.3	8.0	2.1	98.4	102.9	0.0	1121.9
21-Jun-17 8:00	3.4	210.0	7.3	2.5	96.9	247.3	0.0	1121.4
21-Jun-17 9:00	2.9	214.0	12.6	2.9	95.2	260.7	0.0	1121.6
21-Jun-17 10:00	2.9	225.5	10.7	3.1	95.9	309.3	0.0	1121.9
21-Jun-17 11:00	3.1	220.5	12.3	3.8	93.3	503.7	0.0	1122.0
21-Jun-17 12:00	4.0	218.5	14.0	4.1	96.9	569.4	0.0	1122.5
21-Jun-17 13:00	4.5	226.4	13.6	5.1	89.4	813.0	0.0	1122.3
21-Jun-17 14:00	5.7	233.7	15.8	5.7	84.0	570.5	0.0	1122.7
21-Jun-17 15:00	6.0	260.5	17.0	5.1	88.2	254.2	0.0	1121.7
21-Jun-17 16:00	4.2	260.1	37.7	4.8	90.3	234.4	0.0	1120.6
21-Jun-17 17:00	5.5	262.4	12.8	5.5	85.5	278.9	0.0	1121.7
21-Jun-17 18:00	6.5	248.9	17.1	5.5	84.0	383.3	0.0	1121.7
21-Jun-17 19:00	4.5	206.9	14.0	3.7	92.7	107.1	0.0	1121.4
21-Jun-17 20:00	3.6	206.5	12.1	4.1	89.3	88.7	0.0	1121.7
21-Jun-17 21:00	3.1	209.2	15.5	4.2	91.6	58.1	0.0	1121.8
21-Jun-17 22:00	3.2	216.1	10.7	3.6	96.0	7.5	0.0	1121.7
21-Jun-17 23:00	3.5	208.1	12.1	3.3	96.3	0.0	0.0	1121.7
22-Jun-17 0:00	3.2	203.7	10.2	3.4	92.9	0.0	0.0	1121.7
22-Jun-17 1:00	3.0	207.8	8.7	3.3	93.1	0.0	0.0	1121.8
22-Jun-17 2:00	2.5	200.8	11.7	3.2	93.5	0.0	0.0	1121.9
22-Jun-17 3:00	2.5	216.5	10.8	3.1	95.6	0.0	0.0	1121.8
22-Jun-17 4:00	2.3	201.8	11.1	2.9	97.7	0.8	0.0	1122.0
22-Jun-17 5:00	1.9	204.9	9.3	2.9	97.3	18.5	0.0	1121.8
22-Jun-17 6:00	2.3	198.5	8.6	3.0	94.9	60.7	0.0	1121.6
22-Jun-17 7:00	2.8	216.2	9.5	3.0	96.3	262.6	0.0	1121.4
22-Jun-17 8:00	2.1	219.9	10.9	3.6	91.5	475.4	0.0	1121.6
22-Jun-17 9:00	1.7	236.9	23.6	4.2	87.0	315.2	0.0	1122.0
22-Jun-17 10:00	1.6	250.2	27.1	5.1	86.2	476.3	0.0	1121.8
22-Jun-17 11:00	2.4	293.3	17.7	5.1	90.3	442.6	0.0	1122.0
22-Jun-17 12:00	1.9	257.7	35.2	6.0	78.2	509.4	0.0	1121.9
22-Jun-17 13:00	2.1	297.6	35.6	6.3	78.6	468.8	0.0	1121.7
22-Jun-17 14:00	2.8	113.9	32.0	6.3	75.5	286.4	0.0	1121.7
22-Jun-17 15:00	2.9	110.1	11.2	6.5	73.3	485.4	0.0	1121.8
22-Jun-17 16:00	2.5	144.8	38.0	7.2	68.9	330.1	0.0	1121.3
22-Jun-17 17:00	3.0	196.3	47.9	7.5	68.9	467.3	0.0	1120.9
22-Jun-17 18:00	3.8	239.7	21.6	8.3	66.0	559.7	0.0	1119.7
22-Jun-17 19:00	4.5	232.2	12.8	7.4	71.5	202.2	0.0	1120.8
22-Jun-17 20:00	3.6	201.3	13.8	6.6	79.8	148.7	0.0	1120.6
22-Jun-17 21:00	2.6	207.1	11.8	6.2	81.2	60.5	0.0	1121.4
22-Jun-17 22:00	2.7	201.6	16.5	5.6	84.6	7.5	0.0	1121.3
22-Jun-17 23:00	2.3	180.2	14.3	5.0	87.2	0.2	0.0	1121.5

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
23-Jun-17 0:00	1.5	153.1	13.9	5.0	84.7	0.0	0.0	1121.5
23-Jun-17 1:00	1.2	186.0	10.5	5.0	86.2	0.0	0.0	1121.6
23-Jun-17 2:00	0.4	122.2	21.7	4.6	87.1	0.0	0.0	1121.6
23-Jun-17 3:00	0.5	162.6	12.0	4.6	83.6	0.0	0.0	1121.7
23-Jun-17 4:00	0.3	67.6	29.1	4.3	86.1	1.8	0.0	1121.7
23-Jun-17 5:00	0.5	78.6	25.9	4.6	81.8	45.5	0.0	1120.7
23-Jun-17 6:00	0.9	212.0	12.3	5.0	80.7	164.1	0.0	1121.0
23-Jun-17 7:00	0.6	38.5	31.5	6.0	79.8	242.4	0.0	1121.6
23-Jun-17 8:00	0.8	13.5	56.3	6.8	80.3	426.0	0.0	1122.1
23-Jun-17 9:00	0.7	246.0	64.4	7.4	78.2	534.1	0.0	1122.8
23-Jun-17 10:00	1.5	227.3	22.9	7.6	76.7	717.1	0.0	1123.0
23-Jun-17 11:00	1.6	226.0	26.0	8.7	72.7	824.0	0.0	1123.6
23-Jun-17 12:00	2.0	274.4	34.4	9.9	62.1	837.0	0.0	1123.3
23-Jun-17 13:00	2.1	307.4	45.0	10.1	59.5	559.6	0.0	1121.9
23-Jun-17 14:00	1.4	265.5	78.7	11.0	53.0	437.4	0.0	1121.8
23-Jun-17 15:00	3.2	221.3	35.5	12.4	45.3	799.6	0.0	1121.2
23-Jun-17 16:00	4.5	241.6	20.8	12.3	40.0	632.2	0.0	1121.5
23-Jun-17 17:00	5.0	246.1	20.3	12.6	38.9	637.3	0.0	1119.8
23-Jun-17 18:00	4.6	235.7	22.5	12.6	39.2	476.3	0.0	1118.7
23-Jun-17 19:00	5.2	238.2	13.6	12.4	41.4	153.8	0.0	1119.9
23-Jun-17 20:00	2.9	263.3	22.3	11.3	48.9	85.9	0.0	1120.6
23-Jun-17 21:00	2.0	203.0	20.7	10.8	48.6	52.6	0.0	1120.7
23-Jun-17 22:00	1.8	168.6	14.6	10.0	49.2	7.5	0.0	1120.8
23-Jun-17 23:00	2.0	164.9	13.2	10.2	47.9	0.2	0.0	1120.9
24-Jun-17 0:00	1.3	117.6	27.8	9.8	48.3	0.0	0.0	1120.8
24-Jun-17 1:00	1.5	68.1	24.3	10.0	47.9	0.0	0.0	1120.8
24-Jun-17 2:00	0.9	302.7	29.2	10.0	47.7	0.0	0.0	1120.8
24-Jun-17 3:00	1.2	72.2	45.1	9.7	48.8	0.0	0.0	1120.8
24-Jun-17 4:00	1.7	63.7	14.6	9.7	47.7	0.9	0.0	1120.8
24-Jun-17 5:00	1.2	89.6	22.8	9.9	46.5	7.9	0.0	1120.9
24-Jun-17 6:00	3.6	186.2	9.9	8.7	56.9	29.2	0.0	1121.3
24-Jun-17 7:00	4.5	176.0	34.8	7.6	69.9	40.1	0.0	1121.8
24-Jun-17 8:00	3.4	121.2	32.0	6.3	83.8	52.4	0.0	1123.5
24-Jun-17 9:00	2.0	61.9	43.4	6.4	84.2	110.6	0.0	1125.0
24-Jun-17 10:00	2.4	68.1	44.2	6.3	88.6	114.2	0.0	1125.6
24-Jun-17 11:00	2.2	28.5	22.8	6.2	93.0	140.0	0.0	1126.7
24-Jun-17 12:00	2.3	359.1	26.9	6.5	94.1	154.3	0.0	1127.1
24-Jun-17 13:00	3.0	34.7	7.7	6.6	96.1	172.0	0.0	1127.7
24-Jun-17 14:00	2.5	32.5	12.2	7.1	95.8	206.4	0.0	1129.0
24-Jun-17 15:00	3.0	29.3	15.9	7.4	95.9	154.4	0.0	1128.9
24-Jun-17 16:00	1.6	347.1	41.1	7.7	96.4	170.0	0.0	1129.0
24-Jun-17 17:00	1.3	212.6	49.1	7.7	97.5	89.9	0.0	1129.2
24-Jun-17 18:00	1.9	182.1	37.6	7.8	97.8	108.2	0.0	1130.9
24-Jun-17 19:00	1.2	196.5	40.4	7.7	98.0	63.3	0.0	1131.5
24-Jun-17 20:00	1.0	82.2	37.8	7.6	97.9	28.6	0.0	1132.4
24-Jun-17 21:00	1.1	79.4	45.3	7.8	96.9	12.7	0.0	1132.9
24-Jun-17 22:00	1.0	103.6	36.2	7.8	95.9	2.7	0.0	1132.9
24-Jun-17 23:00	1.8	106.9	24.7	7.8	93.9	0.0	0.0	1133.0
25-Jun-17 0:00	2.7	157.0	16.0	7.9	93.4	0.0	0.0	1133.2
25-Jun-17 1:00	2.7	158.2	11.1	8.0	91.0	0.0	0.0	1133.1
25-Jun-17 2:00	3.0	180.3	12.0	8.0	90.3	0.0	0.0	1133.2
25-Jun-17 3:00	2.8	205.2	11.6	7.7	90.8	0.0	0.0	1133.3
25-Jun-17 4:00	1.7	178.5	21.1	7.5	90.3	1.0	0.0	1133.3
25-Jun-17 5:00	2.8	181.0	13.6	7.5	89.3	14.6	0.0	1133.4

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
25-Jun-17 6:00	2.8	196.5	11.0	7.5	91.5	125.1	0.0	1133.2
25-Jun-17 7:00	3.0	201.5	8.5	7.4	89.4	199.5	0.0	1133.9
25-Jun-17 8:00	3.0	199.1	10.9	7.9	86.5	400.9	0.0	1134.4
25-Jun-17 9:00	2.7	211.5	16.3	7.8	88.4	462.9	0.0	1134.1
25-Jun-17 10:00	2.8	200.1	17.3	7.8	86.0	672.6	0.0	1135.8
25-Jun-17 11:00	4.4	198.7	11.2	8.1	82.3	428.0	0.0	1135.2
25-Jun-17 12:00	4.5	219.3	9.7	8.2	87.0	713.2	0.0	1134.0
25-Jun-17 13:00	5.1	195.7	14.6	8.1	85.9	505.8	0.0	1134.6
25-Jun-17 14:00	5.0	216.9	9.6	7.8	88.3	333.7	0.0	1133.9
25-Jun-17 15:00	4.3	208.7	14.0	6.7	94.6	173.3	0.0	1134.6
25-Jun-17 16:00	3.9	213.4	14.3	6.2	96.4	88.7	0.0	1135.1
25-Jun-17 17:00	4.1	219.1	17.8	5.8	97.7	76.3	0.0	1135.8
25-Jun-17 18:00	5.2	222.7	11.4	5.4	98.1	65.9	0.0	1136.6
25-Jun-17 19:00	5.0	223.2	12.1	4.9	98.4	34.0	0.0	1139.0
25-Jun-17 20:00	4.6	215.2	12.8	4.4	98.5	25.9	0.0	1138.9
25-Jun-17 21:00	3.7	221.5	14.3	4.4	98.6	11.1	0.0	1139.7
25-Jun-17 22:00	3.6	225.2	8.6	4.2	98.6	1.4	0.0	1140.6
25-Jun-17 23:00	2.8	198.1	10.9	4.0	98.7	0.0	0.0	1140.9
26-Jun-17 0:00	2.8	219.7	10.1	4.0	98.7	0.0	0.0	1141.2
26-Jun-17 1:00	2.8	218.9	8.5	3.8	98.7	0.0	0.0	1141.4
26-Jun-17 2:00	2.7	215.5	9.3	3.5	98.8	0.0	0.0	1141.5
26-Jun-17 3:00	2.8	207.9	9.6	3.4	98.8	0.0	0.0	1141.5
26-Jun-17 4:00	3.5	210.8	10.9	3.1	98.8	0.6	0.0	1141.7
26-Jun-17 5:00	2.9	210.0	12.6	3.0	98.8	6.0	0.0	1141.8
26-Jun-17 6:00	3.1	214.2	11.1	3.0	98.8	24.3	0.0	1142.1
26-Jun-17 7:00	3.0	197.3	9.4	3.0	98.8	60.3	0.0	1141.9
26-Jun-17 8:00	3.4	204.4	9.5	3.3	98.6	163.6	0.0	1142.2
26-Jun-17 9:00	3.5	218.3	7.8	3.5	98.5	226.5	0.0	1142.1
26-Jun-17 10:00	3.3	213.4	11.0	4.0	98.2	360.0	0.0	1142.4
26-Jun-17 11:00	3.8	220.6	12.2	4.2	98.3	277.6	0.0	1142.1
26-Jun-17 12:00	4.3	220.0	11.2	4.2	98.4	215.4	0.0	1142.5
26-Jun-17 13:00	4.2	229.4	8.6	4.4	98.5	196.5	0.0	1142.2
26-Jun-17 14:00	3.9	220.4	12.9	4.8	98.4	224.7	0.0	1142.2
26-Jun-17 15:00	3.8	210.5	9.4	4.9	98.1	259.0	0.0	1141.9
26-Jun-17 16:00	3.5	220.4	7.0	5.3	97.5	216.1	0.0	1142.3
26-Jun-17 17:00	3.4	225.0	8.1	5.4	97.0	153.6	0.0	1142.3
26-Jun-17 18:00	3.1	231.5	9.1	5.5	96.9	109.5	0.0	1142.5
26-Jun-17 19:00	3.3	223.1	9.7	5.3	97.9	37.4	0.0	1142.3
26-Jun-17 20:00	3.2	205.9	9.2	5.2	97.6	25.9	0.0	1142.2
26-Jun-17 21:00	3.1	206.1	12.0	5.3	95.8	9.5	0.0	1142.5
26-Jun-17 22:00	2.8	203.9	12.1	5.2	97.1	2.7	0.0	1142.5
26-Jun-17 23:00	3.6	199.1	9.9	5.4	96.1	0.0	0.0	1142.6
27-Jun-17 0:00	4.1	199.1	8.8	5.4	96.4	0.0	0.0	1142.2
27-Jun-17 1:00	3.6	201.3	13.4	5.2	98.1	0.0	0.0	1142.5
27-Jun-17 2:00	3.5	209.0	10.6	5.2	98.3	0.0	0.0	1142.1
27-Jun-17 3:00	3.9	204.8	10.2	5.1	98.5	0.0	0.0	1142.5
27-Jun-17 4:00	3.6	210.1	12.3	4.9	98.6	0.2	0.0	1142.1
27-Jun-17 5:00	3.7	225.1	14.7	4.8	98.7	3.3	0.0	1142.4
27-Jun-17 6:00	3.8	219.4	10.9	4.6	98.7	14.7	0.0	1141.9
27-Jun-17 7:00	3.3	211.0	12.3	4.5	98.7	61.2	0.0	1142.4
27-Jun-17 8:00	2.8	204.0	16.3	4.5	98.4	134.5	0.0	1142.4
27-Jun-17 9:00	2.7	235.3	14.5	5.0	96.5	286.1	0.0	1142.5
27-Jun-17 10:00	2.9	240.1	18.1	5.3	94.8	300.7	0.0	1142.6
27-Jun-17 11:00	2.5	281.0	24.6	5.3	91.2	274.8	0.0	1143.1



Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation					
27-Jun-17 12:00	2.3	3.3	22.2	5.4	88.3	200.8	0.0	1143.0
27-Jun-17 13:00	2.6	15.4	22.1	5.2	88.6	237.5	0.0	1142.6
27-Jun-17 14:00	2.3	16.3	18.4	5.6	87.7	228.6	0.0	1142.6
27-Jun-17 15:00	2.1	1.6	26.8	6.3	83.6	327.7	0.0	1142.3
27-Jun-17 16:00	1.7	308.3	28.2	6.4	80.7	252.4	0.0	1142.5
27-Jun-17 17:00	1.5	255.9	46.8	6.5	80.9	193.4	0.0	1142.5
27-Jun-17 18:00	2.6	219.7	18.6	6.2	82.9	163.5	0.0	1142.2
27-Jun-17 19:00	2.8	222.2	12.0	6.0	85.4	110.9	0.0	1142.6
27-Jun-17 20:00	2.3	217.6	12.7	5.8	85.7	68.7	0.0	1142.3
27-Jun-17 21:00	2.0	202.3	12.3	5.6	86.0	18.9	0.0	1142.3
27-Jun-17 22:00	1.7	199.2	12.5	5.4	86.4	2.7	0.0	1142.4
27-Jun-17 23:00	1.4	188.7	12.0	5.3	86.7	0.0	0.0	1142.4
28-Jun-17 0:00	1.1	174.7	19.6	5.0	87.5	0.0	0.0	1142.4
28-Jun-17 1:00	0.9	175.8	18.4	4.9	87.5	0.0	0.0	1142.4
28-Jun-17 2:00	0.9	54.8	28.2	4.7	86.7	0.0	0.0	1142.4
28-Jun-17 3:00	2.3	117.8	12.6	4.3	87.1	0.0	0.0	1142.5
28-Jun-17 4:00	1.8	114.9	14.6	4.2	87.1	1.1	0.0	1142.5
28-Jun-17 5:00	2.3	103.4	14.9	4.0	88.5	9.0	0.0	1142.6
28-Jun-17 6:00	2.2	92.5	16.0	4.0	90.1	42.1	0.0	1142.5
28-Jun-17 7:00	1.5	348.5	20.6	4.2	91.7	60.5	0.0	1142.6
28-Jun-17 8:00	0.6	349.2	55.3	4.4	91.6	120.3	0.0	1142.5
28-Jun-17 9:00	1.0	17.3	42.7	4.8	90.8	252.0	0.0	1142.7
28-Jun-17 10:00	1.3	278.2	22.1	4.7	92.4	247.3	0.0	1142.4
28-Jun-17 11:00	1.3	236.2	33.5	5.1	91.9	273.5	0.0	1142.3
28-Jun-17 12:00	1.9	249.8	28.3	5.7	91.9	312.3	0.0	1142.3
28-Jun-17 13:00	2.6	238.6	24.8	6.6	87.6	508.1	0.0	1142.6
28-Jun-17 14:00	2.2	240.9	35.7	8.1	82.8	697.7	0.0	1142.1
28-Jun-17 15:00	3.3	252.9	22.5	8.9	80.1	605.0	0.0	1143.3
28-Jun-17 16:00	4.2	253.1	16.4	9.8	76.8	657.1	0.0	1141.9
28-Jun-17 17:00	3.3	247.5	21.0	9.9	77.1	408.7	0.0	1141.7
28-Jun-17 18:00	4.6	227.7	11.6	9.9	77.4	398.9	0.0	1141.7
28-Jun-17 19:00	4.0	222.9	8.7	9.6	79.2	155.7	0.0	1141.9
28-Jun-17 20:00	3.4	211.7	7.9	8.9	82.9	55.7	0.0	1142.0
28-Jun-17 21:00	4.2	208.1	10.0	8.7	83.6	26.5	0.0	1141.9
28-Jun-17 22:00	4.1	204.8	10.7	8.2	87.4	2.8	0.0	1142.2
28-Jun-17 23:00	3.1	209.9	8.5	7.6	92.5	0.0	0.0	1142.1
29-Jun-17 0:00	2.6	218.9	8.7	7.8	91.2	0.0	0.0	1142.1
29-Jun-17 1:00	2.9	220.1	4.3	7.3	95.2	0.0	0.0	1142.1
29-Jun-17 2:00	3.3	209.2	7.9	6.8	97.9	0.0	0.0	1142.1
29-Jun-17 3:00	2.0	220.8	13.3	6.7	97.9	0.0	0.0	1142.3
29-Jun-17 4:00	2.0	211.8	11.4	6.9	96.1	0.4	0.0	1142.3
29-Jun-17 5:00	1.4	227.0	36.5	7.0	94.3	8.4	0.0	1142.3
29-Jun-17 6:00	1.0	263.2	47.3	7.4	91.3	51.7	0.0	1142.3
29-Jun-17 7:00	0.8	177.5	27.9	8.0	88.2	107.1	0.0	1142.3
29-Jun-17 8:00	1.8	203.2	11.0	8.5	82.9	188.9	0.0	1142.2
29-Jun-17 9:00	1.1	152.5	27.9	9.3	76.8	305.0	0.0	1142.5
29-Jun-17 10:00	1.2	162.1	29.0	10.3	75.0	393.0	0.0	1142.7
29-Jun-17 11:00	2.6	215.5	14.5	10.9	63.3	807.0	0.0	1143.4
29-Jun-17 12:00	3.8	235.3	17.6	11.7	59.8	932.0	0.0	1142.5
29-Jun-17 13:00	4.3	235.1	17.7	11.6	64.5	625.9	0.0	1142.0
29-Jun-17 14:00	5.0	226.6	18.7	11.9	64.0	548.5	0.0	1141.5
29-Jun-17 15:00	4.7	219.8	17.5	12.0	63.6	407.3	0.0	1140.0
29-Jun-17 16:00	5.7	194.1	14.5	12.2	56.8	402.8	0.0	1143.4
29-Jun-17 17:00	7.3	186.0	10.3	12.1	51.7	304.3	0.0	1142.0

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
	Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
29-Jun-17 18:00	6.9	183.8	9.0	11.4	50.8	185.5	0.0	1141.9
29-Jun-17 19:00	6.5	186.4	8.4	11.0	51.8	111.1	0.0	1141.8
29-Jun-17 20:00	5.9	190.9	12.1	10.4	52.9	54.9	0.0	1138.6
29-Jun-17 21:00	7.2	191.0	9.1	9.0	59.9	14.1	0.0	1141.8
29-Jun-17 22:00	6.1	212.5	11.9	7.7	73.3	3.6	0.0	1141.6
29-Jun-17 23:00	5.4	203.5	9.6	7.0	78.2	0.0	0.0	1142.3
30-Jun-17 0:00	4.5	210.1	9.6	6.9	77.6	0.0	0.0	1141.9
30-Jun-17 1:00	4.0	200.2	9.9	7.0	74.6	0.0	0.0	1142.1
30-Jun-17 2:00	3.0	200.5	11.6	7.2	72.8	0.0	0.0	1142.3
30-Jun-17 3:00	3.5	174.3	14.7	7.6	66.5	0.0	0.0	1142.7
30-Jun-17 4:00	2.0	161.8	20.2	7.5	64.7	0.6	0.0	1142.4
30-Jun-17 5:00	1.5	144.2	24.9	7.7	60.2	5.7	0.0	1142.4
30-Jun-17 6:00	1.1	179.4	27.1	7.8	60.4	33.7	0.0	1142.3
30-Jun-17 7:00	1.6	161.8	18.5	8.0	60.3	88.0	0.0	1142.3
30-Jun-17 8:00	3.3	194.3	8.1	6.7	73.5	98.6	0.0	1142.7
30-Jun-17 9:00	2.8	183.6	13.8	5.6	86.4	136.5	0.0	1144.0
30-Jun-17 10:00	2.5	148.0	22.1	6.5	82.9	213.2	0.0	1144.1
30-Jun-17 11:00	1.6	20.3	23.6	6.8	81.7	174.6	0.0	1144.9
30-Jun-17 12:00	1.5	3.8	19.1	6.9	86.3	212.5	0.0	1145.1
30-Jun-17 13:00	1.2	150.8	35.6	6.6	91.7	204.1	0.0	1144.6
30-Jun-17 14:00	1.5	329.0	55.8	8.0	92.0	512.4	0.0	1144.9
30-Jun-17 15:00	1.2	254.7	39.3	8.9	89.0	442.7	0.0	1144.5
30-Jun-17 16:00	1.1	201.7	27.3	8.5	85.0	174.6	0.0	1144.7
30-Jun-17 17:00	1.2	60.2	55.8	8.7	82.5	181.5	0.0	1145.6
30-Jun-17 18:00	1.6	6.0	22.2	9.1	79.9	203.2	0.0	1145.5
30-Jun-17 19:00	1.0	13.1	39.0	9.0	81.5	104.2	0.0	1145.3
30-Jun-17 20:00	2.8	196.9	13.9	8.1	85.4	57.3	0.0	1145.5
30-Jun-17 21:00	2.2	143.6	39.2	8.2	82.5	29.1	0.0	1145.4
30-Jun-17 22:00	0.7	144.1	50.6	8.6	77.0	5.0	0.0	1145.4
30-Jun-17 23:00	2.1	158.6	33.1	7.8	83.2	0.0	0.0	1145.4
01-Jul-17 0:00	1.6	63.2	30.0	7.4	87.1	0.0	0.0	1146.2
01-Jul-17 1:00	1.6	119.7	37.6	7.2	89.8	0.0	0.0	1146.5
01-Jul-17 2:00	1.3	98.5	52.3	7.5	88.7	0.0	0.0	1146.5
01-Jul-17 3:00	1.3	37.0	44.1	7.4	90.2	0.0	0.0	1146.5
01-Jul-17 4:00	1.2	53.9	31.4	7.0	94.4	0.1	0.0	1146.9
01-Jul-17 5:00	3.0	205.9	34.1	6.9	96.5	11.9	0.0	1147.7
01-Jul-17 6:00	4.7	216.7	14.0	6.1	98.0	16.1	0.0	1147.5
01-Jul-17 7:00	2.5	207.6	18.8	6.0	96.0	29.4	0.0	1148.2
01-Jul-17 8:00	2.9	129.1	51.6	6.2	90.1	38.8	0.0	1149.0
01-Jul-17 9:00	1.1	124.3	50.4	6.2	92.1	74.7	0.0	1150.1
01-Jul-17 10:00	1.8	159.3	34.0	6.7	88.9	154.6	0.0	1149.7
01-Jul-17 11:00	2.7	211.9	13.1	6.5	92.0	293.7	0.0	1149.9
01-Jul-17 12:00	2.4	217.0	17.2	6.9	94.4	410.9	0.0	1150.1
01-Jul-17 13:00	4.1	225.6	14.7	6.8	96.4	302.9	0.0	1150.3
01-Jul-17 14:00	4.1	225.1	15.5	7.0	97.5	221.8	0.0	1150.7
01-Jul-17 15:00	3.6	220.6	11.1	6.8	97.9	140.2	0.0	1150.5
01-Jul-17 16:00	3.1	214.3	10.0	6.8	98.0	138.9	0.0	1150.7
01-Jul-17 17:00	3.3	203.3	12.4	6.9	98.1	136.6	0.0	1150.7
01-Jul-17 18:00	2.8	212.9	11.2	6.9	98.1	138.5	0.0	1150.8
01-Jul-17 19:00	3.1	208.1	10.3	6.9	98.2	87.3	0.0	1151.3
01-Jul-17 20:00	3.3	198.8	9.7	6.9	98.3	51.9	0.0	1151.2
01-Jul-17 21:00	3.5	182.5	10.6	6.9	98.2	16.3	0.0	1151.2
01-Jul-17 22:00	3.1	183.5	7.2	6.8	97.6	2.5	0.0	1151.5
01-Jul-17 23:00	1.4	132.6	15.6	6.6	97.6	0.0	0.0	1152.4

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
02-Jul-17 0:00	1.5	168.7	15.9	6.6	97.2	0.0	0.0	1152.7
02-Jul-17 1:00	2.3	199.5	6.7	6.6	98.2	0.0	0.0	1153.6
02-Jul-17 2:00	2.4	193.4	9.6	6.6	98.4	0.0	0.0	1155.0
02-Jul-17 3:00	2.4	198.7	8.9	6.5	98.4	0.0	0.0	1155.5
02-Jul-17 4:00	1.7	176.6	9.5	6.4	98.5	0.2	0.0	1157.1
02-Jul-17 5:00	1.0	71.9	35.5	6.4	98.5	8.3	0.0	1157.2
02-Jul-17 6:00	1.1	132.8	29.6	6.5	97.9	19.5	0.0	1157.7
02-Jul-17 7:00	1.2	108.9	28.1	6.6	97.3	59.9	0.0	1158.5
02-Jul-17 8:00	2.5	179.4	10.8	6.6	96.7	67.9	0.0	1160.1
02-Jul-17 9:00	2.4	204.3	8.5	6.6	97.5	156.8	0.0	1161.2
02-Jul-17 10:00	4.1	223.6	9.5	6.3	97.9	83.7	0.0	1162.0
02-Jul-17 11:00	5.3	219.6	7.3	5.3	98.2	141.9	0.0	1165.2
02-Jul-17 12:00	4.3	218.7	9.7	5.3	98.1	151.1	0.0	1167.1
02-Jul-17 13:00	4.8	201.7	12.2	5.5	97.7	270.1	0.0	1166.3
02-Jul-17 14:00	3.7	219.0	11.8	5.9	96.5	191.5	0.0	1167.4
02-Jul-17 15:00	4.5	218.1	14.6	6.0	97.9	218.2	0.0	1167.6
02-Jul-17 16:00	5.3	247.8	15.0	5.8	98.2	127.8	0.0	1170.5
02-Jul-17 17:00	6.0	215.6	10.2	5.0	98.3	139.6	0.0	1169.1
02-Jul-17 18:00	4.6	208.7	13.9	4.9	97.0	122.9	0.0	1169.0
02-Jul-17 19:00	4.2	217.3	10.7	5.0	98.1	123.0	0.0	1169.3
02-Jul-17 20:00	6.2	235.8	9.5	5.3	98.3	78.1	0.0	1170.1
02-Jul-17 21:00	5.3	226.1	10.0	4.8	98.6	15.4	0.0	1169.3
02-Jul-17 22:00	4.2	218.8	11.7	4.2	98.7	2.3	0.0	1169.2
02-Jul-17 23:00	4.1	215.0	9.8	3.8	98.7	0.0	0.0	1169.7
03-Jul-17 0:00	4.9	222.1	9.2	3.6	98.8	0.0	0.0	1169.8
03-Jul-17 1:00	4.0	211.2	12.5	3.4	98.8	0.0	0.0	1170.2
03-Jul-17 2:00	3.9	200.3	12.4	3.3	98.8	0.0	0.0	1170.8
03-Jul-17 3:00	5.1	225.2	6.5	3.3	98.8	0.0	0.0	1170.1
03-Jul-17 4:00	4.2	219.6	8.4	3.3	98.9	0.1	0.0	1170.2
03-Jul-17 5:00	3.8	216.0	9.9	3.1	98.9	5.4	0.0	1170.4
03-Jul-17 6:00	4.3	223.8	8.9	2.9	98.8	76.8	0.0	1170.0
03-Jul-17 7:00	4.1	213.1	8.5	2.9	98.7	103.5	0.0	1170.4
03-Jul-17 8:00	5.0	223.3	7.9	3.0	98.7	133.3	0.0	1170.7
03-Jul-17 9:00	4.5	211.2	13.0	3.2	98.3	342.9	0.0	1170.1
03-Jul-17 10:00	3.7	223.5	11.6	3.6	97.8	386.6	0.0	1170.1
03-Jul-17 11:00	4.2	218.4	9.6	3.7	97.6	417.1	0.0	1171.4
03-Jul-17 12:00	4.5	224.9	11.4	4.8	89.0	412.1	0.0	1170.0
03-Jul-17 13:00	5.5	234.3	9.8	4.7	92.7	290.8	0.0	1170.6
03-Jul-17 14:00	5.3	224.1	12.7	5.1	92.7	291.6	0.0	1170.0
03-Jul-17 15:00	6.1	235.3	12.5	6.1	87.3	485.9	0.0	1171.1
03-Jul-17 16:00	5.2	216.2	10.5	5.1	92.9	233.4	0.0	1170.3
03-Jul-17 17:00	4.6	219.4	12.0	4.9	96.4	98.3	0.0	1171.7
03-Jul-17 18:00	5.4	212.5	12.8	4.5	98.3	69.7	0.0	1171.7
03-Jul-17 19:00	4.9	218.0	10.8	4.4	98.5	38.8	0.0	1173.2
03-Jul-17 20:00	4.9	218.7	10.6	4.3	98.6	27.5	0.0	1172.2
03-Jul-17 21:00	4.1	216.6	10.8	4.1	98.7	10.6	0.0	1172.0
03-Jul-17 22:00	3.4	213.1	12.3	4.1	98.8	2.0	0.0	1172.4
03-Jul-17 23:00	4.7	227.9	9.2	4.1	98.8	0.0	0.0	1172.8
04-Jul-17 0:00	4.0	210.6	7.8	3.9	98.8	0.0	0.0	1172.9
04-Jul-17 1:00	4.3	207.0	7.6	3.7	98.8	0.0	0.0	1174.0
04-Jul-17 2:00	4.0	211.2	6.9	3.6	98.9	0.0	0.0	1173.8
04-Jul-17 3:00	3.4	209.0	7.8	3.5	98.9	0.0	0.0	1174.3
04-Jul-17 4:00	3.2	210.3	6.7	3.5	98.9	0.1	0.0	1174.2
04-Jul-17 5:00	3.3	201.1	8.2	3.5	98.9	4.5	0.0	1174.9

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
04-Jul-17 6:00	3.2	203.8	7.6	3.5	98.9	27.3	0.0	1175.0
04-Jul-17 7:00	3.2	218.3	6.5	3.4	98.8	62.5	0.0	1175.3
04-Jul-17 8:00	3.2	220.6	6.7	3.6	98.8	116.3	0.0	1175.0
04-Jul-17 9:00	3.7	219.3	6.9	3.7	98.7	91.5	0.0	1175.2
04-Jul-17 10:00	3.4	217.9	9.0	4.0	98.6	227.7	0.0	1175.1
04-Jul-17 11:00	2.8	231.3	13.2	4.6	98.0	461.2	0.0	1174.9
04-Jul-17 12:00	2.1	262.6	19.0	5.4	97.5	453.1	0.0	1175.5
04-Jul-17 13:00	2.2	293.6	21.6	5.9	95.2	545.2	0.0	1175.6
04-Jul-17 14:00	2.2	285.5	19.0	6.4	93.2	556.7	0.0	1175.7
04-Jul-17 15:00	1.5	299.8	29.5	6.6	88.1	523.1	0.0	1175.3
04-Jul-17 16:00	2.2	238.4	25.2	6.7	89.6	327.1	0.0	1175.0
04-Jul-17 17:00	2.2	278.8	16.4	6.7	90.4	276.5	0.0	1175.4
04-Jul-17 18:00	2.2	270.3	18.7	6.7	88.5	197.4	0.0	1175.0
04-Jul-17 19:00	2.2	217.7	17.2	6.7	87.3	137.9	0.0	1175.0
04-Jul-17 20:00	2.4	183.9	8.8	6.5	86.2	71.1	0.0	1175.0
04-Jul-17 21:00	2.1	219.1	8.2	6.3	89.0	63.4	0.0	1175.1
04-Jul-17 22:00	2.1	206.4	7.2	5.8	90.3	7.1	0.0	1175.3
04-Jul-17 23:00	1.1	170.9	28.0	5.5	91.6	0.1	0.0	1175.2
05-Jul-17 0:00	0.6	89.3	12.9	5.5	89.8	0.0	0.0	1175.3
05-Jul-17 1:00	1.3	65.8	17.6	5.5	87.9	0.0	0.0	1175.2
05-Jul-17 2:00	1.4	52.7	9.5	5.3	87.4	0.0	0.0	1175.3
05-Jul-17 3:00	1.5	54.1	9.8	5.2	84.9	0.0	0.0	1175.3
05-Jul-17 4:00	1.6	39.5	5.8	4.7	91.7	0.7	0.0	1175.4
05-Jul-17 5:00	1.2	29.7	16.6	4.9	89.1	30.3	0.0	1174.7
05-Jul-17 6:00	0.9	34.6	25.1	5.2	88.5	127.2	0.0	1174.2
05-Jul-17 7:00	1.5	182.3	15.1	5.7	88.4	258.4	0.0	1174.5
05-Jul-17 8:00	1.5	181.5	19.5	6.3	84.3	399.1	0.0	1175.8
05-Jul-17 9:00	1.5	189.1	39.9	7.5	81.2	564.1	0.0	1176.3
05-Jul-17 10:00	2.0	217.8	12.6	7.5	80.8	697.2	0.0	1176.9
05-Jul-17 11:00	1.9	233.8	19.3	8.7	79.0	789.0	0.0	1177.0
05-Jul-17 12:00	2.1	275.7	23.0	10.2	74.6	813.0	0.0	1176.5
05-Jul-17 13:00	1.4	308.4	49.1	11.2	70.3	772.5	0.0	1176.4
05-Jul-17 14:00	2.4	299.4	27.5	12.1	66.3	733.7	0.0	1176.0
05-Jul-17 15:00	2.8	290.5	26.4	13.4	58.1	793.6	0.0	1175.3
05-Jul-17 16:00	3.3	290.3	22.8	13.9	54.5	698.7	0.0	1174.1
05-Jul-17 17:00	2.6	295.7	29.5	14.5	51.6	512.9	0.0	1174.1
05-Jul-17 18:00	2.1	288.3	29.4	14.4	50.4	379.9	0.0	1174.1
05-Jul-17 19:00	1.9	305.8	25.5	14.3	50.7	201.6	0.0	1173.6
05-Jul-17 20:00	2.1	327.3	17.1	14.1	50.8	134.9	0.0	1174.0
05-Jul-17 21:00	1.0	44.3	12.0	13.2	53.2	46.3	0.0	1174.3
05-Jul-17 22:00	0.6	76.6	9.4	12.7	53.9	6.0	0.0	1174.4
05-Jul-17 23:00	0.7	203.6	29.9	12.4	55.5	0.1	0.0	1174.3
06-Jul-17 0:00	1.4	37.1	13.4	11.9	55.1	0.0	0.0	1174.2
06-Jul-17 1:00	0.9	73.8	29.1	11.7	55.0	0.0	0.0	1174.4
06-Jul-17 2:00	0.8	129.1	42.5	11.7	49.8	0.0	0.0	1174.5
06-Jul-17 3:00	1.2	176.7	14.3	11.6	52.9	0.0	0.0	1174.5
06-Jul-17 4:00	1.2	181.2	17.6	11.5	53.4	1.7	0.0	1174.5
06-Jul-17 5:00	0.5	129.3	33.5	12.0	47.7	33.4	0.0	1174.1
06-Jul-17 6:00	0.6	22.5	40.3	12.3	45.8	79.8	0.0	1174.2
06-Jul-17 7:00	1.2	201.9	15.9	12.1	48.7	171.8	0.0	1174.2
06-Jul-17 8:00	1.5	55.9	18.0	12.8	47.2	213.4	0.0	1174.5
06-Jul-17 9:00	2.0	61.8	13.3	14.1	46.7	386.1	0.0	1175.2
06-Jul-17 10:00	2.5	26.8	41.3	14.3	47.3	593.7	0.0	1175.8
06-Jul-17 11:00	1.6	248.9	56.8	14.9	49.9	781.7	0.0	1176.3

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
06-Jul-17 12:00	1.5	274.5	32.8	15.8	50.8	834.0	0.0	1176.2
06-Jul-17 13:00	2.0	286.7	20.4	16.8	43.9	840.0	0.0	1175.3
06-Jul-17 14:00	2.6	296.3	15.4	17.5	39.7	787.8	0.0	1174.4
06-Jul-17 15:00	2.7	279.0	21.6	17.9	39.7	636.6	0.0	1173.5
06-Jul-17 16:00	3.1	241.9	19.3	17.8	38.5	548.0	0.0	1173.0
06-Jul-17 17:00	2.8	215.1	22.0	17.8	38.3	454.9	0.0	1173.2
06-Jul-17 18:00	2.2	256.2	22.1	17.4	41.9	335.9	0.0	1172.9
06-Jul-17 19:00	2.6	248.5	14.7	16.7	46.6	209.9	0.0	1173.0
06-Jul-17 20:00	2.5	231.6	13.9	15.5	53.1	105.3	0.0	1173.3
06-Jul-17 21:00	2.3	212.5	9.8	14.4	60.7	37.1	0.0	1173.7
06-Jul-17 22:00	1.9	210.6	7.0	13.5	65.7	4.5	0.0	1173.4
06-Jul-17 23:00	1.7	210.1	6.9	13.2	67.4	0.0	0.0	1173.6
07-Jul-17 0:00	0.4	197.3	14.6	13.0	66.5	0.0	0.0	1173.7
07-Jul-17 1:00	0.3	125.5	4.7	12.7	67.5	0.0	0.0	1173.7
07-Jul-17 2:00	1.3	63.4	8.3	12.5	62.8	0.0	0.0	1173.7
07-Jul-17 3:00	1.5	42.8	14.0	12.3	66.5	0.0	0.0	1173.8
07-Jul-17 4:00	0.5	23.5	45.0	12.3	67.7	0.7	0.0	1173.8
07-Jul-17 5:00	0.9	190.3	30.9	12.0	69.8	19.9	0.0	1173.9
07-Jul-17 6:00	1.9	174.4	18.1	12.1	65.4	92.0	0.0	1173.8
07-Jul-17 7:00	0.8	183.2	40.2	13.5	59.3	214.8	0.0	1173.6
07-Jul-17 8:00	-	-	-	-	-	-	0.0	-
07-Jul-17 9:00	1.2	3.6	54.8	14.8	57.4	271.7	0.0	-
07-Jul-17 10:00	0.9	194.2	41.0	14.3	62.3	323.2	0.0	-
07-Jul-17 11:00	2.7	211.5	10.2	13.6	63.3	387.5	0.0	-
07-Jul-17 12:00	4.8	203.6	14.4	14.1	57.5	479.2	0.0	44.4
07-Jul-17 13:00	4.5	217.2	11.4	14.4	61.0	678.0	0.0	44.6
07-Jul-17 14:00	5.6	230.6	11.1	15.3	58.3	892.0	0.0	44.5
07-Jul-17 15:00	7.2	238.8	13.0	14.9	62.7	712.8	0.0	44.5
07-Jul-17 16:00	7.3	236.6	9.7	13.3	71.0	331.1	0.0	44.6
07-Jul-17 17:00	7.3	226.9	9.6	12.2	68.7	131.3	0.0	44.6
07-Jul-17 18:00	7.5	232.9	8.4	12.7	60.0	327.1	0.0	44.5
07-Jul-17 19:00	7.0	240.6	7.3	12.5	63.5	207.5	0.0	44.7
07-Jul-17 20:00	5.6	230.4	9.7	10.7	71.8	47.4	0.0	44.7
07-Jul-17 21:00	3.2	202.9	18.0	9.8	76.8	3.9	0.0	44.7
07-Jul-17 22:00	3.1	198.6	18.4	9.2	80.4	1.1	0.0	44.8
07-Jul-17 23:00	2.9	185.8	21.4	8.5	85.2	0.0	0.0	44.8
08-Jul-17 0:00	4.1	219.7	10.3	8.2	86.3	0.0	0.0	44.8
08-Jul-17 1:00	3.5	215.1	11.0	7.9	88.9	0.0	0.0	44.9
08-Jul-17 2:00	2.6	204.3	11.2	7.7	89.7	0.0	0.0	44.8
08-Jul-17 3:00	2.5	220.2	10.7	7.6	90.1	0.0	0.0	44.8
08-Jul-17 4:00	2.9	213.9	8.4	7.3	91.5	0.1	0.0	44.7
08-Jul-17 5:00	2.4	200.5	12.0	7.4	90.4	4.6	0.0	44.7
08-Jul-17 6:00	3.1	192.7	9.7	7.5	88.8	29.9	0.0	44.7
08-Jul-17 7:00	2.8	187.3	9.0	7.6	88.5	81.0	0.0	44.5
08-Jul-17 8:00	2.5	161.1	13.8	8.3	84.2	149.2	0.0	44.6
08-Jul-17 9:00	2.6	198.2	12.4	7.6	93.7	231.5	0.0	45.2
08-Jul-17 10:00	3.6	219.3	11.4	7.6	95.5	392.7	0.0	45.2
08-Jul-17 11:00	4.1	216.0	20.4	8.1	92.8	583.1	0.0	45.2
08-Jul-17 12:00	4.3	226.3	20.4	8.9	85.9	527.0	0.0	45.3
08-Jul-17 13:00	5.4	199.3	17.5	9.6	72.6	512.8	0.0	45.3
08-Jul-17 14:00	5.7	225.8	16.1	10.3	66.3	771.9	0.0	45.4
08-Jul-17 15:00	4.4	271.8	29.2	10.9	67.1	538.8	0.0	45.4
08-Jul-17 16:00	3.3	294.0	34.2	11.5	64.3	470.5	0.0	45.4
08-Jul-17 17:00	3.5	297.0	28.5	11.8	61.1	518.4	0.0	45.3

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation					
08-Jul-17 18:00	2.2	291.0	29.9	10.8	67.0	155.0	0.0	45.1
08-Jul-17 19:00	2.0	278.4	17.3	10.3	69.5	132.4	0.0	45.2
08-Jul-17 20:00	1.9	355.1	17.6	9.4	77.2	43.5	0.0	45.2
08-Jul-17 21:00	1.4	8.0	27.2	8.4	86.7	8.8	0.0	45.1
08-Jul-17 22:00	1.0	69.6	54.2	8.0	89.3	1.2	0.0	45.4
08-Jul-17 23:00	1.6	29.0	23.5	7.4	93.4	0.0	0.0	46.3
09-Jul-17 0:00	1.6	35.0	12.2	7.1	96.2	0.0	0.0	48.4
09-Jul-17 1:00	0.6	117.5	19.8	7.0	97.4	0.0	0.0	50.8
09-Jul-17 2:00	1.9	211.8	7.6	6.8	97.8	0.0	0.0	53.4
09-Jul-17 3:00	1.1	190.3	27.4	6.7	98.0	0.0	0.0	54.2
09-Jul-17 4:00	2.3	199.2	21.4	6.6	98.1	0.1	0.0	55.0
09-Jul-17 5:00	2.5	225.3	18.9	6.4	98.2	2.8	0.0	55.1
09-Jul-17 6:00	3.4	224.1	12.3	6.2	98.2	25.5	0.0	55.5
09-Jul-17 7:00	7.2	229.7	11.8	5.8	98.3	24.9	0.0	58.5
09-Jul-17 8:00	6.4	219.7	13.8	4.8	98.4	44.1	0.0	61.2
09-Jul-17 9:00	4.9	194.3	14.5	4.1	98.4	88.7	0.0	61.3
09-Jul-17 10:00	5.4	209.9	14.6	4.3	98.3	126.0	0.0	62.9
09-Jul-17 11:00	5.8	214.0	15.8	4.1	98.3	106.9	0.0	64.5
09-Jul-17 12:00	6.6	219.5	11.4	4.3	98.3	188.6	0.0	65.4
09-Jul-17 13:00	7.6	226.4	8.8	4.6	98.1	243.6	0.0	66.4
09-Jul-17 14:00	7.7	226.3	9.8	4.3	98.2	214.5	0.0	67.6
09-Jul-17 15:00	7.1	228.0	8.1	4.3	98.3	155.9	0.0	67.8
09-Jul-17 16:00	6.6	229.4	9.4	4.3	98.3	132.9	0.0	67.9
09-Jul-17 17:00	6.6	235.0	9.4	4.0	98.4	71.8	0.0	67.9
09-Jul-17 18:00	5.5	237.8	10.5	4.0	98.5	59.7	0.0	68.3
09-Jul-17 19:00	4.3	223.3	8.2	3.9	98.5	53.1	0.0	68.4
09-Jul-17 20:00	3.9	218.3	10.1	3.9	98.5	40.8	0.0	68.4
09-Jul-17 21:00	5.0	219.2	9.9	3.9	98.6	11.4	0.0	68.5
09-Jul-17 22:00	4.9	223.0	9.1	3.6	98.6	1.1	0.0	68.7
09-Jul-17 23:00	5.2	227.8	9.1	3.5	98.7	0.0	0.0	69.0
10-Jul-17 0:00	4.4	229.7	7.3	3.2	98.7	0.0	0.0	69.5
10-Jul-17 1:00	3.2	229.0	10.3	3.1	98.7	0.0	0.0	69.5
10-Jul-17 2:00	3.7	215.6	11.1	3.0	98.7	0.0	0.0	69.6
10-Jul-17 3:00	4.2	214.2	10.4	2.8	98.7	0.0	0.0	69.6
10-Jul-17 4:00	4.5	224.0	7.9	2.7	98.8	0.0	0.0	69.5
10-Jul-17 5:00	3.4	210.7	9.3	2.5	98.8	4.7	0.0	69.6
10-Jul-17 6:00	3.9	208.2	10.9	2.5	98.8	36.6	0.0	69.5
10-Jul-17 7:00	3.9	215.4	11.9	2.6	98.7	99.4	0.0	69.5
10-Jul-17 8:00	3.5	213.9	12.9	2.7	98.5	189.1	0.0	69.5
10-Jul-17 9:00	3.3	215.2	13.5	3.1	98.3	284.5	0.0	69.6
10-Jul-17 10:00	3.3	233.2	13.6	3.5	97.8	561.0	0.0	69.6
10-Jul-17 11:00	4.0	227.5	12.5	4.0	97.3	527.0	0.0	69.6
10-Jul-17 12:00	4.3	225.9	18.1	4.4	93.8	521.8	0.0	69.5
10-Jul-17 13:00	5.0	242.0	17.0	5.0	90.0	410.6	0.0	69.4
10-Jul-17 14:00	4.7	246.0	13.7	5.3	85.3	357.9	0.0	69.3
10-Jul-17 15:00	5.7	249.8	10.4	5.5	86.2	289.0	0.0	69.4
10-Jul-17 16:00	5.0	225.3	13.4	5.3	86.7	341.7	0.0	69.6
10-Jul-17 17:00	5.7	244.6	11.8	6.0	83.9	326.9	0.0	69.5
10-Jul-17 18:00	5.1	240.0	16.2	5.4	88.2	144.5	0.0	69.7
10-Jul-17 19:00	3.5	217.7	15.5	4.8	93.1	62.1	0.0	69.8
10-Jul-17 20:00	3.7	229.3	13.9	4.4	96.9	24.2	0.0	69.9
10-Jul-17 21:00	3.9	204.1	10.7	4.1	98.2	7.6	0.0	70.1
10-Jul-17 22:00	2.8	207.8	14.0	3.9	98.2	0.8	0.0	70.1
10-Jul-17 23:00	2.9	193.2	13.3	3.9	95.2	0.0	0.0	70.1

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
11-Jul-17 0:00	3.3	212.3	10.7	3.7	97.0	0.0	0.0	70.7
11-Jul-17 1:00	3.7	213.8	8.2	3.4	98.2	0.0	0.0	70.8
11-Jul-17 2:00	3.4	209.0	9.5	3.3	98.2	0.0	0.0	71.6
11-Jul-17 3:00	3.6	191.1	11.4	3.0	97.9	0.0	0.0	71.9
11-Jul-17 4:00	4.6	159.9	10.3	3.1	91.5	0.0	0.0	71.8
11-Jul-17 5:00	4.0	169.9	8.6	2.9	93.6	2.4	0.0	72.2
11-Jul-17 6:00	3.7	143.5	17.6	3.2	90.9	17.0	0.0	72.6
11-Jul-17 7:00	2.8	146.4	27.6	3.3	90.2	49.3	0.0	72.8
11-Jul-17 8:00	2.3	87.6	33.5	3.6	90.0	88.6	0.0	72.8
11-Jul-17 9:00	1.8	115.3	41.0	3.9	89.5	93.8	0.0	72.9
11-Jul-17 10:00	1.3	38.9	62.2	4.1	92.0	149.6	0.0	73.4
11-Jul-17 11:00	1.0	332.6	29.7	4.6	91.8	162.5	0.0	73.6
11-Jul-17 12:00	1.6	30.2	17.7	5.0	91.3	220.5	0.0	73.8
11-Jul-17 13:00	1.3	331.7	32.1	5.4	92.2	198.1	0.0	74.0
11-Jul-17 14:00	1.3	339.3	40.5	5.8	93.1	238.6	0.0	74.1
11-Jul-17 15:00	1.2	301.6	42.3	6.1	94.4	175.5	0.0	74.3
11-Jul-17 16:00	1.4	286.7	34.4	6.2	95.1	143.8	0.0	74.2
11-Jul-17 17:00	1.0	190.4	33.8	6.4	93.1	99.9	0.0	74.4
11-Jul-17 18:00	0.8	281.2	47.7	6.3	94.3	54.8	0.0	74.9
11-Jul-17 19:00	0.9	34.1	19.4	6.4	93.4	55.1	0.0	75.0
11-Jul-17 20:00	0.4	221.5	35.4	6.6	89.4	23.5	0.0	75.0
11-Jul-17 21:00	0.5	66.1	20.8	6.7	85.8	9.5	0.0	75.1
11-Jul-17 22:00	0.6	71.4	17.2	6.7	85.6	1.2	0.0	75.3
11-Jul-17 23:00	0.7	152.3	13.6	6.7	84.0	0.0	0.0	75.4
12-Jul-17 0:00	0.7	37.4	17.7	6.8	82.6	0.0	0.0	75.5
12-Jul-17 1:00	0.4	175.7	41.5	6.6	84.4	0.0	0.0	75.5
12-Jul-17 2:00	0.5	24.9	15.8	6.7	83.4	0.0	0.0	75.5
12-Jul-17 3:00	1.0	207.2	33.2	6.1	88.8	0.0	0.0	75.5
12-Jul-17 4:00	0.6	189.3	39.3	6.4	84.8	0.1	0.0	75.5
12-Jul-17 5:00	0.7	209.9	49.6	6.2	87.3	3.5	0.0	75.7
12-Jul-17 6:00	1.3	190.1	18.2	6.5	85.5	26.1	0.0	75.8
12-Jul-17 7:00	4.1	52.8	27.2	7.1	87.8	177.9	0.0	75.6
12-Jul-17 8:00	2.6	49.7	31.2	7.3	90.5	250.6	0.0	75.7
12-Jul-17 9:00	1.9	298.8	63.7	7.3	93.1	235.6	0.0	75.7
12-Jul-17 10:00	1.6	230.5	49.9	7.1	95.0	177.7	0.0	75.8
12-Jul-17 11:00	2.2	217.3	11.5	6.9	95.8	239.1	0.0	75.6
12-Jul-17 12:00	2.4	198.5	14.5	7.6	92.9	372.8	0.0	75.8
12-Jul-17 13:00	1.3	222.9	41.6	8.3	92.2	346.5	0.0	75.9
12-Jul-17 14:00	1.1	241.2	34.0	8.9	87.1	268.1	0.0	76.0
12-Jul-17 15:00	0.8	334.9	44.7	9.7	81.9	325.5	0.0	76.2
12-Jul-17 16:00	1.4	242.8	30.5	9.1	90.2	172.8	0.0	76.0
12-Jul-17 17:00	4.5	211.8	12.3	7.5	95.3	201.1	0.0	75.8
12-Jul-17 18:00	4.2	199.2	15.9	6.5	95.0	154.2	0.0	75.8
12-Jul-17 19:00	4.0	201.8	12.2	6.2	96.9	78.6	0.0	76.0
12-Jul-17 20:00	2.4	189.6	20.1	6.3	95.6	61.2	0.0	76.7
12-Jul-17 21:00	1.7	178.2	15.2	6.6	90.9	23.3	0.0	76.6
12-Jul-17 22:00	1.3	219.1	20.6	6.6	90.6	1.3	0.0	76.6
12-Jul-17 23:00	2.3	193.6	11.1	6.5	90.2	0.0	0.0	76.6
13-Jul-17 0:00	1.9	188.8	16.0	6.2	91.3	0.0	0.0	76.6
13-Jul-17 1:00	1.4	184.1	19.1	6.5	89.3	0.0	0.0	76.6
13-Jul-17 2:00	0.7	249.8	14.0	6.5	89.3	0.0	0.0	76.6
13-Jul-17 3:00	1.1	334.9	43.5	6.2	91.5	0.0	0.0	76.6
13-Jul-17 4:00	1.3	26.4	10.7	6.1	89.8	0.1	0.0	76.6
13-Jul-17 5:00	0.8	45.6	14.3	6.1	89.3	8.2	0.0	76.5

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
13-Jul-17 6:00	1.0	199.7	19.3	6.2	91.1	48.6	0.0	76.6
13-Jul-17 7:00	0.5	228.5	15.1	6.6	90.5	120.0	0.0	76.9
13-Jul-17 8:00	0.6	235.9	40.8	6.7	92.4	162.0	0.0	77.0
13-Jul-17 9:00	1.3	227.8	11.8	6.9	95.0	293.4	0.0	76.6
13-Jul-17 10:00	1.5	235.1	19.5	7.5	91.1	399.9	0.0	76.8
13-Jul-17 11:00	1.6	226.1	14.0	7.6	91.6	287.4	0.0	76.7
13-Jul-17 12:00	3.0	219.9	8.5	7.6	87.2	335.6	0.0	76.6
13-Jul-17 13:00	3.9	223.0	11.3	7.8	87.6	393.1	0.0	76.6
13-Jul-17 14:00	3.9	228.7	11.3	7.8	89.1	500.2	0.0	76.6
13-Jul-17 15:00	4.0	224.9	10.6	7.9	89.3	430.8	0.0	76.7
13-Jul-17 16:00	3.9	226.1	10.2	8.0	87.7	268.2	0.0	76.6
13-Jul-17 17:00	2.9	236.7	15.2	8.3	85.3	298.2	0.0	76.7
13-Jul-17 18:00	2.6	228.7	16.3	8.7	81.1	218.2	0.0	76.8
13-Jul-17 19:00	2.0	259.5	15.1	8.7	83.2	150.1	0.0	76.7
13-Jul-17 20:00	3.7	235.5	12.5	7.7	90.1	32.3	0.0	76.7
13-Jul-17 21:00	3.4	197.3	13.8	6.6	93.5	10.7	0.0	77.8
13-Jul-17 22:00	2.9	205.7	9.1	6.5	94.3	1.2	0.0	78.1
13-Jul-17 23:00	2.9	213.3	13.1	6.4	94.1	0.0	0.0	78.1
14-Jul-17 0:00	2.8	202.3	14.0	5.9	97.0	0.0	0.0	78.1
14-Jul-17 1:00	2.6	216.1	11.9	5.9	94.8	0.0	0.0	78.0
14-Jul-17 2:00	2.3	226.4	9.7	5.7	96.2	0.0	0.0	77.9
14-Jul-17 3:00	2.4	204.1	11.7	6.0	90.9	0.0	0.0	78.0
14-Jul-17 4:00	0.9	169.8	22.4	6.2	87.6	0.1	0.0	77.9
14-Jul-17 5:00	1.4	195.2	5.3	6.3	85.7	5.4	0.0	78.0
14-Jul-17 6:00	0.8	203.3	12.2	6.2	87.9	46.3	0.0	78.0
14-Jul-17 7:00	0.9	217.4	10.2	6.3	89.1	111.4	0.0	78.2
14-Jul-17 8:00	1.2	216.8	9.8	6.3	92.6	170.8	0.0	78.4
14-Jul-17 9:00	1.3	241.7	13.4	6.7	88.3	314.0	0.0	78.6
14-Jul-17 10:00	1.5	255.6	22.7	7.6	85.1	493.7	0.0	78.2
14-Jul-17 11:00	1.9	265.3	23.3	7.7	89.9	415.4	0.0	78.1
14-Jul-17 12:00	2.4	259.6	24.6	7.8	84.8	313.0	0.0	78.0
14-Jul-17 13:00	2.5	238.5	24.7	8.7	75.4	499.7	0.0	78.0
14-Jul-17 14:00	2.7	234.9	24.8	9.1	73.8	618.8	0.0	78.1
14-Jul-17 15:00	3.2	250.3	26.0	9.9	72.3	782.4	0.0	78.1
14-Jul-17 16:00	2.1	231.8	14.0	9.1	75.0	341.8	0.0	77.9
14-Jul-17 17:00	3.4	234.6	10.1	9.1	80.4	364.5	0.0	78.0
14-Jul-17 18:00	3.8	216.1	12.5	8.5	83.0	376.0	0.0	78.4
14-Jul-17 19:00	3.2	202.1	15.1	7.9	85.8	124.1	0.0	79.2
14-Jul-17 20:00	3.2	209.6	18.7	7.9	88.4	132.9	0.0	79.1
14-Jul-17 21:00	1.5	171.0	15.8	7.5	87.8	26.1	0.0	79.0
14-Jul-17 22:00	1.0	178.1	13.7	7.5	85.6	4.5	0.0	78.9
14-Jul-17 23:00	1.2	176.4	11.7	7.5	85.1	0.0	0.0	78.9
15-Jul-17 0:00	0.6	161.6	19.2	7.2	85.3	0.0	0.0	79.0
15-Jul-17 1:00	0.7	29.1	25.3	6.9	84.7	0.0	0.0	78.9
15-Jul-17 2:00	1.4	68.1	11.2	6.6	88.6	0.0	0.0	79.0
15-Jul-17 3:00	1.3	13.3	11.7	6.2	93.6	0.0	0.0	78.9
15-Jul-17 4:00	0.7	52.6	20.3	6.1	92.2	0.3	0.0	78.8
15-Jul-17 5:00	1.1	52.7	13.0	6.1	90.0	15.6	0.0	78.9
15-Jul-17 6:00	1.0	31.7	14.4	6.9	88.7	161.9	0.0	79.4
15-Jul-17 7:00	0.5	117.0	49.4	7.0	89.9	150.5	0.0	79.2
15-Jul-17 8:00	0.4	227.8	34.3	7.4	89.7	241.5	0.0	79.5
15-Jul-17 9:00	0.9	268.9	22.0	7.5	90.4	282.1	0.0	79.6
15-Jul-17 10:00	1.5	230.3	20.0	8.1	90.6	493.2	0.0	79.5
15-Jul-17 11:00	2.0	242.5	16.7	9.0	85.0	762.6	0.0	79.6



Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
15-Jul-17 12:00	2.5	241.6	19.7	9.4	81.5	544.8	0.0	79.2
15-Jul-17 13:00	3.0	227.7	11.5	9.6	70.2	562.9	0.0	79.5
15-Jul-17 14:00	4.0	250.8	18.7	10.2	73.3	613.9	0.0	79.5
15-Jul-17 15:00	2.8	264.3	23.9	10.8	69.7	522.4	0.0	79.6
15-Jul-17 16:00	3.6	297.0	24.3	10.1	74.1	409.4	0.0	79.4
15-Jul-17 17:00	4.7	236.9	22.1	9.4	75.6	218.7	0.0	79.3
15-Jul-17 18:00	4.8	219.9	12.1	8.9	72.4	135.0	0.0	79.5
15-Jul-17 19:00	3.8	219.9	16.7	7.9	82.1	30.6	0.0	80.4
15-Jul-17 20:00	4.5	202.4	12.6	7.1	91.0	52.8	0.0	81.1
15-Jul-17 21:00	4.0	206.3	11.8	6.1	97.2	15.4	0.0	81.1
15-Jul-17 22:00	4.1	208.8	10.0	5.7	97.5	1.0	0.0	81.5
15-Jul-17 23:00	3.6	198.9	10.9	5.8	95.4	0.0	0.0	81.6
16-Jul-17 0:00	3.4	201.1	10.1	5.9	93.7	0.0	0.0	81.6
16-Jul-17 1:00	3.7	192.3	13.7	5.9	92.6	0.0	0.0	81.6
16-Jul-17 2:00	3.3	215.7	8.7	5.5	96.5	0.0	0.0	81.7
16-Jul-17 3:00	3.9	208.9	11.0	5.4	98.1	0.0	0.0	82.0
16-Jul-17 4:00	4.7	183.0	10.2	5.7	92.8	0.0	0.0	82.0
16-Jul-17 5:00	3.2	201.7	15.1	5.4	94.9	3.2	0.0	82.2
16-Jul-17 6:00	3.5	205.4	11.5	5.4	94.5	30.7	0.0	82.2
16-Jul-17 7:00	4.7	195.0	10.8	5.4	93.9	52.3	0.0	82.6
16-Jul-17 8:00	4.0	203.1	10.5	5.3	94.7	78.7	0.0	82.7
16-Jul-17 9:00	4.2	209.4	11.6	5.2	97.0	91.7	0.0	82.8
16-Jul-17 10:00	3.9	213.4	14.9	5.3	96.7	85.4	0.0	82.9
16-Jul-17 11:00	5.8	234.0	10.4	5.4	98.0	64.1	0.0	83.2
16-Jul-17 12:00	5.5	229.2	10.5	5.3	98.1	118.5	0.0	83.5
16-Jul-17 13:00	4.8	230.8	10.1	5.3	98.1	94.4	0.0	83.7
16-Jul-17 14:00	4.5	226.7	10.4	5.5	98.2	108.2	0.0	83.7
16-Jul-17 15:00	4.3	227.9	8.2	5.5	98.2	124.3	0.0	83.7
16-Jul-17 16:00	3.9	225.5	9.9	5.6	98.2	128.5	0.0	83.7
16-Jul-17 17:00	4.1	231.3	10.4	5.7	98.2	124.9	0.0	83.8
16-Jul-17 18:00	3.8	231.0	11.3	5.7	98.3	71.3	0.0	83.9
16-Jul-17 19:00	3.8	217.9	14.9	5.5	98.4	54.0	0.0	84.0
16-Jul-17 20:00	3.8	212.2	12.0	5.5	98.5	25.3	0.0	84.0
16-Jul-17 21:00	4.6	223.9	8.6	5.4	98.5	11.0	0.0	84.2
16-Jul-17 22:00	4.2	221.4	8.1	5.3	98.6	0.5	0.0	84.2
16-Jul-17 23:00	3.3	221.2	9.9	5.2	98.6	0.0	0.0	84.2
17-Jul-17 0:00	2.8	219.2	9.6	5.1	98.6	0.0	0.0	84.2
17-Jul-17 1:00	3.1	214.4	10.1	4.9	98.7	0.0	0.0	84.3
17-Jul-17 2:00	3.2	206.9	10.9	4.8	98.7	0.0	0.0	84.3
17-Jul-17 3:00	3.9	212.1	8.4	4.7	98.7	0.0	0.0	84.3
17-Jul-17 4:00	3.5	202.6	8.7	4.7	98.7	0.0	0.0	84.3
17-Jul-17 5:00	3.0	206.7	8.8	4.7	98.8	1.9	0.0	84.3
17-Jul-17 6:00	3.0	209.4	10.5	4.8	98.8	15.2	0.0	84.4
17-Jul-17 7:00	3.3	217.8	8.4	4.8	98.7	51.2	0.0	84.4
17-Jul-17 8:00	3.7	222.3	7.5	4.9	98.6	118.5	0.0	84.4
17-Jul-17 9:00	3.5	223.0	8.6	5.0	98.5	161.6	0.0	84.4
17-Jul-17 10:00	2.9	224.8	12.2	5.2	98.5	163.1	0.0	84.5
17-Jul-17 11:00	3.3	224.0	10.3	5.6	98.2	357.2	0.0	84.5
17-Jul-17 12:00	3.3	245.2	11.0	6.1	98.1	309.0	0.0	84.5
17-Jul-17 13:00	2.3	252.2	11.9	6.0	98.3	241.7	0.0	84.5
17-Jul-17 14:00	2.0	278.0	20.7	6.2	98.1	306.6	0.0	84.5
17-Jul-17 15:00	2.0	292.4	20.5	6.6	98.0	345.9	0.0	84.5
17-Jul-17 16:00	1.8	289.1	24.0	6.6	97.6	277.6	0.0	84.5
17-Jul-17 17:00	1.9	296.0	14.6	7.1	93.5	258.5	0.0	84.4

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
17-Jul-17 18:00	1.8	316.2	12.5	6.8	92.5	154.6	0.0	84.3
17-Jul-17 19:00	2.0	319.2	8.9	6.8	92.8	85.0	0.0	84.3
17-Jul-17 20:00	1.0	320.9	14.9	6.8	92.7	40.0	0.0	84.2
17-Jul-17 21:00	0.7	319.9	11.8	6.7	93.1	10.5	0.0	84.1
17-Jul-17 22:00	0.7	244.5	12.2	6.6	94.2	1.0	0.0	84.0
17-Jul-17 23:00	0.9	234.2	17.8	6.5	93.7	0.0	0.0	84.0
18-Jul-17 0:00	0.8	237.2	24.0	6.4	95.3	0.0	0.0	84.0
18-Jul-17 1:00	2.0	210.2	9.2	6.2	98.0	0.0	0.0	84.3
18-Jul-17 2:00	1.9	211.5	11.5	6.0	98.3	0.0	0.0	84.2
18-Jul-17 3:00	2.1	198.3	12.8	5.8	98.3	0.0	0.0	84.2
18-Jul-17 4:00	1.3	213.3	16.2	5.6	98.0	0.0	0.0	84.2
18-Jul-17 5:00	1.0	214.2	7.9	5.5	97.1	3.1	0.0	84.2
18-Jul-17 6:00	0.6	200.2	38.3	5.5	96.0	17.9	0.0	84.2
18-Jul-17 7:00	1.5	65.9	36.4	5.5	93.0	51.4	0.0	84.3
18-Jul-17 8:00	1.0	132.2	40.1	5.6	93.6	88.1	0.0	84.4
18-Jul-17 9:00	1.4	227.4	11.6	5.6	94.9	133.7	0.0	84.4
18-Jul-17 10:00	1.0	205.7	25.1	6.1	94.0	187.9	0.0	84.5
18-Jul-17 11:00	2.2	242.7	16.8	6.0	94.8	217.5	0.0	84.3
18-Jul-17 12:00	2.6	229.9	12.6	6.3	94.7	263.0	0.0	84.3
18-Jul-17 13:00	3.0	238.5	13.9	7.0	93.5	269.9	0.0	84.3
18-Jul-17 14:00	3.2	236.0	19.9	7.4	92.8	290.9	0.0	84.3
18-Jul-17 15:00	3.0	252.1	13.7	7.8	91.5	282.4	0.0	84.3
18-Jul-17 16:00	2.7	255.6	14.3	7.9	91.7	234.6	0.0	84.3
18-Jul-17 17:00	3.0	234.9	11.0	8.0	91.6	193.3	0.0	84.3
18-Jul-17 18:00	3.3	229.6	12.1	8.2	91.6	169.5	0.0	84.3
18-Jul-17 19:00	3.4	228.6	9.0	8.0	93.0	98.6	0.0	84.3
18-Jul-17 20:00	3.9	230.4	6.8	7.8	94.2	42.5	0.0	84.3
18-Jul-17 21:00	3.4	220.4	8.6	7.5	95.8	11.0	0.0	84.3
18-Jul-17 22:00	3.8	220.9	10.3	7.2	97.2	1.3	0.0	84.3
18-Jul-17 23:00	3.8	222.7	9.5	7.0	98.1	0.0	0.0	84.3
19-Jul-17 0:00	3.4	223.3	8.1	6.9	98.4	0.0	0.0	84.3
19-Jul-17 1:00	2.5	212.3	10.2	6.8	98.0	0.0	0.0	84.3
19-Jul-17 2:00	2.6	222.9	8.4	6.6	97.3	0.0	0.0	84.3
19-Jul-17 3:00	2.4	227.2	9.5	6.5	97.0	0.0	0.0	84.2
19-Jul-17 4:00	2.6	213.7	11.6	6.3	93.6	0.0	0.0	84.3
19-Jul-17 5:00	2.8	210.1	11.3	6.1	93.6	3.9	0.0	84.2
19-Jul-17 6:00	2.5	205.8	10.1	6.0	91.1	20.5	0.0	84.3
19-Jul-17 7:00	2.6	219.1	10.6	5.9	90.1	56.3	0.0	84.3
19-Jul-17 8:00	2.7	182.0	10.9	6.3	87.9	143.5	0.0	84.3
19-Jul-17 9:00	2.9	202.5	14.8	6.7	85.6	311.9	0.0	84.3
19-Jul-17 10:00	2.9	212.7	16.8	7.2	83.8	325.4	0.0	84.3
19-Jul-17 11:00	2.9	204.6	18.3	7.6	80.7	363.9	0.0	84.3
19-Jul-17 12:00	3.1	230.5	15.2	8.4	78.6	489.1	0.0	84.3
19-Jul-17 13:00	3.8	241.0	21.2	9.7	74.7	630.6	0.0	84.3
19-Jul-17 14:00	3.1	276.1	25.8	10.0	75.3	611.7	0.0	84.3
19-Jul-17 15:00	4.3	267.3	23.9	10.8	71.6	789.8	0.0	84.2
19-Jul-17 16:00	3.6	272.1	32.7	10.8	72.9	410.5	0.0	84.1
19-Jul-17 17:00	3.8	246.1	39.6	10.6	74.3	258.7	0.0	84.1
19-Jul-17 18:00	3.5	263.7	27.1	10.4	76.1	259.2	0.0	84.1
19-Jul-17 19:00	2.7	268.8	29.7	10.0	77.4	144.6	0.0	84.1
19-Jul-17 20:00	3.2	253.2	19.8	9.4	80.0	67.1	0.0	84.1
19-Jul-17 21:00	2.4	213.9	15.6	9.1	80.4	27.3	0.0	84.1
19-Jul-17 22:00	1.7	191.8	17.2	8.5	81.6	2.4	0.0	83.7
19-Jul-17 23:00	0.6	240.7	28.2	8.2	84.0	0.0	0.0	83.5

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean
20-Jul-17 0:00	1.2	208.0	15.8	8.2	81.4	0.0	0.0	83.5
20-Jul-17 1:00	1.7	180.1	16.7	8.1	80.1	0.0	0.0	84.0
20-Jul-17 2:00	1.6	187.2	13.7	8.0	80.8	0.0	0.0	84.0
20-Jul-17 3:00	1.7	184.1	13.8	7.8	82.5	0.0	0.0	83.9
20-Jul-17 4:00	2.1	191.4	12.8	7.6	84.1	0.0	0.0	84.1
20-Jul-17 5:00	1.6	198.8	8.6	7.4	84.7	6.1	0.0	84.0
20-Jul-17 6:00	1.1	196.3	13.6	7.4	83.9	40.6	0.0	84.1
20-Jul-17 7:00	0.5	117.7	22.1	8.0	77.0	132.3	0.0	84.6
20-Jul-17 8:00	1.8	197.4	8.2	8.6	72.3	353.6	0.0	84.1
20-Jul-17 9:00	2.6	216.7	6.2	8.5	72.7	479.6	0.0	84.1
20-Jul-17 10:00	3.1	222.4	7.5	9.1	67.9	551.6	0.0	84.1
20-Jul-17 11:00	3.2	220.9	14.1	9.5	65.6	583.6	0.0	84.2
20-Jul-17 12:00	3.5	231.5	19.6	10.7	60.5	683.1	0.0	84.3
20-Jul-17 13:00	4.4	246.8	17.0	11.7	61.3	653.4	0.0	84.1
20-Jul-17 14:00	5.6	251.5	12.8	11.5	61.5	473.4	0.0	84.1
20-Jul-17 15:00	5.9	225.9	13.8	11.3	63.3	344.6	0.0	84.1
20-Jul-17 16:00	6.2	239.7	10.6	10.8	67.3	275.9	0.0	84.1
20-Jul-17 17:00	5.8	240.4	8.3	10.6	69.8	235.1	0.0	84.1
20-Jul-17 18:00	5.1	236.3	8.5	10.3	74.0	163.5	0.0	84.1
20-Jul-17 19:00	4.1	224.3	10.7	9.5	80.2	73.7	0.0	84.0
20-Jul-17 20:00	2.5	198.0	18.2	9.0	82.5	25.5	0.0	84.0
20-Jul-17 21:00	2.7	200.0	16.9	8.5	84.7	8.2	0.0	84.1
20-Jul-17 22:00	3.1	207.1	17.1	8.1	86.5	0.7	0.0	84.0
20-Jul-17 23:00	3.5	211.3	10.0	7.9	86.1	0.0	0.0	84.2
21-Jul-17 0:00	3.8	216.5	7.7	7.7	86.0	0.0	0.0	84.2
21-Jul-17 1:00	2.6	216.8	8.3	7.6	85.5	0.0	0.0	84.1
21-Jul-17 2:00	3.2	219.0	10.1	7.2	89.1	0.0	0.0	84.0
21-Jul-17 3:00	3.0	203.8	9.6	6.9	90.2	0.0	0.0	84.1
21-Jul-17 4:00	3.7	189.7	6.1	7.0	87.1	0.0	0.0	84.1
21-Jul-17 5:00	2.5	195.8	5.6	6.9	87.0	3.3	0.0	84.1
21-Jul-17 6:00	2.8	211.5	9.7	6.5	90.3	10.8	0.0	84.0
21-Jul-17 7:00	2.8	216.4	9.3	6.2	93.9	55.0	0.0	84.1
21-Jul-17 8:00	3.9	215.2	8.5	6.7	87.9	154.3	0.0	84.2
21-Jul-17 9:00	4.1	209.7	12.7	7.3	84.0	211.6	0.0	84.1
21-Jul-17 10:00	3.8	215.0	14.0	7.7	78.2	330.6	0.0	84.2
21-Jul-17 11:00	1.7	276.7	50.0	9.0	70.9	440.0	0.0	84.4
21-Jul-17 12:00	1.6	310.7	33.1	9.8	73.1	409.4	0.0	84.0
21-Jul-17 13:00	1.5	221.7	41.9	9.4	71.4	234.0	0.0	84.0
21-Jul-17 14:00	3.1	186.2	20.5	9.6	68.7	302.0	0.0	84.1
21-Jul-17 15:00	3.0	199.3	18.8	9.6	72.7	321.3	0.0	84.1
21-Jul-17 16:00	1.7	223.0	23.8	9.3	77.5	179.1	0.0	84.1
21-Jul-17 17:00	1.0	229.9	30.8	9.3	78.4	192.1	0.0	84.2
21-Jul-17 18:00	1.1	245.1	31.8	9.3	80.8	132.7	0.0	84.1
21-Jul-17 19:00	0.8	253.2	22.5	8.8	84.9	86.6	0.0	84.4
21-Jul-17 20:00	1.4	81.9	33.6	8.8	84.6	36.2	0.0	84.6
21-Jul-17 21:00	3.3	131.4	19.6	8.6	86.3	14.5	0.0	84.6
21-Jul-17 22:00	1.4	63.5	42.0	8.5	86.2	0.6	0.0	84.6
21-Jul-17 23:00	1.5	67.7	12.3	8.6	85.4	0.0	0.0	84.6
22-Jul-17 0:00	1.3	66.2	19.3	8.9	82.7	0.0	0.0	84.7
22-Jul-17 1:00	0.9	71.8	16.6	9.1	81.5	0.0	0.0	84.7
22-Jul-17 2:00	0.6	111.5	11.9	9.0	81.3	0.0	0.0	84.8
22-Jul-17 3:00	0.5	278.3	34.4	8.5	87.9	0.0	0.0	85.7
22-Jul-17 4:00	1.6	22.3	35.8	8.0	91.4	0.0	0.0	87.5
22-Jul-17 5:00	1.1	133.7	51.1	8.0	90.6	0.5	0.0	89.0

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
	Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
22-Jul-17 6:00	1.7	20.9	37.4	7.9	91.2	15.3	0.0	89.2
22-Jul-17 7:00	0.8	59.1	27.6	8.3	88.4	54.7	0.0	89.4
22-Jul-17 8:00	1.0	308.6	37.9	8.2	91.0	120.2	0.0	89.8
22-Jul-17 9:00	0.8	10.0	59.0	8.9	90.6	227.7	0.0	90.1
22-Jul-17 10:00	3.4	192.8	35.9	8.8	92.2	225.0	0.0	90.0
22-Jul-17 11:00	6.3	188.1	12.5	7.7	91.5	162.5	0.0	90.8
22-Jul-17 12:00	6.8	220.2	13.9	6.7	97.7	75.2	0.0	90.9
22-Jul-17 13:00	5.5	210.5	14.8	5.8	98.1	60.7	0.0	92.0
22-Jul-17 14:00	5.1	212.2	13.4	5.5	98.1	85.2	0.0	92.6
22-Jul-17 15:00	5.3	218.9	14.2	5.3	98.2	80.2	0.0	94.0
22-Jul-17 16:00	5.7	223.3	10.5	5.5	98.1	154.8	0.0	96.1
22-Jul-17 17:00	4.3	206.7	13.5	5.4	98.1	148.1	0.0	96.3
22-Jul-17 18:00	3.8	213.4	11.2	5.6	98.1	155.8	0.0	96.3
22-Jul-17 19:00	4.2	209.2	10.6	5.3	98.1	65.6	0.0	96.3
22-Jul-17 20:00	3.5	217.9	10.4	5.2	98.2	42.6	0.0	96.3
22-Jul-17 21:00	3.3	206.1	11.6	5.2	98.3	8.1	0.0	96.3
22-Jul-17 22:00	3.6	202.3	9.9	5.1	98.4	1.0	0.0	96.3
22-Jul-17 23:00	3.3	203.7	10.1	4.9	98.1	0.0	0.0	96.4
23-Jul-17 0:00	3.5	202.7	8.9	4.9	97.8	0.0	0.0	96.3
23-Jul-17 1:00	3.8	198.9	12.9	4.8	98.1	0.0	0.0	96.4
23-Jul-17 2:00	3.8	195.0	10.0	4.8	98.3	0.0	0.0	96.4
23-Jul-17 3:00	4.0	213.7	8.3	4.7	98.3	0.0	0.0	96.4
23-Jul-17 4:00	3.3	212.3	9.1	4.6	98.5	0.0	0.0	96.4
23-Jul-17 5:00	3.4	206.7	8.4	4.6	98.5	1.5	0.0	96.4
23-Jul-17 6:00	2.9	218.8	11.4	4.6	98.5	12.5	0.0	96.4
23-Jul-17 7:00	3.3	210.6	10.5	4.7	98.0	50.8	0.0	96.3
23-Jul-17 8:00	2.3	229.0	14.8	4.9	97.4	103.6	0.0	96.4
23-Jul-17 9:00	2.6	208.4	13.4	5.4	93.8	178.5	0.0	96.4
23-Jul-17 10:00	2.9	225.1	14.2	6.2	89.5	418.6	0.0	96.4
23-Jul-17 11:00	3.2	227.6	12.1	6.5	88.7	423.9	0.0	96.3
23-Jul-17 12:00	3.3	240.2	14.3	6.9	87.7	383.4	0.0	96.3
23-Jul-17 13:00	3.1	229.7	19.2	7.2	85.6	402.9	0.0	96.3
23-Jul-17 14:00	3.7	236.5	19.5	7.7	85.8	448.9	0.0	96.2
23-Jul-17 15:00	3.1	239.4	26.9	7.6	85.9	283.6	0.0	96.2
23-Jul-17 16:00	2.6	232.5	20.3	7.8	85.5	267.0	0.0	96.2
23-Jul-17 17:00	3.0	242.7	15.5	7.8	86.8	223.7	0.0	96.2
23-Jul-17 18:00	2.3	261.9	20.2	7.7	88.3	141.2	0.0	96.1
23-Jul-17 19:00	1.3	262.0	33.3	7.6	89.6	67.3	0.0	96.1
23-Jul-17 20:00	1.9	250.7	13.2	7.1	93.0	35.6	0.0	96.0
23-Jul-17 21:00	2.1	226.2	9.5	6.9	94.0	8.9	0.0	96.1
23-Jul-17 22:00	2.3	221.5	10.1	6.7	94.0	0.6	0.0	96.2
23-Jul-17 23:00	2.1	213.4	12.4	6.6	93.7	0.0	0.0	96.2
24-Jul-17 0:00	2.1	210.8	12.4	6.4	94.9	0.0	0.0	96.2
24-Jul-17 1:00	1.7	192.7	12.0	6.2	95.7	0.0	0.0	96.2
24-Jul-17 2:00	1.0	182.0	13.2	6.2	94.6	0.0	0.0	96.1
24-Jul-17 3:00	1.0	169.6	15.6	6.2	92.2	0.0	0.0	96.1
24-Jul-17 4:00	2.2	110.1	11.2	5.9	92.4	0.0	0.0	96.2
24-Jul-17 5:00	1.8	129.6	17.2	5.9	92.4	1.7	0.0	96.2
24-Jul-17 6:00	1.9	110.3	13.3	5.7	94.3	16.1	0.0	96.1
24-Jul-17 7:00	0.9	9.6	41.3	5.8	94.9	42.0	0.0	96.2
24-Jul-17 8:00	1.2	348.8	30.5	5.9	95.4	97.6	0.0	96.3
24-Jul-17 9:00	0.8	332.5	45.9	6.1	95.8	136.6	0.0	96.5
24-Jul-17 10:00	1.2	226.4	33.4	6.1	96.9	180.7	0.0	96.4
24-Jul-17 11:00	1.4	229.6	25.7	6.6	95.9	284.0	0.0	96.4

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
	Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
24-Jul-17 12:00	1.5	251.5	24.0	6.8	96.8	275.1	0.0	96.4
24-Jul-17 13:00	1.8	234.6	18.0	7.3	96.5	320.1	0.0	96.2
24-Jul-17 14:00	1.6	257.4	48.6	8.4	92.5	463.9	0.0	96.3
24-Jul-17 15:00	2.4	272.9	25.2	10.1	86.0	737.0	0.0	96.3
24-Jul-17 16:00	2.9	262.8	19.6	11.4	81.2	711.7	0.0	96.2
24-Jul-17 17:00	3.2	255.3	20.1	12.3	78.2	588.3	0.0	96.2
24-Jul-17 18:00	3.5	238.1	15.6	12.4	77.7	458.5	0.0	96.1
24-Jul-17 19:00	3.1	236.1	15.2	12.3	78.4	216.1	0.0	96.2
24-Jul-17 20:00	2.8	233.8	13.5	11.5	82.4	102.5	0.0	96.1
24-Jul-17 21:00	3.6	215.4	8.6	10.2	87.7	48.2	0.0	96.2
24-Jul-17 22:00	3.4	214.9	9.1	9.0	92.9	1.8	0.0	96.2
24-Jul-17 23:00	3.8	209.2	10.4	8.4	95.7	0.0	0.0	96.2
25-Jul-17 0:00	3.5	206.1	11.1	8.0	97.4	0.0	0.0	96.2
25-Jul-17 1:00	3.1	203.8	11.5	7.8	97.7	0.0	0.0	96.3
25-Jul-17 2:00	3.1	210.9	11.1	7.5	98.0	0.0	0.0	96.3
25-Jul-17 3:00	3.1	212.8	9.5	7.4	97.5	0.0	0.0	96.3
25-Jul-17 4:00	2.6	208.3	9.0	7.3	98.0	0.0	0.0	96.3
25-Jul-17 5:00	2.6	203.6	9.5	7.2	97.9	6.6	0.0	96.3
25-Jul-17 6:00	2.5	198.3	7.1	7.3	97.0	78.3	0.0	96.3
25-Jul-17 7:00	2.7	191.7	8.5	8.0	92.6	212.6	0.0	96.3
25-Jul-17 8:00	2.9	196.9	11.2	8.3	89.7	271.5	0.0	96.4
25-Jul-17 9:00	1.8	202.1	15.8	8.7	89.1	339.2	0.0	96.3
25-Jul-17 10:00	1.4	206.8	20.4	9.5	86.4	461.3	0.0	96.5
25-Jul-17 11:00	2.9	227.7	12.8	9.8	85.8	614.5	0.0	96.4
25-Jul-17 12:00	3.4	231.1	14.9	11.1	76.7	743.7	0.0	96.2
25-Jul-17 13:00	3.9	224.9	9.6	11.1	77.9	371.8	0.0	96.2
25-Jul-17 14:00	3.1	227.2	13.8	11.2	79.4	345.6	0.0	96.2
25-Jul-17 15:00	3.7	231.1	13.3	11.4	80.4	392.4	0.0	96.2
25-Jul-17 16:00	3.4	216.7	10.3	11.4	78.2	274.7	0.0	95.9
25-Jul-17 17:00	-	-	-	-	-	-	0.0	-
25-Jul-17 18:00	4.8	183.8	11.4	10.6	83.8	81.4	0.0	96.1
25-Jul-17 19:00	2.5	193.8	12.8	9.3	94.2	55.4	0.0	97.1
25-Jul-17 20:00	1.9	185.7	24.2	9.6	92.0	29.5	0.0	97.2
25-Jul-17 21:00	2.8	139.4	31.8	9.5	91.2	6.3	0.0	97.2
25-Jul-17 22:00	1.4	54.4	23.8	9.6	91.9	0.1	0.0	97.3
25-Jul-17 23:00	1.5	132.6	20.5	9.6	92.2	0.0	0.0	98.1
26-Jul-17 0:00	2.1	50.6	33.4	9.3	94.8	0.0	0.0	99.1
26-Jul-17 1:00	1.2	28.8	15.9	9.5	92.7	0.0	0.0	99.1
26-Jul-17 2:00	1.1	102.3	46.7	9.4	94.0	0.0	0.0	100.1
26-Jul-17 3:00	0.7	176.8	52.0	9.3	95.3	0.0	0.0	100.2
26-Jul-17 4:00	1.0	158.6	21.0	9.3	96.1	0.0	0.0	100.3
26-Jul-17 5:00	1.9	157.6	21.1	9.2	96.1	0.7	0.0	101.4
26-Jul-17 6:00	1.9	179.0	11.2	9.0	97.3	15.2	0.0	101.6
26-Jul-17 7:00	2.3	198.9	12.6	8.9	96.5	37.6	0.0	101.6
26-Jul-17 8:00	4.5	191.4	11.6	8.6	97.2	138.3	0.0	101.8
26-Jul-17 9:00	4.9	192.7	14.1	8.9	94.6	244.9	0.0	101.7
26-Jul-17 10:00	3.8	205.3	11.8	8.7	96.1	248.4	0.0	101.8
26-Jul-17 11:00	4.7	202.9	11.7	8.6	96.0	232.9	0.0	101.9
26-Jul-17 12:00	5.2	213.1	9.9	8.5	96.4	219.7	0.0	102.0
26-Jul-17 13:00	4.8	217.9	10.9	7.9	97.3	222.9	0.0	102.1
26-Jul-17 14:00	3.8	218.3	11.1	8.3	94.1	384.8	0.0	102.4
26-Jul-17 15:00	3.7	227.4	11.4	9.1	93.5	338.9	0.0	102.3
26-Jul-17 16:00	4.6	231.2	18.4	8.1	97.4	84.3	0.0	105.5
26-Jul-17 17:00	4.3	224.8	16.5	7.7	98.0	84.1	0.0	108.3

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
26-Jul-17 18:00	4.5	222.2	11.7	7.7	98.2	45.8	0.0	112.2
26-Jul-17 19:00	3.8	205.4	11.7	7.8	98.3	43.3	0.0	112.5
26-Jul-17 20:00	4.2	205.8	10.8	7.7	98.4	27.8	0.0	112.5
26-Jul-17 21:00	4.4	199.6	10.6	7.3	98.4	8.8	0.0	112.5
26-Jul-17 22:00	4.2	199.5	11.1	7.1	98.1	0.5	0.0	112.5
26-Jul-17 23:00	5.8	183.7	6.8	7.4	91.9	0.0	0.0	112.8
27-Jul-17 0:00	3.9	183.3	11.6	7.3	90.8	0.0	0.0	112.9
27-Jul-17 1:00	3.9	163.8	8.9	7.4	90.4	0.0	0.0	113.0
27-Jul-17 2:00	3.1	157.2	9.2	7.0	94.8	0.0	0.0	113.8
27-Jul-17 3:00	1.6	148.6	44.2	7.0	95.9	0.0	0.0	114.4
27-Jul-17 4:00	1.7	177.2	44.1	7.0	95.2	0.0	0.0	115.6
27-Jul-17 5:00	2.6	203.5	8.0	6.7	97.9	1.3	0.0	116.0
27-Jul-17 6:00	3.5	195.9	7.7	6.7	98.2	14.5	0.0	116.3
27-Jul-17 7:00	3.8	202.6	7.9	6.8	98.3	44.5	0.0	116.7
27-Jul-17 8:00	3.6	203.5	8.4	6.9	98.3	62.1	0.0	116.8
27-Jul-17 9:00	3.7	205.4	9.4	7.0	98.3	107.2	0.0	117.3
27-Jul-17 10:00	4.1	202.1	8.4	7.2	98.2	162.6	0.0	117.8
27-Jul-17 11:00	3.8	207.2	7.6	7.3	98.2	185.0	0.0	118.0
27-Jul-17 12:00	3.8	217.9	8.0	7.5	98.1	210.2	0.0	118.9
27-Jul-17 13:00	4.8	222.2	8.7	7.7	98.2	174.6	0.0	121.7
27-Jul-17 14:00	4.5	208.9	11.4	8.1	98.1	257.7	0.0	122.2
27-Jul-17 15:00	4.7	215.9	10.0	8.0	98.1	245.7	0.0	122.5
27-Jul-17 16:00	5.8	221.6	9.9	8.3	98.1	181.8	0.0	122.5
27-Jul-17 17:00	5.8	223.4	8.5	8.0	98.2	154.4	0.0	122.4
27-Jul-17 18:00	6.0	234.5	11.7	7.7	98.3	72.1	0.0	123.9
27-Jul-17 19:00	4.1	220.3	11.4	7.5	98.5	38.9	0.0	123.9
27-Jul-17 20:00	4.7	226.2	11.4	7.2	98.5	27.1	0.0	124.2
27-Jul-17 21:00	4.9	225.6	9.3	7.0	98.6	6.4	0.0	124.8
27-Jul-17 22:00	5.4	224.2	7.5	6.9	98.7	0.4	0.0	124.9
27-Jul-17 23:00	4.3	220.2	9.4	6.7	98.7	0.0	0.0	125.3
28-Jul-17 0:00	4.1	218.6	8.0	6.5	98.7	0.0	0.0	125.3
28-Jul-17 1:00	3.2	211.6	7.9	6.4	98.8	0.0	0.0	125.3
28-Jul-17 2:00	3.5	215.9	7.8	6.3	98.8	0.0	0.0	125.3
28-Jul-17 3:00	3.9	217.3	6.9	6.2	98.8	0.0	0.0	125.4
28-Jul-17 4:00	3.5	211.1	8.8	6.2	98.8	0.0	0.0	125.5
28-Jul-17 5:00	3.5	203.1	9.7	6.2	98.8	0.8	0.0	125.6
28-Jul-17 6:00	3.0	205.7	7.5	6.1	98.8	16.5	0.0	125.6
28-Jul-17 7:00	2.8	213.7	8.1	6.1	98.8	43.6	0.0	125.6
28-Jul-17 8:00	3.0	199.5	7.1	6.2	98.7	100.5	0.0	125.6
28-Jul-17 9:00	3.2	202.5	8.4	6.3	98.6	137.5	0.0	125.6
28-Jul-17 10:00	3.1	210.4	9.5	6.6	98.4	227.1	0.0	125.7
28-Jul-17 11:00	3.0	222.9	9.0	7.0	98.0	345.0	0.0	125.6
28-Jul-17 12:00	3.1	225.0	8.1	6.9	97.7	259.0	0.0	125.6
28-Jul-17 13:00	3.3	222.9	9.4	7.5	96.6	488.5	0.0	125.6
28-Jul-17 14:00	3.5	224.1	10.6	8.1	94.0	504.1	0.0	125.6
28-Jul-17 15:00	3.3	230.4	16.0	8.6	89.0	422.7	0.0	125.5
28-Jul-17 16:00	2.7	232.6	14.2	9.0	87.2	434.5	0.0	125.6
28-Jul-17 17:00	2.3	237.6	29.2	10.0	84.9	541.6	0.0	125.6
28-Jul-17 18:00	1.9	276.8	43.8	10.7	84.9	437.9	0.0	125.6
28-Jul-17 19:00	2.8	224.9	29.4	9.5	87.4	147.6	0.0	125.6
28-Jul-17 20:00	2.7	207.9	21.7	9.2	84.3	73.4	0.0	125.5
28-Jul-17 21:00	0.4	138.8	16.9	9.3	81.1	33.2	0.0	125.6
28-Jul-17 22:00	0.9	95.5	20.9	9.1	81.5	0.8	0.0	125.5
28-Jul-17 23:00	0.5	220.8	32.0	9.3	74.8	0.0	0.0	125.5

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
	Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
29-Jul-17 0:00	1.7	59.5	10.5	9.2	77.2	0.0	0.0	125.5
29-Jul-17 1:00	0.9	58.5	15.7	9.3	74.4	0.0	0.0	125.5
29-Jul-17 2:00	1.0	46.2	23.6	9.1	75.8	0.0	0.0	125.4
29-Jul-17 3:00	1.0	101.7	39.6	9.0	76.5	0.0	0.0	125.5
29-Jul-17 4:00	1.1	217.8	23.6	8.5	81.7	0.0	0.0	125.5
29-Jul-17 5:00	0.6	87.8	25.4	8.3	83.2	0.5	0.0	125.6
29-Jul-17 6:00	1.1	200.6	26.6	8.0	85.1	8.4	0.0	126.3
29-Jul-17 7:00	1.6	5.8	30.5	7.8	87.5	23.3	0.0	127.2
29-Jul-17 8:00	1.1	14.1	33.5	8.0	89.8	69.8	0.0	127.6
29-Jul-17 9:00	1.0	158.6	40.8	8.7	87.3	155.7	0.0	128.2
29-Jul-17 10:00	1.9	287.9	49.2	9.0	91.6	293.1	0.0	128.6
29-Jul-17 11:00	2.7	229.8	49.3	10.0	83.8	438.7	0.0	128.8
29-Jul-17 12:00	5.4	190.2	17.4	9.5	88.9	395.9	0.0	129.4
29-Jul-17 13:00	7.0	191.5	15.0	9.7	83.8	602.8	0.0	129.5
29-Jul-17 14:00	6.9	184.2	11.4	8.6	89.1	305.5	0.0	129.9
29-Jul-17 15:00	6.8	177.0	15.1	9.4	73.8	288.6	0.0	130.0
29-Jul-17 16:00	7.4	184.1	10.2	9.3	74.0	239.8	0.0	129.9
29-Jul-17 17:00	6.7	173.4	11.8	8.4	76.3	112.5	0.0	130.3
29-Jul-17 18:00	6.8	180.4	10.1	8.7	74.1	211.8	0.0	130.4
29-Jul-17 19:00	5.0	183.7	15.0	8.5	72.6	97.1	0.0	130.2
29-Jul-17 20:00	7.1	177.2	8.6	7.7	75.0	25.8	0.0	130.2
29-Jul-17 21:00	5.5	185.1	10.1	6.7	84.0	7.8	0.0	130.3
29-Jul-17 22:00	4.8	170.3	15.1	6.3	85.2	0.1	0.0	130.3
29-Jul-17 23:00	6.0	179.4	9.2	6.0	85.7	0.0	0.0	130.3
30-Jul-17 0:00	5.1	175.6	12.6	5.9	87.4	0.0	0.0	130.4
30-Jul-17 1:00	4.3	152.1	19.4	6.0	87.1	0.0	0.0	130.5
30-Jul-17 2:00	3.8	146.2	23.7	5.8	85.5	0.0	0.0	130.6
30-Jul-17 3:00	4.4	147.3	17.6	5.7	84.8	0.0	0.0	130.7
30-Jul-17 4:00	3.6	119.9	29.2	5.5	87.8	0.0	0.0	130.9
30-Jul-17 5:00	2.2	82.3	33.1	5.5	89.7	0.5	0.0	131.1
30-Jul-17 6:00	2.7	101.6	34.1	5.5	89.1	12.5	0.0	131.3
30-Jul-17 7:00	3.1	141.9	30.5	5.6	88.8	40.0	0.0	131.5
30-Jul-17 8:00	2.0	96.6	54.0	5.7	88.7	64.7	0.0	131.7
30-Jul-17 9:00	1.6	78.7	66.9	5.9	89.4	139.6	0.0	131.8
30-Jul-17 10:00	3.7	151.1	35.4	6.0	87.8	227.1	0.0	131.8
30-Jul-17 11:00	5.2	182.4	9.7	5.8	92.1	255.0	0.0	132.0
30-Jul-17 12:00	4.7	184.4	13.3	6.1	92.6	296.7	0.0	132.2
30-Jul-17 13:00	5.8	186.5	10.0	6.3	94.2	341.8	0.0	132.2
30-Jul-17 14:00	4.9	186.7	12.8	6.7	95.0	349.7	0.0	132.3
30-Jul-17 15:00	4.1	187.6	17.2	6.9	97.0	252.0	0.0	132.6
30-Jul-17 16:00	5.0	184.6	13.0	7.0	96.4	225.6	0.0	133.0
30-Jul-17 17:00	5.9	187.7	10.3	7.0	97.4	205.0	0.0	133.3
30-Jul-17 18:00	5.9	190.9	9.5	7.0	97.5	177.5	0.0	133.6
30-Jul-17 19:00	4.8	210.1	12.0	6.8	98.0	91.8	0.0	133.7
30-Jul-17 20:00	4.0	212.8	12.7	6.6	98.2	26.7	0.0	133.6
30-Jul-17 21:00	3.3	204.2	10.5	6.4	98.4	8.3	0.0	133.7
30-Jul-17 22:00	3.6	197.4	9.3	6.2	98.3	0.2	0.0	133.7
30-Jul-17 23:00	3.4	203.4	9.7	6.1	98.1	0.0	0.0	133.7
31-Jul-17 0:00	3.1	206.6	8.6	6.1	97.5	0.0	0.0	133.7
31-Jul-17 1:00	3.1	205.5	6.5	6.1	96.7	0.0	0.0	133.7
31-Jul-17 2:00	2.6	207.6	9.1	6.1	97.7	0.0	0.0	133.8
31-Jul-17 3:00	2.8	214.9	10.6	6.0	98.3	0.0	0.0	133.8
31-Jul-17 4:00	2.1	206.3	8.5	6.0	98.3	0.0	0.0	133.8
31-Jul-17 5:00	2.0	207.1	9.5	6.2	96.5	0.9	0.0	133.8

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
31-Jul-17 6:00	0.7	315.0	11.3	6.4	93.7	15.0	0.0	133.8
31-Jul-17 7:00	1.9	23.4	6.7	6.8	92.9	76.6	0.0	134.0
31-Jul-17 8:00	2.1	356.7	14.3	7.5	91.2	292.8	0.0	134.1
31-Jul-17 9:00	1.5	311.6	24.2	7.0	96.7	213.6	0.0	133.4
31-Jul-17 10:00	0.9	119.6	38.7	7.5	92.0	251.5	0.0	133.7
31-Jul-17 11:00	1.5	78.4	52.3	9.3	85.4	666.7	0.0	134.0
31-Jul-17 12:00	1.6	289.0	24.1	9.4	88.9	643.1	0.0	133.8
31-Jul-17 13:00	1.8	297.9	21.0	10.4	84.9	624.8	0.0	133.7
31-Jul-17 14:00	2.1	287.6	30.6	11.8	73.7	887.0	0.0	133.9
31-Jul-17 15:00	2.7	279.9	25.1	12.8	68.3	823.0	0.0	133.7
31-Jul-17 16:00	2.8	292.4	21.8	13.3	63.8	721.9	0.0	133.7
31-Jul-17 17:00	3.1	296.1	24.0	13.7	60.7	597.2	0.0	133.6
31-Jul-17 18:00	2.9	306.4	20.3	13.7	59.1	453.9	0.0	133.4
31-Jul-17 19:00	2.3	306.4	21.2	13.6	58.9	286.0	0.0	133.4
31-Jul-17 20:00	1.9	325.8	13.7	13.1	63.1	105.6	0.0	133.3
31-Jul-17 21:00	2.2	359.7	7.7	11.6	70.5	32.3	0.0	133.0
31-Jul-17 22:00	1.6	29.8	12.4	11.1	74.9	0.5	0.0	132.8
31-Jul-17 23:00	1.5	59.1	13.3	10.6	74.3	0.0	0.0	132.6
01-Aug-17 0:00	1.8	54.2	14.3	10.3	75.9	0.0	0.0	133.1
01-Aug-17 1:00	2.1	69.0	5.8	10.3	75.3	0.0	0.0	133.1
01-Aug-17 2:00	1.6	51.6	6.0	10.5	73.7	0.0	0.0	133.0
01-Aug-17 3:00	1.4	39.1	8.4	10.2	73.7	0.0	0.0	132.9
01-Aug-17 4:00	1.3	42.6	14.6	10.2	71.8	0.0	0.0	132.9
01-Aug-17 5:00	1.3	55.4	12.1	10.0	71.3	9.0	0.0	132.8
01-Aug-17 6:00	1.2	221.2	49.6	10.0	76.3	53.1	0.0	133.0
01-Aug-17 7:00	1.4	207.2	15.2	10.1	75.7	139.3	0.0	133.4
01-Aug-17 8:00	0.8	48.9	45.9	11.4	69.1	266.4	0.0	134.4
01-Aug-17 9:00	1.0	277.5	32.7	11.9	67.6	479.7	0.0	134.2
01-Aug-17 10:00	1.3	232.9	38.9	12.5	67.1	603.8	0.0	134.0
01-Aug-17 11:00	1.4	254.1	21.6	13.2	64.8	573.1	0.0	133.7
01-Aug-17 12:00	1.4	272.3	24.6	14.1	63.2	724.5	0.0	133.7
01-Aug-17 13:00	1.8	264.1	25.4	14.8	63.6	820.0	0.0	133.6
01-Aug-17 14:00	2.0	269.9	28.6	15.8	55.7	805.0	0.0	133.5
01-Aug-17 15:00	2.8	264.3	32.0	16.3	52.5	783.3	0.0	133.5
01-Aug-17 16:00	3.2	288.4	19.4	16.8	47.9	683.5	0.0	133.5
01-Aug-17 17:00	3.3	296.7	18.4	16.8	49.5	504.6	0.0	133.5
01-Aug-17 18:00	3.1	318.5	13.9	16.2	51.1	321.2	0.0	133.5
01-Aug-17 19:00	2.1	355.1	12.5	15.6	51.7	152.8	0.0	133.4
01-Aug-17 20:00	1.6	17.6	9.6	15.1	55.1	82.9	0.0	133.3
01-Aug-17 21:00	1.6	38.8	15.1	14.4	56.3	15.6	0.0	133.1
01-Aug-17 22:00	1.7	49.3	11.7	13.9	58.5	0.4	0.0	133.4
01-Aug-17 23:00	1.4	53.1	6.1	13.7	60.8	0.0	0.0	133.2
02-Aug-17 0:00	0.9	257.4	26.1	13.3	62.6	0.0	0.0	133.0
02-Aug-17 1:00	0.2	226.3	6.3	13.0	63.5	0.0	0.0	132.9
02-Aug-17 2:00	0.9	201.1	25.4	12.9	62.8	0.0	0.0	132.9
02-Aug-17 3:00	1.2	197.7	9.9	12.7	62.8	0.0	0.0	132.9
02-Aug-17 4:00	0.4	169.1	6.7	12.3	62.8	0.0	0.0	132.7
02-Aug-17 5:00	0.0	223.1	0.9	12.2	64.0	3.4	0.0	132.7
02-Aug-17 6:00	0.6	297.1	37.3	12.4	62.5	33.0	0.0	132.9
02-Aug-17 7:00	0.4	8.3	42.4	12.4	59.9	100.8	0.0	133.4
02-Aug-17 8:00	0.8	252.8	57.8	13.4	62.1	310.2	0.0	133.9
02-Aug-17 9:00	1.1	220.8	19.7	13.7	58.9	462.2	0.0	133.5
02-Aug-17 10:00	1.4	223.2	12.4	13.8	56.2	607.4	0.0	133.6
02-Aug-17 11:00	1.8	227.9	17.9	14.4	58.9	714.3	0.0	133.7



Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
02-Aug-17 12:00	2.2	240.5	22.0	15.1	61.3	789.2	0.0	133.6
02-Aug-17 13:00	2.7	262.0	24.4	15.9	58.5	873.0	0.0	133.5
02-Aug-17 14:00	3.1	271.4	18.7	16.4	57.6	844.0	0.0	133.4
02-Aug-17 15:00	3.0	279.5	20.5	17.2	55.4	776.4	0.0	133.5
02-Aug-17 16:00	3.8	293.9	18.7	17.4	55.4	695.7	0.0	133.5
02-Aug-17 17:00	3.9	306.6	21.8	17.2	57.4	551.5	0.0	133.5
02-Aug-17 18:00	4.2	313.4	17.8	16.6	60.6	393.0	0.0	133.4
02-Aug-17 19:00	3.0	332.8	20.5	16.1	61.5	252.3	0.0	133.3
02-Aug-17 20:00	1.7	0.9	32.1	15.4	63.0	110.8	0.0	133.1
02-Aug-17 21:00	1.2	356.8	33.6	14.3	65.7	27.4	0.0	132.9
02-Aug-17 22:00	1.8	216.5	30.3	13.9	67.8	0.7	0.0	133.4
02-Aug-17 23:00	2.0	179.7	19.4	13.1	70.8	0.0	0.0	133.3
03-Aug-17 0:00	2.5	188.3	10.7	12.7	72.1	0.0	0.0	133.4
03-Aug-17 1:00	2.3	204.7	9.4	12.2	74.2	0.0	0.0	133.5
03-Aug-17 2:00	2.7	197.4	10.2	11.9	75.6	0.0	0.0	133.5
03-Aug-17 3:00	2.0	190.7	18.7	11.5	76.7	0.0	0.0	133.3
03-Aug-17 4:00	1.9	208.0	14.2	11.4	77.4	0.0	0.0	133.4
03-Aug-17 5:00	1.6	42.7	33.2	10.7	80.0	1.6	0.0	133.4
03-Aug-17 6:00	2.1	47.6	9.3	10.5	80.1	12.9	0.0	133.5
03-Aug-17 7:00	2.5	26.9	12.1	10.8	81.1	151.7	0.0	133.6
03-Aug-17 8:00	2.6	13.8	11.1	11.8	76.3	308.6	0.0	133.7
03-Aug-17 9:00	3.1	2.5	13.5	12.1	75.9	471.7	0.0	133.7
03-Aug-17 10:00	2.7	342.6	14.5	12.7	74.5	609.6	0.0	133.7
03-Aug-17 11:00	1.8	291.6	21.1	13.2	72.3	717.9	0.0	133.8
03-Aug-17 12:00	1.9	291.1	22.0	13.9	69.4	793.3	0.0	133.7
03-Aug-17 13:00	2.2	291.8	19.7	14.7	67.6	867.0	0.0	133.6
03-Aug-17 14:00	2.8	300.1	18.5	15.6	62.3	887.0	0.0	133.5
03-Aug-17 15:00	3.3	308.0	18.6	16.6	56.1	780.7	0.0	133.4
03-Aug-17 16:00	3.2	299.6	20.1	17.1	54.5	690.7	0.0	133.3
03-Aug-17 17:00	3.8	313.5	20.2	17.3	58.9	566.1	0.0	133.2
03-Aug-17 18:00	3.6	314.4	19.0	17.3	58.4	432.1	0.0	133.4
03-Aug-17 19:00	3.2	335.1	15.5	16.8	59.6	278.0	0.0	133.3
03-Aug-17 20:00	3.4	342.2	9.1	15.8	62.0	103.8	0.0	133.2
03-Aug-17 21:00	2.7	13.2	14.4	14.7	67.2	28.1	0.0	133.2
03-Aug-17 22:00	1.9	44.3	8.7	14.5	66.1	0.4	0.0	133.2
03-Aug-17 23:00	1.7	32.1	6.2	13.8	72.1	0.0	0.0	132.9
04-Aug-17 0:00	1.6	60.8	5.9	13.8	68.0	0.0	0.0	132.9
04-Aug-17 1:00	1.6	65.5	12.2	13.7	65.3	0.0	0.0	132.8
04-Aug-17 2:00	1.9	49.0	6.0	13.1	69.9	0.0	0.0	133.0
04-Aug-17 3:00	2.0	27.4	2.4	12.8	77.4	0.0	0.0	133.0
04-Aug-17 4:00	2.2	25.8	4.6	12.0	83.0	0.0	0.0	132.9
04-Aug-17 5:00	1.9	41.1	4.3	11.8	82.9	1.7	0.0	132.7
04-Aug-17 6:00	2.0	32.2	5.8	11.5	84.9	11.4	0.0	132.7
04-Aug-17 7:00	1.7	22.6	9.0	11.9	84.2	145.3	0.0	133.5
04-Aug-17 8:00	0.9	146.7	37.7	13.5	75.7	308.7	0.0	134.2
04-Aug-17 9:00	1.5	171.9	17.0	13.9	71.6	471.5	0.0	133.6
04-Aug-17 10:00	1.4	221.0	35.2	15.0	67.8	609.1	0.0	133.6
04-Aug-17 11:00	1.4	242.8	22.8	15.7	65.5	717.6	0.0	133.7
04-Aug-17 12:00	1.6	247.3	21.2	16.6	66.8	792.4	0.0	133.5
04-Aug-17 13:00	1.9	229.7	23.3	17.3	65.1	865.0	0.0	133.4
04-Aug-17 14:00	1.7	264.8	27.8	18.6	59.7	881.0	0.0	133.6
04-Aug-17 15:00	1.9	294.2	25.8	19.7	49.6	775.7	0.0	133.5
04-Aug-17 16:00	2.6	297.5	20.5	20.2	49.2	688.8	0.0	133.5
04-Aug-17 17:00	2.6	299.5	22.7	20.7	46.8	565.1	0.0	133.4

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
04-Aug-17 18:00	2.5	298.6	16.5	20.7	42.7	430.6	0.0	133.4
04-Aug-17 19:00	2.0	329.0	17.8	20.2	43.7	273.5	0.0	133.4
04-Aug-17 20:00	1.5	10.2	14.9	19.3	44.6	97.3	0.0	133.4
04-Aug-17 21:00	2.4	39.5	11.0	18.2	48.3	24.7	0.0	133.4
04-Aug-17 22:00	2.0	52.2	8.2	17.8	48.2	0.3	0.0	133.4
04-Aug-17 23:00	2.4	49.4	7.0	17.3	50.5	0.0	0.0	133.4
05-Aug-17 0:00	2.3	41.5	9.6	16.7	51.8	0.0	0.0	133.4
05-Aug-17 1:00	1.6	46.1	5.8	16.4	52.5	0.0	0.0	133.3
05-Aug-17 2:00	1.2	80.0	41.9	16.4	51.8	0.0	0.0	133.2
05-Aug-17 3:00	0.5	200.8	14.7	16.0	55.5	0.0	0.0	133.0
05-Aug-17 4:00	0.8	174.8	17.4	16.0	54.5	0.0	0.0	133.0
05-Aug-17 5:00	1.1	175.7	14.9	15.7	54.5	1.4	0.0	132.9
05-Aug-17 6:00	0.8	171.6	33.4	15.8	50.7	11.7	0.0	132.9
05-Aug-17 7:00	0.6	15.1	30.2	16.6	49.3	136.2	0.0	133.7
05-Aug-17 8:00	0.6	91.1	43.7	17.7	50.3	301.5	0.0	134.1
05-Aug-17 9:00	1.2	207.9	20.2	17.3	50.2	462.2	0.0	133.7
05-Aug-17 10:00	1.2	210.6	22.4	18.1	49.3	597.3	0.0	133.7
05-Aug-17 11:00	1.4	232.4	15.3	18.5	49.1	699.2	0.0	133.6
05-Aug-17 12:00	1.4	243.7	23.3	19.5	52.8	775.9	0.0	133.7
05-Aug-17 13:00	1.7	256.6	19.2	20.5	53.8	846.0	0.0	133.6
05-Aug-17 14:00	1.8	243.4	34.6	21.4	50.0	864.0	0.0	133.5
05-Aug-17 15:00	1.9	223.9	63.5	22.6	42.2	765.1	0.0	133.4
05-Aug-17 16:00	2.1	261.6	39.5	23.0	39.4	660.2	0.0	133.4
05-Aug-17 17:00	2.9	270.6	21.2	22.9	38.9	557.7	0.0	133.4
05-Aug-17 18:00	2.4	276.2	19.1	22.6	39.6	367.6	0.0	133.3
05-Aug-17 19:00	1.7	329.6	17.4	22.1	39.9	269.5	0.0	133.3
05-Aug-17 20:00	2.3	33.8	10.8	20.9	41.9	93.0	0.0	133.4
05-Aug-17 21:00	3.1	58.7	9.1	19.3	47.7	23.0	0.0	133.4
05-Aug-17 22:00	2.5	73.9	8.1	19.1	49.6	0.1	0.0	133.4
05-Aug-17 23:00	1.2	164.7	22.8	19.0	48.4	0.0	0.0	133.5
06-Aug-17 0:00	1.6	217.3	7.5	18.5	47.5	0.0	0.0	133.5
06-Aug-17 1:00	0.9	254.7	20.4	17.9	51.1	0.0	0.0	133.5
06-Aug-17 2:00	0.5	158.1	43.0	17.6	52.5	0.0	0.0	133.4
06-Aug-17 3:00	1.0	193.9	14.8	17.2	54.9	0.0	0.0	133.4
06-Aug-17 4:00	1.0	88.9	22.1	17.0	52.4	0.0	0.0	133.4
06-Aug-17 5:00	1.0	3.0	26.2	16.9	51.1	0.7	0.0	133.4
06-Aug-17 6:00	0.6	306.6	14.2	16.5	56.0	9.2	0.0	133.3
06-Aug-17 7:00	0.2	66.7	22.2	17.2	55.6	124.0	0.0	133.9
06-Aug-17 8:00	0.3	180.4	34.5	18.0	54.5	294.2	0.0	134.1
06-Aug-17 9:00	0.8	227.7	21.8	18.0	53.4	454.4	0.0	133.7
06-Aug-17 10:00	1.3	242.4	13.8	18.1	50.6	589.8	0.0	133.6
06-Aug-17 11:00	1.6	225.8	11.4	18.0	53.2	694.4	0.0	133.5
06-Aug-17 12:00	1.8	222.8	14.4	18.5	57.6	767.1	0.0	133.5
06-Aug-17 13:00	2.1	234.7	24.8	19.6	53.8	841.0	0.0	133.6
06-Aug-17 14:00	2.5	245.3	23.6	20.0	49.2	847.0	0.0	133.5
06-Aug-17 15:00	2.6	281.9	25.9	20.7	47.1	755.7	0.0	133.5
06-Aug-17 16:00	3.0	294.9	20.3	21.0	46.4	658.8	0.0	133.5
06-Aug-17 17:00	2.8	298.6	18.3	21.2	46.8	536.6	0.0	133.4
06-Aug-17 18:00	2.7	306.3	14.8	20.9	49.1	400.6	0.0	133.4
06-Aug-17 19:00	3.3	340.1	9.2	19.8	54.1	247.7	0.0	133.4
06-Aug-17 20:00	2.2	2.7	47.4	18.9	59.7	95.8	0.0	133.3
06-Aug-17 21:00	2.5	193.8	18.6	18.0	65.4	16.8	0.0	133.4
06-Aug-17 22:00	3.2	189.1	6.7	17.0	70.7	0.2	0.0	133.4
06-Aug-17 23:00	2.9	180.1	7.1	16.3	74.2	0.0	0.0	133.5

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
07-Aug-17 0:00	2.1	199.3	9.5	15.7	77.1	0.0	0.0	133.5
07-Aug-17 1:00	1.8	199.6	5.9	15.2	78.8	0.0	0.0	133.3
07-Aug-17 2:00	0.7	237.5	8.6	15.1	78.2	0.0	0.0	133.2
07-Aug-17 3:00	0.6	235.8	10.6	14.9	78.7	0.0	0.0	133.3
07-Aug-17 4:00	1.2	178.8	10.8	14.4	77.0	0.0	0.0	133.4
07-Aug-17 5:00	1.6	203.8	3.5	14.1	79.1	3.0	0.0	133.4
07-Aug-17 6:00	1.2	202.5	5.5	13.9	82.0	30.1	0.0	133.4
07-Aug-17 7:00	0.6	208.7	6.7	14.1	75.9	128.0	0.0	133.7
07-Aug-17 8:00	1.1	220.9	12.2	14.1	76.8	235.9	0.0	133.6
07-Aug-17 9:00	1.5	213.1	8.8	14.3	75.4	397.0	0.0	133.5
07-Aug-17 10:00	1.9	216.8	9.3	14.4	80.8	462.7	0.0	133.5
07-Aug-17 11:00	1.7	239.9	16.7	15.4	79.5	594.0	0.0	133.5
07-Aug-17 12:00	1.9	236.3	15.2	15.9	77.8	656.9	0.0	133.5
07-Aug-17 13:00	2.1	230.1	9.9	15.7	78.7	462.7	0.0	133.5
07-Aug-17 14:00	2.5	247.0	19.0	16.8	76.1	836.0	0.0	133.5
07-Aug-17 15:00	2.9	246.6	17.6	17.1	72.5	621.9	0.0	133.4
07-Aug-17 16:00	2.7	260.4	25.0	17.4	73.5	586.2	0.0	133.5
07-Aug-17 17:00	3.1	309.4	22.9	17.5	66.9	513.0	0.0	133.4
07-Aug-17 18:00	2.6	335.5	20.4	17.5	64.2	433.7	0.0	133.4
07-Aug-17 19:00	2.8	246.6	33.5	17.2	67.4	289.4	0.0	133.3
07-Aug-17 20:00	3.7	229.1	15.9	16.0	72.1	117.5	0.0	133.4
07-Aug-17 21:00	2.8	229.1	15.2	14.6	77.6	12.7	0.0	133.5
07-Aug-17 22:00	3.2	215.9	9.4	13.5	81.9	0.1	0.0	133.5
07-Aug-17 23:00	2.5	219.7	13.1	12.9	83.1	0.0	0.0	133.5
08-Aug-17 0:00	2.5	203.8	9.3	12.5	84.3	0.0	0.0	133.6
08-Aug-17 1:00	2.5	206.6	9.8	12.2	85.3	0.0	0.0	133.6
08-Aug-17 2:00	2.2	205.9	7.2	11.4	87.3	0.0	0.0	133.4
08-Aug-17 3:00	2.1	228.3	7.5	10.9	88.2	0.0	0.0	133.3
08-Aug-17 4:00	1.0	208.5	30.1	11.1	87.4	0.0	0.0	133.3
08-Aug-17 5:00	0.8	200.1	29.9	11.4	80.8	1.3	0.0	133.3
08-Aug-17 6:00	0.9	280.6	24.6	10.6	87.0	13.6	0.0	133.4
08-Aug-17 7:00	0.5	3.3	34.0	11.3	79.4	107.3	0.0	134.0
08-Aug-17 8:00	0.6	127.7	37.7	12.7	73.3	293.1	0.0	133.6
08-Aug-17 9:00	1.1	31.4	31.9	13.3	68.7	447.8	0.0	133.6
08-Aug-17 10:00	1.3	262.1	22.9	13.2	70.7	592.5	0.0	133.6
08-Aug-17 11:00	1.6	239.3	17.0	13.7	73.5	652.0	0.0	133.6
08-Aug-17 12:00	1.4	270.8	26.1	15.0	65.9	763.9	0.0	133.7
08-Aug-17 13:00	1.7	260.9	22.2	15.7	66.4	847.0	0.0	133.6
08-Aug-17 14:00	1.9	283.0	23.3	16.7	53.4	856.0	0.0	133.5
08-Aug-17 15:00	2.3	289.1	22.2	17.4	50.1	756.5	0.0	133.5
08-Aug-17 16:00	2.8	275.8	23.4	18.0	47.6	669.0	0.0	133.4
08-Aug-17 17:00	2.7	278.1	19.7	18.4	50.1	540.2	0.0	133.4
08-Aug-17 18:00	2.5	303.1	15.2	18.1	51.6	369.1	0.0	133.4
08-Aug-17 19:00	1.7	318.2	16.2	18.0	51.7	249.4	0.0	133.4
08-Aug-17 20:00	2.1	356.4	8.2	16.4	58.9	87.1	0.0	133.4
08-Aug-17 21:00	2.3	356.0	10.5	15.8	60.1	19.6	0.0	133.5
08-Aug-17 22:00	1.9	40.6	5.1	15.3	63.8	0.1	0.0	133.5
08-Aug-17 23:00	1.7	55.6	6.4	15.2	61.8	0.0	0.0	133.5
09-Aug-17 0:00	1.2	61.4	7.7	15.1	62.2	0.0	0.0	133.5
09-Aug-17 1:00	1.2	58.3	12.1	14.9	61.5	0.0	0.0	133.5
09-Aug-17 2:00	1.5	29.8	6.3	14.4	65.2	0.0	0.0	133.5
09-Aug-17 3:00	1.0	34.4	20.3	14.2	66.3	0.0	0.0	133.5
09-Aug-17 4:00	1.0	18.9	13.1	14.0	65.8	0.0	0.0	133.5
09-Aug-17 5:00	0.5	32.0	23.9	13.8	67.2	0.8	0.0	133.5

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
	Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
09-Aug-17 6:00	1.7	177.8	6.6	13.4	68.8	11.1	0.0	133.6
09-Aug-17 7:00	1.9	186.2	7.9	13.8	61.1	93.8	0.0	133.5
09-Aug-17 8:00	0.5	265.4	25.1	15.5	54.6	288.1	0.0	133.6
09-Aug-17 9:00	0.7	277.7	52.8	16.3	53.4	450.3	0.0	133.6
09-Aug-17 10:00	1.2	231.8	13.5	16.9	51.8	586.2	0.0	133.6
09-Aug-17 11:00	1.5	253.5	14.4	17.2	52.9	693.8	0.0	133.6
09-Aug-17 12:00	1.7	224.3	10.9	18.1	51.5	769.1	0.0	133.6
09-Aug-17 13:00	1.9	233.5	16.0	19.0	54.1	841.0	0.0	133.5
09-Aug-17 14:00	2.2	227.5	18.2	19.9	50.7	858.0	0.0	133.5
09-Aug-17 15:00	2.2	245.0	28.2	20.6	45.5	755.6	0.0	133.4
09-Aug-17 16:00	2.7	249.6	24.0	21.2	42.2	665.0	0.0	133.4
09-Aug-17 17:00	2.6	255.1	19.7	21.6	42.1	540.0	0.0	133.3
09-Aug-17 18:00	2.5	303.0	15.2	21.4	40.8	404.1	0.0	133.3
09-Aug-17 19:00	2.2	330.3	12.1	20.7	41.7	250.0	0.0	133.3
09-Aug-17 20:00	2.4	335.4	11.2	19.8	46.3	99.0	0.0	133.4
09-Aug-17 21:00	2.0	36.4	9.2	18.6	51.0	13.6	0.0	133.4
09-Aug-17 22:00	1.5	163.0	36.7	18.0	51.9	0.0	0.0	133.4
09-Aug-17 23:00	1.6	202.8	8.1	17.4	54.8	0.0	0.0	133.5
10-Aug-17 0:00	1.6	212.4	8.3	17.1	54.8	0.0	0.0	133.5
10-Aug-17 1:00	0.8	206.4	16.9	16.8	52.4	0.0	0.0	133.4
10-Aug-17 2:00	1.0	221.4	11.1	16.5	53.4	0.0	0.0	133.5
10-Aug-17 3:00	1.0	191.7	15.8	16.1	55.0	0.0	0.0	133.5
10-Aug-17 4:00	0.8	235.2	11.2	15.9	57.8	0.0	0.0	133.4
10-Aug-17 5:00	0.4	286.2	6.4	15.6	64.2	0.7	0.0	133.5
10-Aug-17 6:00	1.0	24.0	22.8	15.4	61.5	13.4	0.0	133.5
10-Aug-17 7:00	0.6	30.8	14.5	15.5	57.7	84.2	0.0	133.5
10-Aug-17 8:00	0.5	214.0	23.5	16.6	58.6	275.6	0.0	133.5
10-Aug-17 9:00	1.0	167.4	30.5	17.5	56.1	437.2	0.0	133.5
10-Aug-17 10:00	1.5	190.9	19.5	18.0	53.2	578.1	0.0	133.5
10-Aug-17 11:00	1.6	222.6	9.9	17.7	55.1	672.3	0.0	133.6
10-Aug-17 12:00	1.9	228.9	13.3	18.2	58.7	766.2	0.0	133.5
10-Aug-17 13:00	3.0	214.2	12.7	18.9	56.1	834.0	0.0	133.5
10-Aug-17 14:00	3.6	233.6	17.9	19.5	56.5	812.0	0.0	133.5
10-Aug-17 15:00	3.5	234.0	17.7	20.1	55.4	721.3	0.0	133.4
10-Aug-17 16:00	3.7	246.4	16.2	20.4	53.5	579.8	0.0	133.4
10-Aug-17 17:00	2.9	247.5	23.4	20.6	54.4	519.3	0.0	133.3
10-Aug-17 18:00	2.3	254.0	20.4	20.3	55.8	321.1	0.0	133.3
10-Aug-17 19:00	2.4	232.5	16.8	19.4	59.0	161.6	0.0	133.3
10-Aug-17 20:00	2.1	200.2	10.6	18.3	61.1	53.4	0.0	133.4
10-Aug-17 21:00	2.6	192.7	8.0	17.4	65.8	7.5	0.0	133.4
10-Aug-17 22:00	2.9	208.4	8.6	16.7	70.0	0.0	0.0	133.5
10-Aug-17 23:00	2.3	219.1	9.4	16.1	72.4	0.0	0.0	133.5
11-Aug-17 0:00	2.0	239.7	10.4	15.5	75.7	0.0	0.0	133.5
11-Aug-17 1:00	0.9	216.4	29.2	15.2	76.0	0.0	0.0	133.3
11-Aug-17 2:00	0.8	216.5	10.5	15.1	77.3	0.0	0.0	133.3
11-Aug-17 3:00	1.2	214.8	7.5	14.7	78.6	0.0	0.0	133.3
11-Aug-17 4:00	0.6	145.5	27.1	14.8	76.9	0.0	0.0	133.4
11-Aug-17 5:00	0.5	160.8	21.2	14.4	76.4	1.0	0.0	133.4
11-Aug-17 6:00	1.2	181.8	20.6	13.9	79.9	27.8	0.0	133.5
11-Aug-17 7:00	1.8	198.2	6.7	13.8	79.6	98.0	0.0	133.5
11-Aug-17 8:00	2.4	201.3	9.3	14.7	76.7	288.3	0.0	133.5
11-Aug-17 9:00	2.4	200.2	10.5	15.2	75.8	404.8	0.0	133.5
11-Aug-17 10:00	2.6	208.0	11.5	15.4	75.0	577.5	0.0	133.6
11-Aug-17 11:00	3.3	220.2	8.5	15.6	73.3	686.4	0.0	133.6

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
	Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
11-Aug-17 12:00	4.1	219.7	11.4	16.3	68.1	755.7	0.0	133.6
11-Aug-17 13:00	4.1	222.7	14.5	17.3	60.0	807.0	0.0	133.5
11-Aug-17 14:00	4.7	229.6	20.7	18.0	56.3	761.8	0.0	133.5
11-Aug-17 15:00	4.6	246.3	17.4	17.8	57.4	619.9	0.0	133.4
11-Aug-17 16:00	6.9	245.4	11.8	17.2	55.3	432.8	0.0	133.4
11-Aug-17 17:00	5.4	209.6	17.0	16.8	49.5	267.2	0.0	133.4
11-Aug-17 18:00	4.9	207.7	12.8	16.3	50.3	200.3	0.0	133.4
11-Aug-17 19:00	5.3	196.9	12.7	15.4	51.4	113.0	0.0	133.5
11-Aug-17 20:00	4.8	210.0	10.8	14.3	54.5	41.1	0.0	133.5
11-Aug-17 21:00	4.5	199.3	9.5	13.9	53.2	3.9	0.0	133.5
11-Aug-17 22:00	4.5	199.6	8.4	13.2	55.4	0.0	0.0	133.5
11-Aug-17 23:00	3.5	212.9	12.4	12.8	64.1	0.0	0.0	133.6
12-Aug-17 0:00	2.9	186.1	17.3	12.7	59.5	0.0	0.0	133.6
12-Aug-17 1:00	1.6	81.9	31.1	13.1	57.4	0.0	0.0	133.6
12-Aug-17 2:00	3.3	165.5	19.8	12.9	57.6	0.0	0.0	133.5
12-Aug-17 3:00	4.1	205.5	10.0	12.0	61.9	0.0	0.0	133.5
12-Aug-17 4:00	3.6	198.1	18.1	12.5	59.3	0.0	0.0	133.5
12-Aug-17 5:00	3.0	179.4	19.1	12.0	59.7	0.3	0.0	133.6
12-Aug-17 6:00	3.9	184.6	12.9	11.7	59.4	14.8	0.0	133.5
12-Aug-17 7:00	4.7	177.9	14.1	11.8	60.7	68.2	0.0	133.5
12-Aug-17 8:00	4.9	153.8	10.4	12.0	61.5	153.9	0.0	133.5
12-Aug-17 9:00	3.5	167.9	14.6	12.6	60.5	269.4	0.0	133.5
12-Aug-17 10:00	2.8	75.7	29.7	13.4	57.2	393.1	0.0	133.5
12-Aug-17 11:00	2.1	172.0	52.4	13.7	54.8	272.3	0.0	133.5
12-Aug-17 12:00	3.7	182.8	12.8	13.8	53.4	224.7	0.0	133.4
12-Aug-17 13:00	3.3	190.0	25.1	14.2	49.2	258.3	0.0	133.4
12-Aug-17 14:00	2.6	300.5	37.2	13.8	53.3	197.3	0.0	133.4
12-Aug-17 15:00	1.5	292.6	43.5	13.7	53.4	153.2	0.0	133.4
12-Aug-17 16:00	3.1	100.3	41.4	12.9	59.3	121.4	0.0	133.6
12-Aug-17 17:00	2.1	287.8	35.1	11.7	67.7	92.4	0.0	133.8
12-Aug-17 18:00	1.5	205.2	14.5	11.0	72.3	58.8	0.0	134.2
12-Aug-17 19:00	1.9	256.7	24.2	10.2	77.9	27.8	0.0	134.8
12-Aug-17 20:00	1.1	241.9	40.0	10.1	77.3	9.2	0.0	135.2
12-Aug-17 21:00	1.5	214.8	30.6	10.1	76.6	1.0	0.0	135.3
12-Aug-17 22:00	1.7	204.1	37.1	10.2	75.3	0.0	0.0	135.4
12-Aug-17 23:00	1.2	285.7	48.1	10.0	77.4	0.0	0.0	135.4
13-Aug-17 0:00	1.5	346.8	60.1	9.7	80.1	0.0	0.0	135.4
13-Aug-17 1:00	5.6	174.9	16.1	9.4	80.8	0.0	0.0	136.6
13-Aug-17 2:00	8.7	169.5	10.8	8.5	80.2	0.0	0.0	137.7
13-Aug-17 3:00	5.4	192.9	12.8	7.9	88.6	0.0	0.0	137.9
13-Aug-17 4:00	7.7	180.4	7.3	8.1	83.1	0.0	0.0	137.9
13-Aug-17 5:00	7.0	176.6	8.1	8.1	79.6	0.0	0.0	137.9
13-Aug-17 6:00	6.8	176.4	8.8	7.9	79.2	15.4	0.0	137.9
13-Aug-17 7:00	6.1	179.4	8.2	7.4	83.3	49.3	0.0	137.9
13-Aug-17 8:00	4.6	171.4	8.0	7.3	87.0	93.6	0.0	138.0
13-Aug-17 9:00	3.9	155.0	41.5	7.7	86.3	162.5	0.0	138.1
13-Aug-17 10:00	5.1	182.9	13.8	8.0	86.9	430.4	0.0	137.9
13-Aug-17 11:00	5.4	190.8	9.8	7.8	88.6	337.9	0.0	138.1
13-Aug-17 12:00	3.4	216.6	20.9	8.4	87.0	402.8	0.0	138.0
13-Aug-17 13:00	4.6	192.4	14.6	8.5	87.9	444.3	0.0	137.9
13-Aug-17 14:00	4.6	215.4	17.1	8.3	94.5	274.8	0.0	138.0
13-Aug-17 15:00	4.3	210.9	16.1	8.0	95.5	177.6	0.0	138.0
13-Aug-17 16:00	6.0	190.3	11.4	7.8	91.0	191.5	0.0	138.4
13-Aug-17 17:00	6.3	191.5	7.8	8.0	90.8	163.2	0.0	138.4

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
13-Aug-17 18:00	5.6	194.2	12.4	7.5	94.2	125.7	0.0	139.0
13-Aug-17 19:00	4.1	206.8	9.7	7.2	97.0	46.5	0.0	139.1
13-Aug-17 20:00	3.8	207.8	10.0	7.1	97.3	8.8	0.0	139.1
13-Aug-17 21:00	3.8	213.1	12.2	7.0	97.5	1.3	0.0	139.2
13-Aug-17 22:00	4.6	202.5	11.2	7.0	97.6	0.0	0.0	139.8
13-Aug-17 23:00	6.5	228.0	8.1	7.0	97.7	0.0	0.0	140.5
14-Aug-17 0:00	7.7	232.8	7.9	6.6	97.8	0.0	0.0	141.1
14-Aug-17 1:00	8.1	233.0	7.1	6.1	97.9	0.0	0.0	142.2
14-Aug-17 2:00	6.4	218.6	9.2	5.7	98.0	0.0	0.0	143.2
14-Aug-17 3:00	4.9	213.9	10.0	5.5	98.0	0.0	0.0	143.3
14-Aug-17 4:00	5.3	215.4	9.9	5.3	98.0	0.0	0.0	143.6
14-Aug-17 5:00	5.6	211.2	9.6	5.2	98.1	0.0	0.0	143.9
14-Aug-17 6:00	5.4	199.9	10.9	5.0	98.1	1.7	0.0	144.5
14-Aug-17 7:00	4.7	202.2	11.7	4.9	98.1	29.9	0.0	145.0
14-Aug-17 8:00	4.8	205.2	9.4	5.0	98.0	134.3	0.0	145.1
14-Aug-17 9:00	5.7	221.0	9.1	5.1	97.9	119.8	0.0	145.8
14-Aug-17 10:00	6.1	226.1	7.6	5.2	98.0	111.3	0.0	147.0
14-Aug-17 11:00	7.4	226.4	7.7	5.2	98.0	116.3	0.0	147.9
14-Aug-17 12:00	6.8	228.3	8.5	5.4	97.9	111.5	0.0	148.7
14-Aug-17 13:00	5.4	218.8	13.0	5.7	97.9	208.4	0.0	149.0
14-Aug-17 14:00	5.3	227.0	10.0	5.8	97.9	96.9	0.0	150.1
14-Aug-17 15:00	5.3	227.5	10.2	5.8	98.0	71.1	0.0	150.4
14-Aug-17 16:00	5.7	229.5	11.7	5.8	98.0	61.8	0.0	150.8
14-Aug-17 17:00	4.8	223.3	9.8	6.0	98.0	78.5	0.0	151.4
14-Aug-17 18:00	4.4	217.6	12.0	6.0	98.0	81.4	0.0	152.7
14-Aug-17 19:00	5.1	223.3	10.6	6.2	98.1	40.1	0.0	152.8
14-Aug-17 20:00	5.1	212.2	9.2	6.1	98.1	29.4	0.0	152.9
14-Aug-17 21:00	4.5	200.5	12.3	6.1	98.2	3.3	0.0	153.0
14-Aug-17 22:00	4.1	215.1	9.3	5.9	98.2	0.0	0.0	153.0
14-Aug-17 23:00	3.3	214.3	7.6	5.8	98.2	0.0	0.0	153.2
15-Aug-17 0:00	3.6	198.7	9.5	5.7	98.2	0.0	0.0	153.4
15-Aug-17 1:00	4.0	198.0	8.5	5.5	98.3	0.0	0.0	153.8
15-Aug-17 2:00	4.0	195.7	10.6	5.3	98.3	0.0	0.0	154.0
15-Aug-17 3:00	3.5	206.3	7.7	5.2	98.3	0.0	0.0	154.1
15-Aug-17 4:00	3.3	208.1	9.5	5.1	98.3	0.0	0.0	154.1
15-Aug-17 5:00	3.9	202.0	8.4	5.1	98.3	0.1	0.0	154.1
15-Aug-17 6:00	3.0	202.1	11.8	5.2	98.3	8.6	0.0	154.3
15-Aug-17 7:00	2.1	180.8	16.4	5.3	98.3	37.8	0.0	154.3
15-Aug-17 8:00	2.5	146.7	21.0	5.5	98.1	45.0	0.0	154.5
15-Aug-17 9:00	2.7	144.2	34.3	5.8	97.6	87.2	0.0	155.3
15-Aug-17 10:00	5.2	174.4	13.7	6.0	96.0	123.4	0.0	156.2
15-Aug-17 11:00	3.8	176.8	36.6	6.3	94.4	159.4	0.0	156.6
15-Aug-17 12:00	4.4	189.1	12.7	6.4	95.9	190.4	0.0	156.7
15-Aug-17 13:00	3.2	190.4	16.4	6.6	95.1	189.7	0.0	156.8
15-Aug-17 14:00	4.0	191.2	16.0	6.6	96.2	188.3	0.0	157.4
15-Aug-17 15:00	3.1	196.5	24.2	6.4	97.3	132.6	0.0	157.9
15-Aug-17 16:00	3.2	217.9	22.5	6.4	97.5	142.2	0.0	158.6
15-Aug-17 17:00	3.4	211.4	18.0	6.6	97.7	128.8	0.0	158.9
15-Aug-17 18:00	3.5	202.8	16.8	6.6	97.9	71.1	0.0	159.8
15-Aug-17 19:00	2.6	211.0	27.5	6.6	98.0	28.5	0.0	161.4
15-Aug-17 20:00	2.4	185.1	40.2	6.7	98.0	7.2	0.0	162.8
15-Aug-17 21:00	1.7	224.5	33.5	6.7	98.0	0.2	0.0	166.0
15-Aug-17 22:00	2.1	212.1	15.0	6.7	98.1	0.0	0.0	168.3
15-Aug-17 23:00	3.5	193.9	20.2	6.8	98.1	0.0	0.0	169.7

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation					
16-Aug-17 0:00	4.3	197.1	11.1	6.8	98.2	0.0	0.0	170.7
16-Aug-17 1:00	4.1	198.5	8.9	7.0	98.2	0.0	0.0	171.3
16-Aug-17 2:00	4.3	203.4	9.7	7.2	98.2	0.0	0.0	171.6
16-Aug-17 3:00	5.2	210.1	10.0	7.4	98.3	0.0	0.0	171.7
16-Aug-17 4:00	5.1	216.1	9.9	7.5	98.3	0.0	0.0	172.3
16-Aug-17 5:00	5.6	223.1	11.5	7.6	98.3	0.0	0.0	174.4
16-Aug-17 6:00	5.5	222.7	8.9	7.5	98.3	0.6	0.0	175.9
16-Aug-17 7:00	5.6	220.4	8.2	7.5	98.3	6.5	0.0	177.6
16-Aug-17 8:00	6.4	226.8	7.4	7.3	98.3	29.1	0.0	179.4
16-Aug-17 9:00	5.4	216.6	9.8	7.4	98.3	32.0	0.0	180.2
16-Aug-17 10:00	5.2	209.8	9.7	7.4	98.3	48.6	0.0	180.8
16-Aug-17 11:00	4.8	211.3	8.8	7.4	98.3	92.5	0.0	181.0
16-Aug-17 12:00	5.4	220.3	8.7	7.4	98.2	79.8	0.0	181.3
16-Aug-17 13:00	5.5	219.0	11.1	7.5	98.2	86.5	0.0	181.6
16-Aug-17 14:00	4.8	207.8	11.1	7.6	98.2	115.5	0.0	182.3
16-Aug-17 15:00	5.0	218.0	9.3	7.7	98.2	100.7	0.0	182.8
16-Aug-17 16:00	5.0	213.2	9.6	7.7	98.2	80.2	0.0	182.8
16-Aug-17 17:00	5.8	211.3	10.3	7.7	98.2	69.5	0.0	182.8
16-Aug-17 18:00	5.7	200.9	8.9	7.7	98.3	46.0	0.0	183.0
16-Aug-17 19:00	6.1	204.4	9.3	7.7	98.3	45.8	0.0	183.0
16-Aug-17 20:00	5.5	204.0	8.8	7.5	98.3	16.8	0.0	183.0
16-Aug-17 21:00	4.9	214.6	8.1	7.5	98.4	0.6	0.0	183.1
16-Aug-17 22:00	4.7	215.6	9.6	7.6	98.4	0.0	0.0	183.4
16-Aug-17 23:00	4.8	215.6	9.3	7.6	98.4	0.0	0.0	184.2
17-Aug-17 0:00	5.0	224.6	8.8	7.6	98.5	0.0	0.0	185.5
17-Aug-17 1:00	5.1	224.9	8.5	7.5	98.5	0.0	0.0	185.9
17-Aug-17 2:00	4.8	223.1	12.8	7.4	98.5	0.0	0.0	186.0
17-Aug-17 3:00	5.6	228.9	9.2	7.2	98.5	0.0	0.0	186.2
17-Aug-17 4:00	6.1	215.8	11.8	7.1	98.5	0.0	0.0	186.6
17-Aug-17 5:00	5.0	220.1	13.9	6.7	98.6	0.0	0.0	186.7
17-Aug-17 6:00	5.7	217.5	12.7	6.2	98.6	3.3	0.0	186.7
17-Aug-17 7:00	4.8	213.6	13.7	6.0	98.6	15.0	0.0	187.5
17-Aug-17 8:00	3.8	198.8	15.1	6.1	98.6	54.1	0.0	188.3
17-Aug-17 9:00	3.4	201.7	11.9	6.3	98.5	69.5	0.0	189.6
17-Aug-17 10:00	3.7	197.7	12.0	6.3	98.5	94.2	0.0	190.9
17-Aug-17 11:00	3.6	206.6	12.1	6.3	98.5	91.7	0.0	192.4
17-Aug-17 12:00	4.2	197.0	13.4	6.2	98.5	82.2	0.0	194.6
17-Aug-17 13:00	4.6	192.6	11.4	6.0	98.5	105.5	0.0	196.9
17-Aug-17 14:00	3.6	171.3	21.3	5.6	98.5	91.2	0.0	199.5
17-Aug-17 15:00	1.6	330.3	35.4	5.8	98.4	83.1	0.0	201.2
17-Aug-17 16:00	1.6	326.1	21.7	5.7	98.5	70.5	0.0	203.4
17-Aug-17 17:00	2.1	302.6	18.0	5.3	98.5	65.5	0.0	206.3
17-Aug-17 18:00	2.1	1.8	20.8	5.0	98.6	28.2	0.0	209.3
17-Aug-17 19:00	2.1	27.9	23.6	4.9	98.6	12.3	0.0	211.0
17-Aug-17 20:00	4.2	206.2	29.8	5.6	98.6	1.8	0.0	212.9
17-Aug-17 21:00	6.9	213.6	14.9	5.7	98.6	0.0	0.0	217.7
17-Aug-17 22:00	5.8	214.5	14.4	5.6	98.4	0.0	0.0	220.3
17-Aug-17 23:00	5.4	209.2	11.8	5.3	98.5	0.0	0.0	222.4
18-Aug-17 0:00	7.6	196.0	11.2	4.5	97.3	0.0	0.0	224.2
18-Aug-17 1:00	8.1	189.0	12.0	4.8	85.9	0.0	0.0	224.6
18-Aug-17 2:00	7.9	188.0	11.1	4.8	81.9	0.0	0.0	224.6
18-Aug-17 3:00	5.6	207.2	11.1	3.7	97.3	0.0	0.0	225.8
18-Aug-17 4:00	6.2	201.6	9.8	3.6	98.3	0.0	0.0	226.0
18-Aug-17 5:00	5.7	209.6	10.2	3.4	98.4	0.0	0.0	226.8

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
	Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
18-Aug-17 6:00	5.6	206.2	11.2	3.1	98.5	2.5	0.0	227.8
18-Aug-17 7:00	5.7	205.0	10.0	3.1	98.5	14.0	0.0	228.2
18-Aug-17 8:00	5.5	212.8	9.3	3.4	98.5	36.2	0.0	228.5
18-Aug-17 9:00	5.9	219.1	7.2	3.6	98.5	42.5	0.0	228.9
18-Aug-17 10:00	6.4	219.1	8.2	3.8	98.5	83.1	0.0	229.3
18-Aug-17 11:00	5.6	213.5	9.6	3.9	98.4	112.3	0.0	229.4
18-Aug-17 12:00	5.8	222.5	9.1	3.9	98.5	74.0	0.0	229.8
18-Aug-17 13:00	5.4	217.0	9.0	4.0	98.5	102.5	0.0	229.9
18-Aug-17 14:00	5.6	220.7	9.7	4.1	98.5	89.5	0.0	230.1
18-Aug-17 15:00	5.3	222.9	11.6	4.3	98.5	74.3	0.0	230.2
18-Aug-17 16:00	3.9	217.8	11.1	4.3	98.5	78.0	0.0	230.2
18-Aug-17 17:00	4.7	223.8	9.7	4.6	98.5	107.9	0.0	230.8
18-Aug-17 18:00	3.9	236.3	14.3	4.9	98.4	74.7	0.0	231.4
18-Aug-17 19:00	4.8	221.7	8.9	4.6	98.5	30.1	0.0	232.3
18-Aug-17 20:00	3.1	227.3	11.8	4.4	98.6	8.8	0.0	232.4
18-Aug-17 21:00	4.0	218.3	10.7	4.4	98.6	0.3	0.0	232.7
18-Aug-17 22:00	3.6	212.2	11.2	4.4	98.7	0.0	0.0	233.3
18-Aug-17 23:00	3.5	212.8	7.9	4.4	98.7	0.0	0.0	233.4
19-Aug-17 0:00	3.6	206.7	10.6	4.1	98.7	0.0	0.0	233.4
19-Aug-17 1:00	3.0	191.1	11.9	3.9	98.7	0.0	0.0	233.4
19-Aug-17 2:00	3.7	209.6	10.5	3.8	98.7	0.0	0.0	233.4
19-Aug-17 3:00	4.0	214.5	9.3	3.8	98.7	0.0	0.0	233.5
19-Aug-17 4:00	3.7	193.3	12.2	3.6	98.6	0.0	0.0	233.6
19-Aug-17 5:00	3.6	195.6	13.8	3.6	98.3	0.0	0.0	233.6
19-Aug-17 6:00	4.0	198.3	9.5	3.6	97.3	2.3	0.0	233.6
19-Aug-17 7:00	3.6	206.3	12.1	3.5	97.7	10.9	0.0	233.8
19-Aug-17 8:00	3.9	201.0	8.0	3.5	97.8	37.2	0.0	233.8
19-Aug-17 9:00	4.0	211.6	7.8	3.7	97.6	77.4	0.0	234.1
19-Aug-17 10:00	3.6	214.1	9.6	3.9	98.0	124.9	0.0	234.7
19-Aug-17 11:00	3.9	220.3	6.9	4.0	98.1	180.2	0.0	235.5
19-Aug-17 12:00	4.2	219.9	11.7	4.2	98.2	153.7	0.0	235.8
19-Aug-17 13:00	4.3	217.3	11.7	4.2	98.3	98.5	0.0	236.7
19-Aug-17 14:00	5.1	221.9	8.6	4.2	98.3	130.4	0.0	237.2
19-Aug-17 15:00	4.6	209.8	11.0	4.2	98.3	177.5	0.0	238.0
19-Aug-17 16:00	4.4	199.5	11.4	4.2	98.3	142.5	0.0	239.1
19-Aug-17 17:00	3.2	209.6	14.7	4.0	98.2	113.5	0.0	239.6
19-Aug-17 18:00	3.0	199.4	11.8	4.1	97.9	41.5	0.0	240.2
19-Aug-17 19:00	2.8	195.9	8.8	4.3	97.4	37.7	0.0	240.9
19-Aug-17 20:00	2.6	202.2	10.1	4.5	97.3	11.3	0.0	241.3
19-Aug-17 21:00	3.0	204.5	10.4	4.7	97.9	0.5	0.0	241.8
19-Aug-17 22:00	3.9	205.3	11.1	4.7	98.3	0.0	0.0	241.9
19-Aug-17 23:00	4.0	208.5	9.3	4.6	98.5	0.0	0.0	242.0
20-Aug-17 0:00	3.3	216.5	10.0	4.5	98.5	0.0	0.0	242.2
20-Aug-17 1:00	3.0	226.5	8.3	4.5	98.6	0.0	0.0	242.3
20-Aug-17 2:00	2.2	228.2	7.8	4.5	98.6	0.0	0.0	242.3
20-Aug-17 3:00	2.2	203.4	10.3	4.5	98.6	0.0	0.0	242.3
20-Aug-17 4:00	0.9	32.0	25.8	4.6	98.6	0.0	0.0	242.3
20-Aug-17 5:00	1.4	207.3	24.4	4.8	98.1	0.0	0.0	242.2
20-Aug-17 6:00	0.9	60.8	34.2	4.9	97.2	5.3	0.0	242.2
20-Aug-17 7:00	1.4	6.6	19.7	5.2	94.0	28.4	0.0	242.3
20-Aug-17 8:00	0.4	296.9	19.5	5.8	92.4	109.7	0.0	242.6
20-Aug-17 9:00	1.2	330.7	28.1	6.2	89.9	180.8	0.0	242.7
20-Aug-17 10:00	2.0	32.6	12.1	6.9	87.6	202.3	0.0	242.2
20-Aug-17 11:00	2.0	28.7	20.0	7.7	83.9	332.3	0.0	242.3



Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
20-Aug-17 12:00	1.0	226.1	51.8	8.3	87.1	356.1	0.0	242.4
20-Aug-17 13:00	1.2	315.8	40.5	8.7	82.7	216.3	0.0	242.0
20-Aug-17 14:00	0.9	308.7	38.8	9.0	84.7	236.8	0.0	242.1
20-Aug-17 15:00	0.8	278.0	37.6	8.5	87.0	138.4	0.0	242.0
20-Aug-17 16:00	1.5	152.7	26.7	8.2	89.9	98.1	0.0	242.5
20-Aug-17 17:00	2.4	150.8	23.3	8.0	90.4	62.7	0.0	242.6
20-Aug-17 18:00	1.6	177.3	41.8	7.7	94.2	56.6	0.0	243.2
20-Aug-17 19:00	2.9	173.8	16.0	7.4	97.3	31.8	0.0	243.6
20-Aug-17 20:00	2.2	108.4	37.5	7.5	97.5	6.2	0.0	243.9
20-Aug-17 21:00	2.9	165.1	17.3	7.5	97.7	0.1	0.0	245.4
20-Aug-17 22:00	2.6	200.7	20.8	7.6	98.0	0.0	0.0	246.9
20-Aug-17 23:00	3.3	193.0	18.0	7.7	98.1	0.0	0.0	250.8
21-Aug-17 0:00	2.3	183.5	30.9	7.9	98.2	0.0	0.0	253.2
21-Aug-17 1:00	3.0	187.5	36.0	8.0	98.1	0.0	0.0	254.3
21-Aug-17 2:00	4.4	191.8	35.4	8.2	97.9	0.0	0.0	254.4
21-Aug-17 3:00	4.2	202.2	34.8	8.4	97.2	0.0	0.0	254.4
21-Aug-17 4:00	2.7	184.1	26.7	8.6	97.3	0.0	0.0	254.4
21-Aug-17 5:00	2.2	183.1	19.2	8.6	97.3	0.0	0.0	254.4
21-Aug-17 6:00	1.9	136.1	39.9	8.8	95.2	2.4	0.0	254.4
21-Aug-17 7:00	3.2	181.5	13.5	9.3	92.1	38.2	0.0	254.4
21-Aug-17 8:00	3.2	147.5	30.7	9.5	91.4	66.7	0.0	254.7
21-Aug-17 9:00	3.4	153.3	20.0	9.6	91.1	80.4	0.0	255.3
21-Aug-17 10:00	1.4	42.5	15.2	9.3	94.2	59.6	0.0	256.7
21-Aug-17 11:00	1.3	338.1	36.1	9.7	94.8	139.3	0.0	258.1
21-Aug-17 12:00	1.4	295.3	37.2	9.3	96.9	74.8	0.0	262.8
21-Aug-17 13:00	2.3	206.1	34.1	9.5	97.0	116.0	0.0	265.5
21-Aug-17 14:00	4.7	212.1	22.3	9.5	97.7	142.7	0.0	266.6
21-Aug-17 15:00	5.6	200.3	20.9	9.9	97.7	217.2	0.0	266.7
21-Aug-17 16:00	6.6	195.3	12.4	10.1	95.4	151.5	0.0	267.7
21-Aug-17 17:00	5.0	216.6	12.2	9.7	97.8	72.0	0.0	269.5
21-Aug-17 18:00	4.8	201.1	12.6	9.6	98.0	59.9	0.0	270.9
21-Aug-17 19:00	4.7	180.9	14.9	9.6	98.1	32.4	0.0	272.7
21-Aug-17 20:00	2.8	176.5	24.4	9.8	97.9	5.8	0.0	273.7
21-Aug-17 21:00	4.1	192.1	17.1	9.8	97.8	0.2	0.0	274.0
21-Aug-17 22:00	4.5	187.6	11.1	9.8	98.0	0.0	0.0	274.5
21-Aug-17 23:00	4.2	181.1	14.5	9.9	98.0	0.0	0.0	274.8
22-Aug-17 0:00	2.9	137.5	27.5	10.0	97.4	0.0	0.0	275.9
22-Aug-17 1:00	3.7	155.6	15.4	10.1	97.1	0.0	0.0	276.9
22-Aug-17 2:00	3.9	153.7	14.1	10.1	97.1	0.0	0.0	277.4
22-Aug-17 3:00	4.0	166.6	13.6	10.1	97.2	0.0	0.0	278.1
22-Aug-17 4:00	4.7	171.1	11.8	10.0	97.9	0.0	0.0	278.7
22-Aug-17 5:00	5.2	159.9	11.4	10.0	97.8	0.0	0.0	279.2
22-Aug-17 6:00	5.1	160.4	12.0	10.1	96.8	2.1	0.0	279.7
22-Aug-17 7:00	5.9	160.5	10.5	10.0	96.9	21.8	0.0	281.1
22-Aug-17 8:00	6.7	163.5	8.6	10.0	97.2	67.9	0.0	282.5
22-Aug-17 9:00	5.8	167.4	8.8	10.0	97.1	108.2	0.0	283.8
22-Aug-17 10:00	5.9	170.4	10.4	10.1	96.8	149.1	0.0	284.6
22-Aug-17 11:00	5.5	184.0	10.8	10.1	96.5	178.0	0.0	285.0
22-Aug-17 12:00	5.3	167.2	12.0	10.6	94.4	243.3	0.0	285.6
22-Aug-17 13:00	3.8	176.5	19.9	10.9	91.1	222.8	0.0	286.3
22-Aug-17 14:00	3.7	179.8	18.7	10.5	93.1	143.9	0.0	288.4
22-Aug-17 15:00	3.9	184.4	21.8	10.1	95.4	128.3	0.0	291.1
22-Aug-17 16:00	2.1	176.1	56.1	10.6	91.3	132.4	0.0	291.1
22-Aug-17 17:00	3.5	167.1	29.5	10.4	93.0	73.6	0.0	291.6

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation					
22-Aug-17 18:00	5.3	180.2	12.2	9.7	96.5	39.5	0.0	294.1
22-Aug-17 19:00	6.1	218.9	11.5	9.1	98.0	17.1	0.0	295.7
22-Aug-17 20:00	8.7	238.3	8.4	8.1	98.2	17.1	0.0	297.8
22-Aug-17 21:00	8.1	236.0	10.2	6.8	98.4	0.1	0.0	299.9
22-Aug-17 22:00	5.6	216.7	14.7	6.2	98.5	0.0	0.0	300.0
22-Aug-17 23:00	4.7	205.8	14.3	5.9	98.5	0.0	0.0	300.1
23-Aug-17 0:00	5.3	211.6	11.4	5.9	97.4	0.0	0.0	300.3
23-Aug-17 1:00	4.9	209.1	10.1	5.4	96.6	0.0	0.0	300.3
23-Aug-17 2:00	5.2	201.2	10.8	4.8	89.4	0.0	0.0	300.4
23-Aug-17 3:00	5.3	172.1	8.8	5.5	69.6	0.0	0.0	300.3
23-Aug-17 4:00	5.2	188.8	9.1	5.3	76.3	0.0	0.0	300.3
23-Aug-17 5:00	5.0	182.2	9.1	4.8	83.4	0.0	0.0	300.3
23-Aug-17 6:00	4.8	159.9	14.9	4.7	85.4	2.4	0.0	300.3
23-Aug-17 7:00	3.8	161.8	12.3	4.9	84.4	31.5	0.0	300.3
23-Aug-17 8:00	2.4	156.7	50.1	4.9	85.7	57.1	0.0	300.3
23-Aug-17 9:00	3.5	167.1	27.5	5.4	85.4	178.5	0.0	300.3
23-Aug-17 10:00	3.4	152.5	30.6	5.7	86.4	192.7	0.0	300.3
23-Aug-17 11:00	3.1	187.0	49.2	5.5	88.8	175.1	0.0	300.3
23-Aug-17 12:00	3.8	181.0	13.1	5.7	86.6	176.1	0.0	300.3
23-Aug-17 13:00	3.4	191.6	16.7	5.4	91.0	221.9	0.0	300.4
23-Aug-17 14:00	5.1	169.4	11.0	5.5	88.8	271.4	0.0	300.4
23-Aug-17 15:00	4.7	173.3	13.7	6.0	84.9	331.0	0.0	300.4
23-Aug-17 16:00	3.7	141.7	43.3	6.0	84.5	173.8	0.0	300.4
23-Aug-17 17:00	4.8	170.2	9.7	5.9	82.3	248.2	0.0	300.4
23-Aug-17 18:00	4.7	168.3	10.7	5.7	85.2	90.4	0.0	300.4
23-Aug-17 19:00	4.2	169.5	8.0	5.7	82.4	67.8	0.0	300.4
23-Aug-17 20:00	2.9	158.2	18.9	5.6	84.2	14.8	0.0	300.3
23-Aug-17 21:00	1.6	59.3	44.7	5.5	88.1	0.2	0.0	300.3
23-Aug-17 22:00	1.7	123.9	17.1	5.7	82.2	0.0	0.0	300.4
23-Aug-17 23:00	1.4	172.2	12.4	5.7	81.3	0.0	0.0	300.4
24-Aug-17 0:00	0.9	225.0	22.0	5.3	84.5	0.0	0.0	300.3
24-Aug-17 1:00	1.5	182.9	10.6	5.2	86.1	0.0	0.0	300.3
24-Aug-17 2:00	2.2	214.5	7.8	5.0	87.7	0.0	0.0	300.5
24-Aug-17 3:00	2.3	206.0	8.3	4.8	90.4	0.0	0.0	300.5
24-Aug-17 4:00	2.3	212.2	7.7	4.8	90.0	0.0	0.0	300.5
24-Aug-17 5:00	2.6	194.6	7.9	4.7	91.8	0.0	0.0	300.7
24-Aug-17 6:00	3.1	189.8	13.4	4.7	90.8	5.5	0.0	300.8
24-Aug-17 7:00	3.2	200.7	6.9	4.8	92.1	41.2	0.0	300.8
24-Aug-17 8:00	3.1	208.4	9.7	5.1	91.3	92.3	0.0	300.8
24-Aug-17 9:00	3.9	216.0	9.4	4.7	96.2	117.9	0.0	300.7
24-Aug-17 10:00	3.1	218.7	9.4	5.1	94.2	209.0	0.0	300.7
24-Aug-17 11:00	4.1	226.2	10.3	5.1	96.1	193.2	0.0	300.7
24-Aug-17 12:00	3.9	227.2	10.9	5.2	97.5	247.3	0.0	300.7
24-Aug-17 13:00	4.6	228.0	10.0	5.4	97.8	193.3	0.0	300.8
24-Aug-17 14:00	5.0	227.2	12.8	5.5	98.0	147.9	0.0	301.4
24-Aug-17 15:00	4.1	219.6	12.7	5.9	97.9	177.9	0.0	301.4
24-Aug-17 16:00	4.3	220.0	14.9	6.0	97.7	148.1	0.0	301.5
24-Aug-17 17:00	4.0	211.6	14.7	5.7	98.0	80.5	0.0	301.7
24-Aug-17 18:00	4.7	215.1	14.6	5.8	98.1	56.6	0.0	301.7
24-Aug-17 19:00	4.2	214.0	13.3	5.5	98.2	75.0	0.0	301.7
24-Aug-17 20:00	4.3	212.9	14.2	5.3	98.3	7.4	0.0	301.8
24-Aug-17 21:00	3.3	220.4	15.4	5.0	98.4	0.2	0.0	301.9
24-Aug-17 22:00	3.4	209.0	13.1	5.0	98.1	0.0	0.0	301.9
24-Aug-17 23:00	3.5	199.3	11.4	5.1	97.2	0.0	0.0	302.1

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
25-Aug-17 0:00	3.3	198.5	14.3	5.0	97.7	0.0	0.0	302.2
25-Aug-17 1:00	3.0	200.2	13.1	5.0	98.2	0.0	0.0	302.5
25-Aug-17 2:00	3.4	200.1	10.4	5.0	98.3	0.0	0.0	302.6
25-Aug-17 3:00	3.6	178.5	10.2	5.0	98.2	0.0	0.0	302.7
25-Aug-17 4:00	3.0	171.6	20.8	5.2	96.4	0.0	0.0	302.7
25-Aug-17 5:00	1.9	208.2	44.8	5.4	93.4	0.0	0.0	302.7
25-Aug-17 6:00	2.0	165.6	21.8	5.3	94.1	1.7	0.0	302.8
25-Aug-17 7:00	1.9	141.3	65.2	5.4	93.6	13.1	0.0	303.1
25-Aug-17 8:00	1.3	182.1	51.6	5.8	90.7	59.7	0.0	303.1
25-Aug-17 9:00	1.6	192.7	52.7	6.2	92.1	127.8	0.0	303.1
25-Aug-17 10:00	2.6	178.5	34.2	6.5	91.8	231.7	0.0	303.2
25-Aug-17 11:00	1.8	203.8	35.8	6.8	93.5	243.6	0.0	303.2
25-Aug-17 12:00	2.7	195.0	22.8	6.8	94.8	246.8	0.0	303.7
25-Aug-17 13:00	4.6	184.0	15.7	7.0	95.2	292.5	0.0	303.7
25-Aug-17 14:00	4.0	188.4	26.7	7.2	95.6	258.0	0.0	303.8
25-Aug-17 15:00	3.0	211.9	26.4	7.4	96.9	258.8	0.0	303.7
25-Aug-17 16:00	3.8	191.2	18.5	7.5	97.3	183.5	0.0	303.9
25-Aug-17 17:00	3.8	199.8	19.5	7.4	97.8	97.3	0.0	304.5
25-Aug-17 18:00	4.7	200.4	12.9	7.2	98.1	29.1	0.0	306.8
25-Aug-17 19:00	6.8	190.1	9.5	6.6	98.2	15.2	0.0	308.7
25-Aug-17 20:00	6.8	185.2	7.7	6.0	92.8	7.6	0.0	309.1
25-Aug-17 21:00	8.4	182.8	6.4	5.9	92.6	0.1	0.0	309.9
25-Aug-17 22:00	6.2	186.7	7.1	6.0	89.3	0.0	0.0	310.1
25-Aug-17 23:00	2.2	174.3	16.5	5.9	90.7	0.0	0.0	310.2
26-Aug-17 0:00	1.7	192.2	28.0	6.1	93.9	0.0	0.0	310.3
26-Aug-17 1:00	2.1	197.8	15.3	6.0	97.3	0.0	0.0	310.4
26-Aug-17 2:00	2.0	202.9	20.6	6.2	98.0	0.0	0.0	310.6
26-Aug-17 3:00	3.5	205.7	11.2	6.3	98.2	0.0	0.0	310.6
26-Aug-17 4:00	3.4	199.9	11.2	6.4	98.3	0.0	0.0	311.3
26-Aug-17 5:00	4.1	195.0	13.7	6.5	98.4	0.0	0.0	311.5
26-Aug-17 6:00	4.2	203.4	9.7	6.6	98.4	3.3	0.0	311.7
26-Aug-17 7:00	3.9	199.7	9.8	6.8	98.5	21.9	0.0	312.1
26-Aug-17 8:00	4.0	205.8	13.8	7.0	98.4	87.0	0.0	312.4
26-Aug-17 9:00	4.6	207.9	12.6	7.1	98.4	69.1	0.0	313.7
26-Aug-17 10:00	4.9	207.8	12.8	7.3	98.4	76.7	0.0	315.0
26-Aug-17 11:00	5.1	224.6	15.4	7.5	98.4	95.4	0.0	316.5
26-Aug-17 12:00	4.3	262.9	23.8	6.8	98.4	90.9	0.0	322.1
26-Aug-17 13:00	8.1	235.7	13.0	6.7	98.4	82.1	0.0	322.7
26-Aug-17 14:00	7.7	226.1	10.8	6.3	98.5	109.5	0.0	322.9
26-Aug-17 15:00	7.1	234.1	13.0	6.4	98.4	101.5	0.0	323.1
26-Aug-17 16:00	7.6	228.8	10.1	5.4	98.5	91.1	0.0	323.2
26-Aug-17 17:00	5.9	216.3	11.0	5.2	98.4	104.4	0.0	323.2
26-Aug-17 18:00	5.9	220.0	9.8	5.1	98.4	95.8	0.0	323.3
26-Aug-17 19:00	4.6	206.3	12.7	4.8	98.5	35.5	0.0	323.3
26-Aug-17 20:00	4.4	209.0	10.0	4.7	97.7	8.0	0.0	323.3
26-Aug-17 21:00	4.5	213.3	9.5	4.7	94.1	0.3	0.0	323.3
26-Aug-17 22:00	4.6	206.5	11.6	4.6	96.7	0.0	0.0	323.3
26-Aug-17 23:00	3.6	203.2	15.2	4.6	95.6	0.0	0.0	323.3
27-Aug-17 0:00	2.7	197.2	13.2	4.7	91.5	0.0	0.0	323.3
27-Aug-17 1:00	2.5	198.0	11.1	4.9	88.2	0.0	0.0	323.3
27-Aug-17 2:00	2.3	201.9	6.2	5.1	85.9	0.0	0.0	323.3
27-Aug-17 3:00	2.4	199.6	6.2	5.1	86.6	0.0	0.0	323.3
27-Aug-17 4:00	1.8	192.1	9.9	4.8	90.3	0.0	0.0	323.3
27-Aug-17 5:00	0.9	181.2	13.3	4.7	89.8	0.0	0.0	323.2

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
27-Aug-17 6:00	0.7	169.7	23.8	4.7	88.0	1.0	0.0	323.2
27-Aug-17 7:00	0.9	179.3	9.4	4.5	90.3	16.4	0.0	323.2
27-Aug-17 8:00	0.3	243.3	15.2	4.7	90.3	50.6	0.0	323.4
27-Aug-17 9:00	1.4	21.4	12.5	5.0	90.7	150.1	0.0	323.6
27-Aug-17 10:00	0.8	3.9	33.0	5.8	87.3	218.7	0.0	323.8
27-Aug-17 11:00	1.3	285.4	21.0	6.2	89.2	316.8	0.0	323.7
27-Aug-17 12:00	1.2	294.9	24.5	6.7	88.4	264.3	0.0	323.5
27-Aug-17 13:00	1.2	271.2	21.6	6.9	88.6	265.6	0.0	323.4
27-Aug-17 14:00	1.8	204.7	23.3	7.5	87.3	330.3	0.0	323.4
27-Aug-17 15:00	2.6	228.8	14.4	7.7	90.3	382.2	0.0	323.3
27-Aug-17 16:00	2.7	226.5	17.2	7.7	91.9	278.3	0.0	323.4
27-Aug-17 17:00	2.8	221.9	12.1	7.8	92.1	273.2	0.0	323.4
27-Aug-17 18:00	3.0	219.0	9.1	7.7	91.9	166.8	0.0	323.4
27-Aug-17 19:00	3.2	226.5	9.7	8.0	91.9	164.4	0.0	323.4
27-Aug-17 20:00	2.5	207.1	10.9	7.3	94.1	13.7	0.0	323.4
27-Aug-17 21:00	2.2	214.1	13.4	7.1	95.9	0.2	0.0	323.5
27-Aug-17 22:00	2.3	213.7	13.7	6.9	96.0	0.0	0.0	323.4
27-Aug-17 23:00	2.3	217.9	8.7	6.7	95.5	0.0	0.0	323.5
28-Aug-17 0:00	1.9	203.5	10.2	6.8	94.2	0.0	0.0	323.4
28-Aug-17 1:00	1.0	194.5	11.1	6.6	94.2	0.0	0.0	323.3
28-Aug-17 2:00	2.0	189.3	9.8	6.6	90.8	0.0	0.0	323.3
28-Aug-17 3:00	2.1	194.9	7.5	6.6	88.7	0.0	0.0	323.5
28-Aug-17 4:00	1.3	174.9	30.1	6.7	85.7	0.0	0.0	323.5
28-Aug-17 5:00	1.1	223.8	20.2	6.6	86.2	0.0	0.0	323.6
28-Aug-17 6:00	1.2	38.2	42.9	6.8	82.9	1.9	0.0	323.6
28-Aug-17 7:00	0.8	156.2	35.7	7.0	81.2	38.5	0.0	323.6
28-Aug-17 8:00	1.1	178.3	16.8	7.3	82.0	149.5	0.0	324.2
28-Aug-17 9:00	0.7	164.0	59.6	8.4	79.5	319.7	0.0	324.4
28-Aug-17 10:00	1.5	135.7	44.6	9.1	74.0	501.9	0.0	323.4
28-Aug-17 11:00	2.1	192.2	28.1	9.6	71.4	605.5	0.0	323.5
28-Aug-17 12:00	2.0	218.4	23.2	9.9	74.2	689.8	0.0	323.7
28-Aug-17 13:00	1.8	240.9	39.8	10.7	76.0	659.4	0.0	323.4
28-Aug-17 14:00	1.5	284.0	46.1	11.3	73.4	582.3	0.0	323.4
28-Aug-17 15:00	2.1	292.2	24.9	11.7	71.4	509.2	0.0	323.3
28-Aug-17 16:00	1.7	277.2	25.3	11.7	74.0	345.6	0.0	323.2
28-Aug-17 17:00	1.2	244.1	26.8	11.7	75.0	243.6	0.0	323.1
28-Aug-17 18:00	0.7	288.2	45.2	12.1	74.1	187.3	0.0	323.0
28-Aug-17 19:00	1.1	318.9	27.8	11.4	75.2	68.6	0.0	322.9
28-Aug-17 20:00	1.7	36.1	7.0	11.0	68.5	11.8	0.0	322.9
28-Aug-17 21:00	1.7	25.2	4.8	10.7	69.9	0.1	0.0	322.9
28-Aug-17 22:00	1.1	79.5	13.4	10.4	69.6	0.0	0.0	322.9
28-Aug-17 23:00	0.4	176.0	13.4	10.5	70.1	0.0	0.0	322.9
29-Aug-17 0:00	1.0	299.7	17.9	10.4	71.1	0.0	0.0	323.0
29-Aug-17 1:00	0.9	218.4	17.7	10.1	73.0	0.0	0.0	323.2
29-Aug-17 2:00	2.5	181.3	6.7	9.2	77.3	0.0	0.0	323.3
29-Aug-17 3:00	1.9	177.5	13.2	9.1	77.5	0.0	0.0	323.3
29-Aug-17 4:00	1.3	185.5	8.2	9.0	76.9	0.0	0.0	323.2
29-Aug-17 5:00	2.5	185.1	12.2	8.5	79.3	0.0	0.0	323.4
29-Aug-17 6:00	1.4	202.9	23.5	8.9	76.1	4.0	0.0	323.5
29-Aug-17 7:00	0.7	243.7	41.1	9.5	71.1	40.7	0.0	323.6
29-Aug-17 8:00	1.0	203.9	21.8	9.4	74.6	149.1	0.0	323.7
29-Aug-17 9:00	1.8	174.1	17.5	10.2	72.9	326.5	0.0	323.6
29-Aug-17 10:00	1.5	154.3	28.0	11.5	68.8	473.1	0.0	323.6
29-Aug-17 11:00	2.9	75.0	45.0	13.3	62.6	606.0	0.0	323.6

## Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation					
29-Aug-17 12:00	1.6	292.3	58.0	14.2	65.2	689.0	0.0	323.4
29-Aug-17 13:00	1.6	292.3	66.6	15.1	65.2	763.4	0.0	323.3
29-Aug-17 14:00	1.8	6.1	37.5	16.9	55.3	704.9	0.0	323.2
29-Aug-17 15:00	2.2	330.8	33.1	17.5	53.2	650.1	0.0	323.1
29-Aug-17 16:00	1.9	246.3	26.1	17.7	56.2	569.1	0.0	323.1
29-Aug-17 17:00	2.4	201.9	26.2	17.7	54.2	348.8	0.0	323.0
29-Aug-17 18:00	2.9	215.5	16.3	18.0	54.4	344.3	0.0	323.0
29-Aug-17 19:00	2.9	183.8	9.9	17.4	55.0	132.2	0.0	323.1
29-Aug-17 20:00	1.8	102.8	37.0	16.5	57.3	10.1	0.0	323.1
29-Aug-17 21:00	1.0	213.9	56.9	16.5	55.8	0.0	0.0	322.9
29-Aug-17 22:00	0.8	187.2	37.8	16.3	55.4	0.0	0.0	323.1
29-Aug-17 23:00	2.4	169.0	17.8	15.6	58.0	0.0	0.0	323.2
30-Aug-17 0:00	1.9	227.4	23.4	14.8	63.9	0.0	0.0	323.0
30-Aug-17 1:00	2.2	214.1	21.0	14.1	69.6	0.0	0.0	323.2
30-Aug-17 2:00	3.4	215.8	16.3	13.0	78.2	0.0	0.0	323.6
30-Aug-17 3:00	6.4	172.7	11.1	12.4	81.2	0.0	0.0	324.5
30-Aug-17 4:00	7.5	180.6	8.8	12.3	79.1	0.0	0.0	324.5
30-Aug-17 5:00	5.5	200.3	15.4	10.0	94.8	0.0	0.0	326.3
30-Aug-17 6:00	4.5	211.6	13.6	9.3	97.3	0.3	0.0	326.6
30-Aug-17 7:00	4.3	211.4	9.7	9.0	97.7	12.2	0.0	326.6
30-Aug-17 8:00	3.5	212.2	11.7	8.9	97.3	32.3	0.0	326.6
30-Aug-17 9:00	3.1	208.4	12.9	8.9	96.0	41.6	0.0	327.4
30-Aug-17 10:00	3.1	187.6	11.8	8.9	96.7	91.4	0.0	327.9
30-Aug-17 11:00	3.6	178.8	16.6	8.8	96.9	61.4	0.0	330.4
30-Aug-17 12:00	4.9	185.0	8.5	8.9	96.0	70.6	0.0	332.4
30-Aug-17 13:00	4.5	178.1	11.5	9.1	94.8	218.0	0.0	333.4
30-Aug-17 14:00	6.6	213.3	13.8	9.2	97.4	183.1	0.0	334.4
30-Aug-17 15:00	6.2	222.9	10.0	9.5	97.8	82.5	0.0	339.4
30-Aug-17 16:00	10.0	239.1	9.7	8.6	97.9	128.9	0.0	341.1
30-Aug-17 17:00	9.4	233.8	9.9	8.0	98.0	64.4	0.0	341.4
30-Aug-17 18:00	8.2	227.1	8.4	6.7	98.2	27.2	0.0	341.9
30-Aug-17 19:00	7.3	218.7	10.1	6.1	98.4	28.7	0.0	342.9
30-Aug-17 20:00	6.9	217.2	10.2	5.7	98.4	1.3	0.0	343.1
30-Aug-17 21:00	7.6	225.7	8.1	5.4	98.5	0.0	0.0	343.2
30-Aug-17 22:00	7.1	226.1	10.0	5.0	98.5	0.0	0.0	343.3
30-Aug-17 23:00	7.3	219.1	11.2	4.4	98.5	0.0	0.0	343.3
31-Aug-17 0:00	6.8	211.8	11.5	4.0	98.6	0.0	0.0	343.7
31-Aug-17 1:00	6.6	216.0	8.1	3.7	98.6	0.0	0.0	344.1
31-Aug-17 2:00	5.7	210.9	12.2	3.5	98.6	0.0	0.0	344.5
31-Aug-17 3:00	5.2	213.6	10.8	3.5	98.6	0.0	0.0	345.1
31-Aug-17 4:00	4.6	211.1	14.4	3.5	98.7	0.0	0.0	345.6
31-Aug-17 5:00	4.7	212.9	12.5	3.7	98.7	0.0	0.0	346.4
31-Aug-17 6:00	4.9	206.1	9.7	3.8	98.7	1.3	0.0	346.9
31-Aug-17 7:00	5.4	192.4	10.3	4.0	98.7	19.4	0.0	347.5
31-Aug-17 8:00	5.6	200.1	9.7	4.2	98.6	47.0	0.0	348.3
31-Aug-17 9:00	5.6	200.6	12.7	4.4	98.6	74.8	0.0	348.9
31-Aug-17 10:00	6.2	201.9	11.9	4.6	98.6	62.5	0.0	349.1
31-Aug-17 11:00	8.0	185.1	8.0	5.1	98.0	128.3	0.0	349.3
31-Aug-17 12:00	6.1	200.8	10.1	5.4	97.6	163.1	0.0	349.4
31-Aug-17 13:00	6.0	207.3	11.3	5.4	98.2	133.2	0.0	350.4
31-Aug-17 14:00	5.9	210.5	9.9	5.3	98.2	125.5	0.0	351.1
31-Aug-17 15:00	6.1	199.1	10.3	5.3	98.3	92.7	0.0	352.1
31-Aug-17 16:00	7.2	191.5	12.1	5.1	98.4	93.8	0.0	353.3
31-Aug-17 17:00	5.7	196.2	13.2	5.1	98.2	96.9	0.0	353.8

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation					
31-Aug-17 18:00	6.3	192.8	9.6	5.0	98.3	58.3	0.0	354.5
31-Aug-17 19:00	6.3	188.7	7.7	5.0	98.3	21.9	0.0	354.9
31-Aug-17 20:00	6.0	187.1	8.5	5.0	97.8	3.7	0.0	355.1
31-Aug-17 21:00	6.1	191.0	8.3	5.2	97.6	0.0	0.0	355.1
31-Aug-17 22:00	7.4	190.4	7.0	5.5	95.9	0.0	0.0	355.3
31-Aug-17 23:00	6.6	185.2	8.0	5.6	95.8	0.0	0.0	356.3
01-Sep-17 0:00	5.5	191.7	9.5	5.5	97.5	0.0	0.0	358.8
01-Sep-17 1:00	4.3	183.4	9.5	5.3	97.5	0.0	0.0	360.6
01-Sep-17 2:00	4.5	186.4	45.4	5.0	96.0	0.0	0.0	364.8
01-Sep-17 3:00	2.9	312.6	57.1	5.3	92.1	0.0	0.0	366.3
01-Sep-17 4:00	4.1	199.2	26.6	4.9	96.9	0.0	0.0	368.1
01-Sep-17 5:00	3.9	204.1	14.7	5.1	98.1	0.0	0.0	370.5
01-Sep-17 6:00	5.0	209.4	9.7	5.7	98.3	0.4	0.0	370.8
01-Sep-17 7:00	5.2	206.3	11.6	5.8	98.4	7.1	0.0	370.8
01-Sep-17 8:00	5.6	213.6	11.4	5.8	98.5	26.6	0.0	370.9
01-Sep-17 9:00	4.9	216.3	10.4	5.7	98.3	87.5	0.0	370.9
01-Sep-17 10:00	4.3	214.7	9.4	5.8	97.9	115.6	0.0	371.0
01-Sep-17 11:00	4.9	209.0	11.3	6.0	96.6	136.7	0.0	371.0
01-Sep-17 12:00	4.4	211.4	8.9	6.5	94.5	199.8	0.0	370.9
01-Sep-17 13:00	4.7	221.9	12.7	6.1	97.4	125.7	0.0	371.4
01-Sep-17 14:00	4.5	224.2	13.2	6.3	97.8	256.9	0.0	371.5
01-Sep-17 15:00	4.3	217.8	11.7	6.3	97.4	149.0	0.0	371.5
01-Sep-17 16:00	4.4	236.3	16.4	6.2	97.9	95.7	0.0	371.5
01-Sep-17 17:00	3.0	215.4	15.1	6.0	98.0	71.7	0.0	371.7
01-Sep-17 18:00	2.9	212.9	14.9	5.9	97.8	40.3	0.0	371.7
01-Sep-17 19:00	2.7	213.9	17.6	5.5	98.1	23.9	0.0	371.8
01-Sep-17 20:00	2.5	204.2	14.7	5.3	98.2	3.8	0.0	371.9
01-Sep-17 21:00	2.6	215.7	16.9	5.3	98.4	0.0	0.0	372.1
01-Sep-17 22:00	2.0	204.4	14.2	5.2	98.4	0.0	0.0	372.1
01-Sep-17 23:00	1.9	209.7	13.6	5.3	98.2	0.0	0.0	372.1
02-Sep-17 0:00	2.6	184.1	7.9	5.2	97.0	0.0	0.0	372.1
02-Sep-17 1:00	2.7	197.7	9.8	5.2	95.2	0.0	0.0	372.1
02-Sep-17 2:00	2.7	198.2	7.9	5.2	95.2	0.0	0.0	372.1
02-Sep-17 3:00	2.4	196.2	10.0	5.1	94.5	0.0	0.0	372.1
02-Sep-17 4:00	2.5	193.3	9.8	5.0	95.1	0.0	0.0	372.1
02-Sep-17 5:00	2.7	204.1	9.4	4.8	95.3	0.0	0.0	372.1
02-Sep-17 6:00	1.9	228.1	13.7	4.6	97.9	1.0	0.0	372.1
02-Sep-17 7:00	1.8	253.2	19.7	4.7	95.5	26.9	0.0	372.1
02-Sep-17 8:00	0.9	356.8	42.0	4.8	96.3	97.8	0.0	372.3
02-Sep-17 9:00	1.3	235.6	23.0	5.4	93.5	184.1	0.0	372.2
02-Sep-17 10:00	2.2	238.7	13.1	5.2	95.2	230.9	0.0	372.2
02-Sep-17 11:00	2.5	211.4	15.9	5.8	87.7	309.1	0.0	372.1
02-Sep-17 12:00	2.3	262.3	28.7	6.9	85.7	633.9	0.0	372.1
02-Sep-17 13:00	3.0	246.4	21.1	6.7	89.3	433.5	0.0	372.0
02-Sep-17 14:00	3.4	256.2	19.1	7.4	86.1	623.2	0.0	372.0
02-Sep-17 15:00	2.6	285.4	24.6	8.0	80.1	585.1	0.0	372.0
02-Sep-17 16:00	2.5	328.1	16.8	7.3	75.5	293.3	0.0	372.0
02-Sep-17 17:00	3.2	338.3	16.9	7.0	77.4	170.1	0.0	372.0
02-Sep-17 18:00	3.0	0.0	21.5	6.9	78.4	133.8	0.0	372.0
02-Sep-17 19:00	2.7	0.9	9.8	6.5	83.2	87.6	0.0	372.0
02-Sep-17 20:00	2.3	18.4	12.3	6.0	86.6	20.8	0.0	372.0
02-Sep-17 21:00	2.4	31.9	6.2	5.8	84.3	0.0	0.0	371.9
02-Sep-17 22:00	1.6	25.1	15.5	5.7	84.3	0.0	0.0	371.7
02-Sep-17 23:00	1.4	51.6	17.3	5.7	83.7	0.0	0.0	371.8

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
03-Sep-17 0:00	1.5	52.1	5.7	5.7	82.1	0.0	0.0	371.7
03-Sep-17 1:00	1.0	50.7	9.8	5.8	79.2	0.0	0.0	371.5
03-Sep-17 2:00	0.9	43.7	11.6	5.7	78.1	0.0	0.0	371.7
03-Sep-17 3:00	0.4	79.8	38.3	5.2	81.0	0.0	0.0	371.6
03-Sep-17 4:00	1.2	40.7	8.4	5.5	77.4	0.0	0.0	371.9
03-Sep-17 5:00	0.6	171.7	15.9	5.2	79.2	0.0	0.0	371.8
03-Sep-17 6:00	0.3	143.0	14.2	4.9	84.6	1.7	0.0	371.6
03-Sep-17 7:00	0.4	159.3	20.5	5.0	82.1	15.2	0.0	371.7
03-Sep-17 8:00	0.6	263.6	26.1	5.4	77.5	115.3	0.0	372.9
03-Sep-17 9:00	0.8	176.5	41.7	6.9	70.5	345.8	0.0	372.6
03-Sep-17 10:00	1.1	207.0	49.4	7.4	71.2	491.0	0.0	372.3
03-Sep-17 11:00	1.5	94.1	51.4	8.7	66.1	587.4	0.0	372.3
03-Sep-17 12:00	1.9	24.5	48.3	9.9	59.6	638.5	0.0	372.2
03-Sep-17 13:00	1.8	330.6	31.5	10.4	65.8	692.8	0.0	372.1
03-Sep-17 14:00	1.6	272.1	36.2	11.0	72.3	705.2	0.0	371.9
03-Sep-17 15:00	1.6	290.0	42.0	11.9	66.6	638.2	0.0	371.8
03-Sep-17 16:00	1.4	289.8	46.4	12.8	58.1	475.9	0.0	371.8
03-Sep-17 17:00	1.3	281.9	42.3	13.2	55.5	386.2	0.0	371.7
03-Sep-17 18:00	0.9	292.5	36.9	12.5	54.1	139.7	0.0	371.5
03-Sep-17 19:00	1.0	139.3	32.5	12.2	48.5	42.1	0.0	371.7
03-Sep-17 20:00	1.6	109.8	24.4	11.7	46.1	4.1	0.0	371.7
03-Sep-17 21:00	1.1	97.7	42.3	11.8	42.9	0.0	0.0	371.8
03-Sep-17 22:00	1.2	75.5	40.2	11.8	39.3	0.0	0.0	371.8
03-Sep-17 23:00	1.8	114.0	27.3	11.6	43.1	0.0	0.0	371.8
04-Sep-17 0:00	2.0	153.0	59.7	11.6	46.6	0.0	0.0	371.8
04-Sep-17 1:00	2.0	160.4	49.9	12.0	50.0	0.0	0.0	371.8
04-Sep-17 2:00	2.8	166.1	21.5	11.7	52.0	0.0	0.0	371.8
04-Sep-17 3:00	5.6	193.3	7.8	12.1	52.2	0.0	0.0	371.8
04-Sep-17 4:00	4.9	181.0	10.7	12.1	57.4	0.0	0.0	371.7
04-Sep-17 5:00	4.6	182.7	7.5	12.1	57.8	0.0	0.0	371.8
04-Sep-17 6:00	5.0	183.2	8.6	12.0	59.8	0.7	0.0	371.8
04-Sep-17 7:00	5.3	189.1	9.3	12.0	62.0	21.3	0.0	371.7
04-Sep-17 8:00	4.2	188.3	11.4	12.4	63.4	47.5	0.0	371.8
04-Sep-17 9:00	4.2	187.3	10.0	12.7	65.6	80.2	0.0	371.7
04-Sep-17 10:00	4.1	195.8	10.0	13.3	66.4	140.8	0.0	371.7
04-Sep-17 11:00	3.6	205.4	16.8	13.6	67.5	227.1	0.0	371.7
04-Sep-17 12:00	3.7	207.1	15.2	14.0	68.0	262.3	0.0	371.7
04-Sep-17 13:00	3.8	210.0	11.1	14.9	66.6	509.4	0.0	371.9
04-Sep-17 14:00	3.9	220.7	12.2	15.7	64.8	555.5	0.0	371.7
04-Sep-17 15:00	3.8	212.4	10.9	15.5	64.5	377.0	0.0	371.7
04-Sep-17 16:00	3.3	218.7	13.1	16.2	64.1	387.0	0.0	371.7
04-Sep-17 17:00	4.1	196.4	14.4	17.2	60.9	437.5	0.0	371.6
04-Sep-17 18:00	3.3	193.0	16.7	17.1	60.0	271.4	0.0	371.6
04-Sep-17 19:00	3.1	180.9	12.0	16.5	61.2	93.0	0.0	371.6
04-Sep-17 20:00	1.7	97.1	18.0	16.0	62.3	10.5	0.0	371.5
04-Sep-17 21:00	1.1	47.6	26.5	15.8	61.4	0.0	0.0	371.3
04-Sep-17 22:00	0.7	109.5	24.0	15.5	62.5	0.0	0.0	371.2
04-Sep-17 23:00	1.7	79.7	11.0	15.0	62.9	0.0	0.0	371.7
05-Sep-17 0:00	1.7	90.4	13.6	15.1	61.8	0.0	0.0	371.7
05-Sep-17 1:00	1.6	51.6	9.8	15.5	59.6	0.0	0.0	371.8
05-Sep-17 2:00	1.3	68.5	11.0	15.2	60.0	0.0	0.0	371.7
05-Sep-17 3:00	1.5	73.9	20.0	15.1	58.6	0.0	0.0	371.7
05-Sep-17 4:00	1.1	86.9	31.5	14.6	61.1	0.0	0.0	371.6
05-Sep-17 5:00	0.4	163.3	41.6	14.3	63.0	0.0	0.0	371.4

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
05-Sep-17 6:00	0.9	154.8	21.8	14.1	63.5	0.9	0.0	371.5
05-Sep-17 7:00	0.9	182.1	14.7	14.1	63.0	21.7	0.0	371.5
05-Sep-17 8:00	0.5	28.2	20.4	14.7	56.9	99.3	0.0	372.4
05-Sep-17 9:00	0.7	163.2	24.4	15.3	59.7	306.9	0.0	372.4
05-Sep-17 10:00	1.2	113.9	39.9	16.7	56.2	456.2	0.0	372.3
05-Sep-17 11:00	1.2	206.4	23.0	16.8	57.8	573.8	0.0	372.5
05-Sep-17 12:00	1.3	226.8	28.0	17.2	59.6	651.0	0.0	372.0
05-Sep-17 13:00	1.6	220.7	14.2	17.5	63.8	697.3	0.0	371.8
05-Sep-17 14:00	2.0	210.0	19.4	18.5	60.0	698.9	0.0	371.8
05-Sep-17 15:00	1.6	214.4	26.0	19.6	59.8	602.7	0.0	371.7
05-Sep-17 16:00	1.3	217.7	25.9	20.2	58.8	502.7	0.0	371.7
05-Sep-17 17:00	0.9	226.1	48.9	20.9	57.8	370.3	0.0	371.5
05-Sep-17 18:00	1.1	220.5	33.7	20.7	53.6	234.6	0.0	371.5
05-Sep-17 19:00	1.8	187.8	40.5	20.0	51.4	100.7	0.0	371.6
05-Sep-17 20:00	3.3	167.7	8.2	19.4	43.4	4.9	0.0	371.6
05-Sep-17 21:00	1.9	162.0	12.7	19.4	39.5	0.0	0.0	371.6
05-Sep-17 22:00	1.6	129.2	12.8	19.2	39.8	0.0	0.0	371.6
05-Sep-17 23:00	2.0	138.3	10.2	18.4	43.1	0.0	0.0	371.7
06-Sep-17 0:00	2.4	151.9	10.4	18.0	44.7	0.0	0.0	371.7
06-Sep-17 1:00	3.6	178.9	5.6	17.8	45.7	0.0	0.0	371.8
06-Sep-17 2:00	3.9	184.3	7.4	17.7	46.8	0.0	0.0	371.7
06-Sep-17 3:00	2.6	174.6	14.6	17.1	49.4	0.0	0.0	371.7
06-Sep-17 4:00	1.5	153.2	24.8	17.1	50.6	0.0	0.0	371.7
06-Sep-17 5:00	1.3	197.7	44.0	17.2	51.2	0.0	0.0	371.8
06-Sep-17 6:00	1.7	176.3	30.6	16.7	53.3	0.9	0.0	371.8
06-Sep-17 7:00	3.4	188.8	9.3	16.0	56.5	14.3	0.0	371.8
06-Sep-17 8:00	2.2	169.6	31.0	16.5	55.9	84.9	0.0	371.9
06-Sep-17 9:00	2.5	123.5	25.4	16.8	56.3	164.2	0.0	371.8
06-Sep-17 10:00	3.2	195.6	19.4	17.1	55.8	349.7	0.0	371.9
06-Sep-17 11:00	4.3	192.8	12.1	17.6	53.9	340.2	0.0	371.7
06-Sep-17 12:00	4.0	198.4	9.7	17.3	54.6	211.2	0.0	371.7
06-Sep-17 13:00	3.4	207.7	12.6	16.5	59.3	134.7	0.0	371.7
06-Sep-17 14:00	3.8	205.6	11.3	15.2	66.0	100.2	0.0	371.9
06-Sep-17 15:00	1.6	129.2	39.7	14.7	68.9	49.6	0.0	371.9
06-Sep-17 16:00	1.5	161.1	42.9	14.9	67.1	63.7	0.0	372.0
06-Sep-17 17:00	1.2	10.2	48.5	15.0	68.6	67.7	0.0	372.0
06-Sep-17 18:00	2.7	30.4	20.1	14.7	70.0	22.1	0.0	372.0
06-Sep-17 19:00	0.9	175.2	49.1	15.1	67.2	5.5	0.0	372.3
06-Sep-17 20:00	2.4	214.5	14.1	14.4	71.3	0.5	0.0	372.3
06-Sep-17 21:00	2.0	189.2	16.5	14.3	72.1	0.0	0.0	372.3
06-Sep-17 22:00	1.3	216.1	40.2	14.1	72.9	0.0	0.0	372.3
06-Sep-17 23:00	2.3	186.9	14.8	13.7	73.9	0.0	0.0	372.3
07-Sep-17 0:00	4.9	206.6	13.2	13.0	77.4	0.0	0.0	372.4
07-Sep-17 1:00	3.8	199.4	15.5	11.6	87.7	0.0	0.0	372.4
07-Sep-17 2:00	4.6	205.7	12.7	11.0	89.3	0.0	0.0	373.0
07-Sep-17 3:00	7.1	182.6	13.2	11.0	80.6	0.0	0.0	373.5
07-Sep-17 4:00	6.2	198.2	14.4	10.2	87.2	0.0	0.0	373.8
07-Sep-17 5:00	7.1	224.3	10.7	9.3	97.1	0.0	0.0	376.9
07-Sep-17 6:00	5.6	227.8	11.4	8.9	97.6	0.0	0.0	378.3
07-Sep-17 7:00	5.9	237.2	9.7	8.6	97.7	5.1	0.0	379.4
07-Sep-17 8:00	6.4	228.9	9.1	7.9	97.8	22.2	0.0	379.6
07-Sep-17 9:00	5.4	222.2	12.6	7.2	97.9	69.9	0.0	379.6
07-Sep-17 10:00	4.4	221.9	12.3	7.2	97.8	116.4	0.0	379.6
07-Sep-17 11:00	4.9	231.8	12.0	7.2	97.8	138.0	0.0	379.6



Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
07-Sep-17 12:00	4.1	216.1	11.7	7.2	97.6	276.8	0.0	379.6
07-Sep-17 13:00	3.6	225.5	12.8	7.8	97.1	415.2	0.0	379.6
07-Sep-17 14:00	3.3	242.0	21.4	8.3	95.3	327.4	0.0	379.5
07-Sep-17 15:00	3.4	235.1	17.7	8.8	87.1	436.2	0.0	379.6
07-Sep-17 16:00	2.9	288.0	37.2	9.0	83.1	337.1	0.0	379.5
07-Sep-17 17:00	1.8	329.9	26.5	7.9	89.7	129.6	0.0	379.6
07-Sep-17 18:00	4.9	233.4	14.4	7.2	96.6	38.1	0.0	380.8
07-Sep-17 19:00	4.7	220.4	9.5	6.5	97.8	33.4	0.0	381.7
07-Sep-17 20:00	3.8	205.9	12.1	6.5	97.4	1.5	0.0	381.7
07-Sep-17 21:00	3.7	195.2	11.6	6.4	92.9	0.0	0.0	381.7
07-Sep-17 22:00	3.5	201.9	11.7	6.4	89.1	0.0	0.0	381.7
07-Sep-17 23:00	3.3	201.0	11.4	6.4	87.0	0.0	0.0	381.7
08-Sep-17 0:00	3.1	205.8	12.8	6.1	90.2	0.0	0.0	381.7
08-Sep-17 1:00	4.1	204.7	10.6	5.9	92.5	0.0	0.0	381.7
08-Sep-17 2:00	4.7	206.9	11.4	6.1	88.4	0.0	0.0	381.7
08-Sep-17 3:00	4.2	198.3	10.6	5.8	90.1	0.0	0.0	381.7
08-Sep-17 4:00	5.0	198.1	12.1	5.6	89.8	0.0	0.0	381.7
08-Sep-17 5:00	4.6	201.6	10.4	5.3	90.0	0.0	0.0	381.8
08-Sep-17 6:00	4.1	201.1	9.1	4.9	92.4	0.3	0.0	381.9
08-Sep-17 7:00	3.9	195.8	10.5	4.9	91.8	11.5	0.0	382.0
08-Sep-17 8:00	4.1	191.2	11.6	5.1	91.5	38.4	0.0	382.0
08-Sep-17 9:00	4.1	189.4	13.8	5.3	92.1	94.6	0.0	382.0
08-Sep-17 10:00	3.2	190.0	24.7	5.6	91.8	101.7	0.0	382.0
08-Sep-17 11:00	5.5	174.1	11.8	6.1	88.4	189.1	0.0	381.9
08-Sep-17 12:00	5.6	186.7	8.0	6.7	87.1	380.5	0.0	381.9
08-Sep-17 13:00	2.8	232.4	24.9	8.0	83.2	495.2	0.0	381.9
08-Sep-17 14:00	4.8	208.9	26.7	8.1	81.2	327.9	0.0	381.8
08-Sep-17 15:00	4.8	188.2	15.8	8.2	77.4	263.3	0.0	381.8
08-Sep-17 16:00	3.3	144.5	49.1	8.2	75.5	95.6	0.0	381.9
08-Sep-17 17:00	3.5	151.1	34.9	8.3	74.7	83.0	0.0	381.8
08-Sep-17 18:00	3.0	243.1	52.0	8.9	69.8	48.3	0.0	381.8
08-Sep-17 19:00	2.4	255.4	59.6	8.3	74.1	24.3	0.0	381.8
08-Sep-17 20:00	2.4	142.7	48.3	8.5	71.7	2.6	0.0	381.8
08-Sep-17 21:00	2.4	162.5	22.0	8.0	77.5	0.0	0.0	381.9
08-Sep-17 22:00	3.0	175.8	14.5	7.5	83.8	0.0	0.0	382.0
08-Sep-17 23:00	2.1	52.2	14.3	7.1	86.0	0.0	0.0	382.0
09-Sep-17 0:00	1.5	76.5	23.5	7.4	83.1	0.0	0.0	382.4
09-Sep-17 1:00	3.6	186.4	12.3	6.2	95.9	0.0	0.0	384.4
09-Sep-17 2:00	4.4	161.0	18.8	6.7	87.4	0.0	0.0	385.2
09-Sep-17 3:00	1.7	53.6	33.0	6.5	91.5	0.0	0.0	385.8
09-Sep-17 4:00	1.1	168.8	27.9	6.3	91.4	0.0	0.0	388.0
09-Sep-17 5:00	2.5	189.8	14.2	5.9	93.8	0.0	0.0	391.0
09-Sep-17 6:00	3.8	205.4	15.7	5.4	97.2	0.0	0.0	393.1
09-Sep-17 7:00	4.1	207.4	10.8	4.9	97.8	3.8	0.0	394.9
09-Sep-17 8:00	4.0	212.3	9.9	4.6	97.9	26.1	0.0	395.9
09-Sep-17 9:00	2.9	216.7	11.1	4.4	97.9	83.6	0.0	396.4
09-Sep-17 10:00	3.4	226.0	12.0	4.4	97.9	89.7	0.0	396.9
09-Sep-17 11:00	3.6	211.5	11.8	4.5	97.9	100.4	0.0	397.0
09-Sep-17 12:00	6.5	229.0	9.9	4.8	97.9	91.3	0.0	398.8
09-Sep-17 13:00	6.0	220.5	10.0	4.8	97.9	100.1	0.0	399.2
09-Sep-17 14:00	4.4	214.7	9.0	5.0	97.8	154.6	0.0	399.4
09-Sep-17 15:00	6.1	227.4	13.4	5.0	98.0	49.4	0.0	401.9
09-Sep-17 16:00	5.4	221.8	10.4	4.4	98.0	71.1	0.0	403.9
09-Sep-17 17:00	5.7	219.1	11.7	4.7	98.1	56.4	0.0	404.7

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
09-Sep-17 18:00	5.7	219.0	9.3	4.7	98.2	21.4	0.0	406.6
09-Sep-17 19:00	5.3	214.4	15.3	4.2	98.2	17.4	0.0	408.7
09-Sep-17 20:00	6.1	191.7	10.6	4.0	96.8	1.1	0.0	408.6
09-Sep-17 21:00	5.3	212.1	11.0	3.8	96.6	0.0	0.0	409.1
09-Sep-17 22:00	4.0	209.4	11.5	3.7	98.0	0.0	0.0	409.7
09-Sep-17 23:00	4.6	216.8	10.5	3.7	98.0	0.0	0.0	411.5
10-Sep-17 0:00	4.2	210.0	10.7	3.8	98.1	0.0	0.0	412.2
10-Sep-17 1:00	3.9	206.1	13.6	3.7	98.2	0.0	0.0	413.0
10-Sep-17 2:00	4.1	200.8	10.2	3.8	98.2	0.0	0.0	413.8
10-Sep-17 3:00	4.8	197.8	12.0	3.7	97.8	0.0	0.0	414.0
10-Sep-17 4:00	4.3	208.2	9.1	3.7	97.7	0.0	0.0	414.2
10-Sep-17 5:00	4.7	218.3	10.2	3.7	98.1	0.0	0.0	415.7
10-Sep-17 6:00	4.6	218.4	10.0	3.5	98.2	0.0	0.0	416.8
10-Sep-17 7:00	3.7	214.9	11.4	3.3	98.3	7.1	0.0	418.5
10-Sep-17 8:00	3.5	201.7	9.8	3.6	98.2	44.7	0.0	419.0
10-Sep-17 9:00	4.1	195.9	12.0	3.9	98.0	190.2	0.0	419.1
10-Sep-17 10:00	2.9	182.9	23.7	4.4	97.0	208.2	0.0	419.2
10-Sep-17 11:00	2.2	247.5	36.8	5.0	93.1	171.8	0.0	419.0
10-Sep-17 12:00	2.3	170.4	19.7	5.6	86.4	287.8	0.0	419.0
10-Sep-17 13:00	1.6	237.4	40.5	5.9	87.9	206.1	0.0	419.0
10-Sep-17 14:00	1.6	253.8	26.6	5.6	91.4	143.4	0.0	419.1
10-Sep-17 15:00	1.6	293.7	19.6	5.2	95.1	121.4	0.0	419.2
10-Sep-17 16:00	5.1	17.8	9.7	5.3	92.5	124.7	0.0	419.3
10-Sep-17 17:00	7.5	38.8	7.9	5.2	90.8	60.8	0.0	419.6
10-Sep-17 18:00	7.4	51.4	15.7	4.9	89.7	21.9	0.0	420.5
10-Sep-17 19:00	8.3	41.2	6.5	4.4	89.0	6.5	0.0	421.4
10-Sep-17 20:00	8.7	40.6	5.2	3.8	90.2	0.3	0.0	422.8
10-Sep-17 21:00	8.0	43.7	5.0	3.4	91.7	0.0	0.0	423.7
10-Sep-17 22:00	3.8	42.1	30.9	3.1	92.4	0.0	0.0	423.8
10-Sep-17 23:00	1.9	58.8	22.5	3.2	91.9	0.0	0.0	424.0
11-Sep-17 0:00	1.5	69.5	36.9	3.0	93.2	0.0	0.0	424.0
11-Sep-17 1:00	1.5	36.2	20.1	3.3	92.7	0.0	0.0	424.0
11-Sep-17 2:00	1.4	215.3	20.4	2.9	96.4	0.0	0.0	424.0
11-Sep-17 3:00	2.8	191.7	5.9	3.0	96.0	0.0	0.0	424.0
11-Sep-17 4:00	3.8	194.3	10.5	3.4	93.1	0.0	0.0	424.0
11-Sep-17 5:00	3.0	204.8	9.5	2.8	96.9	0.0	0.0	424.0
11-Sep-17 6:00	4.1	203.5	10.3	3.3	96.7	0.0	0.0	424.0
11-Sep-17 7:00	5.4	197.2	10.0	3.8	93.3	8.3	0.0	424.0
11-Sep-17 8:00	4.4	204.9	11.3	3.8	93.7	42.0	0.0	424.0
11-Sep-17 9:00	4.5	219.8	9.7	3.8	97.7	67.7	0.0	424.0
11-Sep-17 10:00	4.3	217.7	12.7	3.8	98.0	45.4	0.0	424.0
11-Sep-17 11:00	4.8	226.2	9.8	3.9	98.0	72.4	0.0	424.5
11-Sep-17 12:00	4.9	229.1	8.8	4.0	98.1	79.0	0.0	425.2
11-Sep-17 13:00	4.6	202.8	11.8	3.9	98.0	180.0	0.0	425.3
11-Sep-17 14:00	4.0	204.9	16.1	4.7	95.2	500.7	0.0	425.3
11-Sep-17 15:00	4.2	210.6	13.7	5.0	93.5	213.3	0.0	425.3
11-Sep-17 16:00	5.1	193.2	9.7	4.7	90.7	237.0	0.0	425.3
11-Sep-17 17:00	4.5	205.5	13.5	5.3	87.8	224.4	0.0	425.3
11-Sep-17 18:00	4.2	218.4	10.7	4.7	94.0	128.5	0.0	425.3
11-Sep-17 19:00	4.6	239.7	11.7	3.8	97.6	4.5	0.0	425.3
11-Sep-17 20:00	3.2	206.1	13.0	3.6	95.4	0.7	0.0	425.3
11-Sep-17 21:00	3.0	196.4	14.5	3.5	95.8	0.0	0.0	425.4
11-Sep-17 22:00	3.3	204.8	14.4	3.2	96.7	0.0	0.0	425.4
11-Sep-17 23:00	2.8	183.9	14.7	3.2	94.9	0.0	0.0	425.4

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
12-Sep-17 0:00	2.3	205.0	11.3	3.1	94.1	0.0	0.0	425.4
12-Sep-17 1:00	2.8	201.9	10.7	3.1	94.8	0.0	0.0	425.4
12-Sep-17 2:00	3.3	203.9	11.5	2.9	95.1	0.0	0.0	425.4
12-Sep-17 3:00	1.5	205.6	22.6	2.8	97.6	0.0	0.0	425.4
12-Sep-17 4:00	1.5	192.3	16.9	3.1	93.9	0.0	0.0	425.4
12-Sep-17 5:00	1.5	198.8	12.5	3.1	92.6	0.0	0.0	425.4
12-Sep-17 6:00	0.6	85.4	21.7	3.2	90.3	0.2	0.0	425.3
12-Sep-17 7:00	0.7	234.6	10.4	3.2	89.1	12.8	0.0	425.3
12-Sep-17 8:00	1.2	212.0	23.9	3.0	92.3	74.4	0.0	425.4
12-Sep-17 9:00	2.6	348.5	14.2	3.0	93.5	163.1	0.0	426.0
12-Sep-17 10:00	2.4	27.4	14.8	4.0	87.7	427.5	0.0	425.9
12-Sep-17 11:00	1.8	26.2	37.4	4.7	84.5	415.9	0.0	425.4
12-Sep-17 12:00	1.4	257.2	40.3	5.3	79.0	554.5	0.0	425.6
12-Sep-17 13:00	1.8	286.1	30.6	6.2	76.8	662.3	0.0	425.5
12-Sep-17 14:00	2.4	290.1	17.8	6.7	70.3	702.3	0.0	425.4
12-Sep-17 15:00	2.5	282.9	16.8	6.9	68.2	602.4	0.0	425.3
12-Sep-17 16:00	2.5	298.9	20.5	7.2	68.2	498.2	0.0	425.2
12-Sep-17 17:00	2.5	292.7	23.3	7.5	66.2	360.1	0.0	425.2
12-Sep-17 18:00	2.4	306.0	21.3	7.1	68.8	205.2	0.0	425.2
12-Sep-17 19:00	2.5	333.3	13.6	5.8	77.2	39.9	0.0	425.2
12-Sep-17 20:00	1.4	354.9	24.2	4.9	81.8	2.0	0.0	425.0
12-Sep-17 21:00	2.1	205.7	24.4	4.7	84.5	0.0	0.0	425.3
12-Sep-17 22:00	1.9	183.0	15.1	4.4	86.7	0.0	0.0	425.3
12-Sep-17 23:00	1.8	172.5	8.5	4.4	85.8	0.0	0.0	425.3
13-Sep-17 0:00	0.9	161.8	11.6	4.3	85.6	0.0	0.0	425.2
13-Sep-17 1:00	0.7	64.0	9.3	4.1	84.3	0.0	0.0	425.2
13-Sep-17 2:00	1.5	38.9	6.3	3.7	89.6	0.0	0.0	425.2
13-Sep-17 3:00	1.0	55.4	11.3	4.0	83.5	0.0	0.0	425.2
13-Sep-17 4:00	1.3	41.9	11.0	3.5	89.4	0.0	0.0	425.2
13-Sep-17 5:00	1.4	45.3	7.7	3.6	86.1	0.0	0.0	425.3
13-Sep-17 6:00	1.2	26.7	5.7	3.7	85.7	0.2	0.0	425.3
13-Sep-17 7:00	1.1	26.9	12.8	3.3	87.0	9.4	0.0	425.2
13-Sep-17 8:00	0.8	35.1	25.0	3.4	87.5	51.0	0.0	426.0
13-Sep-17 9:00	0.9	159.0	29.3	4.7	82.8	298.3	0.0	425.9
13-Sep-17 10:00	1.4	181.4	15.6	5.3	81.4	441.7	0.0	425.8
13-Sep-17 11:00	1.3	230.5	25.6	6.4	78.4	556.6	0.0	425.8
13-Sep-17 12:00	1.4	267.6	19.5	6.8	81.7	632.9	0.0	425.5
13-Sep-17 13:00	1.7	229.3	17.6	7.3	78.8	668.7	0.0	425.5
13-Sep-17 14:00	1.8	235.4	19.7	8.3	78.9	672.4	0.0	425.3
13-Sep-17 15:00	2.6	231.9	17.4	8.8	69.8	594.9	0.0	425.2
13-Sep-17 16:00	2.7	253.3	18.6	9.3	58.8	488.7	0.0	425.1
13-Sep-17 17:00	2.3	286.4	16.0	9.3	56.0	349.0	0.0	425.1
13-Sep-17 18:00	2.1	302.2	16.7	8.8	59.0	202.8	0.0	425.1
13-Sep-17 19:00	1.8	346.4	10.5	7.5	71.0	58.2	0.0	425.0
13-Sep-17 20:00	1.0	206.9	32.9	7.2	73.7	1.4	0.0	425.1
13-Sep-17 21:00	1.9	211.2	10.7	6.6	78.3	0.0	0.0	425.2
13-Sep-17 22:00	1.6	222.1	10.4	6.2	85.3	0.0	0.0	425.1
13-Sep-17 23:00	1.2	231.1	5.1	6.1	86.1	0.0	0.0	425.1
14-Sep-17 0:00	1.1	221.1	6.2	5.6	87.7	0.0	0.0	425.0
14-Sep-17 1:00	0.3	197.6	13.8	5.3	89.2	0.0	0.0	425.0
14-Sep-17 2:00	0.3	225.2	9.4	5.1	88.0	0.0	0.0	425.1
14-Sep-17 3:00	0.7	42.7	9.7	5.0	83.1	0.0	0.0	425.1
14-Sep-17 4:00	0.6	15.8	14.9	4.8	83.5	0.0	0.0	425.0
14-Sep-17 5:00	0.5	211.6	15.2	4.9	86.1	0.0	0.0	425.2

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
14-Sep-17 6:00	0.7	197.3	14.7	4.9	82.1	0.2	0.0	425.2
14-Sep-17 7:00	0.5	329.7	23.2	5.0	77.5	10.4	0.0	425.2
14-Sep-17 8:00	0.8	222.7	34.5	5.0	81.1	50.5	0.0	425.9
14-Sep-17 9:00	0.8	151.8	33.7	6.2	77.2	290.3	0.0	426.2
14-Sep-17 10:00	1.0	170.8	47.7	7.4	71.4	433.5	0.0	426.1
14-Sep-17 11:00	1.2	213.4	31.7	7.7	71.8	547.2	0.0	425.7
14-Sep-17 12:00	1.4	234.0	23.8	8.6	71.9	624.2	0.0	425.6
14-Sep-17 13:00	1.8	220.6	17.1	9.0	71.1	658.4	0.0	425.3
14-Sep-17 14:00	3.1	214.6	12.8	9.2	58.3	654.1	0.0	425.2
14-Sep-17 15:00	3.3	222.8	15.3	9.7	61.4	575.0	0.0	425.1
14-Sep-17 16:00	3.3	223.0	12.9	9.9	64.2	455.6	0.0	425.1
14-Sep-17 17:00	3.5	223.7	10.4	9.8	65.4	262.8	0.0	425.0
14-Sep-17 18:00	3.2	215.9	9.6	9.5	68.2	154.2	0.0	425.0
14-Sep-17 19:00	3.4	202.7	9.0	8.7	72.9	37.7	0.0	425.1
14-Sep-17 20:00	2.5	221.8	12.6	7.8	78.6	0.8	0.0	425.1
14-Sep-17 21:00	2.1	222.1	9.4	7.3	83.1	0.0	0.0	425.1
14-Sep-17 22:00	1.4	230.0	11.0	7.2	84.7	0.0	0.0	425.1
14-Sep-17 23:00	1.4	218.4	11.3	6.6	87.6	0.0	0.0	425.1
15-Sep-17 0:00	2.0	223.5	7.5	6.3	90.5	0.0	0.0	425.2
15-Sep-17 1:00	2.2	212.9	11.1	5.9	91.7	0.0	0.0	425.2
15-Sep-17 2:00	2.5	198.3	13.0	6.3	82.6	0.0	0.0	425.2
15-Sep-17 3:00	1.9	265.2	10.6	5.8	91.1	0.0	0.0	425.3
15-Sep-17 4:00	1.7	236.6	8.8	6.0	88.5	0.0	0.0	425.3
15-Sep-17 5:00	2.4	215.4	7.2	5.8	86.3	0.0	0.0	425.3
15-Sep-17 6:00	2.2	222.8	6.8	5.4	89.3	0.1	0.0	425.3
15-Sep-17 7:00	1.4	210.0	24.7	5.2	87.4	14.0	0.0	425.2
15-Sep-17 8:00	0.6	191.3	19.1	5.7	78.5	75.2	0.0	425.4
15-Sep-17 9:00	2.0	198.0	10.6	5.9	82.6	198.7	0.0	425.5
15-Sep-17 10:00	1.3	181.3	30.0	6.6	81.8	315.1	0.0	425.8
15-Sep-17 11:00	1.5	210.7	30.9	7.6	75.3	436.8	0.0	425.4
15-Sep-17 12:00	2.1	220.8	18.4	8.0	72.0	555.7	0.0	425.4
15-Sep-17 13:00	2.5	229.0	18.0	7.6	78.3	541.7	0.0	425.2
15-Sep-17 14:00	3.2	220.5	15.0	8.3	70.0	552.7	0.0	425.2
15-Sep-17 15:00	3.5	227.4	11.3	8.7	71.8	464.6	0.0	425.1
15-Sep-17 16:00	3.3	243.9	19.0	8.8	74.3	451.6	0.0	425.1
15-Sep-17 17:00	3.2	227.1	12.8	8.3	76.8	257.2	0.0	425.1
15-Sep-17 18:00	3.0	214.2	13.1	7.3	81.3	113.9	0.0	425.1
15-Sep-17 19:00	3.1	203.5	10.1	6.5	84.9	32.8	0.0	425.2
15-Sep-17 20:00	2.9	218.4	9.4	5.7	90.7	0.6	0.0	425.2
15-Sep-17 21:00	2.2	231.1	6.4	5.3	94.6	0.0	0.0	425.2
15-Sep-17 22:00	2.5	219.8	9.2	4.8	97.3	0.0	0.0	425.2
15-Sep-17 23:00	2.2	212.7	15.3	4.5	97.6	0.0	0.0	425.2
16-Sep-17 0:00	2.0	210.6	12.9	4.4	97.4	0.0	0.0	425.3
16-Sep-17 1:00	2.3	194.6	13.0	4.5	95.9	0.0	0.0	425.3
16-Sep-17 2:00	1.3	214.7	17.8	4.3	96.9	0.0	0.0	425.3
16-Sep-17 3:00	2.6	192.0	12.6	4.3	96.6	0.0	0.0	425.3
16-Sep-17 4:00	2.2	201.0	11.9	4.2	94.1	0.0	0.0	425.3
16-Sep-17 5:00	1.0	238.3	28.0	3.9	95.9	0.0	0.0	425.2
16-Sep-17 6:00	2.4	211.6	16.5	3.4	97.4	0.0	0.0	425.3
16-Sep-17 7:00	2.7	200.8	14.4	3.2	97.8	15.3	0.0	425.4
16-Sep-17 8:00	1.4	186.9	13.9	3.4	97.1	90.5	0.0	425.4
16-Sep-17 9:00	1.9	198.8	10.4	4.0	93.7	251.7	0.0	425.5
16-Sep-17 10:00	2.6	207.1	12.8	4.5	89.1	346.4	0.0	425.5
16-Sep-17 11:00	2.0	220.1	17.1	5.0	84.9	384.2	0.0	425.9

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
16-Sep-17 12:00	1.7	226.9	16.9	5.5	83.7	358.5	0.0	425.2
16-Sep-17 13:00	2.2	228.9	28.5	5.9	81.7	262.7	0.0	425.2
16-Sep-17 14:00	2.3	233.5	19.4	6.0	81.3	267.2	0.0	425.2
16-Sep-17 15:00	2.9	216.9	16.2	6.1	81.2	293.2	0.0	425.2
16-Sep-17 16:00	1.5	184.7	36.2	6.8	77.0	247.4	0.0	425.2
16-Sep-17 17:00	2.7	188.0	15.7	6.6	75.7	147.4	0.0	425.1
16-Sep-17 18:00	3.7	165.2	14.4	6.6	73.2	54.6	0.0	425.2
16-Sep-17 19:00	2.3	168.3	17.7	6.3	73.6	14.2	0.0	425.2
16-Sep-17 20:00	2.6	187.7	12.8	5.9	74.0	0.2	0.0	425.3
16-Sep-17 21:00	4.5	182.0	10.1	6.2	68.0	0.0	0.0	425.2
16-Sep-17 22:00	4.2	195.9	13.0	5.6	73.7	0.0	0.0	425.2
16-Sep-17 23:00	4.0	172.1	12.7	5.0	79.5	0.0	0.0	425.2
17-Sep-17 0:00	4.9	188.6	12.1	4.5	83.5	0.0	0.0	425.3
17-Sep-17 1:00	4.4	178.6	13.6	4.1	87.7	0.0	0.0	425.3
17-Sep-17 2:00	3.4	157.8	21.0	4.2	85.8	0.0	0.0	425.4
17-Sep-17 3:00	4.9	167.4	11.9	3.4	88.6	0.0	0.0	426.1
17-Sep-17 4:00	2.3	157.7	14.9	3.3	88.2	0.0	0.0	426.4
17-Sep-17 5:00	1.9	140.3	19.0	3.1	88.4	0.0	0.0	426.6
17-Sep-17 6:00	1.0	37.0	11.8	2.9	93.1	0.0	0.0	426.6
17-Sep-17 7:00	0.7	27.3	12.0	2.9	91.3	2.3	0.0	426.7
17-Sep-17 8:00	0.8	314.0	20.5	2.9	92.7	24.3	0.0	427.0
17-Sep-17 9:00	0.8	100.0	16.3	3.1	91.4	64.1	0.0	427.1
17-Sep-17 10:00	0.9	216.6	18.3	3.4	88.1	88.8	0.0	427.6
17-Sep-17 11:00	1.1	235.8	22.3	3.8	88.9	213.4	0.0	427.7
17-Sep-17 12:00	1.0	266.0	35.6	4.6	86.7	214.2	0.0	427.7
17-Sep-17 13:00	1.1	255.0	16.5	4.3	87.1	111.0	0.0	428.2
17-Sep-17 14:00	0.9	248.3	26.6	4.2	91.0	98.0	0.0	428.9
17-Sep-17 15:00	1.5	282.1	31.3	4.0	92.6	113.5	0.0	429.0
17-Sep-17 16:00	0.9	53.9	23.2	4.6	88.3	135.1	0.0	429.1
17-Sep-17 17:00	1.5	273.8	33.6	4.7	90.3	77.9	0.0	429.2
17-Sep-17 18:00	3.8	189.9	11.2	3.1	95.2	23.0	0.0	430.6
17-Sep-17 19:00	3.8	169.7	13.6	3.2	89.2	14.2	0.0	430.6
17-Sep-17 20:00	3.2	198.9	12.2	2.8	93.9	0.4	0.0	430.6
17-Sep-17 21:00	2.3	196.5	15.8	2.2	97.2	0.0	0.0	430.6
17-Sep-17 22:00	2.1	201.9	12.5	2.5	95.0	0.0	0.0	430.6
17-Sep-17 23:00	1.6	234.3	7.0	2.3	96.6	0.0	0.0	430.6
18-Sep-17 0:00	2.1	225.1	7.7	2.2	97.6	0.0	0.0	430.8
18-Sep-17 1:00	2.0	212.3	12.6	2.2	97.9	0.0	0.0	431.1
18-Sep-17 2:00	2.6	212.0	10.9	1.9	97.9	0.0	0.0	431.6
18-Sep-17 3:00	2.2	204.5	12.3	1.6	96.8	0.0	0.0	432.9
18-Sep-17 4:00	2.2	215.9	14.0	1.6	96.8	0.0	0.0	433.5
18-Sep-17 5:00	2.4	219.0	10.5	1.6	97.7	0.0	0.0	433.8
18-Sep-17 6:00	2.0	222.3	8.3	1.6	97.9	0.0	0.0	434.2
18-Sep-17 7:00	2.7	194.6	8.9	1.5	96.8	4.7	0.0	434.4
18-Sep-17 8:00	2.5	213.3	11.2	1.7	95.0	25.5	0.0	434.5
18-Sep-17 9:00	2.5	214.1	10.4	1.6	96.4	42.2	0.0	435.0
18-Sep-17 10:00	3.1	211.5	10.1	1.8	93.7	98.4	0.0	435.4
18-Sep-17 11:00	2.7	227.8	8.2	1.9	95.7	189.8	0.0	435.6
18-Sep-17 12:00	2.8	226.6	8.8	2.2	96.0	240.5	0.0	436.0
18-Sep-17 13:00	2.8	223.4	10.2	2.4	94.2	193.4	0.0	436.4
18-Sep-17 14:00	2.6	228.1	14.2	2.7	93.0	204.3	0.0	436.6
18-Sep-17 15:00	2.6	230.5	13.2	2.7	93.2	179.8	0.0	437.0
18-Sep-17 16:00	2.0	227.7	12.4	2.8	94.6	95.9	0.0	437.2
18-Sep-17 17:00	1.8	210.4	13.4	2.7	96.0	50.7	0.0	437.5

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
18-Sep-17 18:00	2.2	210.2	11.4	2.8	94.8	32.3	0.0	437.6
18-Sep-17 19:00	1.8	216.0	11.7	2.5	97.2	8.0	0.0	437.6
18-Sep-17 20:00	1.6	225.9	13.9	2.5	97.6	0.1	0.0	437.7
18-Sep-17 21:00	2.0	206.4	11.7	2.5	97.4	0.0	0.0	438.0
18-Sep-17 22:00	2.3	192.5	12.2	2.5	96.1	0.0	0.0	439.1
18-Sep-17 23:00	3.0	182.4	11.4	2.3	93.1	0.0	0.0	440.6
19-Sep-17 0:00	2.8	192.8	8.3	1.9	93.4	0.0	0.0	441.4
19-Sep-17 1:00	2.3	197.6	9.9	1.7	96.7	0.0	0.0	441.5
19-Sep-17 2:00	1.5	193.8	11.8	1.6	96.0	0.0	0.0	441.6
19-Sep-17 3:00	2.0	191.1	6.6	1.6	95.0	0.0	0.0	441.7
19-Sep-17 4:00	2.0	193.0	7.8	1.7	95.2	0.0	0.0	441.7
19-Sep-17 5:00	1.1	197.7	18.8	1.8	94.7	0.0	0.0	441.7
19-Sep-17 6:00	0.8	186.5	9.4	1.7	96.1	0.0	0.0	441.7
19-Sep-17 7:00	0.5	87.7	19.8	1.9	96.7	3.8	0.0	441.8
19-Sep-17 8:00	0.3	346.6	23.3	2.2	97.4	26.3	0.0	441.8
19-Sep-17 9:00	0.8	219.8	14.7	2.2	97.5	50.1	0.0	441.8
19-Sep-17 10:00	0.6	172.1	23.4	2.4	96.3	78.6	0.0	442.5
19-Sep-17 11:00	1.0	32.3	42.2	2.8	92.9	123.2	0.0	443.1
19-Sep-17 12:00	1.1	308.0	24.5	3.0	95.7	186.0	0.0	443.2
19-Sep-17 13:00	1.6	356.2	18.5	3.3	93.6	185.4	0.0	443.2
19-Sep-17 14:00	2.4	345.2	14.1	3.5	94.9	161.3	0.0	443.3
19-Sep-17 15:00	2.3	345.3	11.5	3.6	93.4	156.5	0.0	443.2
19-Sep-17 16:00	1.7	358.9	18.8	3.6	97.0	113.6	0.0	443.3
19-Sep-17 17:00	1.4	278.4	25.8	3.8	97.7	94.8	0.0	443.3
19-Sep-17 18:00	1.1	12.6	20.0	3.6	97.9	44.0	0.0	443.5
19-Sep-17 19:00	3.8	18.3	5.2	3.2	98.1	12.5	0.0	443.7
19-Sep-17 20:00	3.4	13.6	14.0	3.0	98.2	0.1	0.0	443.7
19-Sep-17 21:00	3.9	9.9	9.1	3.2	98.2	0.0	0.0	443.8
19-Sep-17 22:00	3.9	11.2	10.3	3.3	98.3	0.0	0.0	443.8
19-Sep-17 23:00	4.1	20.5	17.7	3.3	98.0	0.0	0.0	443.8
20-Sep-17 0:00	1.3	297.4	40.7	2.8	98.1	0.0	0.0	443.9
20-Sep-17 1:00	1.4	137.0	35.4	2.8	98.2	0.0	0.0	443.9
20-Sep-17 2:00	4.3	29.0	14.0	3.3	98.1	0.0	0.0	443.9
20-Sep-17 3:00	3.0	32.5	47.3	3.2	97.5	0.0	0.0	443.9
20-Sep-17 4:00	6.0	32.8	6.5	4.6	91.3	0.0	0.0	443.9
20-Sep-17 5:00	6.7	28.0	5.5	5.4	84.1	0.0	0.0	443.9
20-Sep-17 6:00	7.6	34.1	5.0	5.7	78.9	0.0	0.0	443.8
20-Sep-17 7:00	7.7	30.8	6.4	5.9	75.4	5.4	0.0	443.8
20-Sep-17 8:00	8.3	37.2	6.1	6.0	74.0	24.8	0.0	443.7
20-Sep-17 9:00	7.6	31.2	6.7	6.3	73.0	161.2	0.0	444.0
20-Sep-17 10:00	7.9	37.4	6.2	7.2	69.1	397.8	0.0	444.0
20-Sep-17 11:00	8.2	36.3	6.4	7.8	65.3	511.6	0.0	443.9
20-Sep-17 12:00	7.4	31.2	8.4	8.3	63.9	561.6	0.0	443.8
20-Sep-17 13:00	5.6	28.5	12.4	8.8	62.4	609.6	0.0	443.9
20-Sep-17 14:00	4.3	25.0	16.6	9.4	59.1	648.2	0.0	443.7
20-Sep-17 15:00	3.0	12.9	20.6	9.9	55.7	557.7	0.0	443.6
20-Sep-17 16:00	2.7	22.4	18.2	10.1	53.6	473.6	0.0	443.5
20-Sep-17 17:00	3.2	34.1	12.9	9.5	58.3	274.0	0.0	443.5
20-Sep-17 18:00	4.5	47.8	13.3	9.3	56.3	160.7	0.0	443.5
20-Sep-17 19:00	3.8	42.4	10.8	8.2	60.4	17.4	0.0	443.5
20-Sep-17 20:00	4.1	40.2	9.2	7.8	58.8	0.2	0.0	443.6
20-Sep-17 21:00	4.3	42.9	8.7	7.6	57.4	0.0	0.0	443.6
20-Sep-17 22:00	5.2	58.2	9.3	7.6	52.3	0.0	0.0	443.6
20-Sep-17 23:00	4.0	51.2	11.4	7.7	50.8	0.0	0.0	443.6

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
	Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
21-Sep-17 0:00	3.7	9.1	8.4	6.8	61.9	0.0	0.0	443.6
21-Sep-17 1:00	2.9	15.7	13.5	6.6	63.2	0.0	0.0	443.6
21-Sep-17 2:00	3.2	4.7	12.3	7.0	58.1	0.0	0.0	443.6
21-Sep-17 3:00	1.0	47.6	29.7	5.9	61.7	0.0	0.0	443.5
21-Sep-17 4:00	0.8	193.6	24.1	5.7	71.8	0.0	0.0	443.5
21-Sep-17 5:00	0.6	249.8	45.4	5.6	72.5	0.0	0.0	443.6
21-Sep-17 6:00	1.1	205.5	10.1	5.4	75.6	0.0	0.0	443.6
21-Sep-17 7:00	1.6	181.1	7.9	5.3	72.1	10.2	0.0	443.7
21-Sep-17 8:00	0.3	139.9	13.2	5.5	64.3	34.0	0.0	443.7
21-Sep-17 9:00	0.8	153.8	18.7	6.5	63.3	239.1	0.0	444.5
21-Sep-17 10:00	1.1	163.7	26.8	7.5	58.5	380.4	0.0	443.9
21-Sep-17 11:00	1.4	220.1	27.0	8.0	57.3	496.4	0.0	444.3
21-Sep-17 12:00	1.6	223.7	15.1	8.4	59.9	498.8	0.0	443.5
21-Sep-17 13:00	2.0	223.4	14.4	8.6	59.9	453.5	0.0	443.6
21-Sep-17 14:00	2.5	217.5	11.8	9.1	58.2	489.6	0.0	443.6
21-Sep-17 15:00	2.7	235.1	15.4	10.0	55.8	537.6	0.0	443.5
21-Sep-17 16:00	2.5	239.4	14.2	9.8	57.3	288.1	0.0	443.4
21-Sep-17 17:00	1.9	229.2	9.4	9.0	56.5	135.3	0.0	443.4
21-Sep-17 18:00	2.8	215.3	7.2	8.7	58.7	70.3	0.0	443.4
21-Sep-17 19:00	3.4	210.0	9.0	8.3	61.6	6.7	0.0	443.5
21-Sep-17 20:00	2.8	197.7	9.9	7.9	66.4	0.0	0.0	443.6
21-Sep-17 21:00	3.0	191.2	12.4	7.6	69.2	0.0	0.0	443.5
21-Sep-17 22:00	2.8	206.2	15.2	6.7	80.6	0.0	0.0	444.2
21-Sep-17 23:00	4.5	195.5	9.4	5.5	84.5	0.0	0.0	445.1
22-Sep-17 0:00	5.5	188.5	6.6	5.1	85.9	0.0	0.0	445.5
22-Sep-17 1:00	4.0	204.2	9.4	4.6	93.0	0.0	0.0	446.0
22-Sep-17 2:00	4.9	209.6	9.3	4.6	96.2	0.0	0.0	447.2
22-Sep-17 3:00	5.1	218.0	9.5	4.3	97.7	0.0	0.0	448.2
22-Sep-17 4:00	4.4	212.5	9.2	4.1	97.9	0.0	0.0	448.8
22-Sep-17 5:00	3.9	204.9	10.3	4.3	98.0	0.0	0.0	448.8
22-Sep-17 6:00	3.6	209.2	8.7	4.4	98.1	0.0	0.0	448.9
22-Sep-17 7:00	3.4	200.9	10.3	4.7	98.1	3.6	0.0	449.1
22-Sep-17 8:00	4.1	204.9	8.0	4.9	98.1	27.0	0.0	449.2
22-Sep-17 9:00	4.8	207.8	7.7	5.1	98.1	95.6	0.0	449.2
22-Sep-17 10:00	3.9	209.8	8.1	5.4	98.0	127.7	0.0	449.2
22-Sep-17 11:00	4.7	217.8	6.7	5.7	97.9	214.0	0.0	449.2
22-Sep-17 12:00	4.7	223.1	7.2	5.8	97.8	190.2	0.0	449.1
22-Sep-17 13:00	4.7	220.0	6.8	6.0	97.8	187.8	0.0	449.1
22-Sep-17 14:00	4.7	223.5	7.9	6.1	97.9	132.5	0.0	449.1
22-Sep-17 15:00	4.7	216.2	6.6	6.3	97.9	160.6	0.0	449.3
22-Sep-17 16:00	4.9	219.1	7.1	6.5	97.9	133.7	0.0	449.3
22-Sep-17 17:00	3.7	214.7	8.0	6.5	98.1	71.3	0.0	449.4
22-Sep-17 18:00	3.9	215.5	8.5	6.5	98.1	45.9	0.0	449.5
22-Sep-17 19:00	4.2	209.8	8.0	6.4	98.2	6.7	0.0	449.6
22-Sep-17 20:00	3.8	216.6	8.1	6.4	98.3	0.0	0.0	449.5
22-Sep-17 21:00	3.7	222.6	6.0	6.3	98.3	0.0	0.0	449.6
22-Sep-17 22:00	3.2	212.6	9.0	6.3	98.3	0.0	0.0	449.5
22-Sep-17 23:00	3.7	218.7	5.5	6.3	98.4	0.0	0.0	449.6
23-Sep-17 0:00	3.6	217.4	5.5	6.2	98.4	0.0	0.0	449.6
23-Sep-17 1:00	4.0	205.1	9.4	6.3	98.4	0.0	0.0	449.6
23-Sep-17 2:00	3.4	223.5	7.2	6.3	98.4	0.0	0.0	449.6
23-Sep-17 3:00	3.5	205.1	8.5	6.3	98.4	0.0	0.0	449.6
23-Sep-17 4:00	3.8	210.1	6.7	6.2	98.4	0.0	0.0	449.6
23-Sep-17 5:00	3.3	203.7	9.6	6.5	98.4	0.0	0.0	449.7

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
23-Sep-17 6:00	3.3	201.0	7.6	6.6	98.4	0.0	0.0	449.9
23-Sep-17 7:00	4.0	192.9	5.7	6.5	98.3	1.9	0.0	450.6
23-Sep-17 8:00	2.8	200.9	10.8	6.7	97.4	17.6	0.0	450.9
23-Sep-17 9:00	2.3	142.5	41.2	6.9	95.5	26.4	0.0	452.1
23-Sep-17 10:00	2.1	306.6	32.3	7.0	93.5	36.0	0.0	454.5
23-Sep-17 11:00	2.1	183.9	32.8	7.0	94.0	47.3	0.0	456.3
23-Sep-17 12:00	1.4	175.3	35.3	7.1	96.1	117.9	0.0	458.2
23-Sep-17 13:00	2.6	217.8	22.1	7.1	97.0	132.9	0.0	459.8
23-Sep-17 14:00	3.9	208.8	15.7	7.2	97.8	115.3	0.0	460.7
23-Sep-17 15:00	4.1	212.8	11.2	7.2	98.0	94.9	0.0	461.5
23-Sep-17 16:00	3.8	217.1	11.1	7.2	98.0	80.7	0.0	462.4
23-Sep-17 17:00	4.2	214.7	9.8	7.2	98.1	42.9	0.0	462.7
23-Sep-17 18:00	3.8	213.4	9.0	7.2	98.2	19.6	0.0	463.3
23-Sep-17 19:00	3.8	203.5	12.4	7.2	98.3	4.2	0.0	464.8
23-Sep-17 20:00	4.3	192.3	11.0	7.1	98.4	0.0	0.0	466.1
23-Sep-17 21:00	4.3	179.3	10.2	7.1	98.3	0.0	0.0	467.2
23-Sep-17 22:00	4.7	190.1	10.9	7.1	98.3	0.0	0.0	469.5
23-Sep-17 23:00	4.6	191.1	12.5	7.2	98.3	0.0	0.0	471.1
24-Sep-17 0:00	4.3	209.8	11.8	7.3	98.4	0.0	0.0	472.4
24-Sep-17 1:00	5.0	206.1	10.1	7.3	98.4	0.0	0.0	473.5
24-Sep-17 2:00	5.3	209.4	8.6	7.4	98.4	0.0	0.0	474.5
24-Sep-17 3:00	5.6	212.3	10.0	7.4	98.4	0.0	0.0	474.8
24-Sep-17 4:00	5.5	209.2	10.8	7.5	98.5	0.0	0.0	475.1
24-Sep-17 5:00	4.6	219.9	12.1	7.5	98.5	0.0	0.0	475.1
24-Sep-17 6:00	3.3	202.3	14.7	7.5	98.5	0.0	0.0	475.1
24-Sep-17 7:00	2.5	204.6	11.9	7.3	98.5	3.7	0.0	475.3
24-Sep-17 8:00	3.2	204.4	8.2	7.4	98.2	39.9	0.0	475.3
24-Sep-17 9:00	4.4	183.9	8.4	7.6	96.0	76.4	0.0	475.4
24-Sep-17 10:00	4.3	164.8	18.4	7.9	93.6	104.7	0.0	475.6
24-Sep-17 11:00	5.9	177.3	9.8	7.8	96.0	177.7	0.0	475.6
24-Sep-17 12:00	6.2	191.5	9.6	7.8	97.2	196.9	0.0	475.5
24-Sep-17 13:00	4.7	202.3	10.1	8.0	97.0	175.6	0.0	475.7
24-Sep-17 14:00	3.9	213.8	15.5	8.0	97.6	188.4	0.0	475.9
24-Sep-17 15:00	4.6	216.9	11.5	8.0	97.9	98.0	0.0	476.3
24-Sep-17 16:00	4.6	219.5	13.7	7.8	98.1	62.4	0.0	477.1
24-Sep-17 17:00	4.1	217.7	11.9	7.9	98.2	58.6	0.0	477.1
24-Sep-17 18:00	4.4	222.3	10.4	7.8	98.3	18.3	0.0	477.3
24-Sep-17 19:00	4.0	213.2	10.9	7.7	98.3	2.6	0.0	477.3
24-Sep-17 20:00	3.6	200.6	12.1	7.4	98.4	0.0	0.0	477.4
24-Sep-17 21:00	4.5	196.9	10.8	7.4	95.3	0.0	0.0	477.3
24-Sep-17 22:00	4.3	210.6	12.5	7.1	97.0	0.0	0.0	477.4
24-Sep-17 23:00	3.8	218.5	10.8	7.0	98.2	0.0	0.0	477.8
25-Sep-17 0:00	3.1	209.9	10.2	6.9	98.3	0.0	0.0	477.9
25-Sep-17 1:00	3.0	201.4	10.7	6.9	98.3	0.0	0.0	477.9
25-Sep-17 2:00	3.1	201.5	9.8	6.9	97.8	0.0	0.0	478.0
25-Sep-17 3:00	2.9	211.5	9.8	6.7	97.9	0.0	0.0	478.1
25-Sep-17 4:00	2.9	208.1	10.0	6.6	98.3	0.0	0.0	478.3
25-Sep-17 5:00	3.1	211.1	6.2	6.5	98.4	0.0	0.0	478.6
25-Sep-17 6:00	3.6	202.9	6.9	6.5	98.4	0.0	0.0	478.6
25-Sep-17 7:00	3.5	196.0	9.5	6.8	98.4	1.8	0.0	478.6
25-Sep-17 8:00	3.7	208.1	8.7	6.9	98.4	18.0	0.0	478.9
25-Sep-17 9:00	3.2	219.6	6.4	7.0	98.4	65.2	0.0	479.0
25-Sep-17 10:00	3.3	213.7	7.3	7.3	98.3	156.0	0.0	479.1
25-Sep-17 11:00	3.2	216.7	7.5	7.5	98.1	196.4	0.0	479.1



Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
	Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
25-Sep-17 12:00	3.4	223.3	8.1	7.8	98.0	268.7	0.0	479.2
25-Sep-17 13:00	2.6	230.5	9.5	8.1	97.9	278.9	0.0	479.2
25-Sep-17 14:00	2.9	222.9	12.5	8.4	97.9	276.5	0.0	479.2
25-Sep-17 15:00	3.4	225.8	11.6	8.8	97.5	373.7	0.0	479.1
25-Sep-17 16:00	3.7	224.7	9.5	9.0	97.4	274.8	0.0	479.1
25-Sep-17 17:00	4.1	230.3	12.1	9.0	97.7	131.5	0.0	479.1
25-Sep-17 18:00	3.9	223.1	10.9	8.7	98.1	35.8	0.0	479.1
25-Sep-17 19:00	1.3	188.0	21.2	8.2	98.3	7.4	0.0	479.0
25-Sep-17 20:00	1.4	181.6	15.7	8.0	97.8	0.0	0.0	479.2
25-Sep-17 21:00	2.1	170.8	18.1	7.8	95.7	0.0	0.0	479.2
25-Sep-17 22:00	2.0	185.7	21.9	7.8	95.8	0.0	0.0	479.2
25-Sep-17 23:00	2.8	192.6	9.8	8.0	93.0	0.0	0.0	479.2
26-Sep-17 0:00	2.8	193.4	10.2	8.3	91.8	0.0	0.0	479.2
26-Sep-17 1:00	4.0	197.9	9.1	8.2	93.5	0.0	0.0	479.1
26-Sep-17 2:00	3.5	191.7	12.7	8.3	93.9	0.0	0.0	479.4
26-Sep-17 3:00	5.4	185.1	7.7	8.2	94.1	0.0	0.0	481.2
26-Sep-17 4:00	3.6	189.5	10.1	7.5	97.0	0.0	0.0	482.2
26-Sep-17 5:00	3.0	188.4	13.6	7.3	96.2	0.0	0.0	483.5
26-Sep-17 6:00	4.4	194.3	16.0	7.3	97.5	0.0	0.0	486.8
26-Sep-17 7:00	5.7	205.6	12.7	7.3	98.2	0.2	0.0	489.3
26-Sep-17 8:00	5.8	208.5	14.7	7.2	98.3	7.5	0.0	491.7
26-Sep-17 9:00	6.2	208.7	13.3	7.2	98.4	18.2	0.0	493.9
26-Sep-17 10:00	6.5	209.7	13.9	7.3	98.4	41.6	0.0	497.5
26-Sep-17 11:00	5.5	214.3	10.8	7.5	98.4	72.5	0.0	498.4
26-Sep-17 12:00	5.5	213.7	10.1	7.7	98.4	83.2	0.0	499.7
26-Sep-17 13:00	5.4	216.4	9.3	8.0	98.4	78.7	0.0	500.8
26-Sep-17 14:00	6.0	201.7	10.6	8.3	98.3	106.9	0.0	502.8
26-Sep-17 15:00	6.3	199.1	10.1	8.5	98.3	71.9	0.0	504.0
26-Sep-17 16:00	5.9	203.4	10.9	8.6	98.4	34.6	0.0	507.3
26-Sep-17 17:00	4.9	207.9	13.0	8.7	98.4	19.0	0.0	509.0
26-Sep-17 18:00	5.0	207.0	13.8	8.8	98.5	7.7	0.0	511.0
26-Sep-17 19:00	5.5	212.7	12.0	8.9	98.5	0.7	0.0	513.7
26-Sep-17 20:00	6.5	205.5	10.8	9.0	98.5	0.0	0.0	516.0
26-Sep-17 21:00	7.2	197.6	10.8	9.1	98.5	0.0	0.0	516.4
26-Sep-17 22:00	6.3	201.4	11.1	9.2	98.5	0.0	0.0	518.1
26-Sep-17 23:00	6.8	207.6	10.9	9.2	98.5	0.0	0.0	520.0
27-Sep-17 0:00	6.3	208.3	10.0	9.3	98.5	0.0	0.0	521.3
27-Sep-17 1:00	7.8	194.6	9.4	9.2	98.5	0.0	0.0	521.7
27-Sep-17 2:00	7.1	191.8	8.6	9.1	98.5	0.0	0.0	522.2
27-Sep-17 3:00	5.5	204.1	8.9	9.1	98.5	0.0	0.0	522.7
27-Sep-17 4:00	3.1	207.8	11.4	9.0	98.5	0.0	0.0	522.7
27-Sep-17 5:00	3.1	211.2	11.0	8.9	98.6	0.0	0.0	522.8
27-Sep-17 6:00	3.6	223.3	16.3	8.9	98.6	0.0	0.0	523.0
27-Sep-17 7:00	3.2	216.6	13.7	8.8	98.6	0.8	0.0	523.1
27-Sep-17 8:00	3.7	210.0	13.5	8.5	98.6	9.9	0.0	523.3
27-Sep-17 9:00	3.0	208.6	13.1	8.5	98.6	22.4	0.0	523.5
27-Sep-17 10:00	4.2	193.4	13.2	8.6	98.5	97.0	0.0	523.5
27-Sep-17 11:00	4.3	190.7	14.1	8.9	97.9	196.1	0.0	523.4
27-Sep-17 12:00	3.9	192.2	13.7	9.5	93.0	184.0	0.0	523.4
27-Sep-17 13:00	5.1	190.1	11.2	9.7	90.1	155.4	0.0	523.4
27-Sep-17 14:00	5.6	183.9	12.5	9.8	89.9	260.6	0.0	523.5
27-Sep-17 15:00	7.2	186.8	9.3	9.7	89.0	212.5	0.0	523.1
27-Sep-17 16:00	7.8	177.5	8.4	10.4	79.9	187.2	0.0	523.3
27-Sep-17 17:00	5.7	164.8	31.0	10.0	83.9	78.2	0.0	523.3

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean
27-Sep-17 18:00	3.5	179.5	12.4	9.8	83.3	17.7	0.0	523.2
27-Sep-17 19:00	1.5	214.6	33.0	10.1	80.7	2.3	0.0	523.3
27-Sep-17 20:00	1.8	237.0	45.4	10.8	74.0	0.0	0.0	523.2
27-Sep-17 21:00	2.7	230.6	30.6	10.4	78.3	0.0	0.0	523.2
27-Sep-17 22:00	2.7	174.8	33.7	10.1	81.9	0.0	0.0	523.2
27-Sep-17 23:00	3.0	180.3	17.1	9.7	85.5	0.0	0.0	523.3
28-Sep-17 0:00	3.4	177.6	14.6	9.7	86.4	0.0	0.0	523.6
28-Sep-17 1:00	5.1	182.7	10.2	9.6	87.7	0.0	0.0	524.1
28-Sep-17 2:00	5.0	186.0	11.3	9.4	89.0	0.0	0.0	524.6
28-Sep-17 3:00	2.9	196.0	21.1	8.8	95.0	0.0	0.0	524.8
28-Sep-17 4:00	3.7	198.3	15.4	9.1	92.3	0.0	0.0	525.4
28-Sep-17 5:00	3.8	194.0	12.8	8.8	96.6	0.0	0.0	526.4
28-Sep-17 6:00	4.9	188.6	10.4	9.0	96.0	0.0	0.0	527.5
28-Sep-17 7:00	3.6	195.4	13.9	8.8	97.6	0.5	0.0	529.1
28-Sep-17 8:00	2.9	195.9	13.0	8.6	97.5	7.8	0.0	530.9
28-Sep-17 9:00	4.1	176.6	12.0	8.9	95.2	32.3	0.0	531.2
28-Sep-17 10:00	3.2	202.2	19.1	8.7	95.9	39.1	0.0	532.7
28-Sep-17 11:00	4.1	212.4	12.3	8.5	97.8	46.8	0.0	536.5
28-Sep-17 12:00	2.9	210.1	10.4	8.5	97.9	86.3	0.0	538.3
28-Sep-17 13:00	2.9	217.0	11.3	8.6	98.0	95.6	0.0	539.4
28-Sep-17 14:00	1.5	253.0	14.6	8.6	98.1	73.2	0.0	541.1
28-Sep-17 15:00	0.5	15.6	40.0	8.5	98.1	74.4	0.0	542.6
28-Sep-17 16:00	1.8	226.0	30.2	8.5	98.0	50.8	0.0	544.5
28-Sep-17 17:00	1.8	236.2	14.4	8.3	98.2	32.7	0.0	547.7
28-Sep-17 18:00	1.7	275.0	15.9	7.9	98.3	13.6	0.0	552.3
28-Sep-17 19:00	1.6	254.4	26.8	7.6	98.4	0.9	0.0	555.3
28-Sep-17 20:00	2.2	224.0	7.8	7.6	98.5	0.0	0.0	555.9
28-Sep-17 21:00	2.1	207.8	12.1	7.4	98.5	0.0	0.0	556.6
28-Sep-17 22:00	1.1	181.5	14.1	6.9	98.5	0.0	0.0	557.1
28-Sep-17 23:00	1.0	343.3	5.2	6.8	98.5	0.0	0.0	557.4
29-Sep-17 0:00	0.9	334.0	17.4	6.6	98.4	0.0	0.0	558.9
29-Sep-17 1:00	1.1	1.4	6.5	6.3	98.2	0.0	0.0	560.2
29-Sep-17 2:00	2.0	31.2	6.1	6.5	98.1	0.0	0.0	561.4
29-Sep-17 3:00	1.9	21.2	6.3	6.5	98.1	0.0	0.0	562.5
29-Sep-17 4:00	1.9	36.0	11.2	6.3	97.5	0.0	0.0	563.1
29-Sep-17 5:00	1.4	18.9	18.9	6.3	97.8	0.0	0.0	563.1
29-Sep-17 6:00	0.8	221.3	33.8	6.2	98.3	0.0	0.0	563.2
29-Sep-17 7:00	0.8	207.7	43.5	6.2	98.4	0.9	0.0	563.2
29-Sep-17 8:00	0.8	323.9	28.6	6.2	98.4	23.5	0.0	563.6
29-Sep-17 9:00	0.5	270.0	14.3	6.4	98.4	42.0	0.0	563.8
29-Sep-17 10:00	1.1	213.7	19.8	6.3	98.4	78.5	0.0	564.7
29-Sep-17 11:00	1.2	235.9	13.9	6.5	98.4	130.2	0.0	564.8
29-Sep-17 12:00	1.8	226.9	15.8	6.5	98.3	137.8	0.0	565.7
29-Sep-17 13:00	3.3	216.2	11.8	6.3	98.4	104.1	0.0	567.5
29-Sep-17 14:00	5.7	226.7	8.4	6.1	98.5	85.2	0.0	568.3
29-Sep-17 15:00	5.3	224.1	9.6	5.8	98.5	104.3	0.0	568.9
29-Sep-17 16:00	5.6	230.1	9.3	5.8	98.5	69.0	0.0	569.6
29-Sep-17 17:00	5.6	238.9	10.2	5.5	98.6	30.4	0.0	569.9
29-Sep-17 18:00	5.8	231.3	9.9	5.0	98.6	26.2	0.0	570.3
29-Sep-17 19:00	5.1	229.4	9.7	4.8	98.7	1.6	0.0	570.3
29-Sep-17 20:00	5.6	241.1	8.7	4.4	98.7	0.0	0.0	570.4
29-Sep-17 21:00	5.1	220.5	11.6	4.0	98.8	0.0	0.0	570.6
29-Sep-17 22:00	4.6	220.7	8.2	3.7	98.8	0.0	0.0	570.8
29-Sep-17 23:00	5.2	228.0	7.3	3.4	98.8	0.0	0.0	570.8

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
	Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
30-Sep-17 0:00	4.5	228.9	7.3	3.1	98.8	0.0	0.0	570.9
30-Sep-17 1:00	4.5	228.9	9.9	2.9	98.8	0.0	0.0	570.8
30-Sep-17 2:00	4.3	216.8	10.3	2.5	98.9	0.0	0.0	570.9
30-Sep-17 3:00	3.4	200.6	14.6	2.3	98.9	0.0	0.0	571.2
30-Sep-17 4:00	3.0	218.0	12.9	2.3	98.9	0.0	0.0	571.3
30-Sep-17 5:00	2.6	212.8	13.4	2.2	98.9	0.0	0.0	571.6
30-Sep-17 6:00	3.5	205.0	10.8	1.8	98.9	0.0	0.0	571.6
30-Sep-17 7:00	2.1	229.8	14.5	1.9	98.7	1.2	0.0	571.7
30-Sep-17 8:00	2.5	213.0	19.8	1.9	98.5	19.8	0.0	571.7
30-Sep-17 9:00	2.2	231.8	15.8	1.9	98.2	90.7	0.0	571.8
30-Sep-17 10:00	0.9	197.8	38.1	2.6	94.8	292.1	0.0	572.4
30-Sep-17 11:00	1.9	221.2	22.4	3.3	88.3	453.3	0.0	572.3
30-Sep-17 12:00	2.2	255.9	19.4	3.3	88.4	293.5	0.0	571.7
30-Sep-17 13:00	1.9	256.0	21.5	3.6	87.1	345.6	0.0	571.9
30-Sep-17 14:00	1.6	251.9	27.9	4.4	83.6	401.3	0.0	571.8
30-Sep-17 15:00	2.8	241.7	25.5	4.7	83.1	474.4	0.0	571.7
30-Sep-17 16:00	3.0	247.8	21.0	5.1	79.5	424.5	0.0	571.6
30-Sep-17 17:00	2.8	234.8	27.2	5.0	80.9	291.5	0.0	571.5
30-Sep-17 18:00	3.1	241.8	18.0	4.0	85.3	90.0	0.0	571.5
30-Sep-17 19:00	2.3	217.7	13.3	3.2	86.0	6.8	0.0	571.6
30-Sep-17 20:00	2.0	210.6	15.4	2.7	87.4	0.0	0.0	571.7
30-Sep-17 21:00	2.1	181.1	15.2	2.5	87.3	0.0	0.0	571.7
30-Sep-17 22:00	2.6	181.9	9.7	2.5	86.2	0.0	0.0	571.7
30-Sep-17 23:00	1.9	193.3	13.9	2.3	87.1	0.0	0.0	571.7
01-Oct-17 0:00	2.0	174.0	10.4	2.2	88.1	0.0	0.0	571.7
01-Oct-17 1:00	2.0	194.6	10.1	2.1	88.8	0.0	0.0	571.8
01-Oct-17 2:00	1.4	228.7	9.2	1.9	91.3	0.0	0.0	571.8
01-Oct-17 3:00	1.2	30.3	5.7	1.8	91.9	0.0	0.0	571.8
01-Oct-17 4:00	2.8	31.0	7.3	1.4	94.3	0.0	0.0	571.8
01-Oct-17 5:00	2.7	24.3	6.9	1.4	96.4	0.0	0.0	571.8
01-Oct-17 6:00	1.9	28.0	4.5	1.6	93.9	0.0	0.0	571.8
01-Oct-17 7:00	1.2	47.7	10.5	1.6	92.2	2.0	0.0	571.8
01-Oct-17 8:00	1.5	30.4	34.4	1.7	91.5	15.4	0.0	571.8
01-Oct-17 9:00	3.1	24.4	5.7	1.2	97.2	72.7	0.0	572.4
01-Oct-17 10:00	4.5	25.5	4.3	2.2	94.6	353.3	0.0	572.5
01-Oct-17 11:00	5.0	37.2	7.2	3.9	80.9	450.5	0.0	572.2
01-Oct-17 12:00	5.6	47.7	11.9	5.6	56.3	521.1	0.0	572.2
01-Oct-17 13:00	6.0	46.7	10.3	5.7	53.6	554.7	0.0	572.0
01-Oct-17 14:00	5.3	43.3	9.6	5.9	53.8	528.3	0.0	571.9
01-Oct-17 15:00	4.0	38.6	13.6	6.2	53.1	459.3	0.0	571.7
01-Oct-17 16:00	3.2	23.1	11.7	6.1	52.9	353.7	0.0	571.7
01-Oct-17 17:00	2.4	31.7	14.1	6.2	51.4	222.6	0.0	571.6
01-Oct-17 18:00	2.6	25.7	7.1	5.5	54.8	77.9	0.0	571.6
01-Oct-17 19:00	3.5	28.1	3.0	4.9	58.8	2.6	0.0	571.6
01-Oct-17 20:00	4.5	34.2	3.0	4.9	55.1	0.0	0.0	571.6
01-Oct-17 21:00	6.1	32.5	5.1	4.2	59.4	0.0	0.0	571.5
01-Oct-17 22:00	7.4	42.7	8.6	4.0	58.9	0.0	0.0	571.5
01-Oct-17 23:00	6.0	21.9	14.4	3.5	57.9	0.0	0.0	571.6
02-Oct-17 0:00	6.0	57.2	23.1	3.1	58.3	0.0	0.0	571.6
02-Oct-17 1:00	6.5	58.4	22.2	3.1	54.6	0.0	0.0	571.7
02-Oct-17 2:00	5.0	73.3	31.1	3.3	50.5	0.0	0.0	571.5
02-Oct-17 3:00	5.2	51.0	47.8	2.9	53.5	0.0	0.0	571.7
02-Oct-17 4:00	1.4	340.0	53.7	3.1	52.9	0.0	0.0	571.7
02-Oct-17 5:00	3.3	42.7	32.5	2.6	54.2	0.0	0.0	571.8

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
02-Oct-17 6:00	1.6	183.3	48.6	2.1	59.1	0.0	0.0	571.7
02-Oct-17 7:00	0.6	202.6	31.7	2.6	54.4	1.8	0.0	571.8
02-Oct-17 8:00	0.7	234.3	23.2	2.3	58.0	13.4	0.0	571.8
02-Oct-17 9:00	0.2	188.4	6.0	2.6	55.0	60.2	0.0	572.7
02-Oct-17 10:00	1.4	180.2	13.8	3.6	56.8	337.5	0.0	572.4
02-Oct-17 11:00	1.7	181.2	43.4	4.5	53.1	450.4	0.0	572.3
02-Oct-17 12:00	1.2	190.7	46.8	6.0	49.4	528.4	0.0	572.2
02-Oct-17 13:00	1.4	217.3	42.7	6.6	51.7	531.9	0.0	572.0
02-Oct-17 14:00	1.6	248.0	25.4	7.0	50.8	508.0	0.0	571.8
02-Oct-17 15:00	1.6	244.2	28.5	7.7	52.1	457.1	0.0	571.6
02-Oct-17 16:00	1.7	213.1	30.5	7.9	55.1	321.9	0.0	571.4
02-Oct-17 17:00	2.0	187.8	30.6	7.7	50.1	167.6	0.0	571.4
02-Oct-17 18:00	1.5	207.7	24.8	6.7	53.7	33.7	0.0	571.5
02-Oct-17 19:00	2.9	197.8	16.9	6.4	49.7	1.5	0.0	571.5
02-Oct-17 20:00	2.3	196.8	16.4	6.1	51.0	0.0	0.0	571.6
02-Oct-17 21:00	1.6	161.7	20.8	5.9	48.2	0.0	0.0	571.6
02-Oct-17 22:00	1.7	168.2	22.9	6.2	45.0	0.0	0.0	571.6
02-Oct-17 23:00	2.9	216.2	8.3	6.1	47.4	0.0	0.0	571.5
03-Oct-17 0:00	3.4	199.8	9.8	6.1	46.0	0.0	0.0	571.5
03-Oct-17 1:00	4.5	204.1	11.3	6.1	44.3	0.0	0.0	571.4
03-Oct-17 2:00	4.6	208.3	9.9	5.8	45.6	0.0	0.0	571.5
03-Oct-17 3:00	3.0	198.5	12.6	5.6	46.9	0.0	0.0	571.5
03-Oct-17 4:00	2.6	207.3	14.6	5.6	44.6	0.0	0.0	571.5
03-Oct-17 5:00	2.5	203.0	12.6	5.9	40.2	0.0	0.0	571.5
03-Oct-17 6:00	2.3	198.9	9.7	5.9	39.2	0.0	0.0	571.5
03-Oct-17 7:00	2.4	208.8	6.8	5.7	40.9	0.2	0.0	571.5
03-Oct-17 8:00	2.9	219.9	21.1	5.7	43.3	11.2	0.0	571.5
03-Oct-17 9:00	2.7	222.5	9.0	5.5	44.8	31.9	0.0	571.5
03-Oct-17 10:00	3.1	222.5	8.3	6.0	40.1	84.4	0.0	571.4
03-Oct-17 11:00	3.5	226.8	9.3	6.2	39.8	117.6	0.0	571.4
03-Oct-17 12:00	3.0	221.3	10.4	6.7	37.9	136.5	0.0	571.3
03-Oct-17 13:00	3.2	207.4	10.2	7.6	33.9	189.7	0.0	571.3
03-Oct-17 14:00	3.9	214.4	14.0	7.2	45.0	125.7	0.0	571.3
03-Oct-17 15:00	4.3	200.2	9.5	5.8	66.0	64.8	0.0	571.4
03-Oct-17 16:00	3.7	196.0	8.7	6.2	69.2	42.9	0.0	571.4
03-Oct-17 17:00	2.8	188.3	26.8	6.5	70.0	27.4	0.0	571.4
03-Oct-17 18:00	1.2	45.6	35.4	6.4	74.6	16.9	0.0	571.4
03-Oct-17 19:00	1.1	48.0	18.5	6.7	70.6	0.6	0.0	571.4
03-Oct-17 20:00	0.9	64.4	29.0	7.3	62.9	0.0	0.0	571.4
03-Oct-17 21:00	1.5	103.1	5.7	7.6	58.9	0.0	0.0	571.4
03-Oct-17 22:00	1.3	114.3	10.7	8.1	51.1	0.0	0.0	571.4
03-Oct-17 23:00	0.9	52.9	26.1	8.6	43.7	0.0	0.0	571.4
04-Oct-17 0:00	1.0	85.3	19.7	9.0	40.9	0.0	0.0	571.4
04-Oct-17 1:00	1.1	234.5	37.4	8.3	50.3	0.0	0.0	571.4
04-Oct-17 2:00	0.5	161.9	20.6	8.0	52.7	0.0	0.0	571.4
04-Oct-17 3:00	1.1	161.0	30.9	9.2	32.8	0.0	0.0	571.4
04-Oct-17 4:00	0.9	208.1	12.6	9.7	22.0	0.0	0.0	571.4
04-Oct-17 5:00	0.6	45.4	50.0	9.1	26.3	0.0	0.0	571.4
04-Oct-17 6:00	0.7	6.3	32.5	8.8	27.7	0.0	0.0	571.4
04-Oct-17 7:00	0.6	195.4	30.2	8.6	30.0	1.3	0.0	571.5
04-Oct-17 8:00	0.7	141.4	28.9	8.4	29.5	12.1	0.0	571.5
04-Oct-17 9:00	1.3	104.0	22.1	9.0	25.1	46.4	0.0	572.3
04-Oct-17 10:00	2.3	215.9	38.7	9.2	33.7	332.9	0.0	571.8
04-Oct-17 11:00	4.4	206.8	14.0	8.7	33.4	445.7	0.0	571.9

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
04-Oct-17 12:00	4.0	207.8	13.9	9.2	33.5	520.4	0.0	571.8
04-Oct-17 13:00	3.1	220.2	17.1	10.5	33.2	553.6	0.0	571.8
04-Oct-17 14:00	4.3	221.0	11.2	10.4	36.9	528.0	0.0	571.6
04-Oct-17 15:00	4.9	222.5	11.2	10.6	34.2	458.9	0.0	571.4
04-Oct-17 16:00	5.0	223.8	9.6	10.5	36.0	338.2	0.0	571.3
04-Oct-17 17:00	4.1	209.7	15.5	9.9	40.0	198.8	0.0	571.3
04-Oct-17 18:00	2.7	200.4	16.2	8.8	38.0	49.0	0.0	571.4
04-Oct-17 19:00	2.6	221.0	11.2	7.9	37.2	1.3	0.0	571.4
04-Oct-17 20:00	3.2	198.8	13.6	7.5	36.9	0.0	0.0	571.3
04-Oct-17 21:00	2.5	185.9	19.3	7.0	37.5	0.0	0.0	571.5
04-Oct-17 22:00	1.7	165.9	16.9	7.1	36.9	0.0	0.0	571.6
04-Oct-17 23:00	4.1	188.4	8.3	7.0	33.9	0.0	0.0	571.5
05-Oct-17 0:00	4.0	204.8	10.3	7.1	31.2	0.0	0.0	571.5
05-Oct-17 1:00	4.1	195.4	11.3	6.8	32.4	0.0	0.0	571.5
05-Oct-17 2:00	4.2	198.7	9.8	6.7	31.4	0.0	0.0	571.5
05-Oct-17 3:00	4.6	201.9	9.2	6.3	32.8	0.0	0.0	571.5
05-Oct-17 4:00	3.8	220.7	11.6	6.0	34.0	0.0	0.0	571.5
05-Oct-17 5:00	3.8	203.4	13.3	5.6	34.9	0.0	0.0	571.5
05-Oct-17 6:00	5.2	197.6	11.0	5.6	34.6	0.0	0.0	571.5
05-Oct-17 7:00	5.2	199.5	11.4	5.4	34.9	0.6	0.0	571.4
05-Oct-17 8:00	5.6	203.7	10.7	5.2	35.8	17.9	0.0	571.3
05-Oct-17 9:00	6.4	203.6	10.0	5.1	37.3	34.6	0.0	571.6
05-Oct-17 10:00	7.1	195.2	9.6	5.3	41.4	91.0	0.0	571.3
05-Oct-17 11:00	10.0	184.6	8.8	5.3	47.2	105.2	0.0	571.3
05-Oct-17 12:00	8.8	199.8	11.3	3.6	70.0	88.3	0.0	571.4
05-Oct-17 13:00	5.3	213.4	11.7	2.0	90.4	57.8	0.0	571.8
05-Oct-17 14:00	5.2	220.9	11.1	1.6	97.2	42.0	0.0	572.3
05-Oct-17 15:00	5.4	227.1	9.8	1.5	97.9	27.6	0.0	573.3
05-Oct-17 16:00	5.3	226.6	7.8	1.5	98.1	25.1	0.0	573.4
05-Oct-17 17:00	5.5	219.2	9.4	1.7	98.2	15.5	0.0	573.6
05-Oct-17 18:00	5.3	213.2	9.3	1.8	98.3	3.4	0.0	573.8
05-Oct-17 19:00	5.8	214.2	13.1	2.0	98.4	0.0	0.0	574.3
05-Oct-17 20:00	6.9	209.5	17.4	2.4	97.9	0.0	0.0	574.7
05-Oct-17 21:00	7.7	197.2	12.9	2.0	98.0	0.0	0.0	575.5
05-Oct-17 22:00	7.7	197.7	10.1	1.7	97.6	0.0	0.0	576.5
05-Oct-17 23:00	6.0	207.0	11.3	1.4	98.3	0.0	0.0	577.4
06-Oct-17 0:00	5.6	206.0	11.1	1.2	98.4	0.0	0.0	578.7
06-Oct-17 1:00	6.3	198.7	11.4	1.5	98.5	0.0	0.0	579.6
06-Oct-17 2:00	5.2	212.5	14.2	1.4	98.5	0.0	0.0	581.8
06-Oct-17 3:00	6.6	222.3	11.6	0.5	98.5	0.0	0.0	583.8
06-Oct-17 4:00	5.5	199.3	17.9	0.0	98.5	0.0	0.0	584.3
06-Oct-17 5:00	6.5	197.3	13.5	0.0	98.5	0.0	0.0	584.8
06-Oct-17 6:00	4.9	192.6	13.7	0.2	95.7	0.0	0.0	585.0
06-Oct-17 7:00	3.4	228.8	16.2	0.0	97.7	0.2	0.0	585.4
06-Oct-17 8:00	4.4	196.5	20.7	0.1	97.8	9.7	0.0	585.6
06-Oct-17 9:00	4.6	202.8	12.5	0.1	97.8	41.7	0.0	585.9
06-Oct-17 10:00	4.9	196.3	13.0	0.4	96.4	93.3	0.0	588.2
06-Oct-17 11:00	5.0	201.0	13.0	0.6	97.1	155.6	0.0	589.1
06-Oct-17 12:00	5.5	202.0	14.1	0.7	97.5	163.1	0.0	589.4
06-Oct-17 13:00	5.3	211.6	13.8	1.2	97.4	250.6	0.0	589.3
06-Oct-17 14:00	6.2	212.9	11.1	1.4	97.9	146.5	0.0	589.4
06-Oct-17 15:00	5.8	218.9	8.8	1.0	98.2	82.6	0.0	589.6
06-Oct-17 16:00	5.6	212.7	9.8	0.9	98.3	76.3	0.0	589.7
06-Oct-17 17:00	4.9	213.1	9.2	0.7	98.4	57.2	0.0	589.7

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
	Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
06-Oct-17 18:00	4.2	207.3	11.1	0.6	98.4	12.0	0.0	589.8
06-Oct-17 19:00	4.0	211.7	12.1	0.5	98.5	0.3	0.0	590.0
06-Oct-17 20:00	4.1	198.4	10.3	0.5	98.5	0.0	0.0	590.5
06-Oct-17 21:00	3.3	204.8	9.9	0.3	98.6	0.0	0.0	590.8
06-Oct-17 22:00	3.3	211.8	7.6	0.1	98.6	0.0	0.0	591.0
06-Oct-17 23:00	3.1	202.4	7.5	0.0	98.6	0.0	0.0	591.3
07-Oct-17 0:00	3.3	206.6	8.1	0.0	98.6	0.0	0.0	591.4
07-Oct-17 1:00	3.3	206.1	8.5	0.0	98.6	0.0	0.0	591.6
07-Oct-17 2:00	3.2	208.7	7.4	0.0	98.6	0.0	0.0	591.6
07-Oct-17 3:00	3.0	212.3	8.1	0.0	98.6	0.0	0.0	591.6
07-Oct-17 4:00	2.8	204.0	8.7	0.0	98.6	0.0	0.0	591.6
07-Oct-17 5:00	2.5	206.6	8.0	0.0	98.6	0.0	0.0	591.6
07-Oct-17 6:00	2.2	209.2	10.3	0.0	98.6	0.0	0.0	591.6
07-Oct-17 7:00	1.9	212.5	8.6	0.1	98.6	0.6	0.0	591.6
07-Oct-17 8:00	0.4	235.1	5.1	0.1	98.6	17.2	0.0	591.6
07-Oct-17 9:00	1.9	352.4	7.2	0.2	98.5	69.1	0.0	591.6
07-Oct-17 10:00	2.7	354.1	9.0	0.2	98.3	127.1	0.0	592.9
07-Oct-17 11:00	2.1	345.7	9.9	0.5	97.8	270.6	0.0	593.5
07-Oct-17 12:00	1.5	15.6	14.8	1.4	97.0	490.5	0.0	593.8
07-Oct-17 13:00	1.8	310.5	19.0	1.8	96.8	351.1	0.0	593.0
07-Oct-17 14:00	2.3	324.7	23.7	1.9	93.2	266.8	0.0	592.9
07-Oct-17 15:00	1.5	285.2	47.0	3.2	85.6	515.4	0.0	592.9
07-Oct-17 16:00	1.5	287.5	42.1	3.7	81.4	373.8	0.0	592.8
07-Oct-17 17:00	1.8	293.3	23.1	3.6	80.3	193.5	0.0	592.7
07-Oct-17 18:00	1.7	209.8	24.3	2.7	86.7	53.7	0.0	592.7
07-Oct-17 19:00	1.7	213.2	12.5	2.1	88.9	1.1	0.0	592.8
07-Oct-17 20:00	1.7	187.5	8.7	2.0	89.2	0.0	0.0	592.8
07-Oct-17 21:00	1.3	186.8	19.2	1.8	89.0	0.0	0.0	592.8
07-Oct-17 22:00	1.5	199.7	16.0	1.6	91.7	0.0	0.0	592.8
07-Oct-17 23:00	1.2	220.6	11.2	1.4	92.3	0.0	0.0	592.8
08-Oct-17 0:00	1.5	210.7	10.8	1.3	93.4	0.0	0.0	592.8
08-Oct-17 1:00	3.2	206.2	6.1	0.7	94.6	0.0	0.0	592.9
08-Oct-17 2:00	3.1	223.2	12.1	0.8	94.1	0.0	0.0	592.8
08-Oct-17 3:00	3.3	204.9	6.6	0.9	91.6	0.0	0.0	592.8
08-Oct-17 4:00	4.3	197.4	8.0	1.1	87.6	0.0	0.0	592.8
08-Oct-17 5:00	4.6	205.3	10.1	0.7	90.7	0.0	0.0	592.7
08-Oct-17 6:00	4.6	200.7	13.4	0.2	96.5	0.0	0.0	592.8
08-Oct-17 7:00	4.5	205.7	13.1	0.0	98.0	0.3	0.0	592.8
08-Oct-17 8:00	4.3	210.7	12.7	0.0	98.2	11.5	0.0	592.8
08-Oct-17 9:00	4.5	204.4	9.5	0.2	97.5	42.2	0.0	592.8
08-Oct-17 10:00	5.6	213.9	9.7	0.3	96.9	66.1	0.0	592.7
08-Oct-17 11:00	6.2	212.7	10.2	0.4	98.1	39.5	0.0	593.0
08-Oct-17 12:00	7.6	211.0	10.6	0.5	98.3	63.8	0.0	593.0
08-Oct-17 13:00	7.1	207.7	11.6	0.4	98.4	49.1	0.0	593.0
08-Oct-17 14:00	6.5	203.8	11.2	0.4	98.4	36.9	0.0	593.4
08-Oct-17 15:00	8.7	212.5	10.6	0.4	98.5	31.7	0.0	593.9
08-Oct-17 16:00	7.4	206.7	12.0	0.1	98.5	23.5	0.0	594.7
08-Oct-17 17:00	6.7	208.5	11.2	-0.2	98.6	12.2	0.0	594.6
08-Oct-17 18:00	5.0	207.7	11.3	-0.2	98.6	3.2	0.0	594.6
08-Oct-17 19:00	3.8	252.9	21.1	-0.3	98.6	0.1	0.0	598.4
08-Oct-17 20:00	4.1	197.5	10.6	-0.3	98.6	0.0	0.0	598.6
08-Oct-17 21:00	9.2	197.0	11.0	-0.4	98.7	0.0	0.0	598.4
08-Oct-17 22:00	7.0	204.9	11.4	-0.3	98.6	0.0	0.0	598.5
08-Oct-17 23:00	7.1	198.0	11.6	-0.2	98.6	0.0	0.0	598.4

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
	Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
09-Oct-17 0:00	6.8	206.7	13.7	-0.4	98.6	0.0	0.0	598.4
09-Oct-17 1:00	5.7	212.7	12.4	-0.5	98.6	0.0	0.0	598.4
09-Oct-17 2:00	5.1	210.2	15.4	-0.4	98.6	0.0	0.0	598.4
09-Oct-17 3:00	4.1	221.3	11.9	-0.5	98.5	0.0	0.0	598.5
09-Oct-17 4:00	4.0	215.3	11.9	-0.7	98.5	0.0	0.0	598.5
09-Oct-17 5:00	3.6	204.9	11.8	-0.5	98.5	0.0	0.0	598.5
09-Oct-17 6:00	3.4	203.1	18.6	-0.8	98.4	0.0	0.0	598.4
09-Oct-17 7:00	3.8	202.8	17.8	-0.8	98.2	0.1	0.0	598.5
09-Oct-17 8:00	4.9	194.0	11.5	-0.9	98.2	9.1	0.0	600.0
09-Oct-17 9:00	3.4	206.2	10.1	-0.9	98.0	43.8	0.0	600.0
09-Oct-17 10:00	3.2	198.3	10.1	-0.6	97.8	82.5	0.0	600.2
09-Oct-17 11:00	3.3	196.8	8.1	-0.2	97.2	213.5	0.0	600.4
09-Oct-17 12:00	3.2	201.2	13.8	0.7	95.3	453.6	0.0	601.0
09-Oct-17 13:00	3.0	237.2	13.6	0.6	95.0	404.6	0.0	601.1
09-Oct-17 14:00	3.6	235.3	15.9	0.0	96.2	258.9	0.0	601.0
09-Oct-17 15:00	2.6	234.7	13.7	-0.4	96.9	138.3	0.0	601.1
09-Oct-17 16:00	2.9	216.5	10.8	0.0	95.5	263.1	0.0	601.2
09-Oct-17 17:00	2.8	229.5	11.5	0.0	93.8	172.5	0.0	601.1
09-Oct-17 18:00	1.9	230.2	17.7	-0.7	96.9	53.9	0.0	601.2
09-Oct-17 19:00	1.0	179.4	15.2	-1.1	97.6	0.5	0.0	601.2
09-Oct-17 20:00	1.3	177.7	24.1	-1.3	95.2	0.0	0.0	601.3
09-Oct-17 21:00	1.2	190.7	17.2	-1.4	95.7	0.0	0.0	601.3
09-Oct-17 22:00	0.8	96.5	24.9	-1.8	92.6	0.0	0.0	601.3
09-Oct-17 23:00	1.5	44.7	8.6	-1.6	91.1	0.0	0.0	601.3
10-Oct-17 0:00	2.4	19.6	9.1	-1.7	93.7	0.0	0.0	601.3
10-Oct-17 1:00	2.7	17.3	16.9	-1.7	95.7	0.0	0.0	601.3
10-Oct-17 2:00	2.0	9.8	15.5	-1.9	97.2	0.0	0.0	601.3
10-Oct-17 3:00	2.0	6.9	21.7	-2.2	97.4	0.0	0.0	601.3
10-Oct-17 4:00	2.7	359.8	34.5	-2.4	93.9	0.0	0.0	601.3
10-Oct-17 5:00	1.5	42.9	32.5	-2.7	97.6	0.0	0.0	601.3
10-Oct-17 6:00	3.1	14.4	18.5	-2.7	97.7	0.0	0.0	601.3
10-Oct-17 7:00	5.6	36.0	6.8	-1.7	89.6	0.2	0.0	601.2
10-Oct-17 8:00	6.9	37.8	5.0	-0.6	78.9	19.5	0.0	601.2
10-Oct-17 9:00	7.8	31.9	6.0	-0.2	74.6	72.1	0.0	601.1
10-Oct-17 10:00	7.8	34.6	6.5	0.1	70.1	247.1	0.0	601.5
10-Oct-17 11:00	8.4	45.4	6.6	0.7	62.5	330.6	0.0	601.7
10-Oct-17 12:00	7.9	51.1	10.7	1.0	59.2	469.7	0.0	601.6
10-Oct-17 13:00	8.1	47.8	6.8	1.2	57.5	503.0	0.0	601.5
10-Oct-17 14:00	6.9	44.0	9.5	1.4	57.2	483.0	0.0	601.4
10-Oct-17 15:00	7.3	41.5	6.9	1.4	58.9	414.8	0.0	601.1
10-Oct-17 16:00	8.1	50.6	7.2	1.4	59.1	290.8	0.0	601.0
10-Oct-17 17:00	7.6	51.2	7.3	1.2	61.0	178.4	0.0	601.0
10-Oct-17 18:00	8.8	49.0	4.6	0.7	62.5	43.4	0.0	601.0
10-Oct-17 19:00	8.3	57.0	8.6	0.3	62.8	0.4	0.0	601.0
10-Oct-17 20:00	7.6	47.3	13.7	-0.2	65.4	0.0	0.0	601.0
10-Oct-17 21:00	4.8	53.1	18.2	-0.9	71.0	0.0	0.0	601.1
10-Oct-17 22:00	1.3	106.9	48.2	-0.9	72.0	0.0	0.0	601.1
10-Oct-17 23:00	1.1	53.1	35.2	-1.0	74.3	0.0	0.0	601.1
11-Oct-17 0:00	1.0	142.4	25.9	-1.3	79.3	0.0	0.0	601.2
11-Oct-17 1:00	0.8	193.2	19.6	-1.5	79.0	0.0	0.0	601.2
11-Oct-17 2:00	0.7	167.2	29.3	-1.6	79.7	0.0	0.0	601.2
11-Oct-17 3:00	0.8	158.5	16.4	-1.6	78.1	0.0	0.0	601.1
11-Oct-17 4:00	1.9	200.6	8.2	-1.7	81.4	0.0	0.0	601.1
11-Oct-17 5:00	2.3	215.3	5.8	-1.9	82.2	0.0	0.0	601.1

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
11-Oct-17 6:00	2.0	223.4	8.5	-1.5	79.2	0.0	0.0	601.1
11-Oct-17 7:00	2.1	205.3	7.4	-1.4	77.6	0.0	0.0	601.1
11-Oct-17 8:00	1.5	233.8	13.1	-2.3	89.8	6.7	0.0	601.7
11-Oct-17 9:00	1.6	196.0	19.8	-2.3	92.3	48.8	0.0	601.7
11-Oct-17 10:00	1.8	214.1	10.9	-2.1	94.4	132.1	0.0	602.1
11-Oct-17 11:00	0.8	140.5	15.0	-1.4	92.6	178.6	0.0	602.5
11-Oct-17 12:00	1.6	34.7	16.4	-0.8	85.3	348.1	0.0	602.3
11-Oct-17 13:00	2.2	22.5	7.7	-0.9	86.6	379.8	0.0	602.5
11-Oct-17 14:00	2.7	359.1	11.6	-0.9	86.2	340.4	0.0	602.0
11-Oct-17 15:00	2.6	2.6	9.0	-0.9	85.7	248.9	0.0	602.0
11-Oct-17 16:00	3.7	15.3	6.7	-1.5	88.0	174.3	0.0	601.9
11-Oct-17 17:00	3.1	350.6	7.2	-1.0	83.9	144.6	0.0	601.8
11-Oct-17 18:00	2.9	0.8	12.2	-1.4	86.6	42.2	0.0	601.8
11-Oct-17 19:00	3.3	357.5	15.1	-1.8	88.6	0.2	0.0	601.7
11-Oct-17 20:00	4.4	21.4	10.0	-1.6	86.2	0.0	0.0	601.7
11-Oct-17 21:00	5.8	32.3	7.0	-1.0	77.9	0.0	0.0	601.7
11-Oct-17 22:00	4.8	33.0	8.0	-1.6	85.1	0.0	0.0	601.7
11-Oct-17 23:00	6.3	30.4	6.0	-1.3	74.0	0.0	0.0	601.6
12-Oct-17 0:00	4.9	28.6	10.7	-1.4	74.2	0.0	0.0	601.6
12-Oct-17 1:00	4.2	15.6	12.4	-1.6	76.0	0.0	0.0	601.6
12-Oct-17 2:00	4.1	31.0	8.4	-1.4	72.7	0.0	0.0	601.6
12-Oct-17 3:00	4.2	14.7	14.3	-1.5	71.1	0.0	0.0	601.5
12-Oct-17 4:00	6.5	33.2	7.8	-1.4	64.8	0.0	0.0	601.4
12-Oct-17 5:00	7.4	42.4	7.5	-1.2	59.6	0.0	0.0	601.4
12-Oct-17 6:00	7.8	38.6	5.9	-1.4	59.6	0.0	0.0	601.4
12-Oct-17 7:00	5.0	29.1	4.6	-1.4	59.8	0.2	0.0	601.4
12-Oct-17 8:00	5.4	37.2	4.9	-1.4	57.5	9.7	0.0	601.4
12-Oct-17 9:00	4.6	32.0	6.4	-1.5	57.9	21.8	0.0	601.4
12-Oct-17 10:00	3.8	12.4	9.3	-1.1	60.5	266.0	0.0	602.2
12-Oct-17 11:00	4.1	10.3	9.3	-1.0	65.3	386.9	0.0	602.2
12-Oct-17 12:00	4.0	18.4	3.7	-0.4	59.5	460.4	0.0	602.0
12-Oct-17 13:00	3.5	8.3	9.1	0.2	57.8	487.8	0.0	601.9
12-Oct-17 14:00	4.0	22.3	6.5	0.2	60.5	468.6	0.0	601.7
12-Oct-17 15:00	4.1	28.4	6.8	0.1	63.2	408.1	0.0	601.3
12-Oct-17 16:00	4.9	26.7	7.5	-0.4	66.4	198.4	0.0	601.1
12-Oct-17 17:00	8.0	47.6	6.2	-1.1	65.5	51.9	0.0	601.0
12-Oct-17 18:00	7.8	51.6	9.9	-1.3	54.5	16.2	0.0	601.0
12-Oct-17 19:00	7.8	42.4	7.0	-1.9	56.3	0.2	0.0	601.1
12-Oct-17 20:00	7.1	41.8	6.5	-2.2	57.8	0.0	0.0	601.1
12-Oct-17 21:00	8.4	42.9	7.4	-2.2	58.2	0.0	0.0	601.1
12-Oct-17 22:00	7.2	31.4	6.4	-2.5	60.4	0.0	0.0	601.1
12-Oct-17 23:00	6.8	44.1	9.4	-2.7	60.6	0.0	0.0	601.0
13-Oct-17 0:00	6.3	54.6	15.0	-2.6	59.5	0.0	0.0	601.0
13-Oct-17 1:00	4.2	66.7	25.8	-3.1	61.3	0.0	0.0	601.1
13-Oct-17 2:00	3.0	5.9	27.8	-3.2	62.8	0.0	0.0	601.1
13-Oct-17 3:00	1.1	328.7	33.9	-3.2	64.0	0.0	0.0	601.0
13-Oct-17 4:00	0.7	113.3	21.7	-3.5	61.5	0.0	0.0	601.1
13-Oct-17 5:00	1.3	174.3	31.5	-3.6	65.4	0.0	0.0	601.1
13-Oct-17 6:00	1.1	168.5	35.5	-3.7	66.8	0.0	0.0	601.0
13-Oct-17 7:00	0.4	186.5	29.7	-3.2	62.2	0.1	0.0	601.0
13-Oct-17 8:00	0.7	209.8	34.5	-3.2	63.6	8.8	0.0	600.9
13-Oct-17 9:00	1.9	191.1	20.6	-2.9	61.1	52.2	0.0	600.9
13-Oct-17 10:00	2.8	205.3	19.2	-2.6	60.4	96.8	0.0	600.9
13-Oct-17 11:00	3.3	220.2	14.2	-2.9	68.1	113.4	0.0	601.0



## Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
	Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
13-Oct-17 12:00	4.4	217.8	11.3	-3.4	80.8	131.5	0.0	601.1
13-Oct-17 13:00	5.7	220.2	8.0	-3.7	91.9	102.2	0.0	601.4
13-Oct-17 14:00	5.9	220.2	6.7	-3.7	95.5	114.2	0.0	601.4
13-Oct-17 15:00	5.4	213.8	9.0	-3.6	95.5	114.8	0.0	601.6
13-Oct-17 16:00	5.5	218.2	7.7	-3.4	95.7	92.8	0.0	601.8
13-Oct-17 17:00	6.3	214.5	6.8	-3.3	96.2	36.8	0.0	601.9
13-Oct-17 18:00	5.2	214.8	7.2	-3.1	96.4	6.7	0.0	602.8
13-Oct-17 19:00	4.4	217.7	8.6	-2.9	96.6	0.0	0.0	603.5
13-Oct-17 20:00	4.8	213.7	7.3	-2.7	96.8	0.0	0.0	603.6
13-Oct-17 21:00	4.8	209.0	9.4	-2.5	96.9	0.0	0.0	603.9
13-Oct-17 22:00	4.4	205.3	10.0	-2.2	97.1	0.0	0.0	604.1
13-Oct-17 23:00	3.7	208.3	9.6	-2.0	97.2	0.0	0.0	604.2
14-Oct-17 0:00	4.0	208.9	9.3	-1.9	97.3	0.0	0.0	604.2
14-Oct-17 1:00	4.6	207.0	9.1	-1.7	97.4	0.0	0.0	603.9
14-Oct-17 2:00	4.4	203.9	6.5	-1.5	97.5	0.0	0.0	603.5
14-Oct-17 3:00	3.9	204.7	10.8	-1.2	97.6	0.0	0.0	603.7
14-Oct-17 4:00	3.1	202.9	12.1	-1.1	97.7	0.0	0.0	604.4
14-Oct-17 5:00	3.9	211.8	12.2	-0.8	97.8	0.0	0.0	604.6
14-Oct-17 6:00	3.7	208.3	10.8	-0.6	97.9	0.0	0.0	604.8
14-Oct-17 7:00	4.0	217.6	9.2	-0.6	98.0	0.0	0.0	605.0
14-Oct-17 8:00	3.2	209.2	10.8	-0.5	98.0	7.3	0.0	605.2
14-Oct-17 9:00	3.7	212.8	8.6	-0.5	98.0	30.7	0.0	605.4
14-Oct-17 10:00	3.7	213.7	8.3	-0.3	97.7	146.3	0.0	605.7
14-Oct-17 11:00	3.8	205.5	7.5	0.1	96.5	359.2	3.0	606.2
14-Oct-17 12:00	3.8	217.3	8.0	-0.1	96.8	248.3	4.4	607.2
14-Oct-17 13:00	4.4	211.5	9.1	-0.2	97.0	221.9	1.1	608.2
14-Oct-17 14:00	3.7	222.1	10.5	0.2	96.5	274.6	1.7	608.9
14-Oct-17 15:00	4.8	214.1	9.9	0.1	96.7	183.1	6.1	609.3
14-Oct-17 16:00	6.2	208.6	8.9	-0.2	96.5	114.2	4.7	609.4
14-Oct-17 17:00	4.2	212.9	9.7	-0.4	93.7	39.2	5.4	609.5
14-Oct-17 18:00	5.1	191.7	10.6	-0.5	87.8	3.9	4.6	609.5
14-Oct-17 19:00	1.8	116.8	36.2	-0.9	90.6	0.0	3.2	609.4
14-Oct-17 20:00	2.0	22.8	48.1	-1.1	96.3	0.0	-	609.5
14-Oct-17 21:00	1.8	230.0	42.5	-0.8	97.7	0.0	-	611.1
14-Oct-17 22:00	3.4	211.7	22.6	-0.2	98.0	0.0	-	611.7
14-Oct-17 23:00	5.3	201.0	12.7	0.8	98.2	0.0	5.6	613.5
15-Oct-17 0:00	4.9	205.7	11.9	1.7	98.3	0.0	5.6	616.4
15-Oct-17 1:00	5.9	202.3	13.6	2.0	98.4	0.0	-	621.7
15-Oct-17 2:00	9.0	181.8	8.3	2.5	96.4	0.0	4.0	626.0
15-Oct-17 3:00	8.5	186.0	8.6	2.9	94.6	0.0	4.4	627.8
15-Oct-17 4:00	7.0	212.1	10.6	2.6	97.7	0.0	3.8	629.2
15-Oct-17 5:00	7.6	222.3	9.3	3.2	98.3	0.0	2.7	629.6
15-Oct-17 6:00	9.4	231.8	8.5	3.1	98.3	0.0	2.1	630.1
15-Oct-17 7:00	7.5	225.8	10.7	2.5	98.3	0.0	2.9	630.4
15-Oct-17 8:00	9.5	228.1	9.3	1.9	98.4	2.4	0.6	630.7
15-Oct-17 9:00	9.1	216.8	10.6	1.3	98.3	35.3	1.8	631.0
15-Oct-17 10:00	7.7	219.2	10.5	0.9	96.2	41.5	0.8	631.0
15-Oct-17 11:00	7.4	207.7	13.5	0.5	98.1	51.1	0.4	632.5
15-Oct-17 12:00	7.2	204.3	12.2	0.5	97.9	81.4	1.4	632.6
15-Oct-17 13:00	6.8	197.9	12.3	0.6	97.8	107.9	0.3	633.0
15-Oct-17 14:00	7.0	200.9	12.1	0.6	98.0	92.6	0.0	633.1
15-Oct-17 15:00	6.7	203.7	12.4	0.4	98.0	86.8	0.0	633.3
15-Oct-17 16:00	5.5	204.6	15.2	0.3	98.2	54.9	0.0	633.5
15-Oct-17 17:00	7.9	230.2	13.5	0.2	98.4	10.1	0.0	634.4

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean
15-Oct-17 18:00	5.5	209.0	9.3	-0.2	98.5	3.8	0.0	635.5
15-Oct-17 19:00	5.8	203.0	13.1	-0.1	98.5	0.0	0.0	635.9
15-Oct-17 20:00	8.4	195.6	11.7	0.1	98.5	0.0	0.0	636.0
15-Oct-17 21:00	7.1	197.7	10.7	0.0	98.4	0.0	0.0	636.1
15-Oct-17 22:00	5.9	197.0	8.9	-0.1	98.5	0.0	0.0	636.1
15-Oct-17 23:00	4.7	206.5	8.7	-0.2	98.5	0.0	0.0	636.1
16-Oct-17 0:00	4.1	223.5	9.0	-0.1	98.5	0.0	0.0	636.1
16-Oct-17 1:00	3.8	222.6	9.0	-0.4	98.6	0.0	0.0	635.1
16-Oct-17 2:00	2.6	225.5	0.9	-0.7	98.7	0.0	0.0	635.5
16-Oct-17 3:00	1.9	225.6	0.1	-0.6	98.6	0.0	0.0	635.6
16-Oct-17 4:00	1.5	225.6	0.2	-0.6	98.6	0.0	0.0	635.8
16-Oct-17 5:00	-	-	-	-0.8	98.5	0.0	0.0	637.0
16-Oct-17 6:00	-	-	-	-0.8	98.5	0.0	0.0	637.5
16-Oct-17 7:00	-	-	-	-0.8	98.4	0.0	0.0	638.1
16-Oct-17 8:00	-	-	-	-0.9	98.3	1.4	0.0	638.4
16-Oct-17 9:00	-	-	-	-0.9	98.2	13.4	0.0	638.5
16-Oct-17 10:00	-	-	-	-0.8	98.0	32.8	0.0	638.6
16-Oct-17 11:00	-	-	-	-0.6	97.9	40.6	1.4	638.9
16-Oct-17 12:00	-	-	-	-0.5	97.8	73.7	3.7	639.5
16-Oct-17 13:00	-	-	-	-0.4	97.8	104.0	2.0	640.1
16-Oct-17 14:00	-	-	-	-0.4	97.8	140.8	3.6	640.7
16-Oct-17 15:00	-	-	-	-0.1	97.9	118.7	4.1	641.2
16-Oct-17 16:00	-	-	-	-0.6	98.2	84.1	5.8	642.0
16-Oct-17 17:00	-	-	-	-0.4	98.1	89.9	4.7	642.0
16-Oct-17 18:00	-	-	-	-0.7	98.3	14.4	5.0	642.1
16-Oct-17 19:00	-	-	-	-1.0	98.4	0.0	4.2	642.1
16-Oct-17 20:00	-	-	-	-1.3	98.2	0.0	-	642.0
16-Oct-17 21:00	-	-	-	-1.6	98.0	0.0	7.0	641.9
16-Oct-17 22:00	-	-	-	-1.7	97.8	0.0	7.3	641.9
16-Oct-17 23:00	-	-	-	-2.0	97.7	0.0	7.2	641.8
17-Oct-17 0:00	-	-	-	-2.1	97.6	0.0	6.7	641.8
17-Oct-17 1:00	-	-	-	-2.4	97.4	0.0	6.1	641.8
17-Oct-17 2:00	-	-	-	-2.4	97.4	0.0	5.6	641.8
17-Oct-17 3:00	-	-	-	-2.4	97.4	0.0	4.6	641.8
17-Oct-17 4:00	-	-	-	-2.5	97.3	0.0	3.7	641.9
17-Oct-17 5:00	-	-	-	-2.5	97.3	0.0	3.0	641.9
17-Oct-17 6:00	-	-	-	-2.4	97.4	0.0	4.9	642.1
17-Oct-17 7:00	-	-	-	-2.5	97.3	0.0	4.9	642.1
17-Oct-17 8:00	-	-	-	-2.5	97.3	11.4	4.9	642.2
17-Oct-17 9:00	-	-	-	-2.2	97.2	52.7	5.4	642.2
17-Oct-17 10:00	-	-	-	-1.8	97.1	133.4	5.2	642.2
17-Oct-17 11:00	-	-	-	-1.9	97.1	136.0	5.8	642.2
17-Oct-17 12:00	-	-	-	-1.7	97.1	133.8	5.3	642.2
17-Oct-17 13:00	-	-	-	-1.4	97.1	178.8	3.7	642.2
17-Oct-17 14:00	-	-	-	-1.4	97.4	130.0	5.1	642.4
17-Oct-17 15:00	-	-	-	-1.3	97.4	125.5	3.8	642.7
17-Oct-17 16:00	-	-	-	-1.5	97.5	76.6	6.0	643.0
17-Oct-17 17:00	-	-	-	-1.7	97.6	27.3	5.0	643.2
17-Oct-17 18:00	-	-	-	-1.9	97.6	8.4	6.7	643.4
17-Oct-17 19:00	-	-	-	-2.1	97.6	0.0	7.1	643.5
17-Oct-17 20:00	-	-	-	-2.3	97.5	0.0	6.3	643.6
17-Oct-17 21:00	-	-	-	-2.4	97.4	0.0	7.0	643.6
17-Oct-17 22:00	-	-	-	-2.2	97.4	0.0	6.2	643.6
17-Oct-17 23:00	-	-	-	-2.0	97.4	0.0	6.1	643.6

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
18-Oct-17 0:00	-	-	-	-1.6	96.1	0.0	5.1	643.6
18-Oct-17 1:00	-	-	-	-1.6	91.9	0.0	2.5	643.7
18-Oct-17 2:00	-	-	-	-1.7	90.7	0.0	2.5	643.8
18-Oct-17 3:00	-	-	-	-1.8	93.0	0.0	1.3	643.9
18-Oct-17 4:00	-	-	-	-1.8	94.7	0.0	0.9	644.0
18-Oct-17 5:00	-	-	-	-1.8	95.2	0.0	4.2	644.4
18-Oct-17 6:00	-	-	-	-1.8	96.0	0.0	4.0	644.8
18-Oct-17 7:00	-	-	-	-1.7	96.0	0.0	2.9	645.1
18-Oct-17 8:00	-	-	-	-1.9	96.8	2.1	6.5	645.3
18-Oct-17 9:00	-	-	-	-1.9	97.0	20.8	7.9	645.3
18-Oct-17 10:00	-	-	-	-1.8	96.9	46.9	9.5	645.5
18-Oct-17 11:00	-	-	-	-1.6	96.3	88.0	7.1	645.6
18-Oct-17 12:00	-	-	-	-1.5	96.2	100.1	9.2	645.6
18-Oct-17 13:00	-	-	-	-1.5	96.2	78.7	10.1	645.7
18-Oct-17 14:00	-	-	-	-1.3	96.5	90.4	9.0	645.8
18-Oct-17 15:00	-	-	-	-1.2	97.0	77.4	10.8	646.0
18-Oct-17 16:00	-	-	-	-1.4	97.1	58.0	8.3	646.0
18-Oct-17 17:00	-	-	-	-1.4	97.3	21.8	11.3	646.1
18-Oct-17 18:00	-	-	-	-1.5	97.5	3.1	11.6	646.2
18-Oct-17 19:00	-	-	-	-1.5	97.5	0.0	8.6	646.2
18-Oct-17 20:00	-	-	-	-1.7	97.4	0.0	9.4	646.2
18-Oct-17 21:00	-	-	-	-1.7	97.3	0.0	11.0	646.2
18-Oct-17 22:00	-	-	-	-1.7	96.9	0.0	12.2	646.2
18-Oct-17 23:00	-	-	-	-1.5	97.3	0.0	12.5	646.3
19-Oct-17 0:00	-	-	-	-1.4	97.6	0.0	13.1	646.4
19-Oct-17 1:00	-	-	-	-1.3	97.7	0.0	13.1	646.4
19-Oct-17 2:00	-	-	-	-1.2	97.4	0.0	12.8	646.5
19-Oct-17 3:00	-	-	-	-1.2	97.3	0.0	8.3	646.5
19-Oct-17 4:00	-	-	-	-1.3	96.9	0.0	11.0	646.4
19-Oct-17 5:00	-	-	-	-1.0	94.3	0.0	11.2	646.4
19-Oct-17 6:00	-	-	-	-0.9	93.9	0.0	13.2	646.4
19-Oct-17 7:00	-	-	-	-1.1	96.4	0.0	12.8	646.5
19-Oct-17 8:00	-	-	-	-1.1	97.3	0.9	13.0	646.8
19-Oct-17 9:00	-	-	-	-0.9	97.5	10.7	14.4	647.1
19-Oct-17 10:00	-	-	-	-0.8	96.8	26.6	14.6	647.0
19-Oct-17 11:00	-	-	-	-0.2	95.6	45.9	14.6	647.4
19-Oct-17 12:00	-	-	-	0.2	94.3	49.9	14.2	649.1
19-Oct-17 13:00	0.8	144.7	24.3	0.2	94.3	142.7	14.2	656.2
19-Oct-17 14:00	1.8	183.0	20.5	-0.2	95.7	140.7	12.3	657.2
19-Oct-17 15:00	3.0	199.5	6.6	-0.6	97.3	85.8	14.0	658.5
19-Oct-17 16:00	3.5	205.1	6.9	-0.6	97.4	90.9	13.2	659.2
19-Oct-17 17:00	2.6	212.2	6.9	-0.8	97.8	36.8	13.0	659.5
19-Oct-17 18:00	1.4	214.0	9.5	-0.7	98.0	5.0	13.6	659.6
19-Oct-17 19:00	1.4	170.4	20.0	-0.7	97.9	0.0	14.2	659.8
19-Oct-17 20:00	1.8	208.4	6.6	-0.6	97.6	0.0	13.7	659.9
19-Oct-17 21:00	2.5	197.1	6.0	-0.7	97.9	0.0	12.8	659.9
19-Oct-17 22:00	2.6	200.7	5.6	-0.7	98.0	0.0	13.4	660.1
19-Oct-17 23:00	2.9	206.1	7.1	-0.7	98.1	0.0	13.7	660.2
20-Oct-17 0:00	3.5	213.1	7.2	-0.7	98.2	0.0	13.5	660.7
20-Oct-17 1:00	3.0	210.9	5.6	-1.1	98.1	0.0	14.7	661.0
20-Oct-17 2:00	3.1	225.1	7.4	-0.9	98.0	0.0	14.7	661.1
20-Oct-17 3:00	2.8	214.3	8.0	-1.0	98.0	0.0	14.9	661.1
20-Oct-17 4:00	2.5	213.9	6.0	-1.2	97.9	0.0	14.1	662.3
20-Oct-17 5:00	3.2	214.1	5.8	-1.4	97.9	0.0	17.3	663.5

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
	Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
20-Oct-17 6:00	3.8	212.3	10.6	-1.5	97.8	0.0	13.5	663.7
20-Oct-17 7:00	3.5	206.6	8.5	-1.7	97.6	0.0	16.9	663.8
20-Oct-17 8:00	4.2	220.1	9.1	-1.9	97.5	4.6	17.4	663.8
20-Oct-17 9:00	4.3	220.3	9.0	-1.9	97.1	47.0	17.4	663.9
20-Oct-17 10:00	3.6	209.7	9.9	-2.0	96.5	90.9	18.5	664.0
20-Oct-17 11:00	3.5	218.1	9.4	-2.0	96.4	101.4	22.5	664.6
20-Oct-17 12:00	5.4	181.7	10.1	-2.5	93.9	188.5	23.6	665.0
20-Oct-17 13:00	5.1	206.1	9.2	-1.9	95.0	217.1	22.5	664.9
20-Oct-17 14:00	4.0	220.4	10.9	-2.2	95.9	116.4	22.4	665.0
20-Oct-17 15:00	3.8	199.4	12.3	-2.5	95.9	147.8	23.1	666.2
20-Oct-17 16:00	3.6	196.4	12.8	-2.5	96.4	100.8	22.0	666.1
20-Oct-17 17:00	3.7	190.9	10.5	-2.8	96.4	24.6	22.5	666.2
20-Oct-17 18:00	3.3	198.1	11.7	-2.9	97.1	3.1	22.3	666.8
20-Oct-17 19:00	3.2	189.6	12.3	-3.1	96.3	0.0	21.9	666.8
20-Oct-17 20:00	3.7	184.0	11.3	-3.3	94.7	0.0	21.7	666.9
20-Oct-17 21:00	4.2	177.8	9.7	-3.3	89.9	0.0	22.3	666.7
20-Oct-17 22:00	4.3	184.2	12.5	-3.4	93.8	0.0	22.2	666.7
20-Oct-17 23:00	3.5	175.6	10.8	-3.5	95.7	0.0	21.2	666.7
21-Oct-17 0:00	3.2	183.9	14.2	-3.4	92.3	0.0	21.5	666.7
21-Oct-17 1:00	1.8	117.2	45.8	-3.4	91.9	0.0	21.3	666.7
21-Oct-17 2:00	1.4	22.6	29.3	-3.4	90.0	0.0	20.6	666.7
21-Oct-17 3:00	1.2	355.2	45.8	-3.6	94.1	0.0	20.3	666.7
21-Oct-17 4:00	2.3	12.0	42.1	-3.5	91.2	0.0	20.2	666.7
21-Oct-17 5:00	1.3	343.9	28.0	-3.2	87.6	0.0	20.3	666.6
21-Oct-17 6:00	2.2	20.1	35.6	-3.1	83.3	0.0	20.1	666.6
21-Oct-17 7:00	1.7	345.6	43.2	-3.0	78.4	0.0	19.8	666.6
21-Oct-17 8:00	3.9	270.7	55.9	-2.7	74.1	4.8	18.8	666.5
21-Oct-17 9:00	12.5	103.2	7.2	-1.4	60.0	24.7	11.4	666.2
21-Oct-17 10:00	12.6	97.7	7.3	-1.8	67.5	43.7	8.1	666.1
21-Oct-17 11:00	6.4	114.1	26.7	-2.6	83.6	57.5	11.7	666.1
21-Oct-17 12:00	2.8	174.2	51.1	-2.9	90.1	87.2	8.7	666.5
21-Oct-17 13:00	1.9	262.1	21.2	-3.0	95.6	86.4	8.2	667.4
21-Oct-17 14:00	1.6	270.6	19.7	-2.7	96.0	103.1	6.6	668.5
21-Oct-17 15:00	2.9	347.9	15.2	-2.7	95.1	80.6	12.9	668.8
21-Oct-17 16:00	3.5	22.4	11.6	-3.0	96.0	85.2	11.8	669.4
21-Oct-17 17:00	4.0	33.0	4.9	-3.2	96.6	32.6	13.9	669.6
21-Oct-17 18:00	4.3	34.3	5.1	-3.1	96.8	6.1	14.9	669.5
21-Oct-17 19:00	3.8	32.0	14.3	-2.8	94.5	0.0	14.4	669.5
21-Oct-17 20:00	3.4	23.8	13.8	-2.2	88.8	0.0	14.6	669.4
21-Oct-17 21:00	3.2	34.7	4.5	-2.2	87.0	0.0	14.6	669.4
21-Oct-17 22:00	3.8	34.2	5.3	-2.3	84.4	0.0	14.3	669.3
21-Oct-17 23:00	3.9	34.3	5.2	-2.0	81.5	0.0	13.2	669.3
22-Oct-17 0:00	3.4	36.8	5.8	-1.7	78.3	0.0	13.9	669.3
22-Oct-17 1:00	3.2	41.1	9.2	-1.8	78.6	0.0	13.6	669.3
22-Oct-17 2:00	2.5	35.6	6.4	-1.7	78.0	0.0	13.2	669.3
22-Oct-17 3:00	2.7	37.8	7.1	-1.5	75.9	0.0	12.7	669.2
22-Oct-17 4:00	2.7	34.6	7.0	-1.5	75.2	0.0	11.6	669.2
22-Oct-17 5:00	3.0	35.7	6.1	-1.5	75.5	0.0	13.0	669.2
22-Oct-17 6:00	3.2	34.9	6.7	-1.3	74.8	0.0	11.4	669.1
22-Oct-17 7:00	3.5	35.8	9.7	-1.3	76.2	0.0	12.6	669.2
22-Oct-17 8:00	1.6	22.0	15.6	-1.2	77.1	2.8	11.8	669.2
22-Oct-17 9:00	1.8	34.4	11.3	-1.3	85.8	45.5	10.7	669.2
22-Oct-17 10:00	2.7	33.2	11.7	-1.8	90.8	82.2	11.0	669.3
22-Oct-17 11:00	2.4	34.6	9.1	-1.4	90.9	110.4	14.1	669.9

Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s) Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
22-Oct-17 12:00	1.4	30.0	37.4	-1.0	93.3	196.9	14.2	670.9
22-Oct-17 13:00	4.6	193.7	7.7	-0.9	96.6	132.7	15.5	671.5
22-Oct-17 14:00	4.3	213.7	7.6	-0.6	96.4	184.7	16.1	671.6
22-Oct-17 15:00	4.0	207.4	7.3	-0.7	97.1	100.5	15.6	671.8
22-Oct-17 16:00	4.5	207.6	7.1	-0.7	97.6	53.7	14.0	672.3
22-Oct-17 17:00	5.4	214.8	7.1	-0.7	97.8	31.7	17.3	672.7
22-Oct-17 18:00	5.3	212.4	8.8	-0.6	98.1	3.4	17.5	672.9
22-Oct-17 19:00	3.7	212.2	6.6	-0.6	98.2	0.0	17.6	673.0
22-Oct-17 20:00	3.4	212.8	9.7	-0.8	98.2	0.0	19.1	673.1
22-Oct-17 21:00	2.6	202.5	8.7	-0.7	98.2	0.0	18.6	673.2
22-Oct-17 22:00	2.3	199.9	10.7	-0.9	98.2	0.0	18.8	673.2
22-Oct-17 23:00	2.6	200.8	8.5	-1.1	98.1	0.0	18.2	673.2
23-Oct-17 0:00	4.1	191.7	9.9	-1.1	98.0	0.0	18.4	673.1
23-Oct-17 1:00	3.9	172.3	8.6	-1.0	97.6	0.0	17.6	673.6
23-Oct-17 2:00	3.4	194.6	10.4	-1.0	98.0	0.0	20.0	674.5
23-Oct-17 3:00	3.6	207.0	16.2	-0.8	98.0	0.0	19.9	674.6
23-Oct-17 4:00	4.1	209.5	9.7	-0.8	98.1	0.0	19.1	674.6
23-Oct-17 5:00	3.8	215.6	8.7	-0.8	98.1	0.0	19.5	674.7
23-Oct-17 6:00	3.6	207.9	8.6	-0.7	98.1	0.0	19.8	674.7
23-Oct-17 7:00	2.0	213.4	16.3	-0.8	98.1	0.0	19.8	674.7
23-Oct-17 8:00	0.7	206.6	20.5	-0.7	97.7	1.3	19.9	674.7
23-Oct-17 9:00	0.6	104.0	3.3	-0.8	97.2	14.7	19.5	674.8
23-Oct-17 10:00	0.3	97.7	0.1	-1.0	97.6	28.2	18.6	675.4
23-Oct-17 11:00	1.7	65.6	20.9	-1.0	97.8	37.6	20.0	676.8
23-Oct-17 12:00	0.8	94.7	38.4	-0.6	97.8	29.5	25.5	681.3
23-Oct-17 13:00	3.6	352.3	38.4	-0.7	98.0	40.9	26.7	684.9
23-Oct-17 14:00	3.1	315.9	36.5	-0.6	98.0	45.4	27.9	691.5
23-Oct-17 15:00	2.1	315.1	54.9	-0.2	98.0	37.6	28.8	695.4
23-Oct-17 16:00	2.6	218.9	28.7	0.0	98.2	21.7	29.8	698.6
23-Oct-17 17:00	6.3	206.8	17.0	1.6	98.3	12.5	26.0	700.5
23-Oct-17 18:00	11.9	221.2	10.0	3.1	98.5	3.6	22.9	703.7
23-Oct-17 19:00	14.8	225.5	10.5	3.4	96.8	0.0	21.9	706.8
23-Oct-17 20:00	13.2	221.3	9.1	3.3	96.0	0.0	21.5	708.4
23-Oct-17 21:00	13.3	223.8	9.6	2.5	97.1	0.0	-	709.2
23-Oct-17 22:00	13.1	230.5	8.4	1.7	98.4	0.0	-	709.9
23-Oct-17 23:00	11.5	229.2	8.4	1.0	98.5	0.0	-	710.5
24-Oct-17 0:00	9.3	224.1	8.2	0.7	98.6	0.0	-	710.7
24-Oct-17 1:00	7.6	218.6	8.5	0.6	98.6	0.0	12.3	710.9
24-Oct-17 2:00	7.0	211.8	8.0	0.5	98.7	0.0	-	711.1
24-Oct-17 3:00	5.8	211.0	8.5	0.5	98.7	0.0	9.2	711.2
24-Oct-17 4:00	4.6	216.8	11.6	0.4	98.7	0.0	11.9	711.3
24-Oct-17 5:00	4.9	218.3	7.2	0.4	98.7	0.0	11.3	711.3
24-Oct-17 6:00	5.3	213.1	8.5	0.4	98.8	0.0	-	711.3
24-Oct-17 7:00	4.2	213.3	7.5	0.4	98.8	0.0	10.8	711.4
24-Oct-17 8:00	2.5	198.7	12.5	0.4	98.8	1.5	-	711.4
24-Oct-17 9:00	1.2	180.9	21.6	0.3	98.7	17.5	-	679.0
24-Oct-17 10:00	1.9	50.7	26.4	0.7	98.0	42.8	-	616.2
24-Oct-17 11:00	1.2	69.4	24.0	0.9	90.3	76.7	11.2	616.3
24-Oct-17 12:00	1.4	58.5	33.8	1.1	85.6	116.2	12.7	616.3
24-Oct-17 13:00	1.8	4.3	29.5	1.5	79.8	101.4	15.3	616.3
24-Oct-17 14:00	7.0	79.8	21.1	1.8	71.0	70.4	17.6	616.1
24-Oct-17 15:00	14.3	75.1	10.7	1.5	69.3	45.0	17.6	616.2
24-Oct-17 16:00	9.7	79.8	16.9	0.7	80.9	23.9	14.5	616.0
24-Oct-17 17:00	8.5	67.9	13.0	-0.6	94.8	8.5	17.4	616.2

## Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
24-Oct-17 18:00	7.6	75.2	24.4	-0.8	95.6	0.6	16.2	616.7
24-Oct-17 19:00	7.5	67.7	25.3	-0.8	94.1	0.0	19.8	616.6
24-Oct-17 20:00	12.4	40.0	3.5	-1.4	97.8	0.0	17.3	616.9
24-Oct-17 21:00	12.3	36.8	4.3	-1.4	97.9	0.0	17.9	616.9
24-Oct-17 22:00	11.9	38.9	5.5	-1.1	97.1	0.0	16.2	617.1
24-Oct-17 23:00	10.1	38.4	5.2	-1.1	95.0	0.0	17.5	617.1
25-Oct-17 0:00	6.1	27.8	6.4	-0.8	90.9	0.0	18.4	617.1
25-Oct-17 1:00	3.3	12.4	16.4	-1.3	95.5	0.0	18.3	617.2
25-Oct-17 2:00	2.1	28.3	28.1	-1.7	97.0	0.0	18.1	617.2
25-Oct-17 3:00	1.7	36.7	23.1	-1.3	92.6	0.0	18.1	617.2
25-Oct-17 4:00	2.1	27.1	13.9	-1.4	89.9	0.0	17.9	617.2
25-Oct-17 5:00	4.1	36.4	8.8	-1.7	90.5	0.0	17.4	617.2
25-Oct-17 6:00	4.1	27.2	4.3	-2.1	91.9	0.0	17.7	617.2
25-Oct-17 7:00	4.7	23.4	5.4	-2.6	91.4	0.0	17.1	617.2
25-Oct-17 8:00	2.4	26.4	12.7	-2.4	84.6	3.3	16.6	617.3
25-Oct-17 9:00	0.9	46.7	43.5	-2.4	81.6	16.4	17.2	617.4
25-Oct-17 10:00	0.9	185.2	21.0	-1.5	79.8	153.1	15.4	618.4
25-Oct-17 11:00	1.8	200.3	8.2	-0.8	80.9	311.6	14.9	618.4
25-Oct-17 12:00	0.9	138.3	27.6	0.0	73.6	381.8	17.6	618.2
25-Oct-17 13:00	1.5	44.2	21.3	-0.3	71.7	403.4	18.1	618.4
25-Oct-17 14:00	0.9	13.1	21.3	0.6	66.3	376.9	17.6	617.9
25-Oct-17 15:00	1.2	226.2	13.0	0.0	83.5	300.1	17.2	617.3
25-Oct-17 16:00	3.1	196.5	11.1	-1.1	91.3	194.6	18.8	617.2
25-Oct-17 17:00	4.4	202.4	11.4	-1.1	87.5	82.8	18.1	617.2
25-Oct-17 18:00	5.0	200.5	9.5	-1.7	95.0	2.6	17.8	617.3
25-Oct-17 19:00	4.6	204.5	11.9	-1.6	94.8	0.0	17.6	617.2
25-Oct-17 20:00	4.0	213.3	9.7	-1.4	92.1	0.0	17.9	617.2
25-Oct-17 21:00	3.4	223.9	6.7	-1.4	87.6	0.0	18.0	617.2
25-Oct-17 22:00	3.8	209.7	8.1	-1.2	85.8	0.0	17.6	617.2
25-Oct-17 23:00	3.2	234.4	7.7	-0.9	82.2	0.0	17.2	617.2
26-Oct-17 0:00	3.4	222.7	11.4	-0.7	77.4	0.0	17.7	617.2
26-Oct-17 1:00	4.5	204.2	10.4	-0.9	78.3	0.0	17.3	617.2
26-Oct-17 2:00	3.8	202.2	11.4	-0.8	75.4	0.0	18.3	617.2
26-Oct-17 3:00	3.5	191.2	11.8	-0.8	71.8	0.0	16.6	617.2
26-Oct-17 4:00	3.9	204.3	8.6	-1.0	74.1	0.0	17.1	617.3
26-Oct-17 5:00	4.1	208.0	5.9	-0.8	66.4	0.0	15.2	617.3
26-Oct-17 6:00	3.4	211.1	7.3	-0.8	64.3	0.0	16.7	617.3
26-Oct-17 7:00	3.1	214.9	5.6	-1.1	66.8	0.0	17.6	617.3
26-Oct-17 8:00	1.8	192.7	14.1	-0.5	58.7	2.2	17.2	617.3
26-Oct-17 9:00	1.3	183.0	19.3	-0.1	53.1	26.1	16.7	617.2
26-Oct-17 10:00	4.2	194.6	15.3	0.1	53.5	69.2	17.0	617.2
26-Oct-17 11:00	6.4	204.8	7.4	0.7	49.5	69.1	16.8	617.2
26-Oct-17 12:00	6.0	204.4	8.2	0.5	52.7	68.9	16.9	617.1
26-Oct-17 13:00	5.5	218.2	9.5	0.8	52.5	163.9	18.4	617.1
26-Oct-17 14:00	6.1	214.2	10.8	0.6	57.8	79.8	17.8	617.3
26-Oct-17 15:00	6.0	205.6	9.7	0.9	54.7	68.0	18.4	617.2
26-Oct-17 16:00	5.5	203.9	11.0	1.3	52.3	42.7	18.9	617.3
26-Oct-17 17:00	5.4	197.8	10.8	1.4	52.0	8.1	18.5	617.2
26-Oct-17 18:00	5.2	202.8	13.3	0.5	76.7	0.4	18.6	618.7
26-Oct-17 19:00	6.6	209.4	10.3	-0.4	94.8	0.0	17.2	620.0
26-Oct-17 20:00	4.0	213.3	7.9	-0.6	98.0	0.0	17.1	620.1
26-Oct-17 21:00	2.9	214.6	7.5	-0.4	98.2	0.0	18.3	620.5
26-Oct-17 22:00	2.6	223.2	5.1	-0.2	98.2	0.0	16.9	621.0
26-Oct-17 23:00	4.8	215.9	10.9	0.1	98.2	0.0	18.1	623.3

## Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)  Mean	Wind Direction (degrees True North)		Air Temperature (°C)  Mean	Relative Humidity (%)  Mean	Solar Radiation (W/m <sup>2</sup> )  Mean	Snow Depth (cm)  Mean	Unadjusted Geonor Precipitation Fluid Level (mm)  Sample
		Mean	Standard Deviation					
27-Oct-17 0:00	5.7	212.8	14.7	0.4	98.3	0.0	18.2	628.4
27-Oct-17 1:00	7.3	203.1	9.7	0.9	98.4	0.0	16.4	628.7
27-Oct-17 2:00	7.5	204.5	9.2	1.3	98.5	0.0	16.4	628.8
27-Oct-17 3:00	7.8	198.6	8.2	1.7	98.6	0.0	15.3	629.0
27-Oct-17 4:00	7.3	203.0	9.0	1.8	98.6	0.0	12.9	629.2
27-Oct-17 5:00	7.6	201.0	8.2	2.1	98.6	0.0	10.0	629.0
27-Oct-17 6:00	7.3	201.1	11.1	2.4	98.7	0.0	12.2	629.2
27-Oct-17 7:00	7.0	200.3	8.6	2.5	98.7	0.0	10.1	628.9
27-Oct-17 8:00	8.5	197.4	7.7	2.9	98.7	1.0	9.5	628.8
27-Oct-17 9:00	8.5	200.6	9.1	3.4	98.7	16.4	8.2	629.3
27-Oct-17 10:00	8.9	198.3	8.0	3.6	98.6	34.4	7.2	629.2
27-Oct-17 11:00	8.8	201.4	9.1	3.8	98.6	43.4	4.7	629.7
27-Oct-17 12:00	8.4	204.2	9.1	4.3	98.3	113.4	6.3	629.4
27-Oct-17 13:00	8.6	207.0	9.0	4.7	98.3	91.3	6.8	629.2
27-Oct-17 14:00	8.3	210.3	8.7	4.8	98.3	91.2	3.9	630.0
27-Oct-17 15:00	8.2	212.8	7.6	4.8	98.4	70.1	1.9	630.0
27-Oct-17 16:00	9.3	215.1	6.2	4.9	98.5	40.4	1.1	630.1
27-Oct-17 17:00	8.6	210.6	8.5	4.7	98.7	11.8	0.8	629.4
27-Oct-17 18:00	7.9	201.2	9.8	4.5	98.7	0.7	0.0	630.1
27-Oct-17 19:00	7.3	201.0	10.2	4.4	98.8	0.0	0.0	630.2
27-Oct-17 20:00	6.2	189.9	7.5	4.3	98.8	0.0	0.0	630.1
27-Oct-17 21:00	4.7	184.4	8.4	4.1	98.8	0.0	0.0	630.2
27-Oct-17 22:00	5.3	189.9	10.2	4.2	98.8	0.0	0.0	630.4
27-Oct-17 23:00	4.8	193.7	9.8	4.1	98.8	0.0	0.0	630.3
28-Oct-17 0:00	4.8	193.8	9.6	4.0	98.8	0.0	0.0	630.0
28-Oct-17 1:00	4.1	205.1	13.7	3.7	98.9	0.0	0.0	630.4
28-Oct-17 2:00	3.4	209.2	11.9	3.6	98.9	0.0	0.0	630.3
28-Oct-17 3:00	2.5	203.1	17.2	3.3	98.9	0.0	0.0	630.3
28-Oct-17 4:00	2.0	212.8	12.4	2.9	98.8	0.0	0.0	630.3
28-Oct-17 5:00	1.9	26.1	33.2	2.4	98.8	0.0	0.0	630.3
28-Oct-17 6:00	3.1	23.0	9.5	2.2	98.8	0.0	0.0	630.3
28-Oct-17 7:00	3.2	24.5	9.5	1.9	98.8	0.0	0.0	630.3
28-Oct-17 8:00	3.7	29.9	9.1	1.5	98.8	2.5	0.0	630.3
28-Oct-17 9:00	5.7	15.9	3.7	1.3	98.6	20.8	0.0	630.7
28-Oct-17 10:00	7.1	34.0	5.5	1.1	98.1	145.2	0.0	631.0
28-Oct-17 11:00	8.8	37.2	7.7	2.6	81.9	282.3	0.0	631.4
28-Oct-17 12:00	7.7	27.0	8.2	3.0	75.1	348.0	0.0	631.2
28-Oct-17 13:00	9.3	32.9	7.6	3.3	66.9	374.0	0.0	630.7
28-Oct-17 14:00	12.5	31.3	5.1	3.7	57.0	356.8	0.0	630.7
28-Oct-17 15:00	10.6	28.6	6.6	3.9	58.0	287.0	0.0	630.8
28-Oct-17 16:00	10.4	39.8	7.1	3.9	53.7	185.7	0.0	630.6
28-Oct-17 17:00	10.1	38.8	6.8	3.7	52.8	70.6	0.0	630.0
28-Oct-17 18:00	9.7	38.3	8.2	3.2	54.3	2.3	0.0	630.3
28-Oct-17 19:00	9.9	31.9	5.0	3.1	54.2	0.0	0.0	630.3
28-Oct-17 20:00	8.4	33.3	7.1	2.8	53.1	0.0	0.0	630.4
28-Oct-17 21:00	11.3	41.1	8.8	3.1	43.9	0.0	0.0	630.0
28-Oct-17 22:00	11.1	37.7	6.7	3.1	42.4	0.0	0.0	630.6
28-Oct-17 23:00	10.5	35.8	9.1	2.7	44.8	0.0	0.0	630.1
29-Oct-17 0:00	11.5	44.6	7.7	3.1	39.8	0.0	0.0	629.7
29-Oct-17 1:00	10.2	37.9	13.1	3.1	38.2	0.0	0.0	630.4
29-Oct-17 2:00	12.5	33.9	6.1	2.7	40.6	0.0	0.0	630.0
29-Oct-17 3:00	11.0	26.2	7.6	2.6	40.0	0.0	0.0	630.3
29-Oct-17 4:00	10.7	31.9	9.0	2.8	37.4	0.0	0.0	630.5
29-Oct-17 5:00	10.6	30.5	6.9	2.6	37.6	0.0	0.0	629.9

## Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
		Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
29-Oct-17 6:00	9.1	13.4	8.7	2.1	39.7	0.0	0.0	630.4
29-Oct-17 7:00	3.3	317.3	31.1	0.6	49.8	0.0	0.0	630.5
29-Oct-17 8:00	2.0	207.9	24.5	-0.7	63.0	2.9	0.0	630.6
29-Oct-17 9:00	1.3	249.6	40.2	0.3	51.0	21.9	0.0	630.6
29-Oct-17 10:00	2.6	180.7	8.6	-0.1	58.6	121.0	0.0	631.3
29-Oct-17 11:00	2.8	184.3	8.9	1.3	51.3	284.7	0.0	631.3
29-Oct-17 12:00	1.8	178.6	19.5	2.6	47.0	353.0	0.0	631.3
29-Oct-17 13:00	1.6	212.7	17.9	2.7	55.9	371.1	0.0	630.9
29-Oct-17 14:00	1.4	202.5	17.8	3.5	56.1	336.1	0.0	630.6
29-Oct-17 15:00	1.3	204.1	12.9	4.5	47.7	293.9	0.0	630.5
29-Oct-17 16:00	1.1	193.3	11.7	4.6	48.1	183.0	0.0	630.3
29-Oct-17 17:00	1.4	173.9	8.4	3.6	47.9	36.5	0.0	630.3
29-Oct-17 18:00	1.7	193.0	10.9	3.2	50.0	1.8	0.0	630.4
29-Oct-17 19:00	1.3	211.6	25.5	3.1	43.3	0.0	0.0	630.4
29-Oct-17 20:00	1.2	186.4	39.0	3.9	31.3	0.0	0.0	630.4
29-Oct-17 21:00	1.2	179.8	54.9	3.9	31.6	0.0	0.0	630.4
29-Oct-17 22:00	1.2	141.4	48.9	3.7	35.0	0.0	0.0	630.4
29-Oct-17 23:00	1.0	144.3	42.3	4.3	31.1	0.0	0.0	630.4
30-Oct-17 0:00	1.4	189.3	69.1	4.1	30.4	0.0	0.0	630.4
30-Oct-17 1:00	1.5	181.0	36.9	4.8	26.9	0.0	0.0	630.4
30-Oct-17 2:00	3.4	207.3	21.0	6.3	20.4	0.0	0.0	630.4
30-Oct-17 3:00	2.9	214.9	12.1	6.4	18.3	0.0	0.0	630.3
30-Oct-17 4:00	4.3	195.4	10.8	8.1	16.8	0.0	0.0	630.2
30-Oct-17 5:00	3.3	211.6	9.3	7.5	19.8	0.0	0.0	630.2
30-Oct-17 6:00	2.5	217.1	11.3	7.6	23.5	0.0	0.0	630.2
30-Oct-17 7:00	2.4	216.6	9.1	7.1	28.1	0.0	0.0	630.2
30-Oct-17 8:00	2.7	207.0	12.7	7.2	38.3	1.4	0.0	630.1
30-Oct-17 9:00	2.5	230.2	16.7	6.7	40.8	37.2	0.0	630.1
30-Oct-17 10:00	2.9	232.3	10.1	6.6	45.8	101.4	0.0	630.1
30-Oct-17 11:00	4.0	201.6	8.1	6.7	56.8	145.6	0.0	630.2
30-Oct-17 12:00	4.4	214.3	9.8	6.8	60.6	115.4	0.0	630.2
30-Oct-17 13:00	5.2	197.7	8.7	7.0	64.6	154.7	0.0	630.0
30-Oct-17 14:00	4.8	203.1	11.0	6.1	63.1	100.7	0.0	630.0
30-Oct-17 15:00	5.8	205.2	12.5	5.3	61.8	58.9	0.0	630.2
30-Oct-17 16:00	5.0	203.8	14.3	4.9	57.8	38.1	0.0	630.2
30-Oct-17 17:00	6.8	199.3	13.8	3.8	67.3	8.1	0.0	630.2
30-Oct-17 18:00	7.0	212.5	8.6	1.9	92.1	0.6	0.0	630.2
30-Oct-17 19:00	6.2	211.8	7.6	1.5	98.0	0.0	0.0	631.8
30-Oct-17 20:00	6.7	216.5	8.4	1.6	98.3	0.0	0.0	632.6
30-Oct-17 21:00	6.5	217.9	9.2	1.6	98.4	0.0	0.0	633.3
30-Oct-17 22:00	5.6	223.2	8.5	1.6	98.5	0.0	0.0	634.0
30-Oct-17 23:00	5.6	209.6	12.1	1.7	98.5	0.0	0.0	634.1
31-Oct-17 0:00	6.1	204.9	10.6	2.4	98.6	0.0	0.0	634.2
31-Oct-17 1:00	6.6	205.8	13.9	2.4	98.6	0.0	0.0	634.3
31-Oct-17 2:00	4.7	221.5	13.8	2.1	98.6	0.0	0.0	634.4
31-Oct-17 3:00	4.7	203.3	15.6	2.3	98.6	0.0	0.0	634.9
31-Oct-17 4:00	5.5	204.0	15.0	2.6	98.0	0.0	0.0	634.6
31-Oct-17 5:00	5.7	219.4	13.4	2.1	97.2	0.0	0.0	634.5
31-Oct-17 6:00	3.9	213.3	13.9	2.0	96.3	0.0	0.0	634.3
31-Oct-17 7:00	5.3	202.9	11.9	2.6	86.4	0.0	0.0	634.6
31-Oct-17 8:00	4.1	195.6	9.8	2.6	82.4	0.7	0.0	634.7
31-Oct-17 9:00	4.7	194.0	11.2	2.5	81.4	17.7	0.0	634.6
31-Oct-17 10:00	6.5	206.6	9.2	2.4	83.2	56.4	0.0	634.7
31-Oct-17 11:00	5.6	203.0	10.6	2.4	84.2	57.8	0.0	634.3
31-Oct-17 12:00	4.2	204.6	12.6	1.7	93.0	58.9	0.0	634.5
31-Oct-17 13:00	4.2	199.8	11.8	1.5	96.0	82.5	0.0	634.6
31-Oct-17 14:00	3.8	212.8	10.8	1.5	95.5	81.9	0.0	634.5
31-Oct-17 15:00	3.8	212.1	13.2	1.6	94.2	107.1	0.0	634.6



Appendix C2: Johnny Mountain November 2016 - October 2017 Hourly Meteorological Data

Timestamp	Wind Speed (m/s)	Wind Direction (degrees True North)		Air Temperature (°C)	Relative Humidity (%)	Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Unadjusted Geonor Precipitation Fluid Level (mm)
	Mean	Mean	Standard Deviation	Mean	Mean	Mean	Mean	Sample
31-Oct-17 16:00	2.9	220.9	13.6	1.2	96.7	62.2	0.0	634.6
31-Oct-17 17:00	1.4	223.9	18.7	1.0	96.0	13.5	0.0	634.6
31-Oct-17 18:00	1.2	211.4	29.7	0.8	95.5	1.0	0.0	634.7
31-Oct-17 19:00	2.6	44.9	25.8	0.5	95.6	0.0	0.0	634.7
31-Oct-17 20:00	4.2	17.3	7.8	0.2	96.5	0.0	0.0	634.8
31-Oct-17 21:00	3.7	12.2	10.1	-0.3	97.9	0.0	0.0	634.7
31-Oct-17 22:00	7.5	40.4	7.6	0.2	90.1	0.0	0.0	633.7
31-Oct-17 23:00	11.0	33.3	8.3	1.1	68.0	0.0	0.0	634.6

*Note: dash (-) = Missing or erroneous data that were removed*

### Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
11/1/2017 0:00	14.8	45.6	0.7	59.2	0.0	0.0	635.0
11/1/2017 1:00	13.8	43.7	0.1	59.4	0.0	0.0	634.4
11/1/2017 2:00	14.1	41.0	-0.3	58.1	0.0	0.0	634.5
11/1/2017 3:00	13.5	31.2	-0.4	53.6	0.0	0.0	634.5
11/1/2017 4:00	12.5	34.8	-0.9	55.7	0.0	0.0	634.9
11/1/2017 5:00	13.0	37.2	-1.3	54.2	0.0	0.0	634.5
11/1/2017 6:00	15.0	36.2	-1.7	53.0	0.0	0.0	634.7
11/1/2017 7:00	14.7	39.0	-1.9	51.0	0.0	0.0	634.6
11/1/2017 8:00	13.3	36.5	-2.4	53.9	1.1	0.0	633.8
11/1/2017 9:00	15.5	43.2	-3.0	50.8	14.6	0.0	634.8
11/1/2017 10:00	17.2	34.9	-3.5	44.1	41.5	0.0	635.2
11/1/2017 11:00	16.4	23.4	-4.0	45.0	92.2	0.0	634.9
11/1/2017 12:00	13.1	19.2	-4.0	49.4	268.5	0.0	635.9
11/1/2017 13:00	11.7	14.7	-3.7	46.4	406.5	0.0	635.9
11/1/2017 14:00	13.3	23.8	-3.8	41.0	369.4	0.0	635.1
11/1/2017 15:00	13.7	27.3	-4.1	38.8	248.8	0.0	635.1
11/1/2017 16:00	13.0	26.3	-4.6	40.3	48.6	0.0	635.0
11/1/2017 17:00	13.8	25.3	-4.8	41.3	19.4	0.0	634.0
11/1/2017 18:00	10.0	32.4	-5.2	43.5	1.0	0.0	635.0
11/1/2017 19:00	10.1	52.3	-5.4	40.8	0.0	0.0	634.6
11/1/2017 20:00	13.8	49.6	-5.6	38.7	0.0	0.0	634.4
11/1/2017 21:00	14.8	43.7	-6.0	37.8	0.0	0.0	635.2
11/1/2017 22:00	12.4	48.1	-6.2	37.2	0.0	0.0	635.0
11/1/2017 23:00	12.3	48.7	-6.6	39.1	0.0	0.0	634.8
11/2/2017 0:00	13.2	45.3	-6.8	40.0	0.0	0.0	635.7
11/2/2017 1:00	11.1	51.6	-7.1	41.4	0.0	0.0	635.3
11/2/2017 2:00	12.6	53.1	-7.2	42.6	0.0	0.0	634.2
11/2/2017 3:00	11.9	48.0	-7.5	44.5	0.0	0.0	635.1
11/2/2017 4:00	10.9	48.4	-7.7	43.9	0.0	0.0	635.0
11/2/2017 5:00	12.3	48.3	-7.9	43.2	0.0	0.0	635.0
11/2/2017 6:00	12.9	53.8	-8.1	42.7	0.0	0.0	635.4
11/2/2017 7:00	14.1	55.3	-8.2	41.9	0.0	0.0	635.2
11/2/2017 8:00	15.2	50.5	-8.4	43.1	1.3	0.0	634.9
11/2/2017 9:00	15.7	52.7	-8.4	43.9	13.9	0.0	635.0
11/2/2017 10:00	15.4	50.0	-8.5	44.6	50.8	0.0	634.6
11/2/2017 11:00	13.6	46.6	-8.2	44.2	206.6	0.0	636.5
11/2/2017 12:00	12.4	41.7	-7.8	43.9	322.3	0.0	635.8
11/2/2017 13:00	11.4	36.2	-7.4	44.1	341.3	0.0	635.7
11/2/2017 14:00	10.8	39.6	-7.2	44.3	318.1	0.0	635.1
11/2/2017 15:00	10.5	43.6	-7.1	43.4	251.9	0.0	635.3
11/2/2017 16:00	11.3	47.9	-7.1	43.0	152.3	0.0	635.5
11/2/2017 17:00	11.6	42.2	-7.1	40.9	44.9	0.0	635.1
11/2/2017 18:00	11.9	32.3	-7.3	40.1	0.8	0.0	634.7
11/2/2017 19:00	13.4	39.8	-7.5	41.5	0.0	0.0	634.2
11/2/2017 20:00	13.6	48.9	-7.3	38.7	0.0	0.0	634.4
11/2/2017 21:00	13.5	33.8	-7.5	38.9	0.0	0.0	635.3
11/2/2017 22:00	12.8	35.5	-7.1	35.1	0.0	0.0	635.0
11/2/2017 23:00	11.8	27.6	-7.4	37.3	0.0	0.0	635.3
11/3/2017 0:00	10.6	17.6	-7.5	37.8	0.0	0.0	635.3
11/3/2017 1:00	4.6	17.4	-8.4	46.1	0.0	0.0	635.2
11/3/2017 2:00	1.8	89.0	-8.5	45.5	0.0	0.0	635.3
11/3/2017 3:00	1.9	191.1	-9.1	51.5	0.0	0.0	635.3
11/3/2017 4:00	1.5	182.7	-8.9	49.0	0.0	0.0	635.3
11/3/2017 5:00	1.6	203.9	-8.7	46.7	0.0	0.0	635.3
11/3/2017 6:00	1.1	186.4	-8.8	47.4	0.0	0.0	635.3

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
11/3/2017 7:00	1.5	202.9	-9.0	48.5	0.0	0.0	635.3
11/3/2017 8:00	1.3	260.2	-8.8	46.9	0.9	0.0	635.3
11/3/2017 9:00	1.0	176.5	-8.6	46.5	21.4	0.0	635.3
11/3/2017 10:00	0.8	297.6	-8.3	47.5	62.7	0.0	635.3
11/3/2017 11:00	1.5	0.7	-7.8	48.2	79.9	0.0	635.2
11/3/2017 12:00	1.1	192.4	-7.6	51.6	137.1	0.0	635.2
11/3/2017 13:00	1.1	349.7	-7.5	60.6	115.1	0.0	635.3
11/3/2017 14:00	0.9	24.7	-7.2	53.1	116.1	0.0	635.3
11/3/2017 15:00	1.0	245.3	-7.0	59.5	104.0	0.0	635.2
11/3/2017 16:00	0.7	126.4	-6.8	56.0	41.3	0.0	635.2
11/3/2017 17:00	0.8	281.9	-6.4	56.1	10.8	0.0	635.2
11/3/2017 18:00	1.1	230.6	-6.8	58.9	0.4	0.0	635.2
11/3/2017 19:00	1.8	198.4	-7.5	69.1	0.0	0.0	635.2
11/3/2017 20:00	2.0	8.3	-8.1	74.9	0.0	0.0	635.3
11/3/2017 21:00	1.3	316.5	-8.3	68.3	0.0	0.0	635.3
11/3/2017 22:00	5.1	32.5	-6.6	80.4	0.0	0.0	635.3
11/3/2017 23:00	7.5	35.3	-4.3	73.4	0.0	0.0	635.3
11/4/2017 0:00	8.3	28.2	-4.9	72.9	0.0	0.0	635.4
11/4/2017 1:00	9.3	29.7	-4.6	69.5	0.0	0.0	635.1
11/4/2017 2:00	9.3	34.1	-4.3	68.2	0.0	0.0	634.9
11/4/2017 3:00	10.8	34.9	-4.4	70.8	0.0	0.0	635.3
11/4/2017 4:00	11.4	29.8	-4.5	71.0	0.0	0.0	635.3
11/4/2017 5:00	10.5	31.0	-4.6	69.8	0.0	0.0	635.0
11/4/2017 6:00	10.5	27.7	-4.8	69.0	0.0	0.0	635.3
11/4/2017 7:00	11.4	29.6	-4.9	66.9	0.0	0.0	635.5
11/4/2017 8:00	12.1	32.1	-5.3	67.6	0.6	0.0	635.2
11/4/2017 9:00	12.6	35.6	-5.3	65.4	12.6	0.0	635.2
11/4/2017 10:00	11.6	32.2	-5.4	64.6	52.9	0.0	635.0
11/4/2017 11:00	9.4	45.3	-5.3	64.2	110.2	0.0	635.1
11/4/2017 12:00	9.5	35.8	-5.4	64.0	118.4	0.0	635.0
11/4/2017 13:00	9.0	38.2	-5.3	64.4	150.8	0.0	635.0
11/4/2017 14:00	10.7	48.7	-5.1	60.3	91.7	0.0	634.9
11/4/2017 15:00	9.4	47.9	-5.0	61.3	90.7	0.0	634.6
11/4/2017 16:00	11.2	56.3	-5.0	59.2	82.8	0.0	635.0
11/4/2017 17:00	11.4	52.0	-5.2	57.9	20.1	0.0	635.6
11/4/2017 18:00	8.6	44.9	-5.7	59.2	0.8	0.0	635.1
11/4/2017 19:00	11.3	49.3	-5.8	57.2	0.0	0.0	635.0
11/4/2017 20:00	11.8	43.0	-6.0	57.3	0.0	0.0	635.3
11/4/2017 21:00	10.7	33.8	-6.2	57.8	0.0	0.0	635.5
11/4/2017 22:00	9.9	47.9	-6.3	56.9	0.0	0.0	634.6
11/4/2017 23:00	9.6	43.7	-6.6	58.6	0.0	0.0	634.8
11/5/2017 0:00	9.7	44.7	-6.7	59.3	0.0	0.0	635.2
11/5/2017 1:00	9.5	53.6	-6.6	56.5	0.0	0.0	635.0
11/5/2017 2:00	11.2	54.6	-6.3	52.8	0.0	0.0	635.2
11/5/2017 3:00	9.8	49.6	-6.3	50.5	0.0	0.0	635.3
11/5/2017 4:00	8.6	35.9	-7.3	58.3	0.0	0.0	635.0
11/5/2017 5:00	9.7	40.4	-7.6	58.7	0.0	0.0	635.1
11/5/2017 6:00	8.1	48.1	-7.5	57.2	0.0	0.0	635.1
11/5/2017 7:00	5.7	61.3	-8.2	62.4	0.0	0.0	635.3
11/5/2017 8:00	2.2	58.5	-7.9	59.2	0.8	0.0	635.2
11/5/2017 9:00	2.6	46.0	-8.5	64.3	11.3	0.0	635.3
11/5/2017 10:00	0.7	172.4	-8.5	65.5	59.9	0.0	636.2
11/5/2017 11:00	1.0	290.4	-7.3	60.4	241.1	0.0	636.6

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
11/5/2017 12:00	0.7	52.2	-6.7	58.7	307.8	0.0	635.9
11/5/2017 13:00	1.4	193.6	-6.4	63.6	329.7	0.0	635.8
11/5/2017 14:00	0.7	172.7	-5.6	61.1	308.3	0.0	635.6
11/5/2017 15:00	0.6	176.2	-5.3	55.7	242.2	0.0	635.3
11/5/2017 16:00	0.5	136.2	-5.7	57.9	140.4	0.0	635.2
11/5/2017 17:00	0.6	189.5	-6.4	61.9	40.0	0.0	635.2
11/5/2017 18:00	0.6	318.0	-6.9	63.8	0.3	0.0	635.2
11/5/2017 19:00	0.6	59.8	-7.1	61.3	0.0	0.0	635.3
11/5/2017 20:00	0.4	201.7	-7.2	59.7	0.0	0.0	635.3
11/5/2017 21:00	0.8	60.8	-7.0	54.1	0.0	0.0	635.3
11/5/2017 22:00	0.9	18.0	-7.0	51.9	0.0	0.0	635.3
11/5/2017 23:00	0.6	50.6	-6.9	49.9	0.0	0.0	635.3
11/6/2017 0:00	0.7	38.7	-6.5	47.3	0.0	0.0	635.3
11/6/2017 1:00	1.2	37.0	-6.4	45.0	0.0	0.0	635.3
11/6/2017 2:00	1.2	31.0	-6.1	41.4	0.0	0.0	635.3
11/6/2017 3:00	1.2	53.4	-6.1	36.6	0.0	0.0	635.3
11/6/2017 4:00	1.1	57.0	-6.1	36.1	0.0	0.0	635.3
11/6/2017 5:00	0.8	52.9	-6.2	36.7	0.0	0.0	635.3
11/6/2017 6:00	1.4	55.8	-6.1	35.5	0.0	0.0	635.3
11/6/2017 7:00	1.9	38.9	-6.3	37.1	0.0	0.0	635.3
11/6/2017 8:00	1.8	39.2	-6.6	38.9	0.4	0.0	635.3
11/6/2017 9:00	1.9	29.4	-6.2	37.4	13.2	0.0	635.3
11/6/2017 10:00	3.6	33.4	-6.3	39.2	39.8	0.0	635.2
11/6/2017 11:00	3.9	31.4	-6.3	41.0	91.1	0.0	635.3
11/6/2017 12:00	2.9	28.9	-6.0	40.9	88.2	0.0	635.3
11/6/2017 13:00	3.4	30.9	-5.9	42.4	87.5	0.0	635.2
11/6/2017 14:00	3.8	29.5	-5.8	42.5	69.4	0.0	635.3
11/6/2017 15:00	4.1	21.6	-5.9	47.3	46.5	0.0	635.1
11/6/2017 16:00	6.7	23.4	-6.0	55.0	37.8	0.0	635.2
11/6/2017 17:00	4.2	17.1	-5.8	56.0	6.9	0.0	635.2
11/6/2017 18:00	1.7	13.2	-6.4	73.1	0.0	0.0	635.4
11/6/2017 19:00	5.3	32.4	-7.3	88.9	0.0	0.0	635.9
11/6/2017 20:00	9.2	37.5	-8.0	92.8	0.0	0.0	635.9
11/6/2017 21:00	8.5	43.3	-7.8	93.0	0.0	0.0	636.2
11/6/2017 22:00	9.3	40.4	-7.7	93.2	0.0	0.0	635.9
11/6/2017 23:00	9.2	40.8	-7.6	93.3	0.0	0.0	636.1
11/7/2017 0:00	8.7	42.6	-7.4	93.5	0.0	0.0	636.0
11/7/2017 1:00	8.1	46.7	-7.2	93.6	0.0	0.0	636.2
11/7/2017 2:00	7.5	52.6	-7.1	93.7	0.0	0.0	636.6
11/7/2017 3:00	7.4	56.3	-6.9	93.8	0.0	0.0	636.4
11/7/2017 4:00	5.8	60.5	-6.7	93.8	0.0	0.0	636.3
11/7/2017 5:00	7.3	43.5	-6.4	92.7	0.0	0.0	636.3
11/7/2017 6:00	7.9	34.7	-6.2	88.8	0.0	0.0	636.4
11/7/2017 7:00	5.7	58.4	-6.3	88.3	0.0	0.0	636.2
11/7/2017 8:00	5.6	67.2	-6.4	86.5	0.2	0.0	636.3
11/7/2017 9:00	7.6	46.4	-6.0	82.2	10.3	0.0	636.3
11/7/2017 10:00	4.0	75.1	-6.2	83.1	32.2	0.0	636.3
11/7/2017 11:00	8.9	42.6	-5.5	75.9	50.8	0.0	636.2
11/7/2017 12:00	10.7	39.4	-5.7	82.7	66.1	0.0	635.8
11/7/2017 13:00	11.5	42.8	-5.5	81.9	106.7	0.0	636.4
11/7/2017 14:00	8.6	59.2	-5.5	82.7	190.5	0.0	636.4
11/7/2017 15:00	7.0	79.6	-5.3	80.9	204.5	0.0	636.3
11/7/2017 16:00	2.7	121.4	-5.8	85.8	106.9	0.0	636.1
11/7/2017 17:00	4.5	98.8	-6.0	84.3	17.2	0.0	636.1

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
11/7/2017 18:00	7.2	73.5	-5.2	74.6	0.2	0.0	636.2
11/7/2017 19:00	7.6	70.6	-5.4	74.4	0.0	0.0	636.1
11/7/2017 20:00	4.6	69.8	-5.6	75.3	0.0	0.0	636.1
11/7/2017 21:00	4.7	79.6	-6.3	76.7	0.0	0.0	636.1
11/7/2017 22:00	7.9	66.7	-6.1	75.3	0.0	0.0	635.9
11/7/2017 23:00	7.7	56.2	-6.0	71.8	0.0	0.0	636.0
11/8/2017 0:00	7.9	50.6	-6.2	71.7	0.0	0.0	636.1
11/8/2017 1:00	6.6	60.9	-6.7	73.1	0.0	0.0	636.1
11/8/2017 2:00	3.9	78.7	-7.5	75.4	0.0	0.0	636.1
11/8/2017 3:00	4.5	62.4	-7.8	76.3	0.0	0.0	636.1
11/8/2017 4:00	2.5	88.1	-8.3	80.1	0.0	0.0	636.2
11/8/2017 5:00	1.6	125.0	-8.4	80.4	0.0	0.0	636.2
11/8/2017 6:00	1.7	162.7	-9.0	85.2	0.0	0.0	636.2
11/8/2017 7:00	1.6	261.6	-8.7	83.2	0.0	0.0	636.2
11/8/2017 8:00	1.4	258.3	-8.9	82.0	0.9	0.0	636.3
11/8/2017 9:00	1.7	189.8	-8.6	81.0	11.1	0.0	636.2
11/8/2017 10:00	1.6	240.0	-8.1	77.0	42.3	0.0	636.9
11/8/2017 11:00	2.1	201.5	-7.1	71.4	225.2	0.0	637.0
11/8/2017 12:00	1.5	213.4	-5.1	64.1	289.3	0.0	637.0
11/8/2017 13:00	1.7	194.9	-5.3	68.3	312.0	0.0	636.8
11/8/2017 14:00	1.4	250.9	-5.1	71.3	289.2	0.0	636.6
11/8/2017 15:00	1.8	254.4	-5.4	72.6	223.3	0.0	636.2
11/8/2017 16:00	1.6	215.8	-5.4	74.9	131.0	0.0	636.1
11/8/2017 17:00	2.0	178.5	-6.6	81.7	14.7	0.0	636.1
11/8/2017 18:00	1.3	205.9	-6.2	76.7	0.1	0.0	636.1
11/8/2017 19:00	2.1	206.0	-6.7	83.3	0.0	0.0	636.1
11/8/2017 20:00	2.2	191.5	-6.6	79.2	0.0	0.0	636.2
11/8/2017 21:00	1.7	205.0	-6.9	78.8	0.0	0.0	636.2
11/8/2017 22:00	2.0	191.0	-7.4	80.2	0.0	0.0	636.2
11/8/2017 23:00	1.3	240.7	-5.7	72.0	0.0	0.0	636.2
11/9/2017 0:00	2.1	205.1	-7.0	77.8	0.0	0.0	636.2
11/9/2017 1:00	2.8	187.2	-7.8	81.2	0.0	0.0	636.2
11/9/2017 2:00	1.6	215.1	-7.2	78.1	0.0	0.0	636.2
11/9/2017 3:00	2.1	194.8	-7.0	76.7	0.0	0.0	636.2
11/9/2017 4:00	1.8	183.3	-6.8	75.6	0.0	0.0	636.2
11/9/2017 5:00	3.0	189.3	-8.0	81.9	0.0	0.0	636.2
11/9/2017 6:00	2.6	189.6	-8.5	84.3	0.0	0.0	636.2
11/9/2017 7:00	3.6	190.9	-8.3	82.4	0.0	0.0	636.2
11/9/2017 8:00	2.6	182.1	-8.8	85.6	0.2	0.0	636.2
11/9/2017 9:00	1.4	213.1	-8.9	86.0	11.4	0.0	636.2
11/9/2017 10:00	1.4	269.1	-8.9	85.2	36.9	0.0	636.9
11/9/2017 11:00	1.6	215.4	-7.7	78.0	216.6	0.0	637.4
11/9/2017 12:00	1.6	273.0	-7.7	77.3	279.2	0.0	637.1
11/9/2017 13:00	0.7	238.4	-7.2	76.8	299.9	0.0	637.1
11/9/2017 14:00	0.9	226.7	-6.3	75.5	278.2	0.0	636.6
11/9/2017 15:00	0.8	260.0	-6.6	78.6	212.6	0.0	636.2
11/9/2017 16:00	1.3	204.7	-7.1	85.9	121.6	0.0	636.1
11/9/2017 17:00	1.7	188.6	-7.9	90.3	25.8	0.0	636.1
11/9/2017 18:00	2.0	189.1	-8.3	90.5	0.2	0.0	636.2
11/9/2017 19:00	1.4	165.9	-8.1	85.7	0.0	0.0	636.2
11/9/2017 20:00	0.6	61.0	-7.8	76.3	0.0	0.0	636.2
11/9/2017 21:00	1.7	189.3	-8.3	77.0	0.0	0.0	636.2
11/9/2017 22:00	1.9	189.9	-8.5	78.3	0.0	0.0	636.3
11/9/2017 23:00	1.5	185.4	-8.2	77.8	0.0	0.0	636.3

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
11/10/2017 0:00	1.5	179.3	-8.2	78.3	0.0	0.0	636.3
11/10/2017 1:00	2.7	208.3	-7.9	75.1	0.0	0.0	636.3
11/10/2017 2:00	4.9	195.5	-5.9	74.3	0.0	0.0	636.2
11/10/2017 3:00	4.0	185.6	-5.3	74.2	0.0	0.0	636.1
11/10/2017 4:00	5.9	197.2	-5.5	76.5	0.0	0.0	636.1
11/10/2017 5:00	5.9	205.6	-5.7	79.4	0.0	0.0	636.1
11/10/2017 6:00	4.4	202.9	-6.0	83.3	0.0	0.0	636.2
11/10/2017 7:00	5.9	202.0	-5.6	82.1	0.0	0.0	635.7
11/10/2017 8:00	5.7	201.4	-5.4	81.9	0.1	0.0	636.1
11/10/2017 9:00	5.1	202.5	-5.7	84.3	14.7	0.0	636.2
11/10/2017 10:00	4.4	201.6	-5.3	83.1	49.3	0.0	636.1
11/10/2017 11:00	4.1	208.7	-5.1	82.3	75.5	0.0	636.0
11/10/2017 12:00	3.9	214.3	-5.2	85.8	90.0	0.0	636.0
11/10/2017 13:00	3.2	220.3	-5.1	89.2	115.1	0.0	636.2
11/10/2017 14:00	2.7	212.4	-5.2	93.6	83.3	0.0	636.3
11/10/2017 15:00	3.1	200.3	-4.9	94.2	67.7	0.0	636.3
11/10/2017 16:00	3.2	195.2	-4.9	95.2	37.7	0.0	636.3
11/10/2017 17:00	2.1	153.9	-4.7	94.3	4.9	0.0	636.4
11/10/2017 18:00	2.8	198.9	-4.4	93.7	0.0	0.0	636.6
11/10/2017 19:00	1.9	39.1	-4.6	94.8	0.0	0.0	636.7
11/10/2017 20:00	1.9	51.8	-4.6	94.0	0.0	0.0	637.3
11/10/2017 21:00	1.9	27.8	-4.6	94.9	0.0	0.0	637.8
11/10/2017 22:00	1.5	52.7	-4.4	94.1	0.0	0.0	637.9
11/10/2017 23:00	1.2	106.4	-4.2	94.8	0.0	0.0	638.3
11/11/2017 0:00	1.5	56.5	-4.3	95.0	0.0	0.0	638.6
11/11/2017 1:00	1.1	136.8	-3.9	94.8	0.0	0.0	638.9
11/11/2017 2:00	1.2	53.4	-4.0	94.5	0.0	0.0	639.0
11/11/2017 3:00	2.4	25.1	-4.3	94.8	0.0	0.0	639.2
11/11/2017 4:00	2.3	27.1	-4.3	93.7	0.0	0.0	639.3
11/11/2017 5:00	2.6	33.5	-4.3	94.3	0.0	0.0	639.6
11/11/2017 6:00	2.5	25.9	-4.3	95.6	0.0	0.0	641.1
11/11/2017 7:00	3.0	31.6	-4.3	95.7	0.0	0.0	642.2
11/11/2017 8:00	3.9	30.3	-4.4	95.6	0.0	0.0	642.9
11/11/2017 9:00	4.6	28.7	-4.4	95.5	7.6	0.0	643.4
11/11/2017 10:00	4.9	28.2	-4.3	95.3	38.4	0.0	643.7
11/11/2017 11:00	5.3	28.0	-4.2	95.0	76.9	0.0	644.0
11/11/2017 12:00	5.5	28.9	-4.2	94.4	138.3	0.0	644.1
11/11/2017 13:00	7.2	34.1	-4.2	92.5	203.3	0.0	644.1
11/11/2017 14:00	4.3	22.8	-3.9	90.8	151.6	0.0	644.0
11/11/2017 15:00	6.8	72.6	-4.1	89.0	92.2	0.0	643.7
11/11/2017 16:00	11.5	58.4	-3.4	79.7	40.8	0.0	643.8
11/11/2017 17:00	12.4	60.3	-3.0	73.5	6.4	0.0	643.7
11/11/2017 18:00	12.6	55.5	-3.0	72.7	0.0	-	644.3
11/11/2017 19:00	11.9	47.8	-3.6	80.3	0.0	0.0	643.4
11/11/2017 20:00	10.0	54.4	-4.3	87.0	0.0	0.0	643.8
11/11/2017 21:00	7.8	60.1	-4.7	85.8	0.0	0.0	644.1
11/11/2017 22:00	7.2	63.1	-5.2	89.9	0.0	0.0	643.9
11/11/2017 23:00	6.3	69.5	-5.0	87.0	0.0	0.0	643.9
11/12/2017 0:00	8.7	42.8	-5.4	91.1	0.0	0.0	643.8
11/12/2017 1:00	9.2	43.6	-5.7	93.1	0.0	0.0	643.8
11/12/2017 2:00	6.4	41.4	-6.5	94.3	0.0	0.0	644.1
11/12/2017 3:00	7.8	40.4	-7.2	93.8	0.0	0.0	643.8
11/12/2017 4:00	2.5	77.8	-7.4	93.7	0.0	0.0	644.6
11/12/2017 5:00	6.1	42.4	-7.8	93.4	0.0	0.0	644.7

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
11/12/2017 6:00	3.7	36.6	-8.1	93.2	0.0	0.0	644.9
11/12/2017 7:00	4.3	39.4	-8.6	92.8	0.0	0.0	645.1
11/12/2017 8:00	4.9	55.8	-9.0	92.5	0.0	0.0	645.1
11/12/2017 9:00	2.7	47.3	-8.9	92.5	10.0	0.0	645.5
11/12/2017 10:00	1.8	17.3	-9.1	92.0	58.6	0.0	645.6
11/12/2017 11:00	1.5	48.2	-9.1	91.3	123.0	0.0	645.8
11/12/2017 12:00	1.4	118.0	-8.9	91.2	155.5	0.0	645.8
11/12/2017 13:00	0.6	105.8	-8.6	91.2	147.0	0.0	645.7
11/12/2017 14:00	0.9	238.7	-8.7	91.5	105.1	0.0	645.6
11/12/2017 15:00	1.0	167.1	-8.8	91.6	83.2	0.0	645.5
11/12/2017 16:00	2.5	13.2	-9.2	91.8	40.8	0.0	645.6
11/12/2017 17:00	1.4	14.2	-9.3	92.0	6.6	0.0	645.6
11/12/2017 18:00	1.3	92.4	-9.4	92.0	0.1	0.0	645.6
11/12/2017 19:00	1.2	183.2	-9.3	92.1	0.0	0.0	645.6
11/12/2017 20:00	1.2	175.4	-9.0	92.3	0.0	0.0	645.6
11/12/2017 21:00	1.9	171.4	-9.4	92.0	0.0	0.0	645.6
11/12/2017 22:00	2.5	199.1	-9.4	92.0	0.0	0.0	645.7
11/12/2017 23:00	1.3	203.1	-9.2	92.2	0.0	0.0	645.7
11/13/2017 0:00	1.3	200.5	-9.7	91.7	0.0	0.0	645.7
11/13/2017 1:00	1.6	197.0	-9.8	91.6	0.0	0.0	645.7
11/13/2017 2:00	1.2	193.8	-9.2	92.1	0.0	0.0	645.7
11/13/2017 3:00	1.1	223.6	-9.3	92.0	0.0	0.0	645.7
11/13/2017 4:00	2.4	335.7	-8.4	92.8	0.0	0.0	645.6
11/13/2017 5:00	3.0	14.4	-8.2	92.8	0.0	0.0	645.7
11/13/2017 6:00	4.8	18.5	-7.8	93.2	0.0	0.0	645.3
11/13/2017 7:00	6.7	38.0	-6.2	91.0	0.0	0.0	645.5
11/13/2017 8:00	9.8	35.8	-6.0	81.6	0.0	0.0	645.3
11/13/2017 9:00	12.6	63.4	-4.1	70.9	6.4	0.0	645.3
11/13/2017 10:00	12.3	77.6	-3.6	66.8	21.9	0.0	645.4
11/13/2017 11:00	11.6	77.1	-3.7	66.6	94.7	0.0	644.9
11/13/2017 12:00	10.2	71.4	-3.7	68.4	129.0	0.0	645.5
11/13/2017 13:00	10.6	64.6	-4.7	80.3	117.3	0.0	645.0
11/13/2017 14:00	10.1	43.2	-5.6	84.1	135.3	0.0	645.5
11/13/2017 15:00	9.9	43.2	-5.5	77.8	101.1	0.0	645.2
11/13/2017 16:00	10.4	43.3	-5.5	75.2	72.0	0.0	645.2
11/13/2017 17:00	9.6	42.7	-6.3	78.3	22.8	0.0	645.1
11/13/2017 18:00	9.9	40.4	-6.6	79.0	0.0	0.0	645.3
11/13/2017 19:00	6.5	44.5	-7.8	86.8	0.0	0.0	645.3
11/13/2017 20:00	7.7	39.8	-7.3	86.2	0.0	0.0	645.4
11/13/2017 21:00	6.4	44.3	-8.0	93.0	0.0	0.0	645.5
11/13/2017 22:00	3.4	67.3	-8.3	92.9	0.0	0.0	645.6
11/13/2017 23:00	3.2	66.3	-8.3	92.8	0.0	0.0	645.5
11/14/2017 0:00	6.2	42.4	-8.0	90.2	0.0	0.0	645.5
11/14/2017 1:00	6.8	38.7	-8.0	85.6	0.0	0.0	645.6
11/14/2017 2:00	3.3	25.5	-8.4	87.5	0.0	0.0	645.5
11/14/2017 3:00	6.4	40.3	-8.3	83.8	0.0	0.0	645.6
11/14/2017 4:00	3.4	44.1	-8.9	87.3	0.0	0.0	645.6
11/14/2017 5:00	2.6	90.7	-9.1	89.3	0.0	0.0	645.6
11/14/2017 6:00	2.1	30.2	-8.9	86.1	0.0	0.0	645.6
11/14/2017 7:00	3.7	70.4	-8.7	83.7	0.0	0.0	645.6
11/14/2017 8:00	2.8	74.9	-9.1	83.9	0.0	0.0	645.6
11/14/2017 9:00	3.2	94.2	-9.2	81.7	11.5	0.0	645.7
11/14/2017 10:00	6.1	71.2	-8.3	75.9	28.4	0.0	645.5
11/14/2017 11:00	7.0	57.5	-8.2	75.0	74.7	0.0	645.6

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
11/14/2017 12:00	6.3	54.0	-8.1	74.6	131.6	0.0	645.7
11/14/2017 13:00	5.6	54.2	-8.2	77.1	153.7	0.0	645.5
11/14/2017 14:00	9.5	37.4	-8.1	78.2	108.8	0.0	645.4
11/14/2017 15:00	8.6	39.0	-8.7	81.6	116.2	0.0	645.6
11/14/2017 16:00	9.6	37.8	-9.3	81.7	35.0	0.0	645.5
11/14/2017 17:00	9.7	38.5	-9.3	79.7	7.3	0.0	645.6
11/14/2017 18:00	7.3	55.3	-9.7	81.9	0.0	0.0	645.7
11/14/2017 19:00	10.5	35.8	-9.4	78.8	0.0	0.0	645.3
11/14/2017 20:00	12.0	34.3	-9.5	77.7	0.0	0.0	645.4
11/14/2017 21:00	12.5	37.5	-9.5	75.5	0.0	0.0	645.0
11/14/2017 22:00	13.0	38.0	-9.3	72.2	0.0	0.0	645.2
11/14/2017 23:00	14.3	41.3	-9.0	70.5	0.0	0.0	645.3
11/15/2017 0:00	15.5	46.4	-9.0	69.5	0.0	0.0	645.4
11/15/2017 1:00	16.8	43.3	-9.3	68.9	0.0	0.0	645.3
11/15/2017 2:00	16.3	41.7	-9.6	69.3	0.0	0.0	645.0
11/15/2017 3:00	17.3	42.7	-10.0	70.8	0.0	0.0	645.6
11/15/2017 4:00	16.7	44.3	-10.3	69.5	0.0	0.0	645.3
11/15/2017 5:00	16.1	49.4	-10.6	69.6	0.0	0.0	646.1
11/15/2017 6:00	18.4	44.6	-10.6	68.1	0.0	0.0	646.0
11/15/2017 7:00	18.4	43.5	-10.7	66.9	0.0	0.0	645.3
11/15/2017 8:00	17.4	46.7	-10.9	67.3	0.0	0.0	645.5
11/15/2017 9:00	17.0	40.3	-10.8	66.0	6.2	0.0	646.0
11/15/2017 10:00	16.2	42.0	-10.5	65.6	50.5	0.0	645.3
11/15/2017 11:00	15.9	42.5	-10.8	65.2	129.6	0.0	646.2
11/15/2017 12:00	17.2	49.3	-10.8	64.6	143.1	0.0	645.5
11/15/2017 13:00	15.0	50.6	-10.4	61.5	283.3	0.0	645.5
11/15/2017 14:00	14.7	42.4	-10.7	61.6	283.5	0.0	645.2
11/15/2017 15:00	14.9	50.7	-11.0	62.1	83.1	0.0	644.8
11/15/2017 16:00	14.7	59.4	-10.7	59.0	77.5	0.0	645.3
11/15/2017 17:00	14.0	60.2	-11.0	59.9	11.6	0.0	645.5
11/15/2017 18:00	13.1	64.6	-11.1	59.5	0.0	0.0	646.1
11/15/2017 19:00	14.4	47.3	-11.6	59.3	0.0	0.0	645.5
11/15/2017 20:00	16.2	40.0	-12.0	60.1	0.0	0.0	645.5
11/15/2017 21:00	16.1	37.9	-12.4	61.2	0.0	0.0	646.3
11/15/2017 22:00	16.1	41.6	-12.6	61.8	0.0	0.0	645.6
11/15/2017 23:00	13.0	50.3	-12.4	60.7	0.0	0.0	645.4
11/16/2017 0:00	11.4	61.0	-12.7	61.1	0.0	0.0	646.1
11/16/2017 1:00	14.2	42.9	-13.0	59.9	0.0	0.0	645.2
11/16/2017 2:00	13.7	40.4	-13.1	58.5	0.0	0.0	645.9
11/16/2017 3:00	14.4	38.5	-13.6	58.8	0.0	0.0	645.5
11/16/2017 4:00	14.8	36.0	-14.2	59.9	0.0	0.0	645.7
11/16/2017 5:00	12.5	36.6	-14.8	61.4	0.0	0.0	645.1
11/16/2017 6:00	11.9	42.0	-15.4	62.8	0.0	0.0	646.1
11/16/2017 7:00	13.3	38.4	-15.4	61.4	0.0	0.0	645.9
11/16/2017 8:00	12.7	34.0	-15.7	62.4	0.0	0.0	645.6
11/16/2017 9:00	8.4	39.1	-16.2	64.2	5.7	0.0	645.8
11/16/2017 10:00	8.3	32.0	-16.1	63.3	18.4	0.0	645.8
11/16/2017 11:00	2.7	36.9	-16.0	64.2	157.3	0.0	646.6
11/16/2017 12:00	2.4	57.6	-15.8	64.3	251.5	0.0	646.6
11/16/2017 13:00	1.7	187.9	-15.6	64.5	274.1	0.0	646.5
11/16/2017 14:00	1.3	124.2	-14.9	61.7	253.0	0.0	646.2
11/16/2017 15:00	1.0	150.0	-14.8	61.5	191.4	0.0	645.9
11/16/2017 16:00	1.0	212.9	-15.1	63.4	102.3	0.0	645.8
11/16/2017 17:00	1.0	179.4	-15.8	67.9	15.1	0.0	645.8



Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
11/16/2017 18:00	0.8	196.5	-16.1	71.5	0.0	0.0	645.9
11/16/2017 19:00	0.8	51.5	-16.2	72.5	0.0	0.0	645.9
11/16/2017 20:00	0.8	299.0	-16.1	72.0	0.0	0.0	645.9
11/16/2017 21:00	0.9	312.4	-15.9	67.7	0.0	0.0	645.9
11/16/2017 22:00	1.1	211.7	-16.1	72.2	0.0	0.0	645.9
11/16/2017 23:00	2.0	177.8	-16.3	72.9	0.0	0.0	645.8
11/17/2017 0:00	2.9	214.0	-16.1	70.8	0.0	0.0	645.9
11/17/2017 1:00	3.9	201.8	-14.6	69.3	0.0	0.0	645.8
11/17/2017 2:00	5.2	192.9	-11.6	59.6	0.0	0.0	645.7
11/17/2017 3:00	6.1	196.5	-11.4	64.8	0.0	0.0	645.7
11/17/2017 4:00	5.7	199.4	-10.5	69.2	0.0	0.0	645.6
11/17/2017 5:00	5.2	199.9	-10.6	78.0	0.0	0.0	645.8
11/17/2017 6:00	4.3	201.7	-10.8	90.2	0.0	0.0	645.8
11/17/2017 7:00	4.3	195.6	-10.5	90.6	0.0	0.0	645.9
11/17/2017 8:00	3.6	192.6	-10.1	91.1	0.0	0.0	646.1
11/17/2017 9:00	2.1	63.3	-9.9	91.2	3.7	0.0	646.2
11/17/2017 10:00	2.2	136.9	-9.1	91.7	23.0	0.0	646.2
11/17/2017 11:00	2.0	155.5	-9.0	91.5	57.3	0.0	646.5
11/17/2017 12:00	2.4	239.3	-8.4	91.9	74.9	0.0	646.8
11/17/2017 13:00	2.2	187.2	-8.0	92.0	80.3	0.0	647.6
11/17/2017 14:00	2.5	222.5	-7.5	92.6	56.1	0.0	648.8
11/17/2017 15:00	2.8	3.4	-7.7	92.7	36.1	0.0	650.2
11/17/2017 16:00	1.7	275.6	-6.8	93.5	20.6	0.0	651.2
11/17/2017 17:00	2.3	344.8	-6.8	93.7	2.6	0.0	652.2
11/17/2017 18:00	2.1	44.6	-6.5	94.0	0.0	0.0	654.0
11/17/2017 19:00	2.4	58.4	-6.4	94.1	0.0	0.0	655.8
11/17/2017 20:00	2.9	24.1	-6.7	93.9	0.0	0.0	657.5
11/17/2017 21:00	2.1	29.9	-6.4	94.1	0.0	5.9	657.9
11/17/2017 22:00	2.4	34.2	-6.3	94.2	0.0	7.9	658.8
11/17/2017 23:00	2.4	101.3	-6.0	94.4	0.0	11.3	659.9
11/18/2017 0:00	1.2	222.2	-5.7	94.6	0.0	11.7	661.6
11/18/2017 1:00	3.2	209.7	-5.1	95.0	0.0	10.7	662.4
11/18/2017 2:00	3.7	186.6	-4.9	95.2	0.0	22.3	663.6
11/18/2017 3:00	4.1	210.4	-4.4	95.5	0.0	25.2	664.2
11/18/2017 4:00	3.6	202.3	-4.2	95.6	0.0	26.4	664.7
11/18/2017 5:00	4.5	200.5	-4.4	95.5	0.0	29.0	665.2
11/18/2017 6:00	4.1	199.5	-4.0	95.8	0.0	27.6	665.2
11/18/2017 7:00	4.1	199.2	-4.1	95.7	0.0	25.9	665.5
11/18/2017 8:00	3.6	202.5	-3.9	95.8	0.0	26.2	665.6
11/18/2017 9:00	3.0	202.8	-3.8	95.8	4.7	21.1	665.7
11/18/2017 10:00	2.1	201.1	-3.8	95.6	44.0	24.1	665.8
11/18/2017 11:00	1.3	184.1	-3.8	95.5	69.8	24.2	665.9
11/18/2017 12:00	0.9	195.4	-3.3	95.6	87.5	0.0	666.0
11/18/2017 13:00	1.0	63.7	-3.7	95.2	117.1	0.0	666.1
11/18/2017 14:00	1.5	50.2	-4.0	95.2	106.4	22.9	666.1
11/18/2017 15:00	1.4	39.5	-4.2	95.2	77.0	21.7	666.1
11/18/2017 16:00	1.7	33.6	-4.9	95.0	43.4	21.8	666.1
11/18/2017 17:00	0.3	17.0	-5.7	94.7	4.6	19.7	666.1
11/18/2017 18:00	-	-	-6.4	94.2	0.0	18.0	666.3
11/18/2017 19:00	0.8	179.9	-7.3	93.5	0.0	19.4	666.5
11/18/2017 20:00	0.7	168.4	-7.6	93.4	0.0	19.0	666.5
11/18/2017 21:00	-	-	-7.8	93.2	0.0	18.3	666.5
11/18/2017 22:00	-	-	-7.9	93.2	0.0	15.7	666.5
11/18/2017 23:00	-	-	-8.1	93.0	0.0	17.7	666.6

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
11/19/2017 0:00	-	-	-8.5	92.7	0.0	0.0	666.6
11/19/2017 1:00	-	-	-8.8	92.4	0.0	22.1	666.6
11/19/2017 2:00	-	-	-8.8	92.4	0.0	22.3	666.6
11/19/2017 3:00	-	-	-9.2	92.1	0.0	22.2	666.7
11/19/2017 4:00	-	-	-9.3	92.0	0.0	20.6	666.7
11/19/2017 5:00	-	-	-9.4	91.9	0.0	20.1	666.7
11/19/2017 6:00	-	-	-9.9	91.4	0.0	18.4	666.9
11/19/2017 7:00	-	-	-10.3	91.1	0.0	22.0	666.9
11/19/2017 8:00	-	-	-10.4	91.0	0.0	21.7	667.0
11/19/2017 9:00	-	-	-10.8	90.5	1.7	21.5	667.1
11/19/2017 10:00	-	-	-11.0	90.3	11.2	22.0	667.3
11/19/2017 11:00	-	-	-11.2	89.9	30.5	21.4	667.3
11/19/2017 12:00	-	-	-11.1	90.0	40.4	18.9	667.6
11/19/2017 13:00	-	-	-10.7	90.0	56.3	15.7	667.6
11/19/2017 14:00	-	-	-10.5	90.2	53.6	19.9	667.9
11/19/2017 15:00	-	-	-11.5	89.0	43.7	20.9	668.0
11/19/2017 16:00	-	-	-12.2	88.8	21.3	21.5	668.0
11/19/2017 17:00	-	-	-12.5	88.8	2.3	21.6	668.0
11/19/2017 18:00	-	-	-12.7	88.6	0.0	22.0	668.0
11/19/2017 19:00	-	-	-13.1	88.3	0.0	0	668.0
11/19/2017 20:00	-	-	-13.2	88.2	0.0	21.4	668.1
11/19/2017 21:00	-	-	-13.6	87.7	0.0	19.0	668.1
11/19/2017 22:00	-	-	-14.1	87.2	0.0	19.5	668.1
11/19/2017 23:00	-	-	-14.1	87.2	0.0	21.4	668.2
11/20/2017 0:00	-	-	-14.3	87.0	0.0	20.4	668.2
11/20/2017 1:00	-	-	-14.7	86.6	0.0	20.3	668.2
11/20/2017 2:00	-	-	-14.8	86.6	0.0	20.0	668.2
11/20/2017 3:00	-	-	-14.7	86.6	0.0	20.0	668.2
11/20/2017 4:00	-	-	-14.7	86.6	0.0	20.2	668.2
11/20/2017 5:00	-	-	-14.8	86.5	0.0	20.3	668.2
11/20/2017 6:00	-	-	-14.9	86.4	0.0	20.8	668.2
11/20/2017 7:00	-	-	-14.8	86.5	0.0	20.0	668.2
11/20/2017 8:00	-	-	-14.8	86.5	0.0	19.5	668.2
11/20/2017 9:00	-	-	-14.9	86.4	1.8	18.7	668.2
11/20/2017 10:00	-	-	-14.6	86.6	18.0	18.6	668.3
11/20/2017 11:00	-	-	-12.8	87.6	106.8	17.9	668.6
11/20/2017 12:00	-	-	-11.1	88.9	111.5	17.0	669.0
11/20/2017 13:00	-	-	-11.3	88.6	107.7	17.8	669.0
11/20/2017 14:00	0.6	212.4	-11.7	88.5	77.0	17.8	668.5
11/20/2017 15:00	1.1	193.9	-13.1	87.8	32.5	17.8	668.4
11/20/2017 16:00	1.4	196.3	-13.6	87.5	16.8	17.4	668.4
11/20/2017 17:00	0.9	171.0	-13.3	87.9	1.7	18.2	668.5
11/20/2017 18:00	0.8	206.1	-13.0	88.3	0.0	17.3	668.5
11/20/2017 19:00	1.6	195.4	-13.3	88.0	0.0	18.8	668.5
11/20/2017 20:00	1.3	190.5	-12.7	88.7	0.0	19.3	668.5
11/20/2017 21:00	0.9	73.6	-11.4	90.0	0.0	17.7	668.4
11/20/2017 22:00	0.4	75.5	-10.7	90.4	0.0	18.8	668.4
11/20/2017 23:00	2.0	41.2	-10.7	90.6	0.0	17.8	668.4
11/21/2017 0:00	2.2	15.9	-10.5	90.7	0.0	19.1	668.8
11/21/2017 1:00	3.4	24.1	-9.7	91.7	0.0	17.4	668.8
11/21/2017 2:00	3.4	26.0	-9.5	91.8	0.0	18.5	668.9
11/21/2017 3:00	2.5	38.7	-9.1	92.0	0.0	15.8	668.9
11/21/2017 4:00	3.1	27.2	-8.8	92.3	0.0	15.1	669.1
11/21/2017 5:00	2.2	50.0	-9.2	92.0	0.0	18.4	669.6

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
11/21/2017 6:00	3.0	37.8	-8.8	92.3	0.0	20.8	670.3
11/21/2017 7:00	2.6	39.7	-8.5	92.4	0.0	0.0	671.2
11/21/2017 8:00	2.9	30.8	-8.1	93.0	0.0	23.4	671.9
11/21/2017 9:00	4.9	31.5	-7.1	93.7	1.9	22.9	672.4
11/21/2017 10:00	3.7	33.0	-7.0	93.6	15.8	21.6	672.8
11/21/2017 11:00	3.9	31.5	-6.7	93.7	62.8	22.1	672.8
11/21/2017 12:00	4.4	30.8	-6.9	93.5	97.4	22.3	673.0
11/21/2017 13:00	1.9	23.7	-7.0	92.9	195.6	20.6	673.5
11/21/2017 14:00	1.0	193.8	-4.6	94.4	219.1	19.2	673.1
11/21/2017 15:00	1.7	294.3	-5.5	93.9	166.4	21.4	673.1
11/21/2017 16:00	2.9	39.1	-7.5	93.2	48.0	21.0	672.8
11/21/2017 17:00	4.6	34.2	-7.1	93.5	3.3	19.9	672.9
11/21/2017 18:00	3.6	31.2	-7.1	93.4	0.0	17.0	672.9
11/21/2017 19:00	7.7	21.8	-6.7	93.0	0.0	14.7	672.8
11/21/2017 20:00	4.2	25.6	-6.5	93.3	0.0	14.9	672.7
11/21/2017 21:00	2.2	248.3	-7.1	93.2	0.0	14.3	672.8
11/21/2017 22:00	2.6	44.0	-6.7	93.1	0.0	14.6	672.7
11/21/2017 23:00	1.4	224.3	-6.5	93.7	0.0	15.2	672.8
11/22/2017 0:00	1.8	271.0	-6.2	93.5	0.0	15.2	672.6
11/22/2017 1:00	2.9	192.6	-6.3	92.5	0.0	15.2	672.7
11/22/2017 2:00	1.1	218.3	-6.1	93.7	0.0	15.5	672.9
11/22/2017 3:00	1.4	94.2	-6.2	93.9	0.0	13.6	673.2
11/22/2017 4:00	4.8	40.3	-6.0	94.4	0.0	11.8	673.4
11/22/2017 5:00	3.2	57.6	-6.1	94.4	0.0	11.3	674.2
11/22/2017 6:00	4.6	50.2	-6.1	94.6	0.0	16.8	674.8
11/22/2017 7:00	3.8	54.0	-6.0	94.6	0.0	15.9	675.4
11/22/2017 8:00	1.2	119.8	-6.0	94.5	0.0	19.9	678.2
11/22/2017 9:00	3.3	59.7	-5.4	95.0	1.2	20.8	678.7
11/22/2017 10:00	5.7	33.5	-4.9	95.3	12.7	17.4	679.0
11/22/2017 11:00	6.0	31.3	-4.1	95.6	29.1	17.5	679.6
11/22/2017 12:00	4.6	34.4	-3.9	95.7	43.8	17.2	680.1
11/22/2017 13:00	2.4	35.0	-3.8	95.6	78.5	16.8	680.9
11/22/2017 14:00	4.2	32.0	-3.2	95.9	75.2	16.2	681.0
11/22/2017 15:00	2.8	35.4	-3.2	96.0	49.3	16.4	681.0
11/22/2017 16:00	2.3	34.5	-2.5	96.5	31.3	16.4	681.1
11/22/2017 17:00	1.9	34.7	-1.9	97.0	3.5	16.0	681.1
11/22/2017 18:00	1.4	144.4	-1.8	97.1	0.0	16.0	681.1
11/22/2017 19:00	0.7	165.4	-2.0	97.1	0.0	16.1	681.1
11/22/2017 20:00	1.6	198.6	-1.5	97.3	0.0	15.2	681.8
11/22/2017 21:00	1.9	206.3	-0.9	97.6	0.0	14.9	682.1
11/22/2017 22:00	2.8	205.7	-1.1	97.7	0.0	15.8	682.4
11/22/2017 23:00	5.0	211.3	-1.3	97.6	0.0	17.3	683.5
11/23/2017 0:00	6.5	212.6	-2.0	97.3	0.0	23.0	683.6
11/23/2017 1:00	5.9	210.7	-1.7	97.3	0.0	24.2	683.9
11/23/2017 2:00	5.1	207.3	-1.2	97.5	0.0	23.8	684.2
11/23/2017 3:00	4.5	205.4	-1.3	97.6	0.0	23.3	684.5
11/23/2017 4:00	4.3	210.1	-1.6	97.5	0.0	22.1	685.5
11/23/2017 5:00	4.9	214.3	-1.6	97.4	0.0	25.7	685.6
11/23/2017 6:00	6.7	218.4	-2.0	97.3	0.0	24.0	686.6
11/23/2017 7:00	5.5	225.3	-2.7	96.8	0.0	25.3	687.0
11/23/2017 8:00	4.2	227.3	-3.4	96.5	0.0	22.4	687.1
11/23/2017 9:00	2.5	225.8	-3.8	96.2	2.3	23.1	687.1
11/23/2017 10:00	4.4	219.1	-4.1	95.8	20.1	22.7	687.0
11/23/2017 11:00	5.6	218.2	-4.0	95.7	60.6	22.1	687.1

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
11/23/2017 12:00	4.8	207.1	-4.0	95.5	105.0	20.3	687.2
11/23/2017 13:00	3.5	208.0	-4.1	95.4	112.0	21.0	687.1
11/23/2017 14:00	2.6	211.5	-4.4	95.2	85.4	21.0	687.2
11/23/2017 15:00	2.6	212.4	-4.7	95.3	39.3	21.0	687.3
11/23/2017 16:00	2.1	211.5	-4.6	95.5	19.5	21.4	687.7
11/23/2017 17:00	1.6	215.2	-4.5	95.6	1.9	22.6	688.1
11/23/2017 18:00	1.4	213.8	-4.4	95.7	0.0	23.1	688.7
11/23/2017 19:00	1.3	213.9	-4.2	95.8	0.0	23.2	689.2
11/23/2017 20:00	1.1	217.4	-3.9	96.0	0.0	23.1	689.5
11/23/2017 21:00	1.0	220.9	-3.8	96.1	0.0	24.2	690.0
11/23/2017 22:00	1.0	219.5	-3.6	96.2	0.0	22.5	690.6
11/23/2017 23:00	1.7	188.2	-3.4	96.4	0.0	25.5	690.8
11/24/2017 0:00	1.6	198.6	-3.3	96.4	0.0	26.4	690.9
11/24/2017 1:00	1.6	220.9	-3.2	96.5	0.0	27.3	691.2
11/24/2017 2:00	2.4	207.2	-3.1	96.5	0.0	27.7	692.2
11/24/2017 3:00	1.4	235.9	-2.9	96.6	0.0	29.5	693.5
11/24/2017 4:00	2.5	207.5	-2.8	96.7	0.0	32.4	694.9
11/24/2017 5:00	2.6	200.3	-2.7	96.8	0.0	36.6	697.2
11/24/2017 6:00	2.7	185.3	-2.7	96.8	0.0	38.3	697.4
11/24/2017 7:00	2.8	197.4	-2.8	96.8	0.0	42.9	698.4
11/24/2017 8:00	3.4	192.9	-3.0	96.7	0.0	40.0	698.5
11/24/2017 9:00	1.6	212.7	-3.3	96.5	1.3	40.1	698.5
11/24/2017 10:00	1.7	205.2	-3.5	96.3	9.9	41.6	699.1
11/24/2017 11:00	2.4	188.6	-3.6	96.2	33.5	42.6	699.3
11/24/2017 12:00	2.0	219.6	-3.4	96.2	49.8	41.7	700.0
11/24/2017 13:00	4.2	205.8	-3.6	96.0	84.0	43.2	700.4
11/24/2017 14:00	3.7	199.3	-3.9	95.9	48.5	44.0	700.6
11/24/2017 15:00	3.1	213.3	-4.1	95.9	43.3	42.3	701.3
11/24/2017 16:00	2.7	214.1	-4.3	95.8	24.7	43.1	701.8
11/24/2017 17:00	2.9	197.8	-4.6	95.7	1.5	43.5	701.9
11/24/2017 18:00	2.9	169.6	-4.7	95.6	0.0	43.7	702.0
11/24/2017 19:00	2.7	172.0	-4.7	95.6	0.0	43.3	701.9
11/24/2017 20:00	2.6	167.7	-4.5	95.7	0.0	42.8	702.1
11/24/2017 21:00	2.4	177.4	-4.3	95.8	0.0	42.7	702.1
11/24/2017 22:00	2.1	175.4	-4.2	95.9	0.0	43.6	702.4
11/24/2017 23:00	2.3	183.1	-4.1	96.0	0.0	44.7	702.6
11/25/2017 0:00	2.1	183.5	-4.1	96.0	0.0	45.1	702.5
11/25/2017 1:00	2.9	188.2	-4.1	96.0	0.0	46.7	702.9
11/25/2017 2:00	2.6	189.1	-4.1	96.0	0.0	43.9	702.8
11/25/2017 3:00	1.3	173.1	-4.4	95.7	0.0	44.1	702.8
11/25/2017 4:00	1.4	171.0	-4.5	95.7	0.0	44.5	702.8
11/25/2017 5:00	1.8	156.7	-4.7	95.5	0.0	43.6	702.8
11/25/2017 6:00	1.2	145.6	-4.8	95.5	0.0	44.5	702.8
11/25/2017 7:00	1.0	229.9	-4.7	95.5	0.0	44.0	702.8
11/25/2017 8:00	0.8	36.1	-5.1	95.0	0.0	43.9	702.8
11/25/2017 9:00	0.8	349.4	-5.5	94.5	2.2	42.9	702.8
11/25/2017 10:00	0.3	354.2	-5.9	94.1	13.7	43.2	702.8
11/25/2017 11:00	1.1	319.1	-5.5	92.3	50.4	42.4	703.2
11/25/2017 12:00	1.0	75.7	-5.0	91.6	229.8	42.6	703.4
11/25/2017 13:00	3.0	32.3	-5.5	90.3	146.3	42.5	702.9
11/25/2017 14:00	4.2	43.0	-5.6	87.2	97.6	42.6	702.7
11/25/2017 15:00	5.9	45.9	-5.1	80.5	83.9	41.7	702.7
11/25/2017 16:00	4.9	51.9	-5.2	80.5	26.9	41.9	702.7
11/25/2017 17:00	4.4	48.0	-4.7	77.5	1.9	42.0	702.7

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
11/25/2017 18:00	5.2	66.7	-5.0	80.3	0.0	41.5	702.5
11/25/2017 19:00	6.9	46.6	-5.0	82.4	0.0	42.1	702.9
11/25/2017 20:00	3.2	57.2	-5.3	87.5	0.0	42.0	702.7
11/25/2017 21:00	1.7	53.2	-5.7	88.1	0.0	41.4	702.7
11/25/2017 22:00	6.7	56.8	-5.3	85.9	0.0	42.0	702.5
11/25/2017 23:00	9.1	44.5	-5.2	87.7	0.0	40.1	703.1
11/26/2017 0:00	5.7	74.0	-5.8	89.7	0.0	39.5	702.6
11/26/2017 1:00	3.3	62.0	-5.8	89.9	0.0	40.2	702.7
11/26/2017 2:00	2.7	84.2	-6.1	91.3	0.0	39.3	702.5
11/26/2017 3:00	7.7	43.2	-5.9	92.1	0.0	39.4	702.7
11/26/2017 4:00	2.0	81.7	-6.7	94.4	0.0	39.7	702.9
11/26/2017 5:00	8.0	48.8	-6.4	94.4	0.0	38.7	702.8
11/26/2017 6:00	2.9	46.6	-6.9	94.3	0.0	38.7	702.8
11/26/2017 7:00	4.2	64.8	-7.1	94.1	0.0	38.4	702.9
11/26/2017 8:00	5.4	49.0	-6.9	94.2	0.0	38.3	702.7
11/26/2017 9:00	8.5	25.0	-7.0	94.2	0.7	38.0	702.9
11/26/2017 10:00	2.7	43.3	-7.3	93.9	10.4	37.9	703.0
11/26/2017 11:00	1.3	231.6	-8.2	93.1	36.9	37.6	703.1
11/26/2017 12:00	0.8	213.4	-7.6	93.3	51.3	37.5	703.5
11/26/2017 13:00	1.0	220.5	-7.5	93.2	59.0	38.3	704.1
11/26/2017 14:00	1.9	222.1	-8.0	93.0	36.2	39.0	704.8
11/26/2017 15:00	1.6	206.8	-8.0	93.1	31.7	39.1	705.3
11/26/2017 16:00	1.6	203.5	-8.2	93.1	13.3	39.4	705.6
11/26/2017 17:00	2.3	197.2	-8.2	93.2	1.4	40.1	705.8
11/26/2017 18:00	2.6	209.9	-8.2	93.2	0.0	39.9	705.8
11/26/2017 19:00	2.5	218.6	-8.1	93.3	0.0	39.8	705.8
11/26/2017 20:00	2.5	219.7	-8.2	93.2	0.0	39.4	705.8
11/26/2017 21:00	3.4	197.3	-7.7	93.6	0.0	39.3	705.8
11/26/2017 22:00	3.3	196.7	-7.5	93.7	0.0	39.2	705.8
11/26/2017 23:00	3.5	209.5	-7.6	93.7	0.0	39.1	705.7
11/27/2017 0:00	3.4	213.4	-7.6	93.7	0.0	38.7	705.7
11/27/2017 1:00	4.0	214.5	-7.4	93.8	0.0	37.6	706.1
11/27/2017 2:00	4.4	210.9	-7.0	94.1	0.0	37.5	706.1
11/27/2017 3:00	4.5	206.3	-6.6	94.4	0.0	36.4	706.0
11/27/2017 4:00	4.8	208.4	-6.2	94.6	0.0	39.0	706.0
11/27/2017 5:00	4.1	209.6	-5.9	94.8	0.0	41.6	706.0
11/27/2017 6:00	3.6	210.8	-5.6	95.1	0.0	41.6	706.0
11/27/2017 7:00	2.6	205.7	-5.4	95.2	0.0	41.6	706.1
11/27/2017 8:00	3.3	208.4	-5.3	95.3	0.0	44.1	706.6
11/27/2017 9:00	4.3	188.1	-5.3	95.3	1.3	40.3	706.2
11/27/2017 10:00	2.9	187.3	-5.0	95.4	20.3	39.7	706.2
11/27/2017 11:00	2.5	220.5	-4.8	95.4	39.7	39.3	706.6
11/27/2017 12:00	3.4	213.7	-4.7	95.5	40.4	40.1	707.3
11/27/2017 13:00	7.7	194.0	-4.2	95.6	83.7	39.1	707.4
11/27/2017 14:00	6.0	214.9	-3.9	95.9	63.1	39.2	707.5
11/27/2017 15:00	3.5	213.8	-3.6	96.1	45.3	39.2	707.7
11/27/2017 16:00	3.1	215.4	-3.5	96.3	12.3	40.0	708.1
11/27/2017 17:00	2.6	212.7	-3.5	96.4	1.2	39.2	708.2
11/27/2017 18:00	2.2	211.2	-3.5	96.4	0.0	39.3	708.1
11/27/2017 19:00	2.1	202.7	-3.6	96.3	0.0	38.5	708.2
11/27/2017 20:00	1.2	81.9	-4.0	96.0	0.0	39.0	708.2
11/27/2017 21:00	1.5	43.5	-4.2	95.9	0.0	39.1	708.2
11/27/2017 22:00	2.0	34.7	-4.4	95.5	0.0	38.8	708.2
11/27/2017 23:00	2.0	41.6	-4.5	95.4	0.0	38.9	708.2

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
11/28/2017 0:00	3.5	32.4	-4.5	94.2	0.0	38.7	708.2
11/28/2017 1:00	8.9	46.9	-3.6	81.0	0.0	38.1	708.0
11/28/2017 2:00	6.9	68.3	-3.1	74.4	0.0	38.7	708.1
11/28/2017 3:00	5.0	82.1	-3.1	80.6	0.0	38.1	708.3
11/28/2017 4:00	4.0	45.5	-3.8	90.2	0.0	40.0	708.1
11/28/2017 5:00	6.1	90.4	-3.5	89.3	0.0	38.3	708.5
11/28/2017 6:00	4.9	92.7	-3.4	86.6	0.0	38.2	708.4
11/28/2017 7:00	1.7	313.0	-4.0	94.4	0.0	38.4	708.7
11/28/2017 8:00	3.5	21.7	-4.1	95.8	0.0	39.9	708.7
11/28/2017 9:00	5.5	32.9	-4.1	93.1	1.0	39.8	708.8
11/28/2017 10:00	6.7	22.9	-3.8	90.5	23.0	40.7	708.8
11/28/2017 11:00	1.7	188.4	-4.2	94.7	39.2	40.2	708.9
11/28/2017 12:00	0.8	147.3	-3.9	95.4	25.1	39.1	709.1
11/28/2017 13:00	1.0	196.9	-3.1	92.3	73.2	41.2	709.1
11/28/2017 14:00	1.3	188.0	-3.1	92.4	60.8	41.6	709.2
11/28/2017 15:00	2.1	193.1	-3.5	94.7	34.6	42.9	709.3
11/28/2017 16:00	3.2	200.7	-3.9	96.0	12.7	44.3	709.7
11/28/2017 17:00	4.3	200.0	-3.9	96.5	1.9	44.2	709.8
11/28/2017 18:00	4.5	216.2	-3.5	96.5	0.0	43.5	710.2
11/28/2017 19:00	5.1	220.3	-3.4	96.6	0.0	41.5	710.1
11/28/2017 20:00	7.1	229.2	-3.6	96.6	0.0	36.7	710.3
11/28/2017 21:00	5.3	224.4	-3.6	96.5	0.0	34.7	710.2
11/28/2017 22:00	3.9	218.0	-3.5	96.4	0.0	34.8	710.3
11/28/2017 23:00	3.3	212.1	-3.6	96.3	0.0	34.9	710.5
11/29/2017 0:00	3.3	201.7	-3.5	96.4	0.0	35.5	710.4
11/29/2017 1:00	2.7	216.5	-3.4	96.5	0.0	35.4	710.5
11/29/2017 2:00	2.4	215.0	-3.1	96.6	0.0	35.1	710.5
11/29/2017 3:00	3.4	203.5	-2.8	96.8	0.0	36.8	710.5
11/29/2017 4:00	5.6	183.3	-2.4	97.1	0.0	36.3	711.0
11/29/2017 5:00	4.2	186.9	-2.5	97.1	0.0	37.7	710.8
11/29/2017 6:00	3.2	202.3	-2.6	96.9	0.0	38.8	711.7
11/29/2017 7:00	4.3	203.0	-2.6	96.9	0.0	40.5	713.0
11/29/2017 8:00	4.2	209.0	-2.6	96.9	0.0	40.6	714.3
11/29/2017 9:00	4.7	201.3	-2.5	97.0	0.7	38.0	714.8
11/29/2017 10:00	5.2	189.8	-2.4	96.7	13.9	45.4	714.5
11/29/2017 11:00	4.7	208.0	-2.5	96.6	37.7	42.9	714.7
11/29/2017 12:00	4.3	194.9	-2.5	96.0	57.5	42.6	714.9
11/29/2017 13:00	4.3	210.4	-2.5	96.4	83.4	41.9	715.1
11/29/2017 14:00	5.0	206.2	-2.4	96.2	115.5	42.0	715.2
11/29/2017 15:00	5.5	224.8	-2.9	96.6	23.5	41.4	718.3
11/29/2017 16:00	4.8	202.0	-2.8	96.7	26.8	41.1	718.7
11/29/2017 17:00	4.2	220.0	-3.0	96.7	0.6	42.6	719.5
11/29/2017 18:00	4.7	212.6	-3.2	96.6	0.0	42.5	719.7
11/29/2017 19:00	3.7	204.3	-3.4	96.5	0.0	43.0	719.7
11/29/2017 20:00	3.6	207.4	-3.4	96.5	0.0	42.7	719.8
11/29/2017 21:00	4.1	202.9	-3.4	96.4	0.0	42.4	719.9
11/29/2017 22:00	4.9	190.0	-3.7	93.9	0.0	42.3	720.0
11/29/2017 23:00	4.0	194.5	-3.8	94.6	0.0	41.8	719.9
11/30/2017 0:00	4.6	198.4	-3.5	95.3	0.0	40.7	720.0
11/30/2017 1:00	2.1	196.6	-3.4	95.7	0.0	40.4	719.7
11/30/2017 2:00	4.0	189.4	-3.4	94.5	0.0	40.4	720.2
11/30/2017 3:00	3.3	192.3	-3.3	95.9	0.0	40.4	720.2
11/30/2017 4:00	2.7	193.9	-3.5	95.9	0.0	41.0	720.2
11/30/2017 5:00	3.3	201.5	-3.5	96.3	0.0	40.5	720.4

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
11/30/2017 6:00	4.8	197.6	-3.4	96.4	0.0	42.4	720.5
11/30/2017 7:00	6.1	184.9	-3.4	96.5	0.0	43.0	720.8
11/30/2017 8:00	5.4	190.9	-3.3	96.5	0.0	41.3	720.6
11/30/2017 9:00	1.0	171.0	-3.4	96.5	0.7	41.0	720.7
11/30/2017 10:00	-	-	-3.7	96.2	14.2	41.3	720.6
11/30/2017 11:00	-	-	-3.9	96.1	27.6	41.9	721.1
11/30/2017 12:00	-	-	-3.7	96.0	67.5	41.8	721.0
11/30/2017 13:00	2.4	186.4	-3.9	95.9	70.8	40.9	721.3
11/30/2017 14:00	4.2	195.3	-3.9	95.9	73.8	40.7	720.9
11/30/2017 15:00	3.9	195.1	-3.9	96.0	54.1	40.5	721.2
11/30/2017 16:00	3.6	192.5	-4.2	95.9	21.9	40.9	721.2
11/30/2017 17:00	2.1	177.8	-4.8	95.5	1.7	41.0	721.1
11/30/2017 18:00	-	-	-5.0	95.3	0.0	41.2	721.2
11/30/2017 19:00	-	-	-4.9	95.2	0.0	41.5	721.1
11/30/2017 20:00	-	-	-4.7	95.4	0.0	41.2	721.1
11/30/2017 21:00	-	-	-4.6	95.5	0.0	40.1	721.1
11/30/2017 22:00	-	-	-5.0	95.3	0.0	40.5	721.1
11/30/2017 23:00	-	-	-4.9	95.4	0.0	39.6	721.1
12/1/2017 0:00	-	-	-4.9	95.4	-	39.9	721.1
12/1/2017 1:00	-	-	-5.0	95.2	-	39.8	721.1
12/1/2017 2:00	-	-	-5.0	95.1	-	39.5	721.1
12/1/2017 3:00	-	-	-5.0	95.1	-	39.6	721.2
12/1/2017 4:00	-	-	-5.0	95.2	-	39.7	721.2
12/1/2017 5:00	-	-	-5.0	95.4	-	40.2	721.2
12/1/2017 6:00	-	-	-5.1	95.4	-	40.6	721.2
12/1/2017 7:00	-	-	-5.1	95.3	-	40.6	721.2
12/1/2017 8:00	-	-	-5.2	95.3	-	40.6	721.2
12/1/2017 9:00	-	-	-5.2	95.3	-	40.7	721.2
12/1/2017 10:00	-	-	-5.3	95.1	-	40.4	721.2
12/1/2017 11:00	-	-	-5.1	95.1	-	40.0	721.2
12/1/2017 12:00	-	-	-4.9	95.0	-	39.9	721.2
12/1/2017 13:00	-	-	-4.1	95.4	-	39.9	721.1
12/1/2017 14:00	-	-	-4.2	95.4	-	39.7	721.2
12/1/2017 15:00	-	-	-4.7	95.3	-	39.9	721.2
12/1/2017 16:00	-	-	-5.2	95.1	-	39.9	721.2
12/1/2017 17:00	-	-	-5.8	94.8	-	40.1	721.2
12/1/2017 18:00	-	-	-5.9	94.8	-	39.4	721.2
12/1/2017 19:00	-	-	-6.2	94.6	-	40.2	721.3
12/1/2017 20:00	-	-	-6.1	94.7	-	40.2	721.2
12/1/2017 21:00	-	-	-6.7	94.2	-	40.3	721.3
12/1/2017 22:00	-	-	-7.0	93.9	-	40.1	721.3
12/1/2017 23:00	-	-	-7.0	94.0	-	40.1	721.3
12/2/2017 0:00	-	-	-7.0	94.0	-	40.0	721.3
12/2/2017 1:00	-	-	-7.3	93.7	-	40.0	721.3
12/2/2017 2:00	-	-	-7.5	93.6	-	39.7	721.3
12/2/2017 3:00	-	-	-7.8	93.4	-	39.5	721.3
12/2/2017 4:00	-	-	-8.0	93.3	-	39.5	721.4
12/2/2017 5:00	-	-	-8.1	93.2	-	39.4	721.4
12/2/2017 6:00	-	-	-8.3	93.1	-	39.2	721.4
12/2/2017 7:00	-	-	-8.3	93.0	-	39.1	721.4
12/2/2017 8:00	-	-	-8.3	93.0	-	39.0	721.4
12/2/2017 9:00	-	-	-8.4	92.9	-	38.7	721.4
12/2/2017 10:00	-	-	-8.5	92.8	-	38.6	721.4
12/2/2017 11:00	-	-	-8.5	92.7	-	38.1	721.4

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
12/2/2017 12:00	-	-	-8.3	92.6	-	38.0	721.4
12/2/2017 13:00	-	-	-8.2	92.4	-	37.8	721.5
12/2/2017 14:00	-	-	-7.2	92.8	-	37.5	721.4
12/2/2017 15:00	-	-	-7.4	93.1	-	38.5	721.4
12/2/2017 16:00	-	-	-7.5	93.5	-	38.2	721.5
12/2/2017 17:00	-	-	-7.5	93.6	-	38.3	721.4
12/2/2017 18:00	-	-	-7.2	93.9	-	39.4	721.4
12/2/2017 19:00	-	-	-7.1	94.0	-	38.4	721.6
12/2/2017 20:00	-	-	-6.8	94.2	-	38.2	721.4
12/2/2017 21:00	-	-	-6.6	94.3	-	38.2	721.7
12/2/2017 22:00	-	-	-6.2	94.6	-	38.2	721.4
12/2/2017 23:00	-	-	-5.9	94.7	-	37.8	721.3
12/3/2017 0:00	-	-	-5.8	94.8	-	37.7	721.4
12/3/2017 1:00	-	-	-5.7	94.9	-	37.6	721.5
12/3/2017 2:00	-	-	-5.6	95.0	-	37.7	721.5
12/3/2017 3:00	-	-	-5.2	95.2	-	37.7	721.4
12/3/2017 4:00	-	-	-5.1	95.3	-	37.6	721.5
12/3/2017 5:00	-	-	-4.9	95.4	-	37.4	721.4
12/3/2017 6:00	-	-	-4.8	95.5	-	37.5	721.5
12/3/2017 7:00	-	-	-4.6	95.6	-	37.3	721.5
12/3/2017 8:00	-	-	-4.5	95.7	-	37.8	721.4
12/3/2017 9:00	-	-	-4.3	95.8	-	36.9	721.4
12/3/2017 10:00	-	-	-4.0	95.9	-	37.1	721.4
12/3/2017 11:00	-	-	-3.8	96.0	-	37.2	721.4
12/3/2017 12:00	-	-	-3.5	96.0	-	36.7	721.2
12/3/2017 13:00	-	-	-3.4	96.0	-	36.9	721.2
12/3/2017 14:00	-	-	-3.3	96.2	-	36.9	721.5
12/3/2017 15:00	-	-	-3.3	96.3	-	36.8	721.4
12/3/2017 16:00	-	-	-3.2	96.4	-	36.8	721.4
12/3/2017 17:00	-	-	-3.2	96.5	-	36.6	721.4
12/3/2017 18:00	-	-	-3.0	96.6	-	36.4	720.9
12/3/2017 19:00	-	-	-2.8	96.7	-	37.1	721.5
12/3/2017 20:00	-	-	-2.7	96.8	-	37.6	721.3
12/3/2017 21:00	-	-	-2.5	96.9	-	37.3	721.4
12/3/2017 22:00	-	-	-2.5	96.9	-	36.8	721.3
12/3/2017 23:00	-	-	-2.6	96.9	-	37.0	721.6
12/4/2017 0:00	-	-	-2.7	96.8	-	37.1	721.5
12/4/2017 1:00	-	-	-2.7	96.8	-	36.7	721.3
12/4/2017 2:00	-	-	-2.7	96.8	-	36.9	721.9
12/4/2017 3:00	-	-	-2.7	96.9	-	36.8	721.9
12/4/2017 4:00	-	-	-2.6	96.9	-	36.9	721.7
12/4/2017 5:00	-	-	-2.4	97.0	-	37.8	722.1
12/4/2017 6:00	-	-	-2.4	97.0	-	38.1	722.5
12/4/2017 7:00	-	-	-2.2	97.2	-	38.2	723.8
12/4/2017 8:00	-	-	-2.1	97.3	-	38.7	724.3
12/4/2017 9:00	-	-	-2.0	97.3	-	38.7	725.3
12/4/2017 10:00	-	-	-1.9	97.4	-	39.2	726.2
12/4/2017 11:00	-	-	-1.8	97.4	-	40.2	725.6
12/4/2017 12:00	-	-	-1.6	97.5	-	39.7	726.6
12/4/2017 13:00	-	-	-1.4	97.4	-	39.2	726.4
12/4/2017 14:00	-	-	-1.2	97.5	-	40.1	726.6
12/4/2017 15:00	-	-	-1.4	97.6	-	40.8	727.3
12/4/2017 16:00	-	-	-1.6	97.6	-	40.9	727.8
12/4/2017 17:00	-	-	-1.7	97.5	-	41.2	727.7



Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
12/4/2017 18:00	-	-	-2.0	97.4	-	40.9	727.5
12/4/2017 19:00	-	-	-2.2	97.3	-	40.8	727.4
12/4/2017 20:00	-	-	-2.3	97.2	-	40.5	727.7
12/4/2017 21:00	-	-	-2.6	97.1	-	40.9	727.6
12/4/2017 22:00	-	-	-2.8	96.9	-	40.6	727.3
12/4/2017 23:00	-	-	-3.0	96.8	-	40.8	727.5
12/5/2017 0:00	-	-	-3.1	96.7	0.0	41.0	727.4
12/5/2017 1:00	-	-	-3.0	96.7	0.0	40.6	727.4
12/5/2017 2:00	-	-	-3.2	96.6	0.0	40.3	727.5
12/5/2017 3:00	-	-	-3.0	96.7	0.0	40.6	727.5
12/5/2017 4:00	-	-	-3.1	96.6	0.0	41.5	727.5
12/5/2017 5:00	-	-	-2.9	95.8	0.0	41.1	727.4
12/5/2017 6:00	-	-	-2.5	96.0	0.0	40.4	727.5
12/5/2017 7:00	-	-	-2.8	96.0	0.0	39.6	727.5
12/5/2017 8:00	-	-	-2.7	96.7	0.0	40.0	727.5
12/5/2017 9:00	-	-	-2.3	97.0	0.2	40.6	727.6
12/5/2017 10:00	-	-	-1.3	97.4	13.2	40.7	727.7
12/5/2017 11:00	-	-	-0.8	97.6	37.6	40.3	727.7
12/5/2017 12:00	-	-	-0.6	97.7	45.1	41.3	727.2
12/5/2017 13:00	5.3	207.6	-0.3	97.8	51.0	40.5	727.7
12/5/2017 14:00	5.9	216.0	-0.1	97.8	56.0	41.1	727.8
12/5/2017 15:00	5.4	214.3	0.1	97.9	37.8	40.0	727.6
12/5/2017 16:00	5.1	212.6	0.1	98.0	13.2	40.1	727.9
12/5/2017 17:00	4.2	211.4	0.0	98.1	0.7	39.4	727.7
12/5/2017 18:00	3.4	210.2	-0.1	98.1	0.0	40.0	727.6
12/5/2017 19:00	5.2	200.8	-0.2	98.0	0.0	40.3	727.8
12/5/2017 20:00	3.9	215.3	-0.3	98.0	0.0	40.4	727.6
12/5/2017 21:00	1.7	212.9	-0.5	98.0	0.0	40.3	727.6
12/5/2017 22:00	2.0	144.7	-0.8	97.7	0.0	40.1	727.7
12/5/2017 23:00	4.2	202.1	-0.7	97.5	0.0	40.0	727.7
12/6/2017 0:00	5.6	196.9	-0.8	97.2	0.0	40.9	727.6
12/6/2017 1:00	5.8	195.0	-0.8	96.5	0.0	40.4	727.4
12/6/2017 2:00	4.1	200.0	-0.9	96.2	0.0	39.8	727.7
12/6/2017 3:00	3.9	198.1	-1.0	96.0	0.0	40.3	727.7
12/6/2017 4:00	2.4	187.8	-1.1	95.2	0.0	39.9	727.7
12/6/2017 5:00	1.4	162.6	-1.0	93.1	0.0	39.3	727.7
12/6/2017 6:00	2.7	158.6	-0.7	87.9	0.0	39.8	727.8
12/6/2017 7:00	2.8	170.5	-0.2	83.3	0.0	40.3	727.7
12/6/2017 8:00	4.3	184.1	0.5	76.7	0.0	40.6	727.8
12/6/2017 9:00	4.7	186.1	0.9	70.5	1.6	41.3	727.9
12/6/2017 10:00	5.0	192.2	1.4	63.0	15.4	39.7	727.6
12/6/2017 11:00	6.3	187.0	2.2	52.4	66.6	39.8	728.3
12/6/2017 12:00	4.4	198.8	2.8	50.0	179.4	41.0	552.7
12/6/2017 13:00	4.4	200.8	4.0	35.7	195.7	40.8	453.3
12/6/2017 14:00	4.4	210.0	3.8	38.8	177.0	40.4	453.1
12/6/2017 15:00	4.2	204.1	3.8	41.3	111.0	41.0	453.0
12/6/2017 16:00	4.6	198.2	3.8	42.5	29.7	40.3	452.9
12/6/2017 17:00	4.3	198.4	3.7	45.3	1.1	40.7	452.9
12/6/2017 18:00	4.6	210.6	3.9	47.0	0.0	40.3	452.9
12/6/2017 19:00	5.1	207.0	3.9	48.0	0.0	39.8	452.8
12/6/2017 20:00	5.5	202.9	3.7	49.4	0.0	40.7	452.9
12/6/2017 21:00	5.1	207.5	3.8	49.2	0.0	39.4	452.9
12/6/2017 22:00	5.4	205.7	3.8	50.2	0.0	39.4	452.8
12/6/2017 23:00	5.5	212.0	4.0	49.8	0.0	39.5	452.9

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
12/7/2017 0:00	4.7	214.1	3.9	50.0	0.0	39.6	452.8
12/7/2017 1:00	6.0	215.3	3.7	51.3	0.0	39.4	452.7
12/7/2017 2:00	5.9	207.8	3.9	50.5	0.0	39.7	452.7
12/7/2017 3:00	5.9	200.6	4.4	47.6	0.0	39.9	452.8
12/7/2017 4:00	6.5	200.9	4.5	46.5	0.0	39.3	452.8
12/7/2017 5:00	6.2	204.1	4.5	46.0	0.0	39.6	452.7
12/7/2017 6:00	6.4	208.0	4.2	46.6	0.0	39.4	452.7
12/7/2017 7:00	6.0	210.6	4.6	44.3	0.0	39.6	452.7
12/7/2017 8:00	5.6	216.1	4.7	43.2	0.0	39.3	452.8
12/7/2017 9:00	4.0	202.5	4.2	43.9	1.8	39.1	452.7
12/7/2017 10:00	4.0	202.4	4.4	42.8	9.0	39.7	452.7
12/7/2017 11:00	3.8	207.9	4.5	42.0	28.2	39.5	452.8
12/7/2017 12:00	3.8	213.7	5.4	38.5	113.7	40.2	452.9
12/7/2017 13:00	4.3	198.3	6.0	37.1	238.0	39.0	453.0
12/7/2017 14:00	4.6	190.4	6.3	35.5	174.5	39.0	452.9
12/7/2017 15:00	5.2	190.4	6.4	35.2	133.6	39.1	452.7
12/7/2017 16:00	3.2	152.3	6.1	34.0	54.9	39.4	452.7
12/7/2017 17:00	4.0	170.2	6.2	32.7	2.2	39.2	452.7
12/7/2017 18:00	5.3	187.1	6.4	31.9	0.0	39.0	452.7
12/7/2017 19:00	4.4	198.3	6.3	32.4	0.0	39.0	452.7
12/7/2017 20:00	3.8	216.8	6.4	31.8	0.0	39.5	452.7
12/7/2017 21:00	5.9	203.3	6.5	31.3	0.0	38.5	452.7
12/7/2017 22:00	6.5	204.8	6.1	32.2	0.0	38.7	452.6
12/7/2017 23:00	8.4	195.0	6.3	31.8	0.0	40.6	452.6
12/8/2017 0:00	6.6	189.9	6.8	29.8	0.0	39.3	452.7
12/8/2017 1:00	6.7	185.2	6.5	30.4	0.0	39.7	452.5
12/8/2017 2:00	6.5	189.5	6.1	31.5	0.0	39.4	452.5
12/8/2017 3:00	5.4	203.8	5.6	32.9	0.0	39.5	452.6
12/8/2017 4:00	4.9	191.2	5.5	33.9	0.0	39.6	452.6
12/8/2017 5:00	5.5	194.0	5.1	37.7	0.0	39.8	452.6
12/8/2017 6:00	5.3	214.3	5.3	38.8	0.0	40.4	452.6
12/8/2017 7:00	5.2	229.6	5.0	41.4	0.0	39.6	452.6
12/8/2017 8:00	6.0	210.0	4.7	43.6	0.0	39.2	452.5
12/8/2017 9:00	6.1	215.0	4.7	43.1	0.5	39.2	452.5
12/8/2017 10:00	7.0	204.1	4.6	43.7	15.9	39.7	452.4
12/8/2017 11:00	8.5	189.2	4.9	42.8	40.9	38.3	452.5
12/8/2017 12:00	9.1	191.3	4.8	42.3	81.6	38.6	452.5
12/8/2017 13:00	9.5	187.9	4.8	44.1	79.4	38.7	452.0
12/8/2017 14:00	10.6	195.5	3.0	68.2	47.2	38.7	452.3
12/8/2017 15:00	7.5	209.1	1.8	81.7	20.6	38.4	452.5
12/8/2017 16:00	7.9	191.4	0.8	93.9	9.3	38.5	452.6
12/8/2017 17:00	6.6	189.4	0.5	95.9	0.4	38.6	452.8
12/8/2017 18:00	5.1	201.0	0.5	96.5	0.0	38.3	453.0
12/8/2017 19:00	2.2	244.7	0.8	95.2	0.0	38.6	453.1
12/8/2017 20:00	1.8	210.8	0.7	95.8	0.0	38.3	454.1
12/8/2017 21:00	3.3	222.7	0.7	97.6	0.0	38.2	455.7
12/8/2017 22:00	5.9	221.2	0.7	98.0	0.0	37.8	456.2
12/8/2017 23:00	5.6	210.0	0.2	98.2	0.0	37.6	456.7
12/9/2017 0:00	3.2	184.9	0.0	98.1	0.0	37.0	457.1
12/9/2017 1:00	1.8	247.5	-0.1	98.1	0.0	38.5	458.4
12/9/2017 2:00	1.5	258.1	0.0	98.2	0.0	39.0	459.2
12/9/2017 3:00	4.0	231.4	0.4	98.2	0.0	39.5	460.3
12/9/2017 4:00	5.1	226.8	0.3	98.3	0.0	39.6	460.9
12/9/2017 5:00	3.2	224.5	0.3	98.4	0.0	38.5	461.4

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
12/9/2017 6:00	1.8	251.2	0.3	98.4	0.0	38.6	461.9
12/9/2017 7:00	1.5	220.9	0.9	98.4	0.0	37.4	463.2
12/9/2017 8:00	3.1	182.8	1.1	98.4	0.0	36.3	464.3
12/9/2017 9:00	6.2	223.6	1.2	98.5	0.1	36.4	464.7
12/9/2017 10:00	6.0	225.0	1.4	97.9	4.6	36.7	464.9
12/9/2017 11:00	4.3	213.2	1.6	96.8	16.0	37.5	465.7
12/9/2017 12:00	3.6	217.4	1.6	96.0	30.4	36.5	466.1
12/9/2017 13:00	5.2	199.4	1.9	93.3	34.0	36.3	466.3
12/9/2017 14:00	4.6	214.0	1.7	94.9	43.8	36.5	466.4
12/9/2017 15:00	5.8	195.6	2.0	92.3	22.5	36.4	466.5
12/9/2017 16:00	6.4	195.6	1.6	96.9	8.1	36.4	467.0
12/9/2017 17:00	6.3	198.1	1.5	97.3	0.5	36.0	467.4
12/9/2017 18:00	6.4	206.2	1.2	97.9	0.0	35.9	468.1
12/9/2017 19:00	6.1	213.0	1.0	98.3	0.0	35.6	469.0
12/9/2017 20:00	6.3	215.5	0.5	98.4	0.0	35.2	469.8
12/9/2017 21:00	6.1	199.2	0.2	98.5	0.0	34.4	470.6
12/9/2017 22:00	5.8	199.8	0.1	98.5	0.0	34.8	470.9
12/9/2017 23:00	5.8	215.6	0.0	98.5	0.0	34.3	471.0
12/10/2017 0:00	4.8	209.7	-0.1	98.5	0.0	34.1	471.1
12/10/2017 1:00	4.7	207.7	-0.1	98.6	0.0	33.5	471.1
12/10/2017 2:00	4.4	200.4	-0.1	98.6	0.0	32.4	471.1
12/10/2017 3:00	3.9	193.6	-0.1	98.6	0.0	33.2	471.1
12/10/2017 4:00	3.5	188.4	-0.1	98.6	0.0	32.8	471.1
12/10/2017 5:00	2.9	188.5	-0.1	98.6	0.0	32.8	471.1
12/10/2017 6:00	2.5	188.4	-0.2	98.6	0.0	32.5	471.1
12/10/2017 7:00	-	-	-0.1	98.3	0.0	34.5	471.1
12/10/2017 8:00	-	-	-0.1	95.6	0.0	33.6	471.0
12/10/2017 9:00	-	-	-0.1	93.2	0.7	33.1	471.1
12/10/2017 10:00	-	-	0.2	88.0	15.0	34.0	471.1
12/10/2017 11:00	-	-	0.8	84.8	54.9	33.1	471.1
12/10/2017 12:00	2.1	50.3	1.0	80.4	119.7	33.8	471.5
12/10/2017 13:00	2.6	32.7	0.9	78.7	105.8	33.4	471.1
12/10/2017 14:00	1.6	31.5	1.0	78.5	39.2	33.8	471.1
12/10/2017 15:00	4.2	25.5	1.4	73.7	31.4	33.7	471.2
12/10/2017 16:00	4.8	23.0	1.3	72.3	7.8	33.7	471.3
12/10/2017 17:00	4.7	23.4	1.4	72.8	0.3	33.7	471.5
12/10/2017 18:00	5.5	26.2	0.5	86.0	0.0	34.4	472.0
12/10/2017 19:00	6.8	23.2	-0.1	96.0	0.0	33.6	472.5
12/10/2017 20:00	5.1	21.1	0.2	96.8	0.0	34.0	475.3
12/10/2017 21:00	4.8	17.2	0.6	97.6	0.0	33.8	479.5
12/10/2017 22:00	2.6	341.9	1.9	97.4	0.0	33.5	481.6
12/10/2017 23:00	3.2	209.4	3.0	97.1	0.0	33.3	484.3
12/11/2017 0:00	5.8	216.2	2.9	97.5	0.0	32.4	486.9
12/11/2017 1:00	10.6	188.0	2.9	91.1	0.0	31.7	488.3
12/11/2017 2:00	7.2	183.0	3.7	77.3	0.0	31.5	488.5
12/11/2017 3:00	5.8	191.6	4.3	67.6	0.0	31.8	488.4
12/11/2017 4:00	6.1	190.8	4.9	63.0	0.0	31.7	488.4
12/11/2017 5:00	5.6	188.2	5.8	53.6	0.0	31.4	488.4
12/11/2017 6:00	6.8	176.3	6.7	39.4	0.0	30.4	488.1
12/11/2017 7:00	12.3	165.1	7.5	30.5	0.0	30.4	488.5
12/11/2017 8:00	10.3	177.4	7.1	30.6	0.0	30.6	487.7
12/11/2017 9:00	9.6	180.3	6.8	29.3	0.2	30.9	488.2
12/11/2017 10:00	10.0	180.0	7.0	25.5	10.6	30.5	488.2
12/11/2017 11:00	8.5	192.7	6.6	28.3	54.8	30.6	488.2

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m²)	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
12/11/2017 12:00	8.6	190.6	7.0	26.3	69.6	30.5	488.1
12/11/2017 13:00	9.0	188.0	7.1	25.9	75.7	30.4	488.0
12/11/2017 14:00	8.4	188.0	7.0	26.5	56.4	30.6	488.0
12/11/2017 15:00	6.0	196.5	6.8	26.8	42.4	30.5	488.2
12/11/2017 16:00	5.3	198.5	6.7	26.9	15.0	30.5	488.2
12/11/2017 17:00	5.2	203.9	6.7	27.0	1.0	30.4	488.1
12/11/2017 18:00	7.3	193.6	6.6	26.9	0.0	30.2	488.1
12/11/2017 19:00	7.0	186.3	6.4	27.6	0.0	29.9	488.1
12/11/2017 20:00	6.5	191.9	6.4	27.3	0.0	30.2	488.1
12/11/2017 21:00	7.1	189.8	6.5	27.9	0.0	30.1	488.1
12/11/2017 22:00	7.5	189.2	6.2	29.3	0.0	30.3	488.1
12/11/2017 23:00	7.6	188.6	5.6	32.4	0.0	30.3	487.9
12/12/2017 0:00	9.1	186.7	5.1	41.1	0.0	30.5	488.0
12/12/2017 1:00	6.2	195.4	4.4	55.8	0.0	30.2	488.1
12/12/2017 2:00	7.9	179.6	3.7	73.5	0.0	30.5	488.1
12/12/2017 3:00	7.9	187.7	2.3	87.0	0.0	30.1	488.2
12/12/2017 4:00	5.2	211.2	1.1	97.4	0.0	30.1	488.5
12/12/2017 5:00	5.0	167.7	1.2	96.7	0.0	30.1	488.5
12/12/2017 6:00	6.0	193.7	1.2	92.8	0.0	30.2	488.5
12/12/2017 7:00	5.6	199.5	1.2	92.2	0.0	30.1	488.5
12/12/2017 8:00	6.0	193.0	1.4	91.8	0.0	29.9	488.5
12/12/2017 9:00	5.1	199.8	1.4	92.8	0.2	29.8	488.6
12/12/2017 10:00	4.4	207.1	1.3	95.7	9.4	29.9	488.6
12/12/2017 11:00	5.1	209.4	1.4	96.8	37.4	29.9	488.7
12/12/2017 12:00	4.3	215.1	1.3	97.3	49.7	29.9	488.7
12/12/2017 13:00	5.1	217.4	1.2	97.7	55.5	30.0	488.8
12/12/2017 14:00	5.9	219.3	0.9	97.9	41.4	29.8	489.1
12/12/2017 15:00	5.9	213.8	0.6	98.1	30.0	29.7	489.4
12/12/2017 16:00	5.4	220.8	0.4	98.2	8.1	29.3	489.4
12/12/2017 17:00	3.5	211.8	0.3	98.3	0.6	29.6	489.5
12/12/2017 18:00	2.6	199.7	0.3	98.3	0.0	29.7	489.5
12/12/2017 19:00	1.5	224.6	0.4	98.1	0.0	29.7	489.5
12/12/2017 20:00	1.8	65.8	0.3	97.8	0.0	29.1	489.7
12/12/2017 21:00	1.1	281.0	0.3	97.6	0.0	28.2	490.1
12/12/2017 22:00	1.0	16.4	0.1	97.9	0.0	28.3	490.8
12/12/2017 23:00	0.8	28.7	0.2	97.8	0.0	28.5	491.2
12/13/2017 0:00	2.2	143.5	0.1	97.9	0.0	28.8	491.6
12/13/2017 1:00	1.7	125.7	0.5	97.5	0.0	29.0	491.8
12/13/2017 2:00	3.3	179.6	0.5	96.7	0.0	28.8	492.4
12/13/2017 3:00	5.6	192.2	0.6	95.9	0.0	28.4	492.6
12/13/2017 4:00	5.0	194.9	0.6	96.9	0.0	29.4	492.6
12/13/2017 5:00	3.7	151.7	0.9	93.9	0.0	29.2	492.6
12/13/2017 6:00	3.2	152.7	1.0	93.0	0.0	29.3	492.6
12/13/2017 7:00	3.3	192.7	1.1	93.8	0.0	29.4	492.6
12/13/2017 8:00	3.1	185.0	1.0	95.3	0.0	29.3	492.6
12/13/2017 9:00	3.7	203.4	1.0	95.3	0.3	29.3	492.6
12/13/2017 10:00	3.4	184.1	1.3	92.6	9.0	29.2	492.6
12/13/2017 11:00	3.2	161.1	1.5	90.9	27.5	29.2	492.5
12/13/2017 12:00	2.6	110.1	2.1	86.3	42.7	29.2	492.6
12/13/2017 13:00	3.5	164.5	2.2	88.8	54.1	27.5	492.6
12/13/2017 14:00	2.0	87.3	2.1	88.2	60.5	29.0	492.7
12/13/2017 15:00	1.6	176.9	2.2	89.8	26.2	29.0	492.7
12/13/2017 16:00	1.9	26.8	1.7	91.9	7.4	28.7	493.0
12/13/2017 17:00	1.9	206.7	1.9	95.0	0.3	27.9	493.6

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
12/13/2017 18:00	2.5	198.8	2.1	97.3	0.0	27.8	494.0
12/13/2017 19:00	2.1	192.3	2.6	96.7	0.0	28.1	494.6
12/13/2017 20:00	2.6	186.3	2.9	95.7	0.0	28.3	495.2
12/13/2017 21:00	3.6	195.7	2.8	97.5	0.0	26.6	496.3
12/13/2017 22:00	3.4	202.1	2.8	98.0	0.0	26.9	498.4
12/13/2017 23:00	3.3	183.8	3.2	98.2	0.0	27.1	499.5
12/14/2017 0:00	4.5	207.7	3.1	98.2	0.0	26.4	501.3
12/14/2017 1:00	4.3	207.3	3.2	98.3	0.0	25.9	503.5
12/14/2017 2:00	5.5	196.2	3.2	98.4	0.0	25.5	505.8
12/14/2017 3:00	6.4	205.7	3.1	98.5	0.0	25.0	506.7
12/14/2017 4:00	8.0	206.1	3.0	98.4	0.0	25.2	508.0
12/14/2017 5:00	6.5	211.6	2.6	98.4	0.0	22.9	510.2
12/14/2017 6:00	7.9	191.2	2.2	97.9	0.0	24.2	512.6
12/14/2017 7:00	7.6	216.2	1.6	98.3	0.0	24.0	513.8
12/14/2017 8:00	6.4	211.1	1.1	98.4	0.0	24.7	514.7
12/14/2017 9:00	5.3	201.7	1.0	98.4	0.0	24.9	515.2
12/14/2017 10:00	4.9	209.8	0.9	98.2	2.9	25.1	515.2
12/14/2017 11:00	5.2	209.9	0.8	98.2	16.0	24.8	515.3
12/14/2017 12:00	4.7	214.3	0.7	98.1	16.3	24.7	515.3
12/14/2017 13:00	6.0	213.2	0.8	98.2	64.6	25.4	515.4
12/14/2017 14:00	4.8	214.9	1.2	96.7	139.6	24.6	515.3
12/14/2017 15:00	10.3	225.6	0.3	98.1	17.9	24.6	515.7
12/14/2017 16:00	7.4	222.5	-0.2	98.3	8.4	24.0	515.9
12/14/2017 17:00	5.6	220.8	-0.5	98.5	0.8	25.2	516.4
12/14/2017 18:00	4.8	216.7	-1.1	98.6	0.0	25.5	516.7
12/14/2017 19:00	4.1	223.8	-1.2	98.5	0.0	26.0	517.0
12/14/2017 20:00	4.9	233.2	-1.4	98.2	0.0	28.4	518.2
12/14/2017 21:00	5.5	236.2	-1.7	97.9	0.0	30.3	519.1
12/14/2017 22:00	5.8	222.5	-2.1	97.6	0.0	31.5	519.2
12/14/2017 23:00	5.2	221.8	-2.4	97.4	0.0	34.4	519.6
12/15/2017 0:00	4.9	215.1	-2.5	97.3	0.0	34.7	519.6
12/15/2017 1:00	4.5	209.2	-3.0	97.1	0.0	34.9	519.6
12/15/2017 2:00	5.0	202.5	-3.2	97.0	0.0	34.5	519.9
12/15/2017 3:00	6.7	201.2	-3.2	96.9	0.0	33.6	519.8
12/15/2017 4:00	5.3	208.6	-3.2	96.9	0.0	32.5	520.0
12/15/2017 5:00	4.2	212.4	-3.2	96.8	0.0	33.5	520.5
12/15/2017 6:00	3.7	208.9	-3.3	96.8	0.0	33.1	520.6
12/15/2017 7:00	2.5	210.1	-3.3	96.8	0.0	34.5	521.5
12/15/2017 8:00	2.4	212.1	-3.3	96.8	0.0	41.1	523.6
12/15/2017 9:00	2.9	207.6	-3.1	96.9	0.2	40.6	524.0
12/15/2017 10:00	4.5	226.1	-3.0	96.9	7.0	40.1	524.1
12/15/2017 11:00	3.2	215.6	-3.1	96.8	34.2	40.6	524.0
12/15/2017 12:00	3.0	220.5	-3.0	96.6	81.5	39.8	524.1
12/15/2017 13:00	2.6	216.1	-2.9	96.7	95.9	39.0	524.3
12/15/2017 14:00	2.8	211.8	-3.0	96.7	75.6	41.2	525.1
12/15/2017 15:00	2.1	211.7	-3.3	96.6	48.0	40.5	525.4
12/15/2017 16:00	2.5	215.1	-3.3	96.7	10.8	41.6	525.5
12/15/2017 17:00	2.2	203.9	-3.4	96.6	0.8	41.5	525.5
12/15/2017 18:00	2.0	205.2	-3.6	96.5	0.0	40.9	525.6
12/15/2017 19:00	2.2	204.9	-3.6	96.6	0.0	41.3	525.6
12/15/2017 20:00	2.2	202.3	-3.8	96.4	0.0	40.9	525.6
12/15/2017 21:00	2.1	207.7	-3.8	96.4	0.0	40.9	525.6
12/15/2017 22:00	1.9	212.8	-3.9	96.3	0.0	40.7	525.6
12/15/2017 23:00	1.8	209.2	-4.2	96.1	0.0	40.6	525.6

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
12/16/2017 0:00	3.5	199.7	-4.3	96.1	-	40.6	525.6
12/16/2017 1:00	5.7	195.3	-4.1	96.3	-	40.3	525.6
12/16/2017 2:00	5.2	191.3	-3.9	96.3	-	41.2	525.7
12/16/2017 3:00	5.1	196.4	-3.7	96.5	-	40.5	525.6
12/16/2017 4:00	4.2	214.9	-3.6	96.5	-	39.7	525.8
12/16/2017 5:00	3.7	229.3	-3.5	96.6	-	40.3	526.5
12/16/2017 6:00	3.6	220.3	-3.5	96.6	-	41.6	527.0
12/16/2017 7:00	4.3	216.9	-3.3	96.7	-	40.4	527.6
12/16/2017 8:00	4.5	222.3	-3.0	96.9	-	40.4	528.1
12/16/2017 9:00	3.9	214.2	-3.0	96.9	-	39.0	528.8
12/16/2017 10:00	-	-	-2.7	97.0	-	40.1	530.0
12/16/2017 11:00	-	-	-2.5	97.1	-	39.9	531.1
12/16/2017 12:00	-	-	-2.2	97.2	-	40.7	532.3
12/16/2017 13:00	-	-	-2.2	97.3	-	40.9	534.1
12/16/2017 14:00	-	-	-2.1	97.3	-	42.1	535.6
12/16/2017 15:00	-	-	-2.0	97.4	-	44.8	537.6
12/16/2017 16:00	-	-	-2.0	97.4	-	45.4	538.5
12/16/2017 17:00	-	-	-1.9	97.5	-	48.5	539.7
12/16/2017 18:00	-	-	-1.9	97.5	-	48.4	541.3
12/16/2017 19:00	-	-	-2.1	97.4	-	48.4	542.8
12/16/2017 20:00	-	-	-2.1	97.5	-	50.2	543.8
12/16/2017 21:00	-	-	-2.1	97.4	-	50.5	544.3
12/16/2017 22:00	-	-	-2.2	97.4	-	50.2	544.7
12/16/2017 23:00	-	-	-2.5	97.3	-	50.2	544.9
12/17/2017 0:00	-	-	-2.8	97.1	-	52.3	545.3
12/17/2017 1:00	-	-	-3.1	96.9	-	52.7	545.9
12/17/2017 2:00	-	-	-3.5	96.7	-	50.0	545.9
12/17/2017 3:00	-	-	-3.8	96.5	-	50.2	545.9
12/17/2017 4:00	-	-	-4.1	96.3	-	50.8	546.0
12/17/2017 5:00	-	-	-4.4	96.1	-	50.1	545.9
12/17/2017 6:00	-	-	-4.3	96.2	-	50.6	546.0
12/17/2017 7:00	-	-	-4.5	96.0	-	50.5	546.1
12/17/2017 8:00	-	-	-4.6	95.9	-	48.8	546.0
12/17/2017 9:00	-	-	-4.9	95.8	-	48.7	546.1
12/17/2017 10:00	-	-	-4.8	95.8	-	49.5	546.4
12/17/2017 11:00	-	-	-4.7	95.9	-	50.2	546.5
12/17/2017 12:00	-	-	-4.4	96.0	-	54.2	546.9
12/17/2017 13:00	-	-	-4.3	96.1	-	52.6	547.1
12/17/2017 14:00	-	-	-4.3	96.1	-	52.3	547.7
12/17/2017 15:00	-	-	-4.3	96.1	-	53.3	547.8
12/17/2017 16:00	-	-	-4.3	96.1	-	54.7	548.2
12/17/2017 17:00	-	-	-4.4	96.0	-	56.0	548.3
12/17/2017 18:00	-	-	-4.5	95.9	-	56.0	548.3
12/17/2017 19:00	-	-	-4.7	95.8	-	55.9	548.3
12/17/2017 20:00	-	-	-4.8	95.8	-	55.8	548.3
12/17/2017 21:00	-	-	-5.0	95.6	-	56.0	548.3
12/17/2017 22:00	-	-	-5.2	95.5	-	55.9	548.4
12/17/2017 23:00	-	-	-5.3	95.5	-	56.0	548.4
12/18/2017 0:00	-	-	-5.2	95.5	-	55.9	548.4
12/18/2017 1:00	-	-	-5.2	95.5	-	55.5	548.4
12/18/2017 2:00	-	-	-5.3	95.5	-	55.5	548.4
12/18/2017 3:00	-	-	-5.3	95.4	-	55.5	548.4
12/18/2017 4:00	-	-	-5.4	95.4	-	55.3	548.4
12/18/2017 5:00	-	-	-5.5	95.3	-	55.5	548.5

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
12/18/2017 6:00	-	-	-5.2	95.5	-	54.9	548.4
12/18/2017 7:00	-	-	-5.4	95.3	-	55.0	548.5
12/18/2017 8:00	-	-	-5.5	95.2	-	55.2	548.4
12/18/2017 9:00	-	-	-5.5	95.3	-	54.8	548.3
12/18/2017 10:00	-	-	-5.8	95.1	-	54.9	548.4
12/18/2017 11:00	-	-	-6.3	94.6	-	55.2	548.3
12/18/2017 12:00	-	-	-5.8	95.0	-	54.8	548.5
12/18/2017 13:00	-	-	-5.8	94.8	-	54.2	548.6
12/18/2017 14:00	-	-	-5.8	94.9	-	54.4	548.7
12/18/2017 15:00	-	-	-5.6	95.1	-	54.0	548.8
12/18/2017 16:00	-	-	-5.8	95.0	-	54.5	548.7
12/18/2017 17:00	-	-	-5.9	94.9	-	54.6	548.6
12/18/2017 18:00	-	-	-6.0	94.9	-	54.6	548.7
12/18/2017 19:00	-	-	-6.0	94.9	-	55.0	548.7
12/18/2017 20:00	-	-	-6.4	94.6	-	54.7	548.5
12/18/2017 21:00	-	-	-6.9	94.3	-	54.1	548.8
12/18/2017 22:00	-	-	-7.1	94.2	-	54.6	548.7
12/18/2017 23:00	-	-	-7.4	93.9	-	54.5	548.8
12/19/2017 0:00	-	-	-7.8	93.5	0.0	54.4	548.8
12/19/2017 1:00	-	-	-7.8	93.6	0.0	54.0	548.8
12/19/2017 2:00	-	-	-7.6	93.8	0.0	54.5	548.9
12/19/2017 3:00	-	-	-7.6	93.7	0.0	54.7	548.9
12/19/2017 4:00	-	-	-7.6	92.5	0.0	53.7	548.9
12/19/2017 5:00	-	-	-7.7	90.4	0.0	54.0	548.9
12/19/2017 6:00	-	-	-8.1	88.5	0.0	52.9	548.9
12/19/2017 7:00	-	-	-7.8	84.0	0.0	52.1	548.8
12/19/2017 8:00	-	-	-7.9	82.2	0.0	51.7	548.8
12/19/2017 9:00	-	-	-8.5	82.3	0.3	52.0	548.8
12/19/2017 10:00	-	-	-8.7	80.2	7.6	52.1	548.8
12/19/2017 11:00	-	-	-9.4	83.0	28.9	52.4	549.3
12/19/2017 12:00	-	-	-8.8	81.4	210.5	52.0	549.3
12/19/2017 13:00	-	-	-8.1	87.0	158.4	50.6	549.1
12/19/2017 14:00	-	-	-8.9	90.0	148.5	51.2	548.9
12/19/2017 15:00	-	-	-9.3	90.2	82.7	51.4	548.7
12/19/2017 16:00	-	-	-9.9	89.4	41.0	51.9	548.8
12/19/2017 17:00	-	-	-10.6	89.1	2.2	52.3	548.7
12/19/2017 18:00	-	-	-10.9	89.2	0.0	52.3	548.9
12/19/2017 19:00	-	-	-10.9	89.9	0.0	51.7	548.8
12/19/2017 20:00	-	-	-10.8	89.0	0.0	52.2	548.9
12/19/2017 21:00	-	-	-10.8	86.5	0.0	51.6	548.8
12/19/2017 22:00	-	-	-11.3	87.2	0.0	53.0	548.7
12/19/2017 23:00	-	-	-11.1	88.1	0.0	51.7	549.1
12/20/2017 0:00	-	-	-10.5	84.8	0.0	51.4	549.3
12/20/2017 1:00	-	-	-10.2	83.1	0.0	51.7	549.2
12/20/2017 2:00	-	-	-10.0	81.0	0.0	52.4	549.1
12/20/2017 3:00	-	-	-9.8	79.5	0.0	52.4	549.1
12/20/2017 4:00	-	-	-9.8	80.5	0.0	51.9	549.1
12/20/2017 5:00	-	-	-9.6	81.7	0.0	50.6	549.1
12/20/2017 6:00	-	-	-9.2	82.4	0.0	50.9	549.1
12/20/2017 7:00	-	-	-8.8	83.4	0.0	50.7	549.1
12/20/2017 8:00	-	-	-8.4	85.0	0.0	50.5	549.1
12/20/2017 9:00	-	-	-8.5	87.4	0.2	50.0	549.1
12/20/2017 10:00	-	-	-7.9	88.3	7.5	50.1	549.1
12/20/2017 11:00	-	-	-7.5	85.6	33.5	49.8	549.2

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
12/20/2017 12:00	-	-	-6.3	88.4	79.9	50.0	549.2
12/20/2017 13:00	-	-	-5.3	89.8	74.4	50.4	549.1
12/20/2017 14:00	-	-	-5.1	92.9	69.3	49.5	549.1
12/20/2017 15:00	-	-	-5.3	95.6	32.4	49.6	549.1
12/20/2017 16:00	-	-	-4.9	95.8	10.3	49.3	549.2
12/20/2017 17:00	-	-	-4.7	95.9	0.7	50.9	549.5
12/20/2017 18:00	-	-	-4.3	96.0	0.0	50.6	549.6
12/20/2017 19:00	-	-	-3.9	96.2	0.0	50.0	549.6
12/20/2017 20:00	-	-	-4.2	96.1	0.0	50.3	549.6
12/20/2017 21:00	-	-	-4.6	95.8	0.0	50.6	549.7
12/20/2017 22:00	-	-	-4.9	95.5	0.0	50.0	549.8
12/20/2017 23:00	-	-	-5.1	95.5	0.0	50.5	549.8
12/21/2017 0:00	-	-	-5.5	95.1	0.0	50.6	549.7
12/21/2017 1:00	-	-	-5.7	94.8	0.0	50.6	549.7
12/21/2017 2:00	-	-	-6.1	94.6	0.0	50.1	549.7
12/21/2017 3:00	-	-	-6.0	95.4	0.0	50.0	549.7
12/21/2017 4:00	-	-	-5.9	95.3	0.0	50.5	549.8
12/21/2017 5:00	-	-	-5.9	95.0	0.0	49.9	549.8
12/21/2017 6:00	-	-	-6.7	84.2	0.0	52.6	549.8
12/21/2017 7:00	-	-	-6.6	64.8	0.0	51.7	549.8
12/21/2017 8:00	-	-	-7.4	59.3	0.0	52.3	549.5
12/21/2017 9:00	-	-	-7.8	55.8	0.3	52.1	549.6
12/21/2017 10:00	-	-	-8.4	59.6	8.2	45.0	549.6
12/21/2017 11:00	-	-	-8.6	59.1	26.4	45.7	549.8
12/21/2017 12:00	-	-	-8.5	57.4	215.2	45.9	549.8
12/21/2017 13:00	-	-	-8.7	58.8	251.2	46.9	549.9
12/21/2017 14:00	-	-	-8.6	57.7	227.1	44.7	549.9
12/21/2017 15:00	-	-	-8.7	58.9	162.5	46.9	549.8
12/21/2017 16:00	-	-	-8.8	56.7	71.9	45.9	549.9
12/21/2017 17:00	-	-	-8.9	55.9	2.8	51.9	549.8
12/21/2017 18:00	-	-	-9.4	58.6	0.0	47.3	549.8
12/21/2017 19:00	-	-	-9.4	58.4	0.0	46.9	549.9
12/21/2017 20:00	-	-	-9.7	60.8	0.0	46.5	549.9
12/21/2017 21:00	-	-	-9.9	61.3	0.0	46.6	549.8
12/21/2017 22:00	-	-	-9.9	59.8	0.0	46.3	549.8
12/21/2017 23:00	-	-	-10.7	66.7	0.0	47.0	549.8
12/22/2017 0:00	-	-	-10.3	64.1	0.0	46.8	549.9
12/22/2017 1:00	-	-	-10.2	62.1	0.0	47.3	549.8
12/22/2017 2:00	-	-	-10.4	62.8	0.0	46.6	549.7
12/22/2017 3:00	-	-	-9.3	52.2	0.0	45.7	549.8
12/22/2017 4:00	-	-	-9.3	51.8	0.0	46.1	549.9
12/22/2017 5:00	-	-	-11.5	68.3	0.0	46.4	550.0
12/22/2017 6:00	-	-	-12.3	75.5	0.0	46.6	550.0
12/22/2017 7:00	-	-	-11.9	76.1	0.0	46.4	550.0
12/22/2017 8:00	-	-	-10.2	59.1	0.0	46.6	550.1
12/22/2017 9:00	-	-	-12.7	77.3	0.3	46.5	550.1
12/22/2017 10:00	-	-	-11.9	74.0	7.4	46.8	550.1
12/22/2017 11:00	-	-	-10.4	63.3	23.7	46.6	550.3
12/22/2017 12:00	-	-	-9.8	60.2	207.0	46.1	550.5
12/22/2017 13:00	-	-	-9.5	62.5	231.3	45.8	550.5
12/22/2017 14:00	-	-	-11.5	78.3	212.6	46.4	550.3
12/22/2017 15:00	-	-	-12.0	83.9	152.8	46.2	550.3
12/22/2017 16:00	-	-	-11.3	68.9	69.9	45.7	550.2
12/22/2017 17:00	-	-	-9.5	57.7	2.7	46.4	550.1



**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
12/22/2017 18:00	-	-	-10.0	59.8	0.0	46.5	550.0
12/22/2017 19:00	-	-	-9.4	56.5	0.0	46.0	550.1
12/22/2017 20:00	-	-	-9.1	55.9	0.0	45.7	550.0
12/22/2017 21:00	-	-	-10.0	60.6	0.0	45.6	550.1
12/22/2017 22:00	-	-	-9.6	59.3	0.0	45.8	550.1
12/22/2017 23:00	4.2	21.3	-8.9	55.9	0.0	45.6	550.1
12/23/2017 0:00	8.9	19.2	-8.4	53.6	0.0	46.7	550.0
12/23/2017 1:00	9.6	19.6	-8.9	56.0	0.0	46.7	550.1
12/23/2017 2:00	9.3	16.6	-8.1	52.5	0.0	45.9	550.1
12/23/2017 3:00	4.4	37.6	-9.6	59.2	0.0	46.5	550.1
12/23/2017 4:00	1.9	199.6	-12.4	72.6	0.0	46.2	550.1
12/23/2017 5:00	2.1	212.8	-11.8	69.4	0.0	46.6	550.2
12/23/2017 6:00	2.3	208.4	-11.3	66.0	0.0	46.9	550.2
12/23/2017 7:00	2.4	194.2	-11.5	66.9	0.0	46.7	550.2
12/23/2017 8:00	2.4	193.2	-11.3	65.7	0.0	46.6	550.2
12/23/2017 9:00	2.4	197.3	-11.7	67.3	0.3	46.5	550.2
12/23/2017 10:00	3.2	188.7	-11.2	64.6	7.4	46.7	550.3
12/23/2017 11:00	3.2	188.7	-9.1	54.8	22.1	45.5	550.4
12/23/2017 12:00	1.8	186.9	-7.3	47.4	190.4	45.7	550.9
12/23/2017 13:00	0.8	268.7	-5.9	44.3	205.5	46.1	550.6
12/23/2017 14:00	0.6	40.0	-4.2	37.9	187.6	45.9	550.4
12/23/2017 15:00	0.5	213.8	-3.8	35.9	138.1	46.0	550.3
12/23/2017 16:00	0.6	258.8	-4.0	36.6	63.3	46.4	550.0
12/23/2017 17:00	1.3	192.4	-5.2	40.8	2.3	46.6	549.8
12/23/2017 18:00	1.1	107.2	-5.0	38.3	0.0	47.0	549.9
12/23/2017 19:00	0.8	25.9	-4.0	35.0	0.0	47.2	550.1
12/23/2017 20:00	0.9	198.3	-4.7	38.2	0.0	46.7	550.0
12/23/2017 21:00	1.2	287.9	-3.1	33.3	0.0	46.7	550.2
12/23/2017 22:00	1.1	253.0	-3.2	32.9	0.0	47.1	550.3
12/23/2017 23:00	0.9	246.0	-3.6	33.8	0.0	46.3	550.1
12/24/2017 0:00	1.6	207.6	-4.4	36.3	0.0	46.4	550.1
12/24/2017 1:00	1.8	181.2	-5.3	38.8	0.0	46.7	550.1
12/24/2017 2:00	2.3	187.4	-6.8	46.0	0.0	46.0	550.1
12/24/2017 3:00	3.3	190.8	-7.8	49.7	0.0	46.6	550.2
12/24/2017 4:00	4.1	190.3	-7.4	48.4	0.0	46.5	550.1
12/24/2017 5:00	3.1	191.9	-7.7	49.0	0.0	46.8	550.1
12/24/2017 6:00	2.8	182.3	-9.0	56.3	0.0	47.0	550.1
12/24/2017 7:00	3.0	184.7	-8.4	52.6	0.0	46.2	550.2
12/24/2017 8:00	3.0	194.4	-7.5	47.5	0.0	46.6	550.2
12/24/2017 9:00	2.8	176.5	-8.6	52.7	0.1	46.4	550.1
12/24/2017 10:00	2.1	200.9	-9.6	60.2	10.3	45.4	550.2
12/24/2017 11:00	2.1	188.2	-7.0	44.5	46.9	46.8	550.3
12/24/2017 12:00	2.7	204.2	-8.9	54.6	89.6	46.2	550.3
12/24/2017 13:00	1.1	206.6	-9.0	55.3	96.4	46.2	550.6
12/24/2017 14:00	2.4	185.9	-7.9	49.7	162.1	46.3	550.4
12/24/2017 15:00	2.6	192.6	-8.5	51.9	104.2	46.5	550.2
12/24/2017 16:00	3.0	191.2	-9.4	56.8	20.7	46.2	550.2
12/24/2017 17:00	3.1	180.9	-9.6	55.6	1.7	47.0	550.2
12/24/2017 18:00	2.3	187.7	-9.8	57.2	0.0	46.9	550.2
12/24/2017 19:00	2.1	220.3	-9.4	54.7	0.0	46.6	550.2
12/24/2017 20:00	3.5	187.5	-10.1	59.4	0.0	46.6	550.3
12/24/2017 21:00	2.8	186.2	-9.8	56.5	0.0	46.9	550.2
12/24/2017 22:00	3.0	205.2	-10.2	58.3	0.0	46.7	550.2
12/24/2017 23:00	2.3	193.8	-9.7	56.5	0.0	46.6	550.3

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
12/25/2017 0:00	3.0	180.9	-9.9	57.5	0.0	46.5	550.2
12/25/2017 1:00	2.9	184.6	-10.0	56.0	0.0	47.0	550.2
12/25/2017 2:00	2.9	190.2	-10.1	56.3	0.0	46.8	550.2
12/25/2017 3:00	3.0	190.7	-10.8	60.4	0.0	46.6	550.3
12/25/2017 4:00	2.6	190.0	-10.5	58.8	0.0	46.8	550.3
12/25/2017 5:00	2.0	182.4	-10.1	56.2	0.0	46.1	550.3
12/25/2017 6:00	2.2	199.0	-11.6	63.7	0.0	46.9	550.2
12/25/2017 7:00	1.5	191.5	-10.5	57.3	0.0	46.9	550.3
12/25/2017 8:00	1.8	178.7	-10.9	59.7	0.0	47.1	550.2
12/25/2017 9:00	1.4	188.6	-10.8	57.6	0.3	47.0	550.2
12/25/2017 10:00	0.8	123.2	-11.0	57.3	9.7	46.9	550.1
12/25/2017 11:00	0.8	141.4	-10.8	56.5	21.3	46.9	550.3
12/25/2017 12:00	0.6	96.1	-9.4	50.7	164.1	46.5	551.4
12/25/2017 13:00	0.6	208.6	-8.6	47.9	203.0	45.9	551.0
12/25/2017 14:00	0.6	276.4	-8.8	49.4	229.8	46.0	551.0
12/25/2017 15:00	0.8	323.9	-8.8	49.7	152.5	46.3	550.6
12/25/2017 16:00	1.3	310.4	-10.3	56.2	55.1	46.3	550.2
12/25/2017 17:00	0.7	268.1	-9.9	53.9	3.4	47.1	550.1
12/25/2017 18:00	1.0	217.6	-10.1	55.1	0.0	46.7	550.3
12/25/2017 19:00	2.0	212.0	-10.2	58.0	0.0	46.8	550.3
12/25/2017 20:00	2.6	204.3	-9.9	56.3	0.0	46.5	550.3
12/25/2017 21:00	2.3	210.7	-9.4	53.6	0.0	46.7	550.3
12/25/2017 22:00	2.5	218.5	-9.2	56.7	0.0	46.4	550.3
12/25/2017 23:00	2.9	203.2	-9.3	60.7	0.0	47.0	550.3
12/26/2017 0:00	3.0	209.7	-9.4	67.1	0.0	46.5	550.3
12/26/2017 1:00	3.2	226.3	-9.8	74.1	0.0	46.3	550.3
12/26/2017 2:00	2.7	216.6	-9.6	80.8	0.0	46.8	550.3
12/26/2017 3:00	1.4	227.7	-9.3	85.2	0.0	47.0	550.5
12/26/2017 4:00	0.5	54.4	-8.9	81.6	0.0	47.2	550.3
12/26/2017 5:00	0.6	11.4	-8.6	76.4	0.0	46.8	550.4
12/26/2017 6:00	1.3	344.7	-9.0	77.7	0.0	47.0	550.3
12/26/2017 7:00	1.0	326.9	-9.5	79.0	0.0	47.1	550.2
12/26/2017 8:00	1.2	329.1	-9.5	86.1	0.0	46.9	550.3
12/26/2017 9:00	1.0	10.0	-9.5	88.6	0.2	47.0	550.3
12/26/2017 10:00	1.0	4.4	-9.6	90.8	4.8	47.0	550.3
12/26/2017 11:00	1.5	26.7	-9.7	91.1	24.9	47.0	550.4
12/26/2017 12:00	1.0	10.0	-9.6	93.2	90.7	46.4	550.6
12/26/2017 13:00	1.9	11.0	-10.2	89.7	80.6	47.0	550.3
12/26/2017 14:00	1.1	242.5	-11.3	84.7	64.5	47.2	550.2
12/26/2017 15:00	1.2	183.0	-11.5	84.7	40.0	46.8	550.3
12/26/2017 16:00	3.5	30.7	-11.1	80.7	17.4	46.6	550.3
12/26/2017 17:00	7.6	36.8	-10.8	73.1	2.1	47.1	550.3
12/26/2017 18:00	10.2	36.7	-11.8	70.5	0.0	46.5	550.3
12/26/2017 19:00	9.8	29.1	-12.5	73.0	0.0	46.8	550.3
12/26/2017 20:00	10.8	25.6	-13.3	72.2	0.0	46.7	550.4
12/26/2017 21:00	11.7	30.5	-13.8	69.6	0.0	46.8	550.2
12/26/2017 22:00	12.2	42.5	-13.9	64.9	0.0	46.0	550.4
12/26/2017 23:00	10.6	38.1	-14.3	64.6	0.0	47.0	550.3
12/27/2017 0:00	10.3	36.5	-14.6	65.1	0.0	46.9	550.4
12/27/2017 1:00	11.4	34.0	-14.5	60.4	0.0	46.3	550.4
12/27/2017 2:00	12.4	42.1	-14.4	56.0	0.0	47.1	550.6
12/27/2017 3:00	11.3	50.9	-14.1	52.7	0.0	47.6	550.4
12/27/2017 4:00	12.2	53.5	-13.7	49.0	0.0	46.8	550.4
12/27/2017 5:00	7.7	60.2	-14.6	52.0	0.0	48.7	550.5

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
12/27/2017 6:00	6.1	54.3	-15.8	54.5	0.0	46.5	550.5
12/27/2017 7:00	8.5	59.0	-15.9	52.2	0.0	46.7	550.6
12/27/2017 8:00	7.8	60.9	-15.5	47.8	0.0	46.5	550.5
12/27/2017 9:00	8.0	50.7	-16.1	51.7	0.2	47.0	550.7
12/27/2017 10:00	10.4	28.9	-15.9	48.6	6.9	46.2	550.5
12/27/2017 11:00	7.3	39.4	-16.1	49.3	18.1	47.0	550.6
12/27/2017 12:00	4.4	66.1	-15.9	50.2	166.1	46.2	551.2
12/27/2017 13:00	3.6	47.7	-15.6	49.3	196.2	46.6	551.2
12/27/2017 14:00	1.8	44.3	-16.0	52.8	186.5	46.9	551.0
12/27/2017 15:00	2.9	18.0	-16.4	53.1	139.8	46.3	550.8
12/27/2017 16:00	3.7	3.3	-16.1	51.4	67.1	47.3	550.7
12/27/2017 17:00	1.9	284.0	-17.6	60.6	3.8	46.6	550.7
12/27/2017 18:00	1.5	266.6	-18.1	63.0	0.0	46.9	550.7
12/27/2017 19:00	2.2	358.5	-17.5	56.6	0.0	46.9	550.8
12/27/2017 20:00	2.3	350.4	-16.9	51.5	0.0	47.2	550.8
12/27/2017 21:00	1.6	224.8	-18.0	60.6	0.0	46.9	550.8
12/27/2017 22:00	1.9	199.0	-18.7	67.8	0.0	47.1	550.8
12/27/2017 23:00	1.8	178.0	-17.3	56.5	0.0	47.9	550.8
12/28/2017 0:00	1.3	241.8	-17.2	53.4	0.0	46.9	550.7
12/28/2017 1:00	1.7	187.8	-17.7	56.3	0.0	46.3	550.8
12/28/2017 2:00	3.0	36.2	-16.6	48.9	0.0	46.4	550.8
12/28/2017 3:00	5.4	21.0	-16.7	48.4	0.0	46.2	550.8
12/28/2017 4:00	3.0	13.7	-16.2	47.3	0.0	47.2	550.8
12/28/2017 5:00	3.3	40.8	-16.1	47.1	0.0	47.2	550.8
12/28/2017 6:00	5.0	61.7	-15.6	46.2	0.0	47.2	550.7
12/28/2017 7:00	6.7	68.2	-16.2	50.5	0.0	46.5	550.7
12/28/2017 8:00	7.9	80.8	-15.5	49.0	0.0	47.4	550.8
12/28/2017 9:00	6.1	85.8	-15.8	48.9	0.2	46.2	550.8
12/28/2017 10:00	6.5	87.4	-15.7	48.9	6.8	46.4	550.8
12/28/2017 11:00	8.6	77.9	-15.4	49.0	17.9	45.8	550.9
12/28/2017 12:00	11.4	68.4	-14.9	48.4	164.7	42.8	551.1
12/28/2017 13:00	14.0	66.2	-14.8	48.6	196.9	45.0	550.8
12/28/2017 14:00	16.0	59.0	-14.6	47.7	186.9	45.4	550.9
12/28/2017 15:00	16.5	58.2	-14.9	48.4	139.5	48.3	551.0
12/28/2017 16:00	16.1	57.2	-15.0	47.4	67.7	44.9	550.9
12/28/2017 17:00	14.4	65.8	-15.3	47.8	4.4	45.8	550.9
12/28/2017 18:00	14.3	70.0	-15.7	49.8	0.0	45.9	550.9
12/28/2017 19:00	15.2	65.9	-15.8	49.4	0.0	45.3	550.5
12/28/2017 20:00	14.5	64.3	-16.0	49.5	0.0	44.9	550.6
12/28/2017 21:00	13.0	68.7	-16.3	50.1	0.0	-	550.9
12/28/2017 22:00	9.1	80.5	-16.7	52.5	0.0	46.4	550.8
12/28/2017 23:00	7.6	70.2	-16.8	53.3	0.0	46.5	550.8
12/29/2017 0:00	10.0	75.7	-17.2	56.4	0.0	45.5	550.8
12/29/2017 1:00	7.3	75.7	-17.2	55.6	0.0	46.0	550.7
12/29/2017 2:00	11.2	62.4	-17.2	56.6	0.0	46.0	550.9
12/29/2017 3:00	8.7	68.6	-17.4	57.3	0.0	45.6	550.8
12/29/2017 4:00	6.0	74.5	-17.5	57.2	0.0	46.3	550.8
12/29/2017 5:00	8.3	72.5	-17.6	58.0	0.0	46.3	550.9
12/29/2017 6:00	6.4	71.0	-17.8	56.9	0.0	45.7	550.7
12/29/2017 7:00	6.9	71.5	-17.8	56.0	0.0	45.7	550.7
12/29/2017 8:00	9.3	66.4	-17.7	55.0	0.0	45.6	550.9
12/29/2017 9:00	9.9	58.7	-18.0	55.9	0.2	45.9	550.8
12/29/2017 10:00	12.1	49.3	-18.0	54.8	6.9	46.0	550.9
12/29/2017 11:00	11.9	44.9	-18.2	54.8	17.8	45.4	550.8

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
12/29/2017 12:00	11.1	44.0	-17.9	52.8	163.5	45.9	551.5
12/29/2017 13:00	13.1	35.9	-17.5	51.9	194.3	44.4	551.2
12/29/2017 14:00	13.4	36.7	-17.1	51.7	185.7	46.1	550.8
12/29/2017 15:00	13.1	35.0	-17.2	52.9	140.0	45.3	551.0
12/29/2017 16:00	12.8	38.4	-17.5	54.9	68.6	45.2	550.9
12/29/2017 17:00	12.8	38.3	-17.8	56.4	4.9	45.2	550.9
12/29/2017 18:00	11.9	41.3	-17.9	56.5	0.0	45.1	550.8
12/29/2017 19:00	12.6	39.7	-18.0	56.4	0.0	45.1	550.7
12/29/2017 20:00	12.3	42.1	-18.0	56.9	0.0	45.1	550.9
12/29/2017 21:00	11.6	43.7	-18.0	57.3	0.0	44.8	550.8
12/29/2017 22:00	7.3	58.6	-18.9	60.2	0.0	45.7	550.9
12/29/2017 23:00	5.6	65.0	-19.5	62.7	0.0	45.7	551.0
12/30/2017 0:00	2.6	68.4	-19.7	63.6	0.0	45.8	551.0
12/30/2017 1:00	1.3	76.0	-19.6	63.8	0.0	45.8	551.0
12/30/2017 2:00	1.2	255.4	-20.0	65.9	0.0	45.0	551.0
12/30/2017 3:00	1.8	190.6	-20.6	69.3	0.0	45.5	551.1
12/30/2017 4:00	2.4	183.7	-20.9	71.9	0.0	45.6	551.1
12/30/2017 5:00	2.1	185.3	-21.4	74.7	0.0	45.6	551.2
12/30/2017 6:00	2.5	188.5	-21.1	70.6	0.0	45.7	551.2
12/30/2017 7:00	2.9	188.7	-21.5	73.8	0.0	45.5	551.2
12/30/2017 8:00	2.5	180.7	-21.2	72.4	0.0	45.6	551.2
12/30/2017 9:00	2.1	181.2	-21.3	72.2	0.3	45.5	551.2
12/30/2017 10:00	2.0	181.8	-21.6	73.1	7.1	45.4	551.2
12/30/2017 11:00	2.1	188.4	-21.5	73.1	18.2	45.5	551.3
12/30/2017 12:00	2.3	191.9	-21.5	73.9	169.6	45.2	551.9
12/30/2017 13:00	1.2	160.1	-20.1	65.7	196.0	44.2	552.2
12/30/2017 14:00	0.8	213.2	-19.9	64.0	186.9	45.2	551.6
12/30/2017 15:00	0.9	313.4	-20.2	66.4	141.3	44.9	551.4
12/30/2017 16:00	1.2	218.3	-21.4	74.6	69.5	45.1	551.2
12/30/2017 17:00	1.0	191.2	-21.7	71.5	4.8	45.9	551.1
12/30/2017 18:00	0.6	157.6	-21.6	73.3	0.0	46.1	551.2
12/30/2017 19:00	1.1	33.6	-21.4	71.0	0.0	45.9	551.3
12/30/2017 20:00	1.3	231.2	-22.2	74.4	0.0	45.6	551.3
12/30/2017 21:00	1.7	191.3	-23.1	78.8	0.0	45.6	551.3
12/30/2017 22:00	1.9	190.8	-22.9	78.5	0.0	45.5	551.3
12/30/2017 23:00	1.0	202.6	-22.3	78.2	0.0	45.6	551.3
12/31/2017 0:00	1.8	195.3	-23.1	77.9	0.0	45.5	551.4
12/31/2017 1:00	1.3	211.5	-23.1	77.7	0.0	45.8	551.4
12/31/2017 2:00	2.2	190.0	-23.9	77.4	0.0	45.4	551.4
12/31/2017 3:00	2.1	195.3	-23.5	74.9	0.0	45.5	551.4
12/31/2017 4:00	2.0	192.1	-23.5	74.0	0.0	45.2	551.4
12/31/2017 5:00	1.8	192.9	-23.3	72.2	0.0	45.3	551.4
12/31/2017 6:00	1.7	190.4	-23.1	71.2	0.0	45.5	551.4
12/31/2017 7:00	2.4	186.3	-23.3	70.5	0.0	45.3	551.4
12/31/2017 8:00	1.4	199.1	-22.4	67.7	0.0	45.5	551.4
12/31/2017 9:00	2.3	190.4	-22.8	68.6	0.2	45.2	551.4
12/31/2017 10:00	1.9	193.9	-22.5	67.1	8.1	45.2	551.4
12/31/2017 11:00	1.2	171.4	-20.7	60.7	27.8	44.6	551.5
12/31/2017 12:00	1.5	159.5	-20.3	58.7	79.9	45.6	551.5
12/31/2017 13:00	1.6	237.0	-20.3	57.5	110.5	45.3	551.5
12/31/2017 14:00	2.0	215.8	-19.3	56.2	152.6	46.0	551.5
12/31/2017 15:00	1.6	314.0	-17.9	51.9	85.8	45.8	551.4
12/31/2017 16:00	1.2	161.4	-18.2	54.5	26.5	45.4	551.3
12/31/2017 17:00	1.7	198.8	-17.3	53.2	1.9	45.6	551.3

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
12/31/2017 18:00	1.5	190.9	-16.2	50.9	0.0	45.4	551.3
12/31/2017 19:00	1.7	197.7	-16.4	52.2	0.0	44.9	551.2
12/31/2017 20:00	1.7	194.1	-16.4	55.1	0.0	45.9	551.2
12/31/2017 21:00	1.5	168.2	-14.9	55.2	0.0	45.7	551.2
12/31/2017 22:00	2.1	188.1	-14.9	58.6	0.0	45.3	551.2
12/31/2017 23:00	3.8	31.2	-10.8	76.4	0.0	45.3	551.7
1/1/2018 0:00	4.0	19.2	-9.8	91.0	0.0	45.7	553.2
1/1/2018 1:00	2.6	9.1	-8.6	92.5	0.0	46.4	554.3
1/1/2018 2:00	3.2	196.0	-7.7	93.2	0.0	45.4	554.8
1/1/2018 3:00	3.0	184.6	-7.3	93.6	0.0	45.4	555.2
1/1/2018 4:00	5.3	188.1	-6.2	94.4	0.0	45.2	555.5
1/1/2018 5:00	7.0	190.3	-5.7	94.8	0.0	45.5	555.9
1/1/2018 6:00	5.7	190.0	-5.6	94.9	0.0	45.4	556.2
1/1/2018 7:00	5.6	196.8	-5.0	95.3	0.0	45.1	556.3
1/1/2018 8:00	6.3	201.5	-4.6	95.6	0.0	45.4	556.4
1/1/2018 9:00	6.4	206.0	-4.1	95.9	0.0	44.3	556.4
1/1/2018 10:00	5.3	210.6	-3.6	96.2	3.0	44.8	556.4
1/1/2018 11:00	5.7	207.7	-3.3	96.4	18.6	44.7	556.5
1/1/2018 12:00	5.2	210.6	-2.7	96.6	32.9	44.6	556.8
1/1/2018 13:00	5.2	212.9	-2.5	96.8	44.4	44.8	557.4
1/1/2018 14:00	5.2	204.4	-2.2	97.0	32.5	45.0	557.5
1/1/2018 15:00	6.0	206.3	-2.2	97.1	22.7	44.8	557.6
1/1/2018 16:00	5.5	207.3	-2.0	97.2	9.3	44.4	557.9
1/1/2018 17:00	4.9	201.8	-1.9	97.3	0.8	43.3	558.3
1/1/2018 18:00	4.7	202.1	-1.6	97.5	0.0	45.3	558.5
1/1/2018 19:00	5.5	206.0	-1.5	97.6	0.0	45.9	559.1
1/1/2018 20:00	5.7	212.5	-1.5	97.6	0.0	46.4	559.8
1/1/2018 21:00	5.3	217.9	-1.6	97.5	0.0	46.3	560.5
1/1/2018 22:00	5.6	216.4	-1.5	97.6	0.0	46.2	561.0
1/1/2018 23:00	5.5	211.3	-1.6	97.6	0.0	47.0	561.9
1/2/2018 0:00	5.3	212.2	-1.3	97.7	0.0	46.7	562.1
1/2/2018 1:00	4.7	211.0	-1.2	97.8	0.0	47.0	562.1
1/2/2018 2:00	4.7	205.4	-1.1	97.8	0.0	46.8	562.1
1/2/2018 3:00	3.4	210.6	-1.2	97.8	0.0	46.9	562.1
1/2/2018 4:00	3.0	203.7	-1.1	97.8	0.0	46.6	562.1
1/2/2018 5:00	3.5	216.1	-0.9	97.9	0.0	46.8	562.1
1/2/2018 6:00	2.6	207.6	-0.8	98.0	0.0	46.7	562.1
1/2/2018 7:00	1.9	206.4	-0.9	98.0	0.0	46.9	562.1
1/2/2018 8:00	2.6	199.7	-1.1	97.9	0.0	46.6	562.1
1/2/2018 9:00	1.6	112.8	-1.1	97.9	0.1	46.4	562.1
1/2/2018 10:00	1.3	43.6	-1.1	97.8	6.7	46.3	562.1
1/2/2018 11:00	1.5	187.6	-1.0	97.8	36.6	47.3	562.1
1/2/2018 12:00	1.3	106.4	-1.1	97.7	57.1	48.8	562.1
1/2/2018 13:00	1.5	184.5	-0.8	97.7	52.4	47.6	562.3
1/2/2018 14:00	1.0	40.2	-0.9	97.8	51.0	46.6	562.6
1/2/2018 15:00	2.2	222.5	-0.6	97.9	37.2	45.9	562.7
1/2/2018 16:00	5.3	211.1	-0.6	98.0	16.0	47.1	563.1
1/2/2018 17:00	5.6	212.0	-0.9	98.1	1.3	47.2	563.2
1/2/2018 18:00	5.8	202.8	-1.1	98.0	0.0	46.7	563.4
1/2/2018 19:00	4.7	210.4	-1.0	97.9	0.0	46.6	563.5
1/2/2018 20:00	3.6	211.4	-0.9	98.0	0.0	46.7	563.5
1/2/2018 21:00	0.9	111.0	-0.9	98.0	0.0	47.1	563.5
1/2/2018 22:00	3.1	195.1	-0.9	98.0	0.0	47.6	563.6
1/2/2018 23:00	3.2	207.8	-0.7	98.0	0.0	46.8	563.7

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
1/3/2018 0:00	3.9	205.4	-0.8	98.1	0.0	46.5	564.2
1/3/2018 1:00	3.6	211.6	-1.0	98.1	0.0	45.1	566.1
1/3/2018 2:00	3.5	202.0	-1.0	98.0	0.0	47.0	567.3
1/3/2018 3:00	5.2	210.4	-1.2	98.0	0.0	50.5	568.2
1/3/2018 4:00	5.7	211.9	-1.5	97.8	0.0	47.4	568.6
1/3/2018 5:00	4.7	217.8	-1.9	97.6	0.0	47.2	569.3
1/3/2018 6:00	3.1	225.3	-2.1	97.5	0.0	47.2	570.9
1/3/2018 7:00	2.1	210.0	-1.9	97.5	0.0	47.1	571.8
1/3/2018 8:00	2.3	210.5	-1.7	97.6	0.0	49.3	573.0
1/3/2018 9:00	1.9	190.9	-1.6	97.6	0.0	49.2	574.3
1/3/2018 10:00	1.7	211.3	-1.5	97.7	3.9	49.8	575.5
1/3/2018 11:00	1.8	200.8	-1.4	97.7	21.8	50.8	576.7
1/3/2018 12:00	2.3	163.9	-1.3	97.7	41.5	51.3	577.1
1/3/2018 13:00	3.8	165.9	-1.2	97.7	59.9	50.4	577.3
1/3/2018 14:00	4.0	148.3	-1.2	97.7	63.4	49.0	577.3
1/3/2018 15:00	3.5	158.8	-1.2	97.7	42.3	49.5	577.4
1/3/2018 16:00	3.4	147.1	-1.3	97.7	16.7	49.3	577.5
1/3/2018 17:00	3.2	137.5	-1.3	97.8	1.4	49.4	577.6
1/3/2018 18:00	1.1	69.7	-1.3	97.8	0.0	49.4	577.9
1/3/2018 19:00	0.3	168.5	-1.2	97.8	0.0	50.1	578.4
1/3/2018 20:00	1.5	52.3	-1.2	97.9	0.0	50.8	578.9
1/3/2018 21:00	0.3	16.2	-1.1	97.8	0.0	51.5	579.2
1/3/2018 22:00	0.8	345.9	-1.0	97.9	0.0	51.6	579.5
1/3/2018 23:00	1.5	32.5	-1.0	97.9	0.0	51.5	579.4
1/4/2018 0:00	2.5	33.2	-1.2	97.9	-	51.7	579.4
1/4/2018 1:00	2.7	31.1	-1.2	97.9	-	51.7	579.5
1/4/2018 2:00	3.4	31.4	-1.0	97.9	-	51.7	579.4
1/4/2018 3:00	3.6	31.9	-0.8	97.9	-	51.8	579.4
1/4/2018 4:00	2.7	28.1	-0.6	98.0	-	50.9	580.0
1/4/2018 5:00	3.0	26.0	-0.5	98.1	-	53.1	580.7
1/4/2018 6:00	2.1	24.9	-0.3	98.1	-	54.8	581.2
1/4/2018 7:00	2.1	20.2	-0.2	98.2	-	54.4	581.7
1/4/2018 8:00	2.6	27.9	-0.2	98.3	-	57.0	582.2
1/4/2018 9:00	2.7	21.4	-0.1	98.3	-	58.0	582.6
1/4/2018 10:00	2.2	17.9	0.0	98.3	-	58.9	582.9
1/4/2018 11:00	0.2	352.0	0.0	98.3	-	59.9	583.0
1/4/2018 12:00	2.3	353.0	0.0	98.3	-	60.1	583.2
1/4/2018 13:00	1.9	13.8	0.1	98.2	-	59.8	583.2
1/4/2018 14:00	2.6	334.9	0.5	98.1	-	59.5	584.4
1/4/2018 15:00	2.0	353.5	0.6	98.2	-	59.5	594.1
1/4/2018 16:00	2.6	354.7	0.8	98.3	-	59.8	596.8
1/4/2018 17:00	2.5	341.8	0.9	98.3	-	59.5	598.4
1/4/2018 18:00	1.1	329.7	1.2	98.0	-	59.3	599.4
1/4/2018 19:00	2.9	9.9	0.9	97.4	-	59.1	600.6
1/4/2018 20:00	2.9	18.2	1.0	96.6	-	59.0	602.3
1/4/2018 21:00	4.2	16.0	1.1	95.1	-	58.9	603.3
1/4/2018 22:00	3.2	26.4	0.9	95.0	-	58.9	604.5
1/4/2018 23:00	3.8	18.8	1.2	94.2	0.0	58.8	605.1
1/5/2018 0:00	3.7	30.0	1.1	94.1	0.0	59.0	605.6
1/5/2018 1:00	3.2	21.7	1.7	92.5	0.0	58.5	605.7
1/5/2018 2:00	2.0	12.0	2.0	91.7	0.0	58.7	605.7
1/5/2018 3:00	2.0	4.9	2.2	91.1	0.0	58.3	605.7
1/5/2018 4:00	1.3	69.9	2.3	90.2	0.0	58.2	605.9
1/5/2018 5:00	1.6	0.5	2.0	90.5	0.0	58.2	606.2

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
1/5/2018 6:00	2.1	22.2	2.0	89.5	0.0	58.2	606.3
1/5/2018 7:00	2.0	54.3	1.9	89.6	0.0	57.9	606.5
1/5/2018 8:00	2.2	36.6	1.5	91.5	0.0	57.8	606.7
1/5/2018 9:00	5.3	206.0	-0.1	97.7	0.1	58.1	608.8
1/5/2018 10:00	5.6	218.8	-1.4	98.3	4.5	57.5	609.1
1/5/2018 11:00	5.6	186.0	-2.0	97.3	31.2	58.1	609.1
1/5/2018 12:00	8.8	170.6	-1.7	81.0	46.6	57.7	609.1
1/5/2018 13:00	9.3	161.1	-1.1	72.6	69.7	57.5	608.9
1/5/2018 14:00	5.6	170.3	-1.6	83.8	63.1	57.6	609.2
1/5/2018 15:00	5.9	174.9	-2.5	96.3	34.2	57.6	609.3
1/5/2018 16:00	6.7	182.8	-2.4	97.2	19.7	57.6	609.5
1/5/2018 17:00	5.2	192.7	-2.3	97.2	1.8	57.8	609.7
1/5/2018 18:00	5.9	212.8	-2.3	97.2	0.0	56.8	610.0
1/5/2018 19:00	6.1	204.6	-2.7	97.1	0.0	57.2	609.8
1/5/2018 20:00	4.9	222.5	-3.0	96.8	0.0	56.9	610.0
1/5/2018 21:00	4.5	214.4	-3.4	96.6	0.0	57.0	610.0
1/5/2018 22:00	4.9	221.9	-3.8	96.4	0.0	56.9	610.0
1/5/2018 23:00	6.5	232.5	-4.5	96.0	0.0	57.0	610.0
1/6/2018 0:00	5.1	222.4	-4.9	95.7	0.0	57.2	610.1
1/6/2018 1:00	4.2	220.4	-4.8	95.7	0.0	57.1	610.1
1/6/2018 2:00	3.9	222.7	-5.2	95.5	0.0	57.1	610.2
1/6/2018 3:00	3.7	219.7	-5.5	95.3	0.0	57.0	610.2
1/6/2018 4:00	3.5	208.0	-5.4	95.4	0.0	57.3	610.3
1/6/2018 5:00	4.7	196.9	-5.3	95.4	0.0	57.1	610.3
1/6/2018 6:00	4.9	188.1	-5.4	95.4	0.0	57.3	610.3
1/6/2018 7:00	2.4	190.4	-5.4	95.3	0.0	57.1	610.3
1/6/2018 8:00	3.2	209.4	-5.4	95.3	0.0	56.0	610.4
1/6/2018 9:00	4.2	208.8	-5.2	95.4	0.1	56.8	610.4
1/6/2018 10:00	3.7	215.6	-4.9	95.6	5.0	57.0	610.7
1/6/2018 11:00	4.3	206.1	-4.6	95.6	30.4	57.1	610.8
1/6/2018 12:00	4.3	206.4	-4.2	95.7	48.0	57.4	611.3
1/6/2018 13:00	3.4	221.2	-3.9	95.8	64.4	57.4	612.2
1/6/2018 14:00	3.4	218.8	-3.6	95.9	76.5	57.5	612.8
1/6/2018 15:00	3.9	215.8	-3.3	96.2	67.5	58.0	613.3
1/6/2018 16:00	5.0	210.7	-3.1	96.6	25.7	58.9	613.3
1/6/2018 17:00	5.5	206.5	-3.0	96.8	3.2	57.0	613.5
1/6/2018 18:00	4.0	211.6	-2.9	96.9	0.0	58.3	613.7
1/6/2018 19:00	3.1	210.8	-2.8	96.9	0.0	58.2	613.8
1/6/2018 20:00	3.3	200.6	-2.7	97.0	0.0	58.2	614.3
1/6/2018 21:00	2.6	212.9	-2.6	97.0	0.0	58.5	615.5
1/6/2018 22:00	2.1	222.4	-2.5	97.1	0.0	59.4	616.0
1/6/2018 23:00	2.1	210.3	-2.4	97.1	0.0	60.8	617.2
1/7/2018 0:00	2.4	217.6	-2.4	97.2	0.0	59.7	618.2
1/7/2018 1:00	2.3	210.9	-2.3	97.2	0.0	61.0	619.7
1/7/2018 2:00	2.1	217.9	-2.3	97.2	0.0	60.7	621.2
1/7/2018 3:00	2.0	219.2	-2.2	97.2	0.0	62.4	622.9
1/7/2018 4:00	1.7	207.6	-2.1	97.3	0.0	64.0	624.2
1/7/2018 5:00	1.8	215.0	-2.1	97.3	0.0	64.3	624.6
1/7/2018 6:00	2.0	208.1	-2.1	97.3	0.0	64.3	624.8
1/7/2018 7:00	1.5	203.9	-2.0	97.3	0.0	64.4	624.8
1/7/2018 8:00	0.5	199.4	-2.2	97.2	0.0	64.4	624.8
1/7/2018 9:00	-	-	-2.2	97.2	0.1	64.3	624.9
1/7/2018 10:00	-	-	-2.3	97.1	13.7	64.2	624.8
1/7/2018 11:00	-	-	-2.4	96.8	36.4	64.0	624.9

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
1/7/2018 12:00	-	-	-2.6	96.3	77.9	64.3	625.0
1/7/2018 13:00	-	-	-2.5	96.1	90.6	64.3	624.9
1/7/2018 14:00	-	-	-3.1	95.6	99.4	64.0	624.9
1/7/2018 15:00	-	-	-2.4	96.1	74.2	63.6	624.8
1/7/2018 16:00	-	-	-3.3	95.9	27.7	64.2	624.8
1/7/2018 17:00	-	-	-4.3	95.8	3.1	64.4	624.9
1/7/2018 18:00	-	-	-4.3	95.8	0.0	64.1	624.9
1/7/2018 19:00	-	-	-4.3	95.9	0.0	64.1	624.9
1/7/2018 20:00	-	-	-4.2	95.9	0.0	64.1	624.9
1/7/2018 21:00	-	-	-4.2	95.6	0.0	64.7	624.9
1/7/2018 22:00	-	-	-4.3	95.0	0.0	64.2	624.9
1/7/2018 23:00	-	-	-4.4	95.7	0.0	64.2	624.9
1/8/2018 0:00	-	-	-4.2	94.4	0.0	63.4	624.9
1/8/2018 1:00	-	-	-4.5	94.1	0.0	64.4	624.9
1/8/2018 2:00	-	-	-4.4	95.3	0.0	63.9	624.9
1/8/2018 3:00	-	-	-4.5	95.4	0.0	63.7	625.1
1/8/2018 4:00	-	-	-4.6	95.6	0.0	64.4	625.1
1/8/2018 5:00	-	-	-4.6	95.6	0.0	63.9	625.5
1/8/2018 6:00	-	-	-4.7	95.6	0.0	65.1	625.9
1/8/2018 7:00	-	-	-4.8	95.5	0.0	64.7	626.6
1/8/2018 8:00	-	-	-4.8	95.5	0.0	65.8	627.0
1/8/2018 9:00	-	-	-4.9	95.4	0.0	65.8	627.6
1/8/2018 10:00	-	-	-5.0	95.2	3.5	66.6	628.0
1/8/2018 11:00	-	-	-4.9	95.1	11.2	66.6	628.4
1/8/2018 12:00	-	-	-4.9	94.8	20.1	66.9	629.2
1/8/2018 13:00	-	-	-4.8	94.3	29.0	67.4	629.6
1/8/2018 14:00	-	-	-5.2	94.4	21.4	68.0	630.3
1/8/2018 15:00	-	-	-5.0	95.0	15.2	68.1	630.9
1/8/2018 16:00	-	-	-5.3	94.7	6.8	68.9	631.3
1/8/2018 17:00	-	-	-5.7	94.7	1.1	69.3	631.9
1/8/2018 18:00	-	-	-6.2	94.9	0.0	70.0	632.1
1/8/2018 19:00	-	-	-6.3	94.8	0.0	70.2	632.2
1/8/2018 20:00	-	-	-6.0	94.8	0.0	70.3	632.3
1/8/2018 21:00	-	-	-6.0	94.7	0.0	70.3	632.4
1/8/2018 22:00	-	-	-6.0	94.7	0.0	70.5	632.4
1/8/2018 23:00	-	-	-6.1	94.8	0.0	70.4	632.5
1/9/2018 0:00	-	-	-6.2	94.8	0.0	70.2	632.6
1/9/2018 1:00	-	-	-6.4	94.7	0.0	70.1	632.6
1/9/2018 2:00	-	-	-6.8	94.5	0.0	70.2	632.7
1/9/2018 3:00	-	-	-7.0	94.3	0.0	70.1	632.7
1/9/2018 4:00	-	-	-8.0	93.6	0.0	70.1	632.7
1/9/2018 5:00	-	-	-8.7	93.0	0.0	70.0	632.8
1/9/2018 6:00	-	-	-9.7	92.1	0.0	70.1	632.8
1/9/2018 7:00	-	-	-10.4	91.4	0.0	69.9	632.9
1/9/2018 8:00	-	-	-11.0	90.6	0.0	69.9	632.8
1/9/2018 9:00	8.0	31.5	-11.8	89.3	0.0	69.9	632.9
1/9/2018 10:00	11.2	32.8	-12.2	87.8	2.5	69.8	632.8
1/9/2018 11:00	11.8	36.7	-12.5	87.0	11.7	69.5	632.8
1/9/2018 12:00	13.1	31.0	-13.2	82.8	61.0	69.6	633.3
1/9/2018 13:00	13.2	35.1	-14.2	81.6	47.9	69.3	633.1
1/9/2018 14:00	13.5	34.3	-14.3	78.9	43.6	69.4	633.3
1/9/2018 15:00	13.1	37.4	-14.8	77.3	35.9	69.5	633.5
1/9/2018 16:00	13.4	36.4	-15.4	77.4	23.8	69.3	633.4
1/9/2018 17:00	13.5	37.9	-16.1	76.7	3.4	69.6	633.5



**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
1/9/2018 18:00	13.2	37.2	-16.8	76.6	0.0	69.3	633.9
1/9/2018 19:00	13.6	37.4	-17.4	74.9	0.0	69.4	633.8
1/9/2018 20:00	13.0	36.1	-18.2	73.8	0.0	69.6	634.0
1/9/2018 21:00	13.2	37.3	-18.5	70.8	0.0	69.3	634.0
1/9/2018 22:00	13.3	36.3	-18.7	69.0	0.0	69.5	633.9
1/9/2018 23:00	12.9	37.3	-19.4	71.2	0.0	69.4	633.9
1/10/2018 0:00	13.0	35.3	-19.7	80.4	0.0	69.5	634.2
1/10/2018 1:00	12.6	35.6	-19.8	80.0	0.0	69.5	634.2
1/10/2018 2:00	13.3	34.0	-19.9	79.5	0.0	69.4	634.3
1/10/2018 3:00	13.9	35.1	-20.2	77.8	0.0	69.3	634.2
1/10/2018 4:00	12.9	37.5	-20.6	80.8	0.0	69.3	634.3
1/10/2018 5:00	11.9	44.6	-21.3	79.3	0.0	69.5	634.5
1/10/2018 6:00	10.1	43.9	-22.2	75.9	0.0	69.6	634.5
1/10/2018 7:00	10.1	50.5	-22.6	70.3	0.0	69.6	634.7
1/10/2018 8:00	7.8	59.7	-23.0	68.2	0.0	69.4	634.7
1/10/2018 9:00	7.5	48.5	-23.7	68.8	0.3	69.3	634.8
1/10/2018 10:00	5.8	49.8	-23.5	67.5	9.3	69.7	634.8
1/10/2018 11:00	3.8	33.4	-23.9	69.2	45.9	69.3	634.9
1/10/2018 12:00	2.7	26.9	-23.8	68.3	97.2	69.4	635.0
1/10/2018 13:00	2.1	27.2	-23.0	64.8	230.1	69.0	635.2
1/10/2018 14:00	1.3	49.0	-22.5	65.6	259.5	68.6	635.0
1/10/2018 15:00	0.7	213.7	-21.6	75.0	193.4	69.1	634.9
1/10/2018 16:00	1.5	241.7	-23.0	78.4	86.8	69.3	634.9
1/10/2018 17:00	1.6	193.8	-23.4	79.2	5.8	69.5	634.8
1/10/2018 18:00	0.8	263.4	-22.8	79.6	0.0	69.2	634.9
1/10/2018 19:00	1.1	223.5	-22.6	79.7	0.0	69.1	634.9
1/10/2018 20:00	1.2	228.9	-22.5	79.8	0.0	69.5	634.9
1/10/2018 21:00	1.6	190.9	-23.0	79.5	0.0	68.8	634.9
1/10/2018 22:00	1.6	182.3	-23.3	79.3	0.0	69.4	634.8
1/10/2018 23:00	2.1	184.8	-23.3	79.2	0.0	69.5	634.9
1/11/2018 0:00	2.1	189.5	-23.3	79.2	0.0	69.3	635.0
1/11/2018 1:00	1.8	194.1	-22.5	79.7	0.0	68.7	634.9
1/11/2018 2:00	2.0	204.2	-23.0	79.5	0.0	69.2	634.9
1/11/2018 3:00	1.8	197.3	-22.4	79.9	0.0	69.6	635.0
1/11/2018 4:00	1.7	195.4	-22.0	80.2	0.0	69.7	634.9
1/11/2018 5:00	1.4	204.9	-21.6	80.4	0.0	69.3	634.9
1/11/2018 6:00	1.9	193.8	-22.0	80.2	0.0	69.3	634.9
1/11/2018 7:00	1.7	197.6	-22.1	80.1	0.0	69.2	634.9
1/11/2018 8:00	1.6	198.8	-22.4	79.9	0.0	69.2	635.0
1/11/2018 9:00	1.9	178.3	-21.8	80.3	0.4	69.0	634.9
1/11/2018 10:00	2.1	184.1	-22.4	79.8	8.0	69.0	635.0
1/11/2018 11:00	2.2	196.0	-21.9	79.9	32.0	68.8	635.1
1/11/2018 12:00	2.3	192.9	-21.3	79.7	102.5	68.9	635.0
1/11/2018 13:00	2.1	201.5	-20.7	79.9	123.0	69.0	634.8
1/11/2018 14:00	2.0	173.8	-21.1	80.0	92.5	69.1	635.0
1/11/2018 15:00	1.7	180.4	-20.5	80.5	87.2	68.8	634.9
1/11/2018 16:00	1.7	180.5	-20.9	80.8	36.0	69.2	634.9
1/11/2018 17:00	2.2	183.7	-20.7	81.2	5.0	69.2	634.9
1/11/2018 18:00	2.0	190.2	-20.6	81.3	0.0	69.3	634.9
1/11/2018 19:00	2.6	179.4	-20.9	81.1	0.0	69.3	634.9
1/11/2018 20:00	2.0	185.4	-20.9	81.0	0.0	69.1	634.9
1/11/2018 21:00	2.4	195.1	-20.5	81.2	0.0	68.6	634.9
1/11/2018 22:00	2.7	201.9	-20.8	81.1	0.0	69.0	635.0
1/11/2018 23:00	2.9	190.0	-19.7	81.7	0.0	68.6	635.0

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
1/12/2018 0:00	2.5	188.7	-18.5	81.5	0.0	69.5	634.9
1/12/2018 1:00	2.4	188.2	-16.8	75.3	0.0	69.3	634.9
1/12/2018 2:00	2.4	200.3	-16.0	72.0	0.0	69.9	634.9
1/12/2018 3:00	2.1	198.5	-15.0	68.3	0.0	69.1	634.9
1/12/2018 4:00	2.8	193.2	-14.8	69.3	0.0	69.3	634.8
1/12/2018 5:00	1.9	184.1	-13.9	64.6	0.0	69.2	634.8
1/12/2018 6:00	1.5	190.4	-13.3	63.7	0.0	68.8	634.8
1/12/2018 7:00	2.7	191.7	-13.9	68.0	0.0	69.4	634.7
1/12/2018 8:00	1.6	205.1	-12.9	63.3	0.0	69.4	634.7
1/12/2018 9:00	1.7	203.8	-12.4	62.8	0.1	69.2	634.7
1/12/2018 10:00	1.3	194.7	-11.7	59.4	12.2	69.4	634.7
1/12/2018 11:00	2.1	33.1	-10.5	56.9	31.7	69.1	634.5
1/12/2018 12:00	4.4	29.6	-9.7	69.5	69.3	68.8	634.4
1/12/2018 13:00	4.5	23.0	-9.4	76.6	73.8	69.1	634.4
1/12/2018 14:00	4.8	27.9	-9.6	84.7	87.5	68.9	634.5
1/12/2018 15:00	4.5	28.4	-9.7	89.8	50.5	69.0	634.6
1/12/2018 16:00	3.3	28.1	-8.9	90.7	24.8	68.8	634.9
1/12/2018 17:00	4.3	30.5	-8.3	90.9	2.3	69.9	635.3
1/12/2018 18:00	4.2	29.7	-8.6	91.9	0.0	70.1	635.6
1/12/2018 19:00	3.5	22.1	-8.2	92.8	0.0	71.0	636.4
1/12/2018 20:00	2.7	26.6	-7.6	93.2	0.0	71.2	636.9
1/12/2018 21:00	4.0	25.3	-7.3	92.8	0.0	71.4	637.5
1/12/2018 22:00	4.0	33.1	-6.7	93.7	0.0	72.5	638.1
1/12/2018 23:00	3.4	24.1	-6.2	94.0	0.0	73.8	639.1
1/13/2018 0:00	2.8	42.1	-5.9	94.6	0.0	75.3	640.7
1/13/2018 1:00	2.3	46.3	-5.7	95.0	0.0	77.5	641.4
1/13/2018 2:00	1.5	152.6	-5.3	95.4	0.0	77.5	641.7
1/13/2018 3:00	2.5	178.1	-4.3	96.1	0.0	77.7	641.9
1/13/2018 4:00	4.3	196.6	-3.9	96.2	0.0	77.2	642.0
1/13/2018 5:00	5.1	192.5	-3.5	96.4	0.0	76.9	641.9
1/13/2018 6:00	4.7	190.5	-3.4	96.4	0.0	76.9	641.9
1/13/2018 7:00	4.1	194.2	-3.0	96.2	0.0	77.0	642.0
1/13/2018 8:00	2.7	164.2	-2.8	95.8	0.0	76.9	641.9
1/13/2018 9:00	2.4	135.4	-2.4	95.4	0.2	76.8	641.9
1/13/2018 10:00	3.1	31.2	-2.4	93.9	10.9	76.2	641.8
1/13/2018 11:00	2.5	16.7	-1.9	92.5	31.5	76.5	641.8
1/13/2018 12:00	3.5	28.4	-1.8	93.3	38.9	76.4	642.3
1/13/2018 13:00	3.9	25.3	-1.7	96.5	38.9	77.5	644.6
1/13/2018 14:00	4.7	23.7	-1.5	97.1	37.5	80.4	646.9
1/13/2018 15:00	4.1	29.4	-1.6	97.2	24.3	80.7	648.3
1/13/2018 16:00	3.8	32.1	-1.5	97.2	15.6	80.0	649.7
1/13/2018 17:00	2.5	59.8	-0.2	97.2	2.4	81.8	649.9
1/13/2018 18:00	3.0	203.4	0.2	97.5	0.0	81.4	649.9
1/13/2018 19:00	4.9	204.4	0.4	98.1	0.0	80.6	650.7
1/13/2018 20:00	5.2	196.0	1.1	98.3	0.0	78.4	650.7
1/13/2018 21:00	5.5	186.1	1.8	98.4	0.0	77.1	651.0
1/13/2018 22:00	5.8	179.3	2.1	98.4	0.0	78.6	651.1
1/13/2018 23:00	4.9	194.1	1.9	98.5	0.0	76.7	651.3
1/14/2018 0:00	4.7	192.0	2.5	98.5	0.0	75.1	651.5
1/14/2018 1:00	6.1	188.4	2.9	98.6	0.0	73.9	651.8
1/14/2018 2:00	5.6	194.5	3.4	98.6	0.0	72.7	652.0
1/14/2018 3:00	5.0	195.2	3.2	98.5	0.0	71.1	652.1
1/14/2018 4:00	4.7	198.9	3.4	98.5	0.0	70.1	652.2
1/14/2018 5:00	4.2	194.6	4.2	94.9	0.0	72.4	652.1

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
1/14/2018 6:00	3.4	208.2	5.0	83.9	0.0	71.1	652.2
1/14/2018 7:00	4.7	196.2	4.6	84.2	0.0	70.7	652.2
1/14/2018 8:00	5.4	197.5	5.5	77.6	0.0	70.5	652.1
1/14/2018 9:00	3.4	215.7	6.0	73.7	0.9	70.4	652.0
1/14/2018 10:00	2.4	269.7	6.3	70.2	11.8	70.4	652.0
1/14/2018 11:00	2.0	339.5	6.5	64.8	51.6	69.9	651.9
1/14/2018 12:00	1.8	324.0	7.2	59.0	79.1	69.9	651.8
1/14/2018 13:00	2.1	308.2	7.5	56.8	92.4	70.2	651.8
1/14/2018 14:00	2.2	336.2	7.6	56.4	89.6	67.5	651.8
1/14/2018 15:00	2.6	7.0	7.6	57.0	78.0	68.4	651.7
1/14/2018 16:00	2.3	21.7	7.7	57.2	31.0	67.2	651.7
1/14/2018 17:00	2.2	19.3	7.9	56.9	8.7	68.8	651.7
1/14/2018 18:00	5.2	27.2	6.5	62.0	0.0	67.5	651.6
1/14/2018 19:00	6.9	26.2	5.8	64.5	0.0	67.3	651.6
1/14/2018 20:00	5.4	29.1	5.5	64.0	0.0	66.9	651.6
1/14/2018 21:00	4.4	34.8	5.9	60.0	0.0	67.1	651.7
1/14/2018 22:00	2.6	145.1	8.1	48.9	0.0	67.2	651.7
1/14/2018 23:00	3.7	165.8	7.9	47.9	0.0	66.7	651.7
1/15/2018 0:00	3.7	161.0	7.9	47.1	0.0	66.9	651.6
1/15/2018 1:00	5.3	158.9	7.9	47.2	0.0	66.4	651.6
1/15/2018 2:00	5.0	171.7	7.6	48.9	0.0	66.3	651.7
1/15/2018 3:00	6.9	175.9	6.4	61.5	0.0	66.1	651.5
1/15/2018 4:00	3.0	217.7	5.7	71.0	0.0	66.5	651.7
1/15/2018 5:00	2.5	349.6	6.0	64.5	0.0	66.3	651.8
1/15/2018 6:00	2.9	342.1	6.9	55.3	0.0	66.2	651.7
1/15/2018 7:00	2.8	342.0	6.8	52.7	0.0	66.2	651.7
1/15/2018 8:00	2.0	39.2	6.5	53.1	0.0	66.1	651.7
1/15/2018 9:00	2.7	39.6	6.0	55.1	0.2	66.0	651.7
1/15/2018 10:00	3.4	34.9	5.8	55.1	5.1	65.9	651.7
1/15/2018 11:00	4.1	29.7	5.7	55.6	26.6	66.0	651.8
1/15/2018 12:00	5.2	30.8	5.4	56.6	48.4	65.8	651.7
1/15/2018 13:00	4.8	18.4	6.1	55.5	75.7	65.1	651.7
1/15/2018 14:00	4.4	31.9	6.3	55.1	65.4	65.9	651.6
1/15/2018 15:00	2.9	164.1	7.0	56.3	52.3	63.8	651.7
1/15/2018 16:00	2.8	35.3	6.6	56.4	23.6	63.3	651.6
1/15/2018 17:00	6.5	40.6	5.5	60.2	6.3	63.2	651.8
1/15/2018 18:00	4.9	87.1	6.3	57.2	0.0	62.7	651.7
1/15/2018 19:00	4.9	26.9	5.8	57.8	0.0	62.6	651.7
1/15/2018 20:00	5.3	36.1	5.4	58.9	0.0	62.6	651.6
1/15/2018 21:00	6.8	23.6	5.4	57.0	0.0	63.1	651.7
1/15/2018 22:00	7.7	18.1	5.3	56.7	0.0	62.6	651.7
1/15/2018 23:00	7.6	20.2	4.8	58.1	0.0	62.9	651.7
1/16/2018 0:00	5.5	20.7	5.0	56.7	0.0	62.7	651.6
1/16/2018 1:00	5.8	22.4	4.4	58.9	0.0	62.1	651.7
1/16/2018 2:00	1.6	145.6	4.4	60.6	0.0	62.6	651.8
1/16/2018 3:00	3.7	15.8	3.9	69.7	0.0	61.8	651.7
1/16/2018 4:00	2.4	4.1	4.0	72.7	0.0	61.8	651.7
1/16/2018 5:00	3.1	14.8	3.6	73.7	0.0	61.9	651.7
1/16/2018 6:00	1.5	180.7	3.0	76.7	0.0	62.0	651.7
1/16/2018 7:00	3.9	205.2	2.7	78.8	0.0	61.9	651.9
1/16/2018 8:00	9.0	166.3	2.3	84.0	0.0	61.5	652.1
1/16/2018 9:00	6.2	195.3	1.1	92.3	0.2	61.4	652.1
1/16/2018 10:00	8.7	181.6	1.2	81.0	9.5	61.1	652.0
1/16/2018 11:00	7.8	182.9	1.0	75.2	24.8	61.1	652.1

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
1/16/2018 12:00	6.7	193.1	0.7	77.8	63.2	61.2	652.2
1/16/2018 13:00	7.9	181.2	1.7	63.9	102.7	61.0	652.2
1/16/2018 14:00	4.4	195.1	1.7	63.9	97.6	61.3	652.2
1/16/2018 15:00	4.2	179.8	2.0	61.0	73.2	61.2	652.2
1/16/2018 16:00	1.9	167.0	1.7	64.2	52.0	61.2	652.3
1/16/2018 17:00	3.8	197.4	1.7	64.0	8.1	61.2	652.3
1/16/2018 18:00	3.0	194.0	0.9	72.6	0.0	61.5	652.3
1/16/2018 19:00	2.2	185.5	0.0	85.1	0.0	61.2	652.4
1/16/2018 20:00	1.5	192.4	-0.2	86.3	0.0	61.5	652.4
1/16/2018 21:00	1.6	152.6	-0.6	91.1	0.0	61.0	652.7
1/16/2018 22:00	1.6	359.8	-0.8	93.3	0.0	61.3	653.0
1/16/2018 23:00	1.3	83.9	-1.0	95.3	0.0	61.2	653.3
1/17/2018 0:00	2.4	299.3	-1.2	95.0	0.0	61.6	654.4
1/17/2018 1:00	3.0	178.6	-2.0	97.3	0.0	65.2	657.3
1/17/2018 2:00	4.4	209.9	-1.9	97.2	0.0	65.4	657.3
1/17/2018 3:00	3.3	225.6	-2.1	97.1	0.0	65.5	657.4
1/17/2018 4:00	1.7	207.0	-2.3	94.6	0.0	65.4	657.4
1/17/2018 5:00	1.4	31.2	-2.1	90.7	0.0	65.2	657.4
1/17/2018 6:00	1.6	32.2	-2.1	86.9	0.0	65.7	657.4
1/17/2018 7:00	2.0	77.6	-1.9	81.3	0.0	65.1	657.4
1/17/2018 8:00	4.9	105.7	-1.0	66.4	0.0	62.4	657.4
1/17/2018 9:00	5.0	103.3	-1.2	69.2	0.3	62.5	657.5
1/17/2018 10:00	10.4	91.3	-0.9	66.0	7.2	60.6	657.6
1/17/2018 11:00	9.3	64.7	-1.6	76.6	28.0	62.7	657.0
1/17/2018 12:00	10.8	66.1	-1.8	78.6	44.3	62.0	657.2
1/17/2018 13:00	12.4	55.9	-1.6	74.9	82.3	60.7	657.3
1/17/2018 14:00	11.4	64.7	-1.1	69.3	77.0	60.8	656.6
1/17/2018 15:00	10.0	48.3	-0.9	66.6	68.7	61.3	657.4
1/17/2018 16:00	4.1	51.9	-0.6	65.5	25.9	60.9	657.1
1/17/2018 17:00	2.0	295.4	-1.6	76.5	3.5	61.3	657.4
1/17/2018 18:00	3.6	55.5	-2.5	88.4	0.0	61.2	657.5
1/17/2018 19:00	5.6	36.1	-3.0	95.6	0.0	62.7	657.9
1/17/2018 20:00	4.3	30.3	-3.0	96.5	0.0	62.6	658.5
1/17/2018 21:00	3.6	28.5	-3.0	96.5	0.0	64.4	659.1
1/17/2018 22:00	4.1	31.2	-3.0	96.5	0.0	64.9	659.4
1/17/2018 23:00	5.3	33.5	-2.9	96.6	0.0	65.7	659.5
1/18/2018 0:00	5.6	36.1	-2.8	96.6	0.0	64.2	659.6
1/18/2018 1:00	4.2	44.1	-2.8	96.6	0.0	64.4	659.9
1/18/2018 2:00	4.2	38.5	-2.8	96.7	0.0	64.4	660.0
1/18/2018 3:00	2.9	50.9	-2.8	96.7	0.0	64.2	660.1
1/18/2018 4:00	3.2	56.1	-2.8	96.7	0.0	63.3	660.2
1/18/2018 5:00	0.9	70.3	-2.7	96.7	0.0	64.2	660.4
1/18/2018 6:00	0.8	51.3	-2.6	96.7	0.0	63.4	660.6
1/18/2018 7:00	0.9	186.9	-2.7	96.7	0.0	67.0	661.3
1/18/2018 8:00	0.5	70.6	-2.4	96.8	0.0	65.0	662.3
1/18/2018 9:00	0.7	140.1	-2.4	96.9	0.1	71.2	663.3
1/18/2018 10:00	0.9	198.5	-2.6	96.6	5.4	72.0	663.6
1/18/2018 11:00	1.2	21.5	-1.8	96.8	18.6	72.5	663.8
1/18/2018 12:00	0.4	135.5	-1.5	96.6	38.1	72.2	664.0
1/18/2018 13:00	0.4	32.5	-1.4	96.3	49.7	71.6	664.2
1/18/2018 14:00	1.3	30.5	-1.4	95.7	97.8	72.2	664.1
1/18/2018 15:00	1.2	278.9	-1.8	95.4	110.7	70.9	664.5
1/18/2018 16:00	1.4	201.2	-2.4	95.8	70.6	71.2	664.1
1/18/2018 17:00	0.6	190.5	-3.0	96.4	6.0	71.2	664.0

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
1/18/2018 18:00	0.3	176.9	-3.4	96.4	0.1	70.9	664.1
1/18/2018 19:00	1.1	83.9	-3.5	96.3	0.0	70.1	664.1
1/18/2018 20:00	1.1	178.7	-3.6	96.3	0.0	70.5	664.2
1/18/2018 21:00	1.1	169.7	-3.6	96.3	0.0	70.4	664.2
1/18/2018 22:00	0.8	177.0	-3.6	96.2	0.0	70.5	664.2
1/18/2018 23:00	0.5	160.4	-3.7	96.2	0.0	70.8	664.2
1/19/2018 0:00	1.0	189.0	-3.5	96.3	0.0	70.6	664.3
1/19/2018 1:00	1.0	195.0	-3.6	96.2	0.0	70.6	664.3
1/19/2018 2:00	-	-	-3.5	96.2	0.0	70.6	664.2
1/19/2018 3:00	-	-	-3.5	96.2	0.0	70.5	664.3
1/19/2018 4:00	-	-	-3.1	96.5	0.0	70.7	664.3
1/19/2018 5:00	-	-	-3.4	96.3	0.0	71.0	664.3
1/19/2018 6:00	-	-	-3.3	96.4	0.0	71.4	664.7
1/19/2018 7:00	-	-	-3.2	96.5	0.0	71.3	664.9
1/19/2018 8:00	-	-	-3.3	96.4	0.0	71.3	664.9
1/19/2018 9:00	-	-	-3.6	96.2	0.3	70.9	665.0
1/19/2018 10:00	-	-	-3.2	96.4	4.5	71.0	665.0
1/19/2018 11:00	-	-	-3.4	96.1	24.0	70.5	665.4
1/19/2018 12:00	-	-	-2.7	95.5	65.1	69.9	665.3
1/19/2018 13:00	-	-	-2.7	95.6	79.2	69.7	665.3
1/19/2018 14:00	-	-	-2.8	95.7	70.7	69.9	665.2
1/19/2018 15:00	-	-	-4.0	95.1	56.3	69.9	665.0
1/19/2018 16:00	-	-	-3.9	95.3	44.5	69.4	665.1
1/19/2018 17:00	-	-	-4.2	95.6	6.3	69.5	664.9
1/19/2018 18:00	-	-	-4.8	95.5	0.1	69.0	665.1
1/19/2018 19:00	-	-	-4.9	95.4	0.0	68.7	665.1
1/19/2018 20:00	-	-	-5.0	95.3	0.0	68.5	665.1
1/19/2018 21:00	-	-	-5.2	95.2	0.0	67.9	665.1
1/19/2018 22:00	-	-	-5.6	95.0	0.0	69.1	665.1
1/19/2018 23:00	-	-	-5.5	94.9	0.0	68.9	665.1
1/20/2018 0:00	-	-	-6.0	94.6	0.0	69.2	665.2
1/20/2018 1:00	-	-	-5.9	94.7	0.0	69.2	665.2
1/20/2018 2:00	-	-	-5.8	94.8	0.0	69.3	665.2
1/20/2018 3:00	-	-	-6.0	94.6	0.0	69.1	665.2
1/20/2018 4:00	-	-	-6.1	94.6	0.0	69.1	665.2
1/20/2018 5:00	-	-	-6.0	94.6	0.0	68.9	665.2
1/20/2018 6:00	-	-	-6.1	94.7	0.0	69.1	665.3
1/20/2018 7:00	-	-	-6.1	94.7	0.0	69.0	665.3
1/20/2018 8:00	-	-	-6.0	94.7	0.0	68.9	665.3
1/20/2018 9:00	-	-	-6.0	94.7	0.3	69.3	665.3
1/20/2018 10:00	2.2	33.4	-5.9	94.6	14.0	68.0	665.4
1/20/2018 11:00	3.1	44.2	-5.7	94.6	24.6	67.7	665.5
1/20/2018 12:00	1.3	199.0	-5.5	94.2	55.2	68.2	665.5
1/20/2018 13:00	0.5	147.3	-4.5	94.5	75.9	67.3	665.8
1/20/2018 14:00	1.6	62.0	-3.5	93.5	156.6	68.4	665.9
1/20/2018 15:00	3.0	0.7	-4.7	93.7	98.1	68.3	665.6
1/20/2018 16:00	2.7	25.3	-4.9	94.3	42.9	68.8	665.4
1/20/2018 17:00	3.9	40.1	-5.1	93.5	9.5	69.2	665.4
1/20/2018 18:00	5.2	52.2	-4.6	90.9	0.1	70.2	665.3
1/20/2018 19:00	5.9	45.0	-3.8	82.5	0.0	69.1	665.3
1/20/2018 20:00	5.2	37.9	-3.4	79.0	0.0	68.9	665.3
1/20/2018 21:00	1.4	77.3	-3.7	83.1	0.0	68.9	665.4
1/20/2018 22:00	2.6	45.1	-4.0	93.1	0.0	68.7	665.5
1/20/2018 23:00	2.8	37.7	-4.1	95.9	0.0	68.2	665.6

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
1/21/2018 0:00	2.5	37.6	-4.1	93.7	0.0	68.5	665.6
1/21/2018 1:00	3.8	35.3	-4.3	92.4	0.0	68.4	665.6
1/21/2018 2:00	2.2	52.8	-4.6	94.8	0.0	68.7	665.6
1/21/2018 3:00	3.6	68.7	-4.3	88.9	0.0	68.1	665.6
1/21/2018 4:00	2.9	87.4	-5.1	91.3	0.0	68.2	665.7
1/21/2018 5:00	1.3	174.1	-5.9	96.1	0.0	67.1	665.7
1/21/2018 6:00	2.0	62.6	-6.2	94.7	0.0	67.6	665.7
1/21/2018 7:00	2.2	64.5	-6.1	93.4	0.0	67.7	665.7
1/21/2018 8:00	1.5	78.5	-6.9	94.2	0.0	67.5	665.8
1/21/2018 9:00	1.6	118.4	-7.0	94.4	0.8	67.8	665.8
1/21/2018 10:00	1.1	209.2	-7.3	94.5	8.6	67.7	665.9
1/21/2018 11:00	1.2	203.3	-7.4	93.9	19.8	67.6	665.9
1/21/2018 12:00	0.9	206.7	-7.2	93.2	94.0	67.5	666.0
1/21/2018 13:00	0.4	291.3	-6.8	93.4	131.4	67.6	666.0
1/21/2018 14:00	0.9	209.6	-6.8	93.0	133.7	67.4	666.0
1/21/2018 15:00	0.7	188.3	-6.8	93.2	105.2	67.4	665.9
1/21/2018 16:00	0.5	208.3	-6.8	93.5	72.8	67.7	665.9
1/21/2018 17:00	0.8	55.5	-7.9	93.4	18.8	67.7	665.9
1/21/2018 18:00	0.6	44.9	-7.9	93.5	0.3	67.4	666.0
1/21/2018 19:00	1.1	23.2	-7.6	93.7	0.0	67.5	666.1
1/21/2018 20:00	0.7	54.8	-7.4	93.7	0.0	67.5	666.1
1/21/2018 21:00	0.9	196.6	-7.5	93.6	0.0	67.7	666.1
1/21/2018 22:00	1.1	41.2	-7.2	93.6	0.0	67.5	666.1
1/21/2018 23:00	1.0	53.9	-7.2	93.3	0.0	67.5	666.0
1/22/2018 0:00	0.8	51.2	-7.2	92.9	0.0	67.8	666.0
1/22/2018 1:00	1.6	44.9	-7.4	92.2	0.0	67.0	666.2
1/22/2018 2:00	1.1	72.4	-7.4	93.4	0.0	69.1	666.7
1/22/2018 3:00	1.6	35.5	-6.6	94.1	0.0	69.7	667.4
1/22/2018 4:00	0.7	15.2	-6.6	94.0	0.0	72.8	669.0
1/22/2018 5:00	0.8	266.1	-6.8	94.0	0.0	72.0	669.5
1/22/2018 6:00	1.4	6.2	-6.5	93.9	0.0	72.5	669.5
1/22/2018 7:00	2.5	40.0	-6.4	93.7	0.0	73.2	669.7
1/22/2018 8:00	1.7	22.6	-6.5	94.2	0.0	74.0	670.1
1/22/2018 9:00	1.0	186.2	-7.2	93.5	0.2	73.7	671.1
1/22/2018 10:00	1.0	65.6	-6.6	94.0	5.1	76.8	671.5
1/22/2018 11:00	1.6	195.1	-5.9	94.1	13.8	76.3	672.2
1/22/2018 12:00	3.0	211.3	-5.2	94.2	46.1	78.8	672.3
1/22/2018 13:00	3.4	214.0	-4.9	94.5	33.6	78.2	672.3
1/22/2018 14:00	3.8	206.2	-4.7	94.4	41.3	79.0	672.4
1/22/2018 15:00	6.2	220.8	-5.4	94.4	58.6	80.9	672.9
1/22/2018 16:00	4.1	216.2	-5.3	94.6	49.9	81.6	673.1
1/22/2018 17:00	4.1	209.8	-5.7	94.6	11.6	80.4	673.1
1/22/2018 18:00	3.6	195.8	-6.0	94.6	0.2	80.6	673.1
1/22/2018 19:00	3.3	198.0	-6.3	94.3	0.0	80.3	673.1
1/22/2018 20:00	3.1	197.4	-6.4	94.3	0.0	80.1	673.2
1/22/2018 21:00	2.9	195.2	-6.4	94.2	0.0	80.1	673.2
1/22/2018 22:00	2.5	206.1	-6.8	93.9	0.0	79.9	673.2
1/22/2018 23:00	2.5	206.0	-6.7	93.9	0.0	79.9	673.2
1/23/2018 0:00	3.6	178.3	-7.0	93.6	0.0	79.5	673.2
1/23/2018 1:00	1.5	115.3	-8.1	90.2	0.0	79.2	673.3
1/23/2018 2:00	1.7	18.2	-7.2	90.6	0.0	79.3	673.3
1/23/2018 3:00	1.4	63.7	-7.7	86.2	0.0	79.3	673.2
1/23/2018 4:00	1.4	66.8	-7.9	81.4	0.0	79.3	673.2
1/23/2018 5:00	1.8	78.9	-8.0	79.3	0.0	79.3	673.3

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
1/23/2018 6:00	1.7	52.0	-7.6	75.2	0.0	78.8	673.3
1/23/2018 7:00	3.6	35.7	-7.5	74.2	0.0	78.8	673.2
1/23/2018 8:00	4.9	39.4	-7.6	79.6	0.0	78.5	673.2
1/23/2018 9:00	4.6	51.5	-7.5	76.5	0.6	78.7	673.2
1/23/2018 10:00	7.3	62.0	-7.4	75.1	22.1	77.6	673.2
1/23/2018 11:00	8.3	52.1	-6.8	72.9	93.4	77.8	673.3
1/23/2018 12:00	2.7	80.0	-6.0	67.1	212.6	77.6	673.5
1/23/2018 13:00	4.0	50.8	-6.3	68.2	139.6	76.1	673.1
1/23/2018 14:00	7.7	62.5	-5.7	63.9	150.5	79.5	673.1
1/23/2018 15:00	5.0	61.8	-5.5	63.3	113.0	78.3	673.1
1/23/2018 16:00	12.7	53.1	-5.8	65.5	82.1	73.9	672.6
1/23/2018 17:00	10.5	60.5	-6.4	69.3	18.0	66.2	672.6
1/23/2018 18:00	7.3	67.2	-6.6	70.7	0.5	67.6	673.1
1/23/2018 19:00	3.4	103.3	-6.7	71.9	0.0	67.4	673.1
1/23/2018 20:00	4.3	79.2	-6.2	69.2	0.0	67.6	673.1
1/23/2018 21:00	3.2	98.3	-6.5	71.7	0.0	67.2	673.1
1/23/2018 22:00	2.2	72.2	-6.0	69.8	0.0	67.2	673.1
1/23/2018 23:00	2.7	115.9	-6.2	71.0	0.0	66.7	673.0
1/24/2018 0:00	3.6	76.7	-6.2	71.0	0.0	66.7	673.0
1/24/2018 1:00	2.4	123.8	-6.4	78.2	0.0	66.8	673.2
1/24/2018 2:00	4.8	45.6	-7.1	90.6	0.0	67.0	673.2
1/24/2018 3:00	4.7	35.9	-7.4	93.7	0.0	67.1	673.7
1/24/2018 4:00	6.0	37.8	-7.3	93.7	0.0	68.6	673.7
1/24/2018 5:00	6.3	35.6	-7.3	93.7	0.0	69.7	673.9
1/24/2018 6:00	7.3	35.4	-7.1	93.6	0.0	69.0	673.8
1/24/2018 7:00	6.1	37.6	-6.8	91.4	0.0	69.1	673.9
1/24/2018 8:00	2.6	72.3	-7.2	93.1	0.0	68.8	673.9
1/24/2018 9:00	2.9	58.0	-7.0	93.2	0.9	68.5	674.1
1/24/2018 10:00	1.3	277.6	-7.1	93.7	21.0	69.3	674.5
1/24/2018 11:00	0.6	155.8	-6.8	92.7	87.7	69.6	674.7
1/24/2018 12:00	1.2	195.1	-6.9	92.9	104.6	70.2	674.8
1/24/2018 13:00	1.8	191.1	-6.9	93.0	93.4	68.5	675.5
1/24/2018 14:00	1.0	223.9	-6.5	93.1	82.7	70.4	675.8
1/24/2018 15:00	1.5	166.0	-6.4	92.3	155.1	69.5	676.2
1/24/2018 16:00	1.2	334.7	-6.6	92.3	77.4	70.6	676.0
1/24/2018 17:00	1.3	31.0	-6.7	93.2	18.9	70.3	676.0
1/24/2018 18:00	1.6	26.5	-6.8	92.3	0.9	70.9	676.0
1/24/2018 19:00	3.1	32.4	-6.9	92.4	0.0	70.5	676.0
1/24/2018 20:00	1.0	218.3	-8.3	93.5	0.0	70.1	676.0
1/24/2018 21:00	1.0	168.9	-8.4	93.4	0.0	69.8	676.1
1/24/2018 22:00	1.3	192.9	-8.5	93.1	0.0	68.9	676.1
1/24/2018 23:00	1.3	273.6	-8.5	93.1	0.0	67.9	676.1
1/25/2018 0:00	1.8	198.5	-9.0	92.8	0.0	67.7	676.1
1/25/2018 1:00	2.3	22.4	-8.1	92.9	0.0	67.5	676.2
1/25/2018 2:00	3.5	346.2	-7.9	93.2	0.0	-	676.0
1/25/2018 3:00	3.2	342.9	-8.1	92.1	0.0	-	676.1
1/25/2018 4:00	1.3	217.1	-9.8	92.0	0.0	66.7	676.1
1/25/2018 5:00	1.1	212.6	-10.0	91.7	0.0	68.6	676.2
1/25/2018 6:00	1.3	205.2	-10.5	91.3	0.0	68.6	676.2
1/25/2018 7:00	1.3	162.8	-10.5	91.2	0.0	69.1	676.3
1/25/2018 8:00	0.9	251.1	-10.7	91.2	0.0	69.2	676.3
1/25/2018 9:00	1.1	188.0	-10.9	90.7	1.2	69.6	676.4
1/25/2018 10:00	0.8	220.2	-10.4	90.9	30.9	69.6	676.4
1/25/2018 11:00	1.3	186.6	-10.8	90.1	69.9	69.1	676.6

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
1/25/2018 12:00	1.2	166.9	-10.5	90.1	115.2	69.6	676.5
1/25/2018 13:00	1.1	186.2	-9.8	90.4	150.1	68.6	676.9
1/25/2018 14:00	1.6	191.5	-9.6	90.4	133.7	69.3	676.5
1/25/2018 15:00	1.1	174.9	-9.8	90.6	84.6	69.6	676.4
1/25/2018 16:00	0.5	242.6	-9.5	91.3	65.2	69.7	676.5
1/25/2018 17:00	1.3	191.1	-10.3	91.0	32.9	69.1	676.3
1/25/2018 18:00	1.0	184.5	-10.5	91.0	0.6	68.8	676.5
1/25/2018 19:00	1.7	179.2	-10.8	90.7	0.0	68.8	676.5
1/25/2018 20:00	1.3	195.9	-10.5	91.0	0.0	68.6	676.5
1/25/2018 21:00	1.6	186.2	-10.3	91.2	0.0	69.0	676.5
1/25/2018 22:00	1.6	196.0	-10.1	91.4	0.0	69.1	676.5
1/25/2018 23:00	1.0	200.2	-10.1	91.3	0.0	68.8	676.5
1/26/2018 0:00	1.1	240.9	-10.4	91.0	0.0	68.4	676.5
1/26/2018 1:00	0.9	206.9	-10.4	91.0	0.0	69.4	676.4
1/26/2018 2:00	1.6	216.0	-10.5	91.0	0.0	68.9	676.6
1/26/2018 3:00	1.9	201.2	-11.2	90.3	0.0	69.6	676.5
1/26/2018 4:00	1.1	253.2	-10.5	90.9	0.0	68.5	676.6
1/26/2018 5:00	2.0	193.9	-10.8	90.8	0.0	69.2	676.7
1/26/2018 6:00	1.4	22.5	-9.3	91.7	0.0	68.3	676.6
1/26/2018 7:00	1.7	31.1	-9.1	91.3	0.0	67.3	676.7
1/26/2018 8:00	1.7	352.0	-9.9	90.9	0.0	67.5	676.6
1/26/2018 9:00	1.1	189.4	-10.1	91.2	1.2	-	676.7
1/26/2018 10:00	1.4	35.3	-9.9	90.9	15.6	67.7	676.7
1/26/2018 11:00	1.9	208.0	-10.0	90.5	36.1	-	676.7
1/26/2018 12:00	1.4	42.3	-8.8	91.1	71.2	69.9	676.8
1/26/2018 13:00	2.7	35.4	-8.4	91.1	83.9	68.6	677.0
1/26/2018 14:00	3.3	21.0	-8.4	90.4	84.4	68.7	676.9
1/26/2018 15:00	1.5	26.4	-8.6	91.1	70.2	69.6	677.0
1/26/2018 16:00	1.1	44.6	-8.8	91.3	32.9	71.2	677.2
1/26/2018 17:00	3.3	37.3	-8.3	90.1	9.0	71.2	677.1
1/26/2018 18:00	3.1	25.1	-8.5	89.4	0.5	71.4	677.1
1/26/2018 19:00	1.4	9.0	-8.9	90.7	0.0	71.0	677.2
1/26/2018 20:00	1.2	28.0	-8.8	90.2	0.0	71.0	677.1
1/26/2018 21:00	2.3	30.2	-8.4	87.6	0.0	71.0	677.2
1/26/2018 22:00	1.4	203.5	-9.4	90.6	0.0	69.7	677.2
1/26/2018 23:00	0.9	225.0	-9.4	90.6	0.0	71.0	677.2
1/27/2018 0:00	2.0	192.9	-9.7	90.4	0.0	70.2	677.2
1/27/2018 1:00	1.4	207.6	-10.1	91.1	0.0	70.4	677.2
1/27/2018 2:00	1.4	211.6	-10.0	90.8	0.0	70.4	677.1
1/27/2018 3:00	1.9	190.3	-10.4	90.7	0.0	70.3	677.2
1/27/2018 4:00	1.4	199.9	-10.7	90.4	0.0	70.3	677.1
1/27/2018 5:00	1.0	246.5	-10.9	90.0	0.0	70.4	677.1
1/27/2018 6:00	1.1	266.3	-11.4	89.8	0.0	70.0	677.2
1/27/2018 7:00	1.0	197.7	-12.2	88.8	0.0	71.7	677.3
1/27/2018 8:00	1.2	195.6	-12.6	88.7	0.0	70.0	677.3
1/27/2018 9:00	1.1	187.5	-12.7	88.4	1.3	70.0	677.3
1/27/2018 10:00	1.2	191.0	-13.4	87.9	8.3	69.7	677.4
1/27/2018 11:00	0.9	196.0	-12.7	87.4	45.3	69.9	677.6
1/27/2018 12:00	0.9	200.4	-10.9	86.4	79.7	68.4	678.7
1/27/2018 13:00	1.0	198.4	-9.5	84.6	68.5	68.3	678.2
1/27/2018 14:00	1.4	274.4	-10.2	83.8	60.8	69.6	677.7
1/27/2018 15:00	1.2	244.1	-9.6	83.4	51.1	69.4	677.6
1/27/2018 16:00	1.4	258.2	-10.0	83.8	39.3	69.6	677.5
1/27/2018 17:00	1.1	247.2	-10.1	82.9	19.2	69.8	677.3



Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
1/27/2018 18:00	1.4	201.4	-11.2	86.3	1.0	68.5	677.3
1/27/2018 19:00	1.1	205.3	-11.1	85.9	0.0	66.8	677.4
1/27/2018 20:00	0.9	179.3	-11.0	82.7	0.0	68.2	677.3
1/27/2018 21:00	1.6	54.2	-10.8	76.7	0.0	68.8	677.3
1/27/2018 22:00	3.3	57.1	-10.9	72.1	0.0	68.8	677.6
1/27/2018 23:00	5.7	53.0	-11.1	72.3	0.0	67.8	677.6
1/28/2018 0:00	5.7	55.8	-11.4	72.5	0.0	69.8	677.5
1/28/2018 1:00	4.6	74.6	-11.7	73.0	0.0	68.5	677.6
1/28/2018 2:00	4.7	70.0	-11.8	72.6	0.0	69.3	677.6
1/28/2018 3:00	5.1	70.4	-11.8	72.8	0.0	69.1	677.6
1/28/2018 4:00	4.7	74.3	-11.8	73.2	0.0	69.1	677.6
1/28/2018 5:00	4.8	63.6	-11.7	74.6	0.0	69.4	677.6
1/28/2018 6:00	6.4	62.2	-11.5	73.9	0.0	70.0	677.6
1/28/2018 7:00	4.8	69.3	-11.2	73.0	0.0	70.8	677.4
1/28/2018 8:00	6.3	68.8	-10.7	72.6	0.0	69.9	677.5
1/28/2018 9:00	5.1	78.2	-10.8	72.5	1.3	69.3	677.6
1/28/2018 10:00	7.7	63.9	-10.2	72.7	24.2	72.7	677.5
1/28/2018 11:00	12.5	44.4	-8.9	68.6	79.8	65.6	677.4
1/28/2018 12:00	4.4	66.3	-8.7	68.9	102.9	64.7	677.5
1/28/2018 13:00	5.9	59.6	-8.6	74.3	119.0	65.5	677.3
1/28/2018 14:00	5.2	42.1	-8.2	78.2	106.8	65.8	677.3
1/28/2018 15:00	8.0	46.6	-9.0	86.7	72.9	65.6	677.6
1/28/2018 16:00	9.2	41.6	-9.0	88.0	45.7	65.4	677.6
1/28/2018 17:00	8.3	41.5	-9.0	89.9	12.8	72.1	677.7
1/28/2018 18:00	9.7	41.0	-8.7	91.8	0.6	65.3	677.9
1/28/2018 19:00	10.7	39.8	-8.4	91.8	0.0	65.2	677.9
1/28/2018 20:00	10.3	41.2	-8.3	93.1	0.0	64.9	677.9
1/28/2018 21:00	10.6	38.9	-8.2	93.2	0.0	64.8	678.1
1/28/2018 22:00	10.0	37.6	-8.0	93.4	0.0	68.5	678.6
1/28/2018 23:00	9.6	35.2	-8.1	93.4	0.0	68.6	678.7
1/29/2018 0:00	8.5	30.8	-8.3	93.2	0.0	64.4	679.1
1/29/2018 1:00	5.9	40.3	-8.2	93.3	0.0	75.9	679.8
1/29/2018 2:00	7.1	39.0	-8.1	93.4	0.0	76.6	679.8
1/29/2018 3:00	8.9	34.2	-7.9	93.6	0.0	77.4	679.7
1/29/2018 4:00	3.5	52.6	-8.0	93.5	0.0	83.2	683.0
1/29/2018 5:00	5.5	25.5	-7.5	93.8	0.0	82.5	683.4
1/29/2018 6:00	5.2	31.3	-7.1	94.1	0.0	82.7	684.7
1/29/2018 7:00	2.7	307.4	-6.4	94.6	0.0	-	686.2
1/29/2018 8:00	3.6	197.0	-5.9	94.9	0.0	-	686.7
1/29/2018 9:00	2.2	110.8	-5.6	95.2	1.5	-	687.2
1/29/2018 10:00	2.6	24.7	-5.8	95.0	20.0	87.2	687.9
1/29/2018 11:00	1.4	351.9	-5.1	95.4	45.0	87.8	689.2
1/29/2018 12:00	2.6	22.3	-5.3	95.1	108.9	90.7	689.7
1/29/2018 13:00	3.2	29.9	-5.6	94.8	129.6	89.2	690.0
1/29/2018 14:00	3.1	27.7	-5.8	94.7	108.3	91.4	690.5
1/29/2018 15:00	3.4	31.5	-5.8	94.7	82.2	92.8	690.9
1/29/2018 16:00	3.9	28.5	-5.9	94.7	62.1	92.2	691.3
1/29/2018 17:00	4.4	31.3	-6.2	94.6	13.6	93.7	691.5
1/29/2018 18:00	5.7	31.0	-6.4	94.6	1.1	93.4	691.4
1/29/2018 19:00	5.8	30.1	-6.6	94.5	0.0	92.6	691.5
1/29/2018 20:00	6.1	32.5	-6.7	94.4	0.0	93.7	691.6
1/29/2018 21:00	6.3	31.4	-6.8	94.3	0.0	92.8	691.7
1/29/2018 22:00	5.7	28.0	-6.9	94.2	0.0	92.7	691.7
1/29/2018 23:00	3.6	6.7	-7.5	93.8	0.0	92.4	691.8

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
1/30/2018 0:00	2.2	358.3	-8.0	93.4	0.0	91.6	691.9
1/30/2018 1:00	1.7	359.9	-8.5	93.0	0.0	91.9	692.0
1/30/2018 2:00	1.3	225.0	-9.4	92.2	0.0	91.7	692.2
1/30/2018 3:00	1.5	313.5	-9.4	92.2	0.0	91.7	692.2
1/30/2018 4:00	2.0	310.2	-10.4	91.4	0.0	91.3	692.3
1/30/2018 5:00	1.5	254.0	-10.7	91.1	0.0	91.7	692.6
1/30/2018 6:00	1.2	271.8	-10.8	90.9	0.0	91.2	692.9
1/30/2018 7:00	1.8	229.4	-11.4	90.3	0.0	92.1	693.1
1/30/2018 8:00	1.8	225.8	-11.1	90.6	0.0	91.0	693.4
1/30/2018 9:00	1.5	236.5	-11.3	90.4	1.7	91.3	693.7
1/30/2018 10:00	1.5	215.4	-11.5	90.0	26.9	90.8	693.8
1/30/2018 11:00	1.6	267.2	-11.4	89.7	79.7	91.6	693.8
1/30/2018 12:00	1.2	238.5	-11.3	89.9	43.4	92.9	694.1
1/30/2018 13:00	1.7	218.6	-11.6	89.5	52.0	94.2	694.5
1/30/2018 14:00	1.5	254.3	-10.8	90.1	64.7	94.8	695.3
1/30/2018 15:00	1.5	233.8	-10.6	90.3	58.7	96.3	695.4
1/30/2018 16:00	1.5	228.2	-11.4	89.7	42.8	96.7	695.8
1/30/2018 17:00	1.5	215.6	-11.8	89.6	12.3	99.2	696.1
1/30/2018 18:00	2.5	206.9	-12.6	89.0	0.3	100.5	696.6
1/30/2018 19:00	2.5	212.6	-12.9	88.8	0.0	101.5	697.1
1/30/2018 20:00	1.7	235.8	-13.2	88.5	0.0	102.3	697.8
1/30/2018 21:00	1.0	275.7	-13.2	88.4	0.0	103.1	698.4
1/30/2018 22:00	0.9	149.9	-13.3	88.3	0.0	102.4	698.6
1/30/2018 23:00	0.3	252.3	-13.1	88.5	0.0	103.3	698.9
1/31/2018 0:00	0.7	242.3	-13.2	88.4	0.0	-	699.3
1/31/2018 1:00	0.7	280.2	-13.3	88.3	0.0	104.0	699.3
1/31/2018 2:00	0.6	271.7	-13.4	88.2	0.0	103.9	699.3
1/31/2018 3:00	0.3	255.9	-13.5	88.2	0.0	103.4	699.4
1/31/2018 4:00	0.6	1.6	-13.5	88.1	0.0	103.0	699.4
1/31/2018 5:00	0.4	7.0	-13.7	87.9	0.0	102.7	699.4
1/31/2018 6:00	0.5	45.5	-13.9	87.7	0.0	102.4	699.4
1/31/2018 7:00	0.3	229.4	-13.8	87.8	0.0	102.1	699.4
1/31/2018 8:00	0.5	252.7	-13.9	87.7	0.0	101.6	699.5
1/31/2018 9:00	0.5	249.4	-13.8	87.8	0.7	102.2	699.9
1/31/2018 10:00	0.5	246.5	-13.7	87.7	10.9	-	700.3
1/31/2018 11:00	0.5	212.2	-13.4	87.8	29.5	103.0	700.6
1/31/2018 12:00	0.5	237.2	-11.7	88.8	75.4	101.7	700.8
1/31/2018 13:00	0.8	288.1	-9.5	89.0	166.9	100.5	701.8
1/31/2018 14:00	0.7	29.5	-11.4	88.2	86.8	102.2	701.3
1/31/2018 15:00	0.5	192.3	-12.5	88.1	41.9	101.4	701.6
1/31/2018 16:00	0.5	92.3	-11.9	88.7	39.6	102.1	701.4
1/31/2018 17:00	1.9	33.1	-14.2	87.0	10.7	103.0	701.5
1/31/2018 18:00	2.5	29.3	-15.0	86.7	0.7	102.3	701.5
1/31/2018 19:00	1.7	42.0	-15.0	86.6	0.0	102.1	701.6
1/31/2018 20:00	1.1	347.1	-15.0	86.6	0.0	101.9	701.6
1/31/2018 21:00	1.2	56.2	-15.1	86.5	0.0	101.6	701.6
1/31/2018 22:00	1.0	323.3	-15.3	86.3	0.0	101.5	701.6
1/31/2018 23:00	0.8	48.4	-15.2	86.4	0.0	101.1	701.7
2/1/2018 0:00	0.7	322.8	-15.0	86.5	0.0	101.5	701.6
2/1/2018 1:00	0.7	256.5	-15.1	86.4	0.0	-	701.7
2/1/2018 2:00	0.8	349.4	-15.3	86.2	0.0	-	701.6
2/1/2018 3:00	1.2	37.4	-15.7	85.9	0.0	100.8	701.7
2/1/2018 4:00	1.4	6.2	-15.7	85.9	0.0	100.0	701.8
2/1/2018 5:00	1.2	32.1	-15.9	85.7	0.0	99.7	701.8

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
2/1/2018 6:00	2.4	25.7	-16.5	85.1	0.0	98.8	701.8
2/1/2018 7:00	1.4	5.2	-16.3	85.3	0.0	99.4	701.9
2/1/2018 8:00	2.0	26.0	-16.6	85.0	0.0	99.7	701.9
2/1/2018 9:00	2.3	26.8	-16.8	84.8	0.8	99.1	701.9
2/1/2018 10:00	2.5	26.5	-17.0	84.4	12.7	98.9	702.0
2/1/2018 11:00	3.1	30.3	-16.9	84.2	37.3	99.4	702.0
2/1/2018 12:00	3.0	28.3	-16.8	84.2	40.1	99.8	702.0
2/1/2018 13:00	2.2	28.3	-16.5	84.5	38.7	99.7	702.0
2/1/2018 14:00	2.0	22.0	-16.3	84.6	37.3	98.9	702.1
2/1/2018 15:00	2.7	27.8	-16.3	84.5	44.1	99.0	702.0
2/1/2018 16:00	4.1	40.6	-16.9	84.5	16.0	100.4	702.1
2/1/2018 17:00	2.3	85.5	-16.8	84.7	6.5	100.1	702.4
2/1/2018 18:00	1.5	357.5	-16.7	84.8	0.5	100.5	702.8
2/1/2018 19:00	0.9	175.4	-17.1	84.4	0.0	100.6	703.2
2/1/2018 20:00	2.1	77.5	-16.9	84.6	0.0	100.5	703.4
2/1/2018 21:00	1.1	186.8	-17.2	84.3	0.0	101.5	703.7
2/1/2018 22:00	1.2	173.8	-17.4	84.1	0.0	104.0	704.6
2/1/2018 23:00	1.7	189.9	-17.9	83.6	0.0	108.4	705.8
2/2/2018 0:00	1.6	238.7	-17.5	84.0	0.0	109.6	708.0
2/2/2018 1:00	2.1	201.5	-18.1	83.4	0.0	110.2	709.6
2/2/2018 2:00	2.1	13.8	-18.0	83.6	0.0	110.0	713.1
2/2/2018 3:00	1.9	26.3	-18.0	83.5	0.0	110.0	714.3
2/2/2018 4:00	1.7	13.4	-18.0	83.5	0.0	109.7	715.2
2/2/2018 5:00	1.6	50.3	-18.2	83.4	0.0	109.7	716.1
2/2/2018 6:00	1.4	74.7	-18.4	83.1	0.0	110.6	717.6
2/2/2018 7:00	1.4	328.9	-18.2	83.4	0.0	111.9	719.6
2/2/2018 8:00	2.0	40.6	-18.4	83.2	0.0	113.5	721.2
2/2/2018 9:00	2.1	40.4	-18.3	83.2	1.7	113.5	722.6
2/2/2018 10:00	1.4	263.2	-18.3	83.2	26.8	113.6	724.2
2/2/2018 11:00	1.7	29.6	-18.1	83.3	62.8	113.7	724.9
2/2/2018 12:00	2.2	55.5	-17.8	83.5	106.4	113.3	725.6
2/2/2018 13:00	4.7	52.9	-17.9	83.3	148.0	112.7	725.9
2/2/2018 14:00	1.5	134.7	-17.1	84.1	151.0	111.8	726.2
2/2/2018 15:00	2.3	80.8	-17.3	83.9	106.9	111.9	726.3
2/2/2018 16:00	8.8	50.6	-17.5	83.9	62.8	113.5	725.9
2/2/2018 17:00	11.7	41.9	-17.4	84.2	25.8	103.8	725.7
2/2/2018 18:00	12.9	36.0	-17.5	84.1	1.6	104.7	725.3
2/2/2018 19:00	12.5	36.9	-17.6	84.0	0.0	94.7	725.8
2/2/2018 20:00	13.6	40.9	-17.5	84.0	0.0	105.0	725.6
2/2/2018 21:00	14.3	38.3	-17.7	83.7	0.0	79.7	725.5
2/2/2018 22:00	14.7	40.2	-17.8	83.8	0.0	86.9	725.4
2/2/2018 23:00	16.1	42.3	-17.7	84.0	0.0	81.3	725.5
2/3/2018 0:00	16.2	40.5	-17.9	84.0	0.0	72.4	725.8
2/3/2018 1:00	14.2	42.8	-18.7	83.2	0.0	-	725.8
2/3/2018 2:00	14.5	36.6	-19.4	82.5	0.0	73.2	726.1
2/3/2018 3:00	16.4	36.6	-19.2	82.5	0.0	107.8	726.0
2/3/2018 4:00	16.6	38.8	-19.6	82.2	0.0	94.0	725.8
2/3/2018 5:00	16.7	39.7	-20.0	81.7	0.0	-	726.0
2/3/2018 6:00	15.3	42.9	-20.8	81.1	0.0	62.5	726.2
2/3/2018 7:00	13.7	44.0	-20.8	81.0	0.0	63.0	726.3
2/3/2018 8:00	13.3	45.4	-20.7	81.1	0.0	62.4	726.0
2/3/2018 9:00	12.0	51.7	-21.4	80.7	4.5	62.3	726.2
2/3/2018 10:00	11.3	53.8	-21.1	80.7	44.9	62.0	726.4
2/3/2018 11:00	7.9	64.2	-21.1	80.7	115.8	62.0	726.6

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
2/3/2018 12:00	5.5	67.0	-21.0	80.7	140.8	62.1	726.4
2/3/2018 13:00	1.9	165.4	-21.3	80.6	163.8	62.2	726.4
2/3/2018 14:00	1.8	185.9	-21.2	80.7	115.3	62.3	726.4
2/3/2018 15:00	1.8	177.7	-21.0	80.9	120.2	62.2	726.4
2/3/2018 16:00	1.7	146.8	-20.8	81.1	110.7	62.3	726.4
2/3/2018 17:00	2.8	79.6	-20.6	81.4	21.5	62.2	726.4
2/3/2018 18:00	1.5	126.9	-20.3	81.6	1.7	62.4	726.4
2/3/2018 19:00	2.2	66.5	-20.3	81.7	0.0	62.4	726.4
2/3/2018 20:00	2.5	141.4	-20.7	81.4	0.0	62.3	726.5
2/3/2018 21:00	1.8	189.1	-20.1	81.9	0.0	61.7	726.5
2/3/2018 22:00	2.0	190.7	-20.1	81.9	0.0	62.2	726.5
2/3/2018 23:00	2.2	197.0	-19.0	82.9	0.0	61.9	726.5
2/4/2018 0:00	2.4	203.7	-19.8	82.2	0.0	62.2	726.4
2/4/2018 1:00	2.3	185.8	-18.9	82.9	0.0	62.4	726.5
2/4/2018 2:00	1.9	222.6	-18.4	83.4	0.0	61.1	726.3
2/4/2018 3:00	1.9	195.4	-18.3	83.5	0.0	62.2	726.4
2/4/2018 4:00	1.9	226.3	-17.8	83.9	0.0	62.4	726.4
2/4/2018 5:00	2.4	214.9	-18.5	83.2	0.0	62.5	726.4
2/4/2018 6:00	2.4	200.9	-18.9	82.8	0.0	62.0	726.4
2/4/2018 7:00	2.0	192.6	-18.8	82.9	0.0	62.5	726.4
2/4/2018 8:00	1.9	236.5	-18.2	83.4	0.0	62.2	726.4
2/4/2018 9:00	1.7	250.1	-17.9	83.7	2.1	62.3	726.4
2/4/2018 10:00	2.2	299.2	-17.2	84.0	26.3	62.5	726.4
2/4/2018 11:00	2.9	324.6	-16.4	84.0	59.4	61.7	726.3
2/4/2018 12:00	3.2	354.1	-15.1	83.9	149.8	60.8	726.4
2/4/2018 13:00	2.8	324.0	-15.2	82.9	165.2	61.9	726.5
2/4/2018 14:00	2.2	305.1	-15.1	81.7	333.8	61.6	727.1
2/4/2018 15:00	1.8	273.9	-15.4	80.4	263.8	61.6	726.6
2/4/2018 16:00	1.6	263.6	-16.0	79.6	102.0	62.0	726.3
2/4/2018 17:00	1.2	73.0	-16.5	77.6	45.3	62.2	726.3
2/4/2018 18:00	1.8	265.4	-16.4	69.6	4.2	60.9	726.3
2/4/2018 19:00	0.9	36.5	-15.9	64.0	0.0	61.9	726.3
2/4/2018 20:00	1.5	250.8	-15.6	55.6	0.0	62.0	726.3
2/4/2018 21:00	1.7	255.5	-15.7	54.6	0.0	62.0	726.3
2/4/2018 22:00	1.1	234.5	-14.8	52.1	0.0	61.9	726.3
2/4/2018 23:00	1.9	199.2	-16.3	57.7	0.0	62.1	726.3
2/5/2018 0:00	2.1	193.6	-16.6	60.0	0.0	61.0	726.4
2/5/2018 1:00	1.7	223.6	-15.9	57.7	0.0	60.7	726.4
2/5/2018 2:00	2.0	207.1	-16.1	58.5	0.0	61.8	726.4
2/5/2018 3:00	2.4	204.1	-16.0	58.6	0.0	61.6	726.3
2/5/2018 4:00	2.6	208.8	-15.8	58.8	0.0	62.0	726.4
2/5/2018 5:00	2.4	182.7	-14.9	56.0	0.0	60.9	726.3
2/5/2018 6:00	2.6	189.1	-14.3	54.7	0.0	61.8	726.3
2/5/2018 7:00	2.1	179.4	-13.4	51.5	0.0	61.9	726.3
2/5/2018 8:00	1.3	175.7	-12.7	49.8	0.0	62.1	726.2
2/5/2018 9:00	1.0	312.5	-12.0	47.9	4.8	61.8	726.2
2/5/2018 10:00	0.6	174.5	-11.6	46.7	41.7	61.4	726.3
2/5/2018 11:00	1.0	228.0	-11.7	46.9	159.3	61.3	726.4
2/5/2018 12:00	0.8	216.5	-11.5	47.0	185.9	61.9	726.2
2/5/2018 13:00	0.4	305.7	-9.1	39.3	349.6	60.7	727.1
2/5/2018 14:00	0.3	6.4	-9.1	39.1	326.9	60.9	726.4
2/5/2018 15:00	0.7	329.0	-9.2	38.7	246.7	61.6	725.8
2/5/2018 16:00	0.3	238.1	-9.0	37.9	163.8	61.5	725.8
2/5/2018 17:00	0.3	333.8	-9.5	39.8	84.3	61.7	725.6

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
2/5/2018 18:00	0.1	67.1	-9.9	40.1	3.2	62.3	725.7
2/5/2018 19:00	0.3	201.3	-9.9	40.6	0.0	62.3	725.7
2/5/2018 20:00	0.6	210.1	-9.7	40.5	0.0	61.9	725.7
2/5/2018 21:00	0.8	67.9	-10.2	44.9	0.0	61.9	725.7
2/5/2018 22:00	0.8	202.7	-10.0	44.2	0.0	62.1	725.8
2/5/2018 23:00	1.5	195.5	-10.6	48.3	0.0	61.1	725.7
2/6/2018 0:00	1.9	194.9	-10.8	49.5	0.0	61.8	725.7
2/6/2018 1:00	0.6	164.1	-9.4	43.7	0.0	62.0	725.6
2/6/2018 2:00	0.3	64.2	-8.8	41.6	0.0	62.1	725.7
2/6/2018 3:00	0.7	195.1	-9.3	44.3	0.0	62.2	725.6
2/6/2018 4:00	2.7	195.5	-10.3	48.9	0.0	62.1	725.6
2/6/2018 5:00	2.5	179.7	-9.7	48.7	0.0	62.1	725.6
2/6/2018 6:00	1.6	163.1	-8.5	43.4	0.0	62.3	725.6
2/6/2018 7:00	2.4	42.9	-8.5	54.1	0.0	62.0	725.6
2/6/2018 8:00	1.9	36.0	-9.2	77.8	0.0	61.6	726.1
2/6/2018 9:00	1.1	40.4	-9.0	89.5	2.0	60.2	726.2
2/6/2018 10:00	1.3	27.1	-8.7	90.3	25.5	62.8	726.9
2/6/2018 11:00	1.0	184.7	-9.1	91.1	60.1	62.1	727.9
2/6/2018 12:00	0.8	222.5	-8.5	91.7	83.5	63.9	728.3
2/6/2018 13:00	0.8	78.6	-7.1	92.2	102.2	63.9	728.8
2/6/2018 14:00	0.9	186.6	-6.2	91.6	130.4	63.5	729.0
2/6/2018 15:00	3.0	198.3	-6.5	93.1	93.1	63.8	729.1
2/6/2018 16:00	4.9	195.8	-6.4	94.0	65.5	61.4	729.3
2/6/2018 17:00	6.0	194.4	-5.0	95.1	31.3	63.4	729.2
2/6/2018 18:00	5.8	197.3	-4.6	95.6	2.3	63.5	729.1
2/6/2018 19:00	6.0	200.3	-4.2	95.8	0.0	63.5	729.1
2/6/2018 20:00	5.6	201.2	-4.0	96.0	0.0	63.6	729.2
2/6/2018 21:00	4.7	205.4	-3.8	96.1	0.0	63.5	729.1
2/6/2018 22:00	4.3	212.8	-3.8	96.1	0.0	63.4	729.1
2/6/2018 23:00	4.5	208.3	-3.6	96.3	0.0	63.6	729.1
2/7/2018 0:00	4.1	207.0	-3.5	96.3	0.0	63.6	729.0
2/7/2018 1:00	3.6	206.5	-3.3	96.4	0.0	63.5	729.1
2/7/2018 2:00	3.3	213.8	-3.0	96.6	0.0	64.1	729.1
2/7/2018 3:00	3.0	216.4	-3.0	96.6	0.0	63.7	729.2
2/7/2018 4:00	2.7	208.0	-2.9	96.7	0.0	63.8	729.1
2/7/2018 5:00	2.5	211.3	-2.7	96.8	0.0	64.0	729.2
2/7/2018 6:00	1.7	217.1	-2.8	96.8	0.0	64.1	729.3
2/7/2018 7:00	0.6	245.4	-2.9	96.7	0.0	64.1	729.3
2/7/2018 8:00	0.7	34.2	-3.1	96.7	0.0	64.2	729.4
2/7/2018 9:00	0.7	46.1	-2.7	96.8	4.3	64.2	729.4
2/7/2018 10:00	0.5	216.8	-2.9	96.6	32.0	63.8	729.4
2/7/2018 11:00	0.5	210.6	-2.9	96.2	66.4	63.6	729.4
2/7/2018 12:00	0.0	0.0	-2.7	96.1	86.0	64.2	729.4
2/7/2018 13:00	0.6	3.3	-4.3	95.1	107.9	63.9	729.2
2/7/2018 14:00	0.7	215.3	-5.2	94.3	122.8	62.8	729.2
2/7/2018 15:00	0.8	278.7	-6.8	93.4	118.7	64.2	729.4
2/7/2018 16:00	0.7	354.0	-8.1	92.9	79.1	64.3	729.4
2/7/2018 17:00	0.6	339.5	-8.4	92.9	37.2	64.5	729.4
2/7/2018 18:00	1.0	35.2	-9.0	92.7	4.6	64.6	729.4
2/7/2018 19:00	2.2	29.4	-8.1	93.4	0.0	64.4	729.3
2/7/2018 20:00	3.4	19.8	-8.4	93.1	0.0	64.2	729.4
2/7/2018 21:00	6.4	17.7	-8.5	93.1	0.0	63.1	729.0
2/7/2018 22:00	6.2	21.7	-8.2	93.2	0.0	63.7	728.9
2/7/2018 23:00	6.1	28.6	-8.5	93.0	0.0	63.6	729.6

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
2/8/2018 0:00	6.8	28.6	-8.8	92.8	0.0	64.0	729.3
2/8/2018 1:00	8.3	29.0	-9.1	92.6	0.0	64.0	729.3
2/8/2018 2:00	10.1	31.1	-8.9	92.6	0.0	63.3	729.3
2/8/2018 3:00	11.3	30.3	-9.0	90.7	0.0	63.7	728.9
2/8/2018 4:00	11.6	30.6	-9.5	86.2	0.0	63.5	729.0
2/8/2018 5:00	11.6	31.3	-9.8	84.5	0.0	63.4	729.1
2/8/2018 6:00	11.7	35.2	-9.7	80.8	0.0	63.5	729.8
2/8/2018 7:00	9.9	35.9	-10.3	80.7	0.0	63.7	729.6
2/8/2018 8:00	4.5	74.4	-11.3	83.7	0.0	63.7	729.7
2/8/2018 9:00	2.7	102.3	-11.3	84.6	7.7	64.0	729.8
2/8/2018 10:00	4.3	62.2	-11.4	81.8	51.2	63.6	729.8
2/8/2018 11:00	3.9	57.4	-11.3	80.0	130.0	63.6	729.9
2/8/2018 12:00	3.5	54.8	-11.1	77.9	205.8	63.5	729.9
2/8/2018 13:00	3.0	62.7	-11.3	78.5	177.7	63.5	729.8
2/8/2018 14:00	2.0	98.2	-11.1	82.9	195.7	63.5	729.8
2/8/2018 15:00	3.5	61.2	-11.2	78.4	153.2	63.6	729.7
2/8/2018 16:00	3.0	79.1	-11.3	80.5	101.7	63.7	729.8
2/8/2018 17:00	1.7	102.5	-11.7	83.3	39.2	63.7	729.9
2/8/2018 18:00	4.0	75.6	-12.2	81.7	6.1	63.7	730.0
2/8/2018 19:00	2.7	94.2	-12.8	84.6	0.0	63.8	730.0
2/8/2018 20:00	1.6	90.1	-13.0	86.4	0.0	63.9	730.0
2/8/2018 21:00	2.2	111.2	-13.1	85.3	0.0	63.9	730.1
2/8/2018 22:00	1.2	84.0	-13.1	86.9	0.0	63.8	730.1
2/8/2018 23:00	1.9	82.0	-13.4	85.8	0.0	63.1	730.1
2/9/2018 0:00	1.6	88.4	-13.8	85.5	0.0	63.8	730.2
2/9/2018 1:00	2.5	87.1	-13.7	82.2	0.0	63.7	730.2
2/9/2018 2:00	4.6	55.4	-13.8	79.8	0.0	63.4	730.0
2/9/2018 3:00	9.1	38.7	-13.5	74.7	0.0	62.9	730.1
2/9/2018 4:00	6.6	59.1	-14.1	77.3	0.0	63.7	730.2
2/9/2018 5:00	2.0	84.8	-15.0	80.7	0.0	64.0	730.3
2/9/2018 6:00	4.4	71.0	-15.1	76.6	0.0	63.4	730.3
2/9/2018 7:00	3.6	77.3	-15.1	76.5	0.0	63.7	730.3
2/9/2018 8:00	1.6	76.9	-15.3	79.1	0.0	63.1	730.4
2/9/2018 9:00	2.9	68.8	-15.5	70.3	6.6	63.3	730.4
2/9/2018 10:00	2.2	290.1	-15.7	76.7	18.7	63.7	730.5
2/9/2018 11:00	2.2	198.1	-15.5	83.1	218.4	62.6	731.5
2/9/2018 12:00	1.6	223.2	-14.5	78.7	313.4	63.0	732.1
2/9/2018 13:00	1.5	281.4	-14.1	70.6	350.5	62.7	731.2
2/9/2018 14:00	1.4	218.5	-13.3	82.9	337.9	62.1	731.1
2/9/2018 15:00	1.3	209.6	-12.8	81.9	287.8	62.6	730.7
2/9/2018 16:00	1.1	216.0	-12.6	83.0	202.8	62.5	730.6
2/9/2018 17:00	1.0	227.7	-12.8	85.2	94.2	62.8	730.4
2/9/2018 18:00	1.0	209.7	-13.4	86.7	15.0	63.6	730.4
2/9/2018 19:00	1.6	213.4	-13.1	63.0	0.0	62.9	730.5
2/9/2018 20:00	2.5	207.8	-12.5	56.3	0.0	63.4	730.5
2/9/2018 21:00	2.6	179.2	-11.4	48.5	0.0	63.4	730.5
2/9/2018 22:00	1.2	23.2	-10.4	39.5	0.0	63.4	730.4
2/9/2018 23:00	1.3	222.7	-9.9	36.6	0.0	63.3	730.5
2/10/2018 0:00	1.0	153.8	-8.8	30.1	0.0	63.2	730.5
2/10/2018 1:00	2.0	216.9	-7.1	23.3	0.0	63.1	730.4
2/10/2018 2:00	0.9	251.8	-5.7	18.8	0.0	63.4	730.4
2/10/2018 3:00	0.6	136.4	-5.2	16.5	0.0	63.4	730.3
2/10/2018 4:00	1.5	224.0	-5.8	18.9	0.0	63.2	730.3
2/10/2018 5:00	2.8	223.3	-4.7	15.9	0.0	63.0	730.3

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
2/10/2018 6:00	3.8	208.4	-3.5	13.7	0.0	63.1	730.2
2/10/2018 7:00	3.3	216.8	-4.0	15.2	0.0	63.0	730.1
2/10/2018 8:00	4.6	202.6	-4.4	16.8	0.0	63.1	730.2
2/10/2018 9:00	4.8	214.7	-5.5	21.7	7.4	62.8	730.0
2/10/2018 10:00	4.6	214.7	-6.3	24.3	20.9	63.0	730.1
2/10/2018 11:00	5.2	224.4	-5.9	26.0	226.8	62.7	731.0
2/10/2018 12:00	5.4	218.9	-4.5	22.1	331.7	62.5	730.7
2/10/2018 13:00	4.8	222.9	-4.4	23.9	381.3	62.8	730.6
2/10/2018 14:00	5.8	212.9	-4.8	27.8	380.7	63.0	730.2
2/10/2018 15:00	5.7	197.1	-5.0	31.0	331.1	63.1	729.8
2/10/2018 16:00	6.0	213.5	-4.9	31.6	241.0	63.0	729.8
2/10/2018 17:00	5.6	211.5	-5.4	33.7	128.7	63.2	729.5
2/10/2018 18:00	5.3	221.1	-6.4	38.1	11.3	63.3	729.7
2/10/2018 19:00	5.1	211.1	-7.4	44.0	0.0	63.5	729.6
2/10/2018 20:00	4.7	222.6	-7.4	44.2	0.0	63.4	729.7
2/10/2018 21:00	2.9	212.2	-6.9	38.7	0.0	63.3	729.8
2/10/2018 22:00	2.0	216.6	-7.4	42.0	0.0	63.3	729.8
2/10/2018 23:00	2.5	191.3	-7.4	41.6	0.0	63.3	729.8
2/11/2018 0:00	2.2	212.9	-8.4	48.3	0.0	63.1	729.9
2/11/2018 1:00	1.6	219.2	-8.9	51.2	0.0	63.5	729.9
2/11/2018 2:00	1.2	38.9	-9.7	53.8	0.0	63.5	730.0
2/11/2018 3:00	1.4	24.2	-9.7	50.9	0.0	63.2	730.0
2/11/2018 4:00	1.4	212.4	-9.9	53.1	0.0	63.3	730.1
2/11/2018 5:00	2.0	216.7	-10.5	63.0	0.0	63.5	730.1
2/11/2018 6:00	1.5	194.1	-10.4	58.2	0.0	63.3	730.1
2/11/2018 7:00	2.0	196.2	-10.9	59.7	0.0	63.0	730.2
2/11/2018 8:00	1.9	204.3	-11.5	63.1	0.1	63.9	730.2
2/11/2018 9:00	2.0	224.2	-11.8	63.1	8.0	63.1	730.2
2/11/2018 10:00	1.8	237.6	-11.8	62.5	20.7	63.5	730.2
2/11/2018 11:00	2.0	205.2	-10.7	57.3	237.9	62.7	731.5
2/11/2018 12:00	2.7	201.7	-9.9	54.4	337.2	63.0	731.1
2/11/2018 13:00	2.1	189.2	-9.5	54.0	387.0	62.6	730.9
2/11/2018 14:00	1.9	192.5	-8.7	53.9	384.8	62.5	730.7
2/11/2018 15:00	1.5	187.7	-8.2	54.0	332.4	62.6	730.2
2/11/2018 16:00	1.6	187.7	-8.0	55.4	222.1	63.2	729.9
2/11/2018 17:00	1.6	186.7	-9.0	59.3	93.0	63.0	729.9
2/11/2018 18:00	1.5	182.8	-9.3	56.4	24.8	63.1	730.0
2/11/2018 19:00	1.9	199.4	-9.5	56.2	0.1	63.3	730.0
2/11/2018 20:00	1.3	218.1	-9.0	53.5	0.0	63.4	730.1
2/11/2018 21:00	1.7	252.7	-8.5	47.9	0.0	63.3	730.0
2/11/2018 22:00	1.9	225.7	-7.9	44.1	0.0	63.0	730.1
2/11/2018 23:00	3.2	202.7	-7.0	40.1	0.0	63.2	730.0
2/12/2018 0:00	3.9	197.7	-7.3	42.1	0.0	63.5	730.0
2/12/2018 1:00	4.1	204.1	-7.6	44.9	0.0	63.2	730.0
2/12/2018 2:00	4.2	218.5	-7.7	45.9	0.0	63.5	729.9
2/12/2018 3:00	4.3	224.1	-7.9	47.6	0.0	63.3	730.0
2/12/2018 4:00	3.4	225.7	-8.2	50.2	0.0	63.6	729.9
2/12/2018 5:00	4.2	228.4	-8.4	52.4	0.0	63.3	730.0
2/12/2018 6:00	4.4	227.9	-8.4	55.5	0.0	63.5	729.9
2/12/2018 7:00	4.5	241.3	-8.0	60.3	0.0	63.6	729.9
2/12/2018 8:00	4.8	230.4	-7.6	72.9	0.1	63.7	729.9
2/12/2018 9:00	5.7	212.1	-6.3	84.8	8.0	63.5	729.8
2/12/2018 10:00	6.9	199.3	-5.8	89.6	42.8	63.4	729.8
2/12/2018 11:00	6.7	194.1	-5.6	94.0	76.0	63.2	729.7

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
2/12/2018 12:00	6.8	209.6	-5.0	94.4	97.1	63.3	729.7
2/12/2018 13:00	6.1	207.4	-4.7	94.5	104.0	63.2	729.8
2/12/2018 14:00	5.5	209.9	-4.4	94.6	129.6	62.9	730.0
2/12/2018 15:00	5.4	208.9	-4.4	94.9	93.2	62.6	730.1
2/12/2018 16:00	6.2	209.5	-4.3	95.3	62.7	63.1	730.3
2/12/2018 17:00	5.4	212.8	-4.1	95.6	31.6	63.3	730.5
2/12/2018 18:00	5.7	212.9	-4.3	95.8	5.0	63.7	730.6
2/12/2018 19:00	5.7	216.8	-4.3	95.8	0.1	63.0	730.7
2/12/2018 20:00	6.5	221.5	-4.5	95.8	0.0	62.9	730.9
2/12/2018 21:00	7.0	215.4	-4.6	95.7	0.0	64.0	731.1
2/12/2018 22:00	7.9	213.7	-4.4	95.8	0.0	63.3	731.5
2/12/2018 23:00	7.5	213.4	-4.3	95.9	0.0	63.9	732.9
2/13/2018 0:00	7.2	216.6	-4.4	95.8	0.0	60.2	734.6
2/13/2018 1:00	6.9	220.5	-4.2	95.9	0.0	63.9	736.9
2/13/2018 2:00	5.6	217.6	-4.0	96.0	0.0	81.9	738.8
2/13/2018 3:00	5.6	212.3	-4.0	96.0	0.0	76.0	741.2
2/13/2018 4:00	5.4	215.9	-4.0	96.0	0.0	73.6	744.1
2/13/2018 5:00	4.6	215.8	-4.0	96.0	0.0	67.4	746.8
2/13/2018 6:00	3.7	211.8	-4.0	96.0	0.0	-	749.5
2/13/2018 7:00	3.3	213.3	-3.9	96.1	0.0	-	751.5
2/13/2018 8:00	3.4	216.1	-3.9	96.1	0.0	-	753.4
2/13/2018 9:00	2.8	218.5	-4.1	96.0	7.1	-	755.2
2/13/2018 10:00	2.9	226.5	-4.2	95.9	32.4	-	757.5
2/13/2018 11:00	2.7	224.4	-4.0	96.0	104.7	81.2	758.7
2/13/2018 12:00	2.4	221.0	-3.7	96.1	131.9	83.2	759.2
2/13/2018 13:00	2.1	219.9	-3.4	96.2	208.2	82.5	759.3
2/13/2018 14:00	2.2	219.9	-3.5	96.1	158.6	83.4	759.3
2/13/2018 15:00	3.7	215.9	-3.9	95.9	145.9	83.9	759.3
2/13/2018 16:00	2.9	214.6	-3.5	96.1	158.3	83.5	759.4
2/13/2018 17:00	-	-	-3.8	96.0	76.2	83.5	759.4
2/13/2018 18:00	-	-	-4.1	95.9	14.2	83.7	759.4
2/13/2018 19:00	-	-	-4.6	95.6	0.2	83.6	759.5
2/13/2018 20:00	-	-	-5.1	95.3	0.0	83.3	759.4
2/13/2018 21:00	-	-	-5.1	95.3	0.0	83.3	759.5
2/13/2018 22:00	-	-	-5.1	95.3	0.0	83.5	759.5
2/13/2018 23:00	-	-	-5.9	94.8	0.0	83.7	759.5
2/14/2018 0:00	-	-	-6.0	94.8	0.0	83.5	759.5
2/14/2018 1:00	-	-	-6.5	94.4	0.0	83.8	759.5
2/14/2018 2:00	-	-	-6.6	94.2	0.0	83.2	759.5
2/14/2018 3:00	-	-	-6.4	94.5	0.0	83.5	759.5
2/14/2018 4:00	-	-	-6.2	94.7	0.0	83.7	759.5
2/14/2018 5:00	-	-	-6.3	94.6	0.0	82.6	759.5
2/14/2018 6:00	-	-	-6.7	94.4	0.0	82.9	759.5
2/14/2018 7:00	-	-	-6.9	94.2	0.0	82.9	759.5
2/14/2018 8:00	5.1	209.0	-7.4	93.7	0.2	83.0	759.5
2/14/2018 9:00	5.5	207.5	-8.2	92.8	9.2	83.8	759.7
2/14/2018 10:00	7.8	45.6	-8.3	89.3	39.5	83.6	760.6
2/14/2018 11:00	11.3	51.5	-7.7	76.7	257.2	88.8	760.6
2/14/2018 12:00	9.5	57.3	-6.8	70.5	424.8	78.5	760.6
2/14/2018 13:00	8.6	46.4	-6.6	68.8	452.3	78.3	760.3
2/14/2018 14:00	6.3	31.8	-6.4	67.1	441.1	78.0	760.4
2/14/2018 15:00	5.6	40.1	-6.4	65.2	347.5	76.7	760.1
2/14/2018 16:00	5.9	55.5	-6.6	62.3	188.9	75.2	759.9
2/14/2018 17:00	6.7	58.7	-7.0	59.1	71.2	76.1	760.0



Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
2/14/2018 18:00	6.3	64.4	-7.2	53.8	12.0	79.1	760.1
2/14/2018 19:00	5.6	56.2	-7.1	48.5	0.0	78.6	760.0
2/14/2018 20:00	2.1	63.4	-7.9	54.9	0.0	79.0	760.1
2/14/2018 21:00	0.4	120.6	-7.8	70.5	0.0	79.4	760.2
2/14/2018 22:00	0.9	191.1	-8.2	77.8	0.0	79.3	760.2
2/14/2018 23:00	0.9	215.6	-8.4	72.5	0.0	79.5	760.3
2/15/2018 0:00	0.6	189.9	-8.3	70.3	0.0	79.3	760.2
2/15/2018 1:00	1.0	208.5	-8.6	69.8	0.0	79.9	760.3
2/15/2018 2:00	2.8	214.2	-8.6	75.0	0.0	80.1	760.3
2/15/2018 3:00	3.9	197.6	-8.1	63.9	0.0	79.3	760.2
2/15/2018 4:00	3.8	201.2	-7.8	58.6	0.0	75.5	760.2
2/15/2018 5:00	4.7	204.3	-7.7	57.6	0.0	75.8	760.2
2/15/2018 6:00	4.4	205.5	-7.7	55.6	0.0	75.9	760.2
2/15/2018 7:00	4.7	202.2	-7.5	54.5	0.0	76.1	760.2
2/15/2018 8:00	4.5	205.9	-7.5	54.6	0.1	76.1	760.0
2/15/2018 9:00	4.6	198.6	-7.3	52.8	10.8	75.8	760.2
2/15/2018 10:00	5.1	201.9	-7.4	55.1	42.3	75.5	760.1
2/15/2018 11:00	5.4	196.4	-7.7	60.2	75.2	76.0	760.3
2/15/2018 12:00	4.9	201.6	-7.9	75.6	142.1	74.7	760.3
2/15/2018 13:00	2.5	224.6	-8.1	91.8	142.4	75.5	760.8
2/15/2018 14:00	3.6	209.3	-7.8	91.9	142.3	77.4	761.7
2/15/2018 15:00	4.4	207.4	-7.2	92.2	160.4	76.2	762.3
2/15/2018 16:00	4.9	207.8	-7.1	92.5	135.4	77.8	762.7
2/15/2018 17:00	5.1	209.7	-6.9	93.4	63.7	77.1	763.1
2/15/2018 18:00	4.0	208.4	-6.9	93.9	10.5	78.4	763.7
2/15/2018 19:00	3.6	205.1	-6.7	94.1	0.0	77.8	764.1
2/15/2018 20:00	3.5	210.9	-6.6	94.1	0.0	77.5	764.5
2/15/2018 21:00	2.6	217.0	-6.6	94.1	0.0	76.4	765.1
2/15/2018 22:00	2.1	218.2	-6.5	94.2	0.0	77.3	765.6
2/15/2018 23:00	1.7	207.6	-6.2	94.4	0.0	78.1	766.0
2/16/2018 0:00	2.5	189.0	-6.2	94.5	0.0	-	766.1
2/16/2018 1:00	2.1	195.0	-6.2	94.4	0.0	78.5	766.1
2/16/2018 2:00	1.6	200.4	-6.4	94.3	0.0	79.0	766.2
2/16/2018 3:00	1.3	193.8	-6.7	94.1	0.0	78.8	766.2
2/16/2018 4:00	0.9	212.5	-6.8	94.0	0.0	78.2	766.2
2/16/2018 5:00	0.9	180.0	-6.8	94.0	0.0	77.8	766.2
2/16/2018 6:00	0.5	239.3	-6.8	94.0	0.0	78.0	766.2
2/16/2018 7:00	1.2	10.9	-7.1	93.9	0.0	77.3	766.2
2/16/2018 8:00	1.7	46.0	-7.2	93.8	0.5	77.9	766.2
2/16/2018 9:00	2.2	38.5	-7.1	93.7	21.1	76.2	766.2
2/16/2018 10:00	2.7	28.3	-7.8	92.8	86.2	77.7	766.2
2/16/2018 11:00	6.4	35.3	-8.4	89.9	166.8	79.1	766.1
2/16/2018 12:00	6.7	39.7	-8.3	84.4	215.4	79.6	766.5
2/16/2018 13:00	1.7	261.8	-7.5	87.4	264.8	78.8	766.2
2/16/2018 14:00	0.7	183.0	-7.1	90.3	242.2	78.3	766.1
2/16/2018 15:00	0.3	68.4	-7.7	88.4	189.1	78.0	766.1
2/16/2018 16:00	1.4	45.9	-8.4	85.2	134.9	78.5	766.2
2/16/2018 17:00	3.2	57.2	-9.1	83.6	65.9	78.9	766.2
2/16/2018 18:00	4.1	61.0	-9.7	80.3	13.8	78.6	766.3
2/16/2018 19:00	3.0	79.6	-9.7	79.9	0.1	79.0	766.4
2/16/2018 20:00	2.6	96.7	-10.0	86.2	0.0	77.9	766.4
2/16/2018 21:00	3.8	83.8	-10.3	81.8	0.0	78.5	766.4
2/16/2018 22:00	4.9	76.4	-10.6	78.5	0.0	78.7	766.5
2/16/2018 23:00	10.5	62.6	-10.3	71.1	0.0	75.9	766.6

### Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
2/17/2018 0:00	13.3	65.8	-10.2	69.2	0.0	78.2	766.1
2/17/2018 1:00	13.7	73.2	-10.6	70.0	0.0	84.5	766.5
2/17/2018 2:00	15.6	62.9	-10.9	67.1	0.0	82.2	766.5
2/17/2018 3:00	15.3	55.4	-11.3	65.5	0.0	-	766.8
2/17/2018 4:00	15.3	52.6	-11.5	62.7	0.0	73.9	766.8
2/17/2018 5:00	16.2	54.8	-11.7	61.8	0.0	74.5	767.1
2/17/2018 6:00	16.9	54.3	-11.9	64.3	0.0	73.9	767.5
2/17/2018 7:00	15.7	46.4	-12.1	69.4	0.0	75.0	766.8
2/17/2018 8:00	17.1	45.6	-12.3	70.9	0.4	72.2	766.3
2/17/2018 9:00	17.1	46.4	-12.5	70.2	10.4	78.7	766.4
2/17/2018 10:00	14.2	51.1	-12.6	65.5	25.9	74.4	766.3
2/17/2018 11:00	15.2	44.8	-12.9	64.8	52.2	72.7	766.5
2/17/2018 12:00	11.9	39.9	-12.7	58.9	228.1	73.3	766.6
2/17/2018 13:00	15.1	39.8	-12.7	61.0	394.1	74.3	766.8
2/17/2018 14:00	10.4	40.6	-12.3	57.6	416.8	74.7	767.7
2/17/2018 15:00	11.6	39.7	-12.3	57.4	381.5	74.4	767.6
2/17/2018 16:00	12.5	31.6	-12.4	57.7	285.2	73.4	766.9
2/17/2018 17:00	13.0	39.6	-12.5	57.4	161.5	74.2	767.0
2/17/2018 18:00	13.7	42.2	-12.6	55.2	38.1	73.5	767.0
2/17/2018 19:00	16.0	38.8	-13.0	62.8	0.5	73.7	767.1
2/17/2018 20:00	17.4	43.6	-13.1	63.6	0.0	72.9	766.7
2/17/2018 21:00	16.9	41.5	-13.0	63.5	0.0	73.0	766.5
2/17/2018 22:00	14.9	40.9	-12.8	58.2	0.0	74.1	767.0
2/17/2018 23:00	12.1	46.5	-12.4	51.7	0.0	73.4	766.8
2/18/2018 0:00	13.6	44.5	-12.5	55.4	0.0	72.9	766.6
2/18/2018 1:00	17.9	45.1	-12.6	61.2	0.0	-	767.3
2/18/2018 2:00	19.7	40.2	-12.9	65.9	0.0	71.9	766.3
2/18/2018 3:00	17.5	38.1	-13.0	60.2	0.0	73.7	767.0
2/18/2018 4:00	10.9	40.3	-12.7	51.7	0.0	73.8	767.2
2/18/2018 5:00	12.5	51.6	-13.0	53.1	0.0	73.0	766.7
2/18/2018 6:00	13.1	51.2	-13.3	53.9	0.0	73.3	767.3
2/18/2018 7:00	16.6	49.2	-13.1	52.8	0.0	73.0	767.1
2/18/2018 8:00	12.0	46.7	-13.6	52.2	0.7	72.9	767.1
2/18/2018 9:00	10.7	48.7	-12.9	46.5	11.5	72.9	767.3
2/18/2018 10:00	7.3	27.8	-13.9	51.9	59.7	73.1	768.3
2/18/2018 11:00	7.7	29.6	-13.3	51.1	281.5	73.1	768.6
2/18/2018 12:00	7.3	27.2	-12.9	49.1	375.0	73.0	768.6
2/18/2018 13:00	8.2	34.9	-12.5	47.9	424.0	72.5	768.3
2/18/2018 14:00	7.5	37.4	-11.9	45.9	423.5	72.8	768.1
2/18/2018 15:00	4.0	21.5	-11.6	49.8	372.1	72.0	767.9
2/18/2018 16:00	4.7	37.5	-11.4	43.6	283.5	72.2	767.6
2/18/2018 17:00	6.7	27.6	-11.6	40.4	166.4	72.0	767.3
2/18/2018 18:00	5.5	39.8	-12.0	44.0	32.5	71.8	767.3
2/18/2018 19:00	4.9	33.4	-12.6	50.1	0.2	72.3	767.3
2/18/2018 20:00	2.0	43.0	-13.2	52.4	0.0	72.8	767.4
2/18/2018 21:00	1.3	195.5	-13.5	59.7	0.0	73.0	767.4
2/18/2018 22:00	0.8	195.5	-13.8	62.2	0.0	72.9	767.5
2/18/2018 23:00	1.6	229.7	-13.9	65.1	0.0	71.9	767.5
2/19/2018 0:00	1.2	186.3	-13.8	62.7	0.0	73.0	767.5
2/19/2018 1:00	1.6	148.2	-13.1	52.7	0.0	72.5	767.4
2/19/2018 2:00	1.7	307.3	-12.3	41.9	0.0	72.7	767.4
2/19/2018 3:00	1.7	226.8	-12.6	46.9	0.0	72.6	767.5
2/19/2018 4:00	2.6	201.1	-13.0	50.1	0.0	72.5	767.5
2/19/2018 5:00	3.2	219.5	-11.1	32.0	0.0	72.4	767.4

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
2/19/2018 6:00	3.5	217.8	-10.7	29.1	0.0	72.1	767.4
2/19/2018 7:00	2.7	231.9	-10.9	30.8	0.0	72.3	767.4
2/19/2018 8:00	1.2	312.8	-10.1	28.8	0.5	72.4	767.4
2/19/2018 9:00	1.1	23.2	-9.9	28.4	23.3	72.6	767.4
2/19/2018 10:00	1.4	17.0	-10.0	30.1	88.6	72.1	768.1
2/19/2018 11:00	0.8	296.9	-10.1	33.0	218.8	72.0	767.4
2/19/2018 12:00	0.9	220.1	-9.4	30.8	329.5	71.6	769.2
2/19/2018 13:00	0.9	303.8	-9.5	36.7	416.8	71.7	767.9
2/19/2018 14:00	0.7	220.6	-8.6	38.2	411.5	71.8	768.1
2/19/2018 15:00	0.6	213.1	-9.1	44.6	357.0	71.9	767.6
2/19/2018 16:00	0.8	210.1	-9.6	47.4	243.0	72.2	767.1
2/19/2018 17:00	1.2	207.9	-10.5	56.7	112.7	72.3	767.0
2/19/2018 18:00	1.5	194.5	-10.9	53.8	40.3	72.4	767.0
2/19/2018 19:00	4.9	20.2	-10.0	48.5	0.7	71.9	766.8
2/19/2018 20:00	5.9	24.3	-9.2	48.5	0.0	72.4	767.0
2/19/2018 21:00	5.2	32.0	-9.3	50.9	0.0	72.0	766.8
2/19/2018 22:00	7.1	33.7	-8.4	50.8	0.0	72.2	766.7
2/19/2018 23:00	9.8	51.3	-7.6	53.4	0.0	72.6	767.0
2/20/2018 0:00	9.3	43.4	-7.6	54.2	0.0	72.3	766.6
2/20/2018 1:00	10.7	48.5	-7.6	54.7	0.0	72.2	766.4
2/20/2018 2:00	13.4	52.6	-7.5	55.1	0.0	72.7	766.6
2/20/2018 3:00	9.0	40.4	-8.1	56.6	0.0	72.0	766.8
2/20/2018 4:00	6.9	25.2	-8.8	59.5	0.0	72.5	766.7
2/20/2018 5:00	7.9	21.1	-8.5	57.4	0.0	72.2	766.9
2/20/2018 6:00	7.6	27.3	-8.6	57.4	0.0	72.9	766.7
2/20/2018 7:00	8.3	20.7	-8.8	58.2	0.0	72.4	766.7
2/20/2018 8:00	4.1	38.8	-9.6	60.5	1.4	73.5	767.0
2/20/2018 9:00	1.3	250.8	-10.2	66.2	25.4	71.9	767.1
2/20/2018 10:00	1.3	187.3	-9.9	66.6	84.8	72.4	768.0
2/20/2018 11:00	1.4	180.4	-8.7	60.3	276.4	72.0	767.8
2/20/2018 12:00	1.5	158.5	-8.5	60.4	350.6	72.5	768.5
2/20/2018 13:00	0.6	310.6	-7.3	52.5	346.5	72.4	766.9
2/20/2018 14:00	1.1	195.3	-7.8	63.6	311.2	72.7	766.7
2/20/2018 15:00	3.2	211.5	-8.7	70.8	196.7	72.9	766.7
2/20/2018 16:00	4.7	203.7	-8.0	63.2	155.7	72.6	766.8
2/20/2018 17:00	5.3	206.9	-7.6	61.6	112.4	71.2	766.7
2/20/2018 18:00	4.9	215.4	-7.7	63.2	16.0	72.2	766.7
2/20/2018 19:00	4.3	206.6	-7.7	64.8	0.1	72.5	766.6
2/20/2018 20:00	4.5	222.1	-8.4	76.6	0.0	72.6	766.9
2/20/2018 21:00	4.2	216.2	-8.7	92.3	0.0	71.7	767.5
2/20/2018 22:00	3.5	232.0	-8.8	92.1	0.0	72.5	767.9
2/20/2018 23:00	3.0	227.4	-8.7	92.2	0.0	73.1	768.0
2/21/2018 0:00	2.7	224.8	-8.7	92.2	0.0	72.9	768.0
2/21/2018 1:00	1.7	208.6	-8.8	92.2	0.0	73.1	768.0
2/21/2018 2:00	1.1	34.5	-8.5	92.4	0.0	72.8	768.0
2/21/2018 3:00	1.7	358.4	-8.4	92.6	0.0	72.8	768.0
2/21/2018 4:00	1.8	47.3	-8.7	92.4	0.0	72.8	768.0
2/21/2018 5:00	2.3	32.5	-8.9	92.2	0.0	73.0	768.0
2/21/2018 6:00	2.6	27.5	-9.1	92.0	0.0	72.9	768.0
2/21/2018 7:00	1.5	44.9	-9.0	92.1	0.0	73.6	768.1
2/21/2018 8:00	2.7	28.9	-8.4	92.3	1.0	73.4	768.0
2/21/2018 9:00	2.6	27.5	-7.8	80.4	12.7	73.0	768.1
2/21/2018 10:00	2.8	15.6	-6.2	53.7	81.4	72.2	769.1
2/21/2018 11:00	4.4	11.3	-5.6	47.1	298.7	71.1	769.5

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
2/21/2018 12:00	4.6	31.7	-5.0	43.0	393.2	70.9	769.6
2/21/2018 13:00	3.9	27.8	-4.0	35.1	443.6	72.1	769.3
2/21/2018 14:00	3.2	36.9	-3.7	32.7	447.0	70.8	768.9
2/21/2018 15:00	3.3	30.6	-3.2	27.6	390.7	72.8	768.3
2/21/2018 16:00	2.7	32.2	-3.2	26.6	276.3	72.5	767.9
2/21/2018 17:00	2.8	5.0	-3.6	29.9	193.2	71.9	767.7
2/21/2018 18:00	2.4	81.6	-5.0	26.9	40.0	72.5	767.6
2/21/2018 19:00	1.3	69.9	-4.6	20.8	0.4	72.7	767.6
2/21/2018 20:00	1.9	172.9	-4.8	29.6	0.0	72.4	767.7
2/21/2018 21:00	2.1	194.8	-4.8	27.0	0.0	72.2	767.7
2/21/2018 22:00	3.5	197.1	-4.7	26.1	0.0	72.1	767.7
2/21/2018 23:00	3.7	205.3	-4.9	25.9	0.0	72.4	767.6
2/22/2018 0:00	2.7	223.1	-5.3	26.5	0.0	73.2	767.6
2/22/2018 1:00	2.5	254.3	-5.1	24.5	0.0	72.8	767.6
2/22/2018 2:00	3.2	221.2	-5.5	26.5	0.0	72.8	767.5
2/22/2018 3:00	3.6	219.3	-5.7	27.8	0.0	72.9	767.6
2/22/2018 4:00	3.1	219.7	-5.9	30.4	0.0	73.5	767.6
2/22/2018 5:00	3.1	226.9	-5.9	32.1	0.0	73.0	767.6
2/22/2018 6:00	2.1	206.4	-6.1	35.1	0.0	71.9	767.7
2/22/2018 7:00	2.8	220.5	-6.3	39.1	0.0	71.6	767.7
2/22/2018 8:00	3.2	221.7	-6.6	40.1	2.3	73.1	767.6
2/22/2018 9:00	4.2	217.3	-6.8	42.0	34.9	72.8	767.7
2/22/2018 10:00	4.8	219.1	-6.8	50.6	121.7	71.4	768.2
2/22/2018 11:00	5.3	203.9	-6.4	58.6	269.7	72.9	768.0
2/22/2018 12:00	6.0	212.5	-6.6	64.8	325.8	72.4	768.2
2/22/2018 13:00	6.6	217.5	-6.4	68.4	367.0	73.4	767.9
2/22/2018 14:00	5.9	212.6	-6.6	76.2	179.2	74.3	767.4
2/22/2018 15:00	5.8	209.4	-6.6	87.7	110.8	74.6	767.4
2/22/2018 16:00	5.4	212.3	-6.6	78.7	114.0	75.8	767.4
2/22/2018 17:00	5.7	211.6	-6.5	89.1	58.8	75.0	767.6
2/22/2018 18:00	5.4	213.0	-6.1	94.3	14.9	74.9	767.7
2/22/2018 19:00	5.6	215.7	-6.1	94.4	0.2	77.3	767.7
2/22/2018 20:00	5.8	209.2	-5.9	94.5	0.0	76.1	767.9
2/22/2018 21:00	6.1	203.7	-5.7	94.7	0.0	72.5	768.0
2/22/2018 22:00	4.1	209.1	-5.3	95.0	0.0	75.2	768.0
2/22/2018 23:00	4.9	212.9	-5.0	95.2	0.0	74.5	768.6
2/23/2018 0:00	7.3	204.5	-4.7	95.4	0.0	73.1	768.9
2/23/2018 1:00	6.6	210.1	-4.5	95.6	0.0	73.0	769.7
2/23/2018 2:00	5.9	213.8	-4.4	95.6	0.0	73.0	770.5
2/23/2018 3:00	4.9	211.9	-4.2	95.7	0.0	75.0	770.7
2/23/2018 4:00	5.7	220.1	-4.4	95.6	0.0	76.4	770.9
2/23/2018 5:00	4.8	203.7	-4.4	95.6	0.0	75.4	771.0
2/23/2018 6:00	5.2	215.0	-4.4	95.7	0.0	74.9	771.0
2/23/2018 7:00	5.1	207.1	-4.6	95.6	0.0	75.3	771.1
2/23/2018 8:00	4.7	203.9	-4.7	95.5	3.3	75.6	771.3
2/23/2018 9:00	4.3	205.9	-4.8	95.3	20.3	75.2	771.1
2/23/2018 10:00	4.7	191.8	-4.9	95.2	68.1	75.2	771.2
2/23/2018 11:00	3.9	200.6	-4.6	95.1	151.7	75.1	771.1
2/23/2018 12:00	3.1	208.4	-4.2	95.4	161.1	75.4	771.3
2/23/2018 13:00	4.1	212.8	-4.0	95.5	156.8	75.6	771.5
2/23/2018 14:00	3.8	210.8	-3.8	95.6	177.1	75.7	771.8
2/23/2018 15:00	3.7	223.4	-3.8	95.7	150.5	77.0	772.3
2/23/2018 16:00	3.3	226.8	-3.8	95.7	114.2	77.7	772.7
2/23/2018 17:00	3.0	227.2	-4.0	95.7	76.5	78.7	773.7

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
2/23/2018 18:00	2.6	216.2	-4.1	95.8	32.2	80.2	774.3
2/23/2018 19:00	2.1	228.6	-4.3	95.7	0.9	79.8	774.6
2/23/2018 20:00	1.8	229.0	-4.5	95.6	0.0	80.5	775.1
2/23/2018 21:00	1.5	238.5	-4.6	95.6	0.0	80.5	775.1
2/23/2018 22:00	1.0	244.2	-4.6	95.6	0.0	80.5	775.2
2/23/2018 23:00	1.1	337.0	-4.8	95.5	0.0	80.7	775.3
2/24/2018 0:00	0.8	20.8	-5.5	95.1	0.0	81.2	775.5
2/24/2018 1:00	1.3	28.5	-5.8	94.8	0.0	81.2	776.0
2/24/2018 2:00	1.4	36.6	-6.4	94.4	0.0	81.1	776.3
2/24/2018 3:00	0.9	40.4	-6.8	94.1	0.0	82.0	776.5
2/24/2018 4:00	-	-	-6.9	94.0	0.0	-	776.5
2/24/2018 5:00	-	-	-6.7	94.1	0.0	81.5	776.6
2/24/2018 6:00	-	-	-6.7	94.1	0.0	81.6	776.6
2/24/2018 7:00	-	-	-6.6	94.2	0.0	81.8	776.7
2/24/2018 8:00	-	-	-6.7	94.1	1.1	81.7	776.7
2/24/2018 9:00	-	-	-6.8	94.1	20.1	81.4	776.6
2/24/2018 10:00	-	-	-7.0	93.9	63.8	81.4	776.8
2/24/2018 11:00	-	-	-7.1	93.8	106.1	82.3	777.0
2/24/2018 12:00	-	-	-7.3	93.6	114.9	82.4	777.4
2/24/2018 13:00	-	-	-7.1	93.7	133.9	82.9	778.5
2/24/2018 14:00	-	-	-6.5	94.1	127.9	92.7	778.9
2/24/2018 15:00	-	-	-6.4	94.2	95.8	94.5	779.6
2/24/2018 16:00	-	-	-6.2	94.4	65.8	-	780.4
2/24/2018 17:00	-	-	-6.1	94.5	52.3	96.1	781.3
2/24/2018 18:00	-	-	-6.0	94.6	18.6	95.7	781.6
2/24/2018 19:00	-	-	-6.0	94.6	0.6	-	781.8
2/24/2018 20:00	-	-	-6.0	94.6	0.0	-	781.9
2/24/2018 21:00	-	-	-6.0	94.6	0.0	-	782.0
2/24/2018 22:00	-	-	-5.9	94.7	0.0	84.3	782.0
2/24/2018 23:00	-	-	-5.8	94.8	0.0	82.7	782.1
2/25/2018 0:00	-	-	-5.7	94.9	0.0	84.1	782.2
2/25/2018 1:00	-	-	-5.9	94.7	0.0	83.9	782.2
2/25/2018 2:00	-	-	-6.3	94.4	0.0	83.6	782.2
2/25/2018 3:00	-	-	-6.7	94.2	0.0	-	782.2
2/25/2018 4:00	-	-	-6.5	94.3	0.0	-	782.3
2/25/2018 5:00	-	-	-6.4	94.4	0.0	-	782.3
2/25/2018 6:00	-	-	-6.5	94.3	0.0	-	782.4
2/25/2018 7:00	-	-	-6.5	94.3	0.0	-	782.4
2/25/2018 8:00	-	-	-6.5	94.2	0.5	83.5	782.6
2/25/2018 9:00	-	-	-6.4	94.3	6.5	-	782.8
2/25/2018 10:00	-	-	-6.1	94.4	39.0	-	783.0
2/25/2018 11:00	-	-	-5.1	94.9	104.0	92.4	783.2
2/25/2018 12:00	-	-	-4.3	95.0	106.4	91.9	783.5
2/25/2018 13:00	-	-	-4.1	95.0	136.1	-	783.7
2/25/2018 14:00	-	-	-2.9	95.5	340.0	95.1	783.4
2/25/2018 15:00	-	-	-2.2	96.6	373.4	95.0	783.9
2/25/2018 16:00	-	-	-3.4	95.6	271.9	94.9	784.0
2/25/2018 17:00	-	-	-3.9	95.1	150.8	95.3	784.0
2/25/2018 18:00	-	-	-4.5	95.4	61.2	95.8	783.9
2/25/2018 19:00	-	-	-5.7	94.8	1.7	96.0	784.0
2/25/2018 20:00	-	-	-6.0	94.7	0.0	94.7	784.0
2/25/2018 21:00	-	-	-6.3	94.5	0.0	94.6	784.0
2/25/2018 22:00	-	-	-6.5	94.3	0.0	94.8	784.0
2/25/2018 23:00	-	-	-6.7	94.2	0.0	94.4	784.0

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
2/26/2018 0:00	-	-	-6.6	94.2	0.0	94.5	784.1
2/26/2018 1:00	-	-	-6.8	94.2	0.0	94.4	784.0
2/26/2018 2:00	-	-	-6.9	94.0	0.0	89.9	784.0
2/26/2018 3:00	-	-	-7.1	93.9	0.0	95.9	784.1
2/26/2018 4:00	-	-	-7.6	93.5	0.0	95.7	783.9
2/26/2018 5:00	-	-	-8.1	93.2	0.0	95.2	784.1
2/26/2018 6:00	-	-	-8.4	92.9	0.0	94.3	784.2
2/26/2018 7:00	-	-	-8.4	92.9	0.0	94.7	784.4
2/26/2018 8:00	-	-	-8.2	93.0	1.4	94.5	784.1
2/26/2018 9:00	-	-	-8.3	93.0	32.2	93.9	784.4
2/26/2018 10:00	-	-	-7.9	93.2	94.6	93.9	784.3
2/26/2018 11:00	-	-	-7.3	93.6	124.0	94.0	784.6
2/26/2018 12:00	-	-	-6.8	94.0	121.5	93.6	784.6
2/26/2018 13:00	-	-	-6.5	94.2	139.8	94.7	785.0
2/26/2018 14:00	-	-	-5.9	94.6	161.4	94.9	784.9
2/26/2018 15:00	-	-	-5.7	94.8	111.0	96.1	785.3
2/26/2018 16:00	-	-	-5.4	95.1	78.2	96.1	784.6
2/26/2018 17:00	-	-	-5.2	95.2	41.9	95.6	785.1
2/26/2018 18:00	-	-	-5.0	95.4	10.6	95.0	785.6
2/26/2018 19:00	-	-	-4.9	95.5	0.6	96.1	786.0
2/26/2018 20:00	-	-	-5.0	95.4	0.0	-	786.3
2/26/2018 21:00	-	-	-5.3	95.2	0.0	96.7	786.4
2/26/2018 22:00	-	-	-5.7	95.0	0.0	97.1	786.2
2/26/2018 23:00	-	-	-5.7	95.0	0.0	96.9	786.4
2/27/2018 0:00	-	-	-5.7	94.9	0.0	96.9	786.5
2/27/2018 1:00	-	-	-5.8	94.9	0.0	97.2	786.6
2/27/2018 2:00	-	-	-5.8	94.8	0.0	97.4	786.5
2/27/2018 3:00	-	-	-6.0	94.8	0.0	97.6	786.5
2/27/2018 4:00	-	-	-6.0	94.7	0.0	97.6	786.7
2/27/2018 5:00	-	-	-6.0	94.7	0.0	97.6	786.8
2/27/2018 6:00	-	-	-6.1	94.7	0.0	97.5	786.7
2/27/2018 7:00	-	-	-6.0	94.7	0.0	97.4	787.1
2/27/2018 8:00	-	-	-5.9	94.8	1.7	97.0	787.0
2/27/2018 9:00	-	-	-5.8	94.8	14.9	96.1	787.0
2/27/2018 10:00	-	-	-5.7	94.9	22.8	96.7	787.1
2/27/2018 11:00	-	-	-5.6	95.0	37.7	96.1	787.1
2/27/2018 12:00	-	-	-5.4	95.0	71.3	94.7	787.3
2/27/2018 13:00	-	-	-5.3	95.0	117.4	95.6	787.4
2/27/2018 14:00	-	-	-5.5	94.9	134.2	-	787.4
2/27/2018 15:00	-	-	-5.9	94.6	184.5	95.5	787.5
2/27/2018 16:00	-	-	-6.4	94.4	94.9	96.5	788.0
2/27/2018 17:00	-	-	-6.3	94.4	67.3	-	788.0
2/27/2018 18:00	-	-	-6.6	94.3	15.4	95.4	787.9
2/27/2018 19:00	-	-	-7.0	94.0	1.0	95.5	788.2
2/27/2018 20:00	-	-	-7.3	93.8	0.0	94.7	788.3
2/27/2018 21:00	-	-	-7.5	93.7	0.0	94.7	788.3
2/27/2018 22:00	-	-	-7.5	93.6	0.0	93.7	788.3
2/27/2018 23:00	-	-	-7.7	93.5	0.0	93.0	788.4
2/28/2018 0:00	-	-	-7.9	93.3	0.0	93.3	788.4
2/28/2018 1:00	-	-	-8.3	93.1	0.0	94.1	788.4
2/28/2018 2:00	-	-	-8.5	92.9	0.0	96.3	788.5
2/28/2018 3:00	-	-	-8.7	92.7	0.0	95.7	788.5
2/28/2018 4:00	-	-	-9.2	92.2	0.0	97.5	788.5
2/28/2018 5:00	-	-	-9.2	92.3	0.0	96.8	788.5

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
2/28/2018 6:00	-	-	-9.4	92.0	0.0	97.3	788.6
2/28/2018 7:00	-	-	-9.4	92.1	0.0	97.1	788.5
2/28/2018 8:00	-	-	-9.4	92.2	3.1	95.7	788.5
2/28/2018 9:00	-	-	-9.2	92.3	42.6	95.7	788.5
2/28/2018 10:00	-	-	-8.5	92.4	144.0	96.1	788.8
2/28/2018 11:00	-	-	-8.3	91.8	241.1	97.2	788.0
2/28/2018 12:00	12.0	75.6	-7.6	84.2	298.5	96.4	788.6
2/28/2018 13:00	19.1	70.1	-7.6	83.4	326.2	95.1	790.1
2/28/2018 14:00	20.1	73.6	-7.0	71.3	415.0	96.4	790.8
2/28/2018 15:00	22.1	67.7	-6.6	65.0	345.9	96.1	788.7
2/28/2018 16:00	22.2	63.6	-5.7	57.8	177.3	95.0	789.4
2/28/2018 17:00	20.7	73.0	-5.3	58.3	106.9	95.6	789.5
2/28/2018 18:00	22.3	68.1	-5.4	55.3	39.2	96.7	791.4
2/28/2018 19:00	19.1	70.3	-4.9	48.4	2.2	89.0	789.3
2/28/2018 20:00	18.2	68.5	-4.7	45.0	0.0	-	789.0
2/28/2018 21:00	17.6	64.6	-4.8	43.1	0.0	86.8	790.0
2/28/2018 22:00	17.4	59.1	-4.8	42.8	0.0	88.9	789.5
2/28/2018 23:00	19.2	59.9	-5.1	46.1	0.0	83.9	789.0
3/1/2018 0:00	23.4	61.5	-5.5	52.5	0.0	-	790.0
3/1/2018 1:00	22.8	62.8	-5.8	56.2	0.0	-	788.2
3/1/2018 2:00	22.0	65.7	-6.0	59.9	0.0	-	789.1
3/1/2018 3:00	21.8	68.6	-6.1	61.2	0.0	-	788.7
3/1/2018 4:00	22.0	68.7	-6.2	61.3	0.0	-	788.9
3/1/2018 5:00	22.8	68.4	-6.2	63.2	0.0	89.9	789.2
3/1/2018 6:00	21.8	68.1	-6.6	69.8	0.0	-	787.8
3/1/2018 7:00	21.8	66.8	-7.2	78.8	0.0	89.4	788.3
3/1/2018 8:00	21.8	62.0	-7.5	83.9	2.0	89.3	789.4
3/1/2018 9:00	22.0	60.6	-7.7	85.1	25.0	90.3	788.9
3/1/2018 10:00	20.5	58.6	-7.8	81.2	76.1	90.6	788.7
3/1/2018 11:00	20.4	54.5	-7.9	78.8	129.1	-	789.4
3/1/2018 12:00	19.7	59.6	-7.9	73.2	205.3	-	788.6
3/1/2018 13:00	19.2	61.0	-8.0	68.9	275.6	91.2	790.1
3/1/2018 14:00	16.8	58.7	-8.0	64.5	264.9	-	789.6
3/1/2018 15:00	17.1	57.9	-8.2	63.3	313.5	90.7	789.6
3/1/2018 16:00	15.7	52.6	-8.4	63.3	240.9	-	790.1
3/1/2018 17:00	15.3	47.3	-8.9	64.8	210.5	91.2	790.4
3/1/2018 18:00	16.2	45.1	-9.6	68.2	53.4	-	789.1
3/1/2018 19:00	17.0	45.9	-10.5	73.0	2.3	88.5	789.2
3/1/2018 20:00	15.5	48.6	-10.9	73.6	0.0	-	789.9
3/1/2018 21:00	15.1	49.0	-11.0	70.8	0.0	-	790.5
3/1/2018 22:00	15.8	54.2	-11.1	67.4	0.0	-	790.1
3/1/2018 23:00	16.6	62.8	-10.9	62.2	0.0	86.0	789.9
3/2/2018 0:00	15.7	72.7	-11.4	62.5	0.0	85.2	790.3
3/2/2018 1:00	16.6	78.0	-11.8	62.9	0.0	-	789.4
3/2/2018 2:00	17.2	72.5	-12.4	62.9	0.0	88.1	789.9
3/2/2018 3:00	18.1	62.5	-13.3	65.3	0.0	90.4	790.0
3/2/2018 4:00	18.6	62.0	-13.6	65.3	0.0	86.5	790.3
3/2/2018 5:00	19.4	48.8	-14.3	65.6	0.0	-	790.3
3/2/2018 6:00	20.7	43.2	-14.4	64.7	0.0	-	789.2
3/2/2018 7:00	20.0	50.0	-14.5	64.2	0.0	81.4	790.7
3/2/2018 8:00	21.4	46.7	-14.9	64.2	4.2	-	790.6
3/2/2018 9:00	21.9	46.4	-14.9	63.4	17.4	-	791.1
3/2/2018 10:00	23.0	45.5	-14.5	60.3	153.9	80.8	785.7
3/2/2018 11:00	22.8	43.1	-13.7	58.2	360.3	83.2	788.7

### Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
3/2/2018 12:00	22.1	41.6	-14.0	61.6	452.5	82.3	788.6
3/2/2018 13:00	20.7	45.4	-13.0	54.3	500.5	82.7	790.6
3/2/2018 14:00	19.3	42.0	-11.9	50.6	500.3	82.0	788.9
3/2/2018 15:00	21.2	39.2	-12.8	56.0	449.4	81.5	790.2
3/2/2018 16:00	20.4	42.0	-12.8	55.0	354.8	79.9	789.9
3/2/2018 17:00	20.3	43.4	-12.4	53.4	230.9	-	790.9
3/2/2018 18:00	19.7	45.1	-11.9	50.7	90.1	79.4	789.3
3/2/2018 19:00	20.1	44.1	-11.9	51.7	3.9	78.9	788.5
3/2/2018 20:00	18.3	50.1	-12.0	52.1	0.0	78.0	790.7
3/2/2018 21:00	14.0	75.1	-12.1	50.8	0.0	-	789.9
3/2/2018 22:00	18.2	60.4	-12.3	53.3	0.0	-	790.3
3/2/2018 23:00	18.8	49.6	-11.9	46.1	0.0	-	791.1
3/3/2018 0:00	17.7	44.2	-11.9	46.1	0.0	79.4	790.1
3/3/2018 1:00	18.6	47.9	-11.4	44.4	0.0	78.9	791.9
3/3/2018 2:00	19.3	40.5	-11.9	44.4	0.0	79.2	790.8
3/3/2018 3:00	18.3	38.7	-11.9	40.6	0.0	-	789.8
3/3/2018 4:00	18.3	37.6	-12.2	38.6	0.0	80.5	790.5
3/3/2018 5:00	17.5	35.3	-11.9	34.4	0.0	76.3	790.2
3/3/2018 6:00	17.0	33.5	-12.2	33.3	0.0	76.8	790.8
3/3/2018 7:00	16.3	32.5	-12.5	32.8	0.0	76.8	790.6
3/3/2018 8:00	15.8	30.7	-12.6	32.6	5.3	77.3	790.5
3/3/2018 9:00	16.3	31.5	-12.7	32.3	18.9	77.9	791.0
3/3/2018 10:00	15.7	30.0	-12.5	31.1	176.5	75.8	791.9
3/3/2018 11:00	13.5	27.0	-12.4	32.3	380.4	77.2	791.8
3/3/2018 12:00	11.8	31.9	-11.4	28.7	475.3	77.8	791.5
3/3/2018 13:00	11.2	31.5	-10.8	27.6	525.0	80.0	791.6
3/3/2018 14:00	12.3	35.9	-9.9	25.6	524.1	79.9	791.5
3/3/2018 15:00	12.1	38.0	-9.2	24.2	470.2	79.8	790.9
3/3/2018 16:00	13.8	42.4	-8.4	21.3	370.8	77.2	790.5
3/3/2018 17:00	11.7	43.8	-8.5	24.0	245.4	76.9	791.0
3/3/2018 18:00	8.6	60.1	-8.7	26.9	103.1	76.2	790.4
3/3/2018 19:00	13.4	45.9	-8.3	22.1	6.4	76.5	790.3
3/3/2018 20:00	4.7	142.9	-9.3	29.3	0.0	78.5	790.3
3/3/2018 21:00	4.0	58.3	-9.1	26.0	0.0	78.1	790.0
3/3/2018 22:00	8.7	39.1	-9.6	29.2	0.0	77.7	790.8
3/3/2018 23:00	10.8	33.7	-9.2	28.9	0.0	77.3	790.3
3/4/2018 0:00	5.6	79.8	-10.4	36.3	0.0	78.2	790.5
3/4/2018 1:00	1.8	43.9	-10.4	35.1	0.0	78.1	790.5
3/4/2018 2:00	1.7	230.9	-10.6	34.1	0.0	78.1	790.6
3/4/2018 3:00	0.7	165.5	-10.8	34.2	0.0	77.9	790.6
3/4/2018 4:00	1.1	243.9	-10.7	34.4	0.0	78.2	790.6
3/4/2018 5:00	1.8	189.1	-11.5	36.5	0.0	78.1	790.7
3/4/2018 6:00	1.8	189.6	-11.3	35.9	0.0	78.0	790.7
3/4/2018 7:00	1.6	214.8	-11.9	38.1	0.0	77.3	790.7
3/4/2018 8:00	1.5	200.4	-11.8	36.7	11.2	77.7	790.8
3/4/2018 9:00	1.3	198.7	-11.0	34.5	62.4	77.4	790.7
3/4/2018 10:00	1.0	220.3	-10.6	34.3	167.9	76.9	791.9
3/4/2018 11:00	0.7	134.9	-8.6	30.6	364.0	77.0	790.8
3/4/2018 12:00	0.6	159.5	-8.9	35.3	287.8	77.8	790.6
3/4/2018 13:00	0.6	150.8	-8.0	35.1	330.5	76.5	790.3
3/4/2018 14:00	1.2	193.7	-8.7	45.4	304.3	76.3	790.4
3/4/2018 15:00	1.9	194.3	-8.4	44.1	319.8	76.3	790.4
3/4/2018 16:00	2.0	202.0	-8.6	44.9	184.1	76.7	790.2
3/4/2018 17:00	1.6	217.2	-8.4	43.2	113.5	76.7	790.2



**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
3/4/2018 18:00	1.4	183.3	-8.3	42.5	60.1	76.5	790.3
3/4/2018 19:00	1.5	209.8	-9.2	46.5	4.8	76.8	790.4
3/4/2018 20:00	0.5	272.7	-9.6	47.7	0.0	77.3	790.4
3/4/2018 21:00	0.7	40.7	-9.9	47.3	0.0	77.0	790.4
3/4/2018 22:00	0.9	46.9	-10.1	47.7	0.0	77.2	790.5
3/4/2018 23:00	0.5	189.0	-10.0	47.8	0.0	77.1	790.6
3/5/2018 0:00	0.6	148.7	-10.1	48.2	0.0	77.1	790.5
3/5/2018 1:00	1.2	175.1	-10.0	48.5	0.0	76.8	790.5
3/5/2018 2:00	0.7	199.4	-10.0	49.5	0.0	77.4	790.5
3/5/2018 3:00	1.3	88.2	-10.4	49.6	0.0	76.9	790.6
3/5/2018 4:00	0.9	234.2	-10.8	51.2	0.0	77.1	790.6
3/5/2018 5:00	1.0	250.7	-11.0	53.1	0.0	77.1	790.6
3/5/2018 6:00	0.8	257.8	-11.3	55.3	0.0	76.7	790.7
3/5/2018 7:00	1.5	57.5	-11.6	56.2	0.0	76.7	790.7
3/5/2018 8:00	3.4	70.3	-12.4	60.1	6.3	77.2	790.7
3/5/2018 9:00	3.5	71.9	-13.0	63.6	19.7	76.3	790.6
3/5/2018 10:00	4.3	69.0	-12.7	62.3	197.5	76.5	792.0
3/5/2018 11:00	8.0	38.2	-11.5	59.5	389.9	76.5	791.9
3/5/2018 12:00	7.0	49.8	-10.9	59.0	483.3	76.6	791.8
3/5/2018 13:00	5.1	68.3	-10.6	58.9	533.9	76.6	791.6
3/5/2018 14:00	3.4	89.5	-10.1	58.5	532.0	76.2	791.3
3/5/2018 15:00	2.3	93.8	-9.6	57.6	478.0	76.1	790.9
3/5/2018 16:00	2.3	94.0	-9.7	59.3	381.1	76.0	790.7
3/5/2018 17:00	2.3	52.4	-9.4	55.4	252.8	76.1	790.8
3/5/2018 18:00	1.7	41.8	-9.9	56.4	110.3	76.4	790.6
3/5/2018 19:00	1.2	65.1	-10.8	62.0	4.8	76.6	790.6
3/5/2018 20:00	1.8	52.1	-11.2	61.0	0.0	76.5	790.6
3/5/2018 21:00	0.9	53.0	-11.3	59.3	0.0	76.7	790.7
3/5/2018 22:00	1.2	188.8	-11.4	63.1	0.0	76.7	790.7
3/5/2018 23:00	0.6	0.9	-11.6	63.1	0.0	76.3	790.7
3/6/2018 0:00	0.7	174.4	-11.7	64.3	0.0	76.1	790.8
3/6/2018 1:00	0.7	328.6	-11.9	65.0	0.0	76.5	790.8
3/6/2018 2:00	0.9	166.4	-12.0	65.7	0.0	76.3	790.9
3/6/2018 3:00	0.7	156.8	-12.1	66.4	0.0	76.0	790.9
3/6/2018 4:00	0.5	161.9	-12.2	66.4	0.0	76.4	790.9
3/6/2018 5:00	0.6	40.8	-11.9	66.6	0.0	76.6	790.8
3/6/2018 6:00	0.6	282.0	-11.6	65.2	0.0	76.7	790.8
3/6/2018 7:00	0.7	280.2	-11.7	65.7	0.0	76.5	790.8
3/6/2018 8:00	0.3	275.3	-11.7	66.0	9.5	76.4	790.8
3/6/2018 9:00	0.5	8.6	-11.4	63.5	64.0	76.7	790.9
3/6/2018 10:00	1.0	198.0	-11.3	64.7	143.1	76.3	791.5
3/6/2018 11:00	1.4	190.3	-10.8	64.0	328.8	76.5	791.0
3/6/2018 12:00	2.2	203.7	-10.8	66.1	340.1	76.4	791.1
3/6/2018 13:00	1.5	181.9	-9.9	66.3	346.2	76.4	790.8
3/6/2018 14:00	2.5	203.0	-9.2	64.7	403.0	76.3	791.2
3/6/2018 15:00	2.9	204.4	-8.9	63.8	391.6	76.3	790.9
3/6/2018 16:00	2.8	223.2	-8.7	59.7	366.3	76.7	790.6
3/6/2018 17:00	3.3	210.5	-8.1	64.3	215.8	77.4	790.5
3/6/2018 18:00	3.0	206.6	-8.1	77.6	77.9	77.0	790.4
3/6/2018 19:00	2.1	193.4	-8.3	86.7	8.3	77.2	790.6
3/6/2018 20:00	2.0	182.6	-8.2	88.3	0.0	77.0	790.6
3/6/2018 21:00	2.1	202.6	-8.2	86.9	0.0	76.7	790.6
3/6/2018 22:00	2.6	204.5	-8.2	84.9	0.0	76.7	790.6
3/6/2018 23:00	2.2	208.5	-8.5	80.6	0.0	76.4	790.6

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
3/7/2018 0:00	3.1	195.6	-8.4	74.4	0.0	76.3	790.6
3/7/2018 1:00	2.8	198.6	-8.8	73.2	0.0	76.3	790.6
3/7/2018 2:00	1.9	197.8	-8.9	74.1	0.0	76.1	790.6
3/7/2018 3:00	1.4	193.9	-9.1	74.7	0.0	76.0	790.6
3/7/2018 4:00	1.7	200.5	-9.2	74.8	0.0	74.8	790.6
3/7/2018 5:00	1.1	199.2	-9.6	75.8	0.0	75.4	790.6
3/7/2018 6:00	0.4	328.1	-9.6	76.1	0.0	75.5	790.6
3/7/2018 7:00	0.2	9.8	-10.0	79.0	0.0	74.7	790.6
3/7/2018 8:00	1.1	32.0	-9.7	77.0	13.0	74.7	790.6
3/7/2018 9:00	0.8	349.6	-9.4	76.3	50.0	75.5	790.7
3/7/2018 10:00	0.5	57.5	-8.4	70.4	200.8	78.3	791.8
3/7/2018 11:00	0.8	74.1	-7.4	65.2	358.2	77.4	791.4
3/7/2018 12:00	0.4	113.2	-6.3	58.8	430.2	77.6	790.8
3/7/2018 13:00	1.0	36.1	-6.6	61.3	418.0	78.6	790.9
3/7/2018 14:00	1.6	22.0	-7.0	64.7	378.6	78.6	790.9
3/7/2018 15:00	0.5	53.7	-5.5	58.1	415.1	78.1	790.5
3/7/2018 16:00	0.6	41.7	-5.2	56.7	331.5	78.0	790.2
3/7/2018 17:00	1.7	53.4	-6.7	62.7	170.3	78.2	790.0
3/7/2018 18:00	1.6	60.8	-7.2	63.3	58.7	78.6	790.1
3/7/2018 19:00	1.3	53.5	-7.5	63.1	6.2	78.2	790.1
3/7/2018 20:00	1.5	54.7	-7.7	63.2	0.0	78.4	790.1
3/7/2018 21:00	0.7	162.0	-8.0	68.3	0.0	78.6	790.1
3/7/2018 22:00	0.7	201.8	-8.2	70.4	0.0	78.6	790.1
3/7/2018 23:00	0.4	143.2	-8.4	69.7	0.0	78.9	790.2
3/8/2018 0:00	1.6	188.3	-8.8	72.0	0.0	78.0	790.2
3/8/2018 1:00	1.3	173.7	-8.9	71.6	0.0	78.5	790.2
3/8/2018 2:00	1.2	182.1	-9.0	71.6	0.0	78.6	790.2
3/8/2018 3:00	1.4	193.0	-9.0	70.5	0.0	78.5	790.3
3/8/2018 4:00	1.1	164.9	-8.9	68.8	0.0	78.5	790.3
3/8/2018 5:00	1.4	183.1	-9.3	71.3	0.0	78.6	790.3
3/8/2018 6:00	0.9	170.1	-9.2	70.2	0.0	79.1	790.3
3/8/2018 7:00	0.8	201.5	-9.3	70.7	0.0	78.3	790.3
3/8/2018 8:00	1.3	194.8	-9.7	75.5	7.7	78.7	790.3
3/8/2018 9:00	1.4	201.2	-9.4	73.4	72.2	78.4	790.4
3/8/2018 10:00	0.7	232.5	-8.4	69.3	212.9	77.0	791.5
3/8/2018 11:00	0.9	220.4	-7.6	66.2	378.6	77.2	791.1
3/8/2018 12:00	0.1	236.8	-5.7	58.6	428.6	76.0	791.3
3/8/2018 13:00	0.7	184.8	-6.1	62.6	544.9	75.7	790.8
3/8/2018 14:00	1.6	233.5	-6.6	67.0	546.0	77.0	790.8
3/8/2018 15:00	2.4	234.8	-6.4	66.2	492.8	76.3	790.3
3/8/2018 16:00	3.1	249.1	-6.3	66.5	397.5	74.9	790.1
3/8/2018 17:00	2.6	264.1	-6.2	67.6	269.5	74.4	790.0
3/8/2018 18:00	2.4	250.9	-6.7	69.0	116.2	75.1	789.9
3/8/2018 19:00	1.9	234.5	-7.7	73.1	6.4	75.8	790.0
3/8/2018 20:00	1.6	249.9	-7.8	73.6	0.0	75.4	790.1
3/8/2018 21:00	2.9	199.8	-7.9	73.9	0.0	75.5	790.1
3/8/2018 22:00	3.5	202.8	-8.0	73.9	0.0	75.9	790.0
3/8/2018 23:00	4.5	191.2	-7.8	74.2	0.0	76.0	789.9
3/9/2018 0:00	5.0	186.1	-7.8	74.0	0.0	75.9	789.9
3/9/2018 1:00	6.9	183.4	-7.5	72.8	0.0	76.1	790.0
3/9/2018 2:00	6.1	194.8	-7.5	75.5	0.0	75.9	789.8
3/9/2018 3:00	7.3	194.6	-7.5	80.7	0.0	75.8	790.0
3/9/2018 4:00	7.2	194.9	-7.6	83.1	0.0	76.6	790.0
3/9/2018 5:00	7.4	184.8	-7.2	78.3	0.0	77.0	790.1

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
3/9/2018 6:00	8.2	188.8	-6.7	74.0	0.0	77.0	789.8
3/9/2018 7:00	6.7	196.5	-7.4	85.3	0.0	76.3	790.0
3/9/2018 8:00	4.5	187.1	-7.3	91.0	11.6	77.1	790.1
3/9/2018 9:00	4.5	206.4	-6.8	93.2	57.5	78.0	790.6
3/9/2018 10:00	3.9	222.5	-6.3	93.0	120.4	80.4	791.2
3/9/2018 11:00	5.3	194.8	-5.5	93.3	152.9	79.9	791.7
3/9/2018 12:00	5.4	209.5	-4.9	93.5	208.7	81.9	792.3
3/9/2018 13:00	4.4	225.8	-4.2	93.9	230.6	82.8	793.3
3/9/2018 14:00	4.8	230.0	-3.8	94.5	207.4	87.7	794.8
3/9/2018 15:00	6.2	222.3	-3.5	95.2	176.7	89.4	796.6
3/9/2018 16:00	5.5	225.1	-3.4	95.5	150.3	96.1	798.6
3/9/2018 17:00	4.8	226.9	-3.5	95.7	93.6	93.2	799.9
3/9/2018 18:00	4.8	228.8	-3.6	95.9	34.2	102.4	801.3
3/9/2018 19:00	4.6	232.1	-3.7	95.9	3.8	100.5	802.2
3/9/2018 20:00	4.7	239.8	-3.8	95.9	0.0	96.4	803.3
3/9/2018 21:00	4.4	232.2	-4.0	95.8	0.0	98.3	804.0
3/9/2018 22:00	3.6	226.3	-4.0	95.8	0.0	98.3	804.9
3/9/2018 23:00	3.3	229.3	-4.0	95.8	0.0	100.5	806.0
3/10/2018 0:00	2.4	232.6	-3.9	95.9	0.0	100.5	806.4
3/10/2018 1:00	2.3	222.0	-3.8	96.0	0.0	101.6	807.0
3/10/2018 2:00	2.0	217.4	-3.7	96.0	0.0	104.4	808.4
3/10/2018 3:00	1.9	215.8	-3.6	96.1	0.0	109.7	809.8
3/10/2018 4:00	1.6	228.0	-3.4	96.3	0.0	110.2	811.6
3/10/2018 5:00	2.4	228.9	-3.2	96.4	0.0	113.1	813.5
3/10/2018 6:00	2.6	223.5	-3.1	96.4	0.0	114.1	815.0
3/10/2018 7:00	2.1	229.4	-2.9	96.5	0.0	114.1	816.6
3/10/2018 8:00	2.1	223.7	-2.8	96.6	12.7	115.8	817.5
3/10/2018 9:00	2.5	225.3	-2.5	96.6	76.4	116.2	817.8
3/10/2018 10:00	4.2	209.1	-2.4	96.5	156.6	115.0	817.8
3/10/2018 11:00	6.0	202.2	-2.2	96.5	216.0	108.1	818.4
3/10/2018 12:00	5.0	212.3	-1.9	96.6	228.9	110.8	818.6
3/10/2018 13:00	6.2	200.2	-1.8	96.6	271.6	110.6	818.9
3/10/2018 14:00	6.4	200.3	-1.6	96.6	295.7	105.8	819.0
3/10/2018 15:00	6.0	193.8	-1.7	96.6	253.0	106.4	818.7
3/10/2018 16:00	3.9	206.3	-1.5	96.8	180.7	106.3	818.8
3/10/2018 17:00	3.4	200.5	-1.8	97.0	111.3	106.1	819.1
3/10/2018 18:00	2.7	176.5	-2.1	97.0	52.1	106.2	819.1
3/10/2018 19:00	1.9	144.3	-2.4	97.0	5.5	106.0	819.3
3/10/2018 20:00	2.7	163.0	-2.5	96.9	0.0	104.8	819.4
3/10/2018 21:00	3.0	169.5	-2.5	96.9	0.0	104.9	819.5
3/10/2018 22:00	1.6	201.4	-2.5	96.9	0.0	104.6	819.3
3/10/2018 23:00	1.6	250.3	-2.5	96.9	0.0	-	819.3
3/11/2018 0:00	1.5	2.3	-2.5	96.9	0.0	-	819.3
3/11/2018 1:00	2.0	34.6	-2.5	96.6	0.0	103.9	819.3
3/11/2018 2:00	1.5	27.0	-2.4	96.3	0.0	104.2	819.3
3/11/2018 3:00	0.9	13.0	-2.3	95.9	0.0	103.6	819.3
3/11/2018 4:00	1.1	10.9	-2.3	95.0	0.0	103.7	819.3
3/11/2018 5:00	1.3	4.5	-2.1	92.9	0.0	103.7	819.3
3/11/2018 6:00	1.2	357.7	-1.8	89.6	0.0	103.8	819.2
3/11/2018 7:00	1.6	195.3	-2.1	91.0	0.1	104.6	819.2
3/11/2018 8:00	1.4	88.9	-1.8	86.9	14.4	104.2	819.4
3/11/2018 9:00	2.2	181.2	-1.4	83.8	73.0	104.1	819.3
3/11/2018 10:00	3.3	203.1	0.1	61.5	116.9	104.2	819.2
3/11/2018 11:00	3.4	207.1	1.1	54.8	157.5	99.6	819.3

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
3/11/2018 12:00	5.3	187.4	1.5	58.6	247.9	102.1	819.2
3/11/2018 13:00	7.6	172.5	2.1	58.6	292.9	98.8	819.0
3/11/2018 14:00	4.3	210.2	2.2	61.2	328.6	97.0	819.2
3/11/2018 15:00	4.3	215.4	1.7	64.7	199.9	97.5	819.2
3/11/2018 16:00	2.6	189.4	1.4	66.4	136.2	97.7	819.3
3/11/2018 17:00	2.8	146.1	1.1	73.1	95.7	97.1	819.4
3/11/2018 18:00	4.0	167.5	0.9	75.5	53.7	97.9	819.3
3/11/2018 19:00	2.8	171.4	0.6	80.4	6.5	97.4	819.5
3/11/2018 20:00	1.8	200.0	0.5	84.8	0.0	97.4	819.6
3/11/2018 21:00	1.8	180.4	0.2	90.1	0.0	97.2	819.9
3/11/2018 22:00	1.7	136.5	0.2	92.5	0.0	97.8	820.0
3/11/2018 23:00	1.9	224.9	-0.1	95.4	0.0	97.8	820.2
3/12/2018 0:00	2.2	215.7	0.3	94.7	0.0	98.3	820.4
3/12/2018 1:00	3.3	202.6	0.5	94.7	0.0	98.2	820.5
3/12/2018 2:00	3.5	202.4	0.7	92.7	0.0	98.5	820.6
3/12/2018 3:00	2.4	185.2	0.6	94.4	0.0	98.5	820.5
3/12/2018 4:00	1.1	178.3	1.4	87.2	0.0	98.5	820.6
3/12/2018 5:00	2.1	154.0	2.0	81.1	0.0	98.3	820.6
3/12/2018 6:00	2.1	156.0	2.7	72.6	0.0	98.2	820.5
3/12/2018 7:00	3.0	160.2	2.9	68.6	0.1	97.8	820.5
3/12/2018 8:00	3.4	171.1	2.9	67.1	11.6	97.5	820.6
3/12/2018 9:00	3.3	183.9	3.3	64.0	77.5	96.9	820.5
3/12/2018 10:00	1.7	166.8	3.7	61.2	134.6	96.9	820.3
3/12/2018 11:00	2.2	170.4	4.4	57.6	256.1	96.4	820.9
3/12/2018 12:00	1.4	199.5	5.6	54.5	505.6	94.9	821.4
3/12/2018 13:00	1.5	31.8	5.7	53.7	560.5	93.7	821.3
3/12/2018 14:00	1.2	50.8	5.0	55.3	373.3	93.8	820.5
3/12/2018 15:00	1.6	40.1	5.0	55.1	353.0	94.1	820.2
3/12/2018 16:00	2.7	12.1	5.0	53.2	355.1	93.4	820.4
3/12/2018 17:00	2.0	332.4	5.1	54.0	237.2	93.9	820.1
3/12/2018 18:00	1.9	35.0	4.0	56.4	69.8	93.8	820.1
3/12/2018 19:00	2.8	40.0	3.6	56.3	12.4	93.7	820.1
3/12/2018 20:00	4.1	32.3	3.5	53.2	0.0	93.5	819.9
3/12/2018 21:00	4.4	30.2	3.2	52.9	0.0	93.4	820.0
3/12/2018 22:00	5.9	33.2	3.2	51.2	0.0	93.2	820.0
3/12/2018 23:00	5.6	28.6	3.5	49.8	0.0	93.7	820.0
3/13/2018 0:00	4.4	22.0	4.0	47.0	0.0	94.1	820.1
3/13/2018 1:00	2.1	349.3	4.2	46.2	0.0	93.0	820.0
3/13/2018 2:00	4.4	35.1	3.6	47.2	0.0	93.2	819.8
3/13/2018 3:00	3.7	17.1	3.7	45.4	0.0	93.3	820.1
3/13/2018 4:00	1.8	201.2	4.0	45.4	0.0	93.0	820.1
3/13/2018 5:00	2.2	329.7	3.9	43.7	0.0	92.8	820.0
3/13/2018 6:00	3.8	16.9	3.3	44.1	0.0	92.6	820.0
3/13/2018 7:00	4.6	22.3	2.9	45.1	0.3	92.4	819.9
3/13/2018 8:00	8.3	14.9	3.3	41.8	16.8	90.7	819.9
3/13/2018 9:00	8.3	21.8	3.2	41.3	81.0	91.3	820.1
3/13/2018 10:00	8.3	28.5	3.4	39.8	226.1	91.7	820.2
3/13/2018 11:00	8.9	27.2	4.6	35.1	475.4	91.8	821.4
3/13/2018 12:00	5.3	58.1	4.8	38.0	546.0	92.3	820.9
3/13/2018 13:00	2.5	65.0	6.4	33.6	612.4	92.0	821.4
3/13/2018 14:00	2.9	106.0	6.6	33.6	597.2	91.3	820.6
3/13/2018 15:00	1.6	246.9	7.3	34.4	514.2	91.3	820.3
3/13/2018 16:00	1.3	160.0	6.9	36.3	348.8	91.5	819.7
3/13/2018 17:00	1.7	87.9	6.3	35.9	191.5	91.6	819.7

## Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
3/13/2018 18:00	1.5	117.5	5.7	35.6	58.9	91.6	819.9
3/13/2018 19:00	1.7	223.5	5.3	38.2	10.3	91.4	819.8
3/13/2018 20:00	1.0	71.2	5.0	39.0	0.0	91.4	819.8
3/13/2018 21:00	1.0	46.3	4.8	40.6	0.0	90.9	819.9
3/13/2018 22:00	1.4	55.7	4.6	42.2	0.0	90.7	819.9
3/13/2018 23:00	1.9	38.9	4.6	43.4	0.0	90.8	819.9
3/14/2018 0:00	0.9	138.7	4.2	44.4	0.0	90.2	819.9
3/14/2018 1:00	3.0	186.9	3.8	47.9	0.0	90.1	820.0
3/14/2018 2:00	2.5	214.5	3.7	50.8	0.0	90.7	819.9
3/14/2018 3:00	1.3	184.3	3.0	54.6	0.0	90.7	819.9
3/14/2018 4:00	2.4	215.8	1.8	62.8	0.0	91.0	819.9
3/14/2018 5:00	2.3	208.4	1.2	71.5	0.0	90.8	820.0
3/14/2018 6:00	3.1	204.6	0.7	75.6	0.0	91.0	820.0
3/14/2018 7:00	2.9	200.8	0.2	84.8	0.1	90.8	820.1
3/14/2018 8:00	1.6	217.1	-0.3	92.4	9.3	90.7	820.2
3/14/2018 9:00	1.1	232.7	-0.5	92.9	35.1	90.0	820.5
3/14/2018 10:00	2.3	193.4	-0.4	96.3	64.9	91.3	821.1
3/14/2018 11:00	2.8	30.3	-0.3	95.9	123.8	91.3	821.1
3/14/2018 12:00	1.5	150.0	0.9	90.0	225.8	90.7	821.0
3/14/2018 13:00	1.6	359.8	1.8	84.6	357.1	87.8	821.7
3/14/2018 14:00	2.2	33.3	2.6	79.5	484.4	89.7	820.9
3/14/2018 15:00	2.7	235.6	0.7	94.5	145.4	90.3	820.7
3/14/2018 16:00	2.4	159.0	0.0	93.5	106.0	90.2	821.1
3/14/2018 17:00	2.9	212.8	0.6	89.6	133.7	90.1	821.2
3/14/2018 18:00	3.6	234.4	0.1	94.8	63.0	90.1	821.2
3/14/2018 19:00	4.1	209.1	-0.7	97.7	7.8	90.0	821.3
3/14/2018 20:00	3.3	201.7	-0.7	97.6	0.0	90.4	821.3
3/14/2018 21:00	3.1	204.6	-0.7	95.3	0.0	90.4	821.6
3/14/2018 22:00	2.8	215.5	-0.9	95.8	0.0	90.1	821.5
3/14/2018 23:00	3.1	214.0	-1.2	97.1	0.0	89.5	821.8
3/15/2018 0:00	2.8	200.5	-1.5	97.8	0.0	89.4	822.0
3/15/2018 1:00	3.2	201.6	-1.7	97.7	0.0	90.6	821.9
3/15/2018 2:00	2.5	195.7	-1.9	97.4	0.0	90.8	822.1
3/15/2018 3:00	2.5	208.8	-2.1	96.6	0.0	90.1	822.1
3/15/2018 4:00	2.1	220.9	-2.3	95.9	0.0	90.1	822.1
3/15/2018 5:00	2.3	226.6	-2.3	94.8	0.0	90.3	822.1
3/15/2018 6:00	2.8	217.9	-2.4	93.5	0.0	90.6	822.1
3/15/2018 7:00	2.2	201.7	-2.4	93.2	0.4	90.6	822.2
3/15/2018 8:00	2.9	219.0	-2.7	94.5	17.8	90.9	822.2
3/15/2018 9:00	2.0	223.2	-2.6	93.5	62.3	90.7	822.3
3/15/2018 10:00	1.4	221.2	-2.2	91.5	138.6	90.5	822.3
3/15/2018 11:00	2.0	233.4	-2.0	90.2	206.3	89.6	822.3
3/15/2018 12:00	2.5	217.8	-2.3	92.9	221.3	90.5	822.4
3/15/2018 13:00	2.0	222.2	-2.2	94.4	242.3	89.6	822.6
3/15/2018 14:00	1.3	195.5	-2.1	94.6	214.0	91.0	822.9
3/15/2018 15:00	1.2	86.1	-2.1	92.0	182.5	92.4	823.4
3/15/2018 16:00	1.8	41.8	-2.4	92.7	123.6	92.0	824.0
3/15/2018 17:00	1.9	59.7	-2.4	93.3	93.4	92.8	824.4
3/15/2018 18:00	1.6	36.2	-2.4	94.4	68.6	89.8	824.6
3/15/2018 19:00	2.6	28.6	-2.7	97.0	7.5	94.1	824.8
3/15/2018 20:00	2.2	30.3	-2.9	97.1	0.1	94.1	824.8
3/15/2018 21:00	1.2	45.8	-2.9	96.8	0.0	94.1	824.8
3/15/2018 22:00	1.3	57.9	-3.2	96.5	0.0	94.2	824.8
3/15/2018 23:00	1.5	74.2	-3.0	96.6	0.0	94.0	824.8

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
3/16/2018 0:00	1.2	82.8	-3.4	96.3	0.0	93.8	824.9
3/16/2018 1:00	0.7	69.5	-3.2	96.6	0.0	94.0	824.9
3/16/2018 2:00	1.2	22.8	-3.2	96.8	0.0	93.9	824.9
3/16/2018 3:00	1.4	61.3	-3.3	96.8	0.0	93.8	824.9
3/16/2018 4:00	0.9	18.9	-3.6	96.5	0.0	93.8	824.9
3/16/2018 5:00	1.1	315.7	-3.5	96.6	0.0	93.7	824.9
3/16/2018 6:00	0.6	163.5	-3.1	96.5	0.0	93.8	825.0
3/16/2018 7:00	1.2	206.5	-3.1	96.5	0.5	93.3	825.0
3/16/2018 8:00	0.6	192.2	-3.1	95.8	10.1	93.9	825.0
3/16/2018 9:00	0.8	202.0	-2.7	94.2	66.8	93.1	826.1
3/16/2018 10:00	0.4	73.1	-0.8	91.2	289.7	92.7	826.5
3/16/2018 11:00	0.5	189.0	-0.1	85.7	473.5	92.6	826.6
3/16/2018 12:00	0.7	316.9	-0.2	83.4	567.5	91.5	826.2
3/16/2018 13:00	0.8	156.2	0.4	81.5	618.4	91.2	825.7
3/16/2018 14:00	1.3	215.6	0.9	86.0	620.7	91.0	825.3
3/16/2018 15:00	1.7	211.0	1.1	84.9	550.7	90.5	824.9
3/16/2018 16:00	1.1	175.1	1.6	81.7	459.1	90.7	824.8
3/16/2018 17:00	0.2	274.4	2.4	75.6	323.7	90.4	824.9
3/16/2018 18:00	0.5	189.3	1.8	74.9	169.5	90.8	824.5
3/16/2018 19:00	0.5	102.4	-0.1	81.4	31.1	91.5	824.7
3/16/2018 20:00	0.3	123.2	-0.9	86.0	0.2	91.8	824.7
3/16/2018 21:00	0.9	75.0	-1.3	84.7	0.0	91.3	824.7
3/16/2018 22:00	1.5	26.2	-1.4	84.9	0.0	91.3	824.6
3/16/2018 23:00	1.4	82.2	-1.6	84.0	0.0	91.6	824.7
3/17/2018 0:00	0.8	244.6	-1.6	88.1	0.0	91.1	824.7
3/17/2018 1:00	1.1	230.0	-1.8	90.2	0.0	90.9	824.8
3/17/2018 2:00	1.8	198.3	-2.0	91.8	0.0	90.9	824.8
3/17/2018 3:00	2.0	183.1	-1.9	89.9	0.0	90.7	824.9
3/17/2018 4:00	1.8	189.8	-2.0	89.0	0.0	90.4	824.9
3/17/2018 5:00	1.9	184.5	-2.5	92.9	0.0	90.1	824.9
3/17/2018 6:00	1.2	185.4	-2.3	91.1	0.0	89.1	824.9
3/17/2018 7:00	1.8	201.4	-2.6	92.6	2.3	89.8	825.0
3/17/2018 8:00	2.4	171.9	-2.7	92.4	24.0	88.1	824.9
3/17/2018 9:00	2.4	181.1	-1.8	85.6	135.0	90.6	825.8
3/17/2018 10:00	1.6	191.3	-0.2	77.2	335.6	89.1	826.0
3/17/2018 11:00	0.9	32.5	2.0	61.6	471.6	88.3	826.4
3/17/2018 12:00	1.3	21.9	2.5	59.4	564.9	89.7	826.7
3/17/2018 13:00	0.5	114.3	4.0	53.5	613.1	88.9	825.6
3/17/2018 14:00	0.7	219.8	4.3	58.9	607.8	89.4	825.4
3/17/2018 15:00	0.8	245.8	4.6	56.9	538.9	88.8	825.0
3/17/2018 16:00	1.1	237.1	4.8	55.2	456.9	89.2	824.7
3/17/2018 17:00	1.2	250.7	4.6	54.9	321.2	89.2	824.5
3/17/2018 18:00	0.2	260.7	5.3	51.6	170.3	88.8	824.3
3/17/2018 19:00	0.5	234.2	2.9	60.5	29.0	90.2	824.5
3/17/2018 20:00	0.6	103.9	1.5	64.4	0.2	90.2	824.5
3/17/2018 21:00	0.4	20.3	1.8	63.4	0.0	90.3	824.5
3/17/2018 22:00	0.5	40.2	1.3	64.5	0.0	90.5	824.5
3/17/2018 23:00	0.6	176.0	1.6	63.6	0.0	89.9	824.6
3/18/2018 0:00	0.5	225.1	1.5	65.6	0.0	90.1	824.6
3/18/2018 1:00	0.7	170.9	1.3	64.9	0.0	90.2	824.6
3/18/2018 2:00	1.7	187.2	1.5	64.0	0.0	90.2	824.6
3/18/2018 3:00	1.7	195.5	1.5	63.4	0.0	90.5	824.6
3/18/2018 4:00	1.1	170.0	1.6	62.8	0.0	90.2	824.6
3/18/2018 5:00	2.2	201.5	1.7	61.7	0.0	90.1	824.5

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
3/18/2018 6:00	1.9	207.5	2.1	60.1	0.0	90.1	824.5
3/18/2018 7:00	2.4	204.1	1.9	61.4	0.8	89.9	824.5
3/18/2018 8:00	2.8	200.6	1.9	60.8	21.3	89.9	824.5
3/18/2018 9:00	3.3	202.2	2.2	62.0	82.9	90.0	824.5
3/18/2018 10:00	3.4	203.7	2.1	65.2	144.1	89.8	824.4
3/18/2018 11:00	3.2	215.7	2.2	66.3	226.6	89.3	824.5
3/18/2018 12:00	3.4	207.5	2.5	67.2	302.1	89.6	824.5
3/18/2018 13:00	6.0	219.7	2.2	68.6	320.3	89.2	824.5
3/18/2018 14:00	5.9	219.4	2.0	70.2	261.3	89.4	824.3
3/18/2018 15:00	6.1	218.1	1.9	68.5	201.2	89.2	824.3
3/18/2018 16:00	6.0	222.3	2.0	67.8	231.8	89.2	824.1
3/18/2018 17:00	6.4	228.6	1.5	72.0	134.5	87.5	824.4
3/18/2018 18:00	6.1	229.4	1.1	74.0	84.9	89.4	824.6
3/18/2018 19:00	6.6	232.6	0.6	76.9	15.2	88.7	824.7
3/18/2018 20:00	5.0	215.1	0.1	81.2	0.2	88.0	824.6
3/18/2018 21:00	4.8	205.4	-0.5	88.8	0.0	86.9	824.5
3/18/2018 22:00	4.0	202.5	-1.0	95.7	0.0	86.9	824.6
3/18/2018 23:00	4.1	205.4	-1.2	97.5	0.0	86.9	824.6
3/19/2018 0:00	4.9	221.3	-1.2	97.8	0.0	87.8	824.3
3/19/2018 1:00	4.5	216.4	-1.3	97.9	0.0	88.3	824.7
3/19/2018 2:00	4.4	209.3	-1.5	97.9	0.0	88.2	824.8
3/19/2018 3:00	4.6	219.0	-1.6	97.8	0.0	-	824.6
3/19/2018 4:00	4.2	219.7	-1.8	97.7	0.0	89.3	824.6
3/19/2018 5:00	4.3	223.3	-1.9	97.5	0.0	90.5	824.8
3/19/2018 6:00	4.1	222.6	-2.1	97.3	0.0	92.4	825.1
3/19/2018 7:00	4.4	224.2	-2.2	97.1	1.3	92.7	825.5
3/19/2018 8:00	4.2	227.5	-2.3	96.9	19.6	92.5	825.7
3/19/2018 9:00	3.7	219.5	-2.3	96.5	84.8	91.9	825.9
3/19/2018 10:00	3.5	226.3	-2.2	96.3	139.9	92.0	825.8
3/19/2018 11:00	3.5	227.4	-2.1	96.0	195.2	91.9	825.6
3/19/2018 12:00	5.2	228.6	-2.0	95.9	220.9	91.7	825.9
3/19/2018 13:00	5.5	227.5	-2.0	96.0	191.3	91.5	826.2
3/19/2018 14:00	5.9	228.1	-1.9	95.8	231.6	92.0	826.2
3/19/2018 15:00	5.5	232.7	-1.9	95.8	236.0	94.8	827.9
3/19/2018 16:00	5.5	223.9	-1.9	95.9	208.7	92.9	828.6
3/19/2018 17:00	5.2	223.9	-2.1	96.2	150.4	95.0	829.6
3/19/2018 18:00	4.7	220.3	-2.3	96.5	79.4	95.4	830.1
3/19/2018 19:00	3.6	225.3	-2.6	96.8	14.9	97.3	831.1
3/19/2018 20:00	3.2	226.9	-2.7	96.8	0.2	97.8	832.0
3/19/2018 21:00	4.0	217.5	-2.7	96.8	0.0	95.8	832.2
3/19/2018 22:00	4.1	215.5	-2.8	96.8	0.0	95.9	832.8
3/19/2018 23:00	3.8	217.2	-2.9	96.7	0.0	97.3	833.7
3/20/2018 0:00	3.6	218.4	-2.9	96.7	0.0	96.4	834.1
3/20/2018 1:00	2.8	228.2	-3.0	96.7	0.0	93.1	835.1
3/20/2018 2:00	2.5	225.3	-3.1	96.6	0.0	-	836.5
3/20/2018 3:00	2.4	220.9	-3.1	96.6	0.0	99.2	837.2
3/20/2018 4:00	2.4	216.7	-3.1	96.6	0.0	99.7	837.8
3/20/2018 5:00	2.1	220.5	-3.2	96.6	0.0	100.8	838.3
3/20/2018 6:00	1.8	218.0	-3.1	96.6	0.0	100.7	838.2
3/20/2018 7:00	1.7	212.6	-3.1	96.6	1.4	100.6	838.9
3/20/2018 8:00	1.9	209.4	-3.0	96.5	30.0	101.2	839.7
3/20/2018 9:00	1.7	208.3	-2.7	96.4	82.1	99.9	840.2
3/20/2018 10:00	1.5	220.7	-2.4	96.2	145.7	100.8	840.3
3/20/2018 11:00	1.6	222.8	-2.3	96.0	198.0	100.4	840.7

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
3/20/2018 12:00	1.5	235.1	-2.2	95.8	241.4	100.8	842.2
3/20/2018 13:00	1.6	224.6	-2.2	95.8	248.7	101.0	842.6
3/20/2018 14:00	1.7	234.4	-2.5	95.8	247.7	100.5	843.1
3/20/2018 15:00	1.7	250.4	-2.8	95.6	258.5	100.8	845.9
3/20/2018 16:00	1.9	223.9	-4.2	95.0	223.9	101.6	846.3
3/20/2018 17:00	2.0	221.3	-5.1	94.4	182.6	101.9	846.2
3/20/2018 18:00	1.7	222.0	-5.4	93.0	283.4	101.5	846.4
3/20/2018 19:00	1.3	221.8	-6.1	93.6	40.8	101.9	846.6
3/20/2018 20:00	1.1	199.4	-6.3	94.4	0.3	101.3	846.6
3/20/2018 21:00	1.2	216.5	-6.5	94.1	0.0	101.2	846.7
3/20/2018 22:00	0.8	180.9	-6.8	94.0	0.0	101.0	846.7
3/20/2018 23:00	0.7	187.2	-7.1	93.8	0.0	101.1	846.8
3/21/2018 0:00	-	-	-7.1	93.6	0.0	101.0	846.8
3/21/2018 1:00	-	-	-7.2	93.0	0.0	100.8	846.8
3/21/2018 2:00	-	-	-7.4	92.0	0.0	100.4	846.8
3/21/2018 3:00	-	-	-8.2	91.0	0.0	100.5	846.9
3/21/2018 4:00	-	-	-8.5	91.1	0.0	100.4	847.0
3/21/2018 5:00	-	-	-8.9	90.8	0.0	99.3	847.1
3/21/2018 6:00	0.3	88.2	-8.6	90.6	0.0	100.2	847.1
3/21/2018 7:00	2.5	83.9	-8.5	87.4	2.4	100.4	846.9
3/21/2018 8:00	9.8	48.3	-7.8	79.4	51.4	100.5	846.5
3/21/2018 9:00	7.1	62.4	-7.3	75.4	151.4	101.3	847.4
3/21/2018 10:00	9.9	67.8	-6.5	68.0	310.4	99.5	847.4
3/21/2018 11:00	7.0	82.3	-5.8	63.7	407.3	99.9	847.7
3/21/2018 12:00	7.6	65.5	-4.8	57.3	487.0	99.4	847.3
3/21/2018 13:00	11.6	54.9	-4.5	58.9	638.3	99.7	847.9
3/21/2018 14:00	12.5	63.2	-4.6	66.1	424.8	98.5	847.3
3/21/2018 15:00	11.2	71.4	-4.3	72.1	365.0	98.3	846.9
3/21/2018 16:00	14.0	68.6	-3.8	72.2	420.5	98.4	846.2
3/21/2018 17:00	13.1	63.5	-3.0	66.9	263.5	97.9	846.3
3/21/2018 18:00	14.4	58.9	-2.9	67.8	73.6	95.8	846.8
3/21/2018 19:00	14.5	61.2	-2.7	66.6	22.2	95.2	846.8
3/21/2018 20:00	17.0	67.8	-2.2	61.8	0.6	94.9	845.3
3/21/2018 21:00	18.3	67.4	-1.8	58.8	0.0	93.5	845.8
3/21/2018 22:00	19.0	66.4	-2.3	66.9	0.0	94.2	845.7
3/21/2018 23:00	19.5	68.6	-2.4	75.3	0.0	93.3	847.4
3/22/2018 0:00	20.0	70.7	-2.0	72.8	0.0	93.7	845.5
3/22/2018 1:00	18.4	66.9	-2.2	80.1	0.0	93.7	846.4
3/22/2018 2:00	19.9	67.4	-2.0	78.9	0.0	93.1	845.9
3/22/2018 3:00	22.5	67.6	-1.9	76.7	0.0	92.8	845.9
3/22/2018 4:00	23.2	69.9	-1.9	76.3	0.0	93.4	845.6
3/22/2018 5:00	23.9	68.4	-2.3	77.5	0.0	90.6	845.1
3/22/2018 6:00	24.9	67.0	-2.8	81.6	0.0	90.6	847.0
3/22/2018 7:00	24.3	66.4	-2.9	78.9	1.7	89.0	846.4
3/22/2018 8:00	22.5	67.3	-2.9	74.6	22.7	89.9	846.8
3/22/2018 9:00	24.8	64.0	-2.8	70.7	71.3	90.1	842.7
3/22/2018 10:00	24.5	64.8	-3.2	75.0	132.7	90.5	846.6
3/22/2018 11:00	25.8	63.6	-3.7	82.4	158.3	89.6	845.0
3/22/2018 12:00	23.7	64.3	-3.5	83.6	179.4	89.8	845.8
3/22/2018 13:00	21.8	63.4	-3.5	86.7	172.3	89.4	845.9
3/22/2018 14:00	18.9	62.3	-3.6	90.6	181.4	-	846.3
3/22/2018 15:00	19.5	61.7	-3.7	91.7	141.9	88.7	845.8
3/22/2018 16:00	19.2	65.5	-3.3	88.3	150.5	87.9	846.4
3/22/2018 17:00	17.3	67.8	-2.9	83.4	100.5	89.8	846.7



Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
3/22/2018 18:00	15.8	58.7	-2.7	81.1	73.7	89.7	846.1
3/22/2018 19:00	15.4	61.1	-2.7	77.1	15.3	87.8	846.6
3/22/2018 20:00	14.6	61.0	-2.6	73.8	0.5	89.0	845.8
3/22/2018 21:00	12.5	63.7	-2.9	71.5	0.0	88.5	846.5
3/22/2018 22:00	9.9	84.1	-3.0	69.6	0.0	89.2	847.0
3/22/2018 23:00	10.6	71.3	-3.6	74.2	0.0	-	847.0
3/23/2018 0:00	9.2	39.5	-4.9	84.4	0.0	90.3	846.3
3/23/2018 1:00	9.8	36.3	-5.7	84.5	0.0	88.5	847.1
3/23/2018 2:00	9.3	36.0	-6.5	92.1	0.0	89.8	847.0
3/23/2018 3:00	10.5	34.6	-7.1	93.7	0.0	89.0	846.6
3/23/2018 4:00	9.1	39.0	-7.4	93.5	0.0	90.6	846.8
3/23/2018 5:00	8.5	37.7	-7.8	93.2	0.0	91.1	847.4
3/23/2018 6:00	6.5	40.5	-8.1	93.0	0.0	90.7	847.1
3/23/2018 7:00	5.1	34.3	-8.3	92.9	3.0	90.5	847.3
3/23/2018 8:00	3.9	42.2	-8.4	92.6	35.7	91.3	847.5
3/23/2018 9:00	2.4	24.9	-8.4	92.3	100.7	92.1	847.7
3/23/2018 10:00	3.7	34.1	-8.3	91.9	155.5	-	847.8
3/23/2018 11:00	4.3	35.1	-8.2	91.3	216.7	92.0	848.1
3/23/2018 12:00	4.5	33.0	-8.2	91.0	239.1	92.3	848.6
3/23/2018 13:00	4.1	38.7	-8.2	90.9	240.7	92.4	849.0
3/23/2018 14:00	3.7	33.3	-7.9	90.6	289.8	92.2	849.4
3/23/2018 15:00	3.0	32.5	-7.8	91.1	243.4	92.5	849.7
3/23/2018 16:00	2.5	27.3	-7.9	91.4	192.6	92.7	849.9
3/23/2018 17:00	2.3	28.0	-7.8	91.9	138.4	90.3	850.1
3/23/2018 18:00	4.9	33.6	-8.3	92.0	89.3	91.5	850.2
3/23/2018 19:00	5.8	34.7	-8.7	92.3	25.3	92.2	850.3
3/23/2018 20:00	2.7	31.8	-8.8	92.4	0.6	92.1	850.4
3/23/2018 21:00	3.3	26.5	-8.8	92.4	0.0	92.0	850.8
3/23/2018 22:00	4.3	42.3	-9.0	92.2	0.0	92.0	850.6
3/23/2018 23:00	1.4	18.6	-9.1	92.1	0.0	91.6	850.7
3/24/2018 0:00	1.4	63.0	-9.3	92.0	0.0	91.7	850.7
3/24/2018 1:00	3.1	56.0	-9.5	91.8	0.0	91.7	850.7
3/24/2018 2:00	3.3	55.4	-9.6	91.8	0.0	91.7	850.7
3/24/2018 3:00	1.0	314.5	-9.4	91.9	0.0	90.4	850.8
3/24/2018 4:00	1.0	208.5	-9.3	91.9	0.0	89.5	850.8
3/24/2018 5:00	0.4	181.0	-9.4	91.9	0.0	90.4	850.8
3/24/2018 6:00	0.4	132.5	-9.7	91.6	0.0	91.4	850.9
3/24/2018 7:00	1.1	225.3	-9.9	91.5	4.0	91.3	851.0
3/24/2018 8:00	0.9	358.3	-10.0	91.1	27.0	90.9	851.0
3/24/2018 9:00	1.2	204.0	-9.3	89.9	185.9	91.1	852.1
3/24/2018 10:00	1.1	218.0	-8.2	88.6	394.6	90.4	852.3
3/24/2018 11:00	0.1	200.8	-7.1	88.3	539.0	90.7	852.1
3/24/2018 12:00	0.2	107.8	-6.7	88.1	627.6	90.6	852.2
3/24/2018 13:00	0.3	189.6	-6.1	88.4	615.0	90.8	850.8
3/24/2018 14:00	0.2	151.3	-6.7	90.0	394.9	90.7	850.7
3/24/2018 15:00	1.2	204.8	-6.2	89.9	386.8	90.7	850.5
3/24/2018 16:00	4.1	225.7	-6.2	87.0	441.8	90.7	850.6
3/24/2018 17:00	4.3	236.6	-5.8	84.8	419.2	91.1	850.4
3/24/2018 18:00	2.6	251.1	-6.0	85.2	253.4	91.0	850.4
3/24/2018 19:00	2.2	225.5	-6.7	87.0	89.3	91.1	850.6
3/24/2018 20:00	2.9	180.0	-7.3	81.8	1.5	91.4	850.7
3/24/2018 21:00	3.6	191.7	-7.3	82.7	0.0	91.4	850.6
3/24/2018 22:00	3.8	212.1	-7.2	89.0	0.0	91.4	850.7
3/24/2018 23:00	3.1	218.2	-7.3	94.0	0.0	91.5	850.7

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
3/25/2018 0:00	3.5	214.0	-7.2	94.1	0.0	91.3	850.6
3/25/2018 1:00	2.6	223.8	-7.1	94.1	0.0	91.2	850.9
3/25/2018 2:00	1.7	168.3	-7.2	93.7	0.0	91.7	851.0
3/25/2018 3:00	1.0	99.4	-7.4	93.5	0.0	91.9	851.1
3/25/2018 4:00	1.0	172.5	-7.3	93.6	0.0	91.2	851.4
3/25/2018 5:00	1.3	41.4	-7.5	93.5	0.0	92.9	851.8
3/25/2018 6:00	1.7	25.4	-7.6	93.4	0.0	91.2	852.6
3/25/2018 7:00	1.0	7.8	-7.5	93.4	2.5	93.2	853.8
3/25/2018 8:00	0.7	57.6	-7.2	93.3	16.4	96.9	854.6
3/25/2018 9:00	0.8	33.0	-7.0	92.9	33.4	99.0	855.6
3/25/2018 10:00	0.9	84.5	-6.4	92.5	54.5	101.1	856.7
3/25/2018 11:00	1.1	258.8	-6.3	91.9	78.4	101.0	857.5
3/25/2018 12:00	2.5	355.0	-6.9	91.3	73.4	103.4	858.7
3/25/2018 13:00	3.6	38.6	-7.4	90.6	248.5	104.8	859.7
3/25/2018 14:00	2.0	26.4	-6.6	89.9	397.3	107.0	860.6
3/25/2018 15:00	1.0	17.3	-5.6	90.5	252.3	108.5	861.4
3/25/2018 16:00	1.3	16.3	-5.9	91.1	148.8	110.0	862.2
3/25/2018 17:00	0.5	336.8	-5.7	91.8	98.1	111.9	862.6
3/25/2018 18:00	0.6	234.2	-6.1	92.2	71.0	111.9	862.8
3/25/2018 19:00	1.6	210.4	-7.0	93.5	16.6	111.5	862.9
3/25/2018 20:00	0.7	243.7	-7.2	93.7	0.5	112.5	863.0
3/25/2018 21:00	0.6	0.3	-7.2	93.5	0.0	112.4	863.2
3/25/2018 22:00	1.3	201.4	-7.1	93.6	0.0	113.1	863.6
3/25/2018 23:00	1.2	179.7	-7.1	93.7	0.0	114.0	863.6
3/26/2018 0:00	1.4	259.0	-7.2	93.7	0.0	114.2	863.7
3/26/2018 1:00	0.7	7.8	-7.2	93.5	0.0	114.9	864.0
3/26/2018 2:00	0.1	260.0	-7.1	93.5	0.0	113.9	864.2
3/26/2018 3:00	0.6	5.2	-7.3	93.5	0.0	113.8	864.3
3/26/2018 4:00	1.3	22.5	-7.3	93.4	0.0	116.1	864.6
3/26/2018 5:00	2.7	35.2	-7.7	93.1	0.0	114.9	864.6
3/26/2018 6:00	1.3	324.4	-8.0	92.9	0.0	113.6	864.7
3/26/2018 7:00	0.8	261.6	-7.8	93.0	3.7	114.7	864.7
3/26/2018 8:00	1.7	26.8	-8.0	92.3	19.5	114.8	864.7
3/26/2018 9:00	1.9	39.1	-7.9	91.8	41.3	114.1	864.8
3/26/2018 10:00	2.3	33.7	-7.7	91.3	64.2	113.7	865.0
3/26/2018 11:00	2.5	35.5	-7.7	91.3	81.1	114.5	866.0
3/26/2018 12:00	1.8	20.1	-7.0	90.8	121.8	117.1	867.2
3/26/2018 13:00	1.6	9.3	-6.5	90.7	166.3	116.2	868.1
3/26/2018 14:00	1.0	3.1	-5.7	90.9	144.9	116.5	868.9
3/26/2018 15:00	1.3	144.8	-6.8	92.1	70.4	118.5	870.1
3/26/2018 16:00	0.8	265.8	-6.3	92.0	72.2	119.5	871.1
3/26/2018 17:00	1.7	194.1	-6.2	92.9	41.5	119.4	872.3
3/26/2018 18:00	3.9	182.6	-5.4	94.3	52.8	122.1	873.5
3/26/2018 19:00	5.7	196.1	-4.7	95.2	36.1	120.3	873.6
3/26/2018 20:00	5.8	204.2	-3.6	96.1	1.1	117.1	873.7
3/26/2018 21:00	5.6	206.0	-3.0	96.5	0.0	116.3	874.1
3/26/2018 22:00	5.1	207.8	-2.9	96.5	0.0	115.7	874.4
3/26/2018 23:00	5.3	211.3	-2.8	96.6	0.0	117.1	874.6
3/27/2018 0:00	5.2	212.2	-2.7	96.6	0.0	115.3	875.0
3/27/2018 1:00	4.4	217.1	-2.5	96.8	0.0	115.1	875.5
3/27/2018 2:00	4.8	223.7	-2.6	96.8	0.0	114.4	875.7
3/27/2018 3:00	5.4	218.8	-2.7	96.7	0.0	113.5	875.7
3/27/2018 4:00	4.7	224.5	-3.1	96.5	0.0	114.2	875.9
3/27/2018 5:00	3.6	223.9	-3.3	96.3	0.0	113.9	875.8

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
3/27/2018 6:00	6.9	226.4	-3.5	96.2	0.0	113.5	875.7
3/27/2018 7:00	5.3	220.5	-4.5	95.6	9.6	114.2	876.2
3/27/2018 8:00	4.7	204.6	-4.6	95.5	50.9	113.9	876.1
3/27/2018 9:00	4.5	205.2	-4.0	95.6	135.7	113.5	875.8
3/27/2018 10:00	4.4	219.7	-3.4	95.7	211.3	113.1	876.0
3/27/2018 11:00	4.1	219.6	-2.9	95.8	250.5	113.1	876.3
3/27/2018 12:00	4.4	217.8	-2.5	95.7	347.0	112.9	876.0
3/27/2018 13:00	5.7	218.3	-2.4	95.6	360.7	112.7	876.3
3/27/2018 14:00	6.2	213.3	-1.7	95.8	461.3	112.3	876.4
3/27/2018 15:00	6.4	219.8	-2.1	96.2	265.6	112.6	876.3
3/27/2018 16:00	7.2	230.9	-2.3	96.0	290.5	112.4	876.8
3/27/2018 17:00	7.5	222.8	-2.8	96.0	214.6	112.5	876.7
3/27/2018 18:00	6.1	232.1	-3.4	96.0	93.7	111.9	876.6
3/27/2018 19:00	4.9	218.1	-3.7	96.0	25.7	112.0	876.8
3/27/2018 20:00	4.3	210.3	-3.9	96.0	1.5	111.5	876.9
3/27/2018 21:00	4.3	225.5	-3.8	96.1	0.0	111.6	876.9
3/27/2018 22:00	4.6	214.1	-3.8	96.1	0.0	111.6	877.1
3/27/2018 23:00	4.2	220.9	-3.8	96.1	0.0	111.6	877.1
3/28/2018 0:00	5.7	213.9	-3.8	96.1	0.0	111.4	877.4
3/28/2018 1:00	4.7	206.5	-3.8	96.0	0.0	111.6	877.5
3/28/2018 2:00	4.4	210.0	-3.9	96.0	0.0	111.0	877.6
3/28/2018 3:00	5.1	204.6	-3.9	96.0	0.0	110.7	877.5
3/28/2018 4:00	4.5	207.3	-3.9	96.0	0.0	111.2	877.7
3/28/2018 5:00	4.6	211.6	-3.9	96.0	0.0	109.8	877.8
3/28/2018 6:00	3.5	214.3	-3.9	96.0	0.0	111.5	877.9
3/28/2018 7:00	2.7	214.5	-4.0	95.9	7.4	110.7	877.9
3/28/2018 8:00	2.1	212.9	-3.8	95.9	52.6	109.3	878.0
3/28/2018 9:00	2.2	217.0	-3.4	95.8	143.6	112.8	878.2
3/28/2018 10:00	2.2	200.2	-3.2	95.7	212.4	112.2	878.3
3/28/2018 11:00	2.2	207.0	-2.3	95.6	408.9	110.3	878.7
3/28/2018 12:00	4.5	222.7	-1.5	95.7	569.7	111.7	878.3
3/28/2018 13:00	4.6	229.9	-1.9	95.6	547.2	111.2	878.7
3/28/2018 14:00	5.4	236.0	-2.8	95.5	408.2	111.2	878.4
3/28/2018 15:00	4.8	226.1	-2.3	95.9	324.8	111.2	878.4
3/28/2018 16:00	5.3	228.6	-2.9	96.0	206.1	111.1	878.5
3/28/2018 17:00	4.1	211.8	-2.4	95.9	262.6	110.6	878.4
3/28/2018 18:00	3.4	218.6	-3.0	96.1	83.3	110.8	878.7
3/28/2018 19:00	3.3	210.8	-3.5	96.1	29.4	110.9	878.7
3/28/2018 20:00	3.1	202.5	-3.9	96.0	2.1	110.9	878.8
3/28/2018 21:00	2.9	216.2	-4.0	95.9	0.0	110.7	878.8
3/28/2018 22:00	2.5	214.0	-4.0	95.9	0.0	110.4	878.9
3/28/2018 23:00	2.4	212.3	-4.2	95.8	0.0	110.4	878.8
3/29/2018 0:00	2.0	212.0	-4.4	95.6	0.0	110.3	878.9
3/29/2018 1:00	1.8	210.7	-4.6	95.5	0.0	110.2	878.9
3/29/2018 2:00	-	-	-4.6	95.5	0.0	110.4	878.9
3/29/2018 3:00	-	-	-4.7	95.4	0.0	110.1	878.9
3/29/2018 4:00	-	-	-4.8	95.4	0.0	110.3	878.8
3/29/2018 5:00	-	-	-5.2	95.1	0.0	109.6	878.9
3/29/2018 6:00	1.8	102.3	-6.3	94.4	0.0	110.2	879.0
3/29/2018 7:00	0.6	138.9	-6.7	94.0	9.4	109.8	879.0
3/29/2018 8:00	0.7	221.0	-7.1	93.6	35.4	109.8	879.1
3/29/2018 9:00	0.9	175.4	-4.7	93.1	323.3	107.9	880.3
3/29/2018 10:00	1.2	150.8	-3.8	93.0	464.5	108.5	879.9
3/29/2018 11:00	1.3	158.2	-4.4	93.2	389.1	109.2	879.2

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
3/29/2018 12:00	2.4	127.5	-4.6	92.4	418.8	110.0	878.9
3/29/2018 13:00	4.3	336.6	-4.0	88.4	502.3	110.0	879.1
3/29/2018 14:00	10.9	78.4	-3.4	68.9	443.3	108.6	878.7
3/29/2018 15:00	12.8	69.2	-2.8	59.4	431.9	108.5	879.0
3/29/2018 16:00	13.1	60.0	-2.5	55.8	270.0	108.0	877.9
3/29/2018 17:00	11.8	58.8	-2.3	52.9	198.0	108.1	879.4
3/29/2018 18:00	13.3	56.1	-2.2	50.3	135.4	108.1	879.0
3/29/2018 19:00	12.6	59.9	-2.3	47.7	42.7	108.3	878.8
3/29/2018 20:00	11.7	56.9	-2.1	44.6	3.8	108.0	879.0
3/29/2018 21:00	9.6	44.7	-2.5	46.9	0.0	107.8	879.0
3/29/2018 22:00	11.1	38.3	-2.6	48.7	0.0	107.8	879.3
3/29/2018 23:00	13.2	41.5	-2.9	52.6	0.0	107.7	879.1
3/30/2018 0:00	10.4	34.1	-3.3	53.4	0.0	107.6	879.0
3/30/2018 1:00	8.1	20.4	-3.6	53.5	0.0	108.0	879.0
3/30/2018 2:00	8.3	32.7	-4.0	54.5	0.0	107.7	878.8
3/30/2018 3:00	8.4	41.3	-4.3	54.6	0.0	107.5	879.4
3/30/2018 4:00	9.0	49.9	-4.9	55.1	0.0	107.8	879.1
3/30/2018 5:00	10.2	54.3	-5.3	53.8	0.0	107.6	879.2
3/30/2018 6:00	10.3	56.0	-5.3	49.5	0.1	107.8	878.9
3/30/2018 7:00	8.1	54.9	-6.4	52.0	8.7	107.7	879.1
3/30/2018 8:00	7.2	54.1	-6.3	51.6	31.2	107.5	879.4
3/30/2018 9:00	8.0	42.3	-6.1	49.3	307.5	107.5	879.8
3/30/2018 10:00	9.4	40.2	-6.0	48.4	464.1	107.6	880.1
3/30/2018 11:00	8.5	39.4	-5.7	48.4	593.0	107.5	880.9
3/30/2018 12:00	7.1	43.7	-5.0	45.8	681.2	107.6	880.5
3/30/2018 13:00	6.6	47.6	-4.5	43.7	724.1	107.4	880.4
3/30/2018 14:00	6.0	50.7	-4.1	41.5	725.4	107.1	879.7
3/30/2018 15:00	4.5	39.3	-3.5	37.9	669.2	107.2	879.9
3/30/2018 16:00	1.3	36.5	-2.2	35.6	548.4	107.0	879.5
3/30/2018 17:00	0.4	61.0	-1.7	32.6	408.6	106.4	878.9
3/30/2018 18:00	1.6	19.5	-3.0	38.2	242.4	106.6	879.0
3/30/2018 19:00	2.5	44.2	-4.3	42.6	89.1	107.0	879.1
3/30/2018 20:00	1.9	56.8	-5.2	46.3	3.9	107.1	879.2
3/30/2018 21:00	1.5	64.0	-5.6	48.9	0.0	107.4	879.1
3/30/2018 22:00	0.2	193.9	-5.1	47.1	0.0	107.5	879.2
3/30/2018 23:00	0.6	37.6	-5.0	47.5	0.0	107.1	879.1
3/31/2018 0:00	0.9	44.4	-5.1	47.6	0.0	107.4	879.1
3/31/2018 1:00	1.2	53.9	-5.0	49.5	0.0	107.2	879.1
3/31/2018 2:00	1.4	33.0	-5.1	50.8	0.0	106.9	879.1
3/31/2018 3:00	0.9	23.5	-5.1	51.7	0.0	105.7	879.2
3/31/2018 4:00	2.2	4.0	-5.3	52.3	0.0	105.9	879.1
3/31/2018 5:00	1.3	33.0	-5.2	53.5	0.0	106.5	879.1
3/31/2018 6:00	2.0	24.7	-5.6	56.7	0.0	106.0	879.2
3/31/2018 7:00	2.3	28.9	-5.9	61.2	12.4	106.4	879.2
3/31/2018 8:00	2.6	30.3	-5.9	63.7	54.6	106.6	879.2
3/31/2018 9:00	3.3	41.8	-5.9	66.6	178.0	106.6	879.5
3/31/2018 10:00	4.0	38.3	-5.6	65.4	331.3	106.5	879.8
3/31/2018 11:00	5.4	38.1	-5.1	62.5	471.4	106.5	879.6
3/31/2018 12:00	6.3	55.5	-4.5	60.1	563.4	106.5	879.7
3/31/2018 13:00	6.7	57.4	-3.9	55.6	634.8	105.6	879.7
3/31/2018 14:00	8.6	68.3	-3.9	53.5	650.0	106.0	879.4
3/31/2018 15:00	8.4	70.9	-3.6	51.0	622.1	106.0	879.0
3/31/2018 16:00	8.8	63.4	-4.1	54.4	337.5	105.9	878.8
3/31/2018 17:00	9.2	59.9	-4.5	58.9	219.3	106.1	879.0

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
3/31/2018 18:00	7.4	63.4	-4.3	52.2	224.8	106.0	879.1
3/31/2018 19:00	9.1	63.8	-4.8	51.7	83.3	105.9	879.4
3/31/2018 20:00	8.9	52.0	-5.2	56.3	4.1	106.1	878.8
3/31/2018 21:00	9.3	50.9	-5.2	53.4	0.0	105.7	878.8
3/31/2018 22:00	10.0	45.5	-5.2	50.7	0.0	105.7	879.0
3/31/2018 23:00	12.4	54.6	-5.1	47.3	0.0	105.9	879.0
4/1/2018 0:00	10.4	42.2	-5.6	51.3	0.0	105.8	878.8
4/1/2018 1:00	10.2	32.6	-6.2	54.3	0.0	106.1	879.0
4/1/2018 2:00	10.2	38.7	-6.3	53.2	0.0	105.8	879.2
4/1/2018 3:00	8.7	38.6	-7.0	53.8	0.0	105.8	878.9
4/1/2018 4:00	9.8	38.7	-7.4	50.7	0.0	105.3	879.2
4/1/2018 5:00	9.8	37.1	-7.7	48.5	0.0	105.5	879.0
4/1/2018 6:00	10.2	41.0	-8.2	49.0	0.1	105.0	879.6
4/1/2018 7:00	11.9	53.9	-8.1	45.5	11.0	106.2	879.6
4/1/2018 8:00	11.9	56.8	-7.6	40.4	40.6	105.2	879.1
4/1/2018 9:00	12.7	61.6	-7.0	38.3	319.2	105.5	880.5
4/1/2018 10:00	12.4	36.5	-7.2	41.4	478.6	105.2	880.3
4/1/2018 11:00	9.8	33.6	-6.6	41.2	602.4	105.1	880.3
4/1/2018 12:00	10.1	36.3	-6.0	39.7	697.6	104.8	880.3
4/1/2018 13:00	8.0	48.4	-5.1	35.5	736.2	105.1	880.0
4/1/2018 14:00	5.4	36.3	-4.5	34.4	746.7	105.0	880.4
4/1/2018 15:00	5.3	34.5	-4.2	34.1	684.0	105.3	879.6
4/1/2018 16:00	5.8	33.9	-4.1	33.2	563.0	105.0	879.4
4/1/2018 17:00	5.4	30.5	-4.0	32.5	424.0	104.6	879.2
4/1/2018 18:00	5.5	31.7	-4.3	32.2	255.5	105.2	879.2
4/1/2018 19:00	4.3	3.8	-5.1	34.0	73.8	105.1	879.2
4/1/2018 20:00	2.5	57.9	-6.9	39.1	2.8	105.6	879.3
4/1/2018 21:00	2.6	64.9	-7.0	41.3	0.0	105.2	879.3
4/1/2018 22:00	1.9	69.2	-6.7	38.9	0.0	105.0	879.3
4/1/2018 23:00	1.5	85.7	-6.9	40.0	0.0	105.4	879.4
4/2/2018 0:00	0.3	76.2	-6.6	39.5	0.0	105.4	879.3
4/2/2018 1:00	0.4	60.1	-6.7	39.9	0.0	105.4	879.4
4/2/2018 2:00	1.0	96.5	-6.6	39.7	0.0	105.3	879.4
4/2/2018 3:00	0.6	181.5	-6.7	41.4	0.0	105.4	879.5
4/2/2018 4:00	0.1	178.4	-6.7	41.1	0.0	105.4	879.4
4/2/2018 5:00	0.5	46.0	-6.7	39.8	0.0	105.2	879.4
4/2/2018 6:00	2.5	33.2	-7.1	41.9	0.1	105.0	879.4
4/2/2018 7:00	2.3	32.1	-7.3	42.9	13.7	105.1	879.4
4/2/2018 8:00	2.7	41.4	-7.3	44.9	73.1	105.1	879.4
4/2/2018 9:00	0.1	359.4	-6.6	49.9	172.6	104.9	879.6
4/2/2018 10:00	0.1	270.6	-6.7	61.9	278.1	104.6	879.5
4/2/2018 11:00	1.2	37.0	-6.3	59.8	429.9	104.5	879.9
4/2/2018 12:00	2.6	73.9	-5.7	58.4	602.4	104.7	879.6
4/2/2018 13:00	5.9	57.8	-6.0	59.0	489.8	105.0	879.3
4/2/2018 14:00	4.7	49.4	-5.8	60.2	421.5	104.9	879.4
4/2/2018 15:00	2.9	19.4	-5.5	62.5	369.1	104.8	879.4
4/2/2018 16:00	1.4	322.0	-5.1	66.5	347.0	105.0	879.4
4/2/2018 17:00	1.3	346.7	-5.3	67.0	222.2	105.0	879.3
4/2/2018 18:00	4.4	60.4	-6.0	72.7	139.6	105.1	879.2
4/2/2018 19:00	2.9	49.2	-6.6	80.9	56.4	105.3	879.3
4/2/2018 20:00	0.7	201.9	-6.9	86.9	4.3	105.0	879.3
4/2/2018 21:00	1.1	182.2	-7.2	91.0	0.0	104.9	879.3
4/2/2018 22:00	0.7	209.1	-7.3	92.1	0.0	104.9	879.4
4/2/2018 23:00	2.4	40.8	-7.5	89.1	0.0	104.8	879.4

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
4/3/2018 0:00	3.4	44.3	-7.7	85.9	0.0	105.1	879.5
4/3/2018 1:00	4.7	39.7	-7.5	81.2	0.0	105.2	879.3
4/3/2018 2:00	5.5	60.3	-7.8	83.8	0.0	104.8	879.3
4/3/2018 3:00	8.9	48.0	-7.3	76.7	0.0	104.3	879.4
4/3/2018 4:00	9.1	49.9	-7.4	77.5	0.0	104.5	879.0
4/3/2018 5:00	9.0	50.9	-7.7	80.3	0.0	104.5	879.0
4/3/2018 6:00	3.4	79.4	-7.8	82.1	0.1	104.6	879.7
4/3/2018 7:00	7.8	46.3	-8.0	82.2	13.8	104.6	879.6
4/3/2018 8:00	6.1	54.1	-8.0	82.1	67.6	104.5	879.1
4/3/2018 9:00	8.3	41.0	-7.8	80.4	215.2	104.4	879.1
4/3/2018 10:00	6.9	38.7	-7.2	80.6	422.8	104.3	879.8
4/3/2018 11:00	4.8	31.2	-6.8	79.2	453.9	104.2	880.5
4/3/2018 12:00	3.7	37.4	-5.4	67.5	658.2	104.4	879.5
4/3/2018 13:00	3.1	82.8	-5.6	65.2	396.3	104.4	879.2
4/3/2018 14:00	2.9	90.5	-5.5	67.8	368.6	104.1	879.1
4/3/2018 15:00	2.8	57.6	-5.1	71.3	494.6	103.8	879.8
4/3/2018 16:00	1.1	77.4	-4.9	70.7	327.9	104.1	879.3
4/3/2018 17:00	2.0	20.2	-5.1	71.0	272.6	104.0	879.5
4/3/2018 18:00	1.9	13.6	-5.8	81.4	152.2	103.3	879.5
4/3/2018 19:00	1.8	18.2	-6.4	84.4	63.4	103.3	879.5
4/3/2018 20:00	2.5	350.1	-6.7	89.8	8.7	103.3	879.5
4/3/2018 21:00	3.4	15.7	-6.9	93.7	0.0	103.9	880.3
4/3/2018 22:00	2.5	24.2	-6.9	93.8	0.0	104.6	881.3
4/3/2018 23:00	2.2	12.6	-6.9	93.8	0.0	105.1	881.7
4/4/2018 0:00	2.2	199.2	-6.9	93.8	0.0	104.8	881.7
4/4/2018 1:00	0.7	222.3	-7.1	93.5	0.0	104.1	881.9
4/4/2018 2:00	0.0	101.0	-7.3	93.3	0.0	104.1	882.2
4/4/2018 3:00	0.3	205.2	-7.1	93.5	0.0	105.4	882.4
4/4/2018 4:00	0.0	0.0	-7.1	93.6	0.0	-	882.6
4/4/2018 5:00	0.2	31.5	-7.3	93.4	0.0	105.9	882.7
4/4/2018 6:00	0.1	264.5	-7.5	93.2	0.2	-	884.6
4/4/2018 7:00	0.0	60.2	-7.7	92.9	10.3	106.0	884.7
4/4/2018 8:00	0.2	54.4	-7.9	92.2	35.1	109.6	884.8
4/4/2018 9:00	0.3	205.6	-6.9	90.6	161.6	107.9	885.8
4/4/2018 10:00	1.1	191.1	-6.6	88.9	301.5	-	886.4
4/4/2018 11:00	0.8	305.3	-5.6	85.0	689.2	107.4	886.4
4/4/2018 12:00	0.7	200.7	-3.8	77.8	715.5	108.1	885.5
4/4/2018 13:00	0.8	220.9	-3.2	67.1	753.2	108.0	885.0
4/4/2018 14:00	1.4	120.3	-3.3	59.3	714.6	106.7	884.8
4/4/2018 15:00	2.8	87.6	-3.5	53.6	603.7	106.9	884.6
4/4/2018 16:00	6.3	78.3	-3.9	47.8	450.6	106.0	884.5
4/4/2018 17:00	6.4	79.8	-3.7	44.1	427.0	105.7	884.1
4/4/2018 18:00	7.7	78.0	-4.0	44.4	257.4	105.5	884.9
4/4/2018 19:00	8.8	81.7	-4.5	47.2	106.2	105.3	884.0
4/4/2018 20:00	7.2	88.4	-5.0	48.7	8.2	105.4	884.4
4/4/2018 21:00	9.0	84.4	-5.1	49.7	0.0	104.7	884.4
4/4/2018 22:00	5.9	102.7	-5.3	49.8	0.0	105.2	884.4
4/4/2018 23:00	3.6	77.5	-5.5	51.4	0.0	105.4	884.4
4/5/2018 0:00	6.7	75.4	-5.4	51.7	0.0	104.8	884.5
4/5/2018 1:00	8.3	80.4	-5.5	52.7	0.0	105.5	883.6
4/5/2018 2:00	10.8	73.2	-5.7	53.7	0.0	105.2	884.2
4/5/2018 3:00	7.7	82.9	-5.9	52.6	0.0	105.6	884.1
4/5/2018 4:00	12.1	65.1	-6.2	53.6	0.0	105.3	883.9
4/5/2018 5:00	9.6	68.2	-6.2	50.8	0.0	104.8	884.7

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
4/5/2018 6:00	9.7	58.4	-6.2	49.7	0.6	105.2	884.4
4/5/2018 7:00	10.9	69.4	-6.4	50.3	18.9	104.4	884.1
4/5/2018 8:00	12.0	74.4	-6.2	50.2	74.6	105.0	882.4
4/5/2018 9:00	18.7	51.2	-6.4	54.0	334.6	102.8	885.5
4/5/2018 10:00	15.9	54.2	-5.5	49.2	417.3	103.5	884.5
4/5/2018 11:00	16.8	52.2	-5.1	47.9	544.0	102.4	885.2
4/5/2018 12:00	13.5	73.5	-3.7	41.4	552.5	102.5	884.7
4/5/2018 13:00	15.5	70.7	-3.5	41.6	574.5	102.4	884.9
4/5/2018 14:00	16.0	76.5	-3.4	41.2	542.2	102.1	885.0
4/5/2018 15:00	15.9	81.9	-3.1	40.6	451.6	101.9	883.8
4/5/2018 16:00	12.9	86.2	-2.7	39.1	271.4	102.2	885.6
4/5/2018 17:00	12.4	93.6	-2.3	38.4	220.4	101.8	883.9
4/5/2018 18:00	14.6	77.9	-3.1	44.0	115.3	102.7	884.9
4/5/2018 19:00	14.2	85.6	-3.4	52.6	40.4	102.2	883.8
4/5/2018 20:00	12.7	87.5	-3.8	61.0	4.3	102.1	884.3
4/5/2018 21:00	4.0	19.1	-3.1	58.1	0.0	102.3	884.4
4/5/2018 22:00	2.7	267.6	-3.4	60.9	0.0	102.3	884.4
4/5/2018 23:00	2.0	312.8	-3.7	63.1	0.0	102.5	884.4
4/6/2018 0:00	1.9	230.9	-3.7	63.4	0.0	102.6	884.4
4/6/2018 1:00	2.9	109.1	-3.6	63.6	0.0	102.3	884.5
4/6/2018 2:00	3.1	240.0	-3.5	62.1	0.0	101.8	884.2
4/6/2018 3:00	4.6	79.2	-3.1	61.1	0.0	102.5	884.4
4/6/2018 4:00	3.0	63.2	-3.2	61.0	0.0	101.7	884.2
4/6/2018 5:00	2.9	125.2	-3.1	59.2	0.0	102.2	884.4
4/6/2018 6:00	4.7	73.4	-3.4	59.6	0.6	101.7	884.4
4/6/2018 7:00	6.5	56.3	-3.1	57.2	24.3	101.0	884.4
4/6/2018 8:00	5.5	64.0	-2.7	56.2	83.3	101.6	884.3
4/6/2018 9:00	6.0	67.0	-2.6	56.0	163.6	101.7	884.3
4/6/2018 10:00	5.9	56.2	-2.3	55.8	255.4	100.8	884.4
4/6/2018 11:00	5.2	81.8	-2.3	57.7	274.6	101.0	884.3
4/6/2018 12:00	3.9	71.6	-1.7	55.6	329.6	100.8	884.2
4/6/2018 13:00	4.6	62.4	-1.3	55.0	400.2	100.6	884.4
4/6/2018 14:00	2.7	77.4	-0.4	53.2	442.7	100.8	884.2
4/6/2018 15:00	3.3	65.5	-0.4	59.7	433.0	100.9	884.3
4/6/2018 16:00	1.0	109.3	-0.4	65.3	326.0	101.0	884.0
4/6/2018 17:00	1.2	71.3	-0.7	67.9	155.7	101.2	884.1
4/6/2018 18:00	2.8	51.5	-0.9	69.3	72.2	101.1	884.2
4/6/2018 19:00	4.1	39.5	-1.1	67.6	30.6	101.1	884.2
4/6/2018 20:00	4.5	34.6	-1.3	69.2	4.0	101.0	883.8
4/6/2018 21:00	4.9	32.7	-1.4	70.1	0.0	100.9	884.2
4/6/2018 22:00	4.9	35.0	-1.3	68.7	0.0	100.7	884.0
4/6/2018 23:00	5.9	39.0	-1.3	66.9	0.0	100.6	884.3
4/7/2018 0:00	9.2	43.5	-1.5	65.9	0.0	100.5	883.9
4/7/2018 1:00	5.9	55.8	-1.9	67.0	0.0	101.1	884.2
4/7/2018 2:00	3.0	92.9	-2.1	68.6	0.0	101.2	884.2
4/7/2018 3:00	4.6	65.7	-1.9	68.2	0.0	101.0	884.0
4/7/2018 4:00	2.8	82.3	-1.8	66.0	0.0	101.0	884.2
4/7/2018 5:00	4.9	110.4	-2.0	68.0	0.0	100.7	884.2
4/7/2018 6:00	10.4	60.7	-1.5	64.7	0.9	100.5	883.6
4/7/2018 7:00	4.8	109.5	-2.2	66.5	24.7	100.6	884.3
4/7/2018 8:00	8.2	104.8	-0.9	60.4	74.5	100.5	884.4
4/7/2018 9:00	9.8	90.5	0.0	57.2	310.2	100.6	884.8
4/7/2018 10:00	12.5	66.3	-0.1	58.8	497.6	100.4	884.3
4/7/2018 11:00	13.0	61.2	0.4	57.9	622.4	99.5	884.8

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
4/7/2018 12:00	10.9	56.2	1.5	54.9	707.1	99.9	884.8
4/7/2018 13:00	12.6	48.1	2.4	49.9	753.5	100.1	884.6
4/7/2018 14:00	12.0	59.2	3.3	47.2	768.0	100.1	884.9
4/7/2018 15:00	12.3	67.6	3.7	47.4	691.2	99.9	884.2
4/7/2018 16:00	14.5	71.9	3.9	47.7	575.3	99.8	883.3
4/7/2018 17:00	10.8	79.4	4.1	47.7	434.9	100.2	884.4
4/7/2018 18:00	10.6	83.9	4.0	48.7	277.3	100.2	884.5
4/7/2018 19:00	9.2	96.8	3.7	50.0	121.5	100.5	884.0
4/7/2018 20:00	7.5	105.8	3.7	49.9	12.4	100.7	883.7
4/7/2018 21:00	5.4	111.6	3.4	50.9	0.0	100.6	883.8
4/7/2018 22:00	2.0	111.4	3.3	50.9	0.0	100.5	883.8
4/7/2018 23:00	0.4	194.5	2.8	53.0	0.0	100.9	883.9
4/8/2018 0:00	0.7	10.5	2.5	54.2	0.0	101.0	883.9
4/8/2018 1:00	0.2	56.0	2.3	54.7	0.0	100.8	883.9
4/8/2018 2:00	1.6	56.3	1.9	56.2	0.0	100.5	883.9
4/8/2018 3:00	0.4	191.3	1.5	57.9	0.0	100.8	883.9
4/8/2018 4:00	-	-	1.7	57.4	0.0	100.7	884.0
4/8/2018 5:00	-	-	1.7	57.5	0.0	100.5	884.0
4/8/2018 6:00	-	-	1.8	57.2	1.4	100.6	883.9
4/8/2018 7:00	-	-	1.9	56.3	20.1	100.3	883.9
4/8/2018 8:00	-	-	2.5	54.1	62.0	100.2	883.9
4/8/2018 9:00	-	-	2.9	54.0	136.6	99.9	883.9
4/8/2018 10:00	0.1	214.6	3.4	52.8	239.1	100.2	883.6
4/8/2018 11:00	1.6	214.5	3.3	55.2	333.5	99.6	883.6
4/8/2018 12:00	1.3	204.7	3.9	54.9	402.8	98.6	883.6
4/8/2018 13:00	1.7	204.3	4.2	55.5	451.8	97.6	883.6
4/8/2018 14:00	2.8	219.0	4.4	56.0	512.9	98.6	883.5
4/8/2018 15:00	3.7	216.9	4.1	58.3	394.9	97.9	883.4
4/8/2018 16:00	3.9	211.5	3.8	62.9	342.5	98.6	883.5
4/8/2018 17:00	3.9	214.6	3.1	73.1	190.3	98.0	883.6
4/8/2018 18:00	4.9	221.3	1.8	87.4	98.2	98.2	883.4
4/8/2018 19:00	3.8	218.4	1.1	95.4	55.1	98.2	883.9
4/8/2018 20:00	3.4	221.2	0.7	97.3	6.2	97.5	884.2
4/8/2018 21:00	2.7	223.2	0.7	97.7	0.0	97.1	884.5
4/8/2018 22:00	3.3	207.7	0.7	97.9	0.0	97.0	884.8
4/8/2018 23:00	3.7	206.7	0.7	98.0	0.0	97.3	884.9
4/9/2018 0:00	3.7	211.0	0.6	98.1	0.0	98.0	885.6
4/9/2018 1:00	4.1	205.6	0.5	98.2	0.0	97.0	886.3
4/9/2018 2:00	3.9	209.6	0.4	98.2	0.0	96.1	886.9
4/9/2018 3:00	4.0	207.8	0.4	98.3	0.0	95.5	887.0
4/9/2018 4:00	3.6	210.8	0.3	98.3	0.0	93.4	887.1
4/9/2018 5:00	3.8	205.0	0.3	98.4	0.0	96.3	887.6
4/9/2018 6:00	3.8	205.3	0.4	98.4	0.6	96.3	887.7
4/9/2018 7:00	2.8	205.8	0.6	98.4	14.3	96.2	887.5
4/9/2018 8:00	3.1	203.9	0.7	98.2	58.2	96.6	887.5
4/9/2018 9:00	2.9	193.3	0.9	97.2	109.0	95.7	887.9
4/9/2018 10:00	4.1	190.8	1.4	93.9	274.4	96.6	888.0
4/9/2018 11:00	3.4	191.7	2.0	88.7	344.8	96.5	888.1
4/9/2018 12:00	3.6	187.5	2.4	88.0	410.9	95.5	887.9
4/9/2018 13:00	3.2	198.8	2.5	89.7	405.1	94.0	887.8
4/9/2018 14:00	2.7	232.9	2.9	86.0	540.1	94.1	888.4
4/9/2018 15:00	2.8	221.8	3.0	80.5	345.4	94.0	887.6
4/9/2018 16:00	2.5	203.0	2.1	85.4	221.2	93.3	887.8
4/9/2018 17:00	3.4	208.7	1.7	88.6	170.9	93.2	887.9



**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
4/9/2018 18:00	2.1	228.8	1.9	82.4	131.4	92.9	887.9
4/9/2018 19:00	2.8	119.8	2.1	76.4	58.0	93.3	887.8
4/9/2018 20:00	3.9	143.8	2.0	73.7	4.5	92.7	887.9
4/9/2018 21:00	2.1	58.4	1.9	76.4	0.0	93.1	887.9
4/9/2018 22:00	0.8	278.3	1.8	76.8	0.0	92.0	888.0
4/9/2018 23:00	0.8	250.4	1.4	80.9	0.0	92.1	888.0
4/10/2018 0:00	1.0	266.6	1.9	75.5	0.0	92.5	888.0
4/10/2018 1:00	3.1	77.2	2.3	69.3	0.0	92.9	887.7
4/10/2018 2:00	9.0	50.2	1.8	70.7	0.0	93.0	887.9
4/10/2018 3:00	9.7	67.7	1.9	69.1	0.0	93.2	887.8
4/10/2018 4:00	11.8	91.6	2.8	62.2	0.0	91.7	887.9
4/10/2018 5:00	12.3	83.2	2.8	62.1	0.0	92.3	887.1
4/10/2018 6:00	11.4	78.7	2.6	65.3	0.5	93.0	888.2
4/10/2018 7:00	10.7	92.7	2.5	67.0	16.3	92.6	888.4
4/10/2018 8:00	9.5	77.2	2.7	68.0	62.3	92.4	888.2
4/10/2018 9:00	10.3	74.9	2.9	69.1	106.6	92.4	887.2
4/10/2018 10:00	14.0	66.4	2.5	73.1	138.0	91.9	888.3
4/10/2018 11:00	14.8	57.4	2.8	70.3	182.9	92.0	887.2
4/10/2018 12:00	13.7	58.6	3.5	65.5	177.8	91.5	887.9
4/10/2018 13:00	13.8	64.4	3.7	66.8	149.0	88.9	887.8
4/10/2018 14:00	10.7	84.2	4.6	60.7	139.5	89.9	887.4
4/10/2018 15:00	11.5	87.8	4.6	61.0	155.8	89.5	887.6
4/10/2018 16:00	10.9	81.0	4.3	64.4	153.1	88.3	888.6
4/10/2018 17:00	6.5	170.6	3.8	71.5	157.8	88.3	887.3
4/10/2018 18:00	10.6	170.7	0.8	89.2	75.4	88.5	888.6
4/10/2018 19:00	11.3	178.3	1.1	78.6	87.8	89.4	887.4
4/10/2018 20:00	11.1	173.0	1.3	61.6	14.2	90.3	888.6
4/10/2018 21:00	4.2	197.0	0.6	66.6	0.0	90.2	888.3
4/10/2018 22:00	4.5	178.8	0.9	56.9	0.0	89.7	888.4
4/10/2018 23:00	2.0	196.6	0.8	57.8	0.0	89.9	888.4
4/11/2018 0:00	0.7	358.3	0.9	56.4	0.0	89.6	888.5
4/11/2018 1:00	1.8	199.0	0.7	58.9	0.0	90.1	888.5
4/11/2018 2:00	0.7	51.8	0.5	60.7	0.0	89.8	888.5
4/11/2018 3:00	2.4	182.3	0.4	69.3	0.0	89.9	888.5
4/11/2018 4:00	2.0	228.2	-0.3	78.7	0.0	89.8	888.5
4/11/2018 5:00	2.7	78.8	-0.8	85.6	0.0	89.7	888.5
4/11/2018 6:00	2.7	35.1	-1.2	86.0	2.6	89.9	888.6
4/11/2018 7:00	1.3	45.8	-0.5	73.4	26.9	89.5	888.6
4/11/2018 8:00	2.4	36.6	-0.6	75.4	72.6	89.6	888.7
4/11/2018 9:00	4.9	112.4	0.9	59.2	235.8	89.3	889.0
4/11/2018 10:00	7.7	62.7	1.4	61.7	572.0	88.9	889.3
4/11/2018 11:00	6.6	68.2	2.2	58.7	691.6	88.7	890.1
4/11/2018 12:00	10.5	67.6	2.7	53.8	761.7	88.0	890.0
4/11/2018 13:00	11.3	71.5	3.2	48.3	792.9	87.5	888.7
4/11/2018 14:00	12.3	81.1	3.6	46.4	808.0	88.0	889.5
4/11/2018 15:00	12.7	86.9	4.1	43.7	726.6	88.2	888.6
4/11/2018 16:00	10.6	75.0	4.5	42.8	636.6	87.9	888.7
4/11/2018 17:00	7.4	76.7	4.5	43.0	366.6	87.9	888.1
4/11/2018 18:00	6.3	85.1	3.9	47.6	102.8	88.1	888.5
4/11/2018 19:00	4.9	109.5	2.7	59.6	53.9	88.4	888.3
4/11/2018 20:00	5.1	144.0	2.0	67.9	8.3	88.2	888.3
4/11/2018 21:00	8.0	216.3	-1.1	94.4	0.0	88.0	888.4
4/11/2018 22:00	5.7	203.4	-2.2	96.9	0.0	88.2	889.0
4/11/2018 23:00	3.9	207.9	-2.5	96.7	0.0	88.2	889.1

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
4/12/2018 0:00	2.8	206.8	-2.9	96.5	0.0	88.2	889.1
4/12/2018 1:00	2.5	198.1	-3.0	96.4	0.0	88.3	889.2
4/12/2018 2:00	2.3	205.4	-3.2	96.3	0.0	85.9	889.3
4/12/2018 3:00	1.5	237.5	-3.4	96.2	0.0	86.7	889.3
4/12/2018 4:00	1.3	180.1	-3.5	96.1	0.0	87.3	889.3
4/12/2018 5:00	3.1	183.8	-3.6	95.6	0.0	88.2	889.4
4/12/2018 6:00	4.3	181.2	-3.2	86.4	2.1	88.5	889.3
4/12/2018 7:00	4.3	182.5	-2.9	81.1	49.4	88.3	889.2
4/12/2018 8:00	3.8	183.6	-2.6	78.4	111.8	88.3	889.2
4/12/2018 9:00	2.9	193.2	-2.2	76.6	232.5	88.1	889.2
4/12/2018 10:00	3.0	197.6	-1.9	76.7	244.6	87.9	889.1
4/12/2018 11:00	3.5	197.9	-1.5	76.7	335.1	88.3	889.3
4/12/2018 12:00	3.5	197.1	-0.4	69.9	541.4	88.0	889.5
4/12/2018 13:00	5.1	204.9	-0.4	68.3	518.6	88.1	889.1
4/12/2018 14:00	6.4	202.2	0.1	64.7	503.7	87.4	889.5
4/12/2018 15:00	7.0	175.7	0.8	57.0	735.6	87.5	889.5
4/12/2018 16:00	3.6	185.9	1.0	54.0	401.7	87.4	889.1
4/12/2018 17:00	2.0	210.4	0.5	59.1	214.3	87.6	889.0
4/12/2018 18:00	3.2	166.9	-0.3	66.0	106.1	88.1	889.1
4/12/2018 19:00	2.4	202.8	-0.5	66.8	76.3	88.2	889.1
4/12/2018 20:00	3.4	191.3	-1.1	71.3	7.3	88.0	889.2
4/12/2018 21:00	2.0	200.8	-1.4	76.5	0.0	88.3	889.2
4/12/2018 22:00	0.7	57.7	-1.8	81.2	0.0	88.2	889.3
4/12/2018 23:00	2.5	41.0	-2.3	88.9	0.0	88.1	889.5
4/13/2018 0:00	2.6	25.5	-2.5	90.0	0.0	88.0	889.4
4/13/2018 1:00	1.8	22.0	-2.3	88.5	0.0	87.9	889.6
4/13/2018 2:00	1.2	13.1	-2.1	87.4	0.0	87.9	889.6
4/13/2018 3:00	1.3	0.5	-1.2	76.0	0.0	87.7	889.6
4/13/2018 4:00	1.5	214.1	-1.6	79.9	0.0	88.0	889.6
4/13/2018 5:00	0.8	247.8	-2.4	91.7	0.0	87.6	889.7
4/13/2018 6:00	0.7	213.6	-2.6	95.2	2.2	86.5	889.8
4/13/2018 7:00	1.1	320.2	-2.4	93.7	32.1	87.2	889.9
4/13/2018 8:00	0.7	351.5	-1.5	82.5	111.4	87.1	890.0
4/13/2018 9:00	1.3	166.4	-0.5	67.4	135.5	87.6	889.8
4/13/2018 10:00	2.7	262.0	-1.9	90.6	196.1	87.4	890.4
4/13/2018 11:00	1.8	256.1	-1.7	92.5	326.4	87.1	890.7
4/13/2018 12:00	2.4	339.3	-1.2	91.8	462.4	88.2	891.5
4/13/2018 13:00	1.6	340.9	-0.8	90.0	409.8	88.1	892.0
4/13/2018 14:00	1.9	23.0	-0.1	82.9	435.8	88.6	891.9
4/13/2018 15:00	0.2	38.8	0.9	78.4	473.2	86.7	892.0
4/13/2018 16:00	2.9	3.9	0.4	75.9	314.3	87.5	891.7
4/13/2018 17:00	6.4	57.6	0.1	70.6	200.8	87.6	891.5
4/13/2018 18:00	6.1	41.6	-0.9	88.4	115.2	88.0	891.5
4/13/2018 19:00	7.0	37.5	-1.6	93.9	82.2	88.0	891.6
4/13/2018 20:00	4.4	40.8	-1.8	93.7	11.1	88.1	891.9
4/13/2018 21:00	0.8	136.2	-1.9	96.3	0.1	88.7	892.5
4/13/2018 22:00	0.0	144.7	-2.0	97.0	0.0	90.1	893.4
4/13/2018 23:00	0.2	213.9	-1.9	96.9	0.0	92.3	894.9
4/14/2018 0:00	0.2	201.3	-1.9	97.3	0.0	93.1	895.2
4/14/2018 1:00	1.3	204.4	-1.9	97.6	0.0	96.2	895.2
4/14/2018 2:00	2.9	221.2	-1.9	97.6	0.0	94.8	895.9
4/14/2018 3:00	3.0	222.1	-2.1	97.3	0.0	97.1	896.7
4/14/2018 4:00	3.2	206.5	-2.3	97.0	0.0	96.8	897.4
4/14/2018 5:00	3.4	207.2	-2.4	96.9	0.0	96.2	897.0

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
4/14/2018 6:00	2.8	213.0	-2.6	96.8	1.8	96.2	897.1
4/14/2018 7:00	2.8	224.1	-2.6	96.6	16.8	95.2	897.3
4/14/2018 8:00	2.1	213.2	-2.2	95.8	100.1	94.4	897.3
4/14/2018 9:00	3.4	209.7	-1.4	94.6	225.2	94.0	897.2
4/14/2018 10:00	4.0	219.8	-0.6	93.0	508.6	93.1	898.1
4/14/2018 11:00	2.8	224.8	0.4	91.1	691.4	91.6	897.9
4/14/2018 12:00	2.5	228.7	0.0	91.6	453.6	90.4	896.7
4/14/2018 13:00	2.4	205.0	0.3	89.5	675.5	89.5	897.1
4/14/2018 14:00	2.8	229.2	0.1	88.8	631.3	88.3	897.9
4/14/2018 15:00	2.5	231.8	-0.3	89.0	360.5	88.4	897.5
4/14/2018 16:00	3.4	237.0	0.5	83.7	589.8	88.7	897.6
4/14/2018 17:00	2.9	208.1	0.7	82.4	525.7	88.7	897.8
4/14/2018 18:00	3.6	235.6	1.0	76.6	437.0	88.1	897.4
4/14/2018 19:00	2.5	305.3	0.6	81.1	305.1	88.3	897.7
4/14/2018 20:00	1.2	22.1	-0.8	86.2	33.7	88.7	897.7
4/14/2018 21:00	1.2	129.6	-1.6	84.5	0.4	88.1	897.8
4/14/2018 22:00	0.8	163.5	-1.7	85.3	0.0	88.2	897.7
4/14/2018 23:00	0.7	135.7	-2.0	84.5	0.0	87.9	897.7
4/15/2018 0:00	1.3	67.4	-2.3	82.3	0.0	87.5	897.7
4/15/2018 1:00	2.2	84.3	-2.3	83.2	0.0	87.5	897.7
4/15/2018 2:00	1.6	114.0	-2.8	83.5	0.0	87.7	897.8
4/15/2018 3:00	0.3	113.0	-2.9	87.2	0.0	87.0	897.8
4/15/2018 4:00	0.4	84.8	-3.2	86.3	0.0	87.0	897.9
4/15/2018 5:00	1.6	54.3	-3.4	88.4	0.0	86.9	897.9
4/15/2018 6:00	2.7	44.9	-3.4	96.6	3.0	86.6	897.8
4/15/2018 7:00	0.7	104.9	-3.3	96.9	25.2	87.0	897.9
4/15/2018 8:00	0.5	212.1	-2.7	92.2	177.5	86.7	898.5
4/15/2018 9:00	0.1	160.3	-1.1	81.1	369.8	85.7	899.0
4/15/2018 10:00	0.1	101.0	-0.3	73.6	563.9	85.8	898.9
4/15/2018 11:00	0.5	129.5	0.7	69.5	683.1	85.9	899.0
4/15/2018 12:00	0.8	88.7	1.4	64.0	763.0	85.9	898.9
4/15/2018 13:00	2.3	104.4	1.0	65.9	811.0	87.2	898.7
4/15/2018 14:00	1.3	37.7	2.5	61.4	780.9	86.4	898.3
4/15/2018 15:00	1.1	74.0	2.2	63.7	475.2	86.3	898.4
4/15/2018 16:00	1.5	71.4	3.0	58.5	685.5	86.8	898.4
4/15/2018 17:00	2.4	331.9	2.8	58.3	506.2	87.2	897.8
4/15/2018 18:00	2.4	333.3	2.4	59.5	344.7	87.4	897.6
4/15/2018 19:00	3.6	336.5	1.4	63.5	177.0	87.5	897.4
4/15/2018 20:00	2.3	29.6	0.2	68.0	37.1	87.8	897.6
4/15/2018 21:00	2.4	78.6	-0.8	69.5	0.4	87.6	897.7
4/15/2018 22:00	1.3	141.5	-0.7	66.8	0.0	87.8	897.7
4/15/2018 23:00	0.7	226.6	-0.6	69.0	0.0	87.8	897.7
4/16/2018 0:00	1.0	60.9	-1.3	68.5	0.0	87.4	897.7
4/16/2018 1:00	1.7	44.8	-1.8	74.9	0.0	87.4	897.7
4/16/2018 2:00	1.4	70.7	-2.3	78.0	0.0	87.4	897.7
4/16/2018 3:00	1.3	79.4	-2.3	74.8	0.0	87.5	897.8
4/16/2018 4:00	1.2	55.1	-2.4	75.6	0.0	87.3	897.8
4/16/2018 5:00	0.8	45.2	-2.5	74.0	0.0	87.6	897.9
4/16/2018 6:00	0.9	196.1	-2.4	80.3	5.1	87.2	898.0
4/16/2018 7:00	0.6	188.4	-2.2	79.8	43.1	87.3	897.9
4/16/2018 8:00	0.5	191.7	-1.0	71.8	190.9	86.8	898.5
4/16/2018 9:00	0.7	200.0	0.3	66.1	424.9	85.9	899.2
4/16/2018 10:00	0.5	72.1	2.2	54.1	526.3	86.2	898.4
4/16/2018 11:00	0.7	179.1	1.2	60.7	591.0	85.6	898.4

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
4/16/2018 12:00	0.8	163.3	2.1	58.8	684.2	86.2	898.9
4/16/2018 13:00	1.3	91.5	2.2	57.2	835.0	86.0	899.1
4/16/2018 14:00	1.7	27.7	1.9	56.0	489.3	85.9	898.2
4/16/2018 15:00	1.5	5.2	1.8	59.9	296.4	86.3	897.9
4/16/2018 16:00	1.8	73.4	1.2	62.7	221.2	86.5	897.9
4/16/2018 17:00	1.5	247.1	1.5	65.9	394.4	85.9	898.3
4/16/2018 18:00	1.9	248.6	0.2	73.7	158.3	86.1	898.1
4/16/2018 19:00	3.0	194.1	-1.7	93.1	34.2	85.8	899.5
4/16/2018 20:00	1.2	79.3	-2.1	95.9	29.9	88.4	899.7
4/16/2018 21:00	1.1	134.0	-2.1	91.3	0.3	88.8	899.8
4/16/2018 22:00	2.1	156.3	-2.1	93.4	0.0	88.1	899.8
4/16/2018 23:00	0.4	32.9	-2.0	88.5	0.0	89.0	899.8
4/17/2018 0:00	0.5	339.1	-2.3	90.0	0.0	89.4	899.8
4/17/2018 1:00	0.4	256.7	-2.5	91.2	0.0	88.3	899.9
4/17/2018 2:00	1.2	202.1	-2.6	95.2	0.0	88.7	900.0
4/17/2018 3:00	2.1	207.0	-2.6	91.4	0.0	88.5	899.9
4/17/2018 4:00	2.5	196.5	-2.5	86.9	0.0	88.5	899.9
4/17/2018 5:00	2.5	205.4	-2.4	85.0	0.0	88.4	899.9
4/17/2018 6:00	2.1	208.9	-2.8	84.8	5.7	88.1	900.0
4/17/2018 7:00	1.9	214.8	-2.6	80.6	41.8	88.2	900.0
4/17/2018 8:00	3.0	192.6	-2.4	82.6	87.2	88.1	900.0
4/17/2018 9:00	2.8	206.2	-2.5	85.4	182.5	87.6	899.9
4/17/2018 10:00	2.6	211.7	-1.5	82.6	479.3	87.0	900.1
4/17/2018 11:00	2.3	231.4	-1.0	81.0	454.2	86.7	900.4
4/17/2018 12:00	3.8	221.1	-0.7	75.6	402.2	84.7	899.5
4/17/2018 13:00	5.7	226.0	-0.1	65.2	582.1	85.5	900.3
4/17/2018 14:00	6.8	227.5	0.3	56.2	505.6	87.4	899.8
4/17/2018 15:00	7.3	237.1	0.5	54.8	430.2	86.5	900.1
4/17/2018 16:00	7.7	230.3	0.9	56.5	465.7	87.1	899.4
4/17/2018 17:00	7.7	236.3	0.8	60.4	444.8	86.8	899.8
4/17/2018 18:00	5.8	217.7	-0.2	66.2	134.4	87.5	899.8
4/17/2018 19:00	5.1	218.0	-0.8	74.9	103.0	87.6	900.0
4/17/2018 20:00	4.5	218.3	-1.6	87.7	15.4	87.5	899.9
4/17/2018 21:00	4.6	213.7	-2.2	93.4	0.2	87.5	900.1
4/17/2018 22:00	6.2	209.5	-2.5	96.8	0.0	87.6	900.5
4/17/2018 23:00	5.3	208.9	-2.7	96.0	0.0	87.6	900.2
4/18/2018 0:00	4.8	212.9	-2.9	96.1	0.0	87.6	899.9
4/18/2018 1:00	4.1	221.4	-3.0	96.7	0.0	87.6	900.0
4/18/2018 2:00	4.5	219.9	-3.1	97.0	0.0	87.6	900.1
4/18/2018 3:00	4.1	217.3	-3.3	96.6	0.0	87.3	900.0
4/18/2018 4:00	3.8	212.6	-3.4	96.4	0.0	87.2	900.1
4/18/2018 5:00	3.4	210.2	-3.5	96.3	0.0	87.8	900.6
4/18/2018 6:00	3.8	214.0	-3.5	96.2	3.1	87.4	900.9
4/18/2018 7:00	3.8	215.1	-3.2	96.2	24.6	87.6	900.7
4/18/2018 8:00	3.9	215.2	-2.9	96.0	86.0	87.8	901.1
4/18/2018 9:00	4.0	212.2	-2.4	95.6	189.4	87.4	900.8
4/18/2018 10:00	4.5	215.0	-1.9	95.2	298.3	87.1	900.8
4/18/2018 11:00	4.5	214.1	-1.4	95.4	323.2	87.3	901.5
4/18/2018 12:00	5.3	217.5	-0.9	95.6	372.5	87.2	901.8
4/18/2018 13:00	5.3	215.4	-0.3	95.6	413.5	87.7	901.7
4/18/2018 14:00	5.5	214.9	-0.1	95.8	381.9	86.9	902.6
4/18/2018 15:00	5.0	212.5	-0.1	96.0	331.6	87.1	902.6
4/18/2018 16:00	5.4	223.3	-0.3	96.5	243.5	89.6	903.1
4/18/2018 17:00	4.8	209.6	-0.4	96.7	191.6	90.0	903.1

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
4/18/2018 18:00	4.9	202.6	-0.7	97.1	128.1	86.2	903.3
4/18/2018 19:00	4.9	203.9	-1.0	97.4	50.4	90.1	903.5
4/18/2018 20:00	5.2	199.5	-1.3	97.6	11.7	89.8	903.8
4/18/2018 21:00	6.8	196.0	-1.5	97.6	0.2	87.9	904.0
4/18/2018 22:00	7.6	196.5	-1.5	97.5	0.0	87.2	903.7
4/18/2018 23:00	6.0	205.7	-1.6	97.5	0.0	87.4	904.1
4/19/2018 0:00	5.7	205.1	-1.6	97.5	0.0	88.0	904.2
4/19/2018 1:00	6.3	202.6	-1.5	97.5	0.0	87.8	904.5
4/19/2018 2:00	4.7	209.7	-1.6	97.5	0.0	87.6	904.3
4/19/2018 3:00	4.7	217.4	-1.7	97.4	0.0	88.1	904.6
4/19/2018 4:00	3.0	232.9	-1.8	97.4	0.0	90.8	905.2
4/19/2018 5:00	2.9	225.8	-1.9	97.3	0.0	87.5	905.8
4/19/2018 6:00	3.8	220.8	-1.9	97.3	2.6	90.2	906.6
4/19/2018 7:00	3.9	229.9	-1.8	97.2	30.5	90.3	908.0
4/19/2018 8:00	3.5	230.4	-1.6	97.1	106.3	94.0	909.0
4/19/2018 9:00	3.1	223.2	-1.3	97.0	176.1	92.0	910.0
4/19/2018 10:00	4.5	204.9	-0.9	96.9	247.7	91.8	910.5
4/19/2018 11:00	4.5	205.9	-0.7	96.9	265.7	91.9	910.7
4/19/2018 12:00	4.2	210.0	-0.6	96.9	274.3	91.9	911.4
4/19/2018 13:00	5.6	200.9	-1.0	96.1	335.4	93.4	911.9
4/19/2018 14:00	6.2	211.2	-1.3	96.2	293.5	93.2	912.3
4/19/2018 15:00	5.3	223.3	-1.2	96.2	345.2	93.3	913.9
4/19/2018 16:00	5.5	232.2	-1.0	96.8	281.7	96.5	915.0
4/19/2018 17:00	3.6	226.6	-1.0	97.0	245.8	93.6	916.0
4/19/2018 18:00	1.4	229.0	-1.6	97.2	159.2	96.4	917.2
4/19/2018 19:00	1.0	228.6	-1.9	97.1	65.5	96.4	917.2
4/19/2018 20:00	4.8	216.9	-2.4	97.1	25.5	96.3	917.4
4/19/2018 21:00	4.4	198.2	-3.2	96.7	0.7	96.4	917.4
4/19/2018 22:00	4.4	210.3	-3.1	96.7	0.0	96.3	917.5
4/19/2018 23:00	3.6	207.6	-3.4	96.5	0.0	96.4	917.5
4/20/2018 0:00	4.0	214.8	-3.4	96.4	0.0	95.7	917.7
4/20/2018 1:00	4.6	217.0	-3.6	96.3	0.0	95.8	917.7
4/20/2018 2:00	3.9	200.5	-4.2	96.0	0.0	95.8	917.8
4/20/2018 3:00	2.9	207.7	-4.1	96.0	0.0	95.7	917.7
4/20/2018 4:00	2.5	192.3	-4.4	95.7	0.0	96.3	917.8
4/20/2018 5:00	2.4	175.2	-4.5	95.7	0.0	96.0	917.9
4/20/2018 6:00	4.1	184.4	-4.5	95.6	9.0	95.7	917.8
4/20/2018 7:00	3.2	154.4	-4.5	95.3	42.2	94.9	917.7
4/20/2018 8:00	0.5	113.3	-3.8	94.2	234.0	94.1	918.5
4/20/2018 9:00	0.9	113.2	-3.9	92.9	335.5	95.3	918.4
4/20/2018 10:00	0.9	106.8	-3.2	92.4	491.3	94.5	918.4
4/20/2018 11:00	1.4	37.8	-3.1	93.3	317.5	94.4	918.4
4/20/2018 12:00	1.8	61.5	-2.7	92.7	414.9	94.1	919.7
4/20/2018 13:00	1.3	61.7	-2.0	93.5	429.2	94.1	919.6
4/20/2018 14:00	1.5	43.7	-1.7	94.1	392.0	93.8	919.5
4/20/2018 15:00	0.7	342.5	-0.5	95.3	326.4	91.9	920.6
4/20/2018 16:00	2.2	24.4	-1.5	95.9	236.3	97.2	922.0
4/20/2018 17:00	2.9	23.8	-1.8	96.4	165.7	98.5	923.5
4/20/2018 18:00	2.9	16.2	-1.7	96.8	103.7	103.0	925.0
4/20/2018 19:00	1.9	1.4	-1.4	97.1	55.0	103.2	926.4
4/20/2018 20:00	1.5	12.5	-1.4	97.3	13.3	107.1	928.1
4/20/2018 21:00	1.0	2.9	-1.4	97.4	0.2	110.3	929.4
4/20/2018 22:00	1.0	340.9	-1.2	97.5	0.0	111.8	930.6
4/20/2018 23:00	0.8	97.0	-1.2	97.6	0.0	111.7	931.9

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
4/21/2018 0:00	0.6	246.1	-1.1	97.6	0.0	113.6	932.9
4/21/2018 1:00	0.7	286.9	-1.1	97.7	0.0	113.1	933.8
4/21/2018 2:00	0.7	247.8	-1.1	97.7	0.0	116.8	935.1
4/21/2018 3:00	2.3	219.8	-1.2	97.7	0.0	114.7	935.6
4/21/2018 4:00	3.5	199.0	-1.6	97.7	0.0	117.3	935.9
4/21/2018 5:00	4.5	229.2	-1.9	97.5	0.0	122.8	936.7
4/21/2018 6:00	4.5	232.0	-2.3	97.3	1.8	121.7	937.1
4/21/2018 7:00	4.2	212.3	-2.6	96.9	16.3	121.7	937.0
4/21/2018 8:00	4.3	212.1	-2.7	96.6	44.9	119.1	937.4
4/21/2018 9:00	4.8	222.0	-2.5	96.5	66.8	118.3	937.5
4/21/2018 10:00	5.0	223.7	-1.7	96.2	154.7	116.8	937.6
4/21/2018 11:00	5.3	228.5	-0.8	96.3	198.5	115.3	937.2
4/21/2018 12:00	5.9	228.7	-0.9	96.3	203.7	114.1	937.3
4/21/2018 13:00	6.4	235.8	-0.6	96.1	286.1	112.8	937.1
4/21/2018 14:00	5.9	229.6	-0.7	96.6	395.6	111.0	936.8
4/21/2018 15:00	3.9	221.0	-0.1	96.2	444.5	110.0	937.1
4/21/2018 16:00	4.7	222.9	-0.8	97.0	254.6	109.2	937.0
4/21/2018 17:00	7.0	216.8	-1.6	96.7	241.0	110.2	937.2
4/21/2018 18:00	4.9	212.8	-0.9	95.8	397.3	109.3	937.1
4/21/2018 19:00	3.1	225.9	-1.6	97.1	68.4	110.2	937.4
4/21/2018 20:00	4.3	210.4	-2.3	97.1	25.3	110.9	938.1
4/21/2018 21:00	3.6	210.8	-2.5	97.0	0.6	112.2	938.4
4/21/2018 22:00	3.9	197.1	-2.7	96.9	0.0	110.9	938.4
4/21/2018 23:00	3.5	208.6	-2.5	97.0	0.0	110.8	938.6
4/22/2018 0:00	3.8	226.3	-2.5	97.0	0.0	110.0	938.9
4/22/2018 1:00	3.2	219.5	-2.7	96.9	0.0	114.0	939.5
4/22/2018 2:00	3.3	223.6	-2.6	96.9	0.0	113.0	940.0
4/22/2018 3:00	2.6	222.7	-2.7	96.9	0.0	-	940.0
4/22/2018 4:00	2.9	206.6	-2.8	96.9	0.0	114.1	940.1
4/22/2018 5:00	4.3	182.2	-3.2	96.6	0.0	109.7	940.0
4/22/2018 6:00	2.5	200.7	-3.2	96.6	4.3	109.8	940.0
4/22/2018 7:00	2.0	221.9	-2.9	96.4	52.9	109.6	940.0
4/22/2018 8:00	2.5	182.7	-2.6	96.1	157.6	109.0	939.8
4/22/2018 9:00	2.0	149.2	-2.0	95.8	266.0	108.6	939.9
4/22/2018 10:00	1.1	293.2	-0.5	95.8	402.0	106.8	940.4
4/22/2018 11:00	1.6	317.4	-0.4	95.3	470.7	106.7	939.9
4/22/2018 12:00	2.6	212.1	0.4	94.3	598.3	107.8	939.8
4/22/2018 13:00	2.4	198.0	0.2	93.7	541.0	106.7	940.2
4/22/2018 14:00	5.5	209.4	-0.1	91.8	542.2	106.8	939.8
4/22/2018 15:00	3.8	217.5	-0.2	92.8	373.6	106.2	940.0
4/22/2018 16:00	2.9	228.1	-0.4	95.4	223.2	105.8	939.9
4/22/2018 17:00	4.4	197.1	-0.7	94.9	213.7	105.8	940.0
4/22/2018 18:00	2.0	150.3	-0.8	95.5	157.2	105.3	940.1
4/22/2018 19:00	1.6	184.0	-0.8	96.3	62.6	105.1	940.4
4/22/2018 20:00	1.9	245.8	-1.1	96.4	19.1	104.3	940.6
4/22/2018 21:00	3.3	177.1	-1.3	96.2	0.4	103.6	940.8
4/22/2018 22:00	4.0	172.6	-1.3	97.1	0.0	106.0	941.0
4/22/2018 23:00	6.9	193.4	-1.4	97.7	0.0	103.9	940.8
4/23/2018 0:00	5.1	201.7	-1.4	97.8	0.0	104.2	940.8
4/23/2018 1:00	3.9	205.0	-1.4	97.7	0.0	104.5	941.0
4/23/2018 2:00	2.9	221.4	-1.4	97.7	0.0	104.4	941.4
4/23/2018 3:00	4.3	217.1	-1.5	97.8	0.0	104.5	941.8
4/23/2018 4:00	4.6	205.5	-1.6	97.7	0.0	104.3	941.9
4/23/2018 5:00	2.2	219.9	-1.6	97.6	0.0	104.5	942.2

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
4/23/2018 6:00	3.2	223.4	-1.6	97.5	5.9	104.2	942.4
4/23/2018 7:00	2.6	206.3	-1.5	97.4	42.2	103.9	942.5
4/23/2018 8:00	2.2	200.1	-1.3	96.9	122.6	102.8	942.9
4/23/2018 9:00	2.9	236.8	-1.0	96.4	209.9	103.5	943.4
4/23/2018 10:00	2.5	237.7	-0.6	96.0	278.7	105.6	944.2
4/23/2018 11:00	3.0	228.6	-0.5	95.8	308.0	105.8	945.0
4/23/2018 12:00	3.6	227.3	-0.5	95.7	328.8	106.3	945.4
4/23/2018 13:00	3.3	229.3	-0.4	95.7	323.3	104.2	946.6
4/23/2018 14:00	2.4	224.3	-0.3	95.8	326.2	106.2	948.6
4/23/2018 15:00	3.8	227.0	-0.6	96.1	270.5	108.5	950.6
4/23/2018 16:00	4.1	230.1	-0.7	96.6	197.5	110.5	952.6
4/23/2018 17:00	3.3	227.5	-0.9	96.8	159.8	110.8	955.0
4/23/2018 18:00	4.0	227.9	-1.0	97.1	104.6	113.6	956.5
4/23/2018 19:00	4.9	228.9	-1.1	97.4	47.4	118.3	958.0
4/23/2018 20:00	4.4	232.8	-1.3	97.6	14.7	119.6	959.6
4/23/2018 21:00	4.9	225.6	-1.4	97.7	0.5	120.6	961.0
4/23/2018 22:00	4.7	212.9	-1.5	97.7	0.0	119.3	962.0
4/23/2018 23:00	4.6	202.6	-1.3	97.7	0.0	117.0	962.2
4/24/2018 0:00	4.5	203.5	-1.4	97.7	0.0	115.7	962.3
4/24/2018 1:00	4.6	204.2	-1.4	97.7	0.0	114.3	962.4
4/24/2018 2:00	4.0	213.8	-1.5	97.7	0.0	115.6	962.5
4/24/2018 3:00	3.2	213.0	-1.5	97.7	0.0	115.5	962.7
4/24/2018 4:00	2.7	211.1	-1.4	97.7	0.0	115.3	962.8
4/24/2018 5:00	2.2	203.2	-1.3	97.7	0.1	115.5	962.9
4/24/2018 6:00	2.5	202.2	-1.2	97.7	12.5	114.4	963.1
4/24/2018 7:00	2.5	202.4	-0.9	97.7	52.4	115.0	963.1
4/24/2018 8:00	2.5	205.5	-0.8	97.7	113.4	114.4	963.0
4/24/2018 9:00	4.5	217.0	-0.6	97.6	186.6	115.0	963.2
4/24/2018 10:00	4.0	213.1	-0.3	97.5	226.4	112.2	963.0
4/24/2018 11:00	4.1	222.5	0.2	96.9	471.1	112.8	964.5
4/24/2018 12:00	4.9	225.5	0.3	96.6	450.2	112.9	964.5
4/24/2018 13:00	4.3	243.4	0.6	96.3	495.2	112.3	964.9
4/24/2018 14:00	3.8	267.1	0.7	94.4	582.6	111.7	965.2
4/24/2018 15:00	4.1	252.1	1.2	89.4	755.4	110.7	964.6
4/24/2018 16:00	5.8	246.9	1.5	82.3	810.0	109.9	964.5
4/24/2018 17:00	6.7	242.6	1.1	78.3	383.0	109.5	964.6
4/24/2018 18:00	5.6	238.8	0.6	80.5	161.0	108.1	964.4
4/24/2018 19:00	4.1	213.0	-0.1	89.2	62.9	107.1	964.5
4/24/2018 20:00	4.7	201.1	-0.3	89.0	17.6	109.9	964.7
4/24/2018 21:00	3.8	199.1	-0.6	94.0	1.0	109.9	964.8
4/24/2018 22:00	4.4	209.9	-0.8	95.5	0.0	110.0	964.9
4/24/2018 23:00	4.0	212.9	-0.9	96.9	0.0	109.8	964.7
4/25/2018 0:00	4.1	211.5	-0.9	96.7	0.0	109.7	964.8
4/25/2018 1:00	4.9	215.3	-1.0	97.7	0.0	109.5	964.7
4/25/2018 2:00	5.1	205.7	-1.0	98.2	0.0	109.2	964.8
4/25/2018 3:00	5.3	216.1	-1.1	98.2	0.0	109.0	964.7
4/25/2018 4:00	4.7	212.8	-1.2	98.2	0.0	109.0	964.2
4/25/2018 5:00	4.8	217.6	-1.4	98.1	0.1	108.7	964.6
4/25/2018 6:00	4.1	227.5	-1.5	97.9	14.2	108.6	964.8
4/25/2018 7:00	3.6	228.2	-1.4	97.2	76.2	108.0	964.8
4/25/2018 8:00	3.7	230.3	-0.8	95.1	284.9	108.4	965.0
4/25/2018 9:00	3.3	241.7	-0.4	93.5	430.7	107.8	965.8
4/25/2018 10:00	3.7	217.0	0.8	89.9	605.9	107.6	965.3
4/25/2018 11:00	3.7	222.3	1.4	89.2	579.6	108.5	965.6

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
4/25/2018 12:00	4.2	227.5	2.6	85.6	754.1	107.3	965.6
4/25/2018 13:00	5.2	226.0	3.8	78.4	837.0	106.5	965.0
4/25/2018 14:00	5.0	235.2	4.2	73.9	617.6	105.0	964.8
4/25/2018 15:00	4.8	245.9	4.6	69.8	695.6	104.1	964.7
4/25/2018 16:00	4.8	235.8	5.2	58.4	634.7	103.8	964.5
4/25/2018 17:00	5.0	229.2	4.8	54.6	357.7	104.0	964.4
4/25/2018 18:00	4.1	221.4	4.5	57.3	203.6	104.2	964.1
4/25/2018 19:00	3.9	217.7	3.9	62.2	85.5	104.3	964.6
4/25/2018 20:00	3.0	233.4	3.5	65.7	28.7	104.2	964.5
4/25/2018 21:00	2.4	220.4	3.3	65.5	1.1	103.9	964.6
4/25/2018 22:00	3.1	226.0	3.1	67.2	0.0	103.9	964.6
4/25/2018 23:00	1.8	248.3	2.9	69.8	0.0	104.1	964.7
4/26/2018 0:00	1.2	196.6	3.2	70.1	0.0	103.9	964.7
4/26/2018 1:00	1.2	328.9	3.3	71.0	0.0	103.8	964.6
4/26/2018 2:00	0.8	81.8	2.6	79.8	0.0	104.0	964.6
4/26/2018 3:00	1.7	68.2	2.5	82.5	0.0	103.5	964.6
4/26/2018 4:00	0.7	68.5	2.7	82.3	0.0	104.1	964.6
4/26/2018 5:00	2.5	33.4	2.9	78.2	0.3	103.4	964.7
4/26/2018 6:00	1.7	240.7	3.0	77.7	12.6	103.5	964.6
4/26/2018 7:00	1.3	183.9	3.0	76.1	46.0	103.5	964.6
4/26/2018 8:00	1.5	98.4	3.8	72.9	129.2	103.2	964.5
4/26/2018 9:00	1.4	229.6	4.5	70.1	229.1	102.9	964.5
4/26/2018 10:00	0.8	220.6	6.3	60.4	392.9	101.9	964.5
4/26/2018 11:00	1.0	327.0	6.6	61.3	388.1	100.9	964.9
4/26/2018 12:00	1.4	306.9	8.0	56.9	551.3	100.9	965.2
4/26/2018 13:00	1.8	49.1	8.3	55.3	634.8	100.2	965.0
4/26/2018 14:00	0.3	77.8	10.4	49.3	601.2	99.3	964.4
4/26/2018 15:00	1.4	210.3	9.1	57.2	597.4	99.8	963.9
4/26/2018 16:00	2.4	221.8	8.6	62.4	579.2	98.5	963.6
4/26/2018 17:00	2.7	203.8	8.8	61.8	458.9	97.4	963.5
4/26/2018 18:00	2.7	228.5	8.9	60.6	369.8	98.8	963.4
4/26/2018 19:00	2.7	222.9	8.4	61.5	193.7	97.2	963.4
4/26/2018 20:00	2.6	207.9	7.7	65.4	53.6	97.7	963.9
4/26/2018 21:00	2.9	211.9	7.1	67.9	2.9	98.1	964.1
4/26/2018 22:00	2.5	204.7	6.7	68.7	0.0	97.9	964.2
4/26/2018 23:00	2.1	224.4	6.5	68.6	0.0	97.8	964.2
4/27/2018 0:00	1.8	219.3	6.0	69.5	0.0	97.9	964.2
4/27/2018 1:00	2.1	219.1	6.0	70.2	0.0	97.6	964.2
4/27/2018 2:00	2.4	207.4	5.8	70.4	0.0	97.9	964.3
4/27/2018 3:00	2.3	219.6	5.5	71.5	0.0	97.4	964.2
4/27/2018 4:00	1.2	214.4	5.4	70.4	0.0	97.9	964.3
4/27/2018 5:00	1.5	214.6	5.2	71.0	0.3	98.0	964.4
4/27/2018 6:00	1.5	198.6	4.7	71.9	18.0	97.7	964.3
4/27/2018 7:00	0.7	337.1	5.5	63.9	73.1	97.5	964.4
4/27/2018 8:00	0.6	228.6	6.7	60.4	282.6	96.9	964.8
4/27/2018 9:00	1.5	211.3	6.6	60.7	421.4	97.2	964.7
4/27/2018 10:00	3.0	206.4	6.3	62.8	586.7	96.4	965.0
4/27/2018 11:00	2.5	215.0	6.7	64.9	710.7	95.7	965.5
4/27/2018 12:00	2.7	219.6	6.8	64.8	781.8	95.5	965.0
4/27/2018 13:00	3.7	215.0	7.2	61.5	855.0	94.4	964.9
4/27/2018 14:00	4.6	222.0	7.9	57.2	865.0	92.0	964.9
4/27/2018 15:00	2.9	249.4	8.5	50.6	759.1	91.2	964.5
4/27/2018 16:00	2.2	311.1	8.4	56.0	719.7	91.9	963.9
4/27/2018 17:00	6.1	271.3	7.2	65.7	586.9	91.3	963.6



**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
4/27/2018 18:00	5.2	276.9	5.8	72.2	382.3	91.8	964.0
4/27/2018 19:00	2.5	266.3	4.0	78.0	62.1	91.9	964.0
4/27/2018 20:00	4.5	221.0	3.3	80.6	35.3	91.0	963.8
4/27/2018 21:00	4.3	203.6	2.4	83.5	7.0	91.4	964.2
4/27/2018 22:00	4.8	216.8	1.9	84.7	0.0	91.2	964.9
4/27/2018 23:00	6.8	230.7	1.3	83.6	0.0	90.7	964.5
4/28/2018 0:00	5.6	222.6	0.5	84.9	0.0	91.1	964.7
4/28/2018 1:00	5.6	222.7	-0.2	84.7	0.0	90.8	964.4
4/28/2018 2:00	4.6	223.0	-1.0	84.3	0.0	90.9	964.1
4/28/2018 3:00	4.5	220.6	-1.5	83.5	0.0	90.9	964.5
4/28/2018 4:00	4.4	225.6	-2.3	87.0	0.0	90.9	964.4
4/28/2018 5:00	4.5	215.9	-3.2	86.4	0.4	90.9	964.9
4/28/2018 6:00	5.9	233.2	-3.3	81.3	16.7	90.8	965.0
4/28/2018 7:00	4.2	223.7	-3.5	77.7	71.5	90.5	965.2
4/28/2018 8:00	4.0	224.3	-3.1	70.5	274.0	90.5	965.4
4/28/2018 9:00	3.7	202.8	-2.9	67.3	332.1	90.8	965.7
4/28/2018 10:00	3.9	224.9	-1.8	61.4	659.4	90.3	965.1
4/28/2018 11:00	4.9	237.2	-1.4	59.4	700.8	90.0	965.6
4/28/2018 12:00	6.0	228.7	-0.9	55.9	672.4	90.3	964.8
4/28/2018 13:00	3.5	231.0	-0.6	54.8	430.7	90.2	964.5
4/28/2018 14:00	2.3	287.7	-0.1	53.7	393.4	90.1	965.0
4/28/2018 15:00	2.9	316.0	0.5	47.6	545.1	89.0	965.5
4/28/2018 16:00	1.2	187.8	1.4	46.2	510.3	89.8	964.5
4/28/2018 17:00	3.8	289.5	0.9	50.6	458.5	89.4	964.6
4/28/2018 18:00	3.7	317.7	0.9	50.6	453.8	89.8	964.7
4/28/2018 19:00	5.0	316.2	0.1	56.1	238.8	89.9	964.0
4/28/2018 20:00	4.0	326.3	-0.6	58.9	73.9	89.9	964.6
4/28/2018 21:00	2.3	31.4	-1.6	63.8	3.9	90.2	964.7
4/28/2018 22:00	0.6	67.1	-1.8	63.1	0.0	90.1	964.9
4/28/2018 23:00	0.8	120.4	-2.3	63.3	0.0	90.0	964.9
4/29/2018 0:00	1.5	66.3	-2.4	63.2	0.0	90.1	964.9
4/29/2018 1:00	1.7	56.3	-2.6	65.1	0.0	90.1	965.0
4/29/2018 2:00	1.0	143.2	-2.5	64.6	0.0	90.1	965.1
4/29/2018 3:00	1.0	205.6	-2.6	65.3	0.0	90.2	965.2
4/29/2018 4:00	0.5	199.3	-2.8	66.0	0.0	90.1	965.2
4/29/2018 5:00	0.4	95.0	-3.0	64.5	0.8	90.2	965.3
4/29/2018 6:00	0.3	42.0	-2.8	64.7	19.1	90.0	965.2
4/29/2018 7:00	0.7	36.0	-2.3	62.6	78.1	89.3	965.6
4/29/2018 8:00	0.6	312.2	-0.7	57.2	306.8	89.1	966.2
4/29/2018 9:00	0.2	99.2	1.4	49.9	470.7	87.3	966.3
4/29/2018 10:00	1.6	211.8	0.6	55.4	622.2	89.4	965.9
4/29/2018 11:00	3.3	238.0	-0.1	61.6	730.2	89.5	966.5
4/29/2018 12:00	3.1	224.0	1.3	55.0	812.0	89.3	966.1
4/29/2018 13:00	3.0	267.0	2.2	50.2	875.0	89.4	966.2
4/29/2018 14:00	2.1	278.8	3.4	46.9	881.0	88.7	965.6
4/29/2018 15:00	3.1	290.1	3.5	45.9	776.3	88.6	965.2
4/29/2018 16:00	1.1	338.3	4.6	42.9	668.9	88.7	965.0
4/29/2018 17:00	2.2	322.6	3.8	47.2	519.8	89.1	964.6
4/29/2018 18:00	1.7	303.6	3.8	49.3	363.7	88.8	964.3
4/29/2018 19:00	1.9	279.2	3.2	51.9	192.0	88.8	964.3
4/29/2018 20:00	1.6	299.7	2.0	58.9	45.8	89.2	964.7
4/29/2018 21:00	2.7	205.5	1.4	57.3	2.9	88.9	964.6
4/29/2018 22:00	4.6	212.3	1.0	60.2	0.0	89.2	964.7
4/29/2018 23:00	4.0	210.1	0.6	64.0	0.0	88.8	964.9

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
4/30/2018 0:00	3.8	203.3	0.2	68.0	0.0	89.0	964.7
4/30/2018 1:00	4.6	210.2	0.0	70.6	0.0	89.0	964.8
4/30/2018 2:00	5.2	209.1	-0.2	72.5	0.0	89.0	964.6
4/30/2018 3:00	4.9	199.0	-0.5	75.2	0.0	88.3	964.7
4/30/2018 4:00	4.7	203.2	-0.8	77.8	0.0	88.7	964.9
4/30/2018 5:00	5.5	206.2	-1.0	79.4	0.7	87.6	964.0
4/30/2018 6:00	6.8	209.7	-1.2	82.5	42.2	87.8	964.6
4/30/2018 7:00	5.0	203.2	-1.3	86.1	75.4	87.5	964.8
4/30/2018 8:00	4.4	209.3	-1.2	87.6	125.9	87.5	964.6
4/30/2018 9:00	7.2	212.3	-1.4	87.8	189.2	87.2	965.1
4/30/2018 10:00	7.7	230.3	-1.4	88.9	255.6	87.4	964.8
4/30/2018 11:00	5.7	231.5	-1.3	87.6	194.5	87.9	965.1
4/30/2018 12:00	7.8	232.6	-1.3	86.9	212.6	87.0	965.5
4/30/2018 13:00	8.6	239.6	-1.3	86.0	217.1	87.3	964.9
4/30/2018 14:00	5.9	237.7	-1.0	85.0	204.0	87.6	964.8
4/30/2018 15:00	6.2	241.8	-0.3	81.6	277.2	87.2	964.8
4/30/2018 16:00	6.4	238.5	0.1	80.1	299.8	87.0	964.6
4/30/2018 17:00	5.4	229.0	-0.2	84.1	143.0	87.7	964.7
4/30/2018 18:00	4.1	223.9	-0.5	88.3	64.5	87.7	964.8
4/30/2018 19:00	3.7	205.1	-0.8	91.4	37.3	87.7	964.9
4/30/2018 20:00	4.5	199.0	-1.1	94.3	14.7	87.5	964.9
4/30/2018 21:00	4.8	204.9	-1.3	96.9	1.1	87.4	965.1
4/30/2018 22:00	4.5	217.1	-1.3	97.8	0.0	87.4	964.8
4/30/2018 23:00	4.6	220.6	-1.2	98.0	0.0	87.2	965.4
5/1/2018 0:00	4.7	209.9	-1.1	97.9	0.0	87.1	965.2
5/1/2018 1:00	4.4	223.3	-1.1	97.9	0.0	87.2	965.0
5/1/2018 2:00	4.3	220.6	-1.1	97.9	0.0	87.1	964.7
5/1/2018 3:00	4.3	210.2	-1.1	97.8	0.0	86.9	964.6
5/1/2018 4:00	5.2	209.9	-1.1	97.8	0.0	86.9	965.0
5/1/2018 5:00	4.2	202.1	-1.1	97.8	0.4	86.9	964.6
5/1/2018 6:00	5.0	223.9	-1.0	97.7	10.2	86.8	964.9
5/1/2018 7:00	5.1	229.4	-0.9	97.5	47.0	86.6	964.7
5/1/2018 8:00	5.7	223.2	-0.7	97.1	121.4	86.7	965.0
5/1/2018 9:00	5.2	213.2	-0.3	96.3	237.6	86.5	964.6
5/1/2018 10:00	4.4	213.8	0.3	95.2	406.5	86.5	965.0
5/1/2018 11:00	4.1	240.0	0.8	94.1	498.2	87.1	964.6
5/1/2018 12:00	5.5	231.4	1.1	93.4	410.9	87.2	964.5
5/1/2018 13:00	6.2	226.1	0.9	94.7	329.5	86.3	964.8
5/1/2018 14:00	7.0	220.0	0.6	96.6	210.5	86.1	965.2
5/1/2018 15:00	6.3	220.5	0.6	96.7	221.0	86.6	966.0
5/1/2018 16:00	7.6	218.7	0.5	97.0	200.6	84.6	966.2
5/1/2018 17:00	7.8	221.7	0.5	97.3	137.0	85.7	966.5
5/1/2018 18:00	6.5	211.8	0.4	97.6	99.0	86.1	967.3
5/1/2018 19:00	6.8	215.7	0.4	98.0	32.5	85.4	967.1
5/1/2018 20:00	6.5	213.6	0.4	98.2	15.3	85.3	967.2
5/1/2018 21:00	6.9	213.8	0.4	98.3	2.3	85.0	968.7
5/1/2018 22:00	6.5	212.0	0.5	98.4	0.0	85.0	968.1
5/1/2018 23:00	6.7	211.7	0.4	98.4	0.0	85.3	969.7
5/2/2018 0:00	6.4	212.2	0.3	98.5	0.0	84.1	970.0
5/2/2018 1:00	6.1	215.6	0.3	98.5	0.0	85.0	971.0
5/2/2018 2:00	6.0	214.3	0.3	98.6	0.0	84.5	971.6
5/2/2018 3:00	7.2	216.2	0.3	98.6	0.0	84.3	971.2
5/2/2018 4:00	7.3	219.1	0.3	98.6	0.0	84.4	971.8
5/2/2018 5:00	6.3	216.6	0.1	98.7	0.4	83.6	972.2

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
5/2/2018 6:00	5.9	209.1	0.0	98.7	8.1	84.3	972.3
5/2/2018 7:00	6.1	210.6	0.1	98.6	27.0	84.2	972.4
5/2/2018 8:00	6.4	210.9	0.2	98.5	79.1	84.8	972.1
5/2/2018 9:00	6.5	210.2	0.4	98.0	199.9	84.3	972.1
5/2/2018 10:00	6.8	217.6	0.8	97.3	306.0	85.2	972.7
5/2/2018 11:00	6.7	220.8	1.2	96.9	372.3	85.4	972.6
5/2/2018 12:00	7.3	228.3	1.6	96.8	360.8	84.7	972.9
5/2/2018 13:00	8.1	231.7	2.0	96.5	434.9	83.9	972.3
5/2/2018 14:00	8.3	232.1	2.0	95.9	445.4	83.7	972.1
5/2/2018 15:00	8.4	229.0	2.0	92.1	355.3	83.2	973.1
5/2/2018 16:00	10.4	234.5	2.2	83.0	284.7	83.3	971.9
5/2/2018 17:00	8.2	238.1	2.2	81.1	258.0	83.6	972.7
5/2/2018 18:00	6.6	225.5	1.9	84.0	221.0	83.2	972.8
5/2/2018 19:00	7.1	229.5	1.9	80.7	150.3	82.7	972.3
5/2/2018 20:00	6.3	232.1	1.5	81.2	97.6	83.0	973.1
5/2/2018 21:00	5.1	216.3	0.8	85.5	6.3	83.0	972.8
5/2/2018 22:00	5.7	226.0	0.5	88.3	0.0	82.9	972.6
5/2/2018 23:00	5.5	226.7	0.4	87.8	0.0	83.1	972.7
5/3/2018 0:00	4.5	229.4	0.2	88.0	0.0	82.9	972.5
5/3/2018 1:00	2.9	210.8	0.3	88.4	0.0	82.9	972.7
5/3/2018 2:00	3.3	210.2	0.2	90.0	0.0	83.0	972.5
5/3/2018 3:00	3.4	207.7	0.2	88.8	0.0	82.9	972.5
5/3/2018 4:00	3.8	200.9	0.1	88.3	0.0	82.8	972.4
5/3/2018 5:00	3.6	199.3	0.0	88.8	0.4	82.8	972.8
5/3/2018 6:00	3.9	205.0	-0.1	90.7	16.8	82.6	972.5
5/3/2018 7:00	3.3	203.0	0.0	89.8	46.8	82.7	972.6
5/3/2018 8:00	4.0	206.8	-0.2	92.9	68.5	82.8	972.5
5/3/2018 9:00	4.5	220.9	-0.2	96.2	183.2	81.8	972.9
5/3/2018 10:00	2.9	223.6	0.1	95.5	320.3	81.5	973.2
5/3/2018 11:00	3.1	225.6	0.4	94.9	382.2	82.0	973.4
5/3/2018 12:00	3.6	225.2	0.6	95.0	380.9	82.2	973.6
5/3/2018 13:00	3.6	223.4	0.8	95.3	365.1	82.9	974.0
5/3/2018 14:00	3.8	229.3	0.8	95.8	320.2	82.6	974.0
5/3/2018 15:00	4.6	226.7	1.0	95.8	358.5	82.6	975.1
5/3/2018 16:00	5.0	228.6	0.8	97.0	169.8	82.4	975.5
5/3/2018 17:00	6.1	229.9	0.8	97.2	171.2	82.3	976.3
5/3/2018 18:00	5.8	221.8	0.6	97.6	107.3	81.7	975.7
5/3/2018 19:00	5.4	218.6	0.5	98.0	52.2	81.5	976.4
5/3/2018 20:00	4.6	218.9	0.5	98.2	18.0	82.4	976.8
5/3/2018 21:00	4.0	212.3	0.4	98.4	2.3	82.6	976.7
5/3/2018 22:00	3.9	218.8	0.4	98.5	0.0	81.6	977.0
5/3/2018 23:00	3.4	216.2	0.5	98.5	0.0	81.7	977.0
5/4/2018 0:00	4.6	215.7	0.6	98.5	0.0	81.8	977.2
5/4/2018 1:00	4.4	211.9	0.5	98.6	0.0	81.1	977.4
5/4/2018 2:00	5.5	202.4	0.5	98.6	0.0	81.2	977.5
5/4/2018 3:00	6.3	200.7	0.6	98.6	0.0	81.4	977.5
5/4/2018 4:00	6.2	208.0	0.5	98.7	0.0	81.3	977.8
5/4/2018 5:00	5.1	206.6	0.4	98.7	0.2	80.8	977.7
5/4/2018 6:00	4.8	199.2	0.4	98.7	6.5	81.2	977.6
5/4/2018 7:00	5.3	207.2	0.5	98.7	29.4	81.7	977.7
5/4/2018 8:00	5.0	219.0	0.7	98.5	81.9	81.6	977.9
5/4/2018 9:00	4.5	216.3	0.9	98.3	112.1	81.7	977.8
5/4/2018 10:00	5.2	224.2	1.2	97.4	273.7	81.0	977.9
5/4/2018 11:00	4.8	226.0	1.6	97.0	314.5	81.1	977.6

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
5/4/2018 12:00	6.1	210.6	1.7	97.0	303.7	80.7	977.6
5/4/2018 13:00	6.3	219.4	1.8	96.7	358.9	80.5	977.3
5/4/2018 14:00	5.6	215.2	2.0	96.7	353.8	80.6	978.0
5/4/2018 15:00	5.3	209.9	2.5	96.1	378.9	80.3	977.6
5/4/2018 16:00	4.7	222.9	2.8	95.9	302.7	79.3	977.7
5/4/2018 17:00	4.6	224.2	2.9	96.5	246.4	78.4	977.9
5/4/2018 18:00	3.7	217.3	2.5	97.4	121.3	79.0	977.7
5/4/2018 19:00	4.5	205.9	2.5	96.7	50.8	79.3	977.5
5/4/2018 20:00	5.0	210.0	2.4	95.8	17.5	78.9	978.4
5/4/2018 21:00	4.4	206.8	2.4	95.2	2.7	77.8	977.6
5/4/2018 22:00	4.3	209.6	2.5	95.0	0.0	77.9	978.0
5/4/2018 23:00	4.9	204.9	2.6	93.0	0.0	77.3	977.7
5/5/2018 0:00	5.4	205.9	2.7	92.3	0.0	77.4	977.9
5/5/2018 1:00	5.0	203.6	2.8	92.5	0.0	78.1	978.4
5/5/2018 2:00	5.1	201.8	2.7	95.0	0.0	77.0	978.4
5/5/2018 3:00	4.8	204.0	2.7	95.9	0.0	77.1	978.3
5/5/2018 4:00	5.7	198.3	2.7	94.8	0.0	76.1	978.6
5/5/2018 5:00	5.8	199.5	2.6	94.9	0.9	76.5	978.8
5/5/2018 6:00	5.8	202.5	2.8	93.0	32.8	76.3	978.2
5/5/2018 7:00	4.8	211.3	2.9	93.0	82.3	76.1	978.6
5/5/2018 8:00	3.2	229.8	3.2	92.2	140.5	75.5	978.6
5/5/2018 9:00	3.4	218.0	3.6	91.6	260.6	75.2	978.4
5/5/2018 10:00	3.6	229.0	4.0	91.0	322.4	74.6	978.6
5/5/2018 11:00	4.8	214.4	3.8	95.1	340.6	74.6	978.1
5/5/2018 12:00	5.5	207.5	3.6	96.6	246.1	73.5	978.3
5/5/2018 13:00	3.9	206.2	3.6	97.1	164.9	72.5	978.5
5/5/2018 14:00	4.8	208.6	3.7	97.0	189.3	72.9	978.8
5/5/2018 15:00	4.4	215.2	3.8	96.9	224.4	70.7	978.4
5/5/2018 16:00	4.4	224.2	4.0	97.0	184.7	71.8	978.9
5/5/2018 17:00	5.7	215.4	4.0	97.0	153.8	71.3	978.1
5/5/2018 18:00	5.5	220.8	4.1	96.7	84.7	70.7	978.6
5/5/2018 19:00	3.9	206.2	4.1	96.1	56.4	70.7	978.7
5/5/2018 20:00	3.5	194.9	3.9	97.5	17.6	70.4	978.7
5/5/2018 21:00	3.7	205.4	4.1	96.8	4.6	69.3	978.8
5/5/2018 22:00	4.1	210.6	4.0	96.4	0.0	69.9	978.7
5/5/2018 23:00	2.9	210.9	4.1	95.1	0.0	70.1	978.9
5/6/2018 0:00	1.6	214.9	4.3	94.9	0.0	69.6	978.9
5/6/2018 1:00	1.1	193.9	4.4	94.2	0.0	69.7	978.8
5/6/2018 2:00	1.1	108.2	4.1	87.8	0.0	68.8	978.9
5/6/2018 3:00	0.4	98.9	4.2	86.1	0.0	69.4	978.8
5/6/2018 4:00	0.9	53.7	3.9	87.3	0.0	68.7	978.8
5/6/2018 5:00	1.0	60.2	3.9	88.5	2.6	69.1	978.8
5/6/2018 6:00	1.1	52.6	4.0	87.5	36.1	68.6	978.9
5/6/2018 7:00	2.3	31.9	4.7	85.0	194.7	68.2	979.2
5/6/2018 8:00	1.9	36.0	5.2	83.1	352.1	68.6	980.2
5/6/2018 9:00	1.2	27.1	6.2	79.4	510.9	67.9	980.6
5/6/2018 10:00	-	-	-	-	-	-	-
5/6/2018 11:00	-	-	-	-	-	-	-
5/6/2018 12:00	-	-	-	-	-	-	-
5/6/2018 13:00	-	-	-	-	-	-	-
5/6/2018 14:00	1.5	48.8	11.8	53.4	675.3	61.1	108.3
5/6/2018 15:00	1.8	58.3	10.9	59.0	672.8	61.4	108.1
5/6/2018 16:00	2.0	67.0	10.8	57.4	540.7	60.5	136.1
5/6/2018 17:00	2.1	61.0	10.8	57.5	417.0	60.3	136.0

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
5/6/2018 18:00	1.6	74.2	10.7	55.5	254.3	60.2	136.0
5/6/2018 19:00	1.7	83.2	10.0	57.5	82.8	61.1	136.1
5/6/2018 20:00	0.4	116.0	9.6	58.5	12.4	62.0	136.2
5/6/2018 21:00	0.1	51.1	9.3	59.2	0.0	61.4	136.2
5/6/2018 22:00	0.8	58.6	9.4	52.5	0.0	62.1	136.2
5/6/2018 23:00	1.3	187.7	9.5	59.2	0.0	61.0	136.2
5/7/2018 0:00	1.4	171.5	9.5	59.8	0.0	61.4	136.2
5/7/2018 1:00	1.6	196.0	9.5	57.6	0.0	61.2	136.2
5/7/2018 2:00	0.8	169.9	9.3	55.6	0.0	60.9	136.2
5/7/2018 3:00	0.5	187.9	9.0	56.0	0.0	62.0	136.2
5/7/2018 4:00	0.9	148.0	8.9	52.5	2.8	61.2	136.2
5/7/2018 5:00	2.0	222.7	9.2	49.0	23.0	61.5	136.2
5/7/2018 6:00	2.8	208.7	9.1	48.6	175.7	61.0	136.3
5/7/2018 7:00	2.8	200.1	9.6	47.4	340.9	59.8	136.5
5/7/2018 8:00	3.5	197.7	9.1	52.3	270.5	60.0	136.5
5/7/2018 9:00	4.2	207.8	9.8	50.4	663.9	58.7	136.5
5/7/2018 10:00	4.7	217.6	10.0	52.0	763.9	57.6	136.5
5/7/2018 11:00	5.1	232.0	10.5	52.4	837.0	56.8	136.5
5/7/2018 12:00	6.6	241.4	10.7	51.3	681.0	55.6	136.2
5/7/2018 13:00	6.4	233.8	10.8	50.7	497.9	55.6	136.2
5/7/2018 14:00	5.9	211.8	11.0	51.3	530.1	54.0	136.2
5/7/2018 15:00	6.1	192.7	10.7	53.1	345.0	53.3	136.2
5/7/2018 16:00	6.5	218.6	10.9	54.2	464.5	52.8	136.1
5/7/2018 17:00	7.6	241.7	10.5	57.2	394.9	52.2	136.1
5/7/2018 18:00	7.3	237.5	10.0	59.9	271.7	50.6	136.0
5/7/2018 19:00	4.5	213.5	9.2	64.3	97.9	50.2	136.1
5/7/2018 20:00	2.9	188.6	8.4	68.6	11.8	50.7	136.2
5/7/2018 21:00	2.8	192.5	7.9	70.5	0.0	51.0	136.2
5/7/2018 22:00	2.6	211.6	7.5	73.8	0.0	51.2	136.2
5/7/2018 23:00	2.5	210.9	7.4	75.1	0.0	51.0	136.2
5/8/2018 0:00	1.7	208.0	7.2	75.9	0.0	51.3	136.2
5/8/2018 1:00	1.0	102.1	6.8	74.1	0.0	51.5	136.2
5/8/2018 2:00	1.2	79.0	6.7	74.2	0.0	50.8	136.3
5/8/2018 3:00	1.1	125.3	6.8	73.7	0.0	50.8	136.3
5/8/2018 4:00	2.5	199.6	6.1	78.6	3.9	50.1	136.3
5/8/2018 5:00	2.4	184.3	6.0	79.7	35.9	50.7	136.3
5/8/2018 6:00	2.1	70.7	6.5	73.5	173.4	50.5	136.5
5/8/2018 7:00	1.6	63.9	7.3	70.6	341.3	50.0	136.6
5/8/2018 8:00	1.3	119.6	8.3	65.3	505.9	49.5	136.6
5/8/2018 9:00	0.9	174.6	9.1	62.6	657.4	48.7	136.6
5/8/2018 10:00	0.6	181.3	10.4	58.8	754.0	47.5	136.6
5/8/2018 11:00	0.9	92.8	10.8	55.2	844.0	46.3	136.6
5/8/2018 12:00	1.4	87.1	10.8	52.1	869.0	45.1	136.5
5/8/2018 13:00	2.9	95.0	10.7	51.1	909.0	45.2	136.3
5/8/2018 14:00	4.2	81.4	11.5	44.4	792.6	46.2	136.2
5/8/2018 15:00	3.3	101.7	11.6	45.4	615.8	46.1	136.2
5/8/2018 16:00	3.4	67.8	12.2	37.0	504.7	43.6	136.1
5/8/2018 17:00	4.3	64.4	12.5	34.6	437.6	43.3	136.1
5/8/2018 18:00	2.9	139.2	12.3	37.5	219.1	43.0	136.0
5/8/2018 19:00	1.3	199.4	11.7	44.6	72.3	43.7	136.2
5/8/2018 20:00	1.5	79.1	10.7	44.5	11.0	43.7	136.2
5/8/2018 21:00	4.4	39.3	10.7	42.1	0.1	42.1	136.2
5/8/2018 22:00	2.5	41.9	10.1	41.3	0.0	43.0	136.2
5/8/2018 23:00	2.3	44.3	10.4	40.4	0.0	43.3	136.2

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
5/9/2018 0:00	2.6	63.7	9.9	45.2	0.0	41.9	136.2
5/9/2018 1:00	7.1	24.1	10.5	42.5	0.0	43.1	136.3
5/9/2018 2:00	7.7	33.5	10.6	41.6	0.0	41.7	136.2
5/9/2018 3:00	6.6	20.6	10.3	42.2	0.0	41.9	136.2
5/9/2018 4:00	2.1	57.3	9.1	47.1	3.1	41.7	136.2
5/9/2018 5:00	2.0	358.3	10.4	43.2	52.4	41.5	136.3
5/9/2018 6:00	3.9	339.4	10.3	42.6	145.3	42.1	136.3
5/9/2018 7:00	3.4	349.1	10.5	42.6	150.0	41.4	136.3
5/9/2018 8:00	2.2	7.7	10.0	45.1	289.0	40.3	136.2
5/9/2018 9:00	7.8	63.8	10.8	43.2	266.1	39.3	136.3
5/9/2018 10:00	5.2	56.2	10.0	47.9	397.3	37.2	136.4
5/9/2018 11:00	7.7	85.5	10.3	49.0	322.8	37.2	136.3
5/9/2018 12:00	5.1	133.6	9.1	58.5	277.7	38.7	136.3
5/9/2018 13:00	3.9	189.0	7.6	78.0	211.6	37.6	136.3
5/9/2018 14:00	5.2	198.8	6.5	92.2	248.2	35.3	136.5
5/9/2018 15:00	4.3	217.1	5.8	96.1	194.6	35.0	136.8
5/9/2018 16:00	4.6	219.3	5.1	97.0	123.5	34.5	137.3
5/9/2018 17:00	4.7	222.2	4.6	97.4	88.1	32.6	138.0
5/9/2018 18:00	3.4	210.7	4.1	97.6	89.9	34.0	138.2
5/9/2018 19:00	2.6	209.4	4.1	97.6	50.2	32.4	138.2
5/9/2018 20:00	2.3	197.1	4.3	95.6	7.7	32.2	138.3
5/9/2018 21:00	1.4	201.0	4.3	93.5	0.0	30.3	138.3
5/9/2018 22:00	1.6	225.7	4.4	91.1	0.0	33.6	138.3
5/9/2018 23:00	2.8	208.6	3.8	94.5	0.0	32.0	138.3
5/10/2018 0:00	1.5	215.6	3.3	97.3	0.0	30.8	138.3
5/10/2018 1:00	1.1	334.7	3.6	96.5	0.0	30.7	138.4
5/10/2018 2:00	1.6	61.6	2.9	97.8	0.0	30.6	138.4
5/10/2018 3:00	1.6	38.6	3.2	98.1	0.0	30.4	138.4
5/10/2018 4:00	1.1	27.7	3.3	98.1	4.2	30.4	138.4
5/10/2018 5:00	0.6	72.5	3.4	97.4	49.7	30.1	138.4
5/10/2018 6:00	0.8	6.1	3.9	94.4	103.0	31.7	138.4
5/10/2018 7:00	0.9	107.8	4.5	89.8	155.4	31.2	138.7
5/10/2018 8:00	1.3	194.1	6.1	82.2	598.7	31.5	139.0
5/10/2018 9:00	1.8	212.3	6.4	79.7	704.9	31.3	139.0
5/10/2018 10:00	1.4	207.5	6.5	80.6	494.9	29.1	138.6
5/10/2018 11:00	3.7	226.5	6.3	75.2	486.7	29.0	138.7
5/10/2018 12:00	2.4	237.3	7.5	63.2	666.9	25.4	138.7
5/10/2018 13:00	2.4	263.7	7.4	69.0	427.7	26.4	138.5
5/10/2018 14:00	2.1	201.9	7.3	65.6	392.8	28.0	138.5
5/10/2018 15:00	6.4	234.1	6.4	71.9	345.7	26.4	138.4
5/10/2018 16:00	4.4	209.2	6.3	72.8	280.5	24.2	138.4
5/10/2018 17:00	4.7	227.5	6.6	71.8	337.7	24.4	138.3
5/10/2018 18:00	4.5	239.0	6.0	76.2	162.0	23.9	138.4
5/10/2018 19:00	3.2	204.2	5.0	84.8	30.6	21.9	138.4
5/10/2018 20:00	2.9	187.5	4.4	90.0	5.7	23.0	138.4
5/10/2018 21:00	3.7	200.7	4.2	91.0	0.1	24.9	138.5
5/10/2018 22:00	3.3	201.0	4.0	91.0	0.0	23.1	138.5
5/10/2018 23:00	3.7	213.0	3.9	90.3	0.0	21.3	138.5
5/11/2018 0:00	4.2	216.8	3.5	94.1	0.0	21.1	138.5
5/11/2018 1:00	4.3	215.5	3.4	93.7	0.0	20.9	138.6
5/11/2018 2:00	3.8	217.6	3.2	94.6	0.0	20.4	138.6
5/11/2018 3:00	4.0	208.7	3.3	90.6	0.0	18.3	138.6
5/11/2018 4:00	4.1	205.1	3.4	85.8	9.4	21.2	138.6
5/11/2018 5:00	4.3	215.7	3.4	85.8	57.9	21.2	138.6

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
5/11/2018 6:00	5.5	208.7	3.5	84.5	125.0	19.1	138.6
5/11/2018 7:00	5.4	217.5	3.7	87.5	278.2	17.5	138.6
5/11/2018 8:00	4.7	224.2	3.7	89.3	262.6	17.0	138.6
5/11/2018 9:00	5.3	227.5	4.0	87.8	304.3	16.9	138.5
5/11/2018 10:00	6.0	223.6	4.0	88.7	286.1	15.9	138.5
5/11/2018 11:00	4.7	218.7	4.2	90.6	367.8	15.8	138.6
5/11/2018 12:00	5.5	227.8	4.7	88.0	401.6	14.2	138.6
5/11/2018 13:00	5.8	224.8	4.8	88.3	347.3	14.0	138.5
5/11/2018 14:00	5.8	225.1	4.4	93.3	235.8	12.9	138.6
5/11/2018 15:00	5.3	219.3	4.1	96.2	137.2	13.0	138.6
5/11/2018 16:00	5.7	214.3	4.2	96.3	178.9	13.8	138.6
5/11/2018 17:00	5.8	214.9	4.2	95.5	89.0	12.0	138.6
5/11/2018 18:00	5.4	211.9	3.9	97.3	28.5	11.3	138.6
5/11/2018 19:00	5.7	213.6	3.7	97.9	13.5	11.3	138.6
5/11/2018 20:00	6.0	215.7	3.6	98.1	3.1	10.5	138.6
5/11/2018 21:00	5.2	212.1	3.6	98.3	0.0	8.8	138.7
5/11/2018 22:00	5.3	210.1	3.5	98.3	0.0	8.1	138.7
5/11/2018 23:00	5.4	208.9	3.5	98.4	0.0	7.7	138.7
5/12/2018 0:00	5.0	208.3	3.5	98.5	0.0	7.1	138.7
5/12/2018 1:00	4.8	208.3	3.5	98.5	0.0	6.6	138.9
5/12/2018 2:00	5.0	213.1	3.4	98.5	0.0	7.0	138.9
5/12/2018 3:00	5.3	201.9	3.4	98.6	0.0	5.5	139.0
5/12/2018 4:00	5.1	204.9	3.4	98.6	2.0	6.4	139.2
5/12/2018 5:00	5.3	207.6	3.4	98.6	32.7	4.4	139.4
5/12/2018 6:00	5.7	211.2	3.6	98.4	87.4	3.9	139.4
5/12/2018 7:00	5.4	206.0	3.7	98.3	111.0	5.6	139.4
5/12/2018 8:00	4.7	188.9	3.9	98.2	115.8	3.5	139.5
5/12/2018 9:00	4.3	208.0	4.1	98.0	130.6	5.3	139.5
5/12/2018 10:00	4.2	222.6	4.8	97.0	353.7	4.9	139.5
5/12/2018 11:00	4.0	211.3	5.4	96.4	417.0	3.1	139.5
5/12/2018 12:00	4.5	231.3	6.4	87.5	454.8	3.4	139.4
5/12/2018 13:00	6.7	246.3	6.2	81.4	316.3	2.4	139.4
5/12/2018 14:00	5.7	241.8	6.1	83.9	277.0	2.5	139.4
5/12/2018 15:00	5.1	231.8	5.9	86.9	175.6	1.7	139.3
5/12/2018 16:00	5.2	226.4	5.6	89.8	153.9	0.0	139.3
5/12/2018 17:00	3.9	209.6	5.5	90.8	127.8	1.2	139.3
5/12/2018 18:00	3.3	199.5	5.0	95.0	59.5	0.7	139.3
5/12/2018 19:00	2.5	197.1	4.8	97.1	48.6	0.8	139.3
5/12/2018 20:00	3.0	224.5	4.7	97.5	6.9	0.5	139.4
5/12/2018 21:00	2.0	179.6	4.4	97.5	0.1	0.1	139.4
5/12/2018 22:00	2.0	149.9	4.3	97.2	0.0	-	139.4
5/12/2018 23:00	2.7	207.9	5.0	93.4	0.0	-	139.4
5/13/2018 0:00	1.7	219.6	4.7	95.1	0.0	0.3	139.4
5/13/2018 1:00	0.7	276.4	4.6	95.6	0.0	0.2	139.4
5/13/2018 2:00	0.9	229.1	4.9	94.6	0.0	0.0	139.4
5/13/2018 3:00	1.6	223.4	5.0	92.7	0.0	0.0	139.4
5/13/2018 4:00	1.3	216.7	5.2	89.4	5.7	0.0	139.4
5/13/2018 5:00	1.0	189.4	6.1	80.5	40.5	0.0	139.4
5/13/2018 6:00	1.6	210.1	5.9	81.6	112.2	0.0	139.4
5/13/2018 7:00	2.7	199.0	6.5	73.0	243.6	0.0	139.4
5/13/2018 8:00	1.4	203.9	7.1	71.2	270.0	0.0	139.3
5/13/2018 9:00	2.8	198.4	6.9	77.7	331.7	0.0	139.3
5/13/2018 10:00	2.9	173.8	6.9	73.3	185.4	0.0	139.3
5/13/2018 11:00	1.8	344.6	6.8	80.0	301.0	0.0	139.4

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
5/13/2018 12:00	1.1	69.8	7.6	71.6	350.5	0.0	139.4
5/13/2018 13:00	1.7	39.5	8.7	64.7	477.9	0.0	139.4
5/13/2018 14:00	1.8	16.0	9.1	69.7	511.6	0.0	139.4
5/13/2018 15:00	0.6	28.0	10.2	67.4	534.5	0.0	139.3
5/13/2018 16:00	1.3	153.5	10.0	67.1	482.8	0.0	139.2
5/13/2018 17:00	2.2	209.9	9.9	67.2	270.9	0.0	139.2
5/13/2018 18:00	3.2	207.1	9.3	68.3	134.4	0.0	139.3
5/13/2018 19:00	2.3	205.5	9.0	68.7	53.9	0.0	139.3
5/13/2018 20:00	2.7	205.8	8.8	67.9	11.3	0.0	139.3
5/13/2018 21:00	2.8	215.4	8.1	72.7	0.0	0.0	139.3
5/13/2018 22:00	2.5	201.0	7.4	77.7	0.0	0.0	139.3
5/13/2018 23:00	5.6	224.6	7.2	80.3	0.0	0.0	139.3
5/14/2018 0:00	6.3	231.4	5.6	94.4	0.0	0.0	139.6
5/14/2018 1:00	7.0	231.5	4.4	97.7	0.0	0.0	140.2
5/14/2018 2:00	6.6	234.0	3.3	98.0	0.0	0.0	140.2
5/14/2018 3:00	4.7	191.5	2.5	98.1	0.0	0.0	140.3
5/14/2018 4:00	4.3	202.1	2.0	97.9	4.7	0.0	140.2
5/14/2018 5:00	5.4	210.5	1.7	96.7	39.8	0.0	140.2
5/14/2018 6:00	5.4	213.2	1.4	97.4	106.2	0.0	140.2
5/14/2018 7:00	5.9	218.6	1.4	97.0	208.6	0.0	140.2
5/14/2018 8:00	5.8	222.3	1.5	95.2	205.8	0.0	140.2
5/14/2018 9:00	6.9	232.3	1.9	87.9	350.8	0.0	140.3
5/14/2018 10:00	7.4	246.0	2.4	83.3	483.4	0.0	140.2
5/14/2018 11:00	5.4	251.8	2.9	81.1	447.7	0.0	140.2
5/14/2018 12:00	4.2	263.2	3.3	78.1	419.6	0.0	140.2
5/14/2018 13:00	2.8	262.8	3.7	75.4	425.9	0.0	140.2
5/14/2018 14:00	2.4	264.2	4.4	69.9	465.3	0.0	140.2
5/14/2018 15:00	2.3	347.7	4.4	72.3	489.5	0.0	140.2
5/14/2018 16:00	3.6	285.4	4.1	72.9	441.7	0.0	140.2
5/14/2018 17:00	3.4	346.5	3.6	76.5	382.0	0.0	140.1
5/14/2018 18:00	3.1	8.6	2.8	79.6	180.5	0.0	140.2
5/14/2018 19:00	1.4	44.0	2.4	81.4	70.2	0.0	140.2
5/14/2018 20:00	1.8	230.4	2.4	81.0	21.9	0.0	140.2
5/14/2018 21:00	2.3	221.0	1.6	86.1	0.5	0.0	140.2
5/14/2018 22:00	2.4	217.7	1.3	86.9	0.0	0.0	140.2
5/14/2018 23:00	2.2	203.6	0.9	88.4	0.0	0.0	140.2
5/15/2018 0:00	2.0	221.4	0.7	88.3	0.0	0.0	140.2
5/15/2018 1:00	2.0	221.0	0.5	88.3	0.0	0.0	140.2
5/15/2018 2:00	2.2	217.0	0.1	90.4	0.0	0.0	140.3
5/15/2018 3:00	1.1	185.9	-0.3	90.5	0.0	0.0	140.3
5/15/2018 4:00	0.9	169.6	-0.4	90.8	6.1	0.0	140.3
5/15/2018 5:00	0.9	181.4	-0.3	88.8	47.4	0.0	140.3
5/15/2018 6:00	0.7	148.6	0.1	85.6	146.1	0.0	140.3
5/15/2018 7:00	1.2	94.5	0.5	82.9	336.0	0.0	140.5
5/15/2018 8:00	1.5	72.0	1.2	79.9	554.4	0.0	140.7
5/15/2018 9:00	1.9	34.8	2.1	76.4	687.4	0.0	140.8
5/15/2018 10:00	0.7	41.2	3.6	61.9	798.7	0.0	140.7
5/15/2018 11:00	1.0	81.9	4.3	58.2	869.0	0.0	140.5
5/15/2018 12:00	1.6	75.9	4.7	58.9	936.0	0.0	140.4
5/15/2018 13:00	2.3	65.5	5.6	55.7	952.0	0.0	140.4
5/15/2018 14:00	2.1	82.7	6.2	51.7	827.0	0.0	140.2
5/15/2018 15:00	1.4	74.1	7.2	47.6	722.0	0.0	140.2
5/15/2018 16:00	2.1	346.7	7.4	49.2	584.3	0.0	140.1
5/15/2018 17:00	3.3	325.2	7.1	52.4	439.4	0.0	140.0



**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
5/15/2018 18:00	3.5	326.6	6.7	54.1	256.6	0.0	140.0
5/15/2018 19:00	2.9	347.8	6.0	57.5	100.9	0.0	140.1
5/15/2018 20:00	1.9	30.3	4.7	65.1	30.3	0.0	140.2
5/15/2018 21:00	1.1	80.2	4.2	64.1	0.7	0.0	140.2
5/15/2018 22:00	1.0	233.2	4.4	63.6	0.0	0.0	140.2
5/15/2018 23:00	0.8	215.5	4.0	65.5	0.0	0.0	140.2
5/16/2018 0:00	1.1	205.0	3.6	66.1	0.0	0.0	140.2
5/16/2018 1:00	0.7	199.3	3.2	67.8	0.0	0.0	140.2
5/16/2018 2:00	0.2	152.8	2.7	68.7	0.0	0.0	140.2
5/16/2018 3:00	0.3	359.6	2.8	69.2	0.0	0.0	140.2
5/16/2018 4:00	0.0	0.0	2.5	69.4	7.8	0.0	140.2
5/16/2018 5:00	0.7	55.9	2.8	65.5	86.9	0.0	140.4
5/16/2018 6:00	0.3	58.2	4.5	59.4	229.2	0.0	140.4
5/16/2018 7:00	0.3	58.3	5.4	54.6	381.6	0.0	140.6
5/16/2018 8:00	1.7	27.5	4.5	62.5	552.6	0.0	140.7
5/16/2018 9:00	0.5	21.9	5.8	59.8	690.8	0.0	140.5
5/16/2018 10:00	0.0	0.0	7.1	51.5	795.1	0.0	140.5
5/16/2018 11:00	0.1	183.6	8.1	51.6	865.0	0.0	140.5
5/16/2018 12:00	0.5	308.0	8.5	49.1	930.0	0.0	140.4
5/16/2018 13:00	0.9	86.0	8.6	45.6	949.0	0.0	140.2
5/16/2018 14:00	2.5	81.5	8.1	45.1	823.0	0.0	140.1
5/16/2018 15:00	1.3	58.5	9.4	41.0	711.2	0.0	140.2
5/16/2018 16:00	0.8	64.9	9.8	40.3	583.8	0.0	140.0
5/16/2018 17:00	2.4	319.5	9.3	43.9	444.7	0.0	140.0
5/16/2018 18:00	3.5	321.5	8.7	47.1	229.6	0.0	140.0
5/16/2018 19:00	2.7	2.8	7.7	53.7	103.4	0.0	140.0
5/16/2018 20:00	2.8	28.1	6.3	60.5	33.4	0.0	140.1
5/16/2018 21:00	2.4	67.4	6.0	60.9	0.9	0.0	140.2
5/16/2018 22:00	1.8	38.8	5.7	62.4	0.0	0.0	140.2
5/16/2018 23:00	1.9	65.2	5.6	61.4	0.0	0.0	140.2
5/17/2018 0:00	1.9	60.0	5.2	61.3	0.0	0.0	140.2
5/17/2018 1:00	2.4	35.6	4.9	64.4	0.0	0.0	140.2
5/17/2018 2:00	1.7	34.8	4.8	64.0	0.0	0.0	140.2
5/17/2018 3:00	0.4	59.6	4.7	63.7	0.1	0.0	140.2
5/17/2018 4:00	0.9	273.7	4.7	62.7	7.9	0.0	140.2
5/17/2018 5:00	0.8	160.7	5.2	60.9	93.6	0.0	140.3
5/17/2018 6:00	1.5	185.3	5.7	59.7	232.5	0.0	140.3
5/17/2018 7:00	1.3	177.0	6.5	57.9	384.0	0.0	140.4
5/17/2018 8:00	0.9	177.8	7.7	52.9	551.1	0.0	140.5
5/17/2018 9:00	1.0	198.0	8.4	51.5	686.4	0.0	140.5
5/17/2018 10:00	0.7	169.5	9.7	47.1	789.2	0.0	140.5
5/17/2018 11:00	0.2	148.4	11.4	41.5	856.0	0.0	140.5
5/17/2018 12:00	0.3	29.2	12.7	36.3	924.0	0.0	140.4
5/17/2018 13:00	0.0	76.5	13.8	33.7	937.0	0.0	140.2
5/17/2018 14:00	0.8	58.6	13.9	32.1	821.0	0.0	140.1
5/17/2018 15:00	1.8	78.8	13.1	35.5	692.8	0.0	140.0
5/17/2018 16:00	2.0	89.7	13.2	36.1	573.5	0.0	140.0
5/17/2018 17:00	1.7	67.2	14.1	33.0	430.8	0.0	140.0
5/17/2018 18:00	1.6	78.7	13.6	34.1	224.7	0.0	139.9
5/17/2018 19:00	0.5	135.0	14.0	33.4	95.6	0.0	139.9
5/17/2018 20:00	0.2	102.0	12.7	36.7	23.6	0.0	140.1
5/17/2018 21:00	1.4	83.2	12.0	36.1	0.5	0.0	140.1
5/17/2018 22:00	1.3	67.8	11.9	36.2	0.0	0.0	140.1
5/17/2018 23:00	1.3	65.8	11.8	34.9	0.0	0.0	140.1

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
5/18/2018 0:00	1.6	81.4	11.9	35.7	0.0	0.0	140.1
5/18/2018 1:00	0.7	67.2	11.7	37.0	0.0	0.0	140.1
5/18/2018 2:00	0.8	76.6	11.7	37.2	0.0	0.0	140.1
5/18/2018 3:00	0.8	115.9	11.6	37.6	0.0	0.0	140.2
5/18/2018 4:00	0.6	185.8	11.7	36.8	8.8	0.0	140.2
5/18/2018 5:00	0.7	102.0	12.3	37.3	84.9	0.0	140.2
5/18/2018 6:00	1.0	68.8	13.1	37.1	222.2	0.0	140.3
5/18/2018 7:00	1.1	68.5	13.5	36.6	370.0	0.0	140.4
5/18/2018 8:00	1.7	57.8	13.5	36.8	543.3	0.0	140.5
5/18/2018 9:00	1.7	61.3	14.0	36.8	676.1	0.0	140.5
5/18/2018 10:00	1.4	86.4	14.6	35.6	778.2	0.0	140.5
5/18/2018 11:00	0.9	88.5	15.2	35.4	846.0	0.0	140.4
5/18/2018 12:00	0.9	95.8	15.4	36.9	911.0	0.0	140.3
5/18/2018 13:00	1.4	105.0	16.1	35.6	929.0	0.0	140.2
5/18/2018 14:00	5.7	227.4	16.9	28.5	813.0	0.0	140.1
5/18/2018 15:00	7.1	222.2	16.8	27.8	721.7	0.0	140.0
5/18/2018 16:00	6.9	220.1	16.6	28.4	588.7	0.0	140.0
5/18/2018 17:00	7.1	237.1	16.1	31.5	447.2	0.0	139.9
5/18/2018 18:00	7.1	243.7	15.0	37.5	207.3	0.0	139.9
5/18/2018 19:00	4.8	227.7	13.8	43.1	96.2	0.0	140.0
5/18/2018 20:00	2.8	231.6	12.5	47.7	32.6	0.0	140.1
5/18/2018 21:00	2.5	219.5	11.7	50.6	1.2	0.0	140.1
5/18/2018 22:00	1.3	195.8	11.3	50.9	0.0	0.0	140.2
5/18/2018 23:00	0.7	135.0	10.8	52.2	0.0	0.0	140.2
5/19/2018 0:00	0.8	195.2	10.5	54.4	0.0	0.0	140.2
5/19/2018 1:00	0.9	118.3	10.0	55.5	0.0	0.0	140.2
5/19/2018 2:00	1.3	82.5	10.0	52.4	0.0	0.0	140.2
5/19/2018 3:00	1.1	77.0	10.0	52.1	0.2	0.0	140.2
5/19/2018 4:00	0.7	180.9	9.7	55.1	8.9	0.0	140.2
5/19/2018 5:00	0.7	174.4	9.9	57.4	94.3	0.0	140.3
5/19/2018 6:00	0.3	175.2	11.7	47.0	229.4	0.0	140.4
5/19/2018 7:00	0.3	86.7	12.3	43.6	377.9	0.0	140.5
5/19/2018 8:00	0.4	168.4	12.6	42.8	546.3	0.0	140.4
5/19/2018 9:00	0.6	137.6	13.2	41.2	654.3	0.0	140.6
5/19/2018 10:00	0.7	47.2	13.8	40.0	776.4	0.0	140.6
5/19/2018 11:00	0.4	56.4	14.7	43.9	848.0	0.0	140.4
5/19/2018 12:00	1.0	69.1	14.3	39.9	913.0	0.0	140.3
5/19/2018 13:00	0.7	94.9	15.5	40.8	931.0	0.0	140.3
5/19/2018 14:00	1.0	37.5	15.8	39.9	823.0	0.0	140.2
5/19/2018 15:00	2.7	209.3	15.9	37.4	797.5	0.0	140.1
5/19/2018 16:00	3.5	229.9	15.7	38.3	627.9	0.0	140.1
5/19/2018 17:00	4.9	244.9	14.2	44.9	223.0	0.0	140.1
5/19/2018 18:00	4.7	221.6	12.5	53.3	97.5	0.0	140.1
5/19/2018 19:00	3.0	198.7	11.8	57.0	47.3	0.0	140.1
5/19/2018 20:00	2.5	208.7	11.3	59.7	10.5	0.0	140.2
5/19/2018 21:00	1.4	230.8	10.8	62.0	0.2	0.0	140.2
5/19/2018 22:00	3.4	224.2	9.7	67.5	0.0	0.0	140.2
5/19/2018 23:00	3.9	206.8	8.6	73.6	0.0	0.0	140.2
5/20/2018 0:00	2.7	192.7	8.2	75.9	0.0	0.0	140.2
5/20/2018 1:00	4.0	211.1	7.5	79.1	0.0	0.0	140.2
5/20/2018 2:00	5.0	217.5	6.3	85.2	0.0	0.0	140.2
5/20/2018 3:00	4.0	207.7	5.5	89.0	0.0	0.0	140.2
5/20/2018 4:00	4.5	200.6	4.9	90.6	1.2	0.0	140.2
5/20/2018 5:00	5.4	208.7	4.4	86.0	17.5	0.0	140.2

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
5/20/2018 6:00	5.2	206.1	3.3	90.2	36.0	0.0	140.3
5/20/2018 7:00	4.8	208.1	3.0	94.9	87.1	0.0	141.3
5/20/2018 8:00	4.4	194.1	3.6	89.7	158.6	0.0	141.6
5/20/2018 9:00	4.2	201.6	3.7	92.9	315.1	0.0	141.7
5/20/2018 10:00	3.9	221.7	4.4	92.0	596.6	0.0	142.0
5/20/2018 11:00	3.5	226.7	5.1	88.7	637.0	0.0	141.7
5/20/2018 12:00	3.9	215.4	4.5	88.8	247.5	0.0	141.6
5/20/2018 13:00	5.0	232.8	4.6	85.9	227.8	0.0	141.6
5/20/2018 14:00	5.9	237.3	5.6	76.4	426.5	0.0	141.6
5/20/2018 15:00	6.3	220.8	6.2	68.2	487.5	0.0	141.6
5/20/2018 16:00	6.4	211.4	5.6	69.3	247.5	0.0	141.6
5/20/2018 17:00	6.6	204.1	5.1	73.5	187.8	0.0	141.5
5/20/2018 18:00	6.8	198.5	4.7	77.2	116.1	0.0	141.5
5/20/2018 19:00	4.9	216.2	4.1	82.0	51.2	0.0	141.5
5/20/2018 20:00	3.5	212.1	3.7	85.7	10.0	0.0	141.6
5/20/2018 21:00	4.3	193.6	3.8	83.2	0.3	0.0	141.6
5/20/2018 22:00	3.2	178.1	3.9	80.7	0.0	0.0	141.6
5/20/2018 23:00	3.4	197.0	3.8	84.0	0.0	0.0	141.6
5/21/2018 0:00	2.1	267.3	3.9	83.0	0.0	0.0	141.6
5/21/2018 1:00	4.1	138.3	3.3	88.3	0.0	0.0	141.6
5/21/2018 2:00	5.1	162.5	3.2	92.3	0.0	0.0	141.9
5/21/2018 3:00	3.8	146.3	3.3	91.1	0.0	0.0	142.3
5/21/2018 4:00	3.2	158.3	3.1	93.9	3.5	0.0	143.2
5/21/2018 5:00	5.0	171.9	2.9	94.4	25.8	0.0	143.8
5/21/2018 6:00	5.3	174.6	2.8	95.4	60.0	0.0	144.2
5/21/2018 7:00	4.4	178.5	3.1	94.1	147.8	0.0	144.4
5/21/2018 8:00	3.7	198.8	3.6	92.6	221.6	0.0	144.4
5/21/2018 9:00	4.0	215.8	3.9	93.1	298.6	0.0	144.5
5/21/2018 10:00	5.2	205.3	4.4	88.8	313.1	0.0	144.4
5/21/2018 11:00	4.8	215.9	4.4	90.2	288.9	0.0	144.4
5/21/2018 12:00	6.1	202.3	4.6	87.5	287.2	0.0	144.4
5/21/2018 13:00	8.3	185.9	4.4	83.6	213.2	0.0	144.7
5/21/2018 14:00	7.3	195.7	3.8	90.2	288.3	0.0	144.9
5/21/2018 15:00	6.0	202.2	3.3	96.1	226.3	0.0	145.4
5/21/2018 16:00	3.5	183.7	3.7	94.1	201.1	0.0	145.4
5/21/2018 17:00	3.3	187.2	4.0	89.9	121.1	0.0	145.4
5/21/2018 18:00	5.0	171.1	3.7	92.2	83.1	0.0	145.5
5/21/2018 19:00	4.3	165.7	3.7	90.5	36.8	0.0	145.5
5/21/2018 20:00	4.2	157.3	3.5	91.1	16.1	0.0	145.4
5/21/2018 21:00	2.5	160.8	3.8	89.1	0.4	0.0	145.5
5/21/2018 22:00	2.0	195.5	3.8	89.6	0.0	0.0	145.5
5/21/2018 23:00	1.8	184.4	3.9	88.8	0.0	0.0	145.5
5/22/2018 0:00	3.4	171.0	3.8	89.5	0.0	0.0	145.5
5/22/2018 1:00	5.6	178.6	3.6	91.5	0.0	0.0	145.6
5/22/2018 2:00	5.4	180.5	3.3	92.9	0.0	0.0	145.8
5/22/2018 3:00	5.1	182.3	3.2	92.6	0.1	0.0	145.8
5/22/2018 4:00	4.0	188.8	3.0	94.7	4.2	0.0	146.4
5/22/2018 5:00	5.5	180.2	2.9	94.3	33.7	0.0	146.7
5/22/2018 6:00	5.3	171.5	3.0	93.1	89.8	0.0	146.9
5/22/2018 7:00	4.5	167.3	3.4	92.1	165.5	0.0	147.0
5/22/2018 8:00	5.1	181.1	3.5	94.2	231.0	0.0	147.5
5/22/2018 9:00	4.4	179.8	3.8	95.4	256.7	0.0	148.0
5/22/2018 10:00	5.4	177.9	3.8	95.7	197.4	0.0	149.2
5/22/2018 11:00	6.2	194.2	3.6	96.9	180.6	0.0	150.4

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
5/22/2018 12:00	5.3	201.2	3.4	97.2	197.1	0.0	151.8
5/22/2018 13:00	4.9	222.2	3.2	97.1	227.2	0.0	153.3
5/22/2018 14:00	5.3	231.8	2.9	97.2	207.1	0.0	154.3
5/22/2018 15:00	5.0	230.6	2.6	97.5	143.2	0.0	155.1
5/22/2018 16:00	3.3	219.7	2.3	97.5	176.4	0.0	155.6
5/22/2018 17:00	1.7	172.9	2.3	97.5	180.0	0.0	155.8
5/22/2018 18:00	0.9	130.4	2.6	97.6	120.6	0.0	155.8
5/22/2018 19:00	1.2	111.8	2.8	97.5	44.0	0.0	155.9
5/22/2018 20:00	1.2	45.5	2.9	97.1	12.2	0.0	156.1
5/22/2018 21:00	0.7	85.9	2.8	97.3	1.1	0.0	156.1
5/22/2018 22:00	1.5	148.3	2.7	97.6	0.0	0.0	156.3
5/22/2018 23:00	2.1	116.1	2.8	96.7	0.0	0.0	156.3
5/23/2018 0:00	2.1	59.6	3.3	92.7	0.0	0.0	156.3
5/23/2018 1:00	0.8	128.1	3.5	92.3	0.0	0.0	156.4
5/23/2018 2:00	0.7	66.7	3.6	91.8	0.0	0.0	156.5
5/23/2018 3:00	0.3	35.3	3.7	90.6	0.3	0.0	156.5
5/23/2018 4:00	1.2	45.8	3.7	88.7	14.7	0.0	156.5
5/23/2018 5:00	1.5	66.6	4.1	84.6	68.7	0.0	156.5
5/23/2018 6:00	1.8	33.6	4.4	81.5	127.4	0.0	156.5
5/23/2018 7:00	0.6	71.9	4.7	84.9	231.0	0.0	156.4
5/23/2018 8:00	1.2	201.4	4.1	94.6	289.3	0.0	156.5
5/23/2018 9:00	0.8	207.2	4.5	95.7	278.6	0.0	156.5
5/23/2018 10:00	0.8	215.4	4.9	95.7	371.8	0.0	156.7
5/23/2018 11:00	1.0	30.8	6.2	89.3	558.8	0.0	156.7
5/23/2018 12:00	0.6	43.4	7.0	88.7	522.6	0.0	156.7
5/23/2018 13:00	0.7	30.1	6.7	91.4	352.7	0.0	156.7
5/23/2018 14:00	0.6	33.8	6.7	92.6	274.6	0.0	156.9
5/23/2018 15:00	1.1	224.3	6.7	94.6	208.7	0.0	157.0
5/23/2018 16:00	3.1	205.8	6.4	97.0	190.2	0.0	157.5
5/23/2018 17:00	4.2	205.4	6.2	97.4	113.6	0.0	157.6
5/23/2018 18:00	4.8	212.1	5.6	97.8	32.1	0.0	157.7
5/23/2018 19:00	5.3	220.5	5.0	98.0	25.2	0.0	158.1
5/23/2018 20:00	4.5	216.0	4.8	98.1	14.0	0.0	158.2
5/23/2018 21:00	7.2	229.7	4.5	98.3	0.2	0.0	158.4
5/23/2018 22:00	6.3	221.9	3.8	98.3	0.0	0.0	159.2
5/23/2018 23:00	6.3	222.8	2.8	98.4	0.0	0.0	159.5
5/24/2018 0:00	5.7	226.0	2.2	98.4	0.0	0.0	159.5
5/24/2018 1:00	4.0	212.1	1.9	98.5	0.0	0.0	159.5
5/24/2018 2:00	3.4	210.7	1.7	98.5	0.0	0.0	159.5
5/24/2018 3:00	3.4	234.7	1.6	98.5	0.0	0.0	159.5
5/24/2018 4:00	2.9	208.1	1.1	98.5	6.3	0.0	159.6
5/24/2018 5:00	3.4	210.0	0.8	98.4	30.0	0.0	159.6
5/24/2018 6:00	2.8	211.6	0.8	98.4	61.8	0.0	159.6
5/24/2018 7:00	2.8	210.2	0.9	98.2	135.9	0.0	159.6
5/24/2018 8:00	2.3	208.0	0.9	97.6	238.7	0.0	159.6
5/24/2018 9:00	2.5	209.5	1.6	92.9	408.2	0.0	159.7
5/24/2018 10:00	4.2	236.9	2.5	84.0	505.0	0.0	159.8
5/24/2018 11:00	4.1	233.2	3.1	82.3	672.3	0.0	159.7
5/24/2018 12:00	5.3	237.6	3.6	78.1	529.6	0.0	159.6
5/24/2018 13:00	5.2	231.7	3.6	76.0	369.7	0.0	159.5
5/24/2018 14:00	5.4	237.6	4.3	72.6	495.9	0.0	159.5
5/24/2018 15:00	5.4	235.9	3.9	74.8	290.1	0.0	159.5
5/24/2018 16:00	5.0	220.0	3.0	82.2	189.8	0.0	159.5
5/24/2018 17:00	3.7	199.2	2.8	87.0	179.9	0.0	159.5

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
5/24/2018 18:00	4.9	207.4	2.1	92.8	105.8	0.0	159.5
5/24/2018 19:00	5.1	208.8	2.2	87.8	91.1	0.0	159.5
5/24/2018 20:00	5.1	209.8	1.6	93.7	24.8	0.0	159.5
5/24/2018 21:00	5.1	205.7	1.5	91.0	1.3	0.0	159.5
5/24/2018 22:00	4.9	204.5	1.9	82.4	0.0	0.0	159.5
5/24/2018 23:00	3.5	217.4	1.8	79.8	0.0	0.0	159.5
5/25/2018 0:00	2.9	187.9	2.0	74.2	0.0	0.0	159.5
5/25/2018 1:00	3.6	187.9	1.9	74.7	0.0	0.0	159.5
5/25/2018 2:00	3.3	198.3	1.4	80.1	0.0	0.0	159.5
5/25/2018 3:00	3.9	175.5	0.8	88.7	0.1	0.0	159.5
5/25/2018 4:00	1.6	139.8	0.9	87.0	6.1	0.0	159.6
5/25/2018 5:00	2.0	181.6	0.3	92.8	30.1	0.0	159.9
5/25/2018 6:00	1.5	144.8	0.1	95.6	75.3	0.0	160.2
5/25/2018 7:00	5.1	188.2	0.1	96.7	158.7	0.0	160.3
5/25/2018 8:00	4.4	187.7	0.4	96.1	246.9	0.0	160.3
5/25/2018 9:00	2.6	147.0	1.4	89.8	471.1	0.0	160.4
5/25/2018 10:00	1.1	172.6	2.9	82.7	629.4	0.0	160.3
5/25/2018 11:00	2.4	234.2	2.7	82.8	564.8	0.0	160.3
5/25/2018 12:00	3.5	238.8	2.3	88.1	457.6	0.0	160.3
5/25/2018 13:00	2.5	229.7	3.0	83.3	628.1	0.0	160.3
5/25/2018 14:00	3.0	237.5	3.9	78.9	619.5	0.0	160.3
5/25/2018 15:00	2.9	241.1	4.1	77.0	479.5	0.0	160.2
5/25/2018 16:00	3.5	240.3	3.8	81.5	408.4	0.0	160.2
5/25/2018 17:00	4.2	228.0	3.5	84.7	280.2	0.0	160.2
5/25/2018 18:00	3.7	224.3	2.8	89.7	141.1	0.0	160.2
5/25/2018 19:00	4.1	220.6	2.5	91.1	82.0	0.0	160.2
5/25/2018 20:00	3.7	212.8	2.1	95.6	15.0	0.0	160.2
5/25/2018 21:00	2.8	220.3	2.0	94.7	0.9	0.0	160.3
5/25/2018 22:00	3.1	189.3	2.0	94.1	0.0	0.0	160.3
5/25/2018 23:00	3.9	201.8	1.8	95.1	0.0	0.0	160.3
5/26/2018 0:00	5.0	191.4	1.8	92.0	0.0	0.0	160.3
5/26/2018 1:00	4.5	186.8	1.9	88.9	0.0	0.0	160.3
5/26/2018 2:00	5.3	183.2	1.8	90.0	0.0	0.0	160.2
5/26/2018 3:00	6.7	184.8	1.3	89.9	0.0	0.0	160.4
5/26/2018 4:00	5.7	201.1	0.5	91.9	3.3	0.0	160.4
5/26/2018 5:00	5.6	202.1	-0.2	96.6	18.5	0.0	160.5
5/26/2018 6:00	5.5	192.4	-0.5	97.4	61.8	0.0	160.6
5/26/2018 7:00	3.1	174.3	-0.1	94.0	152.7	0.0	160.7
5/26/2018 8:00	1.7	184.4	0.3	92.8	195.4	0.0	160.8
5/26/2018 9:00	2.1	197.9	0.3	92.8	255.0	0.0	161.1
5/26/2018 10:00	1.7	218.8	0.6	92.9	279.3	0.0	161.6
5/26/2018 11:00	2.6	235.0	0.9	92.9	320.0	0.0	162.0
5/26/2018 12:00	2.5	207.0	1.0	92.9	285.1	0.0	162.5
5/26/2018 13:00	1.8	231.5	0.7	95.9	185.7	0.0	163.3
5/26/2018 14:00	2.4	207.8	0.9	96.0	216.9	0.0	163.6
5/26/2018 15:00	3.2	237.4	1.1	95.6	195.9	0.0	163.8
5/26/2018 16:00	3.5	211.2	1.3	96.5	163.1	0.0	164.4
5/26/2018 17:00	6.0	196.7	1.4	97.0	144.6	0.0	164.7
5/26/2018 18:00	5.0	194.5	1.7	96.0	77.4	0.0	164.8
5/26/2018 19:00	5.1	177.7	1.6	93.3	24.6	0.0	165.2
5/26/2018 20:00	5.3	175.4	1.4	91.3	16.2	0.0	165.3
5/26/2018 21:00	3.5	182.7	1.6	90.2	0.8	0.0	165.4
5/26/2018 22:00	5.0	200.5	1.0	96.3	0.0	0.0	165.9
5/26/2018 23:00	6.2	178.8	1.0	95.6	0.0	0.0	166.4

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
5/27/2018 0:00	7.2	195.8	1.2	94.7	0.0	0.0	167.0
5/27/2018 1:00	5.6	222.7	0.4	97.7	0.0	0.0	168.0
5/27/2018 2:00	4.7	220.4	0.0	97.9	0.0	0.0	168.8
5/27/2018 3:00	6.4	224.9	0.1	98.1	0.1	0.0	169.1
5/27/2018 4:00	6.7	201.5	0.1	98.1	15.0	0.0	169.4
5/27/2018 5:00	5.4	205.7	-0.1	96.9	68.9	0.0	169.4
5/27/2018 6:00	5.6	202.7	0.1	93.2	170.1	0.0	169.7
5/27/2018 7:00	5.2	198.9	0.7	90.3	275.7	0.0	171.0
5/27/2018 8:00	4.1	215.0	1.0	88.3	405.4	0.0	171.1
5/27/2018 9:00	3.7	221.3	1.4	82.6	448.3	0.0	170.9
5/27/2018 10:00	2.7	166.3	1.2	87.7	296.5	0.0	170.9
5/27/2018 11:00	2.1	197.9	0.8	92.7	294.1	0.0	171.2
5/27/2018 12:00	1.3	20.6	1.1	92.6	313.3	0.0	171.7
5/27/2018 13:00	1.6	0.1	0.9	93.1	297.6	0.0	172.2
5/27/2018 14:00	1.7	2.3	0.8	95.1	238.2	0.0	173.1
5/27/2018 15:00	1.2	6.1	0.6	96.8	177.5	0.0	174.1
5/27/2018 16:00	1.5	9.4	0.3	96.9	172.4	0.0	175.4
5/27/2018 17:00	1.3	29.8	0.3	97.2	108.7	0.0	176.2
5/27/2018 18:00	1.2	302.8	0.3	97.4	99.5	0.0	177.0
5/27/2018 19:00	1.1	13.0	0.1	97.7	56.8	0.0	177.7
5/27/2018 20:00	0.9	5.3	0.1	97.9	11.9	0.0	178.2
5/27/2018 21:00	2.0	212.8	-0.1	98.1	0.4	0.0	179.2
5/27/2018 22:00	3.8	206.0	-0.5	98.2	0.0	0.0	179.7
5/27/2018 23:00	4.3	220.3	-0.9	98.3	0.0	0.0	181.1
5/28/2018 0:00	4.3	213.0	-1.2	98.3	0.0	0.0	182.1
5/28/2018 1:00	4.2	222.4	-1.1	98.1	0.0	0.0	183.2
5/28/2018 2:00	4.6	205.3	-1.2	98.0	0.0	0.0	183.4
5/28/2018 3:00	4.1	213.0	-1.3	97.9	0.2	0.0	183.5
5/28/2018 4:00	4.0	214.5	-1.5	97.7	5.5	0.0	183.6
5/28/2018 5:00	3.2	216.6	-1.4	97.4	56.6	0.0	183.6
5/28/2018 6:00	2.5	212.3	-1.3	97.3	64.7	0.0	183.7
5/28/2018 7:00	3.1	206.5	-1.0	96.9	175.3	0.0	183.7
5/28/2018 8:00	4.1	214.2	-0.2	96.2	376.7	0.0	183.8
5/28/2018 9:00	4.7	217.8	0.2	96.2	368.4	0.0	184.7
5/28/2018 10:00	4.2	221.5	0.3	96.2	390.7	0.0	185.8
5/28/2018 11:00	4.4	224.4	0.5	95.7	414.1	0.0	186.0
5/28/2018 12:00	4.4	230.2	0.7	95.9	371.5	0.0	186.1
5/28/2018 13:00	3.9	234.0	1.2	95.8	408.9	0.0	186.4
5/28/2018 14:00	6.5	229.1	0.6	96.7	255.3	0.0	187.1
5/28/2018 15:00	6.1	220.4	0.2	96.9	266.5	0.0	187.4
5/28/2018 16:00	5.2	220.6	0.2	97.3	150.0	0.0	187.7
5/28/2018 17:00	4.8	217.8	0.2	97.4	152.6	0.0	187.8
5/28/2018 18:00	4.9	204.6	0.1	97.6	126.8	0.0	187.8
5/28/2018 19:00	4.3	208.5	-0.1	97.9	58.6	0.0	187.9
5/28/2018 20:00	3.8	206.4	-0.1	98.1	16.7	0.0	187.9
5/28/2018 21:00	2.3	177.8	-0.3	98.2	1.7	0.0	187.9
5/28/2018 22:00	1.3	120.1	-0.4	98.2	0.0	0.0	187.9
5/28/2018 23:00	0.8	134.3	-0.4	98.1	0.0	0.0	188.2
5/29/2018 0:00	2.3	169.1	-0.5	98.2	0.0	0.0	188.3
5/29/2018 1:00	2.1	198.0	-0.6	98.2	0.0	0.0	188.3
5/29/2018 2:00	0.9	90.1	-0.5	98.2	0.0	0.0	188.3
5/29/2018 3:00	0.8	299.7	-0.5	97.8	0.1	0.0	188.6
5/29/2018 4:00	1.0	165.5	-0.6	97.9	5.1	0.0	188.7
5/29/2018 5:00	0.5	82.2	-0.6	97.7	35.5	0.0	188.7

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
5/29/2018 6:00	0.0	0.0	-0.2	96.8	90.4	0.0	188.8
5/29/2018 7:00	0.6	56.0	0.3	95.5	315.6	0.0	189.1
5/29/2018 8:00	0.0	0.0	1.3	92.9	665.6	0.0	189.1
5/29/2018 9:00	0.2	238.1	2.4	90.4	734.7	0.0	188.9
5/29/2018 10:00	0.3	259.5	3.0	89.4	762.2	0.0	188.9
5/29/2018 11:00	0.7	129.9	2.7	89.6	479.0	0.0	188.9
5/29/2018 12:00	1.7	157.5	2.6	84.7	536.0	0.0	188.9
5/29/2018 13:00	2.3	188.6	2.4	83.6	407.6	0.0	189.0
5/29/2018 14:00	2.8	84.4	2.9	80.2	651.6	0.0	189.0
5/29/2018 15:00	3.1	34.6	2.4	81.5	217.5	0.0	189.2
5/29/2018 16:00	2.5	40.4	2.4	80.1	252.4	0.0	189.2
5/29/2018 17:00	2.7	170.7	1.7	84.2	92.8	0.0	189.3
5/29/2018 18:00	1.9	241.3	3.3	78.6	163.5	0.0	189.2
5/29/2018 19:00	2.2	297.3	2.6	86.3	171.1	0.0	189.4
5/29/2018 20:00	0.9	167.7	2.4	85.1	93.2	0.0	189.3
5/29/2018 21:00	2.0	198.7	2.1	84.7	3.5	0.0	189.3
5/29/2018 22:00	2.0	206.1	1.6	86.3	0.0	0.0	189.3
5/29/2018 23:00	1.9	207.5	1.3	88.3	0.0	0.0	189.3
5/30/2018 0:00	2.1	228.8	1.0	91.2	0.0	0.0	189.3
5/30/2018 1:00	1.7	185.0	0.9	91.4	0.0	0.0	189.4
5/30/2018 2:00	1.0	171.9	1.1	88.8	0.0	0.0	189.3
5/30/2018 3:00	1.1	136.5	1.3	83.8	0.6	0.0	189.3
5/30/2018 4:00	0.9	249.5	1.0	87.9	19.3	0.0	189.3
5/30/2018 5:00	0.2	167.4	1.0	89.3	57.9	0.0	189.4
5/30/2018 6:00	0.6	43.0	1.4	85.2	148.1	0.0	189.4
5/30/2018 7:00	0.7	5.9	1.8	80.8	258.4	0.0	189.4
5/30/2018 8:00	0.3	238.0	2.0	85.6	309.0	0.0	189.4
5/30/2018 9:00	0.1	105.8	3.5	75.3	595.9	0.0	189.5
5/30/2018 10:00	0.8	257.1	3.8	76.3	707.4	0.0	189.6
5/30/2018 11:00	0.9	107.9	4.6	70.8	916.0	0.0	189.3
5/30/2018 12:00	1.1	75.2	5.4	66.7	641.7	0.0	189.4
5/30/2018 13:00	1.3	73.7	5.6	64.7	419.6	0.0	189.2
5/30/2018 14:00	1.4	146.2	5.7	59.5	205.3	0.0	189.2
5/30/2018 15:00	4.0	218.9	6.9	54.1	628.2	0.0	189.2
5/30/2018 16:00	4.9	254.2	7.2	53.1	470.5	0.0	189.2
5/30/2018 17:00	4.3	237.0	6.9	53.9	378.3	0.0	189.2
5/30/2018 18:00	3.5	212.7	6.5	57.1	98.7	0.0	189.0
5/30/2018 19:00	3.6	239.3	6.1	57.0	119.6	0.0	189.1
5/30/2018 20:00	2.3	219.7	5.2	61.8	39.8	0.0	189.3
5/30/2018 21:00	2.1	199.9	4.1	71.4	3.8	0.0	189.3
5/30/2018 22:00	2.5	186.3	3.4	78.5	0.0	0.0	189.3
5/30/2018 23:00	2.1	180.0	3.0	82.0	0.0	0.0	189.3
5/31/2018 0:00	1.9	174.8	2.8	83.7	0.0	0.0	189.3
5/31/2018 1:00	1.8	184.0	2.8	83.0	0.0	0.0	189.3
5/31/2018 2:00	1.0	186.8	2.6	83.5	0.0	0.0	189.3
5/31/2018 3:00	1.0	186.4	2.2	86.6	0.7	0.0	189.3
5/31/2018 4:00	0.3	100.4	2.1	82.7	21.8	0.0	189.4
5/31/2018 5:00	0.2	81.8	2.9	79.2	118.8	0.0	189.4
5/31/2018 6:00	0.0	0.0	2.5	80.5	69.8	0.0	189.3
5/31/2018 7:00	0.0	0.0	2.8	82.6	151.7	0.0	189.3
5/31/2018 8:00	0.1	297.4	4.5	75.9	468.8	0.0	189.5
5/31/2018 9:00	0.3	128.6	5.9	69.8	720.3	0.0	189.6
5/31/2018 10:00	1.0	236.8	5.2	75.7	366.5	0.0	189.3
5/31/2018 11:00	2.8	236.1	5.6	69.1	464.5	0.0	189.3

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
5/31/2018 12:00	1.9	175.5	5.4	69.7	310.9	0.0	189.2
5/31/2018 13:00	2.3	261.7	6.5	65.9	512.1	0.0	189.3
5/31/2018 14:00	3.5	288.4	7.1	62.6	684.8	0.0	189.3
5/31/2018 15:00	1.7	271.1	6.9	61.8	280.7	0.0	189.2
5/31/2018 16:00	2.4	17.9	6.1	64.0	109.0	0.0	190.3
5/31/2018 17:00	2.4	243.7	6.3	63.0	111.4	0.0	190.2
5/31/2018 18:00	4.6	243.7	6.1	64.2	91.2	0.0	190.3
5/31/2018 19:00	2.6	192.5	5.0	71.5	69.8	0.0	190.3
5/31/2018 20:00	2.4	196.4	4.8	72.8	22.4	0.0	190.3
5/31/2018 21:00	3.5	214.1	4.1	76.7	1.4	0.0	190.3
5/31/2018 22:00	2.9	213.8	4.1	75.3	0.0	0.0	190.3
5/31/2018 23:00	4.5	193.8	4.1	73.1	0.0	0.0	190.3
6/1/2018 0:00	6.1	186.3	4.1	59.1	0.0	0.0	190.3
6/1/2018 1:00	4.9	194.9	3.4	55.9	0.0	0.0	190.3
6/1/2018 2:00	2.3	196.2	3.2	56.2	0.0	0.0	190.3
6/1/2018 3:00	0.5	120.8	3.4	58.6	0.6	0.0	190.3
6/1/2018 4:00	2.7	77.1	2.9	68.7	10.5	0.0	190.3
6/1/2018 5:00	2.2	191.7	2.7	68.7	32.9	0.0	190.3
6/1/2018 6:00	0.8	168.0	2.8	71.1	96.6	0.0	190.3
6/1/2018 7:00	0.0	61.7	4.0	66.1	265.0	0.0	190.4
6/1/2018 8:00	0.4	249.2	5.0	66.4	409.7	0.0	190.3
6/1/2018 9:00	0.7	175.9	4.8	69.7	456.6	0.0	190.3
6/1/2018 10:00	0.9	100.7	5.1	69.7	510.7	0.0	190.4
6/1/2018 11:00	1.8	70.3	5.5	70.3	506.3	0.0	190.3
6/1/2018 12:00	2.4	201.4	5.5	70.9	311.5	0.0	190.4
6/1/2018 13:00	4.8	189.7	4.9	77.4	341.7	0.0	190.4
6/1/2018 14:00	4.2	189.8	4.5	81.6	352.5	0.0	190.3
6/1/2018 15:00	5.6	186.1	4.2	82.3	347.0	0.0	190.3
6/1/2018 16:00	6.0	188.2	4.8	77.9	600.0	0.0	190.3
6/1/2018 17:00	5.4	210.8	4.8	76.0	285.2	0.0	190.3
6/1/2018 18:00	4.0	214.1	4.7	77.3	158.8	0.0	190.3
6/1/2018 19:00	4.5	185.2	3.6	83.4	61.3	0.0	190.3
6/1/2018 20:00	3.2	215.3	2.9	90.8	19.3	0.0	190.4
6/1/2018 21:00	4.3	214.7	2.0	97.0	1.4	0.0	190.9
6/1/2018 22:00	3.6	213.9	1.6	97.4	0.0	0.0	191.3
6/1/2018 23:00	3.8	208.0	1.5	97.7	0.0	0.0	191.8
6/2/2018 0:00	3.7	200.4	1.1	97.8	0.0	0.0	191.9
6/2/2018 1:00	3.8	214.8	1.1	97.8	0.0	0.0	191.9
6/2/2018 2:00	3.0	212.9	1.0	97.9	0.0	0.0	191.9
6/2/2018 3:00	3.0	212.7	0.9	97.9	0.5	0.0	191.9
6/2/2018 4:00	3.0	217.2	0.9	97.9	12.7	0.0	191.9
6/2/2018 5:00	2.8	209.1	1.0	97.5	51.9	0.0	191.9
6/2/2018 6:00	3.0	171.7	1.5	93.5	142.8	0.0	191.9
6/2/2018 7:00	1.9	143.2	2.3	86.8	259.0	0.0	191.9
6/2/2018 8:00	3.0	178.3	2.8	86.7	449.5	0.0	191.9
6/2/2018 9:00	3.2	211.2	2.8	88.0	455.1	0.0	192.0
6/2/2018 10:00	2.9	211.9	3.3	88.1	517.6	0.0	192.0
6/2/2018 11:00	4.2	247.5	3.6	85.3	436.6	0.0	191.9
6/2/2018 12:00	3.0	252.1	4.6	79.6	770.1	0.0	192.1
6/2/2018 13:00	4.0	249.6	5.3	76.2	862.0	0.0	191.9
6/2/2018 14:00	5.8	253.0	5.2	75.1	658.7	0.0	191.9
6/2/2018 15:00	6.5	246.1	5.3	72.8	616.9	0.0	191.8
6/2/2018 16:00	5.6	233.9	4.2	79.5	261.0	0.0	191.8
6/2/2018 17:00	3.5	195.4	3.3	85.2	195.5	0.0	192.2



**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
6/2/2018 18:00	2.0	222.0	3.7	83.2	163.1	0.0	192.2
6/2/2018 19:00	2.5	219.4	3.5	84.1	88.6	0.0	192.3
6/2/2018 20:00	1.6	229.9	3.0	88.0	36.0	0.0	192.3
6/2/2018 21:00	2.2	202.3	2.3	94.1	1.8	0.0	193.0
6/2/2018 22:00	1.2	181.2	1.9	92.1	0.0	0.0	193.0
6/2/2018 23:00	1.3	196.8	2.1	88.3	0.0	0.0	193.0
6/3/2018 0:00	1.0	33.9	2.4	85.7	0.0	0.0	193.0
6/3/2018 1:00	2.0	30.6	2.1	91.0	0.0	0.0	193.0
6/3/2018 2:00	1.1	148.4	1.8	93.4	0.0	0.0	193.0
6/3/2018 3:00	1.3	171.1	2.0	88.5	1.0	0.0	193.0
6/3/2018 4:00	1.3	190.8	2.2	85.1	21.7	0.0	193.0
6/3/2018 5:00	0.0	0.0	2.6	80.3	48.0	0.0	193.0
6/3/2018 6:00	0.1	213.6	2.6	84.1	101.1	0.0	193.0
6/3/2018 7:00	2.0	202.2	2.1	92.3	140.5	0.0	193.0
6/3/2018 8:00	0.8	284.4	2.4	92.9	152.6	0.0	193.3
6/3/2018 9:00	1.5	9.5	2.1	94.3	246.5	0.0	194.0
6/3/2018 10:00	1.4	47.8	2.9	90.0	426.0	0.0	194.0
6/3/2018 11:00	1.3	40.8	3.7	87.3	530.3	0.0	194.2
6/3/2018 12:00	0.8	97.7	3.3	87.0	294.3	0.0	196.9
6/3/2018 13:00	1.9	298.0	3.5	89.5	519.8	0.0	197.1
6/3/2018 14:00	2.5	291.1	4.1	87.8	324.9	0.0	197.2
6/3/2018 15:00	1.9	79.0	4.0	82.3	389.4	0.0	197.2
6/3/2018 16:00	1.7	85.3	4.3	79.6	258.9	0.0	197.7
6/3/2018 17:00	2.1	75.3	3.8	82.4	253.8	0.0	198.0
6/3/2018 18:00	0.2	330.3	4.8	75.8	161.7	0.0	198.0
6/3/2018 19:00	0.9	320.6	4.1	83.0	38.5	0.0	198.2
6/3/2018 20:00	4.4	191.7	1.7	95.9	4.2	0.0	200.3
6/3/2018 21:00	3.7	178.4	1.0	94.4	0.6	0.0	203.1
6/3/2018 22:00	3.5	199.3	1.4	93.1	0.0	0.0	204.0
6/3/2018 23:00	3.7	212.8	1.3	95.3	0.0	0.0	204.5
6/4/2018 0:00	3.6	213.9	1.1	97.4	0.0	0.0	204.6
6/4/2018 1:00	3.7	211.8	1.0	97.7	0.0	0.0	204.6
6/4/2018 2:00	3.3	215.2	1.0	97.8	0.0	0.0	204.6
6/4/2018 3:00	3.1	213.8	1.0	97.8	0.3	0.0	204.6
6/4/2018 4:00	3.7	221.0	0.9	97.9	4.2	0.0	204.6
6/4/2018 5:00	3.6	225.0	0.8	98.0	24.6	0.0	204.6
6/4/2018 6:00	3.8	220.9	0.8	98.0	77.0	0.0	204.6
6/4/2018 7:00	3.5	231.0	0.9	97.8	143.8	0.0	204.6
6/4/2018 8:00	4.5	224.0	1.0	97.7	265.6	0.0	204.7
6/4/2018 9:00	4.5	221.2	1.3	97.3	357.6	0.0	204.7
6/4/2018 10:00	4.8	216.0	1.9	91.5	392.6	0.0	204.7
6/4/2018 11:00	4.5	205.3	2.8	84.5	519.4	0.0	204.7
6/4/2018 12:00	3.8	231.7	3.6	79.9	523.1	0.0	204.7
6/4/2018 13:00	4.1	244.0	4.2	75.8	689.0	0.0	204.7
6/4/2018 14:00	3.6	234.6	4.7	70.7	574.1	0.0	204.6
6/4/2018 15:00	5.9	245.6	5.1	67.6	580.5	0.0	204.5
6/4/2018 16:00	5.1	218.7	3.6	79.0	197.5	0.0	204.6
6/4/2018 17:00	4.4	212.2	3.1	82.6	126.9	0.0	204.6
6/4/2018 18:00	3.7	219.3	2.4	89.6	70.1	0.0	204.7
6/4/2018 19:00	3.5	207.1	2.4	89.4	67.9	0.0	204.7
6/4/2018 20:00	3.5	228.5	2.1	89.5	15.3	0.0	204.7
6/4/2018 21:00	2.5	207.5	1.6	92.9	2.4	0.0	204.7
6/4/2018 22:00	1.9	212.5	1.5	91.4	0.0	0.0	204.7
6/4/2018 23:00	2.8	199.7	1.6	88.5	0.0	0.0	204.7

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
6/5/2018 0:00	1.8	180.3	1.8	82.4	0.0	0.0	204.7
6/5/2018 1:00	2.2	214.6	1.2	90.0	0.0	0.0	204.7
6/5/2018 2:00	1.5	155.6	1.4	83.8	0.0	0.0	204.7
6/5/2018 3:00	2.1	157.7	1.4	80.6	0.8	0.0	204.7
6/5/2018 4:00	2.4	75.2	1.3	83.5	36.4	0.0	204.7
6/5/2018 5:00	2.1	8.5	1.6	85.4	130.3	0.0	204.8
6/5/2018 6:00	1.2	43.9	2.7	75.4	289.2	0.0	204.8
6/5/2018 7:00	3.1	53.1	2.9	70.0	343.0	0.0	204.8
6/5/2018 8:00	4.5	45.4	3.7	61.6	504.1	0.0	204.8
6/5/2018 9:00	3.9	72.9	4.5	57.4	689.5	0.0	204.8
6/5/2018 10:00	2.8	74.4	5.0	54.1	657.1	0.0	204.8
6/5/2018 11:00	3.8	101.1	5.4	49.7	842.0	0.0	204.7
6/5/2018 12:00	4.5	99.0	5.9	47.0	882.0	0.0	204.7
6/5/2018 13:00	3.3	113.5	6.5	44.5	689.9	0.0	204.6
6/5/2018 14:00	2.8	100.6	6.8	41.6	470.6	0.0	204.5
6/5/2018 15:00	3.4	84.2	6.9	40.9	399.4	0.0	204.5
6/5/2018 16:00	5.6	101.8	6.9	41.0	412.6	0.0	204.5
6/5/2018 17:00	7.2	98.9	6.9	42.3	261.6	0.0	204.5
6/5/2018 18:00	5.3	94.9	7.1	43.4	140.5	0.0	204.5
6/5/2018 19:00	6.2	96.4	6.9	45.2	50.8	0.0	204.6
6/5/2018 20:00	7.1	104.5	6.0	52.7	32.8	0.0	204.6
6/5/2018 21:00	7.6	105.7	5.8	55.0	4.8	0.0	204.6
6/5/2018 22:00	6.5	82.5	5.6	58.4	0.0	0.0	204.6
6/5/2018 23:00	4.0	138.7	5.1	63.8	0.0	0.0	204.6
6/6/2018 0:00	1.9	184.6	4.6	68.5	0.0	0.0	204.6
6/6/2018 1:00	1.8	359.5	4.4	70.3	0.0	0.0	204.6
6/6/2018 2:00	1.7	10.1	4.4	71.6	0.0	0.0	204.6
6/6/2018 3:00	0.6	109.4	4.5	69.6	0.5	0.0	204.6
6/6/2018 4:00	1.5	225.9	4.7	68.9	17.3	0.0	204.6
6/6/2018 5:00	1.7	184.1	4.4	73.5	51.6	0.0	204.7
6/6/2018 6:00	2.9	180.3	3.5	84.0	82.1	0.0	205.0
6/6/2018 7:00	5.3	176.5	3.2	88.4	175.6	0.0	205.3
6/6/2018 8:00	3.9	204.3	3.6	87.1	371.2	0.0	205.3
6/6/2018 9:00	4.2	228.3	3.4	89.4	446.9	0.0	205.4
6/6/2018 10:00	7.3	193.9	3.2	81.5	440.9	0.0	205.7
6/6/2018 11:00	6.0	210.7	5.0	72.0	943.0	0.0	205.6
6/6/2018 12:00	6.4	203.3	5.8	62.8	700.3	0.0	205.4
6/6/2018 13:00	7.0	197.4	4.8	75.4	527.4	0.0	205.4
6/6/2018 14:00	6.0	188.2	5.9	68.8	682.7	0.0	205.3
6/6/2018 15:00	4.7	202.1	5.2	71.6	363.9	0.0	205.4
6/6/2018 16:00	4.3	213.0	5.8	66.9	410.1	0.0	205.3
6/6/2018 17:00	3.9	219.0	3.9	83.8	175.6	0.0	205.3
6/6/2018 18:00	3.5	206.9	2.1	95.6	69.5	0.0	205.6
6/6/2018 19:00	4.2	173.1	2.1	91.8	53.0	0.0	206.9
6/6/2018 20:00	2.2	144.7	2.7	86.7	16.7	0.0	206.9
6/6/2018 21:00	2.4	192.0	2.4	88.8	2.1	0.0	207.0
6/6/2018 22:00	2.8	61.6	2.4	88.8	0.0	0.0	207.1
6/6/2018 23:00	0.2	58.2	3.0	82.4	0.0	0.0	207.0
6/7/2018 0:00	3.4	210.7	1.7	92.8	0.0	0.0	208.7
6/7/2018 1:00	2.9	162.9	1.2	95.7	0.0	0.0	208.8
6/7/2018 2:00	1.8	47.1	1.8	92.3	0.0	0.0	208.8
6/7/2018 3:00	0.5	62.6	2.0	91.6	0.5	0.0	208.9
6/7/2018 4:00	0.5	89.0	2.0	89.8	13.5	0.0	209.0
6/7/2018 5:00	1.7	56.1	2.0	89.6	62.9	0.0	209.1

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
6/7/2018 6:00	0.7	55.6	2.5	88.4	95.0	0.0	209.1
6/7/2018 7:00	0.3	70.9	3.0	87.6	190.6	0.0	209.2
6/7/2018 8:00	0.6	56.9	3.5	86.2	315.5	0.0	209.3
6/7/2018 9:00	0.6	44.6	4.5	80.4	382.2	0.0	209.2
6/7/2018 10:00	0.7	274.3	4.4	85.3	326.7	0.0	209.3
6/7/2018 11:00	1.0	177.3	3.9	86.3	212.1	0.0	210.5
6/7/2018 12:00	3.0	202.7	4.1	88.2	445.7	0.0	210.4
6/7/2018 13:00	4.4	199.0	2.6	93.5	166.9	0.0	213.8
6/7/2018 14:00	6.8	176.8	3.0	87.2	479.6	0.0	214.6
6/7/2018 15:00	3.5	220.0	4.3	88.1	652.7	0.0	214.6
6/7/2018 16:00	2.0	22.1	4.6	82.5	229.9	0.0	214.6
6/7/2018 17:00	1.6	355.3	5.3	76.7	274.5	0.0	214.5
6/7/2018 18:00	1.0	32.6	5.8	76.9	156.4	0.0	214.5
6/7/2018 19:00	0.9	201.6	6.0	76.9	151.5	0.0	214.4
6/7/2018 20:00	0.6	296.5	5.6	82.2	38.2	0.0	214.5
6/7/2018 21:00	3.9	102.6	5.6	68.2	3.1	0.0	214.5
6/7/2018 22:00	3.8	155.5	4.4	78.0	0.0	0.0	215.1
6/7/2018 23:00	8.4	186.5	2.7	83.9	0.0	0.0	215.5
6/8/2018 0:00	6.2	202.2	2.9	86.8	0.0	0.0	215.5
6/8/2018 1:00	6.5	195.4	2.9	84.8	0.0	0.0	215.4
6/8/2018 2:00	6.5	186.2	2.9	77.5	0.0	0.0	215.4
6/8/2018 3:00	5.8	190.6	2.1	84.3	0.8	0.0	215.4
6/8/2018 4:00	5.9	195.9	1.8	82.7	14.6	0.0	215.4
6/8/2018 5:00	4.2	171.5	1.7	79.9	46.2	0.0	215.4
6/8/2018 6:00	4.2	153.9	1.8	74.1	57.7	0.0	215.4
6/8/2018 7:00	3.3	152.1	2.2	68.2	121.8	0.0	215.4
6/8/2018 8:00	1.4	157.5	3.5	67.2	473.0	0.0	215.6
6/8/2018 9:00	1.0	96.0	4.6	63.7	671.7	0.0	215.6
6/8/2018 10:00	1.1	69.4	5.1	66.8	728.0	0.0	215.5
6/8/2018 11:00	1.9	238.0	5.3	67.3	581.8	0.0	215.5
6/8/2018 12:00	3.1	227.5	5.5	59.8	576.9	0.0	215.3
6/8/2018 13:00	3.5	231.3	5.8	56.2	611.4	0.0	215.3
6/8/2018 14:00	3.1	256.0	7.0	51.4	880.0	0.0	215.3
6/8/2018 15:00	4.5	243.6	6.7	54.8	658.5	0.0	215.2
6/8/2018 16:00	6.2	230.2	5.6	67.0	619.8	0.0	215.2
6/8/2018 17:00	3.0	178.0	3.4	81.0	133.3	0.0	215.4
6/8/2018 18:00	2.0	214.9	3.2	86.5	119.9	0.0	215.9
6/8/2018 19:00	3.4	232.1	3.0	85.2	44.6	0.0	217.3
6/8/2018 20:00	2.3	184.7	2.9	86.9	58.7	0.0	217.4
6/8/2018 21:00	2.9	201.4	2.6	87.2	4.5	0.0	217.4
6/8/2018 22:00	2.5	202.9	2.2	91.7	0.1	0.0	217.4
6/8/2018 23:00	1.7	183.8	2.3	87.3	0.0	0.0	217.4
6/9/2018 0:00	1.9	170.0	2.4	85.4	0.0	0.0	217.4
6/9/2018 1:00	1.8	190.3	2.5	82.6	0.0	0.0	217.3
6/9/2018 2:00	1.2	226.6	2.4	84.1	0.0	0.0	217.3
6/9/2018 3:00	0.6	224.6	2.2	85.4	1.3	0.0	217.3
6/9/2018 4:00	0.5	221.9	2.1	86.4	21.0	0.0	217.3
6/9/2018 5:00	1.3	192.6	2.2	86.4	78.9	0.0	217.3
6/9/2018 6:00	1.4	217.9	2.3	85.6	141.1	0.0	217.3
6/9/2018 7:00	1.4	222.3	2.4	86.5	216.5	0.0	217.3
6/9/2018 8:00	1.1	257.5	2.8	81.1	238.2	0.0	217.4
6/9/2018 9:00	1.2	266.8	3.3	83.3	428.3	0.0	217.4
6/9/2018 10:00	2.4	244.5	3.8	78.6	620.5	0.0	217.4
6/9/2018 11:00	2.2	273.8	4.1	80.0	514.3	0.0	217.3

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
6/9/2018 12:00	2.6	225.2	4.4	74.4	475.0	0.0	217.3
6/9/2018 13:00	3.1	223.9	6.2	63.1	986.0	0.0	217.2
6/9/2018 14:00	3.7	268.5	6.0	67.3	396.2	0.0	217.2
6/9/2018 15:00	5.5	230.3	4.7	75.6	398.1	0.0	217.2
6/9/2018 16:00	4.2	201.4	3.9	80.3	176.6	0.0	217.2
6/9/2018 17:00	5.5	225.4	4.7	79.8	349.7	0.0	217.2
6/9/2018 18:00	4.6	223.7	4.0	81.9	127.0	0.0	217.2
6/9/2018 19:00	5.1	217.3	3.5	83.7	39.5	0.0	217.2
6/9/2018 20:00	3.4	201.4	3.1	87.0	38.6	0.0	217.2
6/9/2018 21:00	3.1	195.7	2.5	92.1	3.8	0.0	217.3
6/9/2018 22:00	2.9	193.5	2.2	94.2	0.0	0.0	217.3
6/9/2018 23:00	2.7	197.0	2.0	95.8	0.0	0.0	217.3
6/10/2018 0:00	3.6	224.6	1.7	96.0	0.0	0.0	217.3
6/10/2018 1:00	3.3	221.4	1.6	95.7	0.0	0.0	217.3
6/10/2018 2:00	3.1	220.4	1.7	93.8	0.0	0.0	217.3
6/10/2018 3:00	3.2	207.8	1.5	94.3	0.4	0.0	217.3
6/10/2018 4:00	3.4	211.2	1.3	96.9	5.4	0.0	217.3
6/10/2018 5:00	3.4	210.3	1.3	97.5	30.2	0.0	217.6
6/10/2018 6:00	3.6	214.7	1.4	97.5	90.0	0.0	217.6
6/10/2018 7:00	3.7	222.2	1.4	97.4	179.8	0.0	217.6
6/10/2018 8:00	3.6	208.7	2.1	97.1	342.2	0.0	217.6
6/10/2018 9:00	4.5	217.1	2.2	96.4	419.6	0.0	217.8
6/10/2018 10:00	5.1	233.8	3.3	82.5	558.8	0.0	217.6
6/10/2018 11:00	4.5	227.6	3.7	79.1	434.6	0.0	217.5
6/10/2018 12:00	4.8	224.0	4.7	69.5	526.5	0.0	217.5
6/10/2018 13:00	7.4	238.6	5.4	64.5	567.7	0.0	217.5
6/10/2018 14:00	8.8	249.4	4.4	73.6	262.0	0.0	217.4
6/10/2018 15:00	6.9	242.5	4.4	74.2	272.7	0.0	217.5
6/10/2018 16:00	7.7	255.4	4.2	76.8	176.1	0.0	217.5
6/10/2018 17:00	5.2	264.3	4.1	82.0	185.9	0.0	217.5
6/10/2018 18:00	5.8	252.3	3.8	82.5	115.8	0.0	217.5
6/10/2018 19:00	6.1	247.3	3.1	86.9	41.6	0.0	217.5
6/10/2018 20:00	5.0	235.4	2.6	90.9	11.0	0.0	217.5
6/10/2018 21:00	3.3	206.2	2.1	93.5	1.6	0.0	217.5
6/10/2018 22:00	4.3	214.5	1.7	95.9	0.0	0.0	217.5
6/10/2018 23:00	3.5	208.5	1.5	97.1	0.0	0.0	217.6
6/11/2018 0:00	3.8	214.2	1.2	97.5	0.0	0.0	217.6
6/11/2018 1:00	3.9	213.1	1.1	97.7	0.0	0.0	217.6
6/11/2018 2:00	4.8	222.4	1.0	97.8	0.0	0.0	217.6
6/11/2018 3:00	3.2	220.8	1.0	97.9	0.5	0.0	217.6
6/11/2018 4:00	4.3	212.7	0.9	97.9	7.1	0.0	217.6
6/11/2018 5:00	4.0	215.9	1.0	98.0	18.8	0.0	217.6
6/11/2018 6:00	4.2	214.4	1.1	97.9	65.5	0.0	217.6
6/11/2018 7:00	4.6	210.1	1.2	97.9	75.9	0.0	217.7
6/11/2018 8:00	4.3	213.5	1.5	97.9	118.2	0.0	217.8
6/11/2018 9:00	4.6	214.6	1.8	97.9	156.6	0.0	217.8
6/11/2018 10:00	4.4	219.2	2.2	97.8	211.5	0.0	217.9
6/11/2018 11:00	4.9	223.4	2.6	97.7	208.1	0.0	217.9
6/11/2018 12:00	4.8	223.3	3.1	97.1	263.7	0.0	217.9
6/11/2018 13:00	5.1	233.1	3.7	94.2	276.4	0.0	218.0
6/11/2018 14:00	6.2	236.2	4.1	90.9	270.0	0.0	218.0
6/11/2018 15:00	7.1	240.1	4.5	87.8	260.6	0.0	218.0
6/11/2018 16:00	7.0	243.9	4.9	85.6	251.4	0.0	218.0
6/11/2018 17:00	6.4	237.3	5.0	86.3	174.2	0.0	218.0

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
6/11/2018 18:00	6.2	240.4	5.1	84.9	118.9	0.0	218.0
6/11/2018 19:00	5.0	236.0	4.5	89.1	69.4	0.0	218.0
6/11/2018 20:00	3.8	205.1	3.8	94.5	17.6	0.0	218.0
6/11/2018 21:00	4.1	210.5	3.5	97.1	3.3	0.0	218.0
6/11/2018 22:00	3.8	202.8	3.3	97.7	0.0	0.0	218.0
6/11/2018 23:00	2.9	190.2	3.2	97.8	0.0	0.0	218.1
6/12/2018 0:00	2.4	197.8	3.1	97.8	0.0	0.0	218.1
6/12/2018 1:00	1.8	190.5	3.0	97.8	0.0	0.0	218.1
6/12/2018 2:00	1.4	231.7	2.9	97.9	0.0	0.0	218.1
6/12/2018 3:00	1.2	199.7	2.9	97.8	1.1	0.0	218.1
6/12/2018 4:00	0.9	202.1	3.0	96.4	29.5	0.0	218.1
6/12/2018 5:00	0.8	209.5	3.4	94.3	140.7	0.0	218.1
6/12/2018 6:00	0.7	45.8	3.5	93.1	131.1	0.0	218.1
6/12/2018 7:00	0.7	14.0	4.1	89.6	196.8	0.0	218.1
6/12/2018 8:00	0.8	65.1	4.9	82.4	351.3	0.0	218.2
6/12/2018 9:00	1.5	84.0	6.3	71.1	766.1	0.0	218.4
6/12/2018 10:00	1.8	141.7	6.8	67.7	790.4	0.0	218.3
6/12/2018 11:00	1.6	226.3	7.6	64.8	547.8	0.0	218.0
6/12/2018 12:00	2.0	248.0	8.3	61.6	638.3	0.0	218.0
6/12/2018 13:00	3.6	217.0	8.2	59.3	610.9	0.0	218.0
6/12/2018 14:00	4.8	242.9	8.8	55.6	706.5	0.0	218.0
6/12/2018 15:00	3.0	240.3	9.2	53.0	565.2	0.0	217.9
6/12/2018 16:00	2.7	226.6	9.0	53.5	391.8	0.0	217.9
6/12/2018 17:00	2.6	192.2	9.4	52.2	435.8	0.0	217.8
6/12/2018 18:00	3.5	215.0	9.3	53.3	192.6	0.0	217.9
6/12/2018 19:00	3.2	233.5	8.6	55.2	115.1	0.0	217.9
6/12/2018 20:00	2.3	210.1	8.1	56.4	71.6	0.0	217.9
6/12/2018 21:00	1.8	206.5	7.5	60.3	12.2	0.0	218.0
6/12/2018 22:00	2.1	230.5	6.9	65.4	0.1	0.0	218.0
6/12/2018 23:00	2.8	223.9	6.0	71.5	0.0	0.0	218.0
6/13/2018 0:00	3.2	216.2	5.1	79.1	0.0	0.0	218.0
6/13/2018 1:00	2.8	185.4	4.7	83.0	0.0	0.0	218.0
6/13/2018 2:00	2.6	187.9	4.2	87.1	0.0	0.0	218.0
6/13/2018 3:00	2.9	206.3	4.2	87.6	3.1	0.0	218.1
6/13/2018 4:00	2.6	221.9	4.3	86.5	27.8	0.0	218.0
6/13/2018 5:00	2.6	229.8	4.4	86.5	67.0	0.0	218.1
6/13/2018 6:00	2.9	216.4	4.7	85.3	173.8	0.0	218.1
6/13/2018 7:00	2.5	224.6	5.2	83.2	316.2	0.0	218.1
6/13/2018 8:00	2.9	225.9	5.5	82.3	352.9	0.0	218.0
6/13/2018 9:00	2.5	227.2	5.7	81.8	388.5	0.0	218.2
6/13/2018 10:00	2.3	238.6	6.9	78.1	585.4	0.0	218.1
6/13/2018 11:00	2.4	254.2	6.8	79.0	341.9	0.0	218.1
6/13/2018 12:00	2.6	260.5	7.3	80.1	510.1	0.0	218.1
6/13/2018 13:00	3.2	248.5	7.4	79.9	420.3	0.0	218.0
6/13/2018 14:00	3.0	254.1	7.8	77.8	315.9	0.0	218.0
6/13/2018 15:00	3.0	277.9	7.9	79.2	347.0	0.0	218.0
6/13/2018 16:00	3.8	262.0	7.7	81.1	238.4	0.0	218.0
6/13/2018 17:00	4.9	245.2	7.3	84.5	175.2	0.0	218.1
6/13/2018 18:00	3.9	233.2	6.6	90.6	114.8	0.0	218.1
6/13/2018 19:00	3.9	233.8	6.4	91.3	46.4	0.0	218.1
6/13/2018 20:00	4.4	236.6	5.9	94.1	13.5	0.0	218.1
6/13/2018 21:00	3.5	218.6	5.6	97.2	1.1	0.0	218.2
6/13/2018 22:00	3.8	218.9	5.5	97.6	0.0	0.0	218.4
6/13/2018 23:00	4.2	221.6	5.4	97.8	0.0	0.0	218.8

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
6/14/2018 0:00	3.5	223.8	5.4	98.0	0.0	0.0	219.9
6/14/2018 1:00	4.2	219.0	5.3	98.0	0.0	0.0	221.1
6/14/2018 2:00	4.4	220.0	5.1	98.1	0.0	0.0	222.3
6/14/2018 3:00	4.2	220.5	5.0	98.2	0.2	0.0	223.4
6/14/2018 4:00	4.7	217.3	4.9	98.2	4.1	0.0	224.6
6/14/2018 5:00	4.4	218.6	4.8	98.3	14.8	0.0	226.2
6/14/2018 6:00	4.7	228.0	4.7	98.3	39.8	0.0	226.9
6/14/2018 7:00	5.1	231.9	4.9	98.3	68.8	0.0	227.7
6/14/2018 8:00	5.3	234.9	4.9	98.2	107.0	0.0	228.2
6/14/2018 9:00	3.7	226.3	5.2	97.9	346.4	0.0	228.2
6/14/2018 10:00	3.7	249.4	5.5	97.4	623.0	0.0	228.4
6/14/2018 11:00	5.6	258.9	5.0	97.5	344.2	0.0	228.2
6/14/2018 12:00	7.7	225.9	5.5	90.5	574.1	0.0	228.2
6/14/2018 13:00	5.0	253.7	6.1	83.0	386.3	0.0	228.2
6/14/2018 14:00	4.3	279.9	5.6	81.9	263.9	0.0	228.2
6/14/2018 15:00	5.3	241.2	5.9	74.3	263.6	0.0	228.2
6/14/2018 16:00	3.5	290.4	5.5	75.4	177.2	0.0	228.2
6/14/2018 17:00	5.0	262.2	6.3	68.2	318.8	0.0	228.0
6/14/2018 18:00	7.5	235.2	6.2	64.5	219.1	0.0	228.0
6/14/2018 19:00	4.5	242.7	5.5	68.4	92.0	0.0	228.1
6/14/2018 20:00	4.6	221.0	4.4	75.3	20.7	0.0	228.1
6/14/2018 21:00	3.5	201.5	3.9	77.1	7.7	0.0	228.1
6/14/2018 22:00	3.2	202.7	3.5	80.9	0.1	0.0	228.1
6/14/2018 23:00	3.2	213.5	3.5	79.0	0.0	0.0	228.1
6/15/2018 0:00	2.8	206.1	3.3	81.3	0.0	0.0	228.1
6/15/2018 1:00	2.1	222.5	3.1	83.3	0.0	0.0	228.1
6/15/2018 2:00	1.7	233.2	3.0	84.2	0.0	0.0	228.1
6/15/2018 3:00	1.8	231.9	2.9	85.5	0.9	0.0	228.1
6/15/2018 4:00	1.3	232.8	3.0	86.4	15.6	0.0	228.1
6/15/2018 5:00	0.6	182.2	3.1	86.9	74.2	0.0	228.1
6/15/2018 6:00	0.8	220.8	3.4	87.1	173.3	0.0	228.2
6/15/2018 7:00	0.9	207.9	4.1	82.8	406.0	0.0	228.3
6/15/2018 8:00	1.0	67.9	5.8	76.1	671.2	0.0	228.2
6/15/2018 9:00	1.4	11.4	6.2	73.9	742.5	0.0	228.3
6/15/2018 10:00	2.0	303.5	6.6	70.6	835.0	0.0	228.4
6/15/2018 11:00	2.7	325.6	7.5	69.2	847.0	0.0	228.4
6/15/2018 12:00	3.2	336.4	8.5	65.7	951.0	0.0	228.2
6/15/2018 13:00	3.1	336.0	9.7	61.1	990.0	0.0	228.1
6/15/2018 14:00	3.8	328.8	10.2	59.1	854.0	0.0	228.0
6/15/2018 15:00	3.6	306.4	11.0	56.6	765.4	0.0	228.0
6/15/2018 16:00	3.9	312.4	11.1	57.5	640.4	0.0	227.9
6/15/2018 17:00	3.1	308.8	11.3	59.6	511.5	0.0	227.8
6/15/2018 18:00	2.4	302.3	11.3	59.4	155.3	0.0	227.7
6/15/2018 19:00	2.5	277.1	10.8	61.4	151.4	0.0	227.7
6/15/2018 20:00	3.0	236.6	9.7	67.5	62.3	0.0	227.9
6/15/2018 21:00	3.2	214.0	8.4	74.6	6.5	0.0	228.0
6/15/2018 22:00	3.0	218.3	7.7	78.4	0.1	0.0	228.0
6/15/2018 23:00	3.4	226.8	7.1	82.1	0.0	0.0	228.0
6/16/2018 0:00	3.4	220.2	6.7	84.2	0.0	0.0	228.0
6/16/2018 1:00	3.6	220.6	6.4	85.7	0.0	0.0	228.0
6/16/2018 2:00	3.4	221.8	6.3	86.1	0.0	0.0	228.0
6/16/2018 3:00	2.5	221.4	6.0	86.8	1.4	0.0	228.1
6/16/2018 4:00	3.4	218.9	6.2	86.1	47.3	0.0	228.0
6/16/2018 5:00	3.4	218.7	6.1	86.6	154.0	0.0	228.0

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
6/16/2018 6:00	3.2	221.3	6.5	85.1	171.8	0.0	228.1
6/16/2018 7:00	3.0	208.1	7.2	81.8	302.9	0.0	228.0
6/16/2018 8:00	2.6	243.4	8.1	76.0	450.7	0.0	228.3
6/16/2018 9:00	2.1	234.0	9.9	60.5	628.1	0.0	228.2
6/16/2018 10:00	2.6	224.6	10.4	57.7	789.4	0.0	228.2
6/16/2018 11:00	2.9	237.1	11.3	58.0	754.0	0.0	228.2
6/16/2018 12:00	3.7	242.2	12.2	49.7	711.8	0.0	228.0
6/16/2018 13:00	3.0	266.8	13.3	48.0	873.0	0.0	228.0
6/16/2018 14:00	3.1	268.5	14.1	47.1	615.6	0.0	227.9
6/16/2018 15:00	3.1	292.0	13.9	48.5	628.6	0.0	227.9
6/16/2018 16:00	3.2	323.8	13.6	53.9	453.1	0.0	227.9
6/16/2018 17:00	1.7	325.9	13.3	55.3	270.1	0.0	227.9
6/16/2018 18:00	2.6	345.3	12.9	58.3	227.9	0.0	227.7
6/16/2018 19:00	2.0	342.9	12.5	61.9	140.5	0.0	227.9
6/16/2018 20:00	1.6	236.6	11.5	66.3	44.5	0.0	227.9
6/16/2018 21:00	1.7	235.8	10.8	69.7	6.6	0.0	227.9
6/16/2018 22:00	1.5	187.2	10.3	71.5	0.1	0.0	227.9
6/16/2018 23:00	2.8	208.1	10.1	71.8	0.0	0.0	227.9
6/17/2018 0:00	3.8	213.1	9.5	74.6	0.0	0.0	227.9
6/17/2018 1:00	4.0	224.1	9.1	77.2	0.0	0.0	228.0
6/17/2018 2:00	3.2	212.9	9.1	76.6	0.0	0.0	228.0
6/17/2018 3:00	2.8	230.5	9.1	76.9	0.4	0.0	228.0
6/17/2018 4:00	3.2	217.5	8.9	78.1	10.1	0.0	228.0
6/17/2018 5:00	2.9	217.4	9.0	78.1	64.1	0.0	228.0
6/17/2018 6:00	3.1	237.7	9.0	79.2	175.3	0.0	228.0
6/17/2018 7:00	3.5	220.6	9.3	79.9	323.9	0.0	228.0
6/17/2018 8:00	3.7	229.4	9.4	81.5	253.6	0.0	228.0
6/17/2018 9:00	3.3	236.8	10.3	80.0	415.8	0.0	228.1
6/17/2018 10:00	4.2	228.5	11.0	79.7	622.3	0.0	228.1
6/17/2018 11:00	3.9	237.7	12.2	76.3	865.0	0.0	228.2
6/17/2018 12:00	3.7	266.7	13.5	70.9	959.0	0.0	228.1
6/17/2018 13:00	4.1	274.0	14.4	65.6	988.0	0.0	228.0
6/17/2018 14:00	3.3	291.2	14.9	61.9	847.0	0.0	227.9
6/17/2018 15:00	3.4	276.1	15.7	58.0	641.5	0.0	227.8
6/17/2018 16:00	3.7	292.6	15.5	57.0	615.2	0.0	227.8
6/17/2018 17:00	3.7	294.8	15.5	55.2	500.6	0.0	227.7
6/17/2018 18:00	3.5	325.1	14.7	55.5	163.9	0.0	227.8
6/17/2018 19:00	3.5	344.9	13.8	62.4	190.1	0.0	227.7
6/17/2018 20:00	2.6	12.4	12.7	69.7	52.7	0.0	227.9
6/17/2018 21:00	1.8	52.5	12.2	70.8	6.7	0.0	227.9
6/17/2018 22:00	1.2	340.4	12.8	66.3	0.1	0.0	227.9
6/17/2018 23:00	1.2	9.2	11.9	74.0	0.0	0.0	227.9
6/18/2018 0:00	1.9	29.2	11.9	70.9	0.0	0.0	227.9
6/18/2018 1:00	2.8	31.8	10.8	81.4	0.0	0.0	228.0
6/18/2018 2:00	3.3	47.5	10.2	83.1	0.0	0.0	228.0
6/18/2018 3:00	3.3	24.1	10.8	76.8	1.4	0.0	228.0
6/18/2018 4:00	2.7	22.4	10.6	79.6	26.4	0.0	228.0
6/18/2018 5:00	1.4	26.7	10.3	81.9	71.7	0.0	228.0
6/18/2018 6:00	1.5	191.1	11.3	77.4	278.1	0.0	228.0
6/18/2018 7:00	1.5	191.8	12.6	68.9	398.8	0.0	228.1
6/18/2018 8:00	1.3	137.2	14.2	62.9	541.1	0.0	228.2
6/18/2018 9:00	2.4	21.7	15.0	61.0	646.4	0.0	228.2
6/18/2018 10:00	2.7	11.5	16.3	58.5	751.7	0.0	228.2
6/18/2018 11:00	1.3	354.1	17.2	53.1	779.6	0.0	228.1

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
6/18/2018 12:00	1.9	319.7	18.2	47.8	893.0	0.0	228.1
6/18/2018 13:00	2.0	327.0	18.9	42.2	968.0	0.0	227.9
6/18/2018 14:00	2.7	308.2	20.1	41.7	807.0	0.0	227.9
6/18/2018 15:00	3.2	305.0	20.7	33.9	728.2	0.0	227.8
6/18/2018 16:00	2.3	310.1	21.1	32.4	578.8	0.0	227.8
6/18/2018 17:00	1.9	354.1	21.3	31.1	481.5	0.0	227.7
6/18/2018 18:00	1.8	346.5	21.3	33.5	193.6	0.0	227.7
6/18/2018 19:00	2.1	21.9	19.7	39.5	140.6	0.0	227.7
6/18/2018 20:00	2.1	48.3	19.1	38.1	70.9	0.0	227.8
6/18/2018 21:00	2.6	56.8	18.0	39.9	8.0	0.0	227.9
6/18/2018 22:00	1.7	47.5	17.4	38.3	0.2	0.0	227.9
6/18/2018 23:00	1.6	51.7	16.9	38.4	0.0	0.0	227.9
6/19/2018 0:00	1.1	63.5	17.1	35.8	0.0	0.0	227.9
6/19/2018 1:00	1.3	65.6	17.0	32.6	0.0	0.0	227.9
6/19/2018 2:00	0.0	0.0	16.8	29.9	0.0	0.0	227.9
6/19/2018 3:00	0.2	65.2	16.6	30.9	2.8	0.0	227.9
6/19/2018 4:00	1.2	55.3	17.1	30.7	62.2	0.0	227.9
6/19/2018 5:00	1.8	55.9	17.3	28.7	171.4	0.0	228.0
6/19/2018 6:00	0.8	52.1	17.0	32.7	231.3	0.0	228.0
6/19/2018 7:00	1.0	105.9	18.4	30.5	423.7	0.0	228.0
6/19/2018 8:00	1.5	178.3	18.5	31.9	563.5	0.0	228.1
6/19/2018 9:00	0.7	271.5	18.9	33.4	638.5	0.0	228.1
6/19/2018 10:00	1.3	281.0	19.2	34.5	737.2	0.0	228.2
6/19/2018 11:00	1.6	258.5	20.0	38.4	859.0	0.0	228.1
6/19/2018 12:00	1.7	262.7	20.8	37.3	944.0	0.0	228.1
6/19/2018 13:00	1.7	303.3	21.9	33.3	980.0	0.0	228.0
6/19/2018 14:00	2.3	301.3	22.9	29.0	845.0	0.0	227.9
6/19/2018 15:00	2.4	293.7	23.6	26.9	743.9	0.0	227.8
6/19/2018 16:00	2.3	306.4	23.4	24.6	504.7	0.0	227.8
6/19/2018 17:00	2.0	343.7	23.3	24.0	359.6	0.0	227.8
6/19/2018 18:00	1.8	13.3	22.1	26.0	176.3	0.0	227.8
6/19/2018 19:00	1.6	52.2	21.0	27.1	85.8	0.0	227.8
6/19/2018 20:00	1.2	55.0	20.5	26.8	38.8	0.0	227.9
6/19/2018 21:00	1.7	80.2	19.5	28.5	6.4	0.0	227.9
6/19/2018 22:00	2.4	68.4	19.0	30.8	0.1	0.0	227.9
6/19/2018 23:00	2.5	61.9	18.2	31.6	0.0	0.0	227.9
6/20/2018 0:00	1.7	66.9	18.1	29.9	0.0	0.0	227.9
6/20/2018 1:00	0.7	74.0	18.3	29.5	0.0	0.0	227.9
6/20/2018 2:00	0.0	0.0	18.4	29.7	0.0	0.0	227.9
6/20/2018 3:00	0.1	32.7	18.0	28.9	0.7	0.0	227.9
6/20/2018 4:00	0.7	351.0	17.8	29.8	24.3	0.0	227.9
6/20/2018 5:00	0.2	31.7	17.8	30.4	115.2	0.0	228.0
6/20/2018 6:00	0.5	187.5	17.8	33.1	276.3	0.0	228.0
6/20/2018 7:00	1.6	204.0	17.7	33.1	412.7	0.0	228.0
6/20/2018 8:00	0.7	211.5	18.2	31.5	563.6	0.0	228.1
6/20/2018 9:00	2.5	207.9	18.5	32.7	692.5	0.0	228.1
6/20/2018 10:00	2.9	221.3	19.1	34.4	791.5	0.0	228.1
6/20/2018 11:00	2.9	228.1	19.7	36.2	780.9	0.0	228.0
6/20/2018 12:00	3.5	234.0	20.4	34.5	887.0	0.0	228.0
6/20/2018 13:00	4.6	242.0	21.3	33.7	890.0	0.0	227.9
6/20/2018 14:00	4.4	282.5	21.3	33.9	633.7	0.0	227.9
6/20/2018 15:00	6.5	243.0	22.3	34.8	784.1	0.0	227.8
6/20/2018 16:00	6.2	203.5	21.3	39.2	471.0	0.0	227.8
6/20/2018 17:00	3.9	201.3	19.9	41.4	112.3	0.0	227.9



Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
6/20/2018 18:00	3.2	217.3	19.3	45.4	111.3	0.0	227.9
6/20/2018 19:00	3.7	201.1	18.7	46.9	53.8	0.0	227.9
6/20/2018 20:00	3.2	194.0	18.0	48.4	38.2	0.0	227.9
6/20/2018 21:00	3.6	191.8	17.4	51.7	2.5	0.0	227.9
6/20/2018 22:00	3.2	215.0	16.7	53.5	0.0	0.0	227.9
6/20/2018 23:00	2.9	209.9	16.1	56.0	0.0	0.0	227.9
6/21/2018 0:00	1.0	208.3	15.8	55.8	0.0	0.0	228.0
6/21/2018 1:00	1.1	212.0	15.4	55.2	0.0	0.0	228.0
6/21/2018 2:00	0.6	210.4	15.2	57.9	0.0	0.0	228.0
6/21/2018 3:00	2.1	196.2	14.5	62.7	0.4	0.0	228.0
6/21/2018 4:00	3.5	210.7	13.9	63.5	4.3	0.0	228.0
6/21/2018 5:00	2.1	236.7	14.0	63.0	41.3	0.0	228.0
6/21/2018 6:00	2.1	222.1	13.6	72.3	72.3	0.0	228.0
6/21/2018 7:00	2.6	200.8	13.4	71.9	100.2	0.0	228.0
6/21/2018 8:00	2.4	219.9	13.5	71.9	233.9	0.0	228.0
6/21/2018 9:00	2.3	226.3	14.4	68.9	575.6	0.0	228.3
6/21/2018 10:00	3.2	242.4	15.5	65.2	772.4	0.0	228.1
6/21/2018 11:00	3.4	235.1	15.9	64.2	700.9	0.0	228.1
6/21/2018 12:00	4.1	250.4	16.1	64.5	566.0	0.0	228.0
6/21/2018 13:00	5.7	241.4	15.8	66.2	488.7	0.0	227.9
6/21/2018 14:00	5.5	232.4	14.8	72.0	307.3	0.0	227.9
6/21/2018 15:00	3.9	206.4	14.2	75.5	247.9	0.0	228.0
6/21/2018 16:00	4.0	198.9	13.4	80.3	188.7	0.0	228.0
6/21/2018 17:00	4.2	188.5	13.1	80.8	258.7	0.0	227.9
6/21/2018 18:00	4.5	226.8	13.3	78.5	226.4	0.0	227.9
6/21/2018 19:00	3.7	219.8	13.0	77.4	119.8	0.0	228.0
6/21/2018 20:00	3.1	197.4	12.4	81.3	27.4	0.0	228.0
6/21/2018 21:00	3.3	201.4	11.7	87.0	4.7	0.0	228.0
6/21/2018 22:00	3.3	192.9	11.0	90.2	0.2	0.0	228.1
6/21/2018 23:00	3.3	200.5	10.5	91.8	0.0	0.0	228.0
6/22/2018 0:00	2.8	210.7	10.1	93.5	0.0	0.0	228.1
6/22/2018 1:00	3.1	222.6	9.6	95.2	0.0	0.0	228.1
6/22/2018 2:00	3.7	216.5	9.3	96.8	0.0	0.0	228.1
6/22/2018 3:00	3.4	223.9	9.0	97.3	0.0	0.0	228.1
6/22/2018 4:00	3.4	222.1	8.7	97.6	1.1	0.0	228.2
6/22/2018 5:00	3.4	235.2	8.3	97.8	4.9	0.0	228.7
6/22/2018 6:00	2.6	230.9	8.1	97.9	14.5	0.0	228.8
6/22/2018 7:00	3.0	211.8	7.9	97.9	61.1	0.0	228.8
6/22/2018 8:00	2.8	220.0	8.1	97.8	194.5	0.0	228.8
6/22/2018 9:00	3.9	228.7	8.5	97.4	476.0	0.0	228.8
6/22/2018 10:00	4.3	220.0	9.1	95.4	580.6	0.0	228.8
6/22/2018 11:00	5.5	238.4	9.7	84.7	349.9	0.0	228.7
6/22/2018 12:00	5.5	241.6	9.9	79.2	285.2	0.0	228.7
6/22/2018 13:00	7.3	248.6	11.0	68.1	504.7	0.0	228.6
6/22/2018 14:00	7.9	245.9	11.0	66.4	374.6	0.0	228.7
6/22/2018 15:00	7.0	239.2	10.7	70.3	331.9	0.0	228.6
6/22/2018 16:00	6.1	238.0	10.0	75.8	199.6	0.0	228.6
6/22/2018 17:00	6.7	240.4	9.5	77.9	118.8	0.0	228.7
6/22/2018 18:00	5.1	237.8	9.4	78.8	105.3	0.0	228.7
6/22/2018 19:00	4.4	239.9	9.6	76.2	147.6	0.0	228.7
6/22/2018 20:00	3.7	230.1	8.9	78.8	53.6	0.0	228.7
6/22/2018 21:00	2.8	224.8	8.1	83.6	7.4	0.0	228.7
6/22/2018 22:00	2.6	206.2	7.6	87.7	0.1	0.0	228.7
6/22/2018 23:00	3.1	200.4	7.0	88.8	0.0	0.0	228.8

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
6/23/2018 0:00	2.9	203.3	6.5	92.3	0.0	0.0	228.8
6/23/2018 1:00	2.4	208.1	6.2	93.7	0.0	0.0	228.8
6/23/2018 2:00	2.2	208.6	6.1	92.1	0.0	0.0	228.8
6/23/2018 3:00	2.9	210.6	5.7	94.8	1.7	0.0	228.8
6/23/2018 4:00	3.4	210.2	5.6	95.5	18.8	0.0	228.8
6/23/2018 5:00	2.8	195.3	5.8	92.5	92.3	0.0	228.8
6/23/2018 6:00	2.3	208.8	6.1	89.3	205.7	0.0	228.9
6/23/2018 7:00	2.6	212.8	6.6	87.2	341.9	0.0	228.8
6/23/2018 8:00	3.0	231.4	6.9	86.2	510.5	0.0	228.9
6/23/2018 9:00	3.6	234.9	7.3	80.3	463.2	0.0	228.8
6/23/2018 10:00	3.6	234.4	7.9	76.0	488.3	0.0	228.7
6/23/2018 11:00	4.7	238.1	8.2	73.5	440.1	0.0	228.8
6/23/2018 12:00	6.3	241.0	8.3	72.8	381.0	0.0	228.7
6/23/2018 13:00	4.4	240.4	8.6	73.6	516.8	0.0	228.7
6/23/2018 14:00	5.6	244.3	9.0	69.7	416.0	0.0	228.7
6/23/2018 15:00	5.3	240.6	8.8	71.4	288.5	0.0	228.7
6/23/2018 16:00	5.8	246.0	9.2	69.0	389.6	0.0	228.7
6/23/2018 17:00	5.6	227.9	8.9	67.4	199.6	0.0	228.7
6/23/2018 18:00	5.3	213.4	8.4	67.8	147.8	0.0	228.7
6/23/2018 19:00	6.2	209.7	7.8	68.5	79.0	0.0	228.7
6/23/2018 20:00	6.4	200.7	7.2	66.8	40.7	0.0	228.7
6/23/2018 21:00	6.3	195.8	6.8	63.8	10.8	0.0	228.7
6/23/2018 22:00	4.4	184.0	6.7	66.9	0.0	0.0	228.8
6/23/2018 23:00	2.7	148.7	6.5	70.2	0.0	0.0	228.8
6/24/2018 0:00	1.7	9.5	7.0	64.7	0.0	0.0	228.8
6/24/2018 1:00	3.4	166.0	6.4	75.0	0.0	0.0	228.8
6/24/2018 2:00	1.7	64.6	6.3	72.8	0.0	0.0	228.8
6/24/2018 3:00	0.7	150.3	6.0	81.4	0.3	0.0	228.9
6/24/2018 4:00	0.9	194.3	6.0	83.5	10.0	0.0	228.9
6/24/2018 5:00	1.4	62.5	6.5	77.7	76.1	0.0	228.9
6/24/2018 6:00	0.9	126.6	6.8	75.8	122.0	0.0	228.9
6/24/2018 7:00	1.1	29.3	6.9	77.4	178.7	0.0	228.9
6/24/2018 8:00	1.3	234.3	7.4	76.2	294.7	0.0	228.9
6/24/2018 9:00	3.3	211.3	6.2	87.7	246.4	0.0	229.0
6/24/2018 10:00	3.2	211.7	6.6	89.6	369.4	0.0	229.0
6/24/2018 11:00	3.4	227.3	6.5	89.5	402.6	0.0	229.0
6/24/2018 12:00	3.2	237.8	6.8	88.5	336.6	0.0	229.0
6/24/2018 13:00	2.4	216.8	8.3	82.2	591.3	0.0	229.0
6/24/2018 14:00	3.3	253.5	9.0	75.6	463.2	0.0	228.9
6/24/2018 15:00	3.6	232.0	8.2	77.5	312.2	0.0	228.9
6/24/2018 16:00	2.3	295.7	9.0	73.9	518.7	0.0	229.0
6/24/2018 17:00	2.3	316.9	9.3	75.1	423.1	0.0	228.9
6/24/2018 18:00	2.3	297.8	7.7	85.6	95.2	0.0	229.0
6/24/2018 19:00	0.5	251.5	6.8	88.1	37.4	0.0	229.0
6/24/2018 20:00	1.4	187.5	6.6	81.9	52.4	0.0	229.0
6/24/2018 21:00	3.1	196.4	6.0	87.4	11.7	0.0	229.0
6/24/2018 22:00	2.1	212.2	5.9	87.9	0.2	0.0	229.0
6/24/2018 23:00	2.0	213.0	5.7	88.4	0.0	0.0	229.0
6/25/2018 0:00	1.9	217.6	5.4	88.6	0.0	0.0	229.0
6/25/2018 1:00	2.0	204.1	5.4	88.7	0.0	0.0	229.0
6/25/2018 2:00	2.1	212.1	5.1	90.9	0.0	0.0	229.0
6/25/2018 3:00	2.3	220.2	4.8	92.5	0.3	0.0	229.0
6/25/2018 4:00	2.0	203.6	4.6	94.8	4.7	0.0	229.0
6/25/2018 5:00	2.6	217.7	4.5	96.2	17.9	0.0	229.0

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
6/25/2018 6:00	2.6	223.6	4.5	97.0	76.5	0.0	229.0
6/25/2018 7:00	3.2	232.6	4.7	95.8	195.5	0.0	229.0
6/25/2018 8:00	2.8	223.8	5.0	92.9	194.0	0.0	229.0
6/25/2018 9:00	3.7	215.5	5.7	89.0	298.0	0.0	229.0
6/25/2018 10:00	4.0	221.8	5.8	92.2	271.2	0.0	229.0
6/25/2018 11:00	4.1	223.5	6.2	87.3	307.2	0.0	229.0
6/25/2018 12:00	4.2	227.0	7.0	85.0	436.1	0.0	229.0
6/25/2018 13:00	6.4	237.0	7.2	81.6	347.2	0.0	229.0
6/25/2018 14:00	5.8	243.0	7.1	81.6	267.4	0.0	229.0
6/25/2018 15:00	6.4	232.0	7.5	80.0	233.8	0.0	228.9
6/25/2018 16:00	7.0	226.5	7.2	80.9	142.7	0.0	228.9
6/25/2018 17:00	7.5	226.8	7.4	78.9	220.1	0.0	228.9
6/25/2018 18:00	6.9	228.7	7.2	77.0	139.9	0.0	229.0
6/25/2018 19:00	6.4	220.1	6.3	82.0	57.2	0.0	229.0
6/25/2018 20:00	5.5	215.1	6.1	82.4	24.2	0.0	229.0
6/25/2018 21:00	4.2	216.0	5.7	83.6	5.1	0.0	229.0
6/25/2018 22:00	4.5	220.7	5.3	87.6	0.1	0.0	229.0
6/25/2018 23:00	3.7	206.2	4.8	90.8	0.0	0.0	229.1
6/26/2018 0:00	3.7	196.4	4.7	89.7	0.0	0.0	229.1
6/26/2018 1:00	3.8	206.2	4.2	93.5	0.0	0.0	229.1
6/26/2018 2:00	3.9	218.7	3.8	94.0	0.0	0.0	229.1
6/26/2018 3:00	4.5	214.4	3.3	94.7	0.3	0.0	229.1
6/26/2018 4:00	4.1	206.8	2.9	93.9	4.9	0.0	229.1
6/26/2018 5:00	5.7	204.3	2.8	89.0	71.1	0.0	229.1
6/26/2018 6:00	6.2	203.3	2.7	84.2	157.3	0.0	229.1
6/26/2018 7:00	6.2	211.1	3.0	79.9	201.3	0.0	229.0
6/26/2018 8:00	6.4	221.0	3.4	76.3	273.5	0.0	229.1
6/26/2018 9:00	6.8	223.2	4.0	73.8	372.1	0.0	229.1
6/26/2018 10:00	7.4	229.8	4.3	74.2	435.6	0.0	229.1
6/26/2018 11:00	8.2	231.0	4.6	75.6	434.6	0.0	229.1
6/26/2018 12:00	8.1	228.5	5.2	73.7	493.4	0.0	229.1
6/26/2018 13:00	8.9	234.3	5.7	71.6	560.3	0.0	229.0
6/26/2018 14:00	8.4	237.3	6.1	70.4	566.1	0.0	229.0
6/26/2018 15:00	8.0	229.7	6.1	72.7	566.6	0.0	229.0
6/26/2018 16:00	8.2	232.8	6.0	73.3	331.8	0.0	229.0
6/26/2018 17:00	8.1	239.9	5.7	75.7	208.7	0.0	229.0
6/26/2018 18:00	6.4	241.5	5.1	80.9	122.1	0.0	229.0
6/26/2018 19:00	6.2	233.6	4.5	85.8	63.1	0.0	229.0
6/26/2018 20:00	5.9	232.3	3.8	91.2	23.7	0.0	229.0
6/26/2018 21:00	4.6	218.7	3.2	95.7	2.3	0.0	229.1
6/26/2018 22:00	4.9	215.1	3.0	96.3	0.0	0.0	229.1
6/26/2018 23:00	3.8	209.2	2.9	97.0	0.0	0.0	229.2
6/27/2018 0:00	4.0	208.8	2.7	97.4	0.0	0.0	229.2
6/27/2018 1:00	3.7	207.3	2.6	97.6	0.0	0.0	229.3
6/27/2018 2:00	4.0	204.4	2.5	97.7	0.0	0.0	229.3
6/27/2018 3:00	3.6	212.9	2.4	97.1	0.7	0.0	229.4
6/27/2018 4:00	3.4	214.7	2.3	97.5	25.3	0.0	229.4
6/27/2018 5:00	3.4	213.1	2.4	97.4	54.8	0.0	229.4
6/27/2018 6:00	3.2	208.8	2.5	97.2	86.5	0.0	229.4
6/27/2018 7:00	3.0	216.6	2.7	96.9	131.2	0.0	229.3
6/27/2018 8:00	3.6	225.7	3.1	93.1	204.1	0.0	229.3
6/27/2018 9:00	4.7	227.1	3.5	89.9	244.1	0.0	229.3
6/27/2018 10:00	5.0	233.3	4.0	85.6	258.0	0.0	229.3
6/27/2018 11:00	4.7	236.7	4.6	80.1	344.5	0.0	229.3

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
6/27/2018 12:00	5.1	229.9	5.1	77.5	405.0	0.0	229.3
6/27/2018 13:00	5.4	236.7	5.5	76.9	364.1	0.0	229.3
6/27/2018 14:00	5.0	234.2	5.6	76.0	321.5	0.0	229.3
6/27/2018 15:00	5.2	231.4	6.0	75.6	305.5	0.0	229.2
6/27/2018 16:00	5.1	228.7	6.1	76.5	298.1	0.0	229.2
6/27/2018 17:00	4.4	223.1	5.8	79.1	177.6	0.0	229.3
6/27/2018 18:00	3.9	228.7	5.8	79.9	135.0	0.0	229.3
6/27/2018 19:00	3.7	215.0	5.6	80.5	67.1	0.0	229.3
6/27/2018 20:00	2.8	183.6	5.1	84.8	29.2	0.0	229.3
6/27/2018 21:00	2.7	182.3	4.7	87.9	2.8	0.0	229.3
6/27/2018 22:00	2.7	216.3	4.5	90.0	0.0	0.0	229.4
6/27/2018 23:00	2.9	224.0	4.3	90.9	0.0	0.0	229.4
6/28/2018 0:00	2.8	207.0	4.4	86.7	0.0	0.0	229.4
6/28/2018 1:00	2.4	210.5	4.4	87.0	0.0	0.0	229.4
6/28/2018 2:00	2.6	215.7	3.9	93.3	0.0	0.0	229.4
6/28/2018 3:00	1.5	190.4	4.3	86.0	2.3	0.0	229.4
6/28/2018 4:00	1.7	195.7	4.5	79.6	15.5	0.0	229.4
6/28/2018 5:00	2.1	204.6	4.3	82.7	27.7	0.0	229.4
6/28/2018 6:00	2.7	197.1	4.7	80.9	98.5	0.0	229.4
6/28/2018 7:00	2.3	211.5	5.1	80.0	203.6	0.0	229.4
6/28/2018 8:00	1.9	202.7	5.6	80.3	289.5	0.0	229.4
6/28/2018 9:00	1.9	215.5	6.2	80.2	304.7	0.0	229.3
6/28/2018 10:00	1.2	290.0	6.6	82.6	262.9	0.0	229.3
6/28/2018 11:00	2.0	290.5	7.1	78.9	319.6	0.0	229.3
6/28/2018 12:00	1.7	302.9	7.9	76.4	352.4	0.0	229.3
6/28/2018 13:00	1.7	291.8	8.4	74.5	388.0	0.0	229.3
6/28/2018 14:00	2.5	236.0	8.9	72.3	400.6	0.0	229.2
6/28/2018 15:00	2.7	234.0	8.7	74.2	339.3	0.0	229.3
6/28/2018 16:00	3.1	236.1	8.1	82.7	304.7	0.0	229.3
6/28/2018 17:00	2.9	237.0	7.9	86.5	204.0	0.0	229.3
6/28/2018 18:00	3.3	232.6	7.3	92.2	107.4	0.0	229.4
6/28/2018 19:00	3.4	215.9	7.1	90.9	43.8	0.0	229.6
6/28/2018 20:00	3.6	218.6	6.7	92.4	12.9	0.0	229.6
6/28/2018 21:00	3.5	205.1	6.4	92.9	2.4	0.0	229.7
6/28/2018 22:00	3.9	189.2	6.2	92.4	0.0	0.0	229.7
6/28/2018 23:00	3.2	203.3	6.1	93.9	0.0	0.0	229.8
6/29/2018 0:00	3.0	208.8	5.8	97.0	0.0	0.0	231.0
6/29/2018 1:00	2.7	207.5	5.8	97.4	0.0	0.0	231.9
6/29/2018 2:00	2.7	189.3	5.7	97.6	0.0	0.0	231.9
6/29/2018 3:00	2.0	188.5	5.7	97.7	0.6	0.0	232.9
6/29/2018 4:00	3.0	205.1	5.7	97.3	8.8	0.0	233.1
6/29/2018 5:00	3.1	217.4	5.7	97.2	52.0	0.0	233.1
6/29/2018 6:00	3.5	193.8	5.8	97.0	60.8	0.0	233.5
6/29/2018 7:00	4.8	185.2	5.7	96.4	96.5	0.0	234.5
6/29/2018 8:00	4.8	175.8	6.2	88.4	200.7	0.0	234.6
6/29/2018 9:00	3.6	213.2	6.2	90.2	257.0	0.0	234.6
6/29/2018 10:00	3.5	217.5	6.5	90.3	236.5	0.0	234.6
6/29/2018 11:00	3.3	228.0	6.9	88.8	299.7	0.0	234.6
6/29/2018 12:00	3.4	229.1	7.0	89.1	310.2	0.0	234.6
6/29/2018 13:00	2.8	235.7	7.5	90.2	418.6	0.0	234.6
6/29/2018 14:00	3.6	230.6	7.5	92.1	327.5	0.0	234.6
6/29/2018 15:00	3.5	230.8	7.4	95.5	301.3	0.0	234.8
6/29/2018 16:00	4.8	226.4	7.4	96.8	176.9	0.0	237.1
6/29/2018 17:00	3.8	220.7	7.6	97.2	177.0	0.0	237.1

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
6/29/2018 18:00	4.2	219.2	7.4	97.6	72.6	0.0	237.2
6/29/2018 19:00	5.0	225.5	7.4	97.7	33.4	0.0	238.0
6/29/2018 20:00	5.7	228.7	7.2	97.9	7.1	0.0	238.7
6/29/2018 21:00	5.9	228.5	6.3	98.0	0.8	0.0	242.9
6/29/2018 22:00	4.6	229.9	5.9	98.1	0.0	0.0	244.6
6/29/2018 23:00	3.5	216.2	5.8	98.1	0.0	0.0	246.8
6/30/2018 0:00	5.0	241.1	5.6	98.2	0.0	0.0	249.4
6/30/2018 1:00	4.1	222.4	5.3	98.2	0.0	0.0	250.3
6/30/2018 2:00	2.3	218.8	5.0	98.2	0.0	0.0	250.8
6/30/2018 3:00	2.3	211.3	5.0	98.3	0.2	0.0	251.0
6/30/2018 4:00	2.2	219.0	5.0	98.3	7.7	0.0	251.4
6/30/2018 5:00	2.3	231.2	5.0	98.3	28.0	0.0	251.5
6/30/2018 6:00	3.7	231.7	5.0	98.3	58.6	0.0	251.7
6/30/2018 7:00	4.8	226.2	4.6	98.2	111.8	0.0	252.1
6/30/2018 8:00	3.3	226.8	4.6	98.2	191.9	0.0	252.4
6/30/2018 9:00	3.0	221.5	4.8	97.9	360.1	0.0	252.5
6/30/2018 10:00	3.4	226.9	5.2	97.7	415.1	0.0	252.4
6/30/2018 11:00	4.0	228.8	5.6	97.7	407.0	0.0	252.4
6/30/2018 12:00	4.0	229.1	6.1	97.7	438.4	0.0	252.6
6/30/2018 13:00	3.4	230.3	6.0	97.8	217.8	0.0	253.7
6/30/2018 14:00	4.8	217.4	6.4	97.3	308.3	0.0	253.8
6/30/2018 15:00	5.7	217.6	6.4	97.3	183.4	0.0	254.3
6/30/2018 16:00	5.7	214.5	6.3	96.7	209.1	0.0	254.5
6/30/2018 17:00	5.5	222.0	6.0	97.3	169.8	0.0	255.1
6/30/2018 18:00	5.1	228.5	5.8	97.6	99.2	0.0	255.3
6/30/2018 19:00	4.9	224.8	5.4	97.9	19.0	0.0	256.0
6/30/2018 20:00	5.1	219.7	5.0	98.1	14.0	0.0	256.4
6/30/2018 21:00	3.3	212.6	4.7	98.2	2.2	0.0	256.5
6/30/2018 22:00	3.9	227.0	4.4	98.2	0.0	0.0	256.5
6/30/2018 23:00	4.6	220.0	4.0	98.3	0.0	0.0	256.6
7/1/2018 0:00	4.6	217.4	3.7	98.3	0.0	0.0	257.0
7/1/2018 1:00	4.1	220.2	3.5	98.4	0.0	0.0	257.0
7/1/2018 2:00	3.9	216.1	3.3	98.4	0.0	0.0	257.2
7/1/2018 3:00	4.3	216.2	3.1	98.4	0.0	0.0	257.4
7/1/2018 4:00	4.5	223.0	3.0	98.4	2.7	0.0	257.9
7/1/2018 5:00	3.5	211.5	2.8	98.4	35.0	0.0	258.1
7/1/2018 6:00	3.5	211.1	2.6	98.4	65.9	0.0	258.2
7/1/2018 7:00	3.0	207.5	2.8	98.3	234.1	0.0	258.4
7/1/2018 8:00	3.0	237.4	3.1	97.9	367.3	0.0	258.3
7/1/2018 9:00	2.4	240.7	3.3	98.0	275.7	0.0	258.6
7/1/2018 10:00	2.6	247.1	4.1	97.2	568.8	0.0	258.6
7/1/2018 11:00	2.2	226.4	4.5	90.6	517.9	0.0	258.9
7/1/2018 12:00	2.6	231.1	5.4	85.6	655.6	0.0	258.9
7/1/2018 13:00	2.9	227.7	6.1	79.4	784.4	0.0	258.8
7/1/2018 14:00	3.6	241.8	6.6	81.1	642.0	0.0	258.7
7/1/2018 15:00	3.0	239.7	7.4	75.4	760.6	0.0	258.6
7/1/2018 16:00	3.3	237.9	7.8	71.1	683.6	0.0	258.5
7/1/2018 17:00	3.3	235.6	7.6	71.5	368.1	0.0	258.6
7/1/2018 18:00	3.2	230.8	7.0	76.8	121.5	0.0	258.5
7/1/2018 19:00	2.5	230.5	6.9	77.0	90.4	0.0	258.6
7/1/2018 20:00	2.2	259.0	6.7	78.4	47.2	0.0	258.6
7/1/2018 21:00	2.5	225.3	6.0	80.9	6.8	0.0	258.6
7/1/2018 22:00	2.9	210.8	5.5	82.0	0.1	0.0	258.6
7/1/2018 23:00	2.1	196.7	5.1	85.8	0.0	0.0	258.6

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
7/2/2018 0:00	2.2	195.5	5.0	86.2	0.0	0.0	258.7
7/2/2018 1:00	2.1	201.7	4.8	86.4	0.0	0.0	258.6
7/2/2018 2:00	2.5	206.9	4.6	87.8	0.0	0.0	258.7
7/2/2018 3:00	2.0	193.7	4.4	87.5	0.8	0.0	258.7
7/2/2018 4:00	2.1	207.5	4.5	87.8	22.9	0.0	258.7
7/2/2018 5:00	1.6	194.0	4.7	87.0	114.8	0.0	258.7
7/2/2018 6:00	1.0	157.2	5.7	83.5	274.8	0.0	258.6
7/2/2018 7:00	1.2	58.7	5.9	84.1	312.4	0.0	258.9
7/2/2018 8:00	1.5	218.2	6.4	81.1	626.2	0.0	258.9
7/2/2018 9:00	1.5	226.8	7.0	80.5	671.8	0.0	258.9
7/2/2018 10:00	1.9	254.3	8.1	79.2	783.5	0.0	258.9
7/2/2018 11:00	1.9	277.7	9.0	76.1	833.0	0.0	258.8
7/2/2018 12:00	2.3	284.6	10.4	71.5	912.0	0.0	258.7
7/2/2018 13:00	2.4	276.5	11.8	63.5	972.0	0.0	258.6
7/2/2018 14:00	3.1	292.2	12.5	60.3	847.0	0.0	258.5
7/2/2018 15:00	3.4	293.5	13.1	59.8	768.9	0.0	258.5
7/2/2018 16:00	3.8	296.4	13.3	59.9	664.0	0.0	258.4
7/2/2018 17:00	3.8	298.7	13.1	62.5	536.7	0.0	258.3
7/2/2018 18:00	2.8	268.3	12.7	64.1	155.0	0.0	258.2
7/2/2018 19:00	3.7	239.4	11.6	68.3	120.3	0.0	258.3
7/2/2018 20:00	3.0	219.4	10.6	72.9	57.8	0.0	258.5
7/2/2018 21:00	3.0	191.7	9.2	80.1	5.1	0.0	258.5
7/2/2018 22:00	2.8	193.3	8.6	83.3	0.1	0.0	258.5
7/2/2018 23:00	2.2	216.0	8.3	84.9	0.0	0.0	258.6
7/3/2018 0:00	1.0	247.8	8.4	84.6	0.0	0.0	258.6
7/3/2018 1:00	1.1	34.0	8.5	83.4	0.0	0.0	258.6
7/3/2018 2:00	2.8	15.1	8.1	83.6	0.0	0.0	258.6
7/3/2018 3:00	3.7	2.5	7.2	85.7	1.3	0.0	258.6
7/3/2018 4:00	5.1	31.7	7.3	85.6	33.5	0.0	258.6
7/3/2018 5:00	4.6	33.9	9.1	77.0	127.8	0.0	258.6
7/3/2018 6:00	5.0	20.8	11.1	67.4	260.3	0.0	258.7
7/3/2018 7:00	6.1	27.7	11.7	64.4	399.5	0.0	258.7
7/3/2018 8:00	6.4	32.5	12.9	59.3	563.8	0.0	258.7
7/3/2018 9:00	4.9	29.6	14.0	54.4	692.5	0.0	258.8
7/3/2018 10:00	4.0	42.5	15.3	45.8	794.3	0.0	258.7
7/3/2018 11:00	3.7	52.2	16.2	39.8	860.0	0.0	258.7
7/3/2018 12:00	3.6	302.9	15.9	48.2	873.0	0.0	258.5
7/3/2018 13:00	3.8	294.0	17.0	43.7	948.0	0.0	258.5
7/3/2018 14:00	3.9	301.2	17.9	39.4	850.0	0.0	258.4
7/3/2018 15:00	3.9	290.8	19.0	35.8	760.2	0.0	258.3
7/3/2018 16:00	3.5	308.4	18.7	34.7	531.3	0.0	258.3
7/3/2018 17:00	4.1	317.2	18.1	39.9	429.9	0.0	258.3
7/3/2018 18:00	5.3	324.7	17.1	46.5	191.6	0.0	258.4
7/3/2018 19:00	3.9	2.7	16.2	48.2	116.6	0.0	258.4
7/3/2018 20:00	3.4	26.6	15.5	48.8	39.8	0.0	258.4
7/3/2018 21:00	3.2	13.1	14.8	51.7	7.6	0.0	258.4
7/3/2018 22:00	2.8	24.0	14.7	47.5	0.2	0.0	258.4
7/3/2018 23:00	6.1	46.0	14.2	46.9	0.0	0.0	258.4
7/4/2018 0:00	5.0	31.4	13.8	48.5	0.0	0.0	258.4
7/4/2018 1:00	3.9	26.8	13.4	50.1	0.0	0.0	258.4
7/4/2018 2:00	4.8	39.6	12.8	53.0	0.0	0.0	258.5
7/4/2018 3:00	1.3	80.5	13.0	52.5	1.2	0.0	258.5
7/4/2018 4:00	0.3	161.6	12.5	55.8	32.6	0.0	258.5
7/4/2018 5:00	0.0	0.0	13.1	53.5	123.4	0.0	258.6

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
7/4/2018 6:00	0.6	182.7	13.2	54.7	251.7	0.0	258.5
7/4/2018 7:00	1.0	261.2	13.8	52.4	389.1	0.0	258.6
7/4/2018 8:00	1.3	300.5	14.5	50.7	550.5	0.0	258.8
7/4/2018 9:00	1.9	2.5	15.5	49.6	678.7	0.0	258.7
7/4/2018 10:00	1.4	245.2	15.7	52.9	777.8	0.0	258.7
7/4/2018 11:00	1.9	257.2	16.5	52.3	846.0	0.0	258.6
7/4/2018 12:00	2.4	286.7	17.6	47.4	914.0	0.0	258.6
7/4/2018 13:00	3.1	289.3	18.6	41.1	956.0	0.0	258.5
7/4/2018 14:00	3.7	301.5	19.1	38.8	840.0	0.0	258.4
7/4/2018 15:00	3.6	302.6	19.4	37.6	748.1	0.0	258.4
7/4/2018 16:00	3.6	307.9	19.5	38.0	630.1	0.0	258.3
7/4/2018 17:00	4.1	316.6	19.2	37.6	505.3	0.0	258.2
7/4/2018 18:00	3.9	317.1	19.0	37.1	136.0	0.0	258.2
7/4/2018 19:00	3.4	341.3	18.7	35.7	107.9	0.0	258.2
7/4/2018 20:00	2.5	26.4	17.7	36.6	60.1	0.0	258.3
7/4/2018 21:00	2.9	58.4	16.5	41.4	6.4	0.0	258.4
7/4/2018 22:00	2.6	59.4	15.7	44.3	0.2	0.0	258.4
7/4/2018 23:00	2.7	63.8	15.6	43.0	0.0	0.0	258.4
7/5/2018 0:00	2.2	58.4	15.5	41.8	0.0	0.0	258.4
7/5/2018 1:00	1.1	75.6	15.5	41.1	0.0	0.0	258.4
7/5/2018 2:00	0.4	70.2	15.4	40.4	0.0	0.0	258.4
7/5/2018 3:00	0.0	94.3	14.7	42.6	0.9	0.0	258.4
7/5/2018 4:00	0.3	39.2	14.9	42.1	29.8	0.0	258.5
7/5/2018 5:00	0.3	59.9	15.4	41.4	123.0	0.0	258.5
7/5/2018 6:00	0.7	64.9	16.3	42.8	255.9	0.0	258.5
7/5/2018 7:00	0.9	136.1	16.9	40.6	394.1	0.0	258.6
7/5/2018 8:00	1.4	200.4	16.7	41.6	555.3	0.0	258.6
7/5/2018 9:00	1.4	255.6	17.4	42.1	681.2	0.0	258.7
7/5/2018 10:00	1.6	255.3	18.0	40.9	780.9	0.0	258.7
7/5/2018 11:00	2.2	249.7	18.7	42.3	850.0	0.0	258.6
7/5/2018 12:00	3.3	262.2	19.4	37.9	927.0	0.0	258.6
7/5/2018 13:00	3.8	288.2	20.0	37.0	967.0	0.0	258.4
7/5/2018 14:00	3.0	303.1	19.0	36.4	289.8	0.0	258.4
7/5/2018 15:00	8.5	238.0	15.4	56.6	216.0	0.0	258.3
7/5/2018 16:00	7.1	215.7	12.8	71.3	232.8	0.0	258.4
7/5/2018 17:00	2.6	183.8	14.0	59.6	141.3	0.0	258.4
7/5/2018 18:00	3.6	188.6	13.1	67.6	107.6	0.0	258.4
7/5/2018 19:00	5.0	202.3	12.2	74.8	72.7	0.0	258.4
7/5/2018 20:00	4.8	198.5	12.1	77.7	32.7	0.0	258.4
7/5/2018 21:00	4.4	209.4	10.9	85.0	12.6	0.0	258.4
7/5/2018 22:00	4.5	211.3	10.5	84.1	0.0	0.0	258.4
7/5/2018 23:00	4.3	212.7	10.3	83.9	0.0	0.0	258.5
7/6/2018 0:00	4.0	211.4	10.2	84.0	0.0	0.0	258.5
7/6/2018 1:00	4.0	209.2	10.1	84.8	0.0	0.0	258.5
7/6/2018 2:00	3.7	214.3	9.9	87.1	0.0	0.0	258.5
7/6/2018 3:00	3.6	214.8	9.6	89.5	0.1	0.0	258.5
7/6/2018 4:00	3.7	220.8	9.3	92.5	2.8	0.0	258.5
7/6/2018 5:00	3.2	211.3	9.3	91.9	7.6	0.0	258.5
7/6/2018 6:00	2.7	226.2	9.3	92.1	58.8	0.0	258.5
7/6/2018 7:00	3.0	226.6	9.4	92.1	142.2	0.0	258.5
7/6/2018 8:00	3.2	227.7	9.5	92.9	194.5	0.0	258.5
7/6/2018 9:00	2.7	231.6	9.9	93.3	281.6	0.0	258.5
7/6/2018 10:00	3.5	232.5	10.1	92.5	289.4	0.0	258.5
7/6/2018 11:00	4.1	224.9	10.1	92.2	255.4	0.0	258.5

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
7/6/2018 12:00	4.1	226.1	10.0	93.6	275.0	0.0	258.5
7/6/2018 13:00	4.1	228.5	10.9	88.7	420.1	0.0	258.5
7/6/2018 14:00	5.1	231.5	11.6	84.3	395.1	0.0	258.5
7/6/2018 15:00	5.9	233.3	11.4	84.0	307.6	0.0	258.5
7/6/2018 16:00	6.0	231.4	11.1	85.8	319.3	0.0	258.5
7/6/2018 17:00	5.9	222.0	10.5	87.8	205.8	0.0	258.5
7/6/2018 18:00	5.8	220.1	9.9	90.0	116.6	0.0	258.5
7/6/2018 19:00	4.1	209.0	9.4	91.9	59.3	0.0	258.5
7/6/2018 20:00	3.9	210.7	9.1	93.3	22.7	0.0	258.5
7/6/2018 21:00	3.3	216.0	8.7	94.1	3.7	0.0	258.5
7/6/2018 22:00	3.6	212.7	8.4	95.3	0.0	0.0	258.6
7/6/2018 23:00	3.3	202.6	8.4	94.9	0.0	0.0	258.6
7/7/2018 0:00	2.6	188.8	8.2	95.9	0.0	0.0	258.6
7/7/2018 1:00	2.8	187.2	8.1	96.5	0.0	0.0	258.6
7/7/2018 2:00	2.6	191.8	8.0	97.0	0.0	0.0	258.6
7/7/2018 3:00	3.0	217.8	7.9	96.2	0.3	0.0	258.6
7/7/2018 4:00	2.8	210.2	7.7	96.7	8.7	0.0	258.6
7/7/2018 5:00	2.7	208.8	7.7	96.7	25.6	0.0	258.6
7/7/2018 6:00	2.9	212.9	7.8	95.1	58.4	0.0	258.6
7/7/2018 7:00	3.3	218.6	7.7	95.7	80.7	0.0	258.6
7/7/2018 8:00	2.7	212.5	7.9	94.1	100.3	0.0	258.6
7/7/2018 9:00	3.2	208.0	8.6	90.3	335.2	0.0	258.6
7/7/2018 10:00	4.7	240.5	8.5	93.0	297.1	0.0	258.6
7/7/2018 11:00	3.4	234.7	8.7	90.6	253.4	0.0	258.5
7/7/2018 12:00	4.1	235.2	9.3	86.1	386.1	0.0	258.5
7/7/2018 13:00	3.8	229.1	9.4	84.2	285.1	0.0	258.5
7/7/2018 14:00	2.6	230.8	9.7	83.3	271.9	0.0	258.5
7/7/2018 15:00	4.0	239.9	9.9	83.1	282.2	0.0	258.5
7/7/2018 16:00	4.5	231.6	9.6	85.0	218.8	0.0	258.5
7/7/2018 17:00	4.4	228.6	9.4	86.9	138.1	0.0	258.5
7/7/2018 18:00	3.5	226.8	8.9	90.6	57.5	0.0	258.6
7/7/2018 19:00	3.2	212.4	8.6	92.9	35.2	0.0	258.5
7/7/2018 20:00	3.0	216.0	8.3	95.2	15.3	0.0	258.6
7/7/2018 21:00	3.1	223.9	8.1	95.9	2.0	0.0	258.6
7/7/2018 22:00	2.6	233.2	8.2	94.3	0.0	0.0	258.6
7/7/2018 23:00	2.8	208.2	8.3	93.1	0.0	0.0	258.6
7/8/2018 0:00	3.1	212.8	8.0	94.0	0.0	0.0	258.6
7/8/2018 1:00	3.3	218.7	8.0	94.9	0.0	0.0	258.6
7/8/2018 2:00	2.7	217.2	7.9	95.6	0.0	0.0	258.6
7/8/2018 3:00	2.8	210.4	7.7	96.4	0.2	0.0	258.6
7/8/2018 4:00	3.0	208.1	7.6	96.3	8.2	0.0	258.6
7/8/2018 5:00	2.7	203.0	7.6	96.1	70.8	0.0	258.6
7/8/2018 6:00	2.3	204.2	7.8	92.7	136.6	0.0	258.6
7/8/2018 7:00	2.7	202.0	8.1	90.4	291.8	0.0	258.8
7/8/2018 8:00	2.9	218.7	8.8	86.2	563.9	0.0	258.8
7/8/2018 9:00	3.1	227.7	9.7	78.8	593.7	0.0	258.6
7/8/2018 10:00	2.9	248.0	10.5	75.5	633.0	0.0	258.7
7/8/2018 11:00	3.0	253.2	11.2	70.2	721.3	0.0	258.7
7/8/2018 12:00	3.5	274.2	12.0	66.5	847.0	0.0	258.7
7/8/2018 13:00	4.2	264.6	13.3	60.4	836.0	0.0	258.6
7/8/2018 14:00	4.2	263.0	13.8	59.6	683.5	0.0	258.5
7/8/2018 15:00	4.7	252.5	13.6	59.1	624.4	0.0	258.4
7/8/2018 16:00	4.8	245.6	14.0	57.8	662.9	0.0	258.4
7/8/2018 17:00	4.8	255.9	13.4	61.7	321.9	0.0	258.4



**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
7/8/2018 18:00	4.3	267.5	12.5	65.6	127.2	0.0	258.4
7/8/2018 19:00	4.8	255.8	12.4	67.3	162.3	0.0	258.3
7/8/2018 20:00	4.1	246.8	11.6	72.3	79.5	0.0	258.5
7/8/2018 21:00	2.3	234.6	10.5	77.5	7.8	0.0	258.5
7/8/2018 22:00	2.5	202.8	10.1	80.3	0.0	0.0	258.5
7/8/2018 23:00	2.7	186.1	9.6	83.0	0.0	0.0	258.5
7/9/2018 0:00	2.4	213.4	9.3	84.6	0.0	0.0	258.6
7/9/2018 1:00	2.0	192.1	9.1	85.4	0.0	0.0	258.6
7/9/2018 2:00	1.9	202.6	8.8	86.9	0.0	0.0	258.6
7/9/2018 3:00	2.2	198.2	8.7	87.7	0.6	0.0	258.6
7/9/2018 4:00	2.2	202.9	8.5	88.5	12.7	0.0	258.6
7/9/2018 5:00	1.8	204.0	8.6	87.9	54.4	0.0	258.6
7/9/2018 6:00	1.9	203.5	9.0	87.3	134.7	0.0	258.6
7/9/2018 7:00	1.9	204.4	9.5	84.7	187.3	0.0	258.6
7/9/2018 8:00	2.0	215.3	9.9	81.6	216.1	0.0	258.6
7/9/2018 9:00	2.7	223.7	10.5	77.7	410.1	0.0	258.6
7/9/2018 10:00	3.2	230.3	11.0	70.4	369.0	0.0	258.5
7/9/2018 11:00	3.4	220.1	10.8	74.1	267.7	0.0	258.5
7/9/2018 12:00	4.2	232.8	11.1	75.7	320.0	0.0	258.5
7/9/2018 13:00	3.8	225.6	10.6	79.6	189.4	0.0	258.5
7/9/2018 14:00	3.2	230.0	10.9	77.1	211.7	0.0	258.5
7/9/2018 15:00	2.8	231.9	11.2	73.9	232.9	0.0	258.5
7/9/2018 16:00	2.9	235.8	11.5	73.2	222.7	0.0	258.5
7/9/2018 17:00	3.0	239.1	11.5	74.0	155.3	0.0	258.5
7/9/2018 18:00	3.0	233.4	11.2	76.4	67.0	0.0	258.5
7/9/2018 19:00	3.9	231.9	11.1	75.8	57.9	0.0	258.5
7/9/2018 20:00	3.5	222.6	10.7	75.1	13.7	0.0	258.5
7/9/2018 21:00	3.1	215.8	10.3	77.7	1.0	0.0	258.5
7/9/2018 22:00	2.7	219.4	9.9	81.4	0.0	0.0	258.5
7/9/2018 23:00	2.6	210.0	9.7	82.3	0.0	0.0	258.5
7/10/2018 0:00	2.9	208.3	9.3	84.0	0.0	0.0	258.6
7/10/2018 1:00	3.2	201.0	9.1	84.6	0.0	0.0	258.6
7/10/2018 2:00	3.7	208.3	8.9	86.0	0.0	0.0	258.6
7/10/2018 3:00	3.3	203.8	8.5	88.8	0.2	0.0	258.6
7/10/2018 4:00	3.1	207.4	8.4	89.3	3.3	0.0	258.6
7/10/2018 5:00	3.3	209.2	8.0	93.1	20.8	0.0	258.6
7/10/2018 6:00	3.7	219.7	8.1	93.1	78.1	0.0	258.6
7/10/2018 7:00	5.5	229.4	7.6	95.8	37.9	0.0	259.0
7/10/2018 8:00	5.2	225.4	7.1	97.2	57.2	0.0	259.1
7/10/2018 9:00	4.3	226.2	7.6	97.0	215.8	0.0	259.1
7/10/2018 10:00	3.8	217.3	7.5	95.9	108.3	0.0	259.1
7/10/2018 11:00	4.5	225.5	7.5	97.1	65.0	0.0	259.1
7/10/2018 12:00	5.0	224.0	7.6	97.4	114.5	0.0	259.3
7/10/2018 13:00	4.7	220.8	7.7	97.4	148.3	0.0	259.7
7/10/2018 14:00	4.7	214.4	8.0	97.4	178.1	0.0	259.7
7/10/2018 15:00	5.2	218.0	8.0	97.5	113.1	0.0	259.8
7/10/2018 16:00	4.9	223.1	8.0	97.7	70.2	0.0	259.9
7/10/2018 17:00	5.3	225.4	8.0	97.8	66.9	0.0	260.3
7/10/2018 18:00	5.5	227.5	8.0	97.8	42.6	0.0	260.4
7/10/2018 19:00	5.5	218.8	8.0	97.9	25.0	0.0	260.5
7/10/2018 20:00	5.7	211.7	8.0	98.0	9.3	0.0	260.7
7/10/2018 21:00	5.5	211.4	7.9	98.0	0.9	0.0	260.9
7/10/2018 22:00	4.9	214.4	7.8	98.1	0.0	0.0	261.2
7/10/2018 23:00	5.5	221.2	7.9	98.1	0.0	0.0	261.5

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
7/11/2018 0:00	6.2	225.0	7.8	98.2	0.0	0.0	263.8
7/11/2018 1:00	5.5	223.4	7.7	98.2	0.0	0.0	265.1
7/11/2018 2:00	6.0	226.0	7.7	98.3	0.0	0.0	266.4
7/11/2018 3:00	6.1	226.0	7.6	98.3	0.0	0.0	266.8
7/11/2018 4:00	5.9	217.9	7.5	98.3	3.3	0.0	266.9
7/11/2018 5:00	5.7	222.7	7.2	98.4	8.3	0.0	267.0
7/11/2018 6:00	6.9	232.5	6.9	98.4	28.3	0.0	267.1
7/11/2018 7:00	7.3	228.9	6.9	98.4	103.9	0.0	267.1
7/11/2018 8:00	6.0	227.9	6.8	98.3	132.8	0.0	267.2
7/11/2018 9:00	5.9	237.5	6.6	98.3	84.8	0.0	267.2
7/11/2018 10:00	6.2	230.3	6.6	98.3	110.8	0.0	267.2
7/11/2018 11:00	6.3	233.0	6.8	98.2	217.5	0.0	267.2
7/11/2018 12:00	7.1	239.5	6.9	98.2	197.7	0.0	267.2
7/11/2018 13:00	5.8	241.9	6.8	98.0	165.4	0.0	267.2
7/11/2018 14:00	4.4	232.6	6.7	95.2	177.3	0.0	267.2
7/11/2018 15:00	4.9	254.8	6.7	89.9	79.5	0.0	267.1
7/11/2018 16:00	4.9	226.1	6.0	93.8	47.1	0.0	267.1
7/11/2018 17:00	4.6	234.6	5.7	96.1	25.2	0.0	267.4
7/11/2018 18:00	4.7	232.2	5.4	97.7	24.7	0.0	267.6
7/11/2018 19:00	4.9	223.2	5.3	97.9	11.2	0.0	268.0
7/11/2018 20:00	5.3	223.1	5.2	98.1	4.6	0.0	268.2
7/11/2018 21:00	5.1	232.0	5.1	98.2	0.7	0.0	268.5
7/11/2018 22:00	5.1	237.9	5.0	98.3	0.0	0.0	269.1
7/11/2018 23:00	5.7	234.3	4.9	98.3	0.0	0.0	269.5
7/12/2018 0:00	3.9	215.2	4.7	98.4	0.0	0.0	269.7
7/12/2018 1:00	4.4	229.8	4.6	98.4	0.0	0.0	269.9
7/12/2018 2:00	5.3	232.9	4.6	98.4	0.0	0.0	270.6
7/12/2018 3:00	6.4	229.6	4.4	98.5	0.0	0.0	271.0
7/12/2018 4:00	5.6	234.8	4.2	98.5	1.2	0.0	271.3
7/12/2018 5:00	4.1	211.2	3.9	98.5	19.4	0.0	271.3
7/12/2018 6:00	4.0	214.0	3.9	98.5	67.9	0.0	271.3
7/12/2018 7:00	3.6	214.6	4.0	98.4	87.3	0.0	271.2
7/12/2018 8:00	3.9	218.2	4.1	98.4	91.3	0.0	271.3
7/12/2018 9:00	4.0	218.7	4.2	98.4	80.2	0.0	271.6
7/12/2018 10:00	4.4	212.6	4.4	98.4	128.4	0.0	271.9
7/12/2018 11:00	4.4	224.6	4.8	98.3	203.3	0.0	271.9
7/12/2018 12:00	3.2	231.9	5.6	98.1	282.7	0.0	272.1
7/12/2018 13:00	3.4	222.7	5.7	98.1	275.3	0.0	272.4
7/12/2018 14:00	3.9	235.5	6.1	97.9	413.8	0.0	272.7
7/12/2018 15:00	4.3	208.7	6.2	97.9	347.5	0.0	272.6
7/12/2018 16:00	3.2	247.7	6.3	97.9	183.6	0.0	273.0
7/12/2018 17:00	3.7	224.4	5.9	98.1	169.9	0.0	273.7
7/12/2018 18:00	3.5	227.9	5.8	98.1	59.4	0.0	274.0
7/12/2018 19:00	2.2	229.3	5.6	98.3	27.5	0.0	274.0
7/12/2018 20:00	3.2	215.7	5.3	98.2	16.3	0.0	274.0
7/12/2018 21:00	3.5	204.4	5.1	95.8	6.6	0.0	274.0
7/12/2018 22:00	2.0	259.2	4.9	95.0	0.0	0.0	274.0
7/12/2018 23:00	1.1	331.5	4.7	94.7	0.0	0.0	274.0
7/13/2018 0:00	1.2	334.8	4.5	95.4	0.0	0.0	274.0
7/13/2018 1:00	0.6	203.9	4.7	94.6	0.0	0.0	274.0
7/13/2018 2:00	1.2	220.7	4.5	94.3	0.0	0.0	274.0
7/13/2018 3:00	0.8	93.7	4.4	94.0	0.2	0.0	274.0
7/13/2018 4:00	0.4	199.7	4.5	92.3	19.9	0.0	274.0
7/13/2018 5:00	0.5	224.7	4.4	95.4	43.0	0.0	274.0

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
7/13/2018 6:00	0.9	218.4	4.6	94.3	115.0	0.0	274.0
7/13/2018 7:00	1.4	223.3	4.8	91.5	272.0	0.0	274.1
7/13/2018 8:00	1.4	227.4	5.5	83.7	551.1	0.0	274.3
7/13/2018 9:00	1.6	238.1	6.4	84.0	722.4	0.0	274.3
7/13/2018 10:00	1.5	280.4	7.1	83.5	585.6	0.0	274.3
7/13/2018 11:00	2.2	295.3	8.4	74.5	798.9	0.0	274.2
7/13/2018 12:00	2.4	298.1	9.4	69.9	909.0	0.0	274.0
7/13/2018 13:00	2.5	297.8	10.6	64.3	915.0	0.0	273.9
7/13/2018 14:00	3.3	304.3	11.8	60.8	854.0	0.0	273.8
7/13/2018 15:00	3.2	304.8	12.0	60.2	727.3	0.0	273.7
7/13/2018 16:00	3.3	287.8	12.9	57.4	788.2	0.0	273.6
7/13/2018 17:00	2.6	278.0	12.9	58.2	547.5	0.0	273.5
7/13/2018 18:00	3.0	286.8	12.7	61.8	179.9	0.0	273.5
7/13/2018 19:00	2.2	316.0	12.3	63.9	91.7	0.0	273.5
7/13/2018 20:00	1.7	327.9	11.0	67.9	53.9	0.0	273.7
7/13/2018 21:00	3.0	192.2	9.8	76.5	4.2	0.0	273.7
7/13/2018 22:00	3.0	180.9	9.1	81.5	0.0	0.0	273.8
7/13/2018 23:00	2.3	194.4	8.9	83.5	0.0	0.0	273.8
7/14/2018 0:00	1.5	227.8	8.9	83.3	0.0	0.0	273.8
7/14/2018 1:00	2.6	209.3	8.5	83.6	0.0	0.0	273.9
7/14/2018 2:00	2.2	221.9	8.5	82.8	0.0	0.0	273.9
7/14/2018 3:00	2.1	221.9	8.4	81.5	0.4	0.0	273.9
7/14/2018 4:00	2.4	210.9	8.1	83.0	13.1	0.0	273.8
7/14/2018 5:00	2.4	214.1	8.2	81.6	79.0	0.0	273.9
7/14/2018 6:00	2.7	199.4	8.7	78.8	217.7	0.0	273.9
7/14/2018 7:00	2.8	201.0	9.2	78.4	382.2	0.0	274.0
7/14/2018 8:00	3.3	211.2	9.4	78.2	486.2	0.0	274.0
7/14/2018 9:00	3.3	221.8	10.3	71.2	618.0	0.0	273.9
7/14/2018 10:00	4.2	227.1	10.8	68.0	672.0	0.0	274.0
7/14/2018 11:00	4.1	239.3	11.9	66.2	726.6	0.0	273.9
7/14/2018 12:00	3.8	252.5	12.5	62.3	606.8	0.0	273.8
7/14/2018 13:00	3.8	272.7	12.6	60.4	557.2	0.0	273.7
7/14/2018 14:00	5.3	251.4	12.9	57.9	419.7	0.0	273.8
7/14/2018 15:00	3.0	270.2	12.1	62.5	162.2	0.0	273.8
7/14/2018 16:00	3.6	337.8	10.7	71.5	128.5	0.0	273.8
7/14/2018 17:00	3.6	172.8	9.2	81.3	64.1	0.0	274.8
7/14/2018 18:00	3.8	221.5	8.7	81.6	38.4	0.0	275.0
7/14/2018 19:00	2.9	219.5	8.8	77.1	13.3	0.0	275.0
7/14/2018 20:00	2.5	222.9	8.6	77.1	8.8	0.0	275.0
7/14/2018 21:00	2.5	208.4	8.6	76.0	1.0	0.0	275.0
7/14/2018 22:00	3.6	193.8	8.7	75.9	0.0	0.0	274.9
7/14/2018 23:00	4.4	200.4	8.7	77.8	0.0	0.0	275.0
7/15/2018 0:00	4.8	200.4	8.3	82.2	0.0	0.0	274.9
7/15/2018 1:00	3.8	193.8	7.9	86.5	0.0	0.0	274.9
7/15/2018 2:00	3.0	187.2	7.6	89.8	0.0	0.0	274.9
7/15/2018 3:00	4.2	203.4	7.4	92.0	0.0	0.0	274.9
7/15/2018 4:00	3.4	203.5	7.3	94.6	2.7	0.0	275.2
7/15/2018 5:00	3.5	196.8	7.3	95.4	18.7	0.0	275.3
7/15/2018 6:00	3.9	202.8	7.6	93.0	85.1	0.0	275.3
7/15/2018 7:00	4.1	210.5	7.7	93.7	140.4	0.0	275.3
7/15/2018 8:00	4.0	212.0	7.6	95.1	110.7	0.0	275.3
7/15/2018 9:00	4.3	220.2	7.5	96.9	117.3	0.0	275.2
7/15/2018 10:00	5.4	228.4	7.7	97.4	118.3	0.0	275.3
7/15/2018 11:00	5.5	226.6	7.6	97.5	112.8	0.0	275.9

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
7/15/2018 12:00	5.5	227.3	7.5	97.7	115.2	0.0	276.5
7/15/2018 13:00	5.8	224.5	7.4	97.9	82.2	0.0	278.0
7/15/2018 14:00	5.9	224.5	6.9	97.9	82.6	0.0	279.5
7/15/2018 15:00	5.2	220.8	6.5	98.0	52.6	0.0	280.2
7/15/2018 16:00	4.8	221.2	6.4	98.1	49.3	0.0	280.3
7/15/2018 17:00	5.5	227.5	6.5	98.1	39.2	0.0	280.5
7/15/2018 18:00	5.1	218.1	6.6	98.2	17.3	0.0	280.8
7/15/2018 19:00	5.7	219.2	6.5	98.2	6.9	0.0	281.0
7/15/2018 20:00	4.7	220.6	6.4	98.3	2.7	0.0	281.4
7/15/2018 21:00	4.7	213.5	6.3	98.3	0.3	0.0	281.4
7/15/2018 22:00	4.6	209.2	6.3	98.4	0.0	0.0	281.5
7/15/2018 23:00	5.2	221.0	6.2	98.4	0.0	0.0	282.0
7/16/2018 0:00	5.6	211.6	6.1	98.4	0.0	0.0	282.7
7/16/2018 1:00	5.3	209.6	6.1	98.5	0.0	0.0	283.7
7/16/2018 2:00	5.8	208.0	6.0	98.5	0.0	0.0	284.3
7/16/2018 3:00	5.9	214.6	6.0	98.5	0.0	0.0	284.6
7/16/2018 4:00	6.4	210.3	5.9	98.5	3.2	0.0	285.1
7/16/2018 5:00	6.6	213.3	5.9	98.5	8.2	0.0	286.7
7/16/2018 6:00	6.1	215.7	6.0	98.5	22.8	0.0	288.3
7/16/2018 7:00	6.3	213.6	6.1	98.5	51.6	0.0	290.5
7/16/2018 8:00	6.3	215.5	6.3	98.5	98.2	0.0	290.7
7/16/2018 9:00	6.6	212.2	6.6	98.5	113.8	0.0	290.7
7/16/2018 10:00	7.2	224.7	7.0	98.4	126.3	0.0	291.0
7/16/2018 11:00	7.4	221.8	7.2	98.4	149.5	0.0	291.5
7/16/2018 12:00	6.9	225.4	7.6	98.4	134.8	0.0	291.9
7/16/2018 13:00	6.3	227.3	7.7	98.4	117.5	0.0	292.5
7/16/2018 14:00	5.8	234.9	7.9	98.4	103.0	0.0	293.5
7/16/2018 15:00	5.8	235.0	7.9	98.4	113.9	0.0	294.1
7/16/2018 16:00	5.9	231.2	8.1	98.4	93.2	0.0	295.0
7/16/2018 17:00	5.5	228.5	8.0	98.4	63.0	0.0	295.5
7/16/2018 18:00	5.1	227.7	7.9	98.5	39.5	0.0	296.5
7/16/2018 19:00	5.1	224.5	7.8	98.5	16.3	0.0	297.1
7/16/2018 20:00	5.5	223.4	7.7	98.5	13.6	0.0	297.6
7/16/2018 21:00	5.5	226.7	7.7	98.6	0.5	0.0	298.5
7/16/2018 22:00	4.9	221.0	7.7	98.6	0.0	0.0	299.0
7/16/2018 23:00	4.7	218.6	7.7	98.6	0.0	0.0	299.4
7/17/2018 0:00	4.5	218.1	7.6	98.7	0.0	0.0	299.6
7/17/2018 1:00	4.5	219.7	7.6	98.7	0.0	0.0	300.2
7/17/2018 2:00	3.9	211.2	7.6	98.7	0.0	0.0	300.8
7/17/2018 3:00	3.5	209.8	7.5	98.8	0.0	0.0	301.1
7/17/2018 4:00	3.9	225.5	7.5	98.8	2.0	0.0	301.5
7/17/2018 5:00	3.8	224.4	7.5	98.8	20.6	0.0	301.8
7/17/2018 6:00	3.5	220.3	7.5	98.8	60.9	0.0	301.8
7/17/2018 7:00	2.7	216.5	7.7	98.8	142.9	0.0	301.8
7/17/2018 8:00	0.8	197.9	7.8	98.7	127.8	0.0	302.4
7/17/2018 9:00	2.0	239.2	7.9	98.7	133.5	0.0	303.8
7/17/2018 10:00	2.4	228.6	8.0	98.7	156.4	0.0	305.2
7/17/2018 11:00	2.0	229.6	8.3	98.6	206.5	0.0	305.3
7/17/2018 12:00	3.0	210.0	8.3	98.6	70.4	0.0	309.7
7/17/2018 13:00	2.4	220.6	8.6	98.6	262.8	0.0	311.2
7/17/2018 14:00	3.8	224.2	8.8	98.5	168.2	0.0	312.6
7/17/2018 15:00	5.3	226.7	8.8	98.6	164.6	0.0	314.2
7/17/2018 16:00	5.9	230.9	8.8	98.6	122.6	0.0	314.8
7/17/2018 17:00	6.4	239.1	8.6	98.7	64.9	0.0	315.6

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
7/17/2018 18:00	5.7	237.4	8.5	98.7	69.6	0.0	315.9
7/17/2018 19:00	4.8	247.1	8.5	98.7	44.4	0.0	316.2
7/17/2018 20:00	4.4	254.4	8.3	98.8	15.4	0.0	316.5
7/17/2018 21:00	2.9	245.6	7.9	98.9	1.3	0.0	317.0
7/17/2018 22:00	3.7	218.1	7.6	98.9	0.0	0.0	317.0
7/17/2018 23:00	4.2	213.2	7.2	98.9	0.0	0.0	317.0
7/18/2018 0:00	3.5	220.5	7.0	99.0	0.0	0.0	317.0
7/18/2018 1:00	4.2	221.7	6.4	99.0	0.0	0.0	317.0
7/18/2018 2:00	4.2	228.1	5.8	99.0	0.0	0.0	317.1
7/18/2018 3:00	4.2	230.6	5.3	99.0	0.1	0.0	317.1
7/18/2018 4:00	3.4	217.1	5.0	99.0	3.7	0.0	317.1
7/18/2018 5:00	3.8	206.3	5.0	99.0	36.2	0.0	317.0
7/18/2018 6:00	2.7	230.4	5.1	98.1	95.1	0.0	317.0
7/18/2018 7:00	2.9	216.6	5.2	95.3	93.5	0.0	317.0
7/18/2018 8:00	2.8	196.1	5.4	95.7	133.4	0.0	317.0
7/18/2018 9:00	2.8	175.6	5.8	93.3	185.4	0.0	317.0
7/18/2018 10:00	2.6	190.9	6.0	91.3	183.2	0.0	317.0
7/18/2018 11:00	2.4	240.1	7.2	84.0	434.5	0.0	317.0
7/18/2018 12:00	2.9	249.7	7.0	86.8	377.1	0.0	316.9
7/18/2018 13:00	3.9	249.8	6.5	94.4	294.7	0.0	317.0
7/18/2018 14:00	3.2	238.3	6.2	97.3	228.8	0.0	317.6
7/18/2018 15:00	2.4	245.3	6.7	96.0	270.5	0.0	317.9
7/18/2018 16:00	3.0	229.3	7.2	92.5	254.0	0.0	317.8
7/18/2018 17:00	3.4	236.0	7.7	90.7	307.7	0.0	317.8
7/18/2018 18:00	3.0	241.2	7.1	92.2	129.9	0.0	317.8
7/18/2018 19:00	2.7	227.1	6.9	91.3	57.3	0.0	317.8
7/18/2018 20:00	2.1	216.5	6.5	92.8	14.9	0.0	317.9
7/18/2018 21:00	2.3	209.7	5.9	96.8	1.1	0.0	317.9
7/18/2018 22:00	2.0	184.5	5.5	97.3	0.0	0.0	317.9
7/18/2018 23:00	2.1	174.3	5.5	96.8	0.0	0.0	317.9
7/19/2018 0:00	1.9	180.0	5.8	92.0	0.0	0.0	317.9
7/19/2018 1:00	1.3	216.0	5.7	92.7	0.0	0.0	317.9
7/19/2018 2:00	0.0	231.5	5.5	93.2	0.0	0.0	317.9
7/19/2018 3:00	0.8	20.5	5.5	92.8	0.0	0.0	317.9
7/19/2018 4:00	1.3	27.2	5.4	92.9	2.8	0.0	317.9
7/19/2018 5:00	2.2	356.5	5.1	96.5	26.6	0.0	317.9
7/19/2018 6:00	2.7	357.0	4.9	97.6	85.3	0.0	317.9
7/19/2018 7:00	2.3	354.3	5.2	95.9	154.3	0.0	317.9
7/19/2018 8:00	2.4	16.0	6.1	91.5	387.3	0.0	318.1
7/19/2018 9:00	2.8	347.3	6.8	87.0	450.1	0.0	318.2
7/19/2018 10:00	3.0	337.2	7.1	86.3	623.6	0.0	318.1
7/19/2018 11:00	1.9	319.4	7.5	83.2	413.4	0.0	317.9
7/19/2018 12:00	1.1	296.8	8.8	80.9	542.2	0.0	317.9
7/19/2018 13:00	1.7	267.1	9.9	80.6	743.7	0.0	317.9
7/19/2018 14:00	1.6	296.9	10.5	70.1	556.9	0.0	317.8
7/19/2018 15:00	1.4	357.5	10.6	69.7	346.8	0.0	317.8
7/19/2018 16:00	1.9	237.4	10.5	73.5	271.3	0.0	317.7
7/19/2018 17:00	2.5	219.2	10.5	75.2	262.6	0.0	317.7
7/19/2018 18:00	3.3	235.8	10.9	74.6	294.2	0.0	317.6
7/19/2018 19:00	2.8	215.8	10.4	76.5	156.5	0.0	317.6
7/19/2018 20:00	3.3	207.3	9.3	80.3	67.9	0.0	317.8
7/19/2018 21:00	3.3	204.1	8.4	83.1	4.3	0.0	317.8
7/19/2018 22:00	3.1	194.0	8.1	84.6	0.0	0.0	317.8
7/19/2018 23:00	2.6	192.9	7.9	85.7	0.0	0.0	317.8

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
7/20/2018 0:00	1.7	174.9	7.9	85.6	0.0	0.0	317.8
7/20/2018 1:00	1.2	172.8	7.7	87.4	0.0	0.0	317.8
7/20/2018 2:00	0.6	182.4	7.9	86.4	0.0	0.0	317.8
7/20/2018 3:00	2.2	20.0	7.9	85.4	0.1	0.0	317.8
7/20/2018 4:00	2.5	23.9	6.8	92.9	6.2	0.0	317.8
7/20/2018 5:00	2.5	28.4	6.8	93.6	85.6	0.0	317.9
7/20/2018 6:00	2.0	45.5	8.0	89.8	206.9	0.0	318.0
7/20/2018 7:00	3.4	27.5	9.2	83.1	345.6	0.0	318.1
7/20/2018 8:00	3.3	11.3	10.5	76.6	510.0	0.0	318.1
7/20/2018 9:00	3.2	15.2	12.2	69.2	643.2	0.0	318.1
7/20/2018 10:00	3.0	348.3	13.2	62.6	747.5	0.0	318.1
7/20/2018 11:00	3.1	307.5	13.3	58.7	820.0	0.0	318.1
7/20/2018 12:00	2.7	310.8	14.2	56.4	887.0	0.0	317.9
7/20/2018 13:00	2.6	310.4	15.3	52.4	921.0	0.0	317.8
7/20/2018 14:00	3.1	315.9	16.1	49.7	813.0	0.0	317.7
7/20/2018 15:00	3.0	305.5	16.8	48.6	717.8	0.0	317.6
7/20/2018 16:00	3.3	311.0	17.0	48.6	599.3	0.0	317.6
7/20/2018 17:00	3.5	318.4	16.8	50.7	469.8	0.0	317.5
7/20/2018 18:00	3.7	331.6	16.2	55.2	214.6	0.0	317.5
7/20/2018 19:00	2.5	327.8	15.7	56.1	105.5	0.0	317.5
7/20/2018 20:00	2.5	227.2	14.9	61.8	43.8	0.0	317.7
7/20/2018 21:00	2.8	182.2	13.4	70.1	2.7	0.0	317.7
7/20/2018 22:00	3.0	215.3	12.8	74.2	0.0	0.0	317.7
7/20/2018 23:00	2.4	194.5	12.6	74.9	0.0	0.0	317.7
7/21/2018 0:00	1.8	171.6	12.9	72.1	0.0	0.0	317.7
7/21/2018 1:00	0.5	195.6	12.5	74.9	0.0	0.0	317.8
7/21/2018 2:00	0.0	0.0	12.4	73.3	0.0	0.0	317.7
7/21/2018 3:00	1.5	25.7	12.1	73.2	0.1	0.0	317.7
7/21/2018 4:00	1.7	38.1	11.6	75.7	5.6	0.0	317.8
7/21/2018 5:00	2.1	20.5	11.8	75.3	77.6	0.0	317.8
7/21/2018 6:00	1.8	45.5	12.7	72.8	205.5	0.0	317.8
7/21/2018 7:00	1.7	20.1	13.8	68.1	341.8	0.0	318.0
7/21/2018 8:00	1.9	355.5	14.8	58.0	502.5	0.0	318.1
7/21/2018 9:00	1.9	339.5	16.1	53.1	637.0	0.0	318.1
7/21/2018 10:00	2.4	327.4	16.7	51.6	740.8	0.0	318.0
7/21/2018 11:00	2.8	314.6	17.4	46.1	803.0	0.0	317.9
7/21/2018 12:00	2.9	319.1	17.9	45.1	866.0	0.0	317.8
7/21/2018 13:00	2.5	309.8	19.0	42.9	909.0	0.0	317.7
7/21/2018 14:00	2.8	318.1	19.4	40.3	804.0	0.0	317.6
7/21/2018 15:00	2.5	300.6	19.9	39.9	706.8	0.0	317.6
7/21/2018 16:00	2.8	304.3	20.2	40.6	586.4	0.0	317.5
7/21/2018 17:00	3.8	322.1	19.6	43.2	455.2	0.0	317.4
7/21/2018 18:00	3.6	328.2	19.2	46.4	214.9	0.0	317.4
7/21/2018 19:00	3.1	348.2	18.2	48.0	105.2	0.0	317.4
7/21/2018 20:00	0.7	24.2	17.5	50.3	44.2	0.0	317.6
7/21/2018 21:00	1.5	193.6	17.0	53.9	2.6	0.0	317.6
7/21/2018 22:00	1.9	191.0	16.5	56.2	0.0	0.0	317.6
7/21/2018 23:00	1.1	99.8	16.1	56.7	0.0	0.0	317.6
7/22/2018 0:00	2.6	42.5	15.4	57.4	0.0	0.0	317.6
7/22/2018 1:00	2.8	33.2	15.0	61.5	0.0	0.0	317.6
7/22/2018 2:00	4.3	32.0	14.3	66.4	0.0	0.0	317.7
7/22/2018 3:00	6.2	21.7	14.6	59.9	0.0	0.0	317.7
7/22/2018 4:00	5.7	34.3	15.3	51.3	3.8	0.0	317.7
7/22/2018 5:00	6.0	27.2	14.4	53.7	45.4	0.0	317.7

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
7/22/2018 6:00	6.3	33.7	15.0	51.2	153.8	0.0	317.7
7/22/2018 7:00	6.7	24.4	15.8	49.4	307.5	0.0	317.8
7/22/2018 8:00	6.1	20.9	16.3	48.2	471.1	0.0	317.9
7/22/2018 9:00	5.3	21.1	16.9	46.2	609.6	0.0	317.9
7/22/2018 10:00	4.8	10.9	17.3	45.9	710.0	0.0	317.9
7/22/2018 11:00	5.1	11.0	17.9	42.4	787.0	0.0	317.9
7/22/2018 12:00	4.1	323.2	18.2	45.0	815.0	0.0	317.8
7/22/2018 13:00	4.9	306.8	18.9	40.9	900.0	0.0	317.7
7/22/2018 14:00	5.1	309.7	19.5	39.0	820.0	0.0	317.6
7/22/2018 15:00	4.5	304.2	19.9	36.6	696.4	0.0	317.6
7/22/2018 16:00	3.5	308.2	20.0	36.0	549.5	0.0	317.5
7/22/2018 17:00	2.5	330.1	19.9	35.9	367.1	0.0	317.5
7/22/2018 18:00	2.1	351.1	19.2	38.4	189.8	0.0	317.5
7/22/2018 19:00	2.1	33.9	18.3	40.3	98.0	0.0	317.5
7/22/2018 20:00	2.1	36.2	17.5	41.9	27.7	0.0	317.6
7/22/2018 21:00	2.0	48.9	17.0	43.9	1.7	0.0	317.6
7/22/2018 22:00	1.6	62.3	16.8	44.6	0.0	0.0	317.6
7/22/2018 23:00	0.6	65.3	16.8	44.2	0.0	0.0	317.6
7/23/2018 0:00	1.4	58.0	16.1	45.3	0.0	0.0	317.6
7/23/2018 1:00	1.4	62.3	15.7	46.1	0.0	0.0	317.6
7/23/2018 2:00	1.7	12.1	15.5	45.4	0.0	0.0	317.6
7/23/2018 3:00	0.9	21.5	14.8	48.3	0.0	0.0	317.6
7/23/2018 4:00	0.8	200.7	14.1	51.2	4.1	0.0	317.7
7/23/2018 5:00	0.0	0.0	14.2	49.5	48.2	0.0	317.7
7/23/2018 6:00	0.2	263.7	14.8	48.9	156.2	0.0	317.7
7/23/2018 7:00	0.1	159.8	15.4	49.2	286.2	0.0	317.8
7/23/2018 8:00	0.6	191.3	15.5	49.1	411.5	0.0	317.8
7/23/2018 9:00	1.6	206.0	15.8	48.3	507.3	0.0	317.8
7/23/2018 10:00	1.4	229.9	16.3	48.5	624.0	0.0	317.9
7/23/2018 11:00	1.7	252.5	16.9	53.1	767.0	0.0	317.8
7/23/2018 12:00	1.9	248.2	17.6	52.9	812.0	0.0	317.7
7/23/2018 13:00	2.1	257.0	18.5	47.9	848.0	0.0	317.6
7/23/2018 14:00	2.3	260.5	19.3	40.1	772.2	0.0	317.6
7/23/2018 15:00	2.5	290.5	19.7	38.8	663.4	0.0	317.5
7/23/2018 16:00	3.4	318.9	19.4	40.5	524.2	0.0	317.5
7/23/2018 17:00	3.2	339.6	19.0	41.3	381.1	0.0	317.5
7/23/2018 18:00	2.9	347.7	18.7	41.0	206.9	0.0	317.5
7/23/2018 19:00	2.5	13.8	17.6	44.1	95.5	0.0	317.5
7/23/2018 20:00	2.6	29.2	16.9	46.3	24.8	0.0	317.6
7/23/2018 21:00	2.3	60.9	16.5	47.3	1.1	0.0	317.6
7/23/2018 22:00	1.0	59.5	16.4	47.4	0.0	0.0	317.6
7/23/2018 23:00	0.2	270.5	16.3	47.9	0.0	0.0	317.6
7/24/2018 0:00	0.0	0.0	15.6	50.4	0.0	0.0	317.6
7/24/2018 1:00	0.0	0.0	15.5	49.8	0.0	0.0	317.6
7/24/2018 2:00	0.3	90.4	15.2	51.0	0.0	0.0	317.7
7/24/2018 3:00	0.3	70.1	14.8	52.6	0.0	0.0	317.7
7/24/2018 4:00	0.2	73.8	14.9	52.1	3.8	0.0	317.7
7/24/2018 5:00	0.0	0.0	14.7	52.3	41.8	0.0	317.7
7/24/2018 6:00	0.0	0.0	15.1	50.2	114.6	0.0	317.7
7/24/2018 7:00	0.0	0.0	15.5	52.8	246.0	0.0	317.8
7/24/2018 8:00	0.2	225.9	16.1	51.6	415.2	0.0	317.8
7/24/2018 9:00	1.0	239.5	16.2	50.2	545.9	0.0	317.8
7/24/2018 10:00	1.2	234.1	16.6	51.8	643.9	0.0	317.8
7/24/2018 11:00	1.6	255.0	17.4	56.0	734.8	0.0	317.8

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
7/24/2018 12:00	1.9	227.6	17.9	54.0	788.8	0.0	317.7
7/24/2018 13:00	2.5	248.1	19.0	48.4	818.0	0.0	317.6
7/24/2018 14:00	2.8	269.2	19.3	42.5	736.3	0.0	317.6
7/24/2018 15:00	3.3	297.9	19.7	39.3	647.9	0.0	317.5
7/24/2018 16:00	3.3	304.6	19.6	37.9	501.3	0.0	317.5
7/24/2018 17:00	3.3	331.6	19.1	39.9	365.7	0.0	317.5
7/24/2018 18:00	3.3	343.3	18.5	43.8	205.8	0.0	317.5
7/24/2018 19:00	2.4	24.0	17.5	49.7	95.1	0.0	317.5
7/24/2018 20:00	2.8	69.8	16.7	53.5	28.9	0.0	317.6
7/24/2018 21:00	1.2	85.6	16.5	53.6	1.4	0.0	317.6
7/24/2018 22:00	1.7	182.8	16.3	55.8	0.0	0.0	317.6
7/24/2018 23:00	1.2	228.8	15.9	58.4	0.0	0.0	317.6
7/25/2018 0:00	0.0	0.0	15.6	60.0	0.0	0.0	317.6
7/25/2018 1:00	0.0	0.0	15.1	61.9	0.0	0.0	317.7
7/25/2018 2:00	0.0	0.0	14.8	62.8	0.0	0.0	317.7
7/25/2018 3:00	0.0	0.0	14.5	62.8	0.0	0.0	317.7
7/25/2018 4:00	0.0	0.0	14.3	63.3	4.2	0.0	317.7
7/25/2018 5:00	0.3	326.9	14.4	61.9	53.1	0.0	317.7
7/25/2018 6:00	0.0	0.0	14.6	61.0	154.2	0.0	317.7
7/25/2018 7:00	0.0	0.0	15.2	63.6	261.6	0.0	317.8
7/25/2018 8:00	0.3	275.1	15.6	59.1	438.4	0.0	317.9
7/25/2018 9:00	1.0	258.6	15.7	61.9	590.8	0.0	317.9
7/25/2018 10:00	1.6	225.9	16.1	61.5	692.4	0.0	317.8
7/25/2018 11:00	1.8	235.1	16.9	61.5	785.6	0.0	317.8
7/25/2018 12:00	2.2	258.7	17.7	55.7	826.0	0.0	317.7
7/25/2018 13:00	2.9	302.8	18.5	47.4	869.0	0.0	317.7
7/25/2018 14:00	3.5	304.0	18.8	46.3	792.1	0.0	317.6
7/25/2018 15:00	3.4	305.9	19.1	46.4	684.6	0.0	317.5
7/25/2018 16:00	4.0	307.6	19.1	47.4	565.7	0.0	317.5
7/25/2018 17:00	3.7	316.8	18.7	50.3	389.9	0.0	317.4
7/25/2018 18:00	4.9	325.7	18.1	53.1	239.5	0.0	317.5
7/25/2018 19:00	5.0	343.0	16.8	56.1	104.7	0.0	317.6
7/25/2018 20:00	2.5	55.9	15.7	58.6	16.8	0.0	317.6
7/25/2018 21:00	1.1	54.0	15.5	60.4	1.2	0.0	317.6
7/25/2018 22:00	1.6	221.6	15.1	63.7	0.0	0.0	317.6
7/25/2018 23:00	0.6	231.0	14.8	65.0	0.0	0.0	317.6
7/26/2018 0:00	0.0	0.0	14.4	66.7	0.0	0.0	317.7
7/26/2018 1:00	0.0	0.0	14.0	68.4	0.0	0.0	317.7
7/26/2018 2:00	0.0	0.0	13.6	70.2	0.0	0.0	317.7
7/26/2018 3:00	0.0	0.0	13.3	72.1	0.0	0.0	317.7
7/26/2018 4:00	0.4	86.1	13.1	71.6	4.9	0.0	317.7
7/26/2018 5:00	1.3	65.0	13.1	68.5	42.8	0.0	317.7
7/26/2018 6:00	0.8	55.2	13.8	67.7	188.5	0.0	317.8
7/26/2018 7:00	1.6	68.4	14.3	67.6	332.1	0.0	317.9
7/26/2018 8:00	0.9	357.5	15.0	67.8	492.1	0.0	317.9
7/26/2018 9:00	1.1	303.7	15.5	67.3	635.7	0.0	317.9
7/26/2018 10:00	1.7	247.9	15.5	64.5	723.8	0.0	317.9
7/26/2018 11:00	1.5	286.4	16.5	57.3	787.8	0.0	317.9
7/26/2018 12:00	2.2	299.2	17.2	55.0	852.0	0.0	317.8
7/26/2018 13:00	2.6	269.9	18.4	49.3	887.0	0.0	317.6
7/26/2018 14:00	2.9	279.1	19.0	48.5	787.5	0.0	317.6
7/26/2018 15:00	3.5	306.9	19.3	46.7	690.1	0.0	317.6
7/26/2018 16:00	3.2	302.7	19.7	49.4	565.2	0.0	317.4
7/26/2018 17:00	4.0	314.1	19.4	53.5	438.2	0.0	317.4



**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
7/26/2018 18:00	3.4	329.2	18.8	58.3	246.2	0.0	317.4
7/26/2018 19:00	3.1	347.0	17.9	61.8	107.9	0.0	317.4
7/26/2018 20:00	2.2	6.0	16.6	67.9	42.7	0.0	317.6
7/26/2018 21:00	0.7	231.4	16.3	69.1	1.5	0.0	317.6
7/26/2018 22:00	2.3	199.6	15.7	72.2	0.0	0.0	317.6
7/26/2018 23:00	2.6	183.6	15.3	74.1	0.0	0.0	317.6
7/27/2018 0:00	0.8	214.4	15.0	75.5	0.0	0.0	317.7
7/27/2018 1:00	0.4	240.5	14.6	77.3	0.0	0.0	317.7
7/27/2018 2:00	0.0	0.0	14.3	78.7	0.0	0.0	317.7
7/27/2018 3:00	0.0	0.0	14.0	80.4	0.0	0.0	317.7
7/27/2018 4:00	0.9	13.7	13.8	79.3	3.7	0.0	317.7
7/27/2018 5:00	2.1	28.6	13.5	83.1	62.0	0.0	317.8
7/27/2018 6:00	1.1	53.7	14.2	83.7	191.1	0.0	317.8
7/27/2018 7:00	0.8	137.5	15.5	74.2	329.5	0.0	317.9
7/27/2018 8:00	0.8	217.1	15.9	72.8	489.6	0.0	317.9
7/27/2018 9:00	1.1	234.9	16.6	70.7	622.4	0.0	317.9
7/27/2018 10:00	1.5	231.9	17.3	68.5	725.9	0.0	317.9
7/27/2018 11:00	2.3	227.8	17.3	71.5	797.1	0.0	317.8
7/27/2018 12:00	2.6	236.5	18.5	63.8	859.0	0.0	317.7
7/27/2018 13:00	3.5	240.7	19.6	60.1	893.0	0.0	317.6
7/27/2018 14:00	2.9	264.3	20.7	55.4	794.7	0.0	317.5
7/27/2018 15:00	3.0	272.5	21.5	53.3	694.6	0.0	317.5
7/27/2018 16:00	2.9	294.1	21.8	53.2	573.3	0.0	317.4
7/27/2018 17:00	2.9	302.2	21.7	52.7	444.4	0.0	317.4
7/27/2018 18:00	3.0	336.3	20.7	54.5	273.1	0.0	317.3
7/27/2018 19:00	1.5	322.2	20.3	55.2	108.9	0.0	317.3
7/27/2018 20:00	2.4	237.1	19.2	61.3	42.5	0.0	317.5
7/27/2018 21:00	2.7	184.2	18.2	64.8	1.4	0.0	317.6
7/27/2018 22:00	2.6	194.6	17.4	68.0	0.0	0.0	317.6
7/27/2018 23:00	2.3	197.9	16.8	70.8	0.0	0.0	317.6
7/28/2018 0:00	2.2	201.0	16.0	74.9	0.0	0.0	317.6
7/28/2018 1:00	2.3	201.5	15.4	77.4	0.0	0.0	317.6
7/28/2018 2:00	1.7	221.9	14.9	79.7	0.0	0.0	317.7
7/28/2018 3:00	0.6	227.6	15.0	78.7	0.0	0.0	317.7
7/28/2018 4:00	0.0	46.8	14.8	79.4	3.4	0.0	317.7
7/28/2018 5:00	1.8	36.1	15.0	71.8	61.6	0.0	317.8
7/28/2018 6:00	0.8	34.1	15.5	71.5	192.4	0.0	317.8
7/28/2018 7:00	0.6	70.7	15.7	74.1	330.7	0.0	317.8
7/28/2018 8:00	0.7	329.7	16.2	71.3	494.0	0.0	318.0
7/28/2018 9:00	1.2	275.7	16.6	71.5	627.3	0.0	318.0
7/28/2018 10:00	1.5	260.5	17.4	71.8	729.9	0.0	317.9
7/28/2018 11:00	1.8	233.6	17.9	69.3	799.9	0.0	317.8
7/28/2018 12:00	1.9	238.6	19.1	63.7	859.0	0.0	317.7
7/28/2018 13:00	2.3	241.5	20.0	57.6	891.0	0.0	317.6
7/28/2018 14:00	3.1	253.1	20.8	54.4	794.4	0.0	317.5
7/28/2018 15:00	3.1	253.7	21.6	53.3	694.9	0.0	317.5
7/28/2018 16:00	2.8	275.9	21.9	50.8	573.0	0.0	317.4
7/28/2018 17:00	2.8	310.6	21.6	52.5	443.7	0.0	317.4
7/28/2018 18:00	2.2	283.9	21.5	52.9	281.3	0.0	317.3
7/28/2018 19:00	2.2	278.8	20.9	55.7	108.9	0.0	317.3
7/28/2018 20:00	2.0	241.1	19.4	61.6	40.7	0.0	317.5
7/28/2018 21:00	3.2	201.0	18.1	67.1	1.2	0.0	317.6
7/28/2018 22:00	3.1	205.7	17.1	71.0	0.0	0.0	317.6
7/28/2018 23:00	2.6	207.0	16.2	74.5	0.0	0.0	317.6

### Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
7/29/2018 0:00	2.3	198.2	15.8	76.4	0.0	0.0	317.6
7/29/2018 1:00	2.0	214.3	15.4	77.4	0.0	0.0	317.6
7/29/2018 2:00	1.9	219.9	15.0	78.6	0.0	0.0	317.7
7/29/2018 3:00	0.1	179.8	15.1	78.8	0.0	0.0	317.7
7/29/2018 4:00	0.2	85.2	15.1	77.3	3.2	0.0	317.7
7/29/2018 5:00	0.0	0.0	15.3	76.1	57.0	0.0	317.8
7/29/2018 6:00	0.0	0.0	15.7	73.0	187.0	0.0	317.8
7/29/2018 7:00	0.6	84.4	16.3	72.6	325.0	0.0	317.9
7/29/2018 8:00	1.0	319.8	16.9	70.6	485.3	0.0	317.9
7/29/2018 9:00	0.8	246.8	16.6	71.2	620.0	0.0	317.9
7/29/2018 10:00	1.9	226.5	17.2	66.5	725.3	0.0	317.9
7/29/2018 11:00	2.4	226.8	17.7	65.5	797.6	0.0	317.8
7/29/2018 12:00	3.0	239.0	18.6	63.0	861.0	0.0	317.7
7/29/2018 13:00	3.0	245.9	19.5	59.7	893.0	0.0	317.6
7/29/2018 14:00	3.2	257.4	20.5	55.8	796.3	0.0	317.5
7/29/2018 15:00	3.2	263.3	21.1	54.1	695.4	0.0	317.5
7/29/2018 16:00	3.2	263.1	21.4	52.7	573.5	0.0	317.4
7/29/2018 17:00	3.0	274.5	21.4	52.0	443.8	0.0	317.3
7/29/2018 18:00	2.7	268.9	21.1	52.6	283.2	0.0	317.3
7/29/2018 19:00	2.4	254.4	20.4	54.6	109.5	0.0	317.3
7/29/2018 20:00	2.0	231.2	19.0	59.2	39.4	0.0	317.5
7/29/2018 21:00	3.3	199.9	17.5	65.7	1.0	0.0	317.6
7/29/2018 22:00	2.8	196.1	16.8	68.1	0.0	0.0	317.6
7/29/2018 23:00	2.1	199.5	16.1	70.7	0.0	0.0	317.6
7/30/2018 0:00	1.5	200.1	15.6	72.0	0.0	0.0	317.6
7/30/2018 1:00	1.5	260.5	15.3	72.1	0.0	0.0	317.7
7/30/2018 2:00	0.1	280.5	15.2	72.6	0.0	0.0	317.7
7/30/2018 3:00	0.6	24.5	15.1	70.3	0.0	0.0	317.7
7/30/2018 4:00	0.3	343.6	14.4	72.7	2.8	0.0	317.7
7/30/2018 5:00	1.9	36.8	14.0	75.2	55.2	0.0	317.8
7/30/2018 6:00	1.3	55.3	14.7	72.7	186.9	0.0	317.8
7/30/2018 7:00	1.3	0.5	15.1	72.6	326.1	0.0	318.0
7/30/2018 8:00	1.3	323.9	15.8	66.3	486.0	0.0	318.0
7/30/2018 9:00	1.4	227.0	16.4	66.1	619.9	0.0	317.9
7/30/2018 10:00	1.7	225.9	17.4	63.6	723.9	0.0	317.9
7/30/2018 11:00	2.0	228.2	18.1	60.8	794.2	0.0	317.8
7/30/2018 12:00	2.3	227.0	19.1	58.3	855.0	0.0	317.7
7/30/2018 13:00	2.3	250.1	20.3	54.5	889.0	0.0	317.6
7/30/2018 14:00	3.0	255.8	21.2	50.4	794.3	0.0	317.5
7/30/2018 15:00	3.2	257.0	21.9	48.3	694.5	0.0	317.5
7/30/2018 16:00	2.7	279.7	22.3	44.8	572.0	0.0	317.4
7/30/2018 17:00	3.2	319.2	21.8	47.0	440.6	0.0	317.4
7/30/2018 18:00	3.4	348.6	20.9	48.5	276.6	0.0	317.3
7/30/2018 19:00	1.4	227.8	21.1	50.5	109.5	0.0	317.3
7/30/2018 20:00	2.4	209.7	20.1	53.7	35.8	0.0	317.5
7/30/2018 21:00	2.8	201.8	19.2	58.0	1.0	0.0	317.5
7/30/2018 22:00	2.2	209.3	18.2	59.6	0.0	0.0	317.6
7/30/2018 23:00	1.8	223.2	17.3	64.1	0.0	0.0	317.6
7/31/2018 0:00	1.7	214.1	16.7	69.3	0.0	0.0	317.6
7/31/2018 1:00	0.9	215.7	16.6	69.3	0.0	0.0	317.6
7/31/2018 2:00	0.2	202.2	16.2	70.7	0.0	0.0	317.6
7/31/2018 3:00	0.0	0.0	15.9	72.4	0.0	0.0	317.7
7/31/2018 4:00	0.0	0.0	15.4	73.6	3.4	0.0	317.7
7/31/2018 5:00	0.0	0.0	15.7	70.5	46.1	0.0	317.7

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
7/31/2018 6:00	0.1	5.1	16.5	66.3	178.6	0.0	317.8
7/31/2018 7:00	0.2	169.4	16.8	66.3	321.8	0.0	317.8
7/31/2018 8:00	0.5	228.1	17.7	62.8	487.4	0.0	317.9
7/31/2018 9:00	0.8	226.0	17.4	63.3	610.6	0.0	317.9
7/31/2018 10:00	1.6	229.0	17.9	61.0	721.7	0.0	317.9
7/31/2018 11:00	1.9	233.8	18.7	60.2	803.0	0.0	317.8
7/31/2018 12:00	1.8	241.0	19.7	58.4	795.5	0.0	317.7
7/31/2018 13:00	2.6	242.1	20.3	55.5	825.0	0.0	317.6
7/31/2018 14:00	3.4	252.3	21.0	54.4	791.7	0.0	317.5
7/31/2018 15:00	3.1	288.9	21.4	51.9	694.3	0.0	317.5
7/31/2018 16:00	3.5	299.5	21.6	52.8	542.6	0.0	317.5
7/31/2018 17:00	2.9	338.2	20.3	58.1	274.3	0.0	317.4
7/31/2018 18:00	2.7	341.1	20.1	61.4	214.0	0.0	317.5
7/31/2018 19:00	2.3	36.8	18.9	66.6	80.0	0.0	317.5
7/31/2018 20:00	0.9	101.2	18.6	67.1	42.1	0.0	317.6
7/31/2018 21:00	0.2	231.3	17.8	70.0	1.3	0.0	317.6
7/31/2018 22:00	1.6	215.7	16.7	72.9	0.0	0.0	317.6
7/31/2018 23:00	2.2	190.8	16.2	77.8	0.0	0.0	317.6
8/1/2018 0:00	2.5	198.4	15.6	80.3	0.0	0.0	317.6
8/1/2018 1:00	2.0	209.8	15.2	81.4	0.0	0.0	317.6
8/1/2018 2:00	1.7	213.3	14.9	82.3	0.0	0.0	317.7
8/1/2018 3:00	1.2	214.5	14.4	84.3	0.0	0.0	317.7
8/1/2018 4:00	1.5	226.2	14.2	83.7	2.4	0.0	317.7
8/1/2018 5:00	1.4	202.4	14.0	84.6	22.3	0.0	317.7
8/1/2018 6:00	2.0	210.8	13.9	85.7	105.9	0.0	317.7
8/1/2018 7:00	1.6	219.3	14.4	83.9	291.4	0.0	317.8
8/1/2018 8:00	1.7	232.2	14.7	83.5	430.6	0.0	317.9
8/1/2018 9:00	1.9	217.2	15.1	81.0	489.1	0.0	317.8
8/1/2018 10:00	3.3	220.4	15.2	82.1	633.5	0.0	317.8
8/1/2018 11:00	3.4	229.9	15.4	82.8	587.0	0.0	317.7
8/1/2018 12:00	3.4	228.2	16.1	80.6	648.4	0.0	317.7
8/1/2018 13:00	4.8	230.4	16.7	76.8	598.8	0.0	317.6
8/1/2018 14:00	5.6	236.6	17.5	71.3	494.5	0.0	317.5
8/1/2018 15:00	6.7	244.2	17.3	71.2	311.8	0.0	317.5
8/1/2018 16:00	7.8	246.1	17.0	71.8	307.3	0.0	317.5
8/1/2018 17:00	7.2	244.3	16.3	73.4	168.0	0.0	317.5
8/1/2018 18:00	7.3	248.3	15.3	77.5	107.8	0.0	317.5
8/1/2018 19:00	5.1	255.3	15.0	79.1	87.7	0.0	317.5
8/1/2018 20:00	3.3	268.7	14.3	80.8	25.9	0.0	317.6
8/1/2018 21:00	1.7	268.0	13.8	81.6	0.5	0.0	317.6
8/1/2018 22:00	3.1	225.1	13.5	85.3	0.0	0.0	317.6
8/1/2018 23:00	3.3	213.8	13.1	85.5	0.0	0.0	317.7
8/2/2018 0:00	3.2	222.1	12.7	84.9	0.0	0.0	317.7
8/2/2018 1:00	2.6	219.0	12.3	85.4	0.0	0.0	317.7
8/2/2018 2:00	3.5	218.2	11.8	89.0	0.0	0.0	317.7
8/2/2018 3:00	2.7	215.2	11.4	91.1	0.0	0.0	317.7
8/2/2018 4:00	2.7	232.9	11.1	91.9	1.1	0.0	317.7
8/2/2018 5:00	2.3	242.1	10.7	91.2	15.9	0.0	317.7
8/2/2018 6:00	3.3	238.4	10.5	90.6	57.3	0.0	317.7
8/2/2018 7:00	3.8	233.2	10.4	89.7	102.1	0.0	317.7
8/2/2018 8:00	3.6	232.6	10.2	91.2	78.7	0.0	317.7
8/2/2018 9:00	4.7	233.6	10.4	90.3	137.3	0.0	317.7
8/2/2018 10:00	4.6	232.4	10.4	89.6	143.7	0.0	317.7
8/2/2018 11:00	4.6	232.1	10.8	88.0	185.4	0.0	317.7

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
8/2/2018 12:00	4.3	228.2	11.1	86.3	236.4	0.0	317.7
8/2/2018 13:00	4.2	233.7	11.3	86.5	219.5	0.0	317.7
8/2/2018 14:00	4.5	230.7	11.7	84.7	238.1	0.0	317.7
8/2/2018 15:00	6.0	242.8	11.2	88.8	115.4	0.0	317.6
8/2/2018 16:00	5.7	225.9	10.3	96.3	77.8	0.0	318.2
8/2/2018 17:00	5.5	232.2	10.2	97.0	42.2	0.0	318.2
8/2/2018 18:00	5.1	221.5	9.9	97.2	28.1	0.0	318.7
8/2/2018 19:00	4.8	213.0	9.9	97.3	19.9	0.0	318.9
8/2/2018 20:00	4.1	213.8	9.9	97.4	5.8	0.0	318.9
8/2/2018 21:00	4.4	221.2	9.7	97.6	0.0	0.0	319.3
8/2/2018 22:00	3.5	221.9	9.6	97.6	0.0	0.0	320.9
8/2/2018 23:00	4.4	206.9	9.4	97.7	0.0	0.0	322.6
8/3/2018 0:00	4.4	222.4	9.5	97.8	0.0	0.0	323.0
8/3/2018 1:00	4.6	213.0	9.4	97.8	0.0	0.0	323.2
8/3/2018 2:00	4.5	212.0	9.2	97.9	0.0	0.0	323.4
8/3/2018 3:00	4.9	209.4	9.1	97.9	0.0	0.0	323.5
8/3/2018 4:00	4.1	211.3	8.8	98.0	1.0	0.0	323.7
8/3/2018 5:00	4.9	217.5	8.7	98.0	9.5	0.0	323.8
8/3/2018 6:00	4.8	214.7	8.6	98.0	60.5	0.0	323.8
8/3/2018 7:00	3.6	209.5	8.5	98.0	111.2	0.0	323.8
8/3/2018 8:00	4.4	196.8	9.0	96.7	264.2	0.0	323.9
8/3/2018 9:00	3.1	209.9	10.1	90.7	571.4	0.0	323.8
8/3/2018 10:00	4.4	189.9	10.3	88.2	267.3	0.0	323.7
8/3/2018 11:00	4.2	190.5	10.5	87.6	233.6	0.0	323.6
8/3/2018 12:00	3.0	213.0	10.3	91.6	243.3	0.0	323.7
8/3/2018 13:00	4.2	214.1	10.6	90.1	284.4	0.0	323.7
8/3/2018 14:00	5.2	210.7	10.9	86.3	187.1	0.0	323.6
8/3/2018 15:00	6.8	195.3	11.4	78.6	144.7	0.0	323.6
8/3/2018 16:00	6.2	196.6	11.0	81.1	111.3	0.0	323.6
8/3/2018 17:00	4.6	188.4	11.1	78.8	98.6	0.0	323.7
8/3/2018 18:00	5.7	183.7	10.6	81.7	65.1	0.0	323.7
8/3/2018 19:00	3.6	176.2	10.4	82.2	23.8	0.0	323.7
8/3/2018 20:00	4.2	182.6	10.1	84.6	6.9	0.0	323.6
8/3/2018 21:00	3.6	172.9	10.0	86.0	0.0	0.0	323.7
8/3/2018 22:00	4.6	178.0	9.7	89.4	0.0	0.0	323.7
8/3/2018 23:00	6.0	184.1	9.7	89.3	0.0	0.0	323.7
8/4/2018 0:00	5.8	178.7	9.6	89.6	0.0	0.0	323.7
8/4/2018 1:00	6.7	175.3	9.7	88.0	0.0	0.0	323.7
8/4/2018 2:00	5.4	164.0	9.8	87.5	0.0	0.0	323.7
8/4/2018 3:00	5.1	161.0	10.0	85.0	0.0	0.0	323.7
8/4/2018 4:00	4.0	165.2	10.0	85.2	1.3	0.0	323.7
8/4/2018 5:00	3.4	154.8	10.1	83.9	16.0	0.0	323.7
8/4/2018 6:00	2.8	137.0	10.4	81.6	30.3	0.0	323.7
8/4/2018 7:00	1.8	133.2	10.9	79.1	85.5	0.0	323.7
8/4/2018 8:00	2.7	184.7	11.3	74.4	124.3	0.0	323.6
8/4/2018 9:00	2.7	190.5	11.6	75.0	207.7	0.0	323.6
8/4/2018 10:00	2.7	206.7	12.3	73.2	357.9	0.0	323.7
8/4/2018 11:00	3.0	220.5	12.2	77.0	291.8	0.0	323.7
8/4/2018 12:00	1.7	218.2	12.9	73.5	317.1	0.0	323.7
8/4/2018 13:00	2.3	229.7	13.3	74.8	391.8	0.0	323.6
8/4/2018 14:00	1.8	260.9	13.6	72.7	435.0	0.0	323.6
8/4/2018 15:00	1.5	258.6	14.2	69.6	404.9	0.0	323.6
8/4/2018 16:00	2.0	246.0	14.3	68.7	323.1	0.0	323.5
8/4/2018 17:00	1.5	259.8	14.6	64.9	254.2	0.0	323.5

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
8/4/2018 18:00	1.7	266.7	15.1	64.3	261.6	0.0	323.4
8/4/2018 19:00	1.0	258.4	14.7	65.7	85.2	0.0	323.4
8/4/2018 20:00	0.2	260.1	13.9	69.2	24.7	0.0	323.6
8/4/2018 21:00	0.0	0.0	13.2	70.6	0.2	0.0	323.7
8/4/2018 22:00	0.0	0.0	12.9	71.0	0.0	0.0	323.7
8/4/2018 23:00	0.0	0.0	12.9	68.2	0.0	0.0	323.7
8/5/2018 0:00	0.6	41.1	12.7	65.3	0.0	0.0	323.7
8/5/2018 1:00	1.5	53.1	12.3	65.7	0.0	0.0	323.7
8/5/2018 2:00	0.2	59.0	12.3	66.0	0.0	0.0	323.7
8/5/2018 3:00	0.0	0.0	12.1	66.4	0.0	0.0	323.7
8/5/2018 4:00	0.2	72.2	12.1	65.2	1.5	0.0	323.7
8/5/2018 5:00	1.4	54.9	12.0	68.4	10.6	0.0	323.7
8/5/2018 6:00	0.4	49.8	13.0	63.8	141.6	0.0	323.8
8/5/2018 7:00	0.4	103.7	13.8	60.2	309.5	0.0	323.9
8/5/2018 8:00	1.7	194.5	13.6	62.4	470.1	0.0	323.9
8/5/2018 9:00	1.7	217.7	14.8	57.0	608.4	0.0	324.0
8/5/2018 10:00	1.3	259.3	15.7	55.0	713.5	0.0	323.9
8/5/2018 11:00	2.1	237.1	16.0	56.9	798.5	0.0	323.9
8/5/2018 12:00	2.8	232.1	16.8	44.9	787.8	0.0	323.7
8/5/2018 13:00	2.6	283.5	17.5	46.5	820.0	0.0	323.6
8/5/2018 14:00	3.0	303.7	17.5	47.2	618.3	0.0	323.6
8/5/2018 15:00	3.1	313.2	17.8	45.3	524.9	0.0	323.6
8/5/2018 16:00	3.2	298.8	18.5	43.6	547.5	0.0	323.4
8/5/2018 17:00	3.8	295.7	18.5	46.4	418.1	0.0	323.4
8/5/2018 18:00	3.1	298.2	18.0	47.3	242.7	0.0	323.3
8/5/2018 19:00	2.9	287.5	17.4	46.7	100.6	0.0	323.4
8/5/2018 20:00	1.8	321.1	16.1	48.6	18.1	0.0	323.6
8/5/2018 21:00	2.4	205.2	14.9	54.9	0.1	0.0	323.6
8/5/2018 22:00	2.3	211.6	14.4	56.4	0.0	0.0	323.6
8/5/2018 23:00	3.4	212.7	14.1	56.1	0.0	0.0	323.6
8/6/2018 0:00	3.8	200.2	14.1	54.4	0.0	0.0	323.6
8/6/2018 1:00	4.5	195.6	14.0	53.1	0.0	0.0	323.6
8/6/2018 2:00	5.1	202.9	14.0	51.8	0.0	0.0	323.6
8/6/2018 3:00	5.4	196.4	13.8	52.9	0.0	0.0	323.6
8/6/2018 4:00	4.4	201.5	13.2	53.4	0.3	0.0	323.6
8/6/2018 5:00	4.5	203.5	13.1	53.5	12.2	0.0	323.6
8/6/2018 6:00	4.8	205.6	12.9	57.5	51.7	0.0	323.6
8/6/2018 7:00	4.9	201.5	12.7	61.2	112.1	0.0	323.6
8/6/2018 8:00	5.0	208.3	12.9	63.3	275.4	0.0	323.6
8/6/2018 9:00	5.0	216.6	13.2	58.9	212.0	0.0	323.6
8/6/2018 10:00	5.3	215.3	14.2	54.7	310.8	0.0	323.6
8/6/2018 11:00	6.5	226.0	14.7	57.1	506.7	0.0	323.7
8/6/2018 12:00	7.9	241.4	15.4	55.0	544.4	0.0	323.6
8/6/2018 13:00	8.9	236.0	16.1	50.5	610.4	0.0	323.5
8/6/2018 14:00	10.0	240.5	16.8	45.6	702.6	0.0	323.5
8/6/2018 15:00	9.9	231.8	17.1	45.5	686.4	0.0	323.5
8/6/2018 16:00	8.2	235.8	16.5	48.5	416.7	0.0	323.4
8/6/2018 17:00	8.9	240.4	15.8	50.3	224.2	0.0	323.5
8/6/2018 18:00	7.7	232.1	14.9	54.7	127.2	0.0	323.5
8/6/2018 19:00	7.2	231.0	14.2	59.1	64.4	0.0	323.6
8/6/2018 20:00	4.9	210.0	13.3	64.6	9.8	0.0	323.6
8/6/2018 21:00	4.5	212.8	13.0	64.2	0.0	0.0	323.6
8/6/2018 22:00	5.4	224.1	12.6	64.9	0.0	0.0	323.6
8/6/2018 23:00	5.3	218.5	12.2	67.8	0.0	0.0	323.6

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
8/7/2018 0:00	5.6	220.6	12.0	66.8	0.0	0.0	323.7
8/7/2018 1:00	4.9	209.5	11.8	68.0	0.0	0.0	323.7
8/7/2018 2:00	5.1	214.5	11.3	69.4	0.0	0.0	323.7
8/7/2018 3:00	4.5	210.2	11.1	69.4	0.0	0.0	323.7
8/7/2018 4:00	4.5	208.7	11.0	68.9	0.1	0.0	323.7
8/7/2018 5:00	4.1	203.1	11.0	68.3	6.6	0.0	323.7
8/7/2018 6:00	4.0	206.3	11.0	68.5	32.6	0.0	323.7
8/7/2018 7:00	3.7	206.4	11.0	68.9	84.7	0.0	323.7
8/7/2018 8:00	4.1	208.4	11.3	67.9	159.9	0.0	323.7
8/7/2018 9:00	4.7	209.9	11.7	67.6	241.6	0.0	323.7
8/7/2018 10:00	4.0	209.8	12.3	67.2	272.9	0.0	323.7
8/7/2018 11:00	4.0	221.8	12.7	68.1	335.5	0.0	323.7
8/7/2018 12:00	4.6	224.1	13.2	68.5	437.7	0.0	323.6
8/7/2018 13:00	5.1	222.3	13.7	67.9	371.9	0.0	323.6
8/7/2018 14:00	5.4	221.0	14.0	67.6	286.5	0.0	323.6
8/7/2018 15:00	4.5	231.7	14.2	68.2	229.5	0.0	323.6
8/7/2018 16:00	4.2	233.0	14.3	66.1	186.2	0.0	323.6
8/7/2018 17:00	3.6	235.8	13.9	67.9	85.2	0.0	323.6
8/7/2018 18:00	3.9	215.9	14.2	67.8	135.3	0.0	323.6
8/7/2018 19:00	4.3	219.7	13.7	70.9	31.9	0.0	323.6
8/7/2018 20:00	5.4	219.2	13.6	69.5	3.5	0.0	323.6
8/7/2018 21:00	4.8	212.3	13.2	70.9	0.0	0.0	323.6
8/7/2018 22:00	4.9	212.9	13.1	71.5	0.0	0.0	323.6
8/7/2018 23:00	4.7	214.1	12.7	73.0	0.0	0.0	323.6
8/8/2018 0:00	5.6	222.8	12.2	75.0	0.0	0.0	323.6
8/8/2018 1:00	5.0	223.5	11.9	76.5	0.0	0.0	323.6
8/8/2018 2:00	4.7	232.5	11.6	77.4	0.0	0.0	323.7
8/8/2018 3:00	5.5	232.7	11.3	80.4	0.0	0.0	323.7
8/8/2018 4:00	4.5	220.3	10.6	86.6	0.0	0.0	323.6
8/8/2018 5:00	5.9	225.8	9.6	95.6	2.1	0.0	324.0
8/8/2018 6:00	5.4	209.3	9.6	96.9	22.0	0.0	324.5
8/8/2018 7:00	5.9	203.6	9.6	97.1	92.6	0.0	324.5
8/8/2018 8:00	5.7	210.9	9.8	97.0	242.5	0.0	324.7
8/8/2018 9:00	5.0	215.9	9.9	97.1	167.2	0.0	324.7
8/8/2018 10:00	4.1	226.7	10.1	97.1	166.7	0.0	324.7
8/8/2018 11:00	4.5	218.4	10.3	96.0	190.1	0.0	324.7
8/8/2018 12:00	6.3	211.8	11.8	83.8	341.9	0.0	324.6
8/8/2018 13:00	6.1	217.8	12.2	77.9	224.0	0.0	324.7
8/8/2018 14:00	5.6	222.0	12.1	80.8	214.7	0.0	324.7
8/8/2018 15:00	7.3	198.4	12.7	73.3	203.6	0.0	324.6
8/8/2018 16:00	5.9	213.5	12.4	77.6	163.6	0.0	324.7
8/8/2018 17:00	4.8	225.1	11.7	84.9	97.6	0.0	324.7
8/8/2018 18:00	3.9	210.4	11.7	84.1	79.6	0.0	324.7
8/8/2018 19:00	3.2	213.7	11.9	80.7	53.2	0.0	324.7
8/8/2018 20:00	3.3	216.0	11.8	80.0	2.5	0.0	324.7
8/8/2018 21:00	4.3	214.1	11.7	80.1	0.0	0.0	324.7
8/8/2018 22:00	8.2	193.1	12.2	74.6	0.0	0.0	324.6
8/8/2018 23:00	7.9	195.0	11.7	75.3	0.0	0.0	324.6
8/9/2018 0:00	8.4	180.4	11.3	78.2	0.0	0.0	324.5
8/9/2018 1:00	9.3	171.4	11.7	73.9	0.0	0.0	324.6
8/9/2018 2:00	7.5	182.7	11.6	75.6	0.0	0.0	324.7
8/9/2018 3:00	7.3	184.2	11.4	78.7	0.0	0.0	324.6
8/9/2018 4:00	7.5	189.8	11.4	78.6	0.1	0.0	324.7
8/9/2018 5:00	5.7	202.9	10.6	85.9	7.9	0.0	324.7

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
8/9/2018 6:00	5.9	201.4	10.0	92.4	22.0	0.0	326.0
8/9/2018 7:00	5.0	204.2	9.6	96.7	22.1	0.0	329.7
8/9/2018 8:00	4.7	200.5	9.7	96.7	33.0	0.0	333.5
8/9/2018 9:00	4.1	193.9	9.6	96.5	60.3	0.0	335.4
8/9/2018 10:00	4.3	212.2	9.5	97.0	45.4	0.0	339.4
8/9/2018 11:00	7.3	180.1	9.6	88.4	35.6	0.0	342.4
8/9/2018 12:00	10.3	169.0	10.2	70.6	60.4	0.0	343.0
8/9/2018 13:00	7.9	184.7	9.5	82.6	82.8	0.0	343.4
8/9/2018 14:00	6.3	197.2	8.9	91.7	85.5	0.0	343.8
8/9/2018 15:00	4.7	223.5	8.8	94.1	75.2	0.0	344.4
8/9/2018 16:00	4.0	229.4	8.7	96.6	60.8	0.0	345.5
8/9/2018 17:00	4.6	224.7	9.0	97.1	39.5	0.0	350.5
8/9/2018 18:00	5.0	209.1	9.1	97.2	44.4	0.0	352.5
8/9/2018 19:00	5.7	239.9	9.1	97.3	5.6	0.0	352.7
8/9/2018 20:00	4.0	255.0	8.6	97.5	2.6	0.0	352.8
8/9/2018 21:00	3.1	235.5	8.4	97.6	0.0	0.0	352.9
8/9/2018 22:00	5.8	236.8	8.2	97.7	0.0	0.0	354.5
8/9/2018 23:00	6.9	232.5	7.7	97.8	0.0	0.0	355.1
8/10/2018 0:00	5.7	220.2	7.0	97.9	0.0	0.0	355.1
8/10/2018 1:00	5.4	229.4	6.9	97.9	0.0	0.0	355.1
8/10/2018 2:00	3.6	208.1	6.4	98.0	0.0	0.0	355.1
8/10/2018 3:00	3.3	202.6	6.3	98.0	0.0	0.0	355.2
8/10/2018 4:00	3.0	198.6	6.2	98.0	0.3	0.0	355.3
8/10/2018 5:00	3.2	194.3	6.0	98.0	14.5	0.0	355.2
8/10/2018 6:00	1.9	216.1	6.1	98.0	41.2	0.0	355.3
8/10/2018 7:00	2.5	205.4	6.2	97.8	136.4	0.0	355.3
8/10/2018 8:00	2.7	216.1	6.9	95.8	316.4	0.0	355.4
8/10/2018 9:00	2.5	274.7	7.2	95.0	364.5	0.0	355.3
8/10/2018 10:00	1.0	293.3	7.5	85.4	258.1	0.0	355.2
8/10/2018 11:00	1.7	231.0	8.2	80.9	340.1	0.0	355.3
8/10/2018 12:00	2.5	246.2	8.8	81.1	568.4	0.0	355.4
8/10/2018 13:00	3.0	268.4	8.5	86.0	345.3	0.0	355.2
8/10/2018 14:00	3.4	208.6	9.3	78.1	633.1	0.0	355.2
8/10/2018 15:00	2.4	258.9	9.4	80.7	343.6	0.0	355.2
8/10/2018 16:00	2.4	267.8	10.8	72.1	602.4	0.0	355.1
8/10/2018 17:00	3.1	305.0	10.9	69.0	405.2	0.0	355.0
8/10/2018 18:00	2.9	312.2	10.7	69.5	251.1	0.0	355.0
8/10/2018 19:00	3.9	342.3	9.7	71.8	98.4	0.0	355.1
8/10/2018 20:00	2.6	32.5	8.6	75.2	13.8	0.0	355.2
8/10/2018 21:00	2.2	24.9	8.2	78.8	0.0	0.0	355.2
8/10/2018 22:00	1.9	32.4	8.1	79.4	0.0	0.0	355.2
8/10/2018 23:00	1.8	34.8	7.8	80.4	0.0	0.0	355.2
8/11/2018 0:00	2.4	33.2	7.3	84.5	0.0	0.0	355.2
8/11/2018 1:00	2.3	54.8	6.9	88.3	0.0	0.0	355.3
8/11/2018 2:00	1.8	51.9	7.1	85.9	0.0	0.0	355.2
8/11/2018 3:00	2.2	26.0	6.7	89.7	0.0	0.0	355.2
8/11/2018 4:00	1.6	40.6	5.9	94.5	0.6	0.0	355.2
8/11/2018 5:00	0.8	48.5	5.8	96.3	9.2	0.0	355.3
8/11/2018 6:00	1.1	189.1	6.2	91.0	76.7	0.0	355.4
8/11/2018 7:00	0.8	194.0	7.5	82.4	301.6	0.0	355.6
8/11/2018 8:00	0.7	273.0	8.2	80.5	456.9	0.0	355.7
8/11/2018 9:00	1.1	259.8	9.1	75.4	591.4	0.0	355.6
8/11/2018 10:00	1.9	225.1	9.5	75.6	702.0	0.0	355.5
8/11/2018 11:00	1.9	236.2	10.6	76.6	776.6	0.0	355.4

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
8/11/2018 12:00	2.0	252.2	11.8	73.0	833.0	0.0	355.4
8/11/2018 13:00	2.1	290.2	13.0	67.9	842.0	0.0	355.2
8/11/2018 14:00	2.3	291.7	13.7	56.7	718.4	0.0	355.1
8/11/2018 15:00	3.1	296.5	14.1	54.8	649.4	0.0	355.1
8/11/2018 16:00	3.7	306.2	14.1	56.0	529.4	0.0	355.0
8/11/2018 17:00	3.1	327.2	14.0	60.3	391.4	0.0	355.0
8/11/2018 18:00	3.8	337.9	13.2	61.9	236.4	0.0	354.9
8/11/2018 19:00	3.6	349.2	12.3	64.5	86.4	0.0	355.1
8/11/2018 20:00	2.0	22.0	11.2	68.1	5.9	0.0	355.1
8/11/2018 21:00	1.1	209.1	11.3	68.4	0.0	0.0	355.1
8/11/2018 22:00	2.4	194.0	10.8	74.0	0.0	0.0	355.1
8/11/2018 23:00	2.1	192.0	10.3	76.9	0.0	0.0	355.1
8/12/2018 0:00	1.5	202.6	10.4	75.7	0.0	0.0	355.1
8/12/2018 1:00	1.7	217.5	9.9	79.3	0.0	0.0	355.1
8/12/2018 2:00	2.5	212.5	9.1	82.9	0.0	0.0	355.1
8/12/2018 3:00	2.8	217.5	8.5	85.8	0.0	0.0	355.2
8/12/2018 4:00	2.5	214.7	8.1	88.3	0.7	0.0	355.2
8/12/2018 5:00	2.1	223.1	7.9	88.3	15.9	0.0	355.2
8/12/2018 6:00	1.8	214.5	8.4	85.4	109.9	0.0	355.4
8/12/2018 7:00	2.5	233.2	8.9	83.9	295.9	0.0	355.4
8/12/2018 8:00	1.4	227.7	9.9	77.6	402.2	0.0	355.5
8/12/2018 9:00	2.3	244.9	10.4	77.2	559.6	0.0	355.4
8/12/2018 10:00	3.4	225.5	10.4	78.8	571.4	0.0	355.3
8/12/2018 11:00	3.3	236.9	11.2	78.4	642.6	0.0	355.3
8/12/2018 12:00	3.5	243.8	11.7	77.1	628.0	0.0	355.1
8/12/2018 13:00	2.9	262.0	11.6	78.5	399.8	0.0	355.1
8/12/2018 14:00	2.8	259.3	11.7	79.1	389.3	0.0	355.1
8/12/2018 15:00	2.6	248.4	11.5	80.6	241.9	0.0	355.1
8/12/2018 16:00	3.1	246.3	11.4	81.2	196.3	0.0	355.1
8/12/2018 17:00	2.7	268.5	11.3	82.5	138.1	0.0	355.0
8/12/2018 18:00	2.3	227.6	11.8	79.5	210.3	0.0	354.8
8/12/2018 19:00	2.0	256.4	11.2	83.1	56.9	0.0	355.1
8/12/2018 20:00	1.2	237.3	10.7	85.2	3.3	0.0	355.1
8/12/2018 21:00	1.1	243.9	10.4	86.7	0.0	0.0	355.1
8/12/2018 22:00	2.5	199.8	10.1	87.7	0.0	0.0	355.1
8/12/2018 23:00	2.8	232.8	9.7	90.4	0.0	0.0	355.1
8/13/2018 0:00	3.2	225.3	9.3	92.8	0.0	0.0	355.1
8/13/2018 1:00	3.5	228.7	8.9	95.0	0.0	0.0	355.2
8/13/2018 2:00	4.1	218.1	8.8	96.1	0.0	0.0	355.2
8/13/2018 3:00	4.4	218.5	8.6	97.0	0.0	0.0	355.1
8/13/2018 4:00	4.4	232.7	8.6	96.6	0.3	0.0	355.1
8/13/2018 5:00	4.3	242.8	8.7	95.1	10.8	0.0	355.1
8/13/2018 6:00	4.2	233.3	8.9	94.0	63.4	0.0	355.2
8/13/2018 7:00	4.6	220.6	9.3	90.1	123.6	0.0	355.1
8/13/2018 8:00	4.9	210.2	9.8	88.5	251.7	0.0	355.3
8/13/2018 9:00	5.0	225.9	10.6	85.6	514.0	0.0	355.2
8/13/2018 10:00	5.9	223.8	11.0	84.6	434.0	0.0	355.1
8/13/2018 11:00	5.2	222.0	11.6	81.1	392.1	0.0	355.0
8/13/2018 12:00	4.9	212.4	11.7	79.5	222.0	0.0	355.0
8/13/2018 13:00	5.1	231.8	11.6	83.4	218.9	0.0	355.0
8/13/2018 14:00	5.5	223.1	11.9	83.3	291.7	0.0	355.0
8/13/2018 15:00	6.7	235.4	12.6	79.6	288.6	0.0	355.0
8/13/2018 16:00	8.5	241.0	13.3	76.8	504.0	0.0	355.0
8/13/2018 17:00	6.5	240.4	12.0	79.9	150.6	0.0	355.1



Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
8/13/2018 18:00	7.5	231.8	10.9	84.3	52.9	0.0	355.1
8/13/2018 19:00	6.6	217.6	9.6	94.5	10.2	0.0	355.3
8/13/2018 20:00	5.4	223.6	9.2	97.1	0.6	0.0	355.4
8/13/2018 21:00	6.0	222.0	8.9	97.3	0.0	0.0	356.3
8/13/2018 22:00	6.3	218.5	8.5	97.5	0.0	0.0	356.4
8/13/2018 23:00	7.0	213.3	8.3	97.7	0.0	0.0	356.5
8/14/2018 0:00	6.7	220.9	8.1	97.8	0.0	0.0	356.9
8/14/2018 1:00	7.1	225.1	8.1	97.9	0.0	0.0	357.5
8/14/2018 2:00	7.2	223.4	8.0	97.9	0.0	0.0	358.5
8/14/2018 3:00	6.7	221.9	7.9	98.0	0.0	0.0	360.5
8/14/2018 4:00	5.6	219.0	7.9	98.0	0.0	0.0	361.6
8/14/2018 5:00	5.8	217.2	7.8	98.0	4.9	0.0	361.8
8/14/2018 6:00	5.6	211.3	7.9	98.0	71.6	0.0	361.9
8/14/2018 7:00	5.1	219.3	7.9	98.0	79.9	0.0	362.0
8/14/2018 8:00	5.0	217.5	8.1	98.0	146.6	0.0	362.2
8/14/2018 9:00	5.1	222.1	8.4	97.8	240.3	0.0	362.3
8/14/2018 10:00	4.8	223.2	8.8	97.7	342.0	0.0	362.5
8/14/2018 11:00	4.2	230.5	9.5	97.2	580.8	0.0	362.4
8/14/2018 12:00	4.8	227.6	10.1	96.9	811.0	0.0	362.4
8/14/2018 13:00	5.4	246.7	11.2	90.1	673.0	0.0	362.3
8/14/2018 14:00	4.0	300.3	10.9	86.8	412.5	0.0	362.1
8/14/2018 15:00	4.5	246.8	9.8	91.9	160.6	0.0	362.4
8/14/2018 16:00	6.2	223.0	9.3	93.2	192.7	0.0	362.5
8/14/2018 17:00	5.5	237.4	10.7	80.9	339.0	0.0	362.4
8/14/2018 18:00	6.2	236.5	10.7	73.1	257.8	0.0	362.4
8/14/2018 19:00	5.3	223.3	9.6	81.2	75.2	0.0	362.5
8/14/2018 20:00	3.7	211.8	8.4	87.9	7.8	0.0	362.5
8/14/2018 21:00	3.0	205.4	7.7	91.4	0.0	0.0	362.5
8/14/2018 22:00	3.3	194.9	7.2	92.1	0.0	0.0	362.6
8/14/2018 23:00	3.0	187.3	6.7	94.1	0.0	0.0	362.6
8/15/2018 0:00	3.0	200.2	6.4	93.3	0.0	0.0	362.6
8/15/2018 1:00	3.5	199.3	6.0	94.7	0.0	0.0	362.5
8/15/2018 2:00	3.2	220.3	5.7	96.7	0.0	0.0	362.6
8/15/2018 3:00	2.2	208.1	5.5	97.3	0.0	0.0	362.6
8/15/2018 4:00	1.6	225.7	5.4	94.7	0.2	0.0	362.6
8/15/2018 5:00	0.3	229.3	5.4	91.5	12.4	0.0	362.6
8/15/2018 6:00	2.0	230.1	5.5	92.9	61.7	0.0	362.6
8/15/2018 7:00	2.3	228.7	5.4	94.0	237.6	0.0	362.9
8/15/2018 8:00	2.0	215.4	6.1	86.6	420.1	0.0	362.9
8/15/2018 9:00	2.1	227.0	6.8	81.1	592.1	0.0	363.0
8/15/2018 10:00	2.2	253.6	7.8	79.2	713.2	0.0	362.9
8/15/2018 11:00	2.8	251.5	8.4	77.4	656.4	0.0	362.9
8/15/2018 12:00	3.1	267.3	9.6	68.8	841.0	0.0	362.7
8/15/2018 13:00	3.8	273.4	10.3	64.3	848.0	0.0	362.6
8/15/2018 14:00	3.7	269.2	11.0	60.4	756.6	0.0	362.5
8/15/2018 15:00	3.7	270.7	11.6	59.9	645.6	0.0	362.4
8/15/2018 16:00	3.2	286.4	11.8	60.0	510.5	0.0	362.4
8/15/2018 17:00	2.9	289.0	11.7	61.2	341.7	0.0	362.4
8/15/2018 18:00	2.0	272.9	11.2	62.3	182.2	0.0	362.4
8/15/2018 19:00	1.6	304.4	9.8	69.2	68.1	0.0	362.5
8/15/2018 20:00	0.7	43.9	8.6	75.2	3.2	0.0	362.5
8/15/2018 21:00	2.0	207.1	8.4	77.5	0.0	0.0	362.5
8/15/2018 22:00	2.6	208.1	7.7	81.4	0.0	0.0	362.5
8/15/2018 23:00	2.5	195.7	7.3	83.1	0.0	0.0	362.5

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
8/16/2018 0:00	1.8	221.0	7.3	83.6	0.0	0.0	362.6
8/16/2018 1:00	2.0	225.6	6.6	87.2	0.0	0.0	362.6
8/16/2018 2:00	2.9	233.1	6.3	88.4	0.0	0.0	362.6
8/16/2018 3:00	3.3	222.6	5.8	90.5	0.0	0.0	362.6
8/16/2018 4:00	2.8	220.1	5.5	91.8	0.1	0.0	362.6
8/16/2018 5:00	2.2	228.1	5.5	92.8	7.9	0.0	362.6
8/16/2018 6:00	2.7	226.2	5.4	92.4	37.8	0.0	362.6
8/16/2018 7:00	2.8	222.2	5.3	93.7	144.5	0.0	362.6
8/16/2018 8:00	2.6	233.4	5.8	93.0	236.7	0.0	362.6
8/16/2018 9:00	3.1	220.1	6.4	89.7	253.8	0.0	362.6
8/16/2018 10:00	4.3	221.1	6.8	88.4	383.0	0.0	362.6
8/16/2018 11:00	5.1	222.8	7.5	86.6	566.6	0.0	362.8
8/16/2018 12:00	4.0	232.3	8.6	81.3	679.0	0.0	362.8
8/16/2018 13:00	4.6	232.0	9.6	73.0	868.0	0.0	362.6
8/16/2018 14:00	4.0	259.0	10.9	65.8	757.1	0.0	362.5
8/16/2018 15:00	4.9	257.2	11.7	56.2	639.1	0.0	362.4
8/16/2018 16:00	5.8	259.1	11.4	56.4	433.2	0.0	362.4
8/16/2018 17:00	6.3	250.2	10.9	58.9	241.9	0.0	362.3
8/16/2018 18:00	5.7	254.0	10.7	60.2	236.1	0.0	362.2
8/16/2018 19:00	4.5	229.1	9.4	64.2	56.6	0.0	362.4
8/16/2018 20:00	3.5	211.5	8.3	69.5	2.3	0.0	362.5
8/16/2018 21:00	4.0	215.1	7.9	74.7	0.0	0.0	362.5
8/16/2018 22:00	4.5	210.7	7.6	77.9	0.0	0.0	362.5
8/16/2018 23:00	4.0	202.5	7.4	79.8	0.0	0.0	362.5
8/17/2018 0:00	4.0	218.9	7.1	81.8	0.0	0.0	362.6
8/17/2018 1:00	3.4	202.9	6.9	82.3	0.0	0.0	362.6
8/17/2018 2:00	4.1	211.5	6.9	83.1	0.0	0.0	362.6
8/17/2018 3:00	4.4	207.8	6.7	83.8	0.0	0.0	362.6
8/17/2018 4:00	3.6	205.7	6.5	85.5	0.0	0.0	362.6
8/17/2018 5:00	3.7	213.1	6.5	85.2	2.2	0.0	362.6
8/17/2018 6:00	4.8	224.1	5.7	93.6	15.6	0.0	363.1
8/17/2018 7:00	5.4	222.8	5.5	97.1	29.6	0.0	363.9
8/17/2018 8:00	4.4	220.7	5.6	97.4	55.1	0.0	364.7
8/17/2018 9:00	4.5	217.4	5.7	97.5	73.0	0.0	365.0
8/17/2018 10:00	4.8	220.6	5.9	97.6	72.4	0.0	366.2
8/17/2018 11:00	5.4	218.7	6.1	97.6	69.4	0.0	368.4
8/17/2018 12:00	5.7	214.7	6.3	97.7	92.4	0.0	368.6
8/17/2018 13:00	5.4	209.3	6.6	97.7	142.0	0.0	368.9
8/17/2018 14:00	5.4	214.3	7.0	97.6	164.4	0.0	369.8
8/17/2018 15:00	5.3	214.2	7.2	97.7	135.4	0.0	370.6
8/17/2018 16:00	5.1	215.0	7.4	97.7	105.8	0.0	370.8
8/17/2018 17:00	4.5	220.9	7.6	97.7	96.2	0.0	370.9
8/17/2018 18:00	5.0	217.5	7.7	97.8	70.0	0.0	371.3
8/17/2018 19:00	4.2	214.3	7.7	97.9	21.9	0.0	371.4
8/17/2018 20:00	3.5	213.1	7.7	98.0	1.5	0.0	371.4
8/17/2018 21:00	3.2	208.7	7.7	98.0	0.0	0.0	371.4
8/17/2018 22:00	3.5	199.6	7.6	98.1	0.0	0.0	371.5
8/17/2018 23:00	3.2	196.0	7.4	98.1	0.0	0.0	371.5
8/18/2018 0:00	2.3	180.6	7.2	98.1	0.0	0.0	371.5
8/18/2018 1:00	3.3	195.5	7.2	98.1	0.0	0.0	371.6
8/18/2018 2:00	2.6	208.1	7.3	98.2	0.0	0.0	371.6
8/18/2018 3:00	2.4	206.2	7.3	98.1	0.0	0.0	371.6
8/18/2018 4:00	2.5	213.9	7.3	98.1	0.0	0.0	371.6
8/18/2018 5:00	2.5	217.3	7.3	98.2	12.9	0.0	371.6

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
8/18/2018 6:00	2.9	227.8	7.4	98.2	44.7	0.0	371.6
8/18/2018 7:00	2.2	238.8	7.4	98.2	96.5	0.0	371.7
8/18/2018 8:00	2.3	246.1	7.7	98.0	227.8	0.0	371.7
8/18/2018 9:00	1.8	226.2	8.1	97.5	459.2	0.0	371.9
8/18/2018 10:00	2.0	262.1	8.8	95.7	692.5	0.0	371.9
8/18/2018 11:00	2.3	275.0	9.6	86.6	724.0	0.0	371.9
8/18/2018 12:00	2.6	249.7	10.5	79.8	753.5	0.0	371.7
8/18/2018 13:00	2.9	273.8	11.3	75.1	787.1	0.0	371.6
8/18/2018 14:00	3.0	297.8	11.9	71.2	735.0	0.0	371.4
8/18/2018 15:00	3.5	300.1	12.2	68.0	597.0	0.0	371.3
8/18/2018 16:00	3.9	321.3	11.6	69.4	390.8	0.0	371.3
8/18/2018 17:00	3.6	327.8	11.8	68.5	363.5	0.0	371.2
8/18/2018 18:00	3.4	330.0	11.4	68.3	212.9	0.0	371.2
8/18/2018 19:00	4.0	343.7	10.0	71.6	68.2	0.0	371.3
8/18/2018 20:00	2.5	12.8	9.0	76.4	2.4	0.0	371.3
8/18/2018 21:00	0.7	151.0	9.2	77.0	0.0	0.0	371.4
8/18/2018 22:00	1.4	214.8	9.0	79.6	0.0	0.0	371.4
8/18/2018 23:00	0.9	173.8	8.9	80.1	0.0	0.0	371.4
8/19/2018 0:00	1.5	213.7	8.5	83.2	0.0	0.0	371.4
8/19/2018 1:00	0.5	229.8	8.3	84.5	0.0	0.0	371.4
8/19/2018 2:00	0.0	0.0	8.1	85.2	0.0	0.0	371.4
8/19/2018 3:00	0.7	36.2	7.8	85.0	0.0	0.0	371.4
8/19/2018 4:00	2.1	40.4	7.5	84.9	0.0	0.0	371.4
8/19/2018 5:00	2.0	41.8	7.3	85.0	6.1	0.0	371.4
8/19/2018 6:00	2.5	32.3	7.0	87.8	15.6	0.0	371.4
8/19/2018 7:00	1.6	40.2	8.3	84.1	223.2	0.0	371.7
8/19/2018 8:00	0.7	273.5	9.0	81.3	402.3	0.0	371.7
8/19/2018 9:00	1.3	273.0	9.5	78.8	529.2	0.0	371.7
8/19/2018 10:00	1.4	253.0	10.3	76.1	650.8	0.0	371.7
8/19/2018 11:00	1.8	248.6	11.1	74.5	724.5	0.0	371.6
8/19/2018 12:00	1.8	250.5	12.1	73.5	779.5	0.0	371.5
8/19/2018 13:00	2.1	278.9	13.1	68.5	809.0	0.0	371.4
8/19/2018 14:00	2.2	295.9	14.0	63.6	728.2	0.0	371.3
8/19/2018 15:00	2.1	301.8	14.7	59.7	622.2	0.0	371.3
8/19/2018 16:00	2.3	308.2	15.3	56.7	493.3	0.0	371.2
8/19/2018 17:00	1.8	322.2	15.5	53.7	349.7	0.0	371.2
8/19/2018 18:00	1.7	336.8	14.9	51.0	200.8	0.0	371.1
8/19/2018 19:00	2.0	356.4	13.4	56.9	63.8	0.0	371.3
8/19/2018 20:00	1.8	30.9	12.9	55.2	1.5	0.0	371.3
8/19/2018 21:00	1.3	62.5	12.8	57.2	0.0	0.0	371.3
8/19/2018 22:00	0.5	75.9	13.0	59.4	0.0	0.0	371.3
8/19/2018 23:00	0.7	33.1	12.4	63.1	0.0	0.0	371.3
8/20/2018 0:00	0.0	0.0	12.5	60.4	0.0	0.0	371.3
8/20/2018 1:00	0.1	261.5	12.6	59.9	0.0	0.0	371.3
8/20/2018 2:00	0.1	67.6	12.4	59.9	0.0	0.0	371.3
8/20/2018 3:00	0.1	57.2	12.4	58.8	0.0	0.0	371.3
8/20/2018 4:00	0.1	43.1	12.5	55.9	0.0	0.0	371.3
8/20/2018 5:00	0.4	18.5	12.5	55.8	7.5	0.0	371.3
8/20/2018 6:00	0.2	287.8	12.8	51.9	35.2	0.0	371.3
8/20/2018 7:00	0.7	48.5	13.6	49.4	204.8	0.0	371.5
8/20/2018 8:00	1.5	207.4	13.4	52.6	358.3	0.0	371.6
8/20/2018 9:00	1.6	219.0	14.8	46.0	546.6	0.0	371.6
8/20/2018 10:00	2.0	218.9	15.6	42.0	649.6	0.0	371.6
8/20/2018 11:00	2.1	216.9	16.5	42.8	724.3	0.0	371.5

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
8/20/2018 12:00	2.0	220.4	17.4	43.8	780.9	0.0	371.4
8/20/2018 13:00	2.4	250.0	17.7	43.7	759.8	0.0	371.3
8/20/2018 14:00	2.0	252.3	18.6	43.5	690.9	0.0	371.2
8/20/2018 15:00	2.3	255.5	18.8	42.1	572.4	0.0	371.1
8/20/2018 16:00	2.5	258.7	18.9	42.3	481.2	0.0	371.0
8/20/2018 17:00	2.5	265.1	18.7	44.7	331.6	0.0	371.0
8/20/2018 18:00	2.1	261.0	18.2	48.8	193.2	0.0	370.9
8/20/2018 19:00	0.8	248.3	17.5	51.4	56.7	0.0	371.1
8/20/2018 20:00	0.1	233.4	16.8	50.4	2.5	0.0	371.2
8/20/2018 21:00	0.9	220.0	16.1	53.2	0.0	0.0	371.2
8/20/2018 22:00	1.7	184.3	15.7	58.1	0.0	0.0	371.2
8/20/2018 23:00	0.4	207.1	15.4	58.8	0.0	0.0	371.2
8/21/2018 0:00	0.0	242.9	15.0	60.2	0.0	0.0	371.2
8/21/2018 1:00	0.1	269.7	14.8	60.1	0.0	0.0	371.2
8/21/2018 2:00	0.3	196.7	14.6	59.4	0.0	0.0	371.3
8/21/2018 3:00	1.1	187.9	14.6	56.5	0.0	0.0	371.3
8/21/2018 4:00	2.3	208.6	13.7	58.0	0.0	0.0	371.3
8/21/2018 5:00	3.2	208.5	13.4	60.2	5.2	0.0	371.3
8/21/2018 6:00	3.2	213.9	13.6	60.7	14.1	0.0	371.3
8/21/2018 7:00	3.3	207.7	14.1	57.7	202.5	0.0	371.5
8/21/2018 8:00	3.3	206.6	15.1	55.0	407.1	0.0	371.5
8/21/2018 9:00	3.8	209.9	15.8	54.0	544.9	0.0	371.6
8/21/2018 10:00	3.8	223.1	16.6	52.1	653.9	0.0	371.5
8/21/2018 11:00	4.4	219.9	17.0	52.6	728.6	0.0	371.4
8/21/2018 12:00	4.6	230.0	18.0	49.1	786.2	0.0	371.4
8/21/2018 13:00	4.7	236.4	18.7	45.3	803.0	0.0	371.2
8/21/2018 14:00	6.3	233.0	19.2	38.8	716.2	0.0	371.1
8/21/2018 15:00	7.6	237.7	19.8	33.3	610.0	0.0	371.0
8/21/2018 16:00	8.0	232.9	19.8	32.8	485.0	0.0	370.9
8/21/2018 17:00	7.3	228.7	18.3	37.4	229.7	0.0	371.0
8/21/2018 18:00	7.0	222.8	17.2	40.3	99.5	0.0	371.1
8/21/2018 19:00	6.6	218.1	15.8	46.2	17.5	0.0	371.1
8/21/2018 20:00	5.7	222.2	14.9	48.9	0.4	0.0	371.2
8/21/2018 21:00	5.1	231.8	13.8	55.0	0.0	0.0	371.2
8/21/2018 22:00	5.7	218.7	11.6	77.8	0.0	0.0	371.2
8/21/2018 23:00	6.2	216.5	9.8	96.6	0.0	0.0	372.5
8/22/2018 0:00	5.7	221.7	9.6	97.4	0.0	0.0	373.6
8/22/2018 1:00	4.9	220.4	9.3	97.6	0.0	0.0	374.1
8/22/2018 2:00	4.9	214.4	9.0	97.7	0.0	0.0	374.3
8/22/2018 3:00	5.2	230.0	9.3	97.8	0.0	0.0	374.5
8/22/2018 4:00	6.0	247.9	8.9	97.9	0.0	0.0	375.5
8/22/2018 5:00	4.8	232.5	8.3	98.0	1.6	0.0	375.7
8/22/2018 6:00	4.6	238.7	8.0	98.1	18.9	0.0	375.8
8/22/2018 7:00	2.0	259.3	7.6	98.1	50.6	0.0	375.8
8/22/2018 8:00	3.0	323.4	6.8	98.1	99.9	0.0	375.8
8/22/2018 9:00	3.8	339.3	6.5	97.9	97.8	0.0	376.0
8/22/2018 10:00	2.3	355.4	6.5	97.8	110.5	0.0	376.6
8/22/2018 11:00	2.0	190.3	7.4	96.3	266.6	0.0	376.6
8/22/2018 12:00	3.7	242.1	7.6	96.3	186.2	0.0	376.5
8/22/2018 13:00	3.5	232.6	7.4	97.4	128.4	0.0	376.5
8/22/2018 14:00	3.6	233.1	7.2	97.7	78.6	0.0	376.8
8/22/2018 15:00	3.8	216.7	6.8	96.6	103.2	0.0	376.8
8/22/2018 16:00	3.0	220.8	7.2	93.3	150.4	0.0	376.8
8/22/2018 17:00	2.6	230.4	7.3	94.3	140.7	0.0	376.8

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
8/22/2018 18:00	2.5	248.5	7.2	93.8	53.2	0.0	376.8
8/22/2018 19:00	2.3	227.9	7.1	91.5	16.5	0.0	376.8
8/22/2018 20:00	1.9	229.4	6.8	93.9	0.5	0.0	376.8
8/22/2018 21:00	1.9	232.9	6.8	91.5	0.0	0.0	376.8
8/22/2018 22:00	1.8	250.8	6.8	90.4	0.0	0.0	376.8
8/22/2018 23:00	1.5	195.5	6.9	89.0	0.0	0.0	376.8
8/23/2018 0:00	1.9	204.8	6.9	89.2	0.0	0.0	376.8
8/23/2018 1:00	2.1	222.8	6.7	91.9	0.0	0.0	376.8
8/23/2018 2:00	2.3	214.3	6.5	93.5	0.0	0.0	376.8
8/23/2018 3:00	2.2	224.1	6.4	94.6	0.0	0.0	376.8
8/23/2018 4:00	2.0	246.7	6.2	96.9	0.0	0.0	376.8
8/23/2018 5:00	1.0	255.1	6.2	97.4	2.5	0.0	376.8
8/23/2018 6:00	1.6	235.5	6.3	95.9	24.6	0.0	376.8
8/23/2018 7:00	1.4	246.1	6.2	96.0	50.2	0.0	376.8
8/23/2018 8:00	1.8	234.2	6.8	93.1	324.1	0.0	377.0
8/23/2018 9:00	2.3	231.1	7.1	89.8	307.6	0.0	376.8
8/23/2018 10:00	2.3	236.2	7.5	86.9	319.7	0.0	376.9
8/23/2018 11:00	2.5	245.9	8.2	86.0	560.2	0.0	377.1
8/23/2018 12:00	2.5	248.8	8.4	85.5	475.7	0.0	376.7
8/23/2018 13:00	2.3	239.9	8.4	85.9	299.6	0.0	376.7
8/23/2018 14:00	2.8	231.9	8.4	85.2	250.1	0.0	376.7
8/23/2018 15:00	3.2	236.8	8.5	85.2	239.3	0.0	376.7
8/23/2018 16:00	2.8	225.1	8.2	88.4	135.2	0.0	376.7
8/23/2018 17:00	3.1	228.0	8.2	86.7	104.5	0.0	376.7
8/23/2018 18:00	2.6	228.2	8.1	86.4	36.1	0.0	376.8
8/23/2018 19:00	2.4	222.4	7.9	87.3	7.3	0.0	376.8
8/23/2018 20:00	2.3	228.7	7.7	89.1	0.1	0.0	376.8
8/23/2018 21:00	2.5	228.5	7.3	94.2	0.0	0.0	376.8
8/23/2018 22:00	2.8	224.5	7.2	93.8	0.0	0.0	376.8
8/23/2018 23:00	3.0	226.2	7.0	95.7	0.0	0.0	376.8
8/24/2018 0:00	3.4	217.4	6.8	96.1	0.0	0.0	376.8
8/24/2018 1:00	3.1	192.6	6.7	96.6	0.0	0.0	376.8
8/24/2018 2:00	3.5	209.4	6.6	96.8	0.0	0.0	376.8
8/24/2018 3:00	4.1	207.2	6.5	97.0	0.0	0.0	376.8
8/24/2018 4:00	4.3	218.6	6.4	97.6	0.0	0.0	376.8
8/24/2018 5:00	3.1	214.9	6.3	97.8	1.8	0.0	376.8
8/24/2018 6:00	3.3	211.4	6.2	97.8	14.8	0.0	376.8
8/24/2018 7:00	4.1	218.3	6.2	97.9	37.7	0.0	376.8
8/24/2018 8:00	4.9	217.8	6.1	97.9	56.5	0.0	376.8
8/24/2018 9:00	4.0	212.4	6.0	97.9	68.0	0.0	376.8
8/24/2018 10:00	4.3	222.0	5.9	97.8	106.4	0.0	376.8
8/24/2018 11:00	4.5	220.3	6.1	96.5	119.1	0.0	376.8
8/24/2018 12:00	4.6	221.0	6.3	94.7	166.8	0.0	377.2
8/24/2018 13:00	5.2	227.1	6.3	97.1	181.3	0.0	377.2
8/24/2018 14:00	4.8	224.0	6.4	97.5	106.9	0.0	377.8
8/24/2018 15:00	4.7	226.4	6.4	97.7	78.4	0.0	378.3
8/24/2018 16:00	4.3	212.8	6.6	97.8	64.2	0.0	378.4
8/24/2018 17:00	3.8	209.5	6.6	97.9	52.1	0.0	378.5
8/24/2018 18:00	4.7	204.2	6.6	98.0	25.9	0.0	378.7
8/24/2018 19:00	4.9	204.0	6.5	98.1	7.0	0.0	378.8
8/24/2018 20:00	4.3	210.3	6.4	98.1	0.1	0.0	379.0
8/24/2018 21:00	4.1	205.1	6.5	98.2	0.0	0.0	379.4
8/24/2018 22:00	4.1	210.9	6.4	98.2	0.0	0.0	379.7
8/24/2018 23:00	4.0	206.6	6.4	98.2	0.0	0.0	379.7

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
8/25/2018 0:00	3.5	208.5	6.4	98.2	0.0	0.0	379.7
8/25/2018 1:00	3.7	201.7	6.4	98.3	0.0	0.0	379.7
8/25/2018 2:00	3.7	210.5	6.3	98.3	0.0	0.0	379.8
8/25/2018 3:00	4.0	209.0	6.2	98.3	0.0	0.0	380.3
8/25/2018 4:00	3.7	201.8	6.4	98.3	0.0	0.0	380.4
8/25/2018 5:00	3.1	209.5	6.5	98.3	1.9	0.0	380.4
8/25/2018 6:00	3.1	208.3	6.7	98.3	50.4	0.0	380.6
8/25/2018 7:00	4.2	217.0	6.8	98.3	79.3	0.0	380.9
8/25/2018 8:00	4.4	199.7	7.0	98.2	189.0	0.0	380.9
8/25/2018 9:00	3.3	212.8	7.3	97.6	163.0	0.0	380.8
8/25/2018 10:00	3.4	222.5	7.4	97.4	208.3	0.0	380.8
8/25/2018 11:00	4.2	216.5	7.7	97.5	289.7	0.0	380.7
8/25/2018 12:00	4.5	215.1	7.5	97.3	204.0	0.0	380.8
8/25/2018 13:00	4.1	218.7	7.7	96.8	201.9	0.0	380.8
8/25/2018 14:00	4.0	215.7	7.7	95.6	109.4	0.0	380.9
8/25/2018 15:00	4.4	217.5	7.4	96.9	93.5	0.0	381.3
8/25/2018 16:00	4.4	210.6	7.3	95.9	82.8	0.0	382.4
8/25/2018 17:00	3.6	236.7	7.3	97.0	30.9	0.0	382.7
8/25/2018 18:00	3.4	221.0	7.2	97.8	18.1	0.0	382.8
8/25/2018 19:00	4.2	235.2	7.0	98.0	2.7	0.0	382.7
8/25/2018 20:00	3.9	241.1	6.9	98.1	0.0	0.0	383.4
8/25/2018 21:00	3.7	220.0	6.6	98.2	0.0	0.0	384.2
8/25/2018 22:00	3.5	230.9	6.4	98.2	0.0	0.0	384.6
8/25/2018 23:00	2.7	237.8	6.3	98.3	0.0	0.0	384.7
8/26/2018 0:00	1.6	229.2	6.1	98.3	0.0	0.0	385.1
8/26/2018 1:00	1.5	209.6	6.0	98.3	0.0	0.0	385.1
8/26/2018 2:00	1.2	242.8	6.0	98.4	0.0	0.0	385.1
8/26/2018 3:00	0.8	97.3	5.9	98.4	0.0	0.0	385.1
8/26/2018 4:00	1.0	350.5	5.8	98.4	0.0	0.0	385.2
8/26/2018 5:00	2.4	15.0	5.9	98.4	2.4	0.0	385.2
8/26/2018 6:00	2.8	2.0	5.7	98.4	29.4	0.0	385.2
8/26/2018 7:00	2.8	20.1	5.6	98.4	52.7	0.0	385.2
8/26/2018 8:00	4.5	357.2	6.0	98.3	214.3	0.0	385.5
8/26/2018 9:00	4.2	358.8	6.9	97.4	503.8	0.0	385.6
8/26/2018 10:00	3.8	16.8	8.2	88.0	611.7	0.0	385.5
8/26/2018 11:00	2.9	334.5	9.3	83.1	628.8	0.0	385.4
8/26/2018 12:00	2.8	325.2	10.2	77.4	735.9	0.0	385.3
8/26/2018 13:00	3.0	302.7	11.1	67.0	743.0	0.0	385.1
8/26/2018 14:00	3.2	303.7	11.7	61.1	658.8	0.0	385.0
8/26/2018 15:00	2.6	289.8	12.2	58.0	553.8	0.0	384.9
8/26/2018 16:00	2.4	295.7	12.4	57.0	374.2	0.0	384.8
8/26/2018 17:00	1.6	295.6	12.0	58.7	261.3	0.0	384.8
8/26/2018 18:00	1.9	301.3	11.6	63.2	135.6	0.0	384.7
8/26/2018 19:00	1.5	281.0	10.8	66.3	38.8	0.0	384.8
8/26/2018 20:00	2.3	203.4	9.9	73.7	0.5	0.0	384.9
8/26/2018 21:00	3.8	213.9	9.2	82.5	0.0	0.0	384.9
8/26/2018 22:00	4.5	212.2	8.7	89.5	0.0	0.0	384.8
8/26/2018 23:00	4.7	213.6	8.4	91.7	0.0	0.0	384.9
8/27/2018 0:00	4.6	211.4	7.9	93.5	0.0	0.0	384.8
8/27/2018 1:00	4.1	201.1	7.5	94.1	0.0	0.0	384.9
8/27/2018 2:00	4.2	220.3	7.3	93.7	0.0	0.0	384.9
8/27/2018 3:00	3.7	224.6	7.2	93.4	0.0	0.0	384.9
8/27/2018 4:00	4.2	220.9	6.9	94.7	0.0	0.0	384.9
8/27/2018 5:00	4.7	211.2	7.2	92.0	1.4	0.0	384.9

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
8/27/2018 6:00	5.4	212.9	7.5	89.3	26.1	0.0	384.9
8/27/2018 7:00	5.4	215.5	7.7	89.8	88.3	0.0	384.9
8/27/2018 8:00	5.5	211.8	7.9	91.5	93.3	0.0	384.9
8/27/2018 9:00	5.8	232.1	7.8	95.0	83.5	0.0	384.8
8/27/2018 10:00	4.5	232.1	7.8	96.9	69.4	0.0	384.9
8/27/2018 11:00	4.1	224.8	8.0	97.5	95.1	0.0	385.0
8/27/2018 12:00	4.3	227.5	8.2	97.5	147.6	0.0	385.1
8/27/2018 13:00	5.9	219.0	8.6	97.6	133.6	0.0	385.1
8/27/2018 14:00	6.1	215.2	9.0	97.8	90.8	0.0	385.2
8/27/2018 15:00	5.5	208.5	9.7	97.9	107.6	0.0	385.2
8/27/2018 16:00	5.6	200.6	10.3	97.6	67.3	0.0	385.2
8/27/2018 17:00	5.5	191.8	10.4	97.0	39.8	0.0	385.2
8/27/2018 18:00	6.6	193.5	10.9	93.6	50.0	0.0	385.2
8/27/2018 19:00	4.4	209.1	9.9	97.5	6.7	0.0	385.3
8/27/2018 20:00	4.1	205.8	9.9	97.8	0.0	0.0	385.3
8/27/2018 21:00	4.4	208.9	9.9	98.0	0.0	0.0	385.3
8/27/2018 22:00	4.8	210.4	9.9	98.1	0.0	0.0	385.4
8/27/2018 23:00	4.4	212.2	9.9	98.2	0.0	0.0	385.5
8/28/2018 0:00	5.0	214.2	9.8	98.2	0.0	0.0	385.5
8/28/2018 1:00	4.3	212.1	9.8	98.3	0.0	0.0	385.6
8/28/2018 2:00	5.7	228.5	9.5	98.3	0.0	0.0	386.0
8/28/2018 3:00	5.5	219.9	9.3	98.3	0.0	0.0	386.3
8/28/2018 4:00	5.4	222.1	9.1	98.4	0.0	0.0	386.4
8/28/2018 5:00	5.9	216.8	8.5	98.4	0.5	0.0	387.3
8/28/2018 6:00	4.4	206.6	8.3	98.5	8.8	0.0	389.1
8/28/2018 7:00	4.1	203.3	8.0	98.5	27.0	0.0	391.0
8/28/2018 8:00	5.5	200.7	7.8	98.5	42.5	0.0	393.9
8/28/2018 9:00	5.8	201.9	7.9	98.5	105.4	0.0	394.9
8/28/2018 10:00	4.6	206.8	8.4	98.4	138.4	0.0	396.5
8/28/2018 11:00	4.7	209.1	8.7	98.3	224.9	0.0	396.7
8/28/2018 12:00	5.4	209.1	9.0	98.2	201.4	0.0	398.7
8/28/2018 13:00	5.0	224.7	8.9	98.3	132.0	0.0	400.5
8/28/2018 14:00	7.8	234.3	8.9	98.3	83.6	0.0	403.0
8/28/2018 15:00	8.4	233.4	8.4	98.4	87.9	0.0	405.1
8/28/2018 16:00	6.6	237.9	7.9	98.5	39.3	0.0	406.5
8/28/2018 17:00	6.0	229.0	7.4	98.5	31.0	0.0	408.0
8/28/2018 18:00	4.2	219.5	7.1	98.6	13.4	0.0	408.0
8/28/2018 19:00	4.9	221.6	6.8	98.6	4.6	0.0	408.1
8/28/2018 20:00	4.4	214.9	6.6	98.6	0.0	0.0	408.3
8/28/2018 21:00	3.8	223.9	6.6	98.6	0.0	0.0	408.5
8/28/2018 22:00	3.3	223.9	6.6	98.6	0.0	0.0	409.1
8/28/2018 23:00	3.2	216.0	6.6	98.7	0.0	0.0	409.1
8/29/2018 0:00	3.5	214.4	6.6	98.7	0.0	0.0	409.2
8/29/2018 1:00	3.0	210.9	6.4	98.7	0.0	0.0	409.2
8/29/2018 2:00	2.9	218.8	6.5	98.7	0.0	0.0	409.3
8/29/2018 3:00	2.8	231.6	6.4	98.7	0.0	0.0	409.3
8/29/2018 4:00	2.9	224.4	6.4	98.7	0.0	0.0	409.3
8/29/2018 5:00	2.5	231.1	6.4	98.7	1.2	0.0	409.3
8/29/2018 6:00	1.9	235.2	6.4	98.7	33.2	0.0	409.4
8/29/2018 7:00	1.5	227.5	6.3	98.7	77.3	0.0	409.4
8/29/2018 8:00	1.5	262.5	6.5	98.7	143.7	0.0	409.4
8/29/2018 9:00	1.6	295.5	6.7	98.6	199.3	0.0	409.4
8/29/2018 10:00	1.7	277.4	6.8	98.4	325.2	0.0	409.4
8/29/2018 11:00	2.2	239.5	7.5	97.7	490.7	0.0	409.5

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
8/29/2018 12:00	2.0	251.9	8.3	92.1	532.6	0.0	409.5
8/29/2018 13:00	2.1	272.5	9.1	86.8	511.8	0.0	409.3
8/29/2018 14:00	1.9	244.6	9.0	85.3	299.8	0.0	409.2
8/29/2018 15:00	2.3	242.4	9.0	88.0	250.0	0.0	409.2
8/29/2018 16:00	2.0	250.8	8.9	90.8	185.0	0.0	409.1
8/29/2018 17:00	2.8	231.1	8.5	92.3	58.8	0.0	409.2
8/29/2018 18:00	3.1	227.1	8.0	97.2	32.4	0.0	409.5
8/29/2018 19:00	2.4	235.1	8.0	97.3	16.2	0.0	409.5
8/29/2018 20:00	2.8	240.9	7.8	97.6	0.1	0.0	409.5
8/29/2018 21:00	2.6	219.0	7.7	95.8	0.0	0.0	409.5
8/29/2018 22:00	2.6	242.0	7.5	97.5	0.0	0.0	409.5
8/29/2018 23:00	2.5	222.0	7.2	98.0	0.0	0.0	409.5
8/30/2018 0:00	1.4	207.6	7.1	96.7	0.0	0.0	409.5
8/30/2018 1:00	1.9	228.5	6.8	95.8	0.0	0.0	409.5
8/30/2018 2:00	1.7	218.3	6.7	96.5	0.0	0.0	409.5
8/30/2018 3:00	0.8	241.1	6.8	95.2	0.0	0.0	409.5
8/30/2018 4:00	2.0	239.0	6.8	93.7	0.0	0.0	409.5
8/30/2018 5:00	2.0	196.2	6.5	95.3	2.0	0.0	409.5
8/30/2018 6:00	2.5	252.6	6.6	95.9	24.8	0.0	409.5
8/30/2018 7:00	2.4	201.0	6.9	93.3	83.3	0.0	409.5
8/30/2018 8:00	2.8	221.8	6.8	95.5	122.1	0.0	409.5
8/30/2018 9:00	2.9	216.5	7.1	93.5	124.8	0.0	409.5
8/30/2018 10:00	3.0	226.4	8.3	89.5	430.7	0.0	409.6
8/30/2018 11:00	4.8	218.7	7.2	96.0	196.9	0.0	409.5
8/30/2018 12:00	4.6	207.6	7.7	96.2	379.5	0.0	409.5
8/30/2018 13:00	5.3	219.8	8.0	92.3	248.7	0.0	409.4
8/30/2018 14:00	7.0	232.8	7.4	95.5	113.7	0.0	409.4
8/30/2018 15:00	7.2	232.8	7.4	92.5	96.9	0.0	409.5
8/30/2018 16:00	5.9	225.1	7.0	92.9	77.2	0.0	409.6
8/30/2018 17:00	5.4	218.4	6.9	94.2	58.4	0.0	409.7
8/30/2018 18:00	6.2	224.2	6.4	96.8	9.3	0.0	409.7
8/30/2018 19:00	6.1	224.0	6.0	96.5	1.3	0.0	409.7
8/30/2018 20:00	6.2	223.6	5.8	96.8	0.0	0.0	409.8
8/30/2018 21:00	7.9	221.9	5.5	97.6	0.0	0.0	409.8
8/30/2018 22:00	7.6	218.6	5.2	97.7	0.0	0.0	409.8
8/30/2018 23:00	6.5	217.3	5.1	97.8	0.0	0.0	409.9
8/31/2018 0:00	7.3	215.0	5.1	95.9	0.0	0.0	409.8
8/31/2018 1:00	7.0	209.7	4.9	97.8	0.0	0.0	410.6
8/31/2018 2:00	5.9	211.5	5.0	98.2	0.0	0.0	411.3
8/31/2018 3:00	5.7	213.7	5.0	98.4	0.0	0.0	411.6
8/31/2018 4:00	5.7	208.2	5.0	98.5	0.0	0.0	411.9
8/31/2018 5:00	5.9	213.3	5.1	98.5	0.2	0.0	412.1
8/31/2018 6:00	4.9	207.4	5.4	98.6	6.0	0.0	412.7
8/31/2018 7:00	5.0	208.6	5.7	98.6	19.3	0.0	413.8
8/31/2018 8:00	5.1	213.3	6.0	98.6	37.4	0.0	416.7
8/31/2018 9:00	5.5	215.5	6.0	98.6	76.4	0.0	418.2
8/31/2018 10:00	4.8	203.6	6.3	97.7	283.7	0.0	418.2
8/31/2018 11:00	6.0	232.3	6.0	97.5	171.4	0.0	418.3
8/31/2018 12:00	7.7	220.0	5.9	87.0	324.5	0.0	418.3
8/31/2018 13:00	6.2	233.8	6.1	90.3	311.6	0.0	418.2
8/31/2018 14:00	5.2	220.7	5.7	87.3	203.6	0.0	418.3
8/31/2018 15:00	3.9	214.2	5.3	92.1	130.3	0.0	418.3
8/31/2018 16:00	4.4	210.3	5.6	91.0	152.9	0.0	418.3
8/31/2018 17:00	3.5	212.8	5.6	90.8	66.0	0.0	418.3



**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
8/31/2018 18:00	3.5	211.3	5.3	93.9	29.3	0.0	418.3
8/31/2018 19:00	3.3	208.6	5.2	91.1	4.5	0.0	418.3
8/31/2018 20:00	3.4	199.6	4.8	96.1	0.0	0.0	418.3
8/31/2018 21:00	4.2	202.1	4.9	91.1	0.0	0.0	418.3
8/31/2018 22:00	3.7	205.4	4.5	97.1	0.0	0.0	418.4
8/31/2018 23:00	3.7	207.3	4.6	93.4	0.0	0.0	418.9
9/1/2018 0:00	3.6	202.4	4.6	95.0	0.0	0.0	418.9
9/1/2018 1:00	3.5	201.1	4.4	97.5	0.0	0.0	419.3
9/1/2018 2:00	3.5	207.3	4.6	94.7	0.0	0.0	419.2
9/1/2018 3:00	3.5	199.4	4.6	94.2	0.0	0.0	419.2
9/1/2018 4:00	3.8	214.1	4.3	96.2	0.0	0.0	419.2
9/1/2018 5:00	3.4	209.3	4.2	98.0	1.0	0.0	419.3
9/1/2018 6:00	4.1	208.6	4.2	97.7	19.5	0.0	419.3
9/1/2018 7:00	3.7	215.6	4.3	98.1	41.6	0.0	419.8
9/1/2018 8:00	3.5	222.7	4.4	98.2	82.8	0.0	420.9
9/1/2018 9:00	3.2	222.6	4.4	98.2	110.9	0.0	421.3
9/1/2018 10:00	4.3	219.5	4.5	98.2	192.4	0.0	423.0
9/1/2018 11:00	4.8	224.3	4.5	98.2	131.1	0.0	422.9
9/1/2018 12:00	4.6	213.0	4.5	98.2	242.7	0.0	423.0
9/1/2018 13:00	3.6	215.6	5.2	93.1	305.7	0.0	422.8
9/1/2018 14:00	4.7	230.4	4.8	96.1	144.0	0.0	423.7
9/1/2018 15:00	3.8	209.6	5.4	96.2	322.9	0.0	423.6
9/1/2018 16:00	5.0	188.3	5.5	89.6	127.2	0.0	423.6
9/1/2018 17:00	4.3	197.2	5.3	88.9	72.2	0.0	423.6
9/1/2018 18:00	5.0	179.5	5.0	87.9	32.7	0.0	423.8
9/1/2018 19:00	2.7	174.8	5.0	83.6	4.9	0.0	423.8
9/1/2018 20:00	3.0	140.3	4.8	86.9	0.0	0.0	423.9
9/1/2018 21:00	1.6	39.7	4.4	92.8	0.0	0.0	423.9
9/1/2018 22:00	1.5	31.6	4.1	92.6	0.0	0.0	423.9
9/1/2018 23:00	2.1	7.7	4.0	94.1	0.0	0.0	424.0
9/2/2018 0:00	0.6	179.3	3.9	93.6	0.0	0.0	425.3
9/2/2018 1:00	2.5	164.0	3.8	93.2	0.0	0.0	426.2
9/2/2018 2:00	1.9	131.4	3.7	94.5	0.0	0.0	426.3
9/2/2018 3:00	1.1	42.9	3.9	92.6	0.0	0.0	427.1
9/2/2018 4:00	0.4	354.0	4.0	91.6	0.0	0.0	427.4
9/2/2018 5:00	1.0	39.6	3.7	93.8	0.1	0.0	429.8
9/2/2018 6:00	1.1	32.2	3.4	94.7	4.1	0.0	432.4
9/2/2018 7:00	0.8	37.8	3.0	95.9	5.9	0.0	436.8
9/2/2018 8:00	0.8	29.6	2.5	95.3	14.9	0.0	441.2
9/2/2018 9:00	1.3	207.2	2.5	97.1	101.1	0.0	443.7
9/2/2018 10:00	0.3	250.7	2.7	97.5	178.4	0.0	444.9
9/2/2018 11:00	0.2	122.7	3.6	95.7	222.7	0.0	445.1
9/2/2018 12:00	0.8	265.2	4.6	94.2	413.4	0.0	445.2
9/2/2018 13:00	1.6	205.3	5.4	92.3	429.5	0.0	445.2
9/2/2018 14:00	2.1	236.3	5.8	91.3	441.2	0.0	445.0
9/2/2018 15:00	2.2	235.0	6.0	87.2	449.3	0.0	445.0
9/2/2018 16:00	1.6	227.4	6.2	85.9	272.6	0.0	444.9
9/2/2018 17:00	2.1	235.5	6.5	84.6	223.3	0.0	444.9
9/2/2018 18:00	2.1	234.8	6.3	85.8	132.3	0.0	444.8
9/2/2018 19:00	2.1	204.6	5.7	83.1	14.3	0.0	445.0
9/2/2018 20:00	1.9	205.9	5.6	86.0	0.0	0.0	445.0
9/2/2018 21:00	1.8	225.6	5.3	89.0	0.0	0.0	445.0
9/2/2018 22:00	2.1	223.9	5.2	89.6	0.0	0.0	445.0
9/2/2018 23:00	2.0	219.3	4.8	91.0	0.0	0.0	445.0

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
9/3/2018 0:00	1.7	189.6	4.7	94.7	0.0	0.0	445.0
9/3/2018 1:00	0.2	186.4	4.8	92.8	0.0	0.0	445.0
9/3/2018 2:00	0.0	211.3	4.7	92.4	0.0	0.0	445.0
9/3/2018 3:00	0.0	0.0	4.6	92.4	0.0	0.0	445.0
9/3/2018 4:00	0.0	137.5	4.5	91.3	0.0	0.0	445.0
9/3/2018 5:00	0.8	171.9	4.5	89.8	1.4	0.0	445.0
9/3/2018 6:00	0.1	127.3	4.5	89.2	16.4	0.0	445.0
9/3/2018 7:00	0.3	45.5	5.0	88.2	122.1	0.0	445.4
9/3/2018 8:00	1.3	35.5	6.3	85.2	362.1	0.0	445.6
9/3/2018 9:00	1.4	346.3	6.5	85.1	420.3	0.0	445.4
9/3/2018 10:00	1.1	272.0	6.5	88.9	436.2	0.0	445.2
9/3/2018 11:00	1.2	319.4	7.8	85.0	632.1	0.0	445.5
9/3/2018 12:00	2.0	273.3	8.5	85.2	677.5	0.0	445.3
9/3/2018 13:00	2.2	281.9	9.2	82.1	630.0	0.0	445.1
9/3/2018 14:00	3.0	288.1	10.2	61.8	616.4	0.0	445.0
9/3/2018 15:00	2.6	296.3	10.9	47.9	555.9	0.0	444.8
9/3/2018 16:00	2.8	294.2	11.1	50.6	415.6	0.0	444.7
9/3/2018 17:00	2.2	294.6	10.8	53.5	264.9	0.0	444.7
9/3/2018 18:00	1.8	330.0	10.0	55.9	116.9	0.0	444.7
9/3/2018 19:00	1.3	352.9	8.9	66.2	11.0	0.0	444.8
9/3/2018 20:00	0.9	47.6	8.6	64.9	0.0	0.0	444.9
9/3/2018 21:00	0.6	183.2	8.4	68.6	0.0	0.0	444.9
9/3/2018 22:00	0.2	210.0	8.0	72.3	0.0	0.0	444.9
9/3/2018 23:00	1.5	199.4	7.5	77.6	0.0	0.0	444.8
9/4/2018 0:00	0.2	14.0	7.3	77.1	0.0	0.0	444.8
9/4/2018 1:00	0.3	53.0	7.0	76.5	0.0	0.0	444.8
9/4/2018 2:00	1.3	63.7	6.9	74.4	0.0	0.0	444.9
9/4/2018 3:00	1.1	7.6	6.8	81.1	0.0	0.0	444.9
9/4/2018 4:00	1.4	187.1	6.6	83.3	0.0	0.0	444.9
9/4/2018 5:00	0.5	152.0	6.5	76.8	1.3	0.0	444.9
9/4/2018 6:00	0.3	101.3	6.6	65.1	15.5	0.0	444.9
9/4/2018 7:00	0.0	8.3	7.0	69.0	111.2	0.0	445.3
9/4/2018 8:00	0.1	174.7	8.4	65.1	344.5	0.0	445.3
9/4/2018 9:00	1.3	22.9	8.8	63.4	455.4	0.0	445.3
9/4/2018 10:00	2.2	200.8	8.7	64.8	594.6	0.0	445.3
9/4/2018 11:00	1.2	229.9	9.9	59.8	681.2	0.0	445.2
9/4/2018 12:00	2.0	243.2	10.7	60.5	746.6	0.0	445.1
9/4/2018 13:00	2.0	256.4	10.8	60.0	708.8	0.0	445.0
9/4/2018 14:00	2.9	232.3	11.3	55.5	661.8	0.0	444.7
9/4/2018 15:00	3.3	240.2	11.6	48.0	540.6	0.0	444.7
9/4/2018 16:00	3.5	256.4	11.8	48.2	404.8	0.0	444.6
9/4/2018 17:00	2.8	246.5	11.4	48.9	209.0	0.0	444.6
9/4/2018 18:00	0.8	261.3	10.5	51.3	43.5	0.0	444.7
9/4/2018 19:00	0.0	0.0	10.2	50.3	5.9	0.0	444.8
9/4/2018 20:00	0.0	0.0	10.2	47.9	0.0	0.0	444.8
9/4/2018 21:00	0.4	189.8	10.0	51.8	0.0	0.0	444.8
9/4/2018 22:00	0.7	49.9	9.3	55.0	0.0	0.0	444.8
9/4/2018 23:00	0.5	43.9	9.2	53.9	0.0	0.0	444.8
9/5/2018 0:00	0.5	28.7	9.0	56.0	0.0	0.0	444.8
9/5/2018 1:00	2.6	22.7	8.4	60.3	0.0	0.0	444.8
9/5/2018 2:00	0.6	249.5	8.2	62.9	0.0	0.0	444.8
9/5/2018 3:00	0.0	0.0	8.3	62.5	0.0	0.0	444.8
9/5/2018 4:00	0.3	197.2	8.2	62.8	0.0	0.0	444.8
9/5/2018 5:00	0.3	23.4	8.3	61.0	1.3	0.0	444.8

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
9/5/2018 6:00	0.7	105.8	7.7	63.9	32.5	0.0	444.8
9/5/2018 7:00	0.9	196.8	7.3	69.4	83.7	0.0	444.8
9/5/2018 8:00	1.1	179.7	7.1	71.6	92.4	0.0	444.8
9/5/2018 9:00	2.0	199.4	7.1	69.3	127.6	0.0	444.8
9/5/2018 10:00	1.2	243.5	7.8	65.2	151.1	0.0	444.8
9/5/2018 11:00	0.2	297.5	8.7	64.8	188.8	0.0	444.8
9/5/2018 12:00	1.1	217.9	8.7	67.8	199.0	0.0	444.7
9/5/2018 13:00	1.2	264.5	9.3	65.0	233.9	0.0	444.7
9/5/2018 14:00	2.5	49.8	9.8	64.8	218.4	0.0	444.7
9/5/2018 15:00	1.6	251.4	9.2	69.4	190.8	0.0	444.7
9/5/2018 16:00	1.8	239.9	9.4	71.8	211.4	0.0	444.7
9/5/2018 17:00	1.9	216.3	9.4	69.4	155.0	0.0	444.7
9/5/2018 18:00	1.9	192.7	8.7	70.7	26.8	0.0	444.8
9/5/2018 19:00	0.6	197.8	8.7	69.7	5.2	0.0	444.8
9/5/2018 20:00	0.3	19.7	8.6	71.0	0.0	0.0	444.8
9/5/2018 21:00	0.3	158.6	8.3	73.4	0.0	0.0	444.8
9/5/2018 22:00	0.3	34.4	8.4	71.6	0.0	0.0	444.8
9/5/2018 23:00	1.0	66.9	8.6	69.7	0.0	0.0	444.8
9/6/2018 0:00	2.2	35.6	8.3	72.3	0.0	0.0	444.8
9/6/2018 1:00	2.2	39.8	8.1	73.4	0.0	0.0	444.8
9/6/2018 2:00	0.8	41.2	7.9	74.5	0.0	0.0	444.8
9/6/2018 3:00	1.1	62.8	7.9	73.8	0.0	0.0	444.8
9/6/2018 4:00	1.7	87.6	7.8	74.2	0.0	0.0	444.8
9/6/2018 5:00	0.3	188.2	7.8	74.7	0.5	0.0	444.8
9/6/2018 6:00	0.1	166.1	7.7	75.4	16.1	0.0	444.8
9/6/2018 7:00	0.3	42.5	7.9	74.2	51.3	0.0	444.8
9/6/2018 8:00	0.4	186.3	8.2	76.5	140.5	0.0	444.9
9/6/2018 9:00	0.7	211.2	8.6	79.5	262.2	0.0	445.0
9/6/2018 10:00	1.3	247.5	9.3	79.5	505.9	0.0	445.1
9/6/2018 11:00	1.8	233.2	9.8	79.6	654.3	0.0	445.3
9/6/2018 12:00	1.3	275.6	10.7	80.0	552.5	0.0	445.0
9/6/2018 13:00	1.6	281.3	11.4	77.0	587.4	0.0	445.0
9/6/2018 14:00	1.6	287.8	11.6	73.7	381.1	0.0	444.8
9/6/2018 15:00	1.8	244.3	12.0	71.3	419.2	0.0	444.8
9/6/2018 16:00	1.4	245.0	11.4	71.1	220.3	0.0	444.7
9/6/2018 17:00	0.4	221.5	10.8	73.4	66.8	0.0	444.8
9/6/2018 18:00	1.4	230.0	10.4	75.4	27.7	0.0	444.8
9/6/2018 19:00	0.7	231.6	9.9	77.6	3.1	0.0	444.9
9/6/2018 20:00	1.0	189.5	10.0	76.5	0.0	0.0	444.9
9/6/2018 21:00	0.9	177.6	10.2	73.2	0.0	0.0	444.9
9/6/2018 22:00	2.3	31.4	9.0	79.3	0.0	0.0	444.9
9/6/2018 23:00	2.6	39.1	8.9	79.7	0.0	0.0	444.9
9/7/2018 0:00	1.8	299.2	8.1	85.9	0.0	0.0	444.9
9/7/2018 1:00	0.8	304.1	7.4	92.0	0.0	0.0	445.0
9/7/2018 2:00	0.1	328.0	7.2	93.6	0.0	0.0	445.1
9/7/2018 3:00	1.4	223.5	6.9	96.0	0.0	0.0	446.0
9/7/2018 4:00	0.4	211.9	7.0	97.1	0.0	0.0	447.7
9/7/2018 5:00	0.7	15.0	7.0	95.5	0.1	0.0	448.3
9/7/2018 6:00	0.6	25.4	7.1	90.9	7.1	0.0	449.2
9/7/2018 7:00	0.9	26.0	7.0	92.6	33.6	0.0	449.4
9/7/2018 8:00	1.4	122.7	7.3	93.6	64.4	0.0	449.5
9/7/2018 9:00	3.4	190.5	7.4	93.8	259.0	0.0	449.4
9/7/2018 10:00	4.0	184.9	7.6	92.9	240.2	0.0	449.4
9/7/2018 11:00	4.7	187.7	8.5	84.2	333.6	0.0	449.4

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
9/7/2018 12:00	2.8	204.9	8.6	84.3	340.1	0.0	449.4
9/7/2018 13:00	3.2	213.9	9.1	82.1	489.5	0.0	449.3
9/7/2018 14:00	4.6	193.3	8.5	83.3	291.0	0.0	449.8
9/7/2018 15:00	4.1	179.8	9.1	79.0	359.8	0.0	449.7
9/7/2018 16:00	1.7	234.3	9.8	77.7	287.5	0.0	449.7
9/7/2018 17:00	1.0	23.1	9.7	76.7	197.3	0.0	449.7
9/7/2018 18:00	2.4	30.8	9.0	75.0	86.2	0.0	449.7
9/7/2018 19:00	3.6	29.2	8.5	77.1	3.6	0.0	449.8
9/7/2018 20:00	1.3	235.2	8.1	83.6	0.0	0.0	449.8
9/7/2018 21:00	0.6	213.4	7.8	87.1	0.0	0.0	449.8
9/7/2018 22:00	0.4	220.5	7.8	86.8	0.0	0.0	449.8
9/7/2018 23:00	1.2	29.7	7.0	94.2	0.0	0.0	449.8
9/8/2018 0:00	1.3	103.8	6.8	95.7	0.0	0.0	449.8
9/8/2018 1:00	5.0	41.4	6.9	92.6	0.0	0.0	449.7
9/8/2018 2:00	7.6	50.4	8.2	81.3	0.0	0.0	449.7
9/8/2018 3:00	6.4	50.4	8.3	79.0	0.0	0.0	449.7
9/8/2018 4:00	2.4	197.3	6.4	95.6	0.0	0.0	449.8
9/8/2018 5:00	1.9	208.3	6.2	97.6	0.0	0.0	450.1
9/8/2018 6:00	0.8	254.2	6.1	97.7	2.7	0.0	451.9
9/8/2018 7:00	0.6	345.2	6.0	96.7	14.0	0.0	453.1
9/8/2018 8:00	0.7	97.3	6.6	95.6	216.3	0.0	453.6
9/8/2018 9:00	1.9	186.6	7.9	90.5	429.1	0.0	453.4
9/8/2018 10:00	5.8	46.9	8.9	78.0	449.4	0.0	453.0
9/8/2018 11:00	4.9	41.2	8.7	79.0	299.7	0.0	452.9
9/8/2018 12:00	3.2	31.0	9.0	81.0	292.3	0.0	452.9
9/8/2018 13:00	1.4	286.6	8.5	90.9	249.5	0.0	453.0
9/8/2018 14:00	1.0	225.4	8.8	89.0	275.1	0.0	452.9
9/8/2018 15:00	1.3	226.1	8.7	89.4	158.0	0.0	453.0
9/8/2018 16:00	1.2	293.7	9.3	85.3	149.2	0.0	452.9
9/8/2018 17:00	1.2	24.3	9.1	88.2	87.5	0.0	452.9
9/8/2018 18:00	1.7	194.6	7.8	94.7	15.9	0.0	453.1
9/8/2018 19:00	0.8	319.5	7.9	88.9	1.7	0.0	453.1
9/8/2018 20:00	3.2	43.1	8.2	82.4	0.0	0.0	453.0
9/8/2018 21:00	5.2	34.2	8.4	78.7	0.0	0.0	453.0
9/8/2018 22:00	7.3	56.1	8.4	77.3	0.0	0.0	453.0
9/8/2018 23:00	6.9	66.0	8.4	75.9	0.0	0.0	453.1
9/9/2018 0:00	9.4	60.5	8.0	79.4	0.0	0.0	453.0
9/9/2018 1:00	10.9	65.8	8.3	76.0	0.0	0.0	453.0
9/9/2018 2:00	13.5	60.9	8.3	76.6	0.0	0.0	452.9
9/9/2018 3:00	16.0	64.0	8.4	74.8	0.0	0.0	452.5
9/9/2018 4:00	11.2	78.5	9.3	65.8	0.0	0.0	452.7
9/9/2018 5:00	11.4	84.2	9.8	60.9	0.5	0.0	452.7
9/9/2018 6:00	9.2	77.0	9.5	63.3	15.5	0.0	452.6
9/9/2018 7:00	10.4	62.5	9.1	67.1	63.7	0.0	452.6
9/9/2018 8:00	13.4	55.5	9.2	66.8	115.9	0.0	452.4
9/9/2018 9:00	14.3	58.3	8.9	69.6	300.7	0.0	452.5
9/9/2018 10:00	14.6	57.7	9.1	70.7	544.0	0.0	452.4
9/9/2018 11:00	14.1	58.7	9.5	67.0	421.1	0.0	452.7
9/9/2018 12:00	12.8	62.3	8.6	73.6	172.1	0.0	452.7
9/9/2018 13:00	9.4	67.9	8.6	73.8	154.4	0.0	452.9
9/9/2018 14:00	5.9	61.7	8.4	74.9	102.2	0.0	453.3
9/9/2018 15:00	4.4	63.1	7.9	82.8	111.8	0.0	453.6
9/9/2018 16:00	1.2	285.4	7.4	92.4	71.2	0.0	453.7
9/9/2018 17:00	0.7	272.2	6.9	96.4	43.2	0.0	453.9

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
9/9/2018 18:00	0.1	258.2	6.8	95.0	21.4	0.0	454.0
9/9/2018 19:00	0.2	242.6	6.6	95.5	1.4	0.0	454.0
9/9/2018 20:00	0.9	44.6	6.5	89.1	0.0	0.0	454.0
9/9/2018 21:00	4.6	51.6	6.7	80.3	0.0	0.0	454.1
9/9/2018 22:00	6.3	42.8	6.8	76.7	0.0	0.0	453.9
9/9/2018 23:00	7.5	53.4	6.8	73.7	0.0	0.0	453.9
9/10/2018 0:00	8.0	69.0	7.2	69.4	0.0	0.0	453.9
9/10/2018 1:00	9.0	70.5	7.2	67.7	0.0	0.0	453.8
9/10/2018 2:00	10.1	74.1	7.2	67.2	0.0	0.0	454.0
9/10/2018 3:00	9.8	83.7	7.4	64.7	0.0	0.0	453.9
9/10/2018 4:00	9.3	75.7	7.4	63.1	0.0	0.0	453.9
9/10/2018 5:00	8.2	71.8	7.5	63.2	0.2	0.0	453.9
9/10/2018 6:00	10.1	51.8	7.2	67.9	11.0	0.0	453.8
9/10/2018 7:00	9.1	47.7	7.3	66.6	75.5	0.0	453.8
9/10/2018 8:00	8.3	52.2	7.3	68.1	174.9	0.0	454.3
9/10/2018 9:00	7.8	58.7	8.3	62.3	508.1	0.0	454.4
9/10/2018 10:00	9.4	65.0	8.9	59.5	618.6	0.0	454.2
9/10/2018 11:00	9.9	73.8	9.5	57.3	649.2	0.0	454.2
9/10/2018 12:00	9.5	68.4	10.0	56.8	703.2	0.0	454.1
9/10/2018 13:00	8.1	66.8	10.3	54.6	668.1	0.0	453.9
9/10/2018 14:00	7.2	62.0	10.5	54.7	377.1	0.0	453.7
9/10/2018 15:00	6.9	29.0	10.1	59.7	181.6	0.0	453.8
9/10/2018 16:00	6.4	36.0	9.8	63.0	112.3	0.0	453.8
9/10/2018 17:00	7.9	69.2	9.7	59.8	82.8	0.0	453.8
9/10/2018 18:00	5.5	74.7	9.8	58.4	38.0	0.0	453.8
9/10/2018 19:00	4.8	41.1	9.2	63.1	2.6	0.0	453.8
9/10/2018 20:00	4.7	31.0	9.0	64.9	0.0	0.0	453.8
9/10/2018 21:00	4.3	40.6	9.0	64.2	0.0	0.0	453.9
9/10/2018 22:00	1.8	91.1	8.3	67.2	0.0	0.0	453.9
9/10/2018 23:00	2.9	34.6	8.5	66.0	0.0	0.0	453.9
9/11/2018 0:00	2.6	36.7	7.7	72.1	0.0	0.0	453.9
9/11/2018 1:00	3.2	10.8	7.5	74.1	0.0	0.0	453.9
9/11/2018 2:00	1.1	58.8	7.1	76.1	0.0	0.0	453.9
9/11/2018 3:00	0.3	61.0	7.4	72.4	0.0	0.0	453.9
9/11/2018 4:00	0.5	35.4	7.7	68.5	0.0	0.0	453.9
9/11/2018 5:00	0.1	42.8	7.6	70.1	0.2	0.0	453.9
9/11/2018 6:00	0.1	320.0	7.5	70.4	15.1	0.0	453.9
9/11/2018 7:00	0.1	331.8	7.6	70.9	63.7	0.0	454.3
9/11/2018 8:00	0.8	70.8	8.8	68.6	294.1	0.0	454.3
9/11/2018 9:00	1.0	12.7	9.6	68.9	452.7	0.0	454.4
9/11/2018 10:00	1.2	267.9	9.4	72.3	464.8	0.0	454.3
9/11/2018 11:00	1.4	277.1	10.0	69.8	563.6	0.0	454.1
9/11/2018 12:00	1.6	270.8	10.7	68.3	656.2	0.0	454.1
9/11/2018 13:00	1.2	268.9	11.0	64.2	539.2	0.0	454.0
9/11/2018 14:00	2.7	292.4	11.9	53.6	639.0	0.0	453.9
9/11/2018 15:00	3.0	326.5	11.2	54.2	299.8	0.0	453.9
9/11/2018 16:00	3.1	343.5	10.6	54.8	183.7	0.0	453.8
9/11/2018 17:00	4.2	344.3	10.9	49.7	214.3	0.0	453.9
9/11/2018 18:00	3.6	358.9	10.3	52.7	99.3	0.0	453.9
9/11/2018 19:00	1.7	39.1	9.5	55.9	2.8	0.0	453.9
9/11/2018 20:00	1.9	39.2	9.5	56.7	0.0	0.0	453.9
9/11/2018 21:00	3.2	30.2	9.2	57.4	0.0	0.0	453.9
9/11/2018 22:00	4.4	44.7	8.6	55.6	0.0	0.0	453.9
9/11/2018 23:00	6.1	52.3	8.1	50.3	0.0	0.0	453.9

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
9/12/2018 0:00	8.3	57.3	7.9	48.7	0.0	0.0	453.9
9/12/2018 1:00	7.6	49.2	7.2	49.2	0.0	0.0	453.9
9/12/2018 2:00	8.0	60.1	7.5	41.6	0.0	0.0	453.8
9/12/2018 3:00	8.4	60.5	6.9	41.3	0.0	0.0	453.8
9/12/2018 4:00	8.5	58.4	6.2	41.3	0.0	0.0	454.0
9/12/2018 5:00	8.0	58.7	5.8	40.0	0.3	0.0	453.8
9/12/2018 6:00	7.6	50.8	5.0	44.6	9.5	0.0	453.9
9/12/2018 7:00	7.8	48.8	4.5	50.0	52.9	0.0	454.2
9/12/2018 8:00	7.9	51.6	5.8	44.9	305.3	0.0	454.4
9/12/2018 9:00	7.5	39.8	6.3	45.9	457.4	0.0	454.5
9/12/2018 10:00	6.7	46.4	6.5	48.8	574.6	0.0	454.3
9/12/2018 11:00	6.6	32.9	6.5	46.7	526.2	0.0	454.2
9/12/2018 12:00	5.8	28.3	6.7	45.6	659.5	0.0	454.3
9/12/2018 13:00	4.6	37.0	7.2	40.7	665.8	0.0	454.1
9/12/2018 14:00	3.7	4.1	7.6	36.8	617.8	0.0	454.0
9/12/2018 15:00	3.1	357.7	8.1	32.4	500.6	0.0	453.9
9/12/2018 16:00	3.8	351.7	7.9	29.4	349.0	0.0	453.8
9/12/2018 17:00	5.4	18.4	7.1	26.5	213.1	0.0	453.9
9/12/2018 18:00	7.5	42.5	6.2	29.1	41.7	0.0	453.9
9/12/2018 19:00	7.1	57.2	5.7	32.4	1.5	0.0	453.8
9/12/2018 20:00	6.6	43.6	5.5	32.5	0.0	0.0	453.9
9/12/2018 21:00	4.0	29.9	5.0	34.4	0.0	0.0	453.9
9/12/2018 22:00	4.0	30.7	4.8	32.2	0.0	0.0	453.9
9/12/2018 23:00	6.2	71.9	5.2	28.1	0.0	0.0	453.9
9/13/2018 0:00	6.4	66.8	5.0	27.8	0.0	0.0	453.9
9/13/2018 1:00	6.2	59.8	4.7	27.3	0.0	0.0	453.9
9/13/2018 2:00	5.3	48.4	4.1	29.1	0.0	0.0	453.9
9/13/2018 3:00	3.8	36.1	3.9	29.9	0.0	0.0	453.9
9/13/2018 4:00	3.0	35.6	4.0	29.2	0.0	0.0	453.9
9/13/2018 5:00	1.7	48.4	3.6	30.7	0.2	0.0	454.0
9/13/2018 6:00	0.2	223.3	3.2	32.3	8.4	0.0	454.0
9/13/2018 7:00	0.0	75.9	3.3	33.0	54.3	0.0	454.4
9/13/2018 8:00	0.2	113.2	4.9	31.1	257.2	0.0	454.1
9/13/2018 9:00	0.8	236.0	4.8	31.9	333.6	0.0	454.4
9/13/2018 10:00	1.3	218.4	5.6	30.7	518.8	0.0	454.4
9/13/2018 11:00	1.7	229.4	6.3	32.9	641.0	0.0	454.3
9/13/2018 12:00	2.1	235.9	6.9	28.5	676.5	0.0	454.2
9/13/2018 13:00	3.0	250.7	7.2	31.8	661.1	0.0	454.0
9/13/2018 14:00	2.9	234.4	7.1	30.2	364.0	0.0	453.8
9/13/2018 15:00	2.8	289.6	7.1	30.8	334.2	0.0	453.9
9/13/2018 16:00	2.8	347.0	6.8	31.1	264.9	0.0	453.9
9/13/2018 17:00	2.2	0.1	6.2	34.2	84.0	0.0	453.9
9/13/2018 18:00	3.8	346.4	5.0	46.5	17.2	0.0	453.9
9/13/2018 19:00	4.7	351.1	3.8	59.9	0.6	0.0	454.0
9/13/2018 20:00	3.8	351.6	2.4	77.0	0.0	0.0	454.0
9/13/2018 21:00	1.3	53.9	2.0	82.7	0.0	0.0	454.0
9/13/2018 22:00	1.8	35.9	2.0	81.7	0.0	0.0	454.0
9/13/2018 23:00	2.6	44.4	1.9	83.0	0.0	0.0	454.0
9/14/2018 0:00	2.0	37.4	2.1	81.9	0.0	0.0	454.0
9/14/2018 1:00	1.0	41.1	2.5	77.1	0.0	0.0	454.0
9/14/2018 2:00	0.6	288.0	2.1	81.1	0.0	0.0	454.0
9/14/2018 3:00	0.5	57.8	2.2	79.8	0.0	0.0	454.0
9/14/2018 4:00	1.0	110.4	2.3	78.7	0.0	0.0	454.1
9/14/2018 5:00	5.7	55.7	2.9	70.8	0.0	0.0	454.0

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
9/14/2018 6:00	5.7	42.2	2.5	73.2	12.7	0.0	454.0
9/14/2018 7:00	1.9	34.7	2.2	79.9	49.1	0.0	454.0
9/14/2018 8:00	6.0	38.7	2.9	73.6	148.6	0.0	454.2
9/14/2018 9:00	5.8	30.8	3.7	68.8	393.8	0.0	454.5
9/14/2018 10:00	6.1	41.4	4.6	63.3	663.9	0.0	454.1
9/14/2018 11:00	5.6	45.2	4.8	58.9	541.6	0.0	454.1
9/14/2018 12:00	6.0	32.7	4.3	64.1	356.7	0.0	454.0
9/14/2018 13:00	7.1	39.1	4.7	60.8	388.5	0.0	453.9
9/14/2018 14:00	7.0	22.4	4.7	61.5	356.5	0.0	453.9
9/14/2018 15:00	4.5	14.7	4.3	63.3	177.9	0.0	454.0
9/14/2018 16:00	8.7	61.1	3.7	65.5	131.6	0.0	453.9
9/14/2018 17:00	8.5	51.1	2.0	81.8	42.8	0.0	454.5
9/14/2018 18:00	8.9	40.8	2.3	81.2	13.9	0.0	454.7
9/14/2018 19:00	10.2	59.4	2.6	71.5	0.5	0.0	454.5
9/14/2018 20:00	10.6	56.2	2.6	69.5	0.0	0.0	454.6
9/14/2018 21:00	11.6	60.3	2.4	66.0	0.0	0.0	454.4
9/14/2018 22:00	12.5	63.3	2.4	60.2	0.0	0.0	454.4
9/14/2018 23:00	13.2	62.6	2.3	60.4	0.0	0.0	454.5
9/15/2018 0:00	14.0	64.1	2.2	60.5	0.0	0.0	454.4
9/15/2018 1:00	12.0	64.5	2.1	58.9	0.0	0.0	454.4
9/15/2018 2:00	11.6	63.1	2.4	57.5	0.0	0.0	454.5
9/15/2018 3:00	11.3	62.7	2.4	56.0	0.0	0.0	454.3
9/15/2018 4:00	12.0	61.5	2.4	52.0	0.0	0.0	454.3
9/15/2018 5:00	12.3	63.0	2.0	54.9	0.1	0.0	454.4
9/15/2018 6:00	11.3	59.5	1.8	55.0	9.1	0.0	454.2
9/15/2018 7:00	13.3	66.9	1.7	52.6	32.3	0.0	454.3
9/15/2018 8:00	13.3	55.2	1.6	50.8	150.7	0.0	454.3
9/15/2018 9:00	15.1	60.7	2.1	48.2	443.1	0.0	454.6
9/15/2018 10:00	13.6	66.7	2.6	45.7	566.4	0.0	454.5
9/15/2018 11:00	9.8	56.9	3.4	43.6	645.4	0.0	454.8
9/15/2018 12:00	9.4	58.6	4.0	42.3	666.3	0.0	454.8
9/15/2018 13:00	7.2	69.0	4.6	40.8	659.8	0.0	454.5
9/15/2018 14:00	9.4	80.9	4.9	40.2	600.0	0.0	454.2
9/15/2018 15:00	9.2	55.2	5.2	39.4	477.0	0.0	454.3
9/15/2018 16:00	9.0	60.3	5.3	39.0	335.1	0.0	454.1
9/15/2018 17:00	7.8	67.1	5.2	39.0	189.8	0.0	454.1
9/15/2018 18:00	9.2	61.0	4.7	40.3	44.3	0.0	454.1
9/15/2018 19:00	10.3	65.6	4.1	42.9	1.0	0.0	454.4
9/15/2018 20:00	9.9	83.6	3.9	43.6	0.0	0.0	454.3
9/15/2018 21:00	9.1	77.8	3.5	44.7	0.0	0.0	454.3
9/15/2018 22:00	8.6	75.7	3.1	46.4	0.0	0.0	454.2
9/15/2018 23:00	9.2	76.0	2.9	46.9	0.0	0.0	454.3
9/16/2018 0:00	8.6	56.0	2.5	47.1	0.0	0.0	454.3
9/16/2018 1:00	6.3	61.5	1.8	51.0	0.0	0.0	454.4
9/16/2018 2:00	6.8	40.7	0.9	54.4	0.0	0.0	454.4
9/16/2018 3:00	4.7	71.5	0.6	56.2	0.0	0.0	454.4
9/16/2018 4:00	2.5	88.5	0.7	56.0	0.0	0.0	454.4
9/16/2018 5:00	2.2	75.1	0.6	56.6	0.0	0.0	454.4
9/16/2018 6:00	1.2	280.5	0.9	54.3	7.5	0.0	454.5
9/16/2018 7:00	1.6	180.8	0.6	57.0	48.3	0.0	454.5
9/16/2018 8:00	2.4	133.2	1.8	54.4	275.2	0.0	455.0
9/16/2018 9:00	2.2	89.0	3.0	50.9	422.1	0.0	455.0
9/16/2018 10:00	2.2	288.2	3.5	51.9	556.1	0.0	454.9
9/16/2018 11:00	2.0	247.1	3.7	55.2	625.8	0.0	454.8

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
9/16/2018 12:00	2.0	249.4	4.5	53.8	647.5	0.0	454.7
9/16/2018 13:00	2.2	272.5	5.7	47.6	636.2	0.0	454.6
9/16/2018 14:00	3.0	335.9	6.6	43.2	600.1	0.0	454.4
9/16/2018 15:00	3.3	338.6	6.0	45.4	334.9	0.0	454.3
9/16/2018 16:00	2.1	1.4	5.9	45.6	196.3	0.0	454.3
9/16/2018 17:00	3.0	19.6	5.5	49.0	69.5	0.0	454.3
9/16/2018 18:00	2.9	26.6	5.0	52.5	9.9	0.0	454.3
9/16/2018 19:00	0.5	292.8	5.0	51.3	0.4	0.0	454.3
9/16/2018 20:00	0.4	220.9	4.8	53.2	0.0	0.0	454.3
9/16/2018 21:00	0.2	221.1	4.9	53.3	0.0	0.0	454.4
9/16/2018 22:00	0.0	0.0	4.7	53.9	0.0	0.0	454.4
9/16/2018 23:00	0.8	184.2	4.5	54.6	0.0	0.0	454.3
9/17/2018 0:00	1.9	193.8	4.5	54.8	0.0	0.0	454.3
9/17/2018 1:00	1.9	195.5	4.3	55.7	0.0	0.0	454.4
9/17/2018 2:00	2.2	187.5	4.1	58.6	0.0	0.0	454.4
9/17/2018 3:00	2.0	194.3	3.9	61.1	0.0	0.0	454.4
9/17/2018 4:00	2.3	196.1	3.9	61.9	0.0	0.0	454.4
9/17/2018 5:00	2.2	206.3	3.7	62.7	0.0	0.0	454.4
9/17/2018 6:00	1.5	200.1	3.6	63.2	7.7	0.0	454.4
9/17/2018 7:00	1.3	185.1	3.7	62.7	46.6	0.0	454.4
9/17/2018 8:00	1.1	186.3	4.4	60.6	197.5	0.0	454.4
9/17/2018 9:00	0.4	185.2	4.2	60.4	174.8	0.0	454.9
9/17/2018 10:00	1.6	240.2	5.9	54.9	580.2	0.0	454.9
9/17/2018 11:00	1.8	244.4	6.3	53.3	598.4	0.0	454.7
9/17/2018 12:00	2.3	267.7	6.6	50.7	555.0	0.0	454.5
9/17/2018 13:00	2.6	279.2	6.8	49.9	617.9	0.0	454.4
9/17/2018 14:00	3.8	275.0	7.7	46.3	705.9	0.0	454.3
9/17/2018 15:00	3.4	267.8	7.6	48.1	625.4	0.0	454.2
9/17/2018 16:00	2.7	236.5	7.4	46.3	431.9	0.0	454.1
9/17/2018 17:00	1.3	217.6	6.2	51.1	76.9	0.0	454.3
9/17/2018 18:00	1.5	203.7	5.7	51.9	13.6	0.0	454.3
9/17/2018 19:00	2.2	179.8	5.4	55.2	0.3	0.0	454.3
9/17/2018 20:00	0.9	195.8	5.5	52.8	0.0	0.0	454.4
9/17/2018 21:00	0.4	210.7	5.1	57.0	0.0	0.0	454.4
9/17/2018 22:00	0.0	0.0	4.7	59.9	0.0	0.0	454.4
9/17/2018 23:00	1.2	56.8	4.3	59.7	0.0	0.0	454.4
9/18/2018 0:00	0.5	254.3	4.6	57.2	0.0	0.0	454.4
9/18/2018 1:00	0.1	87.9	4.3	60.1	0.0	0.0	454.4
9/18/2018 2:00	0.8	68.9	4.1	59.2	0.0	0.0	454.4
9/18/2018 3:00	1.8	97.5	3.5	62.3	0.0	0.0	454.4
9/18/2018 4:00	0.6	136.0	3.4	62.4	0.0	0.0	454.4
9/18/2018 5:00	1.0	71.1	3.0	63.4	0.0	0.0	454.5
9/18/2018 6:00	0.5	146.6	3.2	63.8	6.7	0.0	454.5
9/18/2018 7:00	0.8	175.3	2.8	67.5	17.7	0.0	454.5
9/18/2018 8:00	1.0	201.6	4.0	64.4	267.8	0.0	454.9
9/18/2018 9:00	1.6	178.9	4.7	62.3	420.9	0.0	454.9
9/18/2018 10:00	1.3	207.0	5.9	58.7	533.1	0.0	454.9
9/18/2018 11:00	1.8	231.4	6.4	59.5	609.7	0.0	454.8
9/18/2018 12:00	3.6	12.1	7.8	47.3	689.5	0.0	454.8
9/18/2018 13:00	2.3	354.9	8.4	47.5	604.3	0.0	454.4
9/18/2018 14:00	1.9	336.0	8.2	47.2	377.8	0.0	454.4
9/18/2018 15:00	2.6	300.9	8.9	47.8	514.3	0.0	454.3
9/18/2018 16:00	2.0	300.5	9.2	45.1	408.4	0.0	454.2
9/18/2018 17:00	0.9	308.7	7.8	46.9	97.2	0.0	454.3



Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
9/18/2018 18:00	1.2	23.7	7.2	46.8	19.7	0.0	454.3
9/18/2018 19:00	1.4	47.3	6.9	47.6	0.4	0.0	454.4
9/18/2018 20:00	1.5	48.5	6.5	48.0	0.0	0.0	454.3
9/18/2018 21:00	2.1	39.2	6.0	49.3	0.0	0.0	454.4
9/18/2018 22:00	2.4	43.8	5.6	51.0	0.0	0.0	454.4
9/18/2018 23:00	2.2	28.7	5.7	50.7	0.0	0.0	454.4
9/19/2018 0:00	0.8	51.5	5.0	53.0	0.0	0.0	454.4
9/19/2018 1:00	0.6	51.9	5.1	51.8	0.0	0.0	454.4
9/19/2018 2:00	0.5	51.3	4.7	54.8	0.0	0.0	454.4
9/19/2018 3:00	1.4	20.6	4.7	53.7	0.0	0.0	454.4
9/19/2018 4:00	0.8	331.8	4.2	57.7	0.0	0.0	454.4
9/19/2018 5:00	0.9	204.7	3.5	65.1	0.0	0.0	454.4
9/19/2018 6:00	1.0	177.4	3.5	61.7	6.3	0.0	454.4
9/19/2018 7:00	1.1	319.5	3.7	59.2	17.4	0.0	454.4
9/19/2018 8:00	1.3	237.6	4.4	59.0	262.2	0.0	454.9
9/19/2018 9:00	1.0	254.2	5.3	57.9	416.3	0.0	454.9
9/19/2018 10:00	1.5	239.5	5.7	56.8	528.9	0.0	454.9
9/19/2018 11:00	1.8	230.7	6.3	58.0	602.8	0.0	454.7
9/19/2018 12:00	1.8	247.5	7.2	58.9	635.5	0.0	454.7
9/19/2018 13:00	1.8	254.8	8.0	56.3	619.2	0.0	454.6
9/19/2018 14:00	2.1	292.0	8.6	47.4	565.4	0.0	454.4
9/19/2018 15:00	2.4	301.0	8.8	42.5	463.8	0.0	454.3
9/19/2018 16:00	2.3	293.0	9.0	39.5	312.3	0.0	454.3
9/19/2018 17:00	2.3	327.5	8.1	39.5	101.2	0.0	454.3
9/19/2018 18:00	2.1	20.5	7.2	41.5	28.4	0.0	454.3
9/19/2018 19:00	1.2	47.5	6.7	45.0	0.3	0.0	454.3
9/19/2018 20:00	1.8	73.5	6.7	45.5	0.0	0.0	454.4
9/19/2018 21:00	0.6	90.6	6.4	45.7	0.0	0.0	454.4
9/19/2018 22:00	0.3	186.0	6.3	47.6	0.0	0.0	454.4
9/19/2018 23:00	0.0	0.0	6.1	50.4	0.0	0.0	454.4
9/20/2018 0:00	0.0	0.0	5.9	53.7	0.0	0.0	454.4
9/20/2018 1:00	0.0	0.0	5.5	52.3	0.0	0.0	454.4
9/20/2018 2:00	0.0	0.0	5.1	52.6	0.0	0.0	454.4
9/20/2018 3:00	1.3	336.6	5.3	52.9	0.0	0.0	454.4
9/20/2018 4:00	0.4	8.4	4.9	55.5	0.0	0.0	454.4
9/20/2018 5:00	1.3	182.3	4.3	59.5	0.0	0.0	454.4
9/20/2018 6:00	1.7	181.2	4.4	58.7	6.2	0.0	454.4
9/20/2018 7:00	0.0	61.6	4.5	55.5	20.7	0.0	454.4
9/20/2018 8:00	0.1	270.7	5.9	52.3	259.6	0.0	454.9
9/20/2018 9:00	0.9	178.1	6.6	51.6	395.6	0.0	454.9
9/20/2018 10:00	1.2	260.5	6.7	53.1	515.8	0.0	454.9
9/20/2018 11:00	1.5	231.0	7.2	52.2	597.8	0.0	454.8
9/20/2018 12:00	2.2	284.7	8.5	48.4	624.1	0.0	454.7
9/20/2018 13:00	2.3	286.2	9.0	45.2	639.0	0.0	454.5
9/20/2018 14:00	2.2	290.2	9.3	41.5	609.2	0.0	454.4
9/20/2018 15:00	2.3	298.8	9.5	43.7	519.3	0.0	454.3
9/20/2018 16:00	1.0	300.5	8.1	45.0	107.3	0.0	454.3
9/20/2018 17:00	0.5	356.8	7.7	41.9	57.4	0.0	454.3
9/20/2018 18:00	0.5	3.7	7.6	42.7	26.7	0.0	454.3
9/20/2018 19:00	0.5	10.1	7.0	44.7	0.2	0.0	454.3
9/20/2018 20:00	1.2	28.5	6.4	46.7	0.0	0.0	454.4
9/20/2018 21:00	0.9	73.7	6.2	50.4	0.0	0.0	454.4
9/20/2018 22:00	1.1	57.6	5.8	51.2	0.0	0.0	454.4
9/20/2018 23:00	2.5	38.0	5.5	47.5	0.0	0.0	454.4

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
9/21/2018 0:00	2.6	21.8	5.5	47.7	0.0	0.0	454.4
9/21/2018 1:00	2.1	19.4	5.3	51.1	0.0	0.0	454.4
9/21/2018 2:00	2.5	42.1	5.2	53.8	0.0	0.0	454.3
9/21/2018 3:00	6.2	51.4	4.9	57.4	0.0	0.0	454.4
9/21/2018 4:00	7.4	58.7	5.9	51.9	0.0	0.0	454.4
9/21/2018 5:00	5.0	63.9	6.0	50.7	0.0	0.0	454.3
9/21/2018 6:00	7.0	62.2	5.4	51.8	5.8	0.0	454.3
9/21/2018 7:00	7.4	80.3	5.0	53.0	18.6	0.0	454.3
9/21/2018 8:00	6.6	81.9	6.0	50.6	198.1	0.0	454.7
9/21/2018 9:00	7.2	83.3	7.0	47.7	406.0	0.0	454.7
9/21/2018 10:00	5.4	65.9	7.7	47.3	517.3	0.0	454.8
9/21/2018 11:00	4.8	67.8	8.2	45.7	589.1	0.0	454.8
9/21/2018 12:00	5.1	53.3	8.7	44.2	621.6	0.0	454.6
9/21/2018 13:00	4.6	29.7	9.1	43.5	602.5	0.0	454.5
9/21/2018 14:00	4.0	14.2	9.3	43.0	540.8	0.0	454.4
9/21/2018 15:00	2.5	338.9	9.7	45.5	451.1	0.0	454.4
9/21/2018 16:00	3.5	7.9	9.4	42.4	311.6	0.0	454.3
9/21/2018 17:00	3.6	8.8	8.7	43.7	153.9	0.0	454.3
9/21/2018 18:00	4.0	3.2	8.1	43.9	22.7	0.0	454.3
9/21/2018 19:00	3.0	5.0	7.7	42.9	0.1	0.0	454.3
9/21/2018 20:00	1.6	61.2	6.8	47.8	0.0	0.0	454.3
9/21/2018 21:00	1.6	71.8	6.7	48.7	0.0	0.0	454.4
9/21/2018 22:00	1.4	72.6	6.4	49.1	0.0	0.0	454.4
9/21/2018 23:00	1.2	55.5	6.3	48.0	0.0	0.0	454.4
9/22/2018 0:00	0.2	308.3	6.1	48.6	0.0	0.0	454.4
9/22/2018 1:00	0.0	0.0	5.8	51.4	0.0	0.0	454.4
9/22/2018 2:00	0.1	118.8	5.5	51.3	0.0	0.0	454.4
9/22/2018 3:00	0.0	0.0	5.3	53.3	0.0	0.0	454.4
9/22/2018 4:00	0.1	295.2	5.2	55.4	0.0	0.0	454.4
9/22/2018 5:00	0.2	1.2	5.0	56.3	0.0	0.0	454.4
9/22/2018 6:00	0.0	0.0	4.9	55.6	5.1	0.0	454.4
9/22/2018 7:00	0.0	0.0	4.8	51.9	16.9	0.0	454.4
9/22/2018 8:00	0.8	175.9	6.2	49.4	238.9	0.0	454.9
9/22/2018 9:00	3.0	195.4	6.6	47.3	397.2	0.0	454.8
9/22/2018 10:00	2.6	214.6	7.1	45.4	509.6	0.0	454.8
9/22/2018 11:00	3.3	214.4	8.1	45.4	583.9	0.0	454.7
9/22/2018 12:00	5.7	219.8	8.7	44.9	567.3	0.0	454.4
9/22/2018 13:00	5.7	222.0	9.1	43.2	517.6	0.0	454.2
9/22/2018 14:00	5.9	235.1	8.5	47.2	340.7	0.0	454.2
9/22/2018 15:00	5.5	234.3	7.7	48.8	172.9	0.0	454.2
9/22/2018 16:00	6.0	236.8	7.7	48.8	173.3	0.0	454.2
9/22/2018 17:00	4.7	233.2	7.0	51.8	71.7	0.0	454.3
9/22/2018 18:00	4.1	224.0	5.9	59.5	7.3	0.0	454.3
9/22/2018 19:00	3.9	212.4	5.3	63.0	0.0	0.0	454.4
9/22/2018 20:00	3.9	216.5	4.8	66.5	0.0	0.0	454.3
9/22/2018 21:00	4.2	209.3	4.4	70.4	0.0	0.0	454.4
9/22/2018 22:00	5.0	218.0	4.3	72.1	0.0	0.0	454.3
9/22/2018 23:00	4.2	205.4	4.1	74.0	0.0	0.0	454.4
9/23/2018 0:00	4.0	194.5	3.9	75.9	0.0	0.0	454.3
9/23/2018 1:00	3.6	201.0	3.7	81.1	0.0	0.0	454.4
9/23/2018 2:00	4.6	216.1	3.4	87.5	0.0	0.0	454.4
9/23/2018 3:00	4.3	206.9	3.0	94.8	0.0	0.0	454.6
9/23/2018 4:00	4.7	205.0	3.0	95.3	0.0	0.0	454.8
9/23/2018 5:00	4.6	209.7	2.9	97.1	0.0	0.0	454.9

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
9/23/2018 6:00	4.1	210.9	3.1	96.6	0.6	0.0	454.9
9/23/2018 7:00	4.2	210.5	3.5	97.3	14.3	0.0	454.8
9/23/2018 8:00	4.4	214.0	3.7	97.6	62.4	0.0	455.0
9/23/2018 9:00	4.6	212.0	3.8	97.7	53.6	0.0	457.3
9/23/2018 10:00	5.1	207.0	4.0	97.9	61.7	0.0	460.2
9/23/2018 11:00	5.4	202.3	4.1	98.0	83.6	0.0	462.7
9/23/2018 12:00	5.9	195.2	4.2	98.0	71.5	0.0	465.1
9/23/2018 13:00	4.6	199.1	4.8	96.9	132.6	0.0	467.2
9/23/2018 14:00	5.2	206.7	4.9	97.3	214.9	0.0	467.8
9/23/2018 15:00	4.8	207.6	5.2	97.8	127.7	0.0	468.2
9/23/2018 16:00	5.3	201.9	5.7	97.9	90.2	0.0	468.7
9/23/2018 17:00	6.7	192.5	6.3	96.8	51.2	0.0	469.1
9/23/2018 18:00	5.3	210.5	6.1	97.5	2.5	0.0	469.3
9/23/2018 19:00	4.6	212.2	6.3	98.0	0.0	0.0	469.3
9/23/2018 20:00	5.1	206.3	6.3	98.0	0.0	0.0	469.4
9/23/2018 21:00	4.6	211.2	6.3	97.9	0.0	0.0	469.7
9/23/2018 22:00	4.1	200.0	6.4	98.1	0.0	0.0	469.7
9/23/2018 23:00	3.1	191.5	6.5	98.2	0.0	0.0	469.8
9/24/2018 0:00	3.4	198.1	6.4	98.3	0.0	0.0	469.8
9/24/2018 1:00	4.3	199.8	6.4	98.4	0.0	0.0	469.9
9/24/2018 2:00	4.3	190.4	6.2	98.4	0.0	0.0	469.8
9/24/2018 3:00	4.1	208.1	5.9	98.5	0.0	0.0	469.8
9/24/2018 4:00	3.7	206.2	5.7	98.5	0.0	0.0	469.9
9/24/2018 5:00	3.8	219.7	5.7	98.5	0.0	0.0	469.8
9/24/2018 6:00	4.1	206.6	5.8	98.5	3.0	0.0	469.8
9/24/2018 7:00	3.8	196.0	5.7	98.5	34.7	0.0	469.9
9/24/2018 8:00	4.0	203.4	5.8	98.4	80.9	0.0	469.9
9/24/2018 9:00	4.9	211.7	5.9	98.4	140.1	0.0	469.9
9/24/2018 10:00	4.8	217.3	6.1	98.3	193.7	0.0	469.8
9/24/2018 11:00	5.0	222.2	6.3	98.2	216.3	0.0	469.8
9/24/2018 12:00	5.4	225.0	6.3	98.1	257.5	0.0	469.7
9/24/2018 13:00	5.8	228.0	6.5	97.0	215.1	0.0	469.8
9/24/2018 14:00	4.8	224.8	6.7	92.5	166.9	0.0	469.8
9/24/2018 15:00	5.3	220.7	6.5	92.2	153.6	0.0	469.7
9/24/2018 16:00	5.0	221.5	6.1	93.1	101.3	0.0	469.8
9/24/2018 17:00	4.9	215.0	5.7	93.2	50.3	0.0	469.7
9/24/2018 18:00	4.9	211.9	5.4	91.7	5.6	0.0	469.8
9/24/2018 19:00	4.5	207.4	5.2	90.0	0.0	0.0	469.7
9/24/2018 20:00	4.2	205.9	4.9	93.5	0.0	0.0	469.7
9/24/2018 21:00	4.5	195.7	4.6	97.1	0.0	0.0	469.8
9/24/2018 22:00	4.7	212.0	4.6	97.9	0.0	0.0	469.7
9/24/2018 23:00	4.8	218.9	4.8	98.2	0.0	0.0	469.8
9/25/2018 0:00	4.1	208.2	4.8	98.3	0.0	0.0	469.9
9/25/2018 1:00	4.4	204.6	4.7	98.4	0.0	0.0	470.0
9/25/2018 2:00	4.7	208.2	4.7	98.4	0.0	0.0	469.9
9/25/2018 3:00	4.3	214.3	4.6	98.4	0.0	0.0	470.0
9/25/2018 4:00	4.9	209.7	4.7	98.5	0.0	0.0	470.1
9/25/2018 5:00	5.1	209.5	4.8	98.5	0.0	0.0	470.3
9/25/2018 6:00	4.6	209.1	4.8	98.6	0.7	0.0	470.5
9/25/2018 7:00	5.2	203.4	5.0	98.6	11.0	0.0	471.1
9/25/2018 8:00	5.1	203.6	5.2	98.6	39.0	0.0	471.4
9/25/2018 9:00	5.7	202.1	5.5	98.6	71.5	0.0	471.9
9/25/2018 10:00	5.0	208.7	5.8	98.6	69.1	0.0	472.2
9/25/2018 11:00	5.0	212.9	6.1	98.6	105.8	0.0	472.6

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
9/25/2018 12:00	5.5	212.3	6.3	98.6	107.9	0.0	473.5
9/25/2018 13:00	4.8	209.3	6.5	98.6	118.6	0.0	474.0
9/25/2018 14:00	4.9	214.4	6.5	98.6	102.2	0.0	474.6
9/25/2018 15:00	5.3	215.9	6.6	98.6	56.3	0.0	475.4
9/25/2018 16:00	4.8	221.3	6.5	98.7	38.5	0.0	476.6
9/25/2018 17:00	4.8	222.5	6.5	98.7	14.7	0.0	477.4
9/25/2018 18:00	5.1	223.8	6.4	98.7	1.4	0.0	478.6
9/25/2018 19:00	6.2	223.4	6.3	98.8	0.0	0.0	479.0
9/25/2018 20:00	7.1	221.2	5.9	98.8	0.0	0.0	479.3
9/25/2018 21:00	5.8	218.6	5.4	98.8	0.0	0.0	479.4
9/25/2018 22:00	4.5	218.3	5.2	98.9	0.0	0.0	479.5
9/25/2018 23:00	4.3	213.2	4.9	98.9	0.0	0.0	479.7
9/26/2018 0:00	5.1	201.4	4.8	98.9	0.0	0.0	480.4
9/26/2018 1:00	4.8	205.1	5.0	98.9	0.0	0.0	480.8
9/26/2018 2:00	4.6	212.6	4.9	98.9	0.0	0.0	480.9
9/26/2018 3:00	3.8	210.7	5.0	98.9	0.0	0.0	481.2
9/26/2018 4:00	4.4	205.0	4.9	99.0	0.0	0.0	481.5
9/26/2018 5:00	4.1	207.1	4.9	99.0	0.0	0.0	481.9
9/26/2018 6:00	4.7	209.5	5.0	99.0	1.0	0.0	482.8
9/26/2018 7:00	5.2	194.1	5.1	99.0	13.2	0.0	484.6
9/26/2018 8:00	4.0	199.1	5.2	99.0	29.4	0.0	486.5
9/26/2018 9:00	2.3	183.7	5.3	99.0	61.2	0.0	488.1
9/26/2018 10:00	1.8	149.7	5.7	98.9	85.2	0.0	488.6
9/26/2018 11:00	3.6	196.8	5.8	98.9	141.0	0.0	489.2
9/26/2018 12:00	3.3	205.4	6.0	98.8	163.7	0.0	489.3
9/26/2018 13:00	3.4	219.5	6.2	98.8	110.4	0.0	489.7
9/26/2018 14:00	3.3	226.2	6.1	98.8	76.9	0.0	489.9
9/26/2018 15:00	3.2	227.9	6.2	98.9	50.0	0.0	490.1
9/26/2018 16:00	2.8	230.1	6.3	98.9	41.6	0.0	490.5
9/26/2018 17:00	2.5	228.4	6.2	98.9	9.0	0.0	490.8
9/26/2018 18:00	2.0	210.4	6.1	99.0	1.7	0.0	491.0
9/26/2018 19:00	1.3	198.7	6.2	99.0	0.0	0.0	491.2
9/26/2018 20:00	1.5	51.6	6.1	99.0	0.0	0.0	491.4
9/26/2018 21:00	2.5	38.7	6.0	99.0	0.0	0.0	491.4
9/26/2018 22:00	0.8	6.5	6.0	99.0	0.0	0.0	491.5
9/26/2018 23:00	0.0	0.0	6.0	99.0	0.0	0.0	491.5
9/27/2018 0:00	0.2	187.1	5.9	99.1	0.0	0.0	491.5
9/27/2018 1:00	0.6	277.8	5.7	99.1	0.0	0.0	491.6
9/27/2018 2:00	0.4	265.6	5.7	99.1	0.0	0.0	491.6
9/27/2018 3:00	0.0	0.0	5.6	99.1	0.0	0.0	491.6
9/27/2018 4:00	0.2	6.9	5.5	99.1	0.0	0.0	491.6
9/27/2018 5:00	1.0	54.2	5.4	99.1	0.0	0.0	491.6
9/27/2018 6:00	0.6	53.8	5.2	99.1	2.3	0.0	491.6
9/27/2018 7:00	0.4	175.7	5.2	99.1	38.8	0.0	491.7
9/27/2018 8:00	0.8	4.2	5.4	99.0	130.1	0.0	491.8
9/27/2018 9:00	0.9	87.3	5.7	98.8	227.4	0.0	491.8
9/27/2018 10:00	1.4	29.6	6.2	98.5	347.3	0.0	492.3
9/27/2018 11:00	1.1	254.4	6.4	98.3	308.5	0.0	491.7
9/27/2018 12:00	1.1	241.9	6.4	98.6	216.2	0.0	491.7
9/27/2018 13:00	0.8	262.1	6.7	98.4	208.1	0.0	491.7
9/27/2018 14:00	1.0	248.0	7.2	98.3	215.1	0.0	491.6
9/27/2018 15:00	0.9	245.3	7.8	97.4	246.4	0.0	491.6
9/27/2018 16:00	1.3	245.3	7.6	97.3	143.2	0.0	491.5
9/27/2018 17:00	1.0	187.8	7.0	92.3	47.0	0.0	491.6

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
9/27/2018 18:00	0.9	203.6	7.0	85.3	6.4	0.0	491.6
9/27/2018 19:00	1.8	203.7	6.7	91.2	0.0	0.0	491.6
9/27/2018 20:00	1.1	227.8	6.7	91.4	0.0	0.0	491.6
9/27/2018 21:00	0.9	311.7	6.9	85.7	0.0	0.0	491.6
9/27/2018 22:00	0.8	306.0	6.8	80.4	0.0	0.0	491.6
9/27/2018 23:00	1.6	229.0	6.9	80.7	0.0	0.0	491.5
9/28/2018 0:00	1.3	236.5	6.5	87.6	0.0	0.0	491.5
9/28/2018 1:00	1.2	208.2	6.6	87.6	0.0	0.0	491.5
9/28/2018 2:00	0.8	201.9	6.8	84.7	0.0	0.0	491.5
9/28/2018 3:00	2.0	17.4	6.3	86.0	0.0	0.0	491.5
9/28/2018 4:00	2.3	14.7	5.8	87.8	0.0	0.0	491.5
9/28/2018 5:00	2.8	27.7	5.3	88.5	0.0	0.0	491.5
9/28/2018 6:00	3.2	17.6	5.4	89.6	1.3	0.0	491.5
9/28/2018 7:00	3.4	15.9	4.8	95.9	23.6	0.0	491.5
9/28/2018 8:00	2.1	34.8	4.8	97.9	88.4	0.0	491.6
9/28/2018 9:00	5.6	43.7	5.1	94.2	188.8	0.0	491.6
9/28/2018 10:00	7.2	30.3	6.3	85.1	216.9	0.0	491.7
9/28/2018 11:00	7.5	25.8	7.0	79.7	356.7	0.0	491.5
9/28/2018 12:00	8.1	23.8	7.1	77.4	366.6	0.0	491.6
9/28/2018 13:00	9.2	30.3	7.4	71.7	345.2	0.0	491.5
9/28/2018 14:00	7.9	33.1	7.6	69.7	309.8	0.0	491.5
9/28/2018 15:00	8.9	40.4	7.7	68.6	197.3	0.0	491.3
9/28/2018 16:00	10.0	49.3	7.9	63.9	165.8	0.0	491.4
9/28/2018 17:00	9.6	61.4	7.9	58.7	71.6	0.0	491.4
9/28/2018 18:00	8.7	60.0	7.6	56.6	3.9	0.0	491.4
9/28/2018 19:00	10.9	65.7	7.8	51.0	0.0	0.0	491.2
9/28/2018 20:00	10.8	61.9	7.7	48.8	0.0	0.0	491.5
9/28/2018 21:00	11.9	61.2	7.6	46.1	0.0	0.0	491.3
9/28/2018 22:00	14.7	62.3	7.3	44.5	0.0	0.0	491.0
9/28/2018 23:00	14.1	61.2	7.1	44.5	0.0	0.0	491.3
9/29/2018 0:00	11.9	52.8	6.7	44.8	0.0	0.0	491.4
9/29/2018 1:00	13.4	55.3	6.3	45.3	0.0	0.0	490.9
9/29/2018 2:00	14.5	58.4	5.9	45.0	0.0	0.0	491.3
9/29/2018 3:00	13.4	53.2	5.5	44.2	0.0	0.0	491.1
9/29/2018 4:00	14.0	60.6	5.1	44.8	0.0	0.0	491.0
9/29/2018 5:00	14.0	62.8	4.8	44.6	0.0	0.0	491.4
9/29/2018 6:00	13.1	66.2	4.6	44.4	2.6	0.0	491.4
9/29/2018 7:00	15.2	64.4	4.5	44.8	13.8	0.0	491.2
9/29/2018 8:00	14.1	59.6	4.6	44.6	115.8	0.0	491.6
9/29/2018 9:00	13.1	55.3	5.2	44.2	361.4	0.0	491.3
9/29/2018 10:00	15.4	56.5	5.6	44.6	479.1	0.0	491.5
9/29/2018 11:00	13.1	67.7	6.5	42.7	547.9	0.0	491.5
9/29/2018 12:00	11.6	77.7	6.9	41.1	577.4	0.0	491.6
9/29/2018 13:00	15.0	69.9	7.0	41.4	547.0	0.0	491.1
9/29/2018 14:00	13.1	64.6	7.3	40.4	477.4	0.0	491.2
9/29/2018 15:00	9.9	61.2	7.5	38.9	374.8	0.0	491.3
9/29/2018 16:00	12.5	54.3	7.4	37.5	242.0	0.0	491.2
9/29/2018 17:00	13.1	55.2	7.1	37.3	94.6	0.0	491.0
9/29/2018 18:00	12.5	54.0	6.6	37.5	4.2	0.0	491.2
9/29/2018 19:00	13.2	58.6	6.3	36.3	0.0	0.0	490.9
9/29/2018 20:00	13.5	51.6	6.1	34.4	0.0	0.0	491.3
9/29/2018 21:00	14.8	53.3	5.8	34.2	0.0	0.0	491.0
9/29/2018 22:00	15.8	58.6	5.4	34.9	0.0	0.0	490.8
9/29/2018 23:00	18.0	60.9	5.0	35.6	0.0	0.0	490.5

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
9/30/2018 0:00	17.1	66.9	4.6	35.8	0.0	0.0	490.7
9/30/2018 1:00	14.3	69.6	4.2	35.2	0.0	0.0	491.0
9/30/2018 2:00	13.0	80.6	4.0	34.6	0.0	0.0	491.2
9/30/2018 3:00	14.7	69.9	3.6	35.1	0.0	0.0	490.7
9/30/2018 4:00	16.7	69.4	3.4	34.8	0.0	0.0	491.2
9/30/2018 5:00	14.1	60.6	3.0	35.0	0.0	0.0	491.2
9/30/2018 6:00	18.3	63.5	3.1	32.9	2.3	0.0	491.2
9/30/2018 7:00	17.7	61.8	2.9	33.4	13.2	0.0	491.1
9/30/2018 8:00	14.8	65.1	2.7	34.9	77.9	0.0	490.9
9/30/2018 9:00	14.4	71.7	3.3	33.4	362.6	0.0	491.2
9/30/2018 10:00	13.2	66.1	3.7	32.6	475.0	0.0	491.4
9/30/2018 11:00	11.1	62.0	4.3	32.0	546.7	0.0	491.6
9/30/2018 12:00	10.5	58.7	5.0	30.8	577.2	0.0	491.7
9/30/2018 13:00	9.8	56.5	5.4	31.9	551.2	0.0	491.3
9/30/2018 14:00	9.4	50.2	6.0	32.9	482.6	0.0	491.1
9/30/2018 15:00	8.7	28.8	6.1	33.8	375.5	0.0	491.0
9/30/2018 16:00	8.7	17.3	5.7	35.0	237.8	0.0	491.0
9/30/2018 17:00	9.1	37.8	5.2	35.8	89.4	0.0	491.3
9/30/2018 18:00	12.1	52.1	4.9	35.0	4.4	0.0	491.0
9/30/2018 19:00	11.8	51.3	4.6	33.2	0.0	0.0	491.2
9/30/2018 20:00	8.7	42.2	4.2	32.0	0.0	0.0	491.1
9/30/2018 21:00	10.1	49.9	4.2	31.1	0.0	0.0	491.2
9/30/2018 22:00	8.6	49.0	3.7	32.7	0.0	0.0	491.1
9/30/2018 23:00	8.5	54.2	3.5	32.7	0.0	0.0	491.2
10/1/2018 0:00	8.4	53.8	3.5	32.1	0.0	0.0	491.1
10/1/2018 1:00	7.4	46.8	3.6	31.3	0.0	0.0	491.2
10/1/2018 2:00	7.1	29.7	2.9	33.5	0.0	0.0	491.1
10/1/2018 3:00	8.1	38.2	3.3	30.8	0.0	0.0	491.0
10/1/2018 4:00	8.6	28.9	3.2	31.3	0.0	0.0	491.2
10/1/2018 5:00	7.6	25.2	3.0	31.3	0.0	0.0	491.2
10/1/2018 6:00	2.5	330.2	2.5	33.6	1.8	0.0	491.2
10/1/2018 7:00	2.4	0.3	2.1	35.3	13.0	0.0	491.2
10/1/2018 8:00	6.1	37.9	3.1	31.7	67.6	0.0	491.7
10/1/2018 9:00	8.4	50.0	5.2	27.2	349.5	0.0	491.6
10/1/2018 10:00	11.6	36.0	5.0	30.4	460.9	0.0	491.6
10/1/2018 11:00	9.1	30.7	4.9	33.8	532.0	0.0	491.7
10/1/2018 12:00	9.6	28.9	4.6	35.8	563.1	0.0	491.4
10/1/2018 13:00	8.6	25.4	4.2	38.6	404.7	0.0	491.2
10/1/2018 14:00	9.1	35.6	3.9	37.6	273.1	0.0	491.3
10/1/2018 15:00	12.0	28.3	3.8	36.0	288.0	0.0	491.2
10/1/2018 16:00	10.2	35.4	3.6	36.6	212.6	0.0	491.2
10/1/2018 17:00	10.6	55.9	3.2	37.1	59.7	0.0	491.1
10/1/2018 18:00	10.7	49.5	2.7	38.4	2.4	0.0	491.1
10/1/2018 19:00	10.3	40.1	1.7	40.6	0.0	0.0	491.2
10/1/2018 20:00	9.4	35.4	1.1	41.4	0.0	0.0	491.1
10/1/2018 21:00	8.6	29.9	0.5	41.8	0.0	0.0	491.1
10/1/2018 22:00	11.6	57.9	0.2	41.0	0.0	0.0	491.1
10/1/2018 23:00	13.2	60.5	-0.4	41.1	0.0	0.0	491.2
10/2/2018 0:00	12.7	60.9	-1.0	41.7	0.0	0.0	490.9
10/2/2018 1:00	13.6	55.6	-1.4	41.7	0.0	0.0	491.1
10/2/2018 2:00	13.0	49.7	-1.6	39.3	0.0	0.0	491.4
10/2/2018 3:00	11.4	53.2	-1.8	37.8	0.0	0.0	491.2
10/2/2018 4:00	10.8	56.7	-2.0	37.9	0.0	0.0	491.2
10/2/2018 5:00	9.1	58.3	-2.5	39.0	0.0	0.0	491.2

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
10/2/2018 6:00	8.9	51.5	-2.7	38.5	1.8	0.0	491.1
10/2/2018 7:00	9.8	35.9	-3.1	40.9	12.1	0.0	491.3
10/2/2018 8:00	10.6	31.4	-2.2	35.3	61.4	0.0	491.7
10/2/2018 9:00	10.7	35.7	-1.1	32.2	348.0	0.0	491.9
10/2/2018 10:00	10.1	24.8	-0.1	27.5	459.1	0.0	491.8
10/2/2018 11:00	8.1	24.0	0.7	26.0	531.1	0.0	491.8
10/2/2018 12:00	4.6	11.2	1.8	25.3	567.8	0.0	491.8
10/2/2018 13:00	1.8	240.7	2.0	31.3	489.1	0.0	491.4
10/2/2018 14:00	1.8	289.5	2.4	31.3	431.6	0.0	491.3
10/2/2018 15:00	1.5	312.7	3.0	31.8	356.1	0.0	491.2
10/2/2018 16:00	1.5	283.2	3.0	34.6	202.3	0.0	491.1
10/2/2018 17:00	0.1	274.3	2.1	34.7	52.8	0.0	491.2
10/2/2018 18:00	0.0	90.7	1.5	37.8	1.9	0.0	491.2
10/2/2018 19:00	0.0	0.0	1.6	34.1	0.0	0.0	491.2
10/2/2018 20:00	0.5	20.9	1.5	32.9	0.0	0.0	491.2
10/2/2018 21:00	0.0	0.0	1.3	35.8	0.0	0.0	491.2
10/2/2018 22:00	0.2	16.7	1.3	32.4	0.0	0.0	491.3
10/2/2018 23:00	0.0	0.0	1.1	34.6	0.0	0.0	491.3
10/3/2018 0:00	0.0	0.0	1.1	33.4	0.0	0.0	491.3
10/3/2018 1:00	0.1	243.0	1.3	33.6	0.0	0.0	491.3
10/3/2018 2:00	0.0	243.8	0.7	36.6	0.0	0.0	491.3
10/3/2018 3:00	0.1	243.7	0.7	36.6	0.0	0.0	491.3
10/3/2018 4:00	0.3	230.9	0.5	39.0	0.0	0.0	491.3
10/3/2018 5:00	2.1	194.6	0.8	39.1	0.0	0.0	491.3
10/3/2018 6:00	0.9	165.4	0.5	40.0	3.0	0.0	491.3
10/3/2018 7:00	0.4	177.1	0.8	38.7	29.0	0.0	491.3
10/3/2018 8:00	2.1	207.8	0.8	39.9	86.7	0.0	491.7
10/3/2018 9:00	2.6	204.9	1.6	37.8	302.3	0.0	491.6
10/3/2018 10:00	3.7	212.5	2.3	35.7	414.4	0.0	491.6
10/3/2018 11:00	3.9	221.2	3.0	36.1	505.8	0.0	491.6
10/3/2018 12:00	4.5	220.9	3.5	34.6	507.0	0.0	491.6
10/3/2018 13:00	4.1	228.7	4.0	35.8	504.1	0.0	491.3
10/3/2018 14:00	5.3	226.1	4.0	36.7	461.9	0.0	491.1
10/3/2018 15:00	5.2	232.1	4.2	38.3	337.7	0.0	491.2
10/3/2018 16:00	5.2	230.5	3.8	40.8	199.5	0.0	491.1
10/3/2018 17:00	5.0	220.1	2.7	42.5	64.0	0.0	491.1
10/3/2018 18:00	3.8	207.3	1.6	45.5	2.5	0.0	491.1
10/3/2018 19:00	3.8	200.2	1.2	48.9	0.0	0.0	491.3
10/3/2018 20:00	3.0	182.0	0.8	50.7	0.0	0.0	491.2
10/3/2018 21:00	2.9	192.6	0.6	52.0	0.0	0.0	491.2
10/3/2018 22:00	3.4	200.7	0.3	54.1	0.0	0.0	491.3
10/3/2018 23:00	3.8	204.9	0.0	55.2	0.0	0.0	491.2
10/4/2018 0:00	3.8	206.9	-0.2	54.2	0.0	0.0	491.2
10/4/2018 1:00	3.7	203.3	-0.3	53.6	0.0	0.0	491.3
10/4/2018 2:00	3.8	215.8	-0.3	53.5	0.0	0.0	491.3
10/4/2018 3:00	3.6	212.4	-0.4	53.3	0.0	0.0	491.3
10/4/2018 4:00	3.6	219.0	-0.6	53.2	0.0	0.0	491.3
10/4/2018 5:00	3.1	223.8	-0.9	55.0	0.0	0.0	491.3
10/4/2018 6:00	2.9	223.1	-1.3	56.8	1.5	0.0	491.3
10/4/2018 7:00	2.7	227.4	-1.2	56.6	23.7	0.0	491.3
10/4/2018 8:00	3.5	226.3	-0.8	53.0	85.4	0.0	491.5
10/4/2018 9:00	3.1	224.7	-0.2	50.7	230.1	0.0	491.6
10/4/2018 10:00	3.3	236.3	0.8	45.6	406.5	0.0	491.4
10/4/2018 11:00	3.9	231.8	1.1	43.1	372.0	0.0	491.6

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
10/4/2018 12:00	4.9	233.1	2.0	44.3	540.1	0.0	491.6
10/4/2018 13:00	4.8	231.6	2.1	47.7	372.8	0.0	491.3
10/4/2018 14:00	4.3	228.3	1.8	50.9	209.1	0.0	491.2
10/4/2018 15:00	3.6	228.5	2.1	52.5	172.8	0.0	491.2
10/4/2018 16:00	3.1	223.3	2.0	54.2	103.5	0.0	491.2
10/4/2018 17:00	3.0	221.0	1.7	57.0	39.3	0.0	491.2
10/4/2018 18:00	3.0	227.1	1.2	61.8	1.1	0.0	491.2
10/4/2018 19:00	2.8	217.1	0.7	68.8	0.0	0.0	491.3
10/4/2018 20:00	2.7	199.2	0.3	74.6	0.0	0.0	491.3
10/4/2018 21:00	2.8	203.4	0.2	75.7	0.0	0.0	491.3
10/4/2018 22:00	2.9	201.2	0.2	75.8	0.0	0.0	491.3
10/4/2018 23:00	2.4	207.5	0.5	72.8	0.0	0.0	491.3
10/5/2018 0:00	2.7	225.8	0.7	69.6	0.0	0.0	491.3
10/5/2018 1:00	2.6	208.1	0.6	69.8	0.0	0.0	491.3
10/5/2018 2:00	3.6	215.0	0.7	68.1	0.0	0.0	491.3
10/5/2018 3:00	3.0	219.4	0.7	67.2	0.0	0.0	491.3
10/5/2018 4:00	3.0	211.5	0.5	66.4	0.0	0.0	491.3
10/5/2018 5:00	3.3	221.2	0.5	67.3	0.0	0.0	491.3
10/5/2018 6:00	2.8	225.7	0.3	69.2	1.6	0.0	491.3
10/5/2018 7:00	3.0	217.4	0.6	66.0	23.7	0.0	491.3
10/5/2018 8:00	3.2	224.7	0.8	66.6	88.9	0.0	491.3
10/5/2018 9:00	3.2	232.8	1.0	65.6	140.6	0.0	491.2
10/5/2018 10:00	3.9	218.3	1.6	64.0	149.6	0.0	491.2
10/5/2018 11:00	4.9	210.5	1.7	65.4	100.6	0.0	491.3
10/5/2018 12:00	4.6	203.8	2.1	65.8	124.0	0.0	491.3
10/5/2018 13:00	4.5	202.8	2.3	67.2	76.2	0.0	491.2
10/5/2018 14:00	4.1	235.4	1.4	80.1	82.8	0.0	491.4
10/5/2018 15:00	3.4	229.0	0.1	94.5	37.7	0.0	492.0
10/5/2018 16:00	4.5	214.5	0.1	97.0	33.0	0.0	492.2
10/5/2018 17:00	4.6	211.0	0.2	97.5	12.9	0.0	492.2
10/5/2018 18:00	5.2	215.8	0.3	97.7	0.6	0.0	494.2
10/5/2018 19:00	4.4	218.6	0.5	97.9	0.0	0.0	495.3
10/5/2018 20:00	4.5	207.8	0.7	98.0	0.0	0.0	495.8
10/5/2018 21:00	4.7	209.3	0.8	98.2	0.0	0.0	496.0
10/5/2018 22:00	4.6	199.9	1.0	98.2	0.0	0.0	496.2
10/5/2018 23:00	3.9	203.6	1.1	98.3	0.0	0.0	496.3
10/6/2018 0:00	4.2	204.0	1.3	98.4	0.0	0.0	496.3
10/6/2018 1:00	3.6	197.4	1.5	98.5	0.0	0.0	496.4
10/6/2018 2:00	3.8	200.2	1.6	98.5	0.0	0.0	496.4
10/6/2018 3:00	3.3	188.2	1.6	98.6	0.0	0.0	496.4
10/6/2018 4:00	3.5	190.9	1.6	98.6	0.0	0.0	496.4
10/6/2018 5:00	3.6	202.8	1.6	98.6	0.0	0.0	496.5
10/6/2018 6:00	3.6	219.8	1.6	98.7	0.5	0.0	496.4
10/6/2018 7:00	3.5	202.2	1.5	98.7	19.5	0.0	496.5
10/6/2018 8:00	4.0	200.4	1.6	98.6	91.9	0.0	496.5
10/6/2018 9:00	3.3	209.3	1.9	98.6	173.9	0.0	496.6
10/6/2018 10:00	3.4	203.6	2.3	97.5	256.8	0.0	496.8
10/6/2018 11:00	3.2	225.1	2.7	93.1	300.2	0.0	496.5
10/6/2018 12:00	2.6	232.8	3.3	88.5	280.6	0.0	496.4
10/6/2018 13:00	3.0	237.3	3.6	86.0	243.5	0.0	496.5
10/6/2018 14:00	3.0	226.7	3.7	84.8	159.1	0.0	496.4
10/6/2018 15:00	2.7	223.9	3.8	82.8	116.2	0.0	496.4
10/6/2018 16:00	2.0	219.9	3.8	81.7	66.3	0.0	496.4
10/6/2018 17:00	2.4	202.2	3.6	80.5	15.1	0.0	496.4



Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
10/6/2018 18:00	2.3	196.3	3.5	80.6	0.3	0.0	496.4
10/6/2018 19:00	1.8	202.1	3.4	82.1	0.0	0.0	496.3
10/6/2018 20:00	2.4	205.9	3.3	82.4	0.0	0.0	496.3
10/6/2018 21:00	2.1	208.9	3.2	83.3	0.0	0.0	496.3
10/6/2018 22:00	2.5	222.9	3.1	87.7	0.0	0.0	496.4
10/6/2018 23:00	2.8	205.1	3.1	87.7	0.0	0.0	496.3
10/7/2018 0:00	2.3	193.4	3.0	88.0	0.0	0.0	496.5
10/7/2018 1:00	1.0	166.4	2.7	90.0	0.0	0.0	497.2
10/7/2018 2:00	1.6	48.2	2.2	90.3	0.0	0.0	497.4
10/7/2018 3:00	2.1	37.1	2.0	93.4	0.0	0.0	497.4
10/7/2018 4:00	1.5	33.7	1.9	95.0	0.0	0.0	497.6
10/7/2018 5:00	0.1	30.3	2.3	94.4	0.0	0.0	497.9
10/7/2018 6:00	0.4	28.2	2.3	94.6	0.2	0.0	498.2
10/7/2018 7:00	1.5	32.9	2.3	94.1	11.2	0.0	498.2
10/7/2018 8:00	1.5	33.6	2.6	94.0	48.2	0.0	498.2
10/7/2018 9:00	2.3	31.2	3.2	91.9	98.4	0.0	498.2
10/7/2018 10:00	2.0	24.4	3.4	93.6	134.6	0.0	498.2
10/7/2018 11:00	2.4	28.6	3.9	90.7	159.7	0.0	498.2
10/7/2018 12:00	1.9	15.8	4.3	92.4	142.1	0.0	498.2
10/7/2018 13:00	2.7	28.1	4.7	89.9	184.3	0.0	498.2
10/7/2018 14:00	2.4	29.3	4.8	90.7	142.7	0.0	498.2
10/7/2018 15:00	2.2	19.6	4.8	90.2	77.4	0.0	498.2
10/7/2018 16:00	2.3	29.7	4.7	90.2	40.4	0.0	498.1
10/7/2018 17:00	3.1	32.0	4.5	91.1	7.8	0.0	498.2
10/7/2018 18:00	3.1	28.6	4.4	91.9	0.3	0.0	498.3
10/7/2018 19:00	2.6	35.9	4.5	90.8	0.0	0.0	498.7
10/7/2018 20:00	3.3	32.1	4.4	91.1	0.0	0.0	499.0
10/7/2018 21:00	3.1	35.2	4.3	93.1	0.0	0.0	501.1
10/7/2018 22:00	1.8	37.7	4.4	93.1	0.0	0.0	503.4
10/7/2018 23:00	3.4	35.4	3.9	95.5	0.0	0.0	503.5
10/8/2018 0:00	3.9	36.4	3.8	95.8	0.0	0.0	503.8
10/8/2018 1:00	3.1	33.2	3.8	95.1	0.0	0.0	503.8
10/8/2018 2:00	2.8	36.5	3.6	96.3	0.0	0.0	503.9
10/8/2018 3:00	2.5	20.2	3.5	96.1	0.0	0.0	504.5
10/8/2018 4:00	2.0	14.6	3.5	97.3	0.0	0.0	504.9
10/8/2018 5:00	2.0	195.1	3.8	97.4	0.0	0.0	505.0
10/8/2018 6:00	3.7	202.4	3.8	98.0	0.2	0.0	504.9
10/8/2018 7:00	4.0	209.1	4.2	98.2	13.3	0.0	505.1
10/8/2018 8:00	4.4	206.2	4.2	98.3	71.6	0.0	505.1
10/8/2018 9:00	4.1	205.3	4.6	98.3	82.5	0.0	505.3
10/8/2018 10:00	4.0	209.8	4.8	98.3	97.8	0.0	505.7
10/8/2018 11:00	3.7	211.2	4.9	98.3	131.8	0.0	506.2
10/8/2018 12:00	3.9	219.8	5.0	98.4	135.7	0.0	506.8
10/8/2018 13:00	3.3	222.0	5.2	98.4	97.9	0.0	507.6
10/8/2018 14:00	3.1	212.3	5.2	98.4	128.3	0.0	507.7
10/8/2018 15:00	1.7	232.0	5.4	98.4	108.0	0.0	507.7
10/8/2018 16:00	2.1	4.4	4.9	98.3	94.7	0.0	507.7
10/8/2018 17:00	4.8	347.2	4.2	98.5	15.3	0.0	508.1
10/8/2018 18:00	8.1	35.0	2.9	98.2	0.1	0.0	509.6
10/8/2018 19:00	10.5	44.8	3.0	85.1	0.0	0.0	509.7
10/8/2018 20:00	11.1	43.4	2.4	75.8	0.0	0.0	509.4
10/8/2018 21:00	14.1	49.0	1.8	66.7	0.0	0.0	509.6
10/8/2018 22:00	13.6	50.8	1.5	64.3	0.0	0.0	509.3
10/8/2018 23:00	12.5	44.7	0.9	64.9	0.0	0.0	509.3

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
10/9/2018 0:00	12.6	43.6	0.4	62.8	0.0	0.0	509.5
10/9/2018 1:00	12.1	43.9	0.0	64.4	0.0	0.0	509.6
10/9/2018 2:00	12.3	43.1	-0.2	65.2	0.0	0.0	509.4
10/9/2018 3:00	10.9	44.4	-0.6	68.2	0.0	0.0	509.4
10/9/2018 4:00	9.9	45.9	-0.9	65.3	0.0	0.0	509.3
10/9/2018 5:00	9.9	37.9	-1.0	65.2	0.0	0.0	509.5
10/9/2018 6:00	9.5	39.6	-1.2	66.1	0.6	0.0	509.4
10/9/2018 7:00	8.5	41.2	-1.4	68.2	11.8	0.0	509.4
10/9/2018 8:00	7.3	50.4	-1.5	67.8	36.8	0.0	509.5
10/9/2018 9:00	7.4	47.4	-0.7	66.5	260.8	0.0	509.9
10/9/2018 10:00	7.8	41.8	-0.1	65.2	331.2	0.0	509.8
10/9/2018 11:00	6.6	36.1	-0.1	67.1	280.7	0.0	509.6
10/9/2018 12:00	3.8	27.0	0.3	67.5	324.0	0.0	509.7
10/9/2018 13:00	2.6	30.4	0.8	66.8	318.7	0.0	509.6
10/9/2018 14:00	2.3	22.9	1.0	69.2	243.0	0.0	509.4
10/9/2018 15:00	2.3	26.2	1.2	69.5	224.7	0.0	509.5
10/9/2018 16:00	2.2	28.4	1.2	70.0	176.5	0.0	509.4
10/9/2018 17:00	2.1	39.2	0.7	73.2	42.0	0.0	509.4
10/9/2018 18:00	2.5	45.6	0.4	75.2	0.4	0.0	509.5
10/9/2018 19:00	1.2	173.5	0.1	81.6	0.0	0.0	509.5
10/9/2018 20:00	1.2	190.2	0.1	86.1	0.0	0.0	509.5
10/9/2018 21:00	0.7	216.7	0.1	85.4	0.0	0.0	509.5
10/9/2018 22:00	0.5	213.5	0.0	85.3	0.0	0.0	509.5
10/9/2018 23:00	0.2	212.3	0.0	83.8	0.0	0.0	509.5
10/10/2018 0:00	1.9	185.0	-0.5	86.1	0.0	0.0	509.5
10/10/2018 1:00	1.7	181.9	-0.5	84.9	0.0	0.0	509.5
10/10/2018 2:00	0.5	204.3	-0.5	85.2	0.0	0.0	509.5
10/10/2018 3:00	0.5	276.4	-0.6	86.0	0.0	0.0	509.5
10/10/2018 4:00	0.7	217.9	-0.8	86.0	0.0	0.0	509.6
10/10/2018 5:00	1.7	182.4	-1.6	88.1	0.0	0.0	509.6
10/10/2018 6:00	2.0	188.3	-1.3	85.2	0.4	0.0	509.6
10/10/2018 7:00	1.6	170.3	-1.1	84.0	15.4	0.0	509.6
10/10/2018 8:00	1.2	330.3	-0.8	83.1	33.9	0.0	509.6
10/10/2018 9:00	1.0	169.3	0.6	80.2	281.2	0.0	510.2
10/10/2018 10:00	1.2	159.8	1.8	74.5	391.7	0.0	510.0
10/10/2018 11:00	1.2	209.4	1.9	73.9	439.7	0.0	510.0
10/10/2018 12:00	1.6	237.6	2.6	74.2	497.8	0.0	509.8
10/10/2018 13:00	1.5	222.6	3.6	73.5	456.2	0.0	509.6
10/10/2018 14:00	3.0	214.3	3.9	69.1	250.8	0.0	509.4
10/10/2018 15:00	3.3	202.0	3.5	73.5	57.8	0.0	509.4
10/10/2018 16:00	3.8	208.0	4.1	69.0	37.5	0.0	509.4
10/10/2018 17:00	3.9	202.1	4.2	69.1	4.5	0.0	509.4
10/10/2018 18:00	4.1	206.3	3.9	71.3	0.0	0.0	509.4
10/10/2018 19:00	4.8	206.6	3.4	76.8	0.0	0.0	509.6
10/10/2018 20:00	4.1	195.5	2.9	83.9	0.0	0.0	510.2
10/10/2018 21:00	4.2	208.1	2.3	89.5	0.0	0.0	510.9
10/10/2018 22:00	4.8	212.5	1.7	94.7	0.0	0.0	512.2
10/10/2018 23:00	5.0	200.2	1.7	94.3	0.0	0.0	513.1
10/11/2018 0:00	5.8	208.5	1.7	97.1	0.0	0.0	513.7
10/11/2018 1:00	5.2	209.4	1.9	97.9	0.0	0.0	514.2
10/11/2018 2:00	4.6	205.2	2.2	98.2	0.0	0.0	515.2
10/11/2018 3:00	4.7	207.2	2.3	98.3	0.0	0.0	517.5
10/11/2018 4:00	5.1	201.6	2.6	98.4	0.0	0.0	520.0
10/11/2018 5:00	5.2	207.4	2.5	98.5	0.0	0.0	522.9

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
10/11/2018 6:00	5.4	213.6	2.7	98.5	0.0	0.0	524.5
10/11/2018 7:00	5.1	206.2	2.7	98.6	4.6	0.0	526.8
10/11/2018 8:00	5.2	198.3	2.7	98.6	24.0	0.0	528.7
10/11/2018 9:00	5.1	196.3	2.9	98.6	26.8	0.0	530.3
10/11/2018 10:00	4.6	196.7	2.9	98.7	50.8	0.0	531.8
10/11/2018 11:00	4.0	197.0	3.1	98.7	63.9	0.0	534.0
10/11/2018 12:00	3.4	199.4	3.2	98.7	52.2	0.0	536.7
10/11/2018 13:00	1.5	189.6	3.3	98.7	42.3	0.0	539.3
10/11/2018 14:00	0.6	235.0	3.3	98.7	27.4	0.0	542.8
10/11/2018 15:00	1.4	5.5	2.6	98.7	21.0	0.0	545.6
10/11/2018 16:00	1.2	28.0	1.1	98.6	6.8	0.0	548.9
10/11/2018 17:00	-	-	0.1	98.6	1.6	0.0	550.9
10/11/2018 18:00	-	-	0.1	98.6	0.0	0.0	551.8
10/11/2018 19:00	-	-	0.1	98.6	0.0	0.0	552.8
10/11/2018 20:00	-	-	0.1	98.6	0.0	0.0	554.4
10/11/2018 21:00	-	-	0.2	98.6	0.0	0.0	555.0
10/11/2018 22:00	-	-	0.5	98.6	0.0	0.0	560.5
10/11/2018 23:00	3.7	201.4	1.1	97.4	0.0	0.0	561.1
10/12/2018 0:00	3.9	203.2	1.3	94.7	0.0	0.0	561.1
10/12/2018 1:00	4.1	192.2	1.6	90.0	0.0	0.0	561.1
10/12/2018 2:00	4.5	192.5	1.8	87.5	0.0	0.0	561.1
10/12/2018 3:00	4.6	198.7	1.8	87.2	0.0	0.0	561.2
10/12/2018 4:00	4.7	200.1	1.7	88.2	0.0	0.0	561.1
10/12/2018 5:00	4.2	205.0	1.6	88.9	0.0	0.0	561.1
10/12/2018 6:00	2.9	195.1	1.4	90.5	0.0	0.0	561.1
10/12/2018 7:00	3.1	196.9	1.7	85.7	15.7	0.0	561.0
10/12/2018 8:00	2.6	204.3	1.5	88.4	62.0	0.0	561.1
10/12/2018 9:00	2.5	205.8	1.9	84.2	115.3	0.0	561.1
10/12/2018 10:00	2.8	216.4	2.1	84.2	189.3	0.0	561.1
10/12/2018 11:00	3.2	210.3	2.5	81.7	314.1	0.0	561.3
10/12/2018 12:00	4.1	224.6	2.7	81.5	243.7	0.0	561.2
10/12/2018 13:00	3.6	245.1	3.3	81.4	416.7	0.0	561.3
10/12/2018 14:00	2.6	277.1	3.0	79.2	261.6	0.0	561.1
10/12/2018 15:00	2.7	262.9	2.7	79.8	102.3	0.0	561.0
10/12/2018 16:00	2.8	236.9	2.7	80.2	53.1	0.0	561.0
10/12/2018 17:00	2.7	200.5	2.6	80.2	16.6	0.0	561.1
10/12/2018 18:00	1.2	146.9	2.2	75.4	0.1	0.0	561.1
10/12/2018 19:00	1.0	298.1	2.0	80.6	0.0	0.0	561.1
10/12/2018 20:00	0.9	353.4	1.8	83.3	0.0	0.0	561.1
10/12/2018 21:00	0.3	300.0	1.7	85.2	0.0	0.0	561.1
10/12/2018 22:00	0.8	223.1	1.8	85.3	0.0	0.0	561.1
10/12/2018 23:00	2.1	214.2	1.5	84.7	0.0	0.0	561.1
10/13/2018 0:00	2.3	219.1	1.6	84.6	0.0	0.0	561.1
10/13/2018 1:00	0.8	223.7	1.7	84.4	0.0	0.0	561.1
10/13/2018 2:00	0.8	201.1	1.7	83.9	0.0	0.0	561.1
10/13/2018 3:00	1.7	221.4	1.5	85.7	0.0	0.0	561.1
10/13/2018 4:00	1.6	246.0	1.7	83.9	0.0	0.0	561.1
10/13/2018 5:00	0.8	209.3	2.0	80.3	0.0	0.0	561.1
10/13/2018 6:00	1.3	211.2	2.0	78.9	0.0	0.0	561.1
10/13/2018 7:00	1.5	16.6	2.0	79.5	5.8	0.0	561.1
10/13/2018 8:00	1.3	308.3	2.8	74.8	35.3	0.0	561.1
10/13/2018 9:00	2.2	228.9	2.1	82.0	92.7	0.0	561.2
10/13/2018 10:00	3.3	214.7	2.8	78.7	130.1	0.0	561.1
10/13/2018 11:00	1.4	245.5	3.4	78.3	151.8	0.0	561.1

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
10/13/2018 12:00	1.2	226.6	3.8	77.0	141.6	0.0	561.1
10/13/2018 13:00	2.3	185.3	4.1	78.8	114.3	0.0	561.1
10/13/2018 14:00	2.7	221.9	4.8	76.2	122.7	0.0	561.1
10/13/2018 15:00	2.6	193.4	5.3	73.7	80.9	0.0	561.0
10/13/2018 16:00	3.4	197.6	5.2	72.7	36.0	0.0	561.0
10/13/2018 17:00	4.2	199.0	5.6	67.0	7.5	0.0	561.0
10/13/2018 18:00	4.1	203.1	5.6	66.1	0.0	0.0	561.0
10/13/2018 19:00	4.7	203.3	5.4	67.5	0.0	0.0	561.0
10/13/2018 20:00	5.0	205.4	5.2	66.5	0.0	0.0	561.2
10/13/2018 21:00	3.5	211.0	5.0	64.9	0.0	0.0	561.0
10/13/2018 22:00	5.5	192.4	4.9	58.7	0.0	0.0	561.4
10/13/2018 23:00	5.2	192.6	4.6	55.0	0.0	0.0	561.1
10/14/2018 0:00	4.0	206.5	3.6	63.6	0.0	0.0	561.1
10/14/2018 1:00	4.3	204.9	3.0	66.6	0.0	0.0	561.1
10/14/2018 2:00	4.5	207.9	3.1	62.2	0.0	0.0	561.1
10/14/2018 3:00	5.3	198.0	3.2	58.9	0.0	0.0	561.2
10/14/2018 4:00	4.5	205.4	3.2	60.4	0.0	0.0	561.0
10/14/2018 5:00	4.4	203.5	2.9	64.6	0.0	0.0	561.1
10/14/2018 6:00	4.4	199.1	2.8	66.4	0.0	0.0	561.1
10/14/2018 7:00	5.2	206.4	2.8	68.3	15.1	0.0	561.0
10/14/2018 8:00	5.8	221.1	3.0	69.8	38.9	0.0	561.1
10/14/2018 9:00	5.2	221.7	2.8	75.0	41.9	0.0	561.1
10/14/2018 10:00	5.9	220.8	2.5	84.7	69.0	0.0	561.0
10/14/2018 11:00	6.3	217.2	2.1	93.5	63.4	0.0	561.3
10/14/2018 12:00	5.8	215.0	2.1	97.3	43.6	0.0	561.0
10/14/2018 13:00	5.3	211.4	2.5	98.0	45.9	0.0	561.3
10/14/2018 14:00	5.6	209.9	2.8	98.2	58.2	0.0	561.3
10/14/2018 15:00	5.4	212.3	2.8	98.4	29.4	0.0	561.2
10/14/2018 16:00	4.7	220.2	2.8	98.5	7.9	0.0	561.2
10/14/2018 17:00	4.5	217.0	2.9	98.5	2.3	0.0	561.2
10/14/2018 18:00	4.5	220.2	2.8	98.6	0.0	0.0	561.2
10/14/2018 19:00	5.2	220.5	2.7	98.6	0.0	0.0	561.2
10/14/2018 20:00	5.6	210.4	2.9	96.1	0.0	0.0	561.2
10/14/2018 21:00	5.8	217.5	2.7	92.1	0.0	0.0	561.3
10/14/2018 22:00	7.1	211.7	2.7	88.7	0.0	0.0	561.1
10/14/2018 23:00	7.3	217.4	2.8	87.2	0.0	0.0	561.2
10/15/2018 0:00	7.0	214.2	3.1	80.2	0.0	0.0	561.2
10/15/2018 1:00	6.6	216.3	3.3	73.0	0.0	0.0	561.1
10/15/2018 2:00	5.4	206.9	3.6	65.3	0.0	0.0	561.3
10/15/2018 3:00	4.7	206.5	3.7	60.3	0.0	0.0	561.2
10/15/2018 4:00	4.6	197.8	3.7	56.5	0.0	0.0	561.1
10/15/2018 5:00	3.3	200.2	3.6	54.8	0.0	0.0	561.3
10/15/2018 6:00	5.0	212.7	3.8	50.6	0.0	0.0	561.3
10/15/2018 7:00	4.6	210.1	3.9	48.9	9.6	0.0	618.2
10/15/2018 8:00	4.2	204.2	4.3	45.3	44.0	0.0	618.7
10/15/2018 9:00	4.8	198.0	5.2	39.8	189.7	0.0	619.1
10/15/2018 10:00	4.5	206.1	6.2	36.9	352.1	0.0	618.9
10/15/2018 11:00	4.6	205.5	7.1	34.8	429.4	0.0	619.3
10/15/2018 12:00	4.7	218.8	7.7	33.2	478.4	0.0	619.3
10/15/2018 13:00	4.1	223.6	8.1	31.6	410.8	0.0	619.3
10/15/2018 14:00	5.1	222.0	8.6	29.5	392.2	0.0	619.1
10/15/2018 15:00	4.7	221.3	8.9	28.8	280.7	0.0	619.1
10/15/2018 16:00	4.1	227.0	8.6	30.2	131.1	0.0	618.7
10/15/2018 17:00	4.6	200.5	7.6	30.9	16.9	0.0	619.0

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
10/15/2018 18:00	5.3	193.6	7.2	30.8	0.0	0.0	619.0
10/15/2018 19:00	4.6	198.4	7.2	30.4	0.0	0.0	619.1
10/15/2018 20:00	4.8	202.3	7.1	27.8	0.0	0.0	618.9
10/15/2018 21:00	5.4	204.3	7.2	25.1	0.0	0.0	618.9
10/15/2018 22:00	5.4	198.8	7.3	23.0	0.0	0.0	618.9
10/15/2018 23:00	5.8	195.1	7.6	20.4	0.0	0.0	619.0
10/16/2018 0:00	5.4	201.1	7.4	20.7	0.0	0.0	619.2
10/16/2018 1:00	6.2	201.0	7.9	19.3	0.0	0.0	619.1
10/16/2018 2:00	6.1	195.8	7.7	19.4	0.0	0.0	618.8
10/16/2018 3:00	5.6	201.3	7.7	18.5	0.0	0.0	619.4
10/16/2018 4:00	5.0	195.4	7.7	18.2	0.0	0.0	619.0
10/16/2018 5:00	5.4	196.6	7.9	21.6	0.0	0.0	618.9
10/16/2018 6:00	5.9	198.5	7.8	26.3	0.0	0.0	619.2
10/16/2018 7:00	6.3	194.0	7.9	27.8	8.9	0.0	618.8
10/16/2018 8:00	6.6	198.3	8.2	27.5	28.5	0.0	619.0
10/16/2018 9:00	6.3	208.7	8.6	28.1	203.6	0.0	620.0
10/16/2018 10:00	6.0	207.3	9.4	27.2	347.2	0.0	619.5
10/16/2018 11:00	8.5	195.2	10.9	22.0	437.4	0.0	620.1
10/16/2018 12:00	9.4	194.0	11.4	21.3	463.9	0.0	619.3
10/16/2018 13:00	9.5	194.5	11.6	20.4	388.6	0.0	619.5
10/16/2018 14:00	7.7	197.8	11.1	22.7	258.4	0.0	619.5
10/16/2018 15:00	8.2	189.6	10.7	24.2	172.5	0.0	619.7
10/16/2018 16:00	7.4	186.6	10.0	26.2	39.8	0.0	619.0
10/16/2018 17:00	7.0	194.4	9.4	30.0	6.6	0.0	619.6
10/16/2018 18:00	6.2	203.1	9.7	31.8	0.0	0.0	619.4
10/16/2018 19:00	4.4	215.0	9.1	33.8	0.0	0.0	619.3
10/16/2018 20:00	3.5	215.0	8.7	38.0	0.0	0.0	619.3
10/16/2018 21:00	3.1	221.8	8.5	41.2	0.0	0.0	619.2
10/16/2018 22:00	4.4	220.7	8.5	43.1	0.0	0.0	619.3
10/16/2018 23:00	5.8	207.3	8.4	43.2	0.0	0.0	619.8
10/17/2018 0:00	7.2	200.1	8.6	40.3	0.0	0.0	619.1
10/17/2018 1:00	6.1	207.7	6.9	51.0	0.0	0.0	619.5
10/17/2018 2:00	9.2	195.6	3.6	85.1	0.0	0.0	620.6
10/17/2018 3:00	5.7	199.7	2.4	97.6	0.0	0.0	620.4
10/17/2018 4:00	4.5	204.7	2.2	97.9	0.0	0.0	622.1
10/17/2018 5:00	7.0	189.2	2.5	98.3	0.0	0.0	622.1
10/17/2018 6:00	6.8	198.1	2.6	95.1	0.0	0.0	622.2
10/17/2018 7:00	6.1	205.5	2.2	96.2	1.7	0.0	622.3
10/17/2018 8:00	5.0	208.0	2.6	93.1	12.1	0.0	622.6
10/17/2018 9:00	5.5	199.5	2.8	93.8	39.1	0.0	623.2
10/17/2018 10:00	6.0	194.5	3.1	92.0	102.3	0.0	623.1
10/17/2018 11:00	5.2	207.9	3.3	93.4	109.2	0.0	623.4
10/17/2018 12:00	5.1	219.8	3.2	97.0	69.7	0.0	624.6
10/17/2018 13:00	5.8	223.0	3.6	98.1	35.8	0.0	626.5
10/17/2018 14:00	4.0	217.9	3.5	98.4	38.0	0.0	629.0
10/17/2018 15:00	4.1	194.7	3.3	98.5	42.4	0.0	630.4
10/17/2018 16:00	4.6	187.6	3.4	98.2	38.5	0.0	630.2
10/17/2018 17:00	4.7	202.5	3.6	93.2	6.9	0.0	630.2
10/17/2018 18:00	3.7	215.5	3.3	97.2	0.0	0.0	631.0
10/17/2018 19:00	4.6	185.6	2.6	96.9	0.0	0.0	631.5
10/17/2018 20:00	3.9	208.1	2.6	95.5	0.0	0.0	631.2
10/17/2018 21:00	3.6	198.8	2.8	91.1	0.0	0.0	631.4
10/17/2018 22:00	3.6	201.9	2.6	92.8	0.0	0.0	631.4
10/17/2018 23:00	3.1	212.2	2.6	93.8	0.0	0.0	631.4

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
10/18/2018 0:00	3.1	212.0	2.6	91.2	0.0	0.0	631.6
10/18/2018 1:00	3.3	226.7	2.2	93.8	0.0	0.0	631.5
10/18/2018 2:00	3.4	202.6	2.1	92.8	0.0	0.0	631.3
10/18/2018 3:00	3.1	195.0	1.8	93.9	0.0	0.0	631.4
10/18/2018 4:00	2.3	193.4	1.9	90.4	0.0	0.0	631.4
10/18/2018 5:00	1.4	230.2	2.0	89.6	0.0	0.0	631.4
10/18/2018 6:00	1.7	210.4	1.9	89.6	0.0	0.0	631.4
10/18/2018 7:00	1.5	208.6	1.8	89.4	8.9	0.0	631.5
10/18/2018 8:00	0.3	213.4	1.9	88.6	64.1	0.0	631.5
10/18/2018 9:00	0.9	29.7	2.3	81.4	157.5	0.0	631.7
10/18/2018 10:00	1.0	41.3	3.2	81.2	280.2	0.0	632.3
10/18/2018 11:00	1.3	326.5	3.9	78.3	338.6	0.0	632.3
10/18/2018 12:00	2.1	20.0	4.2	72.3	370.9	0.0	631.9
10/18/2018 13:00	1.9	343.4	4.6	77.2	331.6	0.0	631.7
10/18/2018 14:00	1.3	223.1	4.1	79.7	196.7	0.0	631.5
10/18/2018 15:00	1.2	231.3	3.9	82.0	106.5	0.0	631.5
10/18/2018 16:00	1.1	105.2	3.5	82.1	32.9	0.0	631.5
10/18/2018 17:00	3.2	32.0	3.4	77.2	3.7	0.0	631.5
10/18/2018 18:00	3.6	35.7	3.5	74.0	0.0	0.0	631.5
10/18/2018 19:00	2.6	36.7	3.9	65.8	0.0	0.0	631.5
10/18/2018 20:00	2.7	103.3	4.6	56.0	0.0	0.0	631.2
10/18/2018 21:00	3.2	74.0	3.1	70.1	0.0	0.0	631.4
10/18/2018 22:00	1.6	22.9	2.1	82.2	0.0	0.0	631.6
10/18/2018 23:00	2.0	32.8	1.2	89.5	0.0	0.0	632.1
10/19/2018 0:00	4.1	32.1	0.8	96.1	0.0	0.0	632.6
10/19/2018 1:00	3.8	30.3	0.7	97.5	0.0	0.0	633.4
10/19/2018 2:00	4.3	31.8	1.0	97.8	0.0	0.0	633.8
10/19/2018 3:00	3.1	30.8	1.6	97.1	0.0	0.0	634.4
10/19/2018 4:00	3.6	21.7	1.9	97.2	0.0	0.0	634.8
10/19/2018 5:00	3.2	203.0	3.0	97.8	0.0	0.0	634.9
10/19/2018 6:00	5.2	206.3	3.5	98.2	0.0	0.0	635.4
10/19/2018 7:00	7.0	198.0	4.4	98.4	6.5	0.0	635.5
10/19/2018 8:00	6.6	201.4	4.8	98.4	33.1	0.0	635.3
10/19/2018 9:00	7.7	183.1	6.3	85.2	58.0	0.0	636.0
10/19/2018 10:00	7.9	192.9	5.3	92.2	53.4	0.0	636.7
10/19/2018 11:00	7.5	198.7	4.7	97.9	27.7	0.0	638.9
10/19/2018 12:00	7.9	195.2	4.1	98.3	18.7	0.0	642.0
10/19/2018 13:00	7.7	191.1	3.5	97.2	21.0	0.0	644.8
10/19/2018 14:00	7.6	227.1	3.5	98.2	17.4	0.0	649.1
10/19/2018 15:00	6.4	216.6	3.0	98.4	16.8	0.0	652.3
10/19/2018 16:00	6.9	203.8	3.0	92.1	46.7	0.0	653.2
10/19/2018 17:00	6.2	206.9	2.8	87.1	5.4	0.0	653.4
10/19/2018 18:00	4.2	222.7	2.3	92.0	0.0	0.0	653.1
10/19/2018 19:00	8.9	178.8	3.1	78.8	0.0	0.0	653.2
10/19/2018 20:00	7.1	208.7	1.6	97.2	0.0	0.0	655.0
10/19/2018 21:00	6.2	220.1	1.4	98.0	0.0	0.0	655.3
10/19/2018 22:00	7.2	222.9	1.4	98.3	0.0	0.0	657.4
10/19/2018 23:00	7.4	198.9	1.5	95.1	0.0	0.0	658.0
10/20/2018 0:00	7.2	196.4	1.4	92.9	0.0	0.0	659.4
10/20/2018 1:00	7.3	202.0	0.3	97.9	0.0	0.0	660.0
10/20/2018 2:00	7.3	200.6	0.7	97.7	0.0	0.0	662.1
10/20/2018 3:00	7.6	212.5	0.6	98.0	0.0	0.0	662.8
10/20/2018 4:00	8.3	217.2	0.5	96.6	0.0	0.0	662.9
10/20/2018 5:00	5.2	211.6	0.2	98.0	0.0	0.0	663.7

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
10/20/2018 6:00	6.1	205.0	0.1	98.1	0.0	0.0	664.2
10/20/2018 7:00	6.7	202.5	0.1	97.5	4.1	0.0	664.2
10/20/2018 8:00	7.0	209.9	0.1	94.5	21.8	0.0	664.1
10/20/2018 9:00	6.0	199.3	0.2	94.9	46.6	0.0	664.2
10/20/2018 10:00	4.6	206.4	0.5	94.6	112.0	0.0	664.3
10/20/2018 11:00	5.7	208.9	0.8	97.8	110.9	0.0	664.5
10/20/2018 12:00	5.7	208.7	1.1	98.1	93.0	0.0	664.6
10/20/2018 13:00	5.4	216.7	1.5	98.2	89.8	0.0	664.4
10/20/2018 14:00	4.7	205.9	1.6	98.2	85.7	0.0	664.6
10/20/2018 15:00	3.9	204.1	1.6	98.2	51.2	0.0	664.6
10/20/2018 16:00	3.7	209.5	1.4	98.4	23.2	0.0	664.7
10/20/2018 17:00	4.2	197.5	1.3	98.5	1.9	0.0	664.8
10/20/2018 18:00	4.0	199.7	1.2	98.5	0.0	0.0	665.1
10/20/2018 19:00	2.7	206.3	1.3	98.6	0.0	0.0	665.2
10/20/2018 20:00	3.0	195.9	1.4	98.6	0.0	0.0	665.5
10/20/2018 21:00	3.2	199.3	1.4	98.6	0.0	0.0	665.5
10/20/2018 22:00	4.3	196.6	1.5	98.7	0.0	0.0	665.7
10/20/2018 23:00	4.2	195.8	1.5	98.7	0.0	0.0	665.8
10/21/2018 0:00	3.8	209.5	1.3	98.6	0.0	0.0	665.7
10/21/2018 1:00	2.3	193.5	1.3	98.6	0.0	0.0	665.7
10/21/2018 2:00	2.7	186.1	1.7	92.9	0.0	0.0	665.7
10/21/2018 3:00	1.5	112.6	1.7	84.8	0.0	0.0	665.7
10/21/2018 4:00	1.0	91.7	1.8	82.2	0.0	0.0	665.7
10/21/2018 5:00	1.9	39.7	2.1	83.6	0.0	0.0	665.7
10/21/2018 6:00	1.7	42.9	2.2	79.8	0.0	0.0	665.7
10/21/2018 7:00	1.9	44.2	2.2	77.0	4.6	0.0	665.7
10/21/2018 8:00	2.9	46.6	2.3	73.9	40.7	0.0	665.7
10/21/2018 9:00	3.6	34.0	2.3	73.8	107.8	0.0	665.8
10/21/2018 10:00	4.2	39.7	2.7	74.0	156.8	0.0	665.8
10/21/2018 11:00	4.2	36.9	3.3	72.3	192.2	0.0	665.7
10/21/2018 12:00	4.0	37.2	3.7	69.4	218.2	0.0	665.8
10/21/2018 13:00	4.2	38.8	4.6	62.0	336.6	0.0	666.3
10/21/2018 14:00	4.6	36.0	4.6	59.5	196.2	0.0	665.8
10/21/2018 15:00	4.8	35.0	4.3	60.7	138.7	0.0	665.6
10/21/2018 16:00	3.9	40.3	4.3	58.0	51.1	0.0	665.7
10/21/2018 17:00	3.7	36.5	4.0	58.9	4.9	0.0	665.8
10/21/2018 18:00	2.8	39.2	4.3	53.1	0.0	0.0	665.7
10/21/2018 19:00	1.7	37.4	4.7	47.1	0.0	0.0	665.7
10/21/2018 20:00	0.9	80.0	5.1	42.2	0.0	0.0	665.8
10/21/2018 21:00	0.5	127.9	5.3	41.0	0.0	0.0	665.8
10/21/2018 22:00	2.3	197.0	5.5	39.5	0.0	0.0	665.7
10/21/2018 23:00	3.1	174.5	5.7	37.5	0.0	0.0	665.9
10/22/2018 0:00	1.9	219.4	5.7	37.7	0.0	0.0	665.8
10/22/2018 1:00	1.5	187.2	5.7	37.4	0.0	0.0	665.7
10/22/2018 2:00	1.8	189.9	6.0	35.2	0.0	0.0	665.7
10/22/2018 3:00	2.3	190.4	6.1	33.3	0.0	0.0	665.8
10/22/2018 4:00	2.4	191.7	6.1	35.9	0.0	0.0	665.7
10/22/2018 5:00	1.9	272.6	6.0	40.9	0.0	0.0	665.8
10/22/2018 6:00	1.8	337.6	5.1	52.8	0.0	0.0	665.9
10/22/2018 7:00	2.3	2.0	4.3	62.1	1.4	0.0	665.9
10/22/2018 8:00	1.5	51.1	3.3	81.3	12.9	0.0	667.4
10/22/2018 9:00	1.3	14.7	3.7	92.5	32.4	0.0	667.8
10/22/2018 10:00	1.8	199.1	4.6	94.6	51.0	0.0	668.3
10/22/2018 11:00	3.4	194.0	5.1	97.1	52.9	0.0	668.8

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
10/22/2018 12:00	3.7	208.8	5.5	98.0	61.9	0.0	669.6
10/22/2018 13:00	4.0	209.8	5.6	98.2	51.0	0.0	670.0
10/22/2018 14:00	3.8	196.3	5.9	98.4	40.7	0.0	670.7
10/22/2018 15:00	3.7	205.1	6.2	98.5	28.2	0.0	671.3
10/22/2018 16:00	2.2	222.4	6.1	98.6	10.2	0.0	672.2
10/22/2018 17:00	3.4	186.7	6.5	98.7	1.0	0.0	672.4
10/22/2018 18:00	5.1	177.8	6.6	98.8	0.0	0.0	672.7
10/22/2018 19:00	5.9	169.7	7.0	98.4	0.0	0.0	672.3
10/22/2018 20:00	5.0	157.3	7.1	93.6	0.0	0.0	672.5
10/22/2018 21:00	2.3	36.2	7.5	87.6	0.0	0.0	672.5
10/22/2018 22:00	1.1	78.6	7.9	81.4	0.0	0.0	672.5
10/22/2018 23:00	1.5	66.5	8.3	72.7	0.0	0.0	672.5
10/23/2018 0:00	1.2	34.3	9.0	60.1	0.0	0.0	672.5
10/23/2018 1:00	1.6	55.6	9.3	52.0	0.0	0.0	672.4
10/23/2018 2:00	2.0	353.4	9.6	45.6	0.0	0.0	672.4
10/23/2018 3:00	2.8	37.9	8.6	49.7	0.0	0.0	672.3
10/23/2018 4:00	3.0	34.5	8.0	50.0	0.0	0.0	672.4
10/23/2018 5:00	2.9	29.6	8.0	48.4	0.0	0.0	672.4
10/23/2018 6:00	1.6	38.7	8.5	46.1	0.0	0.0	672.4
10/23/2018 7:00	2.3	24.6	8.3	44.3	12.7	0.0	672.4
10/23/2018 8:00	1.6	13.5	8.7	41.0	48.2	0.0	672.5
10/23/2018 9:00	1.9	145.3	8.9	39.0	106.3	0.0	672.6
10/23/2018 10:00	3.4	185.3	9.3	36.8	111.9	0.0	672.5
10/23/2018 11:00	4.8	167.6	8.9	40.5	101.6	0.0	672.8
10/23/2018 12:00	4.6	185.0	8.4	45.5	121.0	0.0	672.6
10/23/2018 13:00	3.4	212.8	6.7	60.8	92.7	0.0	672.4
10/23/2018 14:00	4.3	200.8	4.8	79.3	94.2	0.0	672.4
10/23/2018 15:00	3.6	201.4	4.0	85.4	28.6	0.0	672.4
10/23/2018 16:00	4.3	222.2	3.1	90.0	11.2	0.0	672.4
10/23/2018 17:00	3.5	197.2	2.6	93.1	1.0	0.0	673.0
10/23/2018 18:00	3.8	177.5	2.5	93.9	0.0	0.0	673.3
10/23/2018 19:00	2.5	105.0	3.1	86.5	0.0	0.0	673.6
10/23/2018 20:00	3.3	119.7	3.2	86.1	0.0	0.0	673.6
10/23/2018 21:00	2.2	144.9	3.1	87.3	0.0	0.0	673.5
10/23/2018 22:00	1.9	187.3	3.1	87.9	0.0	0.0	673.5
10/23/2018 23:00	2.2	183.8	2.9	89.5	0.0	0.0	674.0
10/24/2018 0:00	2.8	198.1	2.2	96.7	0.0	0.0	675.1
10/24/2018 1:00	2.5	205.1	2.1	97.8	0.0	0.0	674.9
10/24/2018 2:00	3.0	185.6	2.2	97.9	0.0	0.0	675.1
10/24/2018 3:00	2.5	169.2	2.3	96.8	0.0	0.0	675.3
10/24/2018 4:00	2.8	171.0	2.5	92.2	0.0	0.0	675.3
10/24/2018 5:00	1.7	107.8	2.6	87.9	0.0	0.0	675.2
10/24/2018 6:00	1.8	145.2	2.8	80.9	0.0	0.0	675.2
10/24/2018 7:00	3.7	187.0	3.0	73.9	7.3	0.0	675.2
10/24/2018 8:00	4.2	155.6	2.9	73.2	36.0	0.0	675.1
10/24/2018 9:00	2.1	32.1	3.7	64.9	67.4	0.0	675.2
10/24/2018 10:00	1.9	315.9	3.7	69.2	116.6	0.0	675.2
10/24/2018 11:00	1.7	302.8	3.8	69.5	109.6	0.0	675.1
10/24/2018 12:00	2.0	312.3	3.8	71.5	114.4	0.0	675.4
10/24/2018 13:00	1.6	147.3	4.0	72.8	115.7	0.0	675.2
10/24/2018 14:00	1.5	220.4	4.3	71.0	88.0	0.0	675.0
10/24/2018 15:00	2.3	264.6	3.6	77.0	36.2	0.0	675.2
10/24/2018 16:00	1.6	156.0	3.3	79.8	7.3	0.0	675.2
10/24/2018 17:00	2.4	272.2	3.0	83.7	0.4	0.0	675.4



Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
10/24/2018 18:00	2.5	262.3	2.4	89.4	0.0	0.0	676.0
10/24/2018 19:00	1.6	243.1	2.7	86.7	0.0	0.0	676.7
10/24/2018 20:00	0.9	167.7	3.1	85.0	0.0	0.0	676.8
10/24/2018 21:00	1.1	72.8	3.6	82.9	0.0	0.0	676.8
10/24/2018 22:00	2.7	163.5	3.6	85.4	0.0	0.0	677.0
10/24/2018 23:00	1.5	99.3	3.5	86.6	0.0	0.0	677.1
10/25/2018 0:00	4.0	178.5	3.5	88.8	0.0	0.0	677.5
10/25/2018 1:00	5.4	165.3	3.0	92.6	0.0	0.0	678.1
10/25/2018 2:00	5.4	173.2	2.8	95.1	0.0	0.0	678.4
10/25/2018 3:00	3.3	183.7	2.5	96.4	0.0	0.0	680.5
10/25/2018 4:00	2.1	204.8	2.0	97.6	0.0	0.0	683.0
10/25/2018 5:00	3.1	167.3	1.9	97.7	0.0	0.0	683.9
10/25/2018 6:00	9.0	174.8	2.3	91.8	0.0	0.0	684.9
10/25/2018 7:00	7.2	180.2	2.0	91.2	1.4	0.0	686.2
10/25/2018 8:00	4.6	189.9	2.1	90.6	51.8	0.0	685.8
10/25/2018 9:00	8.2	191.9	1.2	97.1	23.5	0.0	687.2
10/25/2018 10:00	6.4	195.6	0.9	97.9	46.6	0.0	688.0
10/25/2018 11:00	6.6	221.3	0.7	98.1	49.9	0.0	688.7
10/25/2018 12:00	7.8	230.9	0.1	98.2	38.4	0.0	688.4
10/25/2018 13:00	6.4	212.9	-0.2	98.3	66.3	0.0	689.6
10/25/2018 14:00	5.5	204.2	0.0	98.2	70.7	0.0	690.0
10/25/2018 15:00	5.6	193.9	0.1	98.2	43.7	0.0	690.4
10/25/2018 16:00	5.4	189.2	0.0	98.3	14.6	0.0	690.4
10/25/2018 17:00	3.7	159.9	-0.2	98.4	0.5	0.0	690.6
10/25/2018 18:00	1.2	122.7	0.0	98.4	0.0	0.0	690.6
10/25/2018 19:00	2.0	176.2	0.0	98.4	0.0	0.0	690.9
10/25/2018 20:00	1.7	148.8	0.0	98.4	0.0	0.0	691.0
10/25/2018 21:00	3.2	134.3	0.1	98.4	0.0	0.0	691.2
10/25/2018 22:00	1.9	133.1	0.2	98.4	0.0	0.0	691.2
10/25/2018 23:00	1.7	55.9	0.4	96.9	0.0	0.0	691.2
10/26/2018 0:00	1.2	46.3	0.8	91.3	0.0	0.0	691.2
10/26/2018 1:00	2.3	45.9	1.2	80.6	0.0	0.0	691.2
10/26/2018 2:00	3.6	44.6	1.0	76.8	0.0	0.0	691.1
10/26/2018 3:00	4.8	39.2	0.9	73.9	0.0	0.0	691.1
10/26/2018 4:00	8.6	32.1	1.0	71.9	0.0	0.0	690.6
10/26/2018 5:00	7.1	88.6	1.9	62.1	0.0	0.0	691.6
10/26/2018 6:00	9.1	110.9	2.1	59.7	0.0	0.0	692.3
10/26/2018 7:00	9.4	66.1	1.5	66.9	0.8	0.0	691.5
10/26/2018 8:00	11.5	61.4	1.6	64.8	10.2	0.0	691.8
10/26/2018 9:00	9.1	55.9	0.8	72.7	32.1	0.0	691.6
10/26/2018 10:00	7.9	46.6	-0.3	89.1	59.7	0.0	691.6
10/26/2018 11:00	5.9	28.3	-0.7	96.9	117.0	0.0	692.0
10/26/2018 12:00	2.0	32.5	-0.5	97.0	96.1	0.0	692.5
10/26/2018 13:00	1.0	206.5	-0.7	97.1	68.1	0.0	693.6
10/26/2018 14:00	4.1	211.8	-1.0	97.4	52.1	0.0	694.8
10/26/2018 15:00	4.0	217.3	-1.3	97.7	41.1	0.0	695.8
10/26/2018 16:00	4.5	217.6	-1.1	97.7	31.9	0.0	696.2
10/26/2018 17:00	4.1	213.4	-1.1	97.9	1.2	1.4	697.5
10/26/2018 18:00	4.5	212.6	-1.2	97.9	0.0	2.4	698.6
10/26/2018 19:00	4.2	210.9	-1.3	97.9	0.0	3.1	699.3
10/26/2018 20:00	3.8	208.0	-1.0	97.8	0.0	2.7	699.3
10/26/2018 21:00	4.5	209.4	-1.0	97.9	0.0	3.0	699.2
10/26/2018 22:00	3.9	208.4	-0.9	97.9	0.0	1.9	699.6
10/26/2018 23:00	3.7	206.7	-0.8	98.0	0.0	-	699.6

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
10/27/2018 0:00	3.2	207.0	-0.6	98.0	0.0	-	699.9
10/27/2018 1:00	3.8	221.5	-0.5	98.1	0.0	0.4	699.9
10/27/2018 2:00	3.7	201.1	-0.5	98.1	0.0	1.3	699.9
10/27/2018 3:00	3.0	205.4	-0.7	98.2	0.0	0.5	699.9
10/27/2018 4:00	3.6	192.4	-0.8	98.2	0.0	0.2	699.7
10/27/2018 5:00	3.8	201.6	-0.7	98.2	0.0	0.4	699.9
10/27/2018 6:00	2.0	182.2	-0.8	98.2	0.0	0.8	699.9
10/27/2018 7:00	0.5	152.9	-0.9	98.1	2.2	-	699.9
10/27/2018 8:00	2.8	119.6	-0.6	96.9	45.1	3.5	699.9
10/27/2018 9:00	1.5	45.9	-0.4	93.7	102.3	-	699.9
10/27/2018 10:00	1.7	96.0	0.0	89.1	152.2	3.3	699.9
10/27/2018 11:00	1.7	84.8	1.0	80.8	233.8	2.4	700.4
10/27/2018 12:00	1.6	50.4	1.4	74.8	248.1	-	700.4
10/27/2018 13:00	3.4	31.0	1.6	73.3	272.7	-	700.5
10/27/2018 14:00	3.4	34.6	1.5	74.1	239.1	0.6	700.5
10/27/2018 15:00	8.4	60.3	1.4	65.2	169.5	-	700.3
10/27/2018 16:00	9.5	61.4	1.4	58.2	53.9	0.8	700.5
10/27/2018 17:00	13.7	52.7	0.6	65.7	1.8	0.2	699.8
10/27/2018 18:00	13.4	67.7	0.9	60.7	0.0	0.0	700.1
10/27/2018 19:00	10.5	77.5	1.2	55.5	0.0	-	699.3
10/27/2018 20:00	13.3	89.1	1.3	53.3	0.0	-	700.4
10/27/2018 21:00	11.1	98.0	1.6	48.7	0.0	-	700.5
10/27/2018 22:00	13.7	109.5	1.7	46.3	0.0	-	701.0
10/27/2018 23:00	19.0	76.7	1.2	48.4	0.0	-	698.7
10/28/2018 0:00	15.6	52.4	0.9	50.2	0.0	-	698.7
10/28/2018 1:00	16.0	69.5	1.5	50.9	0.0	-	697.4
10/28/2018 2:00	16.2	98.9	2.0	60.9	0.0	0.8	698.5
10/28/2018 3:00	9.9	112.7	2.7	56.8	0.0	-	699.4
10/28/2018 4:00	2.2	261.8	1.8	62.9	0.0	-	699.3
10/28/2018 5:00	1.5	277.2	1.3	68.1	0.0	-	699.4
10/28/2018 6:00	1.2	222.0	0.7	74.9	0.0	-	699.4
10/28/2018 7:00	3.0	33.5	0.5	75.9	1.2	-	699.4
10/28/2018 8:00	4.9	54.6	0.4	73.5	15.1	-	699.5
10/28/2018 9:00	6.7	43.9	0.1	78.3	103.3	-	699.5
10/28/2018 10:00	5.6	40.1	0.3	79.0	242.6	-	699.8
10/28/2018 11:00	3.0	69.6	0.9	78.4	301.5	0.5	700.3
10/28/2018 12:00	1.1	63.1	1.5	78.3	359.7	-	699.6
10/28/2018 13:00	1.1	97.9	1.2	79.6	177.6	0.6	699.4
10/28/2018 14:00	2.1	71.9	0.4	90.2	93.2	-	699.5
10/28/2018 15:00	2.9	36.4	0.2	88.3	56.2	-	699.7
10/28/2018 16:00	2.1	38.6	-0.1	91.9	19.9	-	700.0
10/28/2018 17:00	2.3	25.5	-0.5	96.9	0.6	-	700.4
10/28/2018 18:00	2.4	28.0	-0.4	97.6	0.0	-	700.7
10/28/2018 19:00	2.4	36.2	-0.3	97.2	0.0	-	700.7
10/28/2018 20:00	2.8	41.0	-0.2	94.1	0.0	-	700.8
10/28/2018 21:00	2.2	42.9	0.1	92.3	0.0	-	700.9
10/28/2018 22:00	3.6	33.8	0.0	92.5	0.0	-	700.9
10/28/2018 23:00	3.8	34.1	0.3	89.1	0.0	-	700.9
10/29/2018 0:00	2.9	33.2	0.2	92.4	0.0	-	700.9
10/29/2018 1:00	2.7	21.0	-0.3	97.2	0.0	-	701.3
10/29/2018 2:00	0.7	126.6	-0.1	97.7	0.0	-	702.2
10/29/2018 3:00	2.4	163.5	-0.4	97.9	0.0	-	703.3
10/29/2018 4:00	1.8	174.9	-0.3	98.0	0.0	-	704.2
10/29/2018 5:00	1.3	151.5	-0.3	98.1	0.0	-	704.3

Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
10/29/2018 6:00	0.9	25.8	0.0	98.0	0.0	-	704.3
10/29/2018 7:00	1.3	341.1	0.0	97.8	0.1	-	705.2
10/29/2018 8:00	0.7	30.4	-0.2	97.9	8.0	-	705.7
10/29/2018 9:00	2.0	8.9	0.2	97.6	17.6	0.7	706.0
10/29/2018 10:00	2.4	39.9	0.2	97.6	13.1	-	706.3
10/29/2018 11:00	2.6	29.6	0.2	97.7	10.3	-	706.6
10/29/2018 12:00	1.8	26.7	0.4	97.3	23.6	-	713.4
10/29/2018 13:00	1.5	10.0	0.4	96.9	41.7	-	715.0
10/29/2018 14:00	0.2	201.2	0.6	96.6	43.2	8.6	717.1
10/29/2018 15:00	1.3	63.5	0.1	97.4	15.6	9.3	718.0
10/29/2018 16:00	3.0	160.2	0.0	97.9	5.3	2.1	718.3
10/29/2018 17:00	4.4	190.7	-0.1	98.1	0.4	-	718.2
10/29/2018 18:00	5.7	194.5	-0.1	98.3	0.0	3.8	718.5
10/29/2018 19:00	4.8	211.9	-0.1	98.4	0.0	3.2	718.3
10/29/2018 20:00	5.5	216.8	0.0	98.4	0.0	10.4	718.7
10/29/2018 21:00	5.2	212.8	0.0	98.4	0.0	6.4	719.1
10/29/2018 22:00	4.4	209.2	-0.2	98.5	0.0	6.7	719.8
10/29/2018 23:00	5.5	213.5	0.0	98.5	0.0	4.8	719.6
10/30/2018 0:00	6.4	207.5	0.0	98.5	0.0	12.0	721.8
10/30/2018 1:00	5.3	216.3	0.4	98.5	0.0	10.6	721.7
10/30/2018 2:00	5.7	202.8	0.7	98.6	0.0	4.7	722.5
10/30/2018 3:00	5.4	205.5	0.6	98.5	0.0	1.6	722.6
10/30/2018 4:00	6.3	205.9	0.6	98.6	0.0	8.0	722.7
10/30/2018 5:00	6.0	220.3	0.4	98.6	0.0	-	723.1
10/30/2018 6:00	7.8	230.4	0.1	98.6	0.0	-	723.1
10/30/2018 7:00	5.1	226.4	-0.1	98.7	1.0	-	723.2
10/30/2018 8:00	5.0	216.3	-0.2	98.7	15.4	5.9	723.1
10/30/2018 9:00	4.8	210.7	-0.2	98.7	49.0	7.7	723.3
10/30/2018 10:00	5.3	212.7	-0.1	98.6	64.5	7.7	723.4
10/30/2018 11:00	6.3	220.5	0.0	98.5	71.0	3.5	723.1
10/30/2018 12:00	5.5	223.3	0.0	98.4	81.4	8.0	723.4
10/30/2018 13:00	5.2	224.2	0.1	98.4	77.0	7.8	723.6
10/30/2018 14:00	5.2	212.9	0.1	98.4	80.0	8.8	723.7
10/30/2018 15:00	4.4	216.5	0.2	98.5	44.9	7.0	723.5
10/30/2018 16:00	3.8	223.2	0.2	98.6	10.4	4.3	723.7
10/30/2018 17:00	3.2	214.9	0.1	98.7	0.6	7.5	723.9
10/30/2018 18:00	3.2	209.5	0.1	98.7	0.0	8.0	724.0
10/30/2018 19:00	3.3	207.8	0.0	98.8	0.0	-	724.2
10/30/2018 20:00	2.5	176.8	-0.1	98.8	0.0	1.4	724.5
10/30/2018 21:00	2.2	185.9	-0.1	98.8	0.0	0.1	724.7
10/30/2018 22:00	3.1	187.7	-0.2	98.8	0.0	1.5	724.8
10/30/2018 23:00	3.6	205.5	-0.3	98.9	0.0	-	724.8
10/31/2018 0:00	4.0	205.8	-0.3	98.9	0.0	-	725.0
10/31/2018 1:00	4.0	214.8	-0.4	98.9	0.0	-	725.2
10/31/2018 2:00	4.1	215.1	-0.4	98.9	0.0	-	725.2
10/31/2018 3:00	4.1	219.2	-0.5	98.9	0.0	3.9	725.8
10/31/2018 4:00	3.3	226.9	-0.7	99.0	0.0	2.7	726.0
10/31/2018 5:00	2.7	217.8	-0.8	99.0	0.0	1.2	726.1
10/31/2018 6:00	2.6	209.3	-1.5	99.1	0.0	-	726.1
10/31/2018 7:00	2.6	207.1	-1.8	99.1	1.3	-	725.6
10/31/2018 8:00	2.4	214.4	-2.1	98.9	12.3	-	726.0
10/31/2018 9:00	1.2	206.8	-2.2	98.1	39.6	-	726.1
10/31/2018 10:00	1.3	190.2	-1.1	96.6	244.8	5.5	727.2
10/31/2018 11:00	1.1	198.4	-0.1	96.5	393.3	4.4	727.3

**Appendix C3: Johnny Mountain November 2017 - October 2018 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
10/31/2018 12:00	0.9	211.2	0.0	96.5	332.8	7.0	726.9
10/31/2018 13:00	0.1	119.3	-2.3	97.0	74.6	6.6	726.3
10/31/2018 14:00	0.4	67.6	-2.4	94.8	80.1	7.8	726.4
10/31/2018 15:00	1.3	60.6	-2.6	91.5	104.1	9.5	726.2
10/31/2018 16:00	2.0	88.1	-2.9	91.8	24.8	6.8	726.1
10/31/2018 17:00	2.0	168.6	-2.6	92.0	0.6	6.9	726.1
10/31/2018 18:00	0.8	249.6	-2.6	91.4	0.0	7.2	726.1
10/31/2018 19:00	0.9	66.2	-2.5	89.0	0.0	6.5	726.1
10/31/2018 20:00	0.9	345.1	-2.2	82.7	0.0	6.2	726.1
10/31/2018 21:00	1.8	46.5	-2.2	78.1	0.0	6.2	726.1
10/31/2018 22:00	2.3	47.9	-2.3	76.9	0.0	8.1	726.1
10/31/2018 23:00	3.8	46.0	-2.4	76.6	0.0	6.2	726.1
11/1/2018 0:00	4.7	33.8	-2.4	76.4	0.0	7.4	726.0

**Notes:**

*dash (-) = Missing or erroneous data that were removed*

<sup>1</sup> *Accumulated precipitation includes instrumental error*

Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
11/1/2018 0:00	4.7	33.8	-2.4	76.4	0.0	7.4	726.0
11/1/2018 1:00	5.6	35.1	-2.6	75.7	0.0	7.6	726.0
11/1/2018 2:00	3.2	62.3	-2.6	75.5	0.0	7.3	726.1
11/1/2018 3:00	5.6	43.7	-2.5	72.5	0.0	7.4	726.1
11/1/2018 4:00	4.2	40.8	-2.7	78.1	0.0	-	726.2
11/1/2018 5:00	1.8	220.8	-3.7	96.3	0.0	2.6	727.2
11/1/2018 6:00	4.6	37.5	-3.7	96.6	0.0	8.7	727.1
11/1/2018 7:00	6.2	42.6	-3.7	96.7	0.2	8.8	727.2
11/1/2018 8:00	5.9	45.1	-3.6	96.7	9.7	7.4	727.8
11/1/2018 9:00	6.4	36.5	-3.4	96.6	38.8	7.5	727.8
11/1/2018 10:00	6.7	38.0	-3.2	95.5	71.0	8.3	728.0
11/1/2018 11:00	6.0	41.0	-2.9	95.5	103.5	5.2	728.3
11/1/2018 12:00	6.6	36.3	-2.7	94.2	107.8	7.0	728.4
11/1/2018 13:00	6.3	34.5	-2.8	95.9	76.1	6.8	728.8
11/1/2018 14:00	6.0	37.9	-2.7	96.3	66.2	4.2	728.9
11/1/2018 15:00	4.2	37.0	-2.5	97.0	43.7	10.3	729.2
11/1/2018 16:00	3.2	42.2	-2.4	97.4	16.4	10.7	729.2
11/1/2018 17:00	4.6	45.0	-2.4	97.6	0.5	10.5	729.5
11/1/2018 18:00	4.4	30.4	-2.1	97.7	0.0	9.9	729.8
11/1/2018 19:00	3.9	29.1	-2.1	97.8	0.0	10.2	730.1
11/1/2018 20:00	3.4	39.5	-1.6	97.8	0.0	8.6	730.7
11/1/2018 21:00	3.3	37.4	-1.3	97.9	0.0	9.4	730.8
11/1/2018 22:00	2.7	31.4	-0.9	98.0	0.0	9.5	731.2
11/1/2018 23:00	2.8	24.6	-0.9	98.2	0.0	9.7	731.8
11/2/2018 0:00	3.0	35.3	-1.1	98.3	0.0	-	733.1
11/2/2018 1:00	3.2	27.3	-1.0	98.3	0.0	5.7	733.7
11/2/2018 2:00	3.4	31.8	-1.2	98.3	0.0	9.8	734.4
11/2/2018 3:00	2.4	37.5	-1.4	98.2	0.0	8.1	735.4
11/2/2018 4:00	3.9	35.2	-1.5	98.1	0.0	9.0	736.2
11/2/2018 5:00	4.1	32.3	-1.6	98.0	0.0	8.9	736.4
11/2/2018 6:00	4.4	31.2	-1.9	97.9	0.0	-	737.1
11/2/2018 7:00	1.8	359.3	-2.4	97.6	0.6	13.7	738.1
11/2/2018 8:00	1.1	336.6	-2.7	97.2	14.8	12.1	738.9
11/2/2018 9:00	1.1	1.1	-2.6	96.8	68.4	13.2	740.1
11/2/2018 10:00	1.1	291.6	-2.9	96.5	84.4	15.0	740.9
11/2/2018 11:00	1.2	324.9	-2.9	96.3	67.4	15.0	742.0
11/2/2018 12:00	1.1	312.9	-2.7	96.1	88.9	-	742.7
11/2/2018 13:00	-	-	-2.9	96.0	52.2	17.1	743.5
11/2/2018 14:00	-	-	-2.5	96.5	40.6	18.3	743.6
11/2/2018 15:00	-	-	-2.8	96.6	23.9	21.5	743.6
11/2/2018 16:00	-	-	-3.1	96.8	5.9	21.6	743.7
11/2/2018 17:00	-	-	-3.6	96.7	0.1	17.4	743.9
11/2/2018 18:00	-	-	-3.5	96.8	0.0	17.8	744.3
11/2/2018 19:00	-	-	-3.5	96.7	0.0	20.4	744.8
11/2/2018 20:00	-	-	-3.6	96.6	0.0	-	745.4
11/2/2018 21:00	-	-	-2.9	97.0	0.0	16.0	745.8
11/2/2018 22:00	-	-	-2.2	97.4	0.0	-	746.3
11/2/2018 23:00	-	-	-2.3	97.4	0.0	16.5	746.7
11/3/2018 0:00	-	-	-1.6	97.7	0.0	18.4	747.2
11/3/2018 1:00	-	-	-1.2	97.9	0.0	18.0	747.9
11/3/2018 2:00	-	-	-1.0	98.0	0.0	22.2	749.7
11/3/2018 3:00	-	-	-1.2	98.1	0.0	22.8	751.1
11/3/2018 4:00	-	-	-1.1	98.1	0.0	23.6	751.8
11/3/2018 5:00	-	-	-1.4	98.1	0.0	21.9	752.1
11/3/2018 6:00	-	-	-0.7	98.1	0.0	26.2	752.5

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
11/3/2018 7:00	-	-	-0.2	98.2	0.0	25.9	752.4
11/3/2018 8:00	2.9	197.5	0.2	98.4	3.3	26.7	752.9
11/3/2018 9:00	4.5	202.4	0.7	98.5	18.1	25.9	755.0
11/3/2018 10:00	4.7	196.8	1.1	98.5	64.9	24.6	757.8
11/3/2018 11:00	3.9	209.4	1.4	98.4	84.8	25.1	757.9
11/3/2018 12:00	4.2	194.3	1.6	97.9	100.9	23.6	758.8
11/3/2018 13:00	1.9	203.1	1.6	96.4	93.9	22.9	759.1
11/3/2018 14:00	1.1	81.7	1.0	96.5	42.3	23.2	760.1
11/3/2018 15:00	0.7	163.3	0.3	97.5	26.1	20.8	761.3
11/3/2018 16:00	1.0	335.3	0.0	98.1	6.3	18.0	761.9
11/3/2018 17:00	-	-	0.0	98.3	0.1	17.9	762.5
11/3/2018 18:00	-	-	-0.2	98.4	0.0	21.2	762.7
11/3/2018 19:00	-	-	-1.2	98.7	0.0	17.6	762.7
11/3/2018 20:00	-	-	-1.2	98.8	0.0	20.2	762.7
11/3/2018 21:00	-	-	-1.3	98.8	0.0	20.7	762.7
11/3/2018 22:00	-	-	-1.3	98.8	0.0	20.6	762.8
11/3/2018 23:00	-	-	-1.4	98.7	0.0	20.0	762.8
11/4/2018 0:00	-	-	-1.1	98.6	0.0	17.9	762.8
11/4/2018 1:00	-	-	-0.9	98.5	0.0	19.0	763.3
11/4/2018 2:00	-	-	-0.8	98.6	0.0	20.6	763.3
11/4/2018 3:00	-	-	-0.5	98.5	0.0	20.5	763.3
11/4/2018 4:00	-	-	-0.2	98.5	0.0	20.6	763.4
11/4/2018 5:00	-	-	-0.5	98.7	0.0	20.3	763.5
11/4/2018 6:00	-	-	-0.7	98.7	0.0	16.8	763.9
11/4/2018 7:00	-	-	-0.7	98.7	0.3	21.5	764.0
11/4/2018 8:00	-	-	-0.7	98.7	12.1	20.8	764.1
11/4/2018 9:00	-	-	-0.6	98.5	30.4	19.9	764.4
11/4/2018 10:00	-	-	-0.7	98.4	41.8	18.6	765.1
11/4/2018 11:00	-	-	-0.3	98.2	50.8	20.7	765.3
11/4/2018 12:00	-	-	-0.4	98.1	70.7	17.5	765.7
11/4/2018 13:00	-	-	-1.0	98.1	73.2	19.5	765.7
11/4/2018 14:00	-	-	-1.3	98.1	34.4	-	765.7
11/4/2018 15:00	-	-	-1.4	98.1	23.8	19.2	765.9
11/4/2018 16:00	-	-	-1.4	98.1	9.4	22.2	766.2
11/4/2018 17:00	-	-	-	-	-	-	-
11/4/2018 18:00	-	-	-	-	-	-	-
11/4/2018 19:00	-	-	-	-	-	-	-
11/4/2018 20:00	-	-	-	-	-	-	-
11/4/2018 21:00	-	-	-	-	-	-	-
11/4/2018 22:00	-	-	-	-	-	-	-
11/4/2018 23:00	-	-	-	-	-	-	-
11/5/2018 0:00	-	-	-	-	-	-	-
11/5/2018 1:00	-	-	-	-	-	-	-
11/5/2018 2:00	-	-	-	-	-	-	-
11/5/2018 3:00	-	-	-	-	-	-	-
11/5/2018 4:00	-	-	-	-	-	-	-
11/5/2018 5:00	-	-	-	-	-	-	-
11/5/2018 6:00	-	-	-	-	-	-	-
11/5/2018 7:00	-	-	-	-	-	-	-
11/5/2018 8:00	-	-	-	-	-	-	-
11/5/2018 9:00	-	-	-	-	-	-	-
11/5/2018 10:00	-	-	-	-	-	-	-
11/5/2018 11:00	-	-	-	-	-	-	-
11/5/2018 12:00	-	-	-	-	-	-	-
11/5/2018 13:00	-	-	-	-	-	-	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
11/5/2018 14:00	-	-	-	-	-	-	-
11/5/2018 15:00	-	-	-	-	-	-	-
11/5/2018 16:00	-	-	-	-	-	-	-
11/5/2018 17:00	-	-	-	-	-	-	-
11/5/2018 18:00	-	-	-	-	-	-	-
11/5/2018 19:00	-	-	-	-	-	-	-
11/5/2018 20:00	-	-	-	-	-	-	-
11/5/2018 21:00	-	-	-	-	-	-	-
11/5/2018 22:00	-	-	-	-	-	-	-
11/5/2018 23:00	-	-	-	-	-	-	-
11/6/2018 0:00	-	-	-	-	-	-	-
11/6/2018 1:00	-	-	-	-	-	-	-
11/6/2018 2:00	-	-	-	-	-	-	-
11/6/2018 3:00	-	-	-	-	-	-	-
11/6/2018 4:00	-	-	-	-	-	-	-
11/6/2018 5:00	-	-	-	-	-	-	-
11/6/2018 6:00	-	-	-	-	-	-	-
11/6/2018 7:00	-	-	-	-	-	-	-
11/6/2018 8:00	-	-	-	-	-	-	-
11/6/2018 9:00	-	-	-	-	-	-	-
11/6/2018 10:00	-	-	-	-	-	-	-
11/6/2018 11:00	-	-	-	-	-	-	-
11/6/2018 12:00	-	-	-	-	-	-	-
11/6/2018 13:00	-	-	-	-	-	-	-
11/6/2018 14:00	-	-	-	-	-	-	-
11/6/2018 15:00	-	-	-	-	-	-	-
11/6/2018 16:00	-	-	-	-	-	-	-
11/6/2018 17:00	-	-	-	-	-	-	-
11/6/2018 18:00	-	-	-	-	-	-	-
11/6/2018 19:00	-	-	-	-	-	-	-
11/6/2018 20:00	-	-	-	-	-	-	-
11/6/2018 21:00	-	-	-	-	-	-	-
11/6/2018 22:00	-	-	-	-	-	-	-
11/6/2018 23:00	-	-	-	-	-	-	-
11/7/2018 0:00	-	-	-	-	-	-	-
11/7/2018 1:00	-	-	-	-	-	-	-
11/7/2018 2:00	-	-	-	-	-	-	-
11/7/2018 3:00	-	-	-	-	-	-	-
11/7/2018 4:00	-	-	-	-	-	-	-
11/7/2018 5:00	-	-	-	-	-	-	-
11/7/2018 6:00	-	-	-	-	-	-	-
11/7/2018 7:00	-	-	-	-	-	-	-
11/7/2018 8:00	-	-	-	-	-	-	-
11/7/2018 9:00	-	-	-	-	-	-	-
11/7/2018 10:00	-	-	-	-	-	-	-
11/7/2018 11:00	-	-	-	-	-	-	-
11/7/2018 12:00	-	-	-	-	-	-	-
11/7/2018 13:00	-	-	-	-	-	-	-
11/7/2018 14:00	-	-	-	-	-	-	-
11/7/2018 15:00	-	-	-	-	-	-	-
11/7/2018 16:00	-	-	-	-	-	-	-
11/7/2018 17:00	-	-	-	-	-	-	-
11/7/2018 18:00	-	-	-	-	-	-	-
11/7/2018 19:00	-	-	-	-	-	-	-
11/7/2018 20:00	-	-	-	-	-	-	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
11/7/2018 21:00	-	-	-	-	-	-	-
11/7/2018 22:00	-	-	-	-	-	-	-
11/7/2018 23:00	-	-	-	-	-	-	-
11/8/2018 0:00	-	-	-	-	-	-	-
11/8/2018 1:00	-	-	-	-	-	-	-
11/8/2018 2:00	-	-	-	-	-	-	-
11/8/2018 3:00	-	-	-	-	-	-	-
11/8/2018 4:00	-	-	-	-	-	-	-
11/8/2018 5:00	-	-	-	-	-	-	-
11/8/2018 6:00	-	-	-	-	-	-	-
11/8/2018 7:00	-	-	-	-	-	-	-
11/8/2018 8:00	-	-	-	-	-	-	-
11/8/2018 9:00	-	-	-	-	-	-	-
11/8/2018 10:00	-	-	-	-	-	-	-
11/8/2018 11:00	-	-	-	-	-	-	-
11/8/2018 12:00	-	-	-	-	-	-	-
11/8/2018 13:00	-	-	-	-	-	-	-
11/8/2018 14:00	-	-	-	-	-	-	-
11/8/2018 15:00	-	-	-	-	-	-	-
11/8/2018 16:00	-	-	-	-	-	-	-
11/8/2018 17:00	-	-	-	-	-	-	-
11/8/2018 18:00	-	-	-	-	-	-	-
11/8/2018 19:00	-	-	-	-	-	-	-
11/8/2018 20:00	-	-	-	-	-	-	-
11/8/2018 21:00	-	-	-	-	-	-	-
11/8/2018 22:00	-	-	-	-	-	-	-
11/8/2018 23:00	-	-	-	-	-	-	-
11/9/2018 0:00	-	-	-	-	-	-	-
11/9/2018 1:00	-	-	-	-	-	-	-
11/9/2018 2:00	-	-	-	-	-	-	-
11/9/2018 3:00	-	-	-	-	-	-	-
11/9/2018 4:00	-	-	-	-	-	-	-
11/9/2018 5:00	-	-	-	-	-	-	-
11/9/2018 6:00	-	-	-	-	-	-	-
11/9/2018 7:00	-	-	-	-	-	-	-
11/9/2018 8:00	-	-	-	-	-	-	-
11/9/2018 9:00	-	-	-	-	-	-	-
11/9/2018 10:00	-	-	-	-	-	-	-
11/9/2018 11:00	-	-	-	-	-	-	-
11/9/2018 12:00	-	-	-	-	-	-	-
11/9/2018 13:00	-	-	-	-	-	-	-
11/9/2018 14:00	-	-	-	-	-	-	-
11/9/2018 15:00	-	-	-	-	-	-	-
11/9/2018 16:00	-	-	-	-	-	-	-
11/9/2018 17:00	-	-	-	-	-	-	-
11/9/2018 18:00	-	-	-	-	-	-	-
11/9/2018 19:00	-	-	-	-	-	-	-
11/9/2018 20:00	-	-	-	-	-	-	-
11/9/2018 21:00	-	-	-	-	-	-	-
11/9/2018 22:00	-	-	-	-	-	-	-
11/9/2018 23:00	-	-	-	-	-	-	-
11/10/2018 0:00	-	-	-	-	-	-	-
11/10/2018 1:00	-	-	-	-	-	-	-
11/10/2018 2:00	-	-	-	-	-	-	-
11/10/2018 3:00	-	-	-	-	-	-	-



**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
11/10/2018 4:00	-	-	-	-	-	-	-
11/10/2018 5:00	-	-	-	-	-	-	-
11/10/2018 6:00	-	-	-	-	-	-	-
11/10/2018 7:00	-	-	-	-	-	-	-
11/10/2018 8:00	-	-	-	-	-	-	-
11/10/2018 9:00	-	-	-	-	-	-	-
11/10/2018 10:00	-	-	-	-	-	-	-
11/10/2018 11:00	-	-	-	-	-	-	-
11/10/2018 12:00	-	-	-	-	-	-	-
11/10/2018 13:00	-	-	-	-	-	-	-
11/10/2018 14:00	-	-	-	-	-	-	-
11/10/2018 15:00	-	-	-	-	-	-	-
11/10/2018 16:00	-	-	-	-	-	-	-
11/10/2018 17:00	-	-	-	-	-	-	-
11/10/2018 18:00	-	-	-	-	-	-	-
11/10/2018 19:00	-	-	-	-	-	-	-
11/10/2018 20:00	-	-	-	-	-	-	-
11/10/2018 21:00	-	-	-	-	-	-	-
11/10/2018 22:00	-	-	-	-	-	-	-
11/10/2018 23:00	-	-	-	-	-	-	-
11/11/2018 0:00	-	-	-	-	-	-	-
11/11/2018 1:00	-	-	-	-	-	-	-
11/11/2018 2:00	-	-	-	-	-	-	-
11/11/2018 3:00	-	-	-	-	-	-	-
11/11/2018 4:00	-	-	-	-	-	-	-
11/11/2018 5:00	-	-	-	-	-	-	-
11/11/2018 6:00	-	-	-	-	-	-	-
11/11/2018 7:00	-	-	-	-	-	-	-
11/11/2018 8:00	-	-	-	-	-	-	-
11/11/2018 9:00	-	-	-	-	-	-	-
11/11/2018 10:00	-	-	-	-	-	-	-
11/11/2018 11:00	-	-	-	-	-	-	-
11/11/2018 12:00	-	-	-	-	-	-	-
11/11/2018 13:00	-	-	-	-	-	-	-
11/11/2018 14:00	-	-	-	-	-	-	-
11/11/2018 15:00	-	-	-	-	-	-	-
11/11/2018 16:00	-	-	-	-	-	-	-
11/11/2018 17:00	-	-	-	-	-	-	-
11/11/2018 18:00	-	-	-	-	-	-	-
11/11/2018 19:00	-	-	-	-	-	-	-
11/11/2018 20:00	-	-	-	-	-	-	-
11/11/2018 21:00	-	-	-	-	-	-	-
11/11/2018 22:00	-	-	-	-	-	-	-
11/11/2018 23:00	-	-	-	-	-	-	-
11/12/2018 0:00	-	-	-	-	-	-	-
11/12/2018 1:00	-	-	-	-	-	-	-
11/12/2018 2:00	-	-	-	-	-	-	-
11/12/2018 3:00	-	-	-	-	-	-	-
11/12/2018 4:00	-	-	-	-	-	-	-
11/12/2018 5:00	-	-	-	-	-	-	-
11/12/2018 6:00	-	-	-	-	-	-	-
11/12/2018 7:00	-	-	-	-	-	-	-
11/12/2018 8:00	-	-	-	-	-	-	-
11/12/2018 9:00	-	-	-	-	-	-	-
11/12/2018 10:00	-	-	-	-	-	-	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
11/12/2018 11:00	-	-	-	-	-	-	-
11/12/2018 12:00	-	-	-	-	-	-	-
11/12/2018 13:00	-	-	-	-	-	-	-
11/12/2018 14:00	-	-	-	-	-	-	-
11/12/2018 15:00	-	-	-	-	-	-	-
11/12/2018 16:00	-	-	-	-	-	-	-
11/12/2018 17:00	-	-	-	-	-	-	-
11/12/2018 18:00	-	-	-	-	-	-	-
11/12/2018 19:00	-	-	-	-	-	-	-
11/12/2018 20:00	-	-	-	-	-	-	-
11/12/2018 21:00	-	-	-	-	-	-	-
11/12/2018 22:00	-	-	-	-	-	-	-
11/12/2018 23:00	-	-	-	-	-	-	-
11/13/2018 0:00	-	-	-	-	-	-	-
11/13/2018 1:00	-	-	-	-	-	-	-
11/13/2018 2:00	-	-	-	-	-	-	-
11/13/2018 3:00	-	-	-	-	-	-	-
11/13/2018 4:00	-	-	-	-	-	-	-
11/13/2018 5:00	-	-	-	-	-	-	-
11/13/2018 6:00	-	-	-	-	-	-	-
11/13/2018 7:00	-	-	-	-	-	-	-
11/13/2018 8:00	-	-	-	-	-	-	-
11/13/2018 9:00	-	-	-	-	-	-	-
11/13/2018 10:00	-	-	-	-	-	-	-
11/13/2018 11:00	-	-	-	-	-	-	-
11/13/2018 12:00	-	-	-	-	-	-	-
11/13/2018 13:00	-	-	-	-	-	-	-
11/13/2018 14:00	-	-	-	-	-	-	-
11/13/2018 15:00	-	-	-	-	-	-	-
11/13/2018 16:00	-	-	-	-	-	-	-
11/13/2018 17:00	-	-	-	-	-	-	-
11/13/2018 18:00	-	-	-	-	-	-	-
11/13/2018 19:00	-	-	-	-	-	-	-
11/13/2018 20:00	-	-	-	-	-	-	-
11/13/2018 21:00	-	-	-	-	-	-	-
11/13/2018 22:00	-	-	-	-	-	-	-
11/13/2018 23:00	-	-	-	-	-	-	-
11/14/2018 0:00	-	-	-	-	-	-	-
11/14/2018 1:00	-	-	-	-	-	-	-
11/14/2018 2:00	-	-	-	-	-	-	-
11/14/2018 3:00	-	-	-	-	-	-	-
11/14/2018 4:00	-	-	-	-	-	-	-
11/14/2018 5:00	-	-	-	-	-	-	-
11/14/2018 6:00	-	-	-	-	-	-	-
11/14/2018 7:00	-	-	-	-	-	-	-
11/14/2018 8:00	-	-	-	-	-	-	-
11/14/2018 9:00	-	-	-	-	-	-	-
11/14/2018 10:00	-	-	-	-	-	-	-
11/14/2018 11:00	-	-	-	-	-	-	-
11/14/2018 12:00	-	-	-	-	-	-	-
11/14/2018 13:00	-	-	-	-	-	-	-
11/14/2018 14:00	-	-	-	-	-	-	-
11/14/2018 15:00	-	-	-	-	-	-	-
11/14/2018 16:00	-	-	-	-	-	-	-
11/14/2018 17:00	-	-	-	-	-	-	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
11/14/2018 18:00	-	-	-	-	-	-	-
11/14/2018 19:00	-	-	-	-	-	-	-
11/14/2018 20:00	-	-	-	-	-	-	-
11/14/2018 21:00	-	-	-	-	-	-	-
11/14/2018 22:00	-	-	-	-	-	-	-
11/14/2018 23:00	-	-	-	-	-	-	-
11/15/2018 0:00	-	-	-	-	-	-	-
11/15/2018 1:00	-	-	-	-	-	-	-
11/15/2018 2:00	-	-	-	-	-	-	-
11/15/2018 3:00	-	-	-	-	-	-	-
11/15/2018 4:00	-	-	-	-	-	-	-
11/15/2018 5:00	-	-	-	-	-	-	-
11/15/2018 6:00	-	-	-	-	-	-	-
11/15/2018 7:00	-	-	-	-	-	-	-
11/15/2018 8:00	-	-	-	-	-	-	-
11/15/2018 9:00	-	-	-	-	-	-	-
11/15/2018 10:00	-	-	-	-	-	-	-
11/15/2018 11:00	-	-	-	-	-	-	-
11/15/2018 12:00	-	-	-	-	-	-	-
11/15/2018 13:00	-	-	-	-	-	-	-
11/15/2018 14:00	-	-	-	-	-	-	-
11/15/2018 15:00	-	-	-	-	-	-	-
11/15/2018 16:00	-	-	-	-	-	-	-
11/15/2018 17:00	-	-	-	-	-	-	-
11/15/2018 18:00	-	-	-	-	-	-	-
11/15/2018 19:00	-	-	-	-	-	-	-
11/15/2018 20:00	-	-	-	-	-	-	-
11/15/2018 21:00	-	-	-	-	-	-	-
11/15/2018 22:00	-	-	-	-	-	-	-
11/15/2018 23:00	-	-	-	-	-	-	-
11/16/2018 0:00	-	-	-	-	-	-	-
11/16/2018 1:00	-	-	-	-	-	-	-
11/16/2018 2:00	-	-	-	-	-	-	-
11/16/2018 3:00	-	-	-	-	-	-	-
11/16/2018 4:00	-	-	-	-	-	-	-
11/16/2018 5:00	-	-	-	-	-	-	-
11/16/2018 6:00	-	-	-	-	-	-	-
11/16/2018 7:00	-	-	-	-	-	-	-
11/16/2018 8:00	-	-	-	-	-	-	-
11/16/2018 9:00	-	-	-	-	-	-	-
11/16/2018 10:00	-	-	-	-	-	-	-
11/16/2018 11:00	0.6	188.7	-2.2	75.7	-	37.5	791.4
11/16/2018 12:00	0.5	132.6	-1.8	74.2	-	36.9	792.1
11/16/2018 13:00	1.1	138.3	-1.9	76.1	-	36.8	791.6
11/16/2018 14:00	0.5	217.8	-1.9	85.7	-	36.3	791.4
11/16/2018 15:00	0.7	104.7	-2.2	76.7	-	36.6	791.3
11/16/2018 16:00	0.5	173.6	-2.6	79.9	-	36.8	791.3
11/16/2018 17:00	0.8	236.8	-2.5	78.3	-	37.0	791.3
11/16/2018 18:00	0.9	114.6	-2.4	76.1	-	37.0	791.3
11/16/2018 19:00	0.7	151.2	-2.2	74.5	-	36.6	791.3
11/16/2018 20:00	0.5	183.8	-1.9	71.5	-	36.9	791.3
11/16/2018 21:00	0.7	23.9	-1.4	66.2	-	36.1	791.3
11/16/2018 22:00	0.6	8.3	-1.3	64.8	-	36.2	791.3
11/16/2018 23:00	1.1	229.3	-1.7	71.7	-	35.8	791.3
11/17/2018 0:00	1.0	69.9	-0.6	65.3	-	36.4	791.3

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
11/17/2018 1:00	1.6	15.3	0.2	58.9	-	36.6	791.3
11/17/2018 2:00	1.4	208.7	0.0	68.7	-	37.2	791.4
11/17/2018 3:00	2.4	185.6	-0.5	74.5	-	37.1	791.5
11/17/2018 4:00	4.5	187.0	-1.0	81.5	-	36.9	791.8
11/17/2018 5:00	5.5	210.1	-1.6	96.1	-	38.5	791.8
11/17/2018 6:00	5.7	205.6	-1.1	98.3	-	38.4	793.2
11/17/2018 7:00	5.5	213.2	-1.1	98.4	-	38.0	794.2
11/17/2018 8:00	6.2	210.9	-1.1	98.5	-	42.2	795.9
11/17/2018 9:00	6.0	211.2	-0.8	98.4	-	42.5	796.3
11/17/2018 10:00	3.7	205.7	-0.3	98.4	-	42.5	796.1
11/17/2018 11:00	3.4	206.1	-0.3	98.5	-	42.2	797.4
11/17/2018 12:00	3.0	208.6	-0.2	98.5	-	42.0	797.1
11/17/2018 13:00	6.1	209.4	0.0	98.5	-	41.7	797.4
11/17/2018 14:00	7.5	213.6	0.0	98.6	-	41.0	797.8
11/17/2018 15:00	7.7	211.7	0.0	98.7	-	41.9	798.3
11/17/2018 16:00	6.2	214.8	-0.3	98.8	-	41.4	798.7
11/17/2018 17:00	4.4	210.2	-0.2	98.9	-	41.3	798.9
11/17/2018 18:00	4.1	216.1	-0.2	98.9	-	40.6	800.1
11/17/2018 19:00	3.8	216.7	-0.1	98.9	-	40.9	800.2
11/17/2018 20:00	7.1	210.2	-0.1	98.9	-	41.4	799.7
11/17/2018 21:00	7.0	209.1	0.0	99.0	-	41.3	801.3
11/17/2018 22:00	6.7	206.3	0.0	99.0	-	41.4	802.2
11/17/2018 23:00	7.0	207.4	0.1	99.0	-	41.1	803.9
11/18/2018 0:00	6.0	208.8	0.2	99.0	-	40.5	808.1
11/18/2018 1:00	5.5	211.7	0.8	99.1	-	40.0	809.2
11/18/2018 2:00	6.0	214.0	1.1	99.1	-	39.4	809.9
11/18/2018 3:00	5.8	214.7	1.3	99.2	-	39.2	811.5
11/18/2018 4:00	5.7	213.0	1.5	99.2	-	38.3	813.1
11/18/2018 5:00	5.8	213.8	1.6	99.3	-	38.1	813.6
11/18/2018 6:00	5.7	212.6	1.7	99.3	-	37.9	814.4
11/18/2018 7:00	6.0	210.2	1.9	99.3	-	37.9	814.5
11/18/2018 8:00	5.6	209.1	2.0	99.3	-	37.5	815.9
11/18/2018 9:00	5.6	210.6	2.1	99.3	-	36.3	816.6
11/18/2018 10:00	5.6	209.3	2.2	99.3	-	35.1	817.5
11/18/2018 11:00	5.7	208.6	2.3	99.3	-	35.9	818.0
11/18/2018 12:00	5.3	208.7	2.4	99.3	-	35.4	817.5
11/18/2018 13:00	5.5	209.9	2.5	99.3	-	35.4	817.2
11/18/2018 14:00	5.5	204.9	2.5	99.2	-	35.1	817.5
11/18/2018 15:00	5.8	201.3	2.4	99.3	-	35.0	817.3
11/18/2018 16:00	6.6	201.0	2.5	99.2	-	34.2	817.1
11/18/2018 17:00	5.3	206.2	2.8	97.1	-	34.3	818.0
11/18/2018 18:00	4.4	211.5	2.6	95.2	-	34.0	817.5
11/18/2018 19:00	4.2	211.9	3.1	91.2	-	33.4	817.7
11/18/2018 20:00	4.5	206.0	3.2	89.5	-	33.6	817.7
11/18/2018 21:00	4.1	205.0	3.2	89.0	-	33.0	817.9
11/18/2018 22:00	3.4	199.0	3.5	86.6	-	32.9	817.7
11/18/2018 23:00	3.2	192.5	3.9	84.1	-	32.9	817.5
11/19/2018 0:00	2.2	205.9	3.8	85.2	-	32.4	817.6
11/19/2018 1:00	2.7	193.3	4.3	82.7	-	32.2	817.3
11/19/2018 2:00	3.2	198.0	4.5	81.9	-	32.2	817.5
11/19/2018 3:00	1.4	146.2	4.2	83.2	-	32.4	817.7
11/19/2018 4:00	1.1	114.5	4.5	80.9	-	32.3	817.6
11/19/2018 5:00	0.8	229.6	4.8	79.5	-	32.1	817.6
11/19/2018 6:00	1.1	161.9	4.7	79.2	-	31.7	817.6
11/19/2018 7:00	1.5	89.8	4.7	78.1	-	30.9	817.6

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
11/19/2018 8:00	1.6	56.0	5.1	74.6	-	32.1	817.6
11/19/2018 9:00	1.2	12.8	5.5	71.8	-	31.8	817.7
11/19/2018 10:00	0.9	52.3	5.8	70.3	-	31.7	817.7
11/19/2018 11:00	0.9	44.4	5.9	69.8	-	31.2	817.7
11/19/2018 12:00	0.9	35.6	6.0	69.0	-	31.3	817.9
11/19/2018 13:00	1.1	319.8	5.8	69.4	-	31.2	817.6
11/19/2018 14:00	2.0	184.2	3.9	83.3	-	30.0	817.8
11/19/2018 15:00	3.2	217.4	3.4	87.7	-	30.7	818.0
11/19/2018 16:00	4.2	214.6	2.3	94.6	-	30.9	817.3
11/19/2018 17:00	4.3	203.9	2.4	88.0	-	30.6	817.0
11/19/2018 18:00	6.0	184.5	2.7	79.8	-	30.1	817.9
11/19/2018 19:00	5.1	181.9	2.9	75.2	-	29.7	817.6
11/19/2018 20:00	5.9	189.6	2.7	75.8	-	29.5	817.3
11/19/2018 21:00	6.8	189.1	2.1	82.9	-	29.3	818.0
11/19/2018 22:00	5.7	191.0	2.0	86.2	-	29.5	817.1
11/19/2018 23:00	5.2	171.0	1.7	90.9	-	29.1	817.2
11/20/2018 0:00	3.5	189.5	1.5	94.9	-	29.3	817.7
11/20/2018 1:00	1.8	319.7	1.4	96.5	-	29.5	818.1
11/20/2018 2:00	3.5	207.4	1.4	96.8	-	29.1	818.3
11/20/2018 3:00	2.2	207.0	1.4	98.2	-	29.0	818.9
11/20/2018 4:00	2.7	181.9	1.5	96.2	-	28.7	819.1
11/20/2018 5:00	1.8	121.8	1.4	96.7	-	27.9	819.5
11/20/2018 6:00	2.2	196.7	1.4	96.1	-	28.2	819.9
11/20/2018 7:00	2.1	199.5	1.4	97.0	-	28.2	820.0
11/20/2018 8:00	2.4	186.6	1.3	97.1	-	28.0	820.1
11/20/2018 9:00	1.8	149.6	1.3	95.6	-	28.5	820.7
11/20/2018 10:00	1.7	131.7	1.1	95.7	-	28.1	821.8
11/20/2018 11:00	1.7	111.5	0.6	97.0	-	28.1	823.3
11/20/2018 12:00	1.4	201.6	0.4	97.8	-	28.0	825.4
11/20/2018 13:00	1.0	168.9	0.4	98.0	-	29.5	826.6
11/20/2018 14:00	2.2	209.6	0.2	98.0	-	29.5	827.7
11/20/2018 15:00	2.5	223.6	0.1	98.3	-	31.4	828.8
11/20/2018 16:00	3.1	220.9	-0.1	98.4	-	30.7	829.4
11/20/2018 17:00	4.2	218.0	-0.2	98.5	-	33.5	830.1
11/20/2018 18:00	4.9	224.1	-0.4	98.7	-	-	831.2
11/20/2018 19:00	3.1	225.6	-0.4	98.8	-	34.0	831.3
11/20/2018 20:00	2.2	224.7	-0.4	98.8	-	34.3	831.4
11/20/2018 21:00	2.2	206.2	-0.5	98.8	-	33.7	831.3
11/20/2018 22:00	1.8	200.5	-0.5	98.7	-	33.1	831.3
11/20/2018 23:00	1.6	204.0	-0.5	98.6	-	33.2	831.3
11/21/2018 0:00	1.0	225.1	-0.5	98.5	-	34.5	831.4
11/21/2018 1:00	1.8	216.1	-0.7	98.4	-	32.9	831.8
11/21/2018 2:00	1.6	207.6	-0.9	98.4	-	32.7	831.7
11/21/2018 3:00	1.0	189.0	-0.6	98.4	-	32.9	831.7
11/21/2018 4:00	0.8	132.4	-0.7	98.1	-	33.4	831.7
11/21/2018 5:00	0.4	134.9	-1.0	95.1	-	34.0	831.7
11/21/2018 6:00	0.5	337.8	-1.0	96.3	-	34.1	831.7
11/21/2018 7:00	0.1	61.1	-1.4	96.5	-	34.2	831.7
11/21/2018 8:00	1.9	52.4	-1.5	97.2	-	34.0	831.7
11/21/2018 9:00	2.5	62.8	-1.5	98.5	-	32.4	831.7
11/21/2018 10:00	5.2	34.4	-1.4	98.4	-	34.6	831.3
11/21/2018 11:00	4.6	26.8	-1.5	98.0	-	34.4	831.7
11/21/2018 12:00	3.8	9.2	-1.5	98.0	-	34.4	831.8
11/21/2018 13:00	2.7	359.9	-1.6	98.1	-	33.9	832.0
11/21/2018 14:00	1.6	342.0	-1.7	98.1	-	35.0	832.6

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
11/21/2018 15:00	0.7	323.2	-1.7	98.1	-	33.3	833.4
11/21/2018 16:00	2.3	210.8	-1.7	98.2	-	37.1	833.6
11/21/2018 17:00	2.7	218.0	-1.9	98.2	-	37.6	833.4
11/21/2018 18:00	2.4	223.4	-1.9	98.1	-	39.3	833.5
11/21/2018 19:00	2.9	226.0	-1.9	98.1	-	39.1	833.6
11/21/2018 20:00	3.2	216.6	-1.9	98.1	-	38.9	833.5
11/21/2018 21:00	3.7	220.3	-2.0	98.1	-	38.3	833.8
11/21/2018 22:00	2.2	207.8	-2.3	98.0	-	38.3	833.8
11/21/2018 23:00	2.0	197.3	-2.6	97.8	-	38.1	833.7
11/22/2018 0:00	2.3	199.2	-3.1	97.5	-	38.2	833.8
11/22/2018 1:00	1.0	219.7	-3.2	97.3	-	38.0	833.7
11/22/2018 2:00	0.6	160.6	-3.2	97.3	-	38.9	833.8
11/22/2018 3:00	1.0	151.9	-3.0	97.2	-	38.4	833.7
11/22/2018 4:00	0.3	151.6	-2.9	97.2	-	38.1	833.7
11/22/2018 5:00	0.2	151.5	-3.2	96.0	-	38.1	833.7
11/22/2018 6:00	0.3	151.6	-3.2	96.0	-	38.3	833.7
11/22/2018 7:00	0.8	151.8	-3.1	94.5	-	38.2	833.7
11/22/2018 8:00	0.8	151.8	-2.9	95.2	-	37.8	833.7
11/22/2018 9:00	0.2	152.0	-2.9	93.6	-	37.7	833.7
11/22/2018 10:00	1.7	124.7	-2.6	89.1	-	37.1	833.7
11/22/2018 11:00	1.2	53.9	-2.6	88.3	-	37.1	833.7
11/22/2018 12:00	0.4	290.7	-2.4	87.9	-	36.9	833.7
11/22/2018 13:00	-	-	-2.4	89.4	-	36.9	833.8
11/22/2018 14:00	0.9	40.4	-2.9	90.4	-	36.6	833.8
11/22/2018 15:00	5.9	43.2	-3.1	89.9	-	34.6	833.6
11/22/2018 16:00	3.8	62.5	-3.0	89.8	-	34.2	833.4
11/22/2018 17:00	6.2	82.5	-2.9	84.4	-	32.6	833.7
11/22/2018 18:00	1.8	288.5	-3.1	86.0	-	32.7	833.7
11/22/2018 19:00	1.7	207.3	-3.3	89.8	-	31.8	833.7
11/22/2018 20:00	0.6	64.5	-3.1	88.6	-	31.8	833.7
11/22/2018 21:00	0.6	55.2	-3.1	88.2	-	32.1	833.8
11/22/2018 22:00	1.8	60.1	-3.1	90.9	-	31.9	833.8
11/22/2018 23:00	5.7	40.1	-3.1	86.8	-	32.0	833.7
11/23/2018 0:00	7.1	42.4	-2.9	82.1	-	31.8	833.7
11/23/2018 1:00	1.8	64.6	-3.6	88.9	-	31.5	833.7
11/23/2018 2:00	4.4	89.9	-3.3	85.0	-	31.3	833.8
11/23/2018 3:00	1.7	33.5	-3.3	83.2	-	31.8	833.8
11/23/2018 4:00	1.0	64.3	-3.6	85.2	-	31.7	833.7
11/23/2018 5:00	1.3	300.2	-3.7	86.0	-	31.7	833.8
11/23/2018 6:00	1.3	309.6	-3.9	88.6	-	31.6	833.8
11/23/2018 7:00	1.5	187.4	-4.1	91.1	-	31.4	833.8
11/23/2018 8:00	1.2	195.8	-4.0	94.3	-	31.5	833.8
11/23/2018 9:00	1.3	204.4	-3.8	95.0	-	31.1	833.8
11/23/2018 10:00	1.6	204.1	-3.3	94.6	-	30.8	833.8
11/23/2018 11:00	1.3	205.1	-3.6	94.7	-	31.0	833.8
11/23/2018 12:00	0.7	170.5	-3.3	93.0	-	30.6	834.0
11/23/2018 13:00	0.4	183.9	-3.0	92.2	-	30.7	833.9
11/23/2018 14:00	0.1	283.1	-3.3	92.8	-	30.5	833.9
11/23/2018 15:00	0.9	185.0	-3.8	95.3	-	30.8	834.0
11/23/2018 16:00	0.8	206.5	-4.1	96.0	-	30.7	834.0
11/23/2018 17:00	0.9	262.7	-4.4	96.5	-	30.6	834.0
11/23/2018 18:00	1.6	248.0	-4.3	95.7	-	30.6	834.0
11/23/2018 19:00	3.0	205.6	-4.0	96.1	-	30.3	834.0
11/23/2018 20:00	3.5	194.1	-3.8	96.4	-	30.5	834.1
11/23/2018 21:00	2.6	224.7	-3.4	96.4	-	30.3	834.0

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
11/23/2018 22:00	2.1	197.2	-3.5	96.9	-	30.4	834.1
11/23/2018 23:00	2.0	206.8	-3.2	97.2	-	30.4	834.0
11/24/2018 0:00	2.2	218.0	-3.3	96.8	-	30.3	834.0
11/24/2018 1:00	2.1	210.2	-3.3	96.7	-	30.3	834.0
11/24/2018 2:00	2.6	202.8	-3.2	97.0	-	30.3	834.0
11/24/2018 3:00	2.6	197.0	-3.3	96.5	-	30.3	834.0
11/24/2018 4:00	2.0	181.7	-3.3	96.7	-	30.0	834.0
11/24/2018 5:00	2.1	186.5	-3.2	96.9	-	30.4	834.0
11/24/2018 6:00	1.3	105.3	-3.1	93.0	-	30.4	834.0
11/24/2018 7:00	1.8	74.8	-2.6	80.0	-	30.3	834.0
11/24/2018 8:00	2.3	125.7	-2.4	80.2	-	30.2	834.0
11/24/2018 9:00	1.9	135.2	-2.1	83.1	-	30.6	834.0
11/24/2018 10:00	2.8	180.5	-1.9	91.1	-	30.3	834.0
11/24/2018 11:00	2.1	355.1	-1.5	82.9	-	30.7	834.0
11/24/2018 12:00	2.0	346.2	-1.3	78.8	-	30.2	834.0
11/24/2018 13:00	2.4	182.8	-1.3	90.2	-	30.1	834.2
11/24/2018 14:00	2.1	304.3	-1.5	91.0	-	29.9	834.2
11/24/2018 15:00	2.7	326.6	-2.0	96.4	-	30.6	834.6
11/24/2018 16:00	2.1	354.4	-2.0	97.2	-	32.0	835.5
11/24/2018 17:00	2.6	1.0	-2.1	97.4	-	34.1	836.8
11/24/2018 18:00	3.6	344.5	-1.9	97.7	-	34.8	837.4
11/24/2018 19:00	2.7	261.3	-1.4	97.7	-	35.6	838.1
11/24/2018 20:00	4.8	209.6	-1.4	98.0	-	36.3	838.6
11/24/2018 21:00	5.1	215.4	-1.1	98.1	-	36.7	838.7
11/24/2018 22:00	4.4	211.2	-0.9	98.1	-	36.7	838.9
11/24/2018 23:00	3.8	210.9	-0.8	98.3	-	36.7	839.2
11/25/2018 0:00	3.6	207.0	-0.6	98.3	-	36.9	839.1
11/25/2018 1:00	3.3	212.3	-0.5	98.4	-	36.4	839.2
11/25/2018 2:00	2.8	202.6	-0.4	98.4	-	33.6	839.3
11/25/2018 3:00	2.6	212.8	-0.3	98.4	-	35.6	839.5
11/25/2018 4:00	2.1	215.6	-0.1	98.3	-	36.6	839.5
11/25/2018 5:00	1.0	222.8	-0.1	97.7	-	36.8	839.5
11/25/2018 6:00	1.3	249.4	0.1	97.4	-	37.1	839.6
11/25/2018 7:00	1.1	213.4	0.3	95.7	-	37.3	839.6
11/25/2018 8:00	2.0	124.4	0.2	97.1	-	37.1	839.7
11/25/2018 9:00	1.4	173.4	0.5	96.3	-	37.6	839.7
11/25/2018 10:00	2.3	18.4	0.3	96.6	-	36.5	840.1
11/25/2018 11:00	1.6	107.4	0.5	96.9	-	38.3	840.3
11/25/2018 12:00	2.4	68.9	0.7	95.6	-	37.7	848.3
11/25/2018 13:00	2.0	65.7	1.1	93.8	-	37.6	848.5
11/25/2018 14:00	2.9	24.9	0.8	93.9	-	37.1	848.7
11/25/2018 15:00	3.3	35.3	0.8	94.8	-	37.7	848.7
11/25/2018 16:00	2.9	23.2	0.6	96.3	-	37.1	849.3
11/25/2018 17:00	3.3	12.8	0.3	97.4	-	36.5	849.9
11/25/2018 18:00	1.9	22.1	0.4	97.2	-	36.4	850.5
11/25/2018 19:00	1.2	209.4	1.4	92.4	-	36.1	851.5
11/25/2018 20:00	2.5	58.7	1.2	93.9	-	35.9	851.9
11/25/2018 21:00	3.1	28.8	1.0	92.3	-	35.4	852.9
11/25/2018 22:00	3.1	39.1	0.9	94.0	-	34.6	854.2
11/25/2018 23:00	2.4	30.5	0.8	95.0	-	35.5	855.6
11/26/2018 0:00	2.8	22.7	0.7	96.6	-	35.4	857.5
11/26/2018 1:00	1.9	22.3	0.5	97.6	-	35.2	859.1
11/26/2018 2:00	2.1	36.5	0.9	96.9	-	34.5	860.8
11/26/2018 3:00	3.7	176.5	1.6	95.4	-	34.3	860.6
11/26/2018 4:00	5.2	183.1	1.6	95.6	-	34.1	860.3

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
11/26/2018 5:00	6.4	189.8	1.7	96.1	-	34.8	861.5
11/26/2018 6:00	6.7	182.9	2.0	95.2	-	34.4	861.4
11/26/2018 7:00	6.9	184.0	2.2	95.1	-	34.4	862.7
11/26/2018 8:00	6.9	178.0	2.2	96.1	-	33.9	862.0
11/26/2018 9:00	4.4	169.9	2.2	95.1	-	33.9	863.4
11/26/2018 10:00	3.2	160.0	2.3	94.3	-	33.7	863.3
11/26/2018 11:00	3.9	166.2	2.3	93.1	-	33.4	863.6
11/26/2018 12:00	4.1	182.9	2.2	93.0	-	32.7	864.2
11/26/2018 13:00	1.9	65.9	1.9	93.2	-	32.1	864.5
11/26/2018 14:00	1.3	74.9	1.6	92.5	-	32.7	865.6
11/26/2018 15:00	1.9	45.6	1.1	95.5	-	32.6	866.0
11/26/2018 16:00	1.2	44.6	1.3	94.2	-	32.4	866.5
11/26/2018 17:00	0.9	357.2	1.5	92.2	-	32.4	866.5
11/26/2018 18:00	0.2	310.1	1.7	90.6	-	32.3	866.5
11/26/2018 19:00	1.0	101.5	1.9	88.9	-	32.2	866.5
11/26/2018 20:00	1.3	54.9	1.9	86.9	-	32.2	866.5
11/26/2018 21:00	1.5	42.7	2.2	84.0	-	32.3	866.5
11/26/2018 22:00	2.4	30.5	1.8	84.9	-	32.2	866.5
11/26/2018 23:00	4.6	39.4	1.4	85.7	-	32.3	866.5
11/27/2018 0:00	2.4	187.3	0.7	94.7	-	32.5	866.4
11/27/2018 1:00	0.6	354.1	1.0	95.0	-	32.4	866.5
11/27/2018 2:00	0.8	120.7	0.7	95.2	-	32.3	866.5
11/27/2018 3:00	0.5	247.5	0.6	97.3	-	32.3	866.6
11/27/2018 4:00	0.6	303.7	0.6	97.0	-	32.3	866.8
11/27/2018 5:00	0.8	113.1	0.3	97.6	-	32.0	867.1
11/27/2018 6:00	1.3	88.9	0.2	97.9	-	31.9	867.2
11/27/2018 7:00	0.7	90.2	0.4	97.3	-	31.9	867.4
11/27/2018 8:00	0.8	71.3	0.5	96.3	-	31.9	867.6
11/27/2018 9:00	0.7	13.5	0.6	95.5	-	31.7	867.8
11/27/2018 10:00	1.1	32.3	0.7	94.5	-	31.4	868.0
11/27/2018 11:00	0.5	73.1	1.3	90.5	-	31.0	868.0
11/27/2018 12:00	1.2	10.4	1.6	90.3	-	31.1	868.7
11/27/2018 13:00	1.2	36.7	1.5	89.8	-	31.2	868.2
11/27/2018 14:00	1.0	71.7	1.2	88.6	-	31.4	868.1
11/27/2018 15:00	0.8	282.9	0.8	94.6	-	31.4	868.1
11/27/2018 16:00	0.1	105.8	0.3	97.4	-	31.3	868.1
11/27/2018 17:00	0.2	214.2	0.3	97.0	-	30.9	868.0
11/27/2018 18:00	0.2	173.7	0.1	95.1	-	31.0	868.1
11/27/2018 19:00	1.1	176.0	0.1	94.5	-	30.7	868.0
11/27/2018 20:00	0.7	191.9	0.1	97.5	-	30.7	868.0
11/27/2018 21:00	0.0	0.0	0.2	96.6	-	31.1	868.0
11/27/2018 22:00	0.9	207.0	-0.1	96.4	-	30.4	868.0
11/27/2018 23:00	1.4	184.9	0.0	95.7	-	30.7	868.0
11/28/2018 0:00	0.5	172.5	-0.1	95.5	-	30.4	868.2
11/28/2018 1:00	-	-	-0.2	97.9	-	30.4	868.1
11/28/2018 2:00	-	-	-0.2	98.3	-	30.0	868.3
11/28/2018 3:00	-	-	-0.3	98.5	-	29.4	868.5
11/28/2018 4:00	-	-	-0.3	98.6	-	30.6	868.7
11/28/2018 5:00	-	-	-0.5	98.8	-	30.0	868.8
11/28/2018 6:00	-	-	-0.6	99.0	-	30.2	868.8
11/28/2018 7:00	-	-	-0.6	99.0	-	30.9	868.8
11/28/2018 8:00	-	-	-0.6	99.1	-	30.8	868.9
11/28/2018 9:00	-	-	-0.5	99.0	-	30.7	869.0
11/28/2018 10:00	-	-	-0.5	99.0	-	31.1	868.9
11/28/2018 11:00	2.1	221.2	-0.6	98.9	-	31.5	869.0



**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
11/28/2018 12:00	2.2	227.2	-0.4	98.7	-	31.6	869.0
11/28/2018 13:00	2.3	220.4	-0.4	98.7	-	31.5	869.0
11/28/2018 14:00	2.7	206.4	-0.4	98.8	-	31.5	869.0
11/28/2018 15:00	2.4	221.2	-0.4	98.8	-	31.6	869.0
11/28/2018 16:00	2.5	216.0	-0.3	98.9	-	31.5	869.1
11/28/2018 17:00	2.6	196.3	-0.3	98.9	-	31.5	869.2
11/28/2018 18:00	2.6	196.3	-0.3	99.0	-	31.4	869.0
11/28/2018 19:00	2.3	200.6	-0.3	99.0	-	31.3	869.1
11/28/2018 20:00	2.5	205.1	-0.3	98.9	-	31.3	869.0
11/28/2018 21:00	2.4	211.6	-0.3	98.9	-	31.2	869.1
11/28/2018 22:00	2.4	218.9	-0.3	98.9	-	31.3	869.1
11/28/2018 23:00	2.0	211.5	-0.3	98.9	-	31.2	869.1
11/29/2018 0:00	2.5	210.3	-0.3	98.9	-	31.0	869.2
11/29/2018 1:00	2.9	209.7	-0.6	98.9	-	31.1	869.1
11/29/2018 2:00	3.1	215.1	-0.6	98.9	-	31.0	869.1
11/29/2018 3:00	2.8	218.1	-0.8	98.9	-	31.0	869.1
11/29/2018 4:00	2.2	197.1	-0.9	98.8	-	31.1	869.2
11/29/2018 5:00	2.1	196.6	-1.2	98.7	-	31.2	869.2
11/29/2018 6:00	1.7	211.6	-1.2	98.6	-	31.2	869.2
11/29/2018 7:00	2.0	198.0	-1.2	98.5	-	31.2	869.2
11/29/2018 8:00	2.0	210.0	-1.2	98.4	-	31.2	869.1
11/29/2018 9:00	1.8	208.4	-1.1	98.2	-	31.2	869.2
11/29/2018 10:00	2.0	198.5	-1.0	97.8	-	31.0	869.2
11/29/2018 11:00	1.5	227.7	-0.9	97.5	-	30.6	869.3
11/29/2018 12:00	1.2	222.4	-0.3	97.0	-	30.2	869.3
11/29/2018 13:00	0.4	227.8	-0.3	97.0	-	30.4	869.2
11/29/2018 14:00	1.1	210.7	-0.8	97.3	-	30.7	869.2
11/29/2018 15:00	0.4	169.8	-1.4	97.2	-	31.2	869.2
11/29/2018 16:00	1.1	176.6	-2.3	95.8	-	31.2	869.2
11/29/2018 17:00	1.2	181.7	-2.4	95.1	-	31.4	869.2
11/29/2018 18:00	0.8	129.3	-2.5	90.3	-	30.5	869.2
11/29/2018 19:00	2.1	86.9	-2.8	85.6	-	30.6	869.1
11/29/2018 20:00	1.3	64.8	-2.7	84.4	-	30.1	869.2
11/29/2018 21:00	0.3	84.9	-2.7	84.9	-	30.1	869.1
11/29/2018 22:00	0.7	35.8	-2.7	85.0	-	30.7	869.1
11/29/2018 23:00	1.7	39.5	-2.8	85.1	-	30.1	869.1
11/30/2018 0:00	2.1	42.7	-3.2	85.6	-	30.3	869.2
11/30/2018 1:00	2.2	42.2	-3.3	87.4	-	29.3	869.2
11/30/2018 2:00	1.9	43.8	-3.4	87.0	-	30.6	869.2
11/30/2018 3:00	1.3	50.0	-3.4	84.3	-	30.3	869.2
11/30/2018 4:00	-	-	-3.2	83.1	-	29.0	869.2
11/30/2018 5:00	-	-	-3.3	84.8	-	29.7	869.2
11/30/2018 6:00	-	-	-3.6	92.0	-	28.9	869.1
11/30/2018 7:00	-	-	-3.5	92.5	-	29.4	869.2
11/30/2018 8:00	-	-	-4.0	94.4	-	29.5	869.2
11/30/2018 9:00	-	-	-3.8	90.0	-	29.0	869.3
11/30/2018 10:00	-	-	-3.4	89.7	-	29.3	869.2
11/30/2018 11:00	-	-	-2.9	88.2	-	29.3	869.3
11/30/2018 12:00	-	-	-3.0	87.5	-	29.6	869.4
11/30/2018 13:00	-	-	-3.2	92.7	-	29.7	869.2
11/30/2018 14:00	-	-	-3.4	94.9	-	29.6	869.2
11/30/2018 15:00	0.4	117.6	-3.7	97.8	-	29.9	869.2
11/30/2018 16:00	0.1	91.1	-4.1	95.4	-	30.5	869.3
11/30/2018 17:00	0.3	288.6	-3.9	94.9	-	30.3	869.3
11/30/2018 18:00	0.5	246.7	-4.0	97.4	-	30.2	869.3

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
11/30/2018 19:00	-	-	-4.1	97.6	-	30.2	869.3
11/30/2018 20:00	-	-	-3.9	96.9	-	30.7	869.3
11/30/2018 21:00	-	-	-4.0	95.6	-	30.4	869.3
11/30/2018 22:00	1.2	326.4	-4.3	96.3	-	30.2	869.3
11/30/2018 23:00	1.7	356.4	-4.4	95.4	-	30.2	869.3
12/1/2018 0:00	1.8	344.3	-4.6	94.2	-	30.1	869.3
12/1/2018 1:00	1.7	353.6	-4.8	97.1	-	30.1	869.3
12/1/2018 2:00	1.9	9.6	-5.0	96.9	-	29.8	869.4
12/1/2018 3:00	2.6	20.0	-5.2	96.4	-	29.9	869.3
12/1/2018 4:00	2.8	25.6	-5.2	96.1	-	30.4	869.3
12/1/2018 5:00	3.0	10.7	-5.3	95.9	-	30.4	869.3
12/1/2018 6:00	3.0	21.3	-5.3	95.9	-	30.3	869.3
12/1/2018 7:00	2.8	30.5	-5.4	95.8	-	30.2	869.2
12/1/2018 8:00	6.3	41.2	-5.7	95.3	-	30.8	869.3
12/1/2018 9:00	7.7	45.8	-5.8	94.9	-	30.9	869.3
12/1/2018 10:00	7.1	36.6	-5.5	94.1	-	30.8	870.2
12/1/2018 11:00	7.8	31.1	-5.4	92.0	-	30.8	869.8
12/1/2018 12:00	7.9	33.8	-5.2	89.7	-	30.8	870.1
12/1/2018 13:00	5.4	59.8	-5.5	84.3	-	30.8	870.0
12/1/2018 14:00	5.5	59.6	-5.6	80.7	-	31.0	869.3
12/1/2018 15:00	4.4	63.1	-6.1	79.4	-	30.7	869.4
12/1/2018 16:00	4.3	51.8	-6.3	84.1	-	30.7	869.2
12/1/2018 17:00	2.9	82.8	-6.5	82.6	-	31.6	869.3
12/1/2018 18:00	2.0	79.2	-6.8	82.0	-	31.4	869.2
12/1/2018 19:00	3.7	75.7	-7.3	81.1	-	31.0	869.3
12/1/2018 20:00	1.2	134.6	-7.2	87.0	-	31.2	869.4
12/1/2018 21:00	1.6	145.6	-7.7	93.9	-	31.7	869.4
12/1/2018 22:00	1.1	217.2	-7.4	94.7	-	31.2	869.5
12/1/2018 23:00	1.5	170.7	-7.8	94.6	-	31.0	869.5
12/2/2018 0:00	1.1	209.8	-7.9	94.3	-	31.1	869.5
12/2/2018 1:00	0.7	173.7	-8.0	94.4	-	31.1	869.5
12/2/2018 2:00	0.3	177.1	-8.2	93.4	-	31.1	869.5
12/2/2018 3:00	0.6	233.9	-8.1	93.4	-	31.2	869.4
12/2/2018 4:00	0.6	16.4	-8.4	91.8	-	31.2	869.5
12/2/2018 5:00	0.6	307.8	-8.4	89.9	-	31.0	869.4
12/2/2018 6:00	0.5	16.6	-8.5	86.4	-	31.2	869.4
12/2/2018 7:00	0.9	274.2	-8.5	89.4	-	30.8	869.4
12/2/2018 8:00	1.1	36.4	-8.8	86.5	-	31.2	869.5
12/2/2018 9:00	1.0	203.1	-9.8	92.1	-	31.2	869.5
12/2/2018 10:00	0.8	237.1	-9.2	90.1	-	-	871.0
12/2/2018 11:00	0.9	18.1	-7.8	84.6	-	30.2	871.9
12/2/2018 12:00	0.7	175.3	-7.3	83.2	-	29.8	871.1
12/2/2018 13:00	0.5	251.9	-7.3	81.7	-	30.0	870.8
12/2/2018 14:00	1.2	291.6	-8.6	89.3	-	30.7	869.7
12/2/2018 15:00	1.3	293.3	-9.2	93.4	-	30.5	869.6
12/2/2018 16:00	1.2	279.9	-9.4	92.4	-	30.3	869.6
12/2/2018 17:00	0.9	215.8	-9.6	91.9	-	31.2	869.6
12/2/2018 18:00	1.4	197.5	-9.6	91.5	-	31.2	869.6
12/2/2018 19:00	2.1	193.3	-9.3	89.6	-	31.2	869.6
12/2/2018 20:00	2.0	180.6	-9.3	87.3	-	30.3	869.6
12/2/2018 21:00	1.5	208.6	-9.5	88.8	-	30.9	869.6
12/2/2018 22:00	2.2	194.0	-9.7	86.9	-	30.7	869.6
12/2/2018 23:00	2.5	183.0	-9.8	87.5	-	30.8	869.6
12/3/2018 0:00	2.0	186.1	-9.3	79.0	-	31.1	869.6
12/3/2018 1:00	1.9	185.8	-9.1	75.6	-	31.1	869.6

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
12/3/2018 2:00	2.0	226.2	-8.8	75.9	-	31.4	869.6
12/3/2018 3:00	0.9	196.4	-8.2	67.1	-	31.8	869.6
12/3/2018 4:00	1.0	189.5	-8.4	67.6	-	31.5	869.7
12/3/2018 5:00	0.9	200.8	-8.1	62.9	-	30.9	869.6
12/3/2018 6:00	0.7	185.3	-7.3	54.4	-	31.0	869.6
12/3/2018 7:00	0.3	256.9	-6.7	48.4	-	30.9	869.6
12/3/2018 8:00	0.0	291.0	-6.5	45.5	-	31.3	869.6
12/3/2018 9:00	0.6	32.9	-5.7	40.2	-	31.0	869.6
12/3/2018 10:00	0.4	246.8	-5.3	39.5	-	31.1	870.3
12/3/2018 11:00	1.9	202.1	-4.1	35.4	-	31.3	869.6
12/3/2018 12:00	4.0	200.8	-3.8	33.3	-	30.8	869.4
12/3/2018 13:00	3.4	214.5	-3.4	32.1	-	30.8	869.3
12/3/2018 14:00	3.6	204.1	-3.4	33.9	-	30.1	869.4
12/3/2018 15:00	4.4	201.4	-3.5	35.2	-	30.8	869.1
12/3/2018 16:00	4.2	208.3	-3.9	38.3	-	30.9	869.4
12/3/2018 17:00	3.7	223.2	-3.9	39.1	-	31.0	869.4
12/3/2018 18:00	3.2	223.6	-4.1	40.6	-	30.8	869.4
12/3/2018 19:00	3.8	216.5	-4.1	41.6	-	30.6	869.6
12/3/2018 20:00	3.9	204.7	-4.6	45.5	-	30.9	869.4
12/3/2018 21:00	4.0	201.8	-4.4	45.2	-	31.0	869.4
12/3/2018 22:00	3.9	210.4	-4.5	46.4	-	30.9	869.6
12/3/2018 23:00	4.2	202.0	-4.5	47.7	-	31.1	869.4
12/4/2018 0:00	4.7	206.1	-4.9	51.8	-	31.1	869.3
12/4/2018 1:00	3.8	212.9	-4.8	50.8	-	31.4	869.4
12/4/2018 2:00	3.7	201.0	-5.0	52.0	-	31.2	869.5
12/4/2018 3:00	3.4	214.7	-5.5	54.5	-	31.4	869.5
12/4/2018 4:00	1.7	183.2	-5.7	55.6	-	31.2	869.5
12/4/2018 5:00	1.3	195.5	-5.6	55.2	-	31.3	869.6
12/4/2018 6:00	2.0	201.0	-5.7	55.9	-	31.1	869.6
12/4/2018 7:00	2.1	198.7	-6.0	60.3	-	31.1	869.6
12/4/2018 8:00	0.3	214.9	-6.4	62.0	-	31.3	869.6
12/4/2018 9:00	1.8	203.9	-6.1	62.9	-	31.2	869.6
12/4/2018 10:00	0.4	207.0	-5.8	65.5	-	30.3	871.3
12/4/2018 11:00	0.1	21.0	-4.6	61.8	-	30.1	871.7
12/4/2018 12:00	0.3	59.5	-5.0	72.9	-	29.9	871.5
12/4/2018 13:00	0.8	29.5	-5.4	81.0	-	30.2	870.9
12/4/2018 14:00	0.9	22.4	-5.8	83.4	-	30.6	870.4
12/4/2018 15:00	1.7	30.9	-6.5	90.5	-	30.7	869.7
12/4/2018 16:00	1.0	39.1	-7.2	95.7	-	31.6	869.5
12/4/2018 17:00	0.3	32.8	-6.8	86.1	-	30.8	869.4
12/4/2018 18:00	1.1	320.4	-6.7	82.8	-	30.9	869.4
12/4/2018 19:00	1.2	193.4	-7.0	85.2	-	31.1	869.5
12/4/2018 20:00	1.3	202.5	-6.6	77.3	-	31.0	869.5
12/4/2018 21:00	1.1	183.6	-6.6	79.2	-	31.0	869.5
12/4/2018 22:00	0.9	245.7	-6.3	72.6	-	30.8	869.5
12/4/2018 23:00	1.5	180.2	-6.5	75.6	-	31.1	869.5
12/5/2018 0:00	1.1	230.9	-5.9	69.1	-	31.1	869.5
12/5/2018 1:00	0.5	215.3	-5.6	68.1	-	31.2	869.5
12/5/2018 2:00	0.4	202.0	-5.5	68.6	-	31.2	869.6
12/5/2018 3:00	1.3	181.6	-5.4	68.3	-	31.3	869.5
12/5/2018 4:00	1.2	181.8	-5.5	67.8	-	31.0	869.5
12/5/2018 5:00	1.8	177.4	-5.9	69.5	-	31.0	869.6
12/5/2018 6:00	0.8	195.8	-5.3	65.5	-	31.1	869.4
12/5/2018 7:00	0.0	120.2	-5.6	67.2	-	31.1	869.5
12/5/2018 8:00	0.4	3.2	-5.2	66.2	-	31.2	869.4

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
12/5/2018 9:00	0.8	277.1	-5.8	67.5	-	30.4	869.6
12/5/2018 10:00	0.6	191.1	-5.7	67.0	-	30.6	870.7
12/5/2018 11:00	2.1	222.9	-6.2	70.1	-	30.6	870.9
12/5/2018 12:00	1.2	219.9	-5.4	67.1	-	30.5	870.8
12/5/2018 13:00	1.2	196.4	-4.8	66.5	-	30.3	870.2
12/5/2018 14:00	0.8	172.4	-5.1	70.1	-	30.9	870.1
12/5/2018 15:00	2.0	218.3	-6.3	73.4	-	30.7	869.5
12/5/2018 16:00	2.4	186.5	-7.3	77.6	-	31.1	869.5
12/5/2018 17:00	2.2	197.3	-7.4	78.4	-	31.1	869.5
12/5/2018 18:00	2.0	182.0	-6.8	74.7	-	31.1	869.5
12/5/2018 19:00	2.2	186.1	-7.1	75.3	-	31.3	869.5
12/5/2018 20:00	2.2	176.9	-7.3	76.5	-	31.4	869.5
12/5/2018 21:00	1.5	196.1	-6.7	72.8	-	31.5	869.5
12/5/2018 22:00	1.7	180.9	-6.6	72.3	-	30.8	869.5
12/5/2018 23:00	2.1	176.8	-6.6	72.6	-	30.6	869.5
12/6/2018 0:00	1.9	175.0	-6.4	71.7	-	31.2	869.6
12/6/2018 1:00	1.2	186.9	-6.4	71.4	-	31.2	869.5
12/6/2018 2:00	1.4	181.2	-6.5	73.2	-	31.1	869.6
12/6/2018 3:00	1.6	177.8	-6.6	73.3	-	31.3	869.5
12/6/2018 4:00	2.2	172.2	-6.8	74.7	-	31.6	869.5
12/6/2018 5:00	1.3	141.7	-6.6	73.3	-	31.2	869.5
12/6/2018 6:00	1.4	207.7	-6.5	73.6	-	31.2	869.5
12/6/2018 7:00	1.2	63.0	-6.3	72.7	-	30.9	869.5
12/6/2018 8:00	1.4	236.7	-6.5	73.5	-	31.2	869.4
12/6/2018 9:00	0.6	11.4	-6.1	71.5	-	31.3	869.5
12/6/2018 10:00	0.6	256.5	-5.6	68.8	-	31.0	869.5
12/6/2018 11:00	0.3	52.2	-4.8	65.2	-	30.7	869.5
12/6/2018 12:00	0.9	22.0	-4.0	61.8	-	30.4	869.8
12/6/2018 13:00	1.5	21.1	-4.7	64.8	-	30.6	869.4
12/6/2018 14:00	0.2	343.4	-4.4	64.1	-	31.1	869.5
12/6/2018 15:00	0.2	233.1	-4.4	63.9	-	30.8	869.5
12/6/2018 16:00	1.2	207.9	-5.7	70.1	-	31.2	869.5
12/6/2018 17:00	2.7	194.4	-5.0	65.1	-	31.3	869.5
12/6/2018 18:00	2.2	31.8	-5.3	66.3	-	30.7	869.6
12/6/2018 19:00	2.7	24.1	-4.3	61.5	-	30.5	869.4
12/6/2018 20:00	0.9	254.9	-4.6	61.3	-	30.6	869.5
12/6/2018 21:00	0.6	28.2	-4.7	60.1	-	30.6	869.4
12/6/2018 22:00	0.6	334.3	-4.3	58.1	-	30.6	869.4
12/6/2018 23:00	0.6	237.6	-5.2	61.7	-	30.6	869.5
12/7/2018 0:00	1.1	82.0	-5.4	62.8	-	30.0	869.4
12/7/2018 1:00	1.8	32.8	-5.0	59.2	-	30.7	869.5
12/7/2018 2:00	0.9	162.1	-5.7	60.9	-	30.8	869.5
12/7/2018 3:00	2.6	40.7	-4.7	54.9	-	30.3	869.4
12/7/2018 4:00	4.0	33.2	-5.1	55.1	-	30.2	869.3
12/7/2018 5:00	1.6	44.8	-4.9	51.6	-	30.1	869.4
12/7/2018 6:00	1.1	17.0	-5.0	52.1	-	30.4	869.4
12/7/2018 7:00	1.4	74.2	-5.3	52.6	-	29.8	869.4
12/7/2018 8:00	2.5	41.0	-5.2	50.7	-	30.1	869.3
12/7/2018 9:00	3.9	34.6	-4.8	46.2	-	30.2	869.4
12/7/2018 10:00	4.1	33.0	-3.9	40.6	-	29.7	869.5
12/7/2018 11:00	2.9	33.1	-3.8	41.1	-	29.3	869.7
12/7/2018 12:00	3.7	29.1	-3.0	37.9	-	29.9	869.6
12/7/2018 13:00	3.1	28.5	-2.4	35.4	-	30.1	869.3
12/7/2018 14:00	1.2	41.2	-2.1	36.1	-	30.6	869.3
12/7/2018 15:00	2.4	245.7	-1.5	39.6	-	31.0	869.5

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
12/7/2018 16:00	2.7	196.0	-1.5	48.8	-	30.8	869.3
12/7/2018 17:00	3.4	177.1	-1.0	44.8	-	30.6	869.7
12/7/2018 18:00	4.3	194.2	-0.5	41.2	-	30.9	869.1
12/7/2018 19:00	3.6	192.1	-0.5	41.8	-	31.4	869.6
12/7/2018 20:00	4.4	188.0	-1.5	57.8	-	31.2	869.5
12/7/2018 21:00	3.8	174.7	-2.7	86.9	-	30.9	869.9
12/7/2018 22:00	4.0	183.1	-2.7	96.8	-	33.3	870.5
12/7/2018 23:00	4.7	191.3	-2.7	97.5	-	34.6	870.7
12/8/2018 0:00	4.6	201.0	-2.5	97.8	-	36.9	871.5
12/8/2018 1:00	5.6	199.4	-2.3	97.9	-	42.8	871.8
12/8/2018 2:00	4.5	205.2	-2.1	97.9	-	43.1	872.1
12/8/2018 3:00	3.8	204.2	-2.0	98.1	-	43.0	872.0
12/8/2018 4:00	3.1	206.5	-2.2	98.0	-	43.0	871.9
12/8/2018 5:00	2.9	203.6	-2.4	97.9	-	43.1	872.3
12/8/2018 6:00	2.9	188.3	-2.6	97.8	-	43.1	872.1
12/8/2018 7:00	1.8	156.2	-2.9	97.6	-	43.0	872.0
12/8/2018 8:00	2.2	183.4	-2.6	97.5	-	43.3	872.0
12/8/2018 9:00	2.3	184.7	-2.3	96.4	-	42.9	872.1
12/8/2018 10:00	3.4	202.4	-2.0	93.2	-	42.9	871.9
12/8/2018 11:00	3.4	199.4	-1.7	91.1	-	42.9	871.9
12/8/2018 12:00	4.8	201.8	-1.6	91.8	-	42.8	872.6
12/8/2018 13:00	6.3	200.0	-1.6	93.8	-	39.0	872.1
12/8/2018 14:00	5.2	197.3	-1.7	95.0	-	38.7	872.1
12/8/2018 15:00	4.2	209.7	-0.9	87.7	-	37.8	872.1
12/8/2018 16:00	3.9	190.2	-0.8	85.7	-	38.4	872.3
12/8/2018 17:00	3.7	226.2	-0.1	77.1	-	38.8	871.5
12/8/2018 18:00	3.1	248.1	0.4	72.3	-	37.5	872.0
12/8/2018 19:00	3.3	185.3	0.7	70.6	-	37.6	871.9
12/8/2018 20:00	4.0	179.5	0.9	67.1	-	37.1	872.5
12/8/2018 21:00	4.0	187.9	1.0	65.1	-	35.8	872.3
12/8/2018 22:00	2.7	192.7	1.0	64.8	-	35.2	872.1
12/8/2018 23:00	2.5	202.0	1.0	66.4	-	35.3	872.1
12/9/2018 0:00	2.9	181.0	1.2	65.2	-	33.5	872.0
12/9/2018 1:00	3.3	307.9	1.2	64.8	-	33.9	872.2
12/9/2018 2:00	4.5	322.2	1.0	64.8	-	32.7	871.3
12/9/2018 3:00	2.8	269.6	1.4	63.8	-	34.2	872.1
12/9/2018 4:00	1.4	202.4	1.0	66.0	-	34.1	872.1
12/9/2018 5:00	4.1	15.7	-0.3	69.7	-	34.0	871.8
12/9/2018 6:00	2.4	8.9	0.1	65.6	-	34.4	872.2
12/9/2018 7:00	1.7	95.4	-0.3	75.2	-	33.7	872.4
12/9/2018 8:00	5.1	25.2	-2.5	93.9	-	38.0	872.6
12/9/2018 9:00	5.6	21.2	-2.8	97.3	-	39.3	873.7
12/9/2018 10:00	4.0	19.3	-2.7	97.4	-	40.2	875.6
12/9/2018 11:00	2.0	31.5	-1.7	97.7	-	39.9	876.6
12/9/2018 12:00	3.9	211.3	-1.3	97.9	-	41.8	877.8
12/9/2018 13:00	4.6	199.4	-1.1	98.0	-	41.8	878.4
12/9/2018 14:00	3.4	209.7	-1.1	98.2	-	41.9	878.8
12/9/2018 15:00	7.4	186.9	-0.9	98.5	-	43.7	879.7
12/9/2018 16:00	7.2	182.5	-0.9	98.5	-	43.1	879.4
12/9/2018 17:00	5.1	198.0	-1.1	98.6	-	42.5	879.5
12/9/2018 18:00	4.9	214.0	-1.3	98.7	-	43.7	880.1
12/9/2018 19:00	4.3	217.4	-1.5	98.6	-	44.0	881.6
12/9/2018 20:00	4.0	203.0	-1.7	98.4	-	45.1	882.2
12/9/2018 21:00	4.9	214.8	-1.7	98.3	-	45.6	883.1
12/9/2018 22:00	4.6	223.0	-1.9	98.2	-	45.5	882.9

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
12/9/2018 23:00	7.6	229.4	-2.4	98.0	-	43.8	883.2
12/10/2018 0:00	7.1	228.2	-3.2	97.4	-	45.7	883.5
12/10/2018 1:00	5.3	228.3	-3.8	97.0	-	46.2	883.6
12/10/2018 2:00	3.5	218.1	-4.1	96.8	-	43.9	883.5
12/10/2018 3:00	3.4	219.6	-4.2	96.7	-	44.1	883.3
12/10/2018 4:00	3.8	210.2	-4.1	96.7	-	44.3	883.7
12/10/2018 5:00	3.0	213.4	-3.9	96.9	-	43.7	883.5
12/10/2018 6:00	4.0	218.2	-3.8	96.9	-	44.0	883.4
12/10/2018 7:00	5.0	202.4	-3.7	97.0	-	44.1	884.9
12/10/2018 8:00	6.5	188.1	-3.6	97.1	-	42.9	883.9
12/10/2018 9:00	5.7	198.4	-3.4	97.1	-	42.7	883.4
12/10/2018 10:00	4.4	204.2	-3.2	97.1	-	43.1	883.5
12/10/2018 11:00	3.3	221.2	-3.0	97.2	-	43.8	883.7
12/10/2018 12:00	2.8	216.7	-2.9	97.1	-	43.1	883.5
12/10/2018 13:00	2.9	215.2	-2.9	97.1	-	44.3	883.5
12/10/2018 14:00	2.7	208.9	-3.0	97.3	-	43.8	884.1
12/10/2018 15:00	3.5	206.3	-3.0	97.4	-	44.0	885.0
12/10/2018 16:00	3.7	222.8	-2.8	97.5	-	44.0	884.7
12/10/2018 17:00	3.6	305.4	-2.9	97.6	-	47.1	886.5
12/10/2018 18:00	2.7	287.6	-2.8	97.6	-	50.1	888.6
12/10/2018 19:00	2.3	281.3	-2.8	97.6	-	52.8	891.4
12/10/2018 20:00	3.2	299.4	-2.7	97.7	-	55.2	893.7
12/10/2018 21:00	3.3	295.2	-2.4	97.9	-	55.6	894.4
12/10/2018 22:00	3.0	244.2	-2.2	98.0	-	55.3	895.7
12/10/2018 23:00	3.1	295.7	-2.1	98.0	-	55.1	896.7
12/11/2018 0:00	3.9	316.0	-2.1	98.1	-	54.4	897.5
12/11/2018 1:00	4.1	317.0	-2.2	98.0	-	55.8	899.0
12/11/2018 2:00	3.3	337.3	-2.4	98.0	-	56.8	900.2
12/11/2018 3:00	3.1	348.3	-2.5	97.8	-	58.9	902.3
12/11/2018 4:00	2.0	53.9	-2.3	97.9	-	60.3	903.0
12/11/2018 5:00	4.2	202.6	-1.5	98.2	-	55.7	903.8
12/11/2018 6:00	6.0	194.6	-1.5	98.3	-	59.6	904.8
12/11/2018 7:00	4.4	198.3	-1.4	98.4	-	58.9	904.4
12/11/2018 8:00	4.1	204.7	-1.4	98.4	-	58.4	906.0
12/11/2018 9:00	7.0	201.0	-1.4	98.4	-	56.9	904.6
12/11/2018 10:00	5.3	216.3	-1.5	98.4	-	56.6	905.5
12/11/2018 11:00	5.6	222.1	-2.0	98.2	-	56.8	904.5
12/11/2018 12:00	3.6	220.0	-2.2	97.9	-	56.7	907.1
12/11/2018 13:00	-	-	-2.9	97.5	-	56.4	906.5
12/11/2018 14:00	-	-	-3.2	97.3	-	55.9	906.0
12/11/2018 15:00	-	-	-3.3	97.3	-	56.6	907.3
12/11/2018 16:00	-	-	-4.0	96.8	-	55.8	907.1
12/11/2018 17:00	-	-	-4.2	96.7	-	55.1	907.5
12/11/2018 18:00	-	-	-4.1	96.7	-	54.9	907.6
12/11/2018 19:00	-	-	-3.9	96.9	-	55.1	907.3
12/11/2018 20:00	-	-	-3.7	97.0	-	54.9	908.0
12/11/2018 21:00	-	-	-3.5	97.1	-	55.6	909.2
12/11/2018 22:00	-	-	-3.3	97.2	-	56.4	909.5
12/11/2018 23:00	-	-	-3.4	97.2	-	55.9	909.2
12/12/2018 0:00	-	-	-4.0	96.8	-	54.2	909.9
12/12/2018 1:00	-	-	-4.5	96.5	-	55.4	909.6
12/12/2018 2:00	-	-	-4.5	96.5	-	55.1	911.3
12/12/2018 3:00	-	-	-4.8	96.3	-	53.9	910.6
12/12/2018 4:00	-	-	-5.1	96.0	-	57.6	911.9
12/12/2018 5:00	-	-	-5.3	95.9	-	55.0	912.0

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
12/12/2018 6:00	-	-	-5.4	95.8	-	54.7	911.8
12/12/2018 7:00	-	-	-5.4	95.8	-	54.4	912.0
12/12/2018 8:00	-	-	-5.4	95.8	-	51.6	911.9
12/12/2018 9:00	-	-	-5.4	95.7	-	54.4	912.0
12/12/2018 10:00	-	-	-5.2	95.8	-	54.6	911.7
12/12/2018 11:00	-	-	-4.9	96.0	-	55.1	912.4
12/12/2018 12:00	-	-	-4.9	95.9	-	54.7	911.9
12/12/2018 13:00	-	-	-4.8	96.1	-	54.4	912.0
12/12/2018 14:00	-	-	-5.0	95.9	-	54.1	913.0
12/12/2018 15:00	-	-	-4.6	96.3	-	58.3	915.2
12/12/2018 16:00	-	-	-4.5	96.4	-	62.4	916.1
12/12/2018 17:00	-	-	-4.5	96.4	-	67.6	918.1
12/12/2018 18:00	-	-	-4.2	96.6	-	70.2	918.4
12/12/2018 19:00	-	-	-3.8	96.8	-	69.6	918.5
12/12/2018 20:00	-	-	-3.7	96.9	-	69.5	918.6
12/12/2018 21:00	-	-	-3.6	97.0	-	70.1	918.6
12/12/2018 22:00	-	-	-3.6	97.0	-	73.1	919.2
12/12/2018 23:00	-	-	-3.7	97.0	-	71.0	918.8
12/13/2018 0:00	-	-	-3.8	96.8	-	73.3	919.7
12/13/2018 1:00	-	-	-3.9	96.8	-	74.2	920.2
12/13/2018 2:00	-	-	-3.8	96.9	-	77.0	921.2
12/13/2018 3:00	-	-	-3.6	97.1	-	75.8	921.2
12/13/2018 4:00	-	-	-3.6	97.1	-	74.4	921.3
12/13/2018 5:00	-	-	-3.5	97.1	-	73.3	921.1
12/13/2018 6:00	-	-	-3.4	97.2	-	68.4	921.7
12/13/2018 7:00	-	-	-3.3	97.3	-	61.3	924.0
12/13/2018 8:00	-	-	-3.2	97.4	-	57.0	920.4
12/13/2018 9:00	-	-	-3.7	97.1	-	56.5	921.7
12/13/2018 10:00	-	-	-3.9	96.9	-	58.7	923.5
12/13/2018 11:00	-	-	-4.3	96.5	-	58.4	922.3
12/13/2018 12:00	-	-	-4.3	96.5	-	58.5	921.1
12/13/2018 13:00	-	-	-4.5	96.4	-	58.3	921.2
12/13/2018 14:00	-	-	-4.4	96.5	-	58.2	921.7
12/13/2018 15:00	-	-	-4.5	96.4	-	53.7	921.9
12/13/2018 16:00	-	-	-4.7	96.3	-	54.9	922.6
12/13/2018 17:00	-	-	-4.9	96.1	-	52.7	923.5
12/13/2018 18:00	-	-	-5.7	95.5	-	52.5	922.0
12/13/2018 19:00	-	-	-6.6	94.7	-	57.2	922.4
12/13/2018 20:00	-	-	-6.7	94.6	-	57.9	922.4
12/13/2018 21:00	-	-	-6.8	94.5	-	57.8	922.3
12/13/2018 22:00	-	-	-6.9	94.4	-	58.4	922.3
12/13/2018 23:00	-	-	-7.0	94.3	-	58.1	922.3
12/14/2018 0:00	-	-	-7.3	94.0	-	57.8	922.3
12/14/2018 1:00	-	-	-7.8	93.6	-	58.3	922.2
12/14/2018 2:00	-	-	-8.2	93.2	-	58.0	922.3
12/14/2018 3:00	-	-	-7.7	93.7	-	56.9	922.2
12/14/2018 4:00	-	-	-8.4	93.2	-	56.7	922.1
12/14/2018 5:00	-	-	-8.2	93.4	-	55.9	922.5
12/14/2018 6:00	-	-	-8.6	93.1	-	53.0	922.3
12/14/2018 7:00	-	-	-8.7	93.0	-	53.6	922.1
12/14/2018 8:00	-	-	-9.1	92.7	-	54.9	921.8
12/14/2018 9:00	-	-	-9.0	92.7	-	54.3	921.8
12/14/2018 10:00	-	-	-9.0	92.5	-	57.5	921.6
12/14/2018 11:00	-	-	-9.0	91.1	-	55.6	923.2
12/14/2018 12:00	-	-	-8.9	89.0	-	52.6	920.9

Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
12/14/2018 13:00	-	-	-8.6	78.5	-	54.2	923.2
12/14/2018 14:00	-	-	-8.5	74.5	-	55.2	921.2
12/14/2018 15:00	-	-	-8.5	71.4	-	54.7	922.2
12/14/2018 16:00	-	-	-8.4	65.3	-	55.7	922.7
12/14/2018 17:00	-	-	-8.1	59.7	-	54.2	921.7
12/14/2018 18:00	-	-	-7.7	56.1	-	54.9	922.0
12/14/2018 19:00	-	-	-7.8	51.1	-	53.9	921.8
12/14/2018 20:00	-	-	-7.6	42.7	-	56.6	920.4
12/14/2018 21:00	-	-	-7.9	40.4	-	55.8	922.1
12/14/2018 22:00	-	-	-8.5	44.6	-	54.9	921.7
12/14/2018 23:00	-	-	-8.8	50.4	-	55.4	922.0
12/15/2018 0:00	-	-	-8.7	47.2	-	54.6	922.1
12/15/2018 1:00	-	-	-9.7	52.0	-	52.9	922.0
12/15/2018 2:00	-	-	-9.6	51.9	-	54.1	922.3
12/15/2018 3:00	-	-	-9.2	50.9	-	52.7	922.3
12/15/2018 4:00	-	-	-9.4	48.5	-	52.2	922.3
12/15/2018 5:00	-	-	-10.1	58.7	-	53.1	922.3
12/15/2018 6:00	-	-	-9.3	53.6	-	53.0	922.3
12/15/2018 7:00	-	-	-8.6	48.1	-	53.1	922.3
12/15/2018 8:00	-	-	-8.3	49.7	-	52.3	922.3
12/15/2018 9:00	-	-	-8.2	49.9	-	52.5	922.2
12/15/2018 10:00	-	-	-8.3	54.5	-	53.0	922.0
12/15/2018 11:00	2.8	58.1	-7.9	56.1	-	52.9	922.2
12/15/2018 12:00	8.9	52.5	-7.4	55.9	-	50.7	923.3
12/15/2018 13:00	8.3	42.6	-6.7	53.6	-	49.7	922.3
12/15/2018 14:00	1.6	139.9	-5.8	53.1	-	50.9	922.2
12/15/2018 15:00	2.1	212.0	-7.2	80.4	-	51.5	922.7
12/15/2018 16:00	2.3	299.0	-6.4	91.4	-	52.2	923.5
12/15/2018 17:00	2.6	267.2	-6.1	93.2	-	51.8	923.9
12/15/2018 18:00	1.7	277.8	-5.5	94.4	-	53.1	924.5
12/15/2018 19:00	1.7	243.5	-5.1	90.3	-	54.9	924.7
12/15/2018 20:00	2.5	14.5	-4.4	84.3	-	56.3	925.0
12/15/2018 21:00	1.6	269.1	-4.7	90.8	-	57.2	926.1
12/15/2018 22:00	1.9	237.3	-5.0	95.5	-	58.5	926.8
12/15/2018 23:00	2.7	283.7	-4.3	95.9	-	58.1	927.5
12/16/2018 0:00	2.3	293.4	-4.3	96.2	-	-	927.8
12/16/2018 1:00	2.7	326.3	-4.1	93.5	-	62.1	928.1
12/16/2018 2:00	4.9	3.8	-4.7	95.0	-	62.2	928.8
12/16/2018 3:00	5.7	20.9	-4.8	96.0	-	59.5	929.0
12/16/2018 4:00	5.2	30.5	-4.5	96.4	-	61.8	929.2
12/16/2018 5:00	5.5	24.7	-4.2	96.6	-	63.6	930.1
12/16/2018 6:00	6.0	26.3	-4.0	96.8	-	63.2	930.5
12/16/2018 7:00	5.2	29.5	-4.0	96.9	-	65.4	931.6
12/16/2018 8:00	3.9	30.3	-3.8	97.0	-	68.0	931.8
12/16/2018 9:00	3.7	31.4	-3.5	97.1	-	68.7	931.7
12/16/2018 10:00	4.6	33.8	-3.3	97.1	-	68.8	931.7
12/16/2018 11:00	4.6	39.7	-2.7	95.9	-	67.9	932.0
12/16/2018 12:00	3.5	23.6	-2.6	94.4	-	67.8	932.4
12/16/2018 13:00	3.4	24.6	-2.7	96.7	-	70.3	932.7
12/16/2018 14:00	2.9	5.8	-2.9	96.8	-	69.5	933.1
12/16/2018 15:00	2.6	37.2	-2.8	97.3	-	71.8	933.5
12/16/2018 16:00	2.7	36.6	-2.5	97.6	-	71.6	934.0
12/16/2018 17:00	2.9	22.6	-2.6	97.6	-	72.8	935.6
12/16/2018 18:00	2.8	30.3	-2.4	97.8	-	75.5	937.0
12/16/2018 19:00	2.4	23.1	-2.1	97.9	-	79.4	937.9



**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
12/16/2018 20:00	2.4	15.9	-2.0	98.0	-	81.0	938.4
12/16/2018 21:00	2.0	145.0	-1.5	98.3	-	82.6	939.1
12/16/2018 22:00	2.0	131.9	-1.5	98.4	-	83.0	939.1
12/16/2018 23:00	4.0	158.9	-1.2	98.5	-	82.8	939.5
12/17/2018 0:00	3.1	170.4	-1.1	98.6	-	82.1	939.5
12/17/2018 1:00	3.4	160.1	-1.2	98.6	-	82.2	939.1
12/17/2018 2:00	3.5	181.0	-1.2	98.7	-	84.3	940.0
12/17/2018 3:00	4.2	204.1	-1.3	98.7	-	84.9	940.8
12/17/2018 4:00	3.0	205.8	-1.0	98.7	-	84.1	941.9
12/17/2018 5:00	2.1	192.1	-1.1	98.7	-	86.3	942.2
12/17/2018 6:00	1.6	202.3	-1.4	98.7	-	83.3	942.2
12/17/2018 7:00	1.9	154.6	-1.4	98.6	-	82.1	942.3
12/17/2018 8:00	2.5	161.2	-1.4	98.6	-	87.4	942.5
12/17/2018 9:00	2.6	173.5	-1.3	98.6	-	90.5	943.8
12/17/2018 10:00	5.9	184.3	-1.1	98.7	-	88.3	944.0
12/17/2018 11:00	4.5	183.2	-1.1	98.7	-	89.8	943.1
12/17/2018 12:00	1.2	94.1	-0.9	98.5	-	89.8	942.9
12/17/2018 13:00	1.7	198.5	-0.8	98.5	-	89.5	943.0
12/17/2018 14:00	2.2	140.3	-1.0	98.6	-	88.1	943.0
12/17/2018 15:00	2.0	17.0	-1.4	98.7	-	87.4	943.0
12/17/2018 16:00	1.4	351.3	-1.4	98.6	-	88.8	943.0
12/17/2018 17:00	1.0	149.3	-1.4	98.6	-	89.2	943.1
12/17/2018 18:00	1.4	172.0	-1.4	98.6	-	89.0	943.1
12/17/2018 19:00	5.9	110.2	-1.5	98.0	-	90.9	943.3
12/17/2018 20:00	6.1	103.2	-1.0	91.7	-	89.0	943.4
12/17/2018 21:00	1.6	220.9	-1.5	98.1	-	88.5	943.5
12/17/2018 22:00	1.9	24.8	-1.5	97.5	-	88.3	943.5
12/17/2018 23:00	2.6	26.6	-1.4	94.3	-	88.0	943.6
12/18/2018 0:00	1.6	46.1	-1.3	93.3	-	88.0	943.5
12/18/2018 1:00	1.9	192.1	-1.2	92.0	-	87.4	943.5
12/18/2018 2:00	1.4	267.8	-1.1	91.5	-	86.9	943.4
12/18/2018 3:00	2.4	189.4	-1.2	93.4	-	86.7	943.5
12/18/2018 4:00	1.9	35.4	-1.5	97.1	-	86.0	943.6
12/18/2018 5:00	1.9	340.4	-1.6	97.5	-	87.8	943.7
12/18/2018 6:00	2.4	321.8	-1.5	98.2	-	89.7	943.6
12/18/2018 7:00	1.4	224.8	-1.4	98.4	-	90.8	944.2
12/18/2018 8:00	1.4	208.1	-1.3	98.5	-	92.1	-
12/18/2018 9:00	2.8	174.7	-1.2	98.5	-	90.5	-
12/18/2018 10:00	3.2	195.4	-0.9	98.5	-	92.0	-
12/18/2018 11:00	2.4	194.8	-0.6	98.2	-	91.3	-
12/18/2018 12:00	2.6	207.1	-0.6	97.9	-	90.6	-
12/18/2018 13:00	4.5	194.8	-0.9	98.2	-	90.5	-
12/18/2018 14:00	3.8	185.0	-0.9	98.3	-	90.4	-
12/18/2018 15:00	5.8	181.0	-1.1	98.6	-	90.7	-
12/18/2018 16:00	5.7	183.6	-1.2	98.8	-	90.2	-
12/18/2018 17:00	2.8	180.3	-1.1	98.8	-	89.4	-
12/18/2018 18:00	3.1	171.6	-1.1	98.8	-	89.6	-
12/18/2018 19:00	3.4	169.7	-1.1	98.8	-	89.8	-
12/18/2018 20:00	2.8	189.5	-1.3	98.7	-	92.3	-
12/18/2018 21:00	5.1	201.5	-1.5	98.6	-	92.2	-
12/18/2018 22:00	6.0	201.4	-1.5	98.6	-	89.1	-
12/18/2018 23:00	6.1	202.0	-1.5	98.7	-	89.1	-
12/19/2018 0:00	5.2	205.3	-1.8	98.6	-	87.5	-
12/19/2018 1:00	4.3	210.1	-2.2	98.4	-	87.7	-
12/19/2018 2:00	3.1	222.1	-2.7	98.0	-	87.0	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
12/19/2018 3:00	2.6	228.3	-2.9	97.8	-	86.8	-
12/19/2018 4:00	3.8	219.9	-3.3	97.5	-	87.1	-
12/19/2018 5:00	5.6	227.6	-3.6	97.2	-	86.1	-
12/19/2018 6:00	5.7	226.6	-4.0	97.0	-	85.7	-
12/19/2018 7:00	5.0	240.7	-4.4	96.7	-	86.7	-
12/19/2018 8:00	4.4	226.3	-4.9	96.4	-	86.3	-
12/19/2018 9:00	3.7	220.0	-5.4	96.0	-	86.3	-
12/19/2018 10:00	3.6	228.8	-5.3	95.9	-	86.1	-
12/19/2018 11:00	3.1	218.1	-5.4	95.6	-	85.9	-
12/19/2018 12:00	2.2	232.4	-5.2	95.7	-	85.7	-
12/19/2018 13:00	2.0	215.3	-5.4	95.7	-	85.4	-
12/19/2018 14:00	1.9	207.3	-5.5	95.7	-	85.6	-
12/19/2018 15:00	1.8	205.1	-5.7	95.6	-	85.4	-
12/19/2018 16:00	2.1	191.5	-6.3	95.2	-	85.4	-
12/19/2018 17:00	1.3	179.0	-6.5	94.9	-	85.3	-
12/19/2018 18:00	0.7	59.0	-6.4	94.9	-	85.0	-
12/19/2018 19:00	1.1	73.9	-6.3	95.0	-	85.0	-
12/19/2018 20:00	3.0	153.2	-6.4	95.0	-	84.8	-
12/19/2018 21:00	3.6	164.3	-6.6	94.7	-	85.0	-
12/19/2018 22:00	1.7	163.1	-6.7	94.5	-	85.0	-
12/19/2018 23:00	1.3	151.0	-6.8	94.1	-	84.6	-
12/20/2018 0:00	0.6	144.1	-7.0	93.5	-	84.7	-
12/20/2018 1:00	0.8	148.4	-6.8	93.3	-	84.3	-
12/20/2018 2:00	0.3	136.7	-6.8	94.0	-	84.4	-
12/20/2018 3:00	1.7	41.9	-7.0	94.4	-	82.4	-
12/20/2018 4:00	1.6	52.7	-7.1	94.2	-	85.0	-
12/20/2018 5:00	1.3	61.6	-7.3	93.6	-	85.6	-
12/20/2018 6:00	0.7	69.5	-7.5	93.0	-	84.8	-
12/20/2018 7:00	0.5	85.5	-7.7	93.8	-	84.7	-
12/20/2018 8:00	0.4	86.5	-7.7	93.7	-	84.1	-
12/20/2018 9:00	0.9	61.0	-8.1	92.9	-	84.1	-
12/20/2018 10:00	0.6	78.3	-8.5	92.2	-	84.3	-
12/20/2018 11:00	0.5	80.2	-7.2	91.5	-	83.5	-
12/20/2018 12:00	0.0	80.2	-6.2	93.4	-	83.2	-
12/20/2018 13:00	0.4	25.5	-8.2	91.3	-	83.7	-
12/20/2018 14:00	1.1	45.9	-9.1	91.9	-	83.2	-
12/20/2018 15:00	1.0	356.3	-9.0	92.8	-	83.5	-
12/20/2018 16:00	1.5	355.4	-9.3	92.8	-	83.3	-
12/20/2018 17:00	2.1	350.8	-9.3	92.7	-	83.3	-
12/20/2018 18:00	1.5	56.5	-9.5	92.9	-	83.1	-
12/20/2018 19:00	0.6	147.3	-9.4	92.5	-	82.7	-
12/20/2018 20:00	1.3	206.1	-9.3	92.3	-	82.9	-
12/20/2018 21:00	1.5	196.2	-9.2	92.5	-	82.8	-
12/20/2018 22:00	2.4	219.5	-9.3	92.4	-	82.8	-
12/20/2018 23:00	2.6	189.7	-9.2	92.5	-	82.6	-
12/21/2018 0:00	2.4	213.4	-9.5	92.2	-	81.9	-
12/21/2018 1:00	2.0	202.1	-9.9	91.7	-	81.9	-
12/21/2018 2:00	1.8	225.3	-10.2	91.4	-	82.2	-
12/21/2018 3:00	2.1	214.8	-10.0	91.6	-	81.8	-
12/21/2018 4:00	2.6	212.8	-9.9	91.7	-	82.0	-
12/21/2018 5:00	3.1	217.0	-9.7	91.9	-	82.0	-
12/21/2018 6:00	3.7	208.4	-9.5	92.2	-	81.9	-
12/21/2018 7:00	3.8	210.0	-9.2	92.4	-	81.7	-
12/21/2018 8:00	2.3	217.0	-9.6	92.0	-	81.9	-
12/21/2018 9:00	1.1	126.0	-9.6	91.6	-	81.5	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
12/21/2018 10:00	0.9	54.8	-9.3	91.1	-	81.2	-
12/21/2018 11:00	0.6	189.8	-8.6	92.0	-	81.1	-
12/21/2018 12:00	0.5	53.2	-8.5	91.2	-	80.5	-
12/21/2018 13:00	0.7	24.7	-8.2	90.8	-	80.4	-
12/21/2018 14:00	0.1	356.9	-7.7	92.1	-	80.1	-
12/21/2018 15:00	0.3	16.1	-7.7	92.4	-	80.4	-
12/21/2018 16:00	1.7	30.7	-8.3	91.6	-	81.1	-
12/21/2018 17:00	1.5	31.2	-8.2	91.3	-	81.1	-
12/21/2018 18:00	1.6	33.4	-8.2	91.5	-	80.4	-
12/21/2018 19:00	2.1	40.1	-8.3	90.7	-	80.5	-
12/21/2018 20:00	2.8	36.0	-8.3	89.7	-	80.5	-
12/21/2018 21:00	4.2	36.2	-8.5	89.3	-	80.1	-
12/21/2018 22:00	2.8	75.9	-8.9	90.0	-	80.4	-
12/21/2018 23:00	1.0	0.5	-8.5	91.2	-	79.6	-
12/22/2018 0:00	1.3	33.0	-8.2	89.2	-	79.2	-
12/22/2018 1:00	1.0	68.5	-8.6	90.8	-	78.7	-
12/22/2018 2:00	1.2	203.8	-9.3	92.0	-	79.9	-
12/22/2018 3:00	1.5	181.9	-9.1	91.6	-	78.8	-
12/22/2018 4:00	1.9	190.6	-9.8	91.7	-	79.4	-
12/22/2018 5:00	0.8	208.7	-9.2	91.9	-	78.6	-
12/22/2018 6:00	1.4	95.5	-9.1	90.6	-	78.7	-
12/22/2018 7:00	1.3	166.4	-9.8	91.3	-	78.4	-
12/22/2018 8:00	1.4	146.8	-9.5	90.7	-	77.7	-
12/22/2018 9:00	1.5	123.6	-9.3	89.9	-	78.2	-
12/22/2018 10:00	2.5	155.9	-9.8	89.0	-	77.9	-
12/22/2018 11:00	1.5	151.1	-8.8	88.5	-	77.9	-
12/22/2018 12:00	7.7	60.5	-8.6	81.3	-	78.7	-
12/22/2018 13:00	8.3	21.9	-7.9	78.8	-	78.1	-
12/22/2018 14:00	6.1	69.2	-8.5	80.5	-	78.5	-
12/22/2018 15:00	8.4	68.5	-8.1	77.6	-	78.8	-
12/22/2018 16:00	12.4	54.3	-7.5	75.8	-	76.8	-
12/22/2018 17:00	16.9	51.8	-6.9	72.9	-	76.4	-
12/22/2018 18:00	11.2	66.8	-6.8	70.7	-	76.2	-
12/22/2018 19:00	5.8	85.0	-6.7	70.0	-	76.5	-
12/22/2018 20:00	6.7	57.0	-5.7	66.8	-	76.2	-
12/22/2018 21:00	7.9	53.0	-5.6	67.8	-	75.8	-
12/22/2018 22:00	4.0	80.1	-5.9	69.7	-	76.7	-
12/22/2018 23:00	5.5	68.4	-6.3	73.5	-	75.5	-
12/23/2018 0:00	7.4	54.1	-6.3	75.7	-	75.7	-
12/23/2018 1:00	9.2	34.0	-6.3	77.7	-	75.7	-
12/23/2018 2:00	10.2	35.6	-6.1	75.7	-	75.7	-
12/23/2018 3:00	10.4	36.2	-6.2	76.7	-	75.4	-
12/23/2018 4:00	9.0	42.5	-6.3	76.7	-	75.6	-
12/23/2018 5:00	8.8	51.6	-6.3	76.1	-	77.4	-
12/23/2018 6:00	8.9	47.2	-6.3	74.2	-	75.5	-
12/23/2018 7:00	8.3	58.4	-6.4	75.0	-	75.4	-
12/23/2018 8:00	4.3	75.1	-6.8	75.9	-	75.8	-
12/23/2018 9:00	5.9	49.4	-6.6	73.8	-	75.2	-
12/23/2018 10:00	5.9	59.3	-6.4	73.4	-	74.9	-
12/23/2018 11:00	6.9	47.5	-5.9	72.2	-	75.1	-
12/23/2018 12:00	5.1	51.2	-5.7	73.2	-	74.9	-
12/23/2018 13:00	6.2	38.4	-5.6	76.1	-	74.5	-
12/23/2018 14:00	6.7	35.0	-6.4	92.9	-	76.2	-
12/23/2018 15:00	7.3	34.5	-6.4	94.0	-	74.9	-
12/23/2018 16:00	6.0	42.8	-6.3	92.6	-	74.7	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
12/23/2018 17:00	2.2	79.4	-6.5	92.2	-	74.6	-
12/23/2018 18:00	0.9	100.6	-6.3	94.1	-	74.2	-
12/23/2018 19:00	2.2	60.1	-6.1	92.0	-	73.5	-
12/23/2018 20:00	2.7	53.9	-5.9	92.6	-	75.3	-
12/23/2018 21:00	2.1	54.8	-5.8	94.4	-	76.5	-
12/23/2018 22:00	3.2	32.1	-5.6	95.5	-	77.7	-
12/23/2018 23:00	3.6	36.0	-5.4	95.9	-	79.4	-
12/24/2018 0:00	4.1	37.7	-5.3	95.8	-	79.8	-
12/24/2018 1:00	2.9	33.2	-5.2	96.1	-	79.8	-
12/24/2018 2:00	0.6	200.1	-5.5	95.6	-	81.2	-
12/24/2018 3:00	0.7	201.6	-5.6	95.5	-	83.2	-
12/24/2018 4:00	1.1	202.0	-5.7	95.5	-	83.8	-
12/24/2018 5:00	2.9	212.0	-5.5	95.7	-	84.0	-
12/24/2018 6:00	4.1	206.1	-5.2	96.0	-	86.4	-
12/24/2018 7:00	4.1	208.3	-5.1	96.2	-	85.5	-
12/24/2018 8:00	3.6	210.6	-4.7	96.4	-	86.5	-
12/24/2018 9:00	3.8	208.4	-4.6	96.4	-	84.5	-
12/24/2018 10:00	3.5	215.0	-4.4	96.4	-	84.3	-
12/24/2018 11:00	3.0	214.5	-4.1	96.3	-	84.0	-
12/24/2018 12:00	2.2	220.8	-3.9	96.4	-	83.7	-
12/24/2018 13:00	2.2	208.0	-4.0	96.3	-	83.3	-
12/24/2018 14:00	3.0	200.7	-4.0	96.3	-	84.0	-
12/24/2018 15:00	2.8	196.7	-4.0	96.7	-	83.9	-
12/24/2018 16:00	3.0	205.9	-4.0	96.8	-	83.7	-
12/24/2018 17:00	3.4	208.2	-3.9	96.9	-	83.2	-
12/24/2018 18:00	3.9	217.4	-3.8	97.4	-	83.4	-
12/24/2018 19:00	3.9	204.5	-3.7	97.3	-	84.0	-
12/24/2018 20:00	3.7	209.9	-3.7	97.2	-	83.6	-
12/24/2018 21:00	2.9	215.8	-3.7	97.2	-	83.5	-
12/24/2018 22:00	3.4	210.9	-3.8	97.1	-	83.3	-
12/24/2018 23:00	2.7	212.3	-3.9	97.0	-	83.1	-
12/25/2018 0:00	2.7	213.8	-4.1	96.9	-	82.9	-
12/25/2018 1:00	2.9	194.2	-4.4	96.7	-	83.2	-
12/25/2018 2:00	2.5	197.0	-4.3	96.7	-	82.9	-
12/25/2018 3:00	2.1	213.7	-4.1	96.9	-	83.7	-
12/25/2018 4:00	2.1	222.5	-3.9	97.0	-	88.0	-
12/25/2018 5:00	2.6	207.1	-3.9	97.0	-	88.5	-
12/25/2018 6:00	2.0	210.5	-4.0	96.9	-	87.8	-
12/25/2018 7:00	2.2	211.5	-4.1	96.9	-	86.8	-
12/25/2018 8:00	2.0	213.3	-4.1	96.8	-	86.9	-
12/25/2018 9:00	1.3	143.7	-4.7	96.4	-	87.2	-
12/25/2018 10:00	0.8	88.0	-5.2	95.8	-	87.6	-
12/25/2018 11:00	1.2	140.2	-5.1	95.0	-	86.6	-
12/25/2018 12:00	0.8	86.5	-4.9	93.9	-	87.0	-
12/25/2018 13:00	1.1	66.1	-5.0	90.3	-	86.4	-
12/25/2018 14:00	1.2	32.4	-5.0	87.0	-	86.8	-
12/25/2018 15:00	-	-	-5.7	86.6	-	86.7	-
12/25/2018 16:00	-	-	-5.5	85.3	-	86.4	-
12/25/2018 17:00	1.5	34.1	-5.6	83.2	-	86.5	-
12/25/2018 18:00	4.3	32.2	-6.0	83.0	-	86.1	-
12/25/2018 19:00	4.1	16.6	-5.7	79.6	-	86.4	-
12/25/2018 20:00	4.0	11.4	-5.4	73.7	-	86.6	-
12/25/2018 21:00	1.7	357.3	-4.7	66.6	-	85.3	-
12/25/2018 22:00	1.8	229.4	-4.8	71.2	-	85.8	-
12/25/2018 23:00	1.5	221.8	-5.8	88.3	-	86.8	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
12/26/2018 0:00	2.0	57.2	-6.1	94.4	-	86.5	-
12/26/2018 1:00	3.4	30.8	-6.2	94.3	-	86.7	-
12/26/2018 2:00	4.3	39.4	-6.0	93.3	-	87.4	-
12/26/2018 3:00	5.9	39.5	-6.1	93.3	-	89.9	-
12/26/2018 4:00	5.2	36.0	-6.0	94.2	-	90.6	-
12/26/2018 5:00	4.8	31.2	-6.1	95.5	-	91.8	-
12/26/2018 6:00	4.6	32.9	-6.1	95.4	-	93.6	-
12/26/2018 7:00	3.8	33.1	-6.1	95.4	-	93.0	-
12/26/2018 8:00	3.7	31.1	-5.9	93.5	-	92.4	-
12/26/2018 9:00	4.1	35.2	-5.8	91.9	-	92.0	-
12/26/2018 10:00	3.8	40.5	-5.4	90.6	-	93.4	-
12/26/2018 11:00	3.7	31.4	-5.1	89.6	-	93.0	-
12/26/2018 12:00	3.9	37.5	-5.1	87.6	-	93.0	-
12/26/2018 13:00	2.8	359.8	-4.3	83.3	-	92.7	-
12/26/2018 14:00	2.6	8.5	-4.1	81.4	-	92.9	-
12/26/2018 15:00	1.9	30.0	-4.5	90.1	-	93.3	-
12/26/2018 16:00	2.5	20.7	-4.9	95.4	-	92.4	-
12/26/2018 17:00	2.3	146.8	-4.1	96.8	-	94.1	-
12/26/2018 18:00	1.6	45.2	-4.2	95.9	-	93.4	-
12/26/2018 19:00	2.1	12.0	-4.1	93.8	-	92.0	-
12/26/2018 20:00	1.9	228.5	-3.6	95.4	-	94.7	-
12/26/2018 21:00	3.3	213.6	-3.7	97.0	-	95.8	-
12/26/2018 22:00	4.3	193.5	-3.6	97.6	-	93.8	-
12/26/2018 23:00	5.1	198.2	-3.5	97.5	-	91.0	-
12/27/2018 0:00	4.4	206.1	-3.3	97.6	-	92.3	-
12/27/2018 1:00	3.6	214.1	-3.1	97.7	-	92.5	-
12/27/2018 2:00	3.8	215.7	-2.9	97.8	-	94.2	-
12/27/2018 3:00	4.5	217.9	-2.9	97.8	-	92.7	-
12/27/2018 4:00	5.7	209.0	-2.9	97.9	-	92.0	-
12/27/2018 5:00	4.8	210.8	-2.8	97.9	-	91.4	-
12/27/2018 6:00	4.8	220.0	-2.7	98.0	-	89.4	-
12/27/2018 7:00	3.8	212.9	-2.7	98.0	-	88.3	-
12/27/2018 8:00	4.0	207.8	-2.8	97.9	-	-	-
12/27/2018 9:00	4.0	212.3	-2.7	97.9	-	87.8	-
12/27/2018 10:00	3.1	215.7	-2.6	97.9	-	88.0	-
12/27/2018 11:00	3.1	209.9	-2.5	97.8	-	89.4	-
12/27/2018 12:00	3.8	205.3	-2.6	97.8	-	89.2	-
12/27/2018 13:00	3.5	194.8	-2.5	97.9	-	89.5	-
12/27/2018 14:00	3.2	194.8	-2.4	98.0	-	90.4	-
12/27/2018 15:00	5.0	194.6	-2.2	98.2	-	88.5	-
12/27/2018 16:00	4.5	210.0	-2.1	98.3	-	89.5	-
12/27/2018 17:00	4.2	216.4	-1.9	98.4	-	88.7	-
12/27/2018 18:00	3.8	216.4	-1.9	98.5	-	89.5	-
12/27/2018 19:00	3.1	219.2	-1.9	98.5	-	89.7	-
12/27/2018 20:00	3.3	216.8	-1.8	98.5	-	89.8	-
12/27/2018 21:00	3.7	215.2	-1.8	98.6	-	89.6	-
12/27/2018 22:00	4.7	215.3	-1.7	98.6	-	88.8	-
12/27/2018 23:00	5.4	219.9	-1.6	98.7	-	88.9	-
12/28/2018 0:00	4.6	217.8	-1.6	98.7	-	88.5	-
12/28/2018 1:00	4.7	226.3	-1.6	98.7	-	88.1	-
12/28/2018 2:00	4.0	223.9	-1.5	98.8	-	88.1	-
12/28/2018 3:00	3.9	217.8	-1.4	98.8	-	87.5	-
12/28/2018 4:00	3.8	217.0	-1.4	98.8	-	87.9	-
12/28/2018 5:00	2.6	241.5	-1.4	98.9	-	87.4	-
12/28/2018 6:00	0.1	210.0	-1.4	98.8	-	89.0	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
12/28/2018 7:00	1.2	195.4	-1.5	98.8	-	88.4	-
12/28/2018 8:00	0.8	244.6	-1.6	98.8	-	88.5	-
12/28/2018 9:00	-	-	-1.7	98.7	-	88.4	-
12/28/2018 10:00	-	-	-1.7	98.5	-	88.1	-
12/28/2018 11:00	-	-	-1.4	98.3	-	87.8	-
12/28/2018 12:00	0.1	225.1	-1.1	98.0	-	86.7	-
12/28/2018 13:00	0.2	184.2	-2.2	97.3	-	87.4	-
12/28/2018 14:00	-	-	-3.0	97.2	-	87.4	-
12/28/2018 15:00	-	-	-2.8	97.6	-	87.4	-
12/28/2018 16:00	-	-	-3.4	97.3	-	87.5	-
12/28/2018 17:00	0.1	45.9	-3.6	96.1	-	87.3	-
12/28/2018 18:00	2.0	32.2	-3.6	95.2	-	87.3	-
12/28/2018 19:00	0.3	185.0	-3.9	96.3	-	87.2	-
12/28/2018 20:00	-	-	-3.9	96.8	-	87.1	-
12/28/2018 21:00	0.3	48.9	-4.0	96.1	-	86.8	-
12/28/2018 22:00	1.7	192.6	-4.3	97.0	-	86.5	-
12/28/2018 23:00	0.6	227.4	-4.1	96.6	-	86.8	-
12/29/2018 0:00	8.6	34.8	-4.4	96.4	-	87.2	-
12/29/2018 1:00	10.3	34.7	-4.5	97.2	-	87.9	-
12/29/2018 2:00	7.8	50.1	-4.7	96.9	-	87.5	-
12/29/2018 3:00	8.5	45.8	-4.8	96.8	-	88.7	-
12/29/2018 4:00	6.9	39.5	-4.9	96.8	-	88.4	-
12/29/2018 5:00	5.8	38.5	-4.9	96.7	-	89.4	-
12/29/2018 6:00	4.4	23.6	-5.4	96.3	-	88.9	-
12/29/2018 7:00	2.4	24.8	-6.3	95.5	-	89.6	-
12/29/2018 8:00	1.9	228.9	-6.4	95.4	-	90.7	-
12/29/2018 9:00	2.6	228.0	-6.3	95.4	-	91.3	-
12/29/2018 10:00	3.8	205.7	-6.0	95.6	-	89.5	-
12/29/2018 11:00	3.0	220.0	-5.6	95.8	-	89.8	-
12/29/2018 12:00	3.9	207.8	-5.5	95.9	-	89.5	-
12/29/2018 13:00	2.5	214.9	-5.3	95.9	-	89.3	-
12/29/2018 14:00	3.3	208.7	-5.3	96.0	-	89.7	-
12/29/2018 15:00	3.1	209.3	-5.4	96.1	-	89.4	-
12/29/2018 16:00	2.6	213.4	-5.5	96.1	-	89.4	-
12/29/2018 17:00	2.7	224.9	-5.5	96.1	-	89.1	-
12/29/2018 18:00	3.0	208.9	-5.8	95.9	-	89.0	-
12/29/2018 19:00	2.4	208.7	-5.8	95.8	-	88.6	-
12/29/2018 20:00	1.9	219.6	-6.3	95.3	-	89.0	-
12/29/2018 21:00	1.7	213.1	-6.5	95.2	-	88.6	-
12/29/2018 22:00	1.9	229.2	-6.4	95.3	-	88.6	-
12/29/2018 23:00	1.0	293.3	-6.0	95.6	-	88.7	-
12/30/2018 0:00	0.7	2.5	-5.8	95.7	-	88.4	-
12/30/2018 1:00	0.7	9.4	-5.9	95.6	-	88.1	-
12/30/2018 2:00	0.7	5.6	-6.0	95.6	-	88.5	-
12/30/2018 3:00	0.9	10.3	-6.0	95.5	-	88.2	-
12/30/2018 4:00	1.1	70.4	-7.0	94.6	-	88.6	-
12/30/2018 5:00	0.7	58.9	-7.3	94.4	-	88.3	-
12/30/2018 6:00	0.3	90.3	-7.3	94.5	-	88.1	-
12/30/2018 7:00	0.0	306.9	-7.4	94.3	-	87.9	-
12/30/2018 8:00	0.2	153.3	-7.5	94.2	-	88.1	-
12/30/2018 9:00	0.4	52.3	-7.8	93.9	-	87.8	-
12/30/2018 10:00	0.3	77.4	-7.7	93.9	-	88.0	-
12/30/2018 11:00	0.8	239.7	-6.4	94.5	-	86.3	-
12/30/2018 12:00	1.5	214.3	-5.7	94.8	-	86.8	-
12/30/2018 13:00	1.9	212.8	-6.0	94.7	-	86.9	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
12/30/2018 14:00	1.7	239.5	-6.4	94.6	-	86.8	-
12/30/2018 15:00	2.2	217.9	-6.9	94.6	-	87.4	-
12/30/2018 16:00	2.7	205.5	-7.3	94.5	-	87.7	-
12/30/2018 17:00	3.3	215.6	-7.2	94.6	-	88.1	-
12/30/2018 18:00	3.1	209.6	-6.9	94.8	-	87.6	-
12/30/2018 19:00	3.4	212.1	-6.6	94.9	-	87.7	-
12/30/2018 20:00	3.3	203.7	-6.5	94.7	-	87.7	-
12/30/2018 21:00	3.7	217.2	-6.2	94.4	-	87.6	-
12/30/2018 22:00	4.6	201.4	-5.4	93.5	-	87.3	-
12/30/2018 23:00	4.9	207.2	-5.2	93.5	-	87.1	-
12/31/2018 0:00	4.6	201.6	-4.7	92.2	-	86.6	-
12/31/2018 1:00	5.2	205.4	-4.5	89.4	-	86.2	-
12/31/2018 2:00	5.6	211.1	-4.5	87.2	-	86.3	-
12/31/2018 3:00	5.5	210.2	-4.1	88.3	-	87.1	-
12/31/2018 4:00	5.3	215.3	-4.2	90.5	-	86.5	-
12/31/2018 5:00	5.3	214.2	-4.5	96.0	-	85.9	-
12/31/2018 6:00	6.1	222.6	-4.5	97.4	-	87.1	-
12/31/2018 7:00	5.5	226.5	-4.3	97.4	-	86.5	-
12/31/2018 8:00	5.0	218.7	-4.1	97.3	-	87.9	-
12/31/2018 9:00	5.4	211.5	-3.8	97.4	-	87.1	-
12/31/2018 10:00	6.0	214.3	-3.5	97.5	-	92.2	-
12/31/2018 11:00	5.7	208.9	-3.3	97.6	-	90.1	-
12/31/2018 12:00	6.2	206.5	-3.0	97.9	-	87.9	-
12/31/2018 13:00	5.6	204.4	-2.8	98.0	-	85.7	-
12/31/2018 14:00	6.8	206.2	-2.7	98.1	-	86.4	-
12/31/2018 15:00	5.7	207.8	-2.6	98.2	-	86.5	-
12/31/2018 16:00	4.9	210.1	-2.4	98.3	-	85.3	-
12/31/2018 17:00	4.0	204.9	-2.4	98.3	-	99.9	-
12/31/2018 18:00	6.3	201.5	-2.0	98.5	-	91.4	-
12/31/2018 19:00	5.3	208.6	-1.9	98.6	-	89.0	-
12/31/2018 20:00	5.5	207.7	-1.6	98.7	-	86.6	-
12/31/2018 21:00	5.5	209.6	-1.4	98.8	-	86.0	-
12/31/2018 22:00	5.4	205.1	-1.3	98.9	-	85.0	-
12/31/2018 23:00	4.5	207.0	-1.1	99.0	-	85.9	-
1/1/2019 0:00	4.7	201.0	-0.8	99.1	-	85.3	-
1/1/2019 0:00	3.6	208.3	-0.6	99.2	-	85.8	-
1/1/2019 1:00	3.9	210.9	-0.7	99.3	-	87.5	-
1/1/2019 2:00	4.7	215.5	-0.7	99.3	-	89.5	-
1/1/2019 3:00	4.4	215.5	-0.8	99.3	-	91.6	-
1/1/2019 4:00	5.3	203.2	-0.7	99.3	-	90.9	-
1/1/2019 5:00	4.8	207.0	-0.6	99.3	-	90.1	-
1/1/2019 6:00	5.9	217.3	-0.6	99.3	-	91.7	-
1/1/2019 7:00	4.8	203.0	-0.6	99.3	-	90.9	-
1/1/2019 8:00	5.3	208.4	-0.1	99.3	-	93.4	-
1/1/2019 9:00	5.0	225.3	0.0	99.3	-	93.8	-
1/1/2019 10:00	7.3	204.6	0.0	99.3	-	90.6	965.8
1/1/2019 11:00	7.1	222.5	0.5	99.3	-	91.1	967.7
1/1/2019 12:00	10.2	198.9	1.3	98.5	-	91.6	969.3
1/1/2019 13:00	8.8	213.3	0.9	98.5	-	90.3	970.9
1/1/2019 14:00	7.4	212.5	0.6	99.3	-	89.4	972.5
1/1/2019 15:00	7.7	219.0	0.3	99.3	-	89.8	974.2
1/1/2019 16:00	6.0	225.3	-0.3	99.3	-	89.7	974.7
1/1/2019 17:00	3.4	234.7	-0.9	99.3	-	90.3	977.8
1/1/2019 18:00	1.8	226.1	-1.1	99.3	-	95.6	979.5
1/1/2019 19:00	1.7	217.0	-1.2	99.3	-	98.2	981.7

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
1/1/2019 20:00	1.4	217.6	-1.2	99.3	-	100.6	983.6
1/1/2019 21:00	1.1	218.6	-1.5	99.3	-	100.6	985.3
1/1/2019 22:00	2.6	226.6	-1.4	99.3	-	-	987.0
1/1/2019 23:00	2.5	222.3	-1.4	99.3	-	106.0	988.1
1/2/2019 0:00	2.2	223.7	-1.1	99.3	-	105.6	988.1
1/2/2019 1:00	2.2	236.3	-1.3	99.3	-	104.4	988.1
1/2/2019 2:00	2.0	222.0	-1.9	99.2	-	103.7	988.2
1/2/2019 3:00	1.9	213.0	-2.4	98.9	-	103.7	988.2
1/2/2019 4:00	2.3	216.3	-2.9	98.6	-	-	988.2
1/2/2019 5:00	1.7	206.1	-3.2	98.4	-	103.8	988.2
1/2/2019 6:00	1.9	215.2	-3.5	98.2	-	103.7	988.2
1/2/2019 7:00	1.9	217.3	-3.8	97.9	-	104.3	988.2
1/2/2019 8:00	1.8	208.6	-3.6	98.0	-	103.9	988.1
1/2/2019 9:00	1.6	223.9	-3.7	97.9	-	105.4	989.2
1/2/2019 10:00	1.5	208.5	-3.7	97.7	-	105.8	989.3
1/2/2019 11:00	1.3	214.6	-3.8	97.6	-	105.6	989.1
1/2/2019 12:00	1.4	218.5	-3.9	97.4	-	105.7	989.1
1/2/2019 13:00	1.1	221.9	-3.8	97.5	-	105.4	989.1
1/2/2019 14:00	1.3	201.1	-4.5	97.2	-	105.1	989.2
1/2/2019 15:00	1.3	201.2	-4.9	97.0	-	105.2	989.1
1/2/2019 16:00	1.1	195.4	-5.2	96.8	-	104.7	989.1
1/2/2019 17:00	1.0	212.3	-5.3	96.7	-	104.6	989.1
1/2/2019 18:00	1.3	196.7	-5.9	96.2	-	104.9	989.1
1/2/2019 19:00	1.3	194.1	-6.4	95.8	-	104.5	989.0
1/2/2019 20:00	1.1	202.1	-6.5	95.6	-	104.3	989.0
1/2/2019 21:00	1.0	173.3	-6.3	95.8	-	104.3	989.0
1/2/2019 22:00	1.0	171.2	-6.3	95.7	-	104.5	989.0
1/2/2019 23:00	1.1	114.9	-6.8	93.1	-	103.8	988.9
1/3/2019 0:00	-	-	-6.4	89.0	-	104.4	988.9
1/3/2019 1:00	-	-	-6.1	90.8	-	104.4	988.9
1/3/2019 2:00	-	-	-6.4	84.5	-	103.9	988.8
1/3/2019 3:00	-	-	-7.0	84.3	-	103.3	988.8
1/3/2019 4:00	-	-	-7.5	84.0	-	103.3	988.8
1/3/2019 5:00	-	-	-7.7	87.3	-	103.4	988.8
1/3/2019 6:00	-	-	-7.9	89.5	-	103.6	988.9
1/3/2019 7:00	-	-	-8.2	88.3	-	103.4	988.8
1/3/2019 8:00	-	-	-8.2	86.9	-	102.6	988.8
1/3/2019 9:00	-	-	-8.5	89.9	-	103.2	988.9
1/3/2019 10:00	-	-	-8.1	87.7	-	102.1	990.0
1/3/2019 11:00	-	-	-7.9	85.1	-	102.8	989.9
1/3/2019 12:00	-	-	-7.0	80.9	-	102.1	989.9
1/3/2019 13:00	-	-	-7.1	80.2	-	101.5	989.2
1/3/2019 14:00	-	-	-7.6	77.6	-	101.9	988.9
1/3/2019 15:00	-	-	-8.7	83.0	-	102.2	988.8
1/3/2019 16:00	-	-	-9.0	80.4	-	102.2	988.8
1/3/2019 17:00	-	-	-9.0	81.5	-	101.5	988.8
1/3/2019 18:00	-	-	-8.4	74.2	-	102.1	988.8
1/3/2019 19:00	-	-	-9.5	80.7	-	101.7	988.7
1/3/2019 20:00	-	-	-9.3	76.6	-	102.2	988.7
1/3/2019 21:00	-	-	-9.3	74.3	-	101.3	988.7
1/3/2019 22:00	-	-	-9.9	75.5	-	101.0	988.7
1/3/2019 23:00	-	-	-9.6	73.0	-	101.5	988.7
1/4/2019 0:00	-	-	-9.6	72.9	-	101.0	988.7
1/4/2019 1:00	-	-	-9.5	67.9	-	101.1	988.7
1/4/2019 2:00	-	-	-10.1	72.8	-	101.2	988.7



**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
1/4/2019 3:00	-	-	-11.5	83.5	-	101.3	988.6
1/4/2019 4:00	-	-	-11.3	79.6	-	101.0	988.6
1/4/2019 5:00	-	-	-11.6	81.3	-	101.3	988.7
1/4/2019 6:00	-	-	-12.4	84.1	-	100.8	988.7
1/4/2019 7:00	-	-	-12.3	81.2	-	100.5	988.7
1/4/2019 8:00	-	-	-12.2	81.5	-	100.8	988.7
1/4/2019 9:00	-	-	-12.7	85.1	-	100.8	988.9
1/4/2019 10:00	-	-	-10.1	78.1	-	98.1	990.3
1/4/2019 11:00	-	-	-9.6	75.3	-	99.6	989.7
1/4/2019 12:00	-	-	-9.1	76.0	-	98.9	989.3
1/4/2019 13:00	-	-	-10.2	81.5	-	99.9	989.0
1/4/2019 14:00	-	-	-11.2	84.5	-	100.2	988.8
1/4/2019 15:00	-	-	-12.3	85.7	-	100.4	988.8
1/4/2019 16:00	-	-	-11.7	83.1	-	100.5	988.9
1/4/2019 17:00	-	-	-11.6	81.7	-	100.2	988.8
1/4/2019 18:00	-	-	-12.2	83.6	-	99.9	988.8
1/4/2019 19:00	-	-	-13.1	85.7	-	100.1	988.8
1/4/2019 20:00	-	-	-12.9	84.1	-	99.8	988.8
1/4/2019 21:00	-	-	-12.5	81.9	-	99.6	988.8
1/4/2019 22:00	-	-	-12.6	82.8	-	99.7	988.8
1/4/2019 23:00	-	-	-12.8	82.9	-	99.9	988.8
1/5/2019 0:00	-	-	-12.8	82.7	-	99.6	988.8
1/5/2019 1:00	-	-	-13.3	84.0	-	99.6	988.8
1/5/2019 2:00	-	-	-13.9	85.9	-	99.4	988.8
1/5/2019 3:00	-	-	-13.1	83.4	-	99.7	988.8
1/5/2019 4:00	-	-	-13.7	84.4	-	99.1	988.7
1/5/2019 5:00	-	-	-14.8	86.9	-	99.2	988.8
1/5/2019 6:00	-	-	-14.7	86.7	-	99.6	988.7
1/5/2019 7:00	-	-	-13.9	87.7	-	98.7	988.7
1/5/2019 8:00	-	-	-14.4	87.1	-	99.3	988.8
1/5/2019 9:00	-	-	-14.1	87.0	-	99.4	988.9
1/5/2019 10:00	-	-	-13.7	86.6	-	99.1	988.8
1/5/2019 11:00	-	-	-13.7	85.1	-	99.3	988.9
1/5/2019 12:00	-	-	-13.9	84.7	-	99.2	988.9
1/5/2019 13:00	-	-	-14.1	84.1	-	99.1	988.8
1/5/2019 14:00	-	-	-14.5	83.5	-	99.3	988.7
1/5/2019 15:00	-	-	-14.9	85.5	-	99.2	988.7
1/5/2019 16:00	-	-	-15.1	81.8	-	99.4	988.7
1/5/2019 17:00	-	-	-14.3	75.9	-	98.8	988.9
1/5/2019 18:00	10.0	27.7	-14.0	71.6	-	96.9	988.1
1/5/2019 19:00	14.0	25.2	-14.0	68.4	-	96.8	987.2
1/5/2019 20:00	14.6	25.0	-14.0	65.2	-	96.4	987.4
1/5/2019 21:00	15.3	28.8	-13.9	60.8	-	96.1	987.3
1/5/2019 22:00	14.4	25.8	-14.3	62.8	-	96.2	989.0
1/5/2019 23:00	14.7	27.0	-14.5	62.7	-	93.7	988.9
1/6/2019 0:00	15.7	31.0	-14.3	59.8	-	91.6	988.2
1/6/2019 1:00	16.0	30.0	-14.3	58.5	-	89.5	988.5
1/6/2019 2:00	16.5	33.8	-14.3	57.2	-	95.0	988.0
1/6/2019 3:00	16.7	34.5	-14.2	56.4	-	49.3	987.8
1/6/2019 4:00	7.3	32.5	-14.3	57.2	-	81.5	989.3
1/6/2019 5:00	-	-	-14.2	58.6	-	80.4	987.9
1/6/2019 6:00	-	-	-14.3	62.7	-	79.9	988.2
1/6/2019 7:00	-	-	-14.2	64.4	-	-	988.3
1/6/2019 8:00	-	-	-14.2	64.9	-	80.0	989.2
1/6/2019 9:00	-	-	-14.4	66.5	-	79.8	989.2

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
1/6/2019 10:00	-	-	-14.6	67.6	-	80.1	987.8
1/6/2019 11:00	-	-	-14.5	66.9	-	80.3	987.8
1/6/2019 12:00	-	-	-14.5	66.0	-	79.8	988.9
1/6/2019 13:00	-	-	-14.4	64.6	-	80.2	988.8
1/6/2019 14:00	-	-	-14.7	65.7	-	80.1	988.5
1/6/2019 15:00	-	-	-15.0	67.5	-	80.5	988.4
1/6/2019 16:00	-	-	-15.2	71.8	-	80.6	988.5
1/6/2019 17:00	-	-	-15.4	75.5	-	80.6	989.0
1/6/2019 18:00	-	-	-15.7	79.8	-	80.7	988.6
1/6/2019 19:00	-	-	-15.6	77.1	-	80.7	988.7
1/6/2019 20:00	-	-	-15.6	76.5	-	80.5	988.7
1/6/2019 21:00	-	-	-15.9	80.4	-	80.6	988.8
1/6/2019 22:00	-	-	-15.8	79.4	-	80.6	988.8
1/6/2019 23:00	-	-	-15.8	78.0	-	80.9	988.8
1/7/2019 0:00	-	-	-15.6	75.0	-	80.7	988.8
1/7/2019 1:00	-	-	-15.8	76.4	-	80.7	988.8
1/7/2019 2:00	-	-	-16.0	75.9	-	80.7	988.8
1/7/2019 3:00	-	-	-16.4	80.1	-	80.8	988.9
1/7/2019 4:00	-	-	-16.9	83.6	-	80.7	988.9
1/7/2019 5:00	-	-	-16.9	83.7	-	80.7	988.9
1/7/2019 6:00	-	-	-17.2	84.1	-	80.4	988.9
1/7/2019 7:00	-	-	-17.2	84.4	-	80.3	988.9
1/7/2019 8:00	-	-	-17.7	83.6	-	80.5	988.9
1/7/2019 9:00	-	-	-17.9	83.1	-	80.4	989.1
1/7/2019 10:00	-	-	-16.3	82.3	-	79.8	990.6
1/7/2019 11:00	-	-	-16.7	81.7	-	80.3	990.8
1/7/2019 12:00	-	-	-16.4	82.5	-	80.4	989.5
1/7/2019 13:00	-	-	-17.5	82.8	-	80.4	989.0
1/7/2019 14:00	-	-	-17.2	83.2	-	80.5	989.1
1/7/2019 15:00	-	-	-16.6	84.2	-	80.9	989.3
1/7/2019 16:00	-	-	-16.0	85.2	-	80.6	989.5
1/7/2019 17:00	-	-	-15.4	85.7	-	80.5	990.0
1/7/2019 18:00	-	-	-15.1	86.2	-	82.6	990.5
1/7/2019 19:00	-	-	-13.6	87.7	-	85.7	991.0
1/7/2019 20:00	-	-	-12.7	88.8	-	87.8	991.5
1/7/2019 21:00	-	-	-11.2	90.3	-	88.0	991.3
1/7/2019 22:00	-	-	-10.9	90.7	-	89.5	991.7
1/7/2019 23:00	-	-	-10.3	91.4	-	89.9	992.1
1/8/2019 0:00	-	-	-9.3	92.5	-	91.5	992.5
1/8/2019 1:00	-	-	-8.8	93.0	-	91.6	992.6
1/8/2019 2:00	-	-	-8.6	93.2	-	92.5	993.0
1/8/2019 3:00	-	-	-8.0	93.7	-	92.5	993.1
1/8/2019 4:00	-	-	-7.9	93.9	-	92.1	993.4
1/8/2019 5:00	-	-	-7.9	93.8	-	92.5	993.4
1/8/2019 6:00	-	-	-8.1	93.6	-	92.1	993.5
1/8/2019 7:00	-	-	-8.1	93.6	-	92.1	993.5
1/8/2019 8:00	-	-	-7.9	93.8	-	92.0	993.6
1/8/2019 9:00	-	-	-8.5	93.1	-	91.5	993.8
1/8/2019 10:00	-	-	-8.9	91.9	-	91.0	995.2
1/8/2019 11:00	-	-	-9.2	91.4	-	90.3	994.1
1/8/2019 12:00	-	-	-9.9	90.9	-	91.0	994.5
1/8/2019 13:00	-	-	-10.9	90.2	-	91.5	994.0
1/8/2019 14:00	-	-	-11.3	90.2	-	91.3	993.3
1/8/2019 15:00	-	-	-12.1	89.5	-	92.8	993.0
1/8/2019 16:00	-	-	-11.9	88.9	-	93.4	993.7

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
1/8/2019 17:00	-	-	-11.7	88.8	-	92.5	993.7
1/8/2019 18:00	-	-	-10.4	79.7	-	85.3	994.0
1/8/2019 19:00	-	-	-9.6	69.9	-	89.5	993.3
1/8/2019 20:00	-	-	-8.9	65.9	-	79.9	994.7
1/8/2019 21:00	10.2	50.4	-8.3	59.8	-	79.7	992.9
1/8/2019 22:00	15.7	59.8	-8.3	58.9	-	79.9	993.4
1/8/2019 23:00	13.6	67.9	-9.1	65.1	-	79.0	993.2
1/9/2019 0:00	9.0	87.1	-9.5	71.9	-	80.9	993.8
1/9/2019 1:00	8.9	83.0	-9.2	66.6	-	80.0	993.3
1/9/2019 2:00	11.8	64.3	-8.7	70.0	-	80.6	994.0
1/9/2019 3:00	2.4	77.9	-10.1	91.4	-	80.3	994.1
1/9/2019 4:00	2.1	270.7	-10.2	91.5	-	81.1	994.5
1/9/2019 5:00	8.1	46.1	-9.9	87.3	-	80.6	994.7
1/9/2019 6:00	8.8	38.4	-9.7	85.9	-	80.7	994.7
1/9/2019 7:00	9.5	37.5	-9.6	85.0	-	80.4	994.5
1/9/2019 8:00	9.2	44.9	-9.4	83.0	-	80.4	994.6
1/9/2019 9:00	10.2	44.9	-9.3	90.1	-	80.2	994.9
1/9/2019 10:00	8.7	42.8	-9.5	92.3	-	81.6	994.7
1/9/2019 11:00	9.2	43.3	-9.3	92.6	-	81.3	995.2
1/9/2019 12:00	7.7	46.5	-9.2	92.6	-	80.8	994.9
1/9/2019 13:00	9.3	41.5	-8.8	92.7	-	80.6	995.0
1/9/2019 14:00	9.2	40.3	-8.8	93.0	-	80.9	995.4
1/9/2019 15:00	9.3	38.6	-8.8	93.0	-	94.5	995.2
1/9/2019 16:00	8.2	41.3	-9.0	93.1	-	89.6	995.2
1/9/2019 17:00	8.0	41.8	-9.0	93.2	-	84.7	995.3
1/9/2019 18:00	7.0	50.1	-8.9	93.2	-	85.8	995.2
1/9/2019 19:00	4.9	59.8	-8.8	93.3	-	85.0	995.3
1/9/2019 20:00	0.5	67.7	-8.5	93.5	-	85.0	995.5
1/9/2019 21:00	0.3	58.7	-8.3	93.7	-	85.5	995.9
1/9/2019 22:00	0.3	9.0	-8.1	93.9	-	85.9	996.5
1/9/2019 23:00	0.1	43.6	-8.0	94.0	-	86.9	997.2
1/10/2019 0:00	0.5	126.2	-8.1	93.8	-	86.9	998.8
1/10/2019 1:00	0.9	115.7	-8.1	93.8	-	91.3	1000.2
1/10/2019 2:00	0.8	176.4	-8.8	93.3	-	92.1	1001.1
1/10/2019 3:00	0.5	180.3	-8.3	93.7	-	93.7	1002.5
1/10/2019 4:00	0.0	202.4	-7.6	94.3	-	95.9	1003.9
1/10/2019 5:00	0.9	42.2	-6.7	95.1	-	98.2	1006.0
1/10/2019 6:00	2.2	40.6	-6.1	95.7	-	100.8	1007.7
1/10/2019 7:00	2.4	24.9	-5.1	96.5	-	102.9	1009.9
1/10/2019 8:00	3.4	208.2	-4.2	97.3	-	102.8	1010.6
1/10/2019 9:00	5.3	205.6	-4.1	97.3	-	104.6	1010.9
1/10/2019 10:00	5.6	201.5	-3.5	97.6	-	102.5	1011.3
1/10/2019 11:00	5.2	193.7	-2.1	98.5	-	99.7	1011.2
1/10/2019 12:00	5.0	188.2	-2.0	98.6	-	100.9	1011.6
1/10/2019 13:00	4.8	181.2	-1.8	98.8	-	100.0	1011.0
1/10/2019 14:00	2.3	192.1	-1.7	99.0	-	100.0	1012.0
1/10/2019 15:00	1.1	342.7	-1.5	99.2	-	101.6	1012.9
1/10/2019 16:00	2.2	338.2	-1.4	99.3	-	102.0	1014.0
1/10/2019 17:00	1.7	19.4	-1.7	99.2	-	102.9	1015.8
1/10/2019 18:00	1.9	29.8	-1.8	99.1	-	105.9	1017.9
1/10/2019 19:00	1.9	29.9	-1.8	99.1	-	108.4	1020.8
1/10/2019 20:00	2.4	22.2	-1.9	99.1	-	111.0	1023.9
1/10/2019 21:00	2.2	354.4	-1.4	99.2	-	112.8	1026.8
1/10/2019 22:00	1.2	178.5	-1.0	99.3	-	116.5	1029.5
1/10/2019 23:00	3.4	199.1	-0.9	99.3	-	118.8	1031.1

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
1/11/2019 0:00	3.0	205.2	-0.8	99.3	-	119.9	1032.9
1/11/2019 1:00	3.1	209.6	-0.9	99.3	-	121.6	1034.3
1/11/2019 2:00	2.5	211.3	-0.8	99.3	-	122.4	1035.6
1/11/2019 3:00	2.6	210.3	-0.8	99.3	-	122.8	1036.9
1/11/2019 4:00	2.1	199.6	-0.9	99.3	-	123.9	1037.8
1/11/2019 5:00	2.2	195.5	-1.0	99.3	-	126.0	1038.8
1/11/2019 6:00	2.1	196.1	-0.9	99.3	-	127.0	1039.3
1/11/2019 7:00	2.1	199.8	-1.0	99.3	-	127.1	1040.1
1/11/2019 8:00	2.3	205.4	-0.9	99.3	-	127.7	1040.5
1/11/2019 9:00	2.1	211.3	-0.8	99.3	-	127.1	1040.8
1/11/2019 10:00	1.9	209.5	-0.5	99.3	-	127.8	1041.2
1/11/2019 11:00	2.7	212.5	-0.5	99.3	-	127.9	1041.3
1/11/2019 12:00	2.5	214.3	-0.6	99.3	-	127.6	1041.4
1/11/2019 13:00	-	-	-0.5	99.3	-	127.6	1041.5
1/11/2019 14:00	-	-	-1.0	99.3	-	127.3	1041.9
1/11/2019 15:00	-	-	-1.6	99.3	-	127.1	1042.6
1/11/2019 16:00	-	-	-1.9	99.2	-	126.7	1042.2
1/11/2019 17:00	-	-	-2.1	99.0	-	126.1	1042.3
1/11/2019 18:00	-	-	-3.2	98.3	-	127.0	1042.2
1/11/2019 19:00	-	-	-4.2	97.6	-	126.5	1042.1
1/11/2019 20:00	-	-	-4.5	97.3	-	126.5	1042.2
1/11/2019 21:00	-	-	-4.1	97.6	-	126.0	1042.2
1/11/2019 22:00	-	-	-4.2	97.5	-	125.7	1042.1
1/11/2019 23:00	-	-	-4.7	97.2	-	125.8	1042.0
1/12/2019 0:00	-	-	-4.7	97.2	-	125.3	1042.0
1/12/2019 1:00	-	-	-4.3	97.4	-	125.2	1042.0
1/12/2019 2:00	-	-	-4.7	97.1	-	125.2	1042.0
1/12/2019 3:00	-	-	-4.9	96.8	-	124.9	1041.9
1/12/2019 4:00	-	-	-4.7	97.0	-	124.7	1041.9
1/12/2019 5:00	-	-	-4.9	96.5	-	125.0	1041.9
1/12/2019 6:00	-	-	-5.2	95.7	-	124.6	1041.9
1/12/2019 7:00	-	-	-4.8	94.8	-	124.9	1042.0
1/12/2019 8:00	-	-	-4.7	92.3	-	123.9	1041.9
1/12/2019 9:00	-	-	-4.7	94.1	-	124.6	1042.6
1/12/2019 10:00	-	-	-3.9	90.5	-	123.4	1042.4
1/12/2019 11:00	-	-	-4.1	89.6	-	123.5	1042.1
1/12/2019 12:00	-	-	-3.5	86.6	-	122.7	1042.0
1/12/2019 13:00	-	-	-3.0	82.9	-	123.2	1041.9
1/12/2019 14:00	-	-	-2.8	82.4	-	124.0	1042.0
1/12/2019 15:00	-	-	-3.0	88.5	-	124.3	1042.2
1/12/2019 16:00	-	-	-3.3	95.8	-	124.6	1042.6
1/12/2019 17:00	-	-	-3.3	98.0	-	125.0	1043.2
1/12/2019 18:00	-	-	-3.2	98.2	-	126.4	1044.4
1/12/2019 19:00	-	-	-2.7	98.5	-	126.9	1045.6
1/12/2019 20:00	-	-	-2.1	98.8	-	127.2	1046.8
1/12/2019 21:00	-	-	-1.5	99.1	-	129.9	1047.9
1/12/2019 22:00	-	-	-0.9	99.2	-	130.3	1048.4
1/12/2019 23:00	-	-	-0.3	99.3	-	130.5	1048.9
1/13/2019 0:00	-	-	-0.1	99.3	-	131.2	1049.5
1/13/2019 1:00	-	-	0.0	99.3	-	131.7	1049.9
1/13/2019 2:00	-	-	0.1	99.3	-	131.8	1050.1
1/13/2019 3:00	-	-	0.4	99.3	-	131.5	1050.2
1/13/2019 4:00	-	-	0.7	99.3	-	131.1	1051.8
1/13/2019 5:00	-	-	0.8	99.3	-	130.7	1052.0
1/13/2019 6:00	-	-	0.9	99.3	-	130.6	1052.4

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
1/13/2019 7:00	-	-	0.9	99.3	-	129.6	1052.7
1/13/2019 8:00	-	-	0.8	99.3	-	129.2	1053.0
1/13/2019 9:00	1.7	181.2	0.7	99.3	-	128.8	1054.0
1/13/2019 10:00	5.5	193.3	0.5	99.3	-	128.0	1054.2
1/13/2019 11:00	6.7	196.0	0.5	99.3	-	127.7	1054.8
1/13/2019 12:00	6.3	195.9	0.1	99.3	-	127.0	1054.9
1/13/2019 13:00	4.1	202.6	0.1	99.3	-	126.9	1054.6
1/13/2019 14:00	3.9	206.4	0.1	99.3	-	126.5	1055.0
1/13/2019 15:00	2.8	208.5	0.0	99.3	-	125.7	1055.4
1/13/2019 16:00	1.7	216.1	0.1	99.3	-	127.6	1055.9
1/13/2019 17:00	0.5	187.3	0.1	99.3	-	-	1056.7
1/13/2019 18:00	0.8	194.3	0.1	99.3	-	-	1057.1
1/13/2019 19:00	1.2	212.7	0.1	99.3	-	129.1	1057.4
1/13/2019 20:00	1.3	188.7	0.1	99.3	-	128.5	1057.5
1/13/2019 21:00	2.1	171.5	0.0	99.3	-	127.9	1057.6
1/13/2019 22:00	1.9	139.4	0.0	99.3	-	128.7	1057.7
1/13/2019 23:00	2.6	150.2	0.0	99.3	-	128.3	1057.8
1/14/2019 0:00	2.8	182.3	0.0	99.3	-	127.8	1057.8
1/14/2019 1:00	1.0	149.0	0.1	99.3	-	129.4	1057.8
1/14/2019 2:00	0.8	161.4	0.1	99.3	-	127.0	1057.8
1/14/2019 3:00	0.5	139.8	0.2	99.3	-	126.9	1057.9
1/14/2019 4:00	1.7	129.4	0.3	99.3	-	128.9	1057.9
1/14/2019 5:00	0.8	81.0	0.4	99.3	-	128.8	1057.9
1/14/2019 6:00	0.3	46.6	0.4	99.3	-	128.7	1057.9
1/14/2019 7:00	0.9	92.9	0.3	99.3	-	128.7	1058.1
1/14/2019 8:00	0.2	32.1	0.4	99.3	-	128.6	1058.0
1/14/2019 9:00	0.2	35.1	0.6	98.9	-	128.5	1058.2
1/14/2019 10:00	0.4	39.3	0.7	96.7	-	128.3	1060.5
1/14/2019 11:00	0.1	25.7	0.9	94.5	-	128.5	1060.7
1/14/2019 12:00	1.0	38.1	1.0	91.7	-	128.1	1060.8
1/14/2019 13:00	1.9	35.2	1.1	87.7	-	127.9	1060.8
1/14/2019 14:00	2.2	32.5	1.2	86.4	-	127.8	1060.8
1/14/2019 15:00	1.9	31.8	1.0	85.8	-	127.5	1060.8
1/14/2019 16:00	1.0	44.9	0.6	89.3	-	127.6	1060.9
1/14/2019 17:00	1.4	42.2	0.9	86.1	-	127.1	1060.8
1/14/2019 18:00	1.9	42.4	0.9	83.4	-	127.2	1060.9
1/14/2019 19:00	0.2	45.3	0.8	85.7	-	126.5	1060.9
1/14/2019 20:00	0.5	188.6	0.8	86.7	-	126.5	1060.9
1/14/2019 21:00	0.8	184.1	0.3	91.1	-	125.5	1060.9
1/14/2019 22:00	0.4	163.1	0.4	88.3	-	125.9	1060.8
1/14/2019 23:00	0.3	96.6	0.4	88.0	-	126.3	1060.9
1/15/2019 0:00	0.4	163.1	0.3	88.7	-	125.4	1060.8
1/15/2019 1:00	0.1	205.7	0.1	88.9	-	125.4	1060.9
1/15/2019 2:00	0.4	178.8	-0.1	89.6	-	124.8	1060.9
1/15/2019 3:00	0.0	178.0	0.2	86.7	-	124.4	1060.9
1/15/2019 4:00	0.9	67.7	0.3	83.8	-	124.5	1060.7
1/15/2019 5:00	3.6	43.9	0.7	80.0	-	124.1	1060.6
1/15/2019 6:00	1.6	90.6	-0.3	86.0	-	123.6	1060.8
1/15/2019 7:00	0.2	57.7	-0.1	85.0	-	123.1	1060.7
1/15/2019 8:00	1.2	100.9	-0.6	86.6	-	123.9	1060.8
1/15/2019 9:00	0.3	209.7	-1.0	91.5	-	123.3	1062.2
1/15/2019 10:00	0.2	187.6	0.6	81.4	-	123.6	1062.6
1/15/2019 11:00	0.1	183.1	1.1	79.5	-	123.5	1062.6
1/15/2019 12:00	0.1	51.5	1.5	70.1	-	123.9	1062.7
1/15/2019 13:00	0.2	179.4	0.2	83.8	-	123.7	1061.6

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
1/15/2019 14:00	0.0	224.4	0.4	81.9	-	124.0	1061.3
1/15/2019 15:00	0.0	27.8	-0.4	81.8	-	121.5	1061.0
1/15/2019 16:00	0.2	191.8	-1.3	88.9	-	-	1061.0
1/15/2019 17:00	0.0	193.3	-1.7	92.0	-	-	1061.0
1/15/2019 18:00	0.1	165.8	-2.0	92.5	-	-	1061.0
1/15/2019 19:00	0.4	75.7	-1.7	76.6	-	-	1061.0
1/15/2019 20:00	1.3	196.3	-2.5	94.9	-	-	1060.9
1/15/2019 21:00	0.4	186.8	-2.1	88.0	-	-	1060.8
1/15/2019 22:00	0.4	286.7	-2.1	84.7	-	-	1060.8
1/15/2019 23:00	0.1	261.8	-2.9	88.2	-	-	1060.9
1/16/2019 0:00	0.5	196.1	-3.2	94.1	-	-	1060.7
1/16/2019 1:00	1.5	234.2	-4.1	97.7	-	-	1060.9
1/16/2019 2:00	1.0	199.8	-4.4	99.3	-	-	1060.8
1/16/2019 3:00	0.8	184.4	-4.8	99.1	-	-	1060.8
1/16/2019 4:00	1.4	196.8	-5.1	98.7	-	-	1060.8
1/16/2019 5:00	1.1	190.2	-5.2	97.7	-	-	1060.8
1/16/2019 6:00	0.3	191.8	-5.6	96.7	-	-	1060.8
1/16/2019 7:00	1.3	192.9	-5.6	96.5	-	-	1060.7
1/16/2019 8:00	1.2	171.6	-6.0	96.0	-	-	1060.8
1/16/2019 9:00	1.3	212.6	-6.0	95.6	-	-	1061.0
1/16/2019 10:00	0.6	210.6	-5.4	94.2	-	-	1060.7
1/16/2019 11:00	0.4	198.3	-5.6	94.4	-	-	1061.0
1/16/2019 12:00	0.2	211.0	-5.7	94.8	-	-	1060.7
1/16/2019 13:00	0.4	182.0	-5.9	95.0	-	-	1060.7
1/16/2019 14:00	0.5	188.7	-6.1	94.7	-	-	1060.7
1/16/2019 15:00	0.4	182.6	-6.5	95.0	-	121.0	1060.7
1/16/2019 16:00	0.5	193.0	-6.9	95.1	-	-	1060.7
1/16/2019 17:00	0.0	161.0	-7.1	95.1	-	121.0	1060.8
1/16/2019 18:00	0.3	176.5	-7.3	95.0	-	-	1060.7
1/16/2019 19:00	0.3	183.7	-7.4	94.9	-	-	1060.7
1/16/2019 20:00	0.4	104.3	-7.5	95.0	-	-	1060.8
1/16/2019 21:00	2.7	81.2	-6.9	93.3	-	-	1060.5
1/16/2019 22:00	1.5	299.4	-7.5	94.7	-	-	1060.7
1/16/2019 23:00	1.2	209.8	-7.9	94.0	-	-	1060.8
1/17/2019 0:00	1.3	115.8	-7.6	93.6	-	-	1060.9
1/17/2019 1:00	1.9	142.3	-7.1	91.6	-	-	1060.8
1/17/2019 2:00	1.0	242.4	-7.1	90.3	-	-	1060.9
1/17/2019 3:00	3.0	75.2	-6.8	85.1	-	-	1060.6
1/17/2019 4:00	5.0	71.9	-6.7	78.0	-	119.4	1060.8
1/17/2019 5:00	5.2	62.3	-6.5	77.2	-	120.2	1060.6
1/17/2019 6:00	4.7	73.2	-6.9	77.8	-	120.8	1060.8
1/17/2019 7:00	6.9	60.2	-6.6	76.9	-	121.2	1060.2
1/17/2019 8:00	6.3	62.1	-6.4	76.3	-	121.1	1060.5
1/17/2019 9:00	4.1	79.0	-6.2	75.1	-	121.6	1061.0
1/17/2019 10:00	1.8	48.7	-5.5	71.9	-	121.6	1061.9
1/17/2019 11:00	2.5	57.7	-5.0	70.8	-	121.8	1061.9
1/17/2019 12:00	1.2	66.4	-4.8	71.0	-	120.9	1062.2
1/17/2019 13:00	0.6	24.4	-4.9	72.5	-	121.7	1061.3
1/17/2019 14:00	1.3	326.6	-6.2	79.2	-	121.6	1060.8
1/17/2019 15:00	0.5	244.4	-6.7	81.0	-	120.7	1060.7
1/17/2019 16:00	0.7	351.4	-6.4	79.1	-	120.9	1060.7
1/17/2019 17:00	0.7	294.7	-7.0	82.3	-	120.7	1060.8
1/17/2019 18:00	0.5	314.6	-7.3	84.9	-	-	1060.8
1/17/2019 19:00	0.9	240.2	-7.8	88.1	-	-	1060.9
1/17/2019 20:00	0.4	260.6	-7.1	84.0	-	-	1060.8

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
1/17/2019 21:00	0.3	270.4	-7.3	83.5	-	119.4	1060.8
1/17/2019 22:00	0.0	247.5	-7.5	84.7	-	119.6	1060.8
1/17/2019 23:00	1.2	202.3	-8.3	87.7	-	119.5	1060.8
1/18/2019 0:00	-	-	-8.0	86.4	-	119.6	1060.8
1/18/2019 1:00	-	-	-8.2	87.9	-	119.3	1060.9
1/18/2019 2:00	-	-	-8.3	93.2	-	119.5	1061.1
1/18/2019 3:00	-	-	-8.3	93.9	-	-	1061.4
1/18/2019 4:00	-	-	-8.9	93.7	-	121.5	1061.5
1/18/2019 5:00	-	-	-9.0	93.6	-	-	1061.5
1/18/2019 6:00	-	-	-8.2	93.5	-	121.0	1061.5
1/18/2019 7:00	-	-	-9.1	93.3	-	-	1061.9
1/18/2019 8:00	-	-	-8.6	93.4	-	-	1062.2
1/18/2019 9:00	-	-	-8.8	92.8	-	122.3	1062.6
1/18/2019 10:00	-	-	-8.9	92.3	-	123.2	1062.8
1/18/2019 11:00	-	-	-8.7	92.8	-	124.2	1063.4
1/18/2019 12:00	-	-	-8.0	93.1	-	126.3	1064.6
1/18/2019 13:00	-	-	-7.6	93.6	-	127.7	1065.9
1/18/2019 14:00	0.1	32.3	-7.2	94.2	-	-	1066.9
1/18/2019 15:00	0.2	46.0	-7.3	94.4	-	-	1068.4
1/18/2019 16:00	1.8	49.8	-6.5	95.2	-	-	1069.5
1/18/2019 17:00	4.5	42.4	-5.8	95.8	-	-	1070.0
1/18/2019 18:00	5.0	35.7	-5.4	95.8	-	132.5	1070.9
1/18/2019 19:00	5.4	36.2	-5.2	94.2	-	-	1070.8
1/18/2019 20:00	4.3	36.0	-5.5	93.4	-	-	1071.0
1/18/2019 21:00	5.5	28.9	-5.5	92.2	-	130.6	1071.0
1/18/2019 22:00	4.4	47.0	-6.3	94.5	-	130.2	1071.0
1/18/2019 23:00	7.5	24.2	-4.4	85.3	-	123.3	1070.3
1/19/2019 0:00	7.3	14.9	-4.6	83.8	-	130.2	1070.7
1/19/2019 1:00	9.2	34.9	-3.0	76.7	-	122.7	1071.6
1/19/2019 2:00	11.9	44.0	-2.8	74.7	-	128.8	1071.1
1/19/2019 3:00	10.6	53.7	-2.3	72.7	-	120.0	1073.2
1/19/2019 4:00	5.4	74.9	-3.7	77.1	-	120.6	1070.8
1/19/2019 5:00	2.6	57.3	-4.2	82.9	-	120.7	1071.3
1/19/2019 6:00	0.2	28.9	-5.0	92.0	-	-	1071.5
1/19/2019 7:00	0.2	20.9	-5.1	94.3	-	118.7	1071.7
1/19/2019 8:00	0.0	6.6	-6.9	95.4	-	118.7	1071.7
1/19/2019 9:00	0.1	182.2	-6.6	94.2	-	119.0	1071.8
1/19/2019 10:00	0.5	175.0	-6.8	95.0	-	119.2	1071.7
1/19/2019 11:00	0.1	218.3	-6.9	93.1	-	119.3	1072.3
1/19/2019 12:00	0.6	203.8	-8.5	93.7	-	119.6	1071.7
1/19/2019 13:00	1.6	190.5	-8.4	93.9	-	119.6	1071.7
1/19/2019 14:00	-	-	-7.6	94.4	-	118.9	1071.7
1/19/2019 15:00	-	-	-8.6	94.2	-	118.1	1071.6
1/19/2019 16:00	-	-	-9.3	93.5	-	118.0	1071.6
1/19/2019 17:00	-	-	-9.0	93.2	-	118.0	1071.6
1/19/2019 18:00	-	-	-7.9	94.1	-	-	1072.0
1/19/2019 19:00	-	-	-7.9	94.0	-	-	1072.3
1/19/2019 20:00	-	-	-8.5	93.5	-	-	1072.9
1/19/2019 21:00	-	-	-7.8	94.0	-	-	1073.3
1/19/2019 22:00	-	-	-7.2	94.7	-	-	1073.7
1/19/2019 23:00	4.1	185.6	-5.4	96.3	-	121.7	1074.2
1/20/2019 0:00	4.4	192.7	-5.0	96.7	-	-	1074.6
1/20/2019 1:00	4.4	190.2	-4.6	97.0	-	120.8	1075.3
1/20/2019 2:00	5.3	200.9	-4.0	97.4	-	-	1075.2
1/20/2019 3:00	5.2	201.1	-3.9	97.5	-	122.2	1075.8

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
1/20/2019 4:00	4.5	202.5	-3.8	97.6	-	-	1075.8
1/20/2019 5:00	4.9	203.0	-3.4	97.9	-	117.1	1076.0
1/20/2019 6:00	5.4	201.2	-3.3	98.0	-	129.8	1076.0
1/20/2019 7:00	5.5	202.2	-3.3	98.0	-	122.3	1076.0
1/20/2019 8:00	4.6	207.8	-3.3	98.0	-	-	1076.4
1/20/2019 9:00	3.7	210.3	-3.3	97.8	-	121.5	1076.9
1/20/2019 10:00	4.0	208.5	-2.9	98.0	-	119.7	1076.8
1/20/2019 11:00	3.9	210.9	-2.7	98.1	-	121.1	1077.0
1/20/2019 12:00	3.8	215.2	-2.5	98.2	-	120.2	1076.9
1/20/2019 13:00	3.2	212.2	-2.4	98.3	-	119.5	1077.1
1/20/2019 14:00	3.8	209.6	-2.4	98.5	-	122.2	1077.7
1/20/2019 15:00	3.7	215.2	-2.3	98.7	-	123.9	1077.5
1/20/2019 16:00	2.8	210.1	-2.4	98.7	-	122.5	1077.6
1/20/2019 17:00	4.2	206.7	-2.4	98.7	-	121.6	1077.6
1/20/2019 18:00	4.0	213.0	-2.5	98.7	-	123.5	1078.0
1/20/2019 19:00	4.8	205.1	-2.4	98.7	-	122.3	1078.3
1/20/2019 20:00	4.6	207.8	-2.5	98.7	-	122.0	1078.3
1/20/2019 21:00	3.1	208.8	-2.5	98.6	-	122.3	1078.0
1/20/2019 22:00	3.7	211.5	-2.6	98.6	-	123.6	1078.5
1/20/2019 23:00	3.3	209.7	-2.6	98.6	-	122.2	1078.8
1/21/2019 0:00	3.1	201.8	-2.6	98.6	-	123.7	1079.0
1/21/2019 1:00	3.3	210.0	-2.6	98.6	-	122.6	1079.2
1/21/2019 2:00	3.1	211.4	-2.6	98.6	-	122.1	1079.8
1/21/2019 3:00	2.8	217.5	-2.6	98.6	-	123.4	1080.0
1/21/2019 4:00	2.5	208.0	-2.7	98.6	-	124.0	1081.0
1/21/2019 5:00	2.1	214.0	-2.7	98.5	-	123.1	1080.9
1/21/2019 6:00	1.5	211.8	-2.7	98.5	-	124.9	1080.6
1/21/2019 7:00	2.1	221.7	-2.7	98.5	-	123.5	1080.6
1/21/2019 8:00	2.7	217.2	-2.6	98.6	-	122.9	1081.1
1/21/2019 9:00	2.9	216.8	-2.5	98.5	-	123.1	1080.8
1/21/2019 10:00	2.4	208.5	-2.4	98.5	-	122.9	1081.0
1/21/2019 11:00	2.0	220.1	-2.1	98.6	-	123.0	1080.9
1/21/2019 12:00	2.2	207.7	-2.2	98.7	-	122.7	1081.1
1/21/2019 13:00	2.4	198.3	-2.2	98.7	-	123.1	1081.5
1/21/2019 14:00	2.3	181.2	-2.6	98.5	-	123.2	1081.5
1/21/2019 15:00	2.7	179.4	-3.1	98.3	-	123.3	1081.6
1/21/2019 16:00	3.2	186.2	-3.5	98.0	-	123.1	1081.5
1/21/2019 17:00	1.0	201.3	-3.5	97.9	-	123.5	1081.6
1/21/2019 18:00	1.3	185.4	-3.6	97.9	-	122.8	1081.6
1/21/2019 19:00	1.8	312.1	-3.8	97.9	-	123.1	1082.2
1/21/2019 20:00	2.2	337.3	-3.9	97.8	-	122.5	1082.5
1/21/2019 21:00	0.9	350.9	-3.9	97.7	-	124.0	1083.8
1/21/2019 22:00	2.1	30.5	-4.0	97.6	-	126.6	1084.9
1/21/2019 23:00	1.0	39.4	-3.9	97.7	-	-	1087.1
1/22/2019 0:00	3.1	27.3	-4.0	97.6	-	133.2	1088.0
1/22/2019 1:00	2.2	21.0	-4.2	97.5	-	135.9	1088.8
1/22/2019 2:00	1.8	31.6	-4.3	97.4	-	135.8	1089.1
1/22/2019 3:00	2.5	28.7	-4.3	97.4	-	135.8	1089.1
1/22/2019 4:00	2.5	36.9	-4.3	97.4	-	135.6	1089.1
1/22/2019 5:00	2.3	40.2	-4.1	97.5	-	135.4	1089.2
1/22/2019 6:00	2.0	39.4	-3.9	97.6	-	135.1	1089.2
1/22/2019 7:00	1.6	34.9	-3.8	97.7	-	-	1089.4
1/22/2019 8:00	2.4	36.4	-3.9	97.7	-	134.6	1089.4
1/22/2019 9:00	3.1	42.6	-3.7	97.8	-	134.3	1089.4
1/22/2019 10:00	1.7	39.4	-3.4	97.9	-	134.3	1089.4



**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
1/22/2019 11:00	-	-	-2.7	98.3	-	134.5	1089.3
1/22/2019 12:00	-	-	-3.1	98.1	-	134.6	1089.5
1/22/2019 13:00	-	-	-2.9	98.2	-	134.5	1089.4
1/22/2019 14:00	-	-	-3.0	98.2	-	133.6	1089.5
1/22/2019 15:00	-	-	-3.1	98.2	-	133.1	1089.5
1/22/2019 16:00	-	-	-3.4	97.9	-	-	1089.5
1/22/2019 17:00	-	-	-3.6	97.7	-	-	1089.5
1/22/2019 18:00	-	-	-3.5	97.8	-	-	1089.5
1/22/2019 19:00	-	-	-3.6	97.8	-	-	1089.5
1/22/2019 20:00	-	-	-3.6	97.8	-	-	1089.5
1/22/2019 21:00	-	-	-3.9	97.6	-	-	1089.5
1/22/2019 22:00	-	-	-4.0	97.5	-	-	1089.5
1/22/2019 23:00	-	-	-4.0	97.5	-	-	1089.6
1/23/2019 0:00	-	-	-4.1	97.4	-	-	1089.5
1/23/2019 1:00	-	-	-4.0	97.4	-	-	1089.5
1/23/2019 2:00	-	-	-4.3	97.3	-	-	1089.5
1/23/2019 3:00	-	-	-4.5	97.1	-	-	1089.6
1/23/2019 4:00	-	-	-4.9	96.9	-	-	1089.5
1/23/2019 5:00	-	-	-5.0	96.7	-	-	1089.5
1/23/2019 6:00	-	-	-5.2	96.6	-	-	1089.5
1/23/2019 7:00	-	-	-5.3	96.5	-	-	1089.5
1/23/2019 8:00	-	-	-5.4	96.4	-	-	1089.5
1/23/2019 9:00	-	-	-4.9	96.7	-	-	1089.4
1/23/2019 10:00	-	-	-3.3	97.7	-	-	1089.5
1/23/2019 11:00	-	-	-2.8	98.1	-	131.4	1089.3
1/23/2019 12:00	-	-	-1.9	98.6	-	130.3	1089.4
1/23/2019 13:00	3.2	206.9	-2.8	98.4	-	130.8	1089.6
1/23/2019 14:00	4.3	198.6	-2.7	98.3	-	130.7	1089.8
1/23/2019 15:00	4.7	197.5	-2.6	98.5	-	129.9	1089.5
1/23/2019 16:00	5.2	206.5	-2.3	98.6	-	129.4	1089.6
1/23/2019 17:00	4.9	199.2	-2.3	98.7	-	-	1089.5
1/23/2019 18:00	4.0	205.6	-2.2	98.7	-	129.2	1089.9
1/23/2019 19:00	4.0	216.5	-2.2	98.7	-	-	1089.7
1/23/2019 20:00	3.7	225.6	-2.3	98.7	-	-	1089.6
1/23/2019 21:00	4.2	216.4	-2.3	98.7	-	-	1090.0
1/23/2019 22:00	4.5	204.8	-2.3	98.7	-	-	1089.2
1/23/2019 23:00	5.0	196.1	-2.4	98.7	-	-	1089.5
1/24/2019 0:00	4.2	211.1	-2.6	98.6	-	-	1089.8
1/24/2019 1:00	5.5	209.2	-2.6	98.5	-	-	1089.8
1/24/2019 2:00	4.9	210.0	-2.5	98.6	-	-	1089.8
1/24/2019 3:00	4.1	212.8	-2.6	98.5	-	-	1089.8
1/24/2019 4:00	3.7	214.1	-2.8	98.4	-	-	1089.7
1/24/2019 5:00	5.2	215.9	-3.0	98.3	-	-	1090.1
1/24/2019 6:00	4.0	213.6	-3.0	98.2	-	-	1089.9
1/24/2019 7:00	4.2	208.3	-3.1	98.2	-	-	1090.0
1/24/2019 8:00	4.7	203.2	-3.1	98.2	-	-	1089.8
1/24/2019 9:00	4.1	200.2	-2.7	98.3	-	128.6	1089.9
1/24/2019 10:00	4.2	197.7	-2.1	98.6	-	127.8	1090.1
1/24/2019 11:00	5.4	219.4	-1.8	98.9	-	-	1090.7
1/24/2019 12:00	4.3	215.5	-1.7	99.0	-	129.0	1093.5
1/24/2019 13:00	4.4	205.3	-1.6	99.1	-	-	1093.2
1/24/2019 14:00	4.3	204.1	-1.5	99.2	-	127.4	1093.9
1/24/2019 15:00	3.6	208.1	-1.6	99.2	-	-	1093.5
1/24/2019 16:00	3.4	209.7	-1.6	99.3	-	127.7	1095.3
1/24/2019 17:00	3.4	206.0	-1.5	99.3	-	-	1094.0

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
1/24/2019 18:00	2.5	213.8	-1.5	99.3	-	-	1094.4
1/24/2019 19:00	1.7	219.9	-1.3	99.3	-	-	1094.4
1/24/2019 20:00	1.3	214.3	-1.1	99.3	-	-	1094.1
1/24/2019 21:00	2.7	214.0	-1.0	99.3	-	126.8	1094.5
1/24/2019 22:00	2.8	219.3	-0.8	99.3	-	-	1094.7
1/24/2019 23:00	2.3	215.8	-0.7	99.3	-	-	1094.9
1/25/2019 0:00	2.2	213.9	-0.5	99.3	-	-	1095.0
1/25/2019 1:00	1.9	207.3	-0.4	99.3	-	-	1094.4
1/25/2019 2:00	1.7	200.6	-0.5	99.3	-	-	1095.0
1/25/2019 3:00	2.0	200.6	-0.4	99.3	-	-	1094.6
1/25/2019 4:00	2.1	200.2	-0.4	99.3	-	-	1095.0
1/25/2019 5:00	2.4	213.4	-0.3	99.3	-	-	1095.6
1/25/2019 6:00	3.4	220.3	-0.4	99.3	-	-	1097.9
1/25/2019 7:00	2.2	215.7	-0.4	99.3	-	-	1097.9
1/25/2019 8:00	1.7	217.0	-0.4	99.3	-	-	1098.5
1/25/2019 9:00	1.0	211.0	-0.3	99.3	-	-	1098.2
1/25/2019 10:00	1.3	201.1	-0.2	99.3	-	-	1098.4
1/25/2019 11:00	5.2	205.7	0.0	99.3	-	-	1099.0
1/25/2019 12:00	5.9	204.7	0.0	99.3	-	-	1098.2
1/25/2019 13:00	5.8	213.8	0.2	99.3	-	126.1	1099.3
1/25/2019 14:00	4.9	211.8	0.5	99.3	-	121.2	1102.5
1/25/2019 15:00	4.7	217.5	0.7	99.3	-	124.8	1102.2
1/25/2019 16:00	4.7	214.5	0.8	99.3	-	-	1102.9
1/25/2019 17:00	5.6	205.8	0.9	99.3	-	-	1103.4
1/25/2019 18:00	6.1	207.8	0.8	99.3	-	-	1103.8
1/25/2019 19:00	5.5	214.0	0.8	99.3	-	-	1104.6
1/25/2019 20:00	6.1	216.4	0.5	99.3	-	-	1105.3
1/25/2019 21:00	6.3	218.3	0.2	99.3	-	-	1105.7
1/25/2019 22:00	7.6	216.0	0.0	99.3	-	-	1106.4
1/25/2019 23:00	6.6	217.9	0.0	99.3	-	-	1106.4
1/26/2019 0:00	5.9	226.9	-0.2	99.3	-	-	1107.7
1/26/2019 1:00	4.8	227.7	-0.4	99.3	-	-	1109.4
1/26/2019 2:00	3.5	225.5	-0.3	99.3	-	-	1110.1
1/26/2019 3:00	3.2	231.6	-0.3	99.3	-	-	1110.3
1/26/2019 4:00	2.5	230.3	-0.3	99.3	-	-	1111.1
1/26/2019 5:00	4.6	226.7	-0.1	99.3	-	-	1111.7
1/26/2019 6:00	5.3	226.9	-0.2	99.3	-	-	1112.3
1/26/2019 7:00	4.3	220.8	-0.5	99.3	-	-	1113.0
1/26/2019 8:00	3.2	228.4	-0.8	99.3	-	-	1114.1
1/26/2019 9:00	1.0	226.9	-1.2	99.3	-	-	1114.6
1/26/2019 10:00	-	-	-1.1	99.3	-	-	1115.6
1/26/2019 11:00	-	-	-0.9	99.3	-	-	1116.4
1/26/2019 12:00	-	-	-0.8	99.3	-	-	1117.0
1/26/2019 13:00	-	-	-0.5	99.3	-	-	1117.0
1/26/2019 14:00	-	-	-0.3	99.3	-	-	1116.5
1/26/2019 15:00	-	-	-0.5	99.3	-	-	1116.7
1/26/2019 16:00	-	-	-0.7	99.3	-	-	1117.5
1/26/2019 17:00	-	-	-1.0	99.3	-	-	1116.9
1/26/2019 18:00	-	-	-1.1	99.3	-	-	1117.1
1/26/2019 19:00	-	-	-1.8	99.3	-	-	1116.9
1/26/2019 20:00	-	-	-2.2	99.3	-	-	1116.7
1/26/2019 21:00	-	-	-2.4	99.3	-	-	1116.6
1/26/2019 22:00	-	-	-2.6	99.2	-	-	1116.5
1/26/2019 23:00	-	-	-3.0	99.0	-	-	1116.3
1/27/2019 0:00	-	-	-3.6	98.5	-	-	1116.0

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
1/27/2019 1:00	-	-	-4.0	98.2	-	-	1115.9
1/27/2019 2:00	-	-	-3.6	98.5	-	-	1116.0
1/27/2019 3:00	-	-	-4.0	98.1	-	-	1115.8
1/27/2019 4:00	-	-	-4.1	98.1	-	-	1115.8
1/27/2019 5:00	-	-	-4.1	98.1	-	-	1115.7
1/27/2019 6:00	-	-	-4.3	97.9	-	-	1115.5
1/27/2019 7:00	-	-	-4.6	97.6	-	-	1115.4
1/27/2019 8:00	-	-	-5.1	96.7	-	-	1115.2
1/27/2019 9:00	-	-	-4.6	96.8	-	-	1115.9
1/27/2019 10:00	-	-	-3.6	96.6	-	129.2	1115.9
1/27/2019 11:00	-	-	-3.3	97.2	-	126.8	1115.3
1/27/2019 12:00	-	-	-4.2	95.9	-	129.0	1115.0
1/27/2019 13:00	-	-	-4.4	96.9	-	-	1115.0
1/27/2019 14:00	-	-	-4.2	97.2	-	126.8	1114.9
1/27/2019 15:00	-	-	-4.9	96.9	-	-	1114.9
1/27/2019 16:00	-	-	-5.3	96.6	-	-	1114.8
1/27/2019 17:00	-	-	-5.2	97.0	-	-	1114.8
1/27/2019 18:00	-	-	-5.2	96.9	-	-	1114.8
1/27/2019 19:00	-	-	-5.5	96.6	-	-	1114.6
1/27/2019 20:00	-	-	-5.7	96.1	-	-	1114.7
1/27/2019 21:00	-	-	-5.6	96.3	-	-	1114.6
1/27/2019 22:00	-	-	-5.9	95.9	-	-	1114.6
1/27/2019 23:00	-	-	-5.7	95.5	-	126.8	1114.5
1/28/2019 0:00	-	-	-6.0	94.8	-	127.0	1114.4
1/28/2019 1:00	-	-	-5.9	93.9	-	127.4	1114.4
1/28/2019 2:00	-	-	-6.0	95.1	-	127.0	1114.4
1/28/2019 3:00	-	-	-5.8	94.8	-	-	1114.4
1/28/2019 4:00	-	-	-5.6	93.1	-	127.4	1114.4
1/28/2019 5:00	-	-	-5.3	88.5	-	128.7	1114.3
1/28/2019 6:00	-	-	-6.0	89.9	-	126.7	1114.3
1/28/2019 7:00	-	-	-5.9	90.7	-	127.1	1114.3
1/28/2019 8:00	-	-	-5.9	83.3	-	128.3	1114.1
1/28/2019 9:00	-	-	-4.9	81.9	-	126.7	1115.5
1/28/2019 10:00	-	-	-2.8	77.6	-	127.5	1115.2
1/28/2019 11:00	-	-	-3.6	82.7	-	126.5	1114.9
1/28/2019 12:00	-	-	-2.4	77.9	-	127.0	1115.1
1/28/2019 13:00	-	-	-2.1	74.2	-	128.0	1114.6
1/28/2019 14:00	-	-	-4.1	80.8	-	128.2	1114.1
1/28/2019 15:00	-	-	-5.1	79.3	-	128.5	1114.1
1/28/2019 16:00	-	-	-5.3	73.1	-	128.9	1114.0
1/28/2019 17:00	-	-	-5.2	70.7	-	128.8	1114.0
1/28/2019 18:00	-	-	-5.9	74.2	-	129.0	1114.0
1/28/2019 19:00	-	-	-5.2	66.2	-	129.4	1114.0
1/28/2019 20:00	-	-	-5.1	68.3	-	128.8	1114.0
1/28/2019 21:00	-	-	-5.0	65.9	-	128.4	1114.0
1/28/2019 22:00	-	-	-3.4	52.6	-	127.8	1114.0
1/28/2019 23:00	-	-	-4.6	59.9	-	128.5	1113.9
1/29/2019 0:00	-	-	-3.4	47.9	-	128.4	1113.9
1/29/2019 1:00	-	-	-2.4	44.5	-	128.6	1114.0
1/29/2019 2:00	-	-	-2.1	41.7	-	128.8	1114.0
1/29/2019 3:00	-	-	-3.9	52.6	-	128.5	1113.9
1/29/2019 4:00	-	-	-2.2	41.7	-	128.2	1113.8
1/29/2019 5:00	-	-	-0.4	33.8	-	127.6	1113.8
1/29/2019 6:00	-	-	0.4	39.2	-	128.0	1114.0
1/29/2019 7:00	-	-	-1.0	47.1	-	127.8	1114.0

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
1/29/2019 8:00	-	-	0.9	35.4	-	128.0	1114.1
1/29/2019 9:00	-	-	1.5	33.8	-	127.6	1114.1
1/29/2019 10:00	-	-	2.3	33.8	-	127.6	1114.1
1/29/2019 11:00	-	-	0.9	43.6	-	128.0	1114.1
1/29/2019 12:00	-	-	0.2	49.7	-	127.6	1114.1
1/29/2019 13:00	-	-	-1.0	68.2	-	127.2	1114.3
1/29/2019 14:00	-	-	-1.9	83.8	-	-	1114.4
1/29/2019 15:00	-	-	-2.7	98.7	-	-	1115.1
1/29/2019 16:00	-	-	-2.8	98.7	-	-	1115.5
1/29/2019 17:00	-	-	-2.6	98.7	-	-	1115.8
1/29/2019 18:00	-	-	-2.7	98.7	-	-	1116.0
1/29/2019 19:00	-	-	-2.5	98.8	-	-	1116.3
1/29/2019 20:00	-	-	-2.4	98.9	-	-	1116.2
1/29/2019 21:00	-	-	-2.4	99.0	-	-	1116.3
1/29/2019 22:00	-	-	-2.4	99.0	-	-	1116.3
1/29/2019 23:00	-	-	-2.3	99.0	-	-	1116.4
1/30/2019 0:00	-	-	-2.3	99.0	-	-	1116.8
1/30/2019 1:00	-	-	-2.1	99.2	-	-	1116.4
1/30/2019 2:00	-	-	-2.1	99.2	-	-	1116.4
1/30/2019 3:00	-	-	-2.1	99.2	-	-	1116.7
1/30/2019 4:00	-	-	-2.1	99.1	-	-	1116.9
1/30/2019 5:00	-	-	-2.1	99.2	-	-	1116.8
1/30/2019 6:00	-	-	-1.9	99.3	-	-	1117.4
1/30/2019 7:00	-	-	-1.9	99.3	-	-	1117.1
1/30/2019 8:00	-	-	-1.6	99.3	-	-	1117.4
1/30/2019 9:00	-	-	-1.5	99.2	-	-	1117.8
1/30/2019 10:00	-	-	-1.3	99.1	-	-	1117.6
1/30/2019 11:00	-	-	-1.2	99.2	-	-	1117.9
1/30/2019 12:00	-	-	-1.2	99.2	-	-	1118.5
1/30/2019 13:00	-	-	-1.2	99.3	-	-	1119.9
1/30/2019 14:00	-	-	-1.2	99.3	-	-	1120.2
1/30/2019 15:00	-	-	-1.3	99.3	-	-	1121.4
1/30/2019 16:00	-	-	-1.1	99.3	-	-	1121.4
1/30/2019 17:00	-	-	-0.9	99.3	-	-	1121.4
1/30/2019 18:00	-	-	-0.9	99.3	-	128.9	1121.4
1/30/2019 19:00	-	-	-0.9	99.3	-	-	1121.5
1/30/2019 20:00	-	-	-0.9	99.3	-	-	1121.5
1/30/2019 21:00	-	-	-0.9	99.3	-	129.7	1121.8
1/30/2019 22:00	-	-	-1.0	99.3	-	129.7	1122.1
1/30/2019 23:00	-	-	-0.9	99.3	-	130.4	1122.4
1/31/2019 0:00	-	-	-1.0	99.3	-	-	1122.6
1/31/2019 1:00	-	-	-0.9	99.3	-	-	1122.8
1/31/2019 2:00	-	-	-0.9	99.3	-	-	1122.9
1/31/2019 3:00	-	-	-0.9	99.3	-	-	1123.1
1/31/2019 4:00	-	-	-1.0	99.3	-	-	1123.1
1/31/2019 5:00	-	-	-1.0	99.3	-	-	1123.1
1/31/2019 6:00	-	-	-1.1	99.3	-	-	1123.2
1/31/2019 7:00	-	-	-1.1	99.3	-	-	1123.1
1/31/2019 8:00	-	-	-1.3	99.3	-	-	1123.1
1/31/2019 9:00	-	-	-1.3	99.2	-	-	1123.2
1/31/2019 10:00	-	-	-1.2	98.8	-	131.8	1123.2
1/31/2019 11:00	-	-	-1.1	98.7	-	131.2	1123.2
1/31/2019 12:00	-	-	-1.8	98.8	-	131.5	1123.5
1/31/2019 13:00	-	-	-2.7	98.4	-	131.8	1123.0
1/31/2019 14:00	-	-	-3.4	97.9	-	131.5	1122.5

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
1/31/2019 15:00	-	-	-4.4	97.6	-	129.0	1122.5
1/31/2019 16:00	-	-	-5.4	97.1	-	130.4	1122.8
1/31/2019 17:00	-	-	-6.3	96.3	-	129.7	1121.3
1/31/2019 18:00	-	-	-7.2	95.3	-	129.7	1121.1
1/31/2019 19:00	-	-	-8.1	93.8	-	130.3	1122.8
1/31/2019 20:00	-	-	-9.1	93.0	-	131.6	1121.5
1/31/2019 21:00	-	-	-9.7	91.7	-	129.8	1120.4
1/31/2019 22:00	-	-	-10.3	89.7	-	129.6	1123.3
1/31/2019 23:00	-	-	-10.9	88.9	-	129.1	1122.3
2/1/2019 0:00	-	-	-11.5	88.9	-	127.4	1121.3
2/1/2019 1:00	-	-	-12.0	86.5	-	126.1	1122.2
2/1/2019 2:00	-	-	-12.4	84.3	-	126.3	1121.3
2/1/2019 3:00	-	-	-12.7	78.5	-	126.4	1121.8
2/1/2019 4:00	-	-	-13.2	76.3	-	126.3	1122.4
2/1/2019 5:00	-	-	-14.1	75.0	-	126.5	1121.5
2/1/2019 6:00	-	-	-14.9	74.3	-	126.5	1121.1
2/1/2019 7:00	-	-	-15.3	72.2	-	126.3	1121.4
2/1/2019 8:00	-	-	-15.6	71.3	-	126.3	1121.4
2/1/2019 9:00	-	-	-16.6	75.4	-	126.3	1124.3
2/1/2019 10:00	-	-	-17.1	77.0	-	126.0	1121.1
2/1/2019 11:00	-	-	-17.5	77.0	-	126.4	1120.5
2/1/2019 12:00	-	-	-18.0	78.2	-	125.6	1122.2
2/1/2019 13:00	-	-	-18.8	80.2	-	125.7	1122.2
2/1/2019 14:00	-	-	-19.6	81.6	-	125.6	1121.4
2/1/2019 15:00	-	-	-20.6	81.0	-	125.3	1120.6
2/1/2019 16:00	-	-	-21.4	80.4	-	125.3	1121.1
2/1/2019 17:00	-	-	-22.2	79.7	-	124.7	1123.0
2/1/2019 18:00	-	-	-23.0	78.8	-	124.6	1121.1
2/1/2019 19:00	-	-	-23.6	78.1	-	124.8	1122.4
2/1/2019 20:00	-	-	-23.8	77.6	-	125.2	1121.9
2/1/2019 21:00	15.4	69.3	-24.1	76.7	-	124.3	1121.1
2/1/2019 22:00	20.6	67.0	-24.5	75.2	-	123.3	1124.0
2/1/2019 23:00	22.0	64.5	-25.0	74.9	-	124.0	1122.5
2/2/2019 0:00	20.7	66.8	-25.2	72.7	-	124.4	1123.9
2/2/2019 1:00	21.1	67.1	-25.7	70.3	-	123.4	1122.3
2/2/2019 2:00	21.3	69.4	-25.8	68.6	-	124.6	1121.0
2/2/2019 3:00	20.6	65.2	-26.1	67.8	-	124.3	1120.3
2/2/2019 4:00	21.1	65.3	-26.2	67.8	-	124.2	1123.1
2/2/2019 5:00	21.3	63.9	-26.3	67.5	-	124.1	1121.0
2/2/2019 6:00	22.3	68.1	-26.4	68.9	-	123.8	1122.5
2/2/2019 7:00	20.1	79.5	-26.3	67.6	-	124.2	1123.1
2/2/2019 8:00	17.2	86.1	-25.9	63.9	-	122.9	1123.1
2/2/2019 9:00	17.2	85.1	-25.5	64.4	-	124.0	1125.2
2/2/2019 10:00	21.1	76.6	-25.1	64.5	-	123.1	1126.8
2/2/2019 11:00	20.0	73.9	-24.4	61.9	-	123.5	1122.7
2/2/2019 12:00	17.0	68.6	-23.6	58.6	-	123.2	1125.3
2/2/2019 13:00	18.7	63.7	-23.7	56.4	-	123.2	1126.3
2/2/2019 14:00	16.9	57.2	-23.4	53.1	-	122.8	1124.0
2/2/2019 15:00	18.8	57.6	-23.3	54.4	-	123.0	1123.3
2/2/2019 16:00	19.5	51.3	-23.2	56.6	-	122.9	1124.7
2/2/2019 17:00	16.1	48.7	-23.1	53.1	-	123.5	1124.6
2/2/2019 18:00	15.2	47.2	-22.8	51.7	-	123.5	1123.4
2/2/2019 19:00	16.2	47.7	-22.6	51.2	-	123.3	1123.5
2/2/2019 20:00	15.7	47.6	-22.2	49.6	-	123.5	1122.2
2/2/2019 21:00	17.1	56.1	-21.8	51.7	-	123.0	1124.7

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
2/2/2019 22:00	18.9	59.1	-21.5	51.8	-	123.1	1126.5
2/2/2019 23:00	16.1	56.9	-21.3	49.5	-	123.1	1124.8
2/3/2019 0:00	16.2	56.6	-21.2	50.4	-	122.8	1124.7
2/3/2019 1:00	17.1	54.6	-21.0	50.4	-	122.9	1124.1
2/3/2019 2:00	15.9	50.7	-20.8	47.9	-	123.3	1123.4
2/3/2019 3:00	15.8	38.0	-21.1	49.0	-	123.0	1123.8
2/3/2019 4:00	19.3	39.1	-21.1	52.8	-	122.9	1124.0
2/3/2019 5:00	17.7	47.4	-20.9	50.5	-	123.1	1122.4
2/3/2019 6:00	21.7	47.8	-20.5	56.6	-	122.9	1122.9
2/3/2019 7:00	20.2	47.8	-19.9	50.7	-	123.1	1123.5
2/3/2019 8:00	18.7	45.4	-19.6	48.7	-	122.8	1124.5
2/3/2019 9:00	17.6	41.7	-18.7	45.2	-	122.6	1125.1
2/3/2019 10:00	12.7	32.3	-19.2	44.0	-	123.1	1125.6
2/3/2019 11:00	11.0	45.2	-17.8	38.5	-	123.4	1125.3
2/3/2019 12:00	10.7	34.6	-17.7	38.6	-	123.3	1125.0
2/3/2019 13:00	11.0	28.2	-17.7	38.9	-	123.2	1123.8
2/3/2019 14:00	9.7	30.5	-18.0	39.5	-	122.9	1124.3
2/3/2019 15:00	3.6	28.0	-19.7	50.5	-	123.0	1124.4
2/3/2019 16:00	6.2	16.9	-19.3	47.2	-	123.5	1124.4
2/3/2019 17:00	4.2	29.6	-20.4	54.3	-	123.5	1124.4
2/3/2019 18:00	1.4	214.1	-21.3	61.8	-	123.6	1124.5
2/3/2019 19:00	0.5	203.6	-21.2	60.6	-	123.4	1124.5
2/3/2019 20:00	0.7	218.1	-21.2	61.3	-	123.4	1124.5
2/3/2019 21:00	0.4	216.3	-21.2	62.2	-	123.1	1124.6
2/3/2019 22:00	0.7	230.0	-20.3	56.0	-	123.3	1124.5
2/3/2019 23:00	0.4	236.7	-19.8	52.2	-	123.5	1124.7
2/4/2019 0:00	-	-	-18.0	40.6	-	123.4	1124.6
2/4/2019 1:00	-	-	-18.0	42.6	-	123.3	1124.5
2/4/2019 2:00	-	-	-17.5	38.2	-	123.1	1124.5
2/4/2019 3:00	-	-	-17.5	37.1	-	123.3	1124.5
2/4/2019 4:00	-	-	-16.4	33.0	-	123.3	1124.5
2/4/2019 5:00	-	-	-15.8	28.2	-	123.4	1124.4
2/4/2019 6:00	-	-	-15.2	27.1	-	123.6	1124.4
2/4/2019 7:00	-	-	-14.7	24.1	-	123.2	1124.4
2/4/2019 8:00	-	-	-13.5	23.2	-	122.8	1124.4
2/4/2019 9:00	-	-	-13.1	36.2	-	123.0	1124.4
2/4/2019 10:00	-	-	-12.8	43.0	-	123.1	1124.5
2/4/2019 11:00	-	-	-12.3	39.5	-	123.0	1124.2
2/4/2019 12:00	-	-	-12.0	40.5	-	123.1	1124.3
2/4/2019 13:00	-	-	-12.7	57.1	-	123.3	1124.3
2/4/2019 14:00	-	-	-12.3	75.5	-	123.3	1124.5
2/4/2019 15:00	-	-	-13.2	84.7	-	123.2	1124.8
2/4/2019 16:00	-	-	-13.3	87.2	-	123.4	1124.9
2/4/2019 17:00	-	-	-13.5	87.3	-	123.4	1124.9
2/4/2019 18:00	-	-	-13.6	87.0	-	123.4	1124.9
2/4/2019 19:00	-	-	-13.6	84.9	-	123.3	1125.0
2/4/2019 20:00	-	-	-14.5	87.1	-	123.0	1125.0
2/4/2019 21:00	-	-	-14.3	86.8	-	123.2	1125.0
2/4/2019 22:00	-	-	-15.0	82.2	-	123.2	1125.0
2/4/2019 23:00	1.3	207.7	-15.3	83.2	-	122.8	1125.2
2/5/2019 0:00	1.8	33.2	-13.1	78.2	-	122.4	1125.0
2/5/2019 1:00	2.5	10.3	-12.3	74.2	-	122.6	1124.9
2/5/2019 2:00	5.8	26.9	-11.2	70.9	-	122.4	1124.9
2/5/2019 3:00	4.1	356.6	-11.7	71.4	-	123.1	1125.0
2/5/2019 4:00	1.2	7.5	-12.2	72.1	-	122.8	1125.0

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
2/5/2019 5:00	-	-	-12.2	72.8	-	122.9	1125.1
2/5/2019 6:00	-	-	-12.1	72.4	-	123.2	1125.1
2/5/2019 7:00	-	-	-11.9	72.8	-	122.8	1125.1
2/5/2019 8:00	-	-	-10.9	68.8	-	123.1	1125.2
2/5/2019 9:00	-	-	-9.1	60.4	-	122.3	1126.4
2/5/2019 10:00	-	-	-8.8	57.9	-	122.5	1126.3
2/5/2019 11:00	-	-	-8.8	59.5	-	122.5	1125.7
2/5/2019 12:00	-	-	-9.3	62.3	-	122.8	1125.1
2/5/2019 13:00	-	-	-9.4	63.0	-	123.0	1125.0
2/5/2019 14:00	-	-	-8.1	55.3	-	123.2	1125.1
2/5/2019 15:00	1.3	214.9	-7.6	54.8	-	123.2	1125.3
2/5/2019 16:00	3.2	201.5	-6.8	50.2	-	123.2	1125.5
2/5/2019 17:00	4.2	194.8	-6.7	52.2	-	123.4	1125.2
2/5/2019 18:00	4.2	196.4	-6.5	50.9	-	123.6	1125.4
2/5/2019 19:00	3.4	200.8	-6.6	53.4	-	123.5	1125.2
2/5/2019 20:00	1.5	208.5	-6.8	54.5	-	123.6	1125.2
2/5/2019 21:00	-	-	-6.6	55.0	-	123.8	1125.2
2/5/2019 22:00	-	-	-6.6	56.6	-	123.8	1125.2
2/5/2019 23:00	-	-	-6.8	59.7	-	124.0	1125.2
2/6/2019 0:00	2.5	220.1	-7.1	60.7	-	124.0	1125.2
2/6/2019 1:00	1.4	220.3	-8.2	85.7	-	124.4	1125.8
2/6/2019 2:00	-	-	-8.3	93.3	-	125.8	1126.2
2/6/2019 3:00	-	-	-7.9	93.5	-	124.5	1126.3
2/6/2019 4:00	-	-	-7.9	93.9	-	126.0	1126.5
2/6/2019 5:00	-	-	-8.0	94.2	-	126.7	1126.9
2/6/2019 6:00	1.7	193.9	-7.4	94.7	-	126.7	1127.4
2/6/2019 7:00	3.0	203.7	-7.1	94.9	-	127.5	1127.8
2/6/2019 8:00	4.1	202.0	-6.7	95.0	-	127.7	1128.1
2/6/2019 9:00	5.0	205.1	-6.3	94.9	-	124.4	1128.3
2/6/2019 10:00	5.3	197.5	-5.9	94.8	-	125.1	1128.0
2/6/2019 11:00	5.1	201.8	-5.7	94.8	-	124.3	1128.3
2/6/2019 12:00	5.2	206.0	-5.7	95.0	-	125.7	1127.8
2/6/2019 13:00	5.0	200.7	-5.5	95.1	-	125.8	1128.4
2/6/2019 14:00	4.7	208.4	-5.5	95.8	-	124.8	1128.2
2/6/2019 15:00	3.8	215.0	-5.6	96.0	-	128.2	1128.8
2/6/2019 16:00	3.3	219.1	-5.4	96.3	-	130.6	1129.1
2/6/2019 17:00	2.9	204.5	-5.2	96.5	-	129.0	1129.4
2/6/2019 18:00	3.1	210.1	-5.2	96.6	-	128.9	1129.4
2/6/2019 19:00	2.3	216.2	-5.2	96.6	-	127.8	1129.6
2/6/2019 20:00	2.1	222.8	-5.1	96.7	-	130.3	1130.0
2/6/2019 21:00	2.5	222.6	-5.0	96.8	-	131.5	1130.1
2/6/2019 22:00	2.2	230.5	-5.1	96.8	-	131.0	1130.2
2/6/2019 23:00	2.4	223.4	-4.9	96.9	-	132.2	1130.4
2/7/2019 0:00	1.6	217.7	-4.8	97.0	-	131.9	1130.6
2/7/2019 1:00	-	-	-4.8	97.0	-	132.4	1130.8
2/7/2019 2:00	-	-	-5.0	96.8	-	132.6	1130.8
2/7/2019 3:00	-	-	-5.1	96.8	-	132.4	1130.9
2/7/2019 4:00	-	-	-5.4	96.5	-	132.4	1130.9
2/7/2019 5:00	-	-	-6.6	95.6	-	132.4	1130.9
2/7/2019 6:00	-	-	-6.8	95.4	-	132.4	1131.0
2/7/2019 7:00	-	-	-6.8	95.4	-	132.5	1131.0
2/7/2019 8:00	-	-	-6.8	95.2	-	132.3	1131.0
2/7/2019 9:00	-	-	-7.4	94.4	-	132.3	1131.2
2/7/2019 10:00	-	-	-7.0	94.5	-	132.3	1131.1
2/7/2019 11:00	-	-	-6.3	95.0	-	131.8	1131.0

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
2/7/2019 12:00	-	-	-7.2	94.2	-	132.1	1130.9
2/7/2019 13:00	-	-	-7.5	94.0	-	132.1	1130.8
2/7/2019 14:00	-	-	-8.1	93.7	-	132.1	1131.0
2/7/2019 15:00	-	-	-8.2	93.7	-	132.1	1131.1
2/7/2019 16:00	-	-	-8.8	93.3	-	132.2	1131.0
2/7/2019 17:00	-	-	-9.3	93.0	-	132.1	1131.0
2/7/2019 18:00	-	-	-9.5	92.8	-	132.1	1131.0
2/7/2019 19:00	-	-	-9.3	92.9	-	132.0	1131.0
2/7/2019 20:00	-	-	-9.4	92.8	-	131.5	1131.0
2/7/2019 21:00	-	-	-9.8	92.4	-	131.4	1131.0
2/7/2019 22:00	-	-	-10.3	91.9	-	131.4	1131.0
2/7/2019 23:00	-	-	-10.5	91.7	-	131.5	1131.0
2/8/2019 0:00	-	-	-10.4	91.9	-	131.6	1130.7
2/8/2019 1:00	7.7	44.9	-8.4	83.7	-	131.0	1130.4
2/8/2019 2:00	11.6	49.1	-7.2	68.2	-	129.1	1129.7
2/8/2019 3:00	16.4	59.1	-6.8	58.3	-	129.4	1129.6
2/8/2019 4:00	16.9	56.2	-7.7	60.3	-	123.0	1131.0
2/8/2019 5:00	18.4	44.9	-8.5	61.6	-	122.9	1129.4
2/8/2019 6:00	14.8	49.7	-9.2	61.0	-	122.6	1132.3
2/8/2019 7:00	13.4	49.4	-9.5	57.2	-	122.7	1130.9
2/8/2019 8:00	12.7	45.3	-10.1	58.0	-	122.6	1130.1
2/8/2019 9:00	11.8	45.3	-10.2	56.0	-	122.8	1132.0
2/8/2019 10:00	11.6	46.5	-10.2	53.9	-	122.7	1132.3
2/8/2019 11:00	11.2	40.4	-10.3	53.4	-	122.6	1132.5
2/8/2019 12:00	13.5	46.7	-10.4	52.4	-	122.5	1132.1
2/8/2019 13:00	16.3	47.9	-10.3	51.3	-	122.6	1130.6
2/8/2019 14:00	14.5	44.7	-10.6	54.3	-	122.6	1129.4
2/8/2019 15:00	12.4	42.5	-10.7	52.4	-	122.7	1130.9
2/8/2019 16:00	12.2	49.5	-10.7	44.1	-	122.7	1131.3
2/8/2019 17:00	9.8	64.0	-10.7	38.5	-	122.7	1131.1
2/8/2019 18:00	12.3	57.4	-11.1	39.6	-	122.4	1131.3
2/8/2019 19:00	12.4	37.1	-11.3	39.5	-	122.2	1130.4
2/8/2019 20:00	12.7	39.0	-11.9	43.2	-	122.5	1130.0
2/8/2019 21:00	11.5	35.7	-12.9	50.6	-	122.6	1131.2
2/8/2019 22:00	10.7	34.6	-12.5	44.3	-	122.6	1131.2
2/8/2019 23:00	10.0	23.9	-12.8	46.4	-	122.6	1130.7
2/9/2019 0:00	3.1	7.3	-13.6	52.6	-	123.2	1131.1
2/9/2019 1:00	0.0	203.4	-14.6	66.8	-	123.3	1131.2
2/9/2019 2:00	0.2	181.0	-15.0	67.6	-	123.0	1131.3
2/9/2019 3:00	0.1	202.3	-14.9	65.4	-	123.0	1131.3
2/9/2019 4:00	0.0	213.7	-14.9	61.5	-	122.9	1131.2
2/9/2019 5:00	0.0	189.9	-14.8	59.0	-	123.0	1131.2
2/9/2019 6:00	0.7	193.6	-14.9	61.3	-	123.0	1131.3
2/9/2019 7:00	0.1	197.5	-14.7	57.8	-	122.7	1131.2
2/9/2019 8:00	0.1	195.5	-14.6	56.4	-	122.9	1131.2
2/9/2019 9:00	0.0	205.3	-13.4	49.1	-	122.4	1132.8
2/9/2019 10:00	0.7	199.3	-13.1	50.5	-	122.7	1132.3
2/9/2019 11:00	0.0	206.4	-12.0	50.9	-	122.2	1132.4
2/9/2019 12:00	0.7	195.4	-12.0	55.7	-	122.6	1132.7
2/9/2019 13:00	0.1	27.9	-11.9	54.4	-	122.5	1131.5
2/9/2019 14:00	0.0	206.7	-11.8	62.4	-	122.6	1131.3
2/9/2019 15:00	1.6	314.2	-11.7	63.8	-	123.7	1131.3
2/9/2019 16:00	8.8	37.0	-6.5	48.9	-	123.1	1130.2
2/9/2019 17:00	10.4	42.7	-5.1	46.6	-	122.4	1130.8
2/9/2019 18:00	14.0	45.3	-5.5	51.6	-	122.4	1130.0



**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
2/9/2019 19:00	15.0	58.4	-6.4	57.9	-	121.5	1131.0
2/9/2019 20:00	17.3	51.9	-7.0	53.3	-	122.1	1130.6
2/9/2019 21:00	15.4	32.9	-7.7	49.8	-	122.4	1132.9
2/9/2019 22:00	13.7	44.1	-8.7	55.7	-	122.4	1130.8
2/9/2019 23:00	13.8	35.7	-9.3	56.5	-	122.3	1130.6
2/10/2019 0:00	12.2	43.0	-9.4	55.0	-	122.5	1131.0
2/10/2019 1:00	9.2	46.4	-9.5	52.4	-	122.1	1130.8
2/10/2019 2:00	10.4	60.4	-8.7	45.8	-	122.1	1131.1
2/10/2019 3:00	10.4	32.6	-9.6	50.3	-	122.3	1130.6
2/10/2019 4:00	12.1	31.4	-9.6	50.5	-	122.3	1130.4
2/10/2019 5:00	11.7	35.6	-9.7	50.2	-	122.5	1130.3
2/10/2019 6:00	11.7	34.9	-9.8	50.8	-	122.5	1131.4
2/10/2019 7:00	11.9	35.6	-10.0	51.3	-	122.4	1132.5
2/10/2019 8:00	11.1	40.9	-10.2	51.2	-	122.7	1130.9
2/10/2019 9:00	10.6	36.1	-10.0	49.9	-	122.8	1132.1
2/10/2019 10:00	9.6	42.4	-9.5	47.5	-	122.4	1113.6
2/10/2019 11:00	9.7	45.7	-9.4	48.1	-	122.3	1132.7
2/10/2019 12:00	-	-	-9.5	50.3	-	122.2	1129.9
2/10/2019 13:00	-	-	-9.5	51.6	-	122.1	1130.6
2/10/2019 14:00	-	-	-9.3	49.0	-	122.1	1132.2
2/10/2019 15:00	-	-	-9.2	47.2	-	122.1	1130.3
2/10/2019 16:00	-	-	-9.0	44.5	-	122.2	1129.4
2/10/2019 17:00	-	-	-9.1	44.7	-	121.9	1129.7
2/10/2019 18:00	-	-	-9.3	45.3	-	122.4	1129.2
2/10/2019 19:00	-	-	-9.1	42.8	-	122.6	1128.8
2/10/2019 20:00	-	-	-9.2	41.1	-	122.0	1132.5
2/10/2019 21:00	-	-	-9.9	44.0	-	122.7	1131.2
2/10/2019 22:00	-	-	-10.4	45.4	-	122.6	1131.5
2/10/2019 23:00	-	-	-10.7	45.4	-	122.4	1131.0
2/11/2019 0:00	-	-	-10.8	44.9	-	122.3	1131.2
2/11/2019 1:00	-	-	-11.1	46.2	-	122.0	1131.0
2/11/2019 2:00	-	-	-10.9	43.7	-	121.9	1131.8
2/11/2019 3:00	-	-	-10.8	41.4	-	122.0	1131.4
2/11/2019 4:00	-	-	-11.0	41.5	-	121.9	1131.3
2/11/2019 5:00	-	-	-11.2	41.8	-	122.2	1131.2
2/11/2019 6:00	-	-	-11.4	42.6	-	122.5	1131.2
2/11/2019 7:00	-	-	-11.8	44.3	-	122.1	1131.1
2/11/2019 8:00	-	-	-11.6	42.4	-	122.3	1131.1
2/11/2019 9:00	-	-	-10.9	39.8	-	122.1	1131.2
2/11/2019 10:00	-	-	-10.2	38.7	-	122.0	1132.2
2/11/2019 11:00	-	-	-10.1	39.9	-	122.0	1130.6
2/11/2019 12:00	-	-	-9.9	39.7	-	122.1	1132.9
2/11/2019 13:00	-	-	-9.7	39.7	-	121.7	1130.1
2/11/2019 14:00	-	-	-9.6	38.8	-	122.1	1129.7
2/11/2019 15:00	-	-	-9.8	40.0	-	121.9	1129.9
2/11/2019 16:00	-	-	-10.0	40.7	-	121.7	1131.6
2/11/2019 17:00	-	-	-10.3	40.7	-	121.9	1131.1
2/11/2019 18:00	-	-	-10.6	41.4	-	121.7	1131.4
2/11/2019 19:00	-	-	-10.8	41.1	-	122.8	1132.0
2/11/2019 20:00	-	-	-10.8	41.0	-	121.7	1131.2
2/11/2019 21:00	-	-	-10.8	38.1	-	121.8	1131.0
2/11/2019 22:00	-	-	-11.3	39.8	-	122.1	1130.5
2/11/2019 23:00	-	-	-11.3	38.5	-	121.8	1131.2
2/12/2019 0:00	-	-	-11.7	40.4	-	121.4	1130.8
2/12/2019 1:00	-	-	-11.8	39.2	-	121.7	1131.1

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
2/12/2019 2:00	-	-	-11.9	39.3	-	121.7	1131.3
2/12/2019 3:00	-	-	-12.3	40.6	-	122.0	1131.2
2/12/2019 4:00	-	-	-12.7	41.7	-	122.2	1131.5
2/12/2019 5:00	-	-	-13.6	48.7	-	122.3	1131.4
2/12/2019 6:00	-	-	-14.2	54.0	-	122.1	1131.5
2/12/2019 7:00	-	-	-14.3	54.2	-	121.2	1131.5
2/12/2019 8:00	-	-	-	-	-	-	-
2/12/2019 9:00	-	-	-	-	-	-	-
2/12/2019 10:00	-	-	-	-	-	-	-
2/12/2019 11:00	-	-	-	-	-	-	-
2/12/2019 12:00	-	-	-	-	-	-	-
2/12/2019 13:00	-	-	-	-	-	-	-
2/12/2019 14:00	-	-	-	-	-	-	-
2/12/2019 15:00	1.3	250.5	-11.3	46.0	51.7	121.1	571.8
2/12/2019 16:00	1.7	168.4	-11.3	48.6	7.4	121.2	571.9
2/12/2019 17:00	2.2	186.1	-10.7	39.4	0.0	121.2	571.9
2/12/2019 18:00	2.0	202.1	-10.9	41.1	0.0	121.1	571.9
2/12/2019 19:00	2.2	187.5	-11.5	61.5	0.0	121.4	571.9
2/12/2019 20:00	2.4	188.8	-11.7	71.0	0.0	121.5	571.9
2/12/2019 21:00	2.3	191.1	-11.8	71.5	0.0	121.5	571.9
2/12/2019 22:00	3.0	198.6	-11.8	72.9	0.0	121.5	571.9
2/12/2019 23:00	2.3	196.7	-11.7	71.7	0.0	121.5	571.9
2/13/2019 0:00	1.6	203.2	-11.7	73.4	0.0	121.5	571.9
2/13/2019 1:00	2.3	201.3	-11.9	76.1	0.0	121.5	571.9
2/13/2019 2:00	2.1	196.4	-11.8	72.7	0.0	121.6	571.9
2/13/2019 3:00	2.4	208.8	-11.6	67.9	0.0	121.3	571.9
2/13/2019 4:00	0.9	66.2	-11.6	79.3	0.0	121.2	571.9
2/13/2019 5:00	0.6	339.1	-11.3	75.3	0.0	120.9	572.0
2/13/2019 6:00	0.4	222.9	-11.4	80.0	0.0	120.9	572.0
2/13/2019 7:00	0.9	13.4	-11.0	79.0	10.7	119.8	572.0
2/13/2019 8:00	0.7	333.8	-10.2	78.8	55.7	121.1	572.1
2/13/2019 9:00	0.8	31.1	-10.4	81.2	106.8	121.2	572.2
2/13/2019 10:00	0.6	297.7	-9.5	79.7	161.6	121.2	572.2
2/13/2019 11:00	0.8	7.7	-9.4	79.2	174.4	121.1	572.3
2/13/2019 12:00	0.6	354.8	-9.3	79.9	160.9	121.2	572.5
2/13/2019 13:00	1.0	35.3	-9.5	83.7	133.2	122.4	572.8
2/13/2019 14:00	0.7	209.7	-10.0	85.1	85.1	123.4	573.2
2/13/2019 15:00	0.8	271.8	-10.2	87.1	44.4	123.2	573.6
2/13/2019 16:00	0.6	356.1	-10.4	87.5	6.5	124.0	574.0
2/13/2019 17:00	0.9	213.7	-10.7	87.9	0.0	124.0	574.3
2/13/2019 18:00	0.8	342.0	-10.6	87.4	0.0	123.9	574.4
2/13/2019 19:00	1.1	271.1	-10.7	87.5	0.0	124.2	574.5
2/13/2019 20:00	1.0	337.5	-10.8	87.4	0.0	124.3	574.6
2/13/2019 21:00	1.2	120.6	-11.0	87.6	0.0	124.1	574.6
2/13/2019 22:00	0.9	15.0	-10.9	87.2	0.0	124.4	574.6
2/13/2019 23:00	0.7	155.9	-11.4	87.0	0.0	124.2	574.6
2/14/2019 0:00	2.5	43.7	-11.3	86.3	0.0	124.3	574.6
2/14/2019 1:00	3.5	64.2	-11.6	85.9	0.0	122.4	574.6
2/14/2019 2:00	3.8	31.7	-11.4	83.1	0.0	122.8	574.6
2/14/2019 3:00	14.3	71.9	-9.5	71.8	0.0	121.4	574.5
2/14/2019 4:00	13.7	76.0	-9.0	68.3	0.0	121.9	574.2
2/14/2019 5:00	15.4	65.0	-8.4	59.8	0.0	121.1	574.1
2/14/2019 6:00	17.3	65.3	-9.1	62.9	0.1	121.7	574.3
2/14/2019 7:00	17.2	69.7	-9.1	59.5	9.1	120.9	574.6
2/14/2019 8:00	18.8	79.1	-9.4	60.8	28.8	120.9	574.3

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
2/14/2019 9:00	19.4	70.3	-9.6	57.7	224.8	121.0	574.1
2/14/2019 10:00	17.7	65.9	-9.5	53.5	312.5	121.4	574.3
2/14/2019 11:00	16.8	64.0	-9.4	52.0	384.5	121.1	574.1
2/14/2019 12:00	16.2	62.9	-9.1	50.6	349.2	121.1	574.1
2/14/2019 13:00	14.8	77.8	-8.8	49.0	272.2	121.0	573.8
2/14/2019 14:00	16.6	65.6	-8.9	52.4	172.4	120.7	574.0
2/14/2019 15:00	18.8	61.2	-8.7	53.4	69.1	120.7	573.7
2/14/2019 16:00	17.8	63.2	-8.6	54.1	12.9	120.2	573.9
2/14/2019 17:00	16.5	66.9	-8.6	55.7	0.1	120.9	573.8
2/14/2019 18:00	15.9	63.2	-8.7	57.7	0.0	120.6	574.0
2/14/2019 19:00	16.6	66.4	-8.8	58.9	0.0	121.0	574.3
2/14/2019 20:00	16.9	65.4	-8.8	58.7	0.0	120.8	573.7
2/14/2019 21:00	15.8	60.2	-9.1	59.6	0.0	121.3	573.6
2/14/2019 22:00	15.5	64.3	-9.1	58.4	0.0	121.2	573.8
2/14/2019 23:00	15.6	62.7	-9.1	56.4	0.0	121.3	573.8
2/15/2019 0:00	14.8	65.9	-9.3	56.1	0.0	121.1	573.5
2/15/2019 1:00	13.6	66.8	-9.6	56.2	0.0	121.4	573.7
2/15/2019 2:00	13.2	76.2	-9.7	55.2	0.0	121.3	573.8
2/15/2019 3:00	12.0	80.6	-9.9	55.2	0.0	121.0	573.6
2/15/2019 4:00	10.4	82.8	-10.2	54.6	0.0	121.0	573.8
2/15/2019 5:00	8.8	83.2	-10.4	54.6	0.0	120.9	573.9
2/15/2019 6:00	4.6	89.3	-10.6	54.9	0.1	121.5	573.7
2/15/2019 7:00	3.8	73.8	-10.9	56.0	10.9	121.5	573.7
2/15/2019 8:00	2.1	96.2	-10.9	57.6	48.1	121.5	573.7
2/15/2019 9:00	4.0	78.8	-11.1	61.3	113.5	121.3	573.6
2/15/2019 10:00	4.7	72.0	-11.1	63.3	207.2	121.3	573.7
2/15/2019 11:00	2.3	124.1	-10.8	64.3	300.3	120.6	573.8
2/15/2019 12:00	3.3	93.7	-10.9	63.9	346.4	121.1	573.7
2/15/2019 13:00	7.6	43.3	-11.0	58.0	323.7	121.3	573.9
2/15/2019 14:00	8.5	40.8	-11.1	59.9	225.8	121.1	573.8
2/15/2019 15:00	8.5	41.3	-11.5	64.1	139.6	121.1	573.7
2/15/2019 16:00	8.4	41.9	-11.9	67.4	23.0	121.0	573.7
2/15/2019 17:00	8.2	42.9	-12.3	67.9	0.2	120.9	573.8
2/15/2019 18:00	8.2	48.9	-12.1	67.4	0.0	121.4	573.8
2/15/2019 19:00	8.1	51.7	-12.4	68.1	0.0	121.4	573.7
2/15/2019 20:00	7.9	46.8	-12.7	67.5	0.0	121.4	573.8
2/15/2019 21:00	8.5	43.0	-13.0	65.2	0.0	121.4	573.8
2/15/2019 22:00	10.0	42.9	-13.5	65.5	0.0	121.3	573.7
2/15/2019 23:00	11.1	42.2	-13.8	62.8	0.0	121.4	573.8
2/16/2019 0:00	12.6	40.5	-14.1	60.2	0.0	121.1	574.0
2/16/2019 1:00	11.8	40.4	-14.3	59.6	0.0	121.3	574.0
2/16/2019 2:00	13.5	41.3	-14.6	60.1	0.0	121.1	573.6
2/16/2019 3:00	13.6	45.2	-15.1	60.2	0.0	120.8	573.8
2/16/2019 4:00	14.3	43.7	-15.1	57.7	0.0	120.8	574.1
2/16/2019 5:00	14.3	44.9	-15.4	56.7	0.0	120.8	573.9
2/16/2019 6:00	14.8	44.0	-15.5	55.3	0.3	121.0	574.0
2/16/2019 7:00	14.0	45.5	-16.0	55.7	11.5	120.5	573.8
2/16/2019 8:00	14.4	43.6	-16.5	56.7	41.1	120.9	574.1
2/16/2019 9:00	14.6	31.5	-16.6	55.9	229.2	120.9	574.5
2/16/2019 10:00	15.5	33.6	-16.3	54.5	355.1	120.7	574.3
2/16/2019 11:00	15.9	44.5	-16.4	54.6	394.5	120.8	574.6
2/16/2019 12:00	15.1	47.2	-16.4	54.5	395.7	120.8	574.3
2/16/2019 13:00	14.2	47.8	-16.0	51.8	355.2	120.8	574.2
2/16/2019 14:00	13.6	43.4	-15.8	51.1	264.9	120.7	574.0
2/16/2019 15:00	13.0	41.4	-16.0	51.3	148.1	120.7	573.5

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
2/16/2019 16:00	13.3	44.6	-16.0	51.1	32.4	120.7	573.7
2/16/2019 17:00	15.6	56.3	-15.7	49.4	0.2	120.7	573.7
2/16/2019 18:00	18.6	58.8	-15.3	48.8	0.0	120.2	574.2
2/16/2019 19:00	17.4	51.9	-15.6	50.1	0.0	120.6	573.7
2/16/2019 20:00	20.4	56.8	-14.8	47.7	0.0	120.6	573.8
2/16/2019 21:00	20.0	50.2	-14.2	46.6	0.0	120.4	574.0
2/16/2019 22:00	18.1	46.2	-14.3	47.2	0.0	120.5	573.9
2/16/2019 23:00	19.0	37.2	-14.0	47.1	0.0	120.2	573.9
2/17/2019 0:00	18.4	38.5	-13.9	46.9	0.0	120.1	573.7
2/17/2019 1:00	16.3	31.1	-14.7	48.9	0.0	120.3	574.0
2/17/2019 2:00	15.5	23.1	-16.0	51.8	0.0	120.3	574.1
2/17/2019 3:00	12.8	22.9	-16.6	54.7	0.0	120.2	573.8
2/17/2019 4:00	4.2	25.3	-16.7	54.1	0.0	120.5	573.8
2/17/2019 5:00	3.7	325.8	-15.7	50.7	0.0	120.0	573.9
2/17/2019 6:00	2.1	171.4	-17.1	56.9	0.4	120.3	573.9
2/17/2019 7:00	1.9	226.8	-16.8	54.3	9.0	120.5	573.9
2/17/2019 8:00	2.4	197.8	-17.3	55.7	51.3	119.6	574.4
2/17/2019 9:00	3.1	178.6	-16.4	51.7	283.9	120.2	574.4
2/17/2019 10:00	2.1	209.6	-14.5	45.2	372.3	119.9	574.3
2/17/2019 11:00	1.5	184.2	-13.9	46.8	417.9	119.4	574.0
2/17/2019 12:00	1.5	200.2	-13.4	46.3	414.6	119.5	574.0
2/17/2019 13:00	1.6	201.6	-13.0	46.0	360.9	119.5	573.7
2/17/2019 14:00	1.2	289.7	-12.2	43.8	225.4	119.7	573.7
2/17/2019 15:00	1.5	325.8	-12.4	43.6	75.8	120.5	573.6
2/17/2019 16:00	1.6	286.5	-12.4	46.0	16.1	120.5	573.6
2/17/2019 17:00	1.3	321.7	-11.6	43.2	0.3	120.8	573.6
2/17/2019 18:00	2.0	196.5	-9.7	35.4	0.0	120.3	573.6
2/17/2019 19:00	2.2	201.5	-9.2	33.6	0.0	120.7	573.6
2/17/2019 20:00	3.5	210.2	-8.8	34.1	0.0	120.4	573.6
2/17/2019 21:00	3.6	204.1	-8.4	34.2	0.0	120.7	573.5
2/17/2019 22:00	4.1	218.0	-8.7	36.2	0.0	120.8	573.6
2/17/2019 23:00	4.1	214.0	-8.8	38.5	0.0	120.6	573.5
2/18/2019 0:00	3.9	208.0	-8.7	39.7	0.0	120.8	573.5
2/18/2019 1:00	4.5	216.1	-8.7	39.6	0.0	120.8	573.5
2/18/2019 2:00	4.5	215.9	-8.5	44.7	0.0	120.8	573.5
2/18/2019 3:00	5.5	208.4	-8.0	61.0	0.0	120.5	573.4
2/18/2019 4:00	4.7	211.5	-8.0	70.6	0.0	120.7	573.5
2/18/2019 5:00	5.1	195.0	-7.6	82.4	0.0	120.8	573.6
2/18/2019 6:00	6.4	204.3	-7.2	90.6	0.2	120.6	573.7
2/18/2019 7:00	6.6	200.7	-6.1	91.8	15.9	120.7	574.0
2/18/2019 8:00	6.0	197.8	-5.8	92.2	47.0	120.6	574.1
2/18/2019 9:00	5.4	203.9	-5.7	92.4	74.0	120.6	574.1
2/18/2019 10:00	6.0	202.7	-5.6	92.6	122.9	120.7	574.1
2/18/2019 11:00	5.5	194.3	-5.7	92.6	152.5	120.7	574.2
2/18/2019 12:00	6.1	207.4	-5.8	92.5	225.6	120.5	574.2
2/18/2019 13:00	5.9	203.8	-5.7	92.5	187.0	120.6	574.1
2/18/2019 14:00	5.6	194.0	-5.8	92.6	155.2	120.7	574.1
2/18/2019 15:00	6.3	209.3	-5.9	92.5	110.9	120.7	574.1
2/18/2019 16:00	6.0	206.5	-6.2	92.3	16.1	120.6	574.2
2/18/2019 17:00	3.7	223.1	-6.2	92.4	0.1	120.8	574.2
2/18/2019 18:00	4.1	218.9	-6.2	92.4	0.0	120.7	574.3
2/18/2019 19:00	5.4	202.8	-5.9	92.7	0.0	120.8	574.2
2/18/2019 20:00	5.3	210.0	-5.8	92.7	0.0	120.9	574.4
2/18/2019 21:00	4.7	219.0	-5.8	92.8	0.0	120.8	574.8
2/18/2019 22:00	5.1	210.4	-5.7	92.9	0.0	120.6	575.0

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
2/18/2019 23:00	4.3	204.0	-5.7	92.9	0.0	120.7	575.2
2/19/2019 0:00	3.9	206.0	-5.7	93.0	0.0	-	575.3
2/19/2019 1:00	3.3	209.8	-5.5	93.1	0.0	120.0	575.7
2/19/2019 2:00	3.0	215.0	-5.4	93.3	0.0	120.5	575.9
2/19/2019 3:00	4.6	208.1	-5.1	93.5	0.0	114.8	576.3
2/19/2019 4:00	4.3	205.8	-5.0	93.7	0.0	119.0	576.5
2/19/2019 5:00	4.0	204.6	-4.9	93.8	0.0	118.9	576.9
2/19/2019 6:00	3.3	206.3	-4.8	93.9	0.3	121.3	577.1
2/19/2019 7:00	3.2	199.3	-4.6	94.1	10.0	123.0	577.3
2/19/2019 8:00	2.7	209.6	-4.5	94.2	45.5	127.1	577.9
2/19/2019 9:00	2.3	215.2	-4.1	94.5	97.0	128.7	578.3
2/19/2019 10:00	2.3	208.5	-3.8	94.8	154.2	129.1	578.3
2/19/2019 11:00	2.0	215.3	-3.6	95.0	180.1	128.9	578.4
2/19/2019 12:00	1.7	213.2	-3.3	95.3	239.4	128.7	578.3
2/19/2019 13:00	1.6	220.9	-3.4	95.0	242.9	128.7	578.3
2/19/2019 14:00	3.2	212.8	-3.8	94.8	132.9	128.3	578.4
2/19/2019 15:00	3.0	211.4	-3.6	94.9	162.0	128.3	578.4
2/19/2019 16:00	2.3	226.5	-4.1	94.6	42.5	128.3	578.5
2/19/2019 17:00	2.1	225.9	-4.4	94.5	0.4	128.3	578.5
2/19/2019 18:00	1.5	232.1	-4.7	94.2	0.0	128.3	578.5
2/19/2019 19:00	2.0	229.4	-4.8	94.1	0.0	128.0	578.5
2/19/2019 20:00	0.3	206.2	-5.3	93.6	0.0	127.7	578.5
2/19/2019 21:00	0.6	113.4	-6.1	92.7	0.0	126.7	578.5
2/19/2019 22:00	1.7	64.4	-6.1	92.6	0.0	126.7	578.5
2/19/2019 23:00	1.4	45.7	-5.7	93.4	0.0	126.7	578.5
2/20/2019 0:00	2.0	21.0	-5.6	93.4	0.0	126.7	578.5
2/20/2019 1:00	1.5	67.1	-6.6	91.8	0.0	126.9	578.5
2/20/2019 2:00	1.3	25.0	-6.2	92.8	0.0	126.8	578.5
2/20/2019 3:00	2.9	12.8	-6.5	91.8	0.0	126.2	578.4
2/20/2019 4:00	2.5	357.8	-6.7	92.4	0.0	125.9	578.5
2/20/2019 5:00	3.7	29.2	-6.2	89.9	0.0	-	578.5
2/20/2019 6:00	2.9	24.4	-6.9	91.7	0.7	125.0	578.5
2/20/2019 7:00	4.1	32.4	-6.3	85.2	10.3	125.6	578.5
2/20/2019 8:00	5.7	36.2	-6.3	78.7	76.0	125.2	578.8
2/20/2019 9:00	4.8	34.0	-5.9	73.8	329.0	125.3	579.0
2/20/2019 10:00	3.8	31.2	-5.5	70.2	412.2	125.2	579.1
2/20/2019 11:00	0.9	219.2	-4.4	73.0	444.3	126.2	579.1
2/20/2019 12:00	0.8	61.7	-3.7	63.6	443.4	126.4	579.1
2/20/2019 13:00	1.1	170.0	-4.1	74.9	363.9	-	578.5
2/20/2019 14:00	1.1	199.1	-5.5	92.4	69.2	-	578.5
2/20/2019 15:00	0.6	221.9	-4.8	87.2	126.8	-	578.5
2/20/2019 16:00	0.3	231.5	-5.4	92.4	27.7	126.8	578.5
2/20/2019 17:00	0.9	168.4	-6.1	90.5	0.4	126.9	578.6
2/20/2019 18:00	1.5	179.2	-6.4	88.2	0.0	126.0	578.6
2/20/2019 19:00	2.8	211.9	-6.6	90.2	0.0	126.1	578.6
2/20/2019 20:00	4.3	197.2	-6.2	79.0	0.0	126.7	578.6
2/20/2019 21:00	3.9	199.5	-6.2	77.3	0.0	126.3	578.6
2/20/2019 22:00	4.4	201.5	-6.5	78.6	0.0	-	578.5
2/20/2019 23:00	4.8	202.4	-6.5	77.3	0.0	-	578.6
2/21/2019 0:00	5.7	195.0	-6.3	76.6	0.0	126.2	578.6
2/21/2019 1:00	5.3	205.4	-6.4	79.6	0.0	126.8	578.5
2/21/2019 2:00	5.9	202.6	-6.5	82.7	0.0	126.9	578.6
2/21/2019 3:00	5.7	206.6	-6.4	85.0	0.0	126.4	578.6
2/21/2019 4:00	5.0	208.8	-6.7	92.9	0.0	127.7	578.8
2/21/2019 5:00	3.8	216.4	-6.6	92.6	0.0	125.8	578.9

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
2/21/2019 6:00	3.1	210.7	-6.6	92.6	0.3	127.7	579.0
2/21/2019 7:00	3.0	201.3	-6.4	92.7	17.1	129.6	579.2
2/21/2019 8:00	4.6	204.8	-6.2	92.9	75.5	131.5	579.3
2/21/2019 9:00	5.3	200.7	-5.8	93.3	124.1	-	579.3
2/21/2019 10:00	3.3	209.9	-5.5	93.5	121.5	131.3	579.6
2/21/2019 11:00	5.0	208.6	-5.4	93.7	127.5	132.6	579.9
2/21/2019 12:00	5.2	199.6	-5.3	93.8	136.9	132.5	580.2
2/21/2019 13:00	5.8	208.0	-5.0	94.0	120.8	133.8	581.3
2/21/2019 14:00	5.4	202.1	-4.8	94.0	79.6	137.3	582.2
2/21/2019 15:00	5.5	199.1	-4.7	94.0	43.8	137.6	582.7
2/21/2019 16:00	5.5	202.6	-4.7	94.0	10.3	137.7	583.5
2/21/2019 17:00	5.5	212.1	-4.8	94.1	0.2	139.8	585.4
2/21/2019 18:00	5.9	201.9	-4.8	94.0	0.0	139.2	585.9
2/21/2019 19:00	4.1	213.1	-5.0	93.8	0.0	138.1	586.1
2/21/2019 20:00	2.8	199.6	-5.7	93.3	0.0	138.4	586.1
2/21/2019 21:00	2.3	187.6	-6.1	92.9	0.0	137.3	586.5
2/21/2019 22:00	1.3	96.6	-6.3	92.8	0.0	136.6	586.6
2/21/2019 23:00	1.3	190.5	-6.1	92.9	0.0	138.9	586.9
2/22/2019 0:00	1.0	126.6	-6.3	92.7	0.0	136.2	586.9
2/22/2019 1:00	0.7	161.7	-6.3	92.8	0.0	137.9	587.0
2/22/2019 2:00	1.0	29.1	-6.3	92.7	0.0	139.3	587.2
2/22/2019 3:00	1.7	32.0	-6.3	92.7	0.0	139.2	587.6
2/22/2019 4:00	1.8	43.5	-6.4	92.7	0.0	142.1	587.7
2/22/2019 5:00	1.3	48.7	-6.5	92.6	0.0	141.9	587.8
2/22/2019 6:00	2.9	35.5	-7.0	92.2	0.7	141.5	587.8
2/22/2019 7:00	5.1	27.5	-7.2	92.2	10.6	140.9	587.8
2/22/2019 8:00	6.4	48.6	-7.3	91.4	27.4	141.6	587.7
2/22/2019 9:00	11.0	51.0	-6.6	85.7	276.3	135.9	588.7
2/22/2019 10:00	12.6	43.3	-6.3	80.5	441.3	138.4	588.1
2/22/2019 11:00	11.5	43.3	-5.9	72.6	438.1	137.2	588.5
2/22/2019 12:00	12.1	37.5	-6.4	77.8	139.8	-	588.8
2/22/2019 13:00	15.2	46.2	-6.7	77.7	358.5	130.9	589.0
2/22/2019 14:00	14.1	47.2	-7.0	78.5	211.8	124.3	588.2
2/22/2019 15:00	14.0	59.0	-7.4	74.6	120.7	141.1	588.6
2/22/2019 16:00	12.2	57.1	-7.8	70.7	46.5	132.2	588.6
2/22/2019 17:00	12.0	57.5	-8.3	68.1	1.1	125.1	588.9
2/22/2019 18:00	14.1	55.6	-9.0	68.0	0.0	128.4	588.5
2/22/2019 19:00	14.9	50.7	-9.5	67.0	0.0	124.1	588.5
2/22/2019 20:00	16.1	50.9	-10.0	66.0	0.0	123.1	589.0
2/22/2019 21:00	16.4	55.4	-10.1	65.7	0.0	123.7	588.7
2/22/2019 22:00	15.1	57.0	-10.5	65.5	0.0	123.4	588.9
2/22/2019 23:00	16.3	59.5	-10.5	63.5	0.0	123.7	589.1
2/23/2019 0:00	15.8	58.7	-10.9	63.1	0.0	123.5	588.8
2/23/2019 1:00	14.6	56.4	-11.6	63.4	0.0	123.6	588.7
2/23/2019 2:00	14.8	56.2	-12.1	63.7	0.0	124.0	589.2
2/23/2019 3:00	13.8	56.1	-12.3	62.6	0.0	123.8	589.0
2/23/2019 4:00	13.1	80.2	-11.7	60.3	0.0	122.8	588.9
2/23/2019 5:00	14.6	65.6	-12.8	63.0	0.0	123.3	588.7
2/23/2019 6:00	14.4	65.2	-13.3	61.8	1.5	122.2	589.1
2/23/2019 7:00	15.7	61.8	-13.3	60.5	13.3	123.6	589.1
2/23/2019 8:00	16.1	58.2	-13.3	59.8	73.1	123.2	589.3
2/23/2019 9:00	15.8	42.0	-13.5	58.7	319.8	122.5	589.9
2/23/2019 10:00	15.8	47.3	-12.8	57.6	414.0	122.4	589.5
2/23/2019 11:00	14.3	46.8	-12.8	58.6	461.6	122.9	589.3
2/23/2019 12:00	10.0	63.3	-12.2	56.4	458.7	122.9	589.3

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
2/23/2019 13:00	8.4	69.9	-11.7	54.9	407.1	122.9	589.1
2/23/2019 14:00	5.8	76.1	-11.1	51.5	310.9	122.9	589.0
2/23/2019 15:00	11.0	53.5	-11.7	52.7	187.2	122.0	589.0
2/23/2019 16:00	8.6	69.5	-11.9	54.3	56.1	122.6	588.9
2/23/2019 17:00	7.0	64.7	-12.4	56.1	1.3	121.6	588.8
2/23/2019 18:00	11.4	58.9	-12.0	52.5	0.0	122.2	588.9
2/23/2019 19:00	12.2	60.4	-12.3	53.3	0.0	122.5	589.0
2/23/2019 20:00	13.4	54.8	-12.2	52.0	0.0	122.4	588.7
2/23/2019 21:00	9.5	70.2	-12.1	49.2	0.0	123.0	588.9
2/23/2019 22:00	5.3	88.2	-12.7	49.7	0.0	123.0	589.0
2/23/2019 23:00	5.2	69.3	-13.1	50.8	0.0	123.1	589.0
2/24/2019 0:00	4.8	96.1	-12.9	47.4	0.0	123.3	589.0
2/24/2019 1:00	9.9	74.5	-12.9	46.7	0.0	122.3	588.9
2/24/2019 2:00	16.6	44.1	-12.9	45.4	0.0	122.0	589.0
2/24/2019 3:00	15.8	43.2	-13.1	43.8	0.0	122.2	588.7
2/24/2019 4:00	13.0	40.1	-13.4	42.8	0.0	122.2	589.0
2/24/2019 5:00	10.4	34.3	-13.9	44.3	0.0	122.3	589.0
2/24/2019 6:00	10.6	28.0	-13.4	40.7	1.7	122.4	589.1
2/24/2019 7:00	9.4	15.8	-14.2	44.2	13.0	122.6	589.1
2/24/2019 8:00	9.5	19.0	-13.4	38.7	104.9	122.9	589.8
2/24/2019 9:00	9.4	18.6	-12.6	36.5	331.1	122.6	589.6
2/24/2019 10:00	9.9	28.2	-11.7	34.0	426.1	122.3	589.7
2/24/2019 11:00	9.0	29.1	-11.0	33.9	474.9	122.2	589.4
2/24/2019 12:00	8.3	27.1	-11.1	35.2	471.6	121.7	589.4
2/24/2019 13:00	8.3	32.5	-10.6	34.4	415.3	121.8	589.1
2/24/2019 14:00	9.8	36.7	-10.6	35.4	318.5	122.0	588.9
2/24/2019 15:00	8.9	37.4	-10.3	35.2	193.7	120.8	588.8
2/24/2019 16:00	9.1	44.6	-9.8	33.1	59.9	120.6	588.9
2/24/2019 17:00	9.7	48.4	-9.6	32.3	1.6	120.1	588.8
2/24/2019 18:00	10.1	48.9	-9.6	32.2	0.0	120.1	589.0
2/24/2019 19:00	10.3	46.1	-9.5	33.3	0.0	120.9	588.8
2/24/2019 20:00	9.6	44.6	-10.1	36.7	0.0	121.1	588.8
2/24/2019 21:00	9.2	42.6	-10.7	39.6	0.0	121.3	588.9
2/24/2019 22:00	9.2	43.3	-10.3	37.7	0.0	120.6	588.8
2/24/2019 23:00	9.2	40.6	-10.1	35.5	0.0	120.4	589.1
2/25/2019 0:00	10.2	48.4	-10.0	37.1	0.0	120.7	588.9
2/25/2019 1:00	11.2	49.5	-9.8	37.5	0.0	120.7	588.8
2/25/2019 2:00	11.2	52.0	-9.8	37.3	0.0	119.8	588.9
2/25/2019 3:00	10.9	45.2	-10.2	39.2	0.0	120.3	588.8
2/25/2019 4:00	10.0	47.1	-11.0	43.3	0.0	120.0	589.1
2/25/2019 5:00	10.2	44.4	-10.9	42.8	0.0	120.2	588.9
2/25/2019 6:00	9.5	36.7	-11.0	43.6	1.9	120.5	588.9
2/25/2019 7:00	8.7	35.0	-11.0	44.0	12.8	121.0	588.9
2/25/2019 8:00	10.2	35.5	-11.0	45.0	113.1	121.4	589.5
2/25/2019 9:00	10.8	31.6	-10.5	45.7	333.8	121.1	589.5
2/25/2019 10:00	10.6	33.1	-10.0	46.3	429.2	121.0	589.4
2/25/2019 11:00	11.2	30.0	-9.1	44.1	477.9	121.4	589.2
2/25/2019 12:00	10.0	36.2	-8.2	41.5	474.7	121.1	589.0
2/25/2019 13:00	11.0	33.3	-7.8	42.6	420.5	120.8	589.0
2/25/2019 14:00	12.4	31.6	-7.5	43.3	324.4	120.1	588.5
2/25/2019 15:00	12.7	34.4	-7.0	42.3	200.5	119.3	588.9
2/25/2019 16:00	13.3	34.1	-6.8	41.9	66.9	119.3	588.6
2/25/2019 17:00	13.2	35.5	-6.8	41.3	1.5	119.0	588.4
2/25/2019 18:00	11.1	39.0	-7.1	41.8	0.0	118.9	588.7
2/25/2019 19:00	11.7	33.5	-7.2	42.4	0.0	119.3	588.7

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
2/25/2019 20:00	10.8	36.0	-7.1	41.6	0.0	119.3	588.6
2/25/2019 21:00	10.2	36.8	-7.5	43.1	0.0	119.8	588.5
2/25/2019 22:00	9.7	31.7	-7.4	41.9	0.0	119.1	588.7
2/25/2019 23:00	11.3	34.5	-7.2	40.6	0.0	119.4	588.5
2/26/2019 0:00	8.9	31.6	-7.6	42.1	0.0	119.6	588.6
2/26/2019 1:00	8.2	28.4	-7.2	39.5	0.0	119.2	588.5
2/26/2019 2:00	9.1	34.6	-6.9	37.6	0.0	118.8	588.6
2/26/2019 3:00	2.8	359.2	-7.9	42.0	0.0	119.7	588.6
2/26/2019 4:00	4.0	10.1	-8.0	43.2	0.0	119.6	588.6
2/26/2019 5:00	2.6	36.3	-8.6	46.5	0.0	119.6	588.6
2/26/2019 6:00	1.4	223.5	-10.0	55.3	2.3	119.6	588.7
2/26/2019 7:00	1.7	210.7	-10.5	58.8	13.8	119.2	588.7
2/26/2019 8:00	2.3	199.9	-10.3	57.7	124.1	119.1	589.3
2/26/2019 9:00	1.9	193.2	-8.9	50.8	338.9	119.2	589.2
2/26/2019 10:00	1.3	195.6	-7.4	45.4	430.6	119.1	589.0
2/26/2019 11:00	1.6	195.3	-7.0	47.6	477.8	119.1	588.8
2/26/2019 12:00	1.1	213.3	-5.5	45.2	468.8	119.4	588.6
2/26/2019 13:00	1.1	202.3	-5.1	45.8	418.1	119.3	588.3
2/26/2019 14:00	1.1	207.3	-4.8	46.3	322.8	119.2	588.2
2/26/2019 15:00	1.3	204.7	-5.1	48.1	200.5	119.3	588.1
2/26/2019 16:00	1.4	200.7	-5.5	47.6	54.0	119.3	588.2
2/26/2019 17:00	1.1	220.0	-6.1	48.2	2.1	119.5	588.3
2/26/2019 18:00	1.3	188.9	-6.3	47.9	0.0	119.5	588.3
2/26/2019 19:00	1.4	183.3	-6.5	49.5	0.0	119.7	588.4
2/26/2019 20:00	1.8	180.8	-6.9	51.8	0.0	119.6	588.4
2/26/2019 21:00	1.9	250.5	-5.8	46.0	0.0	119.5	588.4
2/26/2019 22:00	3.9	348.5	-2.7	40.6	0.0	119.7	588.3
2/26/2019 23:00	7.8	29.1	-1.0	38.1	0.0	118.7	588.2
2/27/2019 0:00	10.2	32.8	-1.0	39.3	0.0	119.0	588.4
2/27/2019 1:00	11.5	32.8	-1.1	40.5	0.0	119.1	588.1
2/27/2019 2:00	12.5	41.4	-1.1	41.6	0.0	119.7	588.0
2/27/2019 3:00	11.4	28.3	-2.5	45.1	0.0	119.3	588.2
2/27/2019 4:00	10.8	30.9	-2.5	45.0	0.0	119.1	588.1
2/27/2019 5:00	10.8	31.5	-2.8	46.5	0.0	118.8	588.0
2/27/2019 6:00	12.1	72.9	-0.1	40.1	2.7	119.6	588.1
2/27/2019 7:00	13.1	69.5	0.3	39.3	14.0	118.1	587.9
2/27/2019 8:00	14.3	64.6	-0.6	44.3	131.6	118.5	588.2
2/27/2019 9:00	14.8	51.1	-1.3	46.2	349.0	119.1	588.5
2/27/2019 10:00	15.1	51.7	-0.8	44.7	440.9	118.7	588.3
2/27/2019 11:00	14.6	64.2	-0.6	44.5	486.8	119.0	588.7
2/27/2019 12:00	14.5	62.1	-0.2	41.8	483.0	119.0	588.1
2/27/2019 13:00	13.3	61.2	-0.1	40.6	427.9	118.5	587.9
2/27/2019 14:00	14.6	60.2	-0.3	41.9	331.9	118.7	587.6
2/27/2019 15:00	12.7	53.4	-0.4	41.8	206.6	118.6	587.2
2/27/2019 16:00	12.3	58.4	-0.5	41.4	75.5	118.0	587.4
2/27/2019 17:00	13.1	66.4	-0.1	40.3	2.4	118.3	587.5
2/27/2019 18:00	11.2	51.0	-0.4	41.8	0.0	118.3	587.5
2/27/2019 19:00	10.2	45.7	-0.5	41.8	0.0	118.7	587.7
2/27/2019 20:00	10.2	31.8	-1.2	44.6	0.0	118.5	587.4
2/27/2019 21:00	9.7	33.6	-1.8	47.4	0.0	118.6	587.6
2/27/2019 22:00	11.7	38.2	-2.1	48.8	0.0	118.8	587.3
2/27/2019 23:00	10.9	57.3	-1.4	43.9	0.0	118.7	587.4
2/28/2019 0:00	9.2	47.1	-2.4	49.1	0.0	118.4	587.4
2/28/2019 1:00	7.9	34.1	-2.7	50.3	0.0	118.9	587.5
2/28/2019 2:00	4.0	53.3	-3.8	54.9	0.0	119.2	587.5



**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
2/28/2019 3:00	4.1	76.9	-3.8	54.2	0.0	118.6	587.5
2/28/2019 4:00	2.8	66.9	-3.8	54.4	0.0	119.0	587.5
2/28/2019 5:00	3.3	43.6	-3.3	52.0	0.0	119.2	587.5
2/28/2019 6:00	3.2	23.2	-3.7	54.5	3.2	119.1	587.5
2/28/2019 7:00	1.9	22.1	-4.2	56.1	15.5	118.3	587.5
2/28/2019 8:00	2.0	353.1	-4.2	55.9	141.6	118.7	588.2
2/28/2019 9:00	1.4	209.2	-4.1	56.2	355.2	118.4	588.2
2/28/2019 10:00	1.5	318.5	-3.5	53.8	446.0	118.6	588.0
2/28/2019 11:00	0.6	184.8	-1.3	46.6	494.4	117.5	587.8
2/28/2019 12:00	0.9	223.8	-1.5	51.1	491.1	118.7	587.6
2/28/2019 13:00	1.2	219.9	-1.6	53.2	435.6	118.9	587.4
2/28/2019 14:00	1.4	202.6	-1.5	53.0	338.5	118.8	587.3
2/28/2019 15:00	0.5	228.6	-0.6	48.6	213.7	118.6	587.2
2/28/2019 16:00	1.0	181.9	-2.1	56.0	80.3	118.7	587.2
2/28/2019 17:00	1.5	190.1	-3.2	59.5	2.8	119.0	587.3
2/28/2019 18:00	1.3	181.1	-3.1	59.7	0.0	119.0	587.4
2/28/2019 19:00	0.7	199.9	-2.7	57.2	0.0	119.1	587.4
2/28/2019 20:00	0.7	187.9	-2.3	51.8	0.0	119.0	587.4
2/28/2019 21:00	0.8	23.2	-2.8	51.1	0.0	118.8	587.4
2/28/2019 22:00	1.0	34.5	-2.8	51.4	0.0	118.8	587.4
2/28/2019 23:00	0.8	188.6	-3.1	55.8	0.0	119.0	587.4
3/1/2019 0:00	0.8	165.2	-2.8	55.3	0.0	118.8	587.4
3/1/2019 1:00	0.9	10.9	-3.7	58.0	0.0	119.3	587.4
3/1/2019 2:00	0.6	347.7	-3.6	55.9	0.0	119.1	587.4
3/1/2019 3:00	1.3	15.7	-3.9	56.0	0.0	118.6	587.4
3/1/2019 4:00	1.3	205.9	-5.1	64.7	0.0	118.6	587.5
3/1/2019 5:00	1.9	173.4	-5.3	65.9	0.0	118.8	587.5
3/1/2019 6:00	1.3	125.4	-5.4	63.9	4.7	118.8	587.5
3/1/2019 7:00	0.8	27.2	-4.8	60.8	47.5	118.4	587.5
3/1/2019 8:00	1.0	26.0	-4.7	60.7	115.9	118.4	587.6
3/1/2019 9:00	1.1	254.7	-5.0	63.1	194.0	118.7	587.6
3/1/2019 10:00	1.2	262.6	-4.9	62.8	363.5	118.5	587.7
3/1/2019 11:00	0.6	205.9	-3.2	56.6	413.0	118.2	587.8
3/1/2019 12:00	0.5	217.6	-2.6	57.0	381.0	118.8	587.4
3/1/2019 13:00	0.7	189.0	-3.9	65.1	193.8	119.0	587.2
3/1/2019 14:00	1.1	201.9	-4.1	65.1	124.9	118.9	587.3
3/1/2019 15:00	1.2	201.8	-4.2	68.5	90.0	118.7	587.3
3/1/2019 16:00	0.6	252.7	-4.0	70.8	35.9	118.9	587.4
3/1/2019 17:00	1.6	295.4	-4.5	72.5	1.6	118.8	587.4
3/1/2019 18:00	1.6	228.3	-4.7	72.8	0.0	119.0	587.4
3/1/2019 19:00	1.0	356.7	-4.6	69.8	0.0	118.9	587.4
3/1/2019 20:00	1.6	82.4	-4.7	68.4	0.0	119.1	587.4
3/1/2019 21:00	2.2	54.9	-4.5	64.3	0.0	119.0	587.4
3/1/2019 22:00	1.9	57.4	-4.9	66.2	0.0	119.0	587.4
3/1/2019 23:00	3.3	45.8	-5.1	65.2	0.0	119.1	587.4
3/2/2019 0:00	4.8	47.9	-5.6	67.2	0.0	119.0	587.5
3/2/2019 1:00	7.9	37.8	-5.8	64.7	0.0	118.9	587.5
3/2/2019 2:00	9.3	32.8	-6.0	62.7	0.0	119.0	587.5
3/2/2019 3:00	10.6	38.4	-6.4	61.1	0.0	118.5	587.4
3/2/2019 4:00	12.1	38.9	-7.0	59.3	0.0	118.4	587.7
3/2/2019 5:00	11.9	40.7	-7.7	60.6	0.0	118.3	587.4
3/2/2019 6:00	12.3	42.2	-8.1	58.6	4.6	118.2	587.7
3/2/2019 7:00	14.3	46.6	-8.6	57.5	18.7	118.0	587.3
3/2/2019 8:00	14.1	41.2	-8.9	56.9	162.5	118.4	588.1
3/2/2019 9:00	15.4	44.4	-9.1	57.8	375.9	118.1	587.9

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
3/2/2019 10:00	13.9	41.3	-9.2	51.7	471.0	118.5	588.0
3/2/2019 11:00	11.7	46.7	-9.1	43.6	519.4	117.5	588.1
3/2/2019 12:00	9.7	50.7	-9.0	40.0	514.5	117.6	587.8
3/2/2019 13:00	12.1	48.1	-9.0	37.8	459.0	117.2	587.8
3/2/2019 14:00	11.3	52.8	-8.9	35.6	360.7	117.2	587.7
3/2/2019 15:00	12.5	51.6	-8.9	33.8	232.7	117.3	587.4
3/2/2019 16:00	12.2	51.0	-9.1	33.2	94.2	117.4	587.6
3/2/2019 17:00	12.8	53.9	-9.4	31.3	3.3	117.5	587.9
3/2/2019 18:00	12.5	54.0	-9.7	30.8	0.0	117.4	587.7
3/2/2019 19:00	8.5	63.5	-9.7	28.8	0.0	118.0	587.6
3/2/2019 20:00	7.5	57.2	-10.0	29.5	0.0	118.1	587.5
3/2/2019 21:00	9.4	53.9	-10.3	30.7	0.0	118.0	587.7
3/2/2019 22:00	9.0	57.7	-11.0	33.5	0.0	118.4	587.6
3/2/2019 23:00	3.3	86.5	-11.2	31.7	0.0	118.3	587.7
3/3/2019 0:00	5.4	63.9	-11.4	32.1	0.0	118.3	587.7
3/3/2019 1:00	4.0	81.0	-12.0	34.8	0.0	119.0	587.7
3/3/2019 2:00	3.7	90.6	-11.4	31.9	0.0	118.4	587.7
3/3/2019 3:00	2.8	83.9	-11.7	33.1	0.0	117.6	587.7
3/3/2019 4:00	1.8	65.4	-11.5	32.4	0.0	117.7	587.8
3/3/2019 5:00	3.9	65.9	-11.5	31.7	0.0	117.9	587.8
3/3/2019 6:00	3.4	90.1	-12.4	34.8	4.2	118.1	587.7
3/3/2019 7:00	2.3	54.5	-12.1	33.6	15.3	117.7	587.8
3/3/2019 8:00	2.5	290.1	-11.4	31.7	176.2	117.9	588.4
3/3/2019 9:00	2.7	316.7	-10.7	31.9	387.6	118.1	588.5
3/3/2019 10:00	7.9	22.9	-9.5	30.1	479.6	117.9	588.4
3/3/2019 11:00	6.7	22.7	-8.9	30.8	526.1	118.2	588.2
3/3/2019 12:00	2.8	50.3	-8.4	31.9	521.4	118.1	588.2
3/3/2019 13:00	2.2	12.3	-7.8	29.4	464.9	118.1	588.0
3/3/2019 14:00	2.1	72.1	-8.1	32.8	364.8	118.2	587.7
3/3/2019 15:00	2.0	72.0	-8.0	32.6	235.0	118.4	587.6
3/3/2019 16:00	2.6	57.7	-8.2	32.7	97.3	118.4	587.7
3/3/2019 17:00	0.9	184.3	-9.0	37.3	3.9	118.8	587.8
3/3/2019 18:00	1.9	21.0	-8.8	35.4	0.0	118.3	587.7
3/3/2019 19:00	4.7	45.3	-8.9	35.7	0.0	118.2	587.7
3/3/2019 20:00	2.3	72.9	-9.4	37.9	0.0	118.6	587.7
3/3/2019 21:00	1.4	98.2	-9.3	36.8	0.0	117.9	587.8
3/3/2019 22:00	0.8	117.7	-9.3	37.0	0.0	118.7	587.8
3/3/2019 23:00	1.5	75.0	-9.3	36.5	0.0	118.8	587.8
3/4/2019 0:00	1.3	178.0	-9.7	39.1	0.0	118.6	587.8
3/4/2019 1:00	1.6	157.4	-10.7	43.8	0.0	118.1	587.8
3/4/2019 2:00	2.4	171.1	-11.3	45.9	0.0	119.1	587.8
3/4/2019 3:00	2.6	177.8	-11.8	48.2	0.0	118.3	587.8
3/4/2019 4:00	2.0	176.0	-11.8	47.4	0.0	118.2	587.8
3/4/2019 5:00	2.5	176.1	-12.1	48.0	0.0	117.8	587.8
3/4/2019 6:00	1.8	233.9	-11.7	45.1	5.0	118.0	587.8
3/4/2019 7:00	1.8	244.8	-11.8	44.9	17.3	118.0	587.8
3/4/2019 8:00	3.2	179.7	-11.9	44.6	184.5	118.1	588.4
3/4/2019 9:00	1.9	179.4	-10.4	40.7	386.3	117.9	588.4
3/4/2019 10:00	1.3	211.8	-8.8	35.1	478.5	117.9	588.6
3/4/2019 11:00	0.7	256.1	-7.7	33.5	527.5	116.7	588.2
3/4/2019 12:00	0.8	215.4	-7.1	35.7	523.9	117.8	588.2
3/4/2019 13:00	0.9	249.5	-6.4	34.6	467.9	118.0	587.9
3/4/2019 14:00	1.2	233.7	-6.2	35.6	368.2	118.1	587.7
3/4/2019 15:00	1.2	219.2	-5.9	36.3	238.4	117.9	587.6
3/4/2019 16:00	1.1	188.0	-6.3	38.0	99.2	118.2	587.6

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
3/4/2019 17:00	1.4	214.4	-7.3	40.5	4.3	118.2	587.7
3/4/2019 18:00	1.5	165.4	-7.9	39.0	0.0	118.3	587.8
3/4/2019 19:00	1.5	171.6	-7.9	40.3	0.0	118.4	587.8
3/4/2019 20:00	1.2	159.3	-8.1	40.6	0.0	118.5	587.8
3/4/2019 21:00	1.2	198.6	-8.4	40.9	0.0	118.4	587.8
3/4/2019 22:00	1.7	166.6	-8.8	42.4	0.0	118.6	587.8
3/4/2019 23:00	1.8	187.6	-9.2	44.0	0.0	118.4	587.8
3/5/2019 0:00	1.2	279.8	-8.5	39.5	0.0	118.7	587.8
3/5/2019 1:00	1.6	193.2	-9.3	44.1	0.0	118.3	587.8
3/5/2019 2:00	1.2	315.4	-8.7	40.2	0.0	118.7	587.8
3/5/2019 3:00	1.4	184.1	-9.2	43.0	0.0	118.2	587.9
3/5/2019 4:00	1.7	240.6	-9.4	43.7	0.0	117.8	587.9
3/5/2019 5:00	1.6	226.4	-9.7	44.0	0.0	119.0	587.9
3/5/2019 6:00	1.5	194.7	-10.0	44.9	5.5	118.3	587.9
3/5/2019 7:00	1.4	241.6	-9.8	43.5	18.3	118.3	587.9
3/5/2019 8:00	1.3	249.2	-8.9	38.9	197.7	117.2	588.5
3/5/2019 9:00	1.6	336.4	-8.7	38.8	396.1	117.8	588.7
3/5/2019 10:00	1.6	227.5	-8.3	38.5	488.3	117.7	588.5
3/5/2019 11:00	2.0	122.3	-7.7	39.4	537.6	117.9	588.2
3/5/2019 12:00	1.3	298.2	-6.6	37.1	533.7	118.1	588.3
3/5/2019 13:00	1.6	321.6	-6.0	36.6	476.5	118.0	587.9
3/5/2019 14:00	2.4	47.8	-6.2	37.7	376.7	117.9	587.7
3/5/2019 15:00	7.5	46.4	-5.8	34.1	246.3	117.9	587.8
3/5/2019 16:00	9.1	59.2	-5.8	33.5	105.4	118.0	587.6
3/5/2019 17:00	8.3	57.6	-5.3	30.7	4.7	118.2	587.7
3/5/2019 18:00	11.5	50.6	-4.7	29.8	0.0	118.0	587.9
3/5/2019 19:00	9.6	69.1	-4.6	30.0	0.0	118.4	587.8
3/5/2019 20:00	7.6	60.9	-5.9	34.7	0.0	118.6	587.7
3/5/2019 21:00	5.9	34.4	-6.4	36.9	0.0	118.4	587.7
3/5/2019 22:00	5.7	6.6	-5.9	34.7	0.0	119.0	587.8
3/5/2019 23:00	5.8	10.2	-6.4	36.4	0.0	118.6	587.7
3/6/2019 0:00	4.8	6.5	-6.2	35.7	0.0	118.2	587.7
3/6/2019 1:00	3.9	8.7	-6.7	36.9	0.0	118.4	587.7
3/6/2019 2:00	3.7	1.2	-6.6	36.1	0.0	118.5	587.7
3/6/2019 3:00	2.1	322.9	-6.6	35.3	0.0	118.5	587.7
3/6/2019 4:00	1.9	332.0	-7.8	39.3	0.0	118.2	587.8
3/6/2019 5:00	2.3	41.2	-9.0	43.3	0.0	118.5	587.8
3/6/2019 6:00	3.5	55.7	-9.5	44.8	6.2	117.8	587.8
3/6/2019 7:00	3.1	67.2	-9.6	45.4	18.4	118.2	587.8
3/6/2019 8:00	5.7	28.9	-8.2	39.0	209.3	117.9	588.5
3/6/2019 9:00	5.5	35.4	-8.2	41.8	407.5	118.2	588.5
3/6/2019 10:00	7.4	25.0	-7.4	39.9	500.9	118.2	588.4
3/6/2019 11:00	8.0	30.1	-7.0	40.1	548.6	118.2	588.3
3/6/2019 12:00	7.3	37.2	-5.8	38.4	542.6	118.1	588.1
3/6/2019 13:00	7.4	51.8	-4.7	33.5	482.8	117.4	587.9
3/6/2019 14:00	7.9	63.9	-3.8	28.7	382.4	117.9	587.8
3/6/2019 15:00	5.6	8.0	-4.7	32.9	251.2	117.8	587.7
3/6/2019 16:00	3.8	21.5	-4.8	32.8	109.3	118.3	587.7
3/6/2019 17:00	3.8	53.4	-5.5	35.8	5.2	118.0	587.7
3/6/2019 18:00	2.1	81.5	-5.7	36.0	0.0	118.4	587.7
3/6/2019 19:00	6.0	63.2	-4.9	33.0	0.0	118.7	587.6
3/6/2019 20:00	6.4	58.2	-4.6	32.3	0.0	118.2	587.7
3/6/2019 21:00	3.6	68.1	-5.3	34.7	0.0	118.5	587.7
3/6/2019 22:00	1.9	12.9	-5.8	36.4	0.0	118.0	587.7
3/6/2019 23:00	1.0	298.9	-6.2	38.4	0.0	118.3	587.7

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
3/7/2019 0:00	0.9	279.1	-6.4	39.8	0.0	118.8	587.8
3/7/2019 1:00	0.9	213.6	-7.1	41.9	0.0	118.4	587.8
3/7/2019 2:00	1.2	287.4	-7.3	43.1	0.0	117.9	587.8
3/7/2019 3:00	1.2	238.8	-8.0	46.9	0.0	117.5	587.8
3/7/2019 4:00	1.6	235.3	-8.5	48.4	0.0	118.2	587.8
3/7/2019 5:00	1.1	181.6	-8.7	48.6	0.0	118.1	587.9
3/7/2019 6:00	1.5	180.1	-8.8	49.5	6.4	118.1	587.9
3/7/2019 7:00	1.0	245.1	-8.8	50.0	18.6	117.8	587.9
3/7/2019 8:00	0.5	218.6	-7.1	41.9	217.8	117.7	588.6
3/7/2019 9:00	0.7	231.5	-6.3	36.6	408.9	117.1	588.5
3/7/2019 10:00	0.8	152.9	-5.1	33.8	502.7	117.4	588.3
3/7/2019 11:00	1.2	177.6	-5.5	39.9	550.4	117.4	588.0
3/7/2019 12:00	1.4	205.4	-5.6	45.9	544.8	117.8	588.0
3/7/2019 13:00	2.5	226.0	-5.7	47.4	487.1	118.0	587.8
3/7/2019 14:00	2.7	231.6	-5.2	45.5	387.5	117.8	587.6
3/7/2019 15:00	2.9	218.0	-4.8	43.9	255.6	117.9	587.6
3/7/2019 16:00	2.9	208.5	-4.9	44.7	113.2	118.0	587.6
3/7/2019 17:00	3.0	196.5	-5.2	44.8	6.2	117.8	587.7
3/7/2019 18:00	3.1	185.0	-5.0	42.6	0.0	118.0	587.7
3/7/2019 19:00	3.1	196.8	-5.4	43.3	0.0	118.1	587.7
3/7/2019 20:00	2.8	205.8	-5.6	44.3	0.0	118.2	587.7
3/7/2019 21:00	3.1	200.9	-5.6	42.8	0.0	118.1	587.7
3/7/2019 22:00	3.2	201.6	-5.9	42.7	0.0	118.2	587.7
3/7/2019 23:00	2.7	206.5	-5.9	42.0	0.0	117.9	587.7
3/8/2019 0:00	2.8	208.2	-6.2	44.1	0.0	118.1	587.7
3/8/2019 1:00	2.9	206.2	-6.3	44.4	0.0	118.1	587.7
3/8/2019 2:00	2.9	201.4	-6.2	41.4	0.0	117.9	587.7
3/8/2019 3:00	2.6	208.3	-6.4	45.2	0.0	117.5	587.7
3/8/2019 4:00	2.7	201.6	-6.6	48.2	0.0	118.1	587.8
3/8/2019 5:00	2.9	203.9	-6.6	47.0	0.1	117.5	587.8
3/8/2019 6:00	2.5	202.7	-6.6	43.7	7.3	117.9	587.8
3/8/2019 7:00	2.5	192.4	-6.7	43.8	19.3	117.8	587.8
3/8/2019 8:00	2.4	193.9	-6.3	43.2	232.1	117.6	588.4
3/8/2019 9:00	2.8	196.1	-5.6	45.5	418.8	117.6	588.3
3/8/2019 10:00	2.5	208.2	-5.5	47.1	509.9	117.9	588.2
3/8/2019 11:00	3.2	211.3	-5.3	49.0	557.5	118.0	588.0
3/8/2019 12:00	3.8	219.3	-4.9	54.1	552.1	117.8	587.9
3/8/2019 13:00	4.1	218.4	-4.6	56.8	494.3	117.9	587.7
3/8/2019 14:00	4.0	221.6	-4.2	53.4	394.9	117.9	587.6
3/8/2019 15:00	3.8	237.3	-4.2	51.8	263.2	117.7	587.5
3/8/2019 16:00	2.6	245.5	-4.4	53.2	118.5	117.8	587.6
3/8/2019 17:00	1.6	234.3	-5.1	57.1	6.7	117.9	587.7
3/8/2019 18:00	1.1	242.6	-5.4	57.7	0.0	117.7	587.7
3/8/2019 19:00	1.5	205.4	-5.7	58.5	0.0	118.3	587.7
3/8/2019 20:00	2.0	191.4	-5.8	60.2	0.0	118.2	587.7
3/8/2019 21:00	2.2	187.2	-5.9	65.6	0.0	118.4	587.7
3/8/2019 22:00	1.5	184.6	-6.0	67.2	0.0	118.4	587.8
3/8/2019 23:00	1.7	190.1	-6.1	66.0	0.0	118.3	587.8
3/9/2019 0:00	2.1	194.4	-6.2	66.6	0.0	118.2	587.7
3/9/2019 1:00	2.2	200.1	-6.3	67.3	0.0	118.4	587.7
3/9/2019 2:00	2.3	204.5	-6.4	68.7	0.0	118.3	587.7
3/9/2019 3:00	1.9	209.0	-6.4	69.0	0.0	118.4	587.7
3/9/2019 4:00	1.4	214.3	-6.4	68.4	0.0	118.2	587.7
3/9/2019 5:00	2.2	158.2	-6.7	69.5	0.0	118.2	587.7
3/9/2019 6:00	2.7	173.1	-6.6	69.7	9.8	117.9	587.7

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
3/9/2019 7:00	2.5	185.5	-6.3	67.9	60.0	118.0	587.7
3/9/2019 8:00	2.8	172.2	-6.1	66.9	186.9	118.1	587.7
3/9/2019 9:00	1.9	211.3	-5.5	64.6	247.5	118.1	587.6
3/9/2019 10:00	2.5	217.2	-5.3	64.1	320.3	118.0	587.7
3/9/2019 11:00	3.4	220.0	-5.1	64.0	381.1	118.0	587.7
3/9/2019 12:00	5.1	237.7	-5.0	63.6	436.9	118.0	587.6
3/9/2019 13:00	5.3	237.2	-5.0	64.6	280.7	118.1	587.6
3/9/2019 14:00	4.3	238.9	-4.6	62.7	392.5	117.9	587.6
3/9/2019 15:00	3.8	243.2	-4.4	62.8	370.6	117.9	587.5
3/9/2019 16:00	3.2	255.4	-5.1	66.4	74.4	118.1	587.6
3/9/2019 17:00	2.8	231.8	-5.4	68.2	5.2	118.2	587.6
3/9/2019 18:00	4.1	213.8	-5.5	69.7	0.0	118.1	587.6
3/9/2019 19:00	3.3	207.3	-5.6	69.7	0.0	118.2	587.6
3/9/2019 20:00	4.7	188.5	-5.7	68.1	0.0	118.2	587.6
3/9/2019 21:00	5.9	173.3	-5.9	68.8	0.0	118.0	587.6
3/9/2019 22:00	6.6	156.8	-6.1	70.5	0.0	118.2	587.6
3/9/2019 23:00	6.7	167.1	-6.0	70.2	0.0	118.0	587.6
3/10/2019 0:00	6.7	180.6	-6.0	73.1	0.0	118.1	587.8
3/10/2019 1:00	6.8	177.6	-6.1	77.1	0.0	118.2	587.6
3/10/2019 2:00	7.9	175.8	-6.2	79.2	0.0	118.0	587.7
3/10/2019 3:00	6.2	188.7	-5.7	75.0	0.0	117.8	587.8
3/10/2019 4:00	5.9	207.6	-6.6	89.1	0.0	117.7	587.7
3/10/2019 5:00	4.9	198.6	-6.7	92.0	0.0	117.7	587.9
3/10/2019 6:00	5.1	203.1	-6.5	92.0	4.8	117.7	588.1
3/10/2019 7:00	5.7	197.4	-6.2	92.3	24.7	118.0	588.4
3/10/2019 8:00	5.5	199.3	-6.0	92.6	67.2	117.8	588.8
3/10/2019 9:00	4.5	217.9	-5.8	92.8	98.5	117.6	589.5
3/10/2019 10:00	6.4	205.9	-5.4	93.2	120.7	118.0	590.0
3/10/2019 11:00	7.9	199.1	-4.9	93.6	117.7	117.8	590.2
3/10/2019 12:00	8.2	195.5	-4.6	93.9	120.4	117.8	590.7
3/10/2019 13:00	6.3	208.2	-4.1	94.4	132.1	117.7	591.0
3/10/2019 14:00	4.3	213.0	-4.0	94.5	95.9	117.8	592.0
3/10/2019 15:00	4.6	200.8	-3.9	94.7	69.7	117.0	592.4
3/10/2019 16:00	6.1	211.6	-3.9	94.7	34.0	117.3	592.4
3/10/2019 17:00	5.4	214.3	-3.9	94.7	4.6	117.7	592.5
3/10/2019 18:00	5.0	219.2	-3.8	94.8	0.0	117.7	592.7
3/10/2019 19:00	5.3	198.6	-3.9	94.8	0.0	-	592.8
3/10/2019 20:00	5.6	208.1	-3.9	94.8	0.0	117.9	593.2
3/10/2019 21:00	6.0	210.4	-3.9	94.8	0.0	117.9	593.4
3/10/2019 22:00	4.0	207.4	-4.1	94.7	0.0	118.0	593.4
3/10/2019 23:00	3.2	206.7	-4.4	94.4	0.0	118.0	593.5
3/11/2019 0:00	2.8	209.6	-4.4	94.4	0.0	116.9	593.6
3/11/2019 1:00	2.3	210.1	-4.3	94.4	0.0	117.3	593.9
3/11/2019 2:00	1.9	211.6	-4.4	94.4	0.0	115.3	594.4
3/11/2019 3:00	2.3	200.2	-4.4	94.4	0.0	119.2	594.7
3/11/2019 4:00	3.0	197.5	-4.3	94.5	0.0	119.8	595.2
3/11/2019 5:00	2.6	202.1	-4.3	94.6	0.1	121.3	595.4
3/11/2019 6:00	2.0	206.9	-4.2	94.6	9.8	120.7	595.4
3/11/2019 7:00	2.0	223.2	-4.1	94.7	49.7	119.9	596.6
3/11/2019 8:00	2.6	226.2	-4.0	94.7	102.5	124.3	597.5
3/11/2019 9:00	1.7	218.5	-3.9	94.9	108.9	123.9	597.8
3/11/2019 10:00	1.4	209.5	-3.1	95.6	151.7	123.6	597.8
3/11/2019 11:00	1.7	216.1	-2.6	95.8	282.1	122.7	597.7
3/11/2019 12:00	1.8	211.5	-2.8	95.0	271.2	123.3	598.1
3/11/2019 13:00	2.4	219.1	-2.4	95.5	299.6	122.0	598.4

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
3/11/2019 14:00	3.7	220.7	-3.0	95.0	206.9	122.2	598.5
3/11/2019 15:00	3.6	205.3	-3.2	95.1	171.7	123.8	598.5
3/11/2019 16:00	3.5	221.5	-3.0	95.3	64.1	124.2	598.7
3/11/2019 17:00	3.3	218.1	-3.7	95.1	7.8	124.1	598.8
3/11/2019 18:00	2.5	209.2	-4.1	94.9	0.0	124.2	598.8
3/11/2019 19:00	2.5	202.9	-4.4	94.6	0.0	124.2	598.8
3/11/2019 20:00	2.6	216.8	-4.6	94.4	0.0	124.3	598.8
3/11/2019 21:00	2.0	227.3	-4.7	94.2	0.0	124.1	598.8
3/11/2019 22:00	2.2	215.3	-4.8	94.2	0.0	123.9	598.8
3/11/2019 23:00	2.5	198.2	-4.8	94.2	0.0	123.6	598.8
3/12/2019 0:00	2.5	217.0	-4.7	94.3	0.0	122.7	598.8
3/12/2019 1:00	2.3	217.6	-4.7	94.3	0.0	121.7	598.8
3/12/2019 2:00	2.3	214.0	-4.8	94.1	0.0	124.0	598.8
3/12/2019 3:00	2.0	207.2	-5.0	94.0	0.0	123.6	598.8
3/12/2019 4:00	2.3	190.2	-5.4	93.7	0.0	123.5	598.8
3/12/2019 5:00	1.8	200.3	-5.3	93.8	0.2	123.2	599.0
3/12/2019 6:00	2.8	195.4	-5.3	93.7	16.3	124.0	599.0
3/12/2019 7:00	2.5	201.4	-4.9	93.7	104.0	123.8	599.1
3/12/2019 8:00	2.9	180.7	-4.8	93.6	183.1	124.0	599.0
3/12/2019 9:00	3.1	202.7	-4.2	93.7	317.3	123.4	599.2
3/12/2019 10:00	3.1	206.4	-3.7	94.1	306.5	119.7	599.0
3/12/2019 11:00	3.3	217.0	-2.6	95.1	380.4	121.7	599.1
3/12/2019 12:00	4.2	223.5	-3.1	95.2	232.0	121.2	599.0
3/12/2019 13:00	3.9	220.9	-2.9	95.4	222.8	123.5	599.2
3/12/2019 14:00	4.0	221.2	-2.9	95.6	158.7	121.2	599.4
3/12/2019 15:00	3.6	219.9	-3.0	95.6	124.3	123.0	599.6
3/12/2019 16:00	3.9	213.3	-3.2	95.6	61.8	124.9	599.7
3/12/2019 17:00	3.2	210.9	-3.3	95.6	7.2	124.6	600.2
3/12/2019 18:00	3.0	207.4	-3.4	95.5	0.0	123.6	600.3
3/12/2019 19:00	2.8	209.4	-3.7	95.3	0.0	125.3	600.4
3/12/2019 20:00	3.1	200.3	-3.8	95.2	0.0	125.8	600.5
3/12/2019 21:00	2.8	202.0	-3.7	95.3	0.0	125.8	600.5
3/12/2019 22:00	2.6	201.5	-3.7	95.3	0.0	124.8	600.8
3/12/2019 23:00	2.8	193.4	-3.6	95.3	0.0	127.3	601.5
3/13/2019 0:00	2.6	206.1	-3.7	95.3	0.0	127.1	601.6
3/13/2019 1:00	2.4	219.0	-3.5	95.5	0.0	125.3	601.8
3/13/2019 2:00	2.5	209.8	-3.7	95.3	0.0	124.7	601.8
3/13/2019 3:00	2.9	206.3	-3.9	95.2	0.0	123.6	601.8
3/13/2019 4:00	1.8	196.6	-4.0	95.0	0.0	123.3	601.8
3/13/2019 5:00	2.3	186.4	-4.4	94.7	0.8	124.0	601.8
3/13/2019 6:00	1.9	151.8	-4.7	94.3	27.4	125.5	601.8
3/13/2019 7:00	2.3	161.8	-4.4	94.4	80.6	126.2	601.8
3/13/2019 8:00	3.4	176.8	-4.0	93.9	169.6	126.4	601.8
3/13/2019 9:00	3.5	177.3	-3.7	92.8	305.3	125.9	601.8
3/13/2019 10:00	4.5	187.5	-3.6	92.4	298.6	126.4	601.7
3/13/2019 11:00	6.2	163.0	-3.8	88.7	325.1	124.7	601.7
3/13/2019 12:00	2.6	215.0	-3.2	85.9	305.5	124.4	602.1
3/13/2019 13:00	1.5	240.0	-2.8	84.6	251.5	123.9	602.1
3/13/2019 14:00	3.0	175.6	-3.3	86.8	179.4	123.7	602.0
3/13/2019 15:00	3.3	318.2	-3.4	83.8	103.5	124.1	602.1
3/13/2019 16:00	3.1	198.9	-3.6	88.0	33.0	124.0	602.1
3/13/2019 17:00	2.0	222.0	-3.8	90.5	4.7	124.1	602.2
3/13/2019 18:00	1.6	275.3	-4.0	92.7	0.0	123.7	602.3
3/13/2019 19:00	1.8	251.1	-4.1	94.8	0.0	123.0	603.0
3/13/2019 20:00	3.2	338.6	-4.1	95.3	0.0	124.2	603.8

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
3/13/2019 21:00	3.7	321.9	-4.0	95.2	0.0	125.6	604.7
3/13/2019 22:00	2.5	335.3	-3.8	95.2	0.0	126.9	606.2
3/13/2019 23:00	2.0	346.9	-3.6	95.3	0.0	130.0	607.7
3/14/2019 0:00	1.4	152.6	-3.5	95.5	0.0	-	609.5
3/14/2019 1:00	2.1	193.9	-3.3	95.7	0.0	136.4	610.3
3/14/2019 2:00	2.1	207.6	-3.2	95.8	0.0	138.3	611.5
3/14/2019 3:00	1.7	221.9	-3.1	95.9	0.0	139.1	612.6
3/14/2019 4:00	3.8	219.3	-3.2	95.7	0.0	-	614.1
3/14/2019 5:00	8.2	217.5	-3.5	95.6	0.3	147.3	614.7
3/14/2019 6:00	5.2	202.9	-3.5	95.6	23.6	139.2	614.8
3/14/2019 7:00	3.6	194.3	-4.0	95.1	69.0	140.8	614.8
3/14/2019 8:00	4.1	180.0	-4.0	95.1	155.2	140.2	614.9
3/14/2019 9:00	3.3	200.0	-3.4	95.6	187.0	139.1	615.0
3/14/2019 10:00	3.1	215.3	-2.3	96.4	225.9	137.3	615.2
3/14/2019 11:00	4.5	185.1	-3.5	95.5	195.1	138.6	615.5
3/14/2019 12:00	8.0	201.4	-4.0	95.0	157.7	132.4	616.1
3/14/2019 13:00	7.0	212.4	-3.9	95.2	317.3	137.5	616.0
3/14/2019 14:00	5.2	205.1	-3.0	95.6	351.8	134.9	616.0
3/14/2019 15:00	4.2	208.0	-3.0	95.9	185.0	135.3	616.0
3/14/2019 16:00	3.7	215.9	-2.4	96.3	179.3	135.2	616.3
3/14/2019 17:00	3.9	204.5	-3.9	95.3	13.0	135.3	616.5
3/14/2019 18:00	4.5	191.3	-4.2	95.0	0.0	135.3	616.6
3/14/2019 19:00	3.7	200.6	-4.2	94.9	0.0	135.2	616.6
3/14/2019 20:00	3.1	213.6	-4.2	95.0	0.0	134.6	617.0
3/14/2019 21:00	3.4	201.1	-4.3	94.9	0.0	134.4	617.2
3/14/2019 22:00	3.5	205.5	-4.4	94.8	0.0	135.0	617.1
3/14/2019 23:00	4.0	218.2	-4.4	94.7	0.0	135.2	617.2
3/15/2019 0:00	3.9	210.4	-4.5	94.7	0.0	134.8	617.1
3/15/2019 1:00	4.3	218.3	-4.5	94.7	0.0	134.8	617.2
3/15/2019 2:00	2.9	206.8	-5.2	94.0	0.0	134.9	617.2
3/15/2019 3:00	3.3	202.3	-5.5	93.8	0.0	134.7	617.2
3/15/2019 4:00	3.8	189.7	-5.4	93.9	0.0	134.7	617.2
3/15/2019 5:00	2.7	184.2	-5.1	94.0	0.3	134.6	617.2
3/15/2019 6:00	2.0	77.0	-5.0	93.8	19.6	134.2	617.2
3/15/2019 7:00	2.8	152.4	-4.5	94.3	79.3	134.2	617.2
3/15/2019 8:00	3.2	188.4	-3.5	95.2	162.9	133.6	617.2
3/15/2019 9:00	1.4	65.8	-3.4	94.4	190.5	132.6	617.2
3/15/2019 10:00	1.4	99.9	-3.2	94.6	220.0	131.7	617.3
3/15/2019 11:00	3.2	164.7	-2.9	95.1	234.8	133.8	617.3
3/15/2019 12:00	2.8	171.4	-2.4	95.4	292.6	133.7	617.3
3/15/2019 13:00	2.1	181.7	-1.6	95.7	283.4	133.1	617.5
3/15/2019 14:00	2.1	50.0	-2.0	95.8	184.3	133.2	617.8
3/15/2019 15:00	1.5	113.9	-2.4	95.7	147.9	133.7	617.9
3/15/2019 16:00	2.0	170.3	-2.6	95.6	72.3	134.7	617.9
3/15/2019 17:00	2.2	358.7	-3.2	95.5	10.1	134.9	617.9
3/15/2019 18:00	1.8	301.0	-3.4	93.8	0.0	135.1	617.9
3/15/2019 19:00	1.6	191.5	-3.4	93.4	0.0	135.0	617.9
3/15/2019 20:00	1.9	176.4	-3.3	93.0	0.0	135.2	617.9
3/15/2019 21:00	1.8	112.6	-3.1	89.6	0.0	135.2	618.0
3/15/2019 22:00	2.3	113.4	-3.0	88.7	0.0	134.6	617.9
3/15/2019 23:00	1.6	34.8	-3.0	88.4	0.0	134.2	618.0
3/16/2019 0:00	2.0	37.1	-3.3	92.6	0.0	134.6	618.2
3/16/2019 1:00	4.8	29.4	-3.4	95.0	0.0	134.2	618.4
3/16/2019 2:00	4.3	23.0	-3.2	95.4	0.0	134.2	618.5
3/16/2019 3:00	4.4	23.1	-2.6	95.4	0.0	132.1	618.7

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
3/16/2019 4:00	5.0	27.0	-2.7	96.3	0.0	133.8	619.2
3/16/2019 5:00	4.5	22.3	-2.5	96.6	0.2	133.7	620.0
3/16/2019 6:00	3.8	24.8	-2.2	96.8	12.5	134.1	621.1
3/16/2019 7:00	3.0	21.4	-1.9	97.0	44.2	135.5	623.1
3/16/2019 8:00	1.6	324.2	-0.9	97.5	78.4	137.7	624.6
3/16/2019 9:00	2.2	225.3	-0.1	98.1	116.6	136.9	626.4
3/16/2019 10:00	3.8	213.3	0.1	98.5	166.8	139.0	627.4
3/16/2019 11:00	4.9	214.4	0.1	98.8	188.7	139.8	627.9
3/16/2019 12:00	4.8	212.3	0.2	99.0	236.6	139.9	628.1
3/16/2019 13:00	4.4	213.6	0.2	99.1	163.8	139.4	628.2
3/16/2019 14:00	4.3	216.8	0.2	99.2	145.9	137.2	628.3
3/16/2019 15:00	4.0	215.8	0.2	99.3	89.7	137.4	628.3
3/16/2019 16:00	4.0	206.5	0.2	99.4	52.5	136.9	628.3
3/16/2019 17:00	5.3	199.2	0.1	99.4	13.9	137.2	628.4
3/16/2019 18:00	4.1	209.2	0.1	99.5	0.1	137.0	628.4
3/16/2019 19:00	5.0	196.1	0.0	99.5	0.0	137.9	628.5
3/16/2019 20:00	5.7	193.4	0.0	99.4	0.0	138.8	628.4
3/16/2019 21:00	3.1	211.7	0.1	99.0	0.0	138.3	628.5
3/16/2019 22:00	3.7	210.2	0.3	96.2	0.0	138.5	628.4
3/16/2019 23:00	3.3	212.0	0.5	93.4	0.0	138.8	628.3
3/17/2019 0:00	5.5	191.8	0.9	97.7	0.0	138.4	628.3
3/17/2019 1:00	4.8	186.4	1.2	99.4	0.0	138.4	628.4
3/17/2019 2:00	4.4	186.7	1.2	99.6	0.0	138.2	628.5
3/17/2019 3:00	6.5	180.0	1.5	99.8	0.0	138.0	628.5
3/17/2019 4:00	7.0	183.4	2.1	90.9	0.0	137.7	628.3
3/17/2019 5:00	6.2	179.8	2.3	88.7	0.9	137.5	628.4
3/17/2019 6:00	6.3	181.7	2.3	90.8	18.8	137.2	628.6
3/17/2019 7:00	5.9	184.6	2.4	91.5	95.1	136.4	628.7
3/17/2019 8:00	3.3	177.1	3.4	83.9	110.4	135.0	628.9
3/17/2019 9:00	4.3	195.5	2.2	96.2	127.5	133.7	629.7
3/17/2019 10:00	4.9	197.4	2.1	96.6	156.4	132.7	630.2
3/17/2019 11:00	6.7	204.0	2.2	96.5	183.7	132.5	630.9
3/17/2019 12:00	7.0	200.9	2.0	98.6	165.9	132.7	632.2
3/17/2019 13:00	6.3	204.5	2.1	98.9	140.0	131.5	632.3
3/17/2019 14:00	5.6	212.7	2.2	99.3	114.3	131.0	632.5
3/17/2019 15:00	5.7	204.3	2.5	97.9	69.8	130.8	632.7
3/17/2019 16:00	4.9	218.7	2.6	98.0	32.5	129.4	633.0
3/17/2019 17:00	5.0	220.9	2.5	99.3	7.6	129.0	633.4
3/17/2019 18:00	5.4	212.8	2.7	99.8	0.0	129.2	633.7
3/17/2019 19:00	9.5	188.5	3.4	100.0	0.0	128.3	634.2
3/17/2019 20:00	7.7	195.4	3.4	99.1	0.0	127.8	634.4
3/17/2019 21:00	9.9	181.8	4.8	83.4	0.0	126.5	633.9
3/17/2019 22:00	9.5	181.4	5.3	74.8	0.0	125.8	634.1
3/17/2019 23:00	7.0	189.2	4.7	77.5	0.0	125.7	633.8
3/18/2019 0:00	5.4	195.6	4.8	76.7	0.0	125.8	634.0
3/18/2019 1:00	4.5	217.0	4.9	76.1	0.0	125.8	633.8
3/18/2019 2:00	3.1	199.7	4.8	76.0	0.0	125.8	633.8
3/18/2019 3:00	3.3	211.2	5.0	74.1	0.0	124.7	633.8
3/18/2019 4:00	3.5	200.3	5.1	73.6	0.0	124.8	633.9
3/18/2019 5:00	4.6	215.0	4.9	75.1	0.6	124.3	633.7
3/18/2019 6:00	4.5	214.8	5.0	73.7	24.0	123.8	633.8
3/18/2019 7:00	3.3	210.3	5.3	71.1	94.0	123.7	633.8
3/18/2019 8:00	2.2	197.9	6.1	67.3	324.4	121.8	634.4
3/18/2019 9:00	2.8	220.5	6.8	63.9	506.8	121.0	634.4
3/18/2019 10:00	3.2	211.3	6.9	64.0	481.6	120.0	634.3



**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
3/18/2019 11:00	3.6	209.4	7.3	62.1	592.4	118.0	634.2
3/18/2019 12:00	3.8	216.6	7.5	61.1	597.7	118.7	634.1
3/18/2019 13:00	3.3	223.1	7.8	59.5	537.3	118.2	633.8
3/18/2019 14:00	1.4	173.3	8.5	56.2	434.7	117.3	633.8
3/18/2019 15:00	1.2	86.8	8.0	57.5	302.0	117.5	633.6
3/18/2019 16:00	1.4	73.3	7.4	57.4	154.8	117.2	633.6
3/18/2019 17:00	1.4	84.5	6.6	60.6	31.7	117.7	633.7
3/18/2019 18:00	1.9	71.5	6.4	58.3	0.2	117.3	633.8
3/18/2019 19:00	1.7	63.5	6.6	54.9	0.0	117.6	633.7
3/18/2019 20:00	1.4	57.9	6.5	54.5	0.0	117.5	633.7
3/18/2019 21:00	1.4	66.0	6.1	49.9	0.0	117.7	633.8
3/18/2019 22:00	1.7	86.8	6.1	46.3	0.0	117.4	633.8
3/18/2019 23:00	1.3	86.8	5.9	44.3	0.0	117.6	633.8
3/19/2019 0:00	2.2	70.4	6.1	42.8	0.0	117.4	633.8
3/19/2019 1:00	2.4	70.3	5.6	42.2	0.0	117.0	633.8
3/19/2019 2:00	2.5	54.3	6.3	39.4	0.0	117.1	633.8
3/19/2019 3:00	2.5	48.4	6.3	40.2	0.0	117.2	633.8
3/19/2019 4:00	2.6	43.9	5.8	43.0	0.0	117.1	633.8
3/19/2019 5:00	2.2	39.8	5.9	41.7	1.7	117.1	633.8
3/19/2019 6:00	1.3	40.5	6.1	36.4	15.6	117.4	633.8
3/19/2019 7:00	0.9	67.5	6.8	35.6	151.0	116.6	634.5
3/19/2019 8:00	0.8	152.0	7.8	33.8	358.7	116.0	634.6
3/19/2019 9:00	1.2	133.7	8.2	35.2	486.0	116.3	634.5
3/19/2019 10:00	0.9	188.4	8.2	37.7	574.7	115.7	634.5
3/19/2019 11:00	1.2	157.8	8.3	39.9	619.4	116.0	634.4
3/19/2019 12:00	0.8	156.3	9.3	39.2	615.7	115.3	634.1
3/19/2019 13:00	0.9	121.4	9.3	36.8	554.7	115.4	633.9
3/19/2019 14:00	1.8	63.9	8.8	39.4	452.9	116.3	633.8
3/19/2019 15:00	1.3	60.6	9.2	35.8	318.2	116.2	633.7
3/19/2019 16:00	1.5	42.1	8.8	37.1	168.8	115.4	633.6
3/19/2019 17:00	1.5	64.1	7.8	39.9	37.0	116.1	633.7
3/19/2019 18:00	1.8	75.2	7.5	38.0	0.4	115.5	633.7
3/19/2019 19:00	1.3	80.8	7.7	34.0	0.0	116.0	633.8
3/19/2019 20:00	1.2	131.8	7.7	34.6	0.0	116.1	633.8
3/19/2019 21:00	1.0	76.2	7.5	31.2	0.0	116.3	633.8
3/19/2019 22:00	1.9	65.7	7.4	30.9	0.0	115.8	633.8
3/19/2019 23:00	1.9	70.1	6.8	31.1	0.0	116.0	633.8
3/20/2019 0:00	1.7	68.9	6.9	30.9	0.0	115.9	633.8
3/20/2019 1:00	1.2	170.6	6.2	39.7	0.0	115.7	633.9
3/20/2019 2:00	1.2	178.6	6.0	40.5	0.0	115.9	633.9
3/20/2019 3:00	0.8	42.7	6.1	34.3	0.0	115.9	633.9
3/20/2019 4:00	0.8	139.3	5.6	37.6	0.0	115.6	633.9
3/20/2019 5:00	1.7	46.0	5.9	33.2	2.5	115.4	633.9
3/20/2019 6:00	1.1	49.3	5.8	33.2	15.2	115.4	633.9
3/20/2019 7:00	2.1	50.2	6.1	32.1	162.4	114.8	634.6
3/20/2019 8:00	3.0	39.7	6.6	33.5	364.3	114.5	634.8
3/20/2019 9:00	2.1	66.0	7.3	32.3	484.0	114.3	634.7
3/20/2019 10:00	2.7	63.4	7.2	34.7	571.7	114.3	634.6
3/20/2019 11:00	1.0	166.6	8.0	37.2	525.8	113.9	634.5
3/20/2019 12:00	1.3	88.7	8.9	34.5	605.1	114.4	634.3
3/20/2019 13:00	1.4	31.4	9.4	32.2	515.4	114.1	634.1
3/20/2019 14:00	2.3	38.7	8.3	34.8	181.3	113.6	633.8
3/20/2019 15:00	2.3	43.4	8.2	35.1	148.3	113.0	633.7
3/20/2019 16:00	2.3	58.6	8.1	36.2	113.4	113.5	633.8
3/20/2019 17:00	2.4	55.2	8.0	36.4	17.4	114.1	633.7

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
3/20/2019 18:00	2.8	45.7	8.3	34.7	0.3	113.8	633.7
3/20/2019 19:00	2.5	50.2	8.2	35.2	0.0	114.1	633.7
3/20/2019 20:00	2.4	129.0	7.8	37.2	0.0	114.2	633.8
3/20/2019 21:00	1.8	127.5	7.5	39.2	0.0	114.1	633.8
3/20/2019 22:00	1.4	67.1	8.1	35.5	0.0	114.0	633.8
3/20/2019 23:00	1.3	83.8	8.2	34.5	0.0	114.0	633.8
3/21/2019 0:00	1.3	85.8	8.5	32.8	0.0	114.2	633.8
3/21/2019 1:00	1.2	72.1	8.3	33.2	0.0	113.9	633.7
3/21/2019 2:00	2.1	46.7	8.2	33.2	0.0	113.6	633.8
3/21/2019 3:00	1.7	66.3	8.2	32.9	0.0	113.6	633.8
3/21/2019 4:00	1.6	71.6	8.2	33.0	0.0	113.4	633.8
3/21/2019 5:00	0.8	208.1	8.2	32.7	3.9	113.8	633.8
3/21/2019 6:00	0.9	76.4	8.2	33.1	37.8	113.6	633.8
3/21/2019 7:00	0.8	143.9	8.7	32.4	168.7	112.8	634.4
3/21/2019 8:00	2.5	164.0	9.0	31.4	369.0	112.6	634.3
3/21/2019 9:00	3.8	172.4	9.1	32.0	473.5	113.0	634.1
3/21/2019 10:00	2.8	181.8	9.3	33.0	561.0	112.3	634.3
3/21/2019 11:00	2.2	177.9	9.8	33.8	577.4	112.4	634.1
3/21/2019 12:00	3.4	182.5	9.2	37.8	564.0	110.8	634.2
3/21/2019 13:00	2.2	186.3	9.9	36.7	556.1	111.2	633.8
3/21/2019 14:00	1.1	170.4	9.9	36.0	374.4	111.4	633.6
3/21/2019 15:00	1.2	242.2	9.1	38.7	200.4	110.5	633.6
3/21/2019 16:00	2.2	163.7	8.4	38.8	117.1	110.5	633.6
3/21/2019 17:00	3.6	178.5	7.8	39.4	27.0	110.3	633.9
3/21/2019 18:00	4.1	172.9	7.2	41.9	0.5	110.6	633.7
3/21/2019 19:00	3.6	164.1	6.9	43.4	0.0	110.2	633.8
3/21/2019 20:00	2.7	160.6	6.3	46.1	0.0	110.9	633.8
3/21/2019 21:00	1.3	157.5	6.3	46.0	0.0	110.6	633.8
3/21/2019 22:00	1.8	174.4	6.3	46.9	0.0	110.8	633.8
3/21/2019 23:00	2.1	166.5	6.3	47.5	0.0	111.0	633.8
3/22/2019 0:00	2.0	37.2	6.3	47.0	0.0	111.0	633.8
3/22/2019 1:00	1.5	73.4	6.2	47.5	0.0	110.8	633.8
3/22/2019 2:00	1.5	49.1	5.9	48.3	0.0	111.0	633.8
3/22/2019 3:00	2.2	53.3	6.0	48.1	0.0	110.9	633.8
3/22/2019 4:00	2.1	35.7	5.9	49.0	0.0	111.2	633.8
3/22/2019 5:00	3.7	24.3	5.7	48.5	1.1	110.6	633.8
3/22/2019 6:00	3.2	148.6	5.2	50.8	21.7	110.7	633.9
3/22/2019 7:00	1.6	323.9	6.1	46.9	140.8	110.6	633.9
3/22/2019 8:00	1.8	144.2	5.8	48.6	301.7	110.3	634.3
3/22/2019 9:00	2.2	315.8	6.6	46.5	501.5	110.0	634.6
3/22/2019 10:00	2.0	310.4	5.9	50.5	396.2	109.3	633.8
3/22/2019 11:00	7.0	59.3	6.8	47.0	369.2	108.9	633.9
3/22/2019 12:00	7.1	41.7	6.5	48.0	329.5	108.7	633.8
3/22/2019 13:00	4.9	47.4	7.4	46.3	283.7	107.9	633.9
3/22/2019 14:00	4.3	66.5	7.2	50.1	180.9	107.1	633.9
3/22/2019 15:00	5.6	93.2	6.8	55.1	87.2	105.8	633.7
3/22/2019 16:00	3.7	56.8	6.5	57.4	50.7	107.1	633.8
3/22/2019 17:00	3.7	52.6	6.4	57.5	14.7	106.2	633.8
3/22/2019 18:00	5.8	111.4	6.5	54.7	0.4	105.2	633.3
3/22/2019 19:00	7.3	103.4	6.8	52.8	0.0	104.9	634.0
3/22/2019 20:00	4.4	132.8	6.6	53.6	0.0	104.7	633.9
3/22/2019 21:00	3.4	128.2	6.4	53.3	0.0	105.4	633.8
3/22/2019 22:00	3.4	130.4	5.7	60.2	0.0	105.3	633.8
3/22/2019 23:00	1.7	259.5	5.6	60.4	0.0	104.9	633.8
3/23/2019 0:00	3.2	204.6	3.5	73.5	0.0	105.5	634.0

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
3/23/2019 1:00	6.5	199.7	0.9	94.6	0.0	105.9	634.3
3/23/2019 2:00	6.5	208.1	0.5	98.2	0.0	105.2	635.1
3/23/2019 3:00	6.2	210.2	0.5	98.7	0.0	105.7	635.3
3/23/2019 4:00	6.9	207.1	0.4	98.5	0.0	105.1	635.1
3/23/2019 5:00	9.6	180.8	1.1	79.5	1.6	104.8	635.6
3/23/2019 6:00	7.8	179.6	0.8	79.8	24.5	104.6	635.2
3/23/2019 7:00	4.9	203.1	0.1	90.6	84.2	104.6	635.4
3/23/2019 8:00	5.2	195.6	0.3	89.2	163.4	104.3	635.5
3/23/2019 9:00	5.1	203.4	0.8	84.9	407.1	104.2	635.8
3/23/2019 10:00	4.6	217.2	1.2	83.3	497.4	104.1	635.9
3/23/2019 11:00	7.2	193.0	1.7	64.4	392.7	104.0	635.3
3/23/2019 12:00	5.5	214.8	2.2	61.5	408.5	104.0	635.5
3/23/2019 13:00	5.2	221.6	2.0	64.0	275.3	103.9	635.4
3/23/2019 14:00	5.3	193.4	2.1	62.8	312.2	103.8	635.3
3/23/2019 15:00	4.3	198.8	1.8	65.3	135.8	103.9	635.2
3/23/2019 16:00	4.2	185.3	1.5	70.2	88.8	103.4	635.1
3/23/2019 17:00	3.4	169.4	1.2	69.2	35.1	103.7	635.4
3/23/2019 18:00	3.4	150.7	1.0	66.4	0.7	103.8	635.4
3/23/2019 19:00	1.3	108.8	1.0	64.2	0.0	104.3	635.4
3/23/2019 20:00	1.0	82.6	0.8	65.2	0.0	103.9	635.5
3/23/2019 21:00	1.8	73.9	0.4	60.0	0.0	104.0	635.5
3/23/2019 22:00	1.6	64.1	0.6	58.0	0.0	104.1	635.5
3/23/2019 23:00	2.3	42.0	0.4	58.2	0.0	103.8	635.5
3/24/2019 0:00	1.3	40.4	0.2	59.1	0.0	104.2	635.5
3/24/2019 1:00	0.8	311.4	0.2	60.4	0.0	104.1	635.6
3/24/2019 2:00	0.9	169.0	-0.2	64.5	0.0	104.1	635.6
3/24/2019 3:00	0.9	49.5	-0.3	59.3	0.0	103.6	635.6
3/24/2019 4:00	0.9	210.6	-0.5	65.0	0.0	103.6	635.6
3/24/2019 5:00	0.5	145.7	-0.8	64.9	4.3	103.7	635.7
3/24/2019 6:00	1.2	180.9	-0.9	65.9	20.5	103.3	635.7
3/24/2019 7:00	0.5	144.8	1.1	54.6	201.7	102.9	636.6
3/24/2019 8:00	0.9	181.0	1.3	52.0	392.9	103.7	636.5
3/24/2019 9:00	0.4	173.9	3.2	45.9	520.0	103.1	636.3
3/24/2019 10:00	0.6	187.8	3.2	48.7	608.2	102.6	636.2
3/24/2019 11:00	0.6	183.3	3.3	49.2	651.2	103.2	636.0
3/24/2019 12:00	0.7	98.1	3.4	48.0	644.3	103.7	635.8
3/24/2019 13:00	1.0	104.1	3.4	46.8	585.6	103.8	635.5
3/24/2019 14:00	1.3	83.7	3.2	48.9	480.2	104.0	635.4
3/24/2019 15:00	1.8	32.2	3.1	50.7	346.1	104.2	635.4
3/24/2019 16:00	1.5	24.7	2.9	50.7	194.9	104.2	635.2
3/24/2019 17:00	1.4	62.9	1.9	53.5	54.9	104.2	635.3
3/24/2019 18:00	2.7	35.9	1.1	54.6	1.3	103.3	635.4
3/24/2019 19:00	3.6	358.4	1.1	60.9	0.0	103.8	635.4
3/24/2019 20:00	3.6	351.8	0.4	65.7	0.0	103.9	635.4
3/24/2019 21:00	2.4	42.8	-0.1	64.6	0.0	104.9	635.5
3/24/2019 22:00	0.7	95.0	0.0	58.9	0.0	104.9	635.6
3/24/2019 23:00	1.2	236.7	0.0	60.0	0.0	103.7	635.6
3/25/2019 0:00	1.4	190.4	0.0	62.2	0.0	104.1	635.7
3/25/2019 1:00	0.9	175.0	-0.2	60.7	0.0	103.9	635.7
3/25/2019 2:00	1.0	200.3	-0.3	60.9	0.0	103.7	635.7
3/25/2019 3:00	0.9	187.5	-0.6	59.6	0.0	103.7	635.7
3/25/2019 4:00	1.2	221.9	-0.8	58.8	0.0	103.7	635.7
3/25/2019 5:00	1.7	205.2	-1.1	57.9	4.4	103.6	635.8
3/25/2019 6:00	1.4	191.7	-1.0	55.7	20.1	103.5	635.8
3/25/2019 7:00	1.2	208.9	0.0	48.5	212.5	103.2	636.5

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
3/25/2019 8:00	1.2	194.2	0.9	44.1	398.9	102.8	636.4
3/25/2019 9:00	0.5	247.7	2.5	37.3	521.8	102.6	636.6
3/25/2019 10:00	0.6	201.8	3.8	38.6	603.4	103.0	636.1
3/25/2019 11:00	1.3	211.5	2.6	45.6	641.7	102.9	636.0
3/25/2019 12:00	0.9	201.4	4.0	42.6	635.1	102.9	635.8
3/25/2019 13:00	1.4	207.5	4.2	41.6	576.2	102.9	635.5
3/25/2019 14:00	1.1	202.0	4.6	39.9	467.0	103.1	635.3
3/25/2019 15:00	0.9	149.8	4.4	40.0	331.3	103.1	635.2
3/25/2019 16:00	0.1	176.2	5.5	36.0	178.8	102.2	635.1
3/25/2019 17:00	0.5	219.5	3.4	46.2	48.6	103.8	635.3
3/25/2019 18:00	0.5	338.3	2.4	45.4	1.7	103.4	635.3
3/25/2019 19:00	1.0	321.3	2.2	43.2	0.0	103.7	635.4
3/25/2019 20:00	1.2	43.5	1.4	46.4	0.0	103.3	635.4
3/25/2019 21:00	1.1	30.5	1.1	46.7	0.0	103.7	635.5
3/25/2019 22:00	0.9	184.1	1.3	46.8	0.0	103.9	635.5
3/25/2019 23:00	0.9	195.4	1.6	47.8	0.0	103.8	635.6
3/26/2019 0:00	1.6	190.0	1.3	47.7	0.0	103.5	635.6
3/26/2019 1:00	1.9	180.1	0.9	49.1	0.0	103.4	635.6
3/26/2019 2:00	0.8	144.2	0.8	48.2	0.0	103.7	635.6
3/26/2019 3:00	0.9	114.6	1.1	43.7	0.0	103.5	635.7
3/26/2019 4:00	0.9	191.8	0.8	48.6	0.0	103.5	635.7
3/26/2019 5:00	0.8	155.5	0.5	50.4	10.4	103.6	635.7
3/26/2019 6:00	0.9	191.0	0.7	46.8	58.0	103.4	635.7
3/26/2019 7:00	0.9	165.6	0.9	47.0	108.6	103.1	636.0
3/26/2019 8:00	1.0	181.4	2.0	41.7	382.4	102.8	636.4
3/26/2019 9:00	0.8	350.6	3.0	38.3	521.8	102.8	636.6
3/26/2019 10:00	1.4	58.3	3.1	39.9	618.3	103.0	636.1
3/26/2019 11:00	1.5	37.6	3.4	39.5	513.1	102.6	636.0
3/26/2019 12:00	1.4	53.7	3.9	38.4	568.5	102.6	635.9
3/26/2019 13:00	1.5	45.4	3.6	41.2	363.2	102.9	635.6
3/26/2019 14:00	2.5	33.4	3.7	40.6	325.7	102.6	635.5
3/26/2019 15:00	2.2	50.2	3.7	41.5	216.6	102.7	635.3
3/26/2019 16:00	1.7	62.6	3.6	43.1	190.3	102.8	635.2
3/26/2019 17:00	1.3	74.3	3.5	43.1	58.1	103.0	635.4
3/26/2019 18:00	0.7	86.7	2.7	48.6	1.6	102.7	635.4
3/26/2019 19:00	1.4	56.3	2.3	47.9	0.0	102.6	635.4
3/26/2019 20:00	1.1	65.5	1.9	48.2	0.0	103.2	635.4
3/26/2019 21:00	1.0	28.8	2.0	47.7	0.0	102.7	635.4
3/26/2019 22:00	0.6	32.1	1.8	48.6	0.0	103.2	635.5
3/26/2019 23:00	0.8	322.4	1.7	49.2	0.0	103.2	635.5
3/27/2019 0:00	1.1	210.3	1.5	50.9	0.0	102.5	635.6
3/27/2019 1:00	0.7	168.5	0.9	52.9	0.0	102.3	635.6
3/27/2019 2:00	0.7	159.3	0.4	55.7	0.0	102.5	635.7
3/27/2019 3:00	1.3	186.8	0.0	63.9	0.0	102.6	635.7
3/27/2019 4:00	1.2	23.4	0.2	57.6	0.0	102.0	635.7
3/27/2019 5:00	1.4	16.7	0.1	58.1	5.6	101.9	635.6
3/27/2019 6:00	1.0	218.9	-0.3	60.4	22.8	102.0	635.7
3/27/2019 7:00	1.0	171.8	0.9	56.6	246.5	101.9	636.4
3/27/2019 8:00	0.9	187.3	1.9	51.0	412.2	101.6	636.3
3/27/2019 9:00	1.0	274.6	2.2	48.1	541.2	101.7	636.3
3/27/2019 10:00	0.4	170.1	4.5	42.0	626.4	100.5	636.2
3/27/2019 11:00	0.7	208.7	4.5	43.4	662.8	101.0	635.9
3/27/2019 12:00	0.4	161.5	6.0	37.3	659.8	101.1	635.8
3/27/2019 13:00	0.7	126.0	5.2	39.4	605.3	101.5	635.6
3/27/2019 14:00	1.6	105.4	4.1	46.2	492.4	101.5	635.4

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
3/27/2019 15:00	1.2	22.2	5.2	42.1	353.8	101.0	635.4
3/27/2019 16:00	1.4	75.1	4.1	47.7	200.6	101.0	635.1
3/27/2019 17:00	1.8	77.0	3.0	51.7	60.3	101.4	635.3
3/27/2019 18:00	4.2	8.5	3.5	46.8	2.3	100.7	635.3
3/27/2019 19:00	2.7	357.5	2.8	49.3	0.0	101.0	635.3
3/27/2019 20:00	2.8	353.3	2.4	51.7	0.0	101.4	635.3
3/27/2019 21:00	2.5	307.7	2.6	50.7	0.0	101.2	635.4
3/27/2019 22:00	2.8	298.1	2.8	48.2	0.0	101.2	635.4
3/27/2019 23:00	3.3	319.7	3.6	42.4	0.0	101.2	635.4
3/28/2019 0:00	2.3	0.9	3.3	42.9	0.0	101.3	635.4
3/28/2019 1:00	1.4	115.3	1.9	49.3	0.0	101.3	635.5
3/28/2019 2:00	1.1	180.6	1.7	52.1	0.0	101.1	635.5
3/28/2019 3:00	1.1	253.4	2.0	48.4	0.0	100.9	635.5
3/28/2019 4:00	1.2	201.4	1.3	52.9	0.0	100.8	635.6
3/28/2019 5:00	1.3	196.7	1.3	51.1	6.0	100.8	635.6
3/28/2019 6:00	1.3	173.8	1.2	52.0	19.7	100.2	635.6
3/28/2019 7:00	0.8	152.0	3.1	42.7	270.9	99.7	636.3
3/28/2019 8:00	1.3	166.0	3.4	42.2	416.9	100.6	636.2
3/28/2019 9:00	1.1	157.5	4.2	39.7	555.1	100.5	636.4
3/28/2019 10:00	0.8	190.1	5.5	37.4	638.4	100.6	636.1
3/28/2019 11:00	1.0	170.8	5.2	41.6	675.6	101.2	636.1
3/28/2019 12:00	0.5	128.0	6.8	37.8	668.4	100.5	635.9
3/28/2019 13:00	0.6	129.5	7.0	40.8	613.0	101.3	635.5
3/28/2019 14:00	1.0	311.2	6.5	39.6	500.6	100.9	635.5
3/28/2019 15:00	0.8	37.7	6.7	38.1	364.5	100.9	635.3
3/28/2019 16:00	0.8	71.0	5.9	40.6	208.2	101.4	635.1
3/28/2019 17:00	0.6	337.6	5.6	40.1	67.3	101.8	635.3
3/28/2019 18:00	0.5	10.4	4.3	44.0	2.4	101.8	635.3
3/28/2019 19:00	1.0	208.4	4.2	45.3	0.0	102.1	635.4
3/28/2019 20:00	2.3	193.6	3.9	46.1	0.0	101.9	635.4
3/28/2019 21:00	3.0	188.6	3.8	46.1	0.0	101.6	635.4
3/28/2019 22:00	2.6	184.6	3.7	46.1	0.0	101.8	635.4
3/28/2019 23:00	3.0	187.5	3.4	47.4	0.0	101.8	635.4
3/29/2019 0:00	3.1	191.2	3.3	47.7	0.0	101.9	635.4
3/29/2019 1:00	2.9	194.3	3.1	48.2	0.0	101.7	635.4
3/29/2019 2:00	2.6	189.2	3.0	48.7	0.0	101.4	635.5
3/29/2019 3:00	3.0	193.3	2.9	49.3	0.0	101.2	635.5
3/29/2019 4:00	3.3	195.8	2.7	50.2	0.0	100.0	635.5
3/29/2019 5:00	2.7	200.9	2.6	50.7	6.8	100.7	635.5
3/29/2019 6:00	2.6	193.7	2.6	50.5	22.9	101.2	635.5
3/29/2019 7:00	2.8	190.0	3.1	48.7	276.1	101.1	636.1
3/29/2019 8:00	2.5	197.3	3.4	47.7	428.7	100.3	636.1
3/29/2019 9:00	2.2	206.4	4.0	46.7	554.2	98.6	636.2
3/29/2019 10:00	2.3	209.8	4.4	47.3	639.2	-	636.1
3/29/2019 11:00	2.2	214.8	5.0	47.9	681.8	100.3	635.9
3/29/2019 12:00	2.6	222.0	5.3	46.3	679.8	100.6	635.8
3/29/2019 13:00	3.3	240.6	5.4	45.1	627.3	99.2	635.5
3/29/2019 14:00	2.0	311.2	5.3	45.2	509.5	99.8	635.5
3/29/2019 15:00	2.5	312.1	4.9	45.7	372.3	99.2	635.3
3/29/2019 16:00	2.3	331.3	4.8	45.4	213.3	99.4	635.2
3/29/2019 17:00	1.0	42.7	4.3	47.5	71.7	99.8	635.3
3/29/2019 18:00	1.1	56.0	3.3	51.9	2.8	99.6	635.4
3/29/2019 19:00	2.2	86.8	2.6	54.9	0.0	99.8	635.4
3/29/2019 20:00	1.0	96.4	2.8	53.9	0.0	99.7	635.4
3/29/2019 21:00	0.6	234.3	2.9	54.2	0.0	99.6	635.4

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
3/29/2019 22:00	0.3	243.2	2.5	55.6	0.0	99.7	635.5
3/29/2019 23:00	0.2	226.4	2.3	56.9	0.0	99.7	635.5
3/30/2019 0:00	0.4	191.5	2.0	58.4	0.0	99.8	635.5
3/30/2019 1:00	0.6	236.7	1.9	59.5	0.0	99.5	635.6
3/30/2019 2:00	1.4	195.8	1.7	58.0	0.0	99.4	635.6
3/30/2019 3:00	0.6	48.9	1.2	58.1	0.0	99.2	635.6
3/30/2019 4:00	0.1	260.1	1.2	60.6	0.0	99.3	635.6
3/30/2019 5:00	0.4	311.5	0.9	61.1	8.8	99.1	635.6
3/30/2019 6:00	0.9	35.5	1.0	56.6	51.2	98.9	635.8
3/30/2019 7:00	0.5	57.5	3.1	47.1	288.3	98.6	636.6
3/30/2019 8:00	0.5	107.0	3.7	46.4	433.6	98.6	636.3
3/30/2019 9:00	0.5	190.4	4.4	45.3	551.7	97.9	636.3
3/30/2019 10:00	0.6	93.8	4.4	47.0	592.1	99.2	636.4
3/30/2019 11:00	0.9	35.5	4.2	48.5	587.1	97.9	635.7
3/30/2019 12:00	0.6	187.4	4.9	50.2	573.9	97.6	635.7
3/30/2019 13:00	0.7	45.8	5.3	47.7	661.0	96.8	635.5
3/30/2019 14:00	0.6	51.3	5.2	48.5	507.1	95.8	635.3
3/30/2019 15:00	1.4	355.1	4.6	51.1	346.1	96.7	635.3
3/30/2019 16:00	1.3	33.2	3.8	54.6	258.5	97.0	635.3
3/30/2019 17:00	1.7	47.8	3.0	57.9	70.1	97.4	635.2
3/30/2019 18:00	2.1	72.9	2.1	59.7	3.5	97.2	635.4
3/30/2019 19:00	1.8	66.1	1.8	60.0	0.0	97.5	635.4
3/30/2019 20:00	2.1	64.2	1.3	62.1	0.0	97.3	635.4
3/30/2019 21:00	1.8	70.2	1.1	63.0	0.0	97.4	635.5
3/30/2019 22:00	2.5	75.7	0.8	63.9	0.0	97.4	635.5
3/30/2019 23:00	1.4	62.1	0.7	64.9	0.0	97.6	635.5
3/31/2019 0:00	1.3	61.1	0.5	64.6	0.0	97.5	635.5
3/31/2019 1:00	2.3	54.0	0.0	67.8	0.0	97.2	635.5
3/31/2019 2:00	2.5	9.3	0.7	66.7	0.0	97.4	635.5
3/31/2019 3:00	1.7	6.0	0.2	68.0	0.0	96.7	635.6
3/31/2019 4:00	4.7	19.3	0.9	58.3	0.0	96.8	635.6
3/31/2019 5:00	4.2	19.3	1.3	55.3	7.9	96.8	635.6
3/31/2019 6:00	5.0	33.4	1.0	55.3	32.2	97.2	635.7
3/31/2019 7:00	6.7	40.6	1.2	54.1	286.4	97.1	636.4
3/31/2019 8:00	8.8	46.3	1.5	54.8	443.0	96.9	636.4
3/31/2019 9:00	8.0	41.6	2.0	54.1	566.7	95.9	636.5
3/31/2019 10:00	7.5	24.5	2.4	54.6	652.7	94.5	636.4
3/31/2019 11:00	7.2	27.0	2.7	53.8	693.6	94.4	636.1
3/31/2019 12:00	4.8	19.0	3.4	51.1	697.6	94.6	636.1
3/31/2019 13:00	3.5	358.3	4.0	49.6	641.3	93.8	635.6
3/31/2019 14:00	2.7	0.8	4.5	47.3	550.6	93.6	635.6
3/31/2019 15:00	3.4	15.1	4.5	46.1	381.8	93.2	635.4
3/31/2019 16:00	3.4	16.3	4.5	45.4	223.2	92.7	635.2
3/31/2019 17:00	3.7	9.5	4.2	45.6	80.7	93.1	635.3
3/31/2019 18:00	4.9	15.1	3.7	46.0	4.0	93.3	635.5
3/31/2019 19:00	7.5	24.2	3.3	46.4	0.0	92.9	635.4
3/31/2019 20:00	7.7	26.0	2.9	46.9	0.0	92.7	635.6
3/31/2019 21:00	8.3	31.0	2.9	46.5	0.0	92.4	635.4
3/31/2019 22:00	6.8	36.7	2.2	50.2	0.0	93.0	635.5
3/31/2019 23:00	6.7	38.5	2.0	49.7	0.0	92.8	635.2
4/1/2019 0:00	6.7	37.0	2.2	47.9	0.0	93.2	635.3
4/1/2019 1:00	7.6	36.0	2.0	47.7	0.0	92.5	635.2
4/1/2019 2:00	9.2	52.8	2.5	44.5	0.0	92.1	635.7
4/1/2019 3:00	8.4	40.2	2.0	45.5	0.0	91.2	635.6
4/1/2019 4:00	7.4	36.9	2.3	43.5	0.1	90.4	635.3

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
4/1/2019 5:00	7.8	59.3	2.9	40.2	10.8	91.1	635.4
4/1/2019 6:00	9.1	60.3	2.8	40.7	42.4	91.5	635.7
4/1/2019 7:00	8.7	45.1	2.1	45.1	292.3	91.6	636.3
4/1/2019 8:00	8.3	13.3	2.5	44.3	441.4	91.1	636.4
4/1/2019 9:00	7.7	12.7	3.2	42.6	568.1	90.8	636.5
4/1/2019 10:00	7.9	7.7	4.2	38.5	653.8	90.6	636.1
4/1/2019 11:00	7.9	14.3	4.9	36.1	695.0	91.1	635.9
4/1/2019 12:00	8.6	20.7	5.5	35.2	696.6	90.5	635.7
4/1/2019 13:00	7.9	18.1	6.3	34.1	632.1	90.7	635.8
4/1/2019 14:00	7.3	34.3	6.5	34.6	515.6	89.1	635.4
4/1/2019 15:00	7.4	31.7	6.4	35.8	379.8	89.3	635.3
4/1/2019 16:00	5.3	43.6	6.2	37.4	219.7	89.9	635.2
4/1/2019 17:00	4.3	36.2	6.4	34.4	79.7	89.4	635.3
4/1/2019 18:00	4.6	0.9	6.1	33.8	4.5	89.6	635.2
4/1/2019 19:00	4.4	3.5	5.4	36.6	0.0	89.7	635.2
4/1/2019 20:00	3.3	18.3	5.7	35.6	0.0	90.0	635.3
4/1/2019 21:00	3.2	26.8	5.7	34.5	0.0	89.8	635.2
4/1/2019 22:00	4.5	32.7	5.7	32.2	0.0	90.1	635.2
4/1/2019 23:00	3.9	24.2	5.7	30.4	0.0	89.8	635.2
4/2/2019 0:00	2.2	47.2	4.8	32.5	0.0	90.3	635.3
4/2/2019 1:00	4.2	21.7	4.9	33.5	0.0	89.7	635.3
4/2/2019 2:00	5.0	25.3	4.8	32.2	0.0	89.6	635.4
4/2/2019 3:00	5.4	34.2	4.4	31.9	0.0	89.5	635.3
4/2/2019 4:00	5.3	31.9	4.2	32.4	0.2	90.2	635.3
4/2/2019 5:00	4.5	22.8	4.1	32.5	12.8	90.4	635.3
4/2/2019 6:00	3.5	45.3	3.3	35.5	50.0	89.5	635.7
4/2/2019 7:00	5.6	28.8	3.7	36.0	292.0	89.7	636.1
4/2/2019 8:00	2.6	46.5	4.7	35.0	448.0	89.5	636.4
4/2/2019 9:00	2.3	53.3	4.9	36.5	574.5	89.7	636.3
4/2/2019 10:00	3.8	6.3	5.1	36.9	664.7	89.5	636.2
4/2/2019 11:00	0.9	191.0	6.7	38.2	706.9	88.4	635.8
4/2/2019 12:00	0.7	169.6	8.2	34.7	711.3	89.1	635.5
4/2/2019 13:00	1.1	209.2	7.6	39.2	645.1	88.1	635.3
4/2/2019 14:00	1.2	161.5	7.3	38.6	527.2	88.3	635.2
4/2/2019 15:00	1.3	233.4	7.7	34.9	389.9	88.1	635.1
4/2/2019 16:00	0.9	243.8	7.7	34.5	230.3	87.4	635.0
4/2/2019 17:00	1.3	226.8	6.7	36.7	89.8	87.7	635.0
4/2/2019 18:00	1.7	222.5	5.7	38.2	4.5	87.9	635.2
4/2/2019 19:00	2.0	201.5	5.4	39.1	0.0	87.9	635.3
4/2/2019 20:00	2.4	204.6	5.0	38.8	0.0	87.8	635.3
4/2/2019 21:00	3.2	194.9	4.7	39.6	0.0	88.1	635.2
4/2/2019 22:00	3.4	196.7	4.4	39.1	0.0	88.5	635.4
4/2/2019 23:00	3.9	193.6	4.4	37.3	0.0	89.0	635.3
4/3/2019 0:00	3.4	202.6	4.2	38.1	0.0	88.9	635.3
4/3/2019 1:00	3.4	192.8	4.0	37.4	0.0	88.5	635.3
4/3/2019 2:00	3.4	192.5	3.8	38.6	0.0	88.8	635.4
4/3/2019 3:00	3.4	189.1	3.6	39.2	0.0	88.1	635.4
4/3/2019 4:00	3.9	190.6	3.4	40.8	0.1	88.0	635.6
4/3/2019 5:00	3.4	198.6	3.1	42.0	18.8	88.2	635.4
4/3/2019 6:00	3.3	197.9	3.4	41.1	105.8	88.4	635.6
4/3/2019 7:00	3.3	201.1	3.6	41.3	223.4	88.5	635.7
4/3/2019 8:00	3.4	185.9	3.7	42.9	396.4	88.4	635.8
4/3/2019 9:00	3.6	193.4	4.2	42.3	549.2	88.2	635.8
4/3/2019 10:00	4.2	216.7	4.3	44.7	631.6	88.8	636.1
4/3/2019 11:00	5.8	224.8	4.7	44.7	698.3	88.4	635.7

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
4/3/2019 12:00	7.2	214.8	5.1	42.1	658.7	87.4	635.3
4/3/2019 13:00	7.5	189.8	4.9	41.7	352.4	87.4	635.1
4/3/2019 14:00	7.8	189.6	4.7	42.9	216.7	87.5	635.3
4/3/2019 15:00	7.6	190.8	4.3	44.9	125.4	86.5	635.3
4/3/2019 16:00	7.9	201.7	3.8	47.8	85.9	86.8	635.3
4/3/2019 17:00	7.0	190.7	3.3	53.4	26.2	86.6	635.5
4/3/2019 18:00	6.8	178.6	2.7	57.3	2.6	86.0	635.5
4/3/2019 19:00	8.0	173.8	2.3	61.3	0.0	86.6	635.1
4/3/2019 20:00	6.7	183.3	1.6	63.0	0.0	86.4	635.0
4/3/2019 21:00	6.2	191.4	1.1	61.4	0.0	86.4	635.4
4/3/2019 22:00	5.9	203.2	0.4	70.9	0.0	86.4	635.4
4/3/2019 23:00	6.3	218.0	-1.0	94.8	0.0	86.3	635.6
4/4/2019 0:00	6.6	215.9	-1.3	97.6	0.0	86.4	635.2
4/4/2019 1:00	5.8	210.7	-1.5	97.6	0.0	86.4	635.7
4/4/2019 2:00	5.5	214.4	-1.8	97.5	0.0	86.5	635.6
4/4/2019 3:00	4.7	221.2	-1.9	97.4	0.0	85.6	636.1
4/4/2019 4:00	4.8	222.3	-2.1	97.3	0.1	86.1	636.7
4/4/2019 5:00	5.0	215.0	-2.3	97.1	6.3	86.2	636.7
4/4/2019 6:00	4.9	202.1	-2.3	97.1	67.2	86.3	636.9
4/4/2019 7:00	4.6	215.5	-2.5	97.0	132.7	86.8	636.7
4/4/2019 8:00	3.8	216.3	-2.4	96.9	237.4	86.8	636.4
4/4/2019 9:00	2.6	217.2	-2.0	96.1	292.2	86.9	636.5
4/4/2019 10:00	1.5	143.5	-1.7	95.7	230.3	86.4	636.9
4/4/2019 11:00	1.6	22.2	-1.3	95.2	254.5	-	637.5
4/4/2019 12:00	1.8	22.3	-1.4	96.7	206.8	86.9	638.0
4/4/2019 13:00	0.7	72.1	-1.0	96.1	205.7	-	638.8
4/4/2019 14:00	1.2	311.2	-1.2	96.4	178.7	84.0	639.5
4/4/2019 15:00	0.6	317.9	-1.0	96.6	162.0	-	640.2
4/4/2019 16:00	1.1	12.4	-1.0	96.9	82.3	88.5	641.0
4/4/2019 17:00	1.4	353.0	-1.1	97.5	23.6	92.3	641.6
4/4/2019 18:00	2.0	14.0	-1.2	97.8	1.9	89.9	642.1
4/4/2019 19:00	1.9	7.3	-1.2	97.9	0.0	90.7	642.4
4/4/2019 20:00	2.3	16.7	-1.3	98.0	0.0	90.3	642.9
4/4/2019 21:00	2.5	28.0	-1.3	98.0	0.0	-	643.7
4/4/2019 22:00	2.3	29.6	-1.2	98.1	0.0	-	644.4
4/4/2019 23:00	2.2	26.1	-1.0	98.2	0.0	-	645.0
4/5/2019 0:00	2.2	27.1	-1.0	98.3	0.0	-	645.4
4/5/2019 1:00	1.8	31.9	-0.8	98.4	0.0	-	645.7
4/5/2019 2:00	1.9	34.7	-0.8	98.5	0.0	89.9	645.8
4/5/2019 3:00	1.8	36.5	-0.7	98.6	0.0	-	645.8
4/5/2019 4:00	2.3	26.5	-0.8	98.6	0.1	-	645.9
4/5/2019 5:00	2.7	32.4	-0.7	98.6	10.6	-	646.0
4/5/2019 6:00	3.9	40.0	-0.5	98.6	49.0	-	646.0
4/5/2019 7:00	5.3	34.7	-0.1	98.4	117.8	-	645.9
4/5/2019 8:00	6.9	38.0	0.1	97.7	248.3	94.9	646.2
4/5/2019 9:00	6.0	29.2	0.3	96.9	324.5	94.3	646.4
4/5/2019 10:00	5.5	30.6	0.5	95.4	381.9	87.1	646.5
4/5/2019 11:00	3.6	37.1	0.8	98.7	301.6	93.6	646.4
4/5/2019 12:00	2.7	33.9	1.3	99.3	314.6	92.7	646.5
4/5/2019 13:00	1.2	52.2	2.1	99.7	294.9	91.7	646.2
4/5/2019 14:00	1.3	47.3	2.2	100.0	301.5	91.7	646.3
4/5/2019 15:00	1.4	82.1	2.5	100.0	284.5	91.1	646.2
4/5/2019 16:00	1.0	136.6	2.3	100.0	128.1	90.8	646.3
4/5/2019 17:00	1.2	328.8	2.6	92.1	62.1	90.2	646.2
4/5/2019 18:00	2.5	86.0	3.0	77.7	6.1	90.5	646.2



**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
4/5/2019 19:00	0.5	187.2	3.2	75.1	0.0	90.2	646.3
4/5/2019 20:00	2.2	191.5	2.5	83.3	0.0	90.3	646.3
4/5/2019 21:00	6.5	206.9	-0.2	97.8	0.0	89.8	647.5
4/5/2019 22:00	8.2	185.3	-0.7	95.9	0.0	90.2	647.6
4/5/2019 23:00	6.4	193.5	-0.9	95.8	0.0	90.4	647.6
4/6/2019 0:00	2.9	195.4	-0.8	94.3	0.0	90.4	647.7
4/6/2019 1:00	1.9	163.5	-0.4	89.6	0.0	90.3	647.8
4/6/2019 2:00	2.3	175.7	-0.4	91.2	0.0	90.0	647.9
4/6/2019 3:00	2.5	191.1	-0.4	91.6	0.0	89.9	647.8
4/6/2019 4:00	3.8	175.0	-0.7	91.3	0.2	89.9	648.0
4/6/2019 5:00	2.0	163.1	-0.8	91.6	14.7	90.0	647.9
4/6/2019 6:00	1.9	177.5	-0.7	90.3	68.0	89.6	647.9
4/6/2019 7:00	2.8	150.5	-0.7	92.5	207.5	89.1	648.8
4/6/2019 8:00	2.4	52.2	0.2	83.1	490.8	88.8	649.2
4/6/2019 9:00	1.6	63.7	1.3	65.6	620.1	89.2	649.1
4/6/2019 10:00	1.8	72.2	1.4	62.9	641.7	89.9	649.1
4/6/2019 11:00	1.9	28.7	2.2	56.0	543.4	87.8	648.9
4/6/2019 12:00	2.9	93.8	2.7	52.5	586.4	88.3	648.3
4/6/2019 13:00	3.6	120.6	2.6	53.2	274.2	88.0	647.9
4/6/2019 14:00	3.6	102.4	3.1	53.3	307.9	87.5	647.8
4/6/2019 15:00	7.6	90.5	2.9	50.4	192.5	88.3	648.1
4/6/2019 16:00	8.7	81.0	2.8	50.5	98.6	88.4	648.1
4/6/2019 17:00	3.3	92.5	2.6	55.6	48.1	88.4	647.9
4/6/2019 18:00	2.1	303.0	2.2	60.6	5.3	88.2	647.9
4/6/2019 19:00	1.8	240.8	1.8	65.2	0.0	88.6	647.9
4/6/2019 20:00	2.8	58.3	1.0	77.6	0.0	88.4	647.8
4/6/2019 21:00	1.1	115.3	1.4	73.5	0.0	88.5	648.0
4/6/2019 22:00	1.8	18.6	1.1	79.3	0.0	88.3	648.0
4/6/2019 23:00	9.1	168.2	-0.6	93.1	0.0	89.0	648.1
4/7/2019 0:00	6.0	199.5	-1.5	97.9	0.0	89.0	648.1
4/7/2019 1:00	3.2	198.7	-1.6	97.9	0.0	87.3	648.3
4/7/2019 2:00	5.3	180.5	-0.9	88.5	0.0	88.7	648.0
4/7/2019 3:00	3.0	187.8	-0.7	82.7	0.0	88.9	648.4
4/7/2019 4:00	2.7	142.4	-0.7	82.2	0.3	88.9	648.3
4/7/2019 5:00	2.6	357.0	-0.7	83.4	15.4	87.9	648.7
4/7/2019 6:00	1.6	207.9	-1.1	94.2	65.0	88.2	649.3
4/7/2019 7:00	5.6	174.5	-1.0	95.4	128.5	87.9	649.5
4/7/2019 8:00	6.3	166.2	-0.9	93.0	239.0	88.3	649.5
4/7/2019 9:00	3.3	163.7	0.6	74.0	335.6	89.2	649.7
4/7/2019 10:00	2.2	211.3	1.3	74.1	477.1	89.0	649.8
4/7/2019 11:00	4.4	220.8	0.8	84.1	482.7	89.1	649.4
4/7/2019 12:00	5.7	188.6	0.1	91.7	312.5	89.2	649.6
4/7/2019 13:00	4.6	194.7	0.6	86.2	323.0	89.0	649.4
4/7/2019 14:00	7.8	188.0	0.1	89.0	196.7	88.3	649.7
4/7/2019 15:00	6.9	185.7	-0.2	91.2	205.2	88.5	649.7
4/7/2019 16:00	6.2	193.9	-0.2	95.7	138.9	88.4	649.6
4/7/2019 17:00	4.6	209.5	-0.7	98.1	40.2	88.6	649.9
4/7/2019 18:00	3.6	199.9	-1.0	97.9	5.8	88.8	649.8
4/7/2019 19:00	2.9	134.8	-1.3	96.4	0.0	-	650.6
4/7/2019 20:00	5.2	190.1	-1.4	96.2	0.0	88.7	651.5
4/7/2019 21:00	7.4	182.8	-1.8	97.8	0.0	88.8	651.5
4/7/2019 22:00	4.7	195.8	-1.9	97.8	0.0	88.6	652.1
4/7/2019 23:00	4.2	199.4	-1.9	97.8	0.0	88.0	652.5
4/8/2019 0:00	4.4	203.2	-1.9	97.8	0.0	88.8	652.9
4/8/2019 1:00	5.0	180.2	-2.1	97.7	0.0	90.2	653.1

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
4/8/2019 2:00	4.1	184.2	-2.0	97.7	0.0	90.1	653.0
4/8/2019 3:00	5.3	179.1	-2.0	97.2	0.0	89.2	653.1
4/8/2019 4:00	3.9	178.4	-1.8	95.4	0.5	88.8	653.1
4/8/2019 5:00	3.5	172.5	-1.5	94.8	16.8	87.9	653.2
4/8/2019 6:00	4.6	176.9	-1.6	97.1	91.3	88.4	653.1
4/8/2019 7:00	5.5	184.8	-1.4	97.6	209.4	88.8	653.3
4/8/2019 8:00	4.8	201.4	-0.7	92.4	430.0	89.0	653.5
4/8/2019 9:00	6.1	188.1	0.0	81.4	432.2	88.2	653.4
4/8/2019 10:00	7.5	187.8	0.9	72.9	522.3	88.8	653.4
4/8/2019 11:00	8.1	194.6	0.5	77.3	395.5	89.1	652.9
4/8/2019 12:00	6.2	198.0	-0.5	94.2	356.3	89.0	653.1
4/8/2019 13:00	4.0	205.4	-0.6	97.2	283.8	88.8	653.3
4/8/2019 14:00	5.1	206.7	-0.6	97.8	229.9	89.1	653.5
4/8/2019 15:00	5.4	204.3	-0.8	98.3	167.3	88.6	653.6
4/8/2019 16:00	4.7	193.7	-0.9	98.5	92.8	88.5	653.7
4/8/2019 17:00	3.8	202.6	-0.9	98.6	40.6	87.6	653.9
4/8/2019 18:00	4.1	193.8	-1.0	98.7	5.6	89.4	654.2
4/8/2019 19:00	4.3	191.1	-1.1	98.6	0.0	89.0	654.4
4/8/2019 20:00	3.5	200.5	-1.2	98.5	0.0	88.6	654.6
4/8/2019 21:00	4.1	202.2	-1.2	98.5	0.0	88.7	654.6
4/8/2019 22:00	3.0	210.9	-1.2	98.5	0.0	-	655.0
4/8/2019 23:00	2.8	202.4	-1.3	98.5	0.0	88.6	655.2
4/9/2019 0:00	3.1	212.2	-1.3	98.5	0.0	88.4	655.4
4/9/2019 1:00	3.1	205.0	-1.3	98.5	0.0	-	655.4
4/9/2019 2:00	3.0	213.1	-1.4	98.5	0.0	90.2	655.7
4/9/2019 3:00	3.2	219.2	-1.6	98.3	0.0	92.1	657.5
4/9/2019 4:00	2.8	216.1	-1.6	98.2	1.0	92.4	657.5
4/9/2019 5:00	3.4	212.5	-1.6	98.2	25.5	92.4	657.4
4/9/2019 6:00	3.2	214.1	-1.5	98.2	120.5	92.0	657.4
4/9/2019 7:00	3.0	202.6	-1.0	98.4	264.9	91.1	658.1
4/9/2019 8:00	2.5	199.3	0.1	98.8	477.8	92.3	658.4
4/9/2019 9:00	1.9	180.3	-0.1	99.1	378.7	91.7	657.9
4/9/2019 10:00	2.2	165.6	-0.5	98.8	291.7	88.7	657.6
4/9/2019 11:00	4.1	187.6	-0.5	98.4	302.1	90.9	658.0
4/9/2019 12:00	3.2	198.5	-0.2	98.3	307.1	92.2	658.3
4/9/2019 13:00	3.7	191.8	-0.4	98.3	272.0	89.6	658.9
4/9/2019 14:00	4.1	209.0	-0.4	98.2	213.6	94.9	659.5
4/9/2019 15:00	4.0	217.0	-0.8	97.9	148.6	96.3	661.1
4/9/2019 16:00	3.3	206.3	-1.0	98.0	93.3	96.8	661.7
4/9/2019 17:00	2.9	192.4	-1.2	98.2	36.2	97.7	662.2
4/9/2019 18:00	3.7	170.1	-1.6	98.3	6.3	99.3	662.2
4/9/2019 19:00	3.5	192.1	-1.7	98.2	0.0	99.5	662.3
4/9/2019 20:00	4.3	188.9	-1.8	97.9	0.0	99.6	662.2
4/9/2019 21:00	5.0	174.9	-2.1	96.8	0.0	99.4	662.2
4/9/2019 22:00	3.4	168.4	-2.3	96.8	0.0	99.4	662.3
4/9/2019 23:00	4.1	165.9	-2.4	95.2	0.0	99.3	662.3
4/10/2019 0:00	3.0	145.0	-2.3	95.7	0.0	99.2	662.3
4/10/2019 1:00	2.6	183.0	-2.4	96.8	0.0	98.8	662.4
4/10/2019 2:00	3.7	202.6	-2.3	97.7	0.0	97.3	662.7
4/10/2019 3:00	3.8	217.3	-2.3	97.8	0.0	99.4	663.1
4/10/2019 4:00	3.2	209.2	-2.4	97.7	0.9	99.5	663.4
4/10/2019 5:00	2.4	217.8	-2.3	97.6	28.9	97.6	663.9
4/10/2019 6:00	2.4	221.8	-2.0	97.2	105.4	98.6	664.0
4/10/2019 7:00	2.8	206.8	-1.8	96.2	162.1	100.6	665.0
4/10/2019 8:00	3.8	204.7	-1.0	93.1	401.6	100.3	664.9

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
4/10/2019 9:00	3.8	228.2	-0.8	92.1	404.8	96.1	665.3
4/10/2019 10:00	2.7	229.4	-1.1	89.8	507.8	98.6	665.9
4/10/2019 11:00	2.7	219.7	-1.5	90.9	345.9	95.5	666.3
4/10/2019 12:00	2.6	228.5	-0.6	86.5	519.4	98.1	666.2
4/10/2019 13:00	2.2	221.7	-0.5	84.7	365.8	98.2	666.1
4/10/2019 14:00	3.1	228.1	-0.3	82.0	378.8	92.3	666.0
4/10/2019 15:00	4.0	227.6	-0.6	87.0	256.5	94.3	666.0
4/10/2019 16:00	4.4	209.7	-1.5	93.1	205.8	96.7	666.0
4/10/2019 17:00	2.9	218.9	-1.7	90.3	95.6	96.9	666.0
4/10/2019 18:00	1.7	203.2	-1.9	89.4	17.7	96.5	666.1
4/10/2019 19:00	1.2	206.7	-2.0	89.8	0.1	97.2	666.1
4/10/2019 20:00	0.8	161.7	-2.2	89.5	0.0	97.0	666.2
4/10/2019 21:00	1.0	185.2	-2.4	91.6	0.0	97.2	666.2
4/10/2019 22:00	0.9	182.7	-2.5	88.1	0.0	97.3	666.2
4/10/2019 23:00	1.1	75.6	-2.9	85.5	0.0	96.9	666.2
4/11/2019 0:00	2.1	33.5	-3.1	91.8	0.0	96.6	666.2
4/11/2019 1:00	2.7	34.8	-3.1	91.6	0.0	96.4	666.2
4/11/2019 2:00	1.2	338.8	-3.7	95.9	0.0	96.5	666.2
4/11/2019 3:00	1.6	51.3	-4.3	96.4	0.0	95.9	666.3
4/11/2019 4:00	2.5	35.8	-4.4	95.3	1.5	96.2	666.3
4/11/2019 5:00	0.9	256.2	-4.4	95.4	12.5	95.5	666.4
4/11/2019 6:00	1.8	359.2	-4.1	93.4	60.2	95.6	666.4
4/11/2019 7:00	1.4	27.4	-3.1	88.7	299.3	95.3	667.1
4/11/2019 8:00	2.7	26.1	-0.8	68.9	513.9	95.6	667.4
4/11/2019 9:00	7.1	30.0	-0.3	63.2	639.3	95.5	667.3
4/11/2019 10:00	4.7	10.6	1.1	60.0	718.0	96.6	667.1
4/11/2019 11:00	0.9	269.6	3.3	56.8	753.4	94.5	666.7
4/11/2019 12:00	1.0	76.3	2.6	62.4	530.4	95.4	666.6
4/11/2019 13:00	1.3	9.9	3.6	53.4	625.8	95.9	666.3
4/11/2019 14:00	1.3	15.2	3.4	55.9	377.3	95.7	665.8
4/11/2019 15:00	1.4	257.8	3.4	56.0	263.5	93.8	665.9
4/11/2019 16:00	1.2	337.7	3.0	57.7	197.3	95.8	665.8
4/11/2019 17:00	0.9	219.2	3.0	57.1	84.5	95.9	665.9
4/11/2019 18:00	1.8	162.6	1.9	62.7	10.9	95.7	666.0
4/11/2019 19:00	4.2	211.3	1.3	70.2	0.1	95.9	665.9
4/11/2019 20:00	4.4	208.9	1.1	71.3	0.0	96.1	666.0
4/11/2019 21:00	4.6	209.8	0.9	70.0	0.0	95.9	665.9
4/11/2019 22:00	4.2	213.7	0.8	70.0	0.0	96.0	666.0
4/11/2019 23:00	5.8	222.9	0.7	70.4	0.0	95.8	666.0
4/12/2019 0:00	4.9	202.0	0.4	72.0	0.0	95.6	666.0
4/12/2019 1:00	8.3	188.4	0.5	61.8	0.0	95.4	665.7
4/12/2019 2:00	7.1	196.3	-0.1	66.8	0.0	95.6	666.3
4/12/2019 3:00	6.4	210.5	-1.0	76.7	0.0	95.6	666.0
4/12/2019 4:00	5.3	220.1	-2.1	95.2	1.4	93.9	665.9
4/12/2019 5:00	5.3	222.0	-2.1	97.5	25.4	96.4	666.3
4/12/2019 6:00	4.5	219.5	-2.0	97.5	79.8	94.9	666.7
4/12/2019 7:00	4.3	225.1	-1.8	97.7	171.8	94.7	666.6
4/12/2019 8:00	4.6	205.5	-	-	222.5	101.8	-
4/12/2019 9:00	4.8	220.5	-	-	313.4	115.0	-
4/12/2019 10:00	4.1	219.8	-	-	271.9	119.6	-
4/12/2019 11:00	5.2	223.4	-	-	376.3	117.6	-
4/12/2019 12:00	5.9	222.1	-	-	586.0	118.8	-
4/12/2019 13:00	5.6	241.7	-	-	400.7	127.6	-
4/12/2019 14:00	6.9	243.1	-	-	211.0	129.0	-
4/12/2019 15:00	7.3	234.4	-	-	364.4	128.5	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
4/12/2019 16:00	7.0	239.4	-	-	167.3	127.6	-
4/12/2019 17:00	3.7	236.6	-	-	63.9	126.8	-
4/12/2019 18:00	3.1	209.6	-	-	5.7	127.5	-
4/12/2019 19:00	2.6	206.7	-	-	0.1	127.8	-
4/12/2019 20:00	2.4	206.1	-	-	0.0	127.6	-
4/12/2019 21:00	1.4	189.2	-	-	0.0	127.4	-
4/12/2019 22:00	0.5	131.1	-	-	0.0	126.3	-
4/12/2019 23:00	1.5	70.3	-	-	0.0	125.3	-
4/13/2019 0:00	1.7	67.1	-	-	0.0	125.4	-
4/13/2019 1:00	1.2	61.3	-	-	0.0	124.8	-
4/13/2019 2:00	0.8	146.2	-	-	0.0	125.0	-
4/13/2019 3:00	0.7	70.9	-	-	0.0	125.7	-
4/13/2019 4:00	1.8	56.8	-	-	2.6	124.2	-
4/13/2019 5:00	0.9	160.5	-	-	41.0	125.0	-
4/13/2019 6:00	2.2	24.0	-	-	152.2	128.2	-
4/13/2019 7:00	1.1	93.2	-	-	332.0	128.1	-
4/13/2019 8:00	5.0	71.4	-	-	500.0	126.2	-
4/13/2019 9:00	8.5	46.9	-	-	455.1	126.2	-
4/13/2019 10:00	7.5	47.9	-	-	522.2	125.6	-
4/13/2019 11:00	6.0	21.1	-	-	747.7	145.2	-
4/13/2019 12:00	5.2	1.6	-	-	716.2	151.1	-
4/13/2019 13:00	2.6	9.9	-	-	591.1	152.7	-
4/13/2019 14:00	2.6	19.4	-	-	442.3	152.4	-
4/13/2019 15:00	3.9	331.9	-	-	512.5	153.1	-
4/13/2019 16:00	5.6	311.1	-	-	298.9	156.2	-
4/13/2019 17:00	3.2	351.9	-	-	98.0	156.9	-
4/13/2019 18:00	2.8	43.6	-	-	15.4	145.0	-
4/13/2019 19:00	1.8	51.5	-	-	0.1	143.2	-
4/13/2019 20:00	0.9	167.5	-	-	0.0	141.8	-
4/13/2019 21:00	2.3	201.2	-	-	0.0	134.7	-
4/13/2019 22:00	2.0	189.9	-	-	0.0	131.1	-
4/13/2019 23:00	2.4	191.8	-	-	0.0	129.8	-
4/14/2019 0:00	1.7	203.5	-	-	0.0	129.6	-
4/14/2019 1:00	2.2	210.4	-	-	0.0	128.8	-
4/14/2019 2:00	2.2	233.5	-	-	0.0	128.3	-
4/14/2019 3:00	2.5	224.9	-	-	0.0	128.0	-
4/14/2019 4:00	3.0	196.2	-	-	2.5	127.5	-
4/14/2019 5:00	2.8	201.1	-	-	29.2	127.3	-
4/14/2019 6:00	2.7	203.3	-	-	86.1	127.4	-
4/14/2019 7:00	2.7	203.9	-	-	141.7	127.5	-
4/14/2019 8:00	3.0	217.1	-	-	194.5	127.2	-
4/14/2019 9:00	2.9	221.2	-	-	301.1	135.8	-
4/14/2019 10:00	2.6	227.2	-	-	349.3	140.4	-
4/14/2019 11:00	4.0	232.2	-	-	357.3	134.3	-
4/14/2019 12:00	4.1	236.7	-	-	342.2	138.6	-
4/14/2019 13:00	3.3	231.9	-	-	315.1	141.0	-
4/14/2019 14:00	3.4	244.8	-	-	332.4	149.1	-
4/14/2019 15:00	2.5	268.0	-	-	198.6	138.6	-
4/14/2019 16:00	2.6	218.7	-	-	61.9	124.4	-
4/14/2019 17:00	3.9	214.6	-	-	20.5	124.2	-
4/14/2019 18:00	3.7	211.2	-	-	5.5	125.8	-
4/14/2019 19:00	3.4	201.9	-	-	0.1	-	-
4/14/2019 20:00	2.6	206.1	-	-	0.0	-	-
4/14/2019 21:00	3.0	204.2	-	-	0.0	-	-
4/14/2019 22:00	2.9	210.1	-	-	0.0	-	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
4/14/2019 23:00	2.5	194.6	-	-	0.0	123.8	-
4/15/2019 0:00	2.2	182.4	-	-	0.0	-	-
4/15/2019 1:00	2.0	149.9	-	-	0.0	-	-
4/15/2019 2:00	2.6	150.7	-	-	0.0	126.8	-
4/15/2019 3:00	2.8	146.9	-	-	0.0	126.6	-
4/15/2019 4:00	0.8	60.6	-	-	3.8	124.8	-
4/15/2019 5:00	1.0	74.1	-	-	35.3	125.8	-
4/15/2019 6:00	0.7	133.5	-	-	126.0	128.5	-
4/15/2019 7:00	1.5	83.5	-	-	388.0	128.7	-
4/15/2019 8:00	1.2	79.7	-	-	540.4	128.1	-
4/15/2019 9:00	1.6	98.3	-	-	660.0	137.8	-
4/15/2019 10:00	1.2	74.7	-	-	737.6	128.2	-
4/15/2019 11:00	3.5	171.0	-	-	671.2	136.6	-
4/15/2019 12:00	5.3	204.5	-	-	821.0	149.9	-
4/15/2019 13:00	5.0	216.2	-	-	500.2	153.5	-
4/15/2019 14:00	5.1	203.8	-	-	526.2	152.5	-
4/15/2019 15:00	4.7	217.8	-	-	461.2	152.9	-
4/15/2019 16:00	3.7	195.4	-	-	132.4	150.1	-
4/15/2019 17:00	1.6	187.1	-	-	58.5	146.9	-
4/15/2019 18:00	1.1	266.9	-	-	10.3	147.5	-
4/15/2019 19:00	1.3	200.4	-	-	0.1	133.1	-
4/15/2019 20:00	2.6	321.7	-	-	0.0	128.8	-
4/15/2019 21:00	2.3	4.3	-	-	0.0	121.6	-
4/15/2019 22:00	2.1	34.8	-	-	0.0	119.3	-
4/15/2019 23:00	2.9	20.7	-	-	0.0	121.7	-
4/16/2019 0:00	1.8	16.4	-	-	0.0	120.2	-
4/16/2019 1:00	1.4	86.7	-	-	0.0	122.6	-
4/16/2019 2:00	1.3	349.4	-	-	0.0	-	-
4/16/2019 3:00	1.4	34.1	-	-	0.0	-	-
4/16/2019 4:00	2.3	27.4	-	-	2.1	125.3	-
4/16/2019 5:00	1.4	3.6	-	-	11.6	126.1	-
4/16/2019 6:00	1.7	268.0	-	-	25.5	133.4	-
4/16/2019 7:00	1.9	190.7	-	-	61.7	132.7	-
4/16/2019 8:00	1.3	89.1	-	-	87.8	135.4	-
4/16/2019 9:00	0.8	344.3	-	-	261.7	140.8	-
4/16/2019 10:00	0.9	292.5	-	-	357.3	-	-
4/16/2019 11:00	0.9	301.8	-	-	338.6	-	-
4/16/2019 12:00	2.2	209.7	-	-	339.7	-	-
4/16/2019 13:00	2.0	178.7	-	-	263.7	136.8	-
4/16/2019 14:00	1.6	346.8	-	-	215.9	-	-
4/16/2019 15:00	1.9	298.0	-	-	172.3	136.8	-
4/16/2019 16:00	1.5	294.6	-	-	80.6	136.4	-
4/16/2019 17:00	1.5	295.6	-	-	21.6	138.2	-
4/16/2019 18:00	3.6	228.3	-	-	4.9	145.7	-
4/16/2019 19:00	4.1	206.2	-	-	0.2	146.5	-
4/16/2019 20:00	3.8	208.7	-	-	0.0	145.6	-
4/16/2019 21:00	5.7	185.3	-	-	0.0	146.6	-
4/16/2019 22:00	4.4	187.3	-	-	0.0	146.3	-
4/16/2019 23:00	4.9	178.9	-	-	0.0	146.0	-
4/17/2019 0:00	4.4	176.0	-	-	0.0	145.6	-
4/17/2019 1:00	2.7	171.8	-	-	0.0	144.4	-
4/17/2019 2:00	2.9	169.9	-	-	0.0	-	-
4/17/2019 3:00	5.2	193.6	-	-	0.0	145.8	-
4/17/2019 4:00	3.7	207.0	-	-	1.6	144.4	-
4/17/2019 5:00	3.4	210.5	-	-	24.2	146.3	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
4/17/2019 6:00	6.0	196.8	-	-	73.8	144.6	-
4/17/2019 7:00	5.9	221.0	-	-	127.3	143.6	-
4/17/2019 8:00	5.0	221.5	-	-	320.2	145.8	-
4/17/2019 9:00	3.7	218.0	-	-	534.6	146.3	-
4/17/2019 10:00	5.0	195.5	-	-	667.3	145.6	-
4/17/2019 11:00	7.1	185.7	-	-	652.7	144.3	-
4/17/2019 12:00	7.6	182.3	-	-	586.2	-	-
4/17/2019 13:00	6.9	177.5	-	-	326.9	143.5	-
4/17/2019 14:00	3.0	204.4	-	-	164.7	141.5	-
4/17/2019 15:00	2.0	22.7	-	-	118.3	138.6	-
4/17/2019 16:00	2.0	303.3	-	-	69.1	135.1	-
4/17/2019 17:00	1.9	257.8	-	-	41.6	140.3	-
4/17/2019 18:00	3.1	260.5	-	-	17.0	142.6	-
4/17/2019 19:00	4.9	195.6	-	-	0.2	141.5	-
4/17/2019 20:00	6.8	175.7	-	-	0.0	138.8	-
4/17/2019 21:00	5.8	185.8	-	-	0.0	139.3	-
4/17/2019 22:00	10.7	165.6	-	-	0.0	140.9	-
4/17/2019 23:00	10.8	172.5	-	-	0.0	140.9	-
4/18/2019 0:00	9.0	201.1	-	-	0.0	137.8	-
4/18/2019 1:00	3.9	194.1	-	-	0.0	135.5	-
4/18/2019 2:00	3.3	193.4	-	-	0.0	136.2	-
4/18/2019 3:00	3.6	193.7	-	-	0.0	135.8	-
4/18/2019 4:00	6.6	184.2	-	-	2.4	134.1	-
4/18/2019 5:00	6.5	187.1	-	-	28.3	134.8	-
4/18/2019 6:00	5.7	185.9	-	-	77.0	135.8	-
4/18/2019 7:00	4.3	193.6	-	-	128.8	135.5	-
4/18/2019 8:00	2.7	218.0	-	-	153.0	135.4	-
4/18/2019 9:00	3.1	195.9	-	-	199.9	135.4	-
4/18/2019 10:00	3.7	217.0	-	-	272.4	139.1	-
4/18/2019 11:00	5.2	199.1	-	-	325.1	141.1	-
4/18/2019 12:00	5.7	201.0	-	-	349.3	142.7	-
4/18/2019 13:00	4.8	218.8	-	-	292.4	140.8	-
4/18/2019 14:00	4.9	219.1	-	-	230.5	140.3	-
4/18/2019 15:00	5.6	230.5	-	-	144.4	141.6	-
4/18/2019 16:00	5.3	208.4	-	-	119.0	143.5	-
4/18/2019 17:00	5.3	199.1	-	-	66.5	140.9	-
4/18/2019 18:00	4.4	199.0	-	-	12.8	140.8	-
4/18/2019 19:00	3.5	203.2	-	-	0.3	141.4	-
4/18/2019 20:00	4.1	198.0	-	-	0.0	140.7	-
4/18/2019 21:00	3.6	202.6	-	-	0.0	140.5	-
4/18/2019 22:00	3.3	217.5	-	-	0.0	-	-
4/18/2019 23:00	3.3	205.2	-	-	0.0	142.5	-
4/19/2019 0:00	3.5	197.0	-	-	0.0	141.9	-
4/19/2019 1:00	2.6	206.7	-	-	0.0	141.8	-
4/19/2019 2:00	5.5	223.8	-	-	0.0	141.6	-
4/19/2019 3:00	3.0	273.2	-	-	0.0	139.9	-
4/19/2019 4:00	4.3	224.3	-	-	4.6	140.7	-
4/19/2019 5:00	2.7	209.7	-	-	34.1	140.6	-
4/19/2019 6:00	2.4	212.0	-	-	121.9	140.7	-
4/19/2019 7:00	3.1	212.2	-	-	205.5	141.3	-
4/19/2019 8:00	3.4	224.3	-	-	282.0	141.8	-
4/19/2019 9:00	4.2	216.3	-	-	414.2	143.3	-
4/19/2019 10:00	3.9	233.3	-	-	356.1	143.0	-
4/19/2019 11:00	4.2	230.7	-	-	475.6	146.0	-
4/19/2019 12:00	5.3	213.2	-	-	592.5	147.5	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
4/19/2019 13:00	4.8	238.6	-	-	291.5	146.7	-
4/19/2019 14:00	6.4	219.0	-	-	270.2	148.3	-
4/19/2019 15:00	5.2	216.0	-	-	401.1	148.1	-
4/19/2019 16:00	4.5	235.1	-	-	206.3	147.6	-
4/19/2019 17:00	3.9	221.3	-	-	140.8	147.6	-
4/19/2019 18:00	3.4	206.4	-	-	17.1	146.7	-
4/19/2019 19:00	3.7	195.4	-	-	0.5	146.5	-
4/19/2019 20:00	3.6	209.7	-	-	0.0	146.7	-
4/19/2019 21:00	3.8	199.0	-	-	0.0	146.3	-
4/19/2019 22:00	2.7	208.4	-	-	0.0	145.1	-
4/19/2019 23:00	2.9	208.9	-	-	0.0	144.0	-
4/20/2019 0:00	2.1	183.1	-	-	0.0	143.4	-
4/20/2019 1:00	2.8	210.5	-	-	0.0	143.7	-
4/20/2019 2:00	2.5	191.6	-	-	0.0	143.2	-
4/20/2019 3:00	2.5	189.0	-	-	0.0	142.9	-
4/20/2019 4:00	3.1	200.4	-	-	5.3	142.6	-
4/20/2019 5:00	3.0	197.7	-	-	48.2	142.8	-
4/20/2019 6:00	3.4	198.6	-	-	166.3	143.0	-
4/20/2019 7:00	1.9	188.0	-	-	409.7	146.8	-
4/20/2019 8:00	1.0	97.9	-	-	574.3	147.8	-
4/20/2019 9:00	1.3	109.1	-	-	710.6	146.7	-
4/20/2019 10:00	1.5	162.9	-	-	323.4	145.6	-
4/20/2019 11:00	1.6	207.2	-	-	404.0	145.9	-
4/20/2019 12:00	1.9	219.8	-	-	438.2	145.7	-
4/20/2019 13:00	3.9	207.7	-	-	576.2	147.6	-
4/20/2019 14:00	4.1	193.5	-	-	578.6	147.7	-
4/20/2019 15:00	4.3	197.9	-	-	353.5	147.4	-
4/20/2019 16:00	4.6	186.0	-	-	186.1	147.5	-
4/20/2019 17:00	3.0	199.1	-	-	80.9	149.0	-
4/20/2019 18:00	3.4	176.8	-	-	18.4	146.5	-
4/20/2019 19:00	1.3	172.5	-	-	0.4	146.2	-
4/20/2019 20:00	1.9	144.6	-	-	0.0	145.8	-
4/20/2019 21:00	1.7	105.3	-	-	0.0	145.7	-
4/20/2019 22:00	2.4	172.1	-	-	0.0	143.0	-
4/20/2019 23:00	3.1	177.9	-	-	0.0	142.2	-
4/21/2019 0:00	2.9	160.2	-	-	0.0	145.0	-
4/21/2019 1:00	2.4	182.9	-	-	0.0	145.5	-
4/21/2019 2:00	2.0	192.4	-	-	0.0	145.0	-
4/21/2019 3:00	1.8	179.3	-	-	0.0	144.3	-
4/21/2019 4:00	2.5	179.2	-	-	4.5	147.0	-
4/21/2019 5:00	1.9	296.0	-	-	32.3	147.8	-
4/21/2019 6:00	2.6	250.0	-	-	67.9	149.8	-
4/21/2019 7:00	2.1	223.3	-	-	144.9	150.7	-
4/21/2019 8:00	2.3	208.0	-	-	260.9	-	-
4/21/2019 9:00	3.0	215.6	-	-	294.9	154.1	-
4/21/2019 10:00	2.5	230.1	-	-	318.1	153.8	-
4/21/2019 11:00	4.2	195.6	-	-	284.7	154.2	-
4/21/2019 12:00	4.9	200.3	-	-	380.3	155.2	-
4/21/2019 13:00	4.0	200.4	-	-	342.3	154.2	-
4/21/2019 14:00	3.6	204.4	-	-	249.0	153.4	-
4/21/2019 15:00	2.8	192.8	-	-	166.3	150.3	-
4/21/2019 16:00	2.9	153.0	-	-	93.7	150.7	-
4/21/2019 17:00	2.4	150.8	-	-	48.8	-	-
4/21/2019 18:00	2.8	157.0	-	-	9.4	153.0	-
4/21/2019 19:00	4.0	179.4	-	-	0.4	152.1	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
4/21/2019 20:00	2.4	225.3	-	-	0.0	151.0	-
4/21/2019 21:00	2.3	178.2	-	-	0.0	152.5	-
4/21/2019 22:00	1.6	146.2	-	-	0.0	151.4	-
4/21/2019 23:00	1.4	120.2	-	-	0.0	153.7	-
4/22/2019 0:00	1.6	278.4	-	-	0.0	154.8	-
4/22/2019 1:00	1.6	8.4	-	-	0.0	153.4	-
4/22/2019 2:00	2.8	342.1	-	-	0.0	155.5	-
4/22/2019 3:00	3.5	316.5	-	-	0.0	155.6	-
4/22/2019 4:00	2.9	275.6	-	-	1.4	155.7	-
4/22/2019 5:00	2.4	286.9	-	-	14.6	159.1	-
4/22/2019 6:00	3.4	199.6	-	-	73.0	-	-
4/22/2019 7:00	4.5	210.4	-	-	111.3	157.4	-
4/22/2019 8:00	6.0	200.8	-	-	254.0	158.5	-
4/22/2019 9:00	6.4	208.6	-	-	223.0	155.9	-
4/22/2019 10:00	8.0	217.0	-	-	233.4	153.9	-
4/22/2019 11:00	10.1	224.3	-	-	249.3	151.4	-
4/22/2019 12:00	12.3	231.0	-	-	385.9	153.0	-
4/22/2019 13:00	12.2	232.2	-	-	380.8	151.7	-
4/22/2019 14:00	10.8	235.4	-	-	274.2	152.2	-
4/22/2019 15:00	11.1	223.7	-	-	380.6	153.7	-
4/22/2019 16:00	9.0	228.6	-	-	251.2	155.2	-
4/22/2019 17:00	7.4	229.6	-	-	165.3	156.8	-
4/22/2019 18:00	7.3	225.1	-	-	15.4	158.8	-
4/22/2019 19:00	5.8	222.1	-	-	1.0	159.4	-
4/22/2019 20:00	5.5	224.3	-	-	0.0	159.6	-
4/22/2019 21:00	4.4	213.4	-	-	0.0	159.6	-
4/22/2019 22:00	4.2	196.6	-	-	0.0	160.4	-
4/22/2019 23:00	5.3	191.2	-	-	0.0	160.9	-
4/23/2019 0:00	4.2	199.0	-	-	0.0	161.2	-
4/23/2019 1:00	4.2	205.0	-	-	0.0	161.2	-
4/23/2019 2:00	4.2	200.8	-	-	0.0	161.1	-
4/23/2019 3:00	5.8	176.0	-	-	0.0	161.5	-
4/23/2019 4:00	7.0	177.0	-	-	8.5	161.5	-
4/23/2019 5:00	5.9	183.8	-	-	57.9	161.2	-
4/23/2019 6:00	4.8	173.8	-	-	119.8	161.9	-
4/23/2019 7:00	4.4	186.4	-	-	156.0	161.1	-
4/23/2019 8:00	4.8	212.3	-	-	197.5	163.1	-
4/23/2019 9:00	4.8	198.2	-	-	302.9	164.4	-
4/23/2019 10:00	5.2	217.7	-	-	296.8	163.8	-
4/23/2019 11:00	5.8	210.7	-	-	290.0	162.5	-
4/23/2019 12:00	6.6	230.6	-	-	317.1	161.8	-
4/23/2019 13:00	6.9	203.6	-	-	373.7	159.7	-
4/23/2019 14:00	6.2	208.7	-	-	461.7	158.9	-
4/23/2019 15:00	6.3	217.0	-	-	250.9	158.5	-
4/23/2019 16:00	4.7	230.4	-	-	95.9	162.2	-
4/23/2019 17:00	4.9	206.9	-	-	169.2	159.9	-
4/23/2019 18:00	4.4	205.2	-	-	21.0	161.5	-
4/23/2019 19:00	4.4	207.2	-	-	0.7	163.4	-
4/23/2019 20:00	5.3	194.0	-	-	0.0	164.2	-
4/23/2019 21:00	4.3	199.4	-	-	0.0	164.7	-
4/23/2019 22:00	4.5	202.0	-	-	0.0	164.1	-
4/23/2019 23:00	4.0	206.8	-	-	0.0	164.3	-
4/24/2019 0:00	3.8	201.4	-	-	0.0	164.6	-
4/24/2019 1:00	2.9	204.9	-	-	0.0	165.0	-
4/24/2019 2:00	2.0	213.4	-	-	0.0	165.4	-



**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
4/24/2019 3:00	1.7	197.2	-	-	0.1	165.9	-
4/24/2019 4:00	2.5	192.0	-	-	10.7	165.8	-
4/24/2019 5:00	4.8	182.1	-	-	45.8	164.9	-
4/24/2019 6:00	0.5	133.2	-	-	144.5	162.3	-
4/24/2019 7:00	1.1	240.8	-	-	177.3	161.2	-
4/24/2019 8:00	2.9	205.2	-	-	358.5	160.5	-
4/24/2019 9:00	3.7	207.1	-	-	281.2	164.5	-
4/24/2019 10:00	5.1	205.4	-	-	387.9	163.1	-
4/24/2019 11:00	5.1	224.1	-	-	552.3	161.0	-
4/24/2019 12:00	5.9	226.7	-	-	329.1	160.4	-
4/24/2019 13:00	4.6	225.6	-	-	420.5	161.4	-
4/24/2019 14:00	5.1	229.9	-	-	419.0	160.3	-
4/24/2019 15:00	4.9	229.2	-	-	316.5	162.1	-
4/24/2019 16:00	5.2	231.7	-	-	130.2	163.2	-
4/24/2019 17:00	3.2	228.0	-	-	62.6	164.5	-
4/24/2019 18:00	3.0	195.4	-	-	37.0	165.7	-
4/24/2019 19:00	3.0	198.1	-	-	1.2	166.3	-
4/24/2019 20:00	1.9	197.1	-	-	0.0	167.4	-
4/24/2019 21:00	1.6	195.6	-	-	0.0	167.9	-
4/24/2019 22:00	1.9	195.9	-	-	0.0	168.4	-
4/24/2019 23:00	1.6	213.0	-	-	0.0	168.6	-
4/25/2019 0:00	1.5	156.9	-	-	0.0	168.7	-
4/25/2019 1:00	2.4	30.9	-	-	0.0	170.0	-
4/25/2019 2:00	1.3	43.4	-	-	0.0	170.5	-
4/25/2019 3:00	1.5	30.9	-	-	0.1	167.6	-
4/25/2019 4:00	1.5	36.3	-	-	9.1	168.3	-
4/25/2019 5:00	1.2	41.0	-	-	59.1	167.3	-
4/25/2019 6:00	1.8	48.9	-	-	123.2	166.0	-
4/25/2019 7:00	1.3	30.6	-	-	216.2	164.8	-
4/25/2019 8:00	1.9	29.9	-	-	363.7	155.8	-
4/25/2019 9:00	1.1	39.9	-	-	477.0	151.0	-
4/25/2019 10:00	1.2	191.4	-	-	541.0	150.5	-
4/25/2019 11:00	1.0	235.9	-	-	548.9	148.3	-
4/25/2019 12:00	1.2	212.6	-	-	521.4	148.9	-
4/25/2019 13:00	0.9	139.2	-	-	489.3	147.2	-
4/25/2019 14:00	1.3	148.1	-	-	427.3	145.8	-
4/25/2019 15:00	2.5	234.7	-	-	364.5	146.5	-
4/25/2019 16:00	2.7	244.9	-	-	351.0	151.6	-
4/25/2019 17:00	2.4	200.5	-	-	108.6	153.0	-
4/25/2019 18:00	1.7	119.0	-	-	28.6	158.2	-
4/25/2019 19:00	1.3	18.6	-	-	1.3	160.2	-
4/25/2019 20:00	1.6	146.3	-	-	0.0	160.8	-
4/25/2019 21:00	1.5	79.3	-	-	0.0	161.2	-
4/25/2019 22:00	0.9	107.4	-	-	0.0	161.0	-
4/25/2019 23:00	1.5	101.1	-	-	0.0	161.2	-
4/26/2019 0:00	1.0	53.8	-	-	0.0	160.2	-
4/26/2019 1:00	1.5	4.4	-	-	0.0	155.7	-
4/26/2019 2:00	1.6	36.4	-	-	0.0	156.5	-
4/26/2019 3:00	1.8	21.2	-	-	0.1	156.3	-
4/26/2019 4:00	1.6	22.2	-	-	7.6	156.7	-
4/26/2019 5:00	1.6	33.4	-	-	46.8	156.7	-
4/26/2019 6:00	1.3	29.7	-	-	96.5	157.4	-
4/26/2019 7:00	1.3	21.1	-	-	229.1	167.9	-
4/26/2019 8:00	1.4	49.4	-	-	303.7	173.9	-
4/26/2019 9:00	1.6	46.4	-	-	423.4	174.3	-

Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
4/26/2019 10:00	1.9	351.1	-	-	448.4	172.7	-
4/26/2019 11:00	2.3	342.3	-	-	523.2	172.4	-
4/26/2019 12:00	1.6	348.6	-	-	474.7	172.1	-
4/26/2019 13:00	1.0	317.3	-	-	246.8	167.0	-
4/26/2019 14:00	2.5	208.0	-	-	436.4	160.6	-
4/26/2019 15:00	5.5	221.7	-	-	280.3	159.6	-
4/26/2019 16:00	4.8	225.1	-	-	99.4	162.3	-
4/26/2019 17:00	4.4	231.3	-	-	69.8	163.4	-
4/26/2019 18:00	3.2	224.0	-	-	14.5	166.2	-
4/26/2019 19:00	2.4	227.0	-	-	1.3	165.3	-
4/26/2019 20:00	2.1	211.6	-	-	0.0	167.4	-
4/26/2019 21:00	1.2	187.6	-	-	0.0	168.1	-
4/26/2019 22:00	1.3	189.3	-	-	0.0	168.3	-
4/26/2019 23:00	0.6	222.9	-	-	0.0	168.7	-
4/27/2019 0:00	0.0	0.0	-	-	0.0	168.9	-
4/27/2019 1:00	0.0	0.0	-	-	0.0	169.1	-
4/27/2019 2:00	1.3	254.1	-	-	0.0	168.4	-
4/27/2019 3:00	2.6	7.0	-	-	0.3	169.0	-
4/27/2019 4:00	1.9	8.1	-	-	9.7	170.6	-
4/27/2019 5:00	1.7	8.5	-	-	29.6	170.5	-
4/27/2019 6:00	2.0	358.3	-	-	322.1	168.1	-
4/27/2019 7:00	2.2	13.7	-	-	465.9	157.7	-
4/27/2019 8:00	2.1	20.6	-	-	611.3	163.4	-
4/27/2019 9:00	2.4	26.3	-	-	718.3	152.6	-
4/27/2019 10:00	2.2	6.7	-	-	795.1	152.2	-
4/27/2019 11:00	1.8	1.8	-	-	854.0	160.6	-
4/27/2019 12:00	0.9	169.4	-	-	861.0	153.7	-
4/27/2019 13:00	1.4	181.3	-	-	720.4	148.1	-
4/27/2019 14:00	0.8	162.1	-	-	648.4	166.0	-
4/27/2019 15:00	1.0	11.4	-	-	503.0	169.6	-
4/27/2019 16:00	1.2	32.2	-	-	349.2	172.0	-
4/27/2019 17:00	2.1	353.8	-	-	190.1	174.7	-
4/27/2019 18:00	2.8	358.0	-	-	54.0	171.6	-
4/27/2019 19:00	1.1	78.8	-	-	3.3	171.6	-
4/27/2019 20:00	1.2	224.0	-	-	0.0	166.4	-
4/27/2019 21:00	1.4	187.6	-	-	0.0	165.8	-
4/27/2019 22:00	0.8	169.0	-	-	0.0	167.3	-
4/27/2019 23:00	0.7	80.6	-	-	0.0	172.0	-
4/28/2019 0:00	1.6	66.2	-	-	0.0	170.2	-
4/28/2019 1:00	1.6	62.1	-	-	0.0	180.1	-
4/28/2019 2:00	1.4	67.4	-	-	0.0	182.1	-
4/28/2019 3:00	1.4	53.2	-	-	0.5	169.1	-
4/28/2019 4:00	1.1	64.4	-	-	10.8	181.5	-
4/28/2019 5:00	1.6	39.1	-	-	39.8	182.2	-
4/28/2019 6:00	0.9	333.8	-	-	299.2	177.0	-
4/28/2019 7:00	0.8	165.7	-	-	462.3	173.1	-
4/28/2019 8:00	0.7	60.1	-	-	607.1	172.4	-
4/28/2019 9:00	0.6	76.1	-	-	720.0	171.4	-
4/28/2019 10:00	0.8	77.7	-	-	794.4	169.5	-
4/28/2019 11:00	0.9	39.5	-	-	857.0	170.8	-
4/28/2019 12:00	1.7	70.9	-	-	871.0	172.2	-
4/28/2019 13:00	2.7	93.4	-	-	728.8	173.0	-
4/28/2019 14:00	2.6	66.7	-	-	654.7	171.5	-
4/28/2019 15:00	4.9	302.8	-	-	466.9	173.4	-
4/28/2019 16:00	4.8	298.3	-	-	374.0	175.7	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
4/28/2019 17:00	3.3	308.1	-	-	152.4	177.4	-
4/28/2019 18:00	1.8	50.2	-	-	33.5	179.8	-
4/28/2019 19:00	3.6	90.7	-	-	2.1	181.7	-
4/28/2019 20:00	3.2	83.0	-	-	0.0	182.8	-
4/28/2019 21:00	3.3	86.3	-	-	0.0	182.8	-
4/28/2019 22:00	3.0	82.2	-	-	0.0	183.5	-
4/28/2019 23:00	2.5	70.9	-	-	0.0	183.7	-
4/29/2019 0:00	2.2	67.1	-	-	0.0	184.0	-
4/29/2019 1:00	2.5	67.0	-	-	0.0	184.4	-
4/29/2019 2:00	2.0	52.9	-	-	0.0	184.7	-
4/29/2019 3:00	1.8	44.8	-	-	0.6	185.3	-
4/29/2019 4:00	2.1	7.0	-	-	10.6	184.5	-
4/29/2019 5:00	2.3	4.1	-	-	55.1	184.0	-
4/29/2019 6:00	2.0	351.5	-	-	305.1	180.1	-
4/29/2019 7:00	3.3	20.4	-	-	465.5	178.4	-
4/29/2019 8:00	3.5	26.1	-	-	608.9	177.6	-
4/29/2019 9:00	3.4	19.0	-	-	721.9	177.0	-
4/29/2019 10:00	2.2	6.3	-	-	795.8	175.9	-
4/29/2019 11:00	1.8	320.7	-	-	855.0	174.8	-
4/29/2019 12:00	2.1	12.3	-	-	862.0	174.4	-
4/29/2019 13:00	2.7	33.0	-	-	751.8	173.9	-
4/29/2019 14:00	2.2	1.1	-	-	642.0	171.8	-
4/29/2019 15:00	2.4	340.0	-	-	502.5	171.9	-
4/29/2019 16:00	2.4	320.7	-	-	356.1	172.6	-
4/29/2019 17:00	2.8	317.5	-	-	199.1	174.1	-
4/29/2019 18:00	1.3	42.5	-	-	58.9	176.0	-
4/29/2019 19:00	1.6	59.5	-	-	4.0	179.8	-
4/29/2019 20:00	3.1	81.8	-	-	0.0	180.5	-
4/29/2019 21:00	2.7	80.4	-	-	0.0	181.2	-
4/29/2019 22:00	1.6	69.7	-	-	0.0	182.5	-
4/29/2019 23:00	1.5	51.3	-	-	0.0	182.1	-
4/30/2019 0:00	2.7	58.6	-	-	0.0	182.2	-
4/30/2019 1:00	2.8	10.3	-	-	0.0	181.8	-
4/30/2019 2:00	1.9	72.7	-	-	0.0	182.3	-
4/30/2019 3:00	1.7	69.4	-	-	0.5	183.4	-
4/30/2019 4:00	1.7	31.4	-	-	13.0	182.8	-
4/30/2019 5:00	1.4	29.2	-	-	73.9	182.2	-
4/30/2019 6:00	0.7	46.2	-	-	297.6	175.2	-
4/30/2019 7:00	1.8	41.3	-	-	468.0	173.9	-
4/30/2019 8:00	1.5	15.0	-	-	602.8	171.1	-
4/30/2019 9:00	0.8	159.0	-	-	703.2	167.9	-
4/30/2019 10:00	1.0	167.3	-	-	713.2	167.5	-
4/30/2019 11:00	1.5	218.5	-	-	796.5	169.1	-
4/30/2019 12:00	0.9	168.9	-	-	751.7	167.1	-
4/30/2019 13:00	1.0	49.6	-	-	740.8	166.8	-
4/30/2019 14:00	0.9	74.5	-	-	610.2	166.7	-
4/30/2019 15:00	1.1	25.5	-	-	508.9	165.8	-
4/30/2019 16:00	0.9	62.0	-	-	354.8	166.3	-
4/30/2019 17:00	0.9	66.4	-	-	153.3	169.9	-
4/30/2019 18:00	1.9	6.3	-	-	37.2	175.4	-
4/30/2019 19:00	1.6	154.1	-	-	2.8	178.2	-
4/30/2019 20:00	1.5	167.4	-	-	0.0	178.8	-
4/30/2019 21:00	1.2	158.5	-	-	0.0	179.9	-
4/30/2019 22:00	0.7	113.6	-	-	0.0	180.5	-
4/30/2019 23:00	1.0	52.4	-	-	0.0	180.2	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
5/1/2019 0:00	1.4	187.4	-	-	0.0	180.1	-
5/1/2019 1:00	1.0	186.9	-	-	0.0	180.3	-
5/1/2019 2:00	0.6	159.6	-	-	0.0	180.3	-
5/1/2019 3:00	0.9	95.5	-	-	0.6	180.2	-
5/1/2019 4:00	1.4	195.1	-	-	32.0	179.9	-
5/1/2019 5:00	1.5	212.3	-	-	114.2	178.1	-
5/1/2019 6:00	2.0	200.7	-	-	197.6	175.9	-
5/1/2019 7:00	3.1	200.0	-	-	342.6	174.9	-
5/1/2019 8:00	2.4	226.2	-	-	431.4	173.8	-
5/1/2019 9:00	2.1	225.9	-	-	534.0	171.7	-
5/1/2019 10:00	3.2	215.6	-	-	666.6	171.8	-
5/1/2019 11:00	4.2	206.7	-	-	829.0	171.9	-
5/1/2019 12:00	4.3	220.3	-	-	774.9	171.2	-
5/1/2019 13:00	4.3	238.1	-	-	663.6	170.5	-
5/1/2019 14:00	5.4	228.0	-	-	444.8	170.3	-
5/1/2019 15:00	7.6	235.7	-	-	455.7	169.8	-
5/1/2019 16:00	7.0	230.1	-	-	245.7	170.8	-
5/1/2019 17:00	5.9	226.5	-	-	84.3	173.2	-
5/1/2019 18:00	5.6	220.4	-	-	28.3	174.6	-
5/1/2019 19:00	5.0	217.4	-	-	6.4	175.1	-
5/1/2019 20:00	3.7	217.9	-	-	0.0	175.5	-
5/1/2019 21:00	4.0	232.4	-	-	0.0	175.9	-
5/1/2019 22:00	3.4	231.7	-	-	0.0	175.6	-
5/1/2019 23:00	3.8	222.7	-	-	0.0	174.0	-
5/2/2019 0:00	4.5	210.8	-	-	0.0	151.2	-
5/2/2019 1:00	4.3	195.9	-	-	0.0	136.4	-
5/2/2019 2:00	4.8	195.5	-	-	0.0	127.1	-
5/2/2019 3:00	4.6	202.5	-	-	0.7	121.9	-
5/2/2019 4:00	5.1	215.3	-	-	13.9	124.5	-
5/2/2019 5:00	5.8	217.6	-	-	57.4	127.9	-
5/2/2019 6:00	6.1	221.5	-	-	122.9	-	-
5/2/2019 7:00	5.8	218.1	-	-	201.0	133.8	-
5/2/2019 8:00	6.9	237.6	-	-	309.4	143.1	-
5/2/2019 9:00	7.6	246.9	-	-	373.4	150.2	-
5/2/2019 10:00	8.3	244.7	-	-	311.7	129.2	-
5/2/2019 11:00	7.4	239.6	-	-	319.5	127.4	-
5/2/2019 12:00	8.0	241.2	-	-	350.0	134.2	-
5/2/2019 13:00	8.6	237.5	-	-	326.2	127.2	-
5/2/2019 14:00	7.0	226.0	-	-	195.7	125.3	-
5/2/2019 15:00	6.0	205.1	-	-	142.2	125.9	-
5/2/2019 16:00	6.5	209.9	-	-	99.1	129.0	-
5/2/2019 17:00	6.1	202.6	-	-	62.7	136.5	-
5/2/2019 18:00	5.3	203.2	-	-	20.8	137.0	-
5/2/2019 19:00	5.7	200.9	-	-	1.6	136.3	-
5/2/2019 20:00	6.0	206.2	-	-	0.0	134.8	-
5/2/2019 21:00	5.6	209.0	-	-	0.0	139.8	-
5/2/2019 22:00	5.2	200.2	-	-	0.0	138.6	-
5/2/2019 23:00	5.1	197.3	-	-	0.0	138.4	-
5/3/2019 0:00	5.3	208.2	-	-	0.0	137.2	-
5/3/2019 1:00	5.3	200.2	-	-	0.0	141.1	-
5/3/2019 2:00	5.9	210.4	-	-	0.0	140.2	-
5/3/2019 3:00	4.9	208.9	-	-	0.1	140.3	-
5/3/2019 4:00	6.7	222.3	-	-	10.2	139.8	-
5/3/2019 5:00	5.8	222.6	-	-	33.1	139.5	-
5/3/2019 6:00	6.2	215.8	-	-	75.3	139.1	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
5/3/2019 7:00	6.6	212.1	-	-	105.1	139.1	-
5/3/2019 8:00	6.1	212.7	-	-	222.4	138.3	-
5/3/2019 9:00	6.9	217.6	-	-	222.6	138.8	-
5/3/2019 10:00	7.1	218.6	-	-	192.7	139.2	-
5/3/2019 11:00	7.3	221.6	-	-	197.4	141.4	-
5/3/2019 12:00	7.4	216.5	-	-	203.2	143.9	-
5/3/2019 13:00	7.9	218.3	-	-	195.5	144.9	-
5/3/2019 14:00	7.2	211.3	-	-	203.4	145.8	-
5/3/2019 15:00	6.9	217.2	-	-	323.2	147.2	-
5/3/2019 16:00	6.1	217.5	-	-	328.8	147.8	-
5/3/2019 17:00	5.7	218.5	-	-	139.0	147.5	-
5/3/2019 18:00	4.5	194.1	-	-	28.0	146.8	-
5/3/2019 19:00	4.2	195.7	-	-	2.1	147.3	-
5/3/2019 20:00	4.4	207.9	-	-	0.0	147.0	-
5/3/2019 21:00	4.8	206.1	-	-	0.0	147.3	-
5/3/2019 22:00	5.9	218.2	-	-	0.0	145.3	-
5/3/2019 23:00	5.9	219.0	-	-	0.0	143.6	-
5/4/2019 0:00	5.3	221.4	-	-	0.0	143.8	-
5/4/2019 1:00	5.8	214.0	-	-	0.0	143.7	-
5/4/2019 2:00	5.3	220.2	-	-	0.0	143.3	-
5/4/2019 3:00	4.4	208.4	-	-	0.3	142.6	-
5/4/2019 4:00	4.4	208.4	-	-	14.6	143.0	-
5/4/2019 5:00	4.3	206.6	-	-	49.2	140.2	-
5/4/2019 6:00	3.7	205.9	-	-	119.8	142.3	-
5/4/2019 7:00	3.2	191.1	-	-	217.8	144.9	-
5/4/2019 8:00	3.8	203.3	-	-	642.1	145.8	-
5/4/2019 9:00	4.0	249.3	-	-	505.1	145.4	-
5/4/2019 10:00	4.1	244.4	-	-	510.7	146.0	-
5/4/2019 11:00	7.4	248.4	-	-	508.3	143.7	-
5/4/2019 12:00	8.7	242.6	-	-	750.4	145.5	-
5/4/2019 13:00	8.9	233.3	-	-	339.5	148.5	-
5/4/2019 14:00	8.4	239.1	-	-	208.6	149.4	-
5/4/2019 15:00	7.5	237.3	-	-	97.6	149.9	-
5/4/2019 16:00	6.5	229.5	-	-	66.2	150.0	-
5/4/2019 17:00	5.6	216.3	-	-	43.4	149.0	-
5/4/2019 18:00	5.5	208.4	-	-	14.4	148.0	-
5/4/2019 19:00	4.4	203.4	-	-	1.7	146.7	-
5/4/2019 20:00	4.7	217.1	-	-	0.0	143.7	-
5/4/2019 21:00	4.5	211.7	-	-	0.0	141.9	-
5/4/2019 22:00	4.6	215.8	-	-	0.0	142.7	-
5/4/2019 23:00	4.7	222.0	-	-	0.0	144.5	-
5/5/2019 0:00	3.9	214.6	-	-	0.0	145.2	-
5/5/2019 1:00	3.1	208.8	-	-	0.0	146.9	-
5/5/2019 2:00	4.0	207.4	-	-	0.0	147.0	-
5/5/2019 3:00	4.2	201.4	-	-	0.9	146.7	-
5/5/2019 4:00	3.6	201.3	-	-	20.9	146.6	-
5/5/2019 5:00	2.8	204.4	-	-	66.4	146.8	-
5/5/2019 6:00	3.2	190.3	-	-	134.6	148.9	-
5/5/2019 7:00	3.3	204.6	-	-	276.3	148.7	-
5/5/2019 8:00	2.8	221.9	-	-	352.8	148.0	-
5/5/2019 9:00	3.3	227.1	-	-	534.3	149.8	-
5/5/2019 10:00	3.0	210.2	-	-	563.0	148.1	-
5/5/2019 11:00	3.9	229.1	-	-	708.5	146.6	-
5/5/2019 12:00	4.6	256.6	-	-	523.0	145.3	-
5/5/2019 13:00	5.1	241.6	-	-	724.2	144.1	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
5/5/2019 14:00	6.1	253.3	-	-	558.9	146.6	-
5/5/2019 15:00	6.8	250.7	-	-	528.8	148.1	-
5/5/2019 16:00	6.9	243.2	-	-	239.9	147.9	-
5/5/2019 17:00	6.9	241.8	-	-	87.1	148.3	-
5/5/2019 18:00	4.4	218.0	-	-	21.3	147.6	-
5/5/2019 19:00	4.0	203.0	-	-	3.1	147.2	-
5/5/2019 20:00	4.4	200.8	-	-	0.0	147.6	-
5/5/2019 21:00	4.7	210.9	-	-	0.0	149.0	-
5/5/2019 22:00	5.1	221.8	-	-	0.0	147.6	-
5/5/2019 23:00	4.9	217.4	-	-	0.0	148.7	-
5/6/2019 0:00	5.1	213.0	-	-	0.0	148.4	-
5/6/2019 1:00	5.1	210.9	-	-	0.0	147.8	-
5/6/2019 2:00	4.7	217.8	-	-	0.0	148.1	-
5/6/2019 3:00	5.2	219.2	-	-	0.8	146.2	-
5/6/2019 4:00	5.2	221.1	-	-	16.7	147.0	-
5/6/2019 5:00	5.2	223.5	-	-	29.3	147.2	-
5/6/2019 6:00	4.9	223.2	-	-	112.2	146.0	-
5/6/2019 7:00	5.0	226.4	-	-	171.1	146.5	-
5/6/2019 8:00	4.9	222.6	-	-	269.5	142.4	-
5/6/2019 9:00	5.1	223.3	-	-	416.4	142.0	-
5/6/2019 10:00	5.6	222.6	-	-	343.1	139.7	-
5/6/2019 11:00	5.6	227.1	-	-	333.0	141.2	-
5/6/2019 12:00	6.0	232.0	-	-	232.5	141.8	-
5/6/2019 13:00	5.0	229.8	-	-	282.7	142.1	-
5/6/2019 14:00	5.5	233.6	-	-	251.5	141.0	-
5/6/2019 15:00	5.5	239.5	-	-	159.7	139.1	-
5/6/2019 16:00	5.0	233.7	-	-	105.2	140.1	-
5/6/2019 17:00	5.6	233.2	-	-	57.0	137.1	-
5/6/2019 18:00	5.2	225.5	-	-	27.5	138.1	-
5/6/2019 19:00	4.5	214.8	-	-	3.4	136.9	-
5/6/2019 20:00	4.1	210.7	-	-	0.0	136.3	-
5/6/2019 21:00	4.6	213.3	-	-	0.0	136.5	-
5/6/2019 22:00	4.6	214.0	-	-	0.0	134.9	-
5/6/2019 23:00	4.6	207.2	-	-	0.0	134.1	-
5/7/2019 0:00	4.9	204.3	-	-	0.0	133.4	-
5/7/2019 1:00	4.0	204.0	-	-	0.0	133.5	-
5/7/2019 2:00	3.7	205.5	-	-	0.0	131.8	-
5/7/2019 3:00	3.6	204.9	-	-	0.8	134.2	-
5/7/2019 4:00	3.8	206.9	-	-	15.9	136.4	-
5/7/2019 5:00	3.8	209.1	-	-	58.9	136.3	-
5/7/2019 6:00	3.4	208.8	-	-	115.9	136.0	-
5/7/2019 7:00	3.2	218.1	-	-	213.2	135.0	-
5/7/2019 8:00	3.4	220.0	-	-	268.0	136.0	-
5/7/2019 9:00	3.8	216.8	-	-	358.7	136.1	-
5/7/2019 10:00	3.7	226.7	-	-	326.2	135.4	-
5/7/2019 11:00	3.8	226.7	-	-	301.3	136.4	-
5/7/2019 12:00	4.3	230.6	-	-	402.0	138.2	-
5/7/2019 13:00	4.5	228.6	-	-	343.2	137.9	-
5/7/2019 14:00	5.1	232.9	-	-	282.1	138.1	-
5/7/2019 15:00	4.4	236.3	-	-	259.4	137.8	-
5/7/2019 16:00	4.7	222.4	-	-	166.0	137.8	-
5/7/2019 17:00	3.6	210.6	-	-	60.4	138.4	-
5/7/2019 18:00	3.3	204.8	-	-	22.7	138.5	-
5/7/2019 19:00	3.3	207.4	-	-	3.6	131.9	-
5/7/2019 20:00	3.2	206.8	-	-	0.0	133.4	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
5/7/2019 21:00	3.3	208.6	-	-	0.0	134.5	-
5/7/2019 22:00	4.0	199.6	-	-	0.0	135.7	-
5/7/2019 23:00	3.9	204.5	-	-	0.0	135.7	-
5/8/2019 0:00	3.4	203.1	-	-	0.0	135.8	-
5/8/2019 1:00	2.2	211.1	-	-	0.0	135.6	-
5/8/2019 2:00	2.2	224.4	-	-	0.0	135.3	-
5/8/2019 3:00	2.4	223.3	-	-	1.5	135.1	-
5/8/2019 4:00	2.3	219.0	-	-	23.9	134.5	-
5/8/2019 5:00	2.2	217.5	-	-	79.6	132.9	-
5/8/2019 6:00	2.8	207.8	-	-	188.7	135.5	-
5/8/2019 7:00	2.6	221.0	-	-	281.2	133.4	-
5/8/2019 8:00	2.5	226.8	-	-	293.9	132.9	-
5/8/2019 9:00	3.3	227.5	-	-	480.2	134.2	-
5/8/2019 10:00	3.8	231.1	-	-	526.5	133.9	-
5/8/2019 11:00	3.7	229.8	-	-	619.9	132.4	-
5/8/2019 12:00	3.1	246.9	-	-	619.5	127.6	-
5/8/2019 13:00	2.3	242.3	-	-	457.0	127.7	-
5/8/2019 14:00	2.3	284.1	-	-	532.0	127.6	-
5/8/2019 15:00	2.0	255.6	-	-	357.6	127.4	-
5/8/2019 16:00	2.1	289.0	-	-	145.3	129.6	-
5/8/2019 17:00	1.2	273.8	-	-	96.8	124.0	-
5/8/2019 18:00	2.5	188.9	-	-	39.6	129.8	-
5/8/2019 19:00	1.9	217.6	-	-	8.9	133.3	-
5/8/2019 20:00	1.0	280.4	-	-	0.1	135.0	-
5/8/2019 21:00	1.3	346.3	-	-	0.0	134.2	-
5/8/2019 22:00	0.5	40.1	-	-	0.0	132.7	-
5/8/2019 23:00	1.0	235.5	-	-	0.0	131.1	-
5/9/2019 0:00	1.0	138.9	-	-	0.0	130.3	-
5/9/2019 1:00	0.9	224.9	-	-	0.0	130.8	-
5/9/2019 2:00	0.8	191.7	-	-	0.0	131.6	-
5/9/2019 3:00	1.4	13.4	-	-	3.5	129.6	-
5/9/2019 4:00	1.7	22.4	-	-	31.8	129.1	-
5/9/2019 5:00	1.8	22.5	-	-	204.4	123.4	-
5/9/2019 6:00	2.4	17.2	-	-	324.5	123.9	-
5/9/2019 7:00	1.3	195.3	-	-	481.0	126.0	-
5/9/2019 8:00	1.4	212.9	-	-	609.4	126.6	-
5/9/2019 9:00	1.9	208.5	-	-	662.2	125.3	-
5/9/2019 10:00	1.4	187.1	-	-	782.3	132.5	-
5/9/2019 11:00	1.0	150.5	-	-	856.0	131.5	-
5/9/2019 12:00	0.7	54.0	-	-	856.0	132.8	-
5/9/2019 13:00	1.3	66.0	-	-	765.9	130.6	-
5/9/2019 14:00	1.3	72.6	-	-	660.2	129.7	-
5/9/2019 15:00	0.9	74.4	-	-	524.8	128.7	-
5/9/2019 16:00	0.9	37.8	-	-	382.7	128.4	-
5/9/2019 17:00	0.9	58.0	-	-	227.9	126.8	-
5/9/2019 18:00	0.3	353.6	-	-	73.9	127.0	-
5/9/2019 19:00	1.0	59.0	-	-	13.6	128.7	-
5/9/2019 20:00	1.7	41.5	-	-	0.1	130.1	-
5/9/2019 21:00	1.8	31.4	-	-	0.0	130.2	-
5/9/2019 22:00	1.2	48.1	-	-	0.0	131.2	-
5/9/2019 23:00	1.2	164.7	-	-	0.0	131.6	-
5/10/2019 0:00	0.4	87.7	-	-	0.0	132.5	-
5/10/2019 1:00	1.1	152.6	-	-	0.0	132.1	-
5/10/2019 2:00	1.6	202.7	-	-	0.0	131.9	-
5/10/2019 3:00	1.0	185.8	-	-	4.1	132.2	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
5/10/2019 4:00	1.1	163.9	-	-	38.3	128.4	-
5/10/2019 5:00	0.8	151.9	-	-	178.1	130.8	-
5/10/2019 6:00	0.2	27.9	-	-	334.3	130.6	-
5/10/2019 7:00	0.6	263.0	-	-	468.4	129.1	-
5/10/2019 8:00	0.6	224.0	-	-	607.3	127.5	-
5/10/2019 9:00	0.8	31.1	-	-	749.0	125.8	-
5/10/2019 10:00	0.7	143.4	-	-	762.5	125.6	-
5/10/2019 11:00	2.2	180.1	-	-	848.0	124.7	-
5/10/2019 12:00	1.8	212.6	-	-	888.0	126.4	-
5/10/2019 13:00	1.4	95.4	-	-	765.4	125.7	-
5/10/2019 14:00	6.6	206.5	-	-	646.4	122.2	-
5/10/2019 15:00	7.9	221.8	-	-	484.4	120.1	-
5/10/2019 16:00	8.7	229.3	-	-	277.0	119.8	-
5/10/2019 17:00	6.2	219.8	-	-	85.6	120.7	-
5/10/2019 18:00	4.7	214.7	-	-	33.7	121.9	-
5/10/2019 19:00	3.3	203.3	-	-	27.9	120.5	-
5/10/2019 20:00	3.0	205.3	-	-	0.1	120.9	-
5/10/2019 21:00	3.6	191.9	-	-	0.0	119.9	-
5/10/2019 22:00	4.0	194.2	-	-	0.0	115.8	-
5/10/2019 23:00	4.5	199.1	-	-	0.0	112.7	-
5/11/2019 0:00	4.5	206.5	-	-	0.0	110.1	-
5/11/2019 1:00	4.4	214.8	-	-	0.0	115.5	-
5/11/2019 2:00	7.3	232.7	-	-	0.0	111.5	-
5/11/2019 3:00	7.4	237.9	-	-	1.1	112.2	-
5/11/2019 4:00	6.1	235.1	-	-	17.9	112.3	-
5/11/2019 5:00	5.3	230.8	-	-	77.8	114.6	-
5/11/2019 6:00	4.4	227.1	-	-	166.9	116.9	-
5/11/2019 7:00	4.1	241.1	-	-	286.2	117.5	-
5/11/2019 8:00	4.0	231.7	-	-	384.0	118.3	-
5/11/2019 9:00	3.9	214.3	-	-	269.0	118.2	-
5/11/2019 10:00	4.9	196.3	-	-	361.7	117.9	-
5/11/2019 11:00	7.3	217.4	-	-	769.6	116.8	-
5/11/2019 12:00	8.2	228.1	-	-	621.8	116.3	-
5/11/2019 13:00	8.8	230.9	-	-	632.7	116.1	-
5/11/2019 14:00	8.2	235.2	-	-	751.7	115.9	-
5/11/2019 15:00	8.3	224.9	-	-	588.1	116.9	-
5/11/2019 16:00	8.9	244.4	-	-	418.4	117.7	-
5/11/2019 17:00	6.5	236.0	-	-	222.0	118.3	-
5/11/2019 18:00	4.6	212.6	-	-	72.4	119.9	-
5/11/2019 19:00	3.4	200.2	-	-	19.7	119.9	-
5/11/2019 20:00	3.6	197.0	-	-	0.3	120.3	-
5/11/2019 21:00	3.9	196.2	-	-	0.0	120.5	-
5/11/2019 22:00	3.3	204.2	-	-	0.0	119.8	-
5/11/2019 23:00	2.9	190.9	-	-	0.0	120.1	-
5/12/2019 0:00	2.5	198.7	-	-	0.0	121.0	-
5/12/2019 1:00	2.3	220.0	-	-	0.0	121.3	-
5/12/2019 2:00	2.3	192.2	-	-	0.0	121.0	-
5/12/2019 3:00	1.5	33.4	-	-	4.2	119.1	-
5/12/2019 4:00	2.1	24.9	-	-	60.3	118.0	-
5/12/2019 5:00	1.9	33.8	-	-	206.9	121.1	-
5/12/2019 6:00	2.3	37.2	-	-	353.9	121.1	-
5/12/2019 7:00	2.4	43.8	-	-	522.2	120.2	-
5/12/2019 8:00	1.7	86.6	-	-	660.4	118.2	-
5/12/2019 9:00	4.6	27.5	-	-	768.3	119.4	-
5/12/2019 10:00	3.1	9.5	-	-	842.0	117.2	-



**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
5/12/2019 11:00	3.5	0.7	-	-	907.0	117.9	-
5/12/2019 12:00	2.9	39.4	-	-	919.0	117.1	-
5/12/2019 13:00	2.5	75.9	-	-	796.7	115.2	-
5/12/2019 14:00	2.0	79.7	-	-	690.2	113.9	-
5/12/2019 15:00	1.7	65.2	-	-	550.8	112.1	-
5/12/2019 16:00	3.0	20.2	-	-	409.2	113.6	-
5/12/2019 17:00	3.4	15.8	-	-	247.7	114.9	-
5/12/2019 18:00	3.1	5.8	-	-	76.0	115.9	-
5/12/2019 19:00	3.1	357.9	-	-	19.4	119.1	-
5/12/2019 20:00	2.4	28.4	-	-	0.3	122.2	-
5/12/2019 21:00	2.8	9.4	-	-	0.0	123.3	-
5/12/2019 22:00	5.2	20.2	-	-	0.0	123.2	-
5/12/2019 23:00	3.7	28.8	-	-	0.0	123.0	-
5/13/2019 0:00	2.4	81.6	-	-	0.0	123.7	-
5/13/2019 1:00	1.1	147.7	-	-	0.0	125.0	-
5/13/2019 2:00	1.6	208.7	-	-	0.0	124.6	-
5/13/2019 3:00	1.1	194.7	-	-	8.5	125.8	-
5/13/2019 4:00	1.1	17.7	-	-	81.6	123.4	-
5/13/2019 5:00	1.1	178.5	-	-	191.5	119.8	-
5/13/2019 6:00	1.0	269.7	-	-	289.6	117.5	-
5/13/2019 7:00	0.9	166.5	-	-	493.8	114.2	-
5/13/2019 8:00	0.6	122.3	-	-	662.0	111.7	-
5/13/2019 9:00	0.7	160.2	-	-	763.1	109.7	-
5/13/2019 10:00	1.0	90.1	-	-	842.0	110.1	-
5/13/2019 11:00	2.7	84.8	-	-	881.0	110.0	-
5/13/2019 12:00	3.1	104.9	-	-	758.6	111.4	-
5/13/2019 13:00	4.5	107.2	-	-	762.4	111.1	-
5/13/2019 14:00	4.0	96.8	-	-	643.5	110.8	-
5/13/2019 15:00	1.2	90.5	-	-	477.3	109.6	-
5/13/2019 16:00	2.8	278.6	-	-	307.2	109.6	-
5/13/2019 17:00	1.9	165.8	-	-	126.7	113.0	-
5/13/2019 18:00	2.5	187.5	-	-	63.8	115.1	-
5/13/2019 19:00	2.0	190.0	-	-	12.1	117.2	-
5/13/2019 20:00	1.0	175.8	-	-	0.1	118.8	-
5/13/2019 21:00	0.7	139.9	-	-	0.0	120.0	-
5/13/2019 22:00	1.0	262.8	-	-	0.0	120.5	-
5/13/2019 23:00	0.9	203.6	-	-	0.0	120.6	-
5/14/2019 0:00	0.9	172.4	-	-	0.0	121.5	-
5/14/2019 1:00	0.5	163.4	-	-	0.0	121.5	-
5/14/2019 2:00	0.7	123.9	-	-	0.0	121.9	-
5/14/2019 3:00	0.5	161.3	-	-	5.0	121.6	-
5/14/2019 4:00	0.6	42.4	-	-	26.0	120.3	-
5/14/2019 5:00	1.1	348.0	-	-	68.4	118.8	-
5/14/2019 6:00	4.6	48.6	-	-	122.5	117.6	-
5/14/2019 7:00	5.0	59.6	-	-	233.3	116.9	-
5/14/2019 8:00	4.7	38.7	-	-	268.8	115.9	-
5/14/2019 9:00	6.9	75.0	-	-	276.2	115.4	-
5/14/2019 10:00	6.9	89.2	-	-	305.6	118.3	-
5/14/2019 11:00	4.9	87.6	-	-	289.9	117.7	-
5/14/2019 12:00	1.5	96.5	-	-	308.7	115.5	-
5/14/2019 13:00	1.3	70.7	-	-	293.6	114.3	-
5/14/2019 14:00	1.7	27.6	-	-	233.9	108.7	-
5/14/2019 15:00	0.8	15.1	-	-	173.5	91.5	-
5/14/2019 16:00	0.4	79.0	-	-	95.6	93.4	-
5/14/2019 17:00	0.4	148.1	-	-	61.9	97.1	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
5/14/2019 18:00	0.4	145.8	-	-	27.3	96.1	-
5/14/2019 19:00	0.3	98.6	-	-	5.3	98.6	-
5/14/2019 20:00	0.1	109.1	-	-	0.1	98.7	-
5/14/2019 21:00	0.6	225.0	-	-	0.0	96.7	-
5/14/2019 22:00	3.2	203.5	-	-	0.0	98.2	-
5/14/2019 23:00	3.7	206.6	-	-	0.0	97.5	-
5/15/2019 0:00	3.9	202.9	-	-	0.0	97.0	-
5/15/2019 1:00	3.4	207.8	-	-	0.0	97.9	-
5/15/2019 2:00	3.4	205.0	-	-	0.0	98.6	-
5/15/2019 3:00	3.4	194.8	-	-	2.3	99.4	-
5/15/2019 4:00	3.9	172.9	-	-	16.6	99.7	-
5/15/2019 5:00	4.1	182.5	-	-	83.0	99.7	-
5/15/2019 6:00	3.5	176.5	-	-	162.9	99.2	-
5/15/2019 7:00	2.9	166.9	-	-	217.2	98.9	-
5/15/2019 8:00	2.5	206.5	-	-	346.5	98.7	-
5/15/2019 9:00	1.2	146.6	-	-	371.4	98.3	-
5/15/2019 10:00	0.7	178.9	-	-	490.9	98.7	-
5/15/2019 11:00	1.8	186.0	-	-	363.7	99.3	-
5/15/2019 12:00	0.9	158.0	-	-	389.9	98.6	-
5/15/2019 13:00	0.9	62.4	-	-	253.0	103.4	-
5/15/2019 14:00	1.7	32.5	-	-	292.1	104.6	-
5/15/2019 15:00	2.1	72.1	-	-	294.8	106.3	-
5/15/2019 16:00	1.0	70.9	-	-	275.7	107.4	-
5/15/2019 17:00	1.4	74.6	-	-	163.2	107.9	-
5/15/2019 18:00	1.7	55.9	-	-	76.0	107.6	-
5/15/2019 19:00	3.1	59.8	-	-	19.4	106.6	-
5/15/2019 20:00	5.8	53.3	-	-	0.3	109.2	-
5/15/2019 21:00	7.5	67.1	-	-	0.0	111.1	-
5/15/2019 22:00	2.3	127.2	-	-	0.0	109.7	-
5/15/2019 23:00	1.2	231.3	-	-	0.0	112.7	-
5/16/2019 0:00	6.7	118.0	-	-	0.0	113.0	-
5/16/2019 1:00	7.2	101.5	-	-	0.0	111.9	-
5/16/2019 2:00	3.7	148.7	-	-	0.0	112.9	-
5/16/2019 3:00	2.0	284.4	-	-	4.2	112.7	-
5/16/2019 4:00	1.9	209.1	-	-	31.4	112.1	-
5/16/2019 5:00	3.2	66.9	-	-	91.1	111.7	-
5/16/2019 6:00	3.6	88.1	-	-	187.4	110.6	-
5/16/2019 7:00	2.2	270.1	-	-	346.9	109.3	-
5/16/2019 8:00	3.2	82.5	-	-	496.7	107.3	-
5/16/2019 9:00	5.5	91.6	-	-	555.4	107.1	-
5/16/2019 10:00	5.3	82.0	-	-	546.4	108.0	-
5/16/2019 11:00	7.0	89.1	-	-	431.8	106.9	-
5/16/2019 12:00	6.4	96.6	-	-	291.6	107.0	-
5/16/2019 13:00	6.6	92.4	-	-	350.0	107.9	-
5/16/2019 14:00	6.2	118.5	-	-	235.7	108.2	-
5/16/2019 15:00	3.5	140.5	-	-	156.3	107.4	-
5/16/2019 16:00	1.2	201.4	-	-	116.5	101.3	-
5/16/2019 17:00	0.5	245.5	-	-	70.5	95.4	-
5/16/2019 18:00	0.8	198.0	-	-	33.2	94.1	-
5/16/2019 19:00	1.3	188.4	-	-	5.3	95.0	-
5/16/2019 20:00	1.1	254.9	-	-	0.1	88.2	-
5/16/2019 21:00	0.5	117.2	-	-	0.0	84.7	-
5/16/2019 22:00	0.8	12.9	-	-	0.0	84.2	-
5/16/2019 23:00	1.4	74.5	-	-	0.0	86.4	-
5/17/2019 0:00	1.2	43.4	-	-	0.0	85.7	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
5/17/2019 1:00	1.8	147.5	-	-	0.0	86.7	-
5/17/2019 2:00	3.3	212.5	-	-	0.0	80.9	-
5/17/2019 3:00	2.6	195.8	-	-	1.8	81.5	-
5/17/2019 4:00	3.1	181.6	-	-	24.6	81.6	-
5/17/2019 5:00	3.1	208.5	-	-	80.3	83.3	-
5/17/2019 6:00	1.9	220.1	-	-	157.1	83.4	-
5/17/2019 7:00	1.0	181.3	-	-	219.1	83.9	-
5/17/2019 8:00	0.7	51.6	-	-	326.2	83.4	-
5/17/2019 9:00	0.9	33.0	-	-	415.7	83.6	-
5/17/2019 10:00	0.5	14.9	-	-	452.9	85.9	-
5/17/2019 11:00	0.3	80.3	-	-	367.2	95.7	-
5/17/2019 12:00	0.9	162.5	-	-	246.9	88.2	-
5/17/2019 13:00	2.7	204.6	-	-	211.9	82.3	-
5/17/2019 14:00	2.7	199.6	-	-	224.6	82.5	-
5/17/2019 15:00	3.7	218.0	-	-	153.0	81.0	-
5/17/2019 16:00	3.6	215.0	-	-	81.7	81.3	-
5/17/2019 17:00	4.0	213.8	-	-	60.4	77.9	-
5/17/2019 18:00	5.7	201.6	-	-	18.3	76.7	-
5/17/2019 19:00	6.0	182.6	-	-	5.3	78.9	-
5/17/2019 20:00	4.2	209.2	-	-	0.3	77.8	-
5/17/2019 21:00	3.5	203.3	-	-	0.0	78.3	-
5/17/2019 22:00	4.4	179.6	-	-	0.0	79.1	-
5/17/2019 23:00	6.1	193.2	-	-	0.0	79.3	-
5/18/2019 0:00	3.5	201.8	-	-	0.0	79.0	-
5/18/2019 1:00	1.8	64.8	-	-	0.0	79.1	-
5/18/2019 2:00	2.5	18.1	-	-	0.0	80.3	-
5/18/2019 3:00	2.5	18.8	-	-	5.1	82.6	-
5/18/2019 4:00	1.8	12.6	-	-	36.1	87.5	-
5/18/2019 5:00	1.3	188.0	-	-	54.0	83.6	-
5/18/2019 6:00	1.5	155.0	-	-	234.0	87.8	-
5/18/2019 7:00	1.1	87.3	-	-	245.6	88.4	-
5/18/2019 8:00	2.7	33.2	-	-	517.6	97.7	-
5/18/2019 9:00	2.1	167.1	-	-	808.0	96.8	-
5/18/2019 10:00	1.0	6.3	-	-	668.2	94.9	-
5/18/2019 11:00	1.4	309.2	-	-	631.0	95.1	-
5/18/2019 12:00	1.9	46.6	-	-	547.9	94.5	-
5/18/2019 13:00	4.9	96.9	-	-	292.6	96.4	-
5/18/2019 14:00	5.3	87.4	-	-	266.4	97.8	-
5/18/2019 15:00	3.9	57.1	-	-	347.2	95.8	-
5/18/2019 16:00	2.7	107.3	-	-	189.1	96.4	-
5/18/2019 17:00	1.7	132.8	-	-	157.2	96.2	-
5/18/2019 18:00	0.9	88.1	-	-	70.2	97.2	-
5/18/2019 19:00	1.9	77.7	-	-	7.9	99.2	-
5/18/2019 20:00	1.9	25.1	-	-	0.5	101.0	-
5/18/2019 21:00	3.1	7.4	-	-	0.0	99.4	-
5/18/2019 22:00	3.4	43.9	-	-	0.0	100.3	-
5/18/2019 23:00	1.0	61.8	-	-	0.0	102.1	-
5/19/2019 0:00	1.6	163.1	-	-	0.0	102.5	-
5/19/2019 1:00	0.8	167.3	-	-	0.0	102.4	-
5/19/2019 2:00	0.8	170.6	-	-	0.0	103.1	-
5/19/2019 3:00	1.2	208.7	-	-	14.6	102.5	-
5/19/2019 4:00	1.2	185.1	-	-	94.5	100.0	-
5/19/2019 5:00	3.3	64.7	-	-	236.0	97.7	-
5/19/2019 6:00	2.5	79.3	-	-	363.6	95.7	-
5/19/2019 7:00	1.5	66.0	-	-	464.5	93.1	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
5/19/2019 8:00	1.4	11.1	-	-	529.6	94.2	-
5/19/2019 9:00	0.9	68.9	-	-	721.2	91.3	-
5/19/2019 10:00	0.8	351.6	-	-	702.4	90.2	-
5/19/2019 11:00	1.5	25.9	-	-	845.0	89.4	-
5/19/2019 12:00	1.3	55.8	-	-	510.9	90.2	-
5/19/2019 13:00	2.3	72.4	-	-	830.0	88.8	-
5/19/2019 14:00	3.4	203.4	-	-	727.5	86.9	-
5/19/2019 15:00	2.3	174.3	-	-	669.3	84.9	-
5/19/2019 16:00	4.1	211.9	-	-	419.4	85.7	-
5/19/2019 17:00	2.1	229.4	-	-	175.7	88.9	-
5/19/2019 18:00	1.7	208.8	-	-	75.1	90.4	-
5/19/2019 19:00	1.1	103.8	-	-	29.2	93.5	-
5/19/2019 20:00	1.8	71.2	-	-	0.9	96.7	-
5/19/2019 21:00	3.5	36.1	-	-	0.0	96.6	-
5/19/2019 22:00	2.9	34.8	-	-	0.0	97.2	-
5/19/2019 23:00	1.7	21.8	-	-	0.0	99.5	-
5/20/2019 0:00	1.9	343.6	-	-	0.0	98.9	-
5/20/2019 1:00	1.1	211.6	-	-	0.0	99.7	-
5/20/2019 2:00	1.5	192.1	-	-	0.1	99.6	-
5/20/2019 3:00	1.0	178.0	-	-	10.1	99.2	-
5/20/2019 4:00	2.9	53.7	-	-	29.7	97.7	-
5/20/2019 5:00	2.9	47.2	-	-	130.5	95.0	-
5/20/2019 6:00	1.4	48.9	-	-	390.7	91.3	-
5/20/2019 7:00	1.1	78.7	-	-	561.2	87.5	-
5/20/2019 8:00	1.0	320.2	-	-	740.5	85.0	-
5/20/2019 9:00	0.7	246.9	-	-	767.3	-	-
5/20/2019 10:00	2.2	349.8	-	-	883.0	84.6	-
5/20/2019 11:00	0.6	97.5	-	-	871.0	82.0	-
5/20/2019 12:00	1.7	74.5	-	-	432.6	82.0	-
5/20/2019 13:00	2.8	68.2	-	-	232.9	87.7	-
5/20/2019 14:00	1.9	65.6	-	-	408.7	87.6	-
5/20/2019 15:00	1.7	67.2	-	-	425.5	84.4	-
5/20/2019 16:00	2.0	75.6	-	-	190.0	87.1	-
5/20/2019 17:00	1.0	61.6	-	-	139.8	87.0	-
5/20/2019 18:00	1.9	191.3	-	-	99.6	86.5	-
5/20/2019 19:00	2.1	165.1	-	-	14.6	89.8	-
5/20/2019 20:00	1.7	168.9	-	-	0.8	92.8	-
5/20/2019 21:00	0.7	173.4	-	-	0.0	94.6	-
5/20/2019 22:00	2.1	64.7	-	-	0.0	95.0	-
5/20/2019 23:00	3.1	118.4	-	-	0.0	73.1	-
5/21/2019 0:00	1.4	228.0	-	-	0.0	75.0	-
5/21/2019 1:00	2.4	9.3	-	-	0.0	73.4	-
5/21/2019 2:00	0.9	135.3	-	-	0.2	72.9	-
5/21/2019 3:00	1.0	269.5	-	-	11.4	73.0	-
5/21/2019 4:00	0.7	254.2	-	-	74.2	72.3	-
5/21/2019 5:00	1.6	227.7	-	-	172.1	71.9	-
5/21/2019 6:00	0.6	218.0	-	-	376.3	73.7	-
5/21/2019 7:00	0.5	102.4	-	-	576.4	79.9	-
5/21/2019 8:00	0.7	72.4	-	-	796.2	78.4	-
5/21/2019 9:00	0.8	35.9	-	-	834.0	77.0	-
5/21/2019 10:00	0.9	103.3	-	-	832.0	78.4	-
5/21/2019 11:00	1.4	77.3	-	-	916.0	78.5	-
5/21/2019 12:00	1.3	67.0	-	-	929.0	80.6	-
5/21/2019 13:00	1.7	90.4	-	-	774.2	80.6	-
5/21/2019 14:00	1.6	55.9	-	-	712.7	78.2	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
5/21/2019 15:00	2.7	276.2	-	-	633.0	77.7	-
5/21/2019 16:00	5.8	252.8	-	-	447.1	78.1	-
5/21/2019 17:00	4.4	244.0	-	-	190.5	79.1	-
5/21/2019 18:00	1.8	186.6	-	-	39.8	79.5	-
5/21/2019 19:00	2.3	186.2	-	-	22.4	73.3	-
5/21/2019 20:00	2.8	179.0	-	-	1.2	68.9	-
5/21/2019 21:00	1.9	179.0	-	-	0.0	59.5	-
5/21/2019 22:00	1.8	178.8	-	-	0.0	62.0	-
5/21/2019 23:00	1.8	186.0	-	-	0.0	54.8	-
5/22/2019 0:00	0.4	154.4	-	-	0.0	56.4	-
5/22/2019 1:00	1.1	50.3	-	-	0.0	54.0	-
5/22/2019 2:00	1.4	54.7	-	-	0.2	50.1	-
5/22/2019 3:00	1.0	87.3	-	-	6.7	52.5	-
5/22/2019 4:00	0.6	124.5	-	-	26.5	51.9	-
5/22/2019 5:00	1.2	188.6	-	-	123.1	57.1	-
5/22/2019 6:00	0.5	126.0	-	-	325.4	79.2	-
5/22/2019 7:00	1.0	83.9	-	-	536.9	76.6	-
5/22/2019 8:00	0.8	76.7	-	-	631.8	74.3	-
5/22/2019 9:00	0.6	103.7	-	-	494.9	73.1	-
5/22/2019 10:00	0.6	132.0	-	-	405.5	75.0	-
5/22/2019 11:00	0.4	138.0	-	-	421.6	73.9	-
5/22/2019 12:00	1.8	186.3	-	-	592.1	74.8	-
5/22/2019 13:00	2.8	286.8	-	-	547.2	75.8	-
5/22/2019 14:00	2.1	286.4	-	-	698.0	73.5	-
5/22/2019 15:00	2.4	291.0	-	-	339.2	75.3	-
5/22/2019 16:00	3.1	278.5	-	-	408.9	73.5	-
5/22/2019 17:00	3.3	329.4	-	-	288.6	73.3	-
5/22/2019 18:00	2.7	11.8	-	-	127.1	74.0	-
5/22/2019 19:00	1.4	56.6	-	-	40.4	73.1	-
5/22/2019 20:00	2.0	179.1	-	-	1.3	77.0	-
5/22/2019 21:00	2.8	195.7	-	-	0.0	69.6	-
5/22/2019 22:00	2.2	227.4	-	-	0.0	63.5	-
5/22/2019 23:00	1.7	213.2	-	-	0.0	62.1	-
5/23/2019 0:00	1.8	223.1	-	-	0.0	55.3	-
5/23/2019 1:00	1.5	195.0	-	-	0.0	50.6	-
5/23/2019 2:00	2.3	211.0	-	-	0.1	47.7	-
5/23/2019 3:00	2.5	208.5	-	-	8.9	46.9	-
5/23/2019 4:00	2.2	222.7	-	-	38.4	47.5	-
5/23/2019 5:00	2.0	210.6	-	-	102.6	51.1	-
5/23/2019 6:00	2.1	196.1	-	-	90.5	48.0	-
5/23/2019 7:00	2.6	200.0	-	-	136.4	50.3	-
5/23/2019 8:00	3.0	222.1	-	-	95.4	50.5	-
5/23/2019 9:00	3.7	208.7	-	-	100.5	50.7	-
5/23/2019 10:00	3.4	210.1	-	-	112.3	48.9	-
5/23/2019 11:00	4.0	223.8	-	-	134.3	47.9	-
5/23/2019 12:00	3.2	213.7	-	-	139.7	47.7	-
5/23/2019 13:00	2.3	178.8	-	-	268.0	50.2	-
5/23/2019 14:00	2.7	193.2	-	-	289.1	51.7	-
5/23/2019 15:00	2.8	193.2	-	-	225.1	50.5	-
5/23/2019 16:00	2.5	202.5	-	-	133.7	50.8	-
5/23/2019 17:00	2.0	214.7	-	-	81.4	50.5	-
5/23/2019 18:00	2.0	224.9	-	-	35.5	48.3	-
5/23/2019 19:00	3.2	235.1	-	-	8.1	29.6	-
5/23/2019 20:00	3.8	244.2	-	-	0.5	43.6	-
5/23/2019 21:00	2.9	227.3	-	-	0.0	43.0	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
5/23/2019 22:00	3.3	226.3	-	-	0.0	43.7	-
5/23/2019 23:00	2.8	225.2	-	-	0.0	45.6	-
5/24/2019 0:00	2.4	213.4	-	-	0.0	46.9	-
5/24/2019 1:00	2.6	216.0	-	-	0.0	46.1	-
5/24/2019 2:00	2.5	209.0	-	-	0.0	48.1	-
5/24/2019 3:00	2.4	220.2	-	-	2.7	47.7	-
5/24/2019 4:00	2.7	212.4	-	-	18.3	47.4	-
5/24/2019 5:00	2.4	215.5	-	-	88.2	46.6	-
5/24/2019 6:00	2.6	227.8	-	-	108.7	47.5	-
5/24/2019 7:00	2.7	210.4	-	-	165.6	47.0	-
5/24/2019 8:00	2.7	224.0	-	-	201.3	44.8	-
5/24/2019 9:00	2.6	245.4	-	-	267.0	46.1	-
5/24/2019 10:00	1.5	236.8	-	-	291.7	46.0	-
5/24/2019 11:00	3.6	218.4	-	-	347.5	47.1	-
5/24/2019 12:00	2.9	234.2	-	-	250.1	47.0	-
5/24/2019 13:00	2.8	227.9	-	-	324.6	47.4	-
5/24/2019 14:00	2.7	255.0	-	-	509.2	46.5	-
5/24/2019 15:00	3.6	317.4	-	-	360.6	43.0	-
5/24/2019 16:00	2.8	347.3	-	-	179.1	44.4	-
5/24/2019 17:00	3.8	345.0	-	-	77.2	43.3	-
5/24/2019 18:00	2.9	0.4	-	-	27.7	45.2	-
5/24/2019 19:00	2.9	31.8	-	-	7.8	44.7	-
5/24/2019 20:00	3.4	47.8	-	-	0.6	44.0	-
5/24/2019 21:00	3.2	28.4	-	-	0.0	43.5	-
5/24/2019 22:00	4.1	20.7	-	-	0.0	42.4	-
5/24/2019 23:00	6.6	31.0	-	-	0.0	42.7	-
5/25/2019 0:00	8.9	34.8	-	-	0.0	44.8	-
5/25/2019 1:00	6.7	28.2	-	-	0.0	44.8	-
5/25/2019 2:00	2.5	324.3	-	-	0.2	43.0	-
5/25/2019 3:00	2.3	308.7	-	-	11.8	41.7	-
5/25/2019 4:00	1.9	23.9	-	-	74.2	-	-
5/25/2019 5:00	2.9	358.2	-	-	151.3	-	-
5/25/2019 6:00	6.5	16.9	-	-	323.0	-	-
5/25/2019 7:00	2.7	30.8	-	-	483.0	-	-
5/25/2019 8:00	1.3	12.2	-	-	619.0	-	-
5/25/2019 9:00	1.5	41.6	-	-	722.4	-	-
5/25/2019 10:00	1.2	83.1	-	-	795.1	-	-
5/25/2019 11:00	0.8	131.7	-	-	870.0	-	-
5/25/2019 12:00	1.3	64.0	-	-	880.0	-	-
5/25/2019 13:00	1.4	70.5	-	-	764.4	-	-
5/25/2019 14:00	1.2	78.4	-	-	671.5	-	-
5/25/2019 15:00	1.4	72.8	-	-	536.2	-	-
5/25/2019 16:00	1.3	69.7	-	-	399.4	-	-
5/25/2019 17:00	0.9	17.5	-	-	156.0	-	-
5/25/2019 18:00	1.2	240.3	-	-	78.5	-	-
5/25/2019 19:00	0.8	234.0	-	-	31.5	-	-
5/25/2019 20:00	0.9	46.4	-	-	2.0	-	-
5/25/2019 21:00	1.1	74.2	-	-	0.0	-	-
5/25/2019 22:00	1.3	80.0	-	-	0.0	-	-
5/25/2019 23:00	1.0	67.7	-	-	0.0	-	-
5/26/2019 0:00	0.6	87.1	-	-	0.0	-	-
5/26/2019 1:00	0.5	97.7	-	-	0.0	-	-
5/26/2019 2:00	0.5	49.3	-	-	0.5	-	-
5/26/2019 3:00	0.7	195.3	-	-	18.2	-	-
5/26/2019 4:00	0.7	192.9	-	-	99.5	-	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
5/26/2019 5:00	0.3	39.5	-	-	219.9	-	-
5/26/2019 6:00	0.2	333.3	-	-	361.4	-	-
5/26/2019 7:00	0.3	236.3	-	-	525.5	-	-
5/26/2019 8:00	0.6	165.4	-	-	656.4	-	-
5/26/2019 9:00	0.6	141.3	-	-	770.6	-	-
5/26/2019 10:00	1.4	158.6	-	-	839.0	-	-
5/26/2019 11:00	2.5	238.8	-	-	907.0	-	-
5/26/2019 12:00	2.3	266.8	-	-	922.0	-	-
5/26/2019 13:00	4.0	272.4	-	-	779.5	-	-
5/26/2019 14:00	2.8	301.3	-	-	658.8	-	k
5/26/2019 15:00	1.9	52.4	-	-	553.6	-	-
5/26/2019 16:00	1.6	38.0	-	-	416.9	-	-
5/26/2019 17:00	1.4	63.2	-	-	151.1	-	-
5/26/2019 18:00	1.8	69.5	-	-	81.0	-	-
5/26/2019 19:00	1.1	90.2	-	-	37.7	-	-
5/26/2019 20:00	0.7	177.6	-	-	2.3	-	-
5/26/2019 21:00	1.6	176.4	-	-	0.0	-	-
5/26/2019 22:00	1.2	193.2	-	-	0.0	-	-
5/26/2019 23:00	1.4	180.9	-	-	0.0	-	-
5/27/2019 0:00	1.5	170.8	-	-	0.0	-	-
5/27/2019 1:00	1.2	162.8	-	-	0.0	-	-
5/27/2019 2:00	1.0	163.3	-	-	0.3	-	-
5/27/2019 3:00	1.3	183.2	-	-	14.1	-	-
5/27/2019 4:00	0.7	91.1	-	-	101.9	-	-
5/27/2019 5:00	0.9	100.2	-	-	230.0	-	-
5/27/2019 6:00	1.1	157.9	-	-	369.9	-	-
5/27/2019 7:00	2.2	187.1	-	-	532.6	-	-
5/27/2019 8:00	2.1	200.1	-	-	667.1	-	-
5/27/2019 9:00	2.8	213.3	-	-	769.0	-	-
5/27/2019 10:00	2.1	211.8	-	-	838.0	-	-
5/27/2019 11:00	2.4	267.6	-	-	901.0	-	-
5/27/2019 12:00	3.8	277.3	-	-	916.0	-	-
5/27/2019 13:00	3.7	247.8	-	-	786.2	-	-
5/27/2019 14:00	4.5	220.4	-	-	692.0	-	-
5/27/2019 15:00	4.9	200.0	-	-	555.8	-	-
5/27/2019 16:00	6.8	226.8	-	-	425.6	-	-
5/27/2019 17:00	8.0	243.4	-	-	143.1	-	-
5/27/2019 18:00	6.5	234.0	-	-	83.7	-	-
5/27/2019 19:00	4.4	220.1	-	-	35.3	-	-
5/27/2019 20:00	1.9	201.7	-	-	2.3	-	-
5/27/2019 21:00	2.4	185.7	-	-	0.0	-	-
5/27/2019 22:00	2.5	213.8	-	-	0.0	-	-
5/27/2019 23:00	3.7	197.2	-	-	0.0	-	-
5/28/2019 0:00	3.0	190.6	-	-	0.0	-	-
5/28/2019 1:00	1.8	187.8	-	-	0.0	-	-
5/28/2019 2:00	2.1	174.6	-	-	0.9	-	-
5/28/2019 3:00	1.8	200.7	-	-	23.5	-	-
5/28/2019 4:00	1.7	203.6	-	-	89.3	-	-
5/28/2019 5:00	2.2	222.8	-	-	240.2	-	-
5/28/2019 6:00	2.5	210.3	-	-	362.2	-	-
5/28/2019 7:00	3.9	203.8	-	-	547.6	-	-
5/28/2019 8:00	3.2	206.4	-	-	647.1	-	-
5/28/2019 9:00	2.9	228.9	-	-	774.8	-	-
5/28/2019 10:00	2.6	249.7	-	-	841.0	-	-
5/28/2019 11:00	2.4	264.4	-	-	916.0	-	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
5/28/2019 12:00	4.1	244.9	-	-	938.0	-	-
5/28/2019 13:00	4.5	247.1	-	-	540.7	-	-
5/28/2019 14:00	8.4	242.4	-	-	692.4	-	-
5/28/2019 15:00	8.1	251.0	-	-	530.1	-	-
5/28/2019 16:00	8.1	245.9	-	-	384.0	-	-
5/28/2019 17:00	6.6	247.3	-	-	162.8	-	-
5/28/2019 18:00	2.5	340.9	-	-	65.7	-	-
5/28/2019 19:00	1.9	62.4	-	-	34.8	-	-
5/28/2019 20:00	2.3	215.4	-	-	2.6	-	-
5/28/2019 21:00	3.8	212.8	-	-	0.0	-	-
5/28/2019 22:00	2.3	183.4	-	-	0.0	-	-
5/28/2019 23:00	2.9	203.6	-	-	0.0	-	-
5/29/2019 0:00	2.5	189.8	-	-	0.0	-	-
5/29/2019 1:00	2.7	194.4	-	-	0.0	-	-
5/29/2019 2:00	2.9	200.5	-	-	0.5	-	-
5/29/2019 3:00	2.7	204.2	-	-	13.5	-	-
5/29/2019 4:00	2.4	197.3	-	-	93.0	-	-
5/29/2019 5:00	2.0	220.8	-	-	236.7	-	-
5/29/2019 6:00	2.2	216.7	-	-	376.0	-	-
5/29/2019 7:00	2.5	219.3	-	-	544.0	-	-
5/29/2019 8:00	2.3	226.7	-	-	654.2	-	-
5/29/2019 9:00	3.1	221.7	-	-	774.1	-	-
5/29/2019 10:00	3.1	269.5	-	-	856.0	-	-
5/29/2019 11:00	3.4	278.1	-	-	923.0	-	-
5/29/2019 12:00	3.1	282.0	-	-	935.0	-	-
5/29/2019 13:00	4.7	286.5	-	-	807.0	-	-
5/29/2019 14:00	4.4	281.6	-	-	708.9	-	-
5/29/2019 15:00	4.6	290.2	-	-	573.7	-	-
5/29/2019 16:00	4.1	298.8	-	-	435.0	-	-
5/29/2019 17:00	3.0	339.8	-	-	122.6	-	-
5/29/2019 18:00	2.2	10.3	-	-	81.4	-	-
5/29/2019 19:00	2.0	23.1	-	-	36.6	-	-
5/29/2019 20:00	1.9	45.7	-	-	2.8	-	-
5/29/2019 21:00	1.0	201.3	-	-	0.0	-	-
5/29/2019 22:00	1.0	235.4	-	-	0.0	-	-
5/29/2019 23:00	1.3	52.1	-	-	0.0	-	-
5/30/2019 0:00	1.3	39.0	-	-	0.0	-	-
5/30/2019 1:00	1.4	32.7	-	-	0.0	-	-
5/30/2019 2:00	0.5	197.4	-	-	0.6	-	-
5/30/2019 3:00	0.5	185.3	-	-	16.6	-	-
5/30/2019 4:00	1.0	176.6	-	-	64.9	-	-
5/30/2019 5:00	2.1	191.4	-	-	170.3	-	-
5/30/2019 6:00	0.8	152.2	-	-	368.6	-	-
5/30/2019 7:00	1.0	84.3	-	-	529.3	-	-
5/30/2019 8:00	0.9	28.1	-	-	651.8	-	-
5/30/2019 9:00	0.8	59.3	-	-	761.5	-	-
5/30/2019 10:00	1.0	62.0	-	-	807.0	-	-
5/30/2019 11:00	1.8	203.2	-	-	818.0	-	-
5/30/2019 12:00	1.6	279.2	-	-	768.9	-	-
5/30/2019 13:00	4.0	279.0	-	-	731.8	-	-
5/30/2019 14:00	3.6	280.7	-	-	673.8	-	-
5/30/2019 15:00	5.1	206.0	-	-	497.4	-	-
5/30/2019 16:00	6.5	233.8	-	-	311.6	-	-
5/30/2019 17:00	7.6	239.1	-	-	160.2	-	-
5/30/2019 18:00	5.7	223.6	-	-	86.0	-	-



**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
5/30/2019 19:00	3.9	209.4	-	-	25.6	-	-
5/30/2019 20:00	2.4	197.0	-	-	1.5	-	-
5/30/2019 21:00	3.1	207.1	-	-	0.0	-	-
5/30/2019 22:00	3.2	204.9	-	-	0.0	-	-
5/30/2019 23:00	3.3	209.0	-	-	0.0	-	-
5/31/2019 0:00	4.1	195.3	-	-	0.0	-	-
5/31/2019 1:00	4.4	197.4	-	-	0.0	-	-
5/31/2019 2:00	4.2	203.6	-	-	0.4	-	-
5/31/2019 3:00	3.4	202.9	-	-	18.0	-	-
5/31/2019 4:00	3.0	186.9	-	-	41.4	-	-
5/31/2019 5:00	3.0	203.3	-	-	93.0	-	-
5/31/2019 6:00	5.0	179.8	-	-	105.2	-	-
5/31/2019 7:00	3.8	206.6	-	-	262.0	-	-
5/31/2019 8:00	4.7	218.0	-	-	266.8	-	-
5/31/2019 9:00	5.9	219.9	-	-	202.9	-	-
5/31/2019 10:00	4.3	223.8	-	-	296.5	-	-
5/31/2019 11:00	3.3	200.8	-	-	268.3	-	-
5/31/2019 12:00	4.6	190.4	-	-	300.3	-	-
5/31/2019 13:00	3.4	224.4	-	-	195.8	-	-
5/31/2019 14:00	4.1	219.5	-	-	80.9	-	-
5/31/2019 15:00	3.4	222.3	-	-	87.4	-	-
5/31/2019 16:00	2.9	212.0	-	-	59.2	-	-
5/31/2019 17:00	4.1	217.4	-	-	48.6	-	-
5/31/2019 18:00	5.0	218.0	-	-	25.9	-	-
5/31/2019 19:00	4.7	220.6	-	-	7.2	-	-
5/31/2019 20:00	4.3	230.0	-	-	0.9	-	-
5/31/2019 21:00	5.0	226.4	-	-	0.0	-	-
5/31/2019 22:00	3.7	214.8	-	-	0.0	-	-
5/31/2019 23:00	3.4	218.6	-	-	0.0	0.0	-
6/1/2019 0:00	3.4	216.8	-	-	0.0	0.0	-
6/1/2019 1:00	3.1	247.0	-	-	0.0	0.0	-
6/1/2019 2:00	5.4	231.6	-	-	0.1	0.0	-
6/1/2019 3:00	6.5	227.5	-	-	8.0	0.0	-
6/1/2019 4:00	5.3	228.6	-	-	25.5	0.0	-
6/1/2019 5:00	4.1	223.1	-	-	68.2	0.0	-
6/1/2019 6:00	4.8	216.1	-	-	124.9	0.0	-
6/1/2019 7:00	4.4	222.6	-	-	225.0	0.0	-
6/1/2019 8:00	4.6	207.7	-	-	237.1	0.0	-
6/1/2019 9:00	4.9	215.2	-	-	625.4	0.0	-
6/1/2019 10:00	5.6	216.3	-	-	267.3	0.0	-
6/1/2019 11:00	5.0	203.4	-	-	277.3	0.0	-
6/1/2019 12:00	5.3	233.9	-	-	241.3	0.0	-
6/1/2019 13:00	6.9	236.1	-	-	309.7	0.0	-
6/1/2019 14:00	6.3	213.1	-	-	377.8	0.0	-
6/1/2019 15:00	5.7	210.2	-	-	277.9	0.0	-
6/1/2019 16:00	4.7	204.3	-	-	148.2	0.0	-
6/1/2019 17:00	5.4	213.0	-	-	68.8	0.0	-
6/1/2019 18:00	4.6	216.4	-	-	35.2	0.0	-
6/1/2019 19:00	4.2	216.5	-	-	10.8	0.0	-
6/1/2019 20:00	4.4	189.8	-	-	0.8	0.0	-
6/1/2019 21:00	3.5	197.5	-	-	0.0	0.0	-
6/1/2019 22:00	3.2	190.6	-	-	0.0	0.0	-
6/1/2019 23:00	3.5	216.2	-	-	0.0	0.0	-
6/2/2019 0:00	3.5	209.0	-	-	0.0	0.0	-
6/2/2019 1:00	3.6	208.5	-	-	0.0	0.0	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
6/2/2019 2:00	2.6	185.6	-	-	0.6	0.0	-
6/2/2019 3:00	1.7	183.7	-	-	8.1	0.0	-
6/2/2019 4:00	1.4	186.6	-	-	55.8	0.0	-
6/2/2019 5:00	0.9	210.5	-	-	143.2	0.0	-
6/2/2019 6:00	1.0	57.2	-	-	160.3	0.0	-
6/2/2019 7:00	1.7	355.3	-	-	315.4	0.0	-
6/2/2019 8:00	1.0	21.5	-	-	568.2	0.0	-
6/2/2019 9:00	1.2	25.0	-	-	743.7	0.0	-
6/2/2019 10:00	1.4	351.4	-	-	500.4	0.0	-
6/2/2019 11:00	1.7	254.2	-	-	257.1	0.0	-
6/2/2019 12:00	1.8	199.0	-	-	260.0	0.0	-
6/2/2019 13:00	2.9	240.0	-	-	221.0	0.0	-
6/2/2019 14:00	1.2	317.4	-	-	127.6	0.0	-
6/2/2019 15:00	0.8	42.6	-	-	119.3	0.0	-
6/2/2019 16:00	1.6	220.4	-	-	155.1	0.0	-
6/2/2019 17:00	1.4	206.7	-	-	149.7	0.0	-
6/2/2019 18:00	0.5	170.8	-	-	55.2	0.0	-
6/2/2019 19:00	1.1	131.2	-	-	9.4	0.0	-
6/2/2019 20:00	0.6	70.2	-	-	1.2	0.0	-
6/2/2019 21:00	0.4	136.4	-	-	0.0	0.0	-
6/2/2019 22:00	1.6	175.6	-	-	0.0	0.0	-
6/2/2019 23:00	2.3	203.1	-	-	0.0	0.0	-
6/3/2019 0:00	1.9	200.6	-	-	0.0	0.0	-
6/3/2019 1:00	1.3	207.5	-	-	0.0	0.0	-
6/3/2019 2:00	1.3	235.8	-	-	0.7	0.0	-
6/3/2019 3:00	1.3	250.6	-	-	21.2	0.0	-
6/3/2019 4:00	1.4	240.1	-	-	86.0	0.0	-
6/3/2019 5:00	1.5	231.0	-	-	159.1	0.0	-
6/3/2019 6:00	1.9	217.0	-	-	279.5	0.0	-
6/3/2019 7:00	2.4	218.8	-	-	471.4	0.0	-
6/3/2019 8:00	2.5	233.6	-	-	579.8	0.0	-
6/3/2019 9:00	3.5	234.9	-	-	574.0	0.0	-
6/3/2019 10:00	2.8	241.5	-	-	610.7	0.0	-
6/3/2019 11:00	2.7	266.4	-	-	568.2	0.0	-
6/3/2019 12:00	3.1	247.1	-	-	547.1	0.0	-
6/3/2019 13:00	3.8	257.9	-	-	418.4	0.0	-
6/3/2019 14:00	3.7	269.4	-	-	367.3	0.0	-
6/3/2019 15:00	3.4	294.8	-	-	199.4	0.0	-
6/3/2019 16:00	3.3	229.8	-	-	208.1	0.0	-
6/3/2019 17:00	4.7	250.3	-	-	55.6	0.0	-
6/3/2019 18:00	4.0	232.1	-	-	49.5	0.0	-
6/3/2019 19:00	4.0	218.2	-	-	20.2	0.0	-
6/3/2019 20:00	4.4	229.6	-	-	1.7	0.0	-
6/3/2019 21:00	4.2	226.6	-	-	0.0	0.0	-
6/3/2019 22:00	4.8	225.3	-	-	0.0	0.0	-
6/3/2019 23:00	3.7	205.0	-	-	0.0	0.0	-
6/4/2019 0:00	3.3	210.4	-	-	0.0	0.0	-
6/4/2019 1:00	3.3	206.0	-	-	0.0	0.0	-
6/4/2019 2:00	3.0	205.9	-	-	0.7	0.0	-
6/4/2019 3:00	2.9	203.3	-	-	10.2	0.0	-
6/4/2019 4:00	2.9	191.7	-	-	55.3	0.0	-
6/4/2019 5:00	2.6	205.1	-	-	209.5	0.0	-
6/4/2019 6:00	2.5	207.5	-	-	318.2	0.0	-
6/4/2019 7:00	2.8	220.9	-	-	373.2	0.0	-
6/4/2019 8:00	2.8	237.2	-	-	472.7	0.0	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
6/4/2019 9:00	2.2	238.1	-	-	394.4	0.0	-
6/4/2019 10:00	2.6	261.2	-	-	688.0	0.0	-
6/4/2019 11:00	3.4	256.4	-	-	525.2	0.0	-
6/4/2019 12:00	3.8	256.1	-	-	763.0	0.0	-
6/4/2019 13:00	5.2	256.1	-	-	623.8	0.0	-
6/4/2019 14:00	4.2	249.9	-	-	533.7	0.0	-
6/4/2019 15:00	4.3	257.9	-	-	341.9	0.0	-
6/4/2019 16:00	2.9	235.8	-	-	191.1	0.0	-
6/4/2019 17:00	3.0	234.3	-	-	101.6	0.0	-
6/4/2019 18:00	4.4	228.0	-	-	50.4	0.0	-
6/4/2019 19:00	3.0	210.3	-	-	17.7	0.0	-
6/4/2019 20:00	2.2	203.5	-	-	2.6	0.0	-
6/4/2019 21:00	2.7	216.1	-	-	0.0	0.0	-
6/4/2019 22:00	2.8	198.5	-	-	0.0	0.0	-
6/4/2019 23:00	2.6	202.1	-	-	0.0	0.0	-
6/5/2019 0:00	2.2	197.7	-	-	0.0	0.0	-
6/5/2019 1:00	1.9	196.4	-	-	0.0	0.0	-
6/5/2019 2:00	1.5	191.8	-	-	0.6	0.0	-
6/5/2019 3:00	1.8	211.6	-	-	11.0	0.0	-
6/5/2019 4:00	0.8	162.2	-	-	45.1	0.0	-
6/5/2019 5:00	0.9	27.7	-	-	100.6	0.0	-
6/5/2019 6:00	1.4	41.1	-	-	206.8	0.0	-
6/5/2019 7:00	2.1	20.5	-	-	206.0	0.0	-
6/5/2019 8:00	1.2	71.7	-	-	468.5	0.0	-
6/5/2019 9:00	2.0	6.2	-	-	654.4	0.0	-
6/5/2019 10:00	2.6	318.3	-	-	618.5	0.0	-
6/5/2019 11:00	1.9	316.6	-	-	357.1	0.0	-
6/5/2019 12:00	1.3	321.5	-	-	469.3	0.0	-
6/5/2019 13:00	1.1	154.7	-	-	404.3	0.0	-
6/5/2019 14:00	2.6	292.8	-	-	380.6	0.0	-
6/5/2019 15:00	4.6	300.0	-	-	484.6	0.0	-
6/5/2019 16:00	3.4	303.3	-	-	250.5	0.0	-
6/5/2019 17:00	2.8	343.7	-	-	123.5	0.0	-
6/5/2019 18:00	2.4	346.8	-	-	118.7	0.0	-
6/5/2019 19:00	3.8	342.5	-	-	28.4	0.0	-
6/5/2019 20:00	3.9	28.2	-	-	2.1	0.0	-
6/5/2019 21:00	5.2	34.0	-	-	0.0	0.0	-
6/5/2019 22:00	5.1	14.0	-	-	0.0	0.0	-
6/5/2019 23:00	5.8	15.9	-	-	0.0	0.0	-
6/6/2019 0:00	3.9	26.7	-	-	0.0	0.0	-
6/6/2019 1:00	1.8	69.3	-	-	0.0	0.0	-
6/6/2019 2:00	4.3	18.0	-	-	0.9	0.0	-
6/6/2019 3:00	3.5	18.7	-	-	22.1	0.0	-
6/6/2019 4:00	2.0	33.9	-	-	62.0	0.0	-
6/6/2019 5:00	3.7	31.4	-	-	90.4	0.0	-
6/6/2019 6:00	4.2	17.1	-	-	189.0	0.0	-
6/6/2019 7:00	4.6	27.7	-	-	325.6	0.0	-
6/6/2019 8:00	4.8	22.6	-	-	623.9	0.0	-
6/6/2019 9:00	3.5	13.7	-	-	775.8	0.0	-
6/6/2019 10:00	3.3	19.6	-	-	869.0	0.0	-
6/6/2019 11:00	2.8	19.7	-	-	892.0	0.0	-
6/6/2019 12:00	2.3	30.0	-	-	624.7	0.0	-
6/6/2019 13:00	1.8	356.1	-	-	472.7	0.0	-
6/6/2019 14:00	2.6	310.6	-	-	617.0	0.0	-
6/6/2019 15:00	3.6	264.9	-	-	711.6	0.0	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
6/6/2019 16:00	4.5	255.3	-	-	589.2	0.0	-
6/6/2019 17:00	5.9	303.2	-	-	225.6	0.0	-
6/6/2019 18:00	4.7	303.5	-	-	196.7	0.0	-
6/6/2019 19:00	2.8	303.6	-	-	167.1	0.0	-
6/6/2019 20:00	1.0	46.1	-	-	19.5	0.0	-
6/6/2019 21:00	2.0	37.1	-	-	0.0	0.0	-
6/6/2019 22:00	0.9	17.3	-	-	0.0	0.0	-
6/6/2019 23:00	1.4	53.8	-	-	0.0	0.0	-
6/7/2019 0:00	1.6	215.0	-	-	0.0	0.0	-
6/7/2019 1:00	2.6	189.5	-	-	0.0	0.0	-
6/7/2019 2:00	2.4	186.7	-	-	0.5	0.0	-
6/7/2019 3:00	2.8	196.6	-	-	9.6	0.0	-
6/7/2019 4:00	3.1	194.4	-	-	49.6	0.0	-
6/7/2019 5:00	2.8	184.8	-	-	71.8	0.0	-
6/7/2019 6:00	2.4	209.3	-	-	98.1	0.0	-
6/7/2019 7:00	2.3	183.6	-	-	96.6	0.0	-
6/7/2019 8:00	2.8	215.3	-	-	365.0	0.0	-
6/7/2019 9:00	2.9	241.8	-	-	542.9	0.0	-
6/7/2019 10:00	3.4	232.9	-	-	704.6	0.0	-
6/7/2019 11:00	4.1	235.4	-	-	519.7	0.0	-
6/7/2019 12:00	4.8	216.7	-	-	618.5	0.0	-
6/7/2019 13:00	4.1	211.0	-	-	436.4	0.0	-
6/7/2019 14:00	4.7	213.5	-	-	326.4	0.0	-
6/7/2019 15:00	2.5	249.1	-	-	216.1	0.0	-
6/7/2019 16:00	3.1	244.7	-	-	70.1	0.0	-
6/7/2019 17:00	4.8	196.3	-	-	128.2	0.0	-
6/7/2019 18:00	4.7	181.1	-	-	117.9	0.0	-
6/7/2019 19:00	3.4	202.4	-	-	40.0	0.0	-
6/7/2019 20:00	2.6	225.0	-	-	4.3	0.0	-
6/7/2019 21:00	3.2	204.3	-	-	0.0	0.0	-
6/7/2019 22:00	3.0	193.2	-	-	0.0	0.0	-
6/7/2019 23:00	2.9	189.0	-	-	0.0	0.0	-
6/8/2019 0:00	3.0	195.0	-	-	0.0	0.0	-
6/8/2019 1:00	2.8	173.9	-	-	0.0	0.0	-
6/8/2019 2:00	4.0	217.7	-	-	0.3	0.0	-
6/8/2019 3:00	4.0	218.2	-	-	4.1	0.0	-
6/8/2019 4:00	4.2	225.1	-	-	12.3	0.0	-
6/8/2019 5:00	4.4	216.3	-	-	25.5	0.0	-
6/8/2019 6:00	4.9	220.7	-	-	64.8	0.0	-
6/8/2019 7:00	5.3	223.0	-	-	138.8	0.0	-
6/8/2019 8:00	4.9	223.8	-	-	181.8	0.0	-
6/8/2019 9:00	4.6	227.0	-	-	256.1	0.0	-
6/8/2019 10:00	4.1	223.9	-	-	295.8	0.0	-
6/8/2019 11:00	4.7	235.1	-	-	394.2	0.0	-
6/8/2019 12:00	5.8	237.9	-	-	257.5	0.0	-
6/8/2019 13:00	6.5	247.1	-	-	240.1	0.0	-
6/8/2019 14:00	5.8	251.4	-	-	373.3	0.0	-
6/8/2019 15:00	7.5	251.3	-	-	186.0	0.0	-
6/8/2019 16:00	6.8	241.9	-	-	160.9	0.0	-
6/8/2019 17:00	5.6	250.2	-	-	109.9	0.0	-
6/8/2019 18:00	5.4	253.1	-	-	75.3	0.0	-
6/8/2019 19:00	4.6	243.7	-	-	18.3	0.0	-
6/8/2019 20:00	3.7	226.1	-	-	1.8	0.0	-
6/8/2019 21:00	3.4	208.9	-	-	0.0	0.0	-
6/8/2019 22:00	3.4	208.0	-	-	0.0	0.0	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
6/8/2019 23:00	2.6	196.6	-	-	0.0	0.0	-
6/9/2019 0:00	4.1	220.2	-	-	0.0	0.0	-
6/9/2019 1:00	3.5	215.4	-	-	0.0	0.0	-
6/9/2019 2:00	3.4	202.7	-	-	1.7	0.0	-
6/9/2019 3:00	3.6	175.7	-	-	14.9	0.0	-
6/9/2019 4:00	3.6	186.7	-	-	59.4	0.0	-
6/9/2019 5:00	3.1	162.9	-	-	110.9	0.0	-
6/9/2019 6:00	1.3	44.3	-	-	167.1	0.0	-
6/9/2019 7:00	1.5	108.6	-	-	340.4	0.0	-
6/9/2019 8:00	1.7	152.2	-	-	397.2	0.0	-
6/9/2019 9:00	1.4	169.7	-	-	326.8	0.0	-
6/9/2019 10:00	4.0	205.2	-	-	479.0	0.0	-
6/9/2019 11:00	3.9	202.0	-	-	425.4	0.0	-
6/9/2019 12:00	4.3	191.1	-	-	342.3	0.0	-
6/9/2019 13:00	4.1	191.4	-	-	325.4	0.0	-
6/9/2019 14:00	4.9	187.5	-	-	226.7	0.0	-
6/9/2019 15:00	4.7	182.9	-	-	133.2	0.0	-
6/9/2019 16:00	3.9	170.3	-	-	84.5	0.0	-
6/9/2019 17:00	2.4	176.2	-	-	45.3	0.0	-
6/9/2019 18:00	3.0	161.2	-	-	22.9	0.0	-
6/9/2019 19:00	3.1	151.2	-	-	9.4	0.0	-
6/9/2019 20:00	1.7	155.0	-	-	1.9	0.0	-
6/9/2019 21:00	2.8	136.8	-	-	0.0	0.0	-
6/9/2019 22:00	2.3	114.0	-	-	0.0	0.0	-
6/9/2019 23:00	1.1	94.9	-	-	0.0	0.0	-
6/10/2019 0:00	1.2	106.5	-	-	0.0	0.0	-
6/10/2019 1:00	1.4	112.7	-	-	0.0	0.0	-
6/10/2019 2:00	1.0	215.3	-	-	0.3	0.0	-
6/10/2019 3:00	1.1	103.0	-	-	6.4	0.0	-
6/10/2019 4:00	0.9	146.1	-	-	31.0	0.0	-
6/10/2019 5:00	0.8	146.2	-	-	74.9	0.0	-
6/10/2019 6:00	2.2	201.4	-	-	130.6	0.0	-
6/10/2019 7:00	1.2	141.5	-	-	210.9	0.0	-
6/10/2019 8:00	2.0	223.0	-	-	273.6	0.0	-
6/10/2019 9:00	1.9	226.8	-	-	354.2	0.0	-
6/10/2019 10:00	2.6	222.4	-	-	292.9	0.0	-
6/10/2019 11:00	3.2	225.5	-	-	324.5	0.0	-
6/10/2019 12:00	2.5	228.7	-	-	363.0	0.0	-
6/10/2019 13:00	3.0	225.2	-	-	341.4	0.0	-
6/10/2019 14:00	3.8	208.3	-	-	197.6	0.0	-
6/10/2019 15:00	4.4	177.0	-	-	219.6	0.0	-
6/10/2019 16:00	3.9	178.3	-	-	140.1	0.0	-
6/10/2019 17:00	2.9	191.7	-	-	51.5	0.0	-
6/10/2019 18:00	4.4	182.0	-	-	26.5	0.0	-
6/10/2019 19:00	2.3	160.6	-	-	8.0	0.0	-
6/10/2019 20:00	3.0	164.9	-	-	0.7	0.0	-
6/10/2019 21:00	2.0	121.3	-	-	0.0	0.0	-
6/10/2019 22:00	1.4	64.6	-	-	0.0	0.0	-
6/10/2019 23:00	1.7	160.9	-	-	0.0	0.0	-
6/11/2019 0:00	1.8	147.8	-	-	0.0	0.0	-
6/11/2019 1:00	3.3	165.1	-	-	0.0	0.0	-
6/11/2019 2:00	5.1	197.1	-	-	0.0	0.0	-
6/11/2019 3:00	4.5	199.7	-	-	2.5	0.0	-
6/11/2019 4:00	4.5	199.6	-	-	14.4	0.0	-
6/11/2019 5:00	4.6	200.8	-	-	38.1	0.0	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
6/11/2019 6:00	4.6	201.7	-	-	87.9	0.0	-
6/11/2019 7:00	4.7	199.9	-	-	175.1	0.0	-
6/11/2019 8:00	4.6	206.3	-	-	190.8	0.0	-
6/11/2019 9:00	5.3	199.2	-	-	230.2	0.0	-
6/11/2019 10:00	4.4	209.7	-	-	272.1	0.0	-
6/11/2019 11:00	4.3	215.6	-	-	150.0	0.0	-
6/11/2019 12:00	6.3	212.3	-	-	139.6	0.0	-
6/11/2019 13:00	5.7	216.0	-	-	145.9	0.0	-
6/11/2019 14:00	5.5	207.1	-	-	152.5	0.0	-
6/11/2019 15:00	5.8	209.5	-	-	98.5	0.0	-
6/11/2019 16:00	5.9	214.0	-	-	107.6	0.0	-
6/11/2019 17:00	5.5	196.2	-	-	80.2	0.0	-
6/11/2019 18:00	5.5	196.7	-	-	61.8	0.0	-
6/11/2019 19:00	5.3	196.9	-	-	18.8	0.0	-
6/11/2019 20:00	3.8	212.2	-	-	2.9	0.0	-
6/11/2019 21:00	2.8	216.1	-	-	0.0	0.0	-
6/11/2019 22:00	4.1	204.8	-	-	0.0	0.0	-
6/11/2019 23:00	4.1	203.7	-	-	0.0	0.0	-
6/12/2019 0:00	3.3	198.2	-	-	0.0	0.0	-
6/12/2019 1:00	2.2	197.6	-	-	0.0	0.0	-
6/12/2019 2:00	2.6	193.8	-	-	0.2	0.0	-
6/12/2019 3:00	1.8	135.5	-	-	3.6	0.0	-
6/12/2019 4:00	2.5	194.8	-	-	17.9	0.0	-
6/12/2019 5:00	2.0	187.1	-	-	39.6	0.0	-
6/12/2019 6:00	1.1	195.0	-	-	59.8	0.0	-
6/12/2019 7:00	2.1	121.5	-	-	134.8	0.0	-
6/12/2019 8:00	1.4	186.7	-	-	157.8	0.0	-
6/12/2019 9:00	4.2	201.6	-	-	139.3	0.0	-
6/12/2019 10:00	4.0	212.4	-	-	145.9	0.0	-
6/12/2019 11:00	4.6	226.7	-	-	236.1	0.0	-
6/12/2019 12:00	3.8	224.6	-	-	177.0	0.0	-
6/12/2019 13:00	4.1	226.6	-	-	178.5	0.0	-
6/12/2019 14:00	4.4	228.1	-	-	113.5	0.0	-
6/12/2019 15:00	4.2	218.7	-	-	149.5	0.0	-
6/12/2019 16:00	4.7	230.3	-	-	124.2	0.0	-
6/12/2019 17:00	4.8	223.5	-	-	82.3	0.0	-
6/12/2019 18:00	4.4	224.5	-	-	66.5	0.0	-
6/12/2019 19:00	3.3	243.8	-	-	20.6	0.0	-
6/12/2019 20:00	2.5	284.1	-	-	2.1	0.0	-
6/12/2019 21:00	1.5	10.6	-	-	0.0	0.0	-
6/12/2019 22:00	1.2	3.1	-	-	0.0	0.0	-
6/12/2019 23:00	1.1	54.7	-	-	0.0	0.0	-
6/13/2019 0:00	1.2	181.7	-	-	0.0	0.0	-
6/13/2019 1:00	1.2	178.0	-	-	0.0	0.0	-
6/13/2019 2:00	1.6	188.9	-	-	0.4	0.0	-
6/13/2019 3:00	3.0	217.5	-	-	5.4	0.0	-
6/13/2019 4:00	3.0	212.5	-	-	39.2	0.0	-
6/13/2019 5:00	2.6	224.1	-	-	94.5	0.0	-
6/13/2019 6:00	2.5	229.2	-	-	186.6	0.0	-
6/13/2019 7:00	2.5	224.2	-	-	260.2	0.0	-
6/13/2019 8:00	2.8	218.6	-	-	554.8	0.0	-
6/13/2019 9:00	2.6	221.8	-	-	576.3	0.0	-
6/13/2019 10:00	3.1	215.8	-	-	630.4	0.0	-
6/13/2019 11:00	3.7	227.4	-	-	720.7	0.0	-
6/13/2019 12:00	3.5	229.8	-	-	369.0	0.0	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
6/13/2019 13:00	3.0	218.5	-	-	247.1	0.0	-
6/13/2019 14:00	3.1	243.5	-	-	227.8	0.0	-
6/13/2019 15:00	3.2	245.9	-	-	137.7	0.0	-
6/13/2019 16:00	3.0	240.0	-	-	126.3	0.0	-
6/13/2019 17:00	2.7	233.3	-	-	176.1	0.0	-
6/13/2019 18:00	2.2	243.2	-	-	88.8	0.0	-
6/13/2019 19:00	2.6	244.2	-	-	39.7	0.0	-
6/13/2019 20:00	2.0	220.5	-	-	3.7	0.0	-
6/13/2019 21:00	1.4	200.6	-	-	0.1	0.0	-
6/13/2019 22:00	1.5	226.9	-	-	0.0	0.0	-
6/13/2019 23:00	1.6	183.6	-	-	0.0	0.0	-
6/14/2019 0:00	1.6	182.0	-	-	0.0	0.0	-
6/14/2019 1:00	1.1	156.8	-	-	0.0	0.0	-
6/14/2019 2:00	1.0	126.2	-	-	0.9	0.0	-
6/14/2019 3:00	1.4	94.9	-	-	13.7	0.0	-
6/14/2019 4:00	1.7	93.1	-	-	51.0	0.0	-
6/14/2019 5:00	1.2	90.5	-	-	121.0	0.0	-
6/14/2019 6:00	1.0	346.1	-	-	150.2	0.0	-
6/14/2019 7:00	1.2	247.7	-	-	144.2	0.0	-
6/14/2019 8:00	1.4	232.4	-	-	218.4	0.0	-
6/14/2019 9:00	1.7	225.2	-	-	347.1	0.0	-
6/14/2019 10:00	2.7	220.7	-	-	436.3	0.0	-
6/14/2019 11:00	3.2	221.6	-	-	767.3	0.0	-
6/14/2019 12:00	3.8	223.5	-	-	786.4	0.0	-
6/14/2019 13:00	6.1	229.5	-	-	664.3	0.0	-
6/14/2019 14:00	6.0	229.7	-	-	325.3	0.0	-
6/14/2019 15:00	5.5	237.0	-	-	181.2	0.0	-
6/14/2019 16:00	5.9	241.4	-	-	378.2	0.0	-
6/14/2019 17:00	6.0	238.7	-	-	172.4	0.0	-
6/14/2019 18:00	5.1	235.6	-	-	116.7	0.0	-
6/14/2019 19:00	3.5	226.6	-	-	35.8	0.0	-
6/14/2019 20:00	2.9	201.8	-	-	5.0	0.0	-
6/14/2019 21:00	3.3	196.8	-	-	0.1	0.0	-
6/14/2019 22:00	3.1	192.5	-	-	0.0	0.0	-
6/14/2019 23:00	3.3	195.0	-	-	0.0	0.0	-
6/15/2019 0:00	3.6	188.3	-	-	0.0	0.0	-
6/15/2019 1:00	2.5	197.1	-	-	0.0	0.0	-
6/15/2019 2:00	2.5	192.8	-	-	2.1	0.0	-
6/15/2019 3:00	2.8	191.7	-	-	29.5	0.0	-
6/15/2019 4:00	2.4	188.3	-	-	82.8	0.0	-
6/15/2019 5:00	2.2	209.6	-	-	174.7	0.0	-
6/15/2019 6:00	2.1	195.8	-	-	218.7	0.0	-
6/15/2019 7:00	1.2	199.4	-	-	273.8	0.0	-
6/15/2019 8:00	1.4	241.9	-	-	400.6	0.0	-
6/15/2019 9:00	1.7	241.3	-	-	578.6	0.0	-
6/15/2019 10:00	2.2	252.8	-	-	646.0	0.0	-
6/15/2019 11:00	2.1	242.5	-	-	585.1	0.0	-
6/15/2019 12:00	2.6	221.9	-	-	513.5	0.0	-
6/15/2019 13:00	5.4	224.5	-	-	528.5	0.0	-
6/15/2019 14:00	5.3	240.9	-	-	344.9	0.0	-
6/15/2019 15:00	5.5	229.5	-	-	197.5	0.0	-
6/15/2019 16:00	4.3	221.8	-	-	94.7	0.0	-
6/15/2019 17:00	4.8	226.3	-	-	24.5	0.0	-
6/15/2019 18:00	3.6	207.5	-	-	36.4	0.0	-
6/15/2019 19:00	2.5	205.6	-	-	16.5	0.0	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
6/15/2019 20:00	3.2	218.5	-	-	0.7	0.0	-
6/15/2019 21:00	3.8	215.7	-	-	0.0	0.0	-
6/15/2019 22:00	4.1	221.3	-	-	0.0	0.0	-
6/15/2019 23:00	4.3	221.3	-	-	0.0	0.0	-
6/16/2019 0:00	3.9	212.8	-	-	0.0	0.0	-
6/16/2019 1:00	3.8	197.4	-	-	0.0	0.0	-
6/16/2019 2:00	3.5	205.6	-	-	0.6	0.0	-
6/16/2019 3:00	3.3	190.1	-	-	7.0	0.0	-
6/16/2019 4:00	3.0	177.1	-	-	33.0	0.0	-
6/16/2019 5:00	2.7	190.4	-	-	88.6	0.0	-
6/16/2019 6:00	2.7	201.4	-	-	272.1	0.0	-
6/16/2019 7:00	2.4	200.9	-	-	358.7	0.0	-
6/16/2019 8:00	3.0	207.9	-	-	387.6	0.0	-
6/16/2019 9:00	3.8	215.9	-	-	360.4	0.0	-
6/16/2019 10:00	3.6	230.7	-	-	384.7	0.0	-
6/16/2019 11:00	3.9	226.1	-	-	477.1	0.0	-
6/16/2019 12:00	4.2	225.1	-	-	416.9	0.0	-
6/16/2019 13:00	3.9	228.4	-	-	327.6	0.0	-
6/16/2019 14:00	4.1	231.9	-	-	275.5	0.0	-
6/16/2019 15:00	3.6	220.3	-	-	260.2	0.0	-
6/16/2019 16:00	2.8	224.9	-	-	140.1	0.0	-
6/16/2019 17:00	2.6	206.1	-	-	108.4	0.0	-
6/16/2019 18:00	2.9	183.5	-	-	58.0	0.0	-
6/16/2019 19:00	3.5	162.9	-	-	19.0	0.0	-
6/16/2019 20:00	3.6	156.5	-	-	2.4	0.0	-
6/16/2019 21:00	3.7	182.2	-	-	0.0	0.0	-
6/16/2019 22:00	5.3	187.9	-	-	0.0	0.0	-
6/16/2019 23:00	3.1	179.4	-	-	0.0	0.0	-
6/17/2019 0:00	2.5	176.5	-	-	0.0	0.0	-
6/17/2019 1:00	3.3	164.2	-	-	0.0	0.0	-
6/17/2019 2:00	2.7	145.9	-	-	0.2	0.0	-
6/17/2019 3:00	3.3	160.4	-	-	3.6	0.0	-
6/17/2019 4:00	3.8	182.6	-	-	11.2	0.0	-
6/17/2019 5:00	4.0	195.3	-	-	26.2	0.0	-
6/17/2019 6:00	3.0	201.7	-	-	57.8	0.0	-
6/17/2019 7:00	3.7	184.2	-	-	105.1	0.0	-
6/17/2019 8:00	5.6	177.9	-	-	200.4	0.0	-
6/17/2019 9:00	4.5	187.5	-	-	365.3	0.0	-
6/17/2019 10:00	4.0	222.9	-	-	246.0	0.0	-
6/17/2019 11:00	3.6	218.3	-	-	352.8	0.0	-
6/17/2019 12:00	3.9	205.7	-	-	284.4	0.0	-
6/17/2019 13:00	5.6	190.2	-	-	282.3	0.0	-
6/17/2019 14:00	6.7	182.6	-	-	127.8	0.0	-
6/17/2019 15:00	7.0	179.5	-	-	102.5	0.0	-
6/17/2019 16:00	7.3	181.1	-	-	163.9	0.0	-
6/17/2019 17:00	5.8	187.7	-	-	139.2	0.0	-
6/17/2019 18:00	5.9	186.0	-	-	74.6	0.0	-
6/17/2019 19:00	4.6	193.6	-	-	46.9	0.0	-
6/17/2019 20:00	6.3	175.2	-	-	6.1	0.0	-
6/17/2019 21:00	7.4	171.0	-	-	0.0	0.0	-
6/17/2019 22:00	7.5	179.3	-	-	0.0	0.0	-
6/17/2019 23:00	7.1	194.1	-	-	0.0	0.0	-
6/18/2019 0:00	6.4	209.2	-	-	0.0	0.0	-
6/18/2019 1:00	8.3	223.0	-	-	0.0	0.0	-
6/18/2019 2:00	5.8	220.3	-	-	0.5	0.0	-



**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
6/18/2019 3:00	6.3	222.0	-	-	6.8	0.0	-
6/18/2019 4:00	4.5	212.8	-	-	20.2	0.0	-
6/18/2019 5:00	5.1	217.1	-	-	68.8	0.0	-
6/18/2019 6:00	4.0	221.5	-	-	62.7	0.0	-
6/18/2019 7:00	3.5	216.1	-	-	83.1	0.0	-
6/18/2019 8:00	4.8	218.3	-	-	170.6	0.0	-
6/18/2019 9:00	3.9	212.9	-	-	307.1	0.0	-
6/18/2019 10:00	4.5	228.2	-	-	187.0	0.0	-
6/18/2019 11:00	6.5	226.1	-	-	201.1	0.0	-
6/18/2019 12:00	5.0	226.5	-	-	587.8	0.0	-
6/18/2019 13:00	5.8	225.3	-	-	374.5	0.0	-
6/18/2019 14:00	6.0	226.3	-	-	161.8	0.0	-
6/18/2019 15:00	5.4	224.6	-	-	139.6	0.0	-
6/18/2019 16:00	5.8	238.7	-	-	131.6	0.0	-
6/18/2019 17:00	6.3	234.5	-	-	86.2	0.0	-
6/18/2019 18:00	5.2	229.0	-	-	25.1	0.0	-
6/18/2019 19:00	4.7	226.6	-	-	7.4	0.0	-
6/18/2019 20:00	3.9	220.0	-	-	2.4	0.0	-
6/18/2019 21:00	3.2	198.7	-	-	0.0	0.0	-
6/18/2019 22:00	3.2	204.0	-	-	0.0	0.0	-
6/18/2019 23:00	2.9	202.8	-	-	0.0	0.0	-
6/19/2019 0:00	3.3	209.6	-	-	0.0	0.0	-
6/19/2019 1:00	3.7	228.6	-	-	0.0	0.0	-
6/19/2019 2:00	3.9	219.3	-	-	0.2	0.0	-
6/19/2019 3:00	2.7	205.2	-	-	8.7	0.0	-
6/19/2019 4:00	3.6	209.7	-	-	36.9	0.0	-
6/19/2019 5:00	3.2	218.4	-	-	126.3	0.0	-
6/19/2019 6:00	2.3	223.4	-	-	136.0	0.0	-
6/19/2019 7:00	2.8	204.7	-	-	191.3	0.0	-
6/19/2019 8:00	3.2	226.5	-	-	432.6	0.0	-
6/19/2019 9:00	3.2	232.8	-	-	445.6	0.0	-
6/19/2019 10:00	4.0	227.1	-	-	525.8	0.0	-
6/19/2019 11:00	3.6	236.0	-	-	410.5	0.0	-
6/19/2019 12:00	3.9	235.4	-	-	314.8	0.0	919.0
6/19/2019 13:00	4.1	223.2	-	-	295.0	0.0	237.6
6/19/2019 14:00	4.4	212.8	-	-	508.1	0.0	237.5
6/19/2019 15:00	4.3	242.2	-	-	179.6	0.0	237.5
6/19/2019 16:00	3.3	205.5	-	-	376.3	0.0	237.3
6/19/2019 17:00	3.9	225.3	-	-	186.9	0.0	237.3
6/19/2019 18:00	3.3	230.2	-	-	140.4	0.0	237.2
6/19/2019 19:00	2.6	210.0	-	-	51.7	0.0	237.4
6/19/2019 20:00	2.3	182.2	-	-	5.6	0.0	237.4
6/19/2019 21:00	2.2	195.8	-	-	0.1	0.0	237.5
6/19/2019 22:00	2.0	197.3	-	-	0.0	0.0	237.5
6/19/2019 23:00	2.5	183.4	-	-	0.0	0.0	237.5
6/20/2019 0:00	2.1	195.7	-	-	0.0	0.0	237.5
6/20/2019 1:00	1.3	179.9	-	-	0.0	0.0	237.5
6/20/2019 2:00	2.0	28.6	-	-	1.1	0.0	237.5
6/20/2019 3:00	2.4	30.4	-	-	12.5	0.0	237.5
6/20/2019 4:00	3.9	11.9	-	-	69.7	0.0	237.7
6/20/2019 5:00	5.1	16.3	-	-	166.0	0.0	237.7
6/20/2019 6:00	4.0	11.0	-	-	358.4	0.0	237.8
6/20/2019 7:00	4.4	25.4	-	-	540.8	0.0	237.8
6/20/2019 8:00	5.6	28.2	-	-	663.9	0.0	237.8
6/20/2019 9:00	3.8	344.5	-	-	812.0	0.0	237.7

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
6/20/2019 10:00	-	-	-	-	-	-	-
6/20/2019 11:00	2.9	359.1	10.1	61.8	423.4	0.0	237.4
6/20/2019 12:00	3.6	15.9	11.1	57.1	586.2	0.0	237.3
6/20/2019 13:00	2.6	61.5	11.5	52.4	511.4	0.0	237.3
6/20/2019 14:00	3.9	54.3	11.8	48.1	480.5	0.0	237.2
6/20/2019 15:00	3.0	44.2	12.0	48.1	289.7	0.0	237.2
6/20/2019 16:00	2.6	330.7	11.7	55.0	211.0	0.0	237.2
6/20/2019 17:00	2.9	2.4	12.1	50.2	180.1	0.0	237.0
6/20/2019 18:00	3.5	341.0	11.7	54.5	116.0	0.0	237.1
6/20/2019 19:00	2.7	354.4	10.8	56.2	32.1	0.0	237.2
6/20/2019 20:00	3.1	339.7	10.7	53.0	6.6	0.0	237.2
6/20/2019 21:00	2.5	5.1	10.3	55.8	0.2	0.0	237.2
6/20/2019 22:00	1.7	47.5	9.8	59.4	0.0	0.0	237.2
6/20/2019 23:00	1.3	51.0	9.7	60.0	0.0	0.0	237.2
6/21/2019 0:00	1.2	65.3	9.8	58.8	0.0	0.0	237.2
6/21/2019 1:00	1.3	68.4	9.5	59.6	0.0	0.0	237.2
6/21/2019 2:00	1.2	84.4	9.3	58.6	1.9	0.0	237.2
6/21/2019 3:00	1.5	79.6	9.0	59.7	25.1	0.0	237.3
6/21/2019 4:00	1.8	71.0	9.5	60.2	95.6	0.0	237.3
6/21/2019 5:00	0.8	76.2	10.5	57.4	238.8	0.0	237.4
6/21/2019 6:00	1.2	76.7	11.1	57.6	372.5	0.0	237.5
6/21/2019 7:00	1.3	228.6	11.0	57.4	527.0	0.0	237.5
6/21/2019 8:00	1.6	258.6	12.0	52.3	709.4	0.0	237.5
6/21/2019 9:00	2.2	240.3	12.5	50.3	805.0	0.0	237.4
6/21/2019 10:00	3.0	258.1	13.0	48.8	755.6	0.0	237.4
6/21/2019 11:00	2.4	221.0	13.6	44.4	795.8	0.0	237.2
6/21/2019 12:00	3.4	234.8	14.4	41.3	941.0	0.0	237.2
6/21/2019 13:00	4.3	243.3	14.9	39.8	838.0	0.0	237.1
6/21/2019 14:00	4.2	255.1	14.6	42.7	431.1	0.0	237.0
6/21/2019 15:00	6.6	256.1	14.4	44.4	240.8	0.0	237.1
6/21/2019 16:00	7.6	242.2	14.2	47.2	326.2	0.0	237.0
6/21/2019 17:00	7.4	239.2	13.1	53.9	101.2	0.0	237.1
6/21/2019 18:00	5.7	229.4	12.2	60.1	42.1	0.0	237.1
6/21/2019 19:00	3.2	220.3	11.4	65.4	10.0	0.0	237.1
6/21/2019 20:00	2.6	198.0	10.7	70.2	3.0	0.0	237.1
6/21/2019 21:00	3.0	203.4	10.4	71.3	0.0	0.0	237.1
6/21/2019 22:00	3.0	199.8	10.0	71.9	0.0	0.0	237.1
6/21/2019 23:00	3.6	200.7	9.5	74.0	0.0	0.0	237.1
6/22/2019 0:00	3.1	201.5	9.1	77.3	0.0	0.0	237.1
6/22/2019 1:00	3.8	210.8	8.6	83.5	0.0	0.0	237.2
6/22/2019 2:00	3.9	197.9	7.3	98.2	0.2	0.0	237.8
6/22/2019 3:00	4.2	214.4	7.3	99.6	1.6	0.0	238.3
6/22/2019 4:00	5.9	221.6	7.0	99.8	6.2	0.0	239.3
6/22/2019 5:00	6.2	220.6	6.8	100.0	37.0	0.0	239.6
6/22/2019 6:00	6.0	230.8	6.6	100.0	43.1	0.0	239.9
6/22/2019 7:00	6.0	226.4	6.1	100.0	64.3	0.0	240.5
6/22/2019 8:00	5.6	231.7	6.1	100.0	84.9	0.0	241.2
6/22/2019 9:00	5.2	232.2	6.2	100.0	100.6	0.0	242.0
6/22/2019 10:00	5.3	235.5	6.3	100.0	149.5	0.0	242.8
6/22/2019 11:00	5.6	229.4	6.2	100.0	171.3	0.0	243.2
6/22/2019 12:00	8.1	238.9	6.0	100.0	167.8	0.0	243.4
6/22/2019 13:00	8.6	230.8	5.1	100.0	121.8	0.0	243.7
6/22/2019 14:00	7.3	236.1	5.1	100.0	115.2	0.0	243.8
6/22/2019 15:00	6.5	239.4	5.4	98.7	153.2	0.0	243.8
6/22/2019 16:00	5.3	226.1	5.3	98.9	66.7	0.0	243.8

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
6/22/2019 17:00	4.7	218.2	4.9	99.9	22.2	0.0	244.3
6/22/2019 18:00	4.0	218.3	4.7	100.0	13.3	0.0	244.5
6/22/2019 19:00	4.5	217.4	4.7	100.0	5.8	0.0	244.7
6/22/2019 20:00	3.9	208.9	4.6	100.0	1.1	0.0	244.7
6/22/2019 21:00	3.3	212.0	4.5	100.0	0.0	0.0	244.7
6/22/2019 22:00	3.7	211.5	4.4	100.0	0.0	0.0	244.7
6/22/2019 23:00	2.6	215.2	4.4	100.0	0.0	0.0	244.7
6/23/2019 0:00	3.0	207.1	4.3	100.0	0.0	0.0	244.7
6/23/2019 1:00	2.6	208.1	4.3	100.0	0.0	0.0	244.7
6/23/2019 2:00	2.1	186.9	4.3	100.0	0.4	0.0	244.8
6/23/2019 3:00	2.3	183.6	4.3	99.6	4.4	0.0	244.8
6/23/2019 4:00	3.1	158.0	4.5	97.8	26.2	0.0	244.8
6/23/2019 5:00	3.7	165.7	4.5	96.9	67.1	0.0	245.5
6/23/2019 6:00	2.7	163.9	4.9	95.3	98.5	0.0	245.6
6/23/2019 7:00	1.2	21.4	5.3	97.0	125.9	0.0	245.6
6/23/2019 8:00	1.1	305.8	5.6	96.4	146.5	0.0	245.6
6/23/2019 9:00	1.1	252.0	5.7	97.5	159.4	0.0	245.9
6/23/2019 10:00	2.0	202.8	6.2	96.8	230.7	0.0	246.0
6/23/2019 11:00	4.0	201.6	6.0	98.8	401.5	0.0	246.1
6/23/2019 12:00	4.1	221.8	6.8	93.1	594.7	0.0	246.0
6/23/2019 13:00	4.5	231.2	7.5	89.7	598.2	0.0	246.0
6/23/2019 14:00	4.2	236.3	6.9	91.4	237.2	0.0	246.2
6/23/2019 15:00	3.7	223.1	7.3	86.5	348.8	0.0	246.2
6/23/2019 16:00	3.8	234.6	7.8	84.7	293.6	0.0	246.2
6/23/2019 17:00	2.6	252.0	7.5	87.0	114.8	0.0	246.2
6/23/2019 18:00	2.0	214.2	7.4	83.8	58.0	0.0	246.2
6/23/2019 19:00	2.3	213.3	7.0	85.2	23.2	0.0	246.2
6/23/2019 20:00	2.7	195.7	6.7	83.9	5.5	0.0	246.2
6/23/2019 21:00	2.2	184.8	6.4	84.2	0.1	0.0	246.2
6/23/2019 22:00	1.5	202.6	6.3	85.7	0.0	0.0	246.2
6/23/2019 23:00	2.0	198.8	5.8	89.6	0.0	0.0	246.3
6/24/2019 0:00	2.2	189.4	5.6	91.4	0.0	0.0	246.3
6/24/2019 1:00	1.5	188.2	5.5	92.7	0.0	0.0	246.3
6/24/2019 2:00	1.6	183.0	5.6	92.1	0.8	0.0	246.3
6/24/2019 3:00	1.4	204.1	5.5	92.5	7.5	0.0	246.3
6/24/2019 4:00	0.9	244.7	5.3	94.3	23.3	0.0	246.3
6/24/2019 5:00	0.7	257.6	5.5	94.3	121.9	0.0	246.3
6/24/2019 6:00	0.5	219.6	5.7	93.9	119.7	0.0	246.3
6/24/2019 7:00	1.0	265.7	6.0	94.3	158.9	0.0	246.3
6/24/2019 8:00	1.1	228.3	6.2	93.0	243.2	0.0	246.2
6/24/2019 9:00	1.6	224.4	6.4	90.5	279.4	0.0	246.2
6/24/2019 10:00	1.9	219.3	6.8	86.7	279.1	0.0	246.2
6/24/2019 11:00	2.1	221.6	7.0	87.9	247.1	0.0	246.3
6/24/2019 12:00	2.8	222.1	7.4	89.6	394.2	0.0	246.3
6/24/2019 13:00	2.8	227.9	7.7	90.4	492.5	0.0	246.6
6/24/2019 14:00	2.5	221.2	8.7	85.8	412.6	0.0	246.6
6/24/2019 15:00	2.8	226.3	9.0	83.4	348.8	0.0	246.5
6/24/2019 16:00	3.0	227.5	8.9	84.5	234.9	0.0	246.5
6/24/2019 17:00	2.6	216.9	8.5	87.3	139.3	0.0	246.6
6/24/2019 18:00	1.9	223.9	8.3	90.5	95.8	0.0	246.6
6/24/2019 19:00	1.4	223.8	8.2	90.2	29.6	0.0	246.6
6/24/2019 20:00	1.0	232.8	8.2	89.7	5.0	0.0	246.6
6/24/2019 21:00	1.0	219.9	8.1	90.3	0.0	0.0	246.6
6/24/2019 22:00	0.6	275.6	8.0	90.3	0.0	0.0	246.7
6/24/2019 23:00	1.6	35.6	7.8	90.8	0.0	0.0	246.7

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
6/25/2019 0:00	2.4	29.1	7.6	92.9	0.0	0.0	246.7
6/25/2019 1:00	2.4	10.5	7.2	96.3	0.0	0.0	246.7
6/25/2019 2:00	2.3	29.2	7.0	97.9	0.6	0.0	246.8
6/25/2019 3:00	2.5	28.9	7.2	96.6	20.2	0.0	246.8
6/25/2019 4:00	2.6	13.6	7.0	98.0	35.9	0.0	246.8
6/25/2019 5:00	2.5	28.8	7.3	97.2	78.0	0.0	246.8
6/25/2019 6:00	3.4	17.8	7.5	95.1	141.1	0.0	246.8
6/25/2019 7:00	1.3	346.0	8.1	95.9	188.2	0.0	246.7
6/25/2019 8:00	1.0	245.3	8.6	96.5	311.9	0.0	247.0
6/25/2019 9:00	1.4	354.3	11.4	86.5	734.0	0.0	247.0
6/25/2019 10:00	1.8	268.1	12.2	83.9	762.5	0.0	246.9
6/25/2019 11:00	2.1	288.5	13.7	76.8	871.0	0.0	246.8
6/25/2019 12:00	2.6	310.4	14.5	72.4	870.0	0.0	246.7
6/25/2019 13:00	3.2	300.5	15.5	63.6	833.0	0.0	246.6
6/25/2019 14:00	3.7	292.6	16.4	56.3	731.0	0.0	246.6
6/25/2019 15:00	3.5	298.6	16.8	53.0	623.3	0.0	246.5
6/25/2019 16:00	3.3	299.8	16.7	54.1	440.9	0.0	246.4
6/25/2019 17:00	4.0	306.7	16.3	59.6	190.4	0.0	246.4
6/25/2019 18:00	3.9	322.4	15.8	62.4	152.0	0.0	246.4
6/25/2019 19:00	2.5	355.3	15.1	63.8	74.0	0.0	246.5
6/25/2019 20:00	1.1	37.2	14.1	66.5	16.6	0.0	246.6
6/25/2019 21:00	1.7	49.0	13.5	68.2	0.2	0.0	246.6
6/25/2019 22:00	0.9	93.4	13.2	69.2	0.0	0.0	246.6
6/25/2019 23:00	1.2	225.3	13.1	72.3	0.0	0.0	246.6
6/26/2019 0:00	0.8	255.3	12.9	72.9	0.0	0.0	246.6
6/26/2019 1:00	1.5	24.5	12.3	73.9	0.0	0.0	246.6
6/26/2019 2:00	3.2	26.3	12.0	74.8	1.2	0.0	246.6
6/26/2019 3:00	3.0	11.0	12.0	74.7	29.5	0.0	246.6
6/26/2019 4:00	1.6	48.0	11.9	77.0	110.2	0.0	246.7
6/26/2019 5:00	1.9	353.3	12.6	73.3	228.9	0.0	246.8
6/26/2019 6:00	1.5	33.4	13.8	71.3	359.7	0.0	246.8
6/26/2019 7:00	1.3	297.3	14.9	66.9	518.6	0.0	246.8
6/26/2019 8:00	1.7	283.5	15.4	65.3	645.1	0.0	246.8
6/26/2019 9:00	2.4	324.7	16.7	61.8	755.0	0.0	246.8
6/26/2019 10:00	1.7	282.1	17.7	60.2	817.0	0.0	246.7
6/26/2019 11:00	2.0	271.9	18.2	56.0	886.0	0.0	246.6
6/26/2019 12:00	2.9	292.8	19.3	48.8	920.0	0.0	246.5
6/26/2019 13:00	3.2	294.2	20.1	42.9	805.0	0.0	246.5
6/26/2019 14:00	3.5	314.4	20.6	41.0	742.6	0.0	246.5
6/26/2019 15:00	3.6	359.1	20.6	36.7	608.3	0.0	246.4
6/26/2019 16:00	3.6	359.3	20.2	38.3	469.3	0.0	246.2
6/26/2019 17:00	3.2	350.3	20.0	39.0	188.5	0.0	246.2
6/26/2019 18:00	3.7	341.7	19.2	45.6	133.9	0.0	246.2
6/26/2019 19:00	3.6	4.5	18.0	49.7	37.2	0.0	246.4
6/26/2019 20:00	2.5	50.7	17.3	49.8	4.5	0.0	246.4
6/26/2019 21:00	3.8	62.2	16.2	51.7	0.1	0.0	246.4
6/26/2019 22:00	3.7	45.0	15.9	50.8	0.0	0.0	246.4
6/26/2019 23:00	3.4	39.3	15.8	49.8	0.0	0.0	246.5
6/27/2019 0:00	1.8	39.2	15.3	51.9	0.0	0.0	246.5
6/27/2019 1:00	3.9	27.3	15.1	52.8	0.0	0.0	246.5
6/27/2019 2:00	2.8	60.6	14.2	56.7	0.6	0.0	246.5
6/27/2019 3:00	1.0	253.6	13.9	59.2	11.3	0.0	246.5
6/27/2019 4:00	1.0	248.1	13.9	59.1	54.3	0.0	246.5
6/27/2019 5:00	0.9	346.7	14.3	59.3	125.1	0.0	246.5
6/27/2019 6:00	0.8	242.4	14.6	61.0	248.3	0.0	246.6

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
6/27/2019 7:00	2.1	319.0	15.3	61.4	432.5	0.0	246.7
6/27/2019 8:00	5.0	12.6	16.4	56.6	605.7	0.0	246.8
6/27/2019 9:00	3.5	5.7	17.4	55.3	674.7	0.0	246.7
6/27/2019 10:00	4.5	47.6	17.9	51.3	840.0	0.0	246.6
6/27/2019 11:00	3.1	93.8	18.3	51.6	769.7	0.0	246.5
6/27/2019 12:00	3.3	354.8	18.8	50.3	917.0	0.0	246.5
6/27/2019 13:00	4.4	337.5	19.2	49.7	837.0	0.0	246.5
6/27/2019 14:00	7.2	27.8	18.4	49.4	587.5	0.0	246.3
6/27/2019 15:00	11.1	83.9	16.3	56.6	53.5	0.0	246.4
6/27/2019 16:00	4.2	271.8	15.0	60.9	13.0	0.0	246.6
6/27/2019 17:00	2.6	221.2	14.1	61.0	28.3	0.0	246.6
6/27/2019 18:00	5.0	26.9	14.5	59.1	39.7	0.0	246.6
6/27/2019 19:00	6.2	53.5	14.9	56.2	27.3	0.0	246.6
6/27/2019 20:00	4.9	52.0	14.5	59.2	7.7	0.0	246.6
6/27/2019 21:00	6.5	57.6	14.4	61.2	0.1	0.0	246.6
6/27/2019 22:00	6.1	69.0	14.3	62.7	0.0	0.0	246.6
6/27/2019 23:00	5.2	46.6	13.3	68.0	0.0	0.0	246.6
6/28/2019 0:00	4.6	46.9	12.7	70.9	0.0	0.0	246.6
6/28/2019 1:00	2.7	47.7	12.4	71.4	0.0	0.0	246.6
6/28/2019 2:00	1.3	326.9	12.1	73.9	1.0	0.0	246.6
6/28/2019 3:00	1.7	49.8	12.2	71.4	22.4	0.0	246.6
6/28/2019 4:00	0.9	324.0	12.4	72.4	104.9	0.0	246.7
6/28/2019 5:00	1.3	66.3	13.2	70.4	225.6	0.0	246.8
6/28/2019 6:00	1.2	183.0	13.6	69.5	353.9	0.0	246.8
6/28/2019 7:00	1.4	217.3	13.8	69.2	508.5	0.0	246.9
6/28/2019 8:00	2.4	356.7	15.1	68.0	638.0	0.0	246.9
6/28/2019 9:00	1.7	239.7	15.0	71.0	731.3	0.0	246.8
6/28/2019 10:00	2.0	290.7	16.0	67.9	848.0	0.0	246.9
6/28/2019 11:00	2.9	298.5	17.1	62.0	924.0	0.0	246.7
6/28/2019 12:00	3.4	289.9	17.8	54.9	961.0	0.0	246.6
6/28/2019 13:00	2.9	306.4	18.2	51.5	825.0	0.0	246.6
6/28/2019 14:00	3.8	307.8	18.8	49.2	738.2	0.0	246.5
6/28/2019 15:00	4.0	303.7	18.8	49.6	583.4	0.0	246.5
6/28/2019 16:00	2.7	292.0	18.9	48.7	453.6	0.0	246.3
6/28/2019 17:00	3.2	301.2	19.0	49.8	223.9	0.0	246.3
6/28/2019 18:00	3.6	310.4	18.4	51.2	191.6	0.0	246.4
6/28/2019 19:00	3.1	356.2	17.1	53.2	53.1	0.0	246.5
6/28/2019 20:00	1.8	64.5	16.5	54.8	7.4	0.0	246.5
6/28/2019 21:00	1.2	230.4	16.0	56.3	0.1	0.0	246.6
6/28/2019 22:00	0.9	182.5	15.5	57.1	0.0	0.0	246.6
6/28/2019 23:00	1.8	183.2	15.2	59.2	0.0	0.0	246.6
6/29/2019 0:00	2.4	190.5	14.7	61.5	0.0	0.0	246.6
6/29/2019 1:00	1.9	203.8	14.2	65.0	0.0	0.0	246.6
6/29/2019 2:00	1.1	195.2	13.8	68.2	1.1	0.0	246.6
6/29/2019 3:00	0.8	152.9	13.7	69.1	17.2	0.0	246.6
6/29/2019 4:00	0.9	121.7	13.4	69.8	38.3	0.0	246.6
6/29/2019 5:00	0.8	51.0	13.5	70.4	56.1	0.0	246.6
6/29/2019 6:00	1.8	32.9	13.5	72.4	124.6	0.0	246.6
6/29/2019 7:00	1.5	244.9	13.4	73.5	162.4	0.0	246.6
6/29/2019 8:00	1.1	43.7	13.8	74.7	212.8	0.0	246.6
6/29/2019 9:00	1.4	310.6	14.8	71.8	447.8	0.0	246.6
6/29/2019 10:00	1.9	238.1	14.5	79.5	612.3	0.0	246.8
6/29/2019 11:00	2.1	241.3	15.6	75.2	869.0	0.0	246.7
6/29/2019 12:00	2.8	236.6	16.5	68.1	912.0	0.0	246.6
6/29/2019 13:00	3.0	238.5	17.8	61.7	793.0	0.0	246.5

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
6/29/2019 14:00	3.5	261.7	18.5	59.9	709.4	0.0	246.5
6/29/2019 15:00	2.9	306.0	18.8	60.1	581.3	0.0	246.5
6/29/2019 16:00	3.3	266.2	18.8	61.1	436.2	0.0	246.3
6/29/2019 17:00	4.7	241.2	17.7	68.3	194.1	0.0	246.4
6/29/2019 18:00	3.8	202.2	16.5	74.7	116.7	0.0	246.5
6/29/2019 19:00	4.3	192.5	15.0	82.1	20.2	0.0	246.5
6/29/2019 20:00	4.1	214.6	13.9	87.6	3.4	0.0	246.5
6/29/2019 21:00	2.7	193.8	13.3	89.8	0.0	0.0	246.5
6/29/2019 22:00	2.8	209.8	13.0	91.0	0.0	0.0	246.6
6/29/2019 23:00	2.0	201.7	12.5	93.1	0.0	0.0	246.6
6/30/2019 0:00	2.5	205.9	12.1	94.6	0.0	0.0	246.6
6/30/2019 1:00	1.5	212.0	11.9	95.7	0.0	0.0	246.6
6/30/2019 2:00	1.7	218.3	11.7	96.3	0.9	0.0	246.6
6/30/2019 3:00	1.7	222.7	11.2	98.3	20.4	0.0	246.7
6/30/2019 4:00	1.9	211.5	11.0	99.3	77.5	0.0	246.7
6/30/2019 5:00	1.6	240.2	11.5	98.2	203.9	0.0	246.8
6/30/2019 6:00	1.5	229.4	11.9	95.5	320.5	0.0	246.8
6/30/2019 7:00	1.8	226.1	12.4	94.3	479.1	0.0	246.9
6/30/2019 8:00	1.5	266.8	14.2	87.1	611.7	0.0	246.7
6/30/2019 9:00	2.3	225.3	13.7	90.9	367.6	0.0	246.6
6/30/2019 10:00	2.4	233.9	14.6	86.6	599.6	0.0	246.8
6/30/2019 11:00	3.5	231.8	15.6	82.8	785.6	0.0	246.7
6/30/2019 12:00	3.9	238.4	16.3	79.7	803.0	0.0	246.6
6/30/2019 13:00	4.3	234.2	16.9	77.5	696.1	0.0	246.5
6/30/2019 14:00	4.3	240.6	17.2	76.6	571.7	0.0	246.5
6/30/2019 15:00	4.5	239.2	16.9	77.4	442.2	0.0	246.5
6/30/2019 16:00	4.8	222.7	16.1	80.1	319.5	0.0	246.4
6/30/2019 17:00	5.6	217.3	14.8	84.2	166.7	0.0	246.5
6/30/2019 18:00	5.3	209.0	13.8	87.5	93.4	0.0	246.5
6/30/2019 19:00	4.7	198.1	13.0	90.5	39.4	0.0	246.6
6/30/2019 20:00	4.1	196.4	12.5	92.8	5.0	0.0	246.6
6/30/2019 21:00	3.5	192.9	12.2	93.7	0.0	0.0	246.6
6/30/2019 22:00	2.2	184.1	12.1	93.6	0.0	0.0	246.6
6/30/2019 23:00	3.1	212.5	11.6	95.8	0.0	0.0	246.6
7/1/2019 0:00	3.3	209.6	11.4	97.4	0.0	0.0	246.6
7/1/2019 1:00	2.8	209.0	11.2	97.0	0.0	0.0	246.6
7/1/2019 2:00	2.6	210.9	11.2	96.3	0.8	0.0	246.6
7/1/2019 3:00	1.4	221.5	11.2	96.5	7.5	0.0	246.7
7/1/2019 4:00	1.1	240.2	11.0	97.3	26.8	0.0	246.7
7/1/2019 5:00	0.9	185.1	11.2	95.1	48.7	0.0	246.7
7/1/2019 6:00	1.0	152.4	11.3	94.9	117.8	0.0	246.7
7/1/2019 7:00	0.9	347.6	12.0	93.3	242.1	0.0	246.8
7/1/2019 8:00	1.0	259.4	12.6	93.3	388.2	0.0	246.8
7/1/2019 9:00	1.7	255.2	12.9	92.5	545.8	0.0	246.7
7/1/2019 10:00	1.6	229.3	13.9	90.1	603.0	0.0	246.6
7/1/2019 11:00	1.7	234.8	15.7	83.2	709.9	0.0	246.7
7/1/2019 12:00	2.2	226.2	16.3	79.4	735.3	0.0	246.6
7/1/2019 13:00	1.9	243.1	17.8	74.3	673.3	0.0	246.5
7/1/2019 14:00	2.0	247.7	18.1	72.8	510.0	0.0	246.4
7/1/2019 15:00	3.0	227.8	17.9	72.9	392.6	0.0	246.4
7/1/2019 16:00	3.2	223.2	18.1	73.9	350.0	0.0	246.4
7/1/2019 17:00	3.2	231.2	17.7	74.4	181.9	0.0	246.4
7/1/2019 18:00	2.9	212.3	17.1	76.8	101.6	0.0	246.4
7/1/2019 19:00	2.7	211.8	16.3	80.5	33.7	0.0	246.5
7/1/2019 20:00	1.3	185.1	16.0	82.4	3.7	0.0	246.5

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
7/1/2019 21:00	2.6	200.0	15.3	85.5	0.0	0.0	246.6
7/1/2019 22:00	1.5	223.2	14.9	86.5	0.0	0.0	246.6
7/1/2019 23:00	1.8	203.6	13.9	91.7	0.0	0.0	246.6
7/2/2019 0:00	1.2	210.3	13.7	92.6	0.0	0.0	246.6
7/2/2019 1:00	0.8	222.0	13.6	92.8	0.0	0.0	246.6
7/2/2019 2:00	1.1	26.0	13.5	92.1	0.4	0.0	246.6
7/2/2019 3:00	0.6	153.3	12.9	95.0	7.3	0.0	246.6
7/2/2019 4:00	0.4	17.5	13.0	94.1	48.3	0.0	246.7
7/2/2019 5:00	1.3	24.9	13.5	93.0	168.6	0.0	246.7
7/2/2019 6:00	0.7	325.2	14.3	92.1	254.2	0.0	246.7
7/2/2019 7:00	1.0	257.4	14.4	92.6	389.3	0.0	246.8
7/2/2019 8:00	1.3	224.2	14.7	90.1	541.7	0.0	246.8
7/2/2019 9:00	1.9	220.5	15.0	88.3	654.6	0.0	246.8
7/2/2019 10:00	2.5	226.1	15.5	87.0	741.7	0.0	246.7
7/2/2019 11:00	3.1	230.6	16.4	82.2	789.0	0.0	246.6
7/2/2019 12:00	3.9	228.3	17.0	78.3	820.0	0.0	246.6
7/2/2019 13:00	4.4	237.8	17.8	75.5	725.5	0.0	246.5
7/2/2019 14:00	4.3	235.9	18.3	73.3	632.3	0.0	246.4
7/2/2019 15:00	4.8	222.3	17.8	74.6	508.4	0.0	246.4
7/2/2019 16:00	5.7	209.1	17.0	78.2	375.3	0.0	246.4
7/2/2019 17:00	6.1	207.4	15.9	83.1	220.0	0.0	246.5
7/2/2019 18:00	5.9	206.2	14.3	89.4	89.0	0.0	246.5
7/2/2019 19:00	5.8	210.8	13.1	94.0	26.2	0.0	246.5
7/2/2019 20:00	5.1	202.8	12.5	96.6	1.0	0.0	246.6
7/2/2019 21:00	4.2	203.4	12.1	98.4	0.0	0.0	246.6
7/2/2019 22:00	3.5	211.7	11.9	98.9	0.0	0.0	246.6
7/2/2019 23:00	2.8	222.7	11.7	99.3	0.0	0.0	246.6
7/3/2019 0:00	2.1	218.1	11.8	97.4	0.0	0.0	246.6
7/3/2019 1:00	1.3	166.8	11.9	95.1	0.0	0.0	246.6
7/3/2019 2:00	1.4	174.0	11.8	93.3	0.1	0.0	246.6
7/3/2019 3:00	1.6	195.9	11.9	90.8	2.8	0.0	246.6
7/3/2019 4:00	1.6	199.2	11.5	93.5	14.3	0.0	246.6
7/3/2019 5:00	1.1	178.8	11.5	93.8	29.3	0.0	246.6
7/3/2019 6:00	1.2	225.1	11.4	94.4	49.2	0.0	246.7
7/3/2019 7:00	1.4	192.7	11.4	94.8	96.3	0.0	246.7
7/3/2019 8:00	2.0	218.6	11.7	94.6	177.8	0.0	246.7
7/3/2019 9:00	2.0	229.5	11.8	92.5	152.4	0.0	246.6
7/3/2019 10:00	2.3	211.0	12.1	90.7	255.5	0.0	246.7
7/3/2019 11:00	3.2	224.7	12.5	90.3	404.1	0.0	246.7
7/3/2019 12:00	2.9	233.0	13.1	87.8	548.6	0.0	246.7
7/3/2019 13:00	2.1	226.9	14.0	83.5	586.3	0.0	246.6
7/3/2019 14:00	2.4	233.8	14.1	84.8	379.0	0.0	246.6
7/3/2019 15:00	2.9	224.0	13.6	87.9	348.4	0.0	246.6
7/3/2019 16:00	3.1	212.0	13.1	90.6	211.6	0.0	246.5
7/3/2019 17:00	3.0	212.6	12.7	93.2	170.0	0.0	246.6
7/3/2019 18:00	2.8	211.6	12.1	95.7	83.2	0.0	246.6
7/3/2019 19:00	2.6	223.0	12.0	95.8	40.4	0.0	246.6
7/3/2019 20:00	2.5	204.3	11.5	98.0	5.0	0.0	246.6
7/3/2019 21:00	2.3	202.6	11.2	99.5	0.1	0.0	246.6
7/3/2019 22:00	2.0	205.7	11.1	99.6	0.0	0.0	246.6
7/3/2019 23:00	1.4	178.6	11.3	99.3	0.0	0.0	246.6
7/4/2019 0:00	0.7	280.6	11.3	99.4	0.0	0.0	246.6
7/4/2019 1:00	1.0	14.4	11.2	99.4	0.0	0.0	246.7
7/4/2019 2:00	1.4	17.5	10.9	99.7	0.5	0.0	246.7
7/4/2019 3:00	1.1	32.9	10.9	99.8	4.8	0.0	246.7

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
7/4/2019 4:00	2.2	13.7	10.6	99.9	19.9	0.0	246.7
7/4/2019 5:00	1.8	20.8	10.8	100.0	86.0	0.0	246.7
7/4/2019 6:00	1.8	11.6	11.1	99.6	159.0	0.0	246.7
7/4/2019 7:00	2.2	1.3	12.1	95.8	426.4	0.0	247.0
7/4/2019 8:00	1.5	315.5	13.4	91.0	547.3	0.0	246.9
7/4/2019 9:00	2.3	358.5	14.6	82.1	596.7	0.0	246.9
7/4/2019 10:00	3.2	11.4	16.8	64.5	800.0	0.0	246.8
7/4/2019 11:00	3.1	346.6	17.4	64.4	862.0	0.0	246.7
7/4/2019 12:00	4.4	327.6	17.3	62.2	668.6	0.0	246.6
7/4/2019 13:00	4.6	327.3	16.7	60.7	315.9	0.0	246.8
7/4/2019 14:00	3.8	309.1	18.5	54.1	618.6	0.0	246.7
7/4/2019 15:00	4.1	319.7	18.8	47.9	531.6	0.0	246.7
7/4/2019 16:00	4.5	321.6	19.4	43.2	381.6	0.0	246.7
7/4/2019 17:00	3.2	329.7	19.1	43.1	152.0	0.0	246.6
7/4/2019 18:00	3.4	297.1	19.1	43.3	143.2	0.0	246.5
7/4/2019 19:00	4.3	218.3	16.0	74.5	45.7	0.0	246.7
7/4/2019 20:00	4.0	204.7	14.7	83.5	6.9	0.0	246.7
7/4/2019 21:00	2.5	215.4	14.2	85.0	0.3	0.0	246.8
7/4/2019 22:00	1.6	236.9	14.2	84.2	0.0	0.0	246.8
7/4/2019 23:00	1.8	208.1	13.9	85.9	0.0	0.0	246.8
7/5/2019 0:00	0.8	119.4	13.9	84.2	0.0	0.0	246.8
7/5/2019 1:00	1.1	58.5	13.8	78.8	0.0	0.0	246.8
7/5/2019 2:00	0.6	58.6	13.8	75.9	0.9	0.0	246.8
7/5/2019 3:00	0.6	53.5	13.8	69.7	26.5	0.0	246.9
7/5/2019 4:00	1.0	207.1	13.1	81.3	106.3	0.0	246.9
7/5/2019 5:00	1.1	156.4	13.6	76.1	227.1	0.0	246.9
7/5/2019 6:00	1.2	320.2	15.1	66.0	360.2	0.0	247.0
7/5/2019 7:00	3.9	11.1	16.1	53.7	511.5	0.0	247.1
7/5/2019 8:00	4.1	359.1	16.1	51.9	637.1	0.0	247.1
7/5/2019 9:00	3.7	338.4	16.9	49.6	735.9	0.0	247.0
7/5/2019 10:00	3.5	305.4	17.7	47.9	819.0	0.0	247.0
7/5/2019 11:00	4.0	308.7	18.4	46.3	897.0	0.0	246.9
7/5/2019 12:00	4.4	315.0	19.1	42.4	936.0	0.0	246.8
7/5/2019 13:00	4.0	303.3	20.2	37.2	824.0	0.0	247.1
7/5/2019 14:00	4.1	304.1	20.5	34.4	700.4	0.0	246.7
7/5/2019 15:00	3.7	310.5	20.7	33.0	587.0	0.0	246.6
7/5/2019 16:00	3.4	301.9	20.9	32.2	464.5	0.0	246.5
7/5/2019 17:00	2.7	299.7	20.7	32.0	201.1	0.0	246.5
7/5/2019 18:00	2.3	306.2	20.3	34.1	127.1	0.0	246.5
7/5/2019 19:00	1.7	355.8	19.3	36.9	47.3	0.0	246.6
7/5/2019 20:00	1.5	171.7	18.5	39.5	5.5	0.0	246.6
7/5/2019 21:00	2.1	222.2	17.8	42.3	0.0	0.0	246.7
7/5/2019 22:00	1.4	185.0	17.4	43.8	0.0	0.0	246.7
7/5/2019 23:00	2.6	171.6	17.0	43.9	0.0	0.0	246.7
7/6/2019 0:00	2.4	207.1	16.8	44.5	0.0	0.0	246.7
7/6/2019 1:00	2.1	233.8	16.6	45.1	0.0	0.0	246.7
7/6/2019 2:00	1.6	213.0	16.4	45.7	0.5	0.0	246.8
7/6/2019 3:00	0.7	160.6	16.1	47.0	16.2	0.0	246.8
7/6/2019 4:00	0.8	35.7	16.1	46.4	61.3	0.0	246.8
7/6/2019 5:00	2.5	31.5	15.2	51.5	80.0	0.0	246.8
7/6/2019 6:00	2.6	19.7	14.2	60.3	49.0	0.0	246.8
7/6/2019 7:00	2.8	33.5	13.6	69.1	136.7	0.0	246.8
7/6/2019 8:00	1.2	244.7	14.1	68.4	179.4	0.0	246.8
7/6/2019 9:00	1.5	319.5	15.8	66.4	640.6	0.0	247.1
7/6/2019 10:00	1.9	331.6	17.0	63.8	658.3	0.0	247.0



**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
7/6/2019 11:00	2.4	296.1	17.5	59.9	854.0	0.0	246.9
7/6/2019 12:00	2.3	290.9	18.3	56.6	896.0	0.0	246.7
7/6/2019 13:00	2.8	297.2	19.6	51.2	786.3	0.0	247.1
7/6/2019 14:00	3.2	291.6	20.4	48.6	686.7	0.0	246.9
7/6/2019 15:00	3.0	294.3	20.6	49.3	562.4	0.0	246.6
7/6/2019 16:00	2.8	309.7	20.6	49.1	443.7	0.0	246.5
7/6/2019 17:00	2.9	328.9	20.6	48.5	271.6	0.0	246.6
7/6/2019 18:00	2.0	20.5	19.6	50.9	128.9	0.0	246.6
7/6/2019 19:00	2.5	31.2	18.8	53.1	42.0	0.0	246.6
7/6/2019 20:00	2.8	46.5	18.2	54.3	4.6	0.0	246.7
7/6/2019 21:00	2.5	53.2	17.7	56.3	0.0	0.0	246.7
7/6/2019 22:00	1.7	33.9	17.7	54.8	0.0	0.0	246.7
7/6/2019 23:00	2.0	52.9	17.2	57.7	0.0	0.0	246.7
7/7/2019 0:00	2.2	42.0	16.7	60.1	0.0	0.0	246.7
7/7/2019 1:00	2.3	37.9	16.6	60.0	0.0	0.0	246.7
7/7/2019 2:00	3.0	14.2	16.6	59.5	0.4	0.0	246.7
7/7/2019 3:00	3.5	3.2	16.6	59.0	12.0	0.0	246.7
7/7/2019 4:00	2.6	0.9	16.2	60.0	39.5	0.0	246.7
7/7/2019 5:00	0.9	318.8	16.2	61.7	120.5	0.0	246.8
7/7/2019 6:00	2.6	29.3	16.6	61.6	233.8	0.0	246.8
7/7/2019 7:00	1.1	222.0	16.8	62.9	336.6	0.0	246.9
7/7/2019 8:00	1.7	207.0	17.4	62.0	572.3	0.0	247.4
7/7/2019 9:00	1.5	275.4	18.2	63.6	553.4	0.0	247.0
7/7/2019 10:00	1.5	262.8	18.4	66.5	593.4	0.0	247.2
7/7/2019 11:00	1.6	274.9	19.1	63.5	658.6	0.0	247.4
7/7/2019 12:00	1.8	240.7	19.7	57.2	768.0	0.0	247.6
7/7/2019 13:00	2.3	247.1	20.5	51.4	756.9	0.0	248.2
7/7/2019 14:00	2.4	259.5	20.7	53.3	575.4	0.0	247.7
7/7/2019 15:00	2.3	287.8	20.8	52.7	496.4	0.0	247.3
7/7/2019 16:00	2.0	294.6	20.8	53.6	399.9	0.0	247.1
7/7/2019 17:00	1.7	327.4	20.5	56.0	222.6	0.0	246.5
7/7/2019 18:00	1.9	257.7	19.5	60.9	135.9	0.0	246.5
7/7/2019 19:00	2.2	226.0	18.2	68.1	33.1	0.0	246.6
7/7/2019 20:00	1.6	240.4	17.0	76.1	3.6	0.0	246.7
7/7/2019 21:00	2.8	38.8	16.2	75.4	0.0	0.0	246.7
7/7/2019 22:00	4.3	22.0	15.8	73.4	0.0	0.0	246.7
7/7/2019 23:00	2.2	23.3	14.8	81.0	0.0	0.0	246.7
7/8/2019 0:00	1.3	88.2	14.6	80.8	0.0	0.0	246.8
7/8/2019 1:00	2.0	193.7	14.0	85.8	0.0	0.0	246.8
7/8/2019 2:00	2.2	205.1	13.6	93.3	0.1	0.0	246.8
7/8/2019 3:00	1.3	191.2	13.5	94.7	10.0	0.0	246.8
7/8/2019 4:00	2.1	206.4	12.9	94.3	44.1	0.0	246.8
7/8/2019 5:00	2.0	198.3	12.8	91.9	92.1	0.0	246.8
7/8/2019 6:00	2.6	212.3	12.8	89.5	282.2	0.0	246.9
7/8/2019 7:00	2.4	221.6	13.3	90.7	339.4	0.0	246.9
7/8/2019 8:00	2.1	236.2	13.8	90.2	429.4	0.0	246.8
7/8/2019 9:00	2.6	226.3	14.6	83.9	625.0	0.0	247.0
7/8/2019 10:00	3.1	233.5	15.0	85.2	633.7	0.0	246.9
7/8/2019 11:00	3.4	237.6	15.5	82.8	737.0	0.0	246.9
7/8/2019 12:00	4.1	241.5	16.2	78.8	794.4	0.0	246.8
7/8/2019 13:00	4.2	236.7	15.9	79.5	454.4	0.0	246.7
7/8/2019 14:00	5.6	238.1	15.4	80.5	249.6	0.0	246.7
7/8/2019 15:00	4.4	219.3	14.6	83.8	187.7	0.0	246.7
7/8/2019 16:00	4.1	197.2	13.9	87.0	177.6	0.0	246.7
7/8/2019 17:00	4.3	211.3	13.1	92.2	130.4	0.0	246.7

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
7/8/2019 18:00	3.7	215.8	12.4	96.0	90.2	0.0	246.7
7/8/2019 19:00	3.2	220.0	11.8	98.4	22.3	0.0	246.8
7/8/2019 20:00	3.8	214.1	11.5	99.6	0.5	0.0	246.8
7/8/2019 21:00	3.9	217.8	11.3	99.9	0.0	0.0	246.8
7/8/2019 22:00	3.4	229.5	11.2	100.0	0.0	0.0	255.1
7/8/2019 23:00	-	-	-	-	-	-	-
7/9/2019 0:00	-	-	-	-	-	-	-
7/9/2019 1:00	-	-	-	-	-	-	-
7/9/2019 2:00	-	-	-	-	-	-	-
7/9/2019 3:00	-	-	-	-	-	-	-
7/9/2019 4:00	-	-	-	-	-	-	-
7/9/2019 5:00	-	-	-	-	-	-	-
7/9/2019 6:00	-	-	-	-	-	-	-
7/9/2019 7:00	-	-	-	-	-	-	-
7/9/2019 8:00	-	-	-	-	-	-	-
7/9/2019 9:00	-	-	-	-	-	-	-
7/9/2019 10:00	-	-	-	-	-	-	-
7/9/2019 11:00	-	-	-	-	-	-	-
7/9/2019 12:00	-	-	-	-	-	-	-
7/9/2019 13:00	-	-	-	-	-	-	-
7/9/2019 14:00	-	-	-	-	-	-	-
7/9/2019 15:00	-	-	-	-	-	-	-
7/9/2019 16:00	-	-	-	-	-	-	-
7/9/2019 17:00	-	-	-	-	-	-	-
7/9/2019 18:00	-	-	-	-	-	-	-
7/9/2019 19:00	-	-	-	-	-	-	-
7/9/2019 20:00	-	-	-	-	-	-	-
7/9/2019 21:00	-	-	-	-	-	-	-
7/9/2019 22:00	-	-	-	-	-	-	-
7/9/2019 23:00	-	-	-	-	-	-	-
7/10/2019 0:00	-	-	-	-	-	-	-
7/10/2019 1:00	-	-	-	-	-	-	-
7/10/2019 2:00	-	-	-	-	-	-	-
7/10/2019 3:00	-	-	-	-	-	-	-
7/10/2019 4:00	-	-	-	-	-	-	-
7/10/2019 5:00	-	-	-	-	-	-	-
7/10/2019 6:00	-	-	-	-	-	-	-
7/10/2019 7:00	-	-	-	-	-	-	-
7/10/2019 8:00	-	-	-	-	-	-	-
7/10/2019 9:00	-	-	-	-	-	-	-
7/10/2019 10:00	-	-	-	-	-	-	-
7/10/2019 11:00	-	-	-	-	-	-	-
7/10/2019 12:00	-	-	-	-	-	-	-
7/10/2019 13:00	-	-	-	-	-	-	-
7/10/2019 14:00	-	-	-	-	-	-	-
7/10/2019 15:00	-	-	-	-	-	-	-
7/10/2019 16:00	-	-	-	-	-	-	-
7/10/2019 17:00	-	-	-	-	-	-	-
7/10/2019 18:00	-	-	-	-	-	-	-
7/10/2019 19:00	-	-	-	-	-	-	-
7/10/2019 20:00	-	-	-	-	-	-	-
7/10/2019 21:00	-	-	-	-	-	-	-
7/10/2019 22:00	-	-	-	-	-	-	-
7/10/2019 23:00	-	-	-	-	-	-	-
7/11/2019 0:00	-	-	-	-	-	-	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
7/11/2019 1:00	-	-	-	-	-	-	-
7/11/2019 2:00	-	-	-	-	-	-	-
7/11/2019 3:00	-	-	-	-	-	-	-
7/11/2019 4:00	-	-	-	-	-	-	-
7/11/2019 5:00	-	-	-	-	-	-	-
7/11/2019 6:00	-	-	-	-	-	-	-
7/11/2019 7:00	-	-	-	-	-	-	-
7/11/2019 8:00	-	-	-	-	-	-	-
7/11/2019 9:00	-	-	-	-	-	-	-
7/11/2019 10:00	-	-	-	-	-	-	-
7/11/2019 11:00	-	-	-	-	-	-	-
7/11/2019 12:00	-	-	-	-	-	-	-
7/11/2019 13:00	-	-	-	-	-	-	-
7/11/2019 14:00	-	-	-	-	-	-	-
7/11/2019 15:00	-	-	-	-	-	-	-
7/11/2019 16:00	-	-	-	-	-	-	-
7/11/2019 17:00	-	-	-	-	-	-	-
7/11/2019 18:00	-	-	-	-	-	-	-
7/11/2019 19:00	-	-	-	-	-	-	-
7/11/2019 20:00	-	-	-	-	-	-	-
7/11/2019 21:00	-	-	-	-	-	-	-
7/11/2019 22:00	-	-	-	-	-	-	-
7/11/2019 23:00	-	-	-	-	-	-	-
7/12/2019 0:00	-	-	-	-	-	-	-
7/12/2019 1:00	-	-	-	-	-	-	-
7/12/2019 2:00	-	-	-	-	-	-	-
7/12/2019 3:00	-	-	-	-	-	-	-
7/12/2019 4:00	-	-	-	-	-	-	-
7/12/2019 5:00	-	-	-	-	-	-	-
7/12/2019 6:00	-	-	-	-	-	-	-
7/12/2019 7:00	-	-	-	-	-	-	-
7/12/2019 8:00	-	-	-	-	-	-	-
7/12/2019 9:00	-	-	-	-	-	-	-
7/12/2019 10:00	-	-	-	-	-	-	-
7/12/2019 11:00	-	-	-	-	-	-	-
7/12/2019 12:00	-	-	-	-	-	-	-
7/12/2019 13:00	-	-	-	-	-	-	-
7/12/2019 14:00	-	-	-	-	-	-	-
7/12/2019 15:00	-	-	-	-	-	-	-
7/12/2019 16:00	-	-	-	-	-	-	-
7/12/2019 17:00	-	-	-	-	-	-	-
7/12/2019 18:00	-	-	-	-	-	-	-
7/12/2019 19:00	-	-	-	-	-	-	-
7/12/2019 20:00	-	-	-	-	-	-	-
7/12/2019 21:00	-	-	-	-	-	-	-
7/12/2019 22:00	-	-	-	-	-	-	-
7/12/2019 23:00	-	-	-	-	-	-	-
7/13/2019 0:00	-	-	-	-	-	-	-
7/13/2019 1:00	-	-	-	-	-	-	-
7/13/2019 2:00	-	-	-	-	-	-	-
7/13/2019 3:00	-	-	-	-	-	-	-
7/13/2019 4:00	-	-	-	-	-	-	-
7/13/2019 5:00	-	-	-	-	-	-	-
7/13/2019 6:00	-	-	-	-	-	-	-
7/13/2019 7:00	-	-	-	-	-	-	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
7/13/2019 8:00	-	-	-	-	-	-	-
7/13/2019 9:00	-	-	-	-	-	-	-
7/13/2019 10:00	-	-	-	-	-	-	-
7/13/2019 11:00	-	-	-	-	-	-	-
7/13/2019 12:00	-	-	-	-	-	-	-
7/13/2019 13:00	-	-	-	-	-	-	-
7/13/2019 14:00	-	-	-	-	-	-	-
7/13/2019 15:00	-	-	-	-	-	-	-
7/13/2019 16:00	-	-	-	-	-	-	-
7/13/2019 17:00	-	-	-	-	-	-	-
7/13/2019 18:00	-	-	-	-	-	-	-
7/13/2019 19:00	-	-	-	-	-	-	-
7/13/2019 20:00	-	-	-	-	-	-	-
7/13/2019 21:00	-	-	-	-	-	-	-
7/13/2019 22:00	-	-	-	-	-	-	-
7/13/2019 23:00	-	-	-	-	-	-	-
7/14/2019 0:00	-	-	-	-	-	-	-
7/14/2019 1:00	-	-	-	-	-	-	-
7/14/2019 2:00	-	-	-	-	-	-	-
7/14/2019 3:00	-	-	-	-	-	-	-
7/14/2019 4:00	-	-	-	-	-	-	-
7/14/2019 5:00	-	-	-	-	-	-	-
7/14/2019 6:00	-	-	-	-	-	-	-
7/14/2019 7:00	-	-	-	-	-	-	-
7/14/2019 8:00	-	-	-	-	-	-	-
7/14/2019 9:00	-	-	-	-	-	-	-
7/14/2019 10:00	-	-	-	-	-	-	-
7/14/2019 11:00	-	-	-	-	-	-	-
7/14/2019 12:00	-	-	-	-	-	-	-
7/14/2019 13:00	-	-	-	-	-	-	-
7/14/2019 14:00	-	-	-	-	-	-	-
7/14/2019 15:00	-	-	-	-	-	-	-
7/14/2019 16:00	-	-	-	-	-	-	-
7/14/2019 17:00	-	-	-	-	-	-	-
7/14/2019 18:00	-	-	-	-	-	-	-
7/14/2019 19:00	-	-	-	-	-	-	-
7/14/2019 20:00	-	-	-	-	-	-	-
7/14/2019 21:00	-	-	-	-	-	-	-
7/14/2019 22:00	-	-	-	-	-	-	-
7/14/2019 23:00	-	-	-	-	-	-	-
7/15/2019 0:00	-	-	-	-	-	-	-
7/15/2019 1:00	-	-	-	-	-	-	-
7/15/2019 2:00	-	-	-	-	-	-	-
7/15/2019 3:00	-	-	-	-	-	-	-
7/15/2019 4:00	-	-	-	-	-	-	-
7/15/2019 5:00	-	-	-	-	-	-	-
7/15/2019 6:00	-	-	-	-	-	-	-
7/15/2019 7:00	-	-	-	-	-	-	-
7/15/2019 8:00	-	-	-	-	-	-	-
7/15/2019 9:00	-	-	-	-	-	-	-
7/15/2019 10:00	-	-	-	-	-	-	-
7/15/2019 11:00	-	-	-	-	-	-	-
7/15/2019 12:00	-	-	-	-	-	-	-
7/15/2019 13:00	-	-	-	-	-	-	-
7/15/2019 14:00	-	-	-	-	-	-	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
7/15/2019 15:00	-	-	-	-	-	-	-
7/15/2019 16:00	-	-	-	-	-	-	-
7/15/2019 17:00	-	-	-	-	-	-	-
7/15/2019 18:00	-	-	-	-	-	-	-
7/15/2019 19:00	-	-	-	-	-	-	-
7/15/2019 20:00	-	-	-	-	-	-	-
7/15/2019 21:00	-	-	-	-	-	-	-
7/15/2019 22:00	-	-	-	-	-	-	-
7/15/2019 23:00	-	-	-	-	-	-	-
7/16/2019 0:00	-	-	-	-	-	-	-
7/16/2019 1:00	-	-	-	-	-	-	-
7/16/2019 2:00	-	-	-	-	-	-	-
7/16/2019 3:00	-	-	-	-	-	-	-
7/16/2019 4:00	-	-	-	-	-	-	-
7/16/2019 5:00	-	-	-	-	-	-	-
7/16/2019 6:00	-	-	-	-	-	-	-
7/16/2019 7:00	-	-	-	-	-	-	-
7/16/2019 8:00	-	-	-	-	-	-	-
7/16/2019 9:00	-	-	-	-	-	-	-
7/16/2019 10:00	-	-	-	-	-	-	-
7/16/2019 11:00	-	-	-	-	-	-	-
7/16/2019 12:00	-	-	-	-	-	-	-
7/16/2019 13:00	-	-	-	-	-	-	-
7/16/2019 14:00	-	-	-	-	-	-	-
7/16/2019 15:00	-	-	-	-	-	-	-
7/16/2019 16:00	-	-	-	-	-	-	-
7/16/2019 17:00	-	-	-	-	-	-	-
7/16/2019 18:00	-	-	-	-	-	-	-
7/16/2019 19:00	-	-	-	-	-	-	-
7/16/2019 20:00	-	-	-	-	-	-	-
7/16/2019 21:00	-	-	-	-	-	-	-
7/16/2019 22:00	-	-	-	-	-	-	-
7/16/2019 23:00	-	-	-	-	-	-	-
7/17/2019 0:00	-	-	-	-	-	-	-
7/17/2019 1:00	-	-	-	-	-	-	-
7/17/2019 2:00	-	-	-	-	-	-	-
7/17/2019 3:00	-	-	-	-	-	-	-
7/17/2019 4:00	-	-	-	-	-	-	-
7/17/2019 5:00	-	-	-	-	-	-	-
7/17/2019 6:00	-	-	-	-	-	-	-
7/17/2019 7:00	-	-	-	-	-	-	-
7/17/2019 8:00	-	-	-	-	-	-	-
7/17/2019 9:00	-	-	-	-	-	-	-
7/17/2019 10:00	-	-	-	-	-	-	-
7/17/2019 11:00	-	-	-	-	-	-	-
7/17/2019 12:00	-	-	-	-	-	-	-
7/17/2019 13:00	-	-	-	-	-	-	-
7/17/2019 14:00	-	-	-	-	-	-	-
7/17/2019 15:00	-	-	-	-	-	-	-
7/17/2019 16:00	-	-	-	-	-	-	-
7/17/2019 17:00	-	-	-	-	-	-	-
7/17/2019 18:00	-	-	-	-	-	-	-
7/17/2019 19:00	-	-	-	-	-	-	-
7/17/2019 20:00	-	-	-	-	-	-	-
7/17/2019 21:00	-	-	-	-	-	-	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
7/17/2019 22:00	-	-	-	-	-	-	-
7/17/2019 23:00	-	-	-	-	-	-	-
7/18/2019 0:00	-	-	-	-	-	-	-
7/18/2019 1:00	-	-	-	-	-	-	-
7/18/2019 2:00	-	-	-	-	-	-	-
7/18/2019 3:00	-	-	-	-	-	-	-
7/18/2019 4:00	-	-	-	-	-	-	-
7/18/2019 5:00	-	-	-	-	-	-	-
7/18/2019 6:00	-	-	-	-	-	-	-
7/18/2019 7:00	-	-	-	-	-	-	-
7/18/2019 8:00	-	-	-	-	-	-	-
7/18/2019 9:00	-	-	-	-	-	-	-
7/18/2019 10:00	-	-	-	-	-	-	-
7/18/2019 11:00	-	-	-	-	-	-	-
7/18/2019 12:00	-	-	-	-	-	-	-
7/18/2019 13:00	-	-	-	-	-	-	-
7/18/2019 14:00	-	-	-	-	-	-	-
7/18/2019 15:00	-	-	-	-	-	-	-
7/18/2019 16:00	-	-	-	-	-	-	-
7/18/2019 17:00	-	-	-	-	-	-	-
7/18/2019 18:00	-	-	-	-	-	-	-
7/18/2019 19:00	-	-	-	-	-	-	-
7/18/2019 20:00	-	-	-	-	-	-	-
7/18/2019 21:00	-	-	-	-	-	-	-
7/18/2019 22:00	-	-	-	-	-	-	-
7/18/2019 23:00	-	-	-	-	-	-	-
7/19/2019 0:00	-	-	-	-	-	-	-
7/19/2019 1:00	-	-	-	-	-	-	-
7/19/2019 2:00	-	-	-	-	-	-	-
7/19/2019 3:00	-	-	-	-	-	-	-
7/19/2019 4:00	-	-	-	-	-	-	-
7/19/2019 5:00	-	-	-	-	-	-	-
7/19/2019 6:00	-	-	-	-	-	-	-
7/19/2019 7:00	-	-	-	-	-	-	-
7/19/2019 8:00	-	-	-	-	-	-	-
7/19/2019 9:00	-	-	-	-	-	-	-
7/19/2019 10:00	-	-	-	-	-	-	-
7/19/2019 11:00	-	-	-	-	-	-	-
7/19/2019 12:00	-	-	-	-	-	-	-
7/19/2019 13:00	-	-	-	-	-	-	-
7/19/2019 14:00	-	-	-	-	-	-	-
7/19/2019 15:00	-	-	-	-	-	-	-
7/19/2019 16:00	-	-	-	-	-	-	-
7/19/2019 17:00	-	-	-	-	-	-	-
7/19/2019 18:00	-	-	-	-	-	-	-
7/19/2019 19:00	-	-	-	-	-	-	-
7/19/2019 20:00	-	-	-	-	-	-	-
7/19/2019 21:00	-	-	-	-	-	-	-
7/19/2019 22:00	-	-	-	-	-	-	-
7/19/2019 23:00	-	-	-	-	-	-	-
7/20/2019 0:00	-	-	-	-	-	-	-
7/20/2019 1:00	-	-	-	-	-	-	-
7/20/2019 2:00	-	-	-	-	-	-	-
7/20/2019 3:00	-	-	-	-	-	-	-
7/20/2019 4:00	-	-	-	-	-	-	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
7/20/2019 5:00	-	-	-	-	-	-	-
7/20/2019 6:00	-	-	-	-	-	-	-
7/20/2019 7:00	-	-	-	-	-	-	-
7/20/2019 8:00	-	-	-	-	-	-	-
7/20/2019 9:00	-	-	-	-	-	-	-
7/20/2019 10:00	-	-	-	-	-	-	-
7/20/2019 11:00	-	-	-	-	-	-	-
7/20/2019 12:00	-	-	-	-	-	-	-
7/20/2019 13:00	-	-	-	-	-	-	-
7/20/2019 14:00	-	-	-	-	-	-	-
7/20/2019 15:00	-	-	-	-	-	-	-
7/20/2019 16:00	-	-	-	-	-	-	-
7/20/2019 17:00	-	-	-	-	-	-	-
7/20/2019 18:00	-	-	-	-	-	-	-
7/20/2019 19:00	-	-	-	-	-	-	-
7/20/2019 20:00	-	-	-	-	-	-	-
7/20/2019 21:00	-	-	-	-	-	-	-
7/20/2019 22:00	-	-	-	-	-	-	-
7/20/2019 23:00	-	-	-	-	-	-	-
7/21/2019 0:00	-	-	-	-	-	-	-
7/21/2019 1:00	-	-	-	-	-	-	-
7/21/2019 2:00	-	-	-	-	-	-	-
7/21/2019 3:00	-	-	-	-	-	-	-
7/21/2019 4:00	-	-	-	-	-	-	-
7/21/2019 5:00	-	-	-	-	-	-	-
7/21/2019 6:00	-	-	-	-	-	-	-
7/21/2019 7:00	-	-	-	-	-	-	-
7/21/2019 8:00	-	-	-	-	-	-	-
7/21/2019 9:00	-	-	-	-	-	-	-
7/21/2019 10:00	-	-	-	-	-	-	-
7/21/2019 11:00	-	-	-	-	-	-	-
7/21/2019 12:00	-	-	-	-	-	-	-
7/21/2019 13:00	-	-	-	-	-	-	-
7/21/2019 14:00	-	-	-	-	-	-	-
7/21/2019 15:00	-	-	-	-	-	-	-
7/21/2019 16:00	-	-	-	-	-	-	-
7/21/2019 17:00	-	-	-	-	-	-	-
7/21/2019 18:00	-	-	-	-	-	-	-
7/21/2019 19:00	-	-	-	-	-	-	-
7/21/2019 20:00	-	-	-	-	-	-	-
7/21/2019 21:00	-	-	-	-	-	-	-
7/21/2019 22:00	-	-	-	-	-	-	-
7/21/2019 23:00	-	-	-	-	-	-	-
7/22/2019 0:00	-	-	-	-	-	-	-
7/22/2019 1:00	-	-	-	-	-	-	-
7/22/2019 2:00	-	-	-	-	-	-	-
7/22/2019 3:00	-	-	-	-	-	-	-
7/22/2019 4:00	-	-	-	-	-	-	-
7/22/2019 5:00	-	-	-	-	-	-	-
7/22/2019 6:00	-	-	-	-	-	-	-
7/22/2019 7:00	-	-	-	-	-	-	-
7/22/2019 8:00	-	-	-	-	-	-	-
7/22/2019 9:00	-	-	-	-	-	-	-
7/22/2019 10:00	-	-	-	-	-	-	-
7/22/2019 11:00	-	-	-	-	-	-	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
7/22/2019 12:00	-	-	-	-	-	-	-
7/22/2019 13:00	-	-	-	-	-	-	-
7/22/2019 14:00	-	-	-	-	-	-	-
7/22/2019 15:00	-	-	-	-	-	-	-
7/22/2019 16:00	-	-	-	-	-	-	-
7/22/2019 17:00	-	-	-	-	-	-	-
7/22/2019 18:00	-	-	-	-	-	-	-
7/22/2019 19:00	-	-	-	-	-	-	-
7/22/2019 20:00	-	-	-	-	-	-	-
7/22/2019 21:00	-	-	-	-	-	-	-
7/22/2019 22:00	-	-	-	-	-	-	-
7/22/2019 23:00	-	-	-	-	-	-	-
7/23/2019 0:00	-	-	-	-	-	-	-
7/23/2019 1:00	-	-	-	-	-	-	-
7/23/2019 2:00	-	-	-	-	-	-	-
7/23/2019 3:00	-	-	-	-	-	-	-
7/23/2019 4:00	-	-	-	-	-	-	-
7/23/2019 5:00	-	-	-	-	-	-	-
7/23/2019 6:00	-	-	-	-	-	-	-
7/23/2019 7:00	-	-	-	-	-	-	-
7/23/2019 8:00	-	-	-	-	-	-	-
7/23/2019 9:00	-	-	-	-	-	-	-
7/23/2019 10:00	-	-	-	-	-	-	-
7/23/2019 11:00	-	-	-	-	-	-	-
7/23/2019 12:00	-	-	-	-	-	-	-
7/23/2019 13:00	-	-	-	-	-	-	-
7/23/2019 14:00	-	-	-	-	-	-	-
7/23/2019 15:00	-	-	-	-	-	-	-
7/23/2019 16:00	-	-	-	-	-	-	-
7/23/2019 17:00	-	-	-	-	-	-	-
7/23/2019 18:00	-	-	-	-	-	-	-
7/23/2019 19:00	-	-	-	-	-	-	-
7/23/2019 20:00	-	-	-	-	-	-	-
7/23/2019 21:00	-	-	-	-	-	-	-
7/23/2019 22:00	-	-	-	-	-	-	-
7/23/2019 23:00	-	-	-	-	-	-	-
7/24/2019 0:00	-	-	-	-	-	-	-
7/24/2019 1:00	-	-	-	-	-	-	-
7/24/2019 2:00	-	-	-	-	-	-	-
7/24/2019 3:00	-	-	-	-	-	-	-
7/24/2019 4:00	-	-	-	-	-	-	-
7/24/2019 5:00	-	-	-	-	-	-	-
7/24/2019 6:00	-	-	-	-	-	-	-
7/24/2019 7:00	-	-	-	-	-	-	-
7/24/2019 8:00	-	-	-	-	-	-	-
7/24/2019 9:00	-	-	-	-	-	-	-
7/24/2019 10:00	-	-	-	-	-	-	-
7/24/2019 11:00	-	-	-	-	-	-	-
7/24/2019 12:00	-	-	-	-	-	-	-
7/24/2019 13:00	-	-	-	-	-	-	-
7/24/2019 14:00	-	-	-	-	-	-	-
7/24/2019 15:00	-	-	-	-	-	-	-
7/24/2019 16:00	-	-	-	-	-	-	-
7/24/2019 17:00	-	-	-	-	-	-	-
7/24/2019 18:00	-	-	-	-	-	-	-



**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
7/24/2019 19:00	-	-	-	-	-	-	-
7/24/2019 20:00	-	-	-	-	-	-	-
7/24/2019 21:00	-	-	-	-	-	-	-
7/24/2019 22:00	-	-	-	-	-	-	-
7/24/2019 23:00	-	-	-	-	-	-	-
7/25/2019 0:00	-	-	-	-	-	-	-
7/25/2019 1:00	-	-	-	-	-	-	-
7/25/2019 2:00	-	-	-	-	-	-	-
7/25/2019 3:00	-	-	-	-	-	-	-
7/25/2019 4:00	-	-	-	-	-	-	-
7/25/2019 5:00	-	-	-	-	-	-	-
7/25/2019 6:00	-	-	-	-	-	-	-
7/25/2019 7:00	-	-	-	-	-	-	-
7/25/2019 8:00	-	-	-	-	-	-	-
7/25/2019 9:00	-	-	-	-	-	-	-
7/25/2019 10:00	-	-	-	-	-	-	-
7/25/2019 11:00	-	-	-	-	-	-	-
7/25/2019 12:00	-	-	-	-	-	-	-
7/25/2019 13:00	-	-	-	-	-	-	-
7/25/2019 14:00	-	-	-	-	-	-	-
7/25/2019 15:00	-	-	-	-	-	-	-
7/25/2019 16:00	-	-	-	-	-	-	-
7/25/2019 17:00	-	-	-	-	-	-	-
7/25/2019 18:00	-	-	-	-	-	-	-
7/25/2019 19:00	-	-	-	-	-	-	-
7/25/2019 20:00	-	-	-	-	-	-	-
7/25/2019 21:00	-	-	-	-	-	-	-
7/25/2019 22:00	-	-	-	-	-	-	-
7/25/2019 23:00	-	-	-	-	-	-	-
7/26/2019 0:00	-	-	-	-	-	-	-
7/26/2019 1:00	-	-	-	-	-	-	-
7/26/2019 2:00	-	-	-	-	-	-	-
7/26/2019 3:00	-	-	-	-	-	-	-
7/26/2019 4:00	-	-	-	-	-	-	-
7/26/2019 5:00	-	-	-	-	-	-	-
7/26/2019 6:00	-	-	-	-	-	-	-
7/26/2019 7:00	-	-	-	-	-	-	-
7/26/2019 8:00	-	-	-	-	-	-	-
7/26/2019 9:00	-	-	-	-	-	-	-
7/26/2019 10:00	-	-	-	-	-	-	-
7/26/2019 11:00	-	-	-	-	-	-	-
7/26/2019 12:00	-	-	-	-	-	-	-
7/26/2019 13:00	-	-	-	-	-	-	-
7/26/2019 14:00	-	-	-	-	-	-	-
7/26/2019 15:00	-	-	-	-	-	-	-
7/26/2019 16:00	-	-	-	-	-	-	-
7/26/2019 17:00	-	-	-	-	-	-	-
7/26/2019 18:00	-	-	-	-	-	-	-
7/26/2019 19:00	-	-	-	-	-	-	-
7/26/2019 20:00	-	-	-	-	-	-	-
7/26/2019 21:00	-	-	-	-	-	-	-
7/26/2019 22:00	-	-	-	-	-	-	-
7/26/2019 23:00	-	-	-	-	-	-	-
7/27/2019 0:00	-	-	-	-	-	-	-
7/27/2019 1:00	-	-	-	-	-	-	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
7/27/2019 2:00	-	-	-	-	-	-	-
7/27/2019 3:00	-	-	-	-	-	-	-
7/27/2019 4:00	-	-	-	-	-	-	-
7/27/2019 5:00	-	-	-	-	-	-	-
7/27/2019 6:00	-	-	-	-	-	-	-
7/27/2019 7:00	-	-	-	-	-	-	-
7/27/2019 8:00	-	-	-	-	-	-	-
7/27/2019 9:00	-	-	-	-	-	-	-
7/27/2019 10:00	-	-	-	-	-	-	-
7/27/2019 11:00	-	-	-	-	-	-	-
7/27/2019 12:00	-	-	-	-	-	-	-
7/27/2019 13:00	-	-	-	-	-	-	-
7/27/2019 14:00	-	-	-	-	-	-	-
7/27/2019 15:00	-	-	-	-	-	-	-
7/27/2019 16:00	-	-	-	-	-	-	-
7/27/2019 17:00	-	-	-	-	-	-	-
7/27/2019 18:00	-	-	-	-	-	-	-
7/27/2019 19:00	-	-	-	-	-	-	-
7/27/2019 20:00	-	-	-	-	-	-	-
7/27/2019 21:00	-	-	-	-	-	-	-
7/27/2019 22:00	-	-	-	-	-	-	-
7/27/2019 23:00	-	-	-	-	-	-	-
7/28/2019 0:00	-	-	-	-	-	-	-
7/28/2019 1:00	-	-	-	-	-	-	-
7/28/2019 2:00	-	-	-	-	-	-	-
7/28/2019 3:00	-	-	-	-	-	-	-
7/28/2019 4:00	-	-	-	-	-	-	-
7/28/2019 5:00	-	-	-	-	-	-	-
7/28/2019 6:00	-	-	-	-	-	-	-
7/28/2019 7:00	-	-	-	-	-	-	-
7/28/2019 8:00	-	-	-	-	-	-	-
7/28/2019 9:00	-	-	-	-	-	-	-
7/28/2019 10:00	-	-	-	-	-	-	-
7/28/2019 11:00	-	-	-	-	-	-	-
7/28/2019 12:00	-	-	-	-	-	-	-
7/28/2019 13:00	-	-	-	-	-	-	-
7/28/2019 14:00	-	-	-	-	-	-	-
7/28/2019 15:00	-	-	-	-	-	-	-
7/28/2019 16:00	-	-	-	-	-	-	-
7/28/2019 17:00	-	-	-	-	-	-	-
7/28/2019 18:00	-	-	-	-	-	-	-
7/28/2019 19:00	-	-	-	-	-	-	-
7/28/2019 20:00	-	-	-	-	-	-	-
7/28/2019 21:00	-	-	-	-	-	-	-
7/28/2019 22:00	-	-	-	-	-	-	-
7/28/2019 23:00	-	-	-	-	-	-	-
7/29/2019 0:00	-	-	-	-	-	-	-
7/29/2019 1:00	-	-	-	-	-	-	-
7/29/2019 2:00	-	-	-	-	-	-	-
7/29/2019 3:00	-	-	-	-	-	-	-
7/29/2019 4:00	-	-	-	-	-	-	-
7/29/2019 5:00	-	-	-	-	-	-	-
7/29/2019 6:00	-	-	-	-	-	-	-
7/29/2019 7:00	-	-	-	-	-	-	-
7/29/2019 8:00	-	-	-	-	-	-	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
7/29/2019 9:00	-	-	-	-	-	-	-
7/29/2019 10:00	-	-	-	-	-	-	-
7/29/2019 11:00	-	-	-	-	-	-	-
7/29/2019 12:00	-	-	-	-	-	-	-
7/29/2019 13:00	-	-	-	-	-	-	-
7/29/2019 14:00	-	-	-	-	-	-	-
7/29/2019 15:00	-	-	-	-	-	-	-
7/29/2019 16:00	-	-	-	-	-	-	-
7/29/2019 17:00	-	-	-	-	-	-	-
7/29/2019 18:00	-	-	-	-	-	-	-
7/29/2019 19:00	-	-	-	-	-	-	-
7/29/2019 20:00	-	-	-	-	-	-	-
7/29/2019 21:00	-	-	-	-	-	-	-
7/29/2019 22:00	-	-	-	-	-	-	-
7/29/2019 23:00	-	-	-	-	-	-	-
7/30/2019 0:00	-	-	-	-	-	-	-
7/30/2019 1:00	-	-	-	-	-	-	-
7/30/2019 2:00	-	-	-	-	-	-	-
7/30/2019 3:00	-	-	-	-	-	-	-
7/30/2019 4:00	-	-	-	-	-	-	-
7/30/2019 5:00	-	-	-	-	-	-	-
7/30/2019 6:00	-	-	-	-	-	-	-
7/30/2019 7:00	-	-	-	-	-	-	-
7/30/2019 8:00	-	-	-	-	-	-	-
7/30/2019 9:00	-	-	-	-	-	-	-
7/30/2019 10:00	-	-	-	-	-	-	-
7/30/2019 11:00	-	-	-	-	-	-	-
7/30/2019 12:00	-	-	-	-	-	-	-
7/30/2019 13:00	-	-	-	-	-	-	-
7/30/2019 14:00	-	-	-	-	-	-	-
7/30/2019 15:00	-	-	-	-	-	-	-
7/30/2019 16:00	-	-	-	-	-	-	-
7/30/2019 17:00	-	-	-	-	-	-	-
7/30/2019 18:00	-	-	-	-	-	-	-
7/30/2019 19:00	-	-	-	-	-	-	-
7/30/2019 20:00	-	-	-	-	-	-	-
7/30/2019 21:00	-	-	-	-	-	-	-
7/30/2019 22:00	-	-	-	-	-	-	-
7/30/2019 23:00	-	-	-	-	-	-	-
7/31/2019 0:00	-	-	-	-	-	-	-
7/31/2019 1:00	-	-	-	-	-	-	-
7/31/2019 2:00	-	-	-	-	-	-	-
7/31/2019 3:00	-	-	-	-	-	-	-
7/31/2019 4:00	-	-	-	-	-	-	-
7/31/2019 5:00	-	-	-	-	-	-	-
7/31/2019 6:00	-	-	-	-	-	-	-
7/31/2019 7:00	-	-	-	-	-	-	-
7/31/2019 8:00	-	-	-	-	-	-	-
7/31/2019 9:00	-	-	-	-	-	-	-
7/31/2019 10:00	-	-	-	-	-	-	-
7/31/2019 11:00	-	-	-	-	-	-	-
7/31/2019 12:00	-	-	-	-	-	-	-
7/31/2019 13:00	-	-	-	-	-	-	-
7/31/2019 14:00	-	-	-	-	-	-	-
7/31/2019 15:00	-	-	-	-	-	-	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
7/31/2019 16:00	-	-	-	-	-	-	-
7/31/2019 17:00	-	-	-	-	-	-	-
7/31/2019 18:00	-	-	-	-	-	-	-
7/31/2019 19:00	-	-	-	-	-	-	-
7/31/2019 20:00	-	-	-	-	-	-	-
7/31/2019 21:00	-	-	-	-	-	-	-
7/31/2019 22:00	-	-	-	-	-	-	-
7/31/2019 23:00	-	-	-	-	-	-	-
8/1/2019 0:00	-	-	-	-	-	-	-
8/1/2019 1:00	-	-	-	-	-	-	-
8/1/2019 2:00	-	-	-	-	-	-	-
8/1/2019 3:00	-	-	-	-	-	-	-
8/1/2019 4:00	-	-	-	-	-	-	-
8/1/2019 5:00	-	-	-	-	-	-	-
8/1/2019 6:00	-	-	-	-	-	-	-
8/1/2019 7:00	-	-	-	-	-	-	-
8/1/2019 8:00	-	-	-	-	-	-	-
8/1/2019 9:00	-	-	-	-	-	-	-
8/1/2019 10:00	-	-	-	-	-	-	-
8/1/2019 11:00	-	-	-	-	-	-	-
8/1/2019 12:00	-	-	-	-	-	-	-
8/1/2019 13:00	-	-	-	-	-	-	-
8/1/2019 14:00	-	-	-	-	-	-	-
8/1/2019 15:00	-	-	-	-	-	-	-
8/1/2019 16:00	-	-	-	-	-	-	-
8/1/2019 17:00	-	-	-	-	-	-	-
8/1/2019 18:00	-	-	-	-	-	-	-
8/1/2019 19:00	-	-	-	-	-	-	-
8/1/2019 20:00	-	-	-	-	-	-	-
8/1/2019 21:00	-	-	-	-	-	-	-
8/1/2019 22:00	-	-	-	-	-	-	-
8/1/2019 23:00	-	-	-	-	-	-	-
8/2/2019 0:00	-	-	-	-	-	-	-
8/2/2019 1:00	-	-	-	-	-	-	-
8/2/2019 2:00	-	-	-	-	-	-	-
8/2/2019 3:00	-	-	-	-	-	-	-
8/2/2019 4:00	-	-	-	-	-	-	-
8/2/2019 5:00	-	-	-	-	-	-	-
8/2/2019 6:00	-	-	-	-	-	-	-
8/2/2019 7:00	-	-	-	-	-	-	-
8/2/2019 8:00	-	-	-	-	-	-	-
8/2/2019 9:00	-	-	-	-	-	-	-
8/2/2019 10:00	-	-	-	-	-	-	-
8/2/2019 11:00	-	-	-	-	-	-	-
8/2/2019 12:00	-	-	-	-	-	-	-
8/2/2019 13:00	-	-	-	-	-	-	-
8/2/2019 14:00	-	-	-	-	-	-	-
8/2/2019 15:00	-	-	-	-	-	-	-
8/2/2019 16:00	-	-	-	-	-	-	-
8/2/2019 17:00	-	-	-	-	-	-	-
8/2/2019 18:00	-	-	-	-	-	-	-
8/2/2019 19:00	-	-	-	-	-	-	-
8/2/2019 20:00	-	-	-	-	-	-	-
8/2/2019 21:00	-	-	-	-	-	-	-
8/2/2019 22:00	-	-	-	-	-	-	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
8/2/2019 23:00	-	-	-	-	-	-	-
8/3/2019 0:00	-	-	-	-	-	-	-
8/3/2019 1:00	-	-	-	-	-	-	-
8/3/2019 2:00	-	-	-	-	-	-	-
8/3/2019 3:00	-	-	-	-	-	-	-
8/3/2019 4:00	-	-	-	-	-	-	-
8/3/2019 5:00	-	-	-	-	-	-	-
8/3/2019 6:00	-	-	-	-	-	-	-
8/3/2019 7:00	-	-	-	-	-	-	-
8/3/2019 8:00	-	-	-	-	-	-	-
8/3/2019 9:00	-	-	-	-	-	-	-
8/3/2019 10:00	-	-	-	-	-	-	-
8/3/2019 11:00	-	-	-	-	-	-	-
8/3/2019 12:00	-	-	-	-	-	-	-
8/3/2019 13:00	-	-	-	-	-	-	-
8/3/2019 14:00	-	-	-	-	-	-	-
8/3/2019 15:00	-	-	-	-	-	-	-
8/3/2019 16:00	-	-	-	-	-	-	-
8/3/2019 17:00	-	-	-	-	-	-	-
8/3/2019 18:00	-	-	-	-	-	-	-
8/3/2019 19:00	-	-	-	-	-	-	-
8/3/2019 20:00	-	-	-	-	-	-	-
8/3/2019 21:00	-	-	-	-	-	-	-
8/3/2019 22:00	-	-	-	-	-	-	-
8/3/2019 23:00	-	-	-	-	-	-	-
8/4/2019 0:00	-	-	-	-	-	-	-
8/4/2019 1:00	-	-	-	-	-	-	-
8/4/2019 2:00	-	-	-	-	-	-	-
8/4/2019 3:00	-	-	-	-	-	-	-
8/4/2019 4:00	-	-	-	-	-	-	-
8/4/2019 5:00	-	-	-	-	-	-	-
8/4/2019 6:00	-	-	-	-	-	-	-
8/4/2019 7:00	-	-	-	-	-	-	-
8/4/2019 8:00	-	-	-	-	-	-	-
8/4/2019 9:00	-	-	-	-	-	-	-
8/4/2019 10:00	-	-	-	-	-	-	-
8/4/2019 11:00	-	-	-	-	-	-	-
8/4/2019 12:00	-	-	-	-	-	-	-
8/4/2019 13:00	-	-	-	-	-	-	-
8/4/2019 14:00	-	-	-	-	-	-	-
8/4/2019 15:00	-	-	-	-	-	-	-
8/4/2019 16:00	-	-	-	-	-	-	-
8/4/2019 17:00	-	-	-	-	-	-	-
8/4/2019 18:00	-	-	-	-	-	-	-
8/4/2019 19:00	-	-	-	-	-	-	-
8/4/2019 20:00	-	-	-	-	-	-	-
8/4/2019 21:00	-	-	-	-	-	-	-
8/4/2019 22:00	-	-	-	-	-	-	-
8/4/2019 23:00	-	-	-	-	-	-	-
8/5/2019 0:00	-	-	-	-	-	-	-
8/5/2019 1:00	-	-	-	-	-	-	-
8/5/2019 2:00	-	-	-	-	-	-	-
8/5/2019 3:00	-	-	-	-	-	-	-
8/5/2019 4:00	-	-	-	-	-	-	-
8/5/2019 5:00	-	-	-	-	-	-	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
8/5/2019 6:00	-	-	-	-	-	-	-
8/5/2019 7:00	-	-	-	-	-	-	-
8/5/2019 8:00	-	-	-	-	-	-	-
8/5/2019 9:00	-	-	-	-	-	-	-
8/5/2019 10:00	-	-	-	-	-	-	-
8/5/2019 11:00	-	-	-	-	-	-	-
8/5/2019 12:00	-	-	-	-	-	-	-
8/5/2019 13:00	-	-	-	-	-	-	-
8/5/2019 14:00	-	-	-	-	-	-	-
8/5/2019 15:00	-	-	-	-	-	-	-
8/5/2019 16:00	-	-	-	-	-	-	-
8/5/2019 17:00	-	-	-	-	-	-	-
8/5/2019 18:00	-	-	-	-	-	-	-
8/5/2019 19:00	-	-	-	-	-	-	-
8/5/2019 20:00	-	-	-	-	-	-	-
8/5/2019 21:00	-	-	-	-	-	-	-
8/5/2019 22:00	-	-	-	-	-	-	-
8/5/2019 23:00	-	-	-	-	-	-	-
8/6/2019 0:00	-	-	-	-	-	-	-
8/6/2019 1:00	-	-	-	-	-	-	-
8/6/2019 2:00	-	-	-	-	-	-	-
8/6/2019 3:00	-	-	-	-	-	-	-
8/6/2019 4:00	-	-	-	-	-	-	-
8/6/2019 5:00	-	-	-	-	-	-	-
8/6/2019 6:00	-	-	-	-	-	-	-
8/6/2019 7:00	-	-	-	-	-	-	-
8/6/2019 8:00	-	-	-	-	-	-	-
8/6/2019 9:00	-	-	-	-	-	-	-
8/6/2019 10:00	-	-	-	-	-	-	-
8/6/2019 11:00	-	-	-	-	-	-	-
8/6/2019 12:00	-	-	-	-	-	-	-
8/6/2019 13:00	-	-	-	-	-	-	-
8/6/2019 14:00	-	-	-	-	-	-	-
8/6/2019 15:00	-	-	-	-	-	-	-
8/6/2019 16:00	-	-	-	-	-	-	-
8/6/2019 17:00	-	-	-	-	-	-	-
8/6/2019 18:00	-	-	-	-	-	-	-
8/6/2019 19:00	-	-	-	-	-	-	-
8/6/2019 20:00	-	-	-	-	-	-	-
8/6/2019 21:00	-	-	-	-	-	-	-
8/6/2019 22:00	-	-	-	-	-	-	-
8/6/2019 23:00	-	-	-	-	-	-	-
8/7/2019 0:00	-	-	-	-	-	-	-
8/7/2019 1:00	-	-	-	-	-	-	-
8/7/2019 2:00	-	-	-	-	-	-	-
8/7/2019 3:00	-	-	-	-	-	-	-
8/7/2019 4:00	-	-	-	-	-	-	-
8/7/2019 5:00	-	-	-	-	-	-	-
8/7/2019 6:00	-	-	-	-	-	-	-
8/7/2019 7:00	-	-	-	-	-	-	-
8/7/2019 8:00	-	-	-	-	-	-	-
8/7/2019 9:00	-	-	-	-	-	-	-
8/7/2019 10:00	-	-	-	-	-	-	-
8/7/2019 11:00	-	-	-	-	-	-	-
8/7/2019 12:00	-	-	-	-	-	-	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
8/7/2019 13:00	-	-	-	-	-	-	-
8/7/2019 14:00	-	-	-	-	-	-	-
8/7/2019 15:00	-	-	-	-	-	-	-
8/7/2019 16:00	-	-	-	-	-	-	-
8/7/2019 17:00	-	-	-	-	-	-	-
8/7/2019 18:00	-	-	-	-	-	-	-
8/7/2019 19:00	-	-	-	-	-	-	-
8/7/2019 20:00	-	-	-	-	-	-	-
8/7/2019 21:00	-	-	-	-	-	-	-
8/7/2019 22:00	-	-	-	-	-	-	-
8/7/2019 23:00	-	-	-	-	-	-	-
8/8/2019 0:00	-	-	-	-	-	-	-
8/8/2019 1:00	-	-	-	-	-	-	-
8/8/2019 2:00	-	-	-	-	-	-	-
8/8/2019 3:00	-	-	-	-	-	-	-
8/8/2019 4:00	-	-	-	-	-	-	-
8/8/2019 5:00	-	-	-	-	-	-	-
8/8/2019 6:00	-	-	-	-	-	-	-
8/8/2019 7:00	-	-	-	-	-	-	-
8/8/2019 8:00	-	-	-	-	-	-	-
8/8/2019 9:00	-	-	-	-	-	-	-
8/8/2019 10:00	-	-	-	-	-	-	-
8/8/2019 11:00	-	-	-	-	-	-	-
8/8/2019 12:00	-	-	-	-	-	-	-
8/8/2019 13:00	-	-	-	-	-	-	-
8/8/2019 14:00	-	-	-	-	-	-	-
8/8/2019 15:00	-	-	-	-	-	-	-
8/8/2019 16:00	-	-	-	-	-	-	-
8/8/2019 17:00	-	-	-	-	-	-	-
8/8/2019 18:00	-	-	-	-	-	-	-
8/8/2019 19:00	-	-	-	-	-	-	-
8/8/2019 20:00	-	-	-	-	-	-	-
8/8/2019 21:00	-	-	-	-	-	-	-
8/8/2019 22:00	-	-	-	-	-	-	-
8/8/2019 23:00	-	-	-	-	-	-	-
8/9/2019 0:00	-	-	-	-	-	-	-
8/9/2019 1:00	-	-	-	-	-	-	-
8/9/2019 2:00	-	-	-	-	-	-	-
8/9/2019 3:00	-	-	-	-	-	-	-
8/9/2019 4:00	-	-	-	-	-	-	-
8/9/2019 5:00	-	-	-	-	-	-	-
8/9/2019 6:00	-	-	-	-	-	-	-
8/9/2019 7:00	-	-	-	-	-	-	-
8/9/2019 8:00	-	-	-	-	-	-	-
8/9/2019 9:00	-	-	-	-	-	-	-
8/9/2019 10:00	-	-	-	-	-	-	-
8/9/2019 11:00	-	-	-	-	-	-	-
8/9/2019 12:00	-	-	-	-	-	-	-
8/9/2019 13:00	-	-	-	-	-	-	-
8/9/2019 14:00	-	-	-	-	-	-	-
8/9/2019 15:00	-	-	-	-	-	-	-
8/9/2019 16:00	-	-	-	-	-	-	-
8/9/2019 17:00	-	-	-	-	-	-	-
8/9/2019 18:00	-	-	-	-	-	-	-
8/9/2019 19:00	-	-	-	-	-	-	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
8/9/2019 20:00	-	-	-	-	-	-	-
8/9/2019 21:00	-	-	-	-	-	-	-
8/9/2019 22:00	-	-	-	-	-	-	-
8/9/2019 23:00	-	-	-	-	-	-	-
8/10/2019 0:00	-	-	-	-	-	-	-
8/10/2019 1:00	-	-	-	-	-	-	-
8/10/2019 2:00	-	-	-	-	-	-	-
8/10/2019 3:00	-	-	-	-	-	-	-
8/10/2019 4:00	-	-	-	-	-	-	-
8/10/2019 5:00	-	-	-	-	-	-	-
8/10/2019 6:00	-	-	-	-	-	-	-
8/10/2019 7:00	-	-	-	-	-	-	-
8/10/2019 8:00	-	-	-	-	-	-	-
8/10/2019 9:00	-	-	-	-	-	-	-
8/10/2019 10:00	-	-	-	-	-	-	-
8/10/2019 11:00	-	-	-	-	-	-	-
8/10/2019 12:00	-	-	-	-	-	-	-
8/10/2019 13:00	-	-	-	-	-	-	-
8/10/2019 14:00	-	-	-	-	-	-	-
8/10/2019 15:00	-	-	-	-	-	-	-
8/10/2019 16:00	-	-	-	-	-	-	-
8/10/2019 17:00	-	-	-	-	-	-	-
8/10/2019 18:00	-	-	-	-	-	-	-
8/10/2019 19:00	-	-	-	-	-	-	-
8/10/2019 20:00	-	-	-	-	-	-	-
8/10/2019 21:00	-	-	-	-	-	-	-
8/10/2019 22:00	-	-	-	-	-	-	-
8/10/2019 23:00	-	-	-	-	-	-	-
8/11/2019 0:00	-	-	-	-	-	-	-
8/11/2019 1:00	-	-	-	-	-	-	-
8/11/2019 2:00	-	-	-	-	-	-	-
8/11/2019 3:00	-	-	-	-	-	-	-
8/11/2019 4:00	-	-	-	-	-	-	-
8/11/2019 5:00	-	-	-	-	-	-	-
8/11/2019 6:00	-	-	-	-	-	-	-
8/11/2019 7:00	-	-	-	-	-	-	-
8/11/2019 8:00	-	-	-	-	-	-	-
8/11/2019 9:00	-	-	-	-	-	-	-
8/11/2019 10:00	-	-	-	-	-	-	-
8/11/2019 11:00	-	-	-	-	-	-	-
8/11/2019 12:00	-	-	-	-	-	-	-
8/11/2019 13:00	-	-	-	-	-	-	-
8/11/2019 14:00	-	-	-	-	-	-	-
8/11/2019 15:00	-	-	-	-	-	-	-
8/11/2019 16:00	-	-	-	-	-	-	-
8/11/2019 17:00	-	-	-	-	-	-	-
8/11/2019 18:00	-	-	-	-	-	-	-
8/11/2019 19:00	-	-	-	-	-	-	-
8/11/2019 20:00	-	-	-	-	-	-	-
8/11/2019 21:00	-	-	-	-	-	-	-
8/11/2019 22:00	-	-	-	-	-	-	-
8/11/2019 23:00	-	-	-	-	-	-	-
8/12/2019 0:00	-	-	-	-	-	-	-
8/12/2019 1:00	-	-	-	-	-	-	-
8/12/2019 2:00	-	-	-	-	-	-	-



**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
8/12/2019 3:00	-	-	-	-	-	-	-
8/12/2019 4:00	-	-	-	-	-	-	-
8/12/2019 5:00	-	-	-	-	-	-	-
8/12/2019 6:00	-	-	-	-	-	-	-
8/12/2019 7:00	-	-	-	-	-	-	-
8/12/2019 8:00	-	-	-	-	-	-	-
8/12/2019 9:00	-	-	-	-	-	-	-
8/12/2019 10:00	-	-	-	-	-	-	-
8/12/2019 11:00	-	-	-	-	-	-	-
8/12/2019 12:00	-	-	-	-	-	-	-
8/12/2019 13:00	-	-	-	-	-	-	-
8/12/2019 14:00	-	-	-	-	-	-	-
8/12/2019 15:00	-	-	-	-	-	-	-
8/12/2019 16:00	-	-	-	-	-	-	-
8/12/2019 17:00	-	-	-	-	-	-	-
8/12/2019 18:00	-	-	-	-	-	-	-
8/12/2019 19:00	-	-	-	-	-	-	-
8/12/2019 20:00	-	-	-	-	-	-	-
8/12/2019 21:00	-	-	-	-	-	-	-
8/12/2019 22:00	-	-	-	-	-	-	-
8/12/2019 23:00	-	-	-	-	-	-	-
8/13/2019 0:00	-	-	-	-	-	-	-
8/13/2019 1:00	-	-	-	-	-	-	-
8/13/2019 2:00	-	-	-	-	-	-	-
8/13/2019 3:00	-	-	-	-	-	-	-
8/13/2019 4:00	-	-	-	-	-	-	-
8/13/2019 5:00	-	-	-	-	-	-	-
8/13/2019 6:00	-	-	-	-	-	-	-
8/13/2019 7:00	-	-	-	-	-	-	-
8/13/2019 8:00	-	-	-	-	-	-	-
8/13/2019 9:00	-	-	-	-	-	-	-
8/13/2019 10:00	-	-	-	-	-	-	-
8/13/2019 11:00	-	-	-	-	-	-	-
8/13/2019 12:00	-	-	-	-	-	-	-
8/13/2019 13:00	-	-	-	-	-	-	-
8/13/2019 14:00	-	-	-	-	-	-	-
8/13/2019 15:00	-	-	-	-	-	-	-
8/13/2019 16:00	-	-	-	-	-	-	-
8/13/2019 17:00	-	-	-	-	-	-	-
8/13/2019 18:00	-	-	-	-	-	-	-
8/13/2019 19:00	-	-	-	-	-	-	-
8/13/2019 20:00	-	-	-	-	-	-	-
8/13/2019 21:00	-	-	-	-	-	-	-
8/13/2019 22:00	-	-	-	-	-	-	-
8/13/2019 23:00	-	-	-	-	-	-	-
8/14/2019 0:00	-	-	-	-	-	-	-
8/14/2019 1:00	-	-	-	-	-	-	-
8/14/2019 2:00	-	-	-	-	-	-	-
8/14/2019 3:00	-	-	-	-	-	-	-
8/14/2019 4:00	-	-	-	-	-	-	-
8/14/2019 5:00	-	-	-	-	-	-	-
8/14/2019 6:00	-	-	-	-	-	-	-
8/14/2019 7:00	-	-	-	-	-	-	-
8/14/2019 8:00	-	-	-	-	-	-	-
8/14/2019 9:00	-	-	-	-	-	-	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
8/14/2019 10:00	-	-	-	-	-	-	-
8/14/2019 11:00	-	-	-	-	-	-	-
8/14/2019 12:00	-	-	-	-	-	-	-
8/14/2019 13:00	-	-	-	-	-	-	-
8/14/2019 14:00	-	-	-	-	-	-	-
8/14/2019 15:00	-	-	-	-	-	-	-
8/14/2019 16:00	-	-	-	-	-	-	-
8/14/2019 17:00	-	-	-	-	-	-	-
8/14/2019 18:00	-	-	-	-	-	-	-
8/14/2019 19:00	-	-	-	-	-	-	-
8/14/2019 20:00	-	-	-	-	-	-	-
8/14/2019 21:00	-	-	-	-	-	-	-
8/14/2019 22:00	-	-	-	-	-	-	-
8/14/2019 23:00	-	-	-	-	-	-	-
8/15/2019 0:00	-	-	-	-	-	-	-
8/15/2019 1:00	-	-	-	-	-	-	-
8/15/2019 2:00	-	-	-	-	-	-	-
8/15/2019 3:00	-	-	-	-	-	-	-
8/15/2019 4:00	-	-	-	-	-	-	-
8/15/2019 5:00	-	-	-	-	-	-	-
8/15/2019 6:00	-	-	-	-	-	-	-
8/15/2019 7:00	-	-	-	-	-	-	-
8/15/2019 8:00	-	-	-	-	-	-	-
8/15/2019 9:00	-	-	-	-	-	-	-
8/15/2019 10:00	-	-	-	-	-	-	-
8/15/2019 11:00	-	-	-	-	-	-	-
8/15/2019 12:00	-	-	-	-	-	-	-
8/15/2019 13:00	-	-	-	-	-	-	-
8/15/2019 14:00	-	-	-	-	-	-	-
8/15/2019 15:00	-	-	-	-	-	-	-
8/15/2019 16:00	-	-	-	-	-	-	-
8/15/2019 17:00	-	-	-	-	-	-	-
8/15/2019 18:00	-	-	-	-	-	-	-
8/15/2019 19:00	-	-	-	-	-	-	-
8/15/2019 20:00	-	-	-	-	-	-	-
8/15/2019 21:00	-	-	-	-	-	-	-
8/15/2019 22:00	-	-	-	-	-	-	-
8/15/2019 23:00	-	-	-	-	-	-	-
8/16/2019 0:00	-	-	-	-	-	-	-
8/16/2019 1:00	-	-	-	-	-	-	-
8/16/2019 2:00	-	-	-	-	-	-	-
8/16/2019 3:00	-	-	-	-	-	-	-
8/16/2019 4:00	-	-	-	-	-	-	-
8/16/2019 5:00	-	-	-	-	-	-	-
8/16/2019 6:00	-	-	-	-	-	-	-
8/16/2019 7:00	-	-	-	-	-	-	-
8/16/2019 8:00	-	-	-	-	-	-	-
8/16/2019 9:00	-	-	-	-	-	-	-
8/16/2019 10:00	-	-	-	-	-	-	-
8/16/2019 11:00	-	-	-	-	-	-	-
8/16/2019 12:00	-	-	-	-	-	-	-
8/16/2019 13:00	-	-	-	-	-	-	-
8/16/2019 14:00	-	-	-	-	-	-	-
8/16/2019 15:00	-	-	-	-	-	-	-
8/16/2019 16:00	-	-	-	-	-	-	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
8/16/2019 17:00	-	-	-	-	-	-	-
8/16/2019 18:00	-	-	-	-	-	-	-
8/16/2019 19:00	-	-	-	-	-	-	-
8/16/2019 20:00	-	-	-	-	-	-	-
8/16/2019 21:00	-	-	-	-	-	-	-
8/16/2019 22:00	-	-	-	-	-	-	-
8/16/2019 23:00	-	-	-	-	-	-	-
8/17/2019 0:00	-	-	-	-	-	-	-
8/17/2019 1:00	-	-	-	-	-	-	-
8/17/2019 2:00	-	-	-	-	-	-	-
8/17/2019 3:00	-	-	-	-	-	-	-
8/17/2019 4:00	-	-	-	-	-	-	-
8/17/2019 5:00	-	-	-	-	-	-	-
8/17/2019 6:00	-	-	-	-	-	-	-
8/17/2019 7:00	-	-	-	-	-	-	-
8/17/2019 8:00	-	-	-	-	-	-	-
8/17/2019 9:00	-	-	-	-	-	-	-
8/17/2019 10:00	-	-	-	-	-	-	-
8/17/2019 11:00	-	-	-	-	-	-	-
8/17/2019 12:00	-	-	-	-	-	-	-
8/17/2019 13:00	-	-	-	-	-	-	-
8/17/2019 14:00	-	-	-	-	-	-	-
8/17/2019 15:00	-	-	-	-	-	-	-
8/17/2019 16:00	-	-	-	-	-	-	-
8/17/2019 17:00	-	-	-	-	-	-	-
8/17/2019 18:00	-	-	-	-	-	-	-
8/17/2019 19:00	-	-	-	-	-	-	-
8/17/2019 20:00	-	-	-	-	-	-	-
8/17/2019 21:00	-	-	-	-	-	-	-
8/17/2019 22:00	-	-	-	-	-	-	-
8/17/2019 23:00	-	-	-	-	-	-	-
8/18/2019 0:00	-	-	-	-	-	-	-
8/18/2019 1:00	-	-	-	-	-	-	-
8/18/2019 2:00	-	-	-	-	-	-	-
8/18/2019 3:00	-	-	-	-	-	-	-
8/18/2019 4:00	-	-	-	-	-	-	-
8/18/2019 5:00	-	-	-	-	-	-	-
8/18/2019 6:00	-	-	-	-	-	-	-
8/18/2019 7:00	-	-	-	-	-	-	-
8/18/2019 8:00	-	-	-	-	-	-	-
8/18/2019 9:00	-	-	-	-	-	-	-
8/18/2019 10:00	-	-	-	-	-	-	-
8/18/2019 11:00	-	-	-	-	-	-	-
8/18/2019 12:00	-	-	-	-	-	-	-
8/18/2019 13:00	-	-	-	-	-	-	-
8/18/2019 14:00	-	-	-	-	-	-	-
8/18/2019 15:00	-	-	-	-	-	-	-
8/18/2019 16:00	-	-	-	-	-	-	-
8/18/2019 17:00	-	-	-	-	-	-	-
8/18/2019 18:00	-	-	-	-	-	-	-
8/18/2019 19:00	-	-	-	-	-	-	-
8/18/2019 20:00	-	-	-	-	-	-	-
8/18/2019 21:00	-	-	-	-	-	-	-
8/18/2019 22:00	-	-	-	-	-	-	-
8/18/2019 23:00	-	-	-	-	-	-	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
8/19/2019 0:00	-	-	-	-	-	-	-
8/19/2019 1:00	-	-	-	-	-	-	-
8/19/2019 2:00	-	-	-	-	-	-	-
8/19/2019 3:00	-	-	-	-	-	-	-
8/19/2019 4:00	-	-	-	-	-	-	-
8/19/2019 5:00	-	-	-	-	-	-	-
8/19/2019 6:00	-	-	-	-	-	-	-
8/19/2019 7:00	-	-	-	-	-	-	-
8/19/2019 8:00	-	-	-	-	-	-	-
8/19/2019 9:00	-	-	-	-	-	-	-
8/19/2019 10:00	-	-	-	-	-	-	-
8/19/2019 11:00	-	-	-	-	-	-	-
8/19/2019 12:00	-	-	-	-	-	-	-
8/19/2019 13:00	-	-	-	-	-	-	-
8/19/2019 14:00	-	-	-	-	-	-	-
8/19/2019 15:00	-	-	-	-	-	-	-
8/19/2019 16:00	-	-	-	-	-	-	-
8/19/2019 17:00	-	-	-	-	-	-	-
8/19/2019 18:00	-	-	-	-	-	-	-
8/19/2019 19:00	-	-	-	-	-	-	-
8/19/2019 20:00	-	-	-	-	-	-	-
8/19/2019 21:00	-	-	-	-	-	-	-
8/19/2019 22:00	-	-	-	-	-	-	-
8/19/2019 23:00	-	-	-	-	-	-	-
8/20/2019 0:00	-	-	-	-	-	-	-
8/20/2019 1:00	-	-	-	-	-	-	-
8/20/2019 2:00	-	-	-	-	-	-	-
8/20/2019 3:00	-	-	-	-	-	-	-
8/20/2019 4:00	-	-	-	-	-	-	-
8/20/2019 5:00	-	-	-	-	-	-	-
8/20/2019 6:00	-	-	-	-	-	-	-
8/20/2019 7:00	-	-	-	-	-	-	-
8/20/2019 8:00	-	-	-	-	-	-	-
8/20/2019 9:00	-	-	-	-	-	-	-
8/20/2019 10:00	-	-	-	-	-	-	-
8/20/2019 11:00	-	-	-	-	-	-	-
8/20/2019 12:00	-	-	-	-	-	-	-
8/20/2019 13:00	-	-	-	-	-	-	-
8/20/2019 14:00	-	-	-	-	-	-	-
8/20/2019 15:00	-	-	-	-	-	-	-
8/20/2019 16:00	-	-	-	-	-	-	-
8/20/2019 17:00	-	-	-	-	-	-	-
8/20/2019 18:00	-	-	-	-	-	-	-
8/20/2019 19:00	-	-	-	-	-	-	-
8/20/2019 20:00	-	-	-	-	-	-	-
8/20/2019 21:00	-	-	-	-	-	-	-
8/20/2019 22:00	-	-	-	-	-	-	-
8/20/2019 23:00	-	-	-	-	-	-	-
8/21/2019 0:00	-	-	-	-	-	-	-
8/21/2019 1:00	-	-	-	-	-	-	-
8/21/2019 2:00	-	-	-	-	-	-	-
8/21/2019 3:00	-	-	-	-	-	-	-
8/21/2019 4:00	-	-	-	-	-	-	-
8/21/2019 5:00	-	-	-	-	-	-	-
8/21/2019 6:00	-	-	-	-	-	-	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
8/21/2019 7:00	-	-	-	-	-	-	-
8/21/2019 8:00	-	-	-	-	-	-	-
8/21/2019 9:00	-	-	-	-	-	-	-
8/21/2019 10:00	-	-	-	-	-	-	-
8/21/2019 11:00	5.2	234.6	6.0	100.0	76.1	0.0	-
8/21/2019 12:00	6.2	212.0	5.7	100.0	99.6	0.0	-
8/21/2019 13:00	6.4	206.2	5.5	100.0	177.0	0.0	-
8/21/2019 14:00	6.6	203.1	5.4	93.1	248.8	0.0	-
8/21/2019 15:00	6.1	214.6	5.0	95.4	115.8	0.0	-
8/21/2019 16:00	5.9	208.5	4.3	98.1	32.6	0.0	-
8/21/2019 17:00	3.9	201.9	4.4	89.6	25.3	0.0	-
8/21/2019 18:00	3.7	198.3	3.9	97.2	8.0	0.0	-
8/21/2019 19:00	4.3	179.2	4.0	93.3	0.7	0.0	-
8/21/2019 20:00	4.1	205.6	3.6	98.9	0.0	0.0	-
8/21/2019 21:00	3.5	209.1	3.5	100.0	0.0	0.0	-
8/21/2019 22:00	4.4	183.1	4.0	93.1	0.0	0.0	-
8/21/2019 23:00	4.0	194.1	4.4	87.8	0.0	0.0	-
8/22/2019 0:00	3.8	200.5	3.7	96.0	0.0	0.0	-
8/22/2019 1:00	4.1	201.3	3.7	95.3	0.0	0.0	-
8/22/2019 2:00	3.4	204.1	3.7	94.4	0.0	0.0	-
8/22/2019 3:00	3.5	212.5	3.7	95.8	0.0	0.0	-
8/22/2019 4:00	3.4	190.6	4.0	93.0	4.6	0.0	-
8/22/2019 5:00	3.5	198.2	4.2	89.7	32.9	0.0	-
8/22/2019 6:00	3.2	202.3	4.2	92.1	96.4	0.0	-
8/22/2019 7:00	3.6	205.0	4.6	90.0	201.6	0.0	-
8/22/2019 8:00	3.6	198.8	5.2	89.4	268.7	0.0	-
8/22/2019 9:00	4.2	198.6	5.4	89.5	332.3	0.0	-
8/22/2019 10:00	4.3	195.5	5.9	90.4	448.6	0.0	-
8/22/2019 11:00	5.5	185.1	5.8	89.3	169.9	0.0	-
8/22/2019 12:00	3.4	159.7	5.7	88.8	138.5	0.0	-
8/22/2019 13:00	3.5	161.6	5.5	91.0	87.9	0.0	-
8/22/2019 14:00	2.7	170.6	5.5	90.9	92.7	0.0	-
8/22/2019 15:00	3.0	117.6	5.2	92.3	55.3	0.0	-
8/22/2019 16:00	4.5	160.8	4.7	91.4	30.0	0.0	-
8/22/2019 17:00	4.4	173.3	4.3	91.9	21.0	0.0	-
8/22/2019 18:00	4.3	158.8	4.3	91.0	8.4	0.0	-
8/22/2019 19:00	5.0	156.2	3.9	94.4	0.1	0.0	-
8/22/2019 20:00	4.0	168.2	3.3	96.9	0.0	0.0	-
8/22/2019 21:00	3.8	185.9	3.3	95.8	0.0	0.0	-
8/22/2019 22:00	3.6	208.9	3.4	97.4	0.0	0.0	-
8/22/2019 23:00	4.4	191.3	3.5	98.7	0.0	0.0	-
8/23/2019 0:00	4.7	192.8	3.6	99.4	0.0	0.0	-
8/23/2019 1:00	4.0	190.5	3.8	99.4	0.0	0.0	-
8/23/2019 2:00	3.7	168.1	4.1	98.6	0.0	0.0	-
8/23/2019 3:00	3.5	181.0	4.6	97.9	0.0	0.0	-
8/23/2019 4:00	1.6	124.8	4.7	97.0	1.5	0.0	-
8/23/2019 5:00	1.6	55.3	4.9	96.1	12.0	0.0	-
8/23/2019 6:00	2.3	15.3	4.9	96.5	32.5	0.0	-
8/23/2019 7:00	2.8	24.2	5.2	96.3	86.6	0.0	-
8/23/2019 8:00	2.7	42.7	5.6	96.6	97.2	0.0	-
8/23/2019 9:00	2.4	143.7	6.0	96.0	111.9	0.0	-
8/23/2019 10:00	1.6	165.9	6.4	96.1	131.1	0.0	-
8/23/2019 11:00	1.4	211.4	6.5	96.6	105.0	0.0	-
8/23/2019 12:00	2.2	272.8	6.4	96.7	79.6	0.0	-
8/23/2019 13:00	1.9	299.6	6.5	96.3	78.9	0.0	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
8/23/2019 14:00	2.1	13.1	6.3	97.8	65.3	0.0	-
8/23/2019 15:00	1.7	37.7	6.5	97.6	57.9	0.0	-
8/23/2019 16:00	1.2	80.2	6.6	98.8	32.6	0.0	-
8/23/2019 17:00	1.4	217.8	7.0	96.9	42.7	0.0	-
8/23/2019 18:00	2.7	208.2	6.8	98.7	5.7	0.0	-
8/23/2019 19:00	2.8	189.0	6.7	99.5	0.1	0.0	-
8/23/2019 20:00	2.6	203.6	6.6	100.0	0.0	0.0	-
8/23/2019 21:00	3.5	205.3	6.4	100.0	0.0	0.0	-
8/23/2019 22:00	3.2	192.4	6.4	100.0	0.0	0.0	-
8/23/2019 23:00	4.2	185.6	6.4	99.1	0.0	0.0	-
8/24/2019 0:00	3.4	169.0	6.6	96.2	0.0	0.0	-
8/24/2019 1:00	4.7	170.5	6.7	93.1	0.0	0.0	-
8/24/2019 2:00	4.6	179.6	6.5	95.5	0.0	0.0	-
8/24/2019 3:00	4.5	174.5	6.6	94.7	0.0	0.0	-
8/24/2019 4:00	3.7	164.9	6.5	95.4	0.5	0.0	-
8/24/2019 5:00	2.8	192.4	6.3	98.5	5.6	0.0	-
8/24/2019 6:00	2.0	174.9	6.3	100.0	17.0	0.0	-
8/24/2019 7:00	2.7	173.1	6.4	100.0	31.1	0.0	-
8/24/2019 8:00	4.1	187.8	6.5	100.0	48.9	0.0	-
8/24/2019 9:00	4.1	205.5	6.9	100.0	66.9	0.0	-
8/24/2019 10:00	4.5	204.8	7.1	100.0	67.7	0.0	-
8/24/2019 11:00	4.1	207.9	7.3	100.0	74.5	0.0	-
8/24/2019 12:00	5.0	219.1	7.6	100.0	78.2	0.0	-
8/24/2019 13:00	4.9	216.7	7.7	100.0	69.1	0.0	-
8/24/2019 14:00	5.3	206.0	8.1	99.4	184.1	0.0	-
8/24/2019 15:00	5.9	219.5	8.1	99.9	166.1	0.0	-
8/24/2019 16:00	6.1	222.3	7.9	98.3	100.4	0.0	-
8/24/2019 17:00	6.9	222.7	7.5	99.9	40.2	0.0	-
8/24/2019 18:00	5.5	214.4	6.7	99.6	5.5	0.0	-
8/24/2019 19:00	4.7	211.7	6.2	99.7	0.1	0.0	-
8/24/2019 20:00	4.8	204.3	5.9	100.0	0.0	0.0	-
8/24/2019 21:00	5.3	190.4	5.5	100.0	0.0	0.0	-
8/24/2019 22:00	4.5	212.3	5.7	98.6	0.0	0.0	-
8/24/2019 23:00	4.2	215.4	5.7	100.0	0.0	0.0	-
8/25/2019 0:00	4.0	200.0	5.4	100.0	0.0	0.0	-
8/25/2019 1:00	3.9	205.7	5.4	100.0	0.0	0.0	-
8/25/2019 2:00	4.4	212.4	5.3	100.0	0.0	0.0	-
8/25/2019 3:00	4.1	195.5	5.1	100.0	0.0	0.0	-
8/25/2019 4:00	3.2	201.4	4.9	100.0	0.9	0.0	-
8/25/2019 5:00	3.0	202.0	5.0	99.7	16.0	0.0	-
8/25/2019 6:00	3.3	198.8	5.1	98.4	51.8	0.0	-
8/25/2019 7:00	4.3	208.5	5.2	99.9	77.7	0.0	-
8/25/2019 8:00	3.8	194.3	5.0	98.2	68.0	0.0	-
8/25/2019 9:00	3.3	199.1	5.6	95.9	215.8	0.0	-
8/25/2019 10:00	3.2	221.5	5.4	99.3	145.5	0.0	-
8/25/2019 11:00	2.5	225.3	6.2	97.7	258.4	0.0	-
8/25/2019 12:00	3.2	185.9	6.7	89.9	461.8	0.0	-
8/25/2019 13:00	2.3	226.4	7.4	87.7	342.7	0.0	-
8/25/2019 14:00	2.7	219.0	7.4	88.2	206.0	0.0	-
8/25/2019 15:00	3.7	238.0	6.7	96.8	56.3	0.0	-
8/25/2019 16:00	3.8	189.5	6.8	90.5	77.4	0.0	-
8/25/2019 17:00	3.1	212.1	6.6	96.0	25.3	0.0	-
8/25/2019 18:00	4.1	185.0	6.2	90.5	18.2	0.0	-
8/25/2019 19:00	3.2	191.5	6.4	87.6	0.3	0.0	-
8/25/2019 20:00	3.4	203.7	6.1	93.4	0.0	0.0	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
8/25/2019 21:00	3.4	208.4	5.8	97.7	0.0	0.0	-
8/25/2019 22:00	3.9	193.6	6.0	93.9	0.0	0.0	-
8/25/2019 23:00	3.7	188.4	6.1	88.8	0.0	0.0	-
8/26/2019 0:00	3.5	191.1	6.2	85.3	0.0	0.0	-
8/26/2019 1:00	3.2	194.0	6.2	84.5	0.0	0.0	-
8/26/2019 2:00	3.4	186.3	6.1	86.7	0.0	0.0	-
8/26/2019 3:00	1.4	156.2	6.0	87.7	0.0	0.0	-
8/26/2019 4:00	1.5	137.9	6.3	86.2	0.9	0.0	-
8/26/2019 5:00	1.6	87.8	6.2	87.9	10.0	0.0	-
8/26/2019 6:00	2.1	129.1	6.3	87.9	34.7	0.0	-
8/26/2019 7:00	2.5	130.3	6.2	90.7	62.9	0.0	-
8/26/2019 8:00	2.0	95.1	6.4	92.1	140.5	0.0	-
8/26/2019 9:00	3.3	168.4	6.6	94.6	195.4	0.0	-
8/26/2019 10:00	3.6	173.6	6.8	95.0	266.7	0.0	-
8/26/2019 11:00	3.8	174.5	7.1	95.5	263.5	0.0	-
8/26/2019 12:00	4.7	170.1	7.2	96.1	210.2	0.0	-
8/26/2019 13:00	4.1	176.7	7.1	95.6	156.2	0.0	-
8/26/2019 14:00	3.7	185.7	6.9	97.9	93.8	0.0	-
8/26/2019 15:00	3.1	193.3	6.8	98.0	48.6	0.0	-
8/26/2019 16:00	3.3	204.0	6.7	99.5	29.4	0.0	-
8/26/2019 17:00	3.0	210.3	6.7	100.0	11.0	0.0	-
8/26/2019 18:00	3.3	194.7	6.7	100.0	2.5	0.0	-
8/26/2019 19:00	2.9	205.5	6.8	100.0	0.0	0.0	-
8/26/2019 20:00	5.0	205.9	6.8	100.0	0.0	0.0	-
8/26/2019 21:00	4.3	211.2	7.0	100.0	0.0	0.0	-
8/26/2019 22:00	4.7	201.3	7.0	100.0	0.0	0.0	-
8/26/2019 23:00	4.4	200.5	7.2	100.0	0.0	0.0	-
8/27/2019 0:00	4.3	210.6	7.3	100.0	0.0	0.0	-
8/27/2019 1:00	4.8	204.6	7.1	100.0	0.0	0.0	-
8/27/2019 2:00	5.0	216.2	7.0	100.0	0.0	0.0	-
8/27/2019 3:00	4.9	220.0	6.5	100.0	0.0	0.0	-
8/27/2019 4:00	5.8	223.9	6.1	100.0	0.9	0.0	-
8/27/2019 5:00	5.7	215.5	5.6	100.0	24.6	0.0	-
8/27/2019 6:00	5.5	208.6	5.2	100.0	68.7	0.0	-
8/27/2019 7:00	5.4	218.4	5.0	99.9	81.1	0.0	-
8/27/2019 8:00	4.7	207.3	4.9	99.8	131.3	0.0	-
8/27/2019 9:00	4.4	195.5	5.6	92.5	393.2	0.0	-
8/27/2019 10:00	4.5	217.4	5.2	97.3	97.7	0.0	-
8/27/2019 11:00	4.2	225.1	5.1	99.7	102.0	0.0	-
8/27/2019 12:00	3.8	213.7	5.3	100.0	144.4	0.0	-
8/27/2019 13:00	3.1	218.7	5.6	99.5	116.9	0.0	-
8/27/2019 14:00	4.1	209.6	5.6	100.0	83.2	0.0	-
8/27/2019 15:00	3.4	215.1	5.8	100.0	111.7	0.0	-
8/27/2019 16:00	3.2	250.1	5.6	100.0	50.5	0.0	-
8/27/2019 17:00	3.1	185.2	5.9	97.6	115.5	0.0	-
8/27/2019 18:00	2.6	200.7	5.9	95.0	12.0	0.0	-
8/27/2019 19:00	1.8	219.9	5.7	99.4	0.2	0.0	-
8/27/2019 20:00	1.3	160.6	5.8	96.4	0.0	0.0	-
8/27/2019 21:00	1.8	230.5	5.6	97.4	0.0	0.0	-
8/27/2019 22:00	1.0	126.2	5.1	99.8	0.0	0.0	-
8/27/2019 23:00	0.5	38.3	5.4	96.4	0.0	0.0	-
8/28/2019 0:00	1.4	22.4	5.3	94.6	0.0	0.0	-
8/28/2019 1:00	1.4	50.2	5.0	94.5	0.0	0.0	-
8/28/2019 2:00	1.4	56.5	4.9	95.1	0.0	0.0	-
8/28/2019 3:00	1.9	43.7	5.1	95.5	0.0	0.0	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
8/28/2019 4:00	2.7	17.7	5.1	93.1	3.7	0.0	-
8/28/2019 5:00	1.6	210.3	4.6	96.1	21.9	0.0	-
8/28/2019 6:00	1.2	186.7	4.3	98.8	123.5	0.0	-
8/28/2019 7:00	1.2	229.4	5.4	92.6	342.9	0.0	-
8/28/2019 8:00	1.2	236.2	6.0	90.4	464.5	0.0	-
8/28/2019 9:00	1.4	232.8	6.5	94.5	572.8	0.0	-
8/28/2019 10:00	1.7	240.5	7.4	94.7	649.6	0.0	-
8/28/2019 11:00	2.1	242.5	8.2	92.1	729.7	0.0	-
8/28/2019 12:00	1.6	271.2	9.4	90.2	536.5	0.0	-
8/28/2019 13:00	2.1	328.4	10.1	80.5	270.3	0.0	-
8/28/2019 14:00	3.3	345.0	10.7	70.1	535.6	0.0	-
8/28/2019 15:00	3.1	352.9	11.0	67.5	417.3	0.0	-
8/28/2019 16:00	3.9	3.7	11.1	66.2	278.4	0.0	-
8/28/2019 17:00	4.2	19.9	10.4	67.6	132.2	0.0	-
8/28/2019 18:00	3.7	31.3	10.1	65.4	26.2	0.0	-
8/28/2019 19:00	3.7	3.2	9.7	67.1	0.2	0.0	-
8/28/2019 20:00	4.3	15.7	9.2	72.1	0.0	0.0	-
8/28/2019 21:00	6.0	32.5	9.3	65.7	0.0	0.0	-
8/28/2019 22:00	7.1	47.0	10.0	56.4	0.0	0.0	-
8/28/2019 23:00	7.0	61.8	10.8	53.4	0.0	0.0	-
8/29/2019 0:00	7.8	57.9	10.5	55.2	0.0	0.0	-
8/29/2019 1:00	6.8	70.9	10.4	56.1	0.0	0.0	-
8/29/2019 2:00	5.7	81.2	9.9	58.2	0.0	0.0	-
8/29/2019 3:00	5.0	84.4	9.5	61.4	0.0	0.0	-
8/29/2019 4:00	5.7	65.5	9.7	58.4	3.0	0.0	-
8/29/2019 5:00	5.0	64.7	9.4	59.3	20.3	0.0	-
8/29/2019 6:00	4.0	81.5	8.9	63.4	145.7	0.0	-
8/29/2019 7:00	3.2	86.1	10.2	59.9	347.6	0.0	-
8/29/2019 8:00	3.2	119.0	10.8	59.2	485.9	0.0	-
8/29/2019 9:00	2.0	180.6	11.5	58.1	598.3	0.0	-
8/29/2019 10:00	2.5	128.7	12.3	56.8	675.6	0.0	-
8/29/2019 11:00	1.7	226.1	12.6	65.9	728.1	0.0	-
8/29/2019 12:00	2.1	236.7	13.3	63.6	733.2	0.0	-
8/29/2019 13:00	2.1	245.1	14.1	63.4	650.6	0.0	-
8/29/2019 14:00	2.1	283.4	14.5	61.1	543.2	0.0	-
8/29/2019 15:00	2.3	291.7	14.7	54.8	415.6	0.0	-
8/29/2019 16:00	1.6	341.8	14.9	51.8	268.1	0.0	-
8/29/2019 17:00	1.8	348.8	14.1	50.9	126.3	0.0	-
8/29/2019 18:00	1.5	15.9	13.4	50.4	22.8	0.0	-
8/29/2019 19:00	1.3	43.4	12.9	52.8	0.2	0.0	-
8/29/2019 20:00	1.8	51.2	12.0	56.8	0.0	0.0	-
8/29/2019 21:00	1.2	28.8	11.5	62.1	0.0	0.0	-
8/29/2019 22:00	1.4	354.5	11.9	57.9	0.0	0.0	-
8/29/2019 23:00	0.6	30.4	11.5	57.7	0.0	0.0	-
8/30/2019 0:00	0.9	193.5	11.2	60.6	0.0	0.0	-
8/30/2019 1:00	0.6	177.4	11.1	59.5	0.0	0.0	-
8/30/2019 2:00	0.8	56.1	10.8	57.0	0.0	0.0	-
8/30/2019 3:00	0.9	194.1	10.4	63.9	0.0	0.0	-
8/30/2019 4:00	0.6	164.0	10.3	62.2	3.2	0.0	-
8/30/2019 5:00	1.5	188.2	9.8	63.9	20.4	0.0	-
8/30/2019 6:00	1.6	163.8	10.1	62.3	140.3	0.0	-
8/30/2019 7:00	1.7	165.4	11.0	61.3	339.4	0.0	-
8/30/2019 8:00	1.3	162.9	12.4	56.0	478.6	0.0	-
8/30/2019 9:00	2.0	205.2	12.0	58.2	589.8	0.0	-
8/30/2019 10:00	1.9	210.3	12.9	57.4	663.7	0.0	-



**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
8/30/2019 11:00	1.7	231.9	13.7	61.5	715.5	0.0	-
8/30/2019 12:00	1.6	272.0	14.9	61.7	726.4	0.0	-
8/30/2019 13:00	1.9	289.5	15.7	51.4	656.2	0.0	-
8/30/2019 14:00	2.1	301.5	16.0	49.1	545.9	0.0	-
8/30/2019 15:00	2.5	296.2	16.0	47.0	406.6	0.0	-
8/30/2019 16:00	2.3	293.4	15.9	45.5	266.0	0.0	-
8/30/2019 17:00	1.5	303.9	15.5	46.0	123.7	0.0	-
8/30/2019 18:00	1.1	19.8	14.6	46.7	21.3	0.0	-
8/30/2019 19:00	2.1	56.5	13.2	51.7	0.0	0.0	-
8/30/2019 20:00	2.0	65.8	12.9	52.7	0.0	0.0	-
8/30/2019 21:00	2.3	70.6	12.8	52.9	0.0	0.0	-
8/30/2019 22:00	1.8	72.1	12.7	53.2	0.0	0.0	-
8/30/2019 23:00	1.2	89.2	12.2	54.8	0.0	0.0	-
8/31/2019 0:00	0.6	51.8	12.2	54.6	0.0	0.0	-
8/31/2019 1:00	1.3	55.6	11.7	54.9	0.0	0.0	-
8/31/2019 2:00	1.3	34.3	11.7	52.4	0.0	0.0	-
8/31/2019 3:00	0.9	161.6	11.3	56.0	0.0	0.0	-
8/31/2019 4:00	0.7	282.2	11.0	55.9	2.7	0.0	-
8/31/2019 5:00	1.1	188.5	10.4	62.9	18.6	0.0	-
8/31/2019 6:00	1.2	168.4	11.1	61.0	139.9	0.0	-
8/31/2019 7:00	1.0	154.6	12.4	56.4	336.9	0.0	-
8/31/2019 8:00	1.8	185.3	12.2	58.7	425.4	0.0	-
8/31/2019 9:00	1.9	208.5	12.4	61.1	538.3	0.0	-
8/31/2019 10:00	1.6	224.6	13.7	59.4	622.8	0.0	-
8/31/2019 11:00	1.8	225.5	13.5	60.5	498.3	0.0	-
8/31/2019 12:00	1.4	245.5	14.7	63.0	584.5	0.0	-
8/31/2019 13:00	1.7	263.8	15.5	63.7	610.4	0.0	-
8/31/2019 14:00	1.8	255.7	16.0	55.5	473.6	0.0	-
8/31/2019 15:00	1.4	252.3	16.0	50.2	301.7	0.0	-
8/31/2019 16:00	1.5	238.6	15.5	50.4	179.8	0.0	-
8/31/2019 17:00	1.3	233.3	14.7	51.4	59.7	0.0	-
8/31/2019 18:00	1.9	195.0	14.2	57.0	10.1	0.0	-
8/31/2019 19:00	2.2	193.6	13.7	60.2	0.0	0.0	-
8/31/2019 20:00	1.6	207.2	13.5	61.7	0.0	0.0	-
8/31/2019 21:00	1.5	196.8	13.1	65.2	0.0	0.0	-
8/31/2019 22:00	2.8	188.0	12.7	67.6	0.0	0.0	-
8/31/2019 23:00	2.8	190.3	12.1	71.3	0.0	0.0	-
9/1/2019 0:00	2.4	196.5	11.9	72.8	0.0	0.0	-
9/1/2019 1:00	2.7	191.1	11.7	73.7	0.0	0.0	-
9/1/2019 2:00	3.2	192.6	11.5	74.1	0.0	0.0	-
9/1/2019 3:00	3.6	206.8	11.2	73.1	0.0	0.0	-
9/1/2019 4:00	4.0	198.4	11.0	73.5	1.9	0.0	-
9/1/2019 5:00	3.8	189.2	11.1	71.0	30.3	0.0	-
9/1/2019 6:00	4.5	190.1	11.7	66.5	86.8	0.0	-
9/1/2019 7:00	3.8	197.4	12.0	67.1	240.3	0.0	-
9/1/2019 8:00	3.3	207.7	12.4	66.8	375.2	0.0	-
9/1/2019 9:00	3.6	212.7	12.9	66.0	583.7	0.0	-
9/1/2019 10:00	4.2	223.7	13.3	64.4	665.0	0.0	-
9/1/2019 11:00	3.2	270.6	13.8	62.7	696.3	0.0	-
9/1/2019 12:00	3.2	281.1	14.4	59.3	714.9	0.0	-
9/1/2019 13:00	3.6	273.9	14.9	55.5	629.0	0.0	-
9/1/2019 14:00	3.0	295.1	15.2	52.2	499.9	0.0	-
9/1/2019 15:00	3.2	298.7	15.3	51.8	425.7	0.0	-
9/1/2019 16:00	3.3	278.7	15.1	54.7	274.7	0.0	-
9/1/2019 17:00	2.8	247.3	14.2	57.7	94.7	0.0	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
9/1/2019 18:00	3.3	215.0	13.1	61.8	17.2	0.0	-
9/1/2019 19:00	3.1	228.8	12.1	64.9	0.0	0.0	-
9/1/2019 20:00	3.7	210.1	11.9	66.7	0.0	0.0	-
9/1/2019 21:00	3.4	215.7	11.5	69.3	0.0	0.0	-
9/1/2019 22:00	3.5	200.9	11.2	68.8	0.0	0.0	-
9/1/2019 23:00	3.7	193.2	11.4	67.1	0.0	0.0	-
9/2/2019 0:00	3.4	200.9	11.0	68.1	0.0	0.0	-
9/2/2019 1:00	4.2	199.4	10.8	67.9	0.0	0.0	-
9/2/2019 2:00	4.0	208.3	10.4	68.9	0.0	0.0	-
9/2/2019 3:00	4.4	204.4	10.4	67.7	0.0	0.0	-
9/2/2019 4:00	4.9	212.6	10.1	69.1	0.7	0.0	-
9/2/2019 5:00	5.0	219.7	10.2	67.1	17.3	0.0	-
9/2/2019 6:00	4.4	207.3	10.2	64.8	43.5	0.0	-
9/2/2019 7:00	5.2	206.8	9.9	62.7	71.5	0.0	-
9/2/2019 8:00	4.4	208.1	9.5	67.1	97.0	0.0	-
9/2/2019 9:00	4.4	208.5	9.6	66.1	157.4	0.0	-
9/2/2019 10:00	4.4	218.2	9.9	64.2	184.8	0.0	-
9/2/2019 11:00	4.6	217.1	9.7	69.1	148.8	0.0	-
9/2/2019 12:00	4.6	221.3	8.6	81.9	178.1	0.0	-
9/2/2019 13:00	3.4	220.7	8.7	83.9	119.8	0.0	-
9/2/2019 14:00	3.8	219.7	8.5	87.4	146.2	0.0	-
9/2/2019 15:00	4.6	224.8	7.9	95.8	95.4	0.0	-
9/2/2019 16:00	4.4	221.9	7.8	99.9	45.6	0.0	-
9/2/2019 17:00	4.9	211.5	8.0	100.0	14.6	0.0	-
9/2/2019 18:00	4.5	217.2	8.0	100.0	1.8	0.0	-
9/2/2019 19:00	4.9	217.1	8.1	100.0	0.0	0.0	-
9/2/2019 20:00	4.8	208.3	8.2	100.0	0.0	0.0	-
9/2/2019 21:00	4.9	212.3	8.2	100.0	0.0	0.0	-
9/2/2019 22:00	5.0	204.4	8.2	100.0	0.0	0.0	-
9/2/2019 23:00	4.7	201.0	8.3	100.0	0.0	0.0	-
9/3/2019 0:00	4.0	208.5	8.3	100.0	0.0	0.0	-
9/3/2019 1:00	4.0	195.6	8.4	100.0	0.0	0.0	-
9/3/2019 2:00	3.0	204.6	8.4	100.0	0.0	0.0	-
9/3/2019 3:00	3.7	188.1	8.5	100.0	0.0	0.0	-
9/3/2019 4:00	3.8	215.0	8.5	100.0	0.3	0.0	-
9/3/2019 5:00	3.4	207.1	8.7	100.0	8.5	0.0	-
9/3/2019 6:00	3.7	196.1	8.6	100.0	31.0	0.0	-
9/3/2019 7:00	2.6	194.0	9.1	100.0	80.7	0.0	-
9/3/2019 8:00	2.9	230.8	8.9	100.0	90.4	0.0	-
9/3/2019 9:00	2.8	215.1	8.8	100.0	65.1	0.0	-
9/3/2019 10:00	3.3	213.9	8.8	100.0	64.2	0.0	-
9/3/2019 11:00	3.8	222.6	8.9	100.0	87.3	0.0	-
9/3/2019 12:00	3.1	220.3	9.0	100.0	102.2	0.0	-
9/3/2019 13:00	3.3	224.3	9.2	100.0	110.2	0.0	-
9/3/2019 14:00	3.9	208.4	9.2	100.0	118.4	0.0	-
9/3/2019 15:00	4.0	217.4	9.2	100.0	55.6	0.0	-
9/3/2019 16:00	3.8	204.5	9.3	100.0	52.6	0.0	-
9/3/2019 17:00	4.2	208.5	9.1	100.0	56.6	0.0	-
9/3/2019 18:00	3.7	199.6	9.0	100.0	7.4	0.0	-
9/3/2019 19:00	3.4	210.6	8.8	100.0	0.0	0.0	-
9/3/2019 20:00	3.7	216.3	8.7	100.0	0.0	0.0	-
9/3/2019 21:00	3.2	230.4	8.8	100.0	0.0	0.0	-
9/3/2019 22:00	3.3	242.9	8.6	100.0	0.0	0.0	-
9/3/2019 23:00	3.4	244.3	8.4	100.0	0.0	0.0	-
9/4/2019 0:00	3.4	234.1	8.2	100.0	0.0	0.0	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
9/4/2019 1:00	3.3	230.7	8.1	100.0	0.0	0.0	-
9/4/2019 2:00	4.5	247.2	7.9	100.0	0.0	0.0	-
9/4/2019 3:00	4.4	237.8	7.6	100.0	0.0	0.0	-
9/4/2019 4:00	4.0	236.1	7.4	100.0	0.5	0.0	-
9/4/2019 5:00	3.8	235.6	7.1	100.0	12.8	0.0	-
9/4/2019 6:00	3.5	227.8	7.0	100.0	46.1	0.0	-
9/4/2019 7:00	3.0	233.1	7.0	100.0	101.6	0.0	-
9/4/2019 8:00	2.3	220.8	7.0	100.0	124.1	0.0	-
9/4/2019 9:00	2.1	224.4	7.2	100.0	269.3	0.0	-
9/4/2019 10:00	3.1	223.2	7.3	100.0	435.0	0.0	-
9/4/2019 11:00	2.6	239.7	8.0	98.3	660.2	0.0	-
9/4/2019 12:00	3.0	239.3	8.9	92.5	691.4	0.0	-
9/4/2019 13:00	3.3	241.3	9.7	83.7	572.5	0.0	-
9/4/2019 14:00	2.6	259.8	9.8	79.8	320.8	0.0	-
9/4/2019 15:00	1.7	245.1	9.5	79.3	147.7	0.0	-
9/4/2019 16:00	2.0	314.6	9.5	80.6	149.5	0.0	-
9/4/2019 17:00	2.2	345.3	9.0	82.1	122.3	0.0	-
9/4/2019 18:00	1.4	18.7	8.0	85.4	6.4	0.0	-
9/4/2019 19:00	1.1	228.1	8.1	89.7	0.0	0.0	-
9/4/2019 20:00	1.6	213.1	7.8	92.2	0.0	0.0	-
9/4/2019 21:00	0.8	197.4	7.7	91.6	0.0	0.0	-
9/4/2019 22:00	0.9	179.0	7.8	88.5	0.0	0.0	-
9/4/2019 23:00	1.3	204.3	7.4	93.0	0.0	0.0	-
9/5/2019 0:00	1.1	175.8	7.2	94.0	0.0	0.0	-
9/5/2019 1:00	0.4	212.3	6.9	95.1	0.0	0.0	-
9/5/2019 2:00	0.7	38.0	6.7	89.4	0.0	0.0	-
9/5/2019 3:00	0.3	242.2	6.7	91.7	0.0	0.0	-
9/5/2019 4:00	0.6	74.3	6.6	89.4	1.1	0.0	-
9/5/2019 5:00	1.2	214.0	6.4	90.8	16.0	0.0	-
9/5/2019 6:00	1.1	171.5	6.5	92.1	103.2	0.0	-
9/5/2019 7:00	0.9	100.2	8.7	82.8	314.1	0.0	-
9/5/2019 8:00	1.5	52.3	9.4	77.9	451.4	0.0	-
9/5/2019 9:00	1.8	213.0	8.2	86.9	547.6	0.0	-
9/5/2019 10:00	1.5	227.7	9.5	82.8	615.8	0.0	-
9/5/2019 11:00	1.7	283.1	10.9	79.9	633.3	0.0	-
9/5/2019 12:00	2.1	268.2	11.5	78.0	688.0	0.0	-
9/5/2019 13:00	1.8	290.1	12.3	63.8	566.1	0.0	-
9/5/2019 14:00	2.2	288.8	12.7	61.5	436.1	0.0	-
9/5/2019 15:00	1.6	293.2	12.3	60.2	210.7	0.0	-
9/5/2019 16:00	0.5	227.5	12.1	59.3	79.7	0.0	-
9/5/2019 17:00	0.6	30.5	11.5	72.9	30.1	0.0	-
9/5/2019 18:00	1.2	32.9	11.3	67.1	2.7	0.0	-
9/5/2019 19:00	1.3	22.0	10.9	64.4	0.0	0.0	-
9/5/2019 20:00	1.0	18.5	10.9	62.5	0.0	0.0	-
9/5/2019 21:00	1.4	15.1	10.7	62.8	0.0	0.0	-
9/5/2019 22:00	1.3	29.8	10.7	62.0	0.0	0.0	-
9/5/2019 23:00	1.2	126.9	10.4	64.4	0.0	0.0	-
9/6/2019 0:00	1.1	40.2	10.5	63.7	0.0	0.0	-
9/6/2019 1:00	0.9	267.5	10.0	67.8	0.0	0.0	-
9/6/2019 2:00	0.9	179.7	9.8	69.8	0.0	0.0	-
9/6/2019 3:00	0.7	173.9	9.9	68.3	0.0	0.0	-
9/6/2019 4:00	1.2	101.9	10.1	64.5	0.3	0.0	-
9/6/2019 5:00	1.2	205.4	9.8	69.2	11.1	0.0	-
9/6/2019 6:00	0.7	189.8	10.2	66.2	57.3	0.0	-
9/6/2019 7:00	1.2	200.6	9.9	70.2	121.3	0.0	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
9/6/2019 8:00	1.1	258.5	10.0	71.4	146.4	0.0	-
9/6/2019 9:00	1.3	229.0	10.4	67.8	245.0	0.0	-
9/6/2019 10:00	1.4	193.9	11.1	74.6	284.2	0.0	-
9/6/2019 11:00	1.2	211.7	11.3	76.2	256.3	0.0	-
9/6/2019 12:00	1.4	200.0	11.4	73.3	217.2	0.0	-
9/6/2019 13:00	1.4	249.1	11.4	80.7	245.5	0.0	-
9/6/2019 14:00	1.5	208.7	11.1	75.4	186.9	0.0	-
9/6/2019 15:00	1.3	266.2	11.3	75.5	136.4	0.0	-
9/6/2019 16:00	0.7	332.6	11.2	70.9	74.3	0.0	-
9/6/2019 17:00	1.0	36.5	11.4	67.1	26.8	0.0	-
9/6/2019 18:00	1.8	195.3	10.6	72.3	2.0	0.0	-
9/6/2019 19:00	1.9	196.4	10.5	71.7	0.0	0.0	-
9/6/2019 20:00	0.7	133.1	10.4	71.2	0.0	0.0	-
9/6/2019 21:00	1.1	60.0	10.3	68.8	0.0	0.0	-
9/6/2019 22:00	1.5	47.7	10.2	68.4	0.0	0.0	-
9/6/2019 23:00	2.0	23.1	10.2	68.2	0.0	0.0	-
9/7/2019 0:00	1.7	35.9	9.7	71.3	0.0	0.0	-
9/7/2019 1:00	1.4	47.9	9.5	75.4	0.0	0.0	-
9/7/2019 2:00	1.5	22.6	9.7	72.6	0.0	0.0	-
9/7/2019 3:00	1.0	300.3	8.8	82.4	0.0	0.0	-
9/7/2019 4:00	1.0	197.0	8.6	85.4	0.4	0.0	-
9/7/2019 5:00	1.7	352.9	9.4	77.6	13.4	0.0	-
9/7/2019 6:00	1.3	236.5	9.1	79.3	61.5	0.0	-
9/7/2019 7:00	2.1	13.3	10.6	74.3	229.1	0.0	-
9/7/2019 8:00	3.4	27.0	12.3	69.7	438.6	0.0	-
9/7/2019 9:00	2.8	322.5	12.4	70.0	547.3	0.0	-
9/7/2019 10:00	5.8	47.2	14.0	59.6	599.6	0.0	-
9/7/2019 11:00	3.6	42.0	14.6	58.8	657.5	0.0	-
9/7/2019 12:00	1.6	266.6	13.8	73.6	438.6	0.0	-
9/7/2019 13:00	0.9	8.7	13.9	68.9	185.2	0.0	-
9/7/2019 14:00	2.6	30.8	14.0	66.7	175.9	0.0	-
9/7/2019 15:00	4.1	37.6	14.1	64.0	126.2	0.0	-
9/7/2019 16:00	4.3	44.8	13.9	60.7	53.5	0.0	-
9/7/2019 17:00	5.2	49.8	13.8	59.6	57.4	0.0	-
9/7/2019 18:00	5.4	61.3	13.6	58.7	4.7	0.0	-
9/7/2019 19:00	5.9	66.5	13.8	54.7	0.0	0.0	-
9/7/2019 20:00	4.8	44.1	13.3	57.4	0.0	0.0	-
9/7/2019 21:00	6.4	46.3	13.1	58.3	0.0	0.0	-
9/7/2019 22:00	8.2	52.5	12.6	61.0	0.0	0.0	-
9/7/2019 23:00	9.4	55.7	12.5	61.9	0.0	0.0	-
9/8/2019 0:00	9.7	60.4	12.6	61.3	0.0	0.0	-
9/8/2019 1:00	9.6	61.6	12.3	61.5	0.0	0.0	-
9/8/2019 2:00	6.8	87.5	12.0	61.6	0.0	0.0	-
9/8/2019 3:00	7.7	73.5	11.9	59.1	0.0	0.0	-
9/8/2019 4:00	7.5	83.6	11.4	61.4	0.5	0.0	-
9/8/2019 5:00	9.4	72.7	11.3	60.7	13.8	0.0	-
9/8/2019 6:00	8.1	89.0	11.0	60.9	38.0	0.0	-
9/8/2019 7:00	6.1	88.5	11.4	61.2	289.7	0.0	-
9/8/2019 8:00	7.2	78.5	12.2	58.3	443.4	0.0	-
9/8/2019 9:00	9.4	71.5	12.9	55.2	555.2	0.0	-
9/8/2019 10:00	11.3	60.6	13.0	53.5	631.8	0.0	-
9/8/2019 11:00	9.8	52.9	13.6	51.3	674.4	0.0	-
9/8/2019 12:00	8.0	55.4	14.3	48.0	691.0	0.0	-
9/8/2019 13:00	6.0	44.6	14.4	46.7	395.7	0.0	-
9/8/2019 14:00	5.9	51.2	14.8	44.2	356.4	0.0	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
9/8/2019 15:00	5.5	58.8	15.0	40.0	321.4	0.0	-
9/8/2019 16:00	4.6	48.8	14.8	40.6	134.1	0.0	-
9/8/2019 17:00	4.5	49.9	14.5	41.6	77.1	0.0	-
9/8/2019 18:00	3.9	56.5	14.3	40.2	4.5	0.0	-
9/8/2019 19:00	2.5	57.0	14.1	40.9	0.0	0.0	-
9/8/2019 20:00	2.4	55.8	13.6	43.0	0.0	0.0	-
9/8/2019 21:00	3.8	69.6	12.8	48.6	0.0	0.0	-
9/8/2019 22:00	3.5	107.7	12.3	50.7	0.0	0.0	-
9/8/2019 23:00	3.9	73.9	12.6	49.2	0.0	0.0	-
9/9/2019 0:00	6.5	67.2	12.2	53.4	0.0	0.0	-
9/9/2019 1:00	5.1	61.6	11.9	55.6	0.0	0.0	-
9/9/2019 2:00	5.4	59.5	11.4	55.5	0.0	0.0	-
9/9/2019 3:00	6.5	57.4	11.2	55.1	0.0	0.0	-
9/9/2019 4:00	8.2	58.1	10.8	55.6	0.7	0.0	-
9/9/2019 5:00	8.9	63.0	10.5	55.7	21.0	0.0	-
9/9/2019 6:00	7.8	59.4	10.4	55.7	83.0	0.0	-
9/9/2019 7:00	7.5	66.3	11.4	50.9	300.6	0.0	-
9/9/2019 8:00	6.2	62.2	12.0	49.6	432.7	0.0	-
9/9/2019 9:00	5.3	58.6	12.5	49.5	540.3	0.0	-
9/9/2019 10:00	2.2	241.9	12.5	53.6	612.7	0.0	-
9/9/2019 11:00	2.4	259.8	12.8	52.6	519.1	0.0	-
9/9/2019 12:00	2.5	271.1	13.7	50.1	628.3	0.0	-
9/9/2019 13:00	2.6	263.1	14.3	48.3	625.0	0.0	-
9/9/2019 14:00	2.4	272.4	14.3	48.0	524.5	0.0	-
9/9/2019 15:00	2.3	257.7	13.9	49.9	330.1	0.0	-
9/9/2019 16:00	1.3	242.3	13.4	51.9	133.7	0.0	-
9/9/2019 17:00	0.4	224.0	12.7	53.8	24.6	0.0	-
9/9/2019 18:00	0.6	185.3	12.3	52.9	1.5	0.0	-
9/9/2019 19:00	0.4	17.8	12.1	53.5	0.0	0.0	-
9/9/2019 20:00	1.1	53.9	11.8	55.5	0.0	0.0	-
9/9/2019 21:00	1.4	66.3	11.6	55.8	0.0	0.0	-
9/9/2019 22:00	1.8	56.4	11.4	55.3	0.0	0.0	-
9/9/2019 23:00	1.0	2.9	11.3	54.7	0.0	0.0	-
9/10/2019 0:00	1.5	212.2	10.9	59.4	0.0	0.0	-
9/10/2019 1:00	1.5	231.8	10.8	59.4	0.0	0.0	-
9/10/2019 2:00	0.8	203.0	10.5	60.6	0.0	0.0	-
9/10/2019 3:00	2.5	179.9	10.4	63.8	0.0	0.0	-
9/10/2019 4:00	2.2	202.6	10.0	66.5	0.1	0.0	-
9/10/2019 5:00	1.7	199.1	9.8	66.9	13.4	0.0	-
9/10/2019 6:00	1.4	181.2	10.2	66.9	98.3	0.0	-
9/10/2019 7:00	0.9	227.8	11.1	65.3	225.5	0.0	-
9/10/2019 8:00	1.0	216.5	11.3	65.0	359.1	0.0	-
9/10/2019 9:00	1.2	246.9	11.2	66.2	295.1	0.0	-
9/10/2019 10:00	0.8	283.6	11.7	65.9	285.0	0.0	-
9/10/2019 11:00	1.0	316.5	12.5	62.6	358.0	0.0	-
9/10/2019 12:00	1.5	279.8	12.2	64.6	256.0	0.0	-
9/10/2019 13:00	1.4	230.9	12.4	66.3	264.6	0.0	-
9/10/2019 14:00	1.8	277.2	12.5	66.7	256.3	0.0	-
9/10/2019 15:00	1.1	270.5	12.8	64.0	221.1	0.0	-
9/10/2019 16:00	1.0	222.8	11.9	69.5	78.5	0.0	-
9/10/2019 17:00	2.3	187.7	11.1	72.5	16.2	0.0	-
9/10/2019 18:00	2.8	190.3	10.7	71.2	1.8	0.0	-
9/10/2019 19:00	2.8	193.4	10.6	71.8	0.0	0.0	-
9/10/2019 20:00	2.5	194.0	10.7	69.5	0.0	0.0	-
9/10/2019 21:00	1.7	187.9	10.6	69.7	0.0	0.0	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
9/10/2019 22:00	1.0	129.5	10.5	68.9	0.0	0.0	-
9/10/2019 23:00	0.9	88.9	10.3	70.2	0.0	0.0	-
9/11/2019 0:00	1.1	168.1	10.1	70.7	0.0	0.0	-
9/11/2019 1:00	2.6	190.1	9.1	77.8	0.0	0.0	-
9/11/2019 2:00	2.9	171.3	9.1	76.4	0.0	0.0	-
9/11/2019 3:00	1.5	51.0	9.0	77.5	0.0	0.0	-
9/11/2019 4:00	0.5	169.5	9.4	73.3	0.3	0.0	-
9/11/2019 5:00	0.5	145.8	9.3	73.8	19.6	0.0	-
9/11/2019 6:00	1.6	85.9	9.3	74.8	73.8	0.0	-
9/11/2019 7:00	1.8	175.3	9.8	70.4	128.9	0.0	-
9/11/2019 8:00	3.8	190.9	9.2	77.7	153.2	0.0	-
9/11/2019 9:00	4.6	183.2	9.3	74.5	210.8	0.0	-
9/11/2019 10:00	2.8	164.2	10.0	71.3	345.3	0.0	-
9/11/2019 11:00	2.2	204.5	11.1	68.8	406.7	0.0	-
9/11/2019 12:00	3.9	182.5	10.5	70.1	173.2	0.0	-
9/11/2019 13:00	1.9	37.9	10.6	72.8	150.4	0.0	-
9/11/2019 14:00	0.9	267.6	10.8	67.9	118.3	0.0	-
9/11/2019 15:00	1.0	348.0	11.0	69.0	112.3	0.0	-
9/11/2019 16:00	0.5	202.7	10.8	69.4	46.4	0.0	-
9/11/2019 17:00	0.5	50.8	10.6	66.8	11.0	0.0	-
9/11/2019 18:00	2.4	210.0	8.9	88.6	0.3	0.0	-
9/11/2019 19:00	3.6	189.6	8.5	89.3	0.0	0.0	-
9/11/2019 20:00	2.5	311.1	8.7	85.4	0.0	0.0	-
9/11/2019 21:00	1.3	260.2	8.2	90.0	0.0	0.0	-
9/11/2019 22:00	1.3	8.1	8.2	89.2	0.0	0.0	-
9/11/2019 23:00	1.4	48.7	8.5	85.6	0.0	0.0	-
9/12/2019 0:00	2.2	110.6	7.8	92.7	0.0	0.0	-
9/12/2019 1:00	2.9	51.0	7.7	93.4	0.0	0.0	-
9/12/2019 2:00	1.6	135.9	7.9	93.1	0.0	0.0	-
9/12/2019 3:00	1.9	40.7	7.8	92.7	0.0	0.0	-
9/12/2019 4:00	1.3	48.1	7.9	92.0	0.0	0.0	-
9/12/2019 5:00	1.3	71.4	8.2	90.4	7.5	0.0	-
9/12/2019 6:00	1.3	59.5	8.3	90.8	42.9	0.0	-
9/12/2019 7:00	1.7	59.8	8.4	90.8	59.1	0.0	-
9/12/2019 8:00	0.8	198.4	8.5	94.0	102.8	0.0	-
9/12/2019 9:00	1.5	207.1	8.5	96.2	113.4	0.0	-
9/12/2019 10:00	1.7	221.7	8.6	97.4	236.9	0.0	-
9/12/2019 11:00	1.8	235.8	9.2	93.1	465.0	0.0	-
9/12/2019 12:00	1.3	284.2	10.5	91.5	499.0	0.0	-
9/12/2019 13:00	3.2	204.5	9.4	93.9	277.6	0.0	-
9/12/2019 14:00	3.3	213.2	10.2	87.8	454.3	0.0	-
9/12/2019 15:00	3.6	201.6	9.7	90.2	117.2	0.0	-
9/12/2019 16:00	6.1	172.3	9.8	77.0	60.7	0.0	-
9/12/2019 17:00	4.5	189.8	9.2	83.6	24.3	0.0	-
9/12/2019 18:00	3.4	202.3	8.1	98.4	0.9	0.0	-
9/12/2019 19:00	3.3	194.7	7.9	96.2	0.0	0.0	-
9/12/2019 20:00	3.3	169.3	8.3	88.9	0.0	0.0	-
9/12/2019 21:00	3.2	155.3	8.3	88.6	0.0	0.0	-
9/12/2019 22:00	3.1	153.2	8.3	89.5	0.0	0.0	-
9/12/2019 23:00	2.9	139.0	8.0	92.9	0.0	0.0	-
9/13/2019 0:00	4.5	166.6	7.7	96.3	0.0	0.0	-
9/13/2019 1:00	3.7	158.3	7.7	97.9	0.0	0.0	-
9/13/2019 2:00	5.4	171.5	7.6	99.0	0.0	0.0	-
9/13/2019 3:00	5.0	185.9	7.5	99.9	0.0	0.0	-
9/13/2019 4:00	5.6	177.7	7.5	96.9	0.0	0.0	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
9/13/2019 5:00	5.9	172.4	7.8	94.2	4.7	0.0	-
9/13/2019 6:00	5.6	170.2	7.6	95.1	20.9	0.0	-
9/13/2019 7:00	5.3	184.0	7.3	98.3	28.3	0.0	-
9/13/2019 8:00	6.5	179.6	7.4	92.8	97.6	0.0	-
9/13/2019 9:00	5.4	181.2	7.0	96.3	143.9	0.0	-
9/13/2019 10:00	5.3	177.6	7.3	96.4	196.5	0.0	-
9/13/2019 11:00	3.7	200.3	7.3	98.4	164.7	0.0	-
9/13/2019 12:00	5.1	200.0	7.1	97.8	119.6	0.0	-
9/13/2019 13:00	4.5	187.9	6.8	84.2	84.5	0.0	-
9/13/2019 14:00	2.9	199.1	6.2	91.7	111.9	0.0	-
9/13/2019 15:00	4.4	178.0	6.3	90.5	84.5	0.0	-
9/13/2019 16:00	4.6	173.8	6.2	89.3	41.5	0.0	-
9/13/2019 17:00	3.5	153.0	6.1	88.2	17.7	0.0	-
9/13/2019 18:00	3.8	148.4	5.8	89.3	0.4	0.0	-
9/13/2019 19:00	3.3	164.5	5.4	90.4	0.0	0.0	-
9/13/2019 20:00	1.1	198.9	5.3	93.7	0.0	0.0	-
9/13/2019 21:00	1.8	168.4	5.4	91.6	0.0	0.0	-
9/13/2019 22:00	2.9	193.7	5.3	93.2	0.0	0.0	-
9/13/2019 23:00	2.8	197.2	4.9	96.9	0.0	0.0	-
9/14/2019 0:00	2.8	202.2	5.0	95.7	0.0	0.0	-
9/14/2019 1:00	2.8	200.7	4.9	98.3	0.0	0.0	-
9/14/2019 2:00	2.6	189.8	4.9	96.3	0.0	0.0	-
9/14/2019 3:00	2.3	188.4	5.0	92.7	0.0	0.0	-
9/14/2019 4:00	1.6	193.5	5.0	91.4	0.0	0.0	-
9/14/2019 5:00	0.7	102.8	5.3	89.1	13.0	0.0	-
9/14/2019 6:00	1.4	230.7	5.2	93.2	63.1	0.0	-
9/14/2019 7:00	2.8	198.5	4.7	97.2	86.5	0.0	-
9/14/2019 8:00	2.2	221.3	4.9	93.2	224.7	0.0	-
9/14/2019 9:00	2.4	221.7	5.8	91.8	463.8	0.0	-
9/14/2019 10:00	1.8	239.2	6.2	87.1	352.0	0.0	-
9/14/2019 11:00	1.9	220.5	6.3	86.7	247.1	0.0	-
9/14/2019 12:00	2.0	202.4	6.4	91.3	160.9	0.0	-
9/14/2019 13:00	1.9	242.9	6.9	89.4	380.9	0.0	-
9/14/2019 14:00	2.3	244.2	7.2	89.2	301.8	0.0	-
9/14/2019 15:00	2.5	232.4	7.4	86.2	274.1	0.0	-
9/14/2019 16:00	2.1	222.4	7.3	82.7	180.1	0.0	-
9/14/2019 17:00	1.3	222.2	6.6	81.3	49.0	0.0	-
9/14/2019 18:00	1.0	22.8	6.3	79.4	1.3	0.0	-
9/14/2019 19:00	2.1	55.7	6.1	82.5	0.0	0.0	-
9/14/2019 20:00	1.9	38.0	6.1	82.6	0.0	0.0	-
9/14/2019 21:00	2.4	25.9	5.9	85.0	0.0	0.0	-
9/14/2019 22:00	2.1	34.1	5.8	86.3	0.0	0.0	-
9/14/2019 23:00	2.1	34.8	5.3	93.3	0.0	0.0	-
9/15/2019 0:00	3.1	24.1	4.9	97.1	0.0	0.0	-
9/15/2019 1:00	2.9	23.5	4.8	99.1	0.0	0.0	-
9/15/2019 2:00	2.3	20.4	5.0	97.7	0.0	0.0	-
9/15/2019 3:00	2.1	7.7	5.0	97.4	0.0	0.0	-
9/15/2019 4:00	2.5	14.4	5.3	94.6	0.0	0.0	-
9/15/2019 5:00	4.1	32.3	5.2	95.5	4.4	0.0	-
9/15/2019 6:00	4.6	50.2	5.7	92.5	23.8	0.0	-
9/15/2019 7:00	3.7	61.7	6.1	91.6	89.9	0.0	-
9/15/2019 8:00	3.1	88.8	8.1	80.8	403.8	0.0	-
9/15/2019 9:00	4.6	46.7	9.6	68.0	499.9	0.0	-
9/15/2019 10:00	5.1	60.2	9.6	66.2	318.0	0.0	-
9/15/2019 11:00	2.6	9.2	10.2	68.5	451.7	0.0	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
9/15/2019 12:00	2.1	339.5	10.5	76.3	458.6	0.0	-
9/15/2019 13:00	2.4	303.0	10.3	83.4	408.4	0.0	-
9/15/2019 14:00	2.0	306.7	10.5	71.9	226.3	0.0	-
9/15/2019 15:00	1.0	41.3	10.4	73.4	121.3	0.0	-
9/15/2019 16:00	0.9	272.4	10.4	75.1	81.9	0.0	-
9/15/2019 17:00	1.1	169.0	9.4	87.3	26.6	0.0	-
9/15/2019 18:00	1.4	171.2	9.1	73.9	0.5	0.0	-
9/15/2019 19:00	2.2	196.5	8.6	77.5	0.0	0.0	-
9/15/2019 20:00	2.7	205.8	8.0	87.8	0.0	0.0	-
9/15/2019 21:00	2.6	207.6	7.4	91.4	0.0	0.0	-
9/15/2019 22:00	2.5	215.9	7.4	91.3	0.0	0.0	-
9/15/2019 23:00	2.6	202.1	7.4	90.6	0.0	0.0	-
9/16/2019 0:00	3.0	197.5	7.2	90.6	0.0	0.0	-
9/16/2019 1:00	3.1	198.6	6.8	91.8	0.0	0.0	-
9/16/2019 2:00	5.2	185.9	6.9	85.7	0.0	0.0	-
9/16/2019 3:00	6.3	179.0	6.6	83.6	0.0	0.0	-
9/16/2019 4:00	6.3	179.3	6.7	79.1	0.0	0.0	-
9/16/2019 5:00	5.6	178.7	6.6	76.8	8.6	0.0	-
9/16/2019 6:00	5.8	177.2	6.7	73.8	44.9	0.0	-
9/16/2019 7:00	5.4	183.1	6.5	77.1	90.8	0.0	-
9/16/2019 8:00	4.8	185.3	6.3	80.5	85.1	0.0	-
9/16/2019 9:00	2.7	159.4	6.5	81.0	79.8	0.0	-
9/16/2019 10:00	1.8	188.8	6.7	81.9	80.6	0.0	-
9/16/2019 11:00	5.3	185.0	6.1	86.4	102.3	0.0	-
9/16/2019 12:00	4.7	181.7	6.1	86.2	126.6	0.0	-
9/16/2019 13:00	3.1	156.7	6.5	83.2	119.1	0.0	-
9/16/2019 14:00	4.2	169.0	6.4	82.0	119.6	0.0	-
9/16/2019 15:00	2.0	26.2	6.8	79.1	76.9	0.0	-
9/16/2019 16:00	1.4	204.2	6.7	77.5	46.1	0.0	-
9/16/2019 17:00	1.3	286.5	6.4	77.3	9.5	0.0	-
9/16/2019 18:00	0.5	88.7	6.5	76.8	0.2	0.0	-
9/16/2019 19:00	0.7	315.0	6.7	73.2	0.0	0.0	-
9/16/2019 20:00	3.1	21.4	6.9	70.4	0.0	0.0	-
9/16/2019 21:00	7.7	61.0	7.0	69.2	0.0	0.0	-
9/16/2019 22:00	6.9	61.0	6.8	70.4	0.0	0.0	-
9/16/2019 23:00	7.4	70.5	7.1	70.2	0.0	0.0	-
9/17/2019 0:00	5.1	79.4	7.2	70.7	0.0	0.0	-
9/17/2019 1:00	2.4	60.1	7.0	70.2	0.0	0.0	-
9/17/2019 2:00	4.6	70.8	7.1	69.2	0.0	0.0	-
9/17/2019 3:00	5.5	68.8	7.2	67.9	0.0	0.0	-
9/17/2019 4:00	4.6	69.0	6.9	70.8	0.0	0.0	-
9/17/2019 5:00	4.6	72.2	6.5	74.8	7.8	0.0	-
9/17/2019 6:00	4.3	81.0	6.9	72.3	59.5	0.0	-
9/17/2019 7:00	1.5	260.7	7.3	72.5	215.8	0.0	-
9/17/2019 8:00	1.7	47.3	8.9	66.4	398.8	0.0	-
9/17/2019 9:00	2.0	332.0	9.1	68.1	542.0	0.0	-
9/17/2019 10:00	1.7	303.6	9.7	69.1	572.2	0.0	-
9/17/2019 11:00	1.7	282.4	9.9	71.6	613.4	0.0	-
9/17/2019 12:00	1.8	248.5	10.6	70.1	616.5	0.0	-
9/17/2019 13:00	2.6	288.1	11.1	66.8	560.9	0.0	-
9/17/2019 14:00	2.4	289.5	11.4	59.4	448.8	0.0	-
9/17/2019 15:00	2.6	290.8	11.5	58.5	295.5	0.0	-
9/17/2019 16:00	2.9	311.2	11.0	58.0	158.7	0.0	-
9/17/2019 17:00	1.8	18.8	9.8	61.9	32.0	0.0	-
9/17/2019 18:00	2.1	52.0	9.2	65.2	0.6	0.0	-



**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
9/17/2019 19:00	1.5	39.2	8.9	67.9	0.0	0.0	-
9/17/2019 20:00	1.1	175.0	8.8	68.6	0.0	0.0	-
9/17/2019 21:00	2.3	201.5	8.5	70.9	0.0	0.0	-
9/17/2019 22:00	1.6	205.6	8.2	74.7	0.0	0.0	-
9/17/2019 23:00	2.1	196.4	8.1	76.2	0.0	0.0	-
9/18/2019 0:00	2.4	199.4	7.9	78.0	0.0	0.0	-
9/18/2019 1:00	2.1	208.1	7.5	79.2	0.0	0.0	-
9/18/2019 2:00	2.5	219.0	7.2	80.8	0.0	0.0	-
9/18/2019 3:00	2.1	219.7	6.9	81.0	0.0	0.0	-
9/18/2019 4:00	1.6	223.9	7.1	79.4	0.0	0.0	-
9/18/2019 5:00	1.6	197.0	6.8	78.5	7.0	0.0	-
9/18/2019 6:00	2.3	207.9	6.6	79.2	19.2	0.0	-
9/18/2019 7:00	2.8	213.4	7.2	77.8	283.3	0.0	-
9/18/2019 8:00	3.1	214.6	7.5	76.7	195.6	0.0	-
9/18/2019 9:00	3.7	215.6	7.6	76.6	175.3	0.0	-
9/18/2019 10:00	3.5	219.3	7.8	76.2	154.3	0.0	-
9/18/2019 11:00	3.9	223.1	8.4	74.6	286.5	0.0	-
9/18/2019 12:00	4.3	210.7	8.2	78.9	207.6	0.0	-
9/18/2019 13:00	4.6	212.4	8.4	79.3	196.2	0.0	-
9/18/2019 14:00	4.2	207.2	8.0	85.4	120.4	0.0	-
9/18/2019 15:00	5.3	226.1	7.8	87.6	60.8	0.0	-
9/18/2019 16:00	3.8	213.5	7.3	91.6	20.2	0.0	-
9/18/2019 17:00	4.7	217.8	6.5	96.6	3.2	0.0	-
9/18/2019 18:00	5.8	209.5	6.2	99.8	0.0	0.0	-
9/18/2019 19:00	6.4	210.3	6.1	100.0	0.0	0.0	-
9/18/2019 20:00	6.4	219.5	5.9	100.0	0.0	0.0	-
9/18/2019 21:00	6.1	220.4	5.8	100.0	0.0	0.0	-
9/18/2019 22:00	6.0	206.5	5.8	100.0	0.0	0.0	-
9/18/2019 23:00	6.3	208.3	5.7	100.0	0.0	0.0	-
9/19/2019 0:00	6.9	204.0	5.7	100.0	0.0	0.0	-
9/19/2019 1:00	6.9	203.6	5.8	100.0	0.0	0.0	-
9/19/2019 2:00	7.0	206.0	5.9	100.0	0.0	0.0	-
9/19/2019 3:00	6.9	206.3	5.8	100.0	0.0	0.0	-
9/19/2019 4:00	6.5	212.5	5.8	100.0	0.0	0.0	-
9/19/2019 5:00	5.3	212.9	5.9	100.0	1.2	0.0	-
9/19/2019 6:00	5.6	218.7	6.0	100.0	8.1	0.0	-
9/19/2019 7:00	5.8	217.6	6.1	100.0	24.4	0.0	-
9/19/2019 8:00	7.0	216.6	6.3	100.0	52.4	0.0	-
9/19/2019 9:00	6.2	220.3	6.0	100.0	114.1	0.0	-
9/19/2019 10:00	5.2	223.3	6.0	100.0	146.2	0.0	-
9/19/2019 11:00	4.0	212.6	5.8	100.0	93.4	0.0	-
9/19/2019 12:00	4.2	212.5	6.0	100.0	83.9	0.0	-
9/19/2019 13:00	3.8	211.7	6.1	100.0	100.7	0.0	-
9/19/2019 14:00	3.1	209.6	6.1	100.0	64.4	0.0	-
9/19/2019 15:00	3.6	202.3	6.1	100.0	27.0	0.0	-
9/19/2019 16:00	4.2	220.3	6.2	100.0	39.5	0.0	-
9/19/2019 17:00	4.6	221.2	6.1	100.0	4.1	0.0	-
9/19/2019 18:00	3.1	200.2	6.1	100.0	0.0	0.0	-
9/19/2019 19:00	4.4	225.5	6.1	100.0	0.0	0.0	-
9/19/2019 20:00	4.4	222.7	5.9	100.0	0.0	0.0	-
9/19/2019 21:00	4.0	214.1	5.7	100.0	0.0	0.0	-
9/19/2019 22:00	4.1	209.4	5.5	100.0	0.0	0.0	-
9/19/2019 23:00	4.2	214.9	5.4	100.0	0.0	0.0	-
9/20/2019 0:00	5.1	214.5	5.2	100.0	0.0	0.0	-
9/20/2019 1:00	4.1	203.7	5.2	100.0	0.0	0.0	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
9/20/2019 2:00	3.3	215.6	5.1	100.0	0.0	0.0	-
9/20/2019 3:00	3.9	197.1	5.0	100.0	0.0	0.0	-
9/20/2019 4:00	3.8	199.7	4.9	100.0	0.0	0.0	-
9/20/2019 5:00	4.5	187.7	4.9	100.0	2.0	0.0	-
9/20/2019 6:00	3.8	202.1	5.0	100.0	17.9	0.0	-
9/20/2019 7:00	4.5	191.2	5.2	100.0	50.9	0.0	-
9/20/2019 8:00	4.9	185.7	5.3	100.0	85.9	0.0	-
9/20/2019 9:00	4.9	192.8	5.6	100.0	105.7	0.0	-
9/20/2019 10:00	5.2	198.4	6.0	100.0	135.7	0.0	-
9/20/2019 11:00	5.4	206.9	6.2	100.0	106.8	0.0	-
9/20/2019 12:00	6.1	204.0	6.4	100.0	109.4	0.0	-
9/20/2019 13:00	5.9	209.9	6.6	100.0	71.4	0.0	-
9/20/2019 14:00	5.8	215.1	6.7	100.0	55.7	0.0	-
9/20/2019 15:00	7.2	211.1	7.0	100.0	39.4	0.0	-
9/20/2019 16:00	6.9	207.3	7.2	100.0	9.1	0.0	-
9/20/2019 17:00	6.4	205.9	7.3	100.0	1.9	0.0	-
9/20/2019 18:00	7.3	200.7	7.4	100.0	0.0	0.0	-
9/20/2019 19:00	7.1	201.5	7.7	100.0	0.0	0.0	-
9/20/2019 20:00	6.9	201.0	7.8	100.0	0.0	0.0	-
9/20/2019 21:00	7.4	196.4	8.0	100.0	0.0	0.0	-
9/20/2019 22:00	6.0	202.8	8.1	100.0	0.0	0.0	-
9/20/2019 23:00	6.2	201.2	8.2	100.0	0.0	0.0	-
9/21/2019 0:00	5.8	201.4	8.3	100.0	0.0	0.0	-
9/21/2019 1:00	5.9	204.6	8.4	100.0	0.0	0.0	-
9/21/2019 2:00	5.6	211.2	8.4	100.0	0.0	0.0	-
9/21/2019 3:00	6.4	202.2	8.6	99.8	0.0	0.0	-
9/21/2019 4:00	4.7	194.3	8.5	99.7	0.0	0.0	-
9/21/2019 5:00	3.9	180.5	8.3	99.2	3.7	0.0	-
9/21/2019 6:00	3.4	215.0	8.3	100.0	19.9	0.0	-
9/21/2019 7:00	4.6	215.4	8.4	100.0	16.1	0.0	-
9/21/2019 8:00	8.0	220.0	8.0	100.0	37.8	0.0	-
9/21/2019 9:00	6.1	210.5	7.7	100.0	74.9	0.0	-
9/21/2019 10:00	6.6	220.6	7.6	100.0	97.9	0.0	-
9/21/2019 11:00	7.0	216.0	7.3	100.0	82.3	0.0	-
9/21/2019 12:00	5.0	220.6	7.0	100.0	46.4	0.0	-
9/21/2019 13:00	4.8	217.1	6.9	100.0	28.2	0.0	-
9/21/2019 14:00	5.0	199.1	6.8	100.0	31.8	0.0	-
9/21/2019 15:00	6.4	219.8	6.4	100.0	17.0	0.0	-
9/21/2019 16:00	7.3	226.1	5.9	100.0	24.6	0.0	-
9/21/2019 17:00	5.1	215.4	5.6	100.0	8.9	0.0	-
9/21/2019 18:00	5.4	200.8	5.2	100.0	0.0	0.0	-
9/21/2019 19:00	6.5	213.3	4.9	100.0	0.0	0.0	-
9/21/2019 20:00	4.8	205.0	4.7	99.9	0.0	0.0	-
9/21/2019 21:00	5.6	204.3	4.3	99.1	0.0	0.0	-
9/21/2019 22:00	5.6	206.7	4.3	99.6	0.0	0.0	-
9/21/2019 23:00	6.2	185.8	3.7	98.4	0.0	0.0	-
9/22/2019 0:00	4.8	197.6	3.4	99.5	0.0	0.0	-
9/22/2019 1:00	4.5	195.8	3.1	99.7	0.0	0.0	-
9/22/2019 2:00	4.4	228.2	3.1	99.6	0.0	0.0	-
9/22/2019 3:00	5.1	188.7	2.4	98.0	0.0	0.0	-
9/22/2019 4:00	3.9	195.1	2.2	98.7	0.0	0.0	-
9/22/2019 5:00	4.3	195.7	1.8	100.0	2.1	0.0	-
9/22/2019 6:00	5.0	197.8	1.3	100.0	12.0	0.0	-
9/22/2019 7:00	4.6	185.1	1.5	99.4	26.5	0.0	-
9/22/2019 8:00	4.8	197.3	1.8	99.7	162.5	0.0	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
9/22/2019 9:00	5.0	198.8	2.8	93.7	390.1	0.0	-
9/22/2019 10:00	4.6	196.0	2.1	99.3	171.7	0.0	-
9/22/2019 11:00	4.5	212.5	2.6	99.7	379.8	0.0	-
9/22/2019 12:00	4.2	221.2	2.8	98.9	243.9	0.0	-
9/22/2019 13:00	3.4	229.2	3.1	100.0	193.3	0.0	-
9/22/2019 14:00	3.3	229.6	3.5	99.4	134.9	0.0	-
9/22/2019 15:00	5.1	226.6	3.5	100.0	86.8	0.0	-
9/22/2019 16:00	4.5	222.1	3.1	100.0	47.2	0.0	-
9/22/2019 17:00	2.9	211.9	2.9	100.0	4.5	0.0	-
9/22/2019 18:00	3.6	203.8	2.8	100.0	0.0	0.0	-
9/22/2019 19:00	4.3	200.5	2.7	100.0	0.0	0.0	-
9/22/2019 20:00	3.9	197.6	2.6	99.4	0.0	0.0	-
9/22/2019 21:00	3.4	199.1	2.5	97.1	0.0	0.0	-
9/22/2019 22:00	3.0	196.7	2.5	94.9	0.0	0.0	-
9/22/2019 23:00	2.5	205.6	2.3	98.6	0.0	0.0	-
9/23/2019 0:00	2.8	208.6	2.2	100.0	0.0	0.0	-
9/23/2019 1:00	1.7	173.5	2.3	99.7	0.0	0.0	-
9/23/2019 2:00	3.8	198.3	2.2	99.6	0.0	0.0	-
9/23/2019 3:00	4.6	186.9	2.1	99.7	0.0	0.0	-
9/23/2019 4:00	3.6	148.5	2.0	97.9	0.0	0.0	-
9/23/2019 5:00	2.0	25.9	1.9	98.3	1.0	0.0	-
9/23/2019 6:00	0.9	334.1	1.8	97.1	6.5	0.0	-
9/23/2019 7:00	2.0	357.3	1.2	98.9	24.5	0.0	-
9/23/2019 8:00	1.7	11.2	0.9	99.2	38.2	0.0	-
9/23/2019 9:00	2.4	323.0	1.0	99.6	121.3	0.0	-
9/23/2019 10:00	2.3	328.0	1.5	99.7	106.5	0.0	-
9/23/2019 11:00	2.3	215.6	2.0	100.0	122.7	0.0	-
9/23/2019 12:00	3.5	209.2	2.5	100.0	117.9	0.0	-
9/23/2019 13:00	4.2	209.7	3.2	100.0	85.3	0.0	-
9/23/2019 14:00	5.2	213.1	3.7	100.0	78.8	0.0	-
9/23/2019 15:00	5.1	207.6	4.0	100.0	53.2	0.0	-
9/23/2019 16:00	5.4	210.8	3.9	100.0	16.7	0.0	-
9/23/2019 17:00	5.9	210.9	3.7	100.0	2.3	0.0	-
9/23/2019 18:00	4.8	200.2	3.8	99.5	0.0	0.0	-
9/23/2019 19:00	7.0	186.2	3.9	98.1	0.0	0.0	-
9/23/2019 20:00	8.0	185.8	4.1	96.2	0.0	0.0	-
9/23/2019 21:00	5.3	199.1	4.1	96.9	0.0	0.0	-
9/23/2019 22:00	5.6	192.9	4.1	99.1	0.0	0.0	-
9/23/2019 23:00	4.8	201.3	4.0	100.0	0.0	0.0	-
9/24/2019 0:00	4.3	185.2	3.7	100.0	0.0	0.0	-
9/24/2019 1:00	7.0	181.4	3.4	96.7	0.0	0.0	-
9/24/2019 2:00	7.0	189.2	3.2	94.7	0.0	0.0	-
9/24/2019 3:00	5.5	199.6	3.5	93.2	0.0	0.0	-
9/24/2019 4:00	4.6	199.3	3.1	99.8	0.0	0.0	-
9/24/2019 5:00	3.9	210.9	3.2	100.0	0.7	0.0	-
9/24/2019 6:00	4.7	205.6	3.6	100.0	12.2	0.0	-
9/24/2019 7:00	4.8	212.4	3.7	100.0	37.2	0.0	-
9/24/2019 8:00	4.7	211.2	4.2	100.0	46.0	0.0	-
9/24/2019 9:00	4.8	213.0	4.5	100.0	63.4	0.0	-
9/24/2019 10:00	4.7	215.9	4.7	100.0	143.9	0.0	-
9/24/2019 11:00	5.1	212.2	5.0	99.9	215.2	0.0	-
9/24/2019 12:00	4.3	216.6	4.8	98.4	111.7	0.0	-
9/24/2019 13:00	4.5	208.3	4.5	100.0	85.5	0.0	-
9/24/2019 14:00	5.1	200.8	4.6	100.0	98.9	0.0	-
9/24/2019 15:00	4.5	189.7	4.3	100.0	42.9	0.0	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
9/24/2019 16:00	3.9	210.3	4.6	100.0	21.8	0.0	-
9/24/2019 17:00	4.3	211.7	4.6	100.0	4.8	0.0	-
9/24/2019 18:00	4.9	194.4	4.6	100.0	0.0	0.0	-
9/24/2019 19:00	5.3	180.9	4.6	97.8	0.0	0.0	-
9/24/2019 20:00	4.3	200.2	4.3	98.5	0.0	0.0	-
9/24/2019 21:00	3.8	203.7	4.4	100.0	0.0	0.0	-
9/24/2019 22:00	4.4	205.9	4.6	100.0	0.0	0.0	-
9/24/2019 23:00	4.4	199.5	4.6	100.0	0.0	0.0	-
9/25/2019 0:00	4.8	192.0	4.6	100.0	0.0	0.0	-
9/25/2019 1:00	4.6	202.9	4.7	100.0	0.0	0.0	-
9/25/2019 2:00	5.7	215.0	4.8	100.0	0.0	0.0	-
9/25/2019 3:00	5.6	209.3	4.7	100.0	0.0	0.0	-
9/25/2019 4:00	5.6	207.8	4.5	100.0	0.0	0.0	-
9/25/2019 5:00	6.8	216.5	4.3	100.0	0.2	0.0	-
9/25/2019 6:00	7.9	225.6	3.5	100.0	3.2	0.0	-
9/25/2019 7:00	4.6	193.7	2.4	100.0	12.2	0.0	-
9/25/2019 8:00	4.5	199.8	2.2	100.0	24.4	0.0	-
9/25/2019 9:00	5.1	206.6	2.0	100.0	33.9	0.0	-
9/25/2019 10:00	5.2	193.0	1.8	100.0	57.6	0.0	-
9/25/2019 11:00	4.8	197.2	1.6	100.0	100.8	0.0	-
9/25/2019 12:00	4.7	200.7	1.5	100.0	132.8	0.0	-
9/25/2019 13:00	4.1	203.3	1.8	100.0	157.6	0.0	-
9/25/2019 14:00	5.0	211.1	1.3	100.0	49.7	0.0	-
9/25/2019 15:00	4.8	203.3	1.1	100.0	74.5	0.0	-
9/25/2019 16:00	4.5	204.6	1.2	100.0	29.2	0.0	-
9/25/2019 17:00	5.3	206.9	1.2	100.0	4.7	0.0	-
9/25/2019 18:00	3.4	199.3	1.1	100.0	0.0	0.0	-
9/25/2019 19:00	3.2	214.0	1.1	100.0	0.0	0.0	-
9/25/2019 20:00	4.7	198.8	1.1	100.0	0.0	0.0	-
9/25/2019 21:00	5.0	193.8	1.3	94.8	0.0	0.0	-
9/25/2019 22:00	4.8	191.8	1.1	97.8	0.0	0.0	-
9/25/2019 23:00	4.2	199.0	1.1	98.0	0.0	0.0	-
9/26/2019 0:00	5.2	201.4	1.1	98.7	0.0	0.0	-
9/26/2019 1:00	4.6	201.5	1.1	97.9	0.0	0.0	-
9/26/2019 2:00	4.9	203.7	1.0	100.0	0.0	0.0	-
9/26/2019 3:00	4.3	202.9	0.9	100.0	0.0	0.0	-
9/26/2019 4:00	4.0	200.5	0.8	100.0	0.0	0.0	-
9/26/2019 5:00	3.6	203.3	1.0	100.0	3.2	0.0	-
9/26/2019 6:00	3.6	206.8	1.0	99.7	28.7	0.0	-
9/26/2019 7:00	3.2	201.4	0.9	100.0	41.2	0.0	-
9/26/2019 8:00	2.9	205.4	0.5	100.0	91.1	0.0	-
9/26/2019 9:00	3.8	207.0	1.0	100.0	189.3	0.0	-
9/26/2019 10:00	5.0	231.3	0.7	100.0	87.5	0.0	-
9/26/2019 11:00	4.4	217.1	0.8	100.0	161.4	0.0	-
9/26/2019 12:00	5.3	210.1	0.8	99.7	186.1	0.0	-
9/26/2019 13:00	4.2	201.7	1.1	87.6	216.1	0.0	-
9/26/2019 14:00	2.4	216.5	1.9	86.0	214.1	0.0	-
9/26/2019 15:00	2.0	250.7	2.0	85.7	129.2	0.0	-
9/26/2019 16:00	1.5	301.7	1.6	87.0	42.9	0.0	-
9/26/2019 17:00	2.8	10.7	1.0	94.1	9.9	0.0	-
9/26/2019 18:00	2.9	9.4	0.6	98.0	0.0	0.0	-
9/26/2019 19:00	3.0	30.0	0.5	99.0	0.0	0.0	-
9/26/2019 20:00	3.2	26.6	0.6	96.8	0.0	0.0	-
9/26/2019 21:00	4.6	5.2	0.3	100.0	0.0	0.0	-
9/26/2019 22:00	4.8	359.0	0.3	100.0	0.0	0.0	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
9/26/2019 23:00	6.0	39.2	0.3	98.8	0.0	0.0	-
9/27/2019 0:00	8.6	57.4	1.4	85.2	0.0	0.0	-
9/27/2019 1:00	7.3	48.1	1.6	81.1	0.0	0.0	-
9/27/2019 2:00	6.2	41.2	1.6	78.9	0.0	0.0	-
9/27/2019 3:00	6.6	34.4	1.8	78.2	0.0	0.0	-
9/27/2019 4:00	7.9	34.5	2.0	78.4	0.0	0.0	-
9/27/2019 5:00	7.8	41.5	2.0	78.0	2.5	0.0	-
9/27/2019 6:00	7.7	35.3	2.1	76.5	21.9	0.0	-
9/27/2019 7:00	6.7	30.3	2.0	76.3	39.5	0.0	-
9/27/2019 8:00	7.9	46.1	2.4	74.1	157.2	0.0	-
9/27/2019 9:00	9.2	54.8	3.6	70.8	484.7	0.0	-
9/27/2019 10:00	9.5	37.4	3.1	71.9	301.9	0.0	-
9/27/2019 11:00	6.6	29.3	3.5	72.0	376.8	0.0	-
9/27/2019 12:00	6.6	22.6	4.0	72.1	492.2	0.0	-
9/27/2019 13:00	8.0	36.8	3.6	73.2	160.2	0.0	-
9/27/2019 14:00	9.0	42.3	4.1	69.3	364.4	0.0	-
9/27/2019 15:00	9.1	47.4	4.3	65.2	240.5	0.0	-
9/27/2019 16:00	8.2	52.6	4.0	66.4	94.5	0.0	-
9/27/2019 17:00	7.3	48.5	3.2	68.1	6.4	0.0	-
9/27/2019 18:00	7.8	51.3	2.8	69.0	0.0	0.0	-
9/27/2019 19:00	6.1	50.1	2.3	71.4	0.0	0.0	-
9/27/2019 20:00	5.4	48.1	2.3	70.6	0.0	0.0	-
9/27/2019 21:00	1.9	70.6	2.1	72.2	0.0	0.0	-
9/27/2019 22:00	1.4	168.4	2.1	72.9	0.0	0.0	-
9/27/2019 23:00	0.8	293.5	2.0	72.2	0.0	0.0	-
9/28/2019 0:00	1.1	224.1	1.8	74.1	0.0	0.0	-
9/28/2019 1:00	0.8	152.2	1.6	71.2	0.0	0.0	-
9/28/2019 2:00	1.0	61.9	1.6	67.1	0.0	0.0	-
9/28/2019 3:00	1.2	24.9	1.2	74.1	0.0	0.0	-
9/28/2019 4:00	1.1	41.5	1.0	75.1	0.0	0.0	-
9/28/2019 5:00	0.7	344.0	1.0	76.1	2.8	0.0	-
9/28/2019 6:00	1.1	2.5	1.1	74.9	17.5	0.0	-
9/28/2019 7:00	3.3	27.3	1.1	75.0	167.8	0.0	-
9/28/2019 8:00	4.0	20.3	2.0	71.9	344.2	0.0	-
9/28/2019 9:00	5.2	7.0	3.1	65.7	454.5	0.0	-
9/28/2019 10:00	6.6	26.6	3.9	57.8	528.7	0.0	-
9/28/2019 11:00	6.7	33.6	4.3	57.4	560.1	0.0	-
9/28/2019 12:00	7.4	34.7	4.7	56.0	537.6	0.0	-
9/28/2019 13:00	6.4	33.5	4.9	56.6	471.3	0.0	-
9/28/2019 14:00	6.0	52.9	5.1	52.5	327.6	0.0	-
9/28/2019 15:00	5.7	43.5	4.8	51.5	168.1	0.0	-
9/28/2019 16:00	4.1	26.8	4.2	57.6	92.7	0.0	-
9/28/2019 17:00	4.5	43.5	3.6	59.2	5.3	0.0	-
9/28/2019 18:00	4.8	53.0	3.9	53.0	0.0	0.0	-
9/28/2019 19:00	5.0	46.9	3.7	52.9	0.0	0.0	-
9/28/2019 20:00	6.6	61.9	3.6	51.5	0.0	0.0	-
9/28/2019 21:00	5.2	78.5	3.2	54.6	0.0	0.0	-
9/28/2019 22:00	3.5	78.1	2.1	63.0	0.0	0.0	-
9/28/2019 23:00	3.1	31.7	2.4	57.0	0.0	0.0	-
9/29/2019 0:00	3.1	56.3	1.7	60.8	0.0	0.0	-
9/29/2019 1:00	4.6	60.8	1.0	63.4	0.0	0.0	-
9/29/2019 2:00	3.0	80.1	1.2	63.5	0.0	0.0	-
9/29/2019 3:00	2.9	76.6	0.9	63.6	0.0	0.0	-
9/29/2019 4:00	1.7	81.0	0.7	65.1	0.0	0.0	-
9/29/2019 5:00	1.2	16.8	0.9	61.7	2.3	0.0	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
9/29/2019 6:00	1.0	211.3	0.6	65.7	19.0	0.0	-
9/29/2019 7:00	1.2	208.9	0.7	66.8	125.3	0.0	-
9/29/2019 8:00	0.9	199.9	1.9	60.5	256.6	0.0	-
9/29/2019 9:00	1.4	230.3	2.8	58.9	441.4	0.0	-
9/29/2019 10:00	2.0	197.6	3.5	60.5	512.8	0.0	-
9/29/2019 11:00	1.5	248.0	4.5	62.6	540.8	0.0	-
9/29/2019 12:00	1.8	229.4	5.1	69.4	512.9	0.0	-
9/29/2019 13:00	1.7	237.9	5.7	67.3	449.1	0.0	-
9/29/2019 14:00	1.6	265.8	6.3	65.9	342.2	0.0	-
9/29/2019 15:00	1.5	220.2	6.4	63.8	230.2	0.0	-
9/29/2019 16:00	1.2	190.4	5.5	63.5	40.8	0.0	-
9/29/2019 17:00	0.5	189.6	5.1	60.5	4.0	0.0	-
9/29/2019 18:00	0.5	276.0	5.0	57.2	0.0	0.0	-
9/29/2019 19:00	1.7	217.0	4.6	62.7	0.0	0.0	-
9/29/2019 20:00	2.4	214.6	4.3	60.9	0.0	0.0	-
9/29/2019 21:00	3.0	215.2	4.3	59.4	0.0	0.0	-
9/29/2019 22:00	2.9	209.9	4.0	60.2	0.0	0.0	-
9/29/2019 23:00	1.9	221.6	4.0	60.4	0.0	0.0	-
9/30/2019 0:00	1.5	217.2	4.4	58.3	0.0	0.0	-
9/30/2019 1:00	2.0	207.3	4.4	58.5	0.0	0.0	-
9/30/2019 2:00	2.4	210.5	4.0	59.7	0.0	0.0	-
9/30/2019 3:00	2.8	212.7	4.0	58.8	0.0	0.0	-
9/30/2019 4:00	2.2	219.2	3.9	59.0	0.0	0.0	-
9/30/2019 5:00	2.6	223.2	4.1	56.2	2.4	0.0	-
9/30/2019 6:00	3.1	228.4	3.7	57.7	25.4	0.0	-
9/30/2019 7:00	3.4	221.2	4.1	56.7	125.7	0.0	-
9/30/2019 8:00	3.3	229.3	4.7	52.9	231.9	0.0	-
9/30/2019 9:00	3.4	220.6	4.9	51.9	217.4	0.0	-
9/30/2019 10:00	3.7	219.0	5.7	50.3	359.7	0.0	-
9/30/2019 11:00	4.5	228.5	6.3	50.3	410.3	0.0	-
9/30/2019 12:00	4.8	225.4	6.3	51.3	241.4	0.0	-
9/30/2019 13:00	4.4	213.9	6.2	53.5	150.4	0.0	-
9/30/2019 14:00	4.4	221.5	6.1	55.2	94.4	0.0	-
9/30/2019 15:00	4.6	211.2	6.1	55.9	79.2	0.0	-
9/30/2019 16:00	4.3	213.6	5.9	56.0	25.6	0.0	-
9/30/2019 17:00	4.2	208.3	5.8	58.0	2.3	0.0	-
9/30/2019 18:00	4.6	217.5	5.6	61.7	0.0	0.0	-
9/30/2019 19:00	4.4	216.8	5.3	67.2	0.0	0.0	-
9/30/2019 20:00	3.9	213.3	5.0	70.5	0.0	0.0	-
9/30/2019 21:00	2.9	189.4	4.9	72.7	0.0	0.0	-
9/30/2019 22:00	2.1	181.7	5.2	71.6	0.0	0.0	-
9/30/2019 23:00	3.4	197.3	5.1	70.5	0.0	0.0	-
10/1/2019 0:00	5.5	197.7	4.7	69.8	0.0	0.0	-
10/1/2019 1:00	5.7	197.2	4.7	66.8	0.0	0.0	-
10/1/2019 2:00	5.0	184.5	5.2	57.5	0.0	0.0	-
10/1/2019 3:00	3.3	195.2	5.2	56.5	0.0	0.0	-
10/1/2019 4:00	2.2	199.5	5.0	57.9	0.0	0.0	-
10/1/2019 5:00	1.9	143.9	4.8	61.1	0.9	0.0	-
10/1/2019 6:00	3.0	204.2	4.5	61.9	16.5	0.0	-
10/1/2019 7:00	4.5	196.1	4.4	62.4	36.8	0.0	-
10/1/2019 8:00	3.2	160.4	4.9	58.5	45.2	0.0	-
10/1/2019 9:00	4.8	195.3	5.2	55.9	108.9	0.0	-
10/1/2019 10:00	2.8	199.0	4.9	63.5	137.5	0.0	-
10/1/2019 11:00	2.7	198.4	4.2	71.3	154.9	0.0	-
10/1/2019 12:00	2.1	183.4	4.0	73.5	119.4	0.0	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
10/1/2019 13:00	1.9	191.6	3.0	82.9	62.0	0.0	-
10/1/2019 14:00	2.0	188.4	2.5	87.0	51.9	0.0	-
10/1/2019 15:00	2.1	115.8	2.5	87.6	34.5	0.0	-
10/1/2019 16:00	3.5	126.5	2.4	90.8	5.3	0.0	-
10/1/2019 17:00	2.2	71.8	2.0	93.6	0.7	0.0	-
10/1/2019 18:00	1.3	61.7	2.1	94.9	0.0	0.0	-
10/1/2019 19:00	1.4	35.8	2.2	96.0	0.0	0.0	-
10/1/2019 20:00	1.6	47.8	2.5	95.7	0.0	0.0	-
10/1/2019 21:00	1.6	165.4	2.5	96.2	0.0	0.0	-
10/1/2019 22:00	1.2	48.9	2.7	96.1	0.0	0.0	-
10/1/2019 23:00	2.3	174.2	3.0	94.7	0.0	0.0	-
10/2/2019 0:00	2.6	167.6	3.0	95.4	0.0	0.0	-
10/2/2019 1:00	1.6	107.0	3.1	95.0	0.0	0.0	-
10/2/2019 2:00	1.2	50.3	3.3	93.1	0.0	0.0	-
10/2/2019 3:00	0.9	69.8	3.5	92.0	0.0	0.0	-
10/2/2019 4:00	1.0	96.0	3.4	92.0	0.0	0.0	-
10/2/2019 5:00	0.9	88.2	3.6	91.2	0.5	0.0	-
10/2/2019 6:00	1.0	60.7	3.6	92.0	9.2	0.0	-
10/2/2019 7:00	1.1	48.6	3.8	92.5	59.2	0.0	-
10/2/2019 8:00	1.0	41.6	4.4	90.0	95.5	0.0	-
10/2/2019 9:00	1.5	168.3	4.7	89.9	150.5	0.0	-
10/2/2019 10:00	2.1	188.9	4.6	91.7	134.9	0.0	-
10/2/2019 11:00	2.4	190.1	4.6	95.2	165.9	0.0	-
10/2/2019 12:00	3.0	188.8	4.5	95.5	118.8	0.0	-
10/2/2019 13:00	4.1	179.3	4.2	95.0	115.6	0.0	-
10/2/2019 14:00	4.8	180.2	4.1	93.3	100.1	0.0	-
10/2/2019 15:00	4.3	147.5	4.4	89.0	66.7	0.0	-
10/2/2019 16:00	2.0	103.2	4.4	88.7	27.3	0.0	-
10/2/2019 17:00	3.3	172.0	4.4	84.6	2.1	0.0	-
10/2/2019 18:00	1.3	25.4	4.4	87.0	0.0	0.0	-
10/2/2019 19:00	4.0	162.2	4.4	82.8	0.0	0.0	-
10/2/2019 20:00	1.8	138.2	4.3	84.8	0.0	0.0	-
10/2/2019 21:00	2.0	144.9	4.1	86.7	0.0	0.0	-
10/2/2019 22:00	0.6	126.5	4.1	87.8	0.0	0.0	-
10/2/2019 23:00	1.0	153.3	3.8	88.0	0.0	0.0	-
10/3/2019 0:00	0.3	106.8	4.0	87.1	0.0	0.0	-
10/3/2019 1:00	1.0	5.4	3.9	88.5	0.0	0.0	-
10/3/2019 2:00	0.6	324.5	3.4	95.0	0.0	0.0	-
10/3/2019 3:00	0.5	319.5	3.2	97.0	0.0	0.0	-
10/3/2019 4:00	0.5	18.0	3.2	95.2	0.0	0.0	-
10/3/2019 5:00	0.6	211.7	2.8	98.4	1.2	0.0	-
10/3/2019 6:00	1.1	3.8	2.7	99.2	28.5	0.0	-
10/3/2019 7:00	1.2	22.4	2.7	99.9	103.1	0.0	-
10/3/2019 8:00	1.4	36.1	3.7	97.5	259.4	0.0	-
10/3/2019 9:00	1.1	251.9	3.4	98.9	168.1	0.0	-
10/3/2019 10:00	1.5	206.1	3.5	98.2	269.1	0.0	-
10/3/2019 11:00	1.3	221.6	4.2	95.7	274.8	0.0	-
10/3/2019 12:00	1.5	232.7	4.6	94.0	229.1	0.0	-
10/3/2019 13:00	1.5	217.1	4.9	93.6	241.1	0.0	-
10/3/2019 14:00	1.1	231.6	4.9	95.4	146.6	0.0	-
10/3/2019 15:00	0.8	213.3	4.9	93.0	101.1	0.0	-
10/3/2019 16:00	0.9	196.8	4.6	94.7	14.6	0.0	-
10/3/2019 17:00	1.7	197.3	4.2	93.6	0.5	0.0	-
10/3/2019 18:00	2.2	215.9	4.0	99.2	0.0	0.0	-
10/3/2019 19:00	1.1	214.5	3.9	100.0	0.0	0.0	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
10/3/2019 20:00	1.6	236.6	3.8	100.0	0.0	0.0	-
10/3/2019 21:00	1.7	212.1	3.8	100.0	0.0	0.0	-
10/3/2019 22:00	2.0	227.5	3.7	100.0	0.0	0.0	-
10/3/2019 23:00	2.1	224.8	3.7	100.0	0.0	0.0	-
10/4/2019 0:00	3.1	220.2	3.5	100.0	0.0	0.0	-
10/4/2019 1:00	3.3	208.3	2.9	100.0	0.0	0.0	-
10/4/2019 2:00	2.8	197.3	2.8	100.0	0.0	0.0	-
10/4/2019 3:00	2.5	201.7	2.6	100.0	0.0	0.0	-
10/4/2019 4:00	2.9	210.9	2.6	100.0	0.0	0.0	-
10/4/2019 5:00	3.5	204.6	2.2	100.0	0.2	0.0	-
10/4/2019 6:00	2.9	200.6	2.1	99.9	7.1	0.0	-
10/4/2019 7:00	3.6	196.0	1.8	98.4	31.4	0.0	-
10/4/2019 8:00	3.2	200.8	2.0	98.3	72.6	0.0	-
10/4/2019 9:00	3.2	213.5	2.3	98.1	115.9	0.0	-
10/4/2019 10:00	3.3	218.3	2.6	99.4	143.0	0.0	-
10/4/2019 11:00	2.8	223.0	2.8	99.7	153.4	0.0	-
10/4/2019 12:00	3.3	217.8	3.0	99.8	161.0	0.0	-
10/4/2019 13:00	3.8	217.8	3.1	100.0	88.5	0.0	-
10/4/2019 14:00	3.9	215.6	3.0	100.0	30.6	0.0	-
10/4/2019 15:00	4.0	213.4	3.1	100.0	27.3	0.0	-
10/4/2019 16:00	4.1	210.9	3.0	100.0	12.1	0.0	-
10/4/2019 17:00	4.3	195.4	2.8	100.0	0.9	0.0	-
10/4/2019 18:00	4.0	200.2	2.6	97.7	0.0	0.0	-
10/4/2019 19:00	4.4	198.3	2.8	92.1	0.0	0.0	-
10/4/2019 20:00	4.4	203.3	2.6	94.9	0.0	0.0	-
10/4/2019 21:00	4.7	208.6	2.2	96.1	0.0	0.0	-
10/4/2019 22:00	5.2	209.2	1.8	99.9	0.0	0.0	-
10/4/2019 23:00	6.5	213.0	1.9	95.6	0.0	0.0	-
10/5/2019 0:00	5.1	204.5	2.1	91.5	0.0	0.0	-
10/5/2019 1:00	4.9	194.3	1.7	95.7	0.0	0.0	-
10/5/2019 2:00	5.0	204.0	1.8	93.6	0.0	0.0	-
10/5/2019 3:00	5.3	206.4	1.5	98.4	0.0	0.0	-
10/5/2019 4:00	5.4	201.6	1.5	99.4	0.0	0.0	-
10/5/2019 5:00	5.5	203.9	1.5	100.0	0.2	0.0	-
10/5/2019 6:00	5.7	211.2	1.5	100.0	4.1	0.0	-
10/5/2019 7:00	5.2	203.6	1.7	100.0	36.8	0.0	-
10/5/2019 8:00	6.0	207.7	1.9	100.0	46.5	0.0	-
10/5/2019 9:00	6.1	204.7	2.2	100.0	59.6	0.0	-
10/5/2019 10:00	7.2	214.6	2.5	100.0	51.6	0.0	-
10/5/2019 11:00	7.6	216.9	2.6	100.0	56.3	0.0	-
10/5/2019 12:00	7.1	218.3	2.7	100.0	56.9	0.0	-
10/5/2019 13:00	8.5	222.5	2.9	100.0	46.0	0.0	-
10/5/2019 14:00	7.8	223.0	3.0	100.0	33.3	0.0	-
10/5/2019 15:00	7.4	217.7	3.0	100.0	16.2	0.0	-
10/5/2019 16:00	6.8	218.8	3.0	100.0	5.1	0.0	-
10/5/2019 17:00	7.2	226.5	3.0	100.0	0.1	0.0	-
10/5/2019 18:00	7.4	228.0	3.0	100.0	0.0	0.0	-
10/5/2019 19:00	8.1	215.4	2.9	100.0	0.0	0.0	-
10/5/2019 20:00	7.4	218.7	2.7	100.0	0.0	0.0	-
10/5/2019 21:00	8.4	213.4	2.5	100.0	0.0	0.0	-
10/5/2019 22:00	8.2	209.2	2.5	100.0	0.0	0.0	-
10/5/2019 23:00	8.3	216.7	2.5	100.0	0.0	0.0	-
10/6/2019 0:00	9.3	222.7	2.5	100.0	0.0	0.0	-
10/6/2019 1:00	9.2	217.1	2.5	100.0	0.0	0.0	-
10/6/2019 2:00	8.7	207.4	2.4	100.0	0.0	0.0	-



**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
10/6/2019 3:00	8.8	204.2	2.3	100.0	0.0	0.0	-
10/6/2019 4:00	9.5	209.9	2.2	100.0	0.0	0.0	-
10/6/2019 5:00	9.4	196.4	2.1	100.0	0.0	0.0	-
10/6/2019 6:00	10.1	193.3	2.0	100.0	2.8	0.0	-
10/6/2019 7:00	8.8	197.2	1.9	100.0	7.9	0.0	-
10/6/2019 8:00	8.5	208.5	1.9	100.0	9.9	0.0	-
10/6/2019 9:00	7.9	209.4	1.9	100.0	11.5	0.0	-
10/6/2019 10:00	9.9	191.6	2.3	100.0	18.0	0.0	-
10/6/2019 11:00	9.9	192.9	2.8	98.7	15.9	0.0	-
10/6/2019 12:00	9.1	198.6	3.1	98.6	12.2	0.0	-
10/6/2019 13:00	10.3	205.8	3.5	97.8	14.3	0.0	-
10/6/2019 14:00	10.5	228.1	3.5	100.0	8.4	0.0	-
10/6/2019 15:00	10.6	234.0	3.5	100.0	5.6	0.0	-
10/6/2019 16:00	9.9	241.9	2.7	100.0	1.5	0.0	-
10/6/2019 17:00	8.1	212.0	1.1	100.0	0.0	0.0	-
10/6/2019 18:00	7.2	205.8	0.6	100.0	0.0	0.0	-
10/6/2019 19:00	5.8	227.0	0.2	100.0	0.0	0.0	-
10/6/2019 20:00	5.2	220.5	-0.2	100.0	0.0	0.0	-
10/6/2019 21:00	4.3	195.9	-0.7	100.0	0.0	0.0	-
10/6/2019 22:00	3.9	190.3	-1.2	99.2	0.0	0.0	-
10/6/2019 23:00	3.6	310.9	-1.9	100.0	0.0	0.0	-
10/7/2019 0:00	2.2	186.9	-2.1	100.0	0.0	0.0	-
10/7/2019 1:00	2.3	214.3	-1.6	100.0	0.0	0.0	-
10/7/2019 2:00	2.2	206.5	-1.7	100.0	0.0	0.0	-
10/7/2019 3:00	1.7	255.7	-1.8	100.0	0.0	0.0	-
10/7/2019 4:00	2.1	190.9	-2.3	100.0	0.0	0.0	-
10/7/2019 5:00	1.3	179.9	-2.5	100.0	0.5	0.0	-
10/7/2019 6:00	1.3	181.6	-2.5	100.0	18.1	0.0	-
10/7/2019 7:00	6.2	23.9	-3.3	99.5	33.4	0.0	-
10/7/2019 8:00	14.9	41.7	-4.7	93.7	64.9	0.0	-
10/7/2019 9:00	12.4	42.4	-4.5	78.7	82.6	7.8	-
10/7/2019 10:00	10.1	35.4	-3.8	69.7	291.4	13.7	-
10/7/2019 11:00	10.4	34.0	-3.5	68.1	376.1	15.2	-
10/7/2019 12:00	10.2	28.1	-3.5	65.3	450.3	15.0	-
10/7/2019 13:00	11.5	26.6	-3.4	61.4	457.6	15.0	-
10/7/2019 14:00	10.7	25.3	-3.3	59.2	343.5	14.1	-
10/7/2019 15:00	10.8	23.2	-3.6	62.4	204.3	14.2	-
10/7/2019 16:00	11.5	29.5	-4.2	64.7	35.9	14.2	-
10/7/2019 17:00	13.4	29.7	-4.1	64.7	0.8	14.0	-
10/7/2019 18:00	12.9	29.0	-4.2	66.7	0.0	-	-
10/7/2019 19:00	11.1	37.0	-4.2	65.8	0.0	13.5	-
10/7/2019 20:00	10.1	38.7	-4.3	65.4	0.0	14.9	-
10/7/2019 21:00	13.6	33.5	-4.4	64.0	0.0	14.3	-
10/7/2019 22:00	14.0	35.6	-4.6	63.2	0.0	14.6	-
10/7/2019 23:00	12.1	33.9	-4.8	63.4	0.0	15.2	-
10/8/2019 0:00	9.7	43.9	-4.7	59.8	0.0	14.2	-
10/8/2019 1:00	9.1	38.2	-5.0	59.8	0.0	14.2	-
10/8/2019 2:00	11.9	42.8	-5.1	60.7	0.0	14.2	-
10/8/2019 3:00	12.9	48.4	-5.5	62.5	0.0	-	-
10/8/2019 4:00	12.4	58.1	-5.3	59.1	0.0	14.1	-
10/8/2019 5:00	10.0	41.3	-5.7	61.4	0.5	14.6	-
10/8/2019 6:00	10.8	44.0	-5.6	59.4	13.8	14.3	-
10/8/2019 7:00	7.6	30.6	-5.8	60.8	38.2	14.4	-
10/8/2019 8:00	7.8	27.9	-5.0	59.4	294.5	14.0	-
10/8/2019 9:00	7.2	22.6	-4.5	58.4	402.8	14.1	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
10/8/2019 10:00	4.3	20.7	-3.8	56.7	475.9	14.1	-
10/8/2019 11:00	1.3	214.4	-2.5	61.6	504.1	13.7	-
10/8/2019 12:00	2.6	274.1	-2.7	61.9	478.9	13.0	-
10/8/2019 13:00	1.5	287.8	-2.0	61.7	408.5	12.5	-
10/8/2019 14:00	2.1	267.3	-2.0	62.6	302.2	13.2	-
10/8/2019 15:00	2.8	241.9	-2.2	60.1	153.6	13.3	-
10/8/2019 16:00	2.1	278.4	-3.0	62.0	45.2	13.8	-
10/8/2019 17:00	1.3	295.0	-3.5	67.9	1.0	13.8	-
10/8/2019 18:00	1.2	280.3	-3.4	62.5	0.0	13.6	-
10/8/2019 19:00	1.6	218.4	-3.4	63.0	0.0	13.2	-
10/8/2019 20:00	2.1	210.8	-3.7	65.7	0.0	13.3	-
10/8/2019 21:00	2.8	201.5	-3.7	64.9	0.0	13.4	-
10/8/2019 22:00	2.7	212.3	-3.8	66.3	0.0	-	-
10/8/2019 23:00	2.9	207.8	-3.9	68.7	0.0	13.3	-
10/9/2019 0:00	2.2	226.8	-3.5	66.8	0.0	13.1	-
10/9/2019 1:00	2.1	236.0	-3.6	68.5	0.0	13.0	-
10/9/2019 2:00	1.9	219.0	-3.4	70.7	0.0	12.9	-
10/9/2019 3:00	2.1	226.7	-3.5	71.4	0.0	13.1	-
10/9/2019 4:00	2.9	231.9	-3.3	73.7	0.0	13.3	-
10/9/2019 5:00	2.5	237.6	-3.4	75.0	0.3	13.4	-
10/9/2019 6:00	3.2	230.7	-3.0	77.7	16.1	-	-
10/9/2019 7:00	2.9	227.5	-2.9	77.2	94.9	13.3	-
10/9/2019 8:00	3.3	243.0	-2.2	76.3	188.6	13.6	-
10/9/2019 9:00	2.8	246.5	-1.9	75.8	209.1	13.3	-
10/9/2019 10:00	2.8	245.8	-1.9	78.7	160.5	13.7	-
10/9/2019 11:00	3.6	246.3	-1.6	80.7	153.6	-	-
10/9/2019 12:00	4.0	228.3	-1.1	83.0	140.6	13.3	-
10/9/2019 13:00	3.7	220.3	-1.3	88.1	124.6	13.0	-
10/9/2019 14:00	3.9	195.4	-0.7	87.8	77.9	13.7	-
10/9/2019 15:00	3.6	196.1	-0.5	91.7	78.2	13.7	-
10/9/2019 16:00	3.7	209.1	-0.5	96.8	26.6	-	-
10/9/2019 17:00	3.7	208.9	-0.6	98.0	0.3	-	-
10/9/2019 18:00	3.4	206.2	-0.5	95.7	0.0	-	-
10/9/2019 19:00	4.0	209.2	-0.8	99.8	0.0	13.9	-
10/9/2019 20:00	3.9	194.4	-0.7	99.7	0.0	13.8	-
10/9/2019 21:00	3.4	182.1	-0.6	98.4	0.0	13.5	-
10/9/2019 22:00	3.8	195.0	-0.6	99.1	0.0	13.5	-
10/9/2019 23:00	3.5	194.4	-0.6	100.0	0.0	13.6	-
10/10/2019 0:00	3.4	205.6	-0.7	100.0	0.0	13.7	-
10/10/2019 1:00	3.5	210.0	-0.7	100.0	0.0	13.8	-
10/10/2019 2:00	3.6	212.0	-0.8	100.0	0.0	13.5	-
10/10/2019 3:00	3.6	203.8	-0.9	100.0	0.0	13.6	-
10/10/2019 4:00	3.2	199.5	-0.9	99.8	0.0	13.7	-
10/10/2019 5:00	3.4	192.6	-0.8	95.4	0.1	13.5	-
10/10/2019 6:00	3.1	185.9	-0.5	92.8	16.3	13.7	-
10/10/2019 7:00	2.8	196.3	-0.4	93.0	57.4	13.6	-
10/10/2019 8:00	3.1	203.7	-0.1	90.4	114.4	13.9	-
10/10/2019 9:00	3.4	218.9	0.2	89.3	182.9	-	-
10/10/2019 10:00	3.3	214.5	0.5	88.9	169.6	-	-
10/10/2019 11:00	2.7	220.3	1.1	86.2	328.1	14.1	-
10/10/2019 12:00	1.8	231.1	1.5	86.3	255.3	14.0	-
10/10/2019 13:00	2.6	221.7	1.3	86.7	187.6	-	-
10/10/2019 14:00	3.4	196.0	1.2	86.1	141.4	13.4	-
10/10/2019 15:00	2.4	181.6	1.4	84.2	144.3	-	-
10/10/2019 16:00	2.7	160.3	1.2	79.3	21.4	13.2	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
10/10/2019 17:00	1.3	78.1	0.7	81.6	0.2	13.6	-
10/10/2019 18:00	2.4	72.6	0.6	80.8	0.0	13.3	-
10/10/2019 19:00	1.9	103.5	0.7	80.4	0.0	-	-
10/10/2019 20:00	1.1	153.5	0.7	78.2	0.0	-	-
10/10/2019 21:00	1.7	41.2	0.4	79.4	0.0	-	-
10/10/2019 22:00	3.2	165.1	1.2	66.4	0.0	13.3	-
10/10/2019 23:00	4.4	181.9	1.6	63.0	0.0	-	-
10/11/2019 0:00	4.8	185.6	1.9	62.6	0.0	13.8	-
10/11/2019 1:00	6.6	184.7	2.2	69.1	0.0	-	-
10/11/2019 2:00	5.5	200.2	2.4	68.3	0.0	13.6	-
10/11/2019 3:00	4.4	222.6	2.2	71.5	0.0	13.5	-
10/11/2019 4:00	4.8	216.1	0.8	90.1	0.0	-	-
10/11/2019 5:00	5.1	214.7	0.3	96.8	0.0	14.2	-
10/11/2019 6:00	4.7	206.7	0.1	100.0	1.9	-	-
10/11/2019 7:00	5.3	220.1	0.1	100.0	8.5	2.1	-
10/11/2019 8:00	4.4	236.0	0.1	100.0	46.9	2.6	-
10/11/2019 9:00	5.5	224.6	0.2	100.0	57.7	-	-
10/11/2019 10:00	5.6	233.9	0.3	100.0	49.2	-	-
10/11/2019 11:00	5.5	230.0	0.4	100.0	65.7	12.9	-
10/11/2019 12:00	5.4	220.7	0.3	100.0	59.5	-	-
10/11/2019 13:00	5.8	218.2	0.2	100.0	71.8	9.0	-
10/11/2019 14:00	5.4	217.6	0.3	100.0	46.8	-	-
10/11/2019 15:00	6.5	217.6	0.4	100.0	29.0	15.1	-
10/11/2019 16:00	7.0	219.1	0.5	100.0	5.7	-	-
10/11/2019 17:00	7.0	227.9	0.2	100.0	0.1	6.6	-
10/11/2019 18:00	5.0	213.9	-0.1	100.0	0.0	5.5	-
10/11/2019 19:00	5.0	214.6	-0.4	100.0	0.0	6.0	-
10/11/2019 20:00	5.0	209.0	-0.7	100.0	0.0	6.5	-
10/11/2019 21:00	4.0	211.1	-0.9	100.0	0.0	6.5	-
10/11/2019 22:00	4.0	201.4	-1.1	99.9	0.0	7.3	-
10/11/2019 23:00	4.1	203.2	-1.2	99.0	0.0	6.5	-
10/12/2019 0:00	4.0	206.3	-1.3	99.9	0.0	-	-
10/12/2019 1:00	3.8	202.1	-1.4	100.0	0.0	5.0	-
10/12/2019 2:00	4.4	200.0	-1.3	100.0	0.0	-	-
10/12/2019 3:00	3.3	207.4	-1.2	100.0	0.0	3.1	-
10/12/2019 4:00	3.3	202.4	-1.3	100.0	0.0	2.3	-
10/12/2019 5:00	2.8	213.7	-1.3	100.0	0.2	2.2	-
10/12/2019 6:00	3.1	199.5	-1.3	100.0	10.1	2.8	-
10/12/2019 7:00	3.0	208.8	-1.2	100.0	51.1	2.8	-
10/12/2019 8:00	2.9	208.0	-1.2	100.0	93.4	2.9	-
10/12/2019 9:00	4.4	218.3	-1.0	100.0	140.9	3.6	-
10/12/2019 10:00	4.1	213.3	-0.8	100.0	174.4	6.3	-
10/12/2019 11:00	3.4	223.7	-0.5	100.0	224.5	4.5	-
10/12/2019 12:00	4.3	218.0	-0.4	100.0	163.7	6.4	-
10/12/2019 13:00	3.5	213.1	-0.3	100.0	205.9	-	-
10/12/2019 14:00	4.2	211.2	-0.5	100.0	57.4	5.2	-
10/12/2019 15:00	4.1	199.8	-0.4	100.0	27.9	3.7	-
10/12/2019 16:00	3.5	224.3	-0.6	100.0	5.0	-	-
10/12/2019 17:00	2.0	235.5	-1.1	100.0	0.0	7.0	-
10/12/2019 18:00	2.5	7.9	-1.4	100.0	0.0	13.8	-
10/12/2019 19:00	4.0	37.3	-1.7	100.0	0.0	17.4	-
10/12/2019 20:00	3.1	36.4	-1.7	100.0	0.0	18.4	-
10/12/2019 21:00	1.3	21.1	-1.5	100.0	0.0	17.4	-
10/12/2019 22:00	0.9	222.2	-1.4	100.0	0.0	17.0	-
10/12/2019 23:00	0.9	54.6	-1.5	100.0	0.0	-	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
10/13/2019 0:00	1.7	23.3	-1.6	100.0	0.0	20.2	-
10/13/2019 1:00	1.1	355.4	-1.6	100.0	0.0	19.0	-
10/13/2019 2:00	1.5	301.7	-1.7	100.0	0.0	18.9	-
10/13/2019 3:00	3.0	318.9	-2.1	100.0	0.0	18.4	-
10/13/2019 4:00	2.3	358.6	-2.2	100.0	0.0	17.4	-
10/13/2019 5:00	1.9	3.4	-2.6	99.8	0.0	17.8	-
10/13/2019 6:00	2.4	15.2	-3.0	99.6	10.2	17.3	-
10/13/2019 7:00	3.0	21.3	-3.0	99.6	28.9	15.3	-
10/13/2019 8:00	2.3	29.0	-2.6	99.6	245.0	15.5	-
10/13/2019 9:00	1.1	217.2	-0.4	100.0	375.6	17.2	-
10/13/2019 10:00	1.6	308.6	-0.4	100.0	374.5	-	-
10/13/2019 11:00	0.9	98.3	0.4	99.8	475.2	15.4	-
10/13/2019 12:00	1.5	151.6	0.1	99.2	349.0	17.1	-
10/13/2019 13:00	1.0	121.6	-0.5	98.3	253.5	16.9	-
10/13/2019 14:00	0.4	198.6	-1.5	99.3	45.9	16.5	-
10/13/2019 15:00	0.7	121.5	-1.7	98.6	72.9	17.0	-
10/13/2019 16:00	0.7	83.6	-2.5	98.5	15.8	18.6	-
10/13/2019 17:00	0.8	113.4	-2.7	98.6	0.1	17.1	-
10/13/2019 18:00	1.0	81.5	-3.1	97.9	0.0	17.8	-
10/13/2019 19:00	0.5	91.5	-3.4	97.5	0.0	18.6	-
10/13/2019 20:00	0.8	91.1	-3.5	97.2	0.0	18.6	-
10/13/2019 21:00	0.5	178.4	-3.4	98.2	0.0	18.5	-
10/13/2019 22:00	0.7	93.1	-3.5	96.6	0.0	18.6	-
10/13/2019 23:00	1.5	77.9	-3.8	94.9	0.0	18.5	-
10/14/2019 0:00	1.5	77.3	-3.8	93.2	0.0	18.0	-
10/14/2019 1:00	2.0	55.1	-3.9	92.7	0.0	17.7	-
10/14/2019 2:00	2.0	48.3	-3.9	89.9	0.0	17.1	-
10/14/2019 3:00	2.5	44.2	-3.8	88.3	0.0	16.3	-
10/14/2019 4:00	3.7	36.6	-3.6	88.0	0.0	16.3	-
10/14/2019 5:00	3.7	35.3	-3.6	87.8	0.0	16.6	-
10/14/2019 6:00	3.8	31.2	-3.4	85.6	7.7	16.3	-
10/14/2019 7:00	3.7	29.3	-3.1	83.3	44.6	17.2	-
10/14/2019 8:00	3.8	28.7	-2.9	81.9	89.9	15.5	-
10/14/2019 9:00	3.5	35.4	-2.6	81.1	117.8	17.1	-
10/14/2019 10:00	4.8	29.1	-2.2	79.1	135.3	17.6	-
10/14/2019 11:00	5.0	24.1	-1.8	75.1	110.3	17.1	-
10/14/2019 12:00	2.5	347.8	-1.6	80.3	79.7	17.7	-
10/14/2019 13:00	3.3	357.0	-2.6	96.9	61.9	15.1	-
10/14/2019 14:00	5.4	30.6	-2.5	98.9	42.7	18.4	-
10/14/2019 15:00	3.7	16.0	-2.3	99.2	22.4	18.1	-
10/14/2019 16:00	3.5	6.4	-2.1	99.6	3.1	22.3	-
10/14/2019 17:00	3.5	34.3	-2.0	100.0	0.0	25.9	-
10/14/2019 18:00	5.8	24.7	-1.9	100.0	0.0	31.2	-
10/14/2019 19:00	6.8	31.5	-2.0	100.0	0.0	27.6	-
10/14/2019 20:00	6.6	28.5	-2.0	100.0	0.0	21.2	-
10/14/2019 21:00	6.1	23.9	-2.0	100.0	0.0	15.7	-
10/14/2019 22:00	5.2	25.2	-1.8	100.0	0.0	15.8	-
10/14/2019 23:00	4.5	25.9	-1.7	100.0	0.0	17.8	-
10/15/2019 0:00	4.3	27.5	-1.5	100.0	0.0	19.6	-
10/15/2019 1:00	3.8	27.4	-1.2	100.0	0.0	26.4	-
10/15/2019 2:00	3.3	24.0	-1.1	100.0	0.0	25.9	-
10/15/2019 3:00	4.6	23.2	-0.9	100.0	0.0	-	-
10/15/2019 4:00	4.2	17.9	-0.7	100.0	0.0	30.9	-
10/15/2019 5:00	3.9	20.4	-0.6	100.0	0.0	32.8	-
10/15/2019 6:00	3.5	22.0	-0.6	100.0	2.5	34.0	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
10/15/2019 7:00	3.3	31.9	-0.4	100.0	13.8	-	-
10/15/2019 8:00	3.8	32.2	-0.2	100.0	41.3	36.8	-
10/15/2019 9:00	3.4	33.7	-0.1	100.0	53.0	38.9	-
10/15/2019 10:00	2.6	34.5	0.0	100.0	54.0	39.6	-
10/15/2019 11:00	1.4	41.3	0.1	100.0	71.1	-	-
10/15/2019 12:00	2.0	40.5	0.1	100.0	83.7	47.5	-
10/15/2019 13:00	2.2	14.2	0.2	100.0	107.6	48.1	-
10/15/2019 14:00	3.6	28.2	0.2	100.0	90.2	48.5	-
10/15/2019 15:00	4.2	17.8	0.3	100.0	27.2	48.5	-
10/15/2019 16:00	2.6	19.1	0.5	100.0	4.3	47.6	-
10/15/2019 17:00	1.3	33.3	0.7	100.0	0.0	47.6	-
10/15/2019 18:00	2.0	23.9	0.8	100.0	0.0	45.6	-
10/15/2019 19:00	1.8	39.8	1.0	99.8	0.0	46.1	-
10/15/2019 20:00	2.3	356.6	1.3	98.5	0.0	45.9	-
10/15/2019 21:00	2.0	349.9	1.1	99.0	0.0	42.7	-
10/15/2019 22:00	2.6	15.1	1.1	99.2	0.0	41.5	-
10/15/2019 23:00	2.2	111.2	1.8	96.4	0.0	41.5	-
10/16/2019 0:00	1.4	156.4	2.3	94.8	0.0	43.1	-
10/16/2019 1:00	1.5	142.7	2.4	93.7	0.0	43.4	-
10/16/2019 2:00	1.2	171.8	2.2	94.9	0.0	43.3	-
10/16/2019 3:00	1.7	10.1	2.1	95.5	0.0	43.3	-
10/16/2019 4:00	3.1	20.9	1.7	97.4	0.0	42.1	-
10/16/2019 5:00	3.6	31.0	1.7	97.5	0.0	43.1	-
10/16/2019 6:00	4.2	24.9	1.9	96.1	5.9	42.9	-
10/16/2019 7:00	3.7	28.4	1.7	97.7	47.3	42.5	-
10/16/2019 8:00	3.7	18.6	2.1	95.5	35.0	41.2	-
10/16/2019 9:00	2.5	9.3	2.2	95.7	65.1	41.2	-
10/16/2019 10:00	2.7	8.0	2.5	93.2	119.7	40.9	-
10/16/2019 11:00	2.5	18.8	3.0	89.4	96.7	40.8	-
10/16/2019 12:00	2.6	11.1	2.9	90.1	70.8	39.8	-
10/16/2019 13:00	1.9	29.6	3.1	89.6	89.3	37.2	-
10/16/2019 14:00	2.5	19.8	2.7	92.3	58.7	38.6	-
10/16/2019 15:00	3.9	186.1	1.3	98.3	19.3	38.5	-
10/16/2019 16:00	5.9	189.7	1.2	99.4	3.9	37.9	-
10/16/2019 17:00	4.4	172.4	1.0	99.9	0.0	36.9	-
10/16/2019 18:00	4.2	179.0	1.5	93.5	0.0	36.8	-
10/16/2019 19:00	2.5	80.9	1.6	90.5	0.0	36.4	-
10/16/2019 20:00	4.1	20.6	1.6	92.4	0.0	36.1	-
10/16/2019 21:00	4.2	30.8	1.4	92.1	0.0	35.8	-
10/16/2019 22:00	2.7	32.2	1.4	90.7	0.0	35.3	-
10/16/2019 23:00	0.9	331.1	1.9	86.3	0.0	35.1	-
10/17/2019 0:00	1.8	21.7	1.4	90.9	0.0	34.3	-
10/17/2019 1:00	1.8	112.9	2.1	84.9	0.0	34.9	-
10/17/2019 2:00	4.3	115.5	2.7	79.5	0.0	33.8	-
10/17/2019 3:00	2.5	207.2	1.6	88.7	0.0	34.5	-
10/17/2019 4:00	1.1	202.8	0.5	98.5	0.0	34.3	-
10/17/2019 5:00	0.7	200.3	0.5	98.7	0.0	33.3	-
10/17/2019 6:00	1.5	60.2	0.4	99.6	3.9	33.4	-
10/17/2019 7:00	2.0	91.4	1.0	94.3	34.1	-	-
10/17/2019 8:00	1.7	70.3	1.4	89.9	75.6	-	-
10/17/2019 9:00	1.6	93.0	2.1	86.8	201.4	-	-
10/17/2019 10:00	1.8	116.5	2.2	87.2	178.4	32.5	-
10/17/2019 11:00	0.9	117.7	2.1	91.1	155.8	32.0	-
10/17/2019 12:00	1.7	126.1	1.8	93.2	129.8	30.8	-
10/17/2019 13:00	1.7	160.7	1.3	97.5	87.3	31.8	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
10/17/2019 14:00	1.7	132.5	0.7	98.2	51.2	28.6	-
10/17/2019 15:00	2.0	135.3	0.4	99.6	13.6	26.5	-
10/17/2019 16:00	2.7	190.2	0.5	100.0	3.5	32.2	-
10/17/2019 17:00	4.5	184.0	0.6	100.0	0.0	30.6	-
10/17/2019 18:00	4.5	195.0	0.5	100.0	0.0	31.5	-
10/17/2019 19:00	5.2	191.5	0.6	100.0	0.0	31.2	-
10/17/2019 20:00	3.4	152.5	0.6	100.0	0.0	31.6	-
10/17/2019 21:00	2.0	152.4	0.9	98.3	0.0	30.9	-
10/17/2019 22:00	2.6	129.4	1.1	96.5	0.0	30.5	-
10/17/2019 23:00	3.5	145.7	1.3	94.8	0.0	30.7	-
10/18/2019 0:00	1.6	101.9	1.4	92.8	0.0	30.4	-
10/18/2019 1:00	0.7	139.3	1.2	94.1	0.0	-	-
10/18/2019 2:00	1.2	150.5	0.5	98.4	0.0	30.5	-
10/18/2019 3:00	3.4	220.3	-0.1	100.0	0.0	-	-
10/18/2019 4:00	4.4	219.0	-0.4	100.0	0.0	22.7	-
10/18/2019 5:00	3.1	214.1	-0.5	100.0	0.0	-	-
10/18/2019 6:00	2.3	213.1	-0.6	100.0	5.2	28.0	-
10/18/2019 7:00	2.0	218.2	-0.6	100.0	28.4	-	-
10/18/2019 8:00	1.5	215.9	-0.5	100.0	86.7	31.3	-
10/18/2019 9:00	2.1	197.9	-0.2	100.0	157.5	-	-
10/18/2019 10:00	4.4	211.2	0.1	100.0	159.8	30.3	-
10/18/2019 11:00	3.7	206.0	0.1	100.0	193.2	-	-
10/18/2019 12:00	4.4	205.7	0.2	100.0	201.3	32.6	-
10/18/2019 13:00	4.0	227.1	0.1	100.0	187.3	31.2	-
10/18/2019 14:00	4.5	223.2	-0.1	100.0	74.8	28.9	-
10/18/2019 15:00	4.3	221.6	-0.3	100.0	23.8	29.5	-
10/18/2019 16:00	4.2	207.1	-0.4	100.0	4.0	30.0	-
10/18/2019 17:00	4.3	196.9	-0.9	100.0	0.0	28.6	-
10/18/2019 18:00	3.0	190.0	-1.2	100.0	0.0	27.5	-
10/18/2019 19:00	2.0	92.9	-1.4	99.0	0.0	25.6	-
10/18/2019 20:00	1.3	109.9	-1.2	98.8	0.0	28.8	-
10/18/2019 21:00	1.5	72.0	-1.3	98.3	0.0	27.9	-
10/18/2019 22:00	1.2	330.1	-1.0	98.1	0.0	29.9	-
10/18/2019 23:00	1.1	1.4	-1.0	98.6	0.0	26.6	-
10/19/2019 0:00	1.1	86.1	-1.1	99.9	0.0	24.2	-
10/19/2019 1:00	1.0	126.9	-1.0	100.0	0.0	27.2	-
10/19/2019 2:00	1.9	172.9	-1.0	100.0	0.0	25.9	-
10/19/2019 3:00	1.2	182.4	-1.0	100.0	0.0	26.8	-
10/19/2019 4:00	1.0	147.0	-1.0	100.0	0.0	-	-
10/19/2019 5:00	1.4	166.0	-1.0	100.0	0.0	-	-
10/19/2019 6:00	1.0	174.9	-1.1	100.0	3.2	25.9	-
10/19/2019 7:00	1.2	103.9	-0.9	100.0	17.7	26.2	-
10/19/2019 8:00	1.5	155.9	-0.7	99.4	45.3	26.7	-
10/19/2019 9:00	1.4	88.5	0.1	98.3	100.1	26.8	-
10/19/2019 10:00	1.7	138.4	0.2	96.7	240.7	25.6	-
10/19/2019 11:00	2.8	169.8	-0.1	96.5	203.5	-	-
10/19/2019 12:00	1.1	126.9	0.5	96.5	199.6	27.1	-
10/19/2019 13:00	3.2	171.7	0.2	95.9	158.3	-	-
10/19/2019 14:00	3.1	172.8	-0.3	99.2	100.2	27.0	-
10/19/2019 15:00	2.9	173.7	-0.2	98.5	53.3	-	-
10/19/2019 16:00	3.5	183.7	-0.4	99.9	5.6	23.3	-
10/19/2019 17:00	2.7	176.6	-0.5	99.7	0.0	23.9	-
10/19/2019 18:00	2.0	148.9	-0.6	100.0	0.0	-	-
10/19/2019 19:00	3.0	153.2	-0.8	99.9	0.0	27.2	-
10/19/2019 20:00	1.3	101.9	-1.2	98.8	0.0	27.2	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
10/19/2019 21:00	1.4	85.7	-0.8	97.5	0.0	27.9	-
10/19/2019 22:00	1.8	123.9	-0.7	96.0	0.0	28.1	-
10/19/2019 23:00	1.4	125.7	-0.8	95.8	0.0	-	-
10/20/2019 0:00	1.8	25.2	-1.0	98.9	0.0	25.9	-
10/20/2019 1:00	1.6	26.9	-0.8	96.5	0.0	25.9	-
10/20/2019 2:00	1.3	33.4	-0.6	94.2	0.0	25.2	-
10/20/2019 3:00	1.8	14.8	-0.9	95.5	0.0	25.6	-
10/20/2019 4:00	2.1	49.2	-1.3	100.0	0.0	26.0	-
10/20/2019 5:00	0.8	66.2	-1.0	98.5	0.0	25.6	-
10/20/2019 6:00	2.7	29.7	-1.0	95.5	4.8	25.6	-
10/20/2019 7:00	3.3	35.4	-1.3	99.9	41.3	26.4	-
10/20/2019 8:00	4.7	32.8	-1.2	100.0	66.9	25.5	-
10/20/2019 9:00	4.7	33.7	-1.1	100.0	119.8	27.4	-
10/20/2019 10:00	4.1	37.3	-1.0	100.0	123.6	-	-
10/20/2019 11:00	3.3	36.2	-0.8	100.0	140.5	26.7	-
10/20/2019 12:00	3.9	30.0	-0.6	100.0	205.5	-	-
10/20/2019 13:00	2.9	34.3	-0.5	100.0	161.4	-	-
10/20/2019 14:00	3.2	16.7	-0.6	100.0	90.8	25.9	-
10/20/2019 15:00	3.3	350.1	-0.8	100.0	53.5	25.7	-
10/20/2019 16:00	2.3	352.6	-0.9	100.0	9.0	25.6	-
10/20/2019 17:00	2.1	359.8	-1.0	100.0	0.0	27.4	-
10/20/2019 18:00	3.1	355.3	-1.2	100.0	0.0	-	-
10/20/2019 19:00	3.2	357.1	-1.2	100.0	0.0	25.5	-
10/20/2019 20:00	1.7	43.4	-1.6	100.0	0.0	25.3	-
10/20/2019 21:00	0.8	231.4	-1.7	100.0	0.0	26.6	-
10/20/2019 22:00	0.6	195.7	-2.2	99.9	0.0	24.7	-
10/20/2019 23:00	0.9	159.0	-2.5	99.9	0.0	24.5	-
10/21/2019 0:00	2.1	165.1	-2.5	99.9	0.0	25.2	-
10/21/2019 1:00	1.6	164.0	-3.0	99.6	0.0	25.9	-
10/21/2019 2:00	2.0	156.2	-2.7	100.0	0.0	27.7	-
10/21/2019 3:00	1.1	64.1	-2.7	99.8	0.0	28.5	-
10/21/2019 4:00	2.5	51.5	-2.8	98.0	0.0	28.4	-
10/21/2019 5:00	0.9	170.6	-3.0	98.4	0.0	28.9	-
10/21/2019 6:00	1.3	108.0	-3.0	97.0	6.1	29.3	-
10/21/2019 7:00	1.0	109.9	-2.9	95.7	45.8	28.8	-
10/21/2019 8:00	1.8	69.8	-2.5	92.1	98.2	28.4	-
10/21/2019 9:00	4.9	33.3	-2.2	91.0	151.6	27.5	-
10/21/2019 10:00	4.5	34.0	-1.9	88.4	172.6	26.7	-
10/21/2019 11:00	3.5	43.8	-1.5	88.1	154.8	24.7	-
10/21/2019 12:00	3.2	36.7	-1.1	85.7	116.9	25.1	-
10/21/2019 13:00	3.4	51.5	-1.2	90.9	87.6	27.4	-
10/21/2019 14:00	7.5	34.5	-1.5	95.1	58.9	35.7	-
10/21/2019 15:00	7.3	46.4	-1.3	93.9	12.2	38.1	-
10/21/2019 16:00	7.8	50.3	-1.7	97.3	1.9	36.3	-
10/21/2019 17:00	8.1	44.1	-1.8	99.9	0.0	36.3	-
10/21/2019 18:00	9.4	41.0	-1.9	99.7	0.0	33.2	-
10/21/2019 19:00	3.1	35.7	-1.8	98.9	0.0	-	-
10/21/2019 20:00	4.7	62.1	-1.9	99.9	0.0	36.3	-
10/21/2019 21:00	3.9	22.4	-1.8	100.0	0.0	40.3	-
10/21/2019 22:00	1.7	341.1	-1.7	100.0	0.0	37.7	-
10/21/2019 23:00	1.9	332.3	-2.3	99.8	0.0	41.8	-
10/22/2019 0:00	4.3	210.6	-2.4	99.9	0.0	42.3	-
10/22/2019 1:00	5.0	205.7	-2.2	100.0	0.0	41.5	-
10/22/2019 2:00	6.9	203.5	-2.1	100.0	0.0	40.2	-
10/22/2019 3:00	6.0	198.0	-2.3	100.0	0.0	48.7	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
10/22/2019 4:00	5.5	203.8	-2.5	99.9	0.0	45.3	-
10/22/2019 5:00	5.0	203.0	-2.6	99.8	0.0	44.6	-
10/22/2019 6:00	4.5	209.3	-2.9	99.7	5.1	44.2	-
10/22/2019 7:00	4.9	204.1	-2.7	99.6	39.7	44.7	-
10/22/2019 8:00	4.5	209.4	-2.4	98.9	75.5	44.5	-
10/22/2019 9:00	4.4	209.4	-2.2	99.3	105.2	44.5	-
10/22/2019 10:00	4.7	208.4	-1.8	99.9	106.2	44.1	-
10/22/2019 11:00	4.3	209.1	-1.4	99.4	203.7	44.0	-
10/22/2019 12:00	4.6	202.8	-1.2	99.4	112.4	43.8	-
10/22/2019 13:00	3.9	197.4	-0.7	98.8	123.9	43.4	-
10/22/2019 14:00	3.9	199.5	-0.6	98.0	110.8	43.4	-
10/22/2019 15:00	2.9	214.4	-0.6	99.3	40.2	43.6	-
10/22/2019 16:00	3.1	199.4	-0.4	99.0	3.8	43.5	-
10/22/2019 17:00	3.1	203.6	-0.3	99.1	0.0	43.2	-
10/22/2019 18:00	3.2	202.3	-0.4	99.8	0.0	42.9	-
10/22/2019 19:00	1.9	196.3	-0.6	100.0	0.0	42.7	-
10/22/2019 20:00	0.8	118.4	-1.0	96.8	0.0	42.6	-
10/22/2019 21:00	0.9	135.2	-1.2	91.4	0.0	42.5	-
10/22/2019 22:00	1.3	137.8	-1.1	90.0	0.0	42.0	-
10/22/2019 23:00	2.1	67.4	-0.6	88.8	0.0	42.4	-
10/23/2019 0:00	1.6	148.2	-0.4	88.4	0.0	42.1	-
10/23/2019 1:00	2.1	58.5	-0.3	86.6	0.0	42.2	-
10/23/2019 2:00	1.2	214.5	0.2	92.1	0.0	42.0	-
10/23/2019 3:00	1.3	128.3	0.0	95.8	0.0	41.8	-
10/23/2019 4:00	1.9	204.9	0.3	94.5	0.0	41.6	-
10/23/2019 5:00	4.3	195.8	-0.1	99.9	0.0	41.4	-
10/23/2019 6:00	5.3	190.6	0.1	99.9	1.6	41.0	-
10/23/2019 7:00	3.2	195.3	0.0	100.0	13.1	40.9	-
10/23/2019 8:00	4.2	189.6	0.2	100.0	24.4	41.9	-
10/23/2019 9:00	6.0	199.8	0.1	100.0	34.7	41.1	-
10/23/2019 10:00	6.9	202.8	0.1	100.0	40.0	42.8	-
10/23/2019 11:00	5.9	206.2	0.1	100.0	48.6	44.3	-
10/23/2019 12:00	7.1	207.4	0.2	100.0	55.4	47.2	-
10/23/2019 13:00	6.7	218.2	0.1	100.0	47.8	47.6	-
10/23/2019 14:00	5.2	215.5	0.1	100.0	29.1	49.1	-
10/23/2019 15:00	3.8	219.3	0.1	100.0	16.0	48.6	-
10/23/2019 16:00	4.4	215.2	0.1	100.0	1.0	48.7	-
10/23/2019 17:00	5.8	213.5	0.1	100.0	0.0	48.0	-
10/23/2019 18:00	6.7	203.1	0.4	100.0	0.0	47.7	-
10/23/2019 19:00	6.5	200.9	1.1	100.0	0.0	45.9	-
10/23/2019 20:00	6.7	198.7	1.5	100.0	0.0	46.3	-
10/23/2019 21:00	6.5	201.3	1.7	100.0	0.0	45.1	-
10/23/2019 22:00	6.8	213.4	1.8	100.0	0.0	43.9	-
10/23/2019 23:00	6.9	228.5	1.7	100.0	0.0	43.7	-
10/24/2019 0:00	7.5	231.4	1.6	100.0	0.0	42.1	-
10/24/2019 1:00	8.6	225.1	1.0	100.0	0.0	41.6	-
10/24/2019 2:00	6.1	203.5	0.6	100.0	0.0	42.7	-
10/24/2019 3:00	3.7	193.9	0.3	100.0	0.0	41.3	-
10/24/2019 4:00	4.8	212.0	0.1	100.0	0.0	40.3	-
10/24/2019 5:00	5.3	216.9	0.1	100.0	0.0	40.7	-
10/24/2019 6:00	4.2	210.7	0.0	100.0	1.5	40.7	-
10/24/2019 7:00	4.6	211.3	0.0	100.0	12.2	40.8	-
10/24/2019 8:00	4.1	223.6	-0.1	100.0	31.1	40.4	-
10/24/2019 9:00	3.9	206.2	0.0	100.0	90.6	40.3	-
10/24/2019 10:00	4.3	220.4	0.0	100.0	87.7	41.0	-



Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
10/24/2019 11:00	5.4	230.9	-0.1	100.0	98.6	40.5	-
10/24/2019 12:00	2.4	207.7	0.0	100.0	99.5	40.3	-
10/24/2019 13:00	3.7	205.8	-0.2	100.0	64.4	39.7	-
10/24/2019 14:00	5.5	203.8	-0.4	100.0	45.3	45.7	-
10/24/2019 15:00	4.9	188.3	-1.0	100.0	17.5	43.9	-
10/24/2019 16:00	3.4	186.6	-1.1	100.0	1.5	45.0	-
10/24/2019 17:00	1.7	168.1	-1.1	100.0	0.0	44.1	-
10/24/2019 18:00	0.6	169.0	-1.2	100.0	0.0	45.7	-
10/24/2019 19:00	0.5	155.6	-1.1	100.0	0.0	46.1	-
10/24/2019 20:00	0.8	156.9	-1.2	100.0	0.0	46.0	-
10/24/2019 21:00	2.3	200.9	-1.1	100.0	0.0	46.5	-
10/24/2019 22:00	2.5	221.3	-1.2	100.0	0.0	-	-
10/24/2019 23:00	1.6	238.5	-1.3	100.0	0.0	47.2	-
10/25/2019 0:00	2.9	210.1	-1.3	100.0	0.0	47.6	-
10/25/2019 1:00	3.0	205.0	-1.5	100.0	0.0	48.0	-
10/25/2019 2:00	3.5	197.3	-1.5	100.0	0.0	48.3	-
10/25/2019 3:00	3.6	197.2	-1.6	100.0	0.0	45.8	-
10/25/2019 4:00	3.9	199.8	-1.7	100.0	0.0	48.0	-
10/25/2019 5:00	4.1	196.6	-1.8	100.0	0.0	48.3	-
10/25/2019 6:00	3.2	203.1	-1.8	100.0	1.5	47.7	-
10/25/2019 7:00	3.5	191.6	-1.7	100.0	15.3	47.4	-
10/25/2019 8:00	3.8	204.9	-1.6	100.0	35.9	47.2	-
10/25/2019 9:00	4.4	214.3	-1.1	100.0	79.8	47.3	-
10/25/2019 10:00	3.6	196.2	-0.9	100.0	76.9	47.7	-
10/25/2019 11:00	3.8	210.1	-0.4	100.0	106.9	47.0	-
10/25/2019 12:00	3.1	219.4	0.0	100.0	104.0	46.1	-
10/25/2019 13:00	2.7	219.7	-0.2	100.0	76.0	46.1	-
10/25/2019 14:00	2.4	218.1	-0.5	100.0	42.3	45.9	-
10/25/2019 15:00	1.5	238.9	-0.6	100.0	16.0	46.0	-
10/25/2019 16:00	0.7	122.4	-1.1	100.0	1.6	46.0	-
10/25/2019 17:00	1.8	23.8	-1.1	100.0	0.0	46.0	-
10/25/2019 18:00	2.2	26.1	-1.4	100.0	0.0	45.3	-
10/25/2019 19:00	2.7	41.8	-2.1	100.0	0.0	45.2	-
10/25/2019 20:00	4.2	17.6	-1.7	100.0	0.0	45.3	-
10/25/2019 21:00	3.8	8.3	-1.7	100.0	0.0	45.0	-
10/25/2019 22:00	4.1	25.9	-2.0	100.0	0.0	44.3	-
10/25/2019 23:00	4.4	31.6	-2.6	99.0	0.0	45.3	-
10/26/2019 0:00	5.6	34.6	-2.7	93.4	0.0	45.6	-
10/26/2019 1:00	3.0	264.9	-2.7	94.8	0.0	44.6	-
10/26/2019 2:00	1.0	185.6	-2.9	99.4	0.0	44.3	-
10/26/2019 3:00	0.9	124.9	-3.0	98.5	0.0	44.6	-
10/26/2019 4:00	1.4	207.9	-3.3	99.2	0.0	44.9	-
10/26/2019 5:00	0.9	215.5	-3.6	99.0	0.0	45.6	-
10/26/2019 6:00	1.1	199.2	-3.5	98.9	2.4	44.8	-
10/26/2019 7:00	1.2	185.2	-3.5	99.3	13.9	45.1	-
10/26/2019 8:00	2.0	204.0	-2.1	99.5	117.1	43.8	-
10/26/2019 9:00	1.8	187.1	-0.4	98.1	212.2	44.2	-
10/26/2019 10:00	0.7	150.7	0.0	93.8	296.2	44.1	-
10/26/2019 11:00	0.8	341.4	-0.1	85.6	382.0	44.1	-
10/26/2019 12:00	0.8	42.5	-0.5	78.6	187.1	45.3	-
10/26/2019 13:00	0.7	245.3	-1.0	84.0	125.2	45.7	-
10/26/2019 14:00	0.6	16.2	-0.8	76.2	81.4	45.4	-
10/26/2019 15:00	0.8	154.9	-0.7	81.3	58.4	44.7	-
10/26/2019 16:00	1.2	173.9	-0.7	80.7	3.8	45.5	-
10/26/2019 17:00	2.0	193.9	-0.9	78.1	0.0	45.5	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
10/26/2019 18:00	2.9	206.1	-0.6	70.4	0.0	45.2	-
10/26/2019 19:00	3.3	204.1	-0.3	64.7	0.0	44.6	-
10/26/2019 20:00	3.7	212.1	-0.1	58.7	0.0	44.6	-
10/26/2019 21:00	3.7	209.8	-0.1	57.0	0.0	44.5	-
10/26/2019 22:00	3.6	211.6	0.0	54.7	0.0	44.0	-
10/26/2019 23:00	3.1	211.0	-0.4	54.9	0.0	44.3	-
10/27/2019 0:00	3.4	202.4	0.1	51.4	0.0	44.4	-
10/27/2019 1:00	3.0	208.4	0.1	50.4	0.0	43.8	-
10/27/2019 2:00	1.7	214.1	0.1	50.7	0.0	44.2	-
10/27/2019 3:00	0.8	252.3	0.4	44.8	0.0	44.5	-
10/27/2019 4:00	0.5	61.3	-0.2	45.0	0.0	44.3	-
10/27/2019 5:00	0.9	96.1	-0.7	50.3	0.0	44.2	-
10/27/2019 6:00	0.5	321.6	-1.0	52.2	2.9	44.3	-
10/27/2019 7:00	0.7	190.7	-1.2	55.1	14.9	44.4	-
10/27/2019 8:00	1.3	188.5	-0.8	54.1	130.3	43.5	-
10/27/2019 9:00	0.7	15.5	1.7	43.5	282.7	42.3	-
10/27/2019 10:00	1.3	200.4	0.6	51.9	338.9	41.7	-
10/27/2019 11:00	1.1	338.1	1.2	48.0	355.7	41.7	-
10/27/2019 12:00	2.6	202.0	0.2	61.5	349.4	43.3	-
10/27/2019 13:00	2.6	206.3	-0.1	61.5	272.4	42.2	-
10/27/2019 14:00	1.9	226.5	0.0	62.8	181.6	42.3	-
10/27/2019 15:00	1.2	221.3	-0.1	67.7	80.3	42.2	-
10/27/2019 16:00	1.7	214.3	-1.5	74.6	3.7	42.4	-
10/27/2019 17:00	1.5	210.4	-1.8	80.1	0.0	42.6	-
10/27/2019 18:00	1.4	223.2	-2.2	81.9	0.0	42.7	-
10/27/2019 19:00	1.4	195.0	-2.5	84.0	0.0	42.2	-
10/27/2019 20:00	0.8	176.2	-2.4	82.4	0.0	42.7	-
10/27/2019 21:00	0.6	115.6	-2.5	80.5	0.0	42.7	-
10/27/2019 22:00	1.9	20.9	-2.8	80.5	0.0	42.3	-
10/27/2019 23:00	2.3	24.6	-2.9	86.1	0.0	42.0	-
10/28/2019 0:00	2.4	21.3	-3.0	88.3	0.0	42.0	-
10/28/2019 1:00	1.9	13.6	-3.2	91.2	0.0	42.4	-
10/28/2019 2:00	1.6	3.9	-2.7	84.2	0.0	42.9	-
10/28/2019 3:00	1.0	311.8	-2.6	79.3	0.0	42.8	-
10/28/2019 4:00	1.5	209.6	-3.1	85.8	0.0	42.1	-
10/28/2019 5:00	1.1	197.0	-2.1	75.1	0.0	42.9	-
10/28/2019 6:00	0.8	117.5	-1.6	69.1	3.3	42.6	-
10/28/2019 7:00	0.8	321.3	-0.8	63.8	29.2	43.4	-
10/28/2019 8:00	1.1	221.4	0.5	56.7	104.8	42.9	-
10/28/2019 9:00	0.9	207.9	2.7	46.0	271.0	42.1	-
10/28/2019 10:00	1.5	180.6	1.6	54.6	308.4	42.8	956.9
10/28/2019 11:00	1.1	189.7	3.6	45.2	281.5	-	-
10/28/2019 12:00	1.0	19.3	3.8	44.7	316.6	41.7	672.4
10/28/2019 13:00	-	-	-	-	-	-	-
10/28/2019 14:00	-	-	-	-	-	-	-
10/28/2019 15:00	-	-	-	-	-	-	-
10/28/2019 16:00	-	-	-	-	-	-	-
10/28/2019 17:00	-	-	-	-	-	-	-
10/28/2019 18:00	-	-	-	-	-	-	-
10/28/2019 19:00	-	-	-	-	-	-	-
10/28/2019 20:00	-	-	-	-	-	-	-
10/28/2019 21:00	-	-	-	-	-	-	-
10/28/2019 22:00	-	-	-	-	-	-	-
10/28/2019 23:00	-	-	-	-	-	-	-
10/29/2019 0:00	-	-	-	-	-	-	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
10/29/2019 1:00	-	-	-	-	-	-	-
10/29/2019 2:00	-	-	-	-	-	-	-
10/29/2019 3:00	-	-	-	-	-	-	-
10/29/2019 4:00	-	-	-	-	-	-	-
10/29/2019 5:00	-	-	-	-	-	-	-
10/29/2019 6:00	-	-	-	-	-	-	-
10/29/2019 7:00	-	-	-	-	-	-	-
10/29/2019 8:00	-	-	-	-	-	-	-
10/29/2019 9:00	-	-	-	-	-	-	-
10/29/2019 10:00	-	-	-	-	-	-	-
10/29/2019 11:00	-	-	-	-	-	-	-
10/29/2019 12:00	-	-	-	-	-	-	-
10/29/2019 13:00	-	-	-	-	-	-	-
10/29/2019 14:00	-	-	-	-	-	-	-
10/29/2019 15:00	-	-	-	-	-	-	-
10/29/2019 16:00	-	-	-	-	-	-	-
10/29/2019 17:00	-	-	-	-	-	-	-
10/29/2019 18:00	-	-	-	-	-	-	-
10/29/2019 19:00	-	-	-	-	-	-	-
10/29/2019 20:00	-	-	-	-	-	-	-
10/29/2019 21:00	-	-	-	-	-	-	-
10/29/2019 22:00	-	-	-	-	-	-	-
10/29/2019 23:00	-	-	-	-	-	-	-
10/30/2019 0:00	-	-	-	-	-	-	-
10/30/2019 1:00	-	-	-	-	-	-	-
10/30/2019 2:00	-	-	-	-	-	-	-
10/30/2019 3:00	-	-	-	-	-	-	-
10/30/2019 4:00	-	-	-	-	-	-	-
10/30/2019 5:00	-	-	-	-	-	-	-
10/30/2019 6:00	-	-	-	-	-	-	-
10/30/2019 7:00	-	-	-	-	-	-	-
10/30/2019 8:00	-	-	-	-	-	-	-
10/30/2019 9:00	-	-	-	-	-	-	-
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10/30/2019 16:00	-	-	-	-	-	-	-
10/30/2019 17:00	-	-	-	-	-	-	-
10/30/2019 18:00	-	-	-	-	-	-	-
10/30/2019 19:00	-	-	-	-	-	-	-
10/30/2019 20:00	-	-	-	-	-	-	-
10/30/2019 21:00	-	-	-	-	-	-	-
10/30/2019 22:00	-	-	-	-	-	-	-
10/30/2019 23:00	-	-	-	-	-	-	-
10/31/2019 0:00	-	-	-	-	-	-	-
10/31/2019 1:00	-	-	-	-	-	-	-
10/31/2019 2:00	-	-	-	-	-	-	-
10/31/2019 3:00	-	-	-	-	-	-	-
10/31/2019 4:00	-	-	-	-	-	-	-
10/31/2019 5:00	-	-	-	-	-	-	-
10/31/2019 6:00	-	-	-	-	-	-	-
10/31/2019 7:00	-	-	-	-	-	-	-

**Appendix C4: Johnny Mountain November 2018 - October 2019 Hourly Meteorological Data**

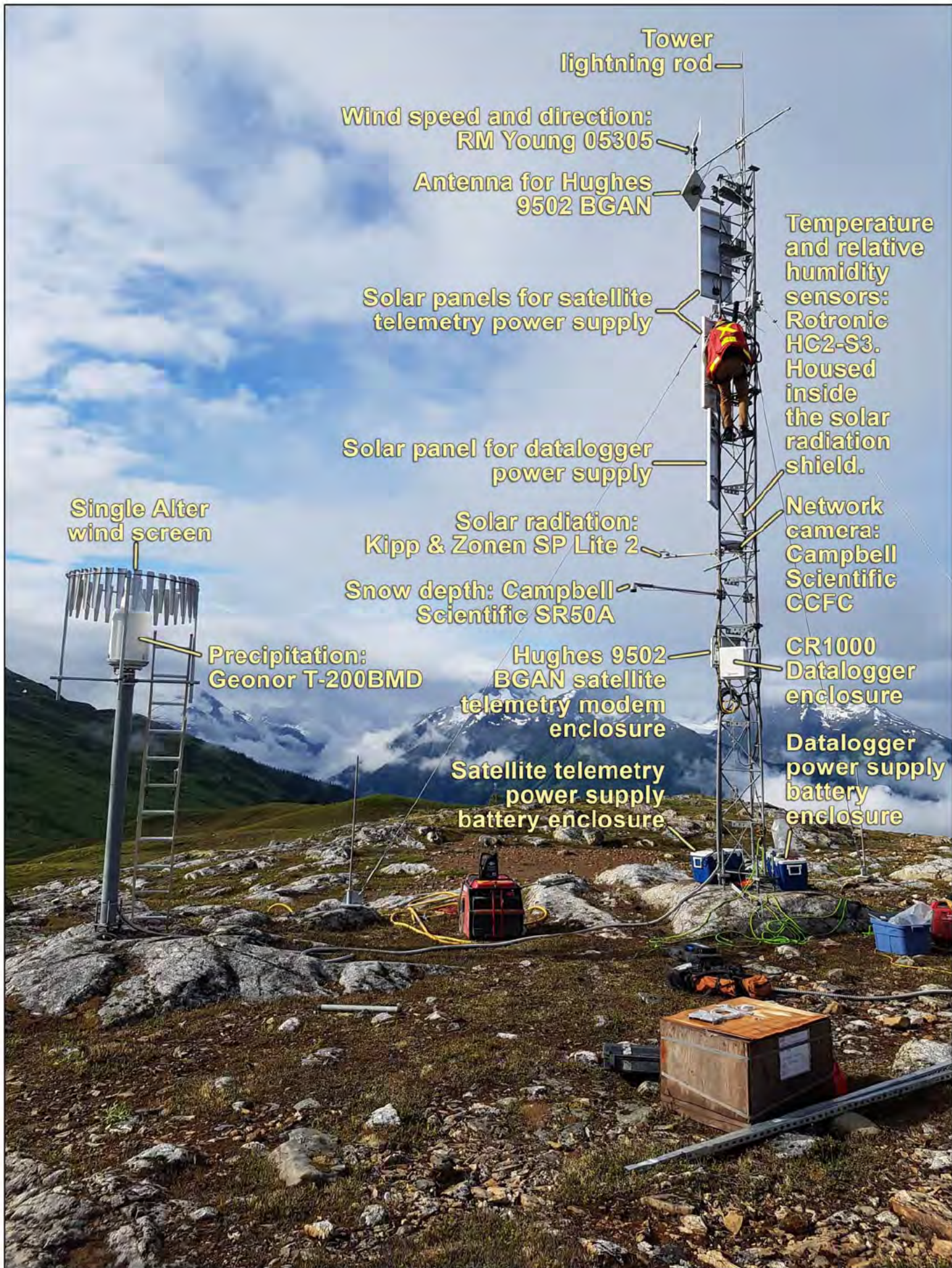
Date and Time	Average Wind Speed (m/s)	Average Wind Direction (degrees True North)	Average Air Temperature (°C)	Average Relative Humidity (%)	Average Solar Radiation (W/m <sup>2</sup> )	Snow Depth (cm)	Accumulated Precipitation <sup>1</sup> (mm)
10/31/2019 8:00	-	-	-	-	-	-	-
10/31/2019 9:00	-	-	-	-	-	-	-
10/31/2019 10:00	-	-	-	-	-	-	-
10/31/2019 11:00	-	-	-	-	-	-	-
10/31/2019 12:00	-	-	-	-	-	-	-
10/31/2019 13:00	-	-	-	-	-	-	-
10/31/2019 14:00	-	-	-	-	-	-	-
10/31/2019 15:00	-	-	-	-	-	-	-
10/31/2019 16:00	-	-	-	-	-	-	-
10/31/2019 17:00	-	-	-	-	-	-	-
10/31/2019 18:00	-	-	-	-	-	-	-
10/31/2019 19:00	-	-	-	-	-	-	-
10/31/2019 20:00	-	-	-	-	-	-	-
10/31/2019 21:00	-	-	-	-	-	-	-
10/31/2019 22:00	-	-	-	-	-	-	-
10/31/2019 23:00	-	-	-	-	-	-	-

**Notes:**

*dash (-) = Missing or erroneous data that were removed*

<sup>1</sup> *Accumulated precipitation includes instrumental error*

APPENDIX D      JOHNNY MOUNTAIN METEOROLOGICAL STATION  
DURING INSTALLATION



Tower lightning rod

Wind speed and direction:  
RM Young 05305

Antenna for Hughes  
9502 BGAN

Solar panels for satellite  
telemetry power supply

Solar panel for datalogger  
power supply

Solar radiation:  
Kipp & Zonen SP Lite 2

Snow depth: Campbell  
Scientific SR50A

Single Alter  
wind screen

Precipitation:  
Geonor T-200BMD

Hughes 9502  
BGAN satellite  
telemetry modem  
enclosure

Satellite telemetry  
power supply  
battery enclosure

Temperature  
and relative  
humidity  
sensors:  
Rotronic  
HC2-S3.  
Housed  
inside  
the solar  
radiation  
shield.

Network  
camera:  
Campbell  
Scientific  
CCFC

CR1000  
Datalogger  
enclosure

Datalogger  
power supply  
battery  
enclosure

APPENDIX C            2021 PROJECT EXECUTION PLAN (SNIPGOLD 2021)

# 2021 PROJECT EXECUTION PLAN (PEP)

<b>Project Title:</b>	<b>Johnny Mountain Mine Reclamation</b>
<b>Customer Name:</b>	<b>SnipGold Corporation (SnipGold)</b>
<b>Revision No.:</b>	<b>2021-rev0</b>



PROJECT NO.: **JMM Reclam. 2021**

REV. NO.: **2021-rev0**

**2021 PROJECT EXECUTION PLAN  
(PEP)**

PROJECT TITLE: **Johnny Mountain Mine  
Reclamation**

---

**PROJECT EXECUTION PLAN APPROVAL AND SIGN-OFF**

The completion and implementation of this PEP is a SnipGold project management requirement. This PEP is created for the:

- **Johnny Mountain Mine (JMM) Reclamation Project - 2021 season**

The PEP will be approved by the appropriate SnipGold Project Management Representatives. This PEP sign-off page requires the identified key project representatives to affirm that the PEP is approved for use.

These key representatives will include:

<b>Title</b>	<b>Name</b>	<b>Signature</b>	<b>Date</b>
SnipGold Project Manager	<u>Elizabeth Miller</u>	_____	_____
SnipGold Mine Manager	<u>Marcus Adam</u>	_____	_____

Once approved, the Project Manager will present the PEP to the project team to confirm their awareness of the content and project commitments and remind them that they are required to follow it.

The PEP is a living document subject to change throughout the life of the project, anticipated to be updated annually on this multi-year project.

Signatures will be obtained prior to the first “Issued for Implementation” revision (Rev 0) of this document. Subsequent changes will be issued as formal “revisions” to the PEP following the document control procedures established for the project.

The signed original of the sign-off page and the corresponding PEP are kept with other documents in the appropriate project folder.

PROJECT NO.: **JMM Reclam. 2021**

REV. NO.: **2021-rev0**

**2021 PROJECT EXECUTION PLAN  
(PEP)**

PROJECT TITLE: **Johnny Mountain Mine  
Reclamation**

---

	<b>Name</b>	<b>Signature</b>	<b>Date</b>
Prepared by:	<u>Kevin Hidber</u>	_____	_____
Checked by:	<u>Michael Skurski</u>	_____	_____
Approved by:	<u>Elizabeth Miller</u>	_____	_____

PROJECT NO.: **JMM Reclam. 2021**

REV. NO.: **2021-rev0**

**2021 PROJECT EXECUTION PLAN  
(PEP)**

PROJECT TITLE: **Johnny Mountain Mine  
Reclamation**

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**APPENDICES**

APPENDIX A – SCHEDULE

Bronson Camp Open - Matrix (approximate)	04 May 2021
Seabridge Reclamation Management Team – Preseason meetings and scheduling	04 May 2021
Seabridge JMM Reclamation Team Mobilize to Iskut Camp	18 May 2021
Start Improvements to JMM Access Road and snow removal	19 May 2021
Matrix Mechanic - Begin repairs to site equipment	19 May 2021
JMM access Road – Repair washout and snow removal	25 May 2021
Stage all reclamation equipment and supplies at McLymont for transfer to site. (Lime, Oil Gator, PVC Pipe)	01 June 2021
Conduct Dam Safety Inspection (DSI)	03 June 2021
Begin In-Situ Soil Remediation - Tank Farm area	03 June 2021
Training of Crew – “Working near Water”	4-6 June 2021
Begin Relocation of Waste Rock to TSF – Level 10	07 June 2021
Begin Relocation of Waste Rock to TSF – Level 11	04 July 2021
Conduct Dam Safety Inspection (DSI)	04 July 2021
Begin Relocation of Waste Rock to TSF – JMM Runway	20 August 2021
Disposal of old mine equipment to JMM landfill	08 Sept 2021

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KCB – Conduct Dam Safety Inspection (DSI) on the TSF	08 Sept 2021
End of 2021 reclamation season at JMM	02 Oct 2021

APPENDIX B – GOVERNING REGULATIONS AND ACTS

APPENDIX C – WBS PROCEDURE

PROJECT NO.: **JMM Reclam. 2021**

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**2021 PROJECT EXECUTION PLAN  
(PEP)**

PROJECT TITLE: **Johnny Mountain Mine  
Reclamation**

---

## **1.0 SECTION 1 – PROJECT EXECUTION PLAN**

### **1.1 INTRODUCTION**

The following Project Execution Plan (PEP), including costing, implementation and scheduling for the Johnny Mountain Mine (JMM) site, located in Northwest British Columbia was compiled by SnipGold with the assistance of several Consulting Engineers adding technical support and specialised knowledge to facilitate a comprehensive reclamation plan.

In June 2016, Seabridge Gold (Seabridge) purchased SnipGold, making SnipGold a wholly owned subsidiary of Seabridge Gold.

The Johnny Mountain Mine (JMM) was a small underground gold mine and milling operation that operated over a short period from November 1988 to August 1990 and then from September to November 1993 when operations were stopped. The mine comprised three (3) adits (numbered 10, 11 and 12), five (5) vent raises (shafts), a mill building, a tailings facility, an air strip (at the mine site), a fuel tank farm, several ancillary buildings, waste rock piles, a 10 km road from the Bronson Slope (adjacent to the Iskut River), a septic bed and a few other minor components (see Figure 1-1 and Figure 1-2). The milling process comprised conventional grinding and gravity separation. The initially milling process included a cyanide leach process that was stopped early in process operations.

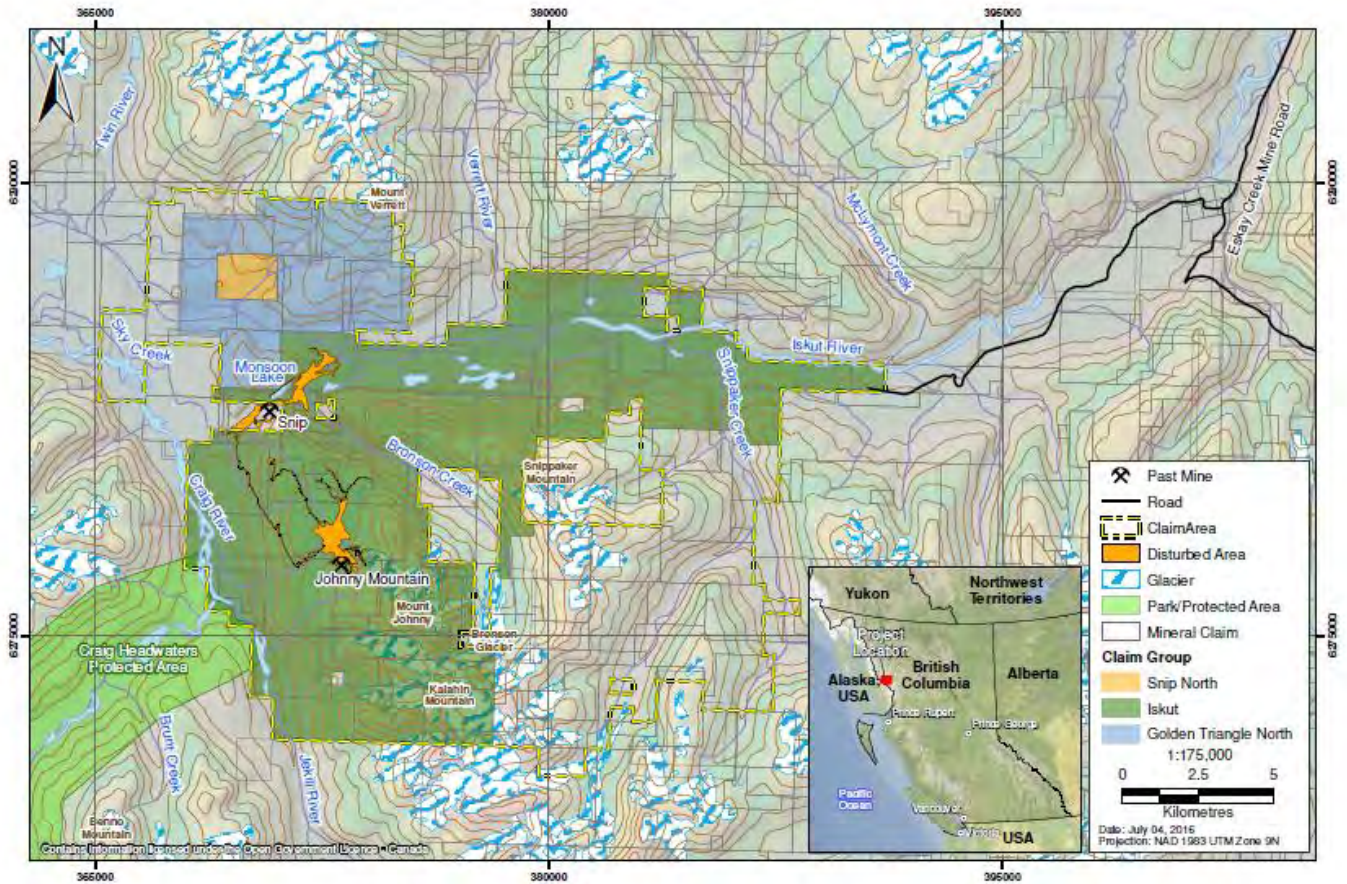


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**2021 PROJECT EXECUTION PLAN  
 (PEP)**

PROJECT TITLE: **Johnny Mountain Mine  
 Reclamation**



**Figure 1-1: Regional Location Plan**

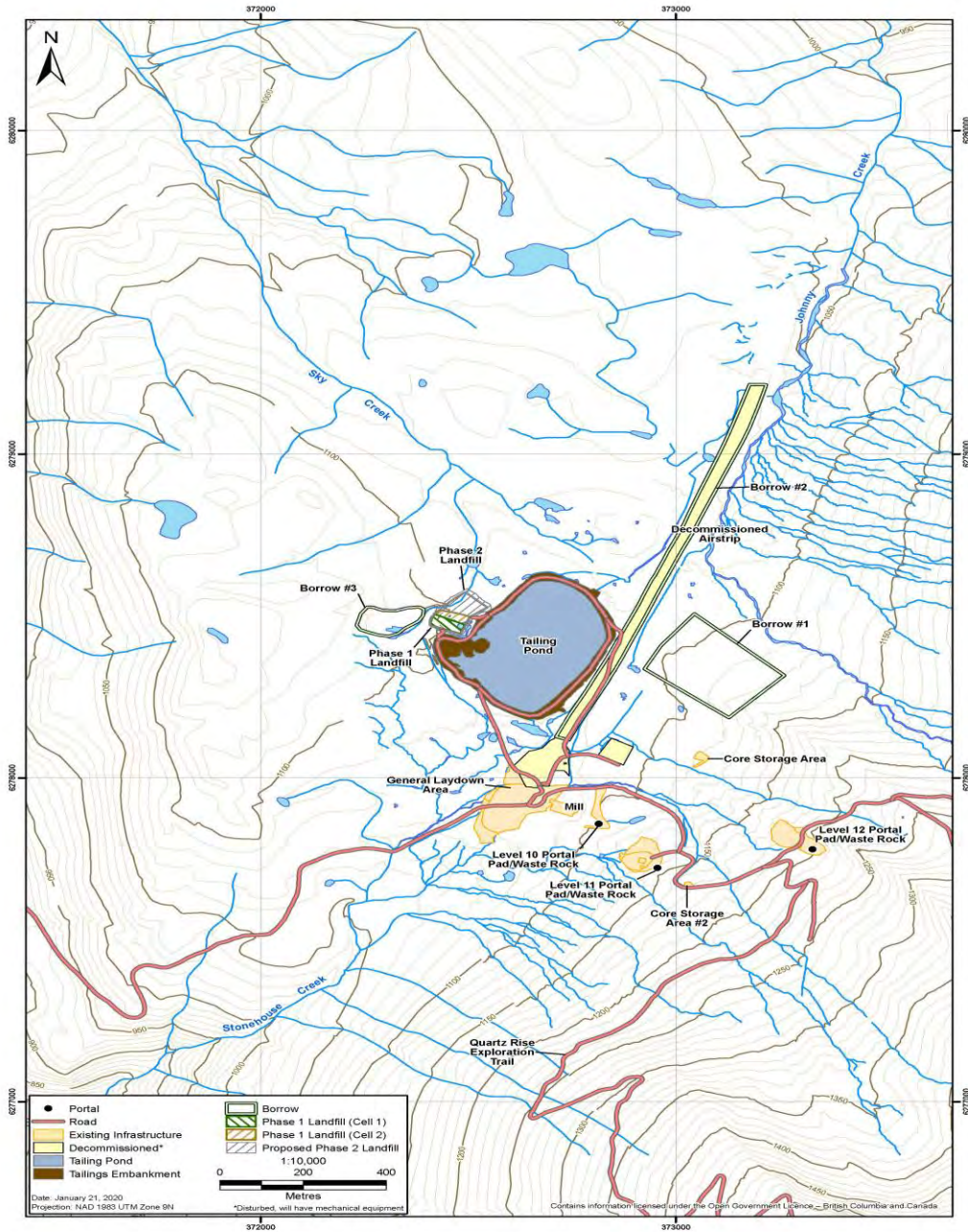
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**Figure 3-1  
 Current Status of the Site**



SNIPGOLD CORP.

Proj # 0492759-0004 | GIS # JM-15-068

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**Figure 1-2: 2021 Mine Site Plan**

Reclamation activities technically began in 1995, although the substantial amount of reclamation achieved to date started in 2000 based on the original reclamation plan (1999), accepted and approved by the British Columbia Ministry of Energy, Mines and Petroleum Resources (currently BC Ministry of Energy and Mines: MEM).

There are currently three BC Government permits applicable to the JMM as follows:

1. Reclamation Permit M-178, dated June 17, 1988, and amended July 7, 2004,
2. Waste Management Permit PE-8415 dated June 6, 1990, amended May 11, 2000, and May 31, 2018.
3. Water Management Permit PR-7927 dated March 29, 1989 and amended July 14, 1999 and later on August 2, 2011.

Site conditions and ownership have changed since the original reclamation plan was prepared and for which these permits were provided and ultimately approved. Even though ownership has changed, the corporate registry and name remain unchanged. All permits remain in the name of SnipGold. The project execution plan herein details the required investigative, design and decommissioning work to meet the requirements of the approved reclamation plan and to appropriately adjust the specific reclamation works.

The PEP will demonstrate the plan anticipated to be implemented, in accordance with the approved reclamation plan, to undertake the complete closure of mine facilities.

There will be interaction between the ongoing exploration work being undertaken by Seabridge Gold geologists; specifically, the sharing of facilities and resources between these two projects. The following activities are not included in the JMM Reclamation Project:

1. Any reparation work on Bronson slope infrastructure,
2. Any equipment refurbishment at Bronson Slope,
3. Any permitting associated with roads designed to access Bronson Slope,
4. Road/bridge reparation work along the Bronson Slope access road to JMM.
5. Site compliance activities associated with overall Iskut Project (e.g. regional) permit compliance.

## **1.2 PROJECT PURPOSE**

SnipGold is committed to closing the JMM site in accordance with the existing (1999) approved reclamation plan. The intention of the reclamation plan is to return disturbed

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lands to their original land use, specifically to the original vegetation and wildlife habitat through the following:

- Remove infrastructure and clean up the JMM Project site to minimize potential impacts to the environment, and to remove the impacts to the visual aspects of the site,
- Re-contour and revegetate disturbed lands to restore to natural appearance, self-sustaining and a stable and productive natural habitat for wildlife utilizing the area, and
- Ensure long term stability of restored areas, biologically, geotechnically and geochemically.

The purpose of this document is to provide SnipGold with an execution plan to implement reclamation measures that will show steady annual progress and can be accomplished by SnipGold in both a financially acceptable and schedule focused manner that meets the company's commitments and obligations to the Tahltan and other stakeholders (e.g. BC government, general public, and downstream users).

### **1.3 GOVERNING REGULATIONS AND ACTS**

The governing regulations for the JMM Reclamation Project are the Mines Acts.

The full list of governing regulations and Acts are referenced in Appendix B.

### **1.4 PROJECT OBJECTIVES AND PROGRESS**

The overall goal of the JMM PEP is to provide SnipGold with a reclamation execution plan that includes a schedule and implementation strategy for the remaining reclamation work required at the JMM site. The overall schedule is based on a six to seven-year period which started in 2017, with planned visual progress expected to occur each year.

#### **1.4.1 2017 - PROGRESS**

The 2017 reclamation season involved the following:

Drilling and installation of fifty-two (52) ground water monitoring wells which provided SnipGold with information on ground water and soil contamination on the JMM site. A total of fifty-three (53) test pits were excavated during the 2017 season to identify and quantify the extent of soil contamination around the fuel tank farm area, mill building and portal #11 entrance.

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Many of the historical hazardous wastes located on the JMM site were removed or eliminated over the 2017 season from the fuel tank farm area and from the Mill Building.

A total of twenty-eight (28) fuel storage tanks were decommissioned in the 2017 reclamation season, ranging in size from 7,000 to 100,000-gallon capacity. The tanks were cleaned, demolished and stored for later disposal to the upgraded JMM landfill.

Portal 11 and 12 were temporarily closed with an earth type barricade, which included a 600mm diameter culvert inserted into the earth barricade to allow ground water out of the portal. One vent raise was temporarily closed using lumber and mesh to prevent access.

Site grading/ditching was completed around the Mill Building and Tank farm to direct surface water away from these locations and direct the runoff toward historic drainage channels.

Areas disturbed by the 2017 reclamation activities were seeded with a reclamation seed mix to help with erosion potential.

Klohn Crippen Berger (KCB) was retained by SnipGold to oversee the installation of five (5) vibrating wire piezometers on the Tailings Storage Facility (TSF). KCB also oversaw repairs to the TSF dam involving repairing stress cracks evident along the dam perimeter and repairs to areas on the upstream face showing signs of erosion due to wave action. A Dam Safety Inspection (DSI) was completed by KCB in 2017 along with removal of old mine equipment and waste items such as empty clean 45-gallon drums and piping. These items were gathered from around the TSF and stored for later disposal in the upgraded JMM landfill.

#### **1.4.2 2018 - PROGRESS**

The 2018 reclamation season involved the following:

Decommission and permanent closure of five (5) vent raises located east of the JMM Mill building. The vent closures involved removal of all historic building material from the vent surface openings and disposal in an appropriate manner. The vents were sealed using a polyurethane foam, as engineered and directed by Golder Associates. Once sealed, all vents were backfilled using soils natural to each vent location with surface water directed away from the vents toward historical drainage channels. All vent sites were revegetated with plants local to the JMM site.

Phase One upgrades to the historic JMM landfill were completed in the 2018 season as designed and supervised by WOOD (formerly Amec Foster Wheeler). Upgrades to the landfill are required to facilitate the demolition of the JMM Mill building and ongoing reclamation of the Johnny Mountain Mine site.

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The 2017 test pit and water well installation program identified hydrocarbon contaminated soils in and around the historic JMM tank farm. During the 2018 reclamation season, approximately 2,900 m<sup>3</sup> of contaminated soils were treated with a biocatalyst (Oil Gator®) to help accelerate the breakdown of hydrocarbons in the soils. The treated soils were aerated three times during the 2018 season.

Two (2) historic burial sites identified in 2008 by BGC engineering were excavated and relocated in 2018 to the approved landfill location, satisfying outstanding requirements from BC MOE letter dated June 11th, 2008 regarding unauthorized burning and buried materials.

Over the course of the mine's operation and decommissioning from 1988 to 1993, several tons of ore concentrate accumulated on the floor of the Mill building at varying depths (range: 0.15m to 0.3m). Due to the potential acid generating (PAG) capacity of this material and as required under reclamation permit MX-178, the ore was removed from the Mill Building in 2018 and placed below water cover within the JMM Tailings Storage Facility (TSF).

Additional 2018 reclamation activities involved permanent closure of portal #10, removal of the old JMM septic field and underground storage tanks, lowering islands of ore concentrate within the TSF, relocation of undocumented burial site #3 to the JMM landfill, additional test pits and geochemical sampling along the JMM runway and at the 10 portal cribbing.

Additional test pits were excavated east of the JMM runway in search of a gravel source that could be used for final TSF and landfill closure.

An area of approximately 12ha was seeded with a reclamation seed mix and vegetation local to the JMM site at the close of the 2018 season.

### **1.4.3 2019 – PROGRESS**

The 2019 reclamation season involved the following:

Continuation of in-situ soil remediation of the hydrocarbon contaminated soils located within the historic tank farm location. Approximately 6,000 m<sup>3</sup> of contaminated soils were treated during the 2019 season using a biocatalyst (Oil Gator®) and a fertilizer high in nitrogen. A total of approximately 9,000 m<sup>3</sup> of contaminated soils were treated during the 2018 and 2019 seasons.

During the process of digging test pits on site, an additional five (5) previously undocumented waste sites were discovered. All five sites were excavated in 2019 with the inert waste placed in the upgraded JMM landfill. All hazardous waste discovered during excavation were stored inside the JMM Mill Building for later offsite disposal.

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The reclamation plan on the Johnny Mountain Mine (JMM) site requires movement of exposed waste rock from the level 10, 11 and 12 adit to the Tailings Storage Facility (TSF). During the 2019 season approximately 2,600 m<sup>3</sup> of waste rock was recovered from the surface of the JMM runway and the level 10 adit and placed within the TSF. Hydrated lime was added to the waste rock prior to being placed in the TSF (at a mixing ratio prescribed by BQE of 3.2kg per 16t (8m<sup>3</sup>) of waste rock), to offset the potential rise in TSF water ph.

Many interior hazards were removed from within the JMM Mill building during the 2018 season. The 2019 season consisted of a further deconstruction of much of the remaining (interior) mine equipment, cyanide tanks, conveyors, pumps, wood timbers and non-load bearing steel structural members. All inert waste was placed in the JMM landfill and all hydrocarbons and hazardous waste was collected for later offsite disposal. At the close of the 2019 season, the Mill building shell remained standing and is currently used for storage of site equipment.

Additionally, the 2019 reclamation season included; completion of cell 2 of the upgraded JMM Landfill, ongoing environmental monitoring, reclamation and vegetation of the north portion of the JMM runway, finalize removal of ore islands within the TSF, removal of fluids from old site equipment, ongoing dam safety inspections (DSI) on the TSF along with seeding and vegetating of disturbed areas and upgrades as required on the JMM access road.

#### **1.4.4 2020 – NO RECLAMATION ACTIVITIES WERE COMPLETED DUE TO COVID19**

Activities during the 2020 season were limited to permit compliance and environmental monitoring. The 2020 annual DSI inspection and report was completed by the KCB Engineer of Record.

### **1.5 2021 PROJECT OBJECTIVES**

The planned 2021 reclamation season involves the following:

The primary goal of the 2021 season is the excavation and relocation of ML/ARD waste rock from the Level 10, 11, 12 portals, as well as waste rock located on the JMM runway and secondary access roads surfaced with waste rock. All excavated waste rock will be mixed with hydrated lime to abate potential ph rise as the waste rock is placed below water elevation inside the TSF.

Additionally, the 2021 reclamation season will include; continued in-situ soil remediation of contaminated soils located within the historic tank farm and a portion of the JMM runway; place all miscellaneous site equipment into expanded landfill (grader,

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crane, D6 dozer and snow cat); excavation and relocation of any additional undocumented waste sites to the JMM Landfill; ongoing environmental monitoring; ongoing dam safety inspections (DSI) on the TSF along with seeding and vegetating of disturbed areas and upgrade to the JMM access road as required.

The objective in 2021 is to show tangible progress, working toward completing the JMM reclamation project within the established budget and timeline, highlighting value to SnipGold stakeholders.

To achieve this overall objective, the 2021 reclamation season will focus on the following:

1. Ensure No Harm to Personnel or Environment by maintaining a controlled, safe and secure site. Safety and Safe work practices are of paramount importance to SnipGold.
2. Ongoing environmental monitoring. A key component of the JMM Reclamation Program is to show continued improvement to the JMM site as the reclamation program moves toward returning the site to its natural state as per permit PE-8415 and M-178.
3. In-situ Soil Remediation – An estimated soil volume of 9,000 m<sup>3</sup> was treated within the JMM tank farm area during the 2018 and 2019 seasons. 2021 will continue with treatment of contaminated soils within the historic JMM tank farm and a portion of the JMM runway. Fertilizer and a natural biocatalyst (oil Gator) will be added to the soils and turned several times during the 2021 season to speed aeration and the treatment process.
4. Excavation and Relocation of ML/ARD waste rock – A significant scope of the JMM reclamation plan is the relocation of waste rock, generated during the mine operation. The waste rock will be relocated from the portal location into the JMM Tailings Storage Facility (TSF). Hydrated lime will be added to the waste rock prior to being placed in the TSF to offset the potential ph increase (2004 Mend Report)

The estimated volume of waste rock to relocate per area is:

- |                                 |                       |
|---------------------------------|-----------------------|
| a. Level 10: .....              | 37,500 m <sup>3</sup> |
| b. Level 11: .....              | 26,500 m <sup>3</sup> |
| c. Level 12: .....              | 12,500 m <sup>3</sup> |
| d. JMM Runway: .....            | 5,000 m <sup>3</sup>  |
| e. Secondary access roads: .... | 4,000 m <sup>3</sup>  |

**Total (Estimated) waste rock: 85,500 m<sup>3</sup>**



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5. Disposal of Mining Equipment - All miscellaneous site equipment will be disposed into the expanded JMM landfill (grader, crane, D6 dozer and snow cat). The old mining equipment has been deemed unsalvageable by Finning and Matrix mechanics and will be cut down and placed into the JMM landfill. All fluids will be drained from equipment prior to disposal and transported off site and disposed in an approved disposal facility.
6. Complete minor upgrades to JMM access road. The JMM access road will require upgrades early in the 2021 season. This will involve ditching, brushing, culvert installation and upgrades where wash outs occurred late in the 2019 season.
7. Conduct annual Dam Safety Inspection (DSI). Klohn Crippen Berger (KCB) is the Engineer of Record (EoR) and will conduct the yearly dam safety review of the JMM Tailings Storage Facility (TSF).
8. Test pits and material testing. Conduct additional test pits and material testing to prove borrow source material on site.
9. Piezometer Data collection. Download data from the TSF vibrating wire piezometers to support the DSI.
10. Equipment Repairs and upgrades. Complete ongoing repairs and upgrades to site equipment to ensure minimal delays due to breakdowns. Repairs to DJB Rock Truck, CAT 235 excavator, Kenworth dump truck, CAT 966 Loader.

## 1.6 2021 PROJECT SCHEDULE AND KEY MILESTONES

Bronson Camp Open - Matrix (approximate)	04 May 2021
Seabridge Reclamation Management Team – Preseason meetings and scheduling	04 May 2021
Seabridge JMM Reclamation Team Mobilize to Iskut Camp	18 May 2021
Start Improvements to JMM Access Road and snow removal	19 May 2021
Matrix Mechanic - Begin repairs to site equipment	19 May 2021
JMM access Road – Repair washout and snow removal	25 May 2021
Stage all reclamation equipment and supplies at McLymont for transfer to site. (Lime, Oil Gator, PVC Pipe)	01 June 2021
Conduct Dam Safety Inspection (DSI)	03 June 2021
Begin In-Situ Soil Remediation - Tank Farm area	03 June 2021

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Training of Crew – “Working near Water”	4-6 June 2021
Begin Relocation of Waste Rock to TSF – Level 10	07 June 2021
Begin Relocation of Waste Rock to TSF – Level 11	04 July 2021
Conduct Dam Safety Inspection (DSI)	04 July 2021
Begin Relocation of Waste Rock to TSF – JMM Runway	20 August 2021
Disposal of old mine equipment to JMM landfill	08 Sept 2021
KCB – Conduct Dam Safety Inspection (DSI) on the TSF	08 Sept 2021
End of 2021 construction season at JMM	02 Oct 2021

## 1.7 PROJECT RISKS

A contingency amount of 12% has been allocated to the overall 2021 JMM reclamation season. The project team has evaluated the 2021 key risks and opportunities and they are described below.

### 1.7.1 KEY RISKS

- *Undocumented Burial Sites.* The excavation, identification, handling, transport and placement of wastes located in previously undocumented burial sites present a risk due to the lack of historical and as-built information.
- *Placement of PAG rock into TSF.* Limestone is required to be mixed with all waste rock placed within the TSF. A quantity of limestone will be required on the JMM site and mixed with the PAG rock at a ratio relative to the PAG potential. Quantity of limestone required on site will vary depending on lab testing.
- *Water hazard at TSF - Drowning or entrapment in cab of equipment* – A risk of drowning or entrapment in the cab of equipment is possible while placing waste rock into the TSF. Supervisor and Workers to review and follow the TSF - “Operation, Maintenance and Surveillance Manual” along with the TSF “Operational Procedures”, as well as complete a Safe Work Procedure (SWP) prior to commencing work.
- *More complex hazardous material cleanup than envisioned.* While many hazardous wastes have been removed and disposed of from the JMM site over the 2017, 2018 and 2019 season, there remains the potential of discovering buried unknown hazards as reclamation progresses.

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- *Shortened field season caused by severe weather.* Severe weather events are well documented at JMM, which may impact the start of the 2021 spring schedule or early onset of winter may shorten the field season.

In addition to the above, the project team has identified these additional site related risks.

- Repairing and maintaining the access road from the Bronson camp to the mine site can limit delays by providing access for personnel and equipment throughout the project. The cost for this may be offset by reduced helicopter costs and also allow site access when poor weather prevents operation of the helicopter.
- Equipment repairs and ongoing maintenance to site equipment. The site equipment is crucial for the ongoing success of the JMM reclamation project requiring and full-time mechanic on site to deal with daily repairs.
- Avalanche potential impacting work progress in the early field season.

Mitigation plans for these key risks will be developed as planning for the 2021 reclamation season progresses, including assessment of resources required for their implementation. Mitigation plans will be reviewed by the Project team to ensure the risks are properly managed.

## **1.8 PROJECT OPPORTUNITIES**

### **1.8.1 KEY OPPORTUNITIES**

- *Synergy with ongoing Iskut exploration.* Cost synergies exist between exploration and the JMM Reclamation Project and a well-designed plan is key to leveraging this opportunity. This is applicable to camp and transportation to and from site, and the utilization of site resources and equipment to maximize their effectiveness in a relatively short field season.
- *Equipment salvage value.* If the metals markets rebound, there may be greater demand for used process and mobile equipment, thus a potential avenue for salvage sale income to offset reclamation expenditure.
- *Metal recycle value.* Aside from used process equipment, there is potentially recyclable metal (scrap iron, copper), principally from within the mill building that should metal prices increase in the short to medium term, may yield opportunity for transport to offsite markets in lieu of interring in a landfill on site.

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- *Development of road access from McLymont to Bronson Slope.* The JMM site is not currently accessible via road. The nearest existing road is approximately 20 km east of Bronson Slope at the McLymont Creek Laydown Area which was used by Alta Gas during the construction of the McLymont Creek Run of River Hydroelectric Generating Station. The SnipGold Exploration team in conjunction with neighboring exploration companies are evaluating the extension of this existing McLymont Creek Road to the Bronson Slope area, as a means to facilitate their exploration activities and reduce associated costs. Should this road be constructed, access to the JMM site would be simplified resulting in an overall reduction of reclamation costs.

After the 2021 field season, each opportunity will be evaluated and incorporated as appropriate into the future planning and budgeting years.

## **1.9 OUTLINE OF THE PROJECT EXECUTION**

The SnipGold management team will mobilize to the JMM site early in May of the 2021 season to initiate the 2021 scope. The first task is to inspect the existing facilities and hold internal discussions with the team to confirm and implement the 2021 project scope. During this early reconnaissance, it is understood that project scope may change based on site conditions.

SnipGold or their permitting contractors will be responsible for securing approvals and permits for all work to be done onsite where applicable.

### **1.9.1 ENGINEERING EXECUTION PLAN**

The Engineering Execution Plan provides project-specific information and detailed work plans of how SnipGold, engineering, environment and reclamation contractors will organise, perform and execute the engineering and reclamation responsibilities for the JMM project.

The engineering work involves developing appropriate investigation programs based on historic and yearly information gathered to develop site knowledge which will provide sufficient information for the detailed design of the reclamation works, including long term monitoring requirements. The 2017, 2018 and 2019 test pit and drilling program provided information to develop the planning basis for the reclamation of the JMM site and will be revised as additional information is gathered.

Information gathered during the field programs will be used to refine the remaining reclamation details for the implementation program (landfill design, adit and vent permanent reclamations, removal of remaining hazardous wastes, demolition of the

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mill and other remaining site structures and equipment, identify salvageable materials, instrumentation and monitoring plan).

**1.9.2 HEALTH, SAFETY AND ENVIRONMENTAL (HSE) PLAN**

SnipGold has and will retain statutory responsibility for the 2021 HSE program at the mine and has established a Project Health, Safety and Environment Management Plan (HSE Plan) for the JMM site and will at all times act in the capacity of the overall lead for HSE, retaining control of the JMM site for purposes of safety and environmental delineation and responsibility under applicable legislation.

Contractors working on the JMM site will be required to prepare an HSE Plan along with Job Hazard Assessment (JHAs) for work procedures specific to their scope of work; to be reviewed and approved by SnipGold prior to starting the work task. The contractor derived HSE plans and JHAs must align with the site specific HSE plan and Safe Operating Procedures (SOPs).

In consideration of the remote nature of the site and the logistics planning necessary to ensure the project runs smoothly and that Health and Safety considerations are paramount, procedures will be implemented for all personnel and equipment use. Health and Safety protocols will be implemented for all reclamation work carried out on the JMM site and will be addressed in the site specific HSE plan. This will include travel, transportation, construction, training requirements, communication and documentation of all activities and will apply to all personnel on site including contractors. Specific protocols will also be developed for working around/with Hazardous materials, enclosed spaces and hazardous work areas. Provision of emergency shelter, rations and first aid will also be considered for personnel working at the mine site.

**1.10 SNIPGOLD CONTACTS**

Contact information for JMM reclamation contractors and stakeholders is below:

Company	Name	Mobile #	Email
SnipGold	Brent Murphy	1-867-445-5553	<a href="mailto:Brent@Seabridgegold.com">Brent@Seabridgegold.com</a>
	Bill Threlkeld	1-303-910-9679	<a href="mailto:Bill@seabridgegold.com">Bill@seabridgegold.com</a>
	Elizabeth Miller	1-250-847-0848	<a href="mailto:Elizabeth@seabridgegold.com">Elizabeth@seabridgegold.com</a>
	Jessy Chaplin	1-778-210-1205	<a href="mailto:Jessy@seabridgegold.com">Jessy@seabridgegold.com</a>
	Carey deHoog	1-250-877-0977	<a href="mailto:Carey@seabridgegold.com">Carey@seabridgegold.com</a>
	Mike Skurski	1-720-232-9284	<a href="mailto:Mike.skurski@seabridgegold.com">Mike.skurski@seabridgegold.com</a>
	Marcus Adam	1-416-709-2012	<a href="mailto:Marcus@seabridgegold.com">Marcus@seabridgegold.com</a>
ERM	Wade Brunham	[REDACTED]	[REDACTED]

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Company	Name	Mobile #	Email
KCB	David Willms		
WOOD	Mario Bianchin Jeremiah Gladu		
Matrix	Martin Knutsen Mike Kenny		
TCG	Chad Day		
THREAT	Nalaine Morin		
TNDC	Hankin Asp		
Ministry of Mines (Health and Safety)	Doug Flynn	1-250-847-7386	<a href="mailto:Doug.Flynn@gov.bc.ca">Doug.Flynn@gov.bc.ca</a>
Coast Mountain Hydro	Brandon Marion		
Skeena Resources	Justin Himmelright Walter Coles		

## 1.11 WORK REQUIRED TO FACILITATE SITE RECLAMATION

### 1.11.1 RECLAMATION REQUIREMENTS

Reclamation activities have been initiated as far back as 1995. Some buildings have been dismantled; materials burned, buried or shipped off site; surface water monitoring plans established and are ongoing; ground water monitoring wells installed; disposal and removal of hazardous waste from the Mill building; some ML/ARD waste rock disposed of within the TSF; and some site grading and revegetation has taken place. This work was carried out in basic accordance with the Reclamation Plan (1999) and the recently updated Reclamation Management Manual (2015). In addition, annual reclamation reports have been prepared to document the past year's reclamation/monitoring activities on site.

Permit M-178 and PE 8415 require annual report submissions to MEM and Ministry of Environment (MoE). An Annual Reclamation Report (ARR) has been prepared and submitted to MoE, MEM and Tahltan Heritage Resources Environmental Assessment Team (THREAT) by March 31 of every year that summarizes any monitoring or reclamation work that occurred on the JMM site the previous year. Tailings

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Impoundment Dam Safety Inspections and water quality data and analyses are included in the ARR.

The 2016 ARR indicated the existing site conditions and state of reclamation as well as a list of reclamation priorities as follows:

- Continuation of non-hazardous site cleanup (disposal of collapsed structures and miscellaneous waste);
- Provide a landfill plan that MoE finds acceptable;
- Installation and/or upgrade weirs to more permanent structures at the Johnny Mountain Tailings Impoundment Embankment;
- Further determine the amount and composition of material in the cyanide tank storage room in the mill building;
- Develop a plan for the disposal/reclamation of the material in the cyanide tank storage room in the mill building;
- Advance various aspects of the Reclamation Plan (1999)

The reclamation management plan also indicated that, upon determination of non-economic viability for the site, the following reclamation and final reclamation items will be addressed in a staged manner:

- A review and where appropriate, an update to the Reclamation Plan (1999).
- Develop plans and schedule to complete final reclaim and reclamation items, including, but not limited to:
  - Restoring drainage to original watercourses or to new watercourses that will sustain themselves without maintenance;
  - Reclaim the land, including all roads, airstrip and the 10 km Johnny Mountain access road, in accordance with land use objectives unless permanent access is required. Reclamation will include re-contouring as practical, to reconstruct the area's original landscape and moisture regime, removing well-traveled compacted surfaces, re-soiling where practical, and re-vegetating to a self-sustaining state, and in a manner consistent with adjacent landforms;
  - Cover and re-vegetation of concrete foundations, unless because of impracticality, they have been exempted by an Inspector;
  - Geotechnical assessment and development plan to reclaim waste dumps that will ensure long-term stability, and long-term erosion control;

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- Final demolition and burial of remaining structures at the site and final disposal of remaining scrap metal and other miscellaneous waste in a manner acceptable to the district inspector of Mines.
- Submission of final reclamation design report for all aspects of tailings storage facility, including plans to stabilize the tailings impoundment for long term abandonment.

## **1.12 2021 RECLAMATION STRATEGY**

The 2021 PEP reclamation strategy is a continuation of the 2017 PEP where initial plans were prepared for each of the reclamation components based on historical information and assumptions presented. The 2021 schedule of activities has been prepared based on this historical information and data captured during the 2017, 2018 and 2019 reclamation season.

The 2021 reclamation season consists of the following work packages:

### **1.12.1 REPAIRS TO SITE EQUIPMENT**

Repairs and ongoing upgrades to site equipment is crucial to the success of the 2021 season. Repairs will be completed early in the 2021 season including an engine rebuild on the CAT DJB rock truck, upgrades to the CAT 235 excavator (replacing leaking hydraulic hoses), and replacement of track rollers on the D8L Dozer. Engine rebuilds will be completed onsite early in the 2021 season.

### **1.12.2 UPGRADES TO JMM ACCESS ROAD**

Early in the 2021 season, upgrades to the JMM access road will be undertaken to reduce crew travel time from Bronson camp to the JMM site. The upgrades will consist of brushing, ditching, culvert installation (as required) and upgrades to the road running surface. Washouts at km 3 were discovered late in the 2019 season and will be addressed early in the 2021 season. The gravel required for the surface repairs will be sourced from borrow sites located on Skeena Resources lease site.

### **1.12.3 IN-SITU SOIL REMEDIATION – TANK FARM**

Test pits and water monitoring wells installed in the 2017 season identified an area of hydrocarbon contaminated soils around the historic tank farm fuel storage area and an area surrounding the fuel pump shed along the edge of the JMM runway. Treatment of the contaminated soils began in 2018 using a natural biocatalyst (Oil Gator®) and continued in the 2019 season. A fertilizer (high in Nitrogen) was added along with the Oil Gator in 2019 to further assist with breakdown of the hydrocarbons. WOOD and



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Northwest Response were contracted by SnipGold to provide oversight on mixing ratios and testing of contaminated soils to ensure a successful treatment program. The 2021 reclamation season will be a continuation of remaining contaminated soils.

#### **1.12.4 EXCAVATION AND RELOCATION OF ML/ARD WASTE ROCK**

The reclamation plan for the Johnny Mountain Mine (JMM) includes the relocation of exposed waste rock from the level 10, 11 and 12 portals to the TSF, along with waste rock used for the construction of the JMM runway and surrounding access roads.

The following documents and field reports will be used as guidance documents during the relocation of ML/ARD to the TSF in 2021.

1. JMM Closure Plan
2. KCB – Operation, Maintenance and Surveillance (OMS) Manual for TSF
3. JMM 2021\_Safe\_Operating\_Procedure (Working Near Water)
4. BQE Water – “18008 – JMM Field Work Report Final Draft, Nov 7, 2019”
5. Wood – “2019 JMM Supplemental SI Report\_Dec 23 WOOD Draft”

As waste rock is deposited into the TSF, there is potential for degradation of the TSF water quality and a risk of non-compliance with the site’s EMA permit, which defines maximum acceptable dissolved copper and zinc levels in the TSF water discharge.

BQE Water was engaged by SnipGold to assess methods of mitigating the risk of TSF water quality degradation as the remote nature of the site meant that any implementation of active water treatment would be difficult to execute and high cost. BQE recommended that waste rock be amended with lime before it is deposited into the TSF to add neutralization potential and prevent the release of dissolved metals. This would obviate the need for water treatment altogether.

During the 2019 reclamation season, BQE Water executed a program to explore this approach in more detail. This program involved on-site assessment and sampling of waste rock used in different mine features followed by bench scale trials to evaluate the efficacy of lime amendment at preventing metal release from waste rock. The key findings from this program were as follows:

- Bench scale results indicated that waste rock on site has potential for metal release when it is placed in the JMM TSF. Highly weathered waste rock with visible gossan formation and/or paste pH below 5 has the highest potential for metal release. Material from the Level 10 and 11 portal pads and the airstrip showed the highest potential for metal release. Sample from the Level 12 portal pad exhibited minimal metal release potential even without lime amendment.

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- BQE Water estimated that the total mass of waste rock requiring management is approximately 171,000 t (85,500 m<sup>3</sup>), in line with previous estimates by MEND and KCB. The TSF can hold 88,000 m<sup>3</sup> of waste rock while maintaining 1.0 m of water cover.
- The amendment of lime to waste rock prevented more than 99% of the release of metal from waste rock. The amount of lime amendment required was found to be 0.01-0.12% w/w as hydrated lime, or approximately 0.02% w/w weighted average across all mine features.
- The total mass of lime required for all waste rock is estimated to be 35 t.
- Once the large-scale disposal of waste rock with lime amendment begins, the water quality of the TSF will be monitored with a handheld pH probe (weekly) and water quality sampling (monthly) during the work season. If pH in the TSF decreases or if metal content increases then lime dosage will be increased, while if pH is above 8.0 then lime dosage will be reduced.
- Other activities that will reduce the risk of exceeding EMA permit limits are:
  - installation of a sediment curtain at the TSF outlet,
  - lowering the water level in the TSF prior to placement of waste rock, and
  - preventing water discharge during the placement of waste rock.

During the 2019 reclamation season WOOD supervised the excavation and collection of soil samples at key locations on the JMM site to identify ML/ARD locations. A map outlining locations of ML/ARD on the JMM runway can be found in the Wood Report: "2019 JMM Supplemental SI Report\_Dec 23 WOOD Draft".

### **1.12.5 DISPOSAL OF OLD MINE EQUIPMENT**

The Johnny Mountain Mine (JMM) was a small underground gold mine and milling operation that operated over a short period from November 1988 to August 1990 and then from September to November 1993 when operations were stopped. Due to the remote nature of the site and lack of road access, mine equipment deemed unsalvageable will be decommissioned and placed within the JMM landfill. The equipment to be decommissioned in the 2021 season and placed in the landfill consist of: Champion D605T grader, CAT D6C dozer, DMC 3700 Hydromaster snow cat, P&H R200 Hydraulic crane and a CAT 350C tracked loader. All decommissioned equipment will be drained of fluids and cut down prior to placement in the landfill. Waste fluids will be stored on site for later disposal off site at a recognized disposal location.

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### **1.12.6 SURFACE WATER MANAGEMENT**

The site is subject to approximately 2000 mm of precipitation and concentrated flows occur from local melting glaciers during summer months. Spring/summer flows can also be significant with melting of the accumulated snowpack in the area. Many ditches and swales were installed over the 2017 and 2018 reclamation season to manage surface flows and direct runoff water toward historic channels. The 2021 season will be a continuation of the overall water management plan, including re-establishing effective surface water diversions around the mill building area, re-establishment of collection channels to effectively maintain drainage across the site and control sedimentation, and mitigate erosion.

### **1.12.7 SITE HYDROGEOLOGY**

A drilling program was undertaken in the 2017 season where groundwater monitoring wells were installed, fulfilling the following objectives:

1. Environmental investigation to assess absence/presence and extent of point source contamination resulting from mine site operations;
2. Characterization of hydrogeological conditions across the mine site identifying key hydro stratigraphic units, and documenting groundwater flow and quality.
3. Establish a network of long-term groundwater monitoring points to support risk assessment requirements that will inform final reclamation plans, assess site reclamation performance, and serve as sentinel wells as part of a monitoring and mitigation plan.

An ongoing groundwater monitoring program is in place to ensure SnipGold is meeting expectations as outlined in the British Columbia Ministry of Environment Water and Air Resource Protection Guidelines for Mine Proponents and Operators Baseline Monitoring (August 2009).

### **1.12.8 ENVIRONMENTAL AND PHYSICAL MONITORING**

Ongoing environmental monitoring will be conducted at JMM during the 2021 season to obtain current site information as well as to monitor and measure the effectiveness of the reclamation/closure measures over time. Monitoring will be conducted in the following study areas: *meteorology, hydrology, water quality and groundwater.*

*Meteorology:* A meteorology station was installed at JMM in 2016. This station will be serviced and maintained annually including an annual data report. The weather station collects temperature, humidity, wind speed, precipitation, snow depth, and solar radiation, data which will be used as inputs for the finalization of reclamation/closure designs and long-term site-specific reporting requirements.

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*Hydrology:* In 2016, two hydrometric monitoring stations were established in order to monitor water flow from the existing tailings pond spillway (northeast side) and low volume seepage from the southwest side of the pond. In 2021, the hydrology stations will be re-installed downstream of the TSF and a data report produced. Additional hydrology will also be attained from the 10, 11 and 12 portals. The hydrology program will meet or exceed recommendations outlined in the BC Hydrometric Guidelines, which includes the collection of Grade A discharge data, consisting of at least five (5) discharge measurements collected per year, and spread across a wide range of observed flows, to support an established and stable rating curve.

*Water Quality:* This water quality sampling is to satisfy the requirements outlined in permit PE-8415, which specifies that surface water quality samples from 7 locations (and one duplicate, and one blank) be collected on an annual basis at the closed mine site (sampling stations JM1-7), plus duplicate (JM8) and blank (JM9). In addition, a water quality sample from the tailing's impoundment will also be collected. Water quality samples will be collected by trained field personnel following standard field methodologies and as per guidance provided in permit PE-8415. Samples will be shipped in coolers with ice packs to ALS Environmental Services in Burnaby, BC, where they will be analyzed for general parameters (e.g. pH, alkalinity, and turbidity), major anions, nutrients, total organic carbon, total and dissolved metals, and cyanides. In-situ measurements of temperature, pH, and conductivity will be collected in the field using a handheld pH/conductivity meter at each site.

*Groundwater:* The work plan for 2021 will be to record water levels and collect groundwater samples for analysis at existing monitoring wells as required for permit PE-8415.

### **1.12.9 SITE GRADING, EROSION/SEDIMENTATION CONTROL**

Mining activities on the JMM site have resulted in the need to divert some surface stream flows around the mill and through other areas of the site. Berms, weirs, culverts and general site grading has taken place to control and monitor these flows. Reclamation is required in these areas to return the site to near original conditions. This work must take into consideration the location of remaining mining features such as landfills and the TSF, as well as ongoing exploration activity on the property. In 2021, site grading will focus on diverting surface water away from work zones and not through areas of infrastructure.

### **1.12.10 PROJECT SCOPE OF WORK AND DUTIES**

The project scope of work and scope of project services, based on the terms and conditions of the contract between the various Consultants and SnipGold, are as follows:

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**1.12.10.1 SnipGold Scope of Work and Services**

**Scope of Work:**

SnipGold will retain statutory responsibility for the 2021 season on the JMM site, working with all other consultants and suppliers to complete the scope as detailed in the Reclamation Plan, specifically:

**JMM Reclamation Project – Key SnipGold Site Based Roles & Responsibilities**

<b>SnipGold Project Manager</b>
Develop and circulate the site HSE plan for review and approval amongst SnipGold, consultants and suppliers.
Coordinates material and personnel movements with Logistics Coordinator/Iskut camp manager
Maintain the staffing plan (daily resolution)
Provides progress reporting to SnipGold management.
Provides direction and guidance for all field activities to ensure progress earned per field season plan. This includes daily activity planning.
Assemble and Approve all general reclamation field procedures
Develop Construction Work Packages, as required
Participate in various aspects of contractor administration
Approves field work orders
Timely responses to RFI's
Ensures completion dates are met

**1.12.10.2 Project Scope of Work and Services by Others**

**Technical Scopes (consultants):**

1. WOOD assembled the overall capital cost component on the project, supported by other project consultants, and will provide material take-offs as required.
2. BQE provided oversight for the addition of Lime to the waste rock prior to disposal into the Tailings Storage Facility (TSF).
3. Tervita provided material take off and estimate for the safe demolition and disposal of the Mill Building.
4. KCB: provides engineering and site management for upgrades to the Tailings Storage Facility (TSF) site investigation, dam safety inspection (DSI), establishment of monitoring wells and system; as well as TSF closure.

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5. AllNorth: provide technical support for upgrades to the JMM access road and design and cost estimate for the construction of the Bronson connector study (including timber evaluation); completion of the Quartz Rise Exploration track.
6. ERM: aquatic effects and compliance monitoring – collect water quality data from JMM as per compliance requirements, monitor weirs and hydrology stations near the TSF, monitor the existing meteorology station and conduct archaeology assessments as needed.
7. Avalanche Assessment: Adapt Mountain Safety Services will be employed early in the season to ensure safe working conditions for field crews during the proposed 2021 spring activities and determine long term impact and avalanche impact to TSF and portals, provide any required avalanche protection engineering required to ensure long term physical stability of the TSF and portals.

**Field Scope (non- consultants):**

1. Matrix: Handling logistics, equipment and material transport; some equipment and material procurement (driller and tank farm demolition contractor bring their own tools and consumables); manage the camp and all camp services.
2. Hazardous Material Removal. Service by TBD Contractor. Removal of hazardous wastes encountered during excavation of burial sites and from within Mill Building as required.

## **1.13 OVERALL PROJECT MANAGEMENT**

### **1.13.1 RISK MANAGEMENT**

All members of the project are responsible for investigating the potential risk exposures for the project and determining suitable actions to mitigate and minimise adverse impacts to the project. Project risks will be captured in a risk register, which will be maintained and updated throughout the life of the project. Project risks will be identified and analysed in a disciplined process in accordance with the standard procedure.

Reference should be made to Section 1.7 for the currently identified major risks.

### **1.13.2 PROJECT ORGANISATION**

#### **1.13.2.1 Organisation Charts**

The JMM Reclamation Project organization structure comprises SnipGold personnel in leadership roles and various consultants and contractors providing design and field services or performing work on site during reclamation activities. Project organization is linear from the lowest levels of field activity up through the project sponsor and

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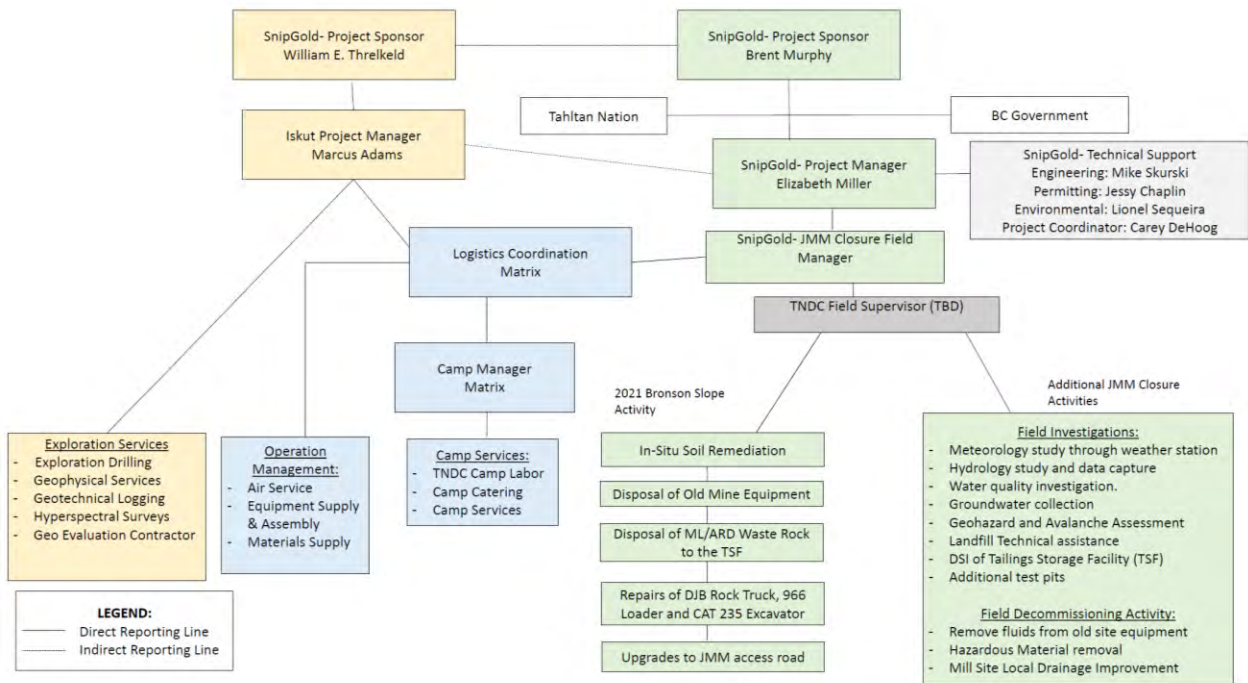
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parallels a similar structure for Iskut exploration who also work on site and share common facilities (e.g. camp) and services (e.g. logistics).

Figure 1-3 presents the overall Project implementation team for the Iskut Property.

**Figure 1-3: Iskut Property Organizational Structure**



It is notable that two important organizations have been incorporated into Figure 1-3 above being the Tahltan Nation and BC Government who have influence on the success of the project. The Tahltan Nation will participate in the reclamation of the JMM Reclamation Project because the Iskut Property is located within Tahltan Traditional Territory. The Government of British Columbia is also an important stakeholder as they regulate the project site under existing permits for the Iskut Property, including Reclamation Permit M-178, and Waste Management Permits PE-8415 and PR-7927.

The overall authority line runs through the project sponsor, Brent Murphy, who has budgetary accountability for all activity on the JMM Reclamation Project. The Project Sponsor shares the responsibility for the preparation and execution of the reclamation project, including organizing, staffing, hiring, purchasing, supervising and controlling all engineering and scientific investigation, procurement, construction and pre-production

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activities required to attain project objectives with the Project Manager, Elizabeth Miller. Support to the Project Sponsor and Manager come from field managers for SnipGold as well as SnipGold Technical staff.

Concurrent exploration activity on the Iskut Property will be occurring on site in parallel to JMM reclamation and Bronson slope activity. Single-point accountability for all site safety is assigned to the Iskut Project Manager, Marcus Adams, whom will be on site during the 2021 field season. Iskut Project managers will be accountable for all aspects of site safety, including but not limited to securing the site, ensuring requisite safety inspections and task observations are conducted according to established procedure and demonstrating visible leadership on safety.

Also, owing to a successful history of logistics coordination to support SnipGold's exploration activity, logistics for all field activity are managed directly by the Iskut Camp Manager and logistics coordinator. All logistics coordination must be routed through the SnipGold Managers, Field Managers and the Iskut Camp Manager to ensure that camp services and space are consistent with field needs and that mobilization/demobilization are well coordinated with SnipGold's other activity in the region.

The key roles and responsibilities for the reclamation project implementation are as follows:

**Project Sponsor:** Assumes overall accountability for execution of all deliverables, including engineering and scientific investigation, procurement, construction and demolition related to the JMM Reclamation Project. Project Sponsors ultimately have final decision for any conflicts arising at lower levels within the reclamation project or between separate groups with activity in close proximity. Project Sponsors are also accountable for communication with external stakeholders comprising First Nations, Government Agencies and neighbouring exploration companies.

**JMM Reclamation Project Manager:** Assumes overall accountability for the execution of the planning of reclamation activities in both design offices and the mine site.

**Iskut Project Manager(s):** Outside of their exploration responsibilities not included in JMM Reclamation Project scope, nor described herein, they assume overall accountability for all aspects of safety for site activity.

**Technical Support:** SnipGold staff providing technical support on project execution, permitting and scientific investigation to the JMM Reclamation Project manager and Project Sponsors.

**Logistics Coordinator:** Assumes accountability for all logistics coordination arranging for equipment, material and personnel transport to/from the Iskut property. Position is yet to be determined between being sited at Iskut or at KSM (SnipGold's neighbouring asset).



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**Field Manager:** SnipGold company position responsible for overall coordination of all JMM Reclamation Project and Bronson slope activity.

**Camp Manager:** The Camp Manager is responsible of all camp services, transportation services for employees onsite and offsite and care and maintenance of the service facilities. The Camp Manager is also accountable for all aspects of camp services and catering.

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**1.13.2.2 Delegation of Authority**

**Levels of Authority**

Levels of authority and approvals are established for the JMM Reclamation Project to be clear and transparent and are provided in Table 1-1 below.

Table 1-1: Levels of Authority & Approvals

Level of Authority/Approvals									
Level	Name	Position	Contracts (Requests & Approvals)	POs	Invoice Approval	Check Requests	Travel		Logistics Support Requests
							Requests	Authorization	
1	B. Murphy	Project Sponsor (SEA)	yes	yes	yes	yes	yes	yes	yes
2	E. Miller	Project Manager (SEA)	yes - up to \$500k	yes - up to \$100k	yes	yes	yes	yes	yes
2	TBD	Field Manager (SEA)	no	yes - up to \$50k	no	no	yes	yes	yes
2	M. Skurski	Technical Support (SEA)	no	no	yes	no	yes	yes	yes
2	L. Sequeira	Technical Support (SEA)	no	no	yes	no	yes	yes	yes
2	J. Chaplin	Technical Support (SEA)	no	no	yes	no	yes	yes	yes
2	C. deHoog	Project Coordinator	no	no	yes	no	yes	yes	yes

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All contracts for service work, and any check requests made to SnipGold treasury must be approved and signed by either Brent Murphy or Elizabeth Miller. All logistics support requests will be routed through Level 2 SnipGold personnel to SnipGold's logistics coordinator. Any travel requests must be routed through SnipGold for authorization as all travel is intended to be coordinated with other SnipGold activity in the area.

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### **1.13.3 PROJECT SECURITY AND CONFIDENTIALITY**

#### **1.13.3.1 Confidentiality**

The following project confidentiality requirements will be observed on the project:

- All participating entities and their employees will be required to safeguard confidential information from unauthorized access, use and misappropriation by applying reasonable security measures, such as the provision of a Secure folder with limited access, within the project drive set of folders.
- All participating entities and their employees may not post or upload, or forward, directly or indirectly, to any other person who might post or upload, any digital photographic image taken of any aspect of the Iskut Property to any internet website or social networking service without prior authorization from SnipGold.

### **1.14 PROJECT SCHEDULE**

Refer to Appendix A for the Project Schedule.

### **1.15 PROJECT PROCEDURES, INSTRUCTIONS, AND FORMS (PIFS)**

#### **1.15.1 PROJECT STANDARDS**

##### **Project Management Systems Software**

The standard suite of project management-related software to be used on the project includes, but is not limited to, the following

- Microsoft office software
- File Share - A file share site will be initiated by Seabridge once the 2021 season commences.

### **1.16 CHANGE MANAGEMENT**

#### **1.16.1 CHANGE MANAGEMENT DURING PROJECT EXECUTION**

A formal project change control work process to update the project during project execution will be applied in accordance with the standard change management procedures.

No work will proceed without written authorisation or a signed change notice. If a project change notice is not fully processed by SnipGold in a timely manner, the Project

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Manager must notify the Project Sponsor in order to bring the issue to SnipGold Senior Management, so that it can be resolved.

## **1.17 PROJECT ADMINISTRATION**

Administration functions will be implemented in accordance with approved procedures, work instructions, and other key project documents issued by the SnipGold Project Manager at the commencement of the project. With the approval of the Project Manager, additional procedures, work instructions, and other documents will be issued.

The project administration will be managed and performed in accordance with standard PIF's.

### **1.17.1 PROJECT FILES**

Project electronic and hardcopy files must be established using the standard PIFs.

### **1.17.2 COMMUNICATION MANAGEMENT**

Project communication can be in the form of hardcopy, electronic copy, informal or formal meetings between some or all team members, SnipGold, and the suppliers. Day-to-day exchange of information will generally take place between the key team members.

Daily and monthly site and safety coordination meetings will be held.

Interaction between JMM reclamation and SnipGold exploration. There will be a requirement for daily on-site meetings to convey daily work scope to develop a safe work plan to eliminate hazards and discuss potential emergency response and because of the shared tools, equipment and resources. All external communication with the Tahltan, BC Government, the State of Alaska, and the general public will be the sole responsibility of SnipGold.

## **1.18 PROJECT IMPLEMENTATION MANAGEMENT**

This section outlines the overall project management activities involved in this project.

### **1.18.1 PERMITTING AND REGULATORY AGENCY APPROVALS**

#### **1.18.1.1 Project Permitting and Regulatory Reporting**

Johnny Mountain Mine currently has three active permits:

1. The primary permit is Mines Act Permit M-178, last amended July 7, 2004, issued by the Ministry of Energy and Mines (MEM) and includes conditions for reclamation activities on

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the site, conditions on site reclamation & reclamation security agreements, including equipment mortgages. Permit M-178 includes Condition 13(c) which states that included under this permit are all mine roads, the airstrip and the 10 km Johnny Mountain Access Road.

2. The two secondary permits are issued under the Environmental Management Act (EMA). Waste Management Permit PE-8415 dated June 6, 1990, amended May 11, 2000, and May 31, 2018, is a permit to discharge solid waste to landfills.
3. Water Management Permit PR-7927 dated March 29, 1989 and amended July 14, 1999 and later on August 2, 2011, is a permit to discharge liquid effluent from the tailing storage facility, from underground workings and from waste rock piles.

Current regulatory reporting requirements for JMM include:

- Permit M-178 Annual Reclamation Report, documenting the current status of the work system, reclamation obligations, the outstanding liability and associated costs, and all monitoring including water quality, and ongoing maintenance activities. Report to be submitted by March 31, annually.
- Permit M-178 Update to the Reclamation Plan (required every 5 years, in permit submission date is March 31, 2005) providing the status of the work system, reclamation obligations, a compilation of all monitoring including ML/ARD prediction, water quality, reclamation and maintenance activities, any changes to the reclamation program that affect long term mitigation, contingency plans, schedule for completion of reclamation works and a breakdown of outstanding liabilities and associated costs.
- Permit M-178 Closure Management Manual (in permit, submission date is March 31, 2005) which describes, and documents key aspects of the operational surveillance and monitoring requirements used to track important changes which could affect long term mitigation performance, monitoring and maintenance requirements. This document shall be a living document that is kept up to date with updates submitted to MEM whenever significant changes occur.
- Permit PE-8415 Condition 3.8 Annual Report, including maintaining data of analysis, new works information, quality assurance/quality control data and submitting the data, suitably tabulated and interpreted to the Regional Waste Manager for the previous year. The annual report shall be submitted by March 31, annually.

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## **1.18.2 PROJECT REPORTS AND REVIEWS**

### **1.18.2.1 Project Progress Reports**

The SnipGold Field Manager will prepare a weekly report covering work completed, and work to be completed in the following week, with updates to manpower needs and schedule changes. Project needs and concerns may also be addressed in the weekly report.

### **1.18.2.2 Project Reviews**

The SnipGold Project Manager will require bi-weekly (or as required) coordination review meetings to plan, implement, and coordinate work activities on the project. The meetings will also serve to identify and resolve issues that might otherwise affect progress and execution of the project.

#### **Monthly Project Review – Internal**

An Internal monthly project review meeting will be held within seven days of the progress report cut-off date. The SnipGold Project Manager will present the progress achieved by discipline or work package unit (or other split as required) at the agreed monthly calendar cut-off date, including a review of the monthly project progress report.

#### **Safety Reviews**

Reviews are an integral part of the safety audit procedure. The audit will be undertaken as part of the management system to confirm that the project is meeting its obligations and HSE policy requirements. Reviews also give the project team the opportunity to voice any concerns or issues.

#### **Supplier/Contractor Reviews**

The SnipGold Project Manager will require that review meetings are held with suppliers and contractors in accordance with the contract terms.

#### **Scope of Plant/Facility Reclamation and Scope of Services Review**

The SnipGold Project Manager will require that trend reviews are held with contractors if appropriate, to confirm trends in scope, capital cost, and change notices.

## **1.18.3 PROJECT CLOSE-OUT**

Project close-out involves finalising all outstanding issues and work items, either when the work is complete, and the contract ends, or when a contract is terminated before all the work is finished. The SnipGold Project Manager will close out the project and ensure that all activities are fulfilled in accordance with the standard procedures.

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## **2.0 SECTION 2 – ENGINEERING**

### **2.1 ENGINEERING SCOPE AND ORGANISATION**

Consulting engineers hired by SnipGold will provide project specific designs and engineered drawings required for the reclamation of the JMM project.

The SnipGold Project Engineer is responsible for the coordination and review of proposed design concepts by project consults for the reclamation of the JMM site.

#### **2.1.1 PROJECT AUTHORISATION AND APPROVALS - ENGINEERING**

##### **2.1.1.1 Technical Document Approvals**

All technical documents and drawings will be checked and approved in accordance with the standard procedure.

##### **2.1.1.2 Professional Engineer Sealing and Company Permit Requirements**

The project follows the requirements of Association of Professional Engineers and Geoscientists of British Columbia (APEGBC), and all technical documents issued for construction or issued to a regulatory body are sealed and stamped with the Engineer of Record permit to practice.

Electronic seals and permit stamps are used.

Technical documents requiring seals, the permit to practice stamp, and associated signatures are identified on the discipline project deliverables requirements matrix list.

**Table 2-1: Discipline Project Deliverables Requirements Matrix List**

<b>Discipline</b>	<b>Regulatory Agency</b>	<b>Person Responsible for Sealing</b>	<b>Date Required</b>
JMM TSF Dam Safety Review	MEM, Mines Act	Professional, Engineer of Record	31-Mar-22
Geochemist - ARR geochemistry	MEM, Mines Act	Geochemist	31-Mar-22
Soils Scientist - Annual Reclamation Report (ARR) soils and vegetation studies and research	MEM, Mines Act	Author and research lead, field specialist	31-Mar-22



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<b>Discipline</b>	<b>Regulatory Agency</b>	<b>Person Responsible for Sealing</b>	<b>Date Required</b>
Environmental Engineer - Application and Supporting Studies to bring Main Landfill into compliance with MOE	MOE, Environmental Management Act	Environmental Engineer	31-Mar-22
HazMat Report	MOE, Contaminated Sites Act, EMA	Environmental Engineer	Upon completion of field assessment
Structural Engineer - Mill Building	not a regulatory requirement, for employee safety	Professional Structural Engineer	Upon completion of field assessment

**2.2 ENGINEERING AND TECHNICAL BASIS**

The SnipGold Project Engineer is responsible for ensuring that the documentation and information provided at the commencement of the project are adequate to fully define the design criteria and the basis for design.

**2.3 PROJECT PROCEDURES, INSTRUCTIONS, AND FORMS (PIFS) – ENGINEERING**

The SnipGold Project Manager ensures that the PIFs are available to all project staff, that all staff working under his or her direction is familiar with the applicable PIFs, and that the PIFs are used appropriately. The SnipGold Project Manager is responsible for assembling and approving general engineering procedures, work instructions, forms, checklists, and guidelines. The project discipline leads are responsible for assembling and obtaining approval for their discipline specific PIFs.

See each topic section in this PEP for the appropriate PIFs.

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## **2.4 PROJECT QUALITY - ENGINEERING**

### **2.4.1 PROJECT TECHNICAL AUDITS**

Project technical audits frequency and schedule will be identified as required by SnipGold. The SnipGold Project Manager will determine the scope of the audit and the resources required to undertake the audit.

## **2.5 ENGINEERING, DESIGN, AND/OR ANALYSIS SET-UP**

The contents of this section explain how the engineering and design work for the project are implemented and controlled to meet the project objectives.

### **2.5.1 PLANNING, AND SCHEDULING ENGINEERING**

The SnipGold Project Manager ensures the schedule for engineering, design, and/or analysis activities is in line with the execution strategy and fits within the constraints of the overall project execution schedule.

Discipline leads have the primary responsibility for day-to-day planning and control of the detailed plan and schedule for their discipline.

### **2.5.2 ENGINEERING DELIVERABLES**

The following deliverables have been identified for the 2021 season:

- Annual dam safety investigation – 2021.
- Issued for Construction (IFC) – Phase 2 Landfill design and specifications.

### **2.5.3 ENGINEERING INPUT TO RECLAMATION WORK PACKAGES**

Reclamation/Construction work packages (See Appendix C for WBS numbering details):

- Specification for use of existing landfill accounting for complete removal and relocation of undocumented burial site's and waste from the Mill Building demolition.

The following engineering inputs to these packages will be required:

- Scope of work,
- WBS with specific WBS package tag numbers.
- Drawing list and drawings,
- Specifications and design standards,

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- Contract/procurement and logistics plan input,
- Project Schedule.

#### **2.5.4 PLANNING TECHNICAL REVIEWS**

The technical review frequency and scheduling shall be as identified in the technical assurance plans. The SnipGold Project Manager is responsible for the detailed scheduling and coordinating of the technical reviews identified in the assurance plan.

##### **2.5.4.1 Technical Peer Reviews**

Technical peer reviews for the project are undertaken for the principal design documents and for any significant technical risk items identified in the risk register. The SnipGold Project Engineer, in consultation with the SnipGold Project Manager form the Technical Peer Review Team.

##### **2.5.4.2 Design Reviews**

Design reviews are undertaken at predetermined stages of production of technical documents and models. A design review will be scheduled with the client by the discipline lead responsible for a work package at around the 30% complete milestone.

##### **2.5.4.3 Safety Reviews**

Safety reviews are undertaken at predetermined stages of field development at a minimum of once per month.

#### **2.5.5 PROJECT NUMBERING AND IDENTIFICATION SYSTEMS – WBS AND ENGINEERING**

##### **2.5.5.1 WBS**

The WBS will be structured by Area per WOOD procedure for Global Coding Structures – Referenced in Appendix C.

As this is the generic WBS, in the month prior to the start of the field season the WBS will be tailored specific to the JMM Reclamation Project requirements by SnipGold Project Manager and distributed to all field and engineering resources intended to work on the project.

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## **2.5.6 RESOURCE PLANNING**

### **2.5.6.1 Staff Plan**

A detailed staffing plan will be maintained by the SnipGold Project Manager and Field Manager for daily resolution and coordinated with the Logistics coordinator and Camp Manager to allow for planning of camp utilization and mobilization/demobilization of all personnel working on the Iskut Property. This includes the three major areas of work: Quartz Rise Exploration, JMM Reclamation Project and Bronson Slope activity, and all services provided to these work centres. Specific to JMM Reclamation Project, a preliminary staffing plan has been generated to allow for planning of the sequence of field activity and to confirm camp space allocated to this project, and this plan is illustrated in Appendix A.

The staffing plan follows the sequence of activity noted in the 2021 Level 3 schedule. This plan accounts for the following three types of site duration described below: full time presence, part time presence and brief site presence.

Full Time Site Presence:

- Field manager (SnipGold) on a 3 week- on, 3 week- off rotation.
- Supervisor (TNDC): 3 weeks on, 3 weeks off rotation

Brief Site Presence:

- Revegetation Specialist
- Geotechnical Engineer,
- Hazardous Waste Specialist,
- Environmental Specialist,
- Surveyors.

Excluded from the JMM Reclamation Project staffing plan are exploration staff, camp services, avalanche specialists, catering staff, logistics coordinator and helicopter pilots. This staff is accounted for in the exploration program. It is notable that being an exploration property, that exploration activity will have a higher priority, although every effort will be made on all sides to accommodate the needs of both exploration and other work programs occurring on site.

The staffing plan is designed to yield a relatively smooth occupancy level for the project while on site between May and September, with weekly staffing presence between 4 and 8 people for the JMM reclamation project with the camp reaching a total occupancy between 20 and 30 people including exploration dedicated staff. Continued

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development of the staffing plan will occur throughout the field season to mitigate peaks where camp space is exceeded, by shifting activity forward and backward where possible and within the constraints of relative activities or sequential activity.

There are several positions in the staffing plan currently unallocated by name or company, and during the preparation period leading up to the field season, these positions will be filled by carefully selecting amongst the most qualified companies and candidates with emphasis on personnel from Northern BC region. This “region” is defined loosely the area south of the Yukon border, east of the Alaska border or the west coast, north of but including the communities along Highway 16 from the west coast to Burns Lake and then west of a boundary line from Burns Lake through Lower Post and up to the Yukon border.

## **2.5.7 PROJECT SOFTWARE AND SOFTWARE VERIFICATION**

The SnipGold Project Engineer and Project Manager, in consultation with hired consultants will decide which software is to be used for design and calculation for the project.

The choice of software for use on the project from SnipGold’s perspective are:

- File Share - A file share site will be initiated by Seabridge once the 2021 season commences.
- Microsoft Office – General office software
- AutoCAD – Design and drafting software

Any software not included on this list must be verified for use by SnipGold prior to use and application on deliverables.

## **2.6 EXECUTION – ENGINEERING, DESIGN, AND/OR ANALYSIS**

### **2.6.1 RECLAMATION RECORD DRAWINGS**

On completion of the 2021 program, the SnipGold Project Manager and project discipline leads determine the drawings and level of reclamation record drawings required based on contractual requirements and SnipGold approval. The project may also require electronic data handover, and this may include as-built drawings and associated databases.

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## **2.6.2 ENGINEERING DELIVERABLES FOR SUPPLY CHAIN MANAGEMENT**

If engineering needs to provide technical input into the limited procurement process for the reclamation project refer to the standard PIFs.

## **2.6.3 TECHNICAL DECISIONS AND INFORMATION NEEDS**

### **2.6.3.1 Document Control Plan**

Document control will be managed using the existing master spread sheet, which lists all the existing documents, and all future documents will be recorded on this spread sheet. This information will be stored in a SnipGold folder located on the shared BHD Cloud folder.

### **2.6.3.2 Technical Decision Records**

All technical decisions must be documented and approved through the use of Technical Decision Reports (TDRs).

### **2.6.3.3 Information Needs**

The discipline and area lead identify the information they need from SnipGold on the project needs list.

### **2.6.3.4 Request for Information (RFI) for Field or Fabrication**

The preferred method for requesting information is through a controlled RFI process which can be monitored and logged as the project progresses.

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### **3.0 SECTION 3 – SUPPLY CHAIN MANAGEMENT EXECUTION PLAN**

#### **3.1.1 JMM CONTRACTING PLAN 2021**

The 2021 JMM contracting plan identifies approximately seventeen (17) contractors that must be established to support the work during the year. Several of the contracts may be sole sourced to select vendors provided negotiation for price, schedule, personnel and scope are mutually acceptable or put out for tender. These include contracts for labour, equipment rental if needed, geotechnical drilling services and road assessment.

<b>Package #</b>	<b>Contract Description</b>
C001	Wood Services – Select engineering designs and assembly of project capital costs
C002	KCB Services - TMF Engineer of record, TMF reclamation plan
C003	Matrix Services - Logistic services
C004	TNDC Services - Provide skilled & unskilled labor, equipment operators
C005	BQE Water
C006	Fixed wing & helicopter transport
C007A	Analytical Lab (water and soils testing)
C007B	Geotechnical Lab
C008	Hazardous Materials Disposal according to Prov. & Fed. Regulations
C009	ERM - Environmental data collection and monitoring Services
C010	Allnorth - Iskut Property / Bronson Connector.
C011A	Adapt Mountain Safety– on the ground avalanche assessment for operational support
C011B	Long term avalanche assessment, impact to TSF & mine portals
C012	Transport shuttle – personnel transport from offsite locations to central muster point
C013	Drill/Heli pad construction

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Package #	Contract Description
C014	Golder Associates – Portal Closure
C015	Mill Demolition
C016	Finning – Equipment repairs and servicing
C017	Geier Waste Management Services
C018	Allnorth – Survey and Engineering

### 3.2 MATERIAL LIST

Most materials are intended to be supplied by the contractors carrying out the specific work. The following list (Table 3-1) is a preliminary estimate of most of the significant materials required including those provided directly by contractors. This list will be provided to Matrix who will determine what if any of this equipment already exists on site that can be applied to the JMM Reclamation Project. Also, this list is intended to be a living document and will be updated periodically as necessary to reflect updated plans just before purchases are made to support the field work.

**Table 3-1: 2021 Material List**

Material	Quantity	Weight lbs.	Dimensions	Purpose	Provided by
Oil Gator	200 bags	6,600	bags	In-Situ Soil Remediation	SnipGold
Fertilizer	3 bags	4,400	780 kg bags	In-Situ Soil Remediation	SnipGold
Hydrated Lime	1,544 bags	77,160	50 lb. bags	Waste Rock	SnipGold
8" PVC Pipe	30m			Lower water elevation in TSF	SnipGold
Silt Curtain	1 – 10m length			Place on the upstream of TSF outlet	SnipGold



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**3.2.1 EQUIPMENT LIST**

All excavation and earth moving will be undertaken using the existing SnipGold equipment currently on site. The intention in the 2021 season is to use one piece of equipment for multiple tasks as discussed in Table 3-2:

**Table 3-2: Equipment List**

<b>Equipment</b>	<b>Alternate</b>	<b>Purpose</b>	<b>Contractor</b>	<b>Comments</b>
Excavator – CAT 312E	CAT 235	Ditch & culvert repair/replace on the JMM access road, Excavation of burial sites, excavate test pits for investigations as necessary, assist in partial demolition of Mill building, In-Situ Soil Remediation tank farm area.	SnipGold	Multipurpose (full time on site, will require tight coordination)
Excavator – CAT 235	CAT 312E	Load soils in Tandem truck at waste burial sites, In-Situ Soil Remediation, Excavate test pits for investigation as necessary,	SnipGold	Used sparingly due to the age of the machine.
Kenworth Dump Truck		Haul waste from burial sites to upgraded landfill. Haul waste from partial Mill demolition to landfill	SnipGold	May require ongoing maintenance due to age of truck
CAT DJB Rock Truck		Haul waste rock from portals to TSF	SnipGold	Ongoing mechanical repairs possible
Dozer (D8L)	Dozer D8K	Site grading, moving equipment and spreading at landfill	SnipGold	Ongoing mechanical repairs possible
3 x (4-Person) UTVs	2 x (6-Person) UTVs	Personnel transport from Bronson camp to JMM site	Matrix	Requires safety training to operate and seatbelt.

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<b>Equipment</b>	<b>Alternate</b>	<b>Purpose</b>	<b>Contractor</b>	<b>Comments</b>
2 x Ford F-150 pickups	UTVs	Personnel transport from Bronson camp to JMM site	Matrix	Driver's license required, seatbelt when driving
Equipment fueling station		Fuel required for onsite equipment	SnipGold / Matrix	One tank located at the Bronson Airstrip, another at the JMM site
Generator set with fuel tankage		Contractor required	Contractor	
Water Pumps / Trash Pumps		Contractor required	Contractor	
Hazardous Wastes Equipment:		To sample and remove hazardous wastes from site as required	Contractor	Additional equipment may be required by contractor
Handheld GPS and radios		Local on-site communication and direction/location	SnipGold	

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### **3.3 PLANNING, SCHEDULING AND COORDINATION**

The planning and scheduling of all the data collection and reclamation activities necessary to execute the project must consider the implications of the master schedule listed in Appendix A.

#### **3.3.1 PROCUREMENT**

Matrix, as directed by SnipGold Management, will have overall responsibility for ensuring that the procurement strategy forms the basis for managing the execution and administration of all contracts and purchase order scopes of supply.

The procurement plan for the project shall be developed in conjunction with SnipGold and will be based on the scopes of work, the quantified purchasing and contract packages and the proposed project procurement strategy.

#### **3.3.2 EXPEDITING**

Matrix shall manage and co-ordinate expediting activities on the project.

Matrix has overall responsibility for ensuring that the expediting strategy forms the basis for managing the delivery of all purchase order scope of supply to meet the project schedule.

#### **3.3.3 SHIPPING AND LOGISTICS**

Matrix shall be responsible for daily activities related to planning and interfacing between suppliers and the Client's freight forwarder.

Matrix has overall responsibility for ensuring that the shipping and logistics strategy forms the basis for managing the delivery of purchase order scope of supply to site, except as supplemented by SnipGold (e.g. small items delivered to SnipGold's Smithers office to be forwarded to site).

Interface between the supplier and the Client's freight forwarder will be facilitated by Matrix.

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## **4.0 SECTION 4 – RECLAMATION MANAGEMENT EXECUTION PLAN**

### **4.1 RECLAMATION SCOPE AND ORGANISATION - EXECUTION APPROACH AND EXECUTION STRATEGY**

#### **4.1.1 INTRODUCTION**

The engineering design and execution plans are being executed or managed by a number of consultants: - See Section: 3.1.1 – JMM Contracting Plan 2021. Supply chain management, including procurement management will be conducted by Matrix. Engineering coordination will be executed by WOOD.

Contract tendering, and award will be conducted by SnipGold. Reclamation management will be based on the site under the direction of SnipGold's Field Manager.

#### **4.1.2 RECLAMATION MANAGEMENT PLAN**

The SnipGold Field Manager will play a key role in the early reclamation planning process. Field managers will assist in the planning and preparation of critical documentation ahead of the field season.

2021 activities will include:

- holding a kick-off meeting,
- identifying early field season reclamation activities,
- defining temporary reclamation facilities and services to be provided by the logistics contractor,
- defining reclamation equipment and material procurement responsibilities that will be split between SnipGold and the logistics contractor,
- preparing reclamation management, and health & safety procedures and a detailed execution plan,
- reviewing onsite access constraints and related safety issues,
- reviewing HSE requirements,
- mobilising the reclamation team to site, including the establishment of reclamation facilities and services.

#### **4.1.3 PROJECT SERVICES EXECUTION PLAN**

SnipGold's Project Manager will provide the following project services.

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**4.1.3.1 Cost Management**

- cost control
- contingency management
- earned value management and reclamation progress monitoring
- project accounting

**4.1.3.2 Planning and Scheduling**

- Maintaining and updating the overall execution schedule

**4.1.3.3 Field Execution**

- Direct management and supervision of multiple contractors.
- Provide guidance and assistance to various technical staff on site to allow them to safely conduct their work,
- Develop the comprehensive asset register, using WBS coding,
- Coordinate with the logistics coordinator the import/export to site of equipment, materials and personnel required to complete the work,
- Collect data and information to assist in planning the 2021 field season and develop an initial draft of the 2021 project execution plan and schedule,
- Communicate often and openly with SnipGold Field Manager to provide updates and discuss program objectives and results, scheduling, cost control, and potential synergies with SnipGold Gold's other properties.

**4.1.4 RECLAMATION STRATEGY**

The following strategy for the execution plan will be used.

**4.1.4.1 Reclamation Material and Equipment Inbound Freight**

In-bound freight during reclamation is classified into the following types, and reclamation infrastructure and supplies that are to be provided by SnipGold, must be discussed and arranged in advance of the field season commencing:

- *Project-Supplied Equipment and Materials* – All project-supplied equipment and materials procured will be assembled by the logistics contractor at a designated staging location and delivered to site.

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- *Contractors' Reclamation Equipment and Materials* – Contractors will be responsible for transport and logistics of all their own Equipment and materials necessary to a laydown yard designated by SnipGold for the completion of their scope of work, with the exception of temporary reclamation infrastructure and facilities to be supplied at the project site by SnipGold.
- *Project-Supplied Infrastructure and Facilities* – The project-supplied facilities and equipment will be procured and delivered to the project site by SnipGold. Major facilities include but are not limited to reclamation camp, waste collection and disposal, laydown area and warehousing.
- *Project-Supplied Reclamation Consumables* – These include food, supplies for the reclamation camp, and other reclamation consumables, which will be by Matrix as directed by SnipGold.

#### **4.1.4.2 Road Safety and Security**

All drivers and vehicles must comply with the requirements of SnipGold's Iskut Camp Standard Operating Procedures and may be required to produce tickets for equipment operation or pass an operator's competency test.

Contractors off-loading materials and/or equipment at the laydown yard must observe all on-site traffic control rules and regulations and must be placed in suitable locations so that they do not block traffic.

#### **4.1.4.3 Transportation of Workers**

Transportation of workers from Smithers to McLymont Laydown will be arranged by SnipGold and will likely include a combination of shuttle or charter air service combined with helicopter support, as there is no road access into the Iskut Project. Transportation on site will include all-terrain vehicles and /or trucks and helicopter services. Transportation from Iskut camp to the JMM Reclamation site will be supplied by SnipGold in suitable vehicles to safely navigate the 10+ km track up the hill.

#### **4.1.4.4 Project Storage and Containers**

If required, temporary covered storage will be made available at the Iskut camp and will be made available to all consultants and contractors up at JMM site.

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## **4.1.5 CONSTRUCTABILITY AND RECLAMATION MANAGEMENT PLAN**

### **4.1.5.1 General**

SnipGold has appointed an experienced field manager to provide input to the planning and who will be responsible for its implementation.

### **4.1.5.2 Field Working Conditions**

JMM is a brownfield project including an existing closed mine and ancillary facilities. Access is limited to mobilization by fixed wing aircraft or helicopter to the Bronson Slope air strip. Access to the JMM site will be by surface vehicles travelling up a 10-kilometer single lane dirt road.

### **4.1.5.3 Weather Considerations**

The site can be subject to extreme weather, especially during winter months, with heavy snow loads. However, the reclamation work will only be conducted over summer, so extreme weather is not anticipated to be a major issue, although occasionally caution may need to be exercised and emergency procedures applied (e.g. severe thunderstorms).

### **4.1.5.4 Temporary and Preparatory Works**

All site capture and temporary facilities required by the contractors will be completed during the Early Works phase of their various contracts. This will include the laydowns, offices, demolitions, relocations, and concrete and aggregate supply.

Being a brownfield project, reclamation will be provided with temporary services such as water, power, and communications from limited existing facilities.

### **4.1.5.5 Camp Requirements**

It is anticipated that a peak labour force of up to 30 people combined during July to September will be required for JMM reclamation, Bronson slope work and Iskut Exploration, including all site and camp services staff. All personnel will be housed at the Iskut camp.

### **4.1.5.6 Field Offices, Facilities, and Services**

#### **Main Field Office**

SnipGold, contractors and consultant personnel will use available office space located at Bronson camp and main Mill building at JMM site.

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### **Washroom Facilities**

SnipGold will provide washroom facilities in strategic locations on the project site as necessary. A “Dry” is supplied by Matrix at the Bronson camp.

### **Communication**

SnipGold has existing radio communications, as well as limited telephone and internet services which will be available for reclamation project purposes. There is no cell phone service at or near the project site.

### **Fuel Storage and Distribution**

The logistics contractor will manage fuel supply and distribution, having fill points both at Bronson camp and a 4500L fuel tank located at JMM site.

### **Reclamation Water Supply and Distribution**

Reclamation water will be provided from local ponds and streams.

### **Access Roads and Temporary Laydown Areas**

Access roads, temporary reclamation access and laydown areas, warehouse/ storage structures will be provided by SnipGold.

Reclamation laydown areas include:

- engineered Equipment and materials storage yard(s),
- demolished facilities, structural steel, tank, and equipment storage,
- reclamation contractor laydown, storage, equipment rental, and maintenance.

### **Airstrip**

The existing Bronson airstrip will be available for transporting reclamation project workers. The airstrip located at the JMM site has been decommissioned and is not available for use for landing fixed wing aircraft.

### **Reclamation Power and Distribution**

Reclamation project contractors will be responsible to provide their own generators as part of their equipment imported to site to complete their work. Fuel will be distributed by the logistics coordinator as required.



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#### **4.1.6 FUTURE RECLAMATION SCOPE**

The following yearly scopes is predicated on a remote (fly-in) site, with support equipment flown to site by heavy lift chopper in support of ongoing reclamation activities started in 2017.

##### **4.1.6.1 2022 Reclamation Scope**

- Ongoing In-Situ soils management to encourage aeration and treatment of soils.
- Completion of ML/ARD waste relocation from portals #10, 11, 12 and airstrip to TSF basin, placed below water cover elevation,
- TSF downstream embankment modifications for final closure.
- Decommission all exploration roads on JMM Site,
- Dam safety inspection,
- Annual environmental monitoring (water quality, hydrology, weather station, weirs and groundwater wells).

##### **4.1.6.2 2023 Reclamation Scope**

- Complete Mill building demolition and site grading,
- Final upgrades and closure of JMM landfill,
- Finalize In-Situ soil management to encourage aeration and treatment of soils,
- Completion of TSF embankment modifications for final closure with water cover. Will include dewatering and may include water treatment.
- Dam safety inspection,
- Annual environmental monitoring (water quality, hydrology, weather station, weirs and groundwater wells),
- Final closure grading:
  - Bulk earthworks,
  - Establish permanent drainages,
  - Cover all infrastructure foundations
- Site auction or transport off site of all mobile stock,
- Vegetation planting,
- Dam safety inspection,

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- Annual environmental monitoring (water quality, hydrology, weather station, weirs and groundwater wells).

## **4.2 PROJECT DOCUMENTATION**

### **4.2.1 PROJECT PROCEDURES, INSTRUCTIONS, AND FORMS (PIFS) – RECLAMATION**

The SnipGold Field Manager is responsible for assembling and approving general reclamation procedures, work instructions, checklists, forms, and guidelines, collectively known as PIFs. All PIFs that relate directly to the project quality management system in reclamation will be defined and approved by the SnipGold Project Managers.

*Documents include:*

- SnipGold mandated policies
- Project policies and job rules
- Project procedures
- Project work instructions
- Forms
- Manuals
- Standards
- Codes of practice
- Standard details
- Regulatory agency documents
- Other relevant documents for use on the project

## **4.3 RECLAMATION COORDINATION AND MANAGEMENT**

The SnipGold Field Manager has an essential role and responsibility in managing and coordinating all key interfaces between the various parties participating in the JMM Reclamation Project.

### **4.3.1 RECLAMATION COORDINATION – KEY INTERFACES**

The project baseline schedule is a SnipGold living document, primarily used as a coordination schedule driven by the reclamation manpower and equipment loading.

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## **4.4 RECLAMATION PLANNING AND EXECUTION**

The reclamation work for the project will be planned, scheduled, and managed to meet the project objectives, ensuring cross function compatibility with Engineering and Procurement and in accordance with the project execution plans provided in the other sections of the PEP.

### **4.4.1 DETAILED PLANNING AND SCHEDULING**

The overall project plan and baseline schedule will be compiled by the SnipGold Project Manager, in conjunction with other support groups. The schedule will be reclamation-driven and based on logical reclamation and closeout methodologies and work sequencing for each discrete site area. Managing and updating the schedule will be the responsibility of the SnipGold Field Manager. The approved reclamation work plans and schedule will establish the priorities for Engineering, Design, Procurement Management, and Closeout.

### **4.4.2 CONSTRUCTION WORK PACKAGES (CWP)**

CWPs if required will be compiled by the SnipGold Field Manager and will be based on the construction/reclamation and closeout methodology, and planning as applied to the investigation program, engineering, procurement, and contracting strategies.

The SnipGold Field Manager is responsible for identifying and defining the scope and schedule of each CWP for the project.

The CWP will be further defined by including the inspection test plan requirements and the HSE safety plan covering the work activities involved with each CWP.

### **4.4.3 FIELD ENGINEERING**

Office based engineering personnel will respond to requests for on-site clarifications, where necessary.

## **4.5 RECLAMATION CONTRACTS ADMINISTRATION**

The SnipGold Project Manager will participate in all phases for establishing field service contracts, including activities related to the following:

- Contract strategy,
- Contract document preparation (reclamation specifications, terms, and conditions),
- Bid evaluation and award,

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- Contract orientation.

#### **4.5.1 FIELD WORK ORDERS (FWO)**

Field work orders will be managed in accordance with project procedure and the terms of conditions applicable to each contract.

The SnipGold Project Manager will ensure that any changes (extras, additions, or decreases) to the contract scope of work, beyond what is covered by the adjusted contract sum, will be negotiated with the contractor.

#### **4.5.2 SUPPLIER/CONTRACTOR REQUESTS FOR FIELD INFORMATION AND CHANGES**

The SnipGold Field Manager will be responsible for the timely processing of supplier/contractor requests for information or changes to field work.

The formal Request for Information (RFI) procedure will be used to request information. A record of all RFIs will be maintained, along with details of responses.

#### **4.5.3 EXTRA WORK TO CONTRACT**

Both SnipGold Field Manager and SnipGold Project Manager will be responsible for managing extra work (not covered by existing contracts) in the most expedient schedule and cost-effective manner, in accordance with best practices and project procedures.

Extra work will be managed in accordance with the provisions of the terms and conditions applicable to each contract and project procedures.

#### **4.5.4 CLAIMS AND DISPUTES**

Contractual claims and disputes will be managed in accordance with the provisions of the terms of conditions applicable to each contract and project procedures.

#### **4.5.5 COMPLETION**

The SnipGold Field Manager will be responsible for ensuring that the completion dates are met and that they comply with all contractual commitments.

Completion defines the verified handover interface of a plant (or system) between the reclamation, completions and the closeout of the project to ensure safe handover.

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#### **4.5.6 RECORD DOCUMENTS**

All reclamation records and electronic and hardcopy documents prepared and approved during reclamation execution will be filed for safe keeping in SnipGold's Smithers office, in accordance with the project instructions and procedures.

### **4.6 PROJECT SERVICES – RECLAMATION**

The SnipGold Project Manager is responsible for the overall reclamation planning and the entire scope of reclamation cost and scheduling. The SnipGold Field Manager is responsible for ensuring that all aspects of the field work are properly set up with the necessary project controls for monitoring of performance.

#### **4.6.1 PLANNING – RECLAMATION**

The SnipGold Field Manager is responsible for conducting day to day reclamation planning for the project.

The SnipGold Field Manager will participate in determining the priorities and sequence for the delivery of engineering work and procurement packages. The SnipGold Field Manager will ensure mutually agreed-upon dates are established.

#### **4.6.2 SCHEDULING – RECLAMATION**

Reclamation planning will be integrated with all other phases and disciplines involved with the project, and in the overall project planning and development of baseline schedules for coordinating and controlling the work.

##### **4.6.2.1 Basis of Schedule**

###### **Introduction**

Calendars have been allocated to the following work assignments as follows:

- Design/technical services, procurement and contract formation – 5 days / week
- Field execution work – 7 days / week

The following constraints have been incorporated in the schedule:

- Camp size,
- Current exploration work,
- No current road access from McLymont to Bronson Camp.
- Travel time from Bronson Camp to the JMM site.

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- Limited duration of field execution work.

### **Schedule Development**

The schedule was developed with input from project team members and includes the following key tasks for the 2021 field execution work at Bronson Slope and at the mine site:

- Engage the services of engineering consultants to provide execution plans and engineering deliverables,
- Procure material and equipment,
- Engage contractors to perform the work,
- Engage logistic services to ensure the camp is available.

Planning work will be advanced to allow procuring of material/equipment and contracts are formalized to ensure that all goods are shipped to McLymont staging area by 01 June 2021 for transport to the mine site.

Mobilization to site to commence field work is anticipated to commence on 1-11 May 2021 depending on weather and snow depth.

### **Procurement**

Material/equipment required for the 2021 field execution work are listed in Section 3.2.

#### **4.6.2.2 Schedule**

Refer to Appendix A for the Master Schedule.

## **4.7 RECLAMATION SITE ADMINISTRATION**

This section provides instructions specifically related to administration requirements at the reclamation field offices, including communications and document control.

### **4.7.1 RECLAMATION OFFICE ADMINISTRATION**

JMM Reclamation site administration will run through the SnipGold Field Manager who reports to the Project Manager and is responsible for the overall administration of the reclamation office. Management support activities include:

#### **4.7.1.1 Filing Systems**

The field office will adopt the same filing system for both electronic and hardcopy filing practices. The field office will add additional categories to the filing systems for site-

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specific document requirements. All project staff responsible for maintaining the project records will use the same filing system.

Files containing documents destined for archiving will be designated as such in the project file system.

#### **4.7.1.2 Request for Information (RFI)**

The project will use a formal Request for Information (RFI) procedure to record issues requiring clarification and requests for information received from contractors and for the responses to the RFI providing the clarification and information requested.

All RFIs will be logged in a register to ensure that a timely response is issued and that contractors are not delayed in their work.

#### **4.7.1.3 Reclamation Progress Reports**

Progress status reports will be prepared and issued in accordance with procedures and instructions issued by the Project Manager.

Each function and discipline will be required to submit status reports for work under their responsibility. The SnipGold Field Manager will compile the reports which will be submittal to the SnipGold Project Manager before distribution.

#### **4.7.1.4 Record Documents**

All formal documents related to reclamation, interfaces with other project functions, SnipGold, and administrative documents issued for contracts management will be retained for record purposes. Documents to be retained include, but are not limited to:

- Minutes of meetings,
- Instructions given and received (written and record of verbal instructions),
- Record of telephone conversations,
- Progress reports,
- Correspondence between reclamation personnel and other project stakeholders.

## **4.8 RECLAMATION CLOSE-OUT REPORTS**

On completion of the work, the SnipGold Field Manager will prepare reclamation close-out reports and submit to the SnipGold Project Manager for inclusion in the project close-out report.

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Details to be included in the report will be in accordance with project procedures and instructions.

## **5.0 SECTION 5 – COMPLETIONS/RECLAMATION EXECUTION PLAN**

### **5.1 RESPONSIBILITY**

The SnipGold Project Manager is responsible for defining the completions and reclamation of the facilities.

### **5.2 DEFICIENCIES**

Deficiencies will be the responsibility of the contractor, as directed by the SnipGold Field Manager.

The Field Manager is responsible for developing various turnover packages that may include the following documents:

- Notice of completion,
- Scope summary of the turnover package,
- Copy of the contract deficiency list. If more than one contract is involved in a turnover package, then a commensurate number of deficiency lists will be included. The list will be in the format prescribed by the reclamation contract,
- Copies of licenses, permits, and other regulatory paperwork as related to the turnover scope.

### **5.3 RECORD DRAWINGS AND REPORTS**

At the end of the project, all reclamation and inspection activities must be recorded and included in any QA reports prepared for the project. This will provide:

- A list of drawings and specifications covering the work,
- A record of each test and measurements conducted for each work element,
- Confirmation records that test results and inspection checks comply with requirements stipulated in the specifications and codes applicable to the work.

These activities should be carried out in conjunction with the records management activities outlined in the project close-out procedure.



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## **6.0 SECTION 6 – HEALTH, SAFETY, AND ENVIRONMENT (HSE) EXECUTION PLAN**

The existing SnipGold HSE plan, with current policies and practices at site which will focus primarily on safety for an exploration site, will be upgraded for the project as applicable.

While executing the work, all personnel will adhere to HSE policies, procedures, rules and all applicable governmental and regulatory requirements.

All site personnel will comply with SnipGold’s HSE Plan and Policies for SnipGold’s Site. SnipGold’s HSE Plan and Policies will take precedence and will be supported and/or supplemented by the Contractor’s Plans and Policies, the most stringent will apply.

## **7.0 SECTION 7 - PROJECT PROCEDURES, INSTRUCTIONS, AND FORMS (PIFS) – PROJECT CONTROLS AND SERVICES**

### **7.1 PROCEDURES AND INSTRUCTIONS**

The SnipGold Field Manager is responsible for the sections of work covered in this section of the PEP and will ensure that approved procedures and work instructions are available, that all project personnel working under his/her direction are familiar with the applicable procedures, and that the procedures are being followed.

### **7.2 PROJECT MANAGEMENT CONTROLS AND SERVICES SOFTWARE**

The following software will be used in the execution of the project controls and services work for the project:

- MPP – Planning and scheduling and schedule risk analysis software
- Microsoft – Office software
- SharePoint – Document management, collaboration, portals, and extranets

### **7.3 PROJECT CONTROLS**

The SnipGold Field Manager is responsible for supporting other project functions in formulating the planning and implementation of project controls, and for reporting on the project through all phases.

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### **7.3.1 COST CONTROL**

Actual costs will come from SnipGold's principal office in Toronto, incorporation into reports for actual vs programmed, progress, etc. will be done on site by field managers.

## **7.4 PROJECT FINANCIAL AND ACCOUNTING**

### **7.4.1 PROJECT ACCOUNTING**

The SnipGold Project and Field Managers are responsible for coordinating and approving accounting requirements for the project, including:

- Reviewing monthly invoices for Engineering & Procurement Services,
- Reviewing vendor invoices and issuing notification to the client that payment may proceed.

### **7.4.2 INVOICES FROM SUPPLIERS/CONTRACTORS AND ACCOUNTS PAYABLE**

All invoices from all contractors will be delivered straight to SnipGold for review and payment processing. SnipGold field manager and project manager will review prior to providing SnipGold accounting approval.

### **7.4.3 REPORTING AND ACCOUNTING RECORDS**

SnipGold Project Manager will maintain a method of accounting in accordance with generally accepted accounting principles and practices, respecting all matters pertinent to the project.

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## Appendix A – Schedule

Bronson Camp Open - Matrix (approximate)	04 May 2021
Seabridge Reclamation Management Team – Preseason meetings and scheduling	04 May 2021
Seabridge JMM Reclamation Team Mobilize to Iskut Camp	18 May 2021
Start Improvements to JMM Access Road and snow removal	19 May 2021
Matrix Mechanic - Begin repairs to site equipment	19 May 2021
JMM access Road – Repair washout and snow removal	25 May 2021
Stage all reclamation equipment and supplies at McLymont for transfer to site. (Lime, Oil Gator, PVC Pipe)	01 June 2021
Conduct Dam Safety Inspection (DSI)	03 June 2021
Begin In-Situ Soil Remediation - Tank Farm area	03 June 2021
Training of Crew – “Working near Water”	4-6 June 2021
Begin Relocation of Waste Rock to TSF – Level 10	07 June 2021
Begin Relocation of Waste Rock to TSF – Level 11	04 July 2021
Conduct Dam Safety Inspection (DSI)	04 July 2021
Begin Relocation of Waste Rock to TSF – JMM Runway	20 August 2021
Disposal of old mine equipment to JMM landfill	08 Sept 2021
KCB – Conduct Dam Safety Inspection (DSI) on the TSF	08 Sept 2021
End of 2021 reclamation season at JMM	02 Oct 2021

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## **Appendix B – Governing Regulations and Acts**

**Guidelines for Workers Compensation Act** (<https://www.worksafebc.com/en/law-policy/occupational-health-safety/searchable-ohs-regulation/ohs-guidelines/guidelines-for-workers-compensation-act>)

**Guidelines Workers Compensation Act Part 3 Division 1 – Interpretation and Purposes**

**G-D1-108-7 Jurisdiction over mines**

Issued June 18, 2008; Editorial Revision September 19, 2014

### **Regulatory excerpt**

WorkSafeBC's prevention jurisdiction is set out in section 108 of Part 3 (Occupational Health and Safety) of the *Workers Compensation Act* ("Act"):

(1) Subject to subsection (2), this Part applies to

(a) the Provincial government and every agency of the Provincial government,

(b) every employer and worker whose occupational health and safety are ordinarily within the jurisdiction of the Provincial government, and

(c) the federal government, every agency of the federal government and every other person whose occupational health and safety are ordinarily within the jurisdiction of the Parliament of Canada, to the extent that the federal government submits to the application of this Part.

(2) This Part and the regulations do not apply in respect of

(a) mines to which the [Mines Act](#) applies,

(b) [Repealed 2004-8-33.]

(c) subject to subsection (3), the operation of industrial camps to the extent their operation is subject to regulations under the [Public Health Act](#).

(3) The Lieutenant Governor in Council may, by regulation, provide that all aspects of this Part and the regulations apply to camps referred to in subsection (2) (c), in which case this Part and the regulations prevail over the regulations under the [Public Health Act](#) to the extent of any conflict.

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### **Purpose of guideline**

The purpose of this guideline is to clarify the authority of WorkSafeBC over the occupational health and safety ("OHS") of organizations that conduct operations on or around mines.

### **Ministry of Energy and Mines OHS Jurisdiction**

WorkSafeBC's prevention jurisdiction does not extend to mines to which the *Mines Act* applies. Under the *Mines Act*, a "mine" includes

- (a) a place where mechanical disturbance of the ground or any excavation is made to explore for or to produce coal, mineral bearing substances, placer minerals, rock, limestone, earth, clay, sand or gravel
- (b) all cleared areas, machinery and equipment for use in servicing a mine or for use in connection with a mine and buildings other than bunkhouses, cook houses and related residential facilities
- (c) all activities including exploratory drilling, excavation, processing, concentrating, waste disposal and site reclamation
- (d) closed and abandoned mines
- (e) a place designated by the chief inspector as a mine

The approval of mining projects under the [\*Mines Act and the Health, Safety and Reclamation Code for Mines in British Columbia\*](#) is administered by the Ministry of Energy and Mines ("MEM"). A permit from MEM is required for coal and mineral exploration programs, placer mining, sand and gravel pits and quarries, proposed coal or hardrock mineral mines, major expansions or modifications of producing coal and hardrock mineral mines, as well as large pilot projects, bulk samples, trial cargoes and test shipments.

All activities conducted in relation to mining within the boundaries of a *Mines Act* permit area fall within the OHS jurisdiction of MEM. Examples include mining drilling and exploration; construction and blasting on mine property; operation of mining company labs and mobile equipment at a mine site; roads on mine property; and processing facilities, power lines and pipelines that service the mine and are situated within the mine boundaries. Sites outside of the mine permit area that are designated as "mines" by the Chief Inspector of Mines will also fall under MEM's OHS jurisdiction.

Aggregate pits, such as gravel pits, that are exploited primarily for commercial purposes constitute "mines" under the *Mines Act* and are thus within the OHS jurisdiction of MEM. In other words, if the primary purpose of the excavation is to extract aggregate, OHS over the pit will be the responsibility of MEM. Examples of such pits include gravel pits primarily used for building a logging road (unless the pit is situated within the road's right-of-way) or for selling

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gravel. On the other hand, if the excavation is primarily conducted for development purposes (for example, for erecting a foundation structure for a building) under a development or building permit from another level of government (such as a municipality or regional district), the aggregate pit will fall within the jurisdiction of WorkSafeBC, even if the excavated material is eventually sold.

### **WorkSafeBC OHS Jurisdiction**

WorkSafeBC has jurisdiction over OHS with respect to areas, machinery, equipment and buildings that are not used to service or in connection with a "mine" as defined above. This includes, for example, access roads outside of the mine boundaries, and timber removal operations that are not connected to the mining activity (even if they are carried out within the mine boundaries). Likewise, WorkSafeBC has OHS jurisdiction over bunkhouses, cook houses and related residential facilities that are used to service a mine or in connection with a mine, to the extent that they are workplaces in which workers such as cooks, maintenance people and others are employed.

WorkSafeBC's jurisdiction also extends to service roads running through mine boundaries that are used to access areas beyond the mine, such as forestry or oil and gas operations. It should also be noted that oil and gas exploration and production activities are within WorkSafeBC's jurisdiction.

### **Dual OHS Jurisdiction**

While WorkSafeBC is excluded from enforcing OHS requirements at a "mine" site, there are employers in respect of which jurisdiction will be divided between WorkSafeBC and MEM. In other words, there are employers who are under WorkSafeBC jurisdiction for much of their business, but who operate on some "mine" workplaces where WorkSafeBC has no jurisdiction. In these situations, WorkSafeBC requirements will apply in general to the employers, but WorkSafeBC has no jurisdiction to enforce specific requirements with respect to those "mine" workplaces. For example, a road construction firm that operates a gravel pit to build an industrial road (such as a logging road) will be subject to general WorkSafeBC requirements around safety programs and health and safety committees. However, WorkSafeBC may not enforce specific requirements around the firm's operation of mobile equipment at the gravel pit.

Other examples of situations where dual jurisdiction may arise include concrete plants with associated gravel pits. In these situations, the jurisdictional dividing line will vary from case to case. The more direct and regular the connection between the activity and the mine site, the more likely it is to be "for use in servicing a mine or for use in connection with a mine." For instance, a loader that is routinely used to dump gravel into the processing plant will fall within WorkSafeBC's jurisdiction. In contrast, if the loader constitutes a significant part of the operation of the gravel pit and is only used occasionally in relation to the processing plant, OHS over that piece of equipment will be the responsibility of MEM.

### **Further information**

When faced with assertions that OHS over a particular facility or activity falls outside of

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WorkSafeBC's jurisdiction, or situations where the jurisdictional divide is unclear, prevention officers may contact MEM to obtain further information about the operations in question. In addition, prevention officers should consult with their manager.

Questions about jurisdiction over mines, and other questions relating to the jurisdiction of WorkSafeBC over OHS, may be directed to the Regulatory Practices Department of WorkSafeBC.

### **Requirements for notifying and cooperating with MEM**

*Prevention Manual* Policy Item [D1-108-1 Application of Part 3 - Where Jurisdictional Limits Exist](#) provides that WorkSafeBC prevention officers will not issue an order or exercise another power to directly enforce a statute or regulation administered by MEM. The policy also requires prevention officers who observe what they believe to be a violation of a statute or a regulation administered by MEM to

- Notify MEM of the details of the observation that they believe to be a violation of its statute or regulation. As part of this notification, it is recommended that prevention officers forward a copy of the inspection report, if one was prepared, to MEM. It should be noted, for further clarity, that if the workplace is outside of WorkSafeBC's jurisdiction, the inspection report must not include an order and it is not required to be posted.
- Cooperate with MEM in dealing with the situation to the extent this is consistent with WorkSafeBC's mandate and prevention officers' duties under the *Act*.

Before notifying MEM, the prevention officer should inform the employer of the situation that may be a violation of a statute or regulation of MEM and that the prevention officer will be contacting MEM for their follow-up.

**Contact information for MEM regional offices is available online at [Office of the Chief Inspector of Mines](#)**

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## Appendix C – WBS Procedure

### Johnny Mountain Mine Closure Bond Estimate- Work Breakdown Structure (WBS)

- 1100 Mine Adits
- 1200 Vent Raises
- 2100 Waste Dumps (Waste Rock)
- 2200 Landfills / Landfarm
- 2300 Surface Water Management
- 3100 Mill Demolition
- 3200 Tank Farm Deconstruction
- 4100 Civil Works associated with TSF Design
- 5100 Mine Access Road
- 8100 General and Administration Costs
- 8200 Asset Management
- 8300 Permitting, Regulatory, Road Usage Costs
- 9100 Engineering and Technical
- 9300 Temporary Construction Utilities
- 9400 Construction Support
- 9600 Site Survey
- 9700 Health, Safety, Security and Environmental
- 9800 Temporary Camp and Catering
- 9900 Freight and Logistics/Contractor Support
- P200 Taxes
- P900 Contingency



APPENDIX D      JOHNNY MOUNTAIN MINE RECLAMATION PROJECT - 2020 MAIN  
LANDFILL EROSION PREVENTION AND SEDIMENT CONTROLS  
INSPECTION MEMORANDUM (WOOD 2021B)

# Memo

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**To:** Elizabeth Miller, M.Sc., R.P. Bio., Vice President Environment  
Jessy Chaplin, M.Sc., R.P.Bio., Director of Permitting  
Kevin Hidber, ASCT, Field Manager

**From:** Mark Anthony Pernito, P.Geo., Megan Gardner, EIT      **Reviewer:** Dean Wall, M.Sc., P.Eng.

**cc:** Mario Bianchin, Ph.D., P.Geo.      **Wood File No.:** VE52655D

**Date:** 3 March 2021

**Re:** **Johnny Mountain Mine Reclamation Project – 2020 Main Landfill Erosion Prevention and Sediment Controls Inspection Memorandum**

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## 1.0 Introduction

Wood Environment & Infrastructure Solutions (Wood) prepared this memorandum for SnipGold Corporation (SnipGold) in lieu of the annual Post Construction Report for Main Landfill Upgrades. Due to the Covid-19 provincial health restrictions, no mine reclamation works or landfill upgrades took place during 2020. However, Permit PR-7927 requires an annual inspection of erosion prevention and sediment control measures. Therefore, this memorandum is intended to provide a review of the erosion prevention and sediment control measures currently in place at the Johnny Mountain Mine (JMM) Main Landfill (Main Landfill).

### 1.1 Background

The Main Landfill has been operating since 1994 at the current location on the west side of the Tailings Storage Facility (TSF). Landfill upgrades are currently underway as part of SnipGold's JMM Reclamation Project. The design of these upgrades is described in detail in the Main Landfill Technical Assessment Report (TAR) dated 31 January 2018, which was completed by Amec Foster Wheeler (now Wood). Following the Ministry of Environment and Climate Change Strategy (ENV) review of the TAR, an amendment to Permit PR-7927 was issued on 31 May 2018. One of the conditions stipulated in the permit requires that at the start of the reclamation activities the Permittee must develop, implement and maintain erosion prevention and sediment control measures. During each snow-free season, a Qualified Professional must assess whether those controls are being undertaken and are effective which are described in the sections below. This assessment, including recommended upgrades to the control measures, shall then be submitted as part of the Permit PR7927 Annual Report.

The Main Landfill upgrades, as outlined in the TAR, began in June 2018. During the 2018 construction season (June to October 2018), the upgrades included re-grading of the Phase 1 Main Landfill floor to ensure that waste material within the landfill was placed at a minimum of 1.22 m above the inferred groundwater table as per Permit PR-7927. The Phase 1 - Cell 1 development included placement of



demolition waste which was subsequently covered with soil. Levelling of the Main Landfill Cell 2 base was partially completed with grade elevations ranging from 1097.0 m to 1098.0 m.

Additional upgrades also included dewatering in Main Landfill area and provision of perimeter ditches around the Landfill facility. On 27 June 2018, a design change was implemented which allowed for drainage to continue to be directed to the TSF, rather than to the north as was originally planned. These changes simplified the erosion prevention and sediment control plan (EPSCP) measures for 2018, as all run-off was directed to the TSF where any remaining sediment would settle.

During the 2019 construction season, no significant earthwork construction activities were observed with the exception of waste placement within the Phase 1 – Cell 2 footprint of the main Landfill, as well as, the placement of leveling fill material to extend the landfill base eastward. The levelling fill terminated slightly above the toe of the western embankment slope of the TSF.

Minor deficiencies were noted during the start-up inspection, which included minor erosion of the embankment slope of the western access road; minor erosion of cover material northwest of the Main Landfill; and ponding of water northeast of the Main Landfill. These deficiencies were addressed by Snipgold during the 2019 construction season and were confirmed during the follow-up inspection carried out on September 6 to 7, 2019 by Wood personnel.

Further details of 2018 and 2019 JMM's Main Landfill Upgrades construction were documented as construction inspection records, which are included in the Post Construction Report – 2018 Main Landfill Upgrades and the Post Construction Report – 2019 Main Landfill Upgrades, issued by Wood dated 19 March 2019 and 20 February 2020, respectively.

## **2.0 Summary of 2020 Erosion Prevention and Sediment Control Measures and Site Inspection**

As noted above, due to the Covid-19 provincial health restrictions, no mine reclamation works or landfill upgrades took place during 2020. However, Permit PR-7927 requires an annual inspection of erosion prevention and sediment control measures. On 29 August, 2020, the Main Landfill inspection was conducted in parallel with the 2020 Site Environmental Investigation carried out by the following personnel:

- Ardavan Mansourpour, M.Sc., Environmental Scientist, Wood

As outlined in the 2020 site inspection record included in Appendix A, minor erosion, ponding and sedimentation deficiencies were noted. These include minor erosion on the north slopes of Cell 2, west slopes of Cell 1, and south slopes of Cell 2. Some metal was also exposed where surface water had eroded the interim cover material along the north slopes of Cell 2. Although, self armoring of gravel and cobbles in the silty kame material was observed in these erosional locations.

Additionally, minor ponding of water was observed in the following locations:

- Northeast access road of the Main Landfill;
- along the north edge of Cell 2; and,
- along the borrow area in the immediate southern edge of Cell 1, west of the culvert.

Since no construction work took place during 2020, it is recommended that these deficiencies are addressed in 2021 prior to the continuation of any waste placement or landfill upgrades.

## 2.1 Survey Layout

Since no Main Landfill upgrades or waste filling activities took place during 2020, an updated survey of the landfill area was not completed. However, on 7 September 2019, a post-construction survey was carried out by AllNorth personnel, which was used by Wood to produce Record Drawings for 2019 construction works included in Appendix B.

## 2.2 Erosion Prevention and Sediment Controls

Wood developed an Erosion Prevention and Sediment Control Plan for the Main Landfill Upgrades. The most current version, Revision 0, is provided for information in Appendix C. SnipGold retains overall responsibility for implementation and maintenance of the erosion prevention and sediment control (EPSC) measures while Wood provides training, ongoing support, inspections, and assessment of the effectiveness of the controls. As outlined previously, minor erosion was noted during the 2020 site inspection, however, the EPSC measures were observed to be effective.

## 3.0 Concluding Statement on Erosion Prevention and Sediment Control Measures and Site Inspection

Wood is of the professional opinion that the Erosion Prevention and Sediment Control measures substantially comply with the plans and supporting documents referenced herein.

## 4.0 Closure

This report has been prepared for the exclusive use of the SnipGold Corporation and their agents, for the specific application described within. Any use which a third party makes of this document, or any reliance on or decisions to be made based on this document are the sole responsibility of such third parties.

Wood cannot accept responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this memo.

The fieldwork completed in this program was completed in general accordance with industry standards with limits imposed by existing infrastructure including roads and buried utilities. Interpretations and conclusions made within this report were based upon the fieldwork and discussions with SnipGold Corporation staff.

This report has been prepared in accordance with generally accepted practices in the environmental industry. No other warranty, expressed or implied, is made. This report is also subject to the further Limitations contained in Appendix D.

Respectfully submitted,

**Wood Environment & Infrastructure Solutions,  
a Division of Wood Canada Limited**

**Prepared by:**



**Megan Gardner, EIT**  
Intermediate Environmental/Civil Engineer



**Mark Anthony Pernito, P. Geo.**  
Sr. Hydro-Geotechnical Specialist

**Reviewed by:**



**Dean K. Wall, M.Sc., P.Eng.**  
Principal Engineer

**Approved by:**



**Mario Bianchin, Ph.D., P. Geo.**  
Project Manager

The logo for the company 'wood.' is located in the top right corner. It consists of the word 'wood.' in a dark blue, lowercase, sans-serif font. The background of the page features large, light grey curved shapes that partially overlap the text.

**wood.**

## **Appendix A**

### **29 August 2020 Inspection Report**

**2020 JMM CONSTRUCTION REVIEW  
MAIN LANDFILL PHASE 1, CELL 1 AND CELL 2  
INSPECTION REPORT**



<b>Date:</b>	29 August 2020
<b>Reported by:</b>	Megan Gardner, E.I.T., Wood
<b>SnipGold Field Lead:</b>	Kevin Hidber, AScT, SnipGold
<b>Wood Personnel:</b>	Ardavan Mansourpour (Construction Reviewer)
<b>Weather:</b>	12° to 15° Cloudy with Sun

**Introduction and Background:**

Wood Environment & Infrastructure Solutions, a division of Wood Canada Limited (Wood) is the current design engineer for upgrades at the Main Landfill at the Johnny Mountain Mine (JMM) Site owned by SnipGold Corporation (SnipGold), a subsidiary of Seabridge Gold Incorporated.

**2020 Main Landfill Inspection:**

Due to Covid-19 provincial health restrictions, no mine reclamation works or landfill upgrades took place during 2020. However, Permit PR-7927 requires an annual inspection of erosion prevention and sediment control measures, and therefore, on 29 August 2020, an inspection of the JMM Main Landfill was conducted in parallel with the 2020 JMM Site Environmental Monitoring.

Field Personnel

- Ardavan Mansourpour, M.Sc., Environmental Scientist, Wood
- Danielle Amaral, Environmental Resources Management (ERM)

Overview

- Groundwater Sampling
- Soil Sampling of Hydrocarbon Biopile remediation
- Main Landfill Inspection
- Surface Water Sampling

The observations/findings during the Main Landfill inspection are outlined below.

**Erosion Prevention and Sediment Control Measures Inspection:**

- The interim cover material consisted of silty kame material and was observed to be intact.

- Run-off was observed flowing from the south-east corner of the Main Landfill over the low spot of the Tailings Storage Facility (TSF) berm and into the TSF as designed.
- The ditch to the south of the Cell 2 was noted to be dry.
- Minor erosion of the interim cover material was observed on the north side of Cell 2. Some metal was exposed where surface water had eroded the interim cover material.
- Ponding of water was observed along the northern access road of the Main Landfill.
- Minor erosion was observed along the western slope of Cell 1 and southern slope of Cell 2. Gravel and cobbles in the silty kame material were observed to be migrating towards the surface in erosional areas which provided self armoured measures.
- Minor ponding of water was observed in the northeast corner of Cell 2 and along the south side of Cell 1.
- As per the landfill design, water is generally being directed away from the Landfill via the outer ditches and the upgradient berms to the west and directed towards the TSF. In the Cell 1 area, flowing water was observed in the outer ditches and directed away from the Landfill.
- Water collected within the Landfill footprint is drained towards the southeast corner of the Landfill as per the landfill design.
- No significant erosion or sediment issues were observed.

#### Photos:



**Photo 1:** Vantage point photo of southeast corner of the Main Landfill looking east. Ponding water over low section of TSF where drainage from Main Landfill enters TSF.





**Photo 2:** Vantage point photo of southeast Corner of Cell-2 looking northwest. South ditch east of culvert observed to be dry.



**Photo 3:** Vantage point photo along northern edge of the Main Landfill. Minor erosion observed along north slope. Ponding of water was observed in the northern access road..



**Photo 4:** Close up of erosion noted on north slope including some exposed metal.



**Photo 5:** Close up of erosion noted on north slope including some exposed metal.



**Photo 6:** Vantage point photo along northern access road of the Main Landfill. Ponding of water was observed in this area.



**Photo 7:** Vantage point photo along western slope of the Main Landfill looking northeast. Minor rill erosion was noted.



**Photo 8:** Vantage point photo along western slope of the Main Landfill looking east. Minor rill erosion was noted.



**Photo 9:** Vantage point photo of southwest corner of Main Landfill looking south. Minor erosion was noted on west slope of western surface water ditch.



**Photo 10:** Vantage point photo of south edge of Main Landfill looking east. Minor erosion was noted on south slope of Main Landfill.



**Photo 11:** Vantage point photo of south edge of Main Landfill looking northeast. Minor erosion was noted on south slope of Main Landfill.



**Photo 12:** Vantage point photo of northeast corner of Main Landfill looking northeast. Minor ponding water was observed in this area.



**Photo 13:** Vantage point photo of southwestern edge of Main Landfill looking east towards the culvert. Ponding water was observed in this area.

The logo for the company 'wood.' is located in the top right corner. It consists of the word 'wood.' in a dark blue, lowercase, sans-serif font. The period at the end of the word is a small dot. The background of the page features large, light gray, curved shapes that resemble stylized architectural elements or abstract patterns.

**Appendix B**  
**2019 Record Drawing Package**



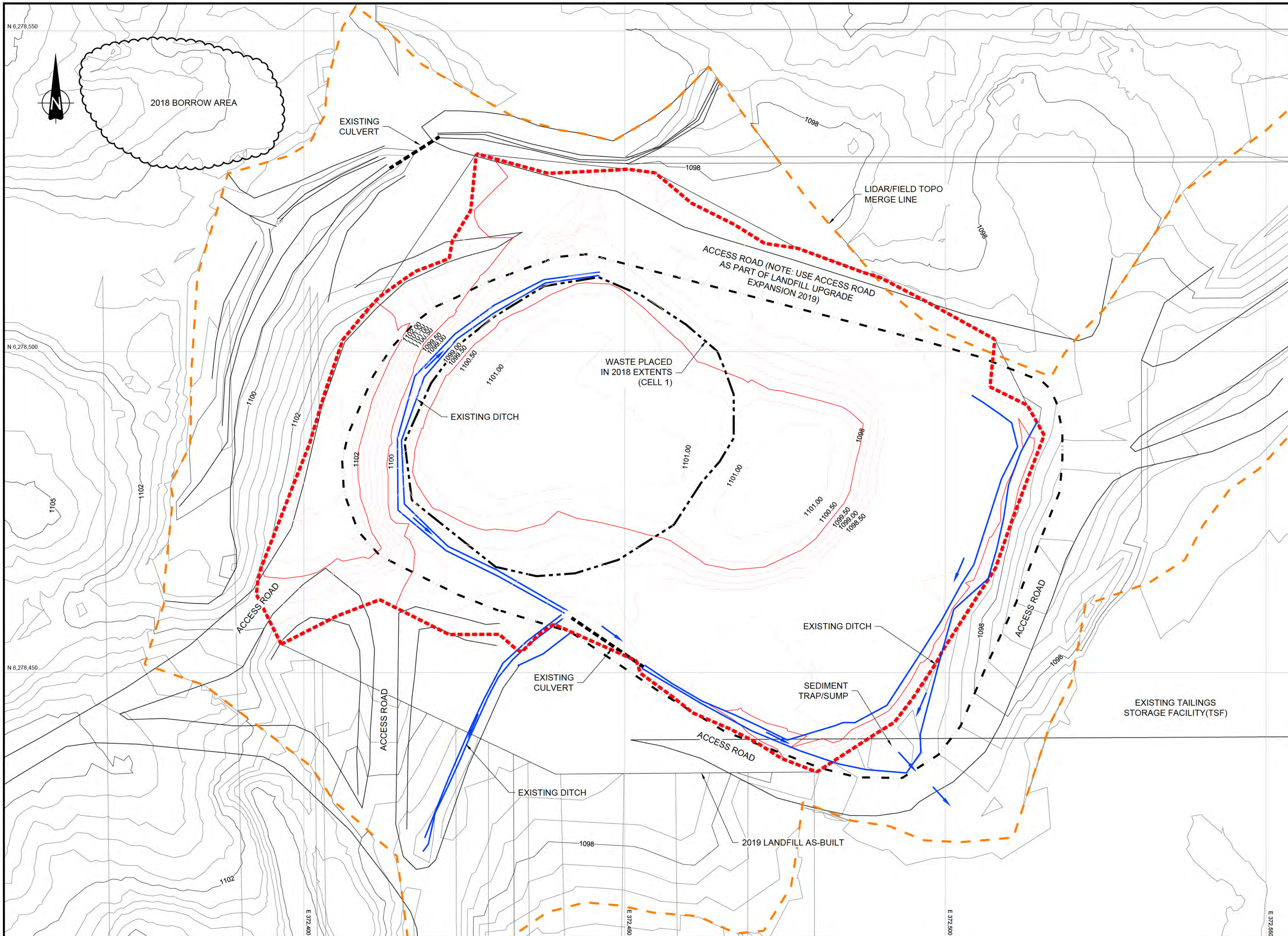
**LEGEND**

- 2018/2019 PROJECT BOUNDARY
- EXISTING DITCH FLOW
- EXISTING CULVERT
- EXISTING BASE OF DITCH
- LIDAR/FIELD TOPO MERGE LINE
- WASTE PLACED IN 2018 EXTENTS
- LANDFILL BOUNDARY
- 2019 LANDFILL AS-BUILT SURVEY LIMITS
- 2019 LANDFILL AS-BUILT SURVEY
- 2019 TEST PIT

- NOTE:**
1. DRAWING BASED ON 2017 LIDAR TOPOGRAPHY MERGED WITH 2018 FIELD SURVEY PROVIDED BY ALLNORTH.
  2. SEDIMENT AND EROSION CONTROL MEASURES TO BE RESPONSIBILITY OF CONTRACTOR. ROCK AND/OR CURLEX SEDIMENT LOG CHECK DAMS TO BE USED AS NEEDED AS PER EROSION AND SEDIMENT CONTROL PLAN.

**RECORD DRAWING**

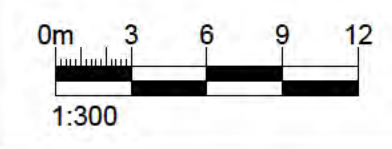
	<p><b>SNIPGOLD CORP</b></p> <p><b>wood.</b> Environment &amp; Infrastructure Solutions Suite 600 - 4445 Lougheed Highway, Burnaby, BC V5C 0E4 Tel: 1-804-294-3811 Fax: 1-804-294-4664</p>	<p>DRAWN BY: KL</p> <p>REVIEWED BY: DW</p> <p>DATUM: -</p> <p>PROJECTION: -</p> <p>SCALE: AS SHOWN</p>	<p><b>JOHNNY MOUNTAIN MINE RECLAMATION PLAN</b> <b>PHASE 1 MAIN LANDFILL UPGRADES</b></p> <p><b>MAIN LANDFILL DEVELOPEMENT</b> <b>GENERAL SITE PLAN</b></p>	<p>DATE: NOV. 2019</p> <p>PROJECT No.: VE52655C.001.02</p> <p>DRAWING No.: JML-DES-001</p> <p>REV. No.: 1</p> <p>SHEET No.: 1 of 2</p>																																										
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>REV</th> <th>D</th> <th>M</th> <th>Y</th> <th>ISSUE/REVISION DESCRIPTION</th> <th>ENG.</th> <th>APPR.</th> </tr> </thead> <tbody> <tr> <td>4</td> <td>11</td> <td>2019</td> <td></td> <td>RECORD DRAWING</td> <td>MAP</td> <td>DW</td> </tr> <tr> <td>14</td> <td>12</td> <td>2018</td> <td></td> <td>2018 CONSTRUCTION RECORD AND 2019 DESIGN</td> <td>D.W.</td> <td>I.B.M.</td> </tr> <tr> <td>01</td> <td>11</td> <td>2018</td> <td></td> <td>2018 CONSTRUCTION SUMMARY AND FOR CLIENT REVIEW</td> <td>D.W.</td> <td>I.B.M.</td> </tr> <tr> <td>22</td> <td>06</td> <td>2018</td> <td></td> <td>PRE-CONSTRUCTION FOR REVIEW</td> <td>D.W.</td> <td>M.B.</td> </tr> <tr> <td>14</td> <td>06</td> <td>2018</td> <td></td> <td>ISSUED FOR 90% REVIEW</td> <td>K.F.</td> <td>D.W.</td> </tr> </tbody> </table>	REV	D	M	Y	ISSUE/REVISION DESCRIPTION	ENG.	APPR.	4	11	2019		RECORD DRAWING	MAP	DW	14	12	2018		2018 CONSTRUCTION RECORD AND 2019 DESIGN	D.W.	I.B.M.	01	11	2018		2018 CONSTRUCTION SUMMARY AND FOR CLIENT REVIEW	D.W.	I.B.M.	22	06	2018		PRE-CONSTRUCTION FOR REVIEW	D.W.	M.B.	14	06	2018		ISSUED FOR 90% REVIEW	K.F.	D.W.				
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- LEGEND**
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  - LIDAR/FIELD TOPO MERGE LINE
  - WASTE PLACED IN 2018 EXTENTS
  - 2019 LANDFILL SURVEY AS-BUILT LIMITS
  - 2019 LANDFILL AS-BUILT SURVEY

- NOTE:**
1. DRAWING BASED ON 2017 LIDAR TOPOGRAPHY MERGED WITH 2018 FIELD SURVEY PROVIDED BY ALLNORTH.
  2. ESTIMATED WASTE AND COVER SOIL PLACED IN 2018 = 3800m<sup>3</sup>

**RECORD DRAWING**



REV	D	M	Y	ISSUE/REVISION DESCRIPTION	ENG.	APPR.
4	11	2019		RECORD DRAWING	MAP	DW
14	12	2018		2018 CONSTRUCTION RECORD AND 2019 DESIGN	D.W.	I.B.M.
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**SNIPGOLD CORP**

**wood.**  
Environment & Infrastructure Solutions  
Suite 600 - 4445 Lougheed Highway, Burnaby, BC V5C 0E4  
Tel: 1-804-294-3811 Fax: 1-804-294-4664

DRAWN BY:	KL
REVIEWED BY:	DW
DATUM:	-
PROJECTION:	-
SCALE:	AS SHOWN

**JOHNNY MOUNTAIN MINE RECLAMATION PLAN  
PHASE 1 MAIN LANDFILL UPGRADES**

**GENERAL SITE PLAN  
2018 CONSTRUCTION**

DATE:	NOV. 2019
PROJECT No.:	VE52655B.001.02
DRAWING No.:	JML-DES-002
REV. No.:	1
SHEET No.:	2 of 2

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**Appendix C**  
**Erosion Prevention and Sediment Control**  
**Plan**

# Technical Memo

**To:** Elizabeth Miller, M.Sc., R.P.Bio.                      **Date:** 18 December 2018  
**From:** Matthew Graham, M.Sc., PMP, CSci,  
CPESC, CAN-CISEC                                              **Email:** [elizabeth@seabridgegold.net](mailto:elizabeth@seabridgegold.net)  
**Review:** Dean Wall, M.Sc., P.Eng.  
**cc:** Mario Bianchin, Ph.D., P. Geo.  
**Ref:** VE52655B – Johnny Mountain Mine Reclamation Plan 2018  
Phase 1 Main Landfill Upgrades  
**Re:** Surface Erosion and Sediment Control Plan

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## 1.0 Introduction

Wood Environment & Infrastructure Solutions, a division of Wood Canada Limited (Wood) has been retained by SnipGold Corp. (SnipGold) to upgrade the Main Landfill at the former Johnny Mountain Mine to receive relocated wastes from Burial Sites 1 and 2 (and other reclamation materials) as described in Permit PR-7927 (amended May 31, 2018). As required by PR-7927, Wood has developed a surface erosion prevention and sediment control plan as described in the following sections to ensure that appropriate mitigative controls are in place during and after construction.

### 1.1 Purpose

The overall purpose of this Surface Erosion Prevention and Sediment Control Plan (SEPSCP) is to minimize the potential for mobilizing sediment, destabilizing slopes, and compromising surface water quality during and after the construction of the landfill foundation and cover. The plan outlines key roles, as well as provides guidance on assessing erosion potential and developing prescriptions for event-based control strategies.

Developing strategies using best management practices (BMPs) during construction requires an understanding of the factors affecting erosion and measures used to control and manage erosion and sedimentation. This plan provides a structured approach to preventing surface erosion ensuring that designated control efforts correspond to best management practices. It includes:

- Guidance for assessing erosion potential and consequence;
- Direction to a set of management tools available for controlling sediment transport;
- Details for controlling erosion and sediment on disturbed surfaces and soil stockpiles;
- Event-based effectiveness monitoring program; and
- Reporting requirements.

The SEPSCP serves to achieve the following:

- Develop effective management strategies that will minimize surface erosion;
- Optimize the operation of drainage-related features consistently throughout the reclamation area;





- Implement environmental protection measures to manage sedimentation in areas subject to erosion using site-specific erosion and sediment control (ESC) techniques;
- Protect environmentally sensitive areas and natural watercourses from sedimentation; and
- Provide guidance to personnel to understand the suitability of sediment control methods used for different erosional circumstances and adapt them to variable site conditions.

The format of this Plan reads with the Construction Phase at the forefront of its guidance. As the Project moves towards the steady state of Closure, this plan will be revisited and updated to ensure that it meets the needs of each phase of the Project.

## 2.0 Surface Preparation Activities and Implementation

### 2.1 Natural Processes

Understanding critical steps in the natural landform recovery process can assist in the identification of site-specific prescriptions for surface erosion and can provide direction for the most applicable techniques for overcoming the obstacles to disturbance recovery. The key is to identify the factors limiting or preventing natural recovery and tailor mitigation strategies to address these factors in a manner similar to what would occur naturally in the long-term (Polster, 2009).

Some of the most basic processes of primary succession, as noted by Bradshaw (2000) are: (1) immigration and establishment of appropriate species, which can be improved by strategically planting species to minimize dispersion distances and prepare the growing surfaces to assist in germination success, (2) stabilization and accumulation of fine-textured soil, which may be accomplished by applying growth media and large woody debris to coarse ground, and (3) soil nitrogen accumulation, which can be assisted by planting nitrogen-fixing species.

Appropriate efforts made during the planning stage to address the processes described above can reduce both the application and maintenance costs of erosion control. Erosion control prescriptions suitable for specific land disturbance areas can also enhance the natural recovery process. Table 2.1-1 indicates some limiting factors that may impede natural recovery, solutions that occur naturally to overcome these obstacles, and general options for strategies to enhance or induce natural solutions. Note that many of these principles overlap those of effective erosion prevention.

Table 2.1-1 List of Limiting Factors that Impede Natural Recovery Process

Obstacle	Natural Solution	Enhanced Solution
Steep slopes	Erosion occurs until slopes are stable; pockets of growth in areas of collected organic matter.	Recontour slopes; strategically select locations for planting or application of erosion control blanket.
Rapid erosion	Rough and loose surfaces; large woody debris; vegetative covers that minimize erosion.	Mechanically roughen up surfaces, apply large woody debris, select species mixes for quick establishment and effective ground cover.
Compaction	Vegetation and weathering promotes decompaction.	Mechanically roughen up surfaces.
Moisture deficit	Weathering to small particle sizes.	Apply growth media and/or engineered mulch.



Obstacle	Natural Solution	Enhanced Solution
Nutrient deficiency	Nitrogen fixing pioneering species.	Apply growth media and or mulch, select nutrient fixing species, fertilize.
Lack of seed sources	Pioneering species with widely dispersed seed.	Pocket planting to provide seed sources over large areas.
Lack of micro-sites	Rough and loose surfaces.	Mechanically roughen up surfaces.

\*Modified from Polster (2009).

## 2.2 General Construction Approach

The SEPSCP focusses on the use of source control measures to prevent sediment from getting entrained in surface water runoff and the use of sediment control measures to manage construction affected water.

The ESC measures outlined in Table 2.2-1 have been selected for general application to construction of the major components of the Project. Selected mitigation measures may be applied individually or combined to deliver the required level of ESC. For higher risk and higher consequence works (e.g., constructing access roads, diversion channels, etc.), a multi-barrier or 'systems approach' may be utilized, in which a combination of ESC measures are combined in series to reduce potential for sediment transport. Adaptive ESC material selection in the field will be dependent on local site conditions, schedule, weather, and available equipment and manpower.

Table 2.2-1: Work Activity, Potential Erosion Hazard and Associated ESC Measures

Type of Work	Potential Hazard	Possible ESC Measures (Best Management Practices)
Disturbed soils (grading, cut and fill)	<ul style="list-style-type: none"> <li>Splash, sheet, rill and wind erosion; and sediment transport off-site.</li> </ul>	<ul style="list-style-type: none"> <li>Limit size of disturbed area to the extent practical.</li> <li>Minimize time of exposure of disturbed soils.</li> <li>Runoff to be directed away from exposed soil surfaces or into contained areas, when practical.</li> <li>Areas of exposed soil to be covered and re-vegetated (if needed) as soon as possible following construction completion or before winter shut down in preparation for freshet (typically by mid-September).</li> <li>Isolate areas of disturbance as needed using fibre roll logs.</li> <li>Use downgradient sediment traps (sumps) to capture runoff and allow settling.</li> <li>Work will stop or be redirected to accommodate heavy rainfall events when the site shows signs of deterioration.</li> <li>ESC measures will be inspected daily and checked after rain events (&gt;10 mm) and repaired as required. The structures will be cleaned out when sediment has accumulated.</li> </ul>
Construction Dewatering	<ul style="list-style-type: none"> <li>Rill and gully erosion and sediment transport off-site.</li> <li>Entrained sediments during pumping associated with dewatering.</li> </ul>	<ul style="list-style-type: none"> <li>Dewatering discharge to outlet onto an energy dissipation splash pad or into a pond (e.g. the Tailings Storage Facility, TSF) to reduce discharge velocity.</li> <li>Dewatering discharge into a pond (e.g. the TSF) or to run through a sediment filter log or a vegetated area or both to reduce suspended solids.</li> <li>Discharge location shall be a minimum of 30 m from any natural watercourse.</li> </ul>



Type of Work	Potential Hazard	Possible ESC Measures (Best Management Practices)
	<ul style="list-style-type: none"> <li>Increase instream turbidity.</li> </ul>	<ul style="list-style-type: none"> <li>Instream isolation method will avoid earthen berm. Appropriate isolation method will be discussed and agreed with QP-ESC.</li> <li>Construct any ditches, water bars, or water diversions within the work area so they do not directly discharge sediment-laden surface flows into any stream. Divert such flows into a pond (e.g. the TSF) or to a vegetated area where flows can slowly infiltrate.</li> <li>Monitor instream turbidity visually as needed when construction activity is within proximity of any watercourse or waterbody including wetlands.</li> <li>Implement sedimentation sump/trap or discharge into pond/TSF.</li> </ul>
Traffic and equipment maintenance	<ul style="list-style-type: none"> <li>Track out.</li> <li>Dust generation.</li> <li>Soil compaction.</li> </ul>	<ul style="list-style-type: none"> <li>Gravel armour key high construction traffic exit areas.</li> <li>Dust suppression with water, calcium chloride, or polymers (as required).</li> <li>Prevent unacceptable damage to soils by using swamp mats, wood pads or work when the soil is frozen.</li> </ul>

Erosion prevention is the most effective measure. The emphasis of ESC prescriptions should strive to prevent erosion, with sediment control as the last resort. Types of control strategies that will be employed are listed in Table 2.2-2.

Table 2.2-2 General ESC Control Strategies Applied at Johnny Mountain Mine

Control Strategy	Application
Limit Exposure of Bare Soil	The timing of construction activities will be phased to avoid large areas of disturbance. Construction activities will be planned to coincide with periods of drier weather (i.e. summer). Disturbance in areas that do not require clearing will be restricted.
	To the extent practical, the Contractor/Owner will minimize disturbance of existing vegetation as a first defense in the control of erosion and sediment release. Areas of highly erodible soils will be avoided.
	Machinery will be operated on land in a manner that minimizes disturbance to existing named and unnamed watercourses or ephemeral streams.
Keep Construction Work Areas Dry	Surface water flowing toward construction work areas shall be diverted to keep the construction area dry. Perimeter diversion swales will be considered and implemented, as required, to divert surface water to a designated area(s).
	Muddy water pumped from excavation work areas will be held (stored) in designated areas prior to its discharge into sediment sumps, the TSF or natural vegetated areas. Work will stop or be redirected to accommodate a heavy rainfall event (approx. 20 mm for 24 hours period) or when the site shows signs of deterioration.
Protection of Watercourses	All watercourses will be identified and disturbance adjacent to them will be avoided. Buffer zones will be applied where disturbance is planned in the vicinity of restricted riparian areas and environmentally sensitive areas. Turbidity monitoring will be conducted according to existing Permit requirements.

Control Strategy	Application
	<p>If unsuitable surface water conditions are encountered in wetlands or at ephemeral streams, work locations may be moved to avoid locations where surface water is an issue; work may be postponed until later in the year when ephemeral surface water has subsided; or activity in work areas may be temporarily halted if work is not feasible due to surface water.</p> <p>Stockpiles of borrow material will be kept a minimum of 30m from a watercourse or waterbody with the appropriate erosion control mitigation in place (e.g., sediment control fibre roll logs, erosion control blankets and/or silt fences to prevent sediment from entering a watercourse or waterbody).</p>
Soil Stockpiles	<p>If soil stockpiles are in environmentally sensitive areas and will be on site for more than 72 hours, they shall be covered in plastic sheeting (minimum thickness 8 mm) or rolled erosion control product (RECP) to protect them from wind, rain, and contact with surface water flow.</p>
Soil and Slope Protection	<p>All areas with steep slopes will be examined closely prior to stripping to ensure accurate work limits are established.</p> <p>The rough and loose surface technique will be applied will be applied to exposed soils in a timely manner.</p> <p>Fibre roll logs will be considered as a sediment control measure at the base of excavated slopes, fills, stockpiles, and borrow areas until vegetative cover is established. Such measures will be placed down slope of the exposed soil areas to intercept the maximum amount of silt contained in runoff.</p>
Avoid cutting steep slopes	<p>Erosion occurs on steep slopes until they are stabilized. Where possible, steep slopes will be recontoured to reduce the slope steepness. Alternatively, methods to reduce the length of the slope will be used (e.g., bench, terrace, drainage control).</p>
Install appropriate perimeter controls	<p>Runoff interception ditches and sediment control traps will be installed as needed prior to ground disturbance activities.</p>
Install Drainage Control Measures	<p>Drainage ditches, riprap, check dams and sediment ponds will be implemented, where appropriate.</p> <p>All practical precautions shall be made to ensure that sediment does not get entrained in surface water discharge flowing to ephemeral or permanent streams.</p>
Ensure site personnel are familiar with the SEPSCP	<p>Contractors and equipment operators will be educated on the SEPSCP.</p>
Monitoring	<p>Event-based visual effectiveness monitoring will be conducted during spring freshet and after large rainstorms. Any damage to control measures will be assessed and modified accordingly. Regular inspections to ensure that control measures are intact and functioning will be carried out.</p> <p>Sediment control structures to be maintained and cleaned out on a regular basis to remain functional. Erosion and sediment control measures shall remain in place and functioning until the disturbed areas have been permanently stabilized.</p>



Control Strategy	Application
	Additional contingency measures are likely required during periods of heavy or persistent precipitation. Work must stop if continuing the work will result in sediment delivery downstream of the immediate work site.
	Erosion and sediment control measures will be inspected by the Owner within 24 hours after each rainfall event of more than 15 mm of rain and maintained/repared by the Contractor, as necessary during the construction season.
Contingency plan	Keep extra ESC material and equipment onsite to repair and correct situations as needed.
Modify the plans as required	The control plans will be adaptable to variable site conditions and modified accordingly.

### 2.3 Erosion and Sediment Control Product List

A comprehensive ESC products list has been provided in Table 2.3-1.

Table 2.3-1 Erosion and Sediment Control Product List

Product	Components	General Description	Potential Uses
Fibre roll logs	Woven Geotextile / stakes	Preassembled woven geotextile mounted to 1.2 m stakes.	Toe of slope of stockpiles or berms containing exposed soils. Downgradient of exposed soil on slopes where rainfall could entrain and transport sediment. Can also be used to construct check dams. See Figure 1.
Rock Check Dams	75 - 300 mm diameter, clean rock	Non-woven geotextile required for core.	Installed in drainage ditches to slow velocity of water and allow entrained sediment to settle upstream of the check dam. See Figure 1.
Coir Logs	20 cm Diameter	Log manufactured from coconut fibres which is staked into the ground.	Same purpose as a silt fence. Requires embedment thus minimizes ground disturbance and effort required for installation. Larger diameter logs should be used to protect ecologically sensitive areas, or to provide basic filtration of water draining from larger areas of exposed soil. Can also be used to construct check dams. See Figure 1.
Erosion Control Blanket	Rolled erosion control blanket (Coir or Straw)	Erosion control blanket made of either coir or straw materials and provided in a roll which can be rolled out to cover exposed soil.	Slopes can be stabilized with erosion control blanket to minimize erosion. Also used in channels which will be exposed to water flow before vegetation establishment.
Riprap	Riprap	As per project specifications.	Steep slopes can be immediately stabilized with riprap to minimize erosion and ensure long-term stability.



Product	Components	General Description	Potential Uses
Clean Gravel	25 mm washed stone	Washed stone.	Used for construction of berms, winter installation of silt fence, temporary cover, etc.
Geotextile	Class I Non-Woven 2 m wide roll	Class I Non-Woven Geotextile. (OPSS 1860)	Used for lining rock check dams or construction of silt fence.

## 2.4 Erosion and Sediment Control Construction Inspection Points

Key construction inspection points for ESC are shown below (Table 2.4-1) and on Figure 2. This allows for quality assurance inspections and a temporary hold on a specific construction activity until an inspection is passed. Wood will inspect ESC measures during periods when personnel are onsite. The Contractor and SnipGold site supervisor will conduct regular inspections throughout the remainder of the project and report findings to Wood for preparation of the annual report as required by Permit PR-7927.

Table 2.4-1 Erosion and Sediment Inspection Point Table

ESC Requirement:	Prior to proceeding with this:
ESC contingency supplies ordered, and inventoried on site.	Construction start.
Surface water management measures.	Construction start.
Baseline ESC prescription development. Provide field map (if required) and instructions to site supervision.	Site specific ESC measure installation and construction start.
Wood review and verification of ESC measures.	Finalization of ESC prescriptions during pre-construction site inspection.
Wood and Contractor inspection of ESC measures, including identification of repairs or maintenance required.	Ongoing. ESC measures to be modified throughout construction as required.
Re-inspect ESC measures after significant rainfall events and identify repairs and remedial measures.	Ongoing.

## 2.5 Phasing of Construction and Intended Sequence of Major Activities

The following is a suggested construction phasing list to be implemented by the Contractor when planning construction activities for the Johnny Mountain Main Landfill upgrades:

1. Identify applicable cut/fill phasing of grading activities. SnipGold will work with Wood to establish a grading plan so that large areas are not cleared without the provision of adequate erosion and sediment control measures.
2. Prepare Erosion and Sediment Control Plan drawings and details for erosion and sediment control measures prescribed for the site (if needed).
3. Install strategic ESC measures (fibre roll logs, silt fence, erosion control blankets and check dams) downgradient of active construction work areas as required.

4. Construct temporary diversion and drainage swales to direct water to designated area(s) and stabilize as required.
5. If spoil stockpiles are in environmentally sensitive areas and are intended to remain in place longer than 72 hours, the stockpile soil will be covered with appropriate materials to prevent erosion and or dust formation.
6. It is anticipated that the SEPSCP would need to be revisited throughout the Construction phase to ensure that controls are being implemented correctly and that adjustments to the plan can be made following heavy rainfall events, or after major construction segments are completed.
7. Once the conveyance ditches are completed and commissioned, all temporary bypass flows will be re-directed to convey surface water to newly constructed conveyance ditches.
8. Monitor and remove accumulated sediment from traps and temporary measures as needed. Following heavy rainfall events ESC measures will be inspected to ensure effectiveness and maintenance will be conducted as required.
9. Based on inspections conducted by Wood during the construction phase in 2018 and by SnipGold and the Contractor, Wood will assess the effectiveness of prescribed ESC measures. The assessment along with recommended updates to the control measures will be included in the annual report specified in Section 2.13 of the May 2018 amendment to permit PR-7927.

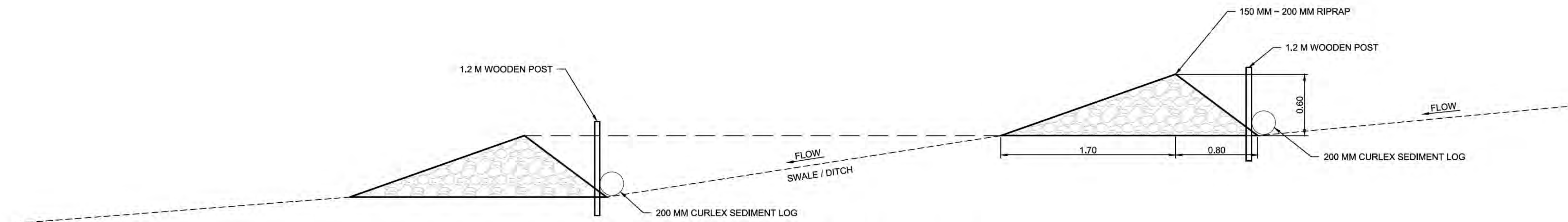
### 3.0 Limitations

The recommended ESC measures presented in this report were selected based on our understanding of current and anticipated site conditions as well as best management practices. The following factors are beyond the control of Wood and may impact the effectiveness of the recommended ESC measures:

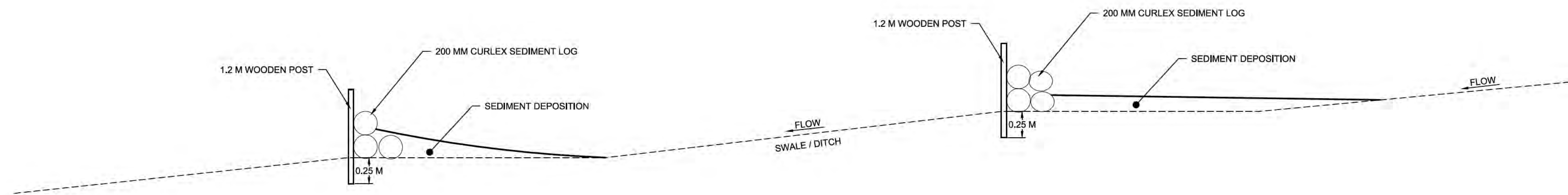
- Improper or incorrect implementation of the recommended ESC measures could hinder the performance of the measures and lead to erosion or sedimentation issues;
- Non-adherence to the recommendations contained in this report could result in soils left un-stabilized, areas prone to erosion left unprotected, or TSS laden water to discharge from the site due to insufficient settlement or filtration;
- Extreme rainfall, in excess of the 1 in 10-year annual exceedance probability (AEP) event, could yield runoff in excess of the flow rates that could reasonably be anticipated for a relatively short construction window scheduled during summer months; and
- Conditions encountered in the field may require changes to the design including steeper gradients or alternative water management strategies, which may require additional or more robust ESC measures to limit erosion or sedimentation issues.

### References

- Bradshaw, A. 2000. The use of natural processes in reclamation — advantages and difficulties. *Landscape and Urban Planning*, 51: 89-100.
- Polster, D., 2009. *Natural Processes: The Application of Natural Systems for the Reclamation of Drastically Disturbed Sites*. Proceedings of the 33rd Annual British Columbia Mine Reclamation Symposium. Cranbrook, BC. Technical and Research Committee on Reclamation. BC Ministry of Energy, Mines and Petroleum Resources. September 14-17, 2009.



**TYPICAL DETAIL ROCK CHECK DAM**  
NTS



**TYPICAL DETAIL CURLEX SEDIMENT LOG CHECK DAM**  
NTS

**SNIPGOLD CORP**

**wood.**  
Environment & Infrastructure Solutions  
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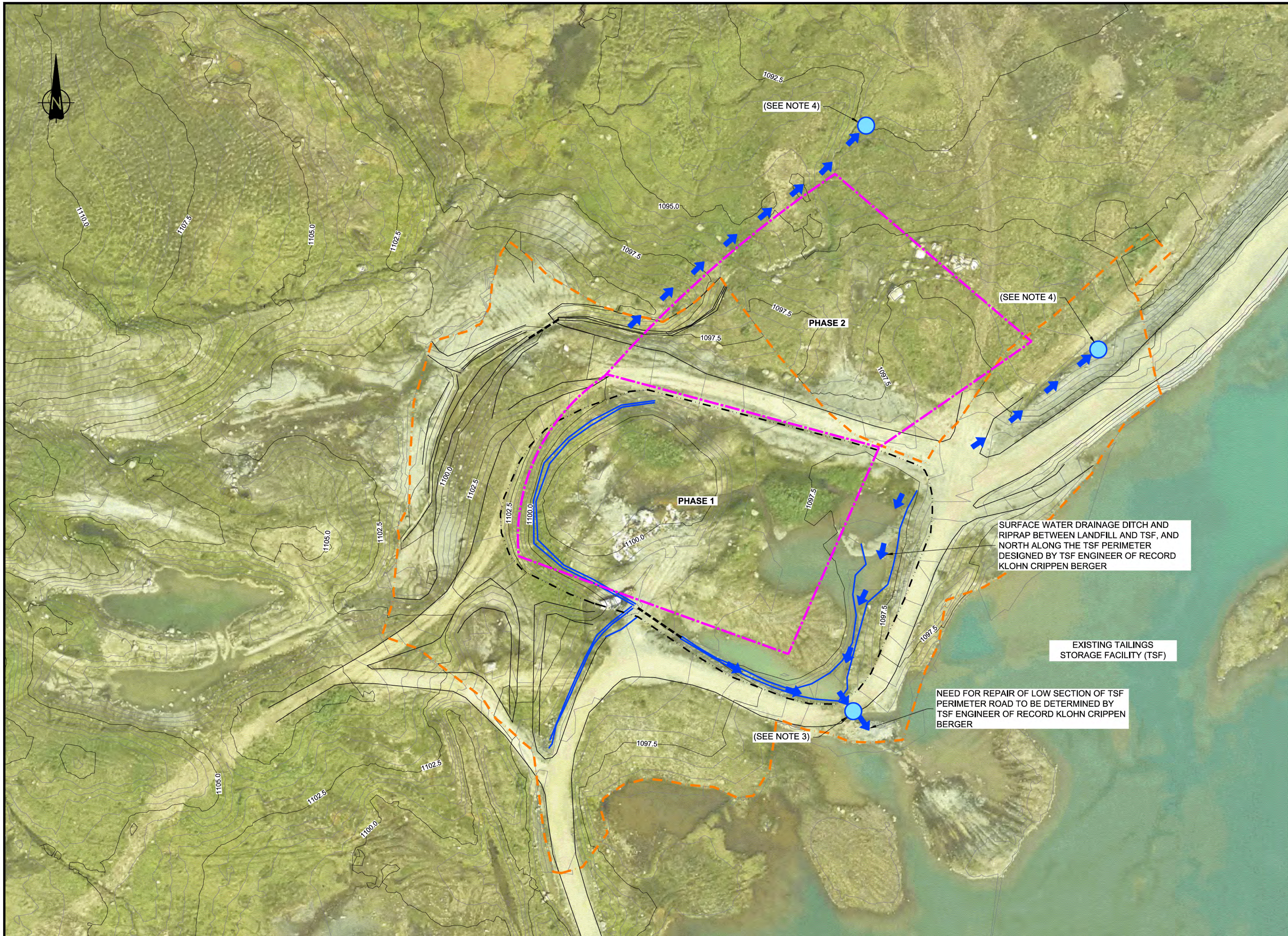
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REVIEWED BY: DW  
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PROJECTION: -  
SCALE: AS SHOWN

**JOHNNY MOUNTAIN MINE RECLAMATION PLAN**  
**EROSION AND SEDIMENT CONTROL PLAN**

TITLE: **CHECK DAM DETAILS**

DATE: DEC. 2018  
PROJECT No.: VE52656B.001.02  
DRAWING No.: FIGURE 1  
REV. No.: 0  
SHEET No.: 1 of 2





- LEGEND**
- 201/8/2019 PROJECT BOUNDARY
  - ➔ EXISTING DITCH FLOW
  - EXISTING CULVERT
  - EXISTING BASE OF DITCH
  - LIDAR/FIELD TOPO MERGE LINE
  - LANDFILL BOUNDARY
  - KEY EROSION AND SEDIMENT CONTROL POINTS

- NOTE:**
1. DRAWING BASED ON 2017 LIDAR TOPOGRAPHY MERGED WITH 2018 FIELD SURVEY PROVIDED BY ALLNORTH.
  2. SEDIMENT AND EROSION CONTROL MEASURES TO BE RESPONSIBILITY OF CONTRACTOR. ROCK AND/OR CURLEX SEDIMENT LOG CHECK DAMS TO BE USED AS NEEDED AS PER EROSION AND SEDIMENT CONTROL PLAN.
  3. ALL PHASE 1 SURFACE WATER TO BE DISCHARGED TO TSF.
  4. PHASE 2 SEDIMENT AND EROSION CONTROL MEASURES TO USE ROCK AND/OR CURLEX LOG CHECK DAMS AS NEEDED.

SURFACE WATER DRAINAGE DITCH AND RIPRAP BETWEEN LANDFILL AND TSF, AND NORTH ALONG THE TSF PERIMETER DESIGNED BY TSF ENGINEER OF RECORD KLOHN CRIPPEN BERGER

EXISTING TAILINGS STORAGE FACILITY (TSF)

NEED FOR REPAIR OF LOW SECTION OF TSF PERIMETER ROAD TO BE DETERMINED BY TSF ENGINEER OF RECORD KLOHN CRIPPEN BERGER

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 REVIEWED BY: DW  
 DATUM: -  
 PROJECTION: -  
 SCALE: AS SHOWN

**JOHNNY MOUNTAIN MINE RECLAMATION PLAN**  
**EROSION AND SEDIMENT CONTROL PLAN**

**KEY EROSION AND SEDIMENT CONTROL POINTS**

DATE: DEC. 2018  
 PROJECT No.: VE52655B.001.02  
 DRAWING No.: FIGURE 2  
 REV. No.: 0  
 SHEET No.: 2 of 2



**wood.**

**Appendix D**  
**Limitations**





## Limitations

1. The work performed in the preparation of this report and the conclusions presented are subject to the following:
  - a. The Standard Terms and Conditions which form a part of our Professional Services Contract;
  - b. The Scope of Services;
  - c. Time and Budgetary limitations as described in our Contract; and
  - d. The Limitations stated herein.
2. No other warranties or representations, either expressed or implied, are made as to the professional services provided under the terms of our Contract, or the conclusions presented.
3. The conclusions presented in this report were based, in part, on visual observations of the Site and attendant structures. Our conclusions cannot and are not extended to include those portions of the Site or structures, which are not reasonably available, in Wood's opinion, for direct observation.
4. The environmental conditions at the Site were assessed, within the limitations set out above, having due regard for applicable environmental regulations as of the date of the inspection. A review of compliance by past owners or occupants of the Site with any applicable local, provincial or federal bylaws, orders-in-council, legislative enactments and regulations was not performed.
5. The Site history research included obtaining information from third parties and employees or agents of the owner. No attempt has been made to verify the accuracy of any information provided, unless specifically noted in our report.
6. Where testing was performed, it was carried out in accordance with the terms of our contract providing for testing. Other substances, or different quantities of substances testing for, may be present on-site and may be revealed by different or other testing not provided for in our contract.
7. Because of the limitations referred to above, different environmental conditions from those stated in our report may exist. Should such different conditions be encountered, Wood must be notified in order that it may determine if modifications to the conclusions in the report are necessary.
8. The utilization of Wood's services during the implementation of any remedial measures will allow Wood to observe compliance with the conclusions and recommendations contained in the report. Wood's involvement will also allow for changes to be made as necessary to suit field conditions as they are encountered.
9. This report is for the sole use of the party to whom it is addressed unless expressly stated otherwise in the report or contract. Any use which any third party makes of the report, in whole or the part, or any reliance thereon or decisions made based on any information or conclusions in the report is the sole responsibility of such third party. Wood accepts no responsibility whatsoever for damages or loss of any nature or kind suffered by any such third party as a result of actions taken or not taken or decisions made in reliance on the report or anything set out therein.
10. This report is not to be given over to any third party for any purpose whatsoever without the written permission of Wood.

11. Provided that the report is still reliable, and less than 12 months old, Wood will issue a third-party reliance letter to parties that the client identifies in writing, upon payment of the then current fee for such letters. All third parties relying on Wood's report, by such reliance agree to be bound by our proposal and Wood's standard reliance letter. Wood's standard reliance letter indicates that in no event shall Wood be liable for any damages, howsoever arising, relating to third-party reliance on Wood's report. No reliance by any party is permitted without such agreement.

APPENDIX E            2020 REPORT FOR EMA PERMIT PE-8415



**SNIPGOLD**  
A SUBSIDIARY OF SEABRIDGE GOLD INC.

## Johnny Mountain Mine

### Annual Report for 2020: *Environmental Management Act* Permit PE-8415

March 2021

Project No.: 0539378-0002



March 2021

# Johnny Mountain Mine

## Annual Report for 2020: *Environmental Management Act* Permit PE-8415

Company Name: SnipGold Corp.

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## EXECUTIVE SUMMARY

This document is the 2020 annual report prepared in accordance with the conditions of the *Environmental Management Act* Permit PE-8415 for the Johnny Mountain Mine. This document was prepared in consideration of requirements in *Technical Guidance 4: Annual Reporting under the Environmental Management Act, A Guide for Mines in British Columbia (ENV 2016)*.

The Johnny Mountain Mine is a past producing underground gold mine located in the Coast Mountain Range of British Columbia (BC), approximately 100 km NW of Stewart, BC. The underground mine has been closed since 1993, and reclamation activities have taken place sporadically on the site from 1999 to 2015. Currently there are three provincial permits associated with the site: *Mines Act* Reclamation Permit M-178, *Environmental Management Act* effluent Permit PE 8415, and *Environmental Management Act* refuse Permit PR-7927. Permit PE-8415 was last amended on June 10, 2019, to address performance and maintenance of works as well as emergency procedures.

The objective of this document is to comply with the requirements in Section 4 of Permit PE-8415 as follows:

*The permittee must, on or before March 31 that occurs during the term of this authorization, submit an annual report for the preceding calendar year ... and includes, but is not limited to:*

- a. A review and interpretation of the monitoring data for the preceding calendar year,*
- b. An evaluation of the laboratory analysis, and quality and precision based on the results of the quality assurance program required herein,*
- c. An evaluation of the performance of the treatment works and identify any changes,*
- d. An implementation schedule for any alterations to the treatment and disposal works which may impact the discharge under this authorization.*

In 2020, monitoring requirements in Permit PE-8415 were met for the five authorized discharges (JM1, JM2, JM3, JM4, and JM5) and two additional sampling site locations (JM6 and JM7).

Four authorized discharges (JM1, JM2, JM3, and JM4) have narrative authorized discharge characteristics described in conditions 1.2.2 and 1.3.2 of Permit PE-8415. The authorized discharge characteristics for JM1, JM2, and JM3 are “typical of leachate that has passed through inert waste rock” and the authorized discharge characteristics of JM4 is “typical of groundwater seepages coming from #10 level portal”. For the purpose of assessment of 2020 monitoring data against the authorized discharge characteristics, “typical” is defined as the 95th percentile of data from the preceding 10 years (2010 to 2019).

In 2020, the characteristics of discharge from sampling site JM1, JM2, and JM3 were typical of leachate which has passed through inert waste rock. The characteristics of discharge from sampling site JM4 were typical of groundwater seepages coming from #10 level portal. Dissolved copper and dissolved zinc concentrations at sampling site JM5 (sampling site location for the authorized discharge of effluent from the tailings storage facility) were better than (i.e., lower than) the maximum concentrations specified in the authorized discharge characteristics in Condition 1.1.2 of Permit PE-8415. No changes to the authorized treatment works occurred in 2020.



## QUALIFIED PROFESSIONAL STATEMENT

I am a qualified professional with the knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the *Johnny Mountain Mine Environmental Management Act Permit PE-8415 Annual Report*. I have prepared or reviewed report content for all sections of this *Annual Report for 2020: Environmental Management Act Permit PE-8415*.

Prepared and reviewed by:



---

Wade Brunham, M.Sc., R.P.Bio.

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## GLOSSARY AND ABBREVIATIONS

ALS	ALS Laboratory
ARR	Annual Reclamation Report
BLM	Biotic Ligand Model
BC	British Columbia
DL	Analytical detection limit
EMA	<i>Environmental Management Act</i>
ENV	British Columbia Ministry of Environment and Climate Change Strategy
FAL	Freshwater Aquatic Life
RPD	Relative Percent Difference
RTEC	RTEC, a joint venture company between ERM Consultants Canada Ltd. (ERM) and the Tahltan Nation Development Corporation (TNDC).
SnipGold	SnipGold Corp., a subsidiary of Seabridge Gold Inc. Acquired the Iskut exploration land package, including the closed Johnny Mountain Mine Site on June 21, 2016.
TSF	Tailings Storage Facility (TSF) or Tailings Pond. Referred to as the Tailings Impoundment or Tailings Pond in Permit PE-8415, referred to as the Tailings Storage Facility in Permit M-178.
QA/QC	Quality Assurance/Quality Control
WQG	Water Quality Guideline

## 1. INTRODUCTION

This document is the 2020 annual report prepared in accordance with the conditions of the *Environmental Management Act (EMA) Permit PE-8415* for the Johnny Mountain Mine. This document was prepared in consideration of *Technical Guidance 4: Annual Reporting under the Environmental Management Act, A Guide for Mines in British Columbia*.

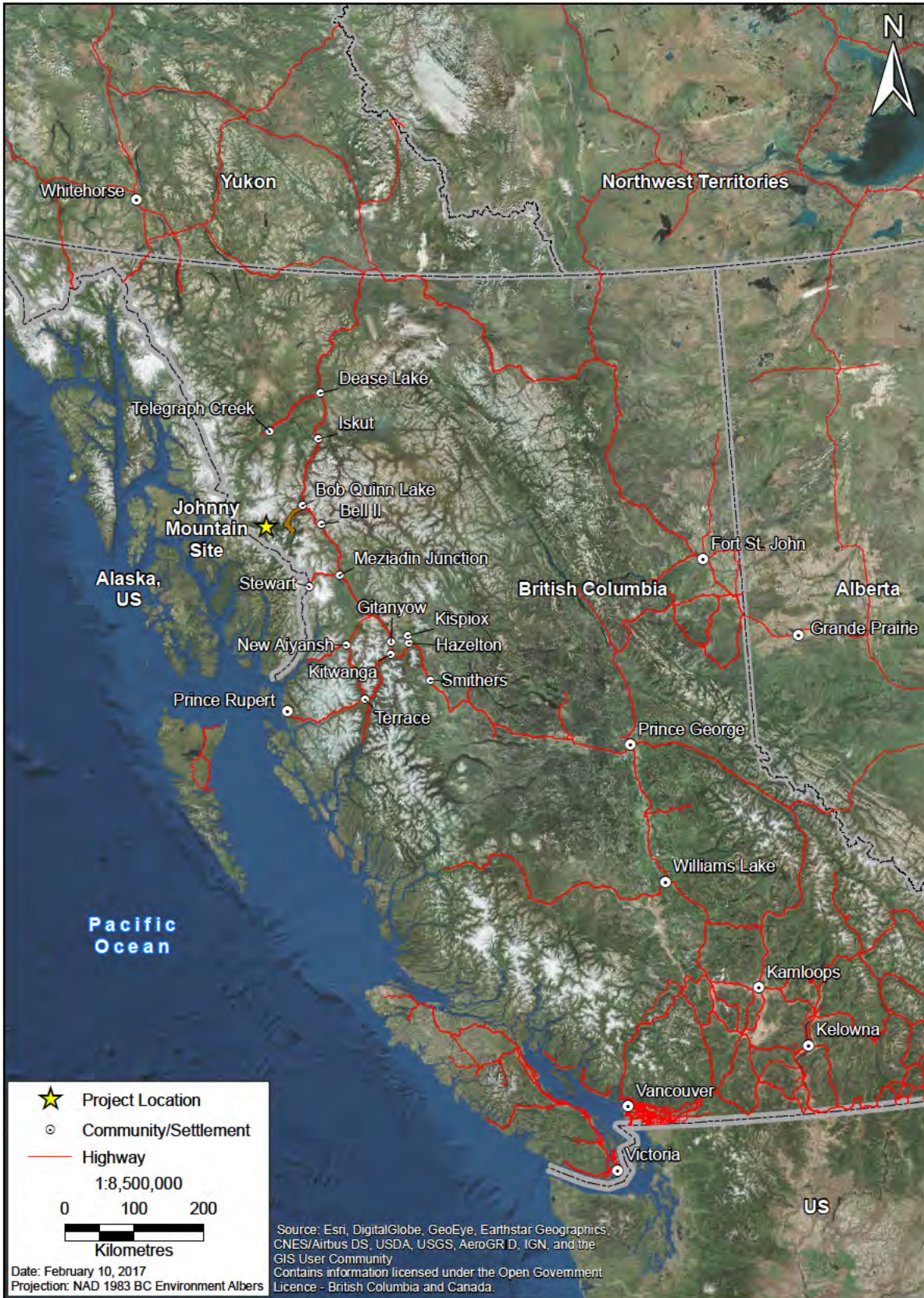
The Johnny Mountain Mine is a past producing underground gold mine located in the Coast Mountain Range of British Columbia (BC), approximately 100 km northwest of Stewart, BC (Figure 1-1). The underground mine has been closed since 1993, and reclamation activities have taken place sporadically on the site from 1999 to 2015. Currently there are three provincial permits associated with the site: *Mines Act Reclamation Permit M-178*, *EMA effluent Permit PE-8415*, and *EMA refuse Permit PR-7927*. Permit PE-8415 was last amended on June 10, 2019, to address performance and maintenance of works as well as emergency procedures.

This document was prepared according to the requirements in Section 4 of Permit PE-8415 as follows:

*The permittee must, on or before March 31 that occurs during the term of this authorization, submit an annual report for the preceding calendar year ... and includes, but is not limited to:*

- a. A review and interpretation of the monitoring data for the preceding calendar year,*
- b. An evaluation of the laboratory analysis, and quality and precision based on the results of the quality assurance program required herein,*
- c. An evaluation of the performance of the treatment works and identify any changes,*
- d. An implementation schedule for any alterations to the treatment and disposal works which may impact the discharge under this authorization.*

**Figure 1-1**  
**Project Location**



## 2. DESCRIPTION OF MINE RECLAMATION ACTIVITIES AND DISCHARGES

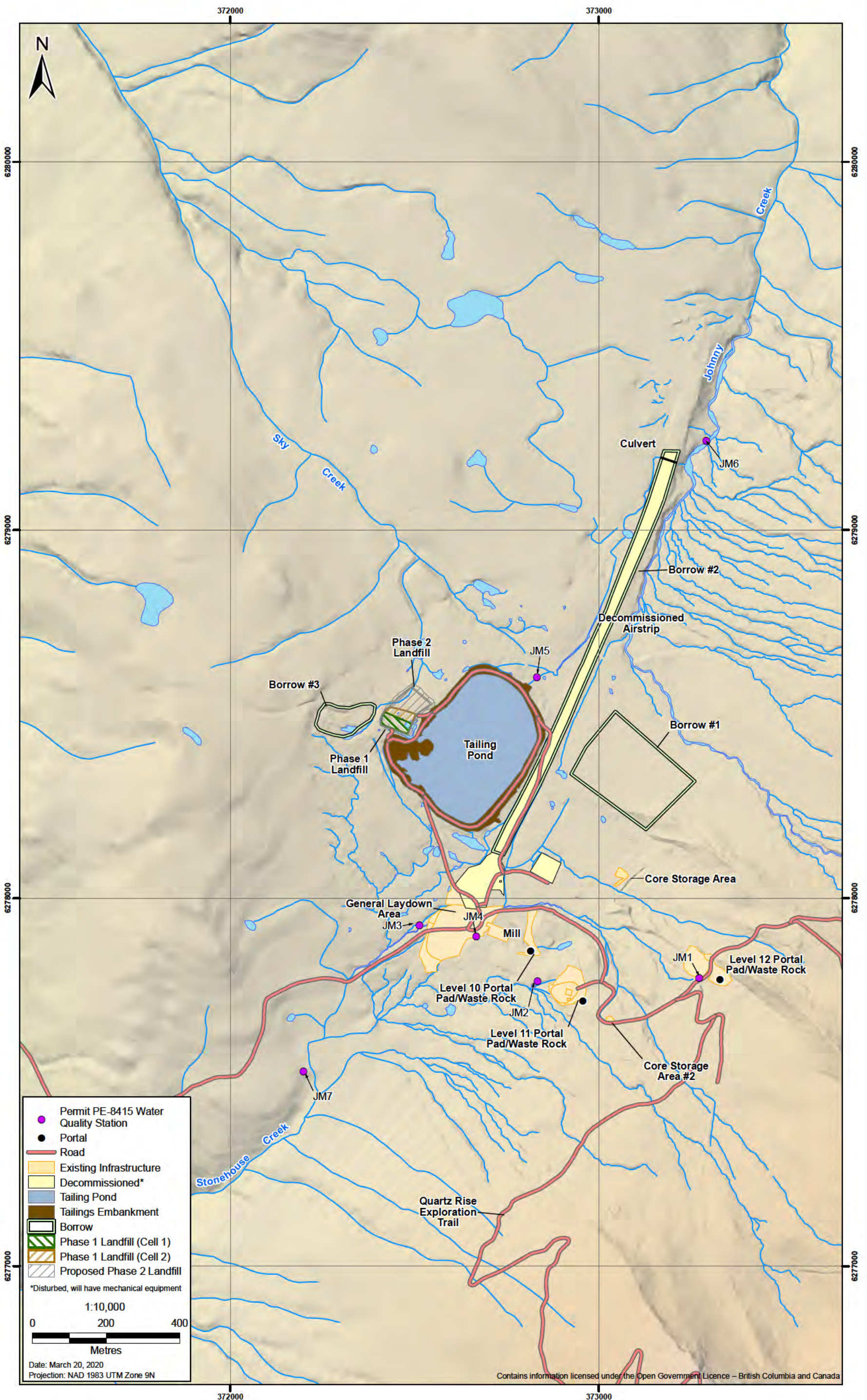
At the Johnny Mountain Mine, three streams originate and drain from the plateau: Johnny Creek (drains to the north-northeast, and enters Bronson Creek); Stonehouse Creek (drains to the southwest, and enters the Craig River); and Sky Creek (drains to the northwest, and enters the Craig River). Below the plateau Bronson Creek drains to the Iskut River. Stonehouse Creek and Sky Creek drain into the Craig River, then into the Iskut River, which eventually drains into the Stikine River, which flows west to the Pacific Ocean. There are fish barriers on Johnny Creek (at the confluence with Bronson Creek - 3 km downstream of the mine), Stonehouse Creek (3 km downstream of the mine), and Sky Creek (4 km downstream of the mine), which prevent fish from accessing the site (RTEC 2017a, 2017b).

The tailings storage facility (TSF) is located in the upper Johnny Creek watershed and passively drains over a spillway to a tributary of Johnny Creek. The closed underground mine is in the upper Stonehouse Creek watershed. Seepage from the closed and reclaimed #10 level portal passively drains to Stonehouse Creek. Seepage from waste rock piles at the #10, #11, and #12 portals passively discharges to ground and to Stonehouse Creek.

The location of authorized discharges and water quality stations and closed mine facilities are shown in Figure 2-1.

Due to the COVID-19 pandemic in 2020 and the associated health and safety risks, activities outlined in the *2020 Project Execution Plan* (SnipGold 2020) for the non-operating Johnny Mountain mine site were deferred. On site activities in 2020 were limited to compliance related requirements associated with **SnipGold's Mines Act Permit M-178**, EMA Permit PR-7927 and EMA Permit PE-8415. The plan to move waste rock into the TSF in 2020 was postponed to 2021.

Figure 2-1  
Permit PE-8415 Water Quality Sampling Stations





### 3. SURFACE WATER QUALITY MONITORING AND DATA ANALYSES

#### 3.1 Surface Water Quality Monitoring Program

Surface water quality samples were collected in 2020 in accordance with Section 3 of Permit PE-8415.

In 2020, monitoring requirements in Permit PE-8415 were met for the five authorized discharges (JM1, JM2, JM3, JM4, and JM5), two additional sampling site locations (JM6 and JM7), and two quality assurance/quality control (QA/QC) samples (JM8 and JM9; see Section 5).

Figure 2-1 shows the locations of stations sampled in 2020. Table 3.1-1 provides the locations, including site reference numbers and GPS coordinates, descriptions, and applicable authorized discharge characteristics.

Table 3.1-1: Surface Water Quality Monitoring and Authorized Discharge Characteristics under Permit PE-8415

Station	Easting	Northing	EMS #	Description	Authorized Discharge Characteristics	Authorized Discharge Rates
JM1	373272	6277784	E216683	12-Level Waste Rock Seepage	The characteristics of the discharge must be typical of leachate, which has passed through inert waste rock	Indeterminate
JM2	372834	6277774	E213931	11-Level Waste Rock Seepage		
JM3	372514	6277926	E236846	10-Level Waste Rock Seepage		
JM4	372668	6277897	E213930	Mine Water Discharge at 10 (represents minewater from all levels)	The characteristics of the discharge must be typical of groundwater seepages coming from #10 level portal	Indeterminate
JM5	372832	6278600	E207745	Tailings pond discharge	0.05 mg/L dissolved copper maximum 0.2 mg/L dissolved zinc maximum	
JM6	373292	6279242	E207735	Johnny Creek at end of Johnny Flats	N/A	
JM7	372199	6277529	E207737	Stonehouse Creek	N/A	N/A
JM8	N/A	N/A	N/A	Duplicate sample from any one of the sampling stations	N/A	N/A
JM9	N/A	N/A	N/A	Travel blank	N/A	N/A

Note: N/A = Not Applicable

#### 3.2 Surface Water Quality Monitoring Methodology

Water quality samples were collected on August 23 and 24, 2020, following guidance in *British Columbia Field Sampling Manual* (ENV 2013). Water samples were collected for the parameters specified in Table 1 of Permit PE-8415 (pH, hardness, sulphate, dissolved copper, dissolved iron, and dissolved zinc). Samples were collected by facing upstream and submersing the lab certified clean sample bottles below the surface until filled. Samples collected for dissolved metals analysis were filtered in the

field. After collection, samples were kept cool (4°C) until analysis by ALS Laboratories (Burnaby, BC). The certificates of analysis are included in Appendix B.

### 3.3 Surface Water Quality Data Analysis

#### 3.3.1 Data Management

Data management, analysis, and graphing were completed using the statistical software program R (R Development Core Team 2020). For data analysis, measurements below the realized detection limit (DL) were replaced with half the realized DL. Duplicate samples were averaged for graphing and analysis. These data manipulations are in accordance with *Technical Guidance 4: Annual Reporting under the Environmental Management Act, A Guide for Mines in British Columbia* (ENV 2016).

#### 3.3.2 Data Analysis: Water Quality Assessment

Observed water quality results for the required parameters at each of the sampling locations were compared to authorized discharge characteristics which include maximum concentrations (JM5) or narrative limits. Four authorized discharges (JM1, JM2, JM3, and JM4) have narrative authorized discharge characteristics described in conditions 1.2.2 and 1.3.2 of Permit PE-8415. The authorized discharge characteristics for JM1, JM2, and JM3 are “typical of leachate that has passed through inert waste rock” and the authorized discharge characteristics of JM4 is “typical of groundwater seepages coming from #10 level portal”. For the purpose of assessment of 2020 monitoring data against the authorized discharge characteristics, “typical” is defined as the 95<sup>th</sup> percentile of data from the preceding 10 years (2010 to 2019)<sup>1</sup>.

Observed water quality was further compared to British Columbia Freshwater Aquatic Life Water Quality Guidelines (BC FAL WQG). These comparisons included identifying parameters that approach or are greater than BC FAL WQG. BC FAL WQG are not authorized discharge limits and do not represent an assessment of compliance with permit conditions related to authorized discharge characteristics. These comparisons were made to provide a general characterization of the local non-fish-bearing mine site area.

For the purposes of the results discussion, water quality samples were compared to the applicable guideline on a sample-by-sample basis. QA/QC replicates were treated as one sample represented by the average concentration of the replicate samples. For guidelines that incorporate toxicity modifying factors, the sample specific concentrations of the applicable factor was used to set the guideline limit.

The “long-term chronic” guidelines were used for initial comparisons. Long-term guidelines are the most restrictive; consequently, if concentrations were below long-term guidelines for a parameter, no further investigation was necessary. Where concentrations were above long-term chronic guidelines or if long-term chronic guidelines did not exist, the short-term acute guidelines were used.

The dissolved copper FAL WQGs (acute and chronic) were updated in August 2019 and are computed using Biotic Ligand Model (BLM) software (BC ENV 2019b). The major factors influencing copper toxicity, and therefore guideline values, are dissolved organic carbon, water hardness, pH, and alkalinity. Sample-specific water chemistry was used to calculate sample-specific dissolved copper FAL WQGs as described in the *BC BLM User’s Manual* (BC ENV 2019c). Inorganic carbon input was assumed

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<sup>1</sup> ENV (2016) suggests that the last 10 years’ of data be included for identification of trends. This recommendation was followed for specifying the historical record for defining narrative limits. The temporal trend analysis used available data after the cessation of operations (i.e., 1994 to present) in order to have sufficient observations to support statistical analyses. Data from mine operations through to present was included on graphs in order to visually identify changes in water quality over time.

to be controlled as a closed system using total alkalinity. The BLM software options were set to "quick normalization – only the most sensitive organisms were normalized to site chemistry" for both the acute and chronic guidelines. Hardness and dissolved zinc do not have a BC FAL WQG. The WQG used for this report are compiled in Appendix F.

### 3.3.3 *Data Analysis: Temporal Trends*

A temporal trend is defined as a marked increase or decrease in the concentration of a parameter as a function of a defined period of time. A temporal trend analysis was conducted at the sampling site locations on the dataset after mine closure, from 1994 to 2020 for the parameters in Table 1 of Permit PE-8415 (dissolved iron, dissolved copper, dissolved zinc, pH, sulphate, and hardness).

Temporal trends were evaluated using the non-parametric seasonal Mann-Kendall test for trend (Hirsch et al. 1982). This method tests for statistically significant monotonic (i.e., continuously increasing or decreasing) trends over time that are not dependent on a normal distribution. The Mann-Kendall test was conducted using the annual compliance sampling event (i.e., August) within each year of the dataset.

The results of the seasonal Mann-Kendall trend test are represented by Mann-Kendall's tau coefficient (a ranked-based measure of association), Thiel slope (an increasing trend has a positive slope, a decreasing trend has a negative slope), and p-value (the probability of observing the monotonic trend if the null hypothesis (i.e.,  $H_0$  = concentration is independent of time) is true).

For each water quality monitoring location and water quality parameter, a temporal trend was identified as statistically significant if the p-value was less than 0.05, indicating a less than 5% probability of concluding a trend exists when there is no actual trend.

## 4. SURFACE WATER QUALITY MONITORING RESULTS

Section 4.1 compares observed water quality at the five authorized discharges with the authorized discharge characteristics as per Condition 1 of Permit PE-8415. Section 4.2 extends the discussion from assessment of compliance with authorized discharge characteristics into interpretations and conclusions about water quality, including comparisons with BC WQG AL and trend analysis at JMM.

Water quality results and field data for 2020 are tabulated in Appendix A. A cumulative dataset from 2009-2020 is provided in Appendix E.

### 4.1 Assessment of Compliance with Condition 1 of Permit PE-8415

In 2020, monitoring requirements in Permit PE-8415 were met for the five authorized discharges (JM1, JM2, JM3, JM4, and JM5) and two additional sampling site locations (JM6 and JM7).

In 2020, the characteristics of discharge from sampling site JM1, JM2, and JM3 were below the 95<sup>th</sup> percentile of data from the preceding 10 years (2010 to 2019; Tables 4.1-1 to 4.1-3). Therefore, water quality at stations JM1, JM2, and JM3 was considered typical of leachate which has passed through inert waste rock.

In 2020, the characteristics of discharge from sampling site JM4 were below the 95<sup>th</sup> percentile of data from the preceding 10 years (2010 to 2019; Table 4.1-4). Therefore, water quality at stations JM4 was considered typical of groundwater seepages coming from #10 level portal.

In 2020, dissolved copper and dissolved zinc concentrations at sampling site JM5 were better than (i.e., lower than) the maximum concentrations specified in the authorized discharge characteristics in Condition 1.1.2 of Permit PE 8415 (Table 4.1-5).

### 4.2 Interpretation of Water Quality Monitoring Results

#### 4.2.1 Johnny Creek

Sampling sites JM5 and JM6 are in the Johnny Creek drainage. Water quality monitoring results for parameters in Table 1 of Permit PE-8415 are presented in Tables 4.2-1 to 4.2-2 and Figures 4.2-1 to 4.2-6.

##### 4.2.1.1 Comparison to Water Quality Guidelines and Historical Record

An assessment of compliance with authorized discharge characteristics for sampling site location JM5 is presented in Section 4.1.

In 2020, dissolved copper (0.00128 mg/L) concentrations at JM5 were higher than the BC long-term chronic and BC short-term acute FAL WQGs but lower than the 95<sup>th</sup> percentile of the 2010 to 2019 dataset (Table 4.2-1; Figure 4.2-4; Appendix F). The other parameters were within BC FAL WQGs. In 2020, pH (6.66) at JM5 was below the range of the 2010 to 2019 dataset.

In 2020, at JM6, concentrations of parameters in Table 1 of Permit PE-8415 were within BC FAL WQGs and within the range of the 2010 to 2019 dataset (Table 4.2-2; Appendix F)

**Table 4.1-1: Water Quality Summary Statistics at Station JM1**

Parameter (unit)	Range of Detection Limit	2010 to 2019 Water Quality									2020 Result
		Number of Samples	Standard Deviation	Standard Error	Min	5 <sup>th</sup> Percentile	Mean	Median	95 <sup>th</sup> Percentile	Max	
pH (pH units)	0.1	10	0.422	0.133	6.63	7.12	7.78	7.89	8.09	8.12	7.56
Hardness as CaCO <sub>3</sub> (mg/L)	0.5 - 0.6	10	51.6	16.3	28.1	34.1	79.0	49.3	164	177	40.5
Sulphate (mg/L)	0.3 - 0.5	10	27.2	8.62	6.56	8.29	31.3	14.8	72.4	76.7	9.18
Copper, dissolved (mg/L)	0.0002 - 0.001	10	0.0140	0.00443	0.00104	0.00113	0.00756	0.00159	0.0299	0.0465	0.00136
Iron, dissolved (mg/L)	0.01 - 0.03	10	0.00422	0.00133	0.00500	0.00500	0.0130	0.0150	0.0150	0.0150	<0.010
Zinc, dissolved (mg/L)	0.001 - 0.005	10	0.133	0.0420	0.00250	0.00250	0.0937	0.00505	0.323	0.368	0.0032

**Notes:**

*Measurements below the realized detection limit (DL) were replaced with half the realized DL.*

*Duplicate samples were averaged to avoid more than one sample counted towards a certain day.*

*Weekly samples were averaged to avoid more than one sample counted towards a certain month.*

*No 2020 concentrations were greater than the 95th percentile value associated with the 2010 to 2019 period of record.*

**Table 4.1-2: Water Quality Summary Statistics at Station JM2**

Parameter (unit)	Range of Detection Limit	2010 to 2019 Water Quality									2020 Result
		Number of Samples	Standard Deviation	Standard Error	Min	5 <sup>th</sup> Percentile	Mean	Median	95 <sup>th</sup> Percentile	Max	
pH (pH units)	0.1	10	1.01	0.321	4.84	5.89	7.57	7.91	8.26	8.29	7.2
Hardness as CaCO <sub>3</sub> (mg/L)	0.5 - 0.6	10	79.2	25.0	121	135	208	195	340	409	41.4
Sulphate (mg/L)	0.3 - 1.5	10	101	31.9	70.0	70.9	150	136	310	407	9.33
Copper, dissolved (mg/L)	0.0002 - 0.001	10	0.641	0.203	0.00283	0.00993	0.351	0.118	1.34	2.13	<0.00020
Iron, dissolved (mg/L)	0.01 - 0.03	10	0.00886	0.00280	0.00500	0.00905	0.0164	0.0150	0.0288	0.0400	0.014
Zinc, dissolved (mg/L)	0.001 - 0.005	10	0.353	0.112	0.00150	0.00200	0.216	0.125	0.757	1.19	<0.0010

**Notes:**

*Measurements below the realized detection limit (DL) were replaced with half the realized DL.*

*Duplicates were averaged to avoid more than one sample counted towards a certain day.*

*Weekly samples were averaged to avoid more than one sample counted towards a certain month.*

*No 2020 concentrations were greater than the 95th percentile value associated with the 2010 to 2019 period of record.*

Table 4.1-3: Water Quality Summary Statistics at Station JM3

Parameter (unit)	Range of Detection Limit	2010 to 2019 Water Quality									2020 Result
		Number of Samples	Standard Deviation	Standard Error	Min	5 <sup>th</sup> Percentile	Mean	Median	95 <sup>th</sup> Percentile	Max	
pH (pH units)	0.1	10	1.22	0.385	4.16	5.85	7.62	7.99	8.09	8.11	7.57
Hardness as CaCO <sub>3</sub> (mg/L)	0.5 - 0.6	10	53.9	17.1	42.4	52.0	93.4	80.4	177	239	78.7
Sulphate (mg/L)	0.3 - 0.5	10	74.6	23.6	9.54	11.8	49.7	29.2	160	260	30.9
Copper, dissolved (mg/L)	0.0002 - 0.001	10	0.748	0.236	0.000472	0.000988	0.242	0.00462	1.31	2.37	0.0215
Iron, dissolved (mg/L)	0.01 - 0.03	10	0.0304	0.00962	0.00500	0.00500	0.0305	0.0150	0.0786	0.0873	0.018
Zinc, dissolved (mg/L)	0.001 - 0.005	10	0.258	0.0817	0.00150	0.00222	0.0911	0.00675	0.473	0.826	0.0261

Notes:

Measurements below the realized detection limit (DL) were replaced with half the realized DL.

Duplicates were averaged to avoid more than one sample counted towards a certain day.

Weekly samples were averaged to avoid more than one sample counted towards a certain month.

No 2020 concentrations were greater than the 95<sup>th</sup> percentile value associated with the 2010 to 2019 period of record.

Table 4.1-4: Water Quality Summary Statistics at Station JM4

Parameter (unit)	Range of Detection Limit	2010 to 2019 Water Quality									2020 Result
		Number of Samples	Standard Deviation	Standard Error	Min	5 <sup>th</sup> Percentile	Mean	Median	95 <sup>th</sup> Percentile	Max	
pH (pH units)	0.1	10	1.74	0.549	3.70	3.99	7.29	8.13	8.24	8.27	6.81
Hardness as CaCO <sub>3</sub> (mg/L)	0.5 - 0.6	10	62.5	19.8	74.1	116	221	240	282	299	115
Sulphate (mg/L)	0.3 - 0.5	10	24.0	7.60	98.8	99.8	131	134	166	183	85.5
Copper, dissolved (mg/L)	0.0002 - 0.001	10	0.596	0.189	0.0256	0.0259	0.260	0.0415	1.22	1.94	0.345
Iron, dissolved (mg/L)	0.01 - 0.03	10	1.12	0.353	0.0150	0.0150	0.542	0.0150	2.65	3.18	0.541
Zinc, dissolved (mg/L)	0.001 - 0.005	10	0.231	0.0732	0.0212	0.0237	0.121	0.0396	0.474	0.775	0.227

Notes:

Measurements below the realized detection limit (DL) were replaced with half the realized DL.

Duplicates were averaged to avoid more than one sample counted towards a certain day.

Weekly samples were averaged to avoid more than one sample counted towards a certain month.

No 2020 concentrations were greater than the 95<sup>th</sup> percentile value associated with the 2010 to 2019 period of record.

Table 4.1-5: Station JM5 Results and Permit Limits, 2020

Parameter	Discharge Limit in Permit PE-8415	2020 Results (August 23)	Comparison with Permit
Dissolved Copper	0.05 mg/L	0.00128 mg/L	Below permit limit
Dissolved Zinc	0.2 mg/L	0.0019 mg/L	Below permit limit

#### 4.2.1.2 Temporal Trend Analysis

Water quality trend analysis results by Mann-Kendall test are presented in Appendix G and summarized in Table 4.2-3.

Dissolved zinc concentrations at station JM5 were identified as having a statistically significant decreasing trend from 1994 to 2020 (Table 4.2-3). However, there has been no substantial decrease in dissolved zinc concentrations in recent years (Figure 4.2-6). Downstream of station JM5, the dissolved zinc concentration at JM6 was higher than observed at JM5 (Figure 4.2-6 and Tables 4.2-1 and 4.2-2) suggesting that authorized discharge is not adversely affecting dissolved zinc concentrations in Johnny Creek.

Sulphate concentrations at station JM6 were identified as having a statistically significant increasing trend from 1994 to 2020 (Table 4.2-3). However, sulphate concentrations at station JM5 did not have a statistically significant trend and sulphate concentrations at JM6 in August 2020 were 2% of the BC FAL WQG suggesting there is no potential for adverse effects to aquatic life due to observed sulphate concentrations in Johnny Creek.

#### 4.2.2 Stonehouse Creek

Sampling sites JM1, JM2, JM3, JM4, and JM7 are in the Stonehouse Creek drainage. Water quality monitoring results for parameters in Table 1 of Permit PE-8415 are presented in Tables 4.1-1 to 4.1-4, Table 4.2-4 and Figures 4.2-7 to 4.2-12.

##### 4.2.2.1 Comparison to Water Quality Guidelines and Historical Record

An assessment of authorized discharge characteristics for sampling site locations JM1, JM2, JM3, and JM4 is presented in Section 4.1.

In 2020, the dissolved copper concentration at JM1 (0.00136 mg/L) was above the BC long-term chronic FAL WQG (0.0002 mg/L) and approaching the BC short-term acute FAL WQG (0.0015 mg/L), but within the range of the 2010 to 2019 dataset (Table 4.1-1; Figure 4.2-10; Appendix F). The other parameters were within BC FAL WQGs and within the range of the 2010 to 2019 dataset.

In 2020, at JM2, concentrations of parameters in Table 1 of Permit PE-8415 were within BC FAL WQGs (Appendix F). Parameters in Table 1 of Permit PE-8415 were within the range of the 2010 to 2019 dataset with the exception of dissolved copper and dissolved iron concentrations which were below the DL (0.00020 mg/L and 0.0010 mg/L, respectively; Table 4.1-2).

In 2020, the dissolved copper concentration at JM3 (0.0215 mg/L) was above the BC long-term chronic (0.0002 mg/L) and the BC short-term acute (0.0008 mg/L) FAL WQGs, but within the range of the 2010 to 2019 dataset (Table 4.1-3; Figure 4.2-10; Appendix F). The other parameters were within BC FAL WQGs and within the range of the 2010 to 2019 dataset.

Table 4.2-1: Water Quality Summary Statistics at Station JM5

Parameter (unit)	Range of Detection Limit	2010 to 2019 Water Quality									2020 Result
		Number of Samples	Standard Deviation	Standard Error	Min	5 <sup>th</sup> Percentile	Mean	Median	95 <sup>th</sup> Percentile	Max	
pH (pH units)	0.1	9	0.453	0.151	6.99	7.00	7.44	7.29	8.16	8.18	6.66
Hardness as CaCO <sub>3</sub> (mg/L)	0.5 - 0.6	9	47.5	15.8	11.1	12.4	44.4	19.0	127	127	23.8
Sulphate (mg/L)	0.3 - 0.5	9	7.36	2.45	5.71	7.47	15.1	12.9	27.1	28.1	13.5
Copper, dissolved (mg/L)	0.0002 - 0.001	9	0.00070	0.00023	0.00050	0.00050	0.00115	0.00084	0.00229	0.00263	0.00128
Iron, dissolved (mg/L)	0.01 - 0.03	9	0.004	0.001	0.005	0.005	0.013	0.015	0.015	0.015	<0.010
Zinc, dissolved (mg/L)	0.001 - 0.005	9	0.0047	0.0016	0.0005	0.0009	0.0044	0.0029	0.0119	0.0163	0.0019

Notes:

Measurements below the realized detection limit (DL) were replaced with half the realized DL.

Duplicates were averaged to avoid more than one sample counted towards a certain day.

Weekly samples were averaged to avoid more than one sample counted towards a certain month.

Table 4.2-2: Water Quality Summary Statistics at Station JM6

Parameter (unit)	Range of Detection Limit	2010 to 2019 Water Quality									2020 Result
		Number of Samples	Standard Deviation	Standard Error	Min	5 <sup>th</sup> Percentile	Mean	Median	95 <sup>th</sup> Percentile	Max	
pH (pH units)	0.1	10	0.184	0.0582	7.37	7.46	7.71	7.70	7.96	8.09	7.63*
Hardness as CaCO <sub>3</sub> (mg/L)	0.5 - 0.6	10	24.6	7.77	20.3	21.2	35.2	29.7	72.0	104	30.7
Sulphate (mg/L)	0.3 - 0.5	10	6.95	2.20	1.99	2.47	6.56	4.63	17.1	26.0	4.83
Copper, dissolved (mg/L)	0.0002 - 0.001	10	0.00326	0.00103	0.00025	0.00025	0.00145	0.00044	0.00630	0.01070	0.00030
Iron, dissolved (mg/L)	0.01 - 0.03	10	0.020	0.006	0.015	0.015	0.023	0.015	0.055	0.078	0.018
Zinc, dissolved (mg/L)	0.001 - 0.005	10	0.0014	0.0005	0.0015	0.0015	0.0032	0.0027	0.0051	0.0053	0.0030

Notes:

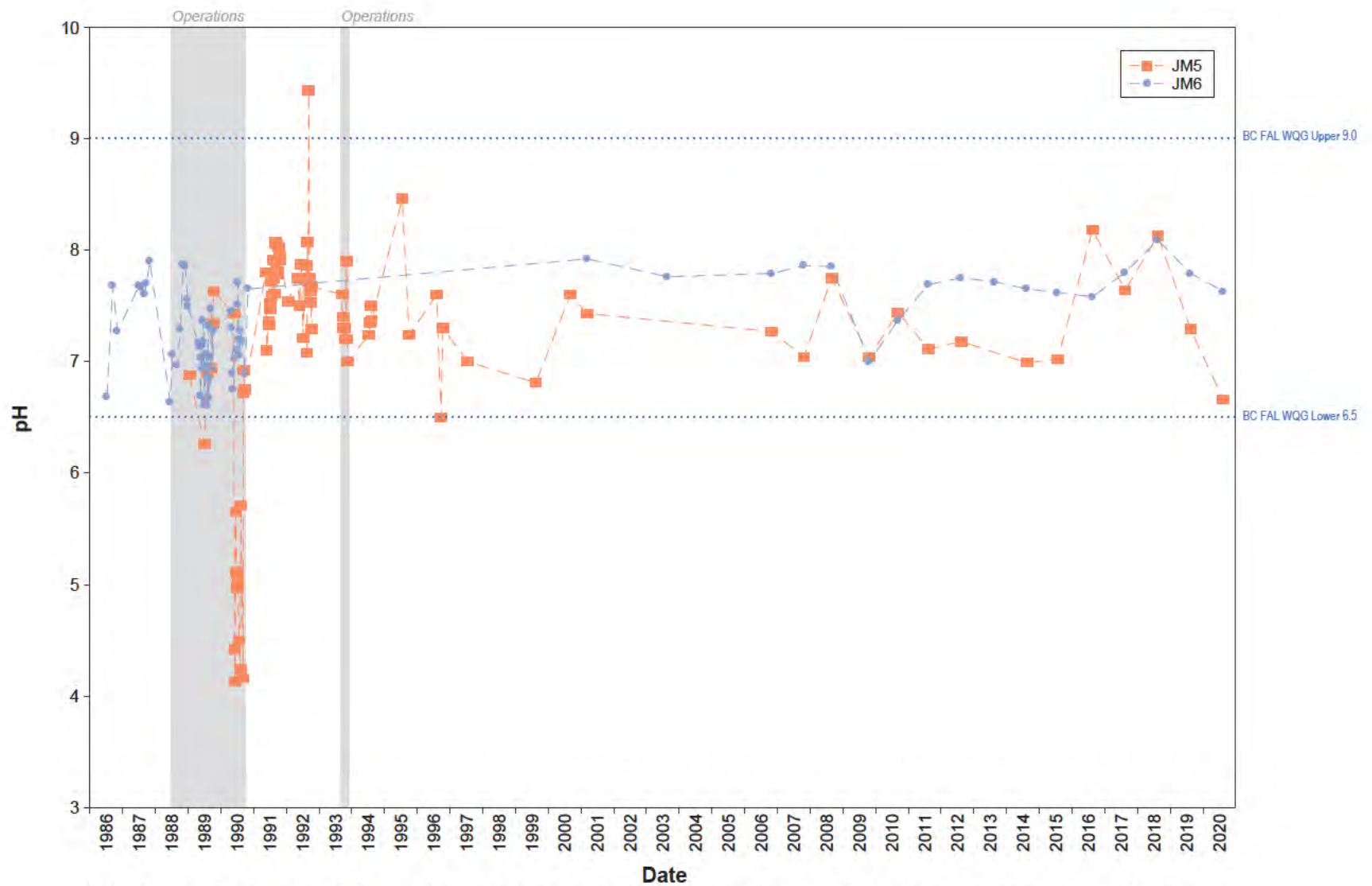
Measurements below the realized detection limit (DL) were replaced with half the realized DL.

Duplicates were averaged to avoid more than one sample counted towards a certain day.

Weekly samples were averaged to avoid more than one sample counted towards a certain month.

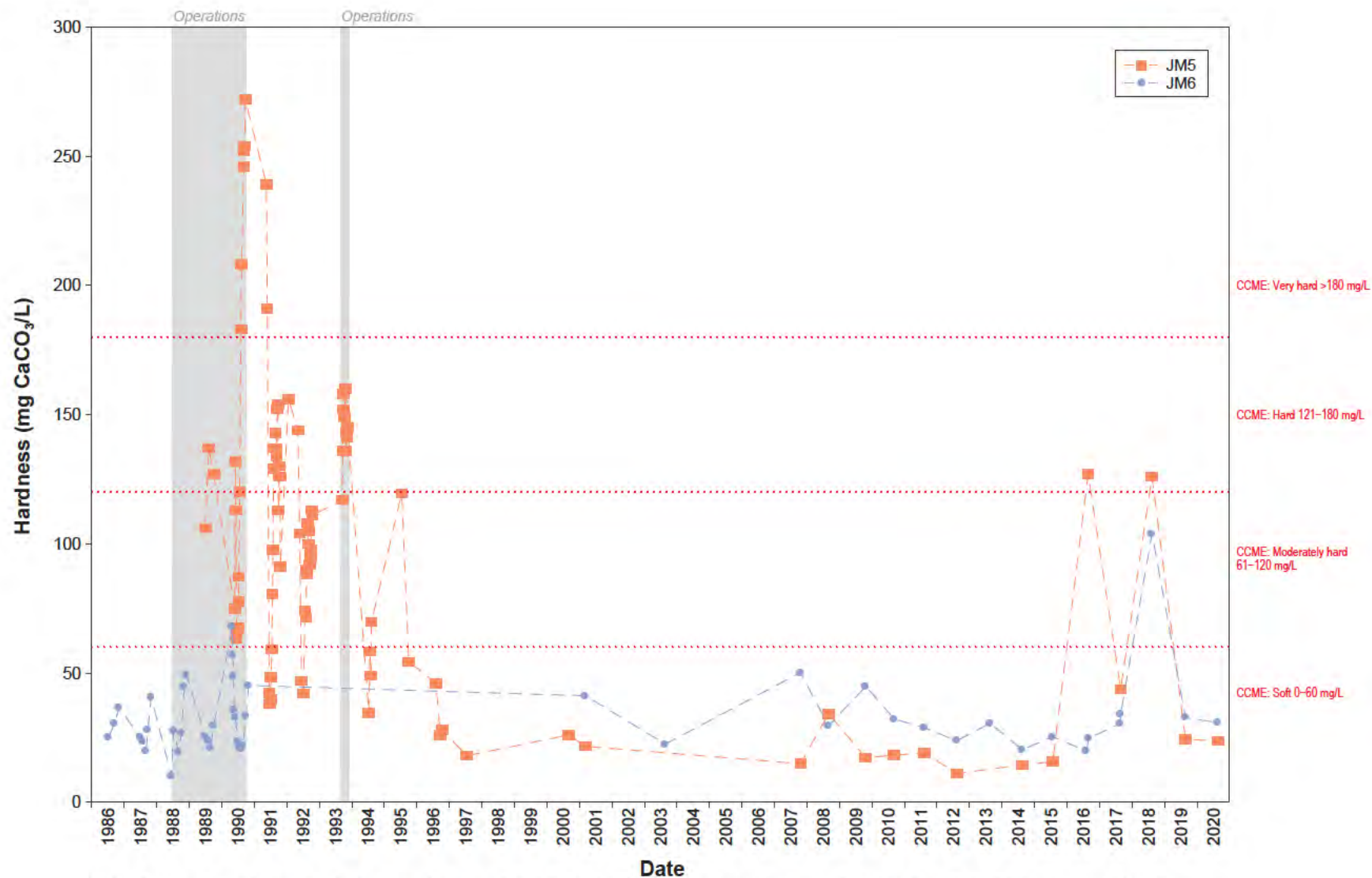
\*ALS reported a loose lid for JM6 general parameters bottle and therefore laboratory pH was missing; value represents field pH.





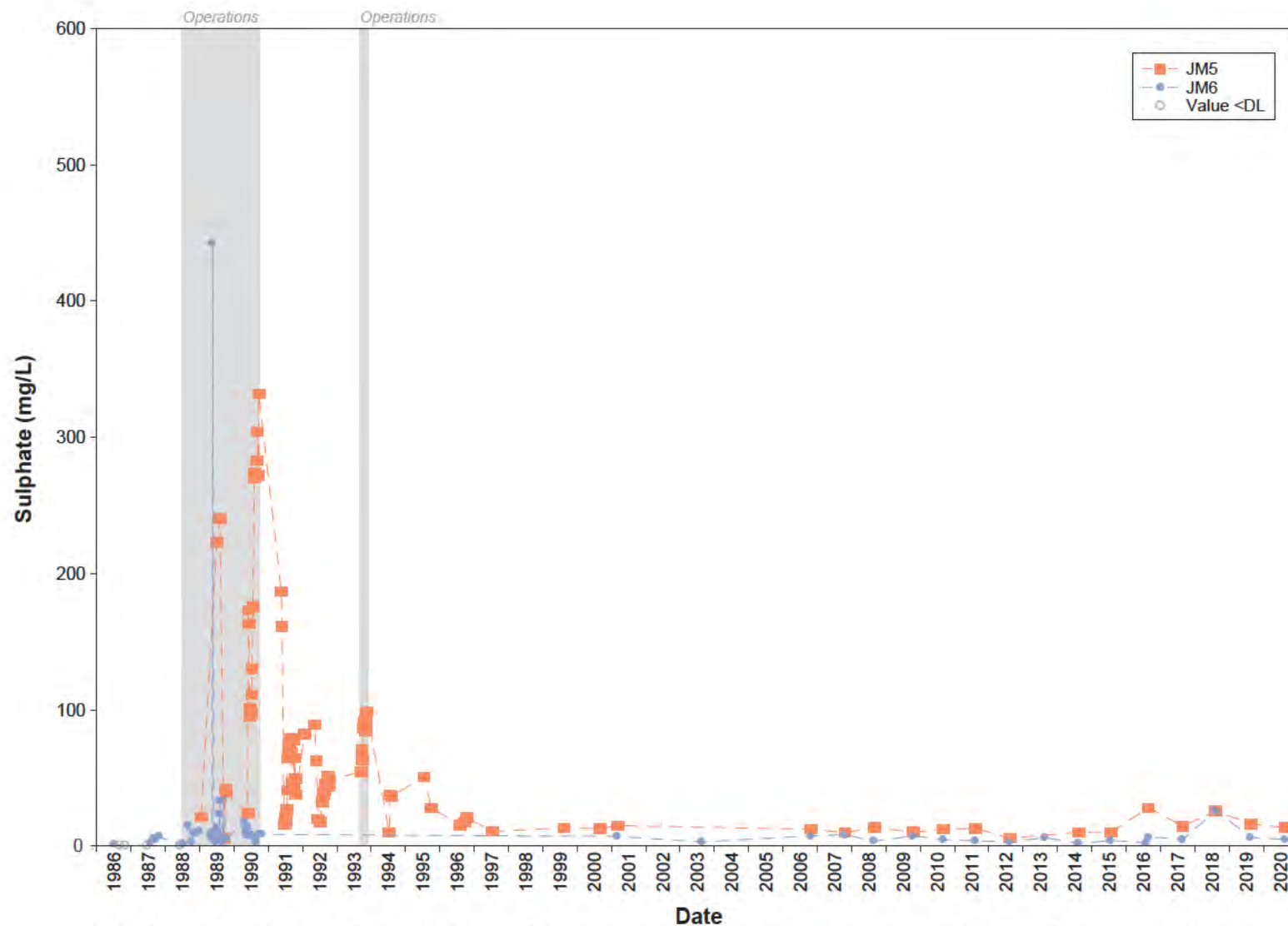
Notes: Concentrations below the detection limit were plotted as half the detection limit. Duplicate samples and August samples collected from 2016 to 2020 were averaged for plotting. Blue dashed lines are BC Fresh Water Aquatic Life Guidelines.

**Figure 3.4-1: pH in Johnny Creek Catchment, 1986 to 2020**



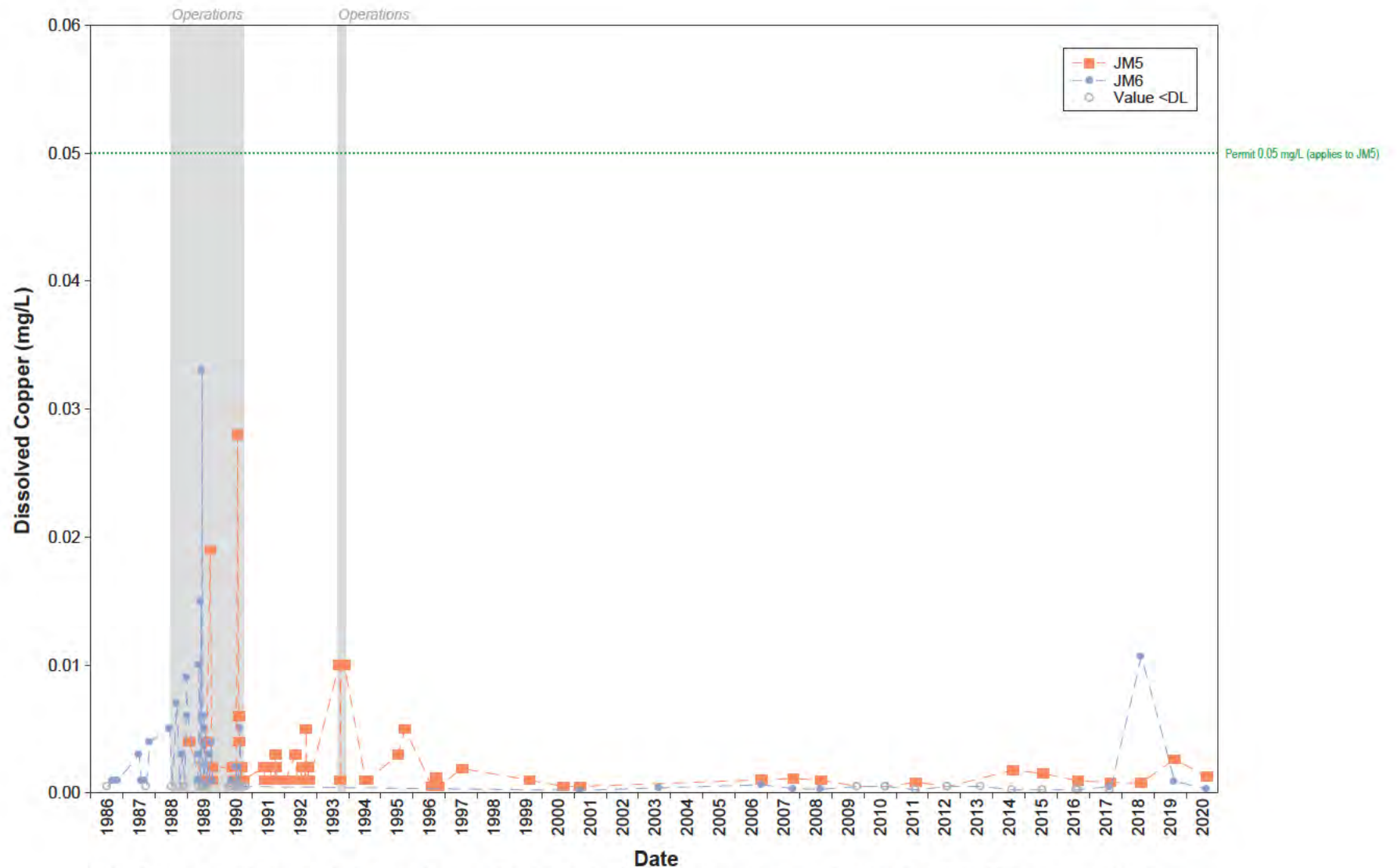
Notes: Concentrations below the detection limit were plotted as half the detection limit. Duplicate samples and August samples collected from 2016 to 2020 were averaged for plotting.

Figure 3.4-2: Hardness in Johnny Creek Catchment, 1986 to 2020



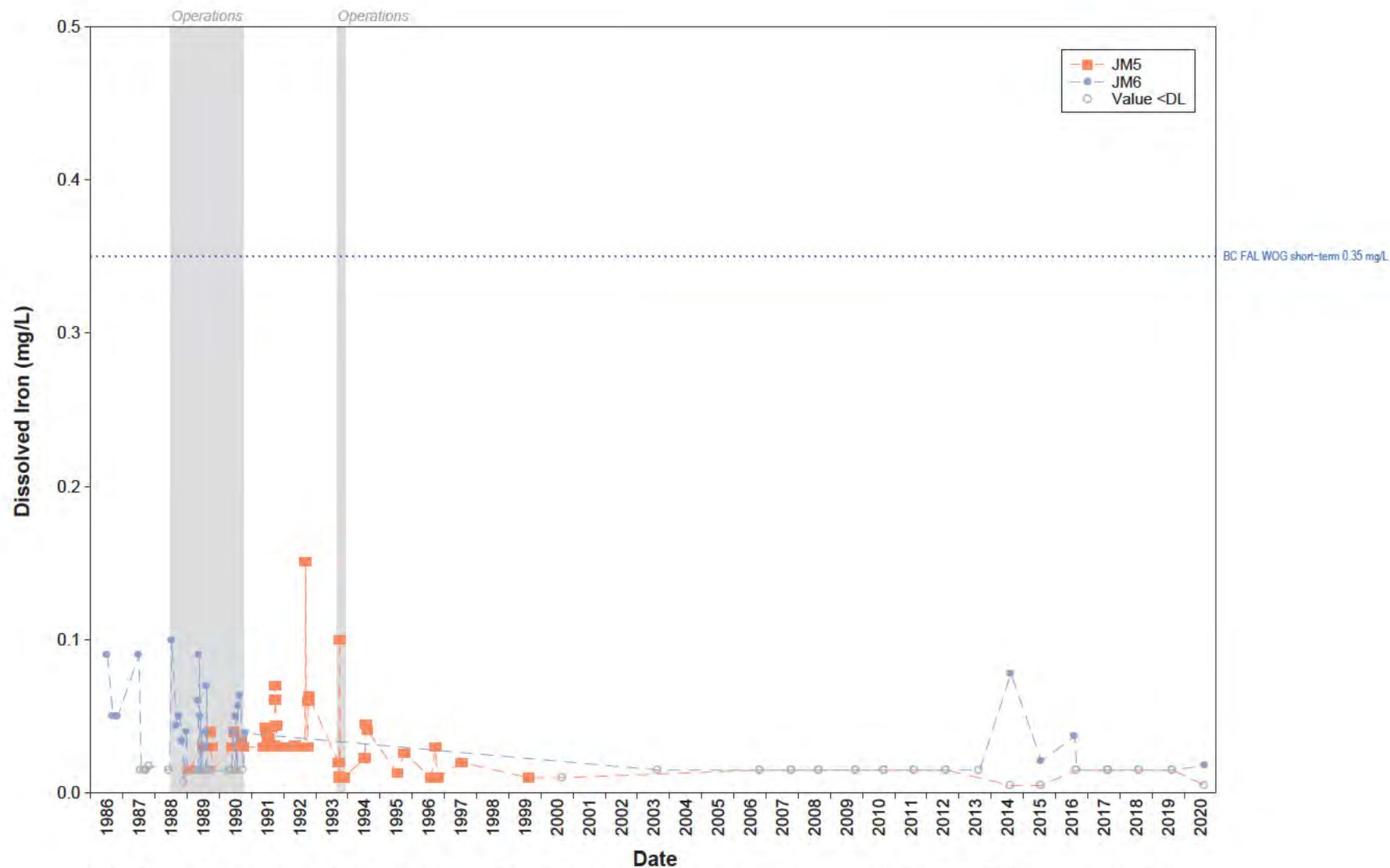
Notes: Concentrations below the detection limit were plotted as half the detection limit. Duplicate samples and August samples collected from 2016 to 2020 were averaged for plotting. BC FAL WQG sulphate guideline is hardness-dependent.

**Figure 3.4-3: Sulphate in Johnny Creek Catchment, 1986 to 2020**



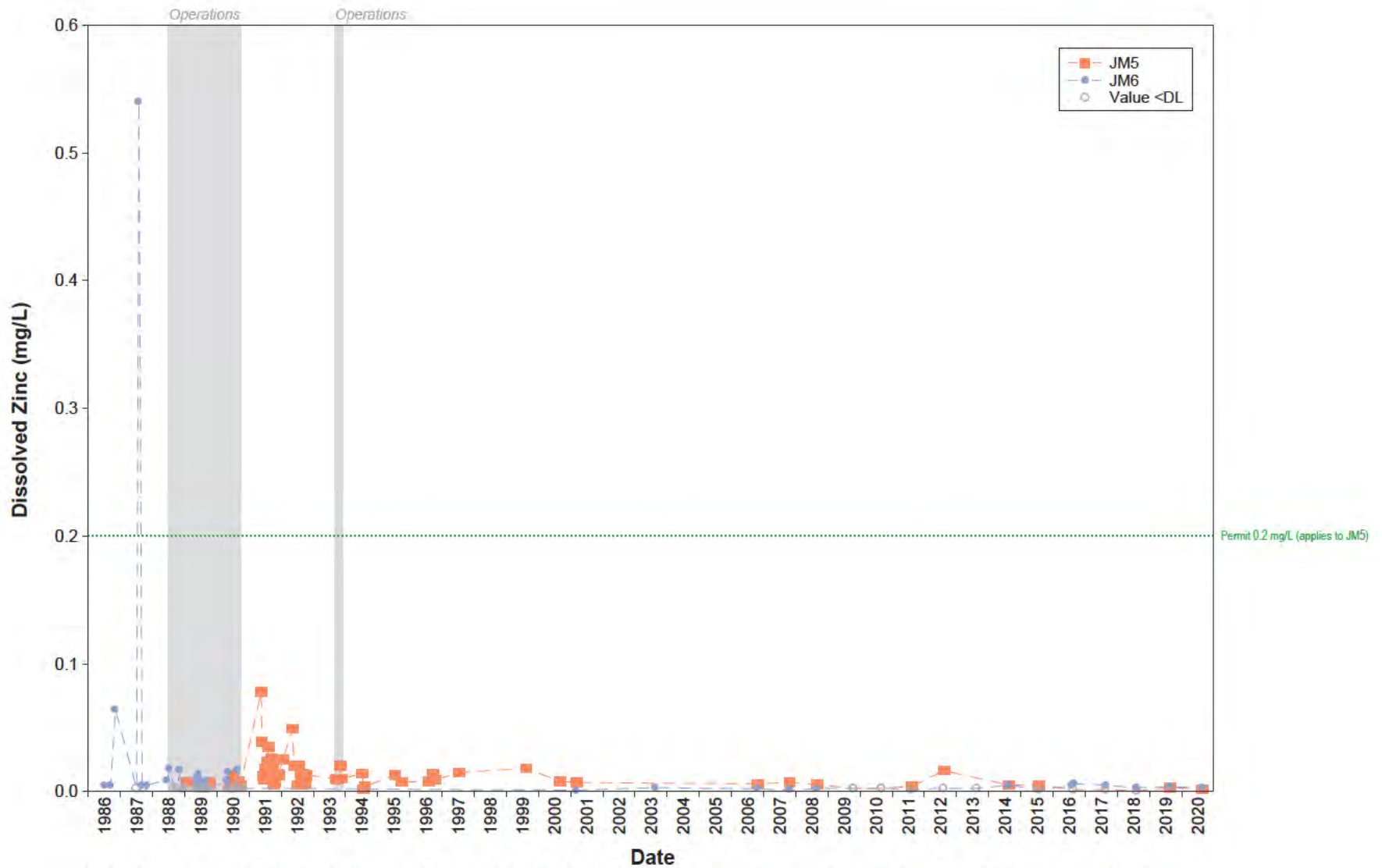
Notes: Concentrations below the detection limit were plotted as half the detection limit. Duplicate samples and August samples collected from 2016 to 2020 were averaged for plotting. BC FAL WQG dissolved copper guideline is water chemistry dependent (for example, hardness, DOC, pH and temperature). Green dashed lines are PE-8415 condition.

**Figure 3.4-4: Dissolved Copper in Johnny Creek Catchment, 1986 to 2020**



Notes: Concentrations below the detection limit were plotted as half the detection limit. Duplicate samples and August samples collected from 2016 to 2020 were averaged for plotting. Blue dashed lines are BC Fresh Water Aquatic Life Guidelines.

Figure 3.4-5: Dissolved Iron in Johnny Creek Catchment, 1986 to 2020



Notes: Concentrations below the detection limit were plotted as half the detection limit. Duplicate samples and August samples collected from 2016 to 2020 were averaged for plotting. Green dashed lines are PE-8415 condition.

**Figure 3.4-6: Dissolved Zinc in Johnny Creek Catchment, 1986 to 2020**

Table 4.2-3: Summary of Identified Temporal Trends (1994 to 2020) in Water Quality Parameters, Johnny Creek

Monitoring Location	Variable	Sample Size	Tau	Slope	p-value
JM5	Dissolved Zinc	12	-0.47	-0.00027	0.039
JM6	Sulphate	11	0.49	0.18	0.043

Table 4.2-4: Water Quality Summary Statistics at Station JM7

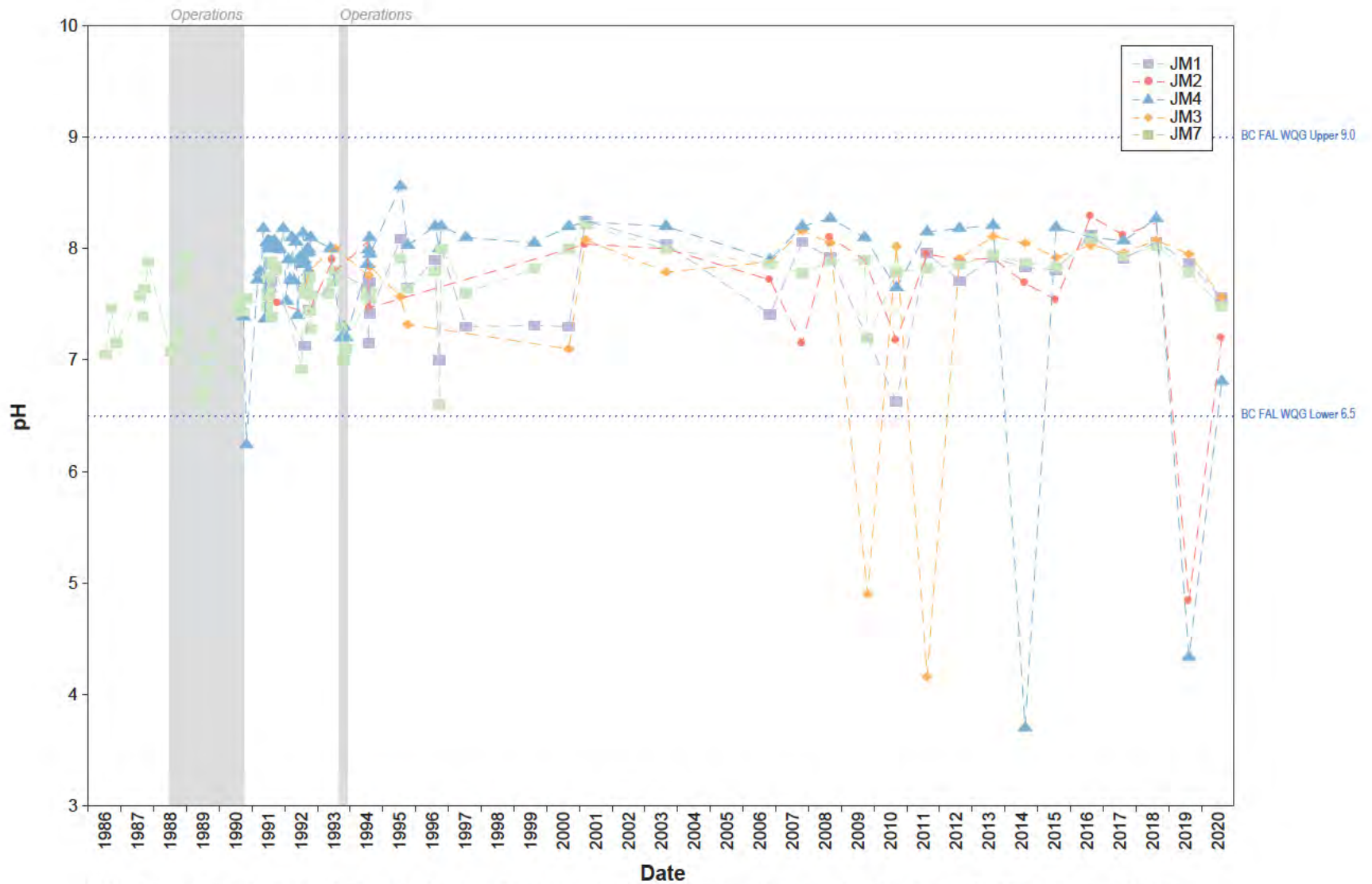
Parameter (unit)	Range of Detection Limit	2010 to 2019 Water Quality									2020 Result
		Number of Samples	Standard Deviation	Standard Error	Min	5 <sup>th</sup> Percentile	Mean	Median	95 <sup>th</sup> Percentile	Max	
pH (pH units)	0.1	10	0.101	0.032	7.79	7.79	7.89	7.87	8.06	8.09	7.48
Hardness as CaCO <sub>3</sub> (mg/L)	0.5 - 0.6	10	9.8	3.09	40.4	42.2	56.5	58.1	69.2	74	52.7
Sulphate (mg/L)	0.3 - 0.5	10	3.70	1.17	12.60	13.68	19.31	20.15	23.8	25.0	19.1
Copper, dissolved (mg/L)	0.0002 - 0.001	10	0.00444	0.00140	0.00057	0.00095	0.00492	0.00381	0.01301	0.01440	0.00983
Iron, dissolved (mg/L)	0.01 - 0.03	10	0.133	0.042	0.015	0.015	0.096	0.047	0.307	0.461	0.012
Zinc, dissolved (mg/L)	0.001 - 0.005	10	0.0052	0.0016	0.0015	0.0015	0.0051	0.0026	0.0145	0.0176	0.0084

Notes:

Measurements below the realized detection limit (DL) were replaced with half the realized DL.

Duplicates were averaged to avoid more than one sample counted towards a certain day.

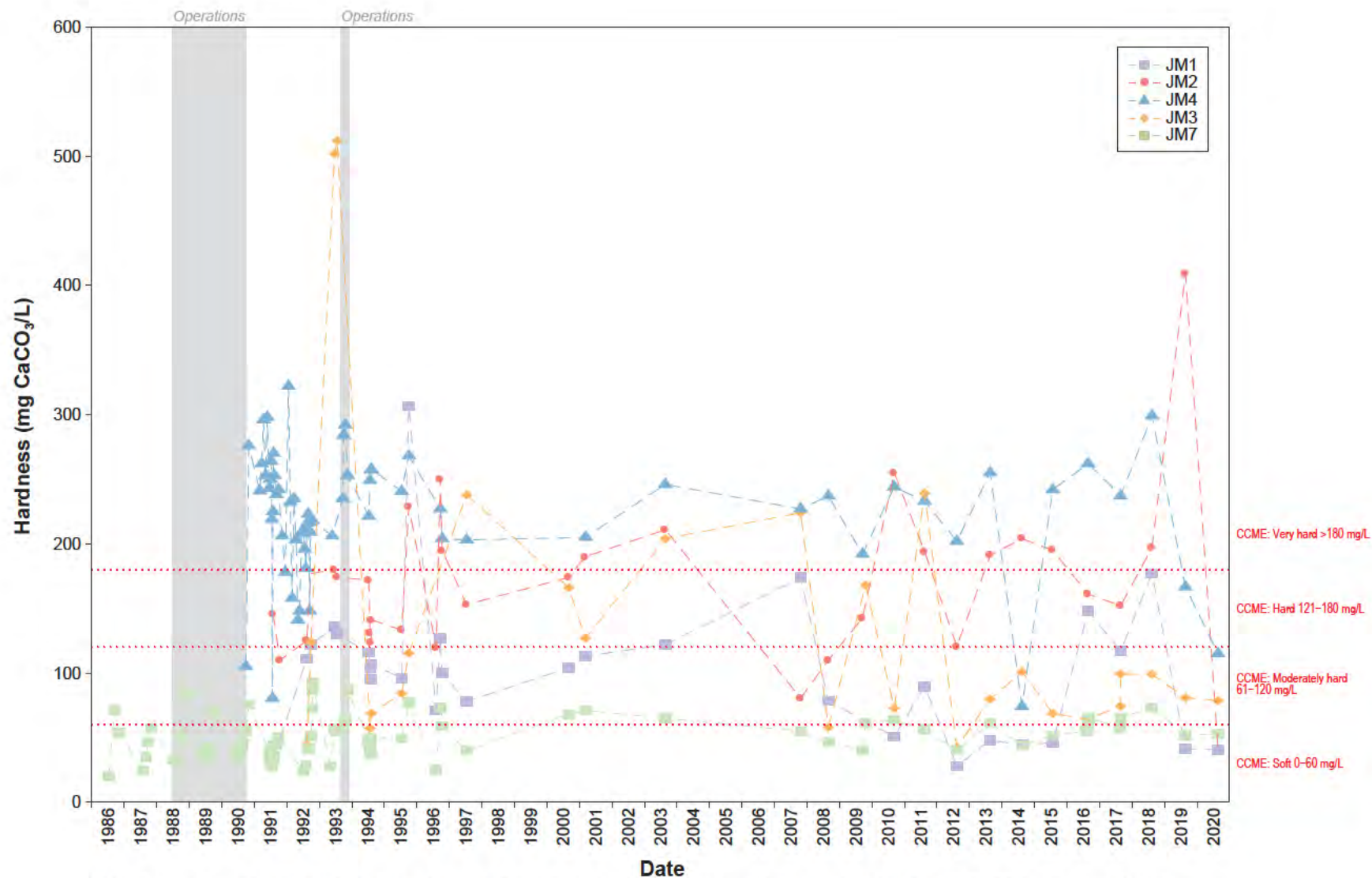
Weekly samples were averaged to avoid more than one sample counted towards a certain month.



Notes: Concentrations below the detection limit were plotted as half the detection limit. Duplicate samples and August samples collected from 2016 to 2020 were averaged for plotting. Blue dashed lines are BC Fresh Water Aquatic Life Guidelines.

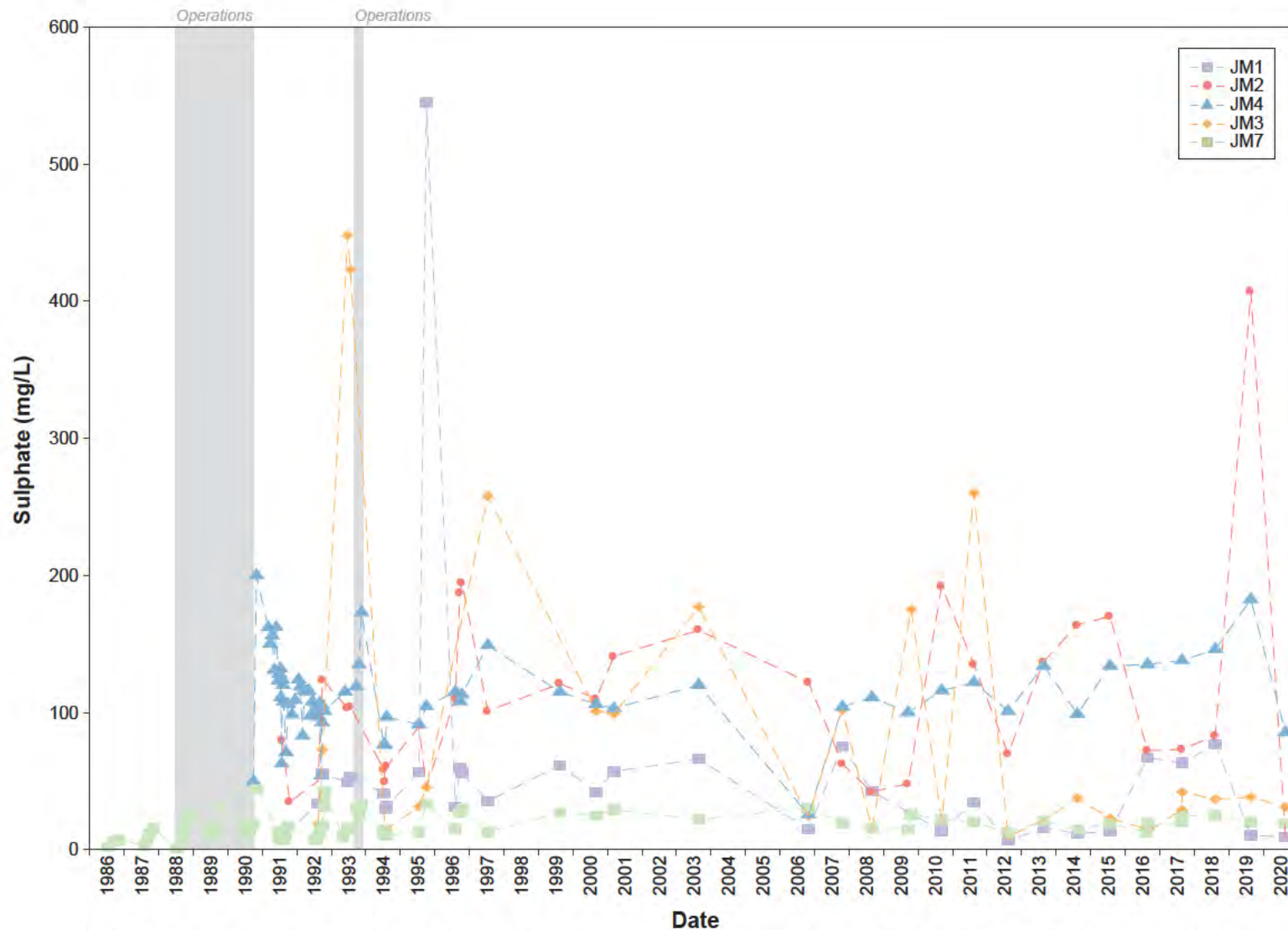
**Figure 3.4-7: pH in Stonehouse Creek Catchment, 1986 to 2020**





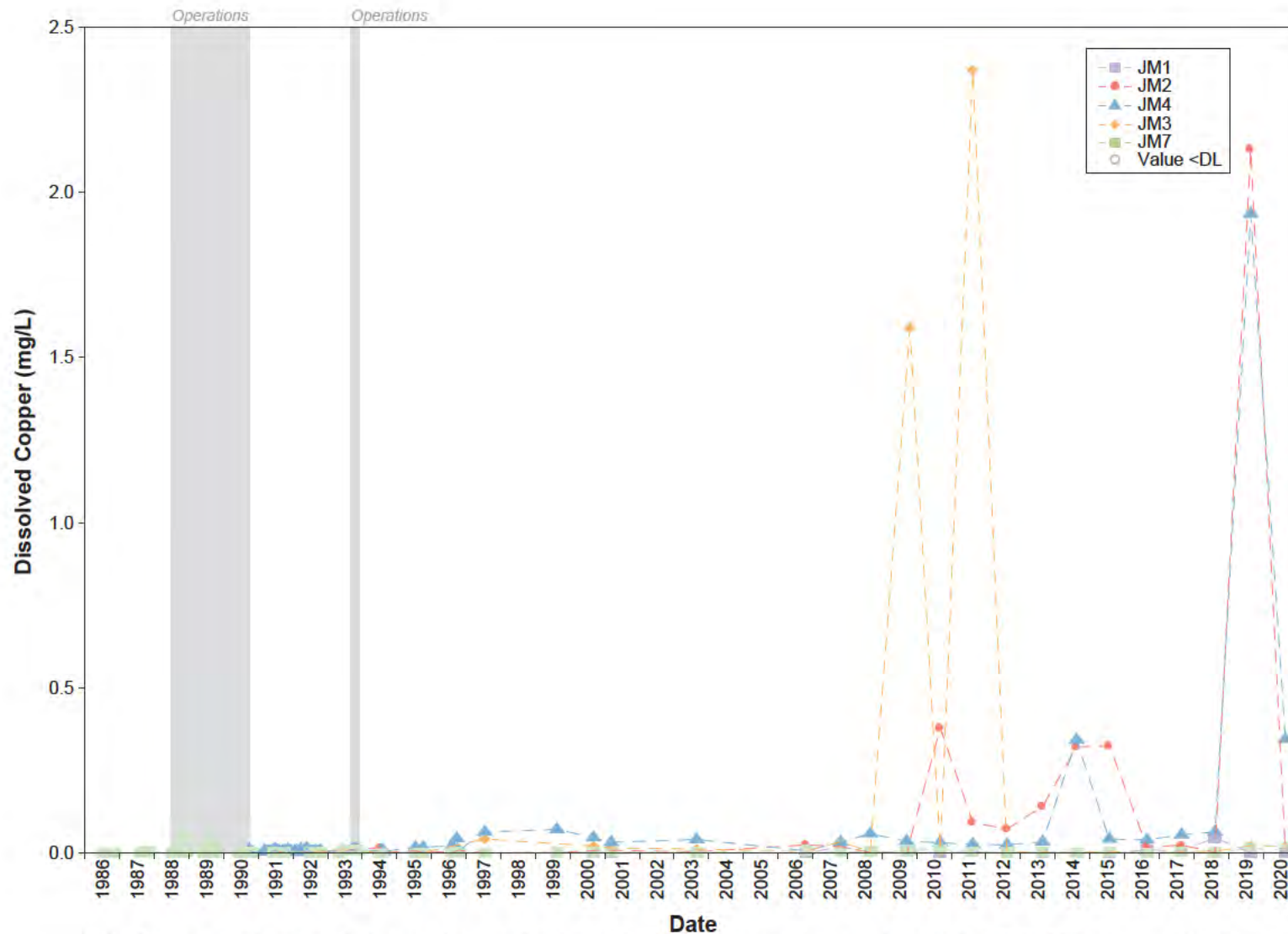
Notes: Concentrations below the detection limit were plotted as half the detection limit. Duplicate samples and August samples collected from 2016 to 2020 were averaged for plotting.

Figure 3.4-8: Hardness in Stonehouse Creek Catchment, 1986 to 2020a



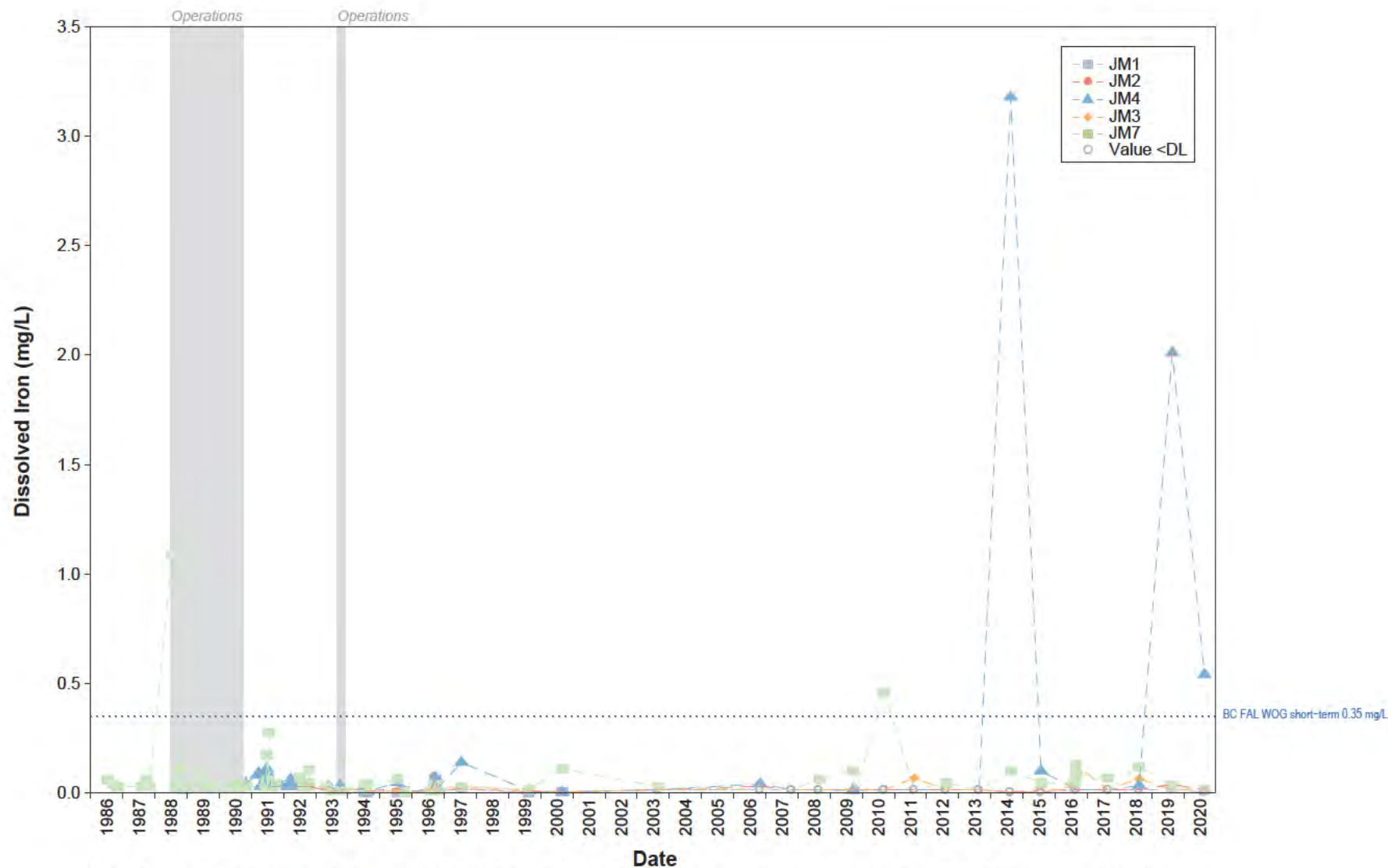
Notes: Concentrations below the detection limit were plotted as half the detection limit. Duplicate samples and August samples collected from 2016 to 2020 were averaged for plotting. BC FAL WQG sulphate guideline is hardness-dependent.

**Figure 3.4-9: Sulphate in Stonehouse Creek Catchment, 1986 to 2020**



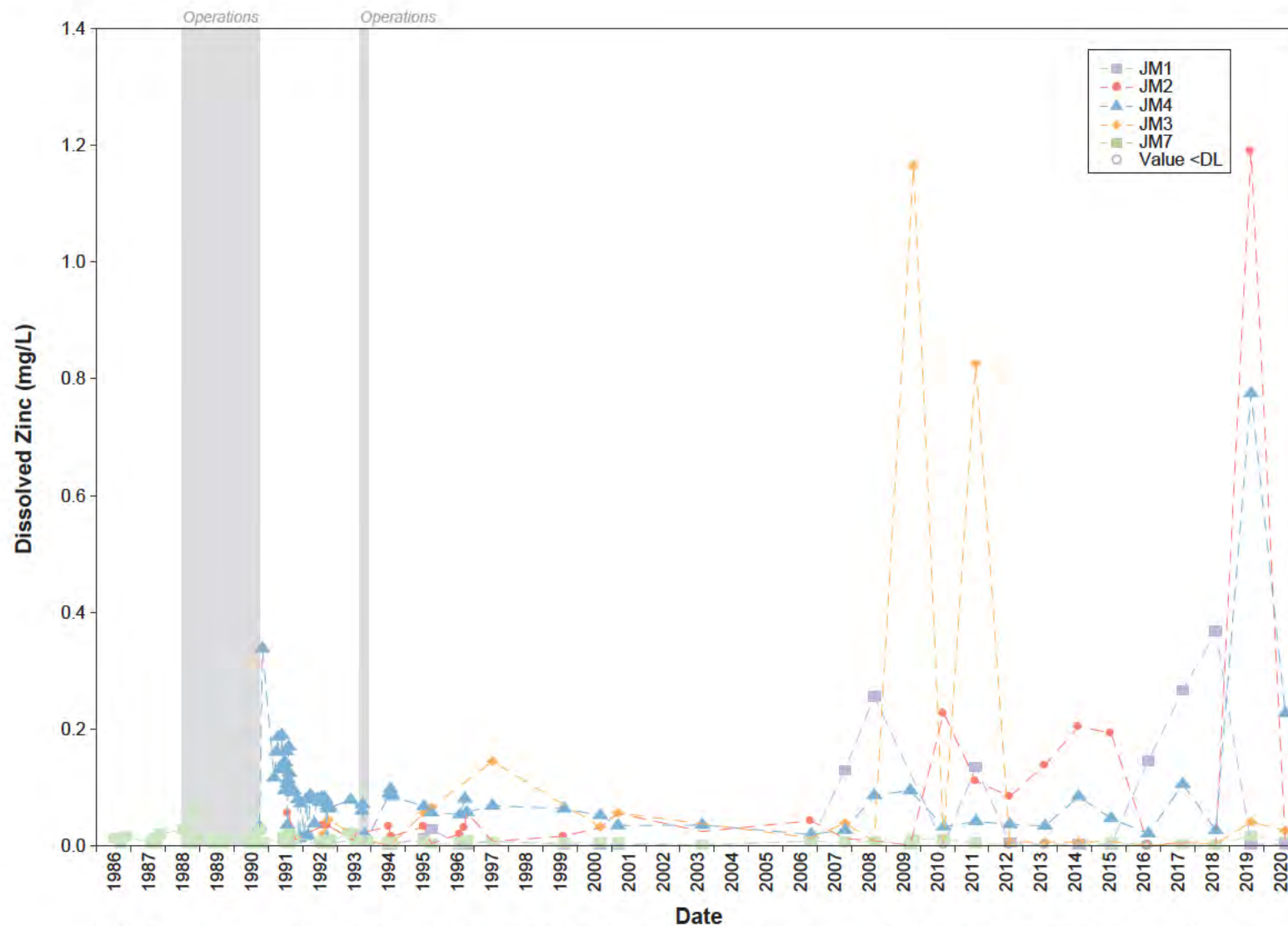
Notes: Concentrations below the detection limit were plotted as half the detection limit. Duplicate samples and August samples collected from 2016 to 2020 were averaged for plotting. BC FAL WQG dissolved copper guideline is water chemistry dependent (for example, hardness, DOC, pH and temperature).

**Figure 3.4-10: Dissolved Copper in Stonehouse Creek Catchment, 1986 to 2020**



Notes: Concentrations below the detection limit were plotted as half the detection limit. Duplicate samples and August samples collected from 2016 to 2020 were averaged for plotting. Blue dashed lines are BC Fresh Water Aquatic Life Guidelines.

**Figure 3.4-11: Dissolved Iron in Stonehouse Creek Catchment, 1986 to 2020**



Notes: Concentrations below the detection limit were plotted as half the detection limit. Duplicate samples and August samples collected from 2016 to 2020 were averaged for plotting.

**Figure 3.4-12: Dissolved Zinc in Stonehouse Creek Catchment, 1986 to 2020**

In 2020, the dissolved copper concentration at JM4 (0.345 mg/L) was above the BC long-term chronic (0.0002 mg/L) and the BC short-term acute (0.0012 mg/L) FAL WQGs, but within the range of the 2010 to 2019 dataset (Table 4.1-4; Figure 4.2-10; Appendix F). The dissolved iron concentration at JM4 (0.541 mg/L) was above the BC FAL WQG (0.35 mg/L), but within the range of the 2010 to 2019 dataset (Table 4.1-4; Figure 4.2-11; Appendix F). The other parameters were within BC FAL WQGs and within the range of the 2010 to 2019 dataset.

In 2020, the dissolved copper concentration (0.00983 mg/L) at JM7 was above the BC long-term chronic (0.0002 mg/L) and the BC short-term acute (0.0012 mg/L) FAL WQGs, but within the range of the 2010 to 2019 dataset (Table 4.2-4; Figure 4.2-10; Appendix F). The other parameters were within the BC FAL WQGs and within the range of the 2010 to 2019 dataset with the exception of pH and dissolved iron which were lower than observed from 2010 to 2019 (Table 4.2-4).

#### 4.2.2.2 Temporal Trend Analysis

Water quality trend analysis results by Mann-Kendall test are presented in Appendix G and summarized in Table 4.2-5.

Table 4.2-5: Summary of Identified Temporal Trends (1994 to 2020) in Water Quality Parameters at Permit Stations, Stonehouse Creek

Station	Variable	Sample Size	Tau	Slope	p-value
JM1	Dissolved copper	14	0.46	0.000054	0.025
JM4	Dissolved copper	14	0.52	0.0038	0.012
JM4	Dissolved iron	14	0.46	0.00056	0.016

Dissolved copper was identified as increasing at stations JM1 and JM4 with the highest increasing rate (i.e., slope) at JM4 (Table 4.2-5). Dissolved iron was also identified as increasing at station JM4.

The statistically significant change dissolved copper concentration at JM1 was likely influenced by a single elevated concentration measured in 2018; concentrations in 2019 and 2020 were lower and more similar to earlier monitoring years (Figure 4.2-10). The change in dissolved copper and iron concentrations at JM4 are mainly attributed to higher concentrations observed since August 2019. Dissolved copper concentrations from station JM4 are substantially attenuated at downstream station JM7, however, dissolved copper concentrations at JM7 were greater than the chronic and acute BC FAL WQG (Appendix F).

## 5. QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) PROGRAM

### 5.1 Permit Requirements

Section 3.4 of the June 2019 Permit PE-8415 amendment outlines the following Quality Assurance/Quality Control (QA/QC) Program, which includes field and laboratory QA/QC:

*The permittee is required to conduct the following Quality Assurance and Control Program to determine the acceptability of data required by this permit and Section 2(d) of the Environmental Data Quality Assurance Regulation.*

- 3.4.1 *The permittee must obtain from the analytical laboratory(ies) their precision, accuracy and blank data for each sample set submitted by the permittee and an evaluation of the data acceptability, based on criteria set by such laboratory.*
- 3.4.2 *The permittee must prepare and submit for analysis by the analytical laboratory(ies) a duplicate sample from one of the monitoring sites identified in Table 1 during each monitoring period.*
- 3.4.3 *The permittee must submit samples to analytical laboratory(ies) that meet the definition of a qualified laboratory under the Environmental Data Quality Assurance Regulation.*
- 3.4.4 *The permittee must report the results for each parameter of the field duplicates in terms of variation as the relative percent difference.*
- 3.4.5 *The permittee must prepare and submit to the laboratory a sample collection blank containing distilled water and preservative if required during each monitoring period. If any result for any parameter indicates detectable concentrations, then efforts must be made to determine and control the source of contamination.*

### 5.2 2020 Compliance

The 2020 monitoring followed the above required QA/QC program. Details of how the sampling complied with the required QA/QC program are described below for both the field and laboratory components.

#### 5.2.1 Field Sampling

Required field QA/QC listed in Permit PE-8415 included the collection of a field duplicate sample submitted as a blind sample to the lab (with the relative percent difference, RPD, calculated), and a travel blank. Both of these sample types were collected in 2019. In addition, a field blank was collected during sampling.

Sampling protocols and RPD calculations followed the *BC Field Sampling Manual* (ENV 2013). A duplicate sample was collected at station JM3, and submitted to ALS as a blind sample. The relative percent difference (RPD) was calculated for parameters that had concentrations at least five times greater than their DL (Appendix D). Of these, the calculated RPD was less than 20% for parameters in Table 1 of Permit PE-8415. These QAQC results indicate that the dataset was of good quality.

Both field and travel blanks were prepared and analyzed as part of the 2020 sampling. The field and travel blanks were below the DL for the parameters in Table 1 of Permit PE-8415.

### 5.2.2 Laboratory

Laboratory QA/QC included measurements of precision (i.e., laboratory replicates), accuracy (i.e., reference materials and matrix spikes), and potential contamination (i.e., laboratory blanks). Laboratory replicates were field samples that were sub-sampled in the lab and analyzed separately to assess analytical precision. Reference materials with known concentrations were analyzed to assess accuracy. Matrix spikes were field samples to which known concentrations of a standard were added to assess the recovery in the sample matrix (i.e., to determine whether the sample matrix affects analytical precision or accuracy). Finally, method blanks were analyte-free matrices (i.e., distilled water) that were prepared and analyzed using the same methodology as a regular sample.

Laboratory QA/QC results for parameters in Table 1 of Permit PE-8415 are available in Appendix C.

Laboratory contamination was low and method blanks were below the DL for parameters in Table 1 of Permit PE-8415. Analytical accuracy was high and reference materials and matrix spikes were within their target ranges. Analytical precision was also high and laboratory duplicate concentration RPD values were low, and within defined limits (<20%).

Samples were received and analyzed by ALS prior to hold time exceedances for all parameters in Table 1 of Permit PE-8415 with the exception of pH. pH has a short holding time (15 minutes) and was measured in the field. Sampling, shipping, and analyzing samples prior to hold time exceedances is challenging in northern BC, given the remoteness of the area and the logistics of getting samples to ALS in Burnaby, BC.

### 5.2.3 Summary

Overall, field and laboratory QA/QC results indicated that the water quality data collected in August 2020 at monitored stations was of high quality. Deviations from data quality objectives for duplicate sampling, travel and field blanks, and laboratory hold-times were minimal and not expected to affect the results and interpretation discussed in the current report.

The 2020 sampling program met the Permit PE-8415 QA/QC program as follows:

- Laboratory results, laboratory QA/QC samples, and the chain of custody form are provided in Appendices A, B, and C;
- Blind field duplicate sample (DUP4) was collected from station JM3 and RPDs calculated (Appendix D);
- Both field and travel blanks were collected (Appendix A); and
- Water quality samples were analyzed by ALS, a Canadian Association for Laboratory Accreditation certified laboratory.



## 6. TREATMENT WORKS

Section 4 of the June 2019 Permit PE-8415 amendment outlines reporting requirements which includes:

- An evaluation of the performance of the treatment works and identify any changes; and
- An implementation schedule for any alterations to the treatment and disposal works which may impact the discharge under this authorization.

There were no changes to the TSF in 2020, and there were no changes to stability or surface water control (RTEC 2021; KCB 2021). The *2021 Project Execution Plan* (SnipGold 2021) for the non-operating Johnny Mountain mine site includes the relocation of potentially acid generating waste rock to the TSF. It is not anticipated that the alterations to the works in 2021 will impact discharge under this authorization.

## 7. SPILLS AND INCIDENT REPORTING

There were no spills or incidents reported at the Johnny Mountain Mine in 2020.

## 8. MANAGEMENT PLANS

Permit PE-8415 has no associated management plans; therefore, there are no additional reporting requirements.

## 9. RECOMMENDATIONS

There are no recommendations to report.

## 10. REFERENCES

Definitions of the acronyms and abbreviations used in this reference list can be found in the Glossary and Abbreviations section.

- ENV. 2013. *British Columbia Field Sampling Manual: For Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples*. 2013 ed. Victoria, BC: Water, Air and Climate Change Branch, Ministry of Water, Land and Air Protection.
- ENV. 2016. *Technical Guidance 4 Environmental Management Act Authorizations: Annual Reporting under the Environmental Management Act. A Guide for Mines*. Version 1.3, May 2016. Victoria, BC, Environmental Protection Division.
- ENV. 2019a. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture: Summary Report*. British Columbia Ministry of Environment, Water Protection & Sustainability Branch: Victoria, BC.
- ENV. 2019b. *Copper Water Quality Guideline for the Protection of Freshwater Aquatic Life - Technical Report. Water Quality Guideline Series, WQG-03-1*. British Columbia Ministry of Environment and Climate Change Strategy: Victoria, BC.
- Helsel, D.R., and Hirsch, R.M. 2002. *Statistical Methods in Water Resources*. United States Geological Survey. September 2002.
- Hirsch, R.M., Slack, J.R., and Smith, R.A. 1982. *Techniques of trend analysis for monthly water quality data*. Water Resources Research 18(1): 107-121.
- KCB. 2021. *Johnny Mountain Mine - Tailings Storage Facility: 2020 Dam Safety Inspection*. Prepared for SnipGold Corp. by Klohn Crippen Berger. January 2021.
- R Development Core Team. 2020. *R: A language and environment for statistical computing*. R Foundation for Statistical Computing, Vienna, Austria. <http://www.R-project.org/>.
- RTEC. 2017a. *Iskut Project: 2017 Johnny Mountain Aquatic Characterization Report*. Prepared for SnipGold Corp. by RTEC. December 2017.
- RTEC. 2017b. *2016 Johnny Mountain Tailings Pond Hydrologic Monitoring Memo (including Groundwater)*. Prepared for SnipGold Corp. by RTEC. January 2017.
- RTEC. 2021. *2020 Annual Reclamation Report for Permit M-178*. Report prepared for SnipGold by RTEC.
- SnipGold. 2020. *Johnny Mountain Mine Reclamation 2020 Project Execution Plan*. SnipGold Corporation.
- SnipGold. 2021. *Johnny Mountain Mine Reclamation 2021 Project Execution Plan*. SnipGold Corporation.

## 11. PROFESSIONAL ACCOUNTABILITY FORMS

## Conflict of Interest Disclosure Statement

A qualified professional <sup>1</sup> providing services to either the Ministry of Environment and Climate Change Strategy ("ministry"), or to a regulated person for the purpose of obtaining an authorization from the ministry, or pursuant to a requirement imposed under the *Environmental Management Act*, the *Integrated Pest Management Act* or the *Park Act* has a real or perceived conflict of interest when the qualified professional, or their relatives, close associates or personal friends have a financial or other interest in the outcome of the work being performed.

A real or perceived conflict of interest occurs when a qualified professional has

- a) an ownership interest in the regulated person's business;
- b) an opportunity to influence a decision that leads to financial benefits from the regulated person or their business other than a standard fee for service (e.g. bonuses, stock options, other profit sharing arrangements);
- c) a personal or professional interest in a specific outcome;
- d) the promise of a long term or ongoing business relationship with the regulated person, that is contingent upon a specific outcome of work;
- e) a spouse or other family member who will benefit from a specific outcome; or
- f) any other interest that could be perceived as a threat to the independence or objectivity of the qualified professional in performing a duty or function.

Qualified professionals who work under ministry legislation must take care in the conduct of their work that potential conflicts of interest within their control are avoided or mitigated. Precise rules in conflict of interest are not possible and professionals must rely on guidance of their professional associations, their common sense, conscience and sense of personal integrity.

## Declaration

I Wade Brunham, as a member of College of Applied Biology  
declare

**Select one of the following:**

Absence from conflict of interest

Other than the standard fee I will receive for my professional services, I have no financial or other interest in the outcome of this Annual Report for Permit PE-8415.

I further declare that should a conflict of interest arise in the future during the course of this work, I will fully disclose the circumstances in writing and without delay to

BC Ministry of Environment and Climate Change Strategy, erring on the side of caution.

Real or perceived conflict of interest

Description and nature of conflict(s):

None

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I will maintain my objectivity, conducting my work in accordance with my Code of Ethics and standards of practice.

In addition, I will take the following steps to mitigate the real or perceived conflict(s) I have disclosed, to ensure the public interest remains paramount:

Not Applicable

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Further, I acknowledge that this disclosure may be interpreted as a threat to my independence and will be considered by the statutory decision maker accordingly.

This conflict of interest disclosure statement is collected under section 26(c) of the *Freedom of Information and Protection of Privacy Act* for the purposes of increasing government transparency and ensuring professional ethics and accountability. By signing and submitting this statement you consent to its publication and its disclosure outside of Canada. This consent is valid from the date submitted and cannot be revoked. If you have any questions about the collection, use or disclosure of your personal information please contact the Ministry of Environment and Climate Change Strategy Headquarters Office at 1-800-663-7867.

Signature:

X



Print name: Wade Brunham

Date: March 30, 2021

Witnessed by:

X working at home due to COVID19

Print name: \_\_\_\_\_

<sup>1</sup>Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who

- is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and
- through suitable education, experience, accreditation and knowledge, may reasonably be relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.



## Declaration of Competency

The Ministry of Environment and Climate Change Strategy relies on the work, advice, recommendations and in some cases decision making of qualified professionals<sup>1</sup>, under government's professional reliance regime. With this comes an assumption that professionals who undertake work in relation to ministry legislation, regulations and codes of practice have the knowledge, experience and objectivity necessary to fulfill this role.

1. Name of Qualified Professional Wade Brunham  
Title Partner
2. Are you a registered member of a professional association in B.C.?  Yes  No  
Name of Association: College of Applied Biology Registration # 3571
3. Brief description of professional services:  
Review of annual report for PE-8415.

This declaration of competency is collected under section 26(c) of the *Freedom of Information and Protection of Privacy Act* for the purposes of increasing government transparency and ensuring professional ethics and accountability. By signing and submitting this statement you consent to its publication and its disclosure outside of Canada. This consent is valid from the date submitted and cannot be revoked. If you have any questions about the collection, use or disclosure of your personal information please contact the Ministry of Environment and Climate Change Strategy Headquarters Office at 1-800-663-7867.

## Declaration

I am a qualified professional with the knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the specific work described above.

Signature:   
**X** \_\_\_\_\_  
Print Name: Wade Brunham

Witnessed by: **working at home due to**  
COVID19  
Print Name: \_\_\_\_\_

Date signed: March 30, 2021

<sup>1</sup>Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who

- a) is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and
- b) through suitable education, experience, accreditation and knowledge, may reasonably be relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.



# Annual Status Form

AUTHORIZATION NUMBER: 8415

AUTHORIZATION TYPE: Effluent, Permit

LEGAL AUTHORIZATION HOLDER NAME: SnipGold Corporation

AUTHORIZED PERSON NAME: Jessy Chaplin

AUTHORIZED PERSON SIGNATURE: *Jessy Chaplin*

SIGNATURE DATE: Mar 17, 2021

*I understand that it is an offense to mislead a government official, and I declare that all of the information presented is accurate and true. I have been given the authority by the authorization holder to sign this form.*

CONDITION NUMBER	CONDITION DESCRIPTION	COMPLIANT? (Yes/No/ND)	ACTION TAKEN
1.1.1	Tailings Impoundment Supernatant and Seepage. The maximum limit for the rate of discharge is indeterminate.	Yes	N/A
1.1.2	Tailings Impoundment Supernatant and Seepage. The characteristics of the discharge must be equivalent to or better than: Dissolved Copper - Maximum: 0.05 mg/L, and Dissolved Zinc - Maximum: 0.2 mg/L.	Yes	N/A
1.2.1	Mine Water Discharges. The maximum limit for the rate of discharge is indeterminate.	Yes	N/A
1.2.2	Mine Water Discharges. The characteristics of the discharge must be typical of groundwater seepages coming from #10 level portal.	Yes	N/A
1.3.1	Waste Rock Seepage Discharges. The maximum limit for the rate of discharge is indeterminate.	Yes	N/A
1.3.2	Waste Rock Seepage Discharges. The characteristics of the discharge must be typical of leachate, which has passed through inert waste rock.	Yes	N/A
2.2.1	The permittee must regularly inspect the Authorized Works and maintain them in good working order. If components of the Authorized Works have a manufacturer's recommended maintenance schedule, then those components must, at a minimum, be maintained in accordance with that schedule. The permittee must maintain a record of inspections and maintenance of the Authorized Works, and make the record available to an officer upon request.	Yes	N/A
2.2.2	In the event of an emergency or other condition which prevents normal operation of the Authorized Works or leads to an unauthorized discharge, the permittee must take remedial action immediately to restore the normal operation of the Authorized Works and to prevent any unauthorized discharges. The permittee must immediately report the emergency or other condition and the remedial action that has and will be taken to the EnvironmentalCompliance@gov.bc.ca email address or as otherwise instructed by the director.	Yes	No onsite emergency or other condition that prevented the normal operation of the authorized works took place in 2020.
3.1	The permittee must install and maintain, suitable to the director, sampling facilities. The permittee must collect samples at each site according to the schedule specified in Table 1. The permittee must take due care in sampling, storing and transporting the samples to control temperature and avoid contamination, breakage, and any other factor or influence that may compromise the integrity of the samples.	Yes	N/A
3.2	The permittee must collect the water quality samples at sampling site locations described in Table 2.	Yes	N/A
3.3	The permittee must carry out analyses in accordance with procedures described in the "British Columbia Laboratory Manual (2015 Permittee Edition)", or the most recent edition or by alternative procedures as authorized by the director.	Yes	N/A
3.4	The permittee is required to conduct the following quality assurance and control program to determine the acceptability of data required by this authorization and section 2(d) of the Environmental Data Quality Assurance Regulation.	Yes	N/A

Authorized Person Initial: \_\_\_\_\_

Date: \_\_\_\_\_

CONDITION NUMBER	CONDITION DESCRIPTION	COMPLIANT? (Yes/No/ND)	ACTION TAKEN
3.4.1	The permittee must obtain from the analytical laboratory(ies) their precision, accuracy and blank data for each sample set submitted by the permittee and an evaluation of the data acceptability, based on criteria set by such laboratory.	Yes	N/A
3.4.2	The permittee must prepare and submit for analysis by the analytical laboratory(ies) a duplicate sample from one of the monitoring sites identified in Table 1 during each monitoring period.	Yes	N/A
3.4.3	The permittee must submit samples to analytical laboratory(ies) that meet the definition of a qualified laboratory under the Environmental Data Quality Assurance Regulation.	Yes	N/A
3.4.4	The permittee must report the results for each parameter of the field duplicates in terms of variation as the relative percent difference.	Yes	N/A
3.4.5	The permittee must prepare and submit to the laboratory a sample collection blank containing distilled water and preservative if required during each monitoring period. If any result for any parameter indicates detectable concentrations, then efforts must be made to determine and control the source of contamination.	Yes	N/A
3.5	The permittee must carry out sampling in accordance with the procedures described in the "British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples, (2013 Permittee Edition)" or most recent edition, or by alternative procedures as authorized by the director.	Yes	N/A
4.0	The permittee must, on or before each March 31 that occurs during the term of this authorization, submit an annual report for the preceding calendar year to the director, by email at envauthorizationsreporting@gov.bc.ca or as otherwise instructed by the director and includes, but is not limited to: a. a review and interpretation of the monitoring data for the preceding calendar year, b. an evaluation of the laboratory analysis, and quality and precision based on the results of the quality assurance program required herein, c. an evaluation of the performance of the treatment works and identify any changes, d. an implementation schedule for any alterations to the treatment and disposal works which may impact the discharge under this authorization.	Yes	N/A
5.1	Non-compliance Notification. The permittee must immediately notify the director or designate by email at EnvironmentalCompliance@gov.bc.ca, or as otherwise instructed by the director of any non-compliance with the requirements of this authorization and take remedial action to remedy any effects of such non-compliance. The permittee must provide the director with written confirmation of all such non-compliance events, including available test results within 24 hours of the original notification by email at EnvironmentalCompliance@gov.bc.ca, or as otherwise instructed by the director.	Yes	No non-compliances related to Permit PE-8415 occurred in 2020
6.0	The permittee must immediately report all spills to the environment (as defined in the Spill Reporting Regulation) in accordance with the Spill Reporting Regulation, which among other things, requires notification to Emergency Management BC at 1-800-663-3456.	Yes	No reportable spills were recorded on site in 2020.

Authorized Person Initial:



Date:

Mar 17, 2021

## APPENDIX A      WATER QUALITY RESULTS, 2020

## Appendix A: Water Quality Results, 2020

Table A-1: 2020 Laboratory Water Quality Data

Station	Lowest Detection Limit	Units	JM1	JM2	JM3	DUP4 (JM3)	JM4	JM5
Date			2020-08-24	2020-08-23	2020-08-23	2020-08-23	2020-08-23	2020-08-23
ALS Sample ID			VA20B3846-006	VA20B3842-013	VA20B3842-009	VA20B3842-010	VA20B3842-011	VA20B3842-015
<b>Physical Tests</b>								
Hardness (as CaCO <sub>3</sub> ), dissolved	0.6	mg/L	40.5	41.4	79.3	78	115	23.8
pH	0.1	pH units	7.56	7.2	7.57	7.56	6.81	6.66
<b>Anions and Nutrients</b>								
Sulphate	0.3	mg/L	9.18	9.33	30.9	30.8	85.5	13.5
<b>Dissolved Metals</b>								
Copper, dissolved	0.0002	mg/L	0.00136	<0.00020	0.0215	0.0215	0.345	0.00128
Iron, dissolved	0.01	mg/L	<0.010	0.014	0.017	0.019	0.541	<0.010
Zinc, dissolved	0.001	mg/L	0.0032	<0.0010	0.0257	0.0265	0.227	0.0019
<b>Station</b>								
Station	Lowest Detection Limit	Units	JM6	JM7	Travel Blank	Field Blank		
Date			2020-08-23	2020-08-24	2020-08-23	2020-08-23		
ALS Sample ID			VA20B3842-019	VA20B3846-002	VA20B3842-024	VA20B3842-023		
<b>Physical Tests</b>								
Hardness (as CaCO <sub>3</sub> ), dissolved	0.6	mg/L	30.7	52.7	-	<0.60		
pH	0.1	pH units		7.48	5.66	5.46		
<b>Anions and Nutrients</b>								
Sulphate	0.3	mg/L	4.83	19.1	<0.30	<0.30		
<b>Dissolved Metals</b>								
Copper, dissolved	0.0002	mg/L	0.0003	0.00983	-	<0.00020		
Iron, dissolved	0.01	mg/L	0.018	0.012	-	<0.010		
Zinc, dissolved	0.001	mg/L	0.003	0.0084	-	<0.0010		

Note: The general's bottle lid was unscrewed in transit and thus pH was not analyzed by the lab for site JM6 on August 23 2020.

## Appendix A: Water Quality Results, 2020

Table A-2: 2020 Field Water Quality Data

Station	Date	Field Temperature	Field Turbidity	Field Electrical Conductivity	Field Specific Conductivity	Field Dissolved Oxygen	Field Dissolved Oxygen	Field pH
		°C	NTU	µS/cm	µS/cm	mg/L	%	pH Unit
JM1	2020-08-24	7.2	0.04	56.4	85.6	11.26	93.2	7.67
JM2	2020-08-23	5.2	10.42	43.1	69	11.67	91.8	7.02
JM3	2020-08-23	7.2	1.31	91	138	11.1	91.9	7.68
JM4	2020-08-23	8.7	5.32	121	176.2	10.49	90.1	6.92
JM5	2020-08-23	10.8	0.74	29	39.8	10.13	91.5	7.23
JM6	2020-08-23	5.9	31	34.3	53.9	11.6	93.1	7.63
JM7	2020-08-24	7.1	2.76	74.8	113.5	11.42	94.4	7.34

## APPENDIX B      2020 CERTIFICATE OF ANALYSIS



**CERTIFICATE OF ANALYSIS**

**Work Order** : **VA20B3842-AB**  
**Amendment** : **2**  
**Client** : **ERM Consultants Canada Ltd.**  
**Contact** : Jill Zyla  
**Address** : 3790 Alfred Ave  
Smithers BC Canada V0J 2N0  
**Telephone** : (250) 877-7838  
**Project** : 0539378-0012 (WQ ISKUT)  
**PO** : ----  
**C-O-C number** : 17-841428, 17-841426  
**Sampler** : ----  
**Site** : ----  
**Quote number** : Q74326  
**No. of samples received** : 8  
**No. of samples analysed** : 8

**Page** : 1 of 15  
**Laboratory** : Vancouver - Environmental  
**Account Manager** : Amber Springer  
**Address** : 8081 Lougheed Highway  
Burnaby BC Canada V5A 1W9  
**Telephone** : +1 604 253 4188  
**Date Samples Received** : 28-Aug-2020 10:10  
**Date Analysis Commenced** : 28-Aug-2020  
**Issue Date** : 26-Mar-2021 17:49

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

**Signatories**

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Bruna Botti	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Clarie Tejano	Laboratory Assistant	Metals, Burnaby, British Columbia
Cristina Alexandre	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Ian Cronshaw	Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Monica Ko	Lab Assistant	Metals, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia
Owen Cheng		Metals, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Shaneel Dayal	Analyst	Metals, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia







## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
-	No Unit
µS/cm	Microsiemens per centimetre
CU	colour units (1 CU = 1 mg/L Pt)
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

## Workorder Comments

Amended COA(1): Units for Organic parameters have been adjusted to mg/L.

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
DLQ	Detection Limit raised due to co-eluting interference. GCMS qualifier ion ratio did not meet acceptance criteria.
DTC	Dissolved concentration exceeds total. Results were confirmed by re-analysis.
RRV	Reported result verified by repeat analysis.



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					JM3	DUP4	JM4	JM2	JM5
Client sampling date / time					23-Aug-2020 10:14	23-Aug-2020 10:14	23-Aug-2020 10:47	23-Aug-2020 11:35	23-Aug-2020 12:25
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-009	VA20B3842-010	VA20B3842-011	VA20B3842-013	VA20B3842-015
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
acidity (as CaCO3)	----	E283	2.0	mg/L	<2.0	<2.0	3.4	<2.0	<2.0
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	50.6	50.1	12.8	34.6	10.0
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	50.6	50.1	12.8	34.6	10.0
colour, true	----	E329	5.0	CU	<5.0	<5.0	<5.0	<5.0	<5.0
conductivity	----	E100	2.0	µS/cm	166	167	219	86.4	53.0
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	79.3	78.0	115	41.4	23.8
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	75.1	75.7	94.4	39.8	21.8
pH	----	E108	0.10	pH units	7.57	7.56	6.81	7.20	6.66
solids, total dissolved [TDS]	----	E162	10	mg/L	91	100	146	57	37
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	<3.0	<3.0	6.9	20.1	<3.0
turbidity	----	E121	0.10	NTU	2.23	1.98	10.2	14.9	0.75
<b>Anions and Nutrients</b>									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0390 <sup>RRV</sup>	0.0609 <sup>RRV</sup>	0.0051	0.0170	<0.0050
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50
fluoride	16984-48-8	E235.F	0.020	mg/L	0.024	0.023	0.042	<0.020	<0.020
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.089	0.096	<0.050	<0.050	<0.050
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0678	0.0665	0.0210	0.0051	<0.0050
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0200	0.0189	<0.0010	<0.0010	<0.0010
nitrogen, total	7727-37-9	E366	0.030	mg/L	0.133	0.157	0.052	0.032	<0.030
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	<0.0010	0.0010	<0.0010
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	<0.0020	<0.0020	<0.0020	0.0221	<0.0020
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	30.9	30.8	85.5	9.33	13.5
<b>Cyanides</b>									
cyanide, free	----	E339	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cyanide, strong acid dissociable (total)	----	E333	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cyanide, weak acid dissociable	----	E336	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
<b>Organic / Inorganic Carbon</b>									



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	JM3	DUP4	JM4	JM2	JM5
Client sampling date / time					23-Aug-2020 10:14	23-Aug-2020 10:14	23-Aug-2020 10:47	23-Aug-2020 11:35	23-Aug-2020 12:25	
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-009	VA20B3842-010	VA20B3842-011	VA20B3842-013	VA20B3842-015	
					Result	Result	Result	Result	Result	
<b>Organic / Inorganic Carbon</b>										
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	<0.50	0.52	1.33	1.24	0.90	
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	0.57	<0.50	<0.50	<0.50	<0.50	
<b>Total Metals</b>										
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.141	0.139	0.631	0.303	0.0356	
antimony, total	7440-36-0	E420	0.00010	mg/L	0.00012	0.00012	0.00027	<0.00010	<0.00010	
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00017	0.00015	0.00025	0.00029	0.00012	
barium, total	7440-39-3	E420	0.00010	mg/L	0.0292	0.0292	0.0305	0.0391	0.00846	
beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	0.000058	<0.000020	<0.000020	
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0.000069	<0.000050	<0.000050	
boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.000351	0.000358	0.00120	0.0000643	0.0000188	
calcium, total	7440-70-2	E420	0.050	mg/L	25.7	26.0	31.3	14.2	7.43	
chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	<0.00010	<0.00010	0.00019	<0.00010	<0.00010	
cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00073	0.00074	0.00462	0.00025	<0.00010	
copper, total	7440-50-8	E420	0.00050	mg/L	0.101	0.0985	0.400	0.00101	0.00187	
iron, total	7439-89-6	E420	0.010	mg/L	0.558	0.535	2.40	0.427	0.046	
lead, total	7439-92-1	E420	0.000050	mg/L	0.000421	0.000395	0.00502	0.00420	0.000125	
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	0.0016	<0.0010	<0.0010	
magnesium, total	7439-95-4	E420	0.100	mg/L	2.64	2.60	3.94	1.07	0.779	
manganese, total	7439-96-5	E420	0.00010	mg/L	0.167	0.163	0.570	0.0530	0.00966	
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000237	0.000213	0.000194	0.000363	<0.000050	
nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	<0.00050	0.00086	<0.00050	<0.00050	
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
potassium, total	7440-09-7	E420	0.100	mg/L	1.46	1.44	1.61	1.11	0.488	
selenium, total	7782-49-2	E420	0.000050	mg/L	0.000129	0.000081	0.000153	0.000064	0.000056	
silicon, total	7440-21-3	E420	0.10	mg/L	1.42	1.43	2.76	1.32	0.19	
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0.000089	0.000010	<0.000010	
sodium, total	17341-25-2	E420	0.050	mg/L	0.552	0.539	0.763	0.441	0.148	
strontium, total	7440-24-6	E420	0.00020	mg/L	0.200	0.204	0.200	0.0900	0.0332	
sulfur, total	7704-34-9	E420	0.50	mg/L	10.5	10.6	29.4	3.34	4.77	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	JM3	DUP4	JM4	JM2	JM5
Client sampling date / time					23-Aug-2020 10:14	23-Aug-2020 10:14	23-Aug-2020 10:47	23-Aug-2020 11:35	23-Aug-2020 12:25	
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-009	VA20B3842-010	VA20B3842-011	VA20B3842-013	VA20B3842-015	
					Result	Result	Result	Result	Result	
<b>Total Metals</b>										
thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0.000020	0.000012	<0.000010	
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
titanium, total	7440-32-6	E420	0.00030	mg/L	0.00171	0.00190	0.00436	0.0218	0.00103	
uranium, total	7440-61-1	E420	0.000010	mg/L	0.000249	0.000236	0.000257	0.000131	<0.000010	
vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	0.00101	<0.00050	
zinc, total	7440-66-6	E420	0.0030	mg/L	0.0352	0.0342	0.164	0.0087	<0.0030	
zirconium, total	7440-67-7	E420	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	
<b>Dissolved Metals</b>										
aluminum, dissolved	7429-90-5	E421	0.0030	mg/L	0.0384	0.0371	0.0173	0.0197	0.0063	
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	0.00017	<0.00010	<0.00010	
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	<0.00010	<0.00010	0.00012	0.00017	<0.00010	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0293	0.0291	0.0323	0.0288	0.00799	
beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	0.000037	<0.000020	<0.000020	
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.000309	0.000300	0.00186 <sup>DTC</sup>	0.0000156	0.0000131	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	27.6	27.2	38.3	15.2	8.22	
chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00070	0.00070	0.00752 <sup>DTC</sup>	<0.00010	<0.00010	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.0215	0.0215	0.345	<0.00020	0.00128	
iron, dissolved	7439-89-6	E421	0.010	mg/L	0.017	0.019	0.541	0.014	<0.010	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0.000060	0.000141	<0.000050	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	0.0020	<0.0010	<0.0010	
magnesium, dissolved	7439-95-4	E421	0.100	mg/L	2.54	2.46	4.65	0.875	0.803	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.160	0.157	1.00 <sup>DTC</sup>	0.00512	0.00229	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000240	0.000234	0.000074	0.000390	<0.000050	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	0.00127	<0.00050	<0.00050	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
potassium, dissolved	7440-09-7	E421	0.100	mg/L	1.48	1.41	1.99	0.955	0.523	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000096	0.000096	0.000085	0.000107	<0.000050	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	JM3	DUP4	JM4	JM2	JM5
Client sampling date / time					23-Aug-2020 10:14	23-Aug-2020 10:14	23-Aug-2020 10:47	23-Aug-2020 11:35	23-Aug-2020 12:25	
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-009	VA20B3842-010	VA20B3842-011	VA20B3842-013	VA20B3842-015	
					Result	Result	Result	Result	Result	
<b>Dissolved Metals</b>										
silicon, dissolved	7440-21-3	E421	0.050	mg/L	1.34	1.26	2.64	0.745	0.117	
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
sodium, dissolved	17341-25-2	E421	0.050	mg/L	0.574	0.565	0.945	0.480	0.155	
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.201	0.190	0.266	0.0894	0.0342	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	10.2	10.3	35.0	2.98	4.44	
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0.000022	<0.000010	<0.000010	
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	<0.00030	0.00063	<0.00030	
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000141	0.000144	0.000043	0.000118	<0.000010	
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0257	0.0265	0.227 <sup>DTC</sup>	<0.0010	0.0019	
zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	
dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	Field	Field	
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	Field	Field	
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>										
benzene	71-43-2	E611A	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
ethylbenzene	100-41-4	E611A	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
styrene	100-42-5	E611A	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
toluene	108-88-3	E611A	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
xylene, m+p-	179601-23-1	E611A	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
xylene, o-	95-47-6	E611A	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
xylenes, total	1330-20-7	E611A	0.00075	mg/L	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	
<b>Volatile Organic Compounds Surrogates</b>										
bromofluorobenzene, 4-	460-00-4	E611A	0.00050	%	94.3	93.7	96.4	94.7	94.8	
difluorobenzene, 1,4-	540-36-3	E611A	0.00050	%	109	106	106	104	111	
<b>Hydrocarbons</b>										
EPH (C10-C19)	----	E601A	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	
EPH (C19-C32)	----	E601A	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	
VHw (C6-C10)	----	E581.VH+F1	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	
HEPHw	----	EC600A	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	JM3	DUP4	JM4	JM2	JM5
Client sampling date / time					23-Aug-2020 10:14	23-Aug-2020 10:14	23-Aug-2020 10:47	23-Aug-2020 11:35	23-Aug-2020 12:25	
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-009	VA20B3842-010	VA20B3842-011	VA20B3842-013	VA20B3842-015	
					Result	Result	Result	Result	Result	
<b>Hydrocarbons</b>										
LEPHw	----	EC600A	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	
VPHw	----	EC580A	0.10	mg/L	<0.07	<0.07	<0.07	<0.07	<0.07	
<b>Hydrocarbons Surrogates</b>										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	0.050	%	91.8	93.2	94.5	102	92.5	
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	0.0010	%	78.3	114	110	106	112	
<b>Polycyclic Aromatic Hydrocarbons</b>										
acenaphthene	83-32-9	E641A	0.000010	mg/L	<0.000010	<0.000010	0.000022	<0.000010	<0.000010	
acenaphthylene	208-96-8	E641A	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
acridine	260-94-6	E641A	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
anthracene	120-12-7	E641A	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
benz(a)anthracene	56-55-3	E641A	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
benzo(a)pyrene	50-32-8	E641A	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
benzo(b+j)fluoranthene	----	E641A	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
benzo(b+j+k)fluoranthene	----	E641A	0.000015	mg/L	<0.000014	<0.000014	<0.000014	<0.000014	<0.000014	
benzo(g,h,i)perylene	191-24-2	E641A	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
benzo(k)fluoranthene	207-08-9	E641A	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
chrysene	218-01-9	E641A	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
dibenz(a,h)anthracene	53-70-3	E641A	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
fluoranthene	206-44-0	E641A	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
fluorene	86-73-7	E641A	0.000010	mg/L	<0.000010	<0.000010	0.000032	<0.000010	<0.000010	
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
methylnaphthalene, 1-	90-12-0	E641A	0.000010	mg/L	<0.000010	<0.000010	0.000351	<0.000010	<0.000010	
methylnaphthalene, 2-	91-57-6	E641A	0.000010	mg/L	<0.000010	<0.000010	0.000090	<0.000010	<0.000010	
naphthalene	91-20-3	E641A	0.000050	mg/L	<0.000050	<0.000050	<0.000070 <sup>DLQ</sup>	<0.000050	<0.000050	
phenanthrene	85-01-8	E641A	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
pyrene	129-00-0	E641A	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
quinoline	6027-02-7	E641A	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>										
acridine-d9	34749-75-2	E641A	0.000010	mg/L	0.000743	0.000751	0.000772	0.000806	0.000774	
chrysene-d12	1719-03-5	E641A	0.000010	%	93.4	88.8	96.4	103	91.3	
naphthalene-d8	1146-65-2	E641A	0.000010	%	98.1	99.8	103	109	106	



## Analytical Results

Sub-Matrix: <b>Water</b> (Matrix: <b>Water</b> )					Client sample ID	JM3	DUP4	JM4	JM2	JM5
Client sampling date / time					23-Aug-2020 10:14	23-Aug-2020 10:14	23-Aug-2020 10:47	23-Aug-2020 11:35	23-Aug-2020 12:25	
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-009	VA20B3842-010	VA20B3842-011	VA20B3842-013	VA20B3842-015	
					Result	Result	Result	Result	Result	
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>										
phenanthrene-d10	1517-22-2	E641A	0.000010	%	100	103	107	111	108	

Please refer to the General Comments section for an explanation of any qualifiers detected.





## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	JM6	FIELD BLANK	TRAVEL BLANK	----	----
Client sampling date / time					23-Aug-2020 14:32	23-Aug-2020 13:23	23-Aug-2020	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-019	VA20B3842-023	VA20B3842-024	-----	-----	
					Result	Result	Result	----	----	
<b>Physical Tests</b>										
acidity (as CaCO3)	----	E283	2.0	mg/L	----	<2.0	<2.0	----	----	
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	----	<1.0	<1.0	----	----	
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	----	<1.0	<1.0	----	----	
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	----	<1.0	<1.0	----	----	
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	----	<1.0	<1.0	----	----	
colour, true	----	E329	5.0	CU	----	<5.0	<5.0	----	----	
conductivity	----	E100	2.0	µS/cm	----	<2.0	<2.0	----	----	
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	30.7	<0.60	----	----	----	
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	32.2	<0.60	<0.60	----	----	
pH	----	E108	0.10	pH units	----	5.46	5.66	----	----	
solids, total dissolved [TDS]	----	E162	10	mg/L	----	<10	<10	----	----	
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	<3.0	<3.0	<3.0	----	----	
turbidity	----	E121	0.10	NTU	220	<0.10	<0.10	----	----	
<b>Anions and Nutrients</b>										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	<0.0050	----	----	
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	<0.050	----	----	
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	<0.50	----	----	
fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	<0.020	<0.020	----	----	
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	<0.050	<0.050	<0.050	----	----	
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0050	<0.0050	----	----	
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	<0.0010	----	----	
nitrogen, total	7727-37-9	E366	0.030	mg/L	<0.030	<0.030	<0.030	----	----	
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0013	<0.0010	<0.0010	----	----	
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0380	<0.0020	<0.0020	----	----	
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	4.83	<0.30	<0.30	----	----	
<b>Cyanides</b>										
cyanide, free	----	E339	0.0050	mg/L	<0.0050	<0.0050	<0.0050	----	----	
cyanide, strong acid dissociable (total)	----	E333	0.0050	mg/L	<0.0050	<0.0050	<0.0050	----	----	
cyanide, weak acid dissociable	----	E336	0.0050	mg/L	<0.0050	<0.0050	<0.0050	----	----	
<b>Organic / Inorganic Carbon</b>										
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	2.04	<0.50	----	----	----	



## Analytical Results

Sub-Matrix: Water					Client sample ID	JM6	FIELD BLANK	TRAVEL BLANK	----	----
(Matrix: Water)					Client sampling date / time	23-Aug-2020 14:32	23-Aug-2020 13:23	23-Aug-2020	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-019	VA20B3842-023	VA20B3842-024	-----	-----	
					Result	Result	Result	----	----	
<b>Organic / Inorganic Carbon</b>										
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	<0.50	<0.50	<0.50	----	----	
<b>Total Metals</b>										
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.557	<0.0030	<0.0030	----	----	
antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----	
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00021	<0.00010	<0.00010	----	----	
barium, total	7440-39-3	E420	0.00010	mg/L	0.0542	<0.00010	<0.00010	----	----	
beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	<0.000020	----	----	
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	----	
boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	<0.010	----	----	
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.000236	<0.0000050	<0.0000050	----	----	
calcium, total	7440-70-2	E420	0.050	mg/L	11.3	<0.050	<0.050	----	----	
chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----	
cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00035	<0.00010	<0.00010	----	----	
copper, total	7440-50-8	E420	0.00050	mg/L	0.00259	<0.00050	<0.00050	----	----	
iron, total	7439-89-6	E420	0.010	mg/L	0.597	<0.010	<0.010	----	----	
lead, total	7439-92-1	E420	0.000050	mg/L	0.00381	<0.000050	<0.000050	----	----	
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	<0.0010	----	----	
magnesium, total	7439-95-4	E420	0.100	mg/L	0.953	<0.100	<0.100	----	----	
manganese, total	7439-96-5	E420	0.00010	mg/L	0.0806	<0.00010	<0.00010	----	----	
mercury, total	7439-97-6	E508	0.0000050	mg/L	0.0000051	<0.0000050	<0.0000050	----	----	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000140	<0.000050	<0.000050	----	----	
nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----	
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	<0.050	----	----	
potassium, total	7440-09-7	E420	0.100	mg/L	0.922	<0.100	<0.100	----	----	
selenium, total	7782-49-2	E420	0.000050	mg/L	0.000076	<0.000050	<0.000050	----	----	
silicon, total	7440-21-3	E420	0.10	mg/L	1.78	<0.10	<0.10	----	----	
silver, total	7440-22-4	E420	0.000010	mg/L	0.000010	<0.000010	<0.000010	----	----	
sodium, total	17341-25-2	E420	0.050	mg/L	0.427	<0.050	<0.050	----	----	
strontium, total	7440-24-6	E420	0.00020	mg/L	0.0676	<0.00020	<0.00020	----	----	
sulfur, total	7704-34-9	E420	0.50	mg/L	1.58	<0.50	<0.50	----	----	
thallium, total	7440-28-0	E420	0.000010	mg/L	0.000022	<0.000010	<0.000010	----	----	



## Analytical Results

Sub-Matrix: Water					Client sample ID	JM6	FIELD BLANK	TRAVEL BLANK	----	----
(Matrix: Water)					Client sampling date / time	23-Aug-2020 14:32	23-Aug-2020 13:23	23-Aug-2020	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-019	VA20B3842-023	VA20B3842-024	-----	-----	
					Result	Result	Result	---	---	
<b>Total Metals</b>										
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----	
titanium, total	7440-32-6	E420	0.00030	mg/L	0.0305	<0.00030	<0.00030	----	----	
uranium, total	7440-61-1	E420	0.000010	mg/L	0.000108	<0.000010	<0.000010	----	----	
vanadium, total	7440-62-2	E420	0.00050	mg/L	0.00122	<0.00050	<0.00050	----	----	
zinc, total	7440-66-6	E420	0.0030	mg/L	0.0365	<0.0030	<0.0030	----	----	
zirconium, total	7440-67-7	E420	0.00030	mg/L	<0.00030	<0.00030	<0.00030	----	----	
<b>Dissolved Metals</b>										
aluminum, dissolved	7429-90-5	E421	0.0030	mg/L	0.0333	<0.0030	----	----	----	
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	----	----	----	
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	<0.00010	<0.00010	----	----	----	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0304	<0.00010	----	----	----	
beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	----	----	----	
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	----	----	----	
boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	----	----	----	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.000114	<0.0000050	----	----	----	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	11.2	<0.050	----	----	----	
chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	<0.00010	<0.00010	----	----	----	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	----	----	----	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00030	<0.00020	----	----	----	
iron, dissolved	7439-89-6	E421	0.010	mg/L	0.018	<0.010	----	----	----	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	0.000141	<0.000050	----	----	----	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	----	----	----	
magnesium, dissolved	7439-95-4	E421	0.100	mg/L	0.693	<0.100	----	----	----	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0217	<0.00010	----	----	----	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	----	----	----	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000165	<0.000050	----	----	----	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	----	----	----	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	----	----	----	
potassium, dissolved	7440-09-7	E421	0.100	mg/L	0.623	<0.100	----	----	----	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000052	<0.000050	----	----	----	
silicon, dissolved	7440-21-3	E421	0.050	mg/L	0.754	<0.050	----	----	----	



## Analytical Results

Sub-Matrix: Water					Client sample ID	JM6	FIELD BLANK	TRAVEL BLANK	----	----
(Matrix: Water)					Client sampling date / time	23-Aug-2020 14:32	23-Aug-2020 13:23	23-Aug-2020	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-019	VA20B3842-023	VA20B3842-024	-----	-----	
					Result	Result	Result	---	---	
<b>Dissolved Metals</b>										
silver, dissolved	7440-22-4	E421	0.00010	mg/L	<0.00010	<0.00010	----	----	----	
sodium, dissolved	17341-25-2	E421	0.050	mg/L	0.368	<0.050	----	----	----	
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0664	<0.00020	----	----	----	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	1.42	<0.50	----	----	----	
thallium, dissolved	7440-28-0	E421	0.00010	mg/L	<0.00010	<0.00010	----	----	----	
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	----	----	----	
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	0.00089	<0.00030	----	----	----	
uranium, dissolved	7440-61-1	E421	0.00010	mg/L	0.000088	<0.00010	----	----	----	
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	----	----	----	
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0030	<0.0010	----	----	----	
zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	----	----	----	
dissolved mercury filtration location	----	EP509	-	-	Field	Field	----	----	----	
dissolved metals filtration location	----	EP421	-	-	Field	Field	----	----	----	
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>										
benzene	71-43-2	E611A	0.00050	mg/L	<0.00050	----	----	----	----	
ethylbenzene	100-41-4	E611A	0.00050	mg/L	<0.00050	----	----	----	----	
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.00050	mg/L	<0.00050	----	----	----	----	
styrene	100-42-5	E611A	0.00050	mg/L	<0.00050	----	----	----	----	
toluene	108-88-3	E611A	0.00050	mg/L	<0.00050	----	----	----	----	
xylene, m+p-	179601-23-1	E611A	0.00050	mg/L	<0.00050	----	----	----	----	
xylene, o-	95-47-6	E611A	0.00050	mg/L	<0.00050	----	----	----	----	
xylenes, total	1330-20-7	E611A	0.00075	mg/L	<0.00071	----	----	----	----	
<b>Volatile Organic Compounds Surrogates</b>										
bromofluorobenzene, 4-	460-00-4	E611A	0.00050	%	93.2	----	----	----	----	
difluorobenzene, 1,4-	540-36-3	E611A	0.00050	%	109	----	----	----	----	
<b>Hydrocarbons</b>										
EPH (C10-C19)	----	E601A	0.25	mg/L	<0.25	----	----	----	----	
EPH (C19-C32)	----	E601A	0.25	mg/L	<0.25	----	----	----	----	
VHw (C6-C10)	----	E581.VH+F1	0.10	mg/L	<0.10	----	----	----	----	
HEPHw	----	EC600A	0.25	mg/L	<0.25	----	----	----	----	
LEPHw	----	EC600A	0.25	mg/L	<0.25	----	----	----	----	



## Analytical Results

Sub-Matrix: Water					Client sample ID	JM6	FIELD BLANK	TRAVEL BLANK	----	----
(Matrix: Water)					Client sampling date / time	23-Aug-2020 14:32	23-Aug-2020 13:23	23-Aug-2020	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-019	VA20B3842-023	VA20B3842-024	-----	-----	
					Result	Result	Result	----	----	
<b>Hydrocarbons</b>										
VPHw	----	EC580A	0.10	mg/L	<0.07	----	----	----	----	----
<b>Hydrocarbons Surrogates</b>										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	0.050	%	88.1	----	----	----	----	----
dichlorotoluene, 3,4-	97-75-0	E581 VH+F1	0.0010	%	110	----	----	----	----	----
<b>Polycyclic Aromatic Hydrocarbons</b>										
acenaphthene	83-32-9	E641A	0.000010	mg/L	<0.000010	----	----	----	----	----
acenaphthylene	208-96-8	E641A	0.000010	mg/L	<0.000010	----	----	----	----	----
acridine	260-94-6	E641A	0.000010	mg/L	<0.000010	----	----	----	----	----
anthracene	120-12-7	E641A	0.000010	mg/L	<0.000010	----	----	----	----	----
benz(a)anthracene	56-55-3	E641A	0.000010	mg/L	<0.000010	----	----	----	----	----
benzo(a)pyrene	50-32-8	E641A	0.0000050	mg/L	<0.0000050	----	----	----	----	----
benzo(b+j)fluoranthene	----	E641A	0.000010	mg/L	<0.000010	----	----	----	----	----
benzo(b+j+k)fluoranthene	----	E641A	0.000015	mg/L	<0.000014	----	----	----	----	----
benzo(g,h,i)perylene	191-24-2	E641A	0.000010	mg/L	<0.000010	----	----	----	----	----
benzo(k)fluoranthene	207-08-9	E641A	0.000010	mg/L	<0.000010	----	----	----	----	----
chrysene	218-01-9	E641A	0.000010	mg/L	<0.000010	----	----	----	----	----
dibenz(a,h)anthracene	53-70-3	E641A	0.0000050	mg/L	<0.0000050	----	----	----	----	----
fluoranthene	206-44-0	E641A	0.000010	mg/L	<0.000010	----	----	----	----	----
fluorene	86-73-7	E641A	0.000010	mg/L	<0.000010	----	----	----	----	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.000010	mg/L	<0.000010	----	----	----	----	----
methylnaphthalene, 1-	90-12-0	E641A	0.000010	mg/L	<0.000010	----	----	----	----	----
methylnaphthalene, 2-	91-57-6	E641A	0.000010	mg/L	<0.000010	----	----	----	----	----
naphthalene	91-20-3	E641A	0.000050	mg/L	<0.000050	----	----	----	----	----
phenanthrene	85-01-8	E641A	0.000020	mg/L	<0.000020	----	----	----	----	----
pyrene	129-00-0	E641A	0.000010	mg/L	<0.000010	----	----	----	----	----
quinoline	6027-02-7	E641A	0.000050	mg/L	<0.000050	----	----	----	----	----
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>										
acridine-d9	34749-75-2	E641A	0.000010	mg/L	0.000719	----	----	----	----	----
chrysene-d12	1719-03-5	E641A	0.000010	%	92.5	----	----	----	----	----
naphthalene-d8	1146-65-2	E641A	0.000010	%	99.0	----	----	----	----	----
phenanthrene-d10	1517-22-2	E641A	0.000010	%	100	----	----	----	----	----



Please refer to the General Comments section for an explanation of any qualifiers detected.

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**CERTIFICATE OF ANALYSIS**

**Work Order** : **VA20B3846-AB**  
**Amendment** : **3**  
**Client** : **ERM Consultants Canada Ltd.**  
**Contact** : Jill Zyla  
**Address** : 3790 Alfred Ave  
Smithers BC Canada V0J 2N0  
**Telephone** : (250) 877-7838  
**Project** : 0539378-0012  
**PO** : ----  
**C-O-C number** : 17-841425, 17-841424  
**Sampler** : ----  
**Site** : ----  
**Quote number** : Q74326  
**No. of samples received** : 2  
**No. of samples analysed** : 2

**Page** : 1 of 9  
**Laboratory** : Vancouver - Environmental  
**Account Manager** : Amber Springer  
**Address** : 8081 Lougheed Highway  
Burnaby BC Canada V5A 1W9  
**Telephone** : +1 604 253 4188  
**Date Samples Received** : 28-Aug-2020 10:10  
**Date Analysis Commenced** : 28-Aug-2020  
**Issue Date** : 26-Mar-2021 17:55

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

**Signatories**

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Bruna Botti	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Cristina Alexandre	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Jashan Kaur	Lab Assistant	Metals, Burnaby, British Columbia
Kevin Duarte	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia
Richard Chong		Metals, Burnaby, British Columbia
Shaneel Dayal	Analyst	Metals, Burnaby, British Columbia







## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
-	No Unit
µS/cm	Microsiemens per centimetre
CU	colour units (1 CU = 1 mg/L Pt)
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

## Workorder Comments

Amended COA(1): Units for Organic parameters have been adjusted to mg/L.

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DTMF	<i>Dissolved concentration exceeds total for field-filtered metals sample. Metallic contaminants may have been introduced to dissolved sample during field filtration.</i>
RRV	<i>Reported result verified by repeat analysis.</i>



## Analytical Results

Sub-Matrix: Water					Client sample ID	JM7	JM1	----	----	----
(Matrix: Water)					Client sampling date / time	24-Aug-2020 10:07	24-Aug-2020 12:17	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-002 Result	VA20B3846-006 Result	-----	-----	-----	
<b>Physical Tests</b>										
acidity (as CaCO3)	----	E283	2.0	mg/L	<2.0	<2.0	----	----	----	
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	38.7	36.4	----	----	----	
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	----	----	----	
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	----	----	----	
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	38.7	36.4	----	----	----	
colour, true	----	E329	5.0	CU	<5.0	<5.0	----	----	----	
conductivity	----	E100	2.0	µS/cm	115	88.1	----	----	----	
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	52.7	40.5	----	----	----	
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	56.0	43.3	----	----	----	
pH	----	E108	0.10	pH units	7.48	7.56	----	----	----	
solids, total dissolved [TDS]	----	E162	10	mg/L	63	46	----	----	----	
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	8.1	<3.0	----	----	----	
turbidity	----	E121	0.10	NTU	1.53	<0.10	----	----	----	
<b>Anions and Nutrients</b>										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0081	<0.0050	----	----	----	
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	----	----	----	
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	----	----	----	
fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	<0.020	----	----	----	
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	<0.050	<0.050	----	----	----	
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0180	<0.0050	----	----	----	
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0029	<0.0010	----	----	----	
nitrogen, total	7727-37-9	E366	0.030	mg/L	0.061	<0.030	----	----	----	
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	0.0028	----	----	----	
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0042	0.0024	----	----	----	
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	19.1	9.18	----	----	----	
<b>Cyanides</b>										
cyanide, free	----	E339	0.0050	mg/L	<0.0050	<0.0050	----	----	----	
cyanide, strong acid dissociable (total)	----	E333	0.0050	mg/L	<0.0050	<0.0050	----	----	----	
cyanide, weak acid dissociable	----	E336	0.0050	mg/L	<0.0050	<0.0050	----	----	----	
<b>Organic / Inorganic Carbon</b>										



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	JM7	JM1	----	----	----
Client sampling date / time					24-Aug-2020 10:07	24-Aug-2020 12:17	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-002	VA20B3846-006	-----	-----	-----	
					Result	Result	---	---	---	
<b>Organic / Inorganic Carbon</b>										
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	0.88	0.78	----	----	----	
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	<0.50	<0.50	----	----	----	
<b>Total Metals</b>										
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.132	0.0226	----	----	----	
antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	----	----	----	
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00014	0.00012	----	----	----	
barium, total	7440-39-3	E420	0.00010	mg/L	0.0305	0.0226	----	----	----	
beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	----	----	----	
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	----	----	----	
boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	----	----	----	
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.000137	0.0000566	----	----	----	
calcium, total	7440-70-2	E420	0.050	mg/L	19.6	15.3	----	----	----	
chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	<0.00010	0.00022	----	----	----	
cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00028	<0.00010	----	----	----	
copper, total	7440-50-8	E420	0.00050	mg/L	0.0270	0.00200	----	----	----	
iron, total	7439-89-6	E420	0.010	mg/L	0.199	<0.010	----	----	----	
lead, total	7439-92-1	E420	0.000050	mg/L	0.00116	<0.000050	----	----	----	
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	----	----	----	
magnesium, total	7439-95-4	E420	0.100	mg/L	1.70	1.23	----	----	----	
manganese, total	7439-96-5	E420	0.00010	mg/L	0.0714	0.00352	----	----	----	
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	----	----	----	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000315	0.000357	----	----	----	
nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	<0.00050	----	----	----	
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	----	----	----	
potassium, total	7440-09-7	E420	0.100	mg/L	1.24	1.04	----	----	----	
selenium, total	7782-49-2	E420	0.000050	mg/L	0.000099	0.000072	----	----	----	
silicon, total	7440-21-3	E420	0.10	mg/L	1.36	1.29	----	----	----	
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	----	----	----	
sodium, total	17341-25-2	E420	0.050	mg/L	0.615	0.489	----	----	----	
strontium, total	7440-24-6	E420	0.00020	mg/L	0.135	0.133	----	----	----	
sulfur, total	7704-34-9	E420	0.50	mg/L	6.81	3.12	----	----	----	



## Analytical Results

Sub-Matrix: Water					Client sample ID	JM7	JM1	----	----	----
(Matrix: Water)					Client sampling date / time	24-Aug-2020 10:07	24-Aug-2020 12:17	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-002	VA20B3846-006	-----	-----	-----	
					Result	Result	---	---	---	
<b>Total Metals</b>										
thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	----	----	----	
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	----	----	----	
titanium, total	7440-32-6	E420	0.00030	mg/L	0.00563	0.00035	----	----	----	
uranium, total	7440-61-1	E420	0.000010	mg/L	0.000146	0.000030	----	----	----	
vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	----	----	----	
zinc, total	7440-66-6	E420	0.0030	mg/L	0.0126	0.0034	----	----	----	
zirconium, total	7440-67-7	E420	0.00030	mg/L	<0.00030	<0.00030	----	----	----	
<b>Dissolved Metals</b>										
aluminum, dissolved	7429-90-5	E421	0.0030	mg/L	0.0251	0.0108	----	----	----	
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	----	----	----	
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	<0.00010	<0.00010	----	----	----	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0254	0.0214	----	----	----	
beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	----	----	----	
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	----	----	----	
boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	----	----	----	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.000104	0.0000549	----	----	----	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	18.6	14.3	----	----	----	
chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	<0.00010	<0.00010	----	----	----	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00019	<0.00010	----	----	----	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00983	0.00136	----	----	----	
iron, dissolved	7439-89-6	E421	0.010	mg/L	0.012	<0.010	----	----	----	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	0.000052	<0.000050	----	----	----	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	----	----	----	
magnesium, dissolved	7439-95-4	E421	0.100	mg/L	1.51	1.15	----	----	----	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0542	0.00300	----	----	----	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	----	----	----	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000290	0.000338	----	----	----	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	----	----	----	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	----	----	----	
potassium, dissolved	7440-09-7	E421	0.100	mg/L	1.06	0.936	----	----	----	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000072	0.000070	----	----	----	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	JM7	JM1	----	----	----
Client sampling date / time					24-Aug-2020 10:07	24-Aug-2020 12:17	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-002 Result	VA20B3846-006 Result	-----	-----	-----	
<b>Dissolved Metals</b>										
silicon, dissolved	7440-21-3	E421	0.050	mg/L	1.21	1.27	----	----	----	
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	----	----	----	
sodium, dissolved	17341-25-2	E421	0.050	mg/L	0.561	0.467	----	----	----	
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.123	0.122	----	----	----	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	6.04	3.16	----	----	----	
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	----	----	----	
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	----	----	----	
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	----	----	----	
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000113	0.000024	----	----	----	
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	----	----	----	
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0084	0.0032	----	----	----	
zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	----	----	----	
dissolved mercury filtration location	----	EP509	-	-	Field	Field	----	----	----	
dissolved metals filtration location	----	EP421	-	-	Field	Field	----	----	----	
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>										
benzene	71-43-2	E611A	0.00050	mg/L	<0.00050	<0.00050	----	----	----	
ethylbenzene	100-41-4	E611A	0.00050	mg/L	<0.00050	<0.00050	----	----	----	
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.00050	mg/L	<0.00050	<0.00050	----	----	----	
styrene	100-42-5	E611A	0.00050	mg/L	<0.00050	<0.00050	----	----	----	
toluene	108-88-3	E611A	0.00050	mg/L	<0.00050	<0.00050	----	----	----	
xylene, m+p-	179601-23-1	E611A	0.00050	mg/L	<0.00050	<0.00050	----	----	----	
xylene, o-	95-47-6	E611A	0.00050	mg/L	<0.00050	<0.00050	----	----	----	
xylenes, total	1330-20-7	E611A	0.00075	mg/L	<0.00071	<0.00071	----	----	----	
<b>Volatile Organic Compounds Surrogates</b>										
bromofluorobenzene, 4-	460-00-4	E611A	0.00050	%	97.2	93.1	----	----	----	
difluorobenzene, 1,4-	540-36-3	E611A	0.00050	%	117	97.6	----	----	----	
<b>Hydrocarbons</b>										
EPH (C10-C19)	----	E601A	0.25	mg/L	<0.25	<0.25	----	----	----	
EPH (C19-C32)	----	E601A	0.25	mg/L	<0.25	<0.25	----	----	----	
VHw (C6-C10)	----	E581.VH+F1	0.10	mg/L	<0.10	<0.10	----	----	----	
HEPHw	----	EC600A	0.25	mg/L	<0.25	<0.25	----	----	----	



## Analytical Results

Sub-Matrix: Water					Client sample ID	JM7	JM1	----	----	----
(Matrix: Water)					Client sampling date / time	24-Aug-2020 10:07	24-Aug-2020 12:17	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-002	VA20B3846-006	-----	-----	-----	
					Result	Result	---	---	---	
<b>Hydrocarbons</b>										
LEPHw	----	EC600A	0.25	mg/L	<0.25	<0.25	----	----	----	
VPHw	----	EC580A	0.10	mg/L	<0.07	<0.07	----	----	----	
<b>Hydrocarbons Surrogates</b>										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	0.050	%	104	96.3				
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	0.0010	%	105	91.9	----	----	----	
<b>Polycyclic Aromatic Hydrocarbons</b>										
acenaphthene	83-32-9	E641A	0.000010	mg/L	<0.000010	<0.000010	----	----	----	
acenaphthylene	208-96-8	E641A	0.000010	mg/L	<0.000010	<0.000010	----	----	----	
acridine	260-94-6	E641A	0.000010	mg/L	<0.000010	<0.000010	----	----	----	
anthracene	120-12-7	E641A	0.000010	mg/L	<0.000010	<0.000010	----	----	----	
benz(a)anthracene	56-55-3	E641A	0.000010	mg/L	<0.000010	<0.000010	----	----	----	
benzo(a)pyrene	50-32-8	E641A	0.0000050	mg/L	<0.0000050	<0.0000050	----	----	----	
benzo(b+j)fluoranthene	----	E641A	0.000010	mg/L	<0.000010	<0.000010	----	----	----	
benzo(b+j+k)fluoranthene	----	E641A	0.000015	mg/L	<0.000014	<0.000014	----	----	----	
benzo(g,h,i)perylene	191-24-2	E641A	0.000010	mg/L	<0.000010	<0.000010	----	----	----	
benzo(k)fluoranthene	207-08-9	E641A	0.000010	mg/L	<0.000010	<0.000010	----	----	----	
chrysene	218-01-9	E641A	0.000010	mg/L	<0.000010	<0.000010	----	----	----	
dibenz(a,h)anthracene	53-70-3	E641A	0.0000050	mg/L	<0.0000050	<0.0000050	----	----	----	
fluoranthene	206-44-0	E641A	0.000010	mg/L	<0.000010	<0.000010	----	----	----	
fluorene	86-73-7	E641A	0.000010	mg/L	<0.000010	<0.000010	----	----	----	
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.000010	mg/L	<0.000010	<0.000010	----	----	----	
methylnaphthalene, 1-	90-12-0	E641A	0.000010	mg/L	<0.000010	<0.000010	----	----	----	
methylnaphthalene, 2-	91-57-6	E641A	0.000010	mg/L	<0.000010	<0.000010	----	----	----	
naphthalene	91-20-3	E641A	0.000050	mg/L	<0.000050	<0.000050	----	----	----	
phenanthrene	85-01-8	E641A	0.000020	mg/L	<0.000020	<0.000020	----	----	----	
pyrene	129-00-0	E641A	0.000010	mg/L	<0.000010	<0.000010	----	----	----	
quinoline	6027-02-7	E641A	0.000050	mg/L	<0.000050	<0.000050	----	----	----	
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>										
acridine-d9	34749-75-2	E641A	0.000010	mg/L	0.000789	0.000747	----	----	----	
chrysene-d12	1719-03-5	E641A	0.000010	%	98.9	97.1	----	----	----	
naphthalene-d8	1146-65-2	E641A	0.000010	%	111	95.9	----	----	----	



## Analytical Results

Sub-Matrix: <b>Water</b>					Client sample ID	JM7	JM1	----	----	----
(Matrix: <b>Water</b> )					Client sampling date / time	24-Aug-2020 10:07	24-Aug-2020 12:17	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-002	VA20B3846-006	-----	-----	-----	
Polycyclic Aromatic Hydrocarbons Surrogates					Result	Result	---	---	---	
phenanthrene-d10	1517-22-2	E641A	0.000010	%	112	102	----	----	----	

Please refer to the General Comments section for an explanation of any qualifiers detected.

APPENDIX C      2020 WATER QUALITY ASSURANCE/QUALITY CONTROL  
RESULTS



## Appendix C: Water Quality Assurance/Quality Control Results, 2020

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## 1. INTRODUCTION

This report summarizes the quality assurance and quality control (QA/QC) results collected on 2020-08-23 to 2020-08-24 from surface water quality sites in the Iskut Project area. Surface water quality study design and sampling methodology followed the guidance outlined in the *Water and Air Baseline Guidance Document for Mine Proponents and Operators* (ENV 2016), and the *British Columbia Field Sampling Manual* (ENV 2013). Table 1-1 presents the samples collected during this sampling event, and Table 1-2 presents the field QA/QC samples collected. These results were reported under ALS work order VA20B3842, VA20B3846, with samples analyzed according to the *British Columbia Environmental Laboratory Manual* (ENV 2020).

Table 1-1: Surface Water Quality Samples, 2020-08-23 to 2020-08-24

Site	August
JM1	2020-08-24
JM2	2020-08-23
JM3	2020-08-23
JM4	2020-08-23
JM5	2020-08-23
JM6	2020-08-23
JM7	2020-08-24

Table 1-2: Surface Water Quality QA/QC Samples, 2020-08-23 to 2020-08-24

QAQC	Site	Date
Field Blank	FIELD BLANK	2020-08-23
Field Duplicate	JM3	2020-08-23
Travel Blank	TRAVEL BLANK	2020-08-23

## 2. LABORATORY QAQC

Quality assurance and quality control measures are in place to evaluate the sensitivity, precision, and accuracy of the laboratory chemical analyses. Sensitivity is evaluated by calculating the percentage of non-detects for each parameter to determine whether the detection limits were sufficiently low to detect all analytes. Laboratory contamination is evaluated using method blanks, precision is assessed using laboratory replicates, and accuracy is determined through the analysis of certified reference material, laboratory control samples, or matrix spikes.

### 2.1 Sensitivity

Sensitivity of lab measurements is expressed as detection limits or reporting limits, and are determined by the sample size and matrix properties as well as the analytical method and instrumentation. Table 2.1-1 summarizes the non-detects in the dataset as well as the maximum and minimum detection limits.

Table 2.1-1: Laboratory Sensitivity, VA20B3842, VA20B3846

Class	Parameter	percent. detected	max_ DL	min_ DL	BC. DL	BC. Flag
Anions and Nutrients	Sulphate	100	0.3	0.3	0.5	-
Dissolved Metals	Cu.Dissolved	100	0.0002	0.0002	0.0002	-
Dissolved Metals	Fe.Dissolved	100	0.01	0.01	0.01	-
Dissolved Metals	Zn.Dissolved	100	0.001	0.001	0.001	-
Physical Tests	Hardness.Total	100	0.6	0.6		
Physical Tests	pH	100	0.1	0.1	0.01	> BC DL

Notes:

"> BC DL" indicates ALS detection limit is greater than the detection limit objective provided Table 2 of the Baseline Guidance (ENV 2016).

## 2.2 Method Blanks

Method blanks are used to assess laboratory contamination during sample preparation and analysis. Method blank concentrations should be lower than the detection limit, or at minimum, more than 5x less than the lowest reported sample concentration.

Surrogate standards are used in some cases to estimate analyte loss during extraction and cleanup. Often, these are isotopically-labelled versions of the analyte. The results are used to correct the reported concentration of the analyte for the recovery of the surrogate standard.

Certified reference material are samples which have been previously characterized for an analyte and have certified reference values and uncertainty associated with them. These samples are externally validated.

Laboratories may also have internal reference material or control samples. These are similar to certified reference material, but do not have external validation and therefore are not as useful for accuracy validation.

All parameters in Table 1 of Permit PE-8415 were below the detection limit in the method blank. No qualification of the sample data is required.

## 2.3 Matrix Spikes

Matrix spikes are samples that have been fortified with a known quantity of analyte. These are used to determine the effects of the sample matrix on the recovery of the analyte and also provides an estimate of analytical precision. If there are no certified reference material available for an analyte, matrix spikes can be used to provide an indication of accuracy. They may also be used to confirm results where reference material is available.

All matrix spike results were within the control limits.

## 2.4 Holding Time Exceedance

Holding times represent the time limit that a sample may be held without significant degradation of the parameter. Table 2.4-1 presents the samples where samples were not analyzed within the recommended holding time. pH was measured *in situ* with a YSI probe.

Table 2.4-1: Holding Time Exceedances, VA20B3842, VA20B3846

Test	Qualifier	Sampling Date	Recommended Hold Time	Actual Hold Time	Samples Affected
pH by Meter	EHTR-FM	2020-08-22	0.25	164	3
pH by Meter	EHTR-FM	2020-08-22	0.25	169	1
pH by Meter	EHTR-FM	2020-08-23	0.25	124	1
pH by Meter	EHTR-FM	2020-08-23	0.25	136	1
pH by Meter	EHTR-FM	2020-08-23	0.25	137	1
pH by Meter	EHTR-FM	2020-08-23	0.25	138	2
pH by Meter	EHTR-FM	2020-08-23	0.25	140	1
pH by Meter	EHTR-FM	2020-08-23	0.25	141	2
pH by Meter	EHTR-FM	2020-08-23	0.25	142	2
pH by Meter	EHTR-FM	2020-08-23	0.25	143	2
pH by Meter	EHTR-FM	2020-08-23	0.25	144	2
pH by Meter	EHTR-FM	2020-08-23	0.25	145	5
pH by Meter	EHTR-FM	2020-08-23	0.25	146	1
pH by Meter	EHTR-FM	2020-08-24	0.25	100	3
pH by Meter	EHTR-FM	2020-08-24	0.25	101	1
pH by Meter	EHTR-FM	2020-08-24	0.25	102	2
pH by Meter	EHTR-FM	2020-08-24	0.25	95	1
pH by Meter	EHTR-FM	2020-08-24	0.25	96	1
pH by Meter	EHTR-FM	2020-08-24	0.25	97	1
pH by Meter	EHTR-FM	2020-08-24	0.25	98	4
pH by Meter	EHTR-FM	2020-08-24	0.25	99	2

Notes:

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.

## 2.5 Laboratory Duplicates

Laboratory duplicates are used to determine the analytical precision of a given method for the specific local conditions and concentrations. These samples are subsampled field samples that are analyzed separately and are meant to represent the reproducibility of the analytical method.

Variability between laboratory duplicate samples was calculated as the relative percent difference (RPD) between the duplicate samples:

$$RPD = 100 * \frac{|rep1 - rep2|}{[(rep1 + rep2)/2]}$$

With high RPD values representing high variability between the duplicate measurements, and therefore reduced precision. All laboratory duplicate measurements met data quality objectives.

All samples met the quality control objectives for precision.

### 3. FIELD QAQC

Field quality assurance and quality control measures assessed potential contamination and sample representativeness of the field program. Sample contamination was assessed with field and travel blanks, and sample variation was determined with field replicates.

#### 3.1 Field and Travel Blanks

Travel blanks were collected to provide an assessment of potential contamination associated with travel, storage, or the analytical laboratory. Travel blank bottles were filled with distilled deionized water (DDW) at the analytical laboratory and were stored with field-collected samples without being opened.

Field blanks were collected to assess potential contamination from sources such as airborne dust, sample preservation, or sample handling. Field blank bottles were provided empty by the laboratory and filled with DDW in the field, and were treated similarly to field-collected samples (i.e., filtered and preserved as a regular sample).

All parameters in Table 1 of Permit PE-8415 were below the detection limit in the field and travel blanks. No qualification of the sample data is required.

#### 3.2 Field Replicate

To assess the potential variability arising from the collection of field samples, replicate samples were collected for 10% of samples. Variability in field samples was calculated for each replicate water quality sample as the relative percent difference (RPD) between the replicate samples (see laboratory replicates, above).

The BC Field Sampling Manual (ENV 2013) suggests if one or both of the replicate water quality values are less than five times the analytical detection limit, they are not to be included in the RPD calculations. This is because the RPD is more sensitive to variation as values approach the analytical detection limit. Thus, only the water quality variables with concentrations greater than five times the detection limit were considered. Overall, RPD values greater than 20% may indicate significant *in situ* variation and that more samples may be required to adequately characterize the site, or sample contamination.

All parameters in Table 1 of Permit PE-8415 had RPDs less than 20%. No qualification of the sample data is required.

### 4. REFERENCES

- BC ENV. 2020. *British Columbia Environmental Laboratory Manual*. Analysis, Reporting & Knowledge Services, Knowledge Management Branch, Ministry of Environment and Climate Change Strategy. Victoria, BC.
- ENV. 2013. *British Columbia Field Sampling Manual: For Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples*. 2013 ed. Victoria, BC: Water, Air and Climate Change Branch, Ministry of Water, Land and Air Protection.
- ENV. 2016. *Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators*. Ministry of Environment. Victoria, BC.

APPENDIX D      WATER QUALITY: RELATIVE PERCENT DIFFERENCE  
RESULTS

### Appendix D: Water Quality Relative Percent Difference Results

Station	Units	JM3				
Date		23-Aug-2020				
ALS Sample ID		Results		Detection Limits		RPD%
		VA20B3842-009	VA20B3842-010	VA20B3842-009	VA20B3842-010	
<b>Physical Tests (Matrix: Water)</b>						
Hardness (as CaCO <sub>3</sub> ), dissolved	mg/L	79.3	78	0.6	0.6	1.65
pH	pH units	7.57	7.56	0.1	0.1	0.13
<b>Anions and Nutrients (Matrix: Water)</b>						
Sulfate (as SO <sub>4</sub> )	mg/L	30.9	30.8	0.3	0.3	0.32
<b>Dissolved Metals (Matrix: Water)</b>						
Copper, dissolved	mg/L	0.0215	0.0215	0.0002	0.0002	0.00
Iron, dissolved	mg/L	0.017	0.019	0.01	0.01	-
Zinc, dissolved	mg/L	0.0257	0.0265	0.001	0.001	3.07

## APPENDIX E      WATER QUALITY RESULTS, 2010 TO 2019



Appendix E: Water Quality Results, 2010 to 2019

Site	Units	JM1	JM1	JM1	JM1	JM1	JM1	JM1	JM1	JM1	JM1	JM1	JM1	JM2	JM2	JM2
ALS Sample ID		L929069-1	L929069-2	L1047018-1	L1192540-1	L1352624-1	L1503010-1	L1648057-1	L1820682-12	L1983781-1	L2147366-1	L2335592-1	L2335592-21	L929069-8	L1047018-2	L1192540-2
Date		9/7/2010	9/7/2010	8/15/2011	8/10/2012	8/21/2013	8/13/2014	7/24/2015	8/25/2016	8/25/2017	8/12/2018	8/23/2019	8/23/2019	9/7/2010	8/15/2011	8/10/2012
QAQC		Dup	Dup						Regular	Regular	Regular	Regular	Field Duplicate			Dup
<b><i>In situ Measurements</i></b>																
Temperature	°C	-	-	-	-	-	-	-	-	-	-	6.7	-	-	-	-
pH	pH	-	-	-	-	-	-	-	-	-	-	7.97	-	-	-	-
<b><i>Physical Tests</i></b>																
Hardness (as CaCO <sub>3</sub> )	mg/L	50.8	50.4	89.5	28.1	47.9	44.5	45.9	148	117	177	40.2	42.5	255	194	121
pH	pH	6.35	6.91	7.96	7.71	7.92	7.83	7.81	8.12	7.91	8.06	7.88	7.86	7.18	7.95	7.87
<b><i>Anions</i></b>																
Sulphate (SO <sub>4</sub> )	mg/L	13.7	13.5	34.6	6.56	15.9	11.8	13.1	67.1	63.2	76.7	10.4	10.4	192	135	69.9
<b><i>Dissolved Metals</i></b>																
Copper (Cu)	mg/L	0.0012	0.0013	0.00377	0.0014	0.0013	0.00148	0.00104	0.00963	0.00751	0.0465	0.00162	0.00178	0.379	0.093	0.0741
Iron (Fe)	mg/L	<0.030	<0.030	<0.030	<0.030	<0.030	<0.010	<0.010	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Zinc (Zn)	mg/L	<0.0050	<0.0050	0.135	0.0066	<0.0050	0.0035	0.0033	0.146	0.267	0.368	0.0027	0.0028	0.228	0.111	0.0848

Appendix E: Water Quality Results, 2010 to 2019

Site	Units	JM2	JM2	JM2	JM2	JM2	JM2	JM2	JM2	JM3	JM3	JM3	JM3	JM3	JM3	JM3
ALS Sample ID			L1352624-2	L1503010-2	L1648057-2	L1820682-11	L1983781-2	L2147366-2	L2335592-3	L929069-12	L1047018-3	L1192540-3	L1352624-3	L1503010-3	L1648057-3	L1809902-2
Date		8/10/2012	8/21/2013	8/13/2014	7/24/2015	8/25/2016	8/25/2017	8/12/2018	8/23/2019	9/7/2010	8/15/2011	8/10/2012	8/21/2013	8/13/2014	7/24/2015	8/6/2016
QAQC		Dup				Regular	Regular	Regular	Regular							Regular
<b><i>In situ Measurements</i></b>																
Temperature	°C	-	-	-	-	-	-	-	6.5	-	-	-	-	-	-	-
pH	pH	-	-	-	-	-	-	-	5.29	-	-	-	-	-	-	-
<b><i>Physical Tests</i></b>																
Hardness (as CaCO <sub>3</sub> )	mg/L	120	191	204	195	161	152	197	409	72.9	239	42.4	79.9	101	68.6	64.4
pH	pH	7.93	7.91	7.69	7.54	8.29	8.12	8.23	4.84	8.02	4.16	7.91	8.11	8.05	7.92	8.14
<b><i>Anions</i></b>																
Sulphate (SO <sub>4</sub> )	mg/L	70.1	137	164	170	72.1	73.1	83.2	407	20.6	260	9.54	21.5	37.4	22.8	15.1
<b><i>Dissolved Metals</i></b>																
Copper (Cu)	mg/L	0.0717	0.142	0.321	0.326	0.0186	0.0245	0.00283	2.13	0.0047	2.37	0.0033	0.0033	0.00162	0.00538	<0.00050
Iron (Fe)	mg/L	<0.03	<0.030	<0.010	0.014	<0.030	<0.030	<0.030	0.04	<0.030	0.068	<0.030	<0.030	<0.010	<0.010	0.033
Zinc (Zn)	mg/L	0.0858	0.139	0.205	0.193	<0.0030	0.0061	0.0026	1.19	0.0066	0.826	0.0069	0.0063	0.007	0.0077	<0.0030

Appendix E: Water Quality Results, 2010 to 2019

Site	Units	JM3	JM3	JM3	JM3	JM3	JM3	JM3	JM3	JM4	JM4	JM4	JM4	JM4	JM4	JM4
ALS Sample ID		L1820682-13	L1820682-5	L1822759-15	L1981364-3	L1983781-3	L2147366-13	L2147366-3	L2335592-4	L929069-9	L1047018-4	L1192540-4	L1352624-4	L1503010-4	L1648057-4	L1820682-14
Date		8/25/2016	8/25/2016	8/30/2016	8/23/2017	8/25/2017	8/12/2018	8/12/2018	8/23/2019	9/7/2010	8/15/2011	8/10/2012	8/21/2013	8/13/2014	7/24/2015	8/25/2016
QAQC		Dup	Dup	Regular	Regular	Regular	Dup	Regular	Regular							Regular
<b><i>In situ Measurements</i></b>																
Temperature	°C	-	-	-	-	-	-	-	7.4	-	-	-	-	-	-	-
pH	pH	-	-	-	-	-	-	-	7.55	-	-	-	-	-	-	-
<b><i>Physical Tests</i></b>																
Hardness (as CaCO <sub>3</sub> )	mg/L	63.3	62.9	64.4	74.3	99.3	99.1	98.9	80.9	244	233	202	255	74.1	242	262
pH	pH	7.92	8.09	7.95	7.93	7.99	8.09	8.06	7.95	7.65	8.15	8.18	8.21	3.7	8.19	8.1
<b><i>Anions</i></b>																
Sulphate (SO <sub>4</sub> )	mg/L	15.6	15.6	13.3	29.1	41.9	36.7	36.9	38.3	116	122	101	134	98.8	134	135
<b><i>Dissolved Metals</i></b>																
Copper (Cu)	mg/L	0.00062	0.00057	0.00057	0.00341	0.00568	0.00581	0.0051	0.0232	0.0319	0.0263	0.0256	0.0343	0.343	0.0426	0.0403
Iron (Fe)	mg/L	0.117	0.089	0.126	<0.030	<0.030	0.096	0.034	<0.030	<0.030	<0.030	<0.030	<0.030	3.18	0.101	<0.030
Zinc (Zn)	mg/L	<0.0030	<0.0030	<0.0030	0.0033	0.0058	0.0038	0.0024	0.0414	0.033	0.0422	0.037	0.0344	0.085	0.0473	0.0212

Appendix E: Water Quality Results, 2010 to 2019

Site	Units	JM4	JM4	JM4	JM4	JM5	JM5	JM5	JM5	JM5	JM5	JM5	JM5	JM5	JM6	JM6	
ALS Sample ID		L1983781-4	L2147366-4	L2335592-5	L2335592-22	L929069-7	L1047018-5	L1192540-5	L1503010-5	L1648057-5	L1820682-6	L1983781-5	L2147366-5	L2335592-6	L929069-5	L1047018-6	
Date		8/25/2017	8/12/2018	8/23/2019	8/23/2019	9/7/2010	8/15/2011	8/10/2012	8/13/2014	7/24/2015	8/25/2016	8/25/2017	8/12/2018	8/23/2019	9/7/2010	8/15/2011	
QAQC		Regular	Regular	Regular	Field Duplicate						Regular	Regular	Regular	Regular			
<b><i>In situ Measurements</i></b>																	
Temperature	°C	-	-	7.8	-	-	-	-	-	-	-	-	-	-	8.8	-	-
pH	pH	-	-	5.22	-	-	-	-	-	-	-	-	-	-	7.6	-	-
<b><i>Physical Tests</i></b>																	
Hardness (as CaCO <sub>3</sub> )	mg/L	237	299	173	160	18.2	19	11.1	14.4	15.7	127	43.8	126	24.3	32.2	28.8	
pH	pH	8.07	8.27	4.38	4.29	7.44	7.11	7.18	6.99	7.02	8.18	7.64	8.13	7.29	7.37	7.69	
<b><i>Anions</i></b>																	
Sulphate (SO <sub>4</sub> )	mg/L	138	146	181	184	12.3	12.9	5.71	10.1	10.1	28.1	14.6	25.7	16.2	4.7	3.78	
<b><i>Dissolved Metals</i></b>																	
Copper (Cu)	mg/L	0.0559	0.0641	2.06	1.81	<0.0010	0.00084	<0.0010	0.00178	0.00151	0.00095	0.00082	0.00079	0.00263	<0.0010	<0.00050	
Iron (Fe)	mg/L	<0.030	0.034	2.15	1.87	<0.030	<0.030	<0.030	<0.010	<0.010	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	
Zinc (Zn)	mg/L	0.106	0.0268	0.811	0.739	<0.0050	0.0041	0.0163	0.0052	0.0048	<0.0030	<0.0030	<0.0010	0.0029	<0.0050	<0.0030	

Appendix E: Water Quality Results, 2010 to 2019

Site	Units	JM6	JM6	JM6	JM6	JM6	JM6	JM6	JM6	JM6	JM6	JM6	JM6	JM7	JM7	JM7
ALS Sample ID		L1192540-6	L1352624-5		L1503010-6	L1648057-6	L1648057-8	L1809902-5	L1822759-28	L1981364-14	L1983781-6	L2147366-6	L2335592-7	L929069-10	L1047018-7	L1192540-7
Date		8/10/2012	8/21/2013	8/21/2013	8/13/2014	7/24/2015	7/24/2015	8/6/2016	8/31/2016	8/23/2017	8/25/2017	8/12/2018	8/23/2019	9/7/2010	8/15/2011	8/10/2012
QAQC			Dup	Dup		Dup	Dup	Regular	Regular	Regular	Regular	Regular	Regular			
<b><i>In situ Measurements</i></b>																
Temperature	°C	-	-	-	-	-	-	-	-	-	-	-	3.9	-	-	-
pH	pH	-	-	-	-	-	-	-	-	-	-	-	7.79	-	-	-
<b><i>Physical Tests</i></b>																
Hardness (as CaCO <sub>3</sub> )	mg/L	23.8	30.4	30.7	20.3	24.9	26.2	19.8	24.8	30.5	34.1	104	32.8	63.8	56	40.4
pH	pH	7.75	7.67	7.76	7.65	7.61	7.64	7.79	7.37	7.83	7.77	8.09	7.79	7.79	7.82	7.86
<b><i>Anions</i></b>																
Sulphate (SO <sub>4</sub> )	mg/L	3.05	6.07	6.07	1.99	3.95	4.03	2.65	6.46	5.42	4.99	26	6.23	21.7	20	12.6
<b><i>Dissolved Metals</i></b>																
Copper (Cu)	mg/L	<0.0010	<0.0010	<0.001	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.0005	<0.00050	0.0107	0.00092	0.0113	0.00473	0.0028
Iron (Fe)	mg/L	<0.030	<0.030	<0.03	0.078	0.02	0.023	0.037	<0.030	<0.030	<0.030	<0.030	<0.030	0.461	<0.030	0.046
Zinc (Zn)	mg/L	<0.0050	<0.0050	<0.005	0.005	<0.0030	<0.0030	0.0045	0.006	0.0052	0.0048	0.0029	0.0037	0.0108	0.0051	<0.0050

Appendix E: Water Quality Results, 2010 to 2019

Site	Units	JM7	JM7	JM7	JM7	JM7	JM7	JM7	JM7	JM7	JM7	JM7
ALS Sample ID		L1352624-6	L1503010-13	L1503010-7	L1648057-7	L1809902-1	L1820682-8	L1822759-13	L1981364-19	L1983781-7	L2147366-7	L2335592-8
Date		8/21/2013	8/13/2014	8/13/2014	7/24/2015	8/6/2016	8/25/2016	8/30/2016	8/23/2017	8/25/2017	8/12/2018	8/23/2019
QAQC			Dup	Dup		Regular	Regular	Regular	Regular	Regular	Regular	Regular
<b><i>In situ Measurements</i></b>												
Temperature	°C	-	-	-	-	-	-	-	-	-	-	7.1
pH	pH	-	-	-	-	-	-	-	-	-	-	7.68
<b><i>Physical Tests</i></b>												
Hardness (as CaCO <sub>3</sub> )	mg/L	61.1	44.6	44.2	51.6	55.1	60.7	65	57.7	65.1	73.7	52
pH	pH	7.94	7.87	7.87	7.83	8.21	8.04	8.03	8	7.87	8.02	7.79
<b><i>Anions</i></b>												
Sulphate (SO <sub>4</sub> )	mg/L	20.9	14.7	15.3	18.9	12.7	19.3	17.1	20.2	24.4	25	20.3
<b><i>Dissolved Metals</i></b>												
Copper (Cu)	mg/L	0.0037	0.00138	0.00145	0.00392	<0.00050	0.00082	0.00063	0.00401	0.00456	0.00204	0.0144
Iron (Fe)	mg/L	<0.030	0.103	0.098	0.047	0.043	0.13	0.086	0.068	<0.030	0.119	0.033
Zinc (Zn)	mg/L	<0.0050	<0.0030	<0.0030	0.0048	<0.0030	<0.0030	<0.0030	<0.0030	0.0039	0.0024	0.0176

APPENDIX F BC WATER QUALITY GUIDELINES FOR THE PROTECTION  
OF FRESHWATER AQUATIC LIFE

**Appendix F: 2020 Water Quality Guideline Comparison to British Columbia Freshwater Aquatic Life Guidelines**

Station	Date	Parameter	Unit	Result	Detection Limit (DL)	Guideline Type	Guideline Value	Approaching Guideline Value	Assessment	DL > Guideline Value?	DL > Approaching Guideline Value?
JM5	2020-08-23	pH	pH Unit	6.66	0.1	BC.FAL.pH.lower	6.5	6.60	Not approaching	No	No
JM5	2020-08-23	pH	pH Unit	6.66	0.1	BC.FAL.pH.upper	9	8.90	Not approaching	No	No
JM5	2020-08-23	Sulphate	mg/L	13.5	0.3	BC.FAL.30d	128	102	Not approaching	No	No
JM5	2020-08-23	Cu.Dissolved	mg/L	0.00128	0.0002	BC.FAL.Acute	0.0009	0.000720	Exceeding	No	No
JM5	2020-08-23	Cu.Dissolved	mg/L	0.00128	0.0002	BC.FAL.Chronic	0.0002	0.000160	Exceeding	No	Yes
JM5	2020-08-23	Fe.Dissolved	mg/L	<0.010	0.01	BC.FAL.max	0.35	0.280	Non-detect	No	No
JM6	2020-08-23	pH	pH Unit	7.63		BC.FAL.pH.lower	6.5	6.60	Not approaching	No	No
JM6	2020-08-23	pH	pH Unit	7.63		BC.FAL.pH.upper	9	8.90	Not approaching	No	No
JM6	2020-08-23	Sulphate	mg/L	4.83	0.3	BC.FAL.30d	218	174	Not approaching	No	No
JM6	2020-08-23	Cu.Dissolved	mg/L	0.0003	0.0002	BC.FAL.Acute	0.0035	0.002800	Not approaching	No	No
JM6	2020-08-23	Cu.Dissolved	mg/L	0.0003	0.0002	BC.FAL.Chronic	0.0006	0.000480	Not approaching	No	No
JM6	2020-08-23	Fe.Dissolved	mg/L	0.018	0.01	BC.FAL.max	0.35	0.280	Not approaching	No	No
JM1	2020-08-24	pH	pH Unit	7.56	0.1	BC.FAL.pH.lower	6.5	6.60	Not approaching	No	No
JM1	2020-08-24	pH	pH Unit	7.56	0.1	BC.FAL.pH.upper	9	8.90	Not approaching	No	No
JM1	2020-08-24	Sulphate	mg/L	9.18	0.3	BC.FAL.30d	218	174	Not approaching	No	No
JM1	2020-08-24	Cu.Dissolved	mg/L	0.00136	0.0002	BC.FAL.Acute	0.0015	0.001200	Approaching	No	No
JM1	2020-08-24	Cu.Dissolved	mg/L	0.00136	0.0002	BC.FAL.Chronic	0.0002	0.000160	Exceeding	No	Yes
JM1	2020-08-24	Fe.Dissolved	mg/L	<0.010	0.01	BC.FAL.max	0.35	0.280	Non-detect	No	No
JM2	2020-08-23	pH	pH Unit	7.2	0.1	BC.FAL.pH.lower	6.5	6.60	Not approaching	No	No
JM2	2020-08-23	pH	pH Unit	7.2	0.1	BC.FAL.pH.upper	9	8.90	Not approaching	No	No
JM2	2020-08-23	Sulphate	mg/L	9.33	0.3	BC.FAL.30d	218	174	Not approaching	No	No
JM2	2020-08-23	Cu.Dissolved	mg/L	<0.00020	0.0002	BC.FAL.Acute	0.001	0.000800	Non-detect	No	No
JM2	2020-08-23	Cu.Dissolved	mg/L	<0.00020	0.0002	BC.FAL.Chronic	0.0002	0.000160	Non-detect	No	Yes
JM2	2020-08-23	Fe.Dissolved	mg/L	0.014	0.01	BC.FAL.max	0.35	0.280	Not approaching	No	No
JM3	2020-08-23	pH	pH Unit	7.57	0.1	BC.FAL.pH.lower	6.5	6.60	Not approaching	No	No
JM3	2020-08-23	pH	pH Unit	7.57	0.1	BC.FAL.pH.upper	9	8.90	Not approaching	No	No
JM3	2020-08-23	Sulphate	mg/L	30.9	0.3	BC.FAL.30d	309	247	Not approaching	No	No
JM3	2020-08-23	Cu.Dissolved	mg/L	0.0215	0.0002	BC.FAL.Acute	0.0008	0.000640	Exceeding	No	No
JM3	2020-08-23	Cu.Dissolved	mg/L	0.0215	0.0002	BC.FAL.Chronic	0.0002	0.000160	Exceeding	No	Yes
JM3	2020-08-23	Fe.Dissolved	mg/L	0.017	0.01	BC.FAL.max	0.35	0.280	Not approaching	No	No
JM4	2020-08-23	pH	pH Unit	6.81	0.1	BC.FAL.pH.lower	6.5	6.60	Not approaching	No	No
JM4	2020-08-23	pH	pH Unit	6.81	0.1	BC.FAL.pH.upper	9	8.90	Not approaching	No	No
JM4	2020-08-23	Sulphate	mg/L	85.5	0.3	BC.FAL.30d	309	247	Not approaching	No	No
JM4	2020-08-23	Cu.Dissolved	mg/L	0.345	0.0002	BC.FAL.Acute	0.0012	0.000960	Exceeding	No	No
JM4	2020-08-23	Cu.Dissolved	mg/L	0.345	0.0002	BC.FAL.Chronic	0.0002	0.000160	Exceeding	No	Yes
JM4	2020-08-23	Fe.Dissolved	mg/L	0.541	0.01	BC.FAL.max	0.35	0.280	Exceeding	No	No
JM7	2020-08-24	pH	pH Unit	7.48	0.1	BC.FAL.pH.lower	6.5	6.60	Not approaching	No	No
JM7	2020-08-24	pH	pH Unit	7.48	0.1	BC.FAL.pH.upper	9	8.90	Not approaching	No	No
JM7	2020-08-24	Sulphate	mg/L	19.1	0.3	BC.FAL.30d	218	174	Not approaching	No	No



**Appendix F: 2020 Water Quality Guideline Comparison to British Columbia Freshwater Aquatic Life Guidelines**

Station	Date	Parameter	Unit	Result	Detection Limit (DL)	Guideline Type	Guideline Value	Approaching Guideline Value	Assessment	DL > Guideline Value?	DL > Approaching Guideline Value?
JM7	2020-08-24	Cu.Dissolved	mg/L	0.00983	0.0002	BC.FAL.Acute	0.0012	0.000960	Exceeding	No	No
JM7	2020-08-24	Cu.Dissolved	mg/L	0.00983	0.0002	BC.FAL.Chronic	0.0002	0.000160	Exceeding	No	Yes
JM7	2020-08-24	Fe.Dissolved	mg/L	0.012	0.01	BC.FAL.max	0.35	0.280	Not approaching	No	No

**Notes:**

*BC.FAL: British Columbia Freshwater Aquatic Life Water Quality Guidelines;*

*DL: detection limit*

## APPENDIX G      TEMPORAL TREND ANALYSIS: MANN-KENDAL TEST

## Appendix G: 2020 Water Quality Mann-Kendall Test for Trend

Station	Parameter	Count	Tau	Slope	Intercept	Z -statistic	p -value	Significant (p -value < 0.05)?
JM5	Cu.Dissolved	12	0.152	0.0000133	-0.0257	0.62	0.54	no
JM5	Fe.Dissolved	12	-0.106	0.00000	0.02	-0.47	0.64	no
JM5	Hardness	11	-0.127	-0.68	1,400	-0.47	0.64	no
JM5	pH	12	0.000	-0.00195	11.3	0.00	1.00	no
JM5	Sulphate	12	-0.045	-0.035	85	-0.14	0.89	no
JM5	Zn.Dissolved	12	-0.470	-0.00027	0.55	-2.0620	0.0392	yes
JM6	Cu.Dissolved	11	0.164	0.000008	-0.01641	0.63	0.53	no
JM6	Fe.Dissolved	11	0.164	0	0.015	0.80	0.42	no
JM6	Hardness	11	0.382	0.48	-942	1.56	0.12	no
JM6	pH	10	0.022	0.0019	04	0.00	1.00	no
JM6	Sulphate	11	0.491	0.18	-361	2.024	0.043	yes
JM6	Zn.Dissolved	11	0.309	0.000080	-0.16	1.25	0.21	no
JM1	Cu.Dissolved	14	0.462	0.000054	-0.11	2.248	0.025	yes
JM1	Fe.Dissolved	14	0.198	0	0.015	1.1	0.3	no
JM1	Hardness	13	-0.128	-0.95	1,998	-0.55	0.58	no
JM1	pH	14	0.088	0.002	05	0.38	0.70	no
JM1	Sulphate	14	-0.099	-0.82	1,685	-0.44	0.66	no
JM1	Zn.Dissolved	14	0.242	0.00010	-0.20	1.15	0.25	no
JM2	Cu.Dissolved	14	0.264	0.0010	-02	1.261	0.207	no
JM2	Fe.Dissolved	14	0.275	0	0.015	1.47	0.14	no
JM2	Hardness	13	0.128	1.4	-2,705	0.549	0.583	no
JM2	pH	12	-0.061	-0.010	27	-0.21	0.84	no
JM2	Sulphate	14	0.099	0.5	-997	0.438	0.661	no
JM2	Zn.Dissolved	14	-0.033	-0.0003	01	-0.11	0.91	no
JM3	Cu.Dissolved	12	0.197	0.000170	-0.34	0.82	0.41	no
JM3	Fe.Dissolved	12	0.227	0.000088	-0.163	1.03	0.30	no
JM3	Hardness	12	0.000	-0.01	92	0.00	1.00	no
JM3	pH	12	0.076	0.004	00	0.275	0.783	no
JM3	Sulphate	12	0.152	0.75	-1,478	0.62	0.54	no
JM3	Zn.Dissolved	12	-0.091	-0.00036	0.7	-0.34	0.73	no
JM4	Cu.Dissolved	14	0.516	0.0038	-7.6	2.518	0.012	yes

### Appendix G: 2020 Water Quality Mann-Kendall Test for Trend

Station	Parameter	Count	Tau	Slope	Intercept	Z -statistic	p -value	Significant (p -value < 0.05)?
JM4	Fe.Dissolved	14	0.462	0.00056	-1.10	2.410	0.016	yes
JM4	Hardness	12	-0.227	-1.54	3,340	-0.96	0.34	no
JM4	pH	14	-0.143	-0.0062	21	-0.66	0.51	no
JM4	Sulphate	14	0.374	1.3	-2,470	1.809	0.070	no
JM4	Zn.Dissolved	14	0.033	0.00078	-1.50	0.11	0.91	no
JM7	Cu.Dissolved	14	0.341	0.00014	-0.28	1.642	0.101	no
JM7	Fe.Dissolved	14	0.220	0.00090	-1.78	1.05	0.30	no
JM7	Hardness	13	0.308	0.78	-1,526	1.40	0.16	no
JM7	pH	14	0.176	0.0050	-2.2	0.82	0.41	no
JM7	Sulphate	14	0.209	0.25	-484	0.99	0.32	no
JM7	Zn.Dissolved	14	-0.044	0	0.00	-0.17	0.87	no

APPENDIX F            2020 REPORT FOR EMA PERMIT PR-7927



**SNIPGOLD**  
A SUBSIDIARY OF SEABRIDGE GOLD INC.

## Johnny Mountain Mine

**Annual Report for 2020:  
*Environmental Management Act*  
Permit PR-7927**

**FINAL**

March 2021

Project No.: 0539378-0003



March 2021

# Johnny Mountain Mine

## Annual Report for 2020: *Environmental Management Act* Permit PR-7927

Name of Property: Johnny Mountain Mine Project  
Company Name: SnipGold Corp.

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## EXECUTIVE SUMMARY

The Johnny Mountain Mine (JMM) is a past-producing underground gold mine located in the Coast Mountain Range of British Columbia (BC), approximately 100 km northwest (NW) of Stewart, British Columbia (BC). The mine is located on a sub-alpine plateau near the confluence of the Craig and Iskut Rivers on the northwest face of Johnny Mountain, where an alpine glacier covers higher altitudes of the Mountain.

Seabridge Gold Inc. (Seabridge) acquired SnipGold Corp. (SnipGold) and their associated properties, including the Johnny Mountain site, on June 21, 2016. SnipGold is now a wholly owned subsidiary of Seabridge and since the acquisition the company have been carrying out the compliance programs, as per their active permits. As operations have ceased since 1993, activity on-site relates primarily to reclamation and closure of the site, pursuant to *Mines Act* permit M-178 and *Environmental Management Act* (EMA) permits PE-8415 and PR-7927, and exploration activities authorized under *Mines Act* MX-1-46.

SnipGold's *Environmental Management Act* permit PR-7927 authorizes discharge of inert solid waste originating from facilities associated with the non-operating JMM at the point of discharge, which is the Main Landfill. Condition 3 of EMA permit PR-7927 requires SnipGold to provide an annual report by March 31 of each year to the Ministry of Environment and Climate Change Strategy (ENV), Ministry of Energy, Mines and Petroleum Resources (EMPR; now Ministry of Energy, Mines and Low Carbon Innovation [EMLI]) and Tahltan First Nations. This report fulfills that requirement.

Due to the COVID-19 pandemic in 2020 and the associated health and safety risks, activities outlined in the 2020 Project Execution Plan for the non-operating Johnny Mountain mine site were deferred. **On site activities in 2020 were limited to compliance related requirements associated with SnipGold's *Mines Act* Permit M-178, EMA Permit PR-7927 and EMA Permit PE-8415. The landfill was not active in 2020.**

Activities conducted in 2020 as authorized under EMA Permit PR-7927, included monitoring:

- concentrations of petroleum hydrocarbons in the in-situ hydrocarbon treatment areas;
- ground and surface water at MW17-22A, MW17-22B and JM10-2018 (equivalent to Sky Creek 1.0 referenced in EMA Permit PR-7927); and
- erosion prevention and sediment control measures implemented at the Main Landfill.

This annual report provides a synopsis of the above EMA Permit PR-7927 related monitoring activities and associated results.



## QUALIFIED PROFESSIONAL SIGN-OFF

I am a qualified professional with the knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the Johnny Mountain Mine Annual Report for 2020: Environmental Management Act Permit PR-7927. I have prepared and reviewed report content for all sections of this Annual Report for 2020: Environmental Management Act Permit PR-7927, with the exception of Section 9.

Prepared and reviewed by:



---

Lorraine Muckian, PhD, RPBio #3142

I am a qualified professional with the knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the Johnny Mountain Mine Annual Report for 2020: Environmental Management Act Permit PR-7927. I have reviewed Section 9 of this Annual Report for 2020: Environmental Management Act Permit PR-7927.

Prepared and reviewed by:



---

Wade Brunham, MSc, RPBio #3571

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## GLOSSARY AND ABBREVIATIONS

AMECFW	AMEC Foster Wheeler
AEC	Areas of Environmental Concern
APEC	Area of Potential Environmental Concern
ARR	Annual Reclamation Report
BC	British Columbia
BTEX	benzene, toluene, ethylbenzene and xylene
CCME	Council of Ministers of the Environment
COA	certificates of analysis
COD	chemical oxygen demand
CSP	corrugated steel pipe
DL	detection limit
DQO	data quality objective
EC	electrical conductivity
EMA	<i>Environmental Management Act</i>
EMPR	British Columbia Ministry of Energy, Mines & Petroleum Resources
EMLI	Ministry of Energy, Mines and Low Carbon Innovation
ENV	British Columbia Ministry of Environment & Climate Change Strategy
EPH	extractable petroleum hydrocarbons
HDPE	high-density polyethylene
HEPH	heavy extractable petroleum hydrocarbons
JMM	Johnny Mountain Mine
KCB	Klohn Crippen Berger
L	litre
LEPH	light extractable petroleum hydrocarbons
m <sup>3</sup>	cubic metres
mbg	metres below grade
mg	milligrams

NTU	nephelometric turbidity units
NWR	NorthWest Response
ORP	oxidation-reduction potential
PAG	potentially acid generating
PAHs	polycyclic aromatic hydrocarbons
PCOC	potential contaminants of concern
PEP	Project Execution Plan
Project	Iskut Project
PSMP	Project Safety Management Plan
PVC	polyvinylchloride
QA/QC	quality assurance/quality control
RPD	relevant percent differences
RTEC	A joint venture company between ERM Consultants Canada Ltd. (ERM) and the Tahltan Nation Development Corporation (TNDC)
Seabridge	Seabridge Gold Inc.
Skyline Gold Corporation (Skyline)	Previous owners of the Johnny Mountain Mine site and SnipGold properties
SnipGold	SnipGold Corp., a subsidiary of Seabridge Gold Inc. SnipGold acquired the Iskut exploration land package, including the closed Johnny Mountain Mine Site, on June 21, 2016.
TDS	total dissolved solids
TIC	total inorganic carbon
TOC	total organic carbon
TSF	Tailings Storage Facility (TSF). Referred to as the Tailings Impoundment or Tailings Pond in Permit PE-8415; referred to as the Tailings Storage Facility in Permit M-178.
VH <sub>w</sub>	volatile hydrocarbons extractable in water
VOCs	volatile organic compounds
WAD	weak acid dissociable
µg	micrograms

## 1. INTRODUCTION

### 1.1 Johnny Mountain Mine Introduction

The Johnny Mountain Mine (JMM) is a past-producing underground gold mine located in the Coast Mountain Range of British Columbia (BC), approximately 100 km northwest of Stewart, BC (Figure 1.1-1). The mine is located on a sub-alpine plateau near the confluence of the Craig and Iskut Rivers on the northwest face of Johnny Mountain, where an alpine glacier covers higher altitudes of the Mountain.

The former mine was comprised of three (3) portals/adits (numbered level 10, level 11, and level 12), five (5) vent raises (shafts), a mill building, a tailings storage facility (TSF), an air strip (at the mine site), an historic fuel tank farm, several ancillary buildings, a 10 km road from the Bronson airstrip and camp (adjacent to the Iskut River), a septic bed and a few other minor components. The milling process involved conventional grinding and gravity separation (initially including a cyanide leach process that was stopped early in process operations).

The underground mine has been closed since 1993, and reclamation activities took place sporadically on the site from 1999 to 2015. In 2016 Seabridge Gold Inc. acquired SnipGold Corp. and their associated properties (including the Johnny Mountain Mine site), and commenced annual reclamation activities. SnipGold is a subsidiary of Seabridge Gold Inc. Currently there are three provincial permits associated with the site: *Mines Act* permit M-178 (reclamation program), *Environmental Management Act* (EMA) Permit PE-8415 (effluent discharge), and EMA Permit PR-7927 (refuse discharge; Appendix A). The Johnny Mountain site, along with surrounding mineral tenures and the Bronson Airstrip, make up the Iskut Project (the Project; Figure 1.1-1).

Since acquiring the property, SnipGold has been carrying out permit compliance programs and on-going reclamation activities. SnipGold continues to carry out an exploration program on the property. New reclamation activities were completed in 2020 as described in the *Mines Act* permit M-178 Annual Reclamation Report (RTEC 2021a).

EMA Permit PR-7927, Condition 3, required SnipGold to provide an annual report by March 31 of each year to the Ministry of Environment and Climate Change Strategy (ENV), Ministry of Energy, Mines and Petroleum Resources (EMPR; now Ministry of Energy, Mines and Low Carbon Innovation [EMLI]) and Tahltan Nation.

This report is intended to fulfill the reporting requirements of EMA Permit PR-7927, following Technical Guidance 4 for EMA Authorizations (ENV 2016). The following sections provide further details on the permit and reporting requirements.

### 1.2 Refuse Discharge EMA Permit PR-7927

#### 1.2.1 Authorized Activity

SnipGold's EMA Permit PR-7927 authorizes discharge of inert solid waste originating from facilities associated with the non-operating JMM at the point of discharge, which is the Main Landfill, located at latitude 56° 04' 28" and longitude 131° 37' 57", elevation of 1,100 m, on the west side of the existing TSF (Figure 1.2-1; Photo 1.2-1). An amendment of EMA Permit PR-7927 in August 2011 updated the conditions to allow the open burning of wood waste generated from the demolition of structures from JMM (i.e., untreated, unpainted wood waste, broken lumber and pallets, logs, brush and branches etc.), along with open burning of cardboard, paper and paper products (Condition 1.2). The permit was amended again on May 31, 2018 to include conditions authorizing the upgrades to the Main Landfill and

introducing additional conditions related to hazardous waste segregation, erosion mitigation measures, compliance monitoring, and annual reporting requirements (Appendix A). The landfill was not active in 2020.



*Photo 1.2-1: Johnny Mountain Mine Main Landfill in 2019 - after the addition of waste material gathered from the JMM area and the covering with mineral soils.*

### 1.2.2 Reclamation and Closure Program Integration

Reclamation activities associated with meeting the requirements of *Mine Act* permit M-178 and fulfilling the overall reclamation objectives include the appropriate handling, segregation, discharge and disposal of waste from across the mine site. These necessary reclamation activities need to be carried out in accordance with conditions within EMA Permit PR-7927 if the Main Landfill is the proposed location of discharge. The landfill was not active in 2020.

Due to the COVID-19 pandemic in 2020 and the associated health and safety risks, activities outlined in the 2020 Project Execution Plan for the non-operating Johnny Mountain mine site were deferred. On-site activities in 2020 were limited to compliance related requirements associated with SnipGold's *Mines Act* Permit M-178, EMA Permit PR-7927, and EMA Permit PE-8415.

No waste was added to the Main landfill at Johnny Mountain Mine in 2020.

Reclamation activities were not conducted in 2020 per the 2020 Project Execution Plan. SnipGold have included deferred activities in the 2021 Project Execution Plan (Appendix B).



**Figure 1.1-1**  
**Johnny Mountain Mine: Regional Location and Land Tenures**

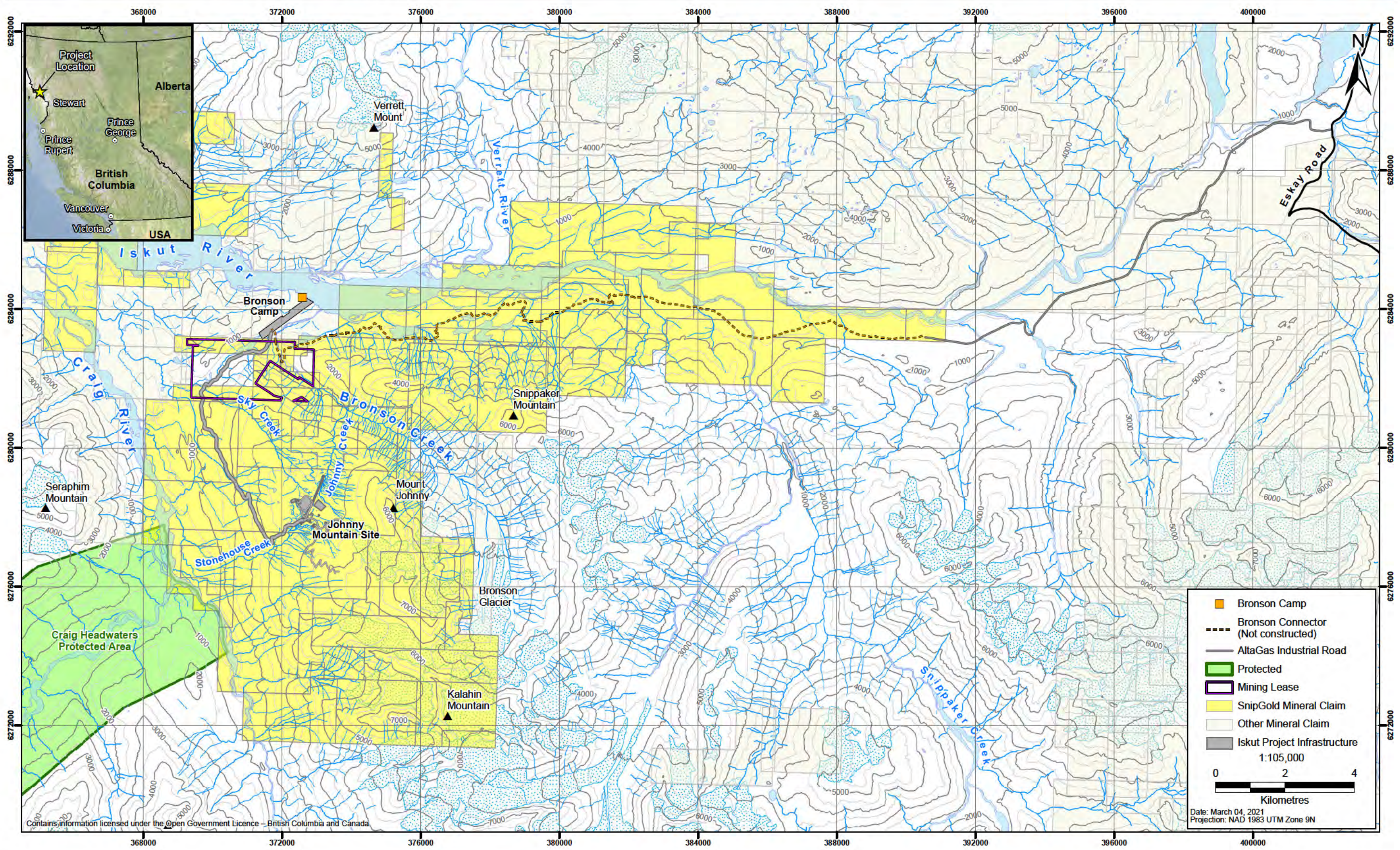
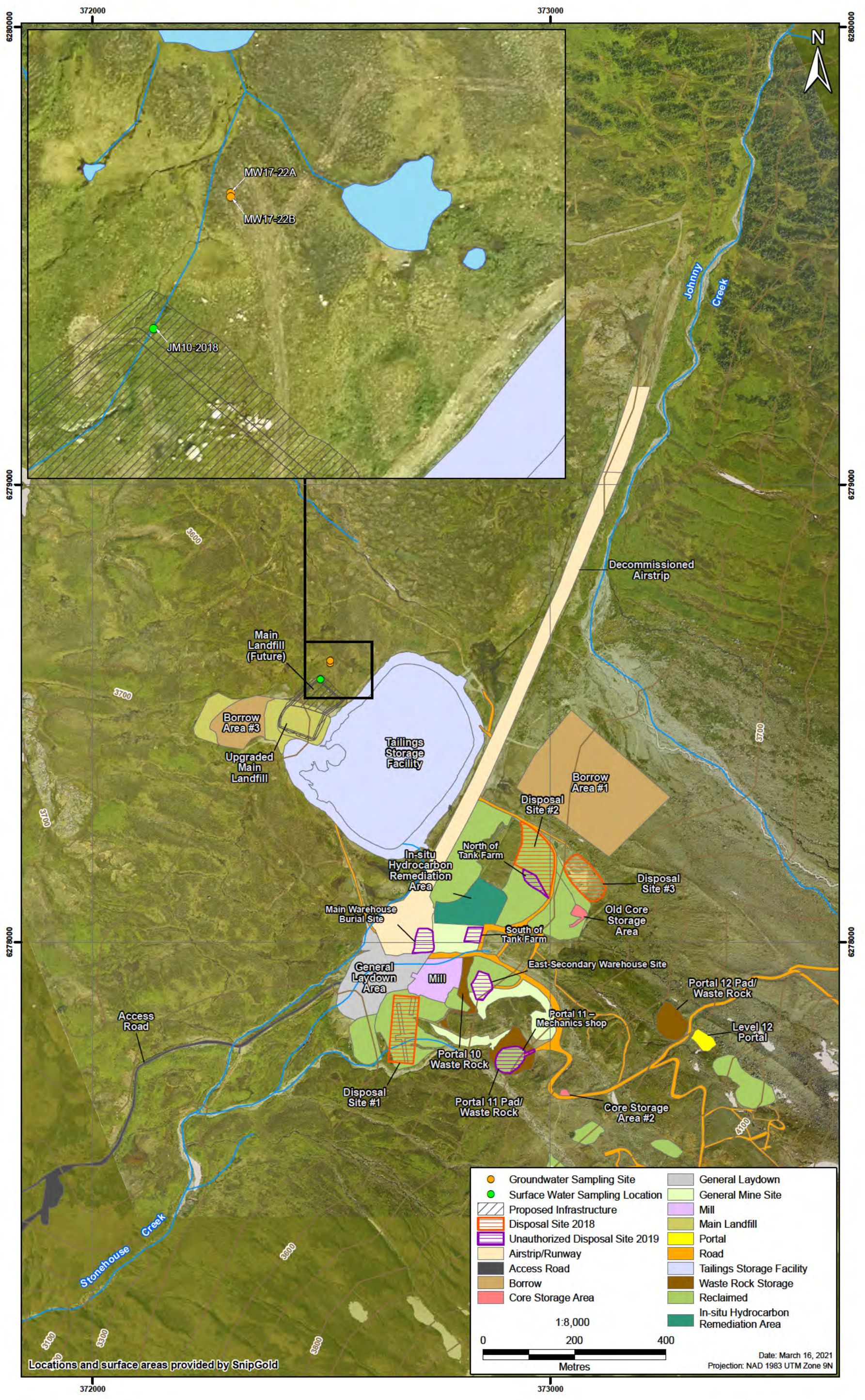


Figure 1.2-1  
 Johnny Mountain Mine: Mine Site and Permit PR-7927 Related Sites



### 1.2.3 Annual Reporting

Condition 3 of EMA Permit PR-7927 requires SnipGold to provide an annual report by March 31 each year to ENV, EMLI and to the Tahltan Nation. As stipulated in EMA Permit PR-7927, the report must include:

- a. summary of spills and other environmental incidents;
- b. all environmental monitoring data collected during the demolition, waste excavation and associated disposal activities;
- c. description and volume of waste materials excavated from Disposal Sites #1 and #2 (which refers to the buried waste at Disposal Sites #1 and #2);
- d. description and volume of demolition waste;
- e. characterization of suspected hazardous waste materials and its disposal method, as required by Section 2.9;
- f. results of confirmatory soil testing, as required by Section 2.10;
- g. assessment of sediment control measures, as required by Section 2.11;
- h. a summary of all surface water and groundwater quality, and groundwater levels, including from previous years, suitably tabulated and graphed, where appropriate, to indicate key water quality trends, as required by Section 2.12;
- i. assessment of quality assurance/quality control data; and
- j. site management and monitoring recommendations related to the mine reclamation.

Additionally, as per Technical Guidance 4: *Environmental Management Act* Authorizations: Annual Reporting under the *Environmental Management Act*, A Guide for Mines in British Columbia (ENV 2016), a summary of refuse discharge provided in an annual report should include:

- o a site map with refuse discharge locations;
- o the annual volume of refuse buried;
- o the annual volume of material recovered and recycled;
- o the annual sludge disposal volume;
- o a description of site maintenance activities; and
- o a table detailing how human wildlife interactions and the wildlife issues were avoided.

This report is submitted by SnipGold to fulfill EMA Permit PR-7927 Condition 3, following the guidance of Technical Guidance 4 for EMA Authorizations (ENV 2016). It captures the environmental, reclamation and closure activities, and waste management activities directly associated with the Main Landfill facility (i.e., authorized point of refuse discharge at JMM). Note that SnipGold also submits annual reports separately to fulfill reporting obligations under *Mines Act* permit M-178 (the Annual Reclamation Report [RTEC 2021a]) and EMA permit PE-8415 (the Annual Permit PE-8415 Report [RTEC 2021b]).

## 2. JOHNNY MOUNTAIN MINE SITE ACTIVITIES - 2020

### 2.1 Overview - 2020

Activity on-site at JMM relates primarily to reclamation and closure of the site as operations have ceased since 1993. Due to the COVID-19 pandemic in 2020 and the associated health and safety risks, activities outlined in the 2020 Project Execution Plan for the non-operating Johnny Mountain mine site were deferred. The Project Execution Plan for 2021 is outline in Appendix B. On site activities in 2020 were limited to meeting compliance requirements in *Mines Act* Permit M-178, EMA Permit PR-7927 and EMA Permit PE-8415.

Compliance activities at the Main Landfill in 2020 included:

- Condition 2.14 Erosion Prevention and Sediment Controls (Wood 2021a).
- Condition 2.15 Main Landfill Water Monitoring, i.e., monitoring of ground and surface water at MW17-22A, MW17-22B, and JM10-2018 (equivalent to Sky Creek 1.0; see Section 9).

### 2.2 Main Landfill - Upgrades

As part of the JMM reclamation and closure program and in order to comply with BC *Landfill Criteria for Municipal Solid Waste* (ENV 2016) and directive from ENV, a review of the Main Landfill facility on site was initiated by SnipGold in 2018. Wood Environment & Infrastructure (Wood; formally AMEC Foster Wheeler [AMECFW]) was contracted to complete a Technical Assessment Report for the Main Landfill that would address the requirements of / Permit PR-7927 and compliance with the relevant legislation (AMECFW 2018). The review resulted in proposed upgrades to the Main Landfill, including separation of waste from groundwater, creation of a facility boundary and control of surface water run-off and run-on. Wood developed and implemented a phased construction schedule that would accommodate the necessary disposal of authorized waste generated from reclamation activities occurring on-site (Wood 2019a). The proposed Main Landfill design put forward by Wood is presented in Figure 2.2-1.

As the Main Landfill is located in close proximity to the TSF, Klohn Crippen Berger (KCB) were contracted by SnipGold to provide drainage details and drainage profiles for the area so that appropriate water management structures were put in place to facilitate the works with minimal impact on water resources in the area (Wood 2019a).

Proposed Phase 1 upgrades to Cell 1 of the Main Landfill were completed ahead of schedule in 2018 allowing for commencement of Cell 2 development and upgrades in the same year (Wood 2019a; Photo 2.2-1).

In 2018 re-grading of the Main Landfill floor to ensure waste material would remain above the natural water table was completed (Wood 2019a). Authorized waste material from Disposal Sites #1, #2 and #3, and from general cleanup around the site were then placed into Cells 1 and 2 by SnipGold and capped with mineral soils (i.e., free of boulders and organic material; Wood 2019a). Additional 2018 upgrades to the Main Landfill also included the installation of ditches around the facility perimeter, dewatering of the area, and installation of a retention berm to the north of the cells.

Figure 2.2-1  
Main Landfill Upgrades - Design





*Photo 2.2-1: Main Landfill - Cell 1 and 2 covered, recontoured and compacted to drain to the TSF (2019).*

Activities relating to the development and upgrades to Cell 2 of the Main Landfill continued between June and September 2019 (Wood 2020a, Wood 2020b). All work on the Main Landfill was completed under the direction of Wood site supervision, with support from SnipGold field managers. AllNorth Engineering provided an initial survey layout for elevation and a construction layout for Cell 1 and Cell 2 of the Main Landfill and performed an as-built survey of all works completed during the 2019 season (Wood 2020a).

In 2019 non-PAG gravel from Borrow Area 1 was placed and compacted at the base leveling course of the Cell 2 area to an elevation of 1098 m (Wood 2020a). Authorized waste material from disposal sites located at Main Warehouse Disposal Site, East-Secondary Warehouse Disposal Site, Portal 11 Mechanics shop, South of Old Tank Farm, North of Old Tank Farm, and the Mill Building were then placed into Cells 1 and 2 by SnipGold (Wood 2020a). Details of the volumes and type of waste materials transferred to the Main Landfill and logged by SnipGold are provided in the annual reports for 2018 and 2019 (RTEC 2019a and 2020e). Once all waste was transferred to the facility, the cells were capped by SnipGold with an interim cover consisting of a layer of mineral soils extracted from Borrow Area #3, to a minimum depth of 300 mm. The soil was subsequently compacted in a manner that would facilitate surface water flow towards the constructed perimeter catchment ditches, which drain to the TSF (Wood 2020a).

The planned activities for 2020 were deferred and therefore there was no additional waste material added to the Main Landfill, nor did any further landfill upgrades occur.

### 3. SPILLS AND ENVIRONMENTAL INCIDENTS - SUMMARY

In 2020, there were no recorded spills or environmental incidents at the Johnny Mountain Mine. Wood conducted a supplementary site investigation in August 2020, part of which involved measuring concentrations of petroleum hydrocarbons in the In-situ Hydrocarbon Remediation Area and evaluating groundwater quality to support annual compliance monitoring requirements for EMA Permit PR-7927 (Appendix D; Wood 2021b).

### 4. ENVIRONMENTAL MONITORING DATA

There are a number of environmental monitoring programs ongoing at the JMM site, and data from these are presented and reported on in the *Iskut Project 2020 Annual Reclamation Report for Mines Act M-178* (RTEC 2021a). The 2020 Iskut Project environmental monitoring programs included monitoring of meteorology, hydrology, water quality, and groundwater.

In addition to the above programs SnipGold are required to collect relevant environmental data during the demolition, waste excavation and associated disposal activities conducted within the scope of EMA permit PR-7927. Programs specified in the conditions of the permit include:

- o Confirmatory soil testing of Disposal Sites #1 and #2 (Condition 2.10);
- o Assessment of erosion prevention and sediment control measures in place (Condition 2.11); and
- o Groundwater and surface water monitoring for the Main Landfill (Condition 2.12).

These programs are discussed in Chapters 7, 8 and 9 respectively of this report. Note that confirmatory soil testing required by Condition 2.10 was completed in 2018.

SnipGold carried out site-wide monitoring for hydrocarbon contamination in 2019. Additional monitoring was conducted by Wood in 2020 as part of the supplementary site investigations, the sampling, analysis and results are presented in detail within Wood's 2020 *Supplementary Site Investigation* report (Appendix D).

#### 4.1 In-situ Hydrocarbon Remediation Area

In 2017 an in-situ hydrocarbon remediation program was developed by NorthWest Response (NWR) and SnipGold initiated implementation of this program in 2018. The designated treatment area used is located on the footprint of the Old Tank Farm and a portion of the general mine site (Figure 1.2-1).

As a result of the ongoing remediation program, there is a stockpile of soil that was excavated in 2018 and contains approximately 3,000 m<sup>3</sup> of soil (i.e., Treatment Area 1; Appendix D: Figure 7). In 2019 an additional 6,000 m<sup>3</sup> of contaminated soil was excavated from unauthorized disposal sites and placed into a stockpile adjacent to Treatment Area 1 (i.e., Treatment Area 2). Within these treatment areas, a total of 9,000 m<sup>3</sup> of soil was treated during the 2018 and 2019 reclamation season.

Wood's 2020 scope of work included the completion of year-end sampling of Treatment Area 1 and Treatment Area 2. The treated soil was evaluated for petroleum hydrocarbon constituents, nutrients, moisture content, pH and hydrocarbon utilizing bacteria (HUB). The assessment of the efficacy of the remediation program was also included within the 2020 scope of work (Appendix D).

On August 29, 2020, Wood completed six hand dug test pits (TP20-1-1 to TP20-1-6) to a depth of 1 metre below ground level (mbgl) within Treatment Area 1 and twelve test pits (TP20-2-1 to TP20-2-12) to a depth of 1 mbgl within Treatment Area 2 to assess hydrocarbon concentrations in soil. One sample was collected from each test pit, and two duplicate soil samples were obtained from each treatment area. The soil samples were sent to the ALS Laboratory in Burnaby for testing for soil moisture, available nitrogen as nitrate and phosphorus as phosphate, HUB and total organic carbon (TOC; Appendix D).

The soil type encountered during hand dug test pits within Treatment Areas 1 and 2 was consistent with that observed during the 2017, 2018 and 2019 works and included a variable clay/silt/sand/gravel fill. Hydrocarbon odour was observed during test pitting for sample TP20-02-02 in Treatment Area 2. No odour was observed for all the other samples at Treatment Areas 1 and 2. Details of the sampling results are presented within Section 5 of the *Wood 2020 Supplementary Site Investigation Report* (Appendix D).

#### 4.2 Human-Wildlife Interactions

No human-wildlife interactions occurred in 2020.

### 5. MAIN LANDFILL - WASTE INVENTORY

No waste was added to the Main Landfill in 2020.

### 6. SUSPECTED HAZARDOUS WASTE

There are no known areas of suspected hazardous waste at Johnny Mountain Mine. In 2020, no hazardous waste was encountered at the site during compliance monitoring.

### 7. CONFIRMATORY SOIL TESTING FOR DISPOSAL SITES #1 AND #2

An official warning was issued by ENV to Skyline Gold Corporation (previous owners) in 2008 for the unauthorized burning and burial of waste (Appendix H). The letter issued determined that Skyline Gold was in non-compliance with Section 6(3) of the *Environmental Management Act* and that remediation of the waste was required. In 2018 SnipGold contracted NWR to complete the excavation and removal of the waste material from Disposal Sites #1 and #2 and a third undocumented site, Disposal Site #3 (NWR 2018a). In order to comply with Condition 2.10 of EMA Permit PR-7927, soil and water samples were collected by NWR during the excavation and waste transfer program associated with Disposal Sites #1 and #2 (NWR 2018a). Confirmatory soil sampling and analysis was completed for both disposal sites in 2018 as per Condition 2.10 and detailed results were provided in NWR's *Removal and Transfer of Waste Materials from Disposal Sites #1 and #2* report (NWR 2018a; RTEC 2019a).

Once all waste was removed from Disposal Sites #1, #2 and #3, NWR and SnipGold site staff conducted a program of test pitting around the perimeter of the excavated pit to confirm the extent of the disposal pit and ensure that all waste material had been removed from the area. Test pits were dug every 7 m along the perimeter to the same depth of the pit (4.5 m; NWR 2018a). No additional waste materials were detected. In compliance with Condition 2.10 of EMA permit PR-7927, a number of soil and water samples were collected by NWR during the excavation and waste transfer program (NWR 2018a). NWR identified the primary contaminant of concern as petroleum hydrocarbons and interpretation of the analysis indicated that no petroleum hydrocarbons were detected in Disposal



Site #2 (NWR 2018a). Elevated levels of total zinc were noted however NWR suggested that waste disposal was not the likely cause (RTEC 2019a).

Once all waste was removed and transferred to the Main Landfill, NWR directed the excavator operators to slope the side-walls of the pits for safety purposes and leave the pit open with a suitable drainage system to prevent pooling of precipitation (NWR 2018a). As part of the reclamation activities Disposal Site #2 was levelled and backfilled with mineral soils (i.e., free of boulders and organic material) local to the area. The site was then re-contoured and seeded (RTEC 2019a). The area was reclaimed in a manner that would prevent the ponding of surface water and reduce erosion.

In 2021, SnipGold received confirmation that ENV does not anticipate that they will conduct further inspections on the matters referred to in the 2008 warning letter (pers. comm. B. Vroom, 2021; Appendix I). SnipGold understands it is the responsibility of the waste discharger to comply with the EMA and its regulations, including the *Contaminated Sites Regulation*.

## 8. SEDIMENT CONTROL MEASURES EFFICACY

As a requirement of EMA Permit PR-7927, SnipGold were required to integrate appropriate erosion prevention and sediment control measures into the Main Landfill Upgrades. Once completed a Qualified Professional must annually assess those controls are being undertaken and are effective.

From 2018 to 2019 Wood supervised the installation of new drainage systems at the Main Landfill as detailed in the previous annual reports (RTEC 2019a, 2020e). SnipGold in collaboration with Wood developed an Erosion and Sediment Control Plan for the Main Landfill upgrades (Appendix C of Appendix C; Wood 2021a).

Ditches and swales were installed on site over the 2017 and 2018 reclamation seasons to manage surface flows and direct runoff water toward historic channels. The 2019 season included the re-establishment of collection channels to effectively maintain drainage across the site and control sedimentation, and mitigate erosion.

In 2020, the Main Landfill inspection and assessment was conducted by Wood personnel on August 29, 2020 (Appendix C). The below text and photographs have been extracted from Appendix C.

During the inspection of the Main Landfill (i.e., Cells 1 and 2) minor erosion, ponding and sedimentation deficiencies were noted (Photo 8-1). These deficiencies included minor erosion on the north slopes of Cell 2, west slopes of Cell 1, and south slopes of Cell 2 (Photos 8-2 and 8-3). Some metal was also exposed where surface water had eroded the interim cover material along the north slopes of Cell 2 (Photo 8-4). Self-armouring of gravel and cobbles in the silty kame material was observed in these erosional locations (Appendix C).

Additionally, minor ponding of water was observed in the following locations:

- Northeast access road of the Main Landfill;
- along the north edge of Cell 2; and
- along the borrow area in the immediate southern edge of Cell 1, west of the culvert.

Wood stated that the erosion prevention and sediment control measures were observed to be effective despite the minor erosion noted above. Wood recommends that the deficiencies be addressed in 2021 prior to the continuation of any waste placement or landfill upgrades.



*Photo 8-1: Vantage point photo of southeast corner of the Main Landfill looking east. Ponding water over low section of TSF where drainage from Main Landfill enters TSF.*



*Photo 8-2: Vantage point photo of south edge of Main Landfill looking northeast. Minor erosion was noted on south slope of Main Landfill.*



*Photo 8-3: Vantage point photo along western slope of the Main Landfill looking east. Minor rill erosion was noted.*



*Photo 8-4: Close up of erosion noted on north slope including some exposed metal.*

Wood in the capacity of Qualified Professionals state that following their site inspection and assessment conducted in 2020, erosion prevention and sediment control measures implemented as part of the Main Landfill Erosion and Sediment Control Plan are deemed effective.

## 9. SURFACE AND GROUNDWATER MONITORING

### 9.1 Groundwater Monitoring during Site Investigation

From 2017-2020, SnipGold contracted Wood to conduct a site investigation (SI) and supplementary site investigations (SSI) that included groundwater sampling (AMECFW 2018; Wood 2019; Wood 2020b). The groundwater sampling was intended to capture potential trends in groundwater quality in the areas

around the two disposal sites, mill building, old tank farm, and main landfill. Results of the groundwater sampling, maps and information on other aspects of the site investigation can be found in the appended *Wood 2020 Supplementary Environmental Site Investigation Report* (Appendix D). The following results summary was provided by Wood (2020b), and the full report with the analytical results is available in Appendix D.

Monitoring wells were drilled in nested pairs such that the well designated as ‘A’ had the screen set within the competent bedrock while the well designated as ‘B’ had the screen either within the weathered shallow bedrock or straddling the bedrock-aternary sediment interface (Table 9.1-1). Generally, nested well pairs were completed within 3 m of each other and were never completed within the same borehole.

Table 9.1-1: Groundwater Wells

Well No.	Easting	Northing	Elevation <sup>1</sup>	2020 Water Quality Samples	
				Petroleum Hydrocarbons	Other Water Quality Parameters
17-1A	372693.958	6277903.336	1083.786		
17-1B	372695.042	6277902.436	1083.696		
17-2A	372718.882	6277890.468	1083.465		
17-2B	372717.598	6277890.976	1083.669		
17-3	372746.416	6277880.225	1083.984		
17-4A	372701.537	6277921.720	1083.779	x	
17-4B	372700.950	6277920.335	1083.813	x	x
17-5A	372754.017	6277916.918	1083.956		
17-5B	372753.034	6277917.649	1084.056		x
17-6A	372744.004	6277921.232	1083.919	x	
17-6B	372742.001	6277921.855	1083.919	x	x
17-7A	372713.666	6277931.743	1083.775	x	
17-7B	372714.526	6277931.537	1083.799	x	
17-08A	372766.873	6277811.477	1098.827		
17-08B	372767.491	6277812.932	1098.829		
17-09A	372642.880	6277814.643	1084.576		x
17-09B	372640.747	6277814.965	1084.379		x
17-10A	372572.820	6277778.395	1076.470		
17-10B	372571.985	6277779.834	1076.336		
17-11A	372203.570	6277629.878	1047.410		x
17-11B	372205.103	6277630.548	1048.087		x
17-12A	372762.660	6278079.394	1087.818	x	
17-12B	372764.104	6278079.428	1087.800	x	
17-13	372823.236	6278104.818	1091.940		
17-14A	372965.871	6278144.488	1099.533		x
17-14B	372967.688	6278145.377	1099.433		

Well No.	Easting	Northing	Elevation <sup>1</sup>	2020 Water Quality Samples	
				Petroleum Hydrocarbons	Other Water Quality Parameters
17-15A	373081.531	6278140.495	1104.776		
17-15B	373082.544	6278141.171	1104.865		
17-16	372880.344	6278039.610	1096.101		
17-17A	372811.595	6278071.755	1091.468	x	
17-17B	372810.540	6278071.741	1090.850	x	
17-18A	372547.945	6278175.680	1088.468		
17-18B	372548.780	6278175.829	1088.407		
17-19A	372378.340	6278077.084	1085.623		
17-19B	372379.171	6278077.661	1085.503		
17-20A	372364.057	6278274.283	1096.742	x	
17-20B	372363.701	6278275.205	1096.739	x	
17-21A	372262.620	6278384.328	1105.499		x
17-21B	372262.968	6278383.425	1105.461		x
17-22A	372518.212	6278611.596	1090.672	x	x
17-22B	372518.625	6278610.891	1090.776	x	x
17-23A	372620.792	6278634.639	1092.821	x	
17-23B	372619.845	6278635.060	1092.853		
17-24A	372507.015	6278880.354	1082.008		x
17-24B	372507.205	6278879.505	1082.072		x
17-25A	372848.366	6278555.470	1088.441		x
17-25B	372848.728	6278554.379	1088.382		
17-26A	373076.278	6278334.141	1105.428		x
17-26B	373075.647	6278333.276	1105.700		x
17-27A	373272.974	6279424.474	1065.484		x
17-27B	373272.198	6279423.126	1065.348		x
17-28	372028.969	6277284.894	1007.896		

Notes:

*Petroleum hydrocarbons included: Benzene Toluene Ethylbenzene and Xylene (BTEX), light and heavy extractable petroleum hydrocarbons (LEPH and HEPH), and Polycyclic Aromatic Hydrocarbons (PAH); other water quality parameters included physical parameters, major ions and nutrients, and dissolved metals.*

<sup>1</sup> Elevations were measured at the top of the PVC pipe.

Groundwater samples were collected in August 2020 (Table 9.1-1; additional information in Appendix D, Table 3). During the period of August 23 to 28, 2020, Wood collected groundwater samples from monitoring wells MW17-04A, MW17-04B, MW17-05B, MW17-06A, MW17-06B, MW17-07A, MW17-07B, MW17-09A, MW17-09B, MW17-11A, MW17-11B, MW17-12A, MW17-12B, MW17-14A, MW17-17A, MW17-17B, MW17-20A, MW17-20B, MW17-21A, MW17-21B, MW17-22A, MW17-22B, MW17-23A, MW17-24A, MW17-24B, MW17-25A, MW17-26A, MW17-26B, MW17-27A and MW17-27B. Further information on monitoring, sampling, and QA/QC of these groundwater samples is provided in Appendix D.

### 9.1.1 2020 Results

The following provides a summary of the 2020 groundwater quality results as presented in Wood (2021b). Please refer to Appendix D for additional maps, figures and details. For discussion purpose only, a parameter was considered elevated if it exceeded five-times the laboratory method detection limit.

#### 9.1.1.1 Petroleum Hydrocarbons

- Groundwater sample MW17-6B, located within APEC 1 (Mill and 10 Level Portal), contained elevated concentrations of acenaphthene (0.061 µg/L) and methylnaphthalene (0.056 µg/L).
- Groundwater sample MW17-12A, located within APEC 14 (Fuel Lines), contained an elevated concentration of LEPH<sub>w</sub> (530 µg/L).
- Groundwater sample MW17-17A, located within APEC 14 (Fuel Lines), contained an elevated concentration of methylnaphthalene (0.124 µg/L).
- Groundwater sample MW17-20A, located downstream of the Tailings Impoundment, contained elevated concentrations of methylnaphthalene (0.182 µg/L) and naphthalene (0.165 µg/L).
- Groundwater samples collected from monitoring well MW17-22A, located at the Main Landfill, contained elevated concentrations of ethylbenzene (2.14 µg/L), methylnaphthalene (3.63 µg/L), and naphthalene (4.27 µg/L).
- A light non-aqueous phase liquid (LNAPL; measurement of 1 cm) was measured with a Heron interface probe within monitoring well MW17-17B located within APEC 14 (Fuel Lines). The presence of LNAPL was also verified visually with a bailer.

#### 9.1.2 Dissolved Metals

- Groundwater sample MW17-5B, located within APEC 1 (Mill and 10 Level Portal), contained elevated concentrations of cobalt (1.94 µg/L) and manganese (5,700 µg/L);
- Groundwater sample MW17-9A, located within APEC 10 (Burial Site 1), contained an elevated concentration of iron (1,970 µg/L), lithium (8.5 µg/L) and manganese (1,760 µg/L);
- Groundwater sample MW17-9B, located within APEC 10 (Burial Site 1), contained elevated concentrations of cobalt (2.96 µg/L) and manganese (3,320 µg/L);
- Groundwater sample MW17-14A, located within APEC 12 (Burial Site 2), contained an elevated concentration of iron (3,800 µg/L).
- Groundwater sample MW17-27A, located within APEC 11 (Airstrip), contained elevated concentrations of cobalt (1.44 µg/L);
- Groundwater sample MW17-24A, located downstream Sky Creek Drainage, contained an elevated concentration of Lithium (8.4 µg/L).
- Groundwater sample MW17-21A, located downstream Sky Creek Drainage, contained an elevated concentration of Lithium (8.5 µg/L).

The remaining groundwater samples analyzed for dissolved metals reported concentrations that are below the detection limits, less than five times the MDL and/or marginal and not considered significant.

#### 9.1.2.1 Alkalinity, Major Ions and Nutrients

Groundwater samples were submitted for laboratory analysis of alkalinity, ions and nutrients. Groundwater samples analyzed for alkalinity, major ions and nutrients reported concentrations that are below the detection limits, less than five times the MDL and/or marginal and not considered significant.

#### 9.1.2.2 Quality Assurance and Quality Control

To ensure quality of data, a field duplicate was taken to measure possible field sampling error or local environmental heterogeneity. Duplicate samples are taken at a frequency of 1 out of 10 for groundwater samples. Relative percent difference (RPD) values are calculated for each duplicate that has a concentration at or greater than five times the reported detection limit. A summary of RPDs for duplicate samples collected is provided in Appendix D.

The BC Field Sampling Manual (ENV 2013) identifies RPD values >20% as an indication that a possible problem exists, and >50% indicates that a definite problem exists, most likely either through contamination or lack of sample representativeness (ENV 2013). During the 2017 to 2020 investigations, a total of ten soil duplicate samples and nine groundwater duplicate samples were analyzed for concentrations of hydrocarbons, metals, PAHs, Volatile Organic Compounds (VOCs) and major ions.

The RPD values for a total of 773 groundwater parameters were calculated. Out of 773 groundwater RPDs, a total of 10 metal parameters had a calculated RPD value greater than 50% and one hardness parameter had a calculated RPD value greater than 20%. The remaining groundwater RPDs were either below the target RPD of 20% or not calculated due to concentrations reported as less than the detection limit or less than five times the detection limit.

Some errors in sampling are anticipated during a large site investigation and this can be further compounded by the heterogeneity of concentrations in soil; however, overall the field QA/QC project has met the data quality objectives (Appendix D).

#### 9.1.2.3 2017 to 2020 Overview

The 2020 results were compared to results from 2017, 2018 and 2019 to establish trends over time. Light-end petroleum hydrocarbon (BTEX) concentrations were detectable in the groundwater samples from the deep well (MW17-22A) in 2018 and 2019; however, elevated concentrations of toluene and xylenes were not identified in the 2020 sampling event, as it was during the previous groundwater sampling event. Concentrations of ethylbenzene were observed but were more than three times lower than the one observed in 2019. Concentrations of BTEX were not detected in the groundwater samples from the shallow well (MW17-22B) in 2020. Concentrations of heavier end hydrocarbons (VHW, LEPHW) were not detected in groundwater samples collected from the shallow well (MW17-22B) or in the deep well (MW17-22A) in 2020, confirming the results of 2019. Concentrations of naphthalene in groundwater from MW17-22A were detectable in 2020; and measured concentrations were slightly higher than the 2019 sampling events. However, the concentrations were still lower than those observed in 2017 and 2018. No PAHs were detected in the shallow well (MW17-22B). Concentrations of ethylbenzene, xylenes and naphthalene in groundwater at the deep well (MW17-22A) demonstrate a steady declining trend over time, which is likely attributed to the natural attenuation of a finite and localized source.

Concentrations of dissolved metals in the groundwater samples from MW17-22A and MW17-22B were reported at low levels for all sampling events in 2017, 2018, 2019 and 2020. The measured dissolved metals concentrations from the 2020 sampling are consistent with concentrations observed during the previous Site Investigation.

Total metals in groundwater samples were analyzed in 2019 and 2020. The results indicated that the groundwater sample collected from the shallow groundwater well MW17-22B contained an elevated concentration of total cobalt in 2019. In 2020, cobalt concentration was lower than the MDL. It should be noted that analysis of dissolved metals in groundwater well MW17-22B in 2017, 2018, 2019, and 2020 did not identify elevated concentrations of metals.

All cyanide species were reported at low concentrations in groundwater samples collected from both MW17-22A and MW17-22B during the 2017, 2018, 2019 and 2020 sampling events (Appendix H; Wood 2019b).

## 9.2 Permit PR-7927 Required Monitoring

Surface water and groundwater quality samples were collected and groundwater levels recorded in 2020 to comply with requirements in Permit PR-7927. Permit PR-7927 requires annual monitoring during the summer of two groundwater sites (MW17-22A and MW17-22B), and one surface water site (JM10-2018). Annual sampling was initiated in 2018, and is required for a period of five years. Table 9.2-1 provides the sites, descriptions, and required sampling outlined in Permit PR-7927 and Figure 1.2-1 illustrates the sampling locations.

Table 9.2-1: Surface Water and Groundwater Monitoring Requirements under Permit PR-7927

Monitoring Sites	Location Description	Coordinates	Monitoring Period, Parameters and Frequencies	
			Water Quality	Water Level
MW17-22A (existing site)	Deep monitoring well downgradient from the Main Landfill.	372519, 6278611	A <sup>1</sup>	A
MW17-22B (existing site)	Shallow monitoring well downgradient from the Main Landfill.	372519, 6278610	A <sup>1</sup>	A
JM10-2018 (new site) <sup>3</sup>	New surface water station on a tributary to Sky Creek, downslope from the Main Landfill and upstream from MW17-22.	372498, 6278574	A <sup>2</sup>	-

Notes:

A = Annually (during summer)

<sup>1</sup> Field Parameters: specific conductivity, temperature, ORP, and pH Analytical parameters: BTEX, EPH, PAH, dissolved metals, pH, alkalinity, bicarbonate, carbonate, chloride, conductivity (EC), fluoride, hardness, hydroxide, total iron, total magnesium, total manganese, nitrate, nitrite, ammonia, total potassium, total sodium, sulphate, TDS, TIC, TOC, COD and turbidity, acidity (hot peroxide titration) and cyanides (WAD, free, total, cyanate and thiocyanate).

<sup>2</sup> Field Parameters: specific conductivity, temperature and pH. Analytical parameters: BTEX, EPH, PAH, total metals, pH, alkalinity, bicarbonate, carbonate, chloride, conductivity (EC), fluoride, hardness, nitrate, nitrite, ammonia, sulphate, TDS, TIC, TOC, COD and turbidity, acidity (hot peroxide titration) and cyanides (weak acid dissociable (WAD), free, total, cyanate and thiocyanate).

<sup>3</sup> Internally revised to JM10-2018, this is equivalent to Sky Creek 1.0 listed in Permit PR-7927

### 9.2.1 Methodology

Compliance groundwater and surface water quality samples and groundwater levels were collected August 23 and 28, 2020.

Groundwater levels were measured at nine of eleven standpipe piezometers in August 2020. A Solinst® Model 101B electric water level meter was used. P89-01 was unable to be located and an accurate water

level reading could not be taken at P89-03 due to well damage. The results of the 2020 groundwater level monitoring program are summarized in Appendix E (RTEC 2021a).

Surface water and groundwater sampling was conducted in accordance with the provisions of provincial guidance documents, including the *British Columbia Field Sampling Manual* (ENV 2013) and *Technical Guidance on Contaminated Sites, Groundwater Investigation and Characterization* (ENV 2017). Samples were analyzed for a full suite of parameters, which included the parameters listed in the notes to Table 9.2-1.

#### 9.2.1.1 Groundwater Sampling

Groundwater samples were collected using dedicated HDPE tubing and a peristaltic pump. Water was purged from monitoring wells prior to collecting samples. Where inflow rates were adequate, water was purged until field parameters measured in a flow through cell stabilized. Field parameters were measured in the flow through cell immediately prior to sample collection. Bottles were pre-charged with preservative, except for metals samples, which were preserved at the laboratory, as per ALS Laboratories recommendations. Dissolved nutrients, metals, and mercury were filtered in the field. After collection, samples were kept cool (4°C) until analysis by ALS Laboratories (Burnaby, BC).

#### 9.2.1.2 Surface Water Sampling

Water samples were collected while facing upstream by submerging the general parameters bottle until it was almost full. Bottles pre-charged with preservatives were then filled from the general parameters bottle. Nutrients and cyanides were preserved at the time of collection, while metals samples were preserved at the laboratory, as per ALS Laboratories recommendations. Dissolved nutrients, metals, and mercury were filtered in the field. After collection, samples were kept cool (4°C) until analysis by ALS Laboratories (Burnaby, BC).

#### 9.2.1.3 Data Analysis

There are no water level or water quality limits or compliance criteria specified within Permit PR-7927. For the purposes of the results discussion, water quality samples were compared to the applicable water quality guideline on a sample-by-sample basis. Water quality guidelines were used to benchmark observed concentrations and provide a general characterization of the mine site, where appropriate. These guidelines are not discharge limits and are not included as an evaluation of compliance with permit conditions.

Water quality parameters in groundwater from MW17-22A and MW17-22B were plotted and compared with the British Columbia Contaminated Sites Regulation (CSR) for Freshwater Aquatic Life (BC CSR 2021). pH was compared with the British Columbia Ministry of Environment Freshwater Aquatic Life Guideline (FAL; ENV 2019), as the CSR guidelines do not specify a pH range.

Water quality parameters in surface water samples collected from JM10-2018 were compared to approved and working Freshwater Aquatic Life Water Quality Guidelines (BC FAL WQG; ENV 2019, 2021). BC FAL WQG are not authorized discharge limits and do not represent an assessment of compliance with permit conditions related to authorized discharge characteristics. These comparisons are to provide a benchmark for general characterization of the local non-fish-bearing mine site area.



## 9.2.2 Results

### 9.2.2.1 Assessment of Compliance with Permit PR-7927

In 2020, the sampling requirements outlined in Permit PR-7927 were met for both groundwater and surface water sites.

All permit-specified parameters (Table 9.2-1) were measured in groundwater obtained from the two nested groundwater wells, MW17-22A and MW17-22B, and surface water samples obtained from JM10-2018. Analytical results for all sites and parameters are provided in Appendix F. The permit requires annual sample collection for five consecutive years starting in 2018, thus 2020 was the third year of sample collection.

#### 9.2.2.2 Groundwater Monitoring

##### Hydrocarbons and Polycyclic Aromatic Hydrocarbons

In the August 2020 samples for MW17-22A, concentrations of benzene, toluene, and xylene were not detected while ethylbenzene concentrations were low (Figures 9.2-1 and 9.2-2). Concentrations of heavier end hydrocarbons including volatile hydrocarbons extracted in water (VHW), light extractable petroleum hydrocarbons in water (LEPHw) and extracted petroleum hydrocarbons (EPH<sub>10-19</sub>) were not detected (Figure 9.2-3; Appendix F). Concentrations of naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene in groundwater from MW17-22A decreased compared to previous years (Figure 9.2-3; Appendix F).

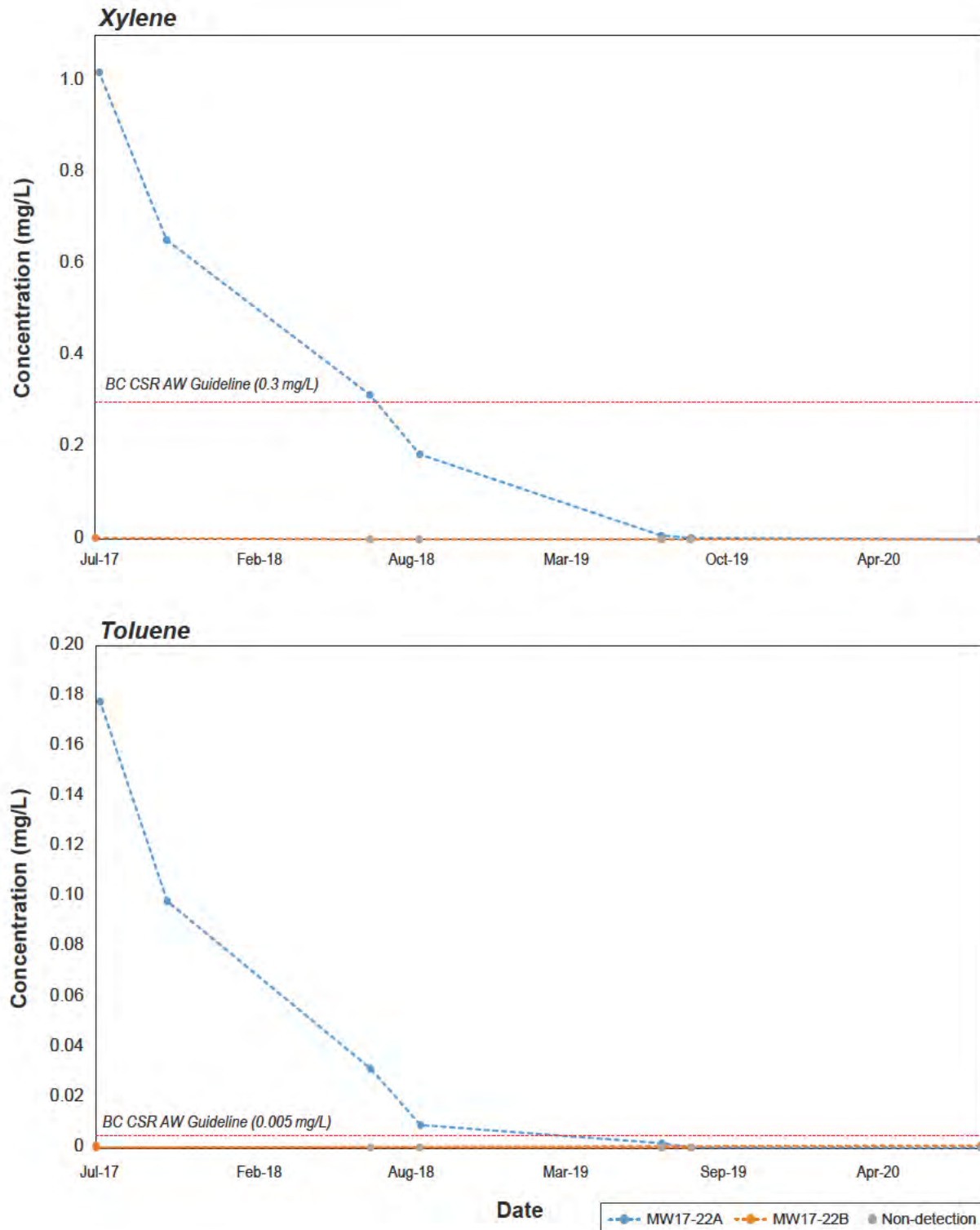
Concentrations of benzene, toluene, ethylbenzene, and xylene (BTEX; Figures 9.2-1 to 9.2-2), naphthalene (Figure 9.2-3), VHW, HEPHw, and EPH<sub>10-19</sub> were not detected in the groundwater samples from the MW17-22B (Appendix F). In 2020, all measured hydrocarbon and polycyclic aromatic hydrocarbon concentrations measured in samples collected from MW17-22A and MW17-22B were below the BC CSR Freshwater Aquatic Life guidelines.

##### Physical Parameters and Major Ions

Laboratory pH values at both MW17-22B and MW17-22A were circumneutral and within the BC FAL WQG range of 6.5 to 9 (Figure 9.2-4). Alkalinity results in 2020 indicate that both wells have a dominant bicarbonate speciation, consistent with results from previous years (Appendix F). Fluoride concentrations in groundwater from MW17-22A are higher than those observed at MW17-22B (Figure 9.2-4). Chloride concentrations were less than the detection limit (0.5 mg/L) in 2020 at both MW17-22B and MW17-22A in 2020 (Appendix F) and concentrations of sulphate and nitrate were reported at low concentrations (Figure 9.2-5).

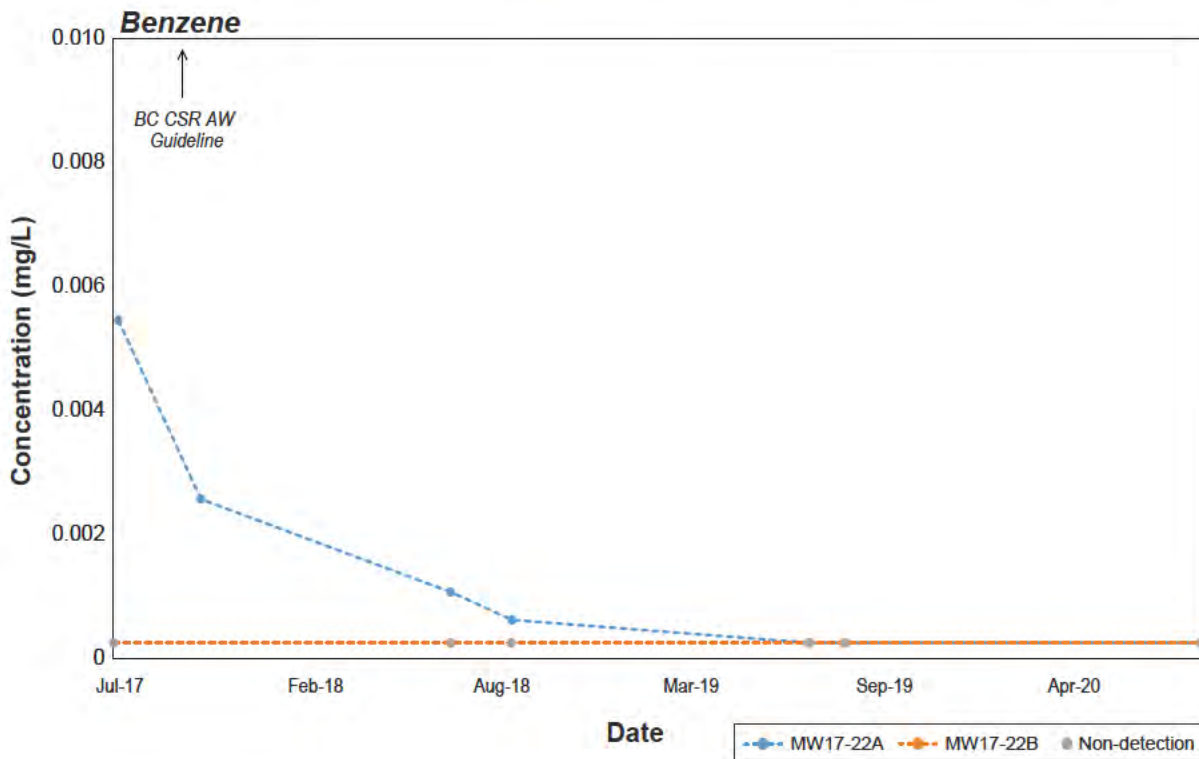
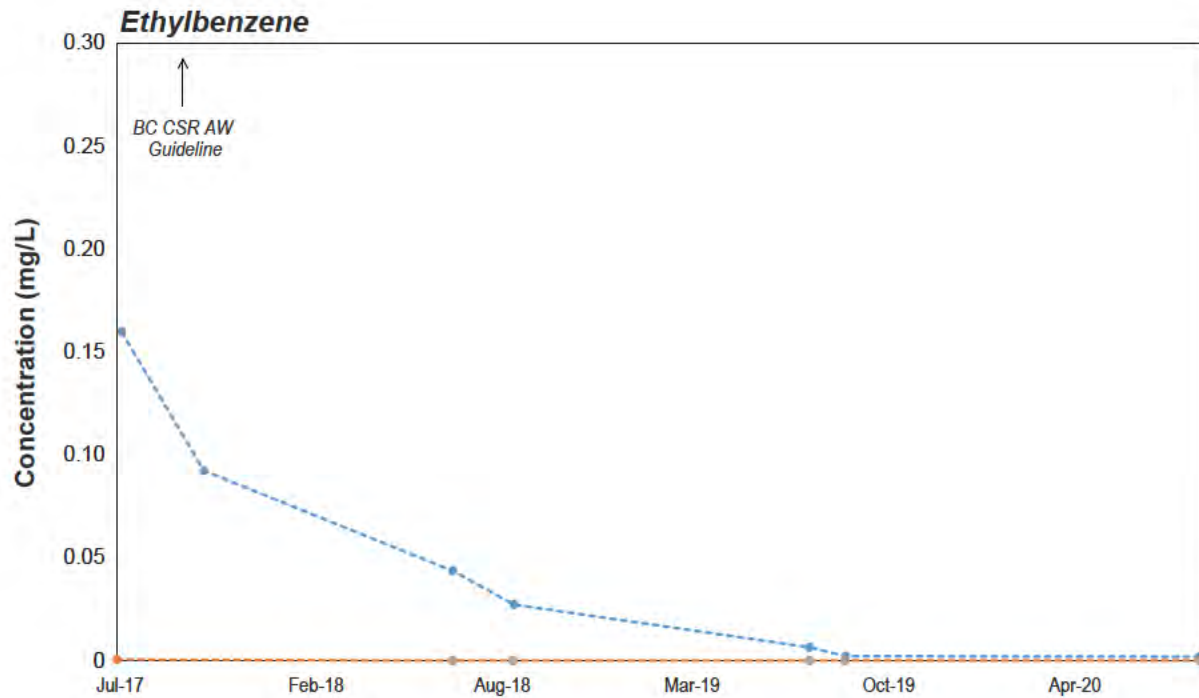
Dissolved metal concentrations in groundwater samples from MW17-22A and MW17-22B were less than the BC CSR Freshwater Aquatic Life Guidelines for sampling events since 2017 (Figures 9.2-6 to 9.2-12), and are interpreted to represent background metal concentrations. There were no consistent increasing or decreasing trends indicative of changes in dissolved metal concentrations. Typically, the deep groundwater reserves (MW17-22A) tended to have higher concentrations of dissolved metals compared to the shallow groundwater reserves (MW17-22B).

Cyanide species were reported below the detection limit in groundwater samples collected from both MW17-22A and MW17-22B during sampling events since 2017 with the exception of July 2019 when thiocyanate was detected at concentrations less than two-times the detection limit (Appendix F).



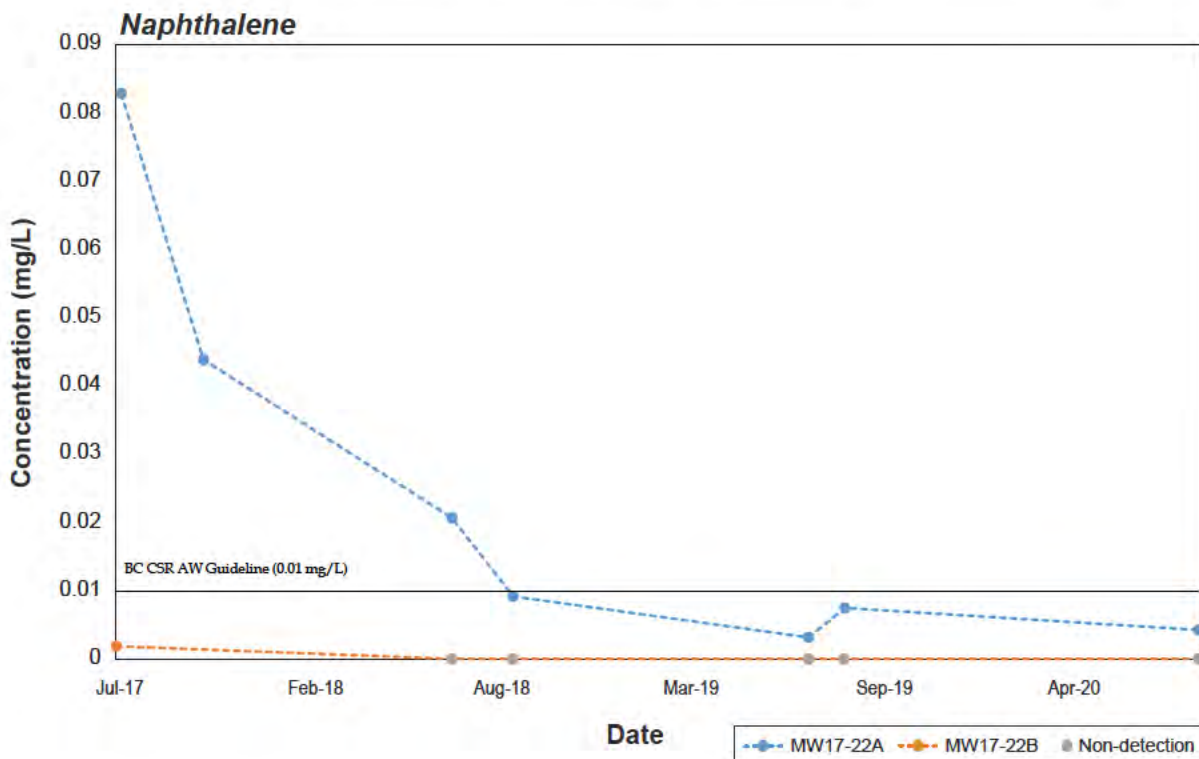
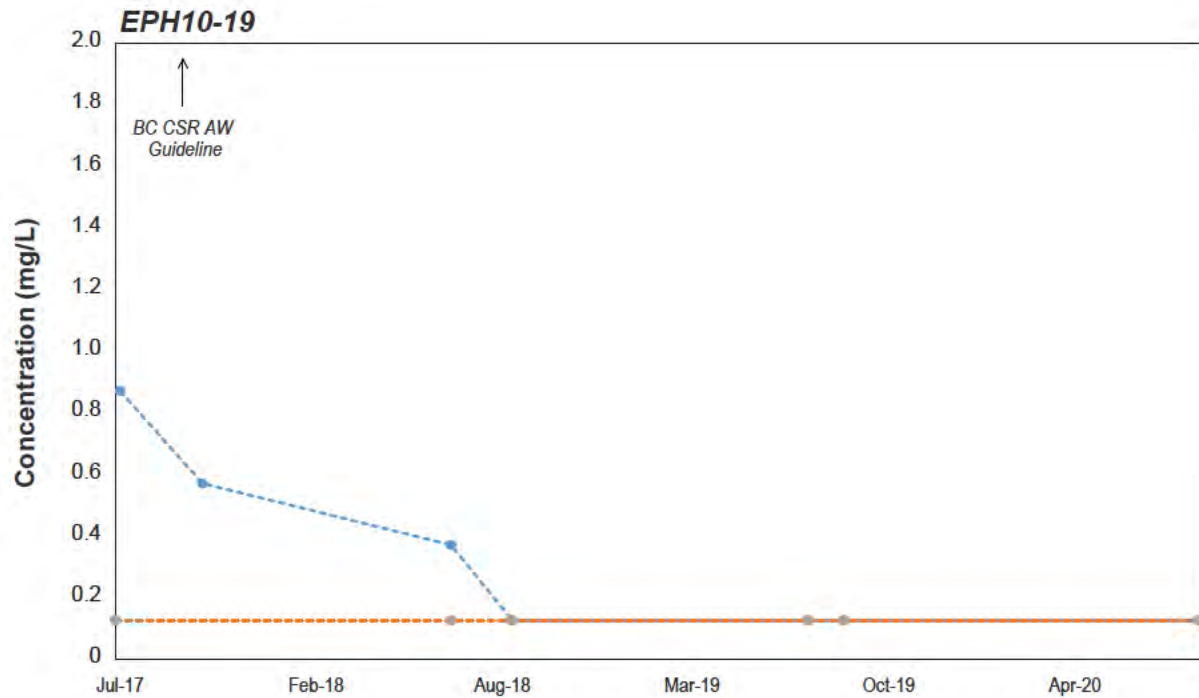
Notes: BC CSR AW = British Columbia Contaminated Sites Regulation for Freshwater Aquatic Life.

**Figure 9.2-1: Johnny Mountain Mine Main Landfill Xylene and Toluene**



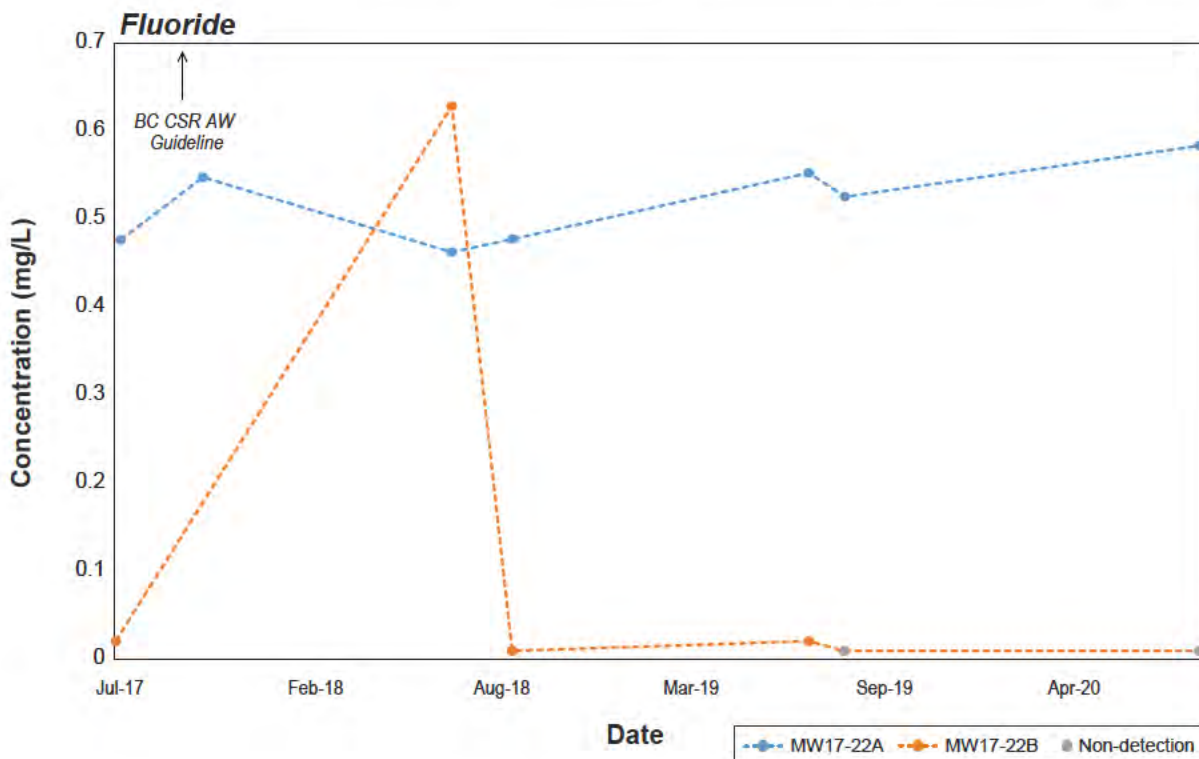
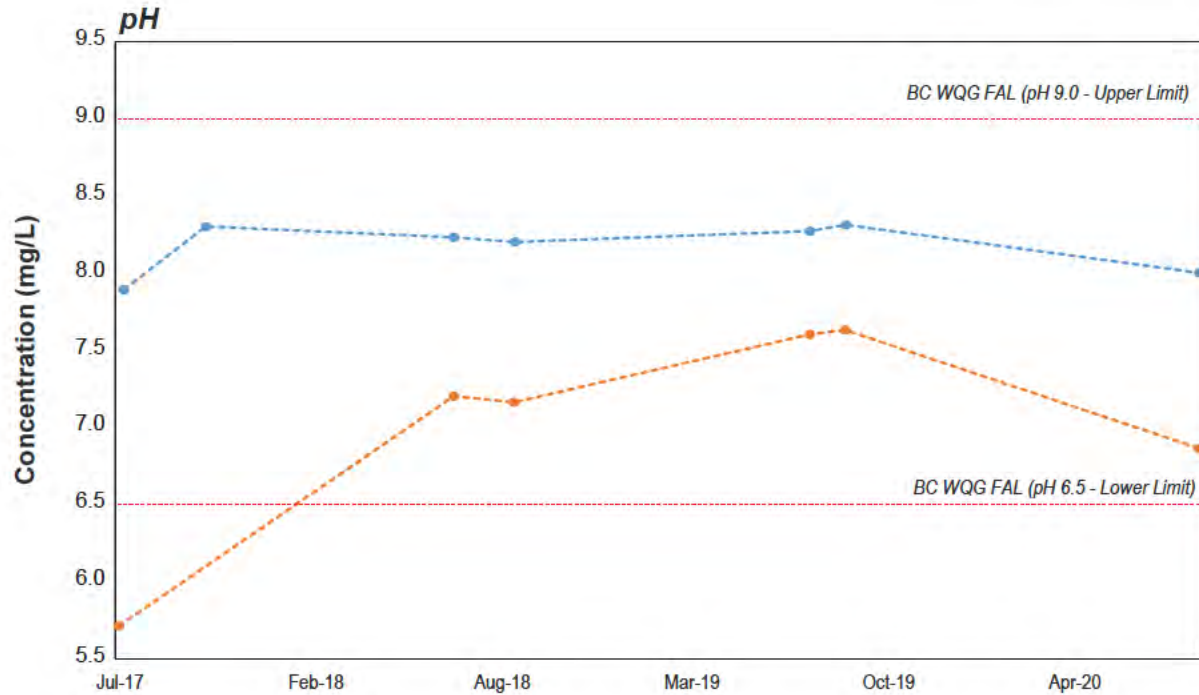
Notes: BC CSR AW = British Columbia Contaminated Sites Regulation for Freshwater Aquatic Life.

**Figure 9.2-2: Johnny Mountain Mine Main Landfill Ethylbenzene and Benzene**



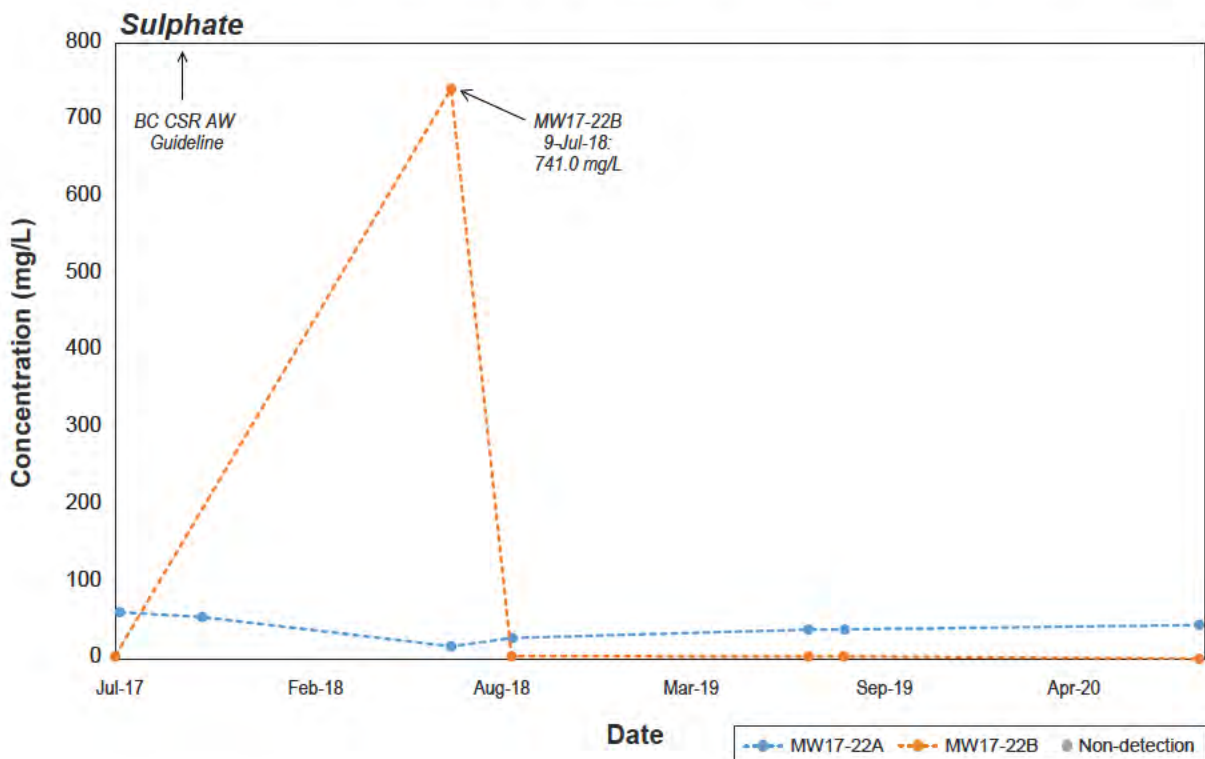
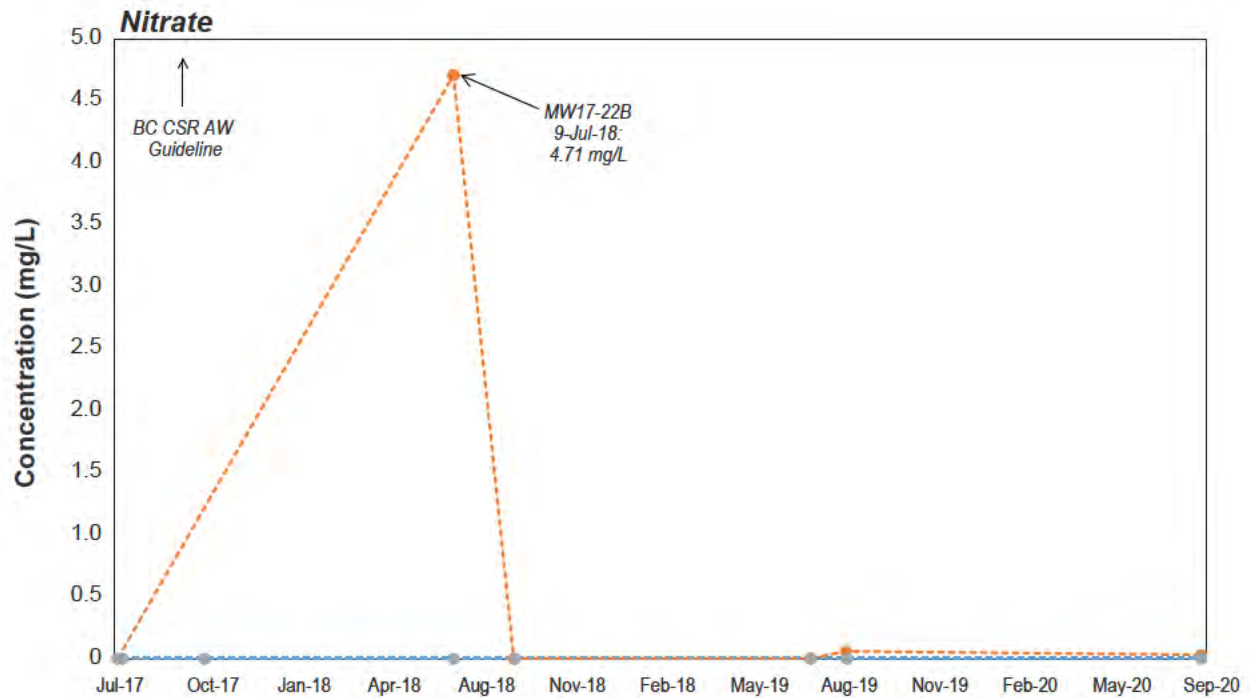
Notes: BC CSR AW = British Columbia Contaminated Sites Regulation for Freshwater Aquatic Life.

**Figure 9.2-3: Johnny Mountain Mine Main Landfill EPH10-19 and Naphthalene**



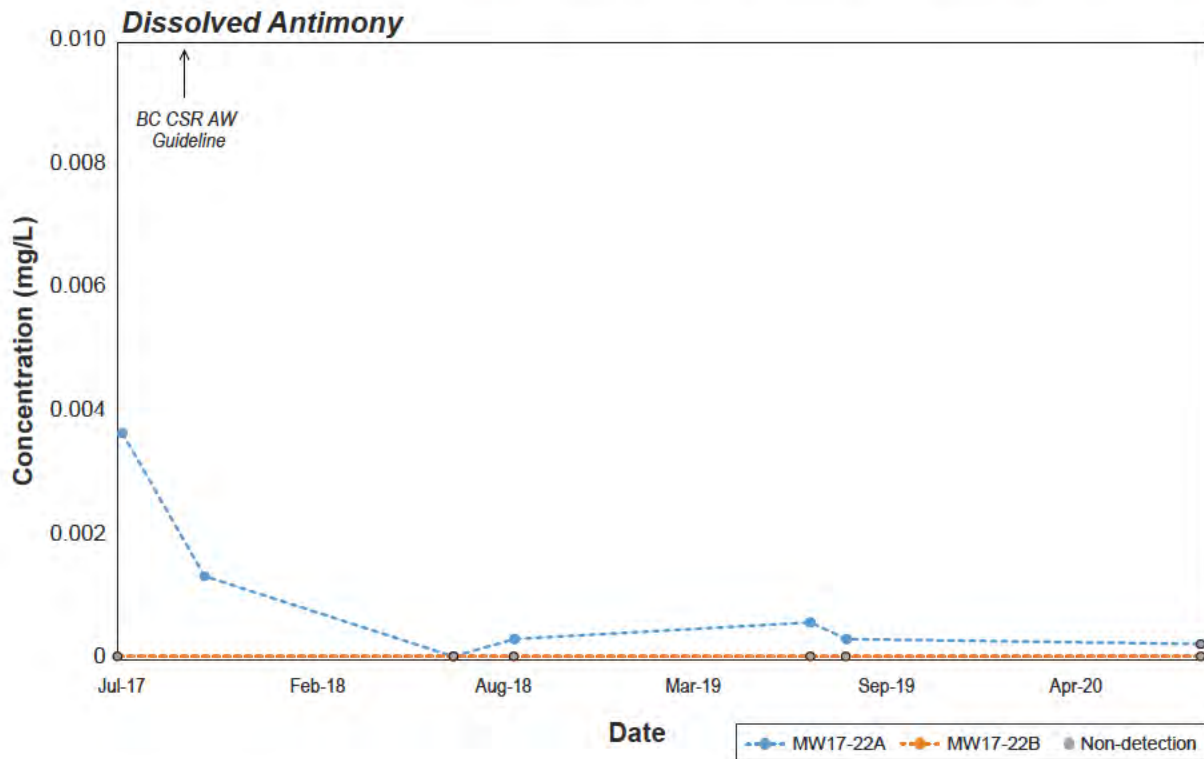
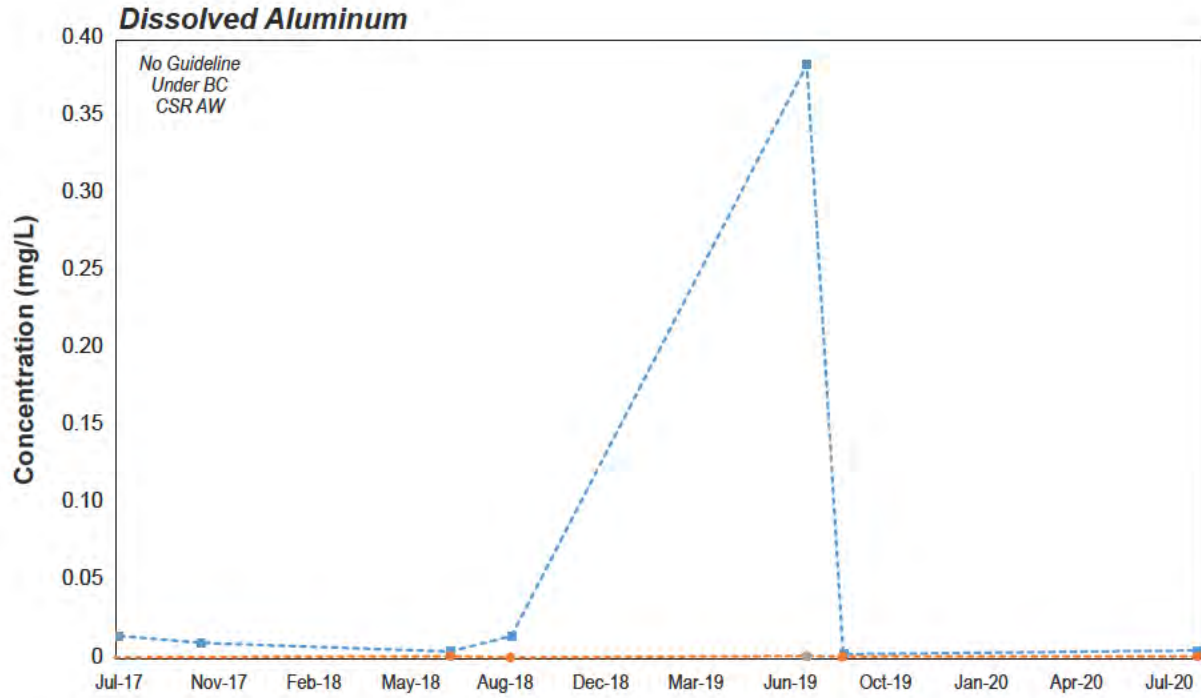
Notes: pH values compared to the British Columbia Water Quality Guideline for Freshwater Aquatic Life due to the British Columbia Contaminated Sites Regulation not having specified pH guidelines for Freshwater Aquatic Life.

**Figure 9.2-4: Johnny Mountain Mine Main Landfill pH and Fluoride**



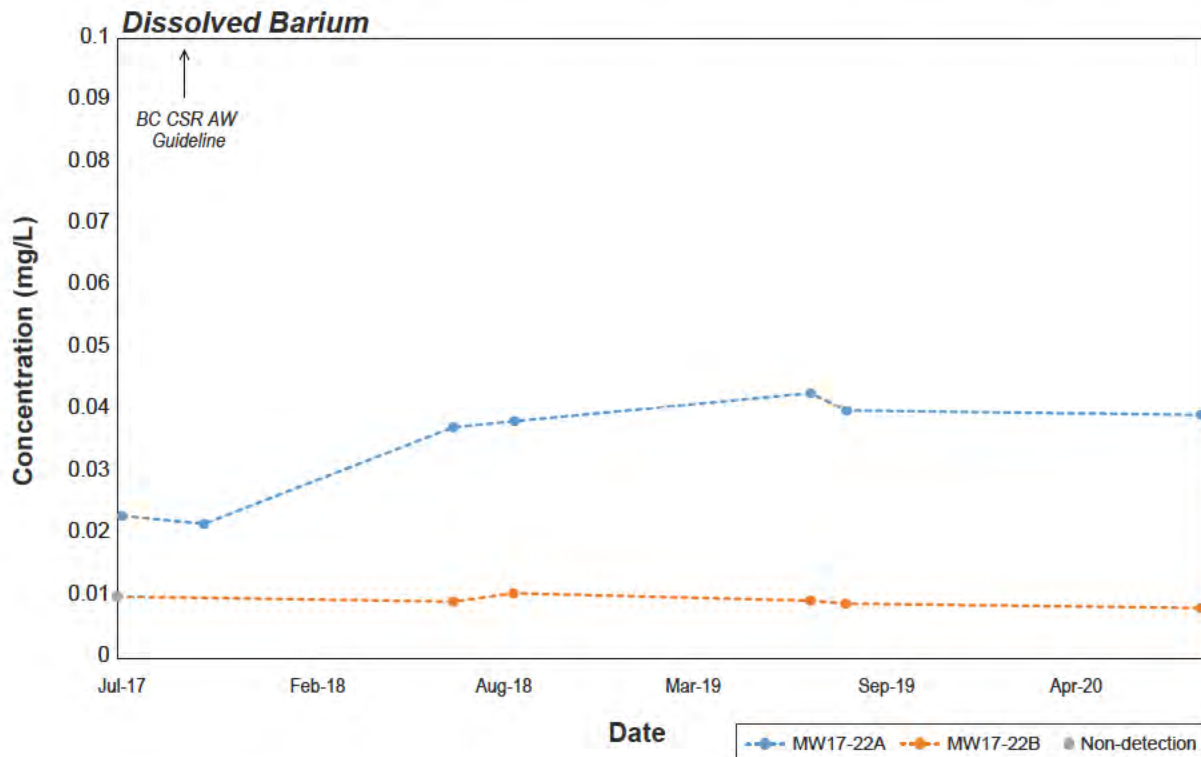
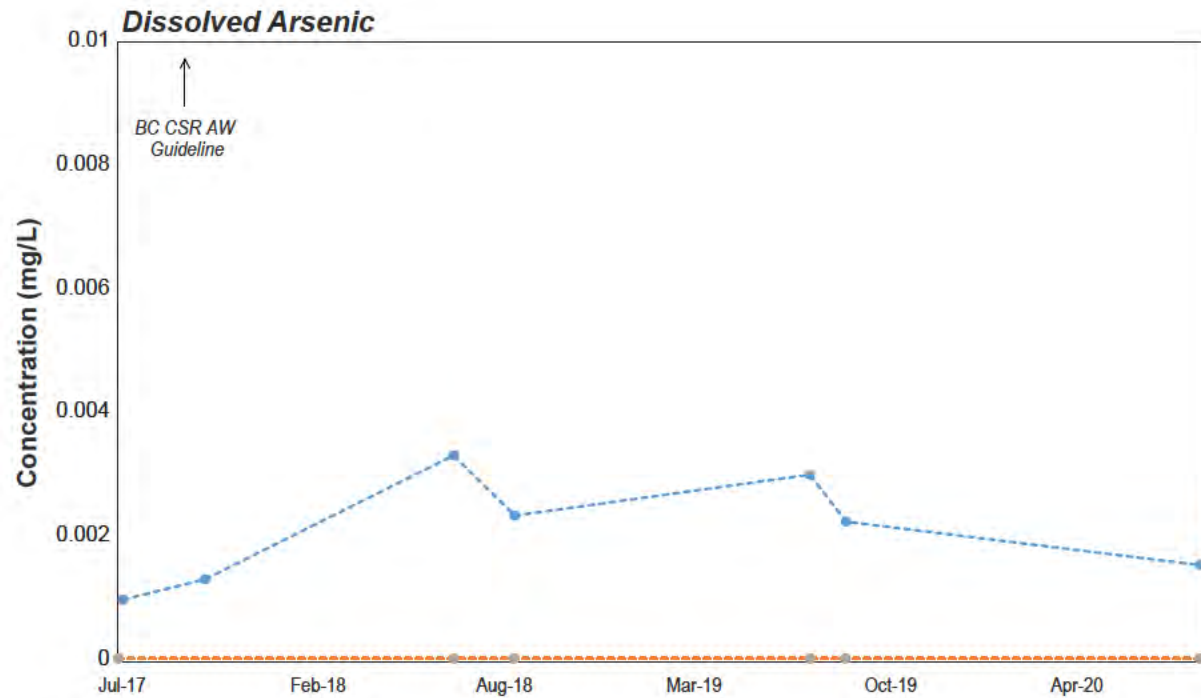
Notes: BC CSR AW = British Columbia Contaminated Sites Regulation for Freshwater Aquatic Life.

**Figure 9.2-5: Johnny Mountain Mine Main Landfill Nitrate and Sulphate**



Notes: BC CSR AW = British Columbia Contaminated Sites Regulation for Freshwater Aquatic Life.

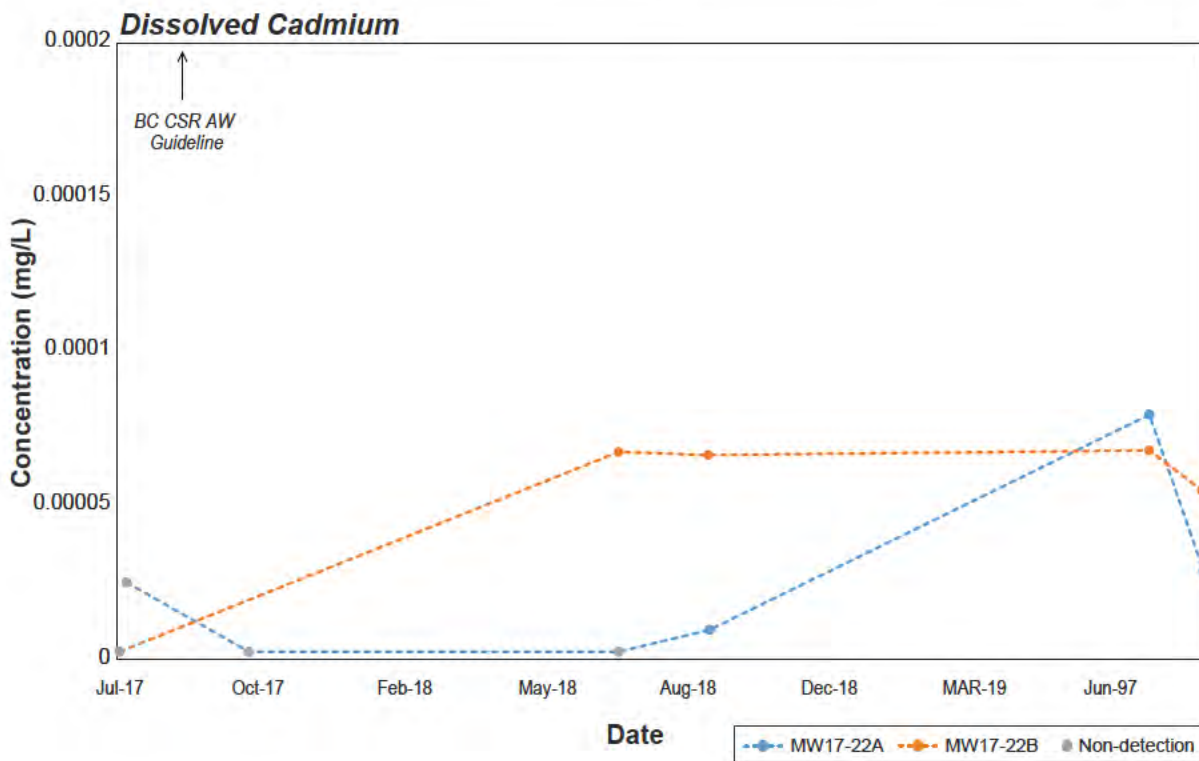
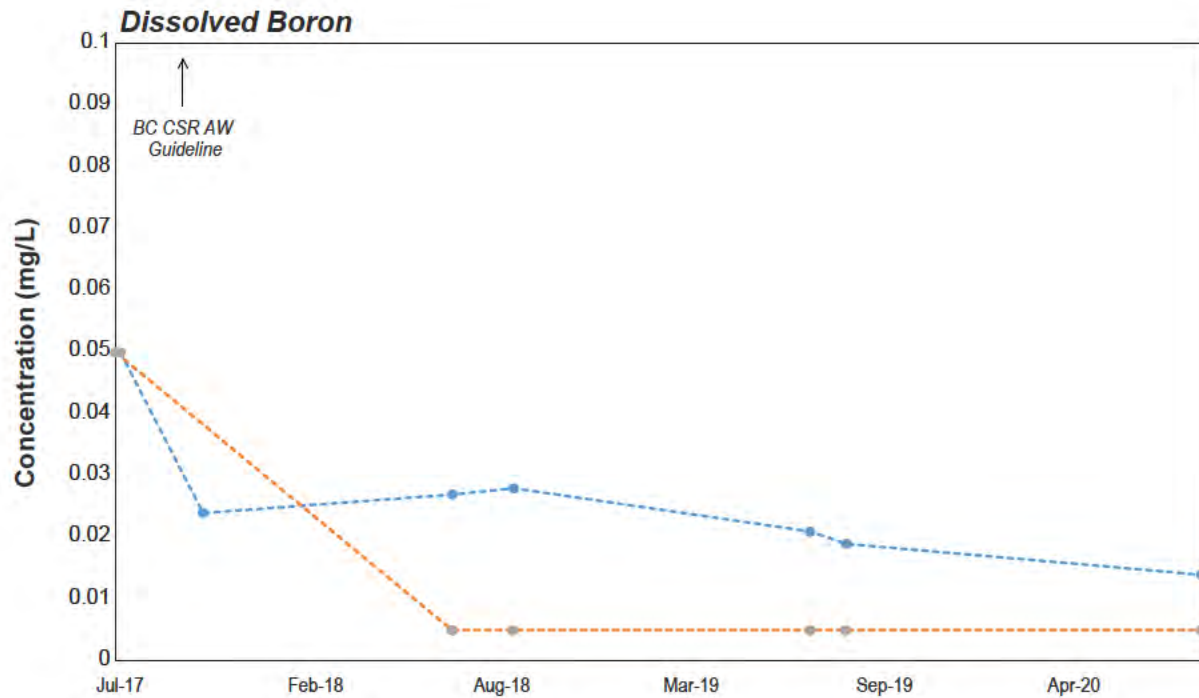
**Figure 9.2-6: Johnny Mountain Mine Main Landfill  
Dissolved Aluminum and Dissolved Antimony**



Notes: BC CSR AW = British Columbia Contaminated Sites Regulation for Freshwater Aquatic Life.

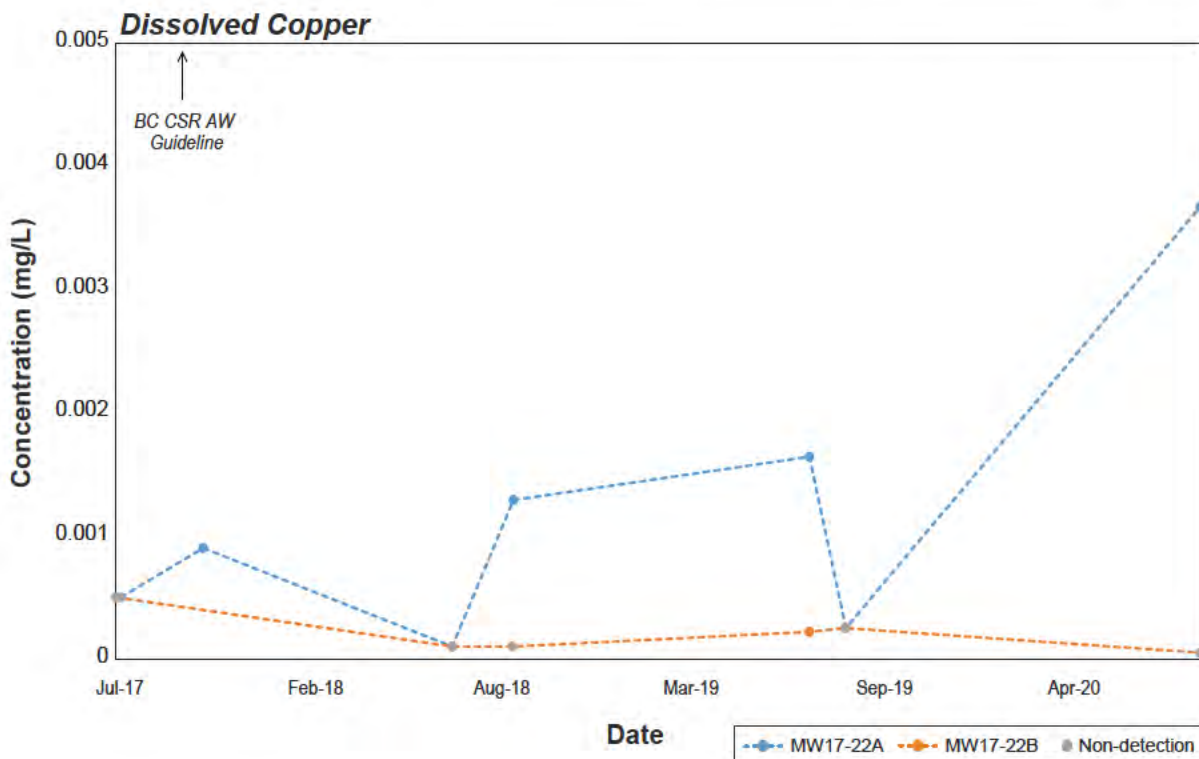
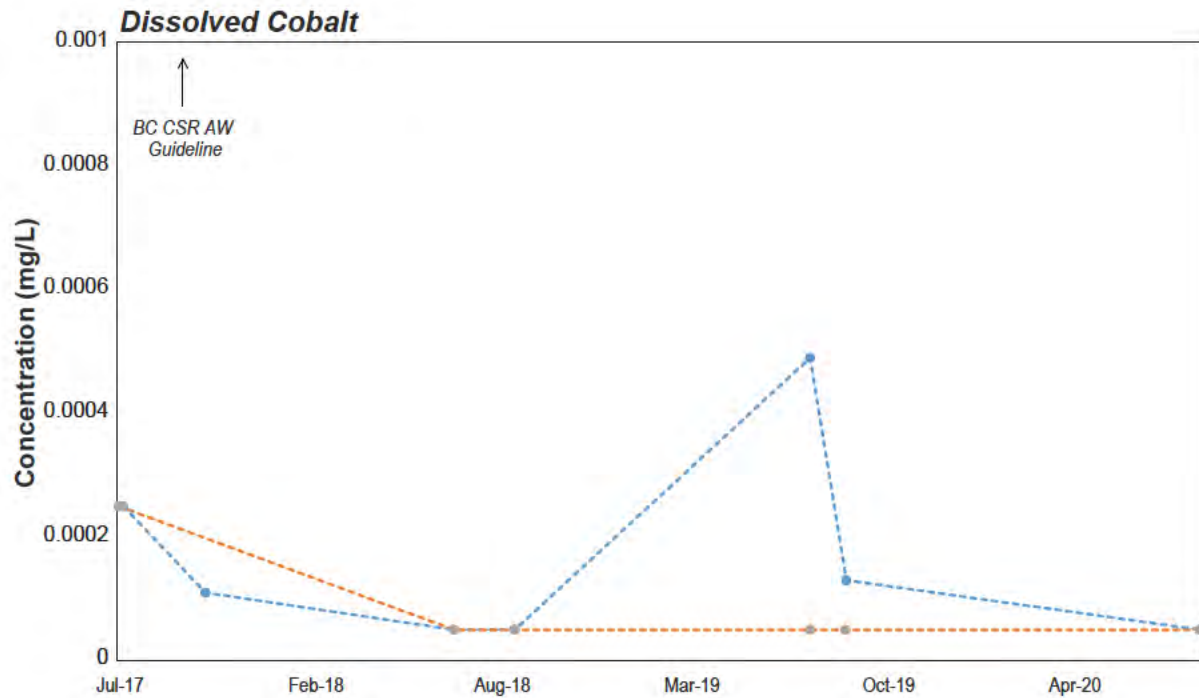
**Figure 9.2-7: Johnny Mountain Mine Main Landfill  
Dissolved Arsenic and Dissolved Barium**





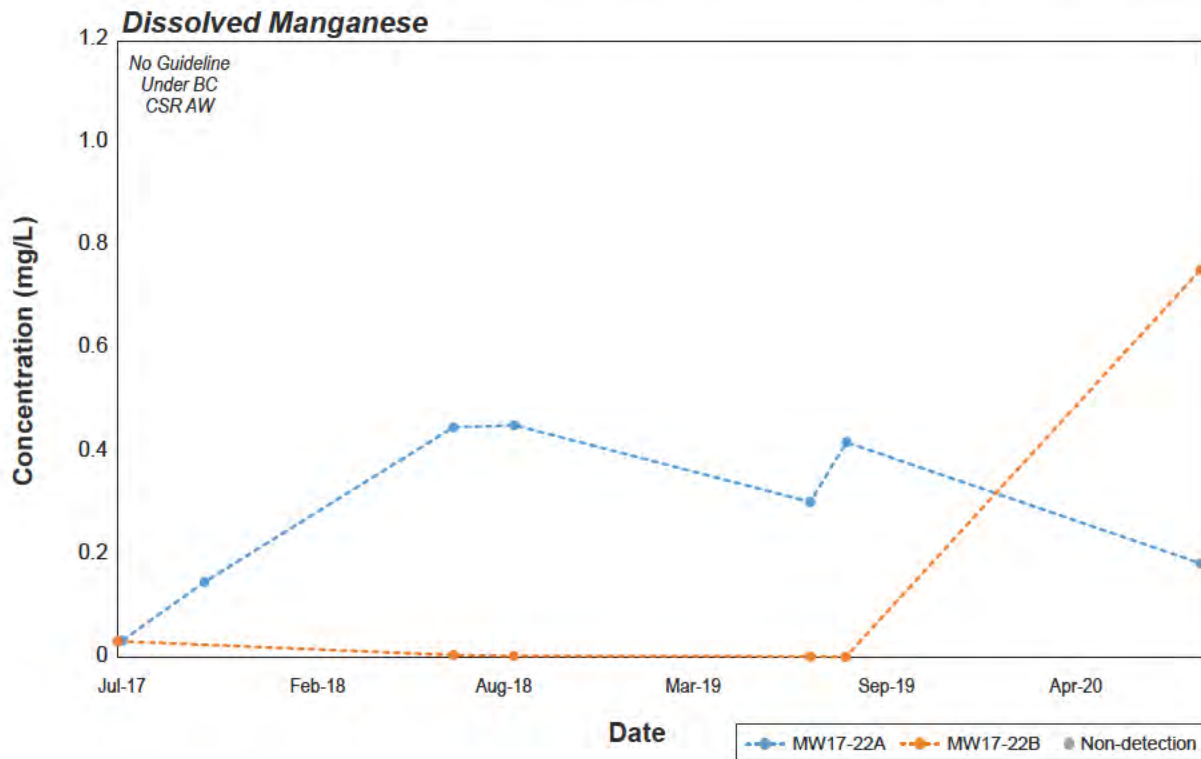
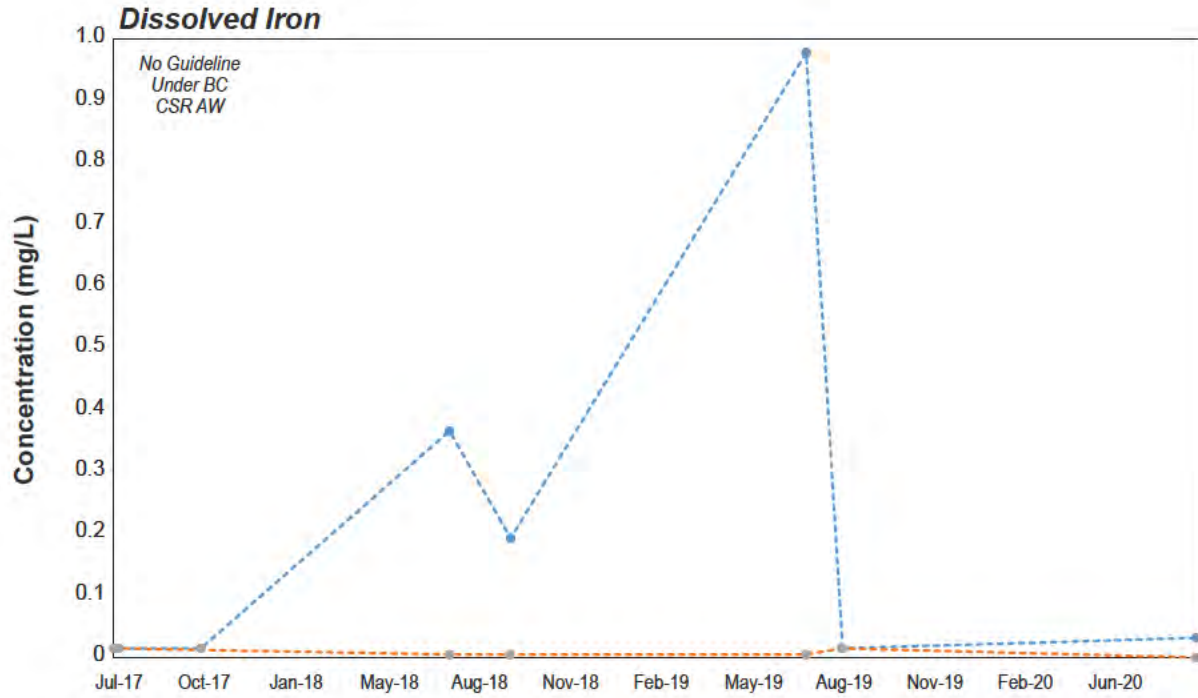
Notes: BC CSR AW = British Columbia Contaminated Sites Regulation for Freshwater Aquatic Life.

**Figure 9.2-8: Johnny Mountain Mine Main Landfill  
Dissolved Boron and Dissolved Cadmium**



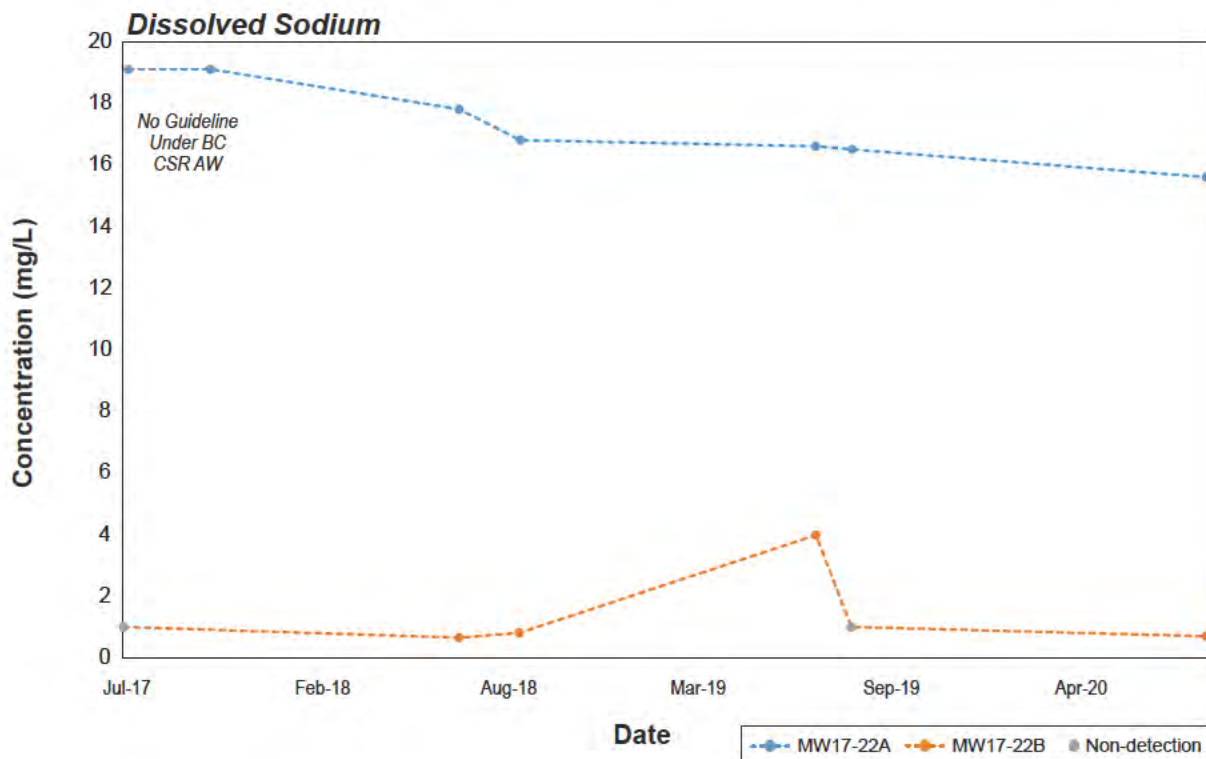
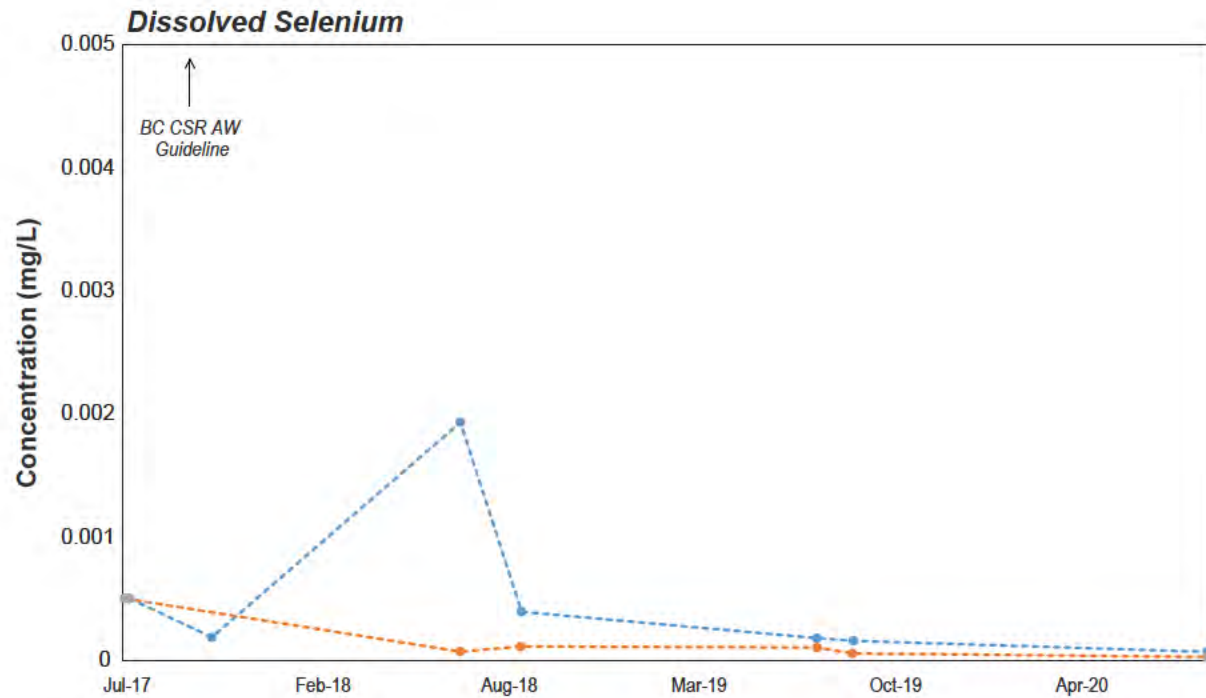
Notes: BC CSR AW = British Columbia Contaminated Sites Regulation for Freshwater Aquatic Life.

**Figure 9.2-9: Johnny Mountain Mine Main Landfill  
Dissolved Cobalt and Dissolved Copper**



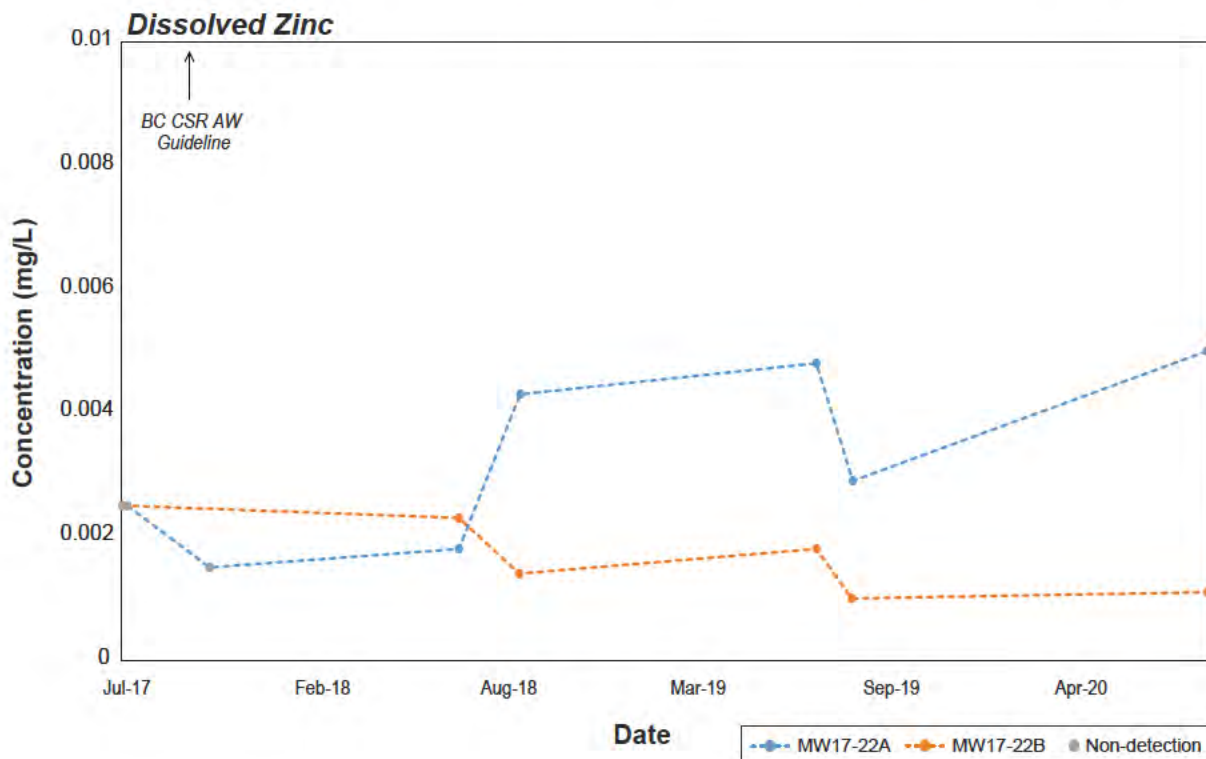
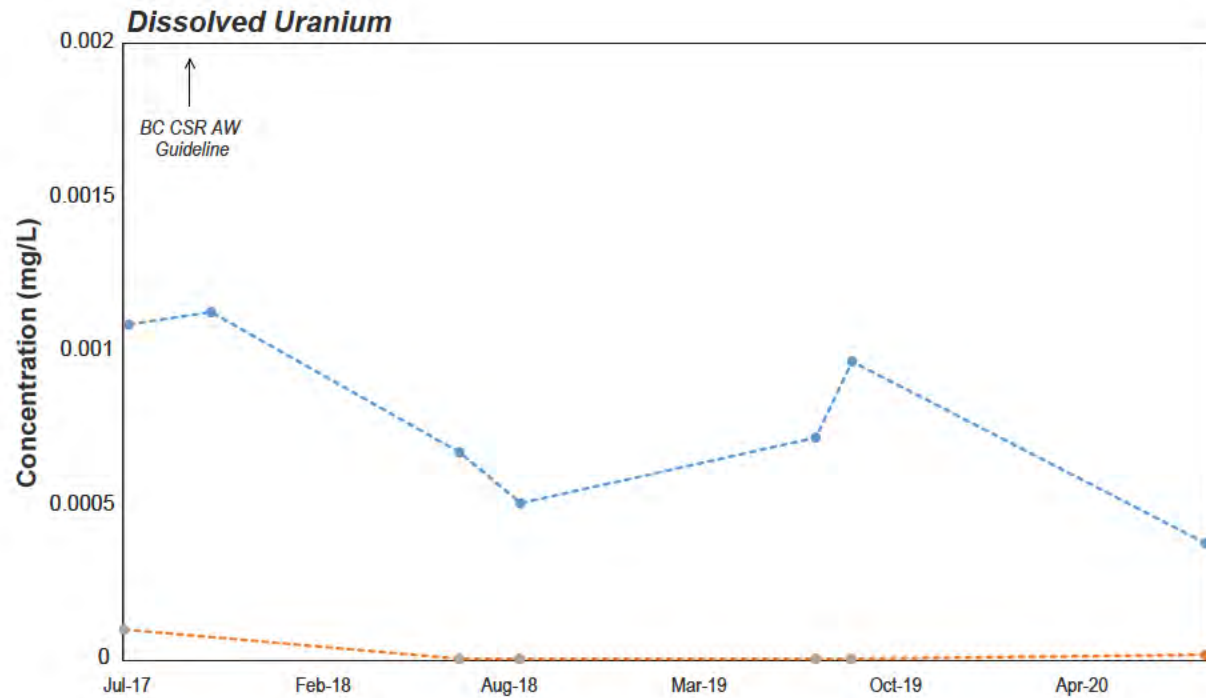
Notes: BC CSR AW = British Columbia Contaminated Sites Regulation for Freshwater Aquatic Life.

**Figure 9.2-10: Johnny Mountain Mine Main Landfill  
Dissolved Iron and Dissolved Manganese**



Notes: BC CSR AW = British Columbia Contaminated Sites Regulation for Freshwater Aquatic Life.

**Figure 9.2-11: Johnny Mountain Mine Main Landfill  
Dissolved Selenium and Dissolved Sodium**



Notes: BC CSR AW = British Columbia Contaminated Sites Regulation for Freshwater Aquatic Life.

**Figure 9.2-12: Johnny Mountain Mine Main Landfill  
Dissolved Uranium and Dissolved Zinc**

### 9.2.2.3 Surface Water Monitoring

The JM10-2018 site was established in October 2018. There are no water level or water quality limits or compliance criteria specified within Permit PR-7927. For the purposes of the results discussion, water quality samples were compared to the applicable water quality guideline on a sample-by-sample basis. Water quality guidelines were used to benchmark observed concentrations and provide a general characterization of the mine site, where appropriate. These guidelines are not discharge limits and are not included as an evaluation of compliance with permit conditions.

The 2020 sample collected at JM10-2018 was compared with BC freshwater aquatic life water quality guidelines (FAL WQGs; Table 9.2-2).

All field and laboratory physical measurements for JM10-2018 in 2020 were within BC FAL WQGs. Specific conductivity levels increased to 119  $\mu\text{S}/\text{cm}$ . Field and laboratory measured pH in 2020 was circumneutral and consistent with 2019 (Table 9.2-2). The surface water at JM10-2018 was classified as moderately hard in 2020 (68.8 mg/L; Durfor and Becker 1964) with low sensitivity to acid inputs (total alkalinity = 55.5 mg/L; Saffran and Trew 1996). Both hardness and total alkalinity increased from values observed in 2019. The water sample was clear, with a turbidity of 1.31 NTU in 2020, compared to a turbidity of 10.7 NTU in 2019. In 2020, TDS was low (80 mg/L), with a similar result from 2019 (76 mg/L).

Anions and nutrients at JM10-2018 in 2020 were all below applicable BC FAL WQGs. Sulphate was the dominant anion in the sample (15.4 mg/L in 2020) while chloride concentrations were below the detection limit (<0.50 mg/L) in 2020. Ammonia, nitrate, and nitrite concentrations were below detection limit since 2018 with the exception of ammonia in 2019 when concentrations were less than two-times the detection limit.

Both total and weak acid dissociable (WAD) cyanide were below their respective detection limits (<0.0050 mg/L) since 2018.

All analyzed total metals at JM10-2018 in 2020 were below BC FAL WQGs. Total aluminum and total iron in 2020 decreased in comparison to 2019. In 2020, 16 of the 35 total metals results were below the detection limit. Eleven total metal concentrations were greater in 2020 compared to 2019.

All analyzed dissolved metals at JM10-2018 in 2020 were below applicable BC FAL WQGs with the exception of dissolved copper (0.0006 mg/L). In 2020, 15 of the 35 dissolved metals analytical results were below detection limits. Three of dissolved metals concentrations were greater in 2020 compared to 2018 (dissolved metals were not analyzed in surface water samples in 2019).

All VOC, hydrocarbon, and PAH concentrations were below the detection limit (Appendix F).

Overall, the JM10-2018 surface water quality results do not indicate consistent increasing or decreasing trends through time suggesting that inter-year differences in water quality were likely due to natural variability.

### 9.2.2.4 Quality Assurance and Quality Control

A field blank and travel blank were prepared and analyzed as part of the 2020 surface water sampling. Results are included in Appendix F. The analytical parameters were below detection limits for all parameters (Appendix F).

Table 9.2-2: Surface Water Quality Comparison to British Columbia Water Quality Guidelines, 2018, 2019 and 2020

Parameter	Unit	Guideline Description	Detection Limit	25-Oct-18		23-Aug-19		23-Aug-20	
				BC Water Quality Guideline Value	Concentration	BC Water Quality Guideline Value	Concentration	BC Water Quality Guideline Value	Concentration
Physical Tests									
Field pH	pH Unit	-	0.1	6.5 - 9.0	8.26	6.5 - 9.0	7.52	6.5 - 9.0	7.46
Lab pH	pH Unit	-	0.1	6.5 - 9.0	7.83	6.5 - 9.0	7.8	6.5 - 9.0	7.49
Anions									
Chloride (Cl)	mg/L	short-term acute	0.5	600	<0.50	600	<0.50	600	<0.50
	mg/L	long-term chronic		150		150		150	
Fluoride (F)	mg/L	short-term acute (Hardness dependent)	0.02	1.287	0.024	0.555	0.021	0.555	0.02
Sulphate (SO <sub>4</sub> )	mg/L	long-term chronic (Hardness dependent)	0.3	309	36.8	128	15.9	128	15.4
Nutrients									
Ammonia, Total (as N)	mg/L	short-term acute (pH- and temperature-dependent)	0.005	8.88	<0.0050	8.4	0.0057	8.4	<0.0050
		long-term chronic (pH- and temperature-dependent)		1.71		1.62		1.62	
Nitrate (as N)	mg/L	short-term acute	0.005	32.8	<0.0050	32.8	<0.0050	32.8	<0.0050
	mg/L	long-term chronic		3		3		3	

Parameter	Unit	Guideline Description	Detection Limit	25-Oct-18		23-Aug-19		23-Aug-20	
				BC Water Quality Guideline Value	Concentration	BC Water Quality Guideline Value	Concentration	BC Water Quality Guideline Value	Concentration
Nitrite (as N)	mg/L	short-term acute (chloride dependent)	0.001	0.06		0.06		0.06	
		long-term chronic (chloride dependent)		0.02	<0.0010	0.02	<0.0010	0.02	<0.0010
Phosphorus, Total	mg/L	CCME Trigger range (mesotrophic)	0.002	<0.02 and >0.01	0.0131	-	-	-	-
Cyanides									
Cyanide	mg/L	short-term acute	<0.001	0.01	<0.0010	0.01	<0.0050	0.01	<0.0050
Weak Acid Dissociable		long-term chronic		0.005		0.005		0.005	
Total Metals									
Antimony (Sb)	mg/L	working guideline	0.0001	0.009	<0.00010	0.009	0.0001	0.009	<0.0001
Arsenic (As)	mg/L	-	0.0001	0.005	0.00025	0.005	0.00161	0.005	0.00037
Barium (Ba)	mg/L	working guideline	0.0001	1	0.0162	1	0.0113	1	0.0168
Beryllium (Be)	mg/L	working guideline	0.0001	0.00013	<0.00010	0.00013	<0.00010	0.00013	<0.00020
Boron (B)	mg/L	long-term chronic	0.01	1.2	<0.010	1.2	<0.010	1.2	<0.010
Chromium (Cr)	mg/L	working guideline Cr(VI)	0.0001	0.001	<0.00010	0.001	0.00092	0.001	<0.00010
	mg/L	working guideline Cr(III)		0.0089		0.0089		0.0089	
Cobalt (Co)	mg/L	short-term acute	0.0001	0.11	<0.00010	0.11	0.00042	0.11	<0.00010
		long-term chronic		0.004		0.004		0.004	
Iron (Fe)	mg/L	short-term acute	0.03	1	<0.030	1	1.01	1	0.083



Parameter	Unit	Guideline Description	Detection Limit	25-Oct-18		23-Aug-19		23-Aug-20	
				BC Water Quality Guideline Value	Concentration	BC Water Quality Guideline Value	Concentration	BC Water Quality Guideline Value	Concentration
Lead (Pb)	mg/L	short-term acute (Hardness dependent)	0.00005	0.07039	<0.000050	0.00693	0.00137	0.00693	0.000206
		long-term chronic (Hardness dependent)		0.00605		0.00358		0.00358	
Manganese (Mn)	mg/L	short-term acute (Hardness dependent)	0.0001	1.5208	0.00783	0.8155	0.0458	0.8155	0.0165
		long-term chronic (Hardness dependent)		0.9966		0.7678		0.7678	
Mercury (Hg)	mg/L	when MeHg = 0.5% THg	0.000005	0.00002	<0.0000050	0.00002	<0.0000050	0.00002	<0.0000050
Molybdenum (Mo)	mg/L	short-term acute	0.00005	2	0.0004	2	0.000126	2	0.000293
		long-term chronic		1		1		1	
Nickel (Ni)	mg/L	working guideline	0.0005	0.0875	<0.00050	0.025	0.00125	0.025	0.00125
Selenium (Se)	mg/L	0.002	0.00005	0.002	0.000195	0.002	0.000054	0.002	<0.000050
Silver (Ag)	mg/L	short-term acute (Hardness dependent)	0.00001	0.0001	<0.000010	0.0001	0.000032	0.0001	<0.000010
		long-term chronic (Hardness dependent)		0.00005		0.00005		0.00005	
Thallium (Tl)	mg/L	working guideline	0.00001	0.0008	<0.000010	0.0008	0.000011	0.0008	<0.000010
Uranium (U)	mg/L	working guideline	0.00001	0.0085	0.000089	0.0085	0.000013	0.0085	0.000054
Zinc (Zn)	mg/L	short-term acute (Hardness dependent)	0.003	0.033	<0.0030	0.033	0.0119	0.033	<0.00030
		long-term chronic (Hardness dependent)		0.0075		0.0075		0.0075	

Parameter	Unit	Guideline Description	Detection Limit	25-Oct-18		23-Aug-19		23-Aug-20	
				BC Water Quality Guideline Value	Concentration	BC Water Quality Guideline Value	Concentration	BC Water Quality Guideline Value	Concentration
Dissolved Metals									
Aluminum (Al)	mg/L	short-term acute (pH-dependent)	0.003	0.1	0.204	0.1	-	0.1	0.0145
		long-term chronic (pH-dependent)		0.05		0.05		0.05	
Cadmium (Cd)	mg/L	short-term acute (Hardness dependent)	0.000005	0.0005217	0.0000391	0.0005217	-	0.0005217	0.0000205
		long-term chronic (Hardness dependent)		0.0000508		0.0000508		0.0000508	
Copper (Cu)	mg/L	short-term acute (BLM Modelling)	0.0005	0.0002	<u>0.00169</u>	0.0002	-	0.0002	<u>0.00060</u>
		long-term chronic (BLM Modelling)		0.0002		0.0002		0.0002	
Iron (Fe)	mg/L	short-term acute	0.03	0.35	0.266	0.35	-	0.35	0.015

Notes:

All units in mg/L unless otherwise noted.

**“-” parameter not analyzed.**

British Columbia guideline for the protection of freshwater aquatic life (ENV 2019).

BLM Modelling is calculated based on water chemistry: hardness, pH, temperature and DOC.

Bold and underline indicates concentration above the BC long-term chronic guideline.

In 2020, two duplicate samples were collected for groundwater (MW17-12B and MW17-25A ) and surface water (JM10-2018 and its duplicate DUP 5) and were analyzed for concentrations of hydrocarbons, metals, VOCs and major ions. The groundwater sampling program conducted in 2020 included multiple wells not required for PR-7927. MW17-12B and MW17-25A duplicate results and relative percent difference (RPD) are included in Appendix D. RPDs calculated for duplicate samples collected at JM10-2018 are included in Appendix F. Three surface water parameters had a value greater than 20% and no groundwater parameters had a calculated RPD value above 20%. There were no RPDs greater than 50% for either surface water or groundwater duplicates.

Samples were analyzed within their recommended holding times, with the following exceptions: pH, which has a short holding time (15 minutes) and was measured in the field; as well as turbidity (three-day holding time). The monitoring wells MW17-22A and MW17-22B exceeded the holding time for acidity by three days. The JM10-2018 sample and the field and travel blanks exceeded the three-day holding time for colour, nitrate, nitrite, and dissolved orthophosphate. Sampling, shipping, and analyzing samples prior to hold time exceedances is challenging in northern BC, given the remoteness of the area and the logistics of getting samples to ALS Laboratories in Burnaby, BC.

The detection limit for quinoline in the MW17-22A sample was increased to 5.50 µg/L from 0.05 µg/L due to a co-eluting congener. Quinoline was not detected in the sample. Laboratory contamination was low, as method blanks were below detection limits. In the batch containing JM10-2018, the surrogate recovery in a method blank sample marginally exceeded the data quality objective for a handful of analytes (hydrocarbons and PAHs), however this is not expected to have any effect on sample results. Analytical accuracy was good, as all reference materials and matrix spikes were within their target ranges. Analytical precision was also good, as laboratory duplicate concentration RPD values were low (<20%), and all within defined laboratory objectives.

Overall, the QA/QC program indicates the 2020 groundwater and surface water data is of high quality.

## 10. MINE RECLAMATION RECOMMENDATIONS

### 10.1 Site Management

#### 10.1.1 Safety

New arrivals to the Bronson Camp, which is located proximal to the Bronson Creek Airstrip, were provided with a site-specific orientation, delivered by the onsite Health and Safety Covid Coordinator, who outlined camp safety policies. All site activity carried out in 2020 season was conducted in line with SnipGold's Project Safety Management Plan (PSMP). Subcontractor's also had their own site specific safety plans, which aligned with the JMM PSMP.

To protect workers during the Covid-19 pandemic, SnipGold Corp. developed a Covid-19 Plan. All workers were trained on how to follow the Plan. No Covid-19 incidents occurred during 2020 field activities. These safety-specific site management practices will continue to be implemented for the 2021 reclamation and closure program of activities.

#### 10.1.2 Water Management

Water management onsite is a key component of the JMM reclamation and closure program (Woznow and Yeager 1999; RTEC 2019c). SnipGold continues to manage site drainage.

#### 10.1.2.1 Main Landfill

The landfill was not active in 2020. Wood's 2020 Main Landfill sediment and erosion control annual assessment noted:

- o Minor ponding of water was observed in the northeast corner of Cell 2 and along the south side of Cell 1.
- o As per the landfill design, water is generally being directed away from the Main Landfill via the outer ditches and the upgradient berms to the west and directed towards the TSF. In the Cell 1 area, flowing water was observed in the outer ditches and directed away from the Main Landfill.
- o Water collected within the Main Landfill footprint is drained towards the southeast corner of the landfill, as per the landfill design (Appendix C).

Wood recommended that the ponding of water be addressed in 2021 prior to the continuation of any waste placement or landfill upgrades. The landfill will be active in 2021.

#### 10.1.3 Mill Building

No work was conducted at the Mill Building in 2020.

#### 10.1.4 In-situ Hydrocarbon Remediation Area

In 2021 SnipGold will continue with treatment of contaminated soils within the In-Situ Hydrocarbon Remediation Area. It is recommended that fertilizer and a natural biocatalyst (oil Gator) be added to the soils and that soils are turned several times during the 2021 season to speed aeration and the treatment process (Appendix B).

#### 10.1.5 Disposal of Unused Site Equipment

All miscellaneous site equipment will be disposed into the expanded JMM Main Landfill (i.e., grader, crane, D6 dozer and snow cat) in 2021. The old mining equipment has been deemed unsalvageable by Finning and Matrix mechanics and will be cut down and placed into the Main Landfill. All fluids will be drained from equipment prior to disposal and transported off site and disposed in an approved disposal facility (Appendix B).

#### 10.1.6 Monitoring Recommendations Related to the Mine Reclamation

The monitoring programs currently conducted on-site as part of the reclamation program and required as authorized compliance and monitoring programs will continue into 2021.

## 11. ANNUAL STATUS FORM

The Annual Status Form for EMA Permit PR-7927 is appended to this annual report as required (Appendix G).

## 12. REFERENCES

- AMECFW. 2018. *Johnny Mountain Mine Main Landfill Technical Assessment Report*. Prepared on behalf of SnipGold Corp.
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- NWR. 2018a. *2018 Summary Report Johnny Mountain Mine Reclamation Project: Removal and Transfer of Waste Materials from Burial Sites #1 and #2*. Prepared for SnipGold Corp. by NorthWest Response Ltd: Smithers, British Columbia.
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- RTEC. 2017. *2017 Iskut Project Groundwater Monitoring Summary*. Memo prepared for SnipGold Corp. by Rescan Tahltan Environmental Consultants: Vancouver, British Columbia.
- RTEC. 2018a. *Iskut Project: Annual Reclamation Report for 2017: Mines Act Permit M178*. Prepared for SnipGold Corp. by Rescan Tahltan Environmental Consultants: Vancouver, British Columbia.

- RTEC. 2018b. *Hoary Marmot Salvage of Main Landfill and Borrow Area at Johnny Mountain*. Prepared for SnipGold Corp. by Rescan Tahltan Environmental Consultants: Vancouver, British Columbia.
- RTEC. 2018c. *2018 Iskut Project Groundwater Monitoring Summary*. Prepared for SnipGold Corp. by Rescan Tahltan Environmental Consultants: Vancouver, British Columbia.
- RTEC. 2019a. *Iskut Project and Johnny Mountain Mine Reclamation Project: Annual Report for 2018: Environmental Management Act Permit PR-7927*. Prepared for SnipGold Corp. by RTEC: Vancouver, British Columbia.
- RTEC. 2019b. *Iskut Project: Annual Reclamation Report for 2018: Mines Act Permit M-178*. Prepared for SnipGold Corp. by Rescan Tahltan Environmental Consultants: Vancouver, British Columbia.
- RTEC. 2019c. *Iskut Project: Annual Report for 2018: Environmental Management Act Permit PE-8415*. Prepared for SnipGold Corp. by Rescan Tahltan Environmental Consultants: Vancouver, British Columbia.
- RTEC. 2020a. *Iskut Project: Annual Reclamation Report for 2019: Mines Act Permit M-178*. Prepared for SnipGold Corp. by RTEC: Vancouver, British Columbia.
- RTEC. 2020b. *Iskut Project: Annual Report for 2019: Environmental Management Act Permit PE-8415*. Prepared for SnipGold Corp. by RTEC: Vancouver, British Columbia.
- RTEC. 2020c. *2019 Compliance Water Quality Results for Permit PR-7927 memo*. Prepared for SnipGold Corp. by RTEC: Vancouver, British Columbia.
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Wood. 2021a. *Johnny Mountain Mine Reclamation Project: 2020 Main Landfill Erosion Prevention and Sediment Controls Inspection Memorandum*.

Wood. 2021b. *2020 Supplementary Environmental Site Investigation Report - Johnny Mountain Mine Reclamation Project, BC. Rev A*. Prepared on behalf of SnipGold Corp.

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#### Personnal Communications

Vroom, B. 2021. Email communication with SnipGold's C. deHoog, dated March 4, 2021.

### 13. PROFESSIONAL ACCOUNTABILITY FORMS

- o Declaration of Competency
- o Conflict of Interest Disclosure Statement

## Declaration of Competency

The Ministry of Environment and Climate Change Strategy relies on the work, advice, recommendations and in some cases decision making of qualified professionals<sup>1</sup>, under government's professional reliance regime. With this comes an assumption that professionals who undertake work in relation to ministry legislation, regulations and codes of practice have the knowledge, experience and objectivity necessary to fulfill this role.

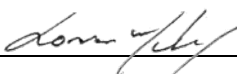
1. Name of Qualified Professional Lorraine Muckian  
Title Principal Consultant - Permitting Specialist
2. Are you a registered member of a professional association in B.C.?  Yes  No  
Name of Association: Applied College of Biology Registration # 3142
3. Brief description of professional services:  
Qualified person completing annual report requirements for Environmental Management Act permit PR-7927, on behalf of SnipGold Corp. for activities conducted in 2020.

This declaration of competency is collected under section 26(c) of the *Freedom of Information and Protection of Privacy Act* for the purposes of increasing government transparency and ensuring professional ethics and accountability. By signing and submitting this statement you consent to its publication and its disclosure outside of Canada. This consent is valid from the date submitted and cannot be revoked. If you have any questions about the collection, use or disclosure of your personal information please contact the Ministry of Environment and Climate Change Strategy Headquarters Office at 1-800-663-7867.

## Declaration

I am a qualified professional with the knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the specific work described above.

Signature:

**X** 

Print Name: Lorraine Muckian

Witnessed by:

**X** 

Print Name: Rolf Schmitt

Date signed: March 30, 2021

<sup>1</sup>Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who

- a) is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and
- b) through suitable education, experience, accreditation and knowledge, may reasonably be relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.



## Conflict of Interest Disclosure Statement

A qualified professional <sup>1</sup> providing services to either the Ministry of Environment and Climate Change Strategy (“ministry”), or to a regulated person for the purpose of obtaining an authorization from the ministry, or pursuant to a requirement imposed under the *Environmental Management Act*, the *Integrated Pest Management Act* or the *Park Act* has a real or perceived conflict of interest when the qualified professional, or their relatives, close associates or personal friends have a financial or other interest in the outcome of the work being performed.

A real or perceived conflict of interest occurs when a qualified professional has

- a) an ownership interest in the regulated person’s business;
- b) an opportunity to influence a decision that leads to financial benefits from the regulated person or their business other than a standard fee for service (e.g. bonuses, stock options, other profit sharing arrangements);
- c) a personal or professional interest in a specific outcome;
- d) the promise of a long term or ongoing business relationship with the regulated person, that is contingent upon a specific outcome of work;
- e) a spouse or other family member who will benefit from a specific outcome; or
- f) any other interest that could be perceived as a threat to the independence or objectivity of the qualified professional in performing a duty or function.

Qualified professionals who work under ministry legislation must take care in the conduct of their work that potential conflicts of interest within their control are avoided or mitigated. Precise rules in conflict of interest are not possible and professionals must rely on guidance of their professional associations, their common sense, conscience and sense of personal integrity.

### Declaration

I Lorraine Muckian, as a member of College of Applied Biology  
declare

**Select one of the following:**

- Absence from conflict of interest

Other than the standard fee I will receive for my professional services, I have no financial or other interest in the outcome of this Annual report for Environmental Management Act Permit PR-7927  
I further declare that should a conflict of interest arise in the future during the course of this work, I will fully disclose the circumstances in writing and without delay to Ministry of Environment and Climate Change Strategy, erring on the side of caution.



Real or perceived conflict of interest

Description and nature of conflict(s):

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

I will maintain my objectivity, conducting my work in accordance with my Code of Ethics and standards of practice.

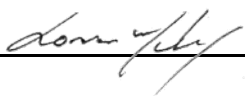
In addition, I will take the following steps to mitigate the real or perceived conflict(s) I have disclosed, to ensure the public interest remains paramount:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Further, I acknowledge that this disclosure may be interpreted as a threat to my independence and will be considered by the statutory decision maker accordingly.

This conflict of interest disclosure statement is collected under section 26(c) of the *Freedom of Information and Protection of Privacy Act* for the purposes of increasing government transparency and ensuring professional ethics and accountability. By signing and submitting this statement you consent to its publication and its disclosure outside of Canada. This consent is valid from the date submitted and cannot be revoked. If you have any questions about the collection, use or disclosure of your personal information please contact the Ministry of Environment and Climate Change Strategy Headquarters Office at 1-800-663-7867.

Signature:

X 

Print name: Lorraine Muckian

Witnessed by:

X 

Print name: Rolf Schmitt

Date: March 30, 2021

<sup>1</sup>Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who  
a) is registered in British Columbia with a professional association, is acting under that organization’s code of ethics, and is subject to disciplinary action by that association, and  
b) through suitable education, experience, accreditation and knowledge, may reasonably be relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.

## APPENDIX A      PERMITS (PR-7927, M-178, AND PE-8415)

## Permit PR-7927



April 17, 2019

Tracking Number: 379083  
Authorization Number: 7927

**REGISTERED MAIL**

SNIPGOLD CORP.  
10TH FLOOR, 595 HOWE STREET  
VANCOUVER, BC, V6C 2T5

Dear Permittee:

Enclosed is amended permit PR-7927 issued under the provisions of the *Environmental Management Act*. Your attention is respectfully directed to the terms and conditions outlined in the permit. An annual fee will be determined according to the Permit Fees Regulation.

This permit does not authorize entry upon, crossing over, or use for any purpose of private or Crown lands or works, unless and except as authorized by the owner of such lands or works. The responsibility for obtaining such authority rests with the permittee. This permit is issued pursuant to the provisions of the *Environmental Management Act* to ensure compliance with Section 120(3) of that statute, which makes it an offence to discharge waste, from a prescribed industry or activity, without proper authorization. It is also the responsibility of the permittee to ensure that all activities conducted under this authorization are carried out with regard to the rights of third parties, and comply with other applicable legislation that may be in force.

This decision may be appealed to the Environmental Appeal Board in accordance with Part 8 of the *Environmental Management Act*. An appeal must be delivered within 30 days from the date that notice of this decision is given. For further information, please contact the Environmental Appeal Board at (250) 387-3464.

Administration of this permit will be carried out by staff from the Environmental Protection Division's Regional Operations Branch. Plans, data and reports pertinent to the permit are to be submitted by email or electronic transfer to the director, designated officer, or as further instructed.

Yours truly,

Mark P. Love P.Ag.  
for Director, *Environmental Management Act*  
Authorizations - North Region

Enclosure



**MINISTRY OF  
ENVIRONMENT AND  
CLIMATE CHANGE  
STRATEGY**

**PERMIT**

7927

*Under the Provisions of the Environmental Management Act*

**SNIPGOLD CORP.  
10TH FLOOR, 595 HOWE STREET  
VANCOUVER BC V6C 2T5**

is authorized to discharge refuse to the land and emissions to the air from open burning and incineration from a non-operating Johnny Mountain gold mine, mill and camp, located 90 kilometres northwest of Stewart, British Columbia, subject to the requirements listed below.

Contravention of any of these requirements is a violation of the *Environmental Management Act* and may lead to prosecution.

This authorization supersedes and replaces all previous versions of permit PR-7927 issued under sections 14 or 16 of the *Environmental Management Act*.

Where this authorization provides that the director may require an action to be carried out, the permittee must carry out the action in accordance with the requirements of the director.

**1. AUTHORIZED DISCHARGES**


**1.1 Inert Solid Waste Disposal**

This section applies to the discharge of refuse from a non-operating gold mine, mill and camp. The site reference number for this discharge is E236686.

1.1.1 The maximum authorized volume of solid waste that can be discharged is 38,000 m<sup>3</sup>.

1.1.2 The authorized discharge period is continuous between the years 2018 to

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for Director, *Environmental Management Act*  
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2022 snow-free seasons.

1.1.3 The Authorized Works are the Main Landfill.

1.1.4 The permittee must not discharge under this authorization unless the Authorized Works are complete and fully operational.

1.1.5 The location of the facilities from which the discharge is authorized to originate is the non-operating Johnny Mountain Mine. The point of discharge is the Main Landfill located at latitude 56° 04' 28" and longitude 131° 37' 57".

1.2 **Emissions from Regulated Open Burning of Wood Waste and Associated Products**

This subsection applies to the discharge of contaminants to the air from the open burning of wood waste and associated products from the demolition and reclamation of the Johnny Mountain Mine site, mill.

1.2.1 The maximum authorized rate of discharge is indeterminate.

1.2.2 The characteristics of the emissions must be typical of those originating from the regulated open burning of wood waste, cardboard, paper and paper products.

1.2.3 The location of the facilities from which the discharge is authorized to originate and the point where the discharge is authorized to occur is the same as specified in subsection 1.1.5 above.

2. **GENERAL REQUIREMENTS**

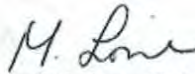
2.1 **Auxiliary Fueled, Forced Air Incineration**

Authorization for the discharge of emissions from a properly designed auxiliary fired refuse incinerator that serves a remote industrial camp with a design capacity of less than 100 persons is through the Waste Discharge Regulation pursuant to the *Environmental Management Act*.

2.2 **Nature of Open Burn Waste**

The permittee must not open burn waste which is unacceptable to the director.

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Unacceptable materials include nuisance causing combustibles such as painted and treated wood, rubber, plastics, tars, asphalt shingles, roofing material, insulation, etc.

Acceptable materials include unpainted, untreated demolition and construction wood wastes, broken lumber and pallets, slabs, log ends and branches, brush and miscellaneous, non-recyclable cardboard and paper products.

### 2.3 Combustion Residue Disposal

The permittee must incorporate the residue of combustion from a burn into the landfill authorized in subsection 1.1 or a landfill authorized by the director once such residue has cooled to ambient temperature.

### 2.4 Licence to Publish Documents

- a. Subject to paragraph b, the permittee authorizes the Province to publish on the Ministry of Environment and Climate Change Strategy website the entirety of any Regulatory Document.
- b. The Province will not publish any information that could not, if it were subject to a request under section 5 of the *Freedom of Information and Protection of Privacy Act*, be disclosed under that Act.
- c. The permittee will indemnify and save harmless the Province and the Province's employees and agents from any claim for infringement of copyright or other intellectual property rights that the Province or any of the Province's employees or agents may sustain, incur, suffer or be put to at any time that arise from the publication of a Regulatory Document.


### 2.5 Maintenance of Works and Emergency Procedures

#### 2.5.1 Maintenance of Works

The permittee must regularly inspect the Authorized Works and maintain them in good working order. If components of the Authorized Works have a manufacturer's recommended maintenance schedule, then those components must, at a minimum, be maintained in accordance with that schedule.

The permittee must maintain a record of inspections and maintenance of the Authorized Works, and make the record available to an officer upon request.

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### 2.5.2 Emergency Procedures

In the event of an emergency or other condition which prevents normal operation of the Authorized Works or leads to an unauthorized discharge, the permittee must take remedial action immediately to restore the normal operation of the Authorized Works and to prevent any unauthorized discharges. The permittee must immediately report the emergency or other condition and the remedial action that has and will be taken to the [EnvironmentalCompliance@gov.bc.ca](mailto:EnvironmentalCompliance@gov.bc.ca) email address or as otherwise instructed by the director.

### 2.6 Use of Qualified Professional(s)

The permittee must cause a Qualified Professional to

- a. Certify all facilities and information, including works, plans, assessments, investigations, surveys, programs and reports related to the design, and
- b. Seal all as-built drawings.

### 2.7 Landfill Operation

The permittee must compact all refuse and confine such compacted refuse to the smallest practical area and volume at the operating face of the landfill. The permittee must apply a minimum 0.15 metre of cover material that is to the satisfaction of the director, on all exposed solid waste at least once per month while in use. The director may vary the frequency of covering when freezing conditions adversely affect normal operation or when sufficient quantities of soil material are incorporated with the waste.


### 2.8 Litter Control

The permittee must use the best practical means available to prevent the scatter of litter at the site. The permittee must clean up any litter scattered at a minimum of twice per year.

### 2.9 Final Cover

The permittee must apply final cover to all areas of the site that have reached final landfill elevations as soon as practical thereafter. Final cover requirements must be in accordance with the approved 2018 Johnny Mountain Mine TAR Chapter 3.2 Facility Design, Operation, and Closure Plan.

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for Director, *Environmental Management Act*  
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2.10 **Wildlife Nuisance**

The director may require the permittee to construct or modify works, or follow specific operating instructions, if the director is of the opinion that there is a possibility of a nuisance or hazard being caused by bears or other animals that are attracted to the site.

2.11 **Water Table Restriction**

The permittee must not deposit or store waste at the site at less than 1.22 metres above the highest groundwater level at the site.

2.12 **Hazardous Waste Segregation**

The permittee must comply with all applicable provisions of the Hazardous Waste Regulation of the *Environmental Management Act* when handling and disposing any hazardous waste generated during the mine reclamation. Hazardous waste as defined by the regulation is not authorized for discharge to the Main Landfill. Where conflict exists between this permit and the Hazardous Waste Regulation, the latter must take precedence.


2.13 **Confirmatory Soil Testing**

Following the excavation of Burial Sites #1 and #2, the permittee must complete confirmatory soil sampling and analysis from the walls and floors of the excavations to confirm removal of all waste material. The confirmatory testing must be completed in a matter consistent with the Technical Guidance 1 on Contaminated Sites, "Site Characterization and Confirmation Testing". Results and interpretations of the confirmatory soil testing must be submitted as part of the annual report required by section 3.

2.14 **Erosion Prevention and Sediment Controls**

At the start of the reclamation activities the permittee must develop, implement and then maintain erosion prevention and sediment control measures. Each snow-free season, until the end of the authorization provided in section 1.1, a Qualified Professional must assess whether those controls are being undertaken and are effective. That assessment, including recommended updates to the control measures, must be submitted as part of the annual report required by section 3.

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## 2.15 Main Landfill Water Monitoring

The permittee must annually monitor groundwater and surface water downslope from the Main Landfill for a period of five years, starting in summer 2018. The following table specifies the monitoring sites, frequency and parameters.

Table 1: Monitoring sites, frequency and parameters to be analyzed

Monitoring Sites	Location Description	Monitoring Period, Parameters and Frequencies	
		Water Quality	Water Level
MW17-22A (existing site)	Deep monitoring well downgradient from the Main Landfill.	A <sup>1</sup>	A
MW17-22B (existing site)	Shallow monitoring well downgradient from the Main Landfill.	A <sup>1</sup>	A
Sky Creek 1.0 (new site)	New surface water station on a tributary to Sky Creek, downslope from the Main Landfill and upstream from MW17-22.	A <sup>2</sup>	-

**Notes:**

**A** Annually (during summer)

**1** Field Parameters: specific conductivity, temperature, ORP, and pH.


Analytical parameters: BTEX, EPH, PAH, dissolved metals, pH, alkalinity, bicarbonate, carbonate, chloride, conductivity (EC), fluoride, hardness, hydroxide, total iron, total magnesium, total manganese, nitrate, nitrite, ammonia, total potassium, total sodium, sulphate, TDS, TIC, TOC, COD and turbidity, acidity (hot peroxide titration) and cyanides (WAD, free, total, cyanate and thiocyanate).

**2** Field Parameters: specific conductivity, temperature and pH.

Analytical parameters: BTEX, EPH, PAH, total metals, pH, alkalinity, bicarbonate, carbonate, chloride, conductivity (EC), fluoride, hardness, nitrate, nitrite, ammonia, sulphate, TDS, TIC, TOC, COD and turbidity, acidity (hot peroxide titration) and cyanides (WAD, free, total, cyanate and thiocyanate).

Results and interpretations of the water monitoring program specified above must be submitted as part of the annual report required by section 3.

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### 3. ANNUAL REPORTING

The permittee must, on or before each March 31 that occurs during the term of this Authorization, submit such data, operating and discharge periods for the preceding calendar year to the director, by email at [EnvAuthorisationsReporting@gov.bc.ca](mailto:EnvAuthorisationsReporting@gov.bc.ca) or as otherwise instructed by the director, in a form that is tabulated, graphically represented and interpreted to the satisfaction of the director. For guidelines on how to properly name the files and email subject lines or for more information visit the Ministry website: <https://www2.gov.bc.ca/gov/content/environment/waste-management/waste-discharge-authorization/data-and-report-submissions/routine-environmental-reporting-submission-mailbox>

The annual report must include:

- a. A summary of spills and other environmental incidents;
- b. All environmental monitoring data collected during the demolition, waste excavation and associated disposal activities;
- c. Description and volume of waste materials excavated from Burial Sites #1 and #2;
- d. Description and volume of demolition waste;
- e. Characterization of suspected hazardous waste materials and its disposal method, as required by section 2.12;
- f. Results of confirmatory soil testing, as required by section 2.13;
- g. Assessment of sediment control measures, as required by section 2.14;
- h. A summary of all surface water and groundwater quality, and groundwater levels, including from previous years, suitably tabulated and graphed, where appropriate, to indicate key water quality trends, as required by section 2.15;
- i. Assessment of quality control/quality assurance data; and
- j. Site management and monitoring recommendations related to the mine reclamation.


The format of the annual report must be suitable for review by the public and copies must be made available to the Ministry of Energy, Mines and Petroleum Resources and the Tahltan First Nation.

### 4. NON-COMPLIANCE REPORTING

#### 4.1 Non-compliance Notification

The permittee must immediately notify the director or designate by email at [EnvironmentalCompliance@gov.bc.ca](mailto:EnvironmentalCompliance@gov.bc.ca), or as otherwise instructed by the

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director of any non-compliance with the requirements of this Authorization by the permittee and take remedial action to remedy any effects of such non-compliance.

The permittee must provide the director with written confirmation of all such non-compliance events, including available test results within 24 hours of the original notification by email at [EnvironmentalCompliance@gov.bc.ca](mailto:EnvironmentalCompliance@gov.bc.ca), or as otherwise instructed by the director.

#### 4.2 **Non-compliance Reporting**

If the permittee fails to comply with any of the requirements of this Authorization, the permittee must, within 30 days of such non-compliance, submit to the director a written report that is satisfactory to the director and includes, but is not necessarily limited to, the following:

- a. All relevant test results obtained by the permittee related to the non-compliance,
- b. An explanation of the most probable cause(s) of the non-compliance, and
- c. A description of remedial action planned and/or taken by the permittee to prevent similar non-compliance(s) in the future.


The permittee must submit all non-compliance reporting required to be submitted under this section by email to the Ministry's Compliance Reporting Submission Mailbox (CRSM) at [EnvironmentalCompliance@gov.bc.ca](mailto:EnvironmentalCompliance@gov.bc.ca) or as otherwise instructed by the director. For guidelines on how to report a non-compliance or for more information visit the Ministry website:

<https://www2.gov.bc.ca/gov/content/environment/waste-management/waste-discharge-authorization/data-and-report-submissions/compliance-reporting-mailbox>

#### 5. **SPILL REPORTING**

The permittee must immediately report all spills to the environment (as defined in the Spill Reporting Regulation) in accordance with the Spill Reporting Regulation, which among other things, requires notification to Emergency Management BC at 1-800-663-3456.

Date issued: March 22, 1989  
Date amended: April 17, 2019  
(most recent)

  
Mark P. Love P.Ag.  
for Director, *Environmental Management Act*  
Authorizations - North Region

## 6. GLOSSARY

Capitalized terms referred to in this authorization are defined below. Other terms used in this authorization have the same meaning as those defined in the *Environmental Management Act* and applicable regulations.

### 6.1 "Authorized Works"

"Authorized Works" means Main Landfill as stated in subsection 1.1.3 and auxiliary fired refuse Incinerator as stated in subsection 2.1;

### 6.2 "Regulatory Document"

"Regulatory Document" means any document that the permittee is required to provide to the director or the Province pursuant to:

- i. This Authorization;
- ii. Any regulation made under the *Environmental Management Act* that regulates the facility described in this Authorization or the discharge of waste from that facility; or
- iii. Any order issued under the *Environmental Management Act* directed against the permittee that is related to the facility described in this Authorization or the discharge of waste from that facility;


### 6.3 "Qualified Professional"

"Qualified Professional" means an applied scientist or technologist specializing in an applied science or technology applicable to the duty or function, including, if applicable and without limiting this, agronomy, biology, chemistry, engineering, geology or hydrogeology and who :

- i. Is registered with the appropriate professional organization, is acting under that organization's code of ethics and is subject to disciplinary action by that organization, and
- ii. Through suitable education, experience, accreditation and/or knowledge, may be reasonably relied on to provide advice within their area of expertise.

All documents submitted to the director by a Qualified Professional must be signed by the author(s).

Date issued: March 22, 1989  
Date amended: April 17, 2019  
(most recent)

  
Mark P. Love P.Ag.  
for Director, *Environmental Management Act*  
Authorizations - North Region

## Permit M-178

PROVINCE OF BRITISH COLUMBIA  
MINISTRY OF ENERGY AND MINES

**AMENDED PERMIT**

**APPROVING WORK SYSTEM AND RECLAMATION PROGRAM**

(Issued pursuant to Section of the **Mines Act** R.S.B.C. 1996, c. 293)

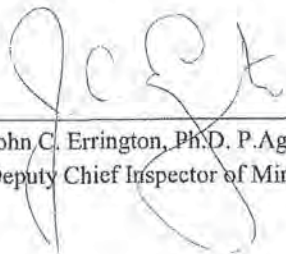
Permit: **M-178**

Issued to: **Skyline Gold Corporation**  
**1118 - 925 West Georgia Street**  
**Vancouver, British Columbia**  
**V6C 3L2**

for work located at the:

**Johnny Mountain Mine**

Amended at Victoria, British Columbia this 7th day of July in the year 2004.



---

John C. Errington, Ph.D. P.Ag.  
Deputy Chief Inspector of Mines



## PREAMBLE

An application describing plans for the protection and reclamation of the surface of the land and watercourses affected by the mine, entitled "Closure Plan for the Johnny Mountain Gold Mine, International Skyline Gold Corporation", dated October 13, 1999 was filed with the Chief Inspector of Mines (Chief Inspector) on October 21, 1999 in accordance with Part 10(6) of the **Mines Act**.

The following letter forms part of this application:

Letter by D. Yeager entitled "Aspects of ML/ARD in Closure Plan for the Johnny Mountain Mine Site" dated December 24, 2002.

This application was referred to other agencies in accordance with Part 10.3 of the Health, Safety and Reclamation Code for Mines in British Columbia (Code).

This permit contains the requirements of the Ministry of Energy and Mines (MEM) for reclamation. It also is compatible, to the extent possible, with the requirements of other provincial ministries for reclamation issues. The amount of security required by this permit and the manner to which this security may be applied, will also reflect the requirements of those ministries. However, nothing in this permit limits the authority of other provincial ministries to set other conditions, or to act independently, under their respective permits and legislation.

The reclamation liability to fully implement closure on this property has been estimated by MEM to be \$1,591,179.00 (One Million, Five Hundred and Ninety One Thousand, One Hundred and Seventy Nine Dollars). This estimated cost of reclamation liability includes:

- site decommissioning, including chemical and waste oil disposal
- disposal of PAG waste rock into a secure flooded location
- tailings relocation
- tailing impoundment stabilization
- sealing of portals and vent raises
- contaminated soil treatment
- removal of mill buildings and tank farm
- miscellaneous demolition and disposal of camp facilities, warehouses and offices
- construction of diversion ditches etc.
- estimate of demobilization costs
- site preparation and revegetation
- on-going site monitoring and maintenance requirement and,
- water quality sampling

## CONDITIONS

The Chief Inspector of Mines (herein called the Chief Inspector) hereby approves the amended programs for protection and reclamation of the land surface and watercourse affected by the mine reclamation plan subject to compliance with the following terms and conditions.

### General

1. Compliance with Mines Act and Code

All work shall be in compliance with all sections and parts of the **Mines Act** and Code and the owner, agent or manager (herein called the Permittee) shall obey all orders issued by the Chief Inspector or his delegate.

2. Departure from Approval

The Permittee shall notify the Chief Inspector in writing of any intention to depart from either the plan of the work system or the program for the protection and reclamation of the surface of the land and watercourses to any substantial degree, and shall not proceed to implement the proposed changes without the written authorization of the Chief Inspector.

3. Reporting

(a) By March 31 of each year, an Annual Reclamation Report shall be submitted in a form and containing the information required by the Chief Inspector. The Annual Reclamation Report shall document the current status of the work system, reclamation obligations, the outstanding liability and associated costs, and all monitoring including water quality, and ongoing maintenance activities.

(b) An update to the Closure Plan shall be submitted by **March 31, 2005** providing the current status of the work system and reclamation obligations, a compilation of all monitoring including ML/ARD prediction, water quality, closure and maintenance activities, any changes to the reclamation program that affect long-term mitigation, contingency plans, schedule for completion of reclamation works, and a breakdown of outstanding liabilities and associated costs.

- (c) By **March 31, 2005** the Permittee shall submit a Closure Management Manual which describes and documents key aspects of the operational surveillance and monitoring requirements used to track important changes which could affect long term mitigation performance, monitoring and maintenance requirements. This document shall be a living document that is kept up to date with updates submitted to this Ministry whenever significant changes occur.

#### **Health and Safety**

1. Operational Procedure for Waste Dumping into the Tailings Impoundment

The Permittee shall prepare and submit an operational procedure describing the methodology to be used for waste dumping into the tailings impoundment, including platform construction (if required), monitoring and operator training. This procedure shall be submitted to the district Inspector of Mines, Engineer for review and approval before dumping will be allowed to commence.

#### **Geotechnical**

1. Tailings Storage Facility

The Permittee shall submit a final closure design report for all aspects of the tailings storage facility and water management system on the property for review and approval. The report shall include a stability review of the dam final designs. The report shall be submitted by **September 30, 2004**.

2. Tailings Storage Facility As-built Report

The Permittee shall submit an as-built report for closure construction of the tailings storage facility and water management system no later than March 31st of the year following completion of construction.

3. Long-term Inspections and Reporting

- (a) The Permittee shall inspect the tailings impoundment at least once a year, with the results reported in the Annual Reclamation Report. Any changes shall be immediately reported to the district Inspector of Mines, Engineer and Geotechnical Inspector.
- (b) Every 2 years, a Dam Safety Inspection Report prepared by a professional engineer, shall be submitted to the Chief Inspector by March 31st of the year following inspection.

- (c) If the yearly field inspection (a) is not undertaken by the Permittee, then every year, a Dam Safety Inspection Report prepared by a professional engineer, shall be submitted to the Chief Inspector by March 31st of the year following inspection.
- (d) A Dam Safety Review, prepared by a professional engineer, shall be submitted to the Chief Inspector by **March 31, 2005**, and every 10 years thereafter.

### **Metal Leaching and Acid Rock Drainage (ML/ARD)**

#### 1. General

- (a) All materials with the potential to generate ML/ARD shall be placed in a manner that minimizes the production and release of metals and contaminants to levels that assure long-term protection of environmental quality.
- (b) All plans for the prediction, and if necessary, the prevention, mitigation and management of metal leaching and acid rock drainage shall be prepared in accordance with the *Guidelines for Metal Leaching and Acid Rock Drainage at Minesites in British Columbia*.

#### 2. Disposal of PAG Waste Material

- (a) The only approved disposal location for PAG waste material is in the flooded tailings impoundment. Upon completion, the Permittee shall ensure that all PAG waste rock and tailings placed in the tailings impoundment is covered by a minimum of one metre of water during periods of minimum water levels.
- (b) PAG waste is defined as waste material with a  $NPR_{(sobek)} < 2$  and/or has a weathering rinse pH  $< 6$  and/or has an acidic drainage pH  $< 5.5$  and/or is showing signs of visible limonite staining.
- (c) The Permittee shall monitor the rinse pH of all PAG waste rock being placed in the tailings impoundment. Where the rinse pH is less than 4.5, the Permittee shall add alkalinity at a rate of 75 g/tonnes of waste rock (i.e. 2 kg of lime per 25 tonnes of waste rock) during excavation and loading of the trucks. No lime is to be applied when the daily pH in the tailings impoundment exceeds 7.5.
- (d) The Permittee shall keep an inventory of the materials placed in the tailings impoundment including: volume and tonnes of material, deposition location within the impoundment, rinse pH values, lime addition and drainage monitoring data.

3. Drainage Monitoring

The Permittee shall implement a program to monitor and track changes to drainage chemistry from disturbed areas and waste materials. The program shall be capable of detecting significant metal leaching and provide early warning about the onset of ARD or increases in contaminant loadings. This program must specify the frequency, sampling type, location, parameters to be analysed, detection limits and QA/QC procedures and triggers for implementing additional mitigation works, and shall be submitted with the 2004 annual Reclamation Report due **March 31, 2005**, for approval by the Chief Inspector.

4. Drainage Management and Collection

- (a) The Permittee shall maintain a system of drainage diversion and collection ditches to minimize contaminate loadings for areas of disturbance or waste disposal.
- (b) The Permittee shall install weirs or other suitable flow measuring equipment at all water quality monitoring locations so that flows can be monitored when water quality monitoring is conducted.
- (c) In the event that the mine site drainage is not of acceptable discharge quality, the Permittee shall collect and treat, or otherwise mitigate drainage for as long as is necessary.

5. Contingency Plans

Pursuant to condition 4 above, the Permittee must develop contingency plans demonstrating how contaminant loadings will be reduced, and receiving environment reclamation objectives will be achieved, should the underground and/or tailings mitigation strategies fail to protect against the onset of ML/ARD. Contingency Plans shall be described in the updated Closure Plan due **March 31, 2005**.

6. Research - Field Test Cells

The Permittee shall provide an update on the existing field test cells and reinstate a plan to provide for future monitoring. Plans shall be described in the updated Closure Plan due **March 31, 2005**.

## Reclamation Program

### 1. Reclamation Security

- (a) The Permittee shall cause to be deposited with the Minister of Finance, within 30 days of receipt of this permit, additional security in the amount of Nine Thousand Six Hundred and Seventy Two dollars (\$9,672.00) bringing the total security for this permit to Five Hundred and Twenty-five Thousand dollars (\$525,000.00). The security will be held by the Minister of Finance for the proper performance of the approved program and all the conditions of this permit in a manner satisfactory to the Chief Inspector..
- (b) The Permittee shall conform to all Ministry of Sustainable Resource Management and Ministry of Water, Land air Protection approval, license and permit conditions, including the **Waste Management Act**, Contaminated Sites and Special Waste regulations as well as the **Wildlife Act** and **Land Act**. Should the Permittee not conform to these requirements, and then all or part of the security may be used to cover the costs of these requirements.
- (c) The Province holds a security interest as detailed in the Asset Security Agreement dated April 1, 2000. The Permittee must annually inspect the assets for appraisal purposes, and provide a report to the Province as to their condition including any related maintenance records and depreciation.
- (d) The Permittee must annually estimate the outstanding liability for unfulfilled or ongoing work system, protection of the land and watercourses, and reclamation obligations. The detailed costs shall include those for the monitoring, care and maintenance of geotechnical works, and required predictive testwork and mitigation for metal leaching and acid rock drainage (ML/ARD).
- (e) The amount of security will be adjusted for inflation where required. The first adjustment will be made when the cumulative inflation from January 2005 exceeds 10% based on each of the previous years annual increase in the British Columbia Consumer Price Index (B.C. CPI).

### 2. Land Use

The proposed end land use as alpine tundra wildlife habitat is approved.

3. Capability

Excluding the tailings pond area, the average land capability to be achieved on the remaining lands shall not be less than the average that existed prior to mining.

4. Long-term Stability

Land, watercourses and access roads shall be left in a manner that ensures long-term stability.

5. Re-vegetation

On all lands suitable, as designated by the Chief Inspector, the land shall be re-vegetated to a self-sustaining state using appropriate plant species.

6. Growth Medium

- (a) On all lands to be re-vegetated, the growth medium shall satisfy land use, capability, and water quality objectives.
- (b) All severely compacted areas shall be deeply ripped prior to placement of growth media and/or vegetation.

7. Landforms

Where practicable, land and watercourses shall be reclaimed in a manner that is consistent with the adjacent landforms.

8. Structures and Equipment

- (a) Prior to abandonment, and unless the Chief Inspector has made a ruling with respect to heritage project status or industrial use,
  - (i) All machinery, equipment and building superstructures shall be removed,
  - (ii) Concrete foundations shall be covered and re-vegetated, unless because of impracticality, they have been exempted by an Inspector, and
  - (iii) All scrap material shall be disposed of in a manner acceptable to the district Inspector of Mines, Engineer.

- (b) The Permittee is responsible for the following structures and equipment located at the Bronson airstrip:
- (i) 'cold storage' building,
  - (ii) two storage buildings adjacent to the 'cold storage' building ("horse barn" and "green house"),
  - (iii) shipping office building,
  - (iv) mechanics lunchroom cabin,
  - (v) two aircraft maintenance cabins,
  - (vi) two 1986 Chevrolet 1-ton dual flat deck 4x4 trucks, one in running condition and one for parts,
  - (vii) miscellaneous shelving, benches and storage cupboards in buildings, and
  - (viii) 70 ton 'Link-belt' crane.

9. Dumps

Dumps shall be reclaimed to ensure,

- (a) long-term stability, and
- (b) long-term erosion control.

10. Erosion Control

Reduction of erosion shall be achieved through development of maintenance-free vegetation covers and the development of self-sustaining, erosion-resistant watercourses.

11. Watercourses

Watercourses shall be reclaimed to a condition that ensures,

- (a) Drainage is restored either to original watercourses or to new watercourses which will sustain themselves without maintenance, and



- (b) The level of productive capacity shall not be less than existed prior to mining, unless the Permittee can provide evidence, which demonstrates, to the satisfaction of the Chief Inspector, the impracticality of doing so.

12. Impoundments

Impoundment facilities shall be inspected, monitored and maintained to ensure stability.

13. Roads

- (a) All roads shall be reclaimed in accordance with land use objectives unless permanent access is required. This shall include the ripping of the road surface and re-contouring the roadway into adjacent landforms to reconstruct the areas' relative original landscape and moisture regime.
- (b) Soil cover shall be replaced over the re-contoured surface and immediately revegetated with appropriate species that will lead to achieving end land use and productivity objectives.
- (c) Included under this permit are all mine roads, the airstrip and the 10 km Johnny Mountain Access Road.

14. Securing Openings

- (a) All access roads shall be effectively blocked to prevent inadvertent vehicular access to surface areas of the mine that may be dangerous.
- (b) All shafts, raises, stope openings, adits, or drifts opening to the surface shall either be capped with reinforced concrete or filled with material so that subsidence of the material will not pose a future hazard.
- (c) In the case of shafts or raises, the cap shall be secured to solid rock, or to a concrete collar secured to solid rock, and capable of supporting a uniformly distributed load of 12 Kpa or a concentrated load of 24 kn, whichever is greater.
- (d) Where there is evidence or a potential for use by wildlife, mine openings may be fitted with a barrier that allows wildlife passage but prevents human entry.
- (e) When mine openings are permanently closed and it may be possible for mine water to build to dangerous pressures, a permanent drain shall be installed.

15. Disposal of Fuels and Toxic Chemicals

Fuels, chemicals or reagents, which cannot be returned to the manufacturer/supplier, are to be disposed of as directed by the Chief Inspector in compliance with municipal, regional, provincial and federal statutes.

16. Monitoring

The Permittee shall undertake monitoring to demonstrate that reclamation and environmental protection objectives including land use, water quality and stability of structures are being achieved.

## Permit PE-8415



June 10, 2019

Tracking Number: 382371  
Authorization Number: 8415

**REGISTERED MAIL**

SNIPGOLD CORP.  
10TH FLOOR, 595 HOWE STREET  
VANCOUVER BC V6C 2T5

Dear Permittee:

Enclosed is amended permit 8415 issued under the provisions of the *Environmental Management Act*. Your attention is respectfully directed to the terms and conditions outlined in the permit. An annual fee will be determined according to the Permit Fees Regulation.

This permit does not authorize entry upon, crossing over, or use for any purpose of private or Crown lands or works, unless and except as authorized by the owner of such lands or works. The responsibility for obtaining such authority rests with the permittee. This permit is issued pursuant to the provisions of the *Environmental Management Act* to ensure compliance with Section 120(3) of that statute, which makes it an offence to discharge waste, from a prescribed industry or activity, without proper authorization. It is also the responsibility of the permittee to ensure that all activities conducted under this authorization are carried out with regard to the rights of third parties, and comply with other applicable legislation that may be in force.

This decision may be appealed to the Environmental Appeal Board in accordance with Part 8 of the *Environmental Management Act*. An appeal must be delivered within 30 days from the date that notice of this decision is given. For further information, please contact the Environmental Appeal Board at (250) 387-3464.

Administration of this permit will be carried out by staff from the Environmental Protection Division's Regional Operations Branch. Plans, data and reports pertinent to the permit are to be submitted by email or electronic transfer to the director, designated officer, or as further instructed.

Yours truly,

Mark P. Love P.Ag.  
for Director, *Environmental Management Act*



**MINISTRY OF  
ENVIRONMENT AND  
CLIMATE CHANGE  
STRATEGY**

**PERMIT**

**8415**

*Under the Provisions of the Environmental Management Act*

**SNIPGOLD CORP.**

**10TH FLOOR, 595 HOWE STREET  
VANCOUVER BC V6C 2T5**

is authorized to discharge mine influenced water to Johnny Creek, and Stonehouse Creek from the closed Johnny Mountain Gold Mine located 90 kilometres northwest of Stewart, British Columbia, subject to the requirements listed below.

Contravention of any of these requirements is a violation of the *Environmental Management Act* and may lead to prosecution.

This authorization supersedes and replaces all previous versions of Permit 8415 issued under Section 14 or 16 of the *Environmental Management Act*.

Where this authorization provides that the director may require an action to be carried out, the permittee must carry out the action in accordance with the requirements of the director.


The permittee must not discharge under this authorization unless the Authorized Works are complete and fully operational.

**1. AUTHORIZED DISCHARGES**

**1.1 Tailings Impoundment Supernatant and Seepage**

This section applies to the discharge of effluent from the tailings impoundment to Johnny Creek. The site reference number for this discharge is E207745 (JM5).

Date issued: June 6, 1990  
Date amended: June 10, 2019  
(most recent)

  
Mark P. Love P.Ag.  
for Director, *Environmental Management Act*  
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- 1.1.1 The maximum limit for the rate of discharge is indeterminate.
- 1.1.2 The characteristics of the discharge must be equivalent to or better than:

Dissolved Copper  
Maximum: 0.05 mg/L

Dissolved Zinc  
Maximum: 0.2 mg/L

- 1.1.3 The discharge is authorized from Authorized Works, which are a tailings impoundment, spillway and discharge weir, seepage collection ditches and ponds, and related appurtenances approximately located as shown on Site Plan A.
- 1.1.4 The location of the facilities from which the discharge is authorized to originate and the point where the discharge is authorized to occur is Crown Grant Mineral Claims Reg 3 and Reg 4, Liard Mining Division.

## 1.2 Mine Water Discharges


This section applies to the portal seepage from the closed and reclaimed #10 level portal to Stonehouse Creek. The site reference number for this discharge is E213930 (JM4).

- 1.2.1 The maximum limit for the rate of discharge is indeterminate.
- 1.2.2 The characteristics of the discharge must be typical of groundwater seepages coming from #10 level portal.
- 1.2.3 The location of the facilities from which the discharge is authorized to originate and the point where the discharge is authorized to occur is the same as specified in section 1.1.4 above.

## 1.3 Waste Rock Seepage Discharges

This section applies to the discharge of seepage from the #10, #11 and #12 level waste rock piles to ground and Stonehouse Creek. The site reference numbers for the #10, #11 and #12 level seepage discharges are E236846 (JM3), E213931 (JM2) and E216683 (JM1), respectively.

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Date amended: June 10, 2019  
(most recent)

  
Mark P. Love P.Ag.  
for Director, *Environmental Management Act*  
Authorizations - North Region

- 1.3.1 The maximum limit for the rate of discharge is indeterminate.
- 1.3.2 The characteristics of the discharge must be typical of leachate, which has passed through inert waste rock.
- 1.3.3 The location of the facilities from which the discharge is authorized to originate and the point where the discharge is authorized to occur is the same as specified in section 1.1.4 above.

## 2 GENERAL PROVISIONS

### 2.1 Licence to Publish Documents

- 2.1.1 Subject to paragraph 2.1.2, the permittee authorizes the Province to publish on the Ministry of Environment and Climate Change Strategy website the entirety of any Regulatory Document.
- 2.1.2 The Province will not publish any information that could not, if it were subject to a request under section 5 of the *Freedom of Information and Protection of Privacy Act*, be disclosed under that Act.
- 2.1.3 The permittee will indemnify and save harmless the Province and the Province's employees and agents from any claim for infringement of copyright or other intellectual property rights that the Province or any of the Province's employees or agents may sustain, incur, suffer or be put to at any time that arise from the publication of a Regulatory Document.


### 2.2 Maintenance of Works and Emergency Procedures

#### 2.2.1 Maintenance of Works

The permittee must regularly inspect the Authorized Works and maintain them in good working order. If components of the Authorized Works have a manufacturer's recommended maintenance schedule, then those components must, at a minimum, be maintained in accordance with that schedule.

The permittee must maintain a record of inspections and maintenance of the Authorized Works, and make the record available to an officer upon request.

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Mark P. Love P.Ag.  
for Director, *Environmental Management Act*  
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2.2.2 **Emergency Procedures**

In the event of an emergency or other condition which prevents normal operation of the Authorized Works or leads to an unauthorized discharge, the permittee must take remedial action immediately to restore the normal operation of the Authorized Works and to prevent any unauthorized discharges. The permittee must immediately report the emergency or other condition and the remedial action that has and will be taken to the [EnvironmentalCompliance@gov.bc.ca](mailto:EnvironmentalCompliance@gov.bc.ca) email address or as otherwise instructed by the director.

3. **MONITORING REQUIREMENTS**

3.1 **Sampling Facilities**

The permittee must install and maintain, suitable to the director, sampling facilities. The permittee must collect samples at each site according to the schedule specified in Table 1. The permittee must take due care in sampling, storing and transporting the samples to control temperature and avoid contamination, breakage, and any other factor or influence that may compromise the integrity of the samples.

Table 1: Water Quality Sampling Requirements

Parameter	JM1	JM2	JM3	JM4	JM5	JM6	JM7	JM8	JM9
Fe (dissolved)	A	A	A	A	A	A	A	A	A
Cu (dissolved)	A	A	A	A	A	A	A	A	A
Zn (dissolved)	A	A	A	A	A	A	A	A	A
pH	A	A	A	A	A	A	A	A	A
SO <sub>4</sub>	A	A	A	A	A	A	A	A	A
Hardness	A	A	A	A	A	A	A	A	A

A: Annual Water Quality Sample Required

3.2 **Water Quality Sampling Site Locations**

The permittee must collect the water quality samples at sampling site locations described in Table 2.

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Table 2: Water Quality Sampling Site Locations

Designation	Coordinates		EMS #	Description
	Easting	Northing		
JM1	373272	6277784	E216683	12-Level Waste Rock Seepage
JM2	372834	6277774	E213931	11-Level Waste Rock Seepage
JM3	372514	6277926	E236846	10-Level Waste Rock Seepage
JM4	372668	6277897	E213930	Mine Water Discharge at 10 (represents minewater from all levels)
JM5	372832	6278600	E207745	Tailings pond discharge
JM6	373292	6279242	E207735	Johnny Creek at end of Johnny Flats
JM7	372199	6277529	E207737	Stonehouse Creek
JM8	-	-	-	Duplicate sample from any one of the sampling stations
JM9	-	-	-	Travel blank

Note: GPS coordinates are Easting, Northing Zone 9, NAD 83

### 3.3 Analytical Procedures

The permittee must carry out analyses in accordance with procedures described in the "British Columbia Laboratory Manual (2015 Permittee Edition)", or the most recent edition or by alternative procedures as authorized by the director.


A copy of the above manual is available on the Ministry web page at <https://www2.gov.bc.ca/gov/content/environment/research-monitoring-reporting/monitoring/laboratory-standards-quality-assurance/bc-environmental-laboratory-manual>

### 3.4 Quality Assurance

The permittee is required to conduct the following quality assurance and control program to determine the acceptability of data required by this authorization and section 2(d) of the Environmental Data Quality Assurance Regulation.

- 3.4.1 The permittee must obtain from the analytical laboratory(ies) their precision, accuracy and blank data for each sample set submitted by the permittee and an evaluation of the data acceptability, based on criteria set

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by such laboratory.

- 3.4.2 The permittee must prepare and submit for analysis by the analytical laboratory(ies) a duplicate sample from one of the monitoring sites identified in Table 1 during each monitoring period.
- 3.4.3 The permittee must submit samples to analytical laboratory(ies) that meet the definition of a qualified laboratory under the Environmental Data Quality Assurance Regulation.
- 3.4.4 The permittee must report the results for each parameter of the field duplicates in terms of variation as the relative percent difference.
- 3.4.5 The permittee must prepare and submit to the laboratory a sample collection blank containing distilled water and preservative if required during each monitoring period. If any result for any parameter indicates detectable concentrations, then efforts must be made to determine and control the source of contamination.

### 3.5 **Sampling Procedures**

The permittee must carry out sampling in accordance with the procedures described in the "British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples, (2013 Permittee Edition)" or most recent edition, or by alternative procedures as authorized by the director.


A copy of the above manual is available on the Ministry web page at <https://www2.gov.bc.ca/gov/content/environment/research-monitoring-reporting/monitoring/laboratory-standards-quality-assurance/bc-field-sampling-manual>

## 4. **REPORTING REQUIREMENTS**

The permittee must, on or before each March 31 that occurs during the term of this authorization, submit an annual report for the preceding calendar year to the director, by email at [envauthorizationsreporting@gov.bc.ca](mailto:envauthorizationsreporting@gov.bc.ca) or as otherwise instructed by the director and includes, but is not limited to:

- a. a review and interpretation of the monitoring data for the preceding calendar year,

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(most recent)

  
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for Director, *Environmental Management Act*  
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- b. an evaluation of the laboratory analysis, and quality and precision based on the results of the quality assurance program required herein,
- c. an evaluation of the performance of the treatment works and identify any changes,
- d. an implementation schedule for any alterations to the treatment and disposal works which may impact the discharge under this authorization.

## 5. NON-COMPLIANCE REPORTING

### 5.1 Non-compliance Notification

The permittee must immediately notify the director or designate by email at [EnvironmentalCompliance@gov.bc.ca](mailto:EnvironmentalCompliance@gov.bc.ca), or as otherwise instructed by the director of any non-compliance with the requirements of this authorization and take remedial action to remedy any effects of such non-compliance.

The permittee must provide the director with written confirmation of all such non-compliance events, including available test results within 24 hours of the original notification by email at [EnvironmentalCompliance@gov.bc.ca](mailto:EnvironmentalCompliance@gov.bc.ca), or as otherwise instructed by the director.


### 5.2 Non-compliance Reporting

If the permittee fails to comply with any of the requirements of this authorization, the permittee must, within 30 days of such non-compliance, submit to the director a written report that includes, but is not necessarily limited to, the following:

- a. all relevant test results obtained by the permittee related to the non-compliance,
- b. an explanation of the most probable cause(s) of the non-compliance, and
- c. a description of remedial action planned and/or taken by the permittee to prevent similar non-compliance(s) in the future.

The permittee must submit all non-compliance reporting required to be submitted under this section by email to the Ministry's Compliance Reporting Submission Mailbox (CRSM) at [EnvironmentalCompliance@gov.bc.ca](mailto:EnvironmentalCompliance@gov.bc.ca) or as otherwise instructed by the director. For guidelines on how to report a non-compliance or for more information visit the Ministry website:

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<https://www2.gov.bc.ca/gov/content/environment/waste-management/waste-discharge-authorization/data-and-report-submissions/compliance-reporting-mailbox>

## 6 **Spill Reporting**

The permittee must immediately report all spills to the environment (as defined in the Spill Reporting Regulation) in accordance with the Spill Reporting Regulation, which among other things, requires notification to Emergency Management BC at 1-800-663-3456.

## 7. **GLOSSARY**

Capitalized terms referred to in this authorization are defined below. Other terms used in this authorization have the same meaning as those defined in the *Environmental Management Act* and applicable regulations.

### 7.1 **“Authorized Works”**


“Authorized Works” means a tailings impoundment, spillway and discharge weir, seepage collection ditches and ponds, and related appurtenances as stated in Section 1.1.3;

### 7.2 **“Regulatory Document”**

“Regulatory Document” means any document that the permittee is required to provide to the director or the Province pursuant to:

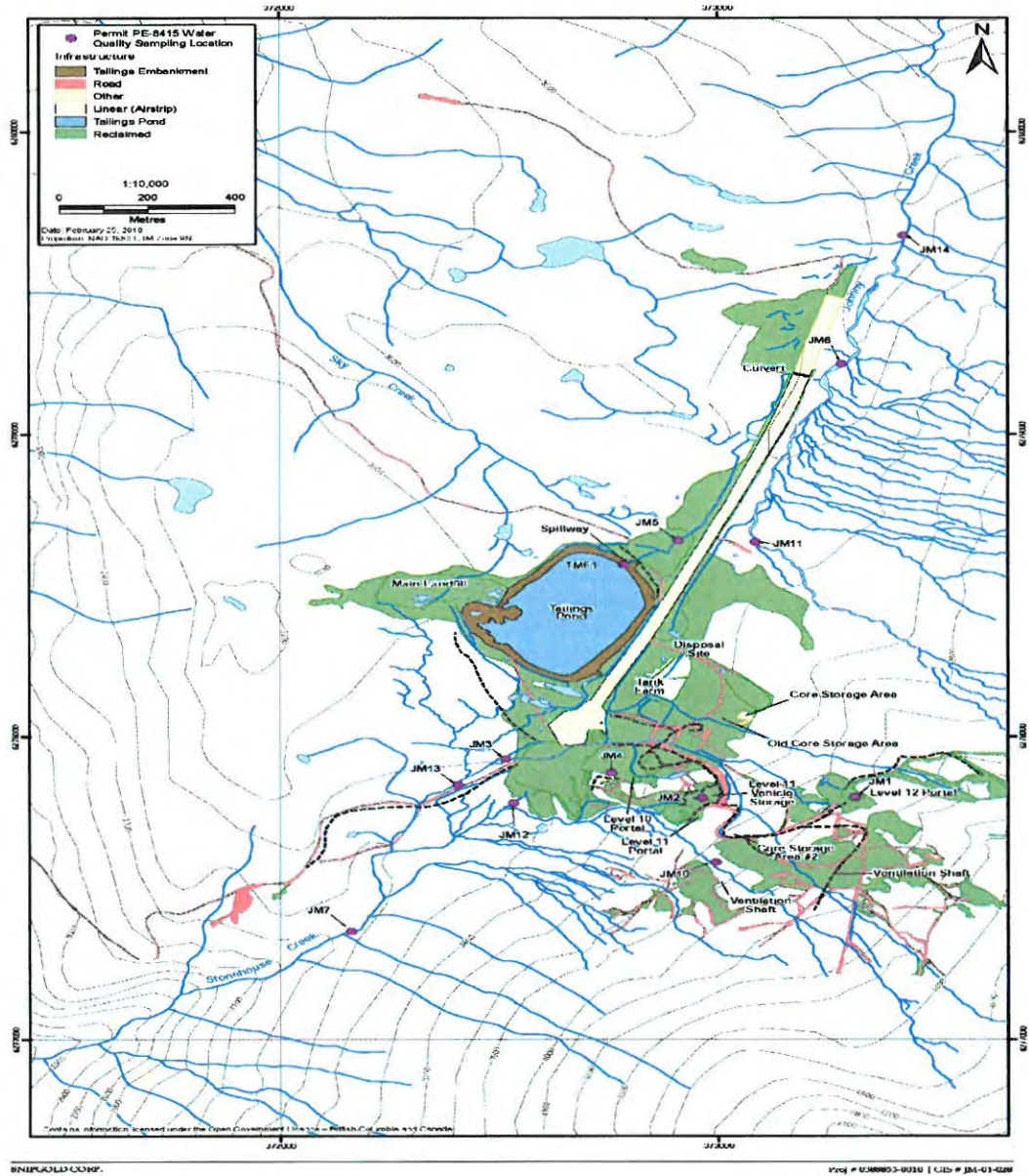
- i. this authorization;
- ii. any regulation made under the *Environmental Management Act* that regulates the facility described in this authorization or the discharge of waste from that facility; or
- iii. any order issued under the *Environmental Management Act* directed against the permittee that is related to the facility described in this authorization or the discharge of waste from that facility;

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Site Plan A

Figure 1  
Permit PE-8415 Water Quality Sampling Stations



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(most recent)

*M. Love*  
Mark P. Love P.Ag.  
for Director, *Environmental Management Act*  
Authorizations - North Region

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## APPENDIX B      2021 PROJECT EXECUTION PLAN (SNIPGOLD 2021)

# 2021 PROJECT EXECUTION PLAN (PEP)

<b>Project Title:</b>	<b>Johnny Mountain Mine Reclamation</b>
<b>Customer Name:</b>	<b>SnipGold Corporation (SnipGold)</b>
<b>Revision No.:</b>	<b>2021-rev0</b>



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**PROJECT EXECUTION PLAN APPROVAL AND SIGN-OFF**

The completion and implementation of this PEP is a SnipGold project management requirement. This PEP is created for the:

- **Johnny Mountain Mine (JMM) Reclamation Project - 2021 season**

The PEP will be approved by the appropriate SnipGold Project Management Representatives. This PEP sign-off page requires the identified key project representatives to affirm that the PEP is approved for use.

These key representatives will include:

<b>Title</b>	<b>Name</b>	<b>Signature</b>	<b>Date</b>
SnipGold Project Manager	<u>Elizabeth Miller</u>	_____	_____
SnipGold Mine Manager	<u>Marcus Adam</u>	_____	_____

Once approved, the Project Manager will present the PEP to the project team to confirm their awareness of the content and project commitments and remind them that they are required to follow it.

The PEP is a living document subject to change throughout the life of the project, anticipated to be updated annually on this multi-year project.

Signatures will be obtained prior to the first “Issued for Implementation” revision (Rev 0) of this document. Subsequent changes will be issued as formal “revisions” to the PEP following the document control procedures established for the project.

The signed original of the sign-off page and the corresponding PEP are kept with other documents in the appropriate project folder.

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	<b>Name</b>	<b>Signature</b>	<b>Date</b>
Prepared by:	<u>Kevin Hidber</u>	_____	_____
Checked by:	<u>Michael Skurski</u>	_____	_____
Approved by:	<u>Elizabeth Miller</u>	_____	_____

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APPENDIX A – SCHEDULE

Bronson Camp Open - Matrix (approximate)	04 May 2021
Seabridge Reclamation Management Team – Preseason meetings and scheduling	04 May 2021
Seabridge JMM Reclamation Team Mobilize to Iskut Camp	18 May 2021
Start Improvements to JMM Access Road and snow removal	19 May 2021
Matrix Mechanic - Begin repairs to site equipment	19 May 2021
JMM access Road – Repair washout and snow removal	25 May 2021
Stage all reclamation equipment and supplies at McLymont for transfer to site. (Lime, Oil Gator, PVC Pipe)	01 June 2021
Conduct Dam Safety Inspection (DSI)	03 June 2021
Begin In-Situ Soil Remediation - Tank Farm area	03 June 2021
Training of Crew – “Working near Water”	4-6 June 2021
Begin Relocation of Waste Rock to TSF – Level 10	07 June 2021
Begin Relocation of Waste Rock to TSF – Level 11	04 July 2021
Conduct Dam Safety Inspection (DSI)	04 July 2021
Begin Relocation of Waste Rock to TSF – JMM Runway	20 August 2021
Disposal of old mine equipment to JMM landfill	08 Sept 2021

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KCB – Conduct Dam Safety Inspection (DSI) on the TSF	08 Sept 2021
End of 2021 reclamation season at JMM	02 Oct 2021

APPENDIX B – GOVERNING REGULATIONS AND ACTS

APPENDIX C – WBS PROCEDURE

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## **1.0 SECTION 1 – PROJECT EXECUTION PLAN**

### **1.1 INTRODUCTION**

The following Project Execution Plan (PEP), including costing, implementation and scheduling for the Johnny Mountain Mine (JMM) site, located in Northwest British Columbia was compiled by SnipGold with the assistance of several Consulting Engineers adding technical support and specialised knowledge to facilitate a comprehensive reclamation plan.

In June 2016, Seabridge Gold (Seabridge) purchased SnipGold, making SnipGold a wholly owned subsidiary of Seabridge Gold.

The Johnny Mountain Mine (JMM) was a small underground gold mine and milling operation that operated over a short period from November 1988 to August 1990 and then from September to November 1993 when operations were stopped. The mine comprised three (3) adits (numbered 10, 11 and 12), five (5) vent raises (shafts), a mill building, a tailings facility, an air strip (at the mine site), a fuel tank farm, several ancillary buildings, waste rock piles, a 10 km road from the Bronson Slope (adjacent to the Iskut River), a septic bed and a few other minor components (see Figure 1-1 and Figure 1-2). The milling process comprised conventional grinding and gravity separation. The initially milling process included a cyanide leach process that was stopped early in process operations.

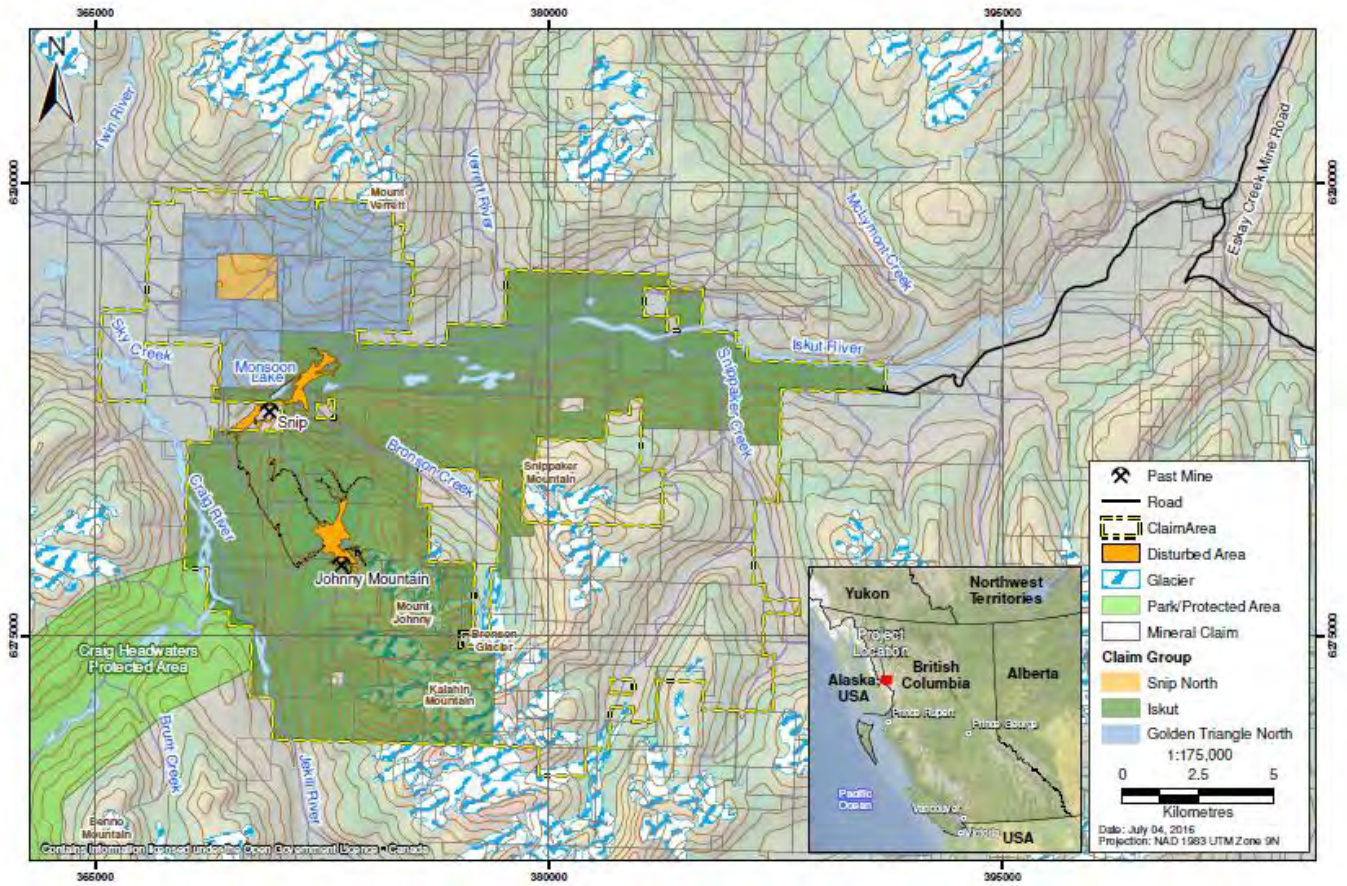


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**Figure 1-1: Regional Location Plan**

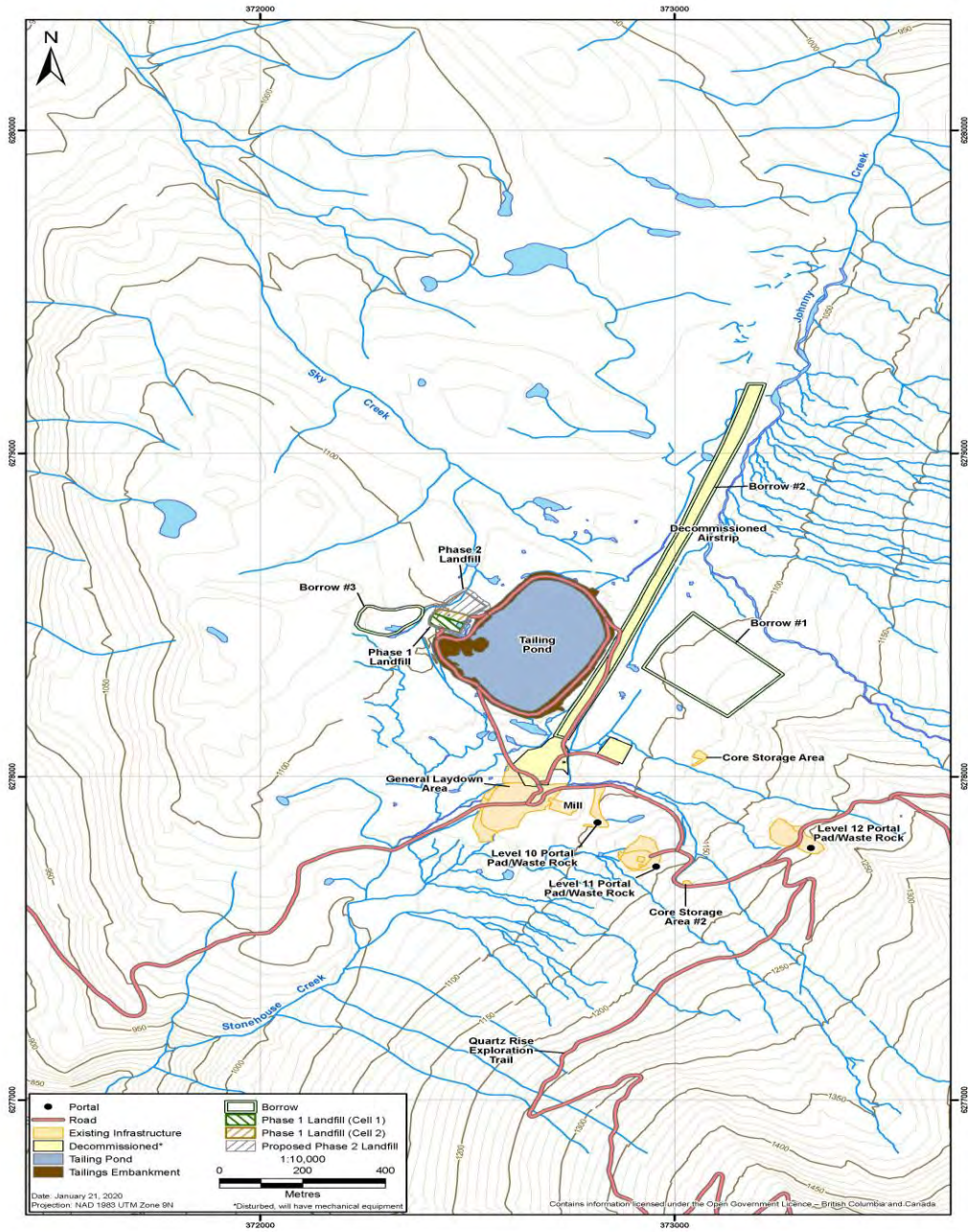
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**Figure 3-1  
 Current Status of the Site**



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**Figure 1-2: 2021 Mine Site Plan**

Reclamation activities technically began in 1995, although the substantial amount of reclamation achieved to date started in 2000 based on the original reclamation plan (1999), accepted and approved by the British Columbia Ministry of Energy, Mines and Petroleum Resources (currently BC Ministry of Energy and Mines: MEM).

There are currently three BC Government permits applicable to the JMM as follows:

1. Reclamation Permit M-178, dated June 17, 1988, and amended July 7, 2004,
2. Waste Management Permit PE-8415 dated June 6, 1990, amended May 11, 2000, and May 31, 2018.
3. Water Management Permit PR-7927 dated March 29, 1989 and amended July 14, 1999 and later on August 2, 2011.

Site conditions and ownership have changed since the original reclamation plan was prepared and for which these permits were provided and ultimately approved. Even though ownership has changed, the corporate registry and name remain unchanged. All permits remain in the name of SnipGold. The project execution plan herein details the required investigative, design and decommissioning work to meet the requirements of the approved reclamation plan and to appropriately adjust the specific reclamation works.

The PEP will demonstrate the plan anticipated to be implemented, in accordance with the approved reclamation plan, to undertake the complete closure of mine facilities.

There will be interaction between the ongoing exploration work being undertaken by Seabridge Gold geologists; specifically, the sharing of facilities and resources between these two projects. The following activities are not included in the JMM Reclamation Project:

1. Any reparation work on Bronson slope infrastructure,
2. Any equipment refurbishment at Bronson Slope,
3. Any permitting associated with roads designed to access Bronson Slope,
4. Road/bridge reparation work along the Bronson Slope access road to JMM.
5. Site compliance activities associated with overall Iskut Project (e.g. regional) permit compliance.

## **1.2 PROJECT PURPOSE**

SnipGold is committed to closing the JMM site in accordance with the existing (1999) approved reclamation plan. The intention of the reclamation plan is to return disturbed

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lands to their original land use, specifically to the original vegetation and wildlife habitat through the following:

- Remove infrastructure and clean up the JMM Project site to minimize potential impacts to the environment, and to remove the impacts to the visual aspects of the site,
- Re-contour and revegetate disturbed lands to restore to natural appearance, self-sustaining and a stable and productive natural habitat for wildlife utilizing the area, and
- Ensure long term stability of restored areas, biologically, geotechnically and geochemically.

The purpose of this document is to provide SnipGold with an execution plan to implement reclamation measures that will show steady annual progress and can be accomplished by SnipGold in both a financially acceptable and schedule focused manner that meets the company's commitments and obligations to the Tahltan and other stakeholders (e.g. BC government, general public, and downstream users).

### **1.3 GOVERNING REGULATIONS AND ACTS**

The governing regulations for the JMM Reclamation Project are the Mines Acts.

The full list of governing regulations and Acts are referenced in Appendix B.

### **1.4 PROJECT OBJECTIVES AND PROGRESS**

The overall goal of the JMM PEP is to provide SnipGold with a reclamation execution plan that includes a schedule and implementation strategy for the remaining reclamation work required at the JMM site. The overall schedule is based on a six to seven-year period which started in 2017, with planned visual progress expected to occur each year.

#### **1.4.1 2017 - PROGRESS**

The 2017 reclamation season involved the following:

Drilling and installation of fifty-two (52) ground water monitoring wells which provided SnipGold with information on ground water and soil contamination on the JMM site. A total of fifty-three (53) test pits were excavated during the 2017 season to identify and quantify the extent of soil contamination around the fuel tank farm area, mill building and portal #11 entrance.

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Many of the historical hazardous wastes located on the JMM site were removed or eliminated over the 2017 season from the fuel tank farm area and from the Mill Building.

A total of twenty-eight (28) fuel storage tanks were decommissioned in the 2017 reclamation season, ranging in size from 7,000 to 100,000-gallon capacity. The tanks were cleaned, demolished and stored for later disposal to the upgraded JMM landfill.

Portal 11 and 12 were temporarily closed with an earth type barricade, which included a 600mm diameter culvert inserted into the earth barricade to allow ground water out of the portal. One vent raise was temporarily closed using lumber and mesh to prevent access.

Site grading/ditching was completed around the Mill Building and Tank farm to direct surface water away from these locations and direct the runoff toward historic drainage channels.

Areas disturbed by the 2017 reclamation activities were seeded with a reclamation seed mix to help with erosion potential.

Klohn Crippen Berger (KCB) was retained by SnipGold to oversee the installation of five (5) vibrating wire piezometers on the Tailings Storage Facility (TSF). KCB also oversaw repairs to the TSF dam involving repairing stress cracks evident along the dam perimeter and repairs to areas on the upstream face showing signs of erosion due to wave action. A Dam Safety Inspection (DSI) was completed by KCB in 2017 along with removal of old mine equipment and waste items such as empty clean 45-gallon drums and piping. These items were gathered from around the TSF and stored for later disposal in the upgraded JMM landfill.

#### **1.4.2 2018 - PROGRESS**

The 2018 reclamation season involved the following:

Decommission and permanent closure of five (5) vent raises located east of the JMM Mill building. The vent closures involved removal of all historic building material from the vent surface openings and disposal in an appropriate manner. The vents were sealed using a polyurethane foam, as engineered and directed by Golder Associates. Once sealed, all vents were backfilled using soils natural to each vent location with surface water directed away from the vents toward historical drainage channels. All vent sites were revegetated with plants local to the JMM site.

Phase One upgrades to the historic JMM landfill were completed in the 2018 season as designed and supervised by WOOD (formerly Amec Foster Wheeler). Upgrades to the landfill are required to facilitate the demolition of the JMM Mill building and ongoing reclamation of the Johnny Mountain Mine site.

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The 2017 test pit and water well installation program identified hydrocarbon contaminated soils in and around the historic JMM tank farm. During the 2018 reclamation season, approximately 2,900 m<sup>3</sup> of contaminated soils were treated with a biocatalyst (Oil Gator®) to help accelerate the breakdown of hydrocarbons in the soils. The treated soils were aerated three times during the 2018 season.

Two (2) historic burial sites identified in 2008 by BGC engineering were excavated and relocated in 2018 to the approved landfill location, satisfying outstanding requirements from BC MOE letter dated June 11th, 2008 regarding unauthorized burning and buried materials.

Over the course of the mine's operation and decommissioning from 1988 to 1993, several tons of ore concentrate accumulated on the floor of the Mill building at varying depths (range: 0.15m to 0.3m). Due to the potential acid generating (PAG) capacity of this material and as required under reclamation permit MX-178, the ore was removed from the Mill Building in 2018 and placed below water cover within the JMM Tailings Storage Facility (TSF).

Additional 2018 reclamation activities involved permanent closure of portal #10, removal of the old JMM septic field and underground storage tanks, lowering islands of ore concentrate within the TSF, relocation of undocumented burial site #3 to the JMM landfill, additional test pits and geochemical sampling along the JMM runway and at the 10 portal cribbing.

Additional test pits were excavated east of the JMM runway in search of a gravel source that could be used for final TSF and landfill closure.

An area of approximately 12ha was seeded with a reclamation seed mix and vegetation local to the JMM site at the close of the 2018 season.

### **1.4.3 2019 – PROGRESS**

The 2019 reclamation season involved the following:

Continuation of in-situ soil remediation of the hydrocarbon contaminated soils located within the historic tank farm location. Approximately 6,000 m<sup>3</sup> of contaminated soils were treated during the 2019 season using a biocatalyst (Oil Gator®) and a fertilizer high in nitrogen. A total of approximately 9,000 m<sup>3</sup> of contaminated soils were treated during the 2018 and 2019 seasons.

During the process of digging test pits on site, an additional five (5) previously undocumented waste sites were discovered. All five sites were excavated in 2019 with the inert waste placed in the upgraded JMM landfill. All hazardous waste discovered during excavation were stored inside the JMM Mill Building for later offsite disposal.

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The reclamation plan on the Johnny Mountain Mine (JMM) site requires movement of exposed waste rock from the level 10, 11 and 12 adit to the Tailings Storage Facility (TSF). During the 2019 season approximately 2,600 m<sup>3</sup> of waste rock was recovered from the surface of the JMM runway and the level 10 adit and placed within the TSF. Hydrated lime was added to the waste rock prior to being placed in the TSF (at a mixing ratio prescribed by BQE of 3.2kg per 16t (8m<sup>3</sup>) of waste rock), to offset the potential rise in TSF water ph.

Many interior hazards were removed from within the JMM Mill building during the 2018 season. The 2019 season consisted of a further deconstruction of much of the remaining (interior) mine equipment, cyanide tanks, conveyors, pumps, wood timbers and non-load bearing steel structural members. All inert waste was placed in the JMM landfill and all hydrocarbons and hazardous waste was collected for later offsite disposal. At the close of the 2019 season, the Mill building shell remained standing and is currently used for storage of site equipment.

Additionally, the 2019 reclamation season included; completion of cell 2 of the upgraded JMM Landfill, ongoing environmental monitoring, reclamation and vegetation of the north portion of the JMM runway, finalize removal of ore islands within the TSF, removal of fluids from old site equipment, ongoing dam safety inspections (DSI) on the TSF along with seeding and vegetating of disturbed areas and upgrades as required on the JMM access road.

#### **1.4.4 2020 – NO RECLAMATION ACTIVITIES WERE COMPLETED DUE TO COVID19**

Activities during the 2020 season were limited to permit compliance and environmental monitoring. The 2020 annual DSI inspection and report was completed by the KCB Engineer of Record.

### **1.5 2021 PROJECT OBJECTIVES**

The planned 2021 reclamation season involves the following:

The primary goal of the 2021 season is the excavation and relocation of ML/ARD waste rock from the Level 10, 11, 12 portals, as well as waste rock located on the JMM runway and secondary access roads surfaced with waste rock. All excavated waste rock will be mixed with hydrated lime to abate potential ph rise as the waste rock is placed below water elevation inside the TSF.

Additionally, the 2021 reclamation season will include; continued in-situ soil remediation of contaminated soils located within the historic tank farm and a portion of the JMM runway; place all miscellaneous site equipment into expanded landfill (grader,

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crane, D6 dozer and snow cat); excavation and relocation of any additional undocumented waste sites to the JMM Landfill; ongoing environmental monitoring; ongoing dam safety inspections (DSI) on the TSF along with seeding and vegetating of disturbed areas and upgrade to the JMM access road as required.

The objective in 2021 is to show tangible progress, working toward completing the JMM reclamation project within the established budget and timeline, highlighting value to SnipGold stakeholders.

To achieve this overall objective, the 2021 reclamation season will focus on the following:

1. Ensure No Harm to Personnel or Environment by maintaining a controlled, safe and secure site. Safety and Safe work practices are of paramount importance to SnipGold.
2. Ongoing environmental monitoring. A key component of the JMM Reclamation Program is to show continued improvement to the JMM site as the reclamation program moves toward returning the site to its natural state as per permit PE-8415 and M-178.
3. In-situ Soil Remediation – An estimated soil volume of 9,000 m<sup>3</sup> was treated within the JMM tank farm area during the 2018 and 2019 seasons. 2021 will continue with treatment of contaminated soils within the historic JMM tank farm and a portion of the JMM runway. Fertilizer and a natural biocatalyst (oil Gator) will be added to the soils and turned several times during the 2021 season to speed aeration and the treatment process.
4. Excavation and Relocation of ML/ARD waste rock – A significant scope of the JMM reclamation plan is the relocation of waste rock, generated during the mine operation. The waste rock will be relocated from the portal location into the JMM Tailings Storage Facility (TSF). Hydrated lime will be added to the waste rock prior to being placed in the TSF to offset the potential ph increase (2004 Mend Report)

The estimated volume of waste rock to relocate per area is:

- |                                 |                       |
|---------------------------------|-----------------------|
| a. Level 10: .....              | 37,500 m <sup>3</sup> |
| b. Level 11: .....              | 26,500 m <sup>3</sup> |
| c. Level 12: .....              | 12,500 m <sup>3</sup> |
| d. JMM Runway: .....            | 5,000 m <sup>3</sup>  |
| e. Secondary access roads: .... | 4,000 m <sup>3</sup>  |

**Total (Estimated) waste rock: 85,500 m<sup>3</sup>**



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5. Disposal of Mining Equipment - All miscellaneous site equipment will be disposed into the expanded JMM landfill (grader, crane, D6 dozer and snow cat). The old mining equipment has been deemed unsalvageable by Finning and Matrix mechanics and will be cut down and placed into the JMM landfill. All fluids will be drained from equipment prior to disposal and transported off site and disposed in an approved disposal facility.
6. Complete minor upgrades to JMM access road. The JMM access road will require upgrades early in the 2021 season. This will involve ditching, brushing, culvert installation and upgrades where wash outs occurred late in the 2019 season.
7. Conduct annual Dam Safety Inspection (DSI). Klohn Crippen Berger (KCB) is the Engineer of Record (EoR) and will conduct the yearly dam safety review of the JMM Tailings Storage Facility (TSF).
8. Test pits and material testing. Conduct additional test pits and material testing to prove borrow source material on site.
9. Piezometer Data collection. Download data from the TSF vibrating wire piezometers to support the DSI.
10. Equipment Repairs and upgrades. Complete ongoing repairs and upgrades to site equipment to ensure minimal delays due to breakdowns. Repairs to DJB Rock Truck, CAT 235 excavator, Kenworth dump truck, CAT 966 Loader.

## 1.6 2021 PROJECT SCHEDULE AND KEY MILESTONES

Bronson Camp Open - Matrix (approximate)	04 May 2021
Seabridge Reclamation Management Team – Preseason meetings and scheduling	04 May 2021
Seabridge JMM Reclamation Team Mobilize to Iskut Camp	18 May 2021
Start Improvements to JMM Access Road and snow removal	19 May 2021
Matrix Mechanic - Begin repairs to site equipment	19 May 2021
JMM access Road – Repair washout and snow removal	25 May 2021
Stage all reclamation equipment and supplies at McLymont for transfer to site. (Lime, Oil Gator, PVC Pipe)	01 June 2021
Conduct Dam Safety Inspection (DSI)	03 June 2021
Begin In-Situ Soil Remediation - Tank Farm area	03 June 2021

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Training of Crew – “Working near Water”	4-6 June 2021
Begin Relocation of Waste Rock to TSF – Level 10	07 June 2021
Begin Relocation of Waste Rock to TSF – Level 11	04 July 2021
Conduct Dam Safety Inspection (DSI)	04 July 2021
Begin Relocation of Waste Rock to TSF – JMM Runway	20 August 2021
Disposal of old mine equipment to JMM landfill	08 Sept 2021
KCB – Conduct Dam Safety Inspection (DSI) on the TSF	08 Sept 2021
End of 2021 construction season at JMM	02 Oct 2021

## 1.7 PROJECT RISKS

A contingency amount of 12% has been allocated to the overall 2021 JMM reclamation season. The project team has evaluated the 2021 key risks and opportunities and they are described below.

### 1.7.1 KEY RISKS

- *Undocumented Burial Sites.* The excavation, identification, handling, transport and placement of wastes located in previously undocumented burial sites present a risk due to the lack of historical and as-built information.
- *Placement of PAG rock into TSF.* Limestone is required to be mixed with all waste rock placed within the TSF. A quantity of limestone will be required on the JMM site and mixed with the PAG rock at a ratio relative to the PAG potential. Quantity of limestone required on site will vary depending on lab testing.
- *Water hazard at TSF - Drowning or entrapment in cab of equipment* – A risk of drowning or entrapment in the cab of equipment is possible while placing waste rock into the TSF. Supervisor and Workers to review and follow the TSF - “Operation, Maintenance and Surveillance Manual” along with the TSF “Operational Procedures”, as well as complete a Safe Work Procedure (SWP) prior to commencing work.
- *More complex hazardous material cleanup than envisioned.* While many hazardous wastes have been removed and disposed of from the JMM site over the 2017, 2018 and 2019 season, there remains the potential of discovering buried unknown hazards as reclamation progresses.

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- *Shortened field season caused by severe weather.* Severe weather events are well documented at JMM, which may impact the start of the 2021 spring schedule or early onset of winter may shorten the field season.

In addition to the above, the project team has identified these additional site related risks.

- Repairing and maintaining the access road from the Bronson camp to the mine site can limit delays by providing access for personnel and equipment throughout the project. The cost for this may be offset by reduced helicopter costs and also allow site access when poor weather prevents operation of the helicopter.
- Equipment repairs and ongoing maintenance to site equipment. The site equipment is crucial for the ongoing success of the JMM reclamation project requiring and full-time mechanic on site to deal with daily repairs.
- Avalanche potential impacting work progress in the early field season.

Mitigation plans for these key risks will be developed as planning for the 2021 reclamation season progresses, including assessment of resources required for their implementation. Mitigation plans will be reviewed by the Project team to ensure the risks are properly managed.

## **1.8 PROJECT OPPORTUNITIES**

### **1.8.1 KEY OPPORTUNITIES**

- *Synergy with ongoing Iskut exploration.* Cost synergies exist between exploration and the JMM Reclamation Project and a well-designed plan is key to leveraging this opportunity. This is applicable to camp and transportation to and from site, and the utilization of site resources and equipment to maximize their effectiveness in a relatively short field season.
- *Equipment salvage value.* If the metals markets rebound, there may be greater demand for used process and mobile equipment, thus a potential avenue for salvage sale income to offset reclamation expenditure.
- *Metal recycle value.* Aside from used process equipment, there is potentially recyclable metal (scrap iron, copper), principally from within the mill building that should metal prices increase in the short to medium term, may yield opportunity for transport to offsite markets in lieu of interring in a landfill on site.

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- *Development of road access from McLymont to Bronson Slope.* The JMM site is not currently accessible via road. The nearest existing road is approximately 20 km east of Bronson Slope at the McLymont Creek Laydown Area which was used by Alta Gas during the construction of the McLymont Creek Run of River Hydroelectric Generating Station. The SnipGold Exploration team in conjunction with neighboring exploration companies are evaluating the extension of this existing McLymont Creek Road to the Bronson Slope area, as a means to facilitate their exploration activities and reduce associated costs. Should this road be constructed, access to the JMM site would be simplified resulting in an overall reduction of reclamation costs.

After the 2021 field season, each opportunity will be evaluated and incorporated as appropriate into the future planning and budgeting years.

## **1.9 OUTLINE OF THE PROJECT EXECUTION**

The SnipGold management team will mobilize to the JMM site early in May of the 2021 season to initiate the 2021 scope. The first task is to inspect the existing facilities and hold internal discussions with the team to confirm and implement the 2021 project scope. During this early reconnaissance, it is understood that project scope may change based on site conditions.

SnipGold or their permitting contractors will be responsible for securing approvals and permits for all work to be done onsite where applicable.

### **1.9.1 ENGINEERING EXECUTION PLAN**

The Engineering Execution Plan provides project-specific information and detailed work plans of how SnipGold, engineering, environment and reclamation contractors will organise, perform and execute the engineering and reclamation responsibilities for the JMM project.

The engineering work involves developing appropriate investigation programs based on historic and yearly information gathered to develop site knowledge which will provide sufficient information for the detailed design of the reclamation works, including long term monitoring requirements. The 2017, 2018 and 2019 test pit and drilling program provided information to develop the planning basis for the reclamation of the JMM site and will be revised as additional information is gathered.

Information gathered during the field programs will be used to refine the remaining reclamation details for the implementation program (landfill design, adit and vent permanent reclamations, removal of remaining hazardous wastes, demolition of the

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mill and other remaining site structures and equipment, identify salvageable materials, instrumentation and monitoring plan).

### 1.9.2 HEALTH, SAFETY AND ENVIRONMENTAL (HSE) PLAN

SnipGold has and will retain statutory responsibility for the 2021 HSE program at the mine and has established a Project Health, Safety and Environment Management Plan (HSE Plan) for the JMM site and will at all times act in the capacity of the overall lead for HSE, retaining control of the JMM site for purposes of safety and environmental delineation and responsibility under applicable legislation.

Contractors working on the JMM site will be required to prepare an HSE Plan along with Job Hazard Assessment (JHAs) for work procedures specific to their scope of work; to be reviewed and approved by SnipGold prior to starting the work task. The contractor derived HSE plans and JHAs must align with the site specific HSE plan and Safe Operating Procedures (SOPs).

In consideration of the remote nature of the site and the logistics planning necessary to ensure the project runs smoothly and that Health and Safety considerations are paramount, procedures will be implemented for all personnel and equipment use. Health and Safety protocols will be implemented for all reclamation work carried out on the JMM site and will be addressed in the site specific HSE plan. This will include travel, transportation, construction, training requirements, communication and documentation of all activities and will apply to all personnel on site including contractors. Specific protocols will also be developed for working around/with Hazardous materials, enclosed spaces and hazardous work areas. Provision of emergency shelter, rations and first aid will also be considered for personnel working at the mine site.

### 1.10 SNIPGOLD CONTACTS

Contact information for JMM reclamation contractors and stakeholders is below:

Company	Name	Mobile #	Email
SnipGold	Brent Murphy	1-867-445-5553	<a href="mailto:Brent@Seabridgegold.com">Brent@Seabridgegold.com</a>
	Bill Threlkeld	1-303-910-9679	<a href="mailto:Bill@seabridgegold.com">Bill@seabridgegold.com</a>
	Elizabeth Miller	1-250-847-0848	<a href="mailto:Elizabeth@seabridgegold.com">Elizabeth@seabridgegold.com</a>
	Jessy Chaplin	1-778-210-1205	<a href="mailto:Jessy@seabridgegold.com">Jessy@seabridgegold.com</a>
	Carey deHoog	1-250-877-0977	<a href="mailto:Carey@seabridgegold.com">Carey@seabridgegold.com</a>
	Mike Skurski	1-720-232-9284	<a href="mailto:Mike.skurski@seabridgegold.com">Mike.skurski@seabridgegold.com</a>
	Marcus Adam	1-416-709-2012	<a href="mailto:Marcus@seabridgegold.com">Marcus@seabridgegold.com</a>
ERM	Wade Brunham	██████████	██████████

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Company	Name	Mobile #	Email
KCB	David Willms	[REDACTED]	[REDACTED]
WOOD	Mario Bianchin Jeremiah Gladu	[REDACTED]	[REDACTED]
Matrix	Martin Knutsen Mike Kenny	[REDACTED]	[REDACTED]
TCG	Chad Day	[REDACTED]	[REDACTED]
THREAT	Nalaine Morin	[REDACTED]	[REDACTED]
TNDC	Hankin Asp	[REDACTED]	[REDACTED]
Ministry of Mines (Health and Safety)	Doug Flynn	1-250-847-7386	<a href="mailto:Doug.Flynn@gov.bc.ca">Doug.Flynn@gov.bc.ca</a>
Coast Mountain Hydro	Brandon Marion	[REDACTED]	[REDACTED]
Skeena Resources	Justin Himmelright Walter Coles	[REDACTED]	[REDACTED]

## 1.11 WORK REQUIRED TO FACILITATE SITE RECLAMATION

### 1.11.1 RECLAMATION REQUIREMENTS

Reclamation activities have been initiated as far back as 1995. Some buildings have been dismantled; materials burned, buried or shipped off site; surface water monitoring plans established and are ongoing; ground water monitoring wells installed; disposal and removal of hazardous waste from the Mill building; some ML/ARD waste rock disposed of within the TSF; and some site grading and revegetation has taken place. This work was carried out in basic accordance with the Reclamation Plan (1999) and the recently updated Reclamation Management Manual (2015). In addition, annual reclamation reports have been prepared to document the past year's reclamation/monitoring activities on site.

Permit M-178 and PE 8415 require annual report submissions to MEM and Ministry of Environment (MoE). An Annual Reclamation Report (ARR) has been prepared and submitted to MoE, MEM and Tahltan Heritage Resources Environmental Assessment Team (THREAT) by March 31 of every year that summarizes any monitoring or reclamation work that occurred on the JMM site the previous year. Tailings

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Impoundment Dam Safety Inspections and water quality data and analyses are included in the ARR.

The 2016 ARR indicated the existing site conditions and state of reclamation as well as a list of reclamation priorities as follows:

- Continuation of non-hazardous site cleanup (disposal of collapsed structures and miscellaneous waste);
- Provide a landfill plan that MoE finds acceptable;
- Installation and/or upgrade weirs to more permanent structures at the Johnny Mountain Tailings Impoundment Embankment;
- Further determine the amount and composition of material in the cyanide tank storage room in the mill building;
- Develop a plan for the disposal/reclamation of the material in the cyanide tank storage room in the mill building;
- Advance various aspects of the Reclamation Plan (1999)

The reclamation management plan also indicated that, upon determination of non-economic viability for the site, the following reclamation and final reclamation items will be addressed in a staged manner:

- A review and where appropriate, an update to the Reclamation Plan (1999).
- Develop plans and schedule to complete final reclaim and reclamation items, including, but not limited to:
  - Restoring drainage to original watercourses or to new watercourses that will sustain themselves without maintenance;
  - Reclaim the land, including all roads, airstrip and the 10 km Johnny Mountain access road, in accordance with land use objectives unless permanent access is required. Reclamation will include re-contouring as practical, to reconstruct the area's original landscape and moisture regime, removing well-traveled compacted surfaces, re-soiling where practical, and re-vegetating to a self-sustaining state, and in a manner consistent with adjacent landforms;
  - Cover and re-vegetation of concrete foundations, unless because of impracticality, they have been exempted by an Inspector;
  - Geotechnical assessment and development plan to reclaim waste dumps that will ensure long-term stability, and long-term erosion control;

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- Final demolition and burial of remaining structures at the site and final disposal of remaining scrap metal and other miscellaneous waste in a manner acceptable to the district inspector of Mines.
- Submission of final reclamation design report for all aspects of tailings storage facility, including plans to stabilize the tailings impoundment for long term abandonment.

## **1.12 2021 RECLAMATION STRATEGY**

The 2021 PEP reclamation strategy is a continuation of the 2017 PEP where initial plans were prepared for each of the reclamation components based on historical information and assumptions presented. The 2021 schedule of activities has been prepared based on this historical information and data captured during the 2017, 2018 and 2019 reclamation season.

The 2021 reclamation season consists of the following work packages:

### **1.12.1 REPAIRS TO SITE EQUIPMENT**

Repairs and ongoing upgrades to site equipment is crucial to the success of the 2021 season. Repairs will be completed early in the 2021 season including an engine rebuild on the CAT DJB rock truck, upgrades to the CAT 235 excavator (replacing leaking hydraulic hoses), and replacement of track rollers on the D8L Dozer. Engine rebuilds will be completed onsite early in the 2021 season.

### **1.12.2 UPGRADES TO JMM ACCESS ROAD**

Early in the 2021 season, upgrades to the JMM access road will be undertaken to reduce crew travel time from Bronson camp to the JMM site. The upgrades will consist of brushing, ditching, culvert installation (as required) and upgrades to the road running surface. Washouts at km 3 were discovered late in the 2019 season and will be addressed early in the 2021 season. The gravel required for the surface repairs will be sourced from borrow sites located on Skeena Resources lease site.

### **1.12.3 IN-SITU SOIL REMEDIATION – TANK FARM**

Test pits and water monitoring wells installed in the 2017 season identified an area of hydrocarbon contaminated soils around the historic tank farm fuel storage area and an area surrounding the fuel pump shed along the edge of the JMM runway. Treatment of the contaminated soils began in 2018 using a natural biocatalyst (Oil Gator®) and continued in the 2019 season. A fertilizer (high in Nitrogen) was added along with the Oil Gator in 2019 to further assist with breakdown of the hydrocarbons. WOOD and



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Northwest Response were contracted by SnipGold to provide oversight on mixing ratios and testing of contaminated soils to ensure a successful treatment program. The 2021 reclamation season will be a continuation of remaining contaminated soils.

#### **1.12.4 EXCAVATION AND RELOCATION OF ML/ARD WASTE ROCK**

The reclamation plan for the Johnny Mountain Mine (JMM) includes the relocation of exposed waste rock from the level 10, 11 and 12 portals to the TSF, along with waste rock used for the construction of the JMM runway and surrounding access roads.

The following documents and field reports will be used as guidance documents during the relocation of ML/ARD to the TSF in 2021.

1. JMM Closure Plan
2. KCB – Operation, Maintenance and Surveillance (OMS) Manual for TSF
3. JMM 2021\_Safe\_Operating\_Procedure (Working Near Water)
4. BQE Water – “18008 – JMM Field Work Report Final Draft, Nov 7, 2019”
5. Wood – “2019 JMM Supplemental SI Report\_Dec 23 WOOD Draft”

As waste rock is deposited into the TSF, there is potential for degradation of the TSF water quality and a risk of non-compliance with the site’s EMA permit, which defines maximum acceptable dissolved copper and zinc levels in the TSF water discharge.

BQE Water was engaged by SnipGold to assess methods of mitigating the risk of TSF water quality degradation as the remote nature of the site meant that any implementation of active water treatment would be difficult to execute and high cost. BQE recommended that waste rock be amended with lime before it is deposited into the TSF to add neutralization potential and prevent the release of dissolved metals. This would obviate the need for water treatment altogether.

During the 2019 reclamation season, BQE Water executed a program to explore this approach in more detail. This program involved on-site assessment and sampling of waste rock used in different mine features followed by bench scale trials to evaluate the efficacy of lime amendment at preventing metal release from waste rock. The key findings from this program were as follows:

- Bench scale results indicated that waste rock on site has potential for metal release when it is placed in the JMM TSF. Highly weathered waste rock with visible gossan formation and/or paste pH below 5 has the highest potential for metal release. Material from the Level 10 and 11 portal pads and the airstrip showed the highest potential for metal release. Sample from the Level 12 portal pad exhibited minimal metal release potential even without lime amendment.

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- BQE Water estimated that the total mass of waste rock requiring management is approximately 171,000 t (85,500 m<sup>3</sup>), in line with previous estimates by MEND and KCB. The TSF can hold 88,000 m<sup>3</sup> of waste rock while maintaining 1.0 m of water cover.
- The amendment of lime to waste rock prevented more than 99% of the release of metal from waste rock. The amount of lime amendment required was found to be 0.01-0.12% w/w as hydrated lime, or approximately 0.02% w/w weighted average across all mine features.
- The total mass of lime required for all waste rock is estimated to be 35 t.
- Once the large-scale disposal of waste rock with lime amendment begins, the water quality of the TSF will be monitored with a handheld pH probe (weekly) and water quality sampling (monthly) during the work season. If pH in the TSF decreases or if metal content increases then lime dosage will be increased, while if pH is above 8.0 then lime dosage will be reduced.
- Other activities that will reduce the risk of exceeding EMA permit limits are:
  - installation of a sediment curtain at the TSF outlet,
  - lowering the water level in the TSF prior to placement of waste rock, and
  - preventing water discharge during the placement of waste rock.

During the 2019 reclamation season WOOD supervised the excavation and collection of soil samples at key locations on the JMM site to identify ML/ARD locations. A map outlining locations of ML/ARD on the JMM runway can be found in the Wood Report: "2019 JMM Supplemental SI Report\_Dec 23 WOOD Draft".

### **1.12.5 DISPOSAL OF OLD MINE EQUIPMENT**

The Johnny Mountain Mine (JMM) was a small underground gold mine and milling operation that operated over a short period from November 1988 to August 1990 and then from September to November 1993 when operations were stopped. Due to the remote nature of the site and lack of road access, mine equipment deemed unsalvageable will be decommissioned and placed within the JMM landfill. The equipment to be decommissioned in the 2021 season and placed in the landfill consist of: Champion D605T grader, CAT D6C dozer, DMC 3700 Hydromaster snow cat, P&H R200 Hydraulic crane and a CAT 350C tracked loader. All decommissioned equipment will be drained of fluids and cut down prior to placement in the landfill. Waste fluids will be stored on site for later disposal off site at a recognized disposal location.

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### **1.12.6 SURFACE WATER MANAGEMENT**

The site is subject to approximately 2000 mm of precipitation and concentrated flows occur from local melting glaciers during summer months. Spring/summer flows can also be significant with melting of the accumulated snowpack in the area. Many ditches and swales were installed over the 2017 and 2018 reclamation season to manage surface flows and direct runoff water toward historic channels. The 2021 season will be a continuation of the overall water management plan, including re-establishing effective surface water diversions around the mill building area, re-establishment of collection channels to effectively maintain drainage across the site and control sedimentation, and mitigate erosion.

### **1.12.7 SITE HYDROGEOLOGY**

A drilling program was undertaken in the 2017 season where groundwater monitoring wells were installed, fulfilling the following objectives:

1. Environmental investigation to assess absence/presence and extent of point source contamination resulting from mine site operations;
2. Characterization of hydrogeological conditions across the mine site identifying key hydro stratigraphic units, and documenting groundwater flow and quality.
3. Establish a network of long-term groundwater monitoring points to support risk assessment requirements that will inform final reclamation plans, assess site reclamation performance, and serve as sentinel wells as part of a monitoring and mitigation plan.

An ongoing groundwater monitoring program is in place to ensure SnipGold is meeting expectations as outlined in the British Columbia Ministry of Environment Water and Air Resource Protection Guidelines for Mine Proponents and Operators Baseline Monitoring (August 2009).

### **1.12.8 ENVIRONMENTAL AND PHYSICAL MONITORING**

Ongoing environmental monitoring will be conducted at JMM during the 2021 season to obtain current site information as well as to monitor and measure the effectiveness of the reclamation/closure measures over time. Monitoring will be conducted in the following study areas: *meteorology, hydrology, water quality and groundwater.*

*Meteorology:* A meteorology station was installed at JMM in 2016. This station will be serviced and maintained annually including an annual data report. The weather station collects temperature, humidity, wind speed, precipitation, snow depth, and solar radiation, data which will be used as inputs for the finalization of reclamation/closure designs and long-term site-specific reporting requirements.

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*Hydrology:* In 2016, two hydrometric monitoring stations were established in order to monitor water flow from the existing tailings pond spillway (northeast side) and low volume seepage from the southwest side of the pond. In 2021, the hydrology stations will be re-installed downstream of the TSF and a data report produced. Additional hydrology will also be attained from the 10, 11 and 12 portals. The hydrology program will meet or exceed recommendations outlined in the BC Hydrometric Guidelines, which includes the collection of Grade A discharge data, consisting of at least five (5) discharge measurements collected per year, and spread across a wide range of observed flows, to support an established and stable rating curve.

*Water Quality:* This water quality sampling is to satisfy the requirements outlined in permit PE-8415, which specifies that surface water quality samples from 7 locations (and one duplicate, and one blank) be collected on an annual basis at the closed mine site (sampling stations JM1-7), plus duplicate (JM8) and blank (JM9). In addition, a water quality sample from the tailing's impoundment will also be collected. Water quality samples will be collected by trained field personnel following standard field methodologies and as per guidance provided in permit PE-8415. Samples will be shipped in coolers with ice packs to ALS Environmental Services in Burnaby, BC, where they will be analyzed for general parameters (e.g. pH, alkalinity, and turbidity), major anions, nutrients, total organic carbon, total and dissolved metals, and cyanides. In-situ measurements of temperature, pH, and conductivity will be collected in the field using a handheld pH/conductivity meter at each site.

*Groundwater:* The work plan for 2021 will be to record water levels and collect groundwater samples for analysis at existing monitoring wells as required for permit PE-8415.

### **1.12.9 SITE GRADING, EROSION/SEDIMENTATION CONTROL**

Mining activities on the JMM site have resulted in the need to divert some surface stream flows around the mill and through other areas of the site. Berms, weirs, culverts and general site grading has taken place to control and monitor these flows. Reclamation is required in these areas to return the site to near original conditions. This work must take into consideration the location of remaining mining features such as landfills and the TSF, as well as ongoing exploration activity on the property. In 2021, site grading will focus on diverting surface water away from work zones and not through areas of infrastructure.

### **1.12.10 PROJECT SCOPE OF WORK AND DUTIES**

The project scope of work and scope of project services, based on the terms and conditions of the contract between the various Consultants and SnipGold, are as follows:

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**1.12.10.1 SnipGold Scope of Work and Services**

**Scope of Work:**

SnipGold will retain statutory responsibility for the 2021 season on the JMM site, working with all other consultants and suppliers to complete the scope as detailed in the Reclamation Plan, specifically:

**JMM Reclamation Project – Key SnipGold Site Based Roles & Responsibilities**

<b>SnipGold Project Manager</b>
Develop and circulate the site HSE plan for review and approval amongst SnipGold, consultants and suppliers.
Coordinates material and personnel movements with Logistics Coordinator/Iskut camp manager
Maintain the staffing plan (daily resolution)
Provides progress reporting to SnipGold management.
Provides direction and guidance for all field activities to ensure progress earned per field season plan. This includes daily activity planning.
Assemble and Approve all general reclamation field procedures
Develop Construction Work Packages, as required
Participate in various aspects of contractor administration
Approves field work orders
Timely responses to RFI's
Ensures completion dates are met

**1.12.10.2 Project Scope of Work and Services by Others**

**Technical Scopes (consultants):**

1. WOOD assembled the overall capital cost component on the project, supported by other project consultants, and will provide material take-offs as required.
2. BQE provided oversight for the addition of Lime to the waste rock prior to disposal into the Tailings Storage Facility (TSF).
3. Tervita provided material take off and estimate for the safe demolition and disposal of the Mill Building.
4. KCB: provides engineering and site management for upgrades to the Tailings Storage Facility (TSF) site investigation, dam safety inspection (DSI), establishment of monitoring wells and system; as well as TSF closure.

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5. AllNorth: provide technical support for upgrades to the JMM access road and design and cost estimate for the construction of the Bronson connector study (including timber evaluation); completion of the Quartz Rise Exploration track.
6. ERM: aquatic effects and compliance monitoring – collect water quality data from JMM as per compliance requirements, monitor weirs and hydrology stations near the TSF, monitor the existing meteorology station and conduct archaeology assessments as needed.
7. Avalanche Assessment: Adapt Mountain Safety Services will be employed early in the season to ensure safe working conditions for field crews during the proposed 2021 spring activities and determine long term impact and avalanche impact to TSF and portals, provide any required avalanche protection engineering required to ensure long term physical stability of the TSF and portals.

**Field Scope (non- consultants):**

1. Matrix: Handling logistics, equipment and material transport; some equipment and material procurement (driller and tank farm demolition contractor bring their own tools and consumables); manage the camp and all camp services.
2. Hazardous Material Removal. Service by TBD Contractor. Removal of hazardous wastes encountered during excavation of burial sites and from within Mill Building as required.

## **1.13 OVERALL PROJECT MANAGEMENT**

### **1.13.1 RISK MANAGEMENT**

All members of the project are responsible for investigating the potential risk exposures for the project and determining suitable actions to mitigate and minimise adverse impacts to the project. Project risks will be captured in a risk register, which will be maintained and updated throughout the life of the project. Project risks will be identified and analysed in a disciplined process in accordance with the standard procedure.

Reference should be made to Section 1.7 for the currently identified major risks.

### **1.13.2 PROJECT ORGANISATION**

#### **1.13.2.1 Organisation Charts**

The JMM Reclamation Project organization structure comprises SnipGold personnel in leadership roles and various consultants and contractors providing design and field services or performing work on site during reclamation activities. Project organization is linear from the lowest levels of field activity up through the project sponsor and

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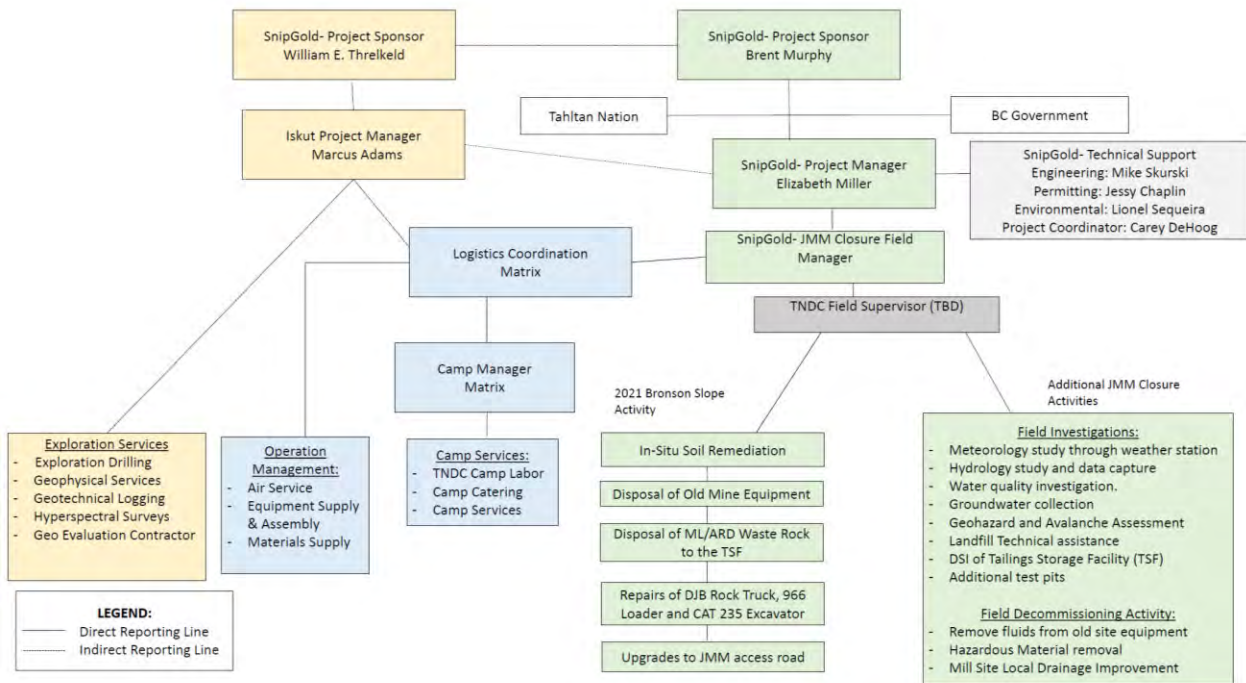
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parallels a similar structure for Iskut exploration who also work on site and share common facilities (e.g. camp) and services (e.g. logistics).

Figure 1-3 presents the overall Project implementation team for the Iskut Property.

**Figure 1-3: Iskut Property Organizational Structure**



It is notable that two important organizations have been incorporated into Figure 1-3 above being the Tahltan Nation and BC Government who have influence on the success of the project. The Tahltan Nation will participate in the reclamation of the JMM Reclamation Project because the Iskut Property is located within Tahltan Traditional Territory. The Government of British Columbia is also an important stakeholder as they regulate the project site under existing permits for the Iskut Property, including Reclamation Permit M-178, and Waste Management Permits PE-8415 and PR-7927.

The overall authority line runs through the project sponsor, Brent Murphy, who has budgetary accountability for all activity on the JMM Reclamation Project. The Project Sponsor shares the responsibility for the preparation and execution of the reclamation project, including organizing, staffing, hiring, purchasing, supervising and controlling all engineering and scientific investigation, procurement, construction and pre-production

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activities required to attain project objectives with the Project Manager, Elizabeth Miller. Support to the Project Sponsor and Manager come from field managers for SnipGold as well as SnipGold Technical staff.

Concurrent exploration activity on the Iskut Property will be occurring on site in parallel to JMM reclamation and Bronson slope activity. Single-point accountability for all site safety is assigned to the Iskut Project Manager, Marcus Adams, whom will be on site during the 2021 field season. Iskut Project managers will be accountable for all aspects of site safety, including but not limited to securing the site, ensuring requisite safety inspections and task observations are conducted according to established procedure and demonstrating visible leadership on safety.

Also, owing to a successful history of logistics coordination to support SnipGold's exploration activity, logistics for all field activity are managed directly by the Iskut Camp Manager and logistics coordinator. All logistics coordination must be routed through the SnipGold Managers, Field Managers and the Iskut Camp Manager to ensure that camp services and space are consistent with field needs and that mobilization/demobilization are well coordinated with SnipGold's other activity in the region.

The key roles and responsibilities for the reclamation project implementation are as follows:

**Project Sponsor:** Assumes overall accountability for execution of all deliverables, including engineering and scientific investigation, procurement, construction and demolition related to the JMM Reclamation Project. Project Sponsors ultimately have final decision for any conflicts arising at lower levels within the reclamation project or between separate groups with activity in close proximity. Project Sponsors are also accountable for communication with external stakeholders comprising First Nations, Government Agencies and neighbouring exploration companies.

**JMM Reclamation Project Manager:** Assumes overall accountability for the execution of the planning of reclamation activities in both design offices and the mine site.

**Iskut Project Manager(s):** Outside of their exploration responsibilities not included in JMM Reclamation Project scope, nor described herein, they assume overall accountability for all aspects of safety for site activity.

**Technical Support:** SnipGold staff providing technical support on project execution, permitting and scientific investigation to the JMM Reclamation Project manager and Project Sponsors.

**Logistics Coordinator:** Assumes accountability for all logistics coordination arranging for equipment, material and personnel transport to/from the Iskut property. Position is yet to be determined between being sited at Iskut or at KSM (SnipGold's neighbouring asset).



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**Field Manager:** SnipGold company position responsible for overall coordination of all JMM Reclamation Project and Bronson slope activity.

**Camp Manager:** The Camp Manager is responsible of all camp services, transportation services for employees onsite and offsite and care and maintenance of the service facilities. The Camp Manager is also accountable for all aspects of camp services and catering.

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**1.13.2.2 Delegation of Authority**

**Levels of Authority**

Levels of authority and approvals are established for the JMM Reclamation Project to be clear and transparent and are provided in Table 1-1 below.

Table 1-1: Levels of Authority & Approvals

Level of Authority/Approvals									
Level	Name	Position	Contracts (Requests & Approvals)	POs	Invoice Approval	Check Requests	Travel		Logistics Support Requests
							Requests	Authorization	
1	B. Murphy	Project Sponsor (SEA)	yes	yes	yes	yes	yes	yes	yes
2	E. Miller	Project Manager (SEA)	yes - up to \$500k	yes - up to \$100k	yes	yes	yes	yes	yes
2	TBD	Field Manager (SEA)	no	yes - up to \$50k	no	no	yes	yes	yes
2	M. Skurski	Technical Support (SEA)	no	no	yes	no	yes	yes	yes
2	L. Sequeira	Technical Support (SEA)	no	no	yes	no	yes	yes	yes
2	J. Chaplin	Technical Support (SEA)	no	no	yes	no	yes	yes	yes
2	C. deHoog	Project Coordinator	no	no	yes	no	yes	yes	yes

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All contracts for service work, and any check requests made to SnipGold treasury must be approved and signed by either Brent Murphy or Elizabeth Miller. All logistics support requests will be routed through Level 2 SnipGold personnel to SnipGold's logistics coordinator. Any travel requests must be routed through SnipGold for authorization as all travel is intended to be coordinated with other SnipGold activity in the area.

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### **1.13.3 PROJECT SECURITY AND CONFIDENTIALITY**

#### **1.13.3.1 Confidentiality**

The following project confidentiality requirements will be observed on the project:

- All participating entities and their employees will be required to safeguard confidential information from unauthorized access, use and misappropriation by applying reasonable security measures, such as the provision of a Secure folder with limited access, within the project drive set of folders.
- All participating entities and their employees may not post or upload, or forward, directly or indirectly, to any other person who might post or upload, any digital photographic image taken of any aspect of the Iskut Property to any internet website or social networking service without prior authorization from SnipGold.

### **1.14 PROJECT SCHEDULE**

Refer to Appendix A for the Project Schedule.

### **1.15 PROJECT PROCEDURES, INSTRUCTIONS, AND FORMS (PIFS)**

#### **1.15.1 PROJECT STANDARDS**

##### **Project Management Systems Software**

The standard suite of project management-related software to be used on the project includes, but is not limited to, the following

- Microsoft office software
- File Share - A file share site will be initiated by Seabridge once the 2021 season commences.

### **1.16 CHANGE MANAGEMENT**

#### **1.16.1 CHANGE MANAGEMENT DURING PROJECT EXECUTION**

A formal project change control work process to update the project during project execution will be applied in accordance with the standard change management procedures.

No work will proceed without written authorisation or a signed change notice. If a project change notice is not fully processed by SnipGold in a timely manner, the Project

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Manager must notify the Project Sponsor in order to bring the issue to SnipGold Senior Management, so that it can be resolved.

## **1.17 PROJECT ADMINISTRATION**

Administration functions will be implemented in accordance with approved procedures, work instructions, and other key project documents issued by the SnipGold Project Manager at the commencement of the project. With the approval of the Project Manager, additional procedures, work instructions, and other documents will be issued.

The project administration will be managed and performed in accordance with standard PIF's.

### **1.17.1 PROJECT FILES**

Project electronic and hardcopy files must be established using the standard PIFs.

### **1.17.2 COMMUNICATION MANAGEMENT**

Project communication can be in the form of hardcopy, electronic copy, informal or formal meetings between some or all team members, SnipGold, and the suppliers. Day-to-day exchange of information will generally take place between the key team members.

Daily and monthly site and safety coordination meetings will be held.

Interaction between JMM reclamation and SnipGold exploration. There will be a requirement for daily on-site meetings to convey daily work scope to develop a safe work plan to eliminate hazards and discuss potential emergency response and because of the shared tools, equipment and resources. All external communication with the Tahltan, BC Government, the State of Alaska, and the general public will be the sole responsibility of SnipGold.

## **1.18 PROJECT IMPLEMENTATION MANAGEMENT**

This section outlines the overall project management activities involved in this project.

### **1.18.1 PERMITTING AND REGULATORY AGENCY APPROVALS**

#### **1.18.1.1 Project Permitting and Regulatory Reporting**

Johnny Mountain Mine currently has three active permits:

1. The primary permit is Mines Act Permit M-178, last amended July 7, 2004, issued by the Ministry of Energy and Mines (MEM) and includes conditions for reclamation activities on

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the site, conditions on site reclamation & reclamation security agreements, including equipment mortgages. Permit M-178 includes Condition 13(c) which states that included under this permit are all mine roads, the airstrip and the 10 km Johnny Mountain Access Road.

2. The two secondary permits are issued under the Environmental Management Act (EMA). Waste Management Permit PE-8415 dated June 6, 1990, amended May 11, 2000, and May 31, 2018, is a permit to discharge solid waste to landfills.
3. Water Management Permit PR-7927 dated March 29, 1989 and amended July 14, 1999 and later on August 2, 2011, is a permit to discharge liquid effluent from the tailing storage facility, from underground workings and from waste rock piles.

Current regulatory reporting requirements for JMM include:

- Permit M-178 Annual Reclamation Report, documenting the current status of the work system, reclamation obligations, the outstanding liability and associated costs, and all monitoring including water quality, and ongoing maintenance activities. Report to be submitted by March 31, annually.
- Permit M-178 Update to the Reclamation Plan (required every 5 years, in permit submission date is March 31, 2005) providing the status of the work system, reclamation obligations, a compilation of all monitoring including ML/ARD prediction, water quality, reclamation and maintenance activities, any changes to the reclamation program that affect long term mitigation, contingency plans, schedule for completion of reclamation works and a breakdown of outstanding liabilities and associated costs.
- Permit M-178 Closure Management Manual (in permit, submission date is March 31, 2005) which describes, and documents key aspects of the operational surveillance and monitoring requirements used to track important changes which could affect long term mitigation performance, monitoring and maintenance requirements. This document shall be a living document that is kept up to date with updates submitted to MEM whenever significant changes occur.
- Permit PE-8415 Condition 3.8 Annual Report, including maintaining data of analysis, new works information, quality assurance/quality control data and submitting the data, suitably tabulated and interpreted to the Regional Waste Manager for the previous year. The annual report shall be submitted by March 31, annually.

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## **1.18.2 PROJECT REPORTS AND REVIEWS**

### **1.18.2.1 Project Progress Reports**

The SnipGold Field Manager will prepare a weekly report covering work completed, and work to be completed in the following week, with updates to manpower needs and schedule changes. Project needs and concerns may also be addressed in the weekly report.

### **1.18.2.2 Project Reviews**

The SnipGold Project Manager will require bi-weekly (or as required) coordination review meetings to plan, implement, and coordinate work activities on the project. The meetings will also serve to identify and resolve issues that might otherwise affect progress and execution of the project.

#### **Monthly Project Review – Internal**

An Internal monthly project review meeting will be held within seven days of the progress report cut-off date. The SnipGold Project Manager will present the progress achieved by discipline or work package unit (or other split as required) at the agreed monthly calendar cut-off date, including a review of the monthly project progress report.

#### **Safety Reviews**

Reviews are an integral part of the safety audit procedure. The audit will be undertaken as part of the management system to confirm that the project is meeting its obligations and HSE policy requirements. Reviews also give the project team the opportunity to voice any concerns or issues.

#### **Supplier/Contractor Reviews**

The SnipGold Project Manager will require that review meetings are held with suppliers and contractors in accordance with the contract terms.

#### **Scope of Plant/Facility Reclamation and Scope of Services Review**

The SnipGold Project Manager will require that trend reviews are held with contractors if appropriate, to confirm trends in scope, capital cost, and change notices.

## **1.18.3 PROJECT CLOSE-OUT**

Project close-out involves finalising all outstanding issues and work items, either when the work is complete, and the contract ends, or when a contract is terminated before all the work is finished. The SnipGold Project Manager will close out the project and ensure that all activities are fulfilled in accordance with the standard procedures.

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## **2.0 SECTION 2 – ENGINEERING**

### **2.1 ENGINEERING SCOPE AND ORGANISATION**

Consulting engineers hired by SnipGold will provide project specific designs and engineered drawings required for the reclamation of the JMM project.

The SnipGold Project Engineer is responsible for the coordination and review of proposed design concepts by project consults for the reclamation of the JMM site.

#### **2.1.1 PROJECT AUTHORISATION AND APPROVALS - ENGINEERING**

##### **2.1.1.1 Technical Document Approvals**

All technical documents and drawings will be checked and approved in accordance with the standard procedure.

##### **2.1.1.2 Professional Engineer Sealing and Company Permit Requirements**

The project follows the requirements of Association of Professional Engineers and Geoscientists of British Columbia (APEGBC), and all technical documents issued for construction or issued to a regulatory body are sealed and stamped with the Engineer of Record permit to practice.

Electronic seals and permit stamps are used.

Technical documents requiring seals, the permit to practice stamp, and associated signatures are identified on the discipline project deliverables requirements matrix list.

**Table 2-1: Discipline Project Deliverables Requirements Matrix List**

<b>Discipline</b>	<b>Regulatory Agency</b>	<b>Person Responsible for Sealing</b>	<b>Date Required</b>
JMM TSF Dam Safety Review	MEM, Mines Act	Professional, Engineer of Record	31-Mar-22
Geochemist - ARR geochemistry	MEM, Mines Act	Geochemist	31-Mar-22
Soils Scientist - Annual Reclamation Report (ARR) soils and vegetation studies and research	MEM, Mines Act	Author and research lead, field specialist	31-Mar-22



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<b>Discipline</b>	<b>Regulatory Agency</b>	<b>Person Responsible for Sealing</b>	<b>Date Required</b>
Environmental Engineer - Application and Supporting Studies to bring Main Landfill into compliance with MOE	MOE, Environmental Management Act	Environmental Engineer	31-Mar-22
HazMat Report	MOE, Contaminated Sites Act, EMA	Environmental Engineer	Upon completion of field assessment
Structural Engineer - Mill Building	not a regulatory requirement, for employee safety	Professional Structural Engineer	Upon completion of field assessment

**2.2 ENGINEERING AND TECHNICAL BASIS**

The SnipGold Project Engineer is responsible for ensuring that the documentation and information provided at the commencement of the project are adequate to fully define the design criteria and the basis for design.

**2.3 PROJECT PROCEDURES, INSTRUCTIONS, AND FORMS (PIFS) – ENGINEERING**

The SnipGold Project Manager ensures that the PIFs are available to all project staff, that all staff working under his or her direction is familiar with the applicable PIFs, and that the PIFs are used appropriately. The SnipGold Project Manager is responsible for assembling and approving general engineering procedures, work instructions, forms, checklists, and guidelines. The project discipline leads are responsible for assembling and obtaining approval for their discipline specific PIFs.

See each topic section in this PEP for the appropriate PIFs.

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## **2.4 PROJECT QUALITY - ENGINEERING**

### **2.4.1 PROJECT TECHNICAL AUDITS**

Project technical audits frequency and schedule will be identified as required by SnipGold. The SnipGold Project Manager will determine the scope of the audit and the resources required to undertake the audit.

## **2.5 ENGINEERING, DESIGN, AND/OR ANALYSIS SET-UP**

The contents of this section explain how the engineering and design work for the project are implemented and controlled to meet the project objectives.

### **2.5.1 PLANNING, AND SCHEDULING ENGINEERING**

The SnipGold Project Manager ensures the schedule for engineering, design, and/or analysis activities is in line with the execution strategy and fits within the constraints of the overall project execution schedule.

Discipline leads have the primary responsibility for day-to-day planning and control of the detailed plan and schedule for their discipline.

### **2.5.2 ENGINEERING DELIVERABLES**

The following deliverables have been identified for the 2021 season:

- Annual dam safety investigation – 2021.
- Issued for Construction (IFC) – Phase 2 Landfill design and specifications.

### **2.5.3 ENGINEERING INPUT TO RECLAMATION WORK PACKAGES**

Reclamation/Construction work packages (See Appendix C for WBS numbering details):

- Specification for use of existing landfill accounting for complete removal and relocation of undocumented burial site's and waste from the Mill Building demolition.

The following engineering inputs to these packages will be required:

- Scope of work,
- WBS with specific WBS package tag numbers.
- Drawing list and drawings,
- Specifications and design standards,

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- Contract/procurement and logistics plan input,
- Project Schedule.

#### **2.5.4 PLANNING TECHNICAL REVIEWS**

The technical review frequency and scheduling shall be as identified in the technical assurance plans. The SnipGold Project Manager is responsible for the detailed scheduling and coordinating of the technical reviews identified in the assurance plan.

##### **2.5.4.1 Technical Peer Reviews**

Technical peer reviews for the project are undertaken for the principal design documents and for any significant technical risk items identified in the risk register. The SnipGold Project Engineer, in consultation with the SnipGold Project Manager form the Technical Peer Review Team.

##### **2.5.4.2 Design Reviews**

Design reviews are undertaken at predetermined stages of production of technical documents and models. A design review will be scheduled with the client by the discipline lead responsible for a work package at around the 30% complete milestone.

##### **2.5.4.3 Safety Reviews**

Safety reviews are undertaken at predetermined stages of field development at a minimum of once per month.

#### **2.5.5 PROJECT NUMBERING AND IDENTIFICATION SYSTEMS – WBS AND ENGINEERING**

##### **2.5.5.1 WBS**

The WBS will be structured by Area per WOOD procedure for Global Coding Structures – Referenced in Appendix C.

As this is the generic WBS, in the month prior to the start of the field season the WBS will be tailored specific to the JMM Reclamation Project requirements by SnipGold Project Manager and distributed to all field and engineering resources intended to work on the project.

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## **2.5.6 RESOURCE PLANNING**

### **2.5.6.1 Staff Plan**

A detailed staffing plan will be maintained by the SnipGold Project Manager and Field Manager for daily resolution and coordinated with the Logistics coordinator and Camp Manager to allow for planning of camp utilization and mobilization/demobilization of all personnel working on the Iskut Property. This includes the three major areas of work: Quartz Rise Exploration, JMM Reclamation Project and Bronson Slope activity, and all services provided to these work centres. Specific to JMM Reclamation Project, a preliminary staffing plan has been generated to allow for planning of the sequence of field activity and to confirm camp space allocated to this project, and this plan is illustrated in Appendix A.

The staffing plan follows the sequence of activity noted in the 2021 Level 3 schedule. This plan accounts for the following three types of site duration described below: full time presence, part time presence and brief site presence.

Full Time Site Presence:

- Field manager (SnipGold) on a 3 week- on, 3 week- off rotation.
- Supervisor (TNDC): 3 weeks on, 3 weeks off rotation

Brief Site Presence:

- Revegetation Specialist
- Geotechnical Engineer,
- Hazardous Waste Specialist,
- Environmental Specialist,
- Surveyors.

Excluded from the JMM Reclamation Project staffing plan are exploration staff, camp services, avalanche specialists, catering staff, logistics coordinator and helicopter pilots. This staff is accounted for in the exploration program. It is notable that being an exploration property, that exploration activity will have a higher priority, although every effort will be made on all sides to accommodate the needs of both exploration and other work programs occurring on site.

The staffing plan is designed to yield a relatively smooth occupancy level for the project while on site between May and September, with weekly staffing presence between 4 and 8 people for the JMM reclamation project with the camp reaching a total occupancy between 20 and 30 people including exploration dedicated staff. Continued

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development of the staffing plan will occur throughout the field season to mitigate peaks where camp space is exceeded, by shifting activity forward and backward where possible and within the constraints of relative activities or sequential activity.

There are several positions in the staffing plan currently unallocated by name or company, and during the preparation period leading up to the field season, these positions will be filled by carefully selecting amongst the most qualified companies and candidates with emphasis on personnel from Northern BC region. This “region” is defined loosely the area south of the Yukon border, east of the Alaska border or the west coast, north of but including the communities along Highway 16 from the west coast to Burns Lake and then west of a boundary line from Burns Lake through Lower Post and up to the Yukon border.

## **2.5.7 PROJECT SOFTWARE AND SOFTWARE VERIFICATION**

The SnipGold Project Engineer and Project Manager, in consultation with hired consultants will decide which software is to be used for design and calculation for the project.

The choice of software for use on the project from SnipGold’s perspective are:

- File Share - A file share site will be initiated by Seabridge once the 2021 season commences.
- Microsoft Office – General office software
- AutoCAD – Design and drafting software

Any software not included on this list must be verified for use by SnipGold prior to use and application on deliverables.

## **2.6 EXECUTION – ENGINEERING, DESIGN, AND/OR ANALYSIS**

### **2.6.1 RECLAMATION RECORD DRAWINGS**

On completion of the 2021 program, the SnipGold Project Manager and project discipline leads determine the drawings and level of reclamation record drawings required based on contractual requirements and SnipGold approval. The project may also require electronic data handover, and this may include as-built drawings and associated databases.

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**2.6.2 ENGINEERING DELIVERABLES FOR SUPPLY CHAIN MANAGEMENT**

If engineering needs to provide technical input into the limited procurement process for the reclamation project refer to the standard PIFs.

**2.6.3 TECHNICAL DECISIONS AND INFORMATION NEEDS**

**2.6.3.1 Document Control Plan**

Document control will be managed using the existing master spread sheet, which lists all the existing documents, and all future documents will be recorded on this spread sheet. This information will be stored in a SnipGold folder located on the shared BHD Cloud folder.

**2.6.3.2 Technical Decision Records**

All technical decisions must be documented and approved through the use of Technical Decision Reports (TDRs).

**2.6.3.3 Information Needs**

The discipline and area lead identify the information they need from SnipGold on the project needs list.

**2.6.3.4 Request for Information (RFI) for Field or Fabrication**

The preferred method for requesting information is through a controlled RFI process which can be monitored and logged as the project progresses.

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### **3.0 SECTION 3 – SUPPLY CHAIN MANAGEMENT EXECUTION PLAN**

#### **3.1.1 JMM CONTRACTING PLAN 2021**

The 2021 JMM contracting plan identifies approximately seventeen (17) contractors that must be established to support the work during the year. Several of the contracts may be sole sourced to select vendors provided negotiation for price, schedule, personnel and scope are mutually acceptable or put out for tender. These include contracts for labour, equipment rental if needed, geotechnical drilling services and road assessment.

<b>Package #</b>	<b>Contract Description</b>
C001	Wood Services – Select engineering designs and assembly of project capital costs
C002	KCB Services - TMF Engineer of record, TMF reclamation plan
C003	Matrix Services - Logistic services
C004	TNDC Services - Provide skilled & unskilled labor, equipment operators
C005	BQE Water
C006	Fixed wing & helicopter transport
C007A	Analytical Lab (water and soils testing)
C007B	Geotechnical Lab
C008	Hazardous Materials Disposal according to Prov. & Fed. Regulations
C009	ERM - Environmental data collection and monitoring Services
C010	Allnorth - Iskut Property / Bronson Connector.
C011A	Adapt Mountain Safety– on the ground avalanche assessment for operational support
C011B	Long term avalanche assessment, impact to TSF & mine portals
C012	Transport shuttle – personnel transport from offsite locations to central muster point
C013	Drill/Heli pad construction

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<b>Package #</b>	<b>Contract Description</b>
C014	Golder Associates – Portal Closure
C015	Mill Demolition
C016	Finning – Equipment repairs and servicing
C017	Geier Waste Management Services
C018	Allnorth – Survey and Engineering

### 3.2 MATERIAL LIST

Most materials are intended to be supplied by the contractors carrying out the specific work. The following list (Table 3-1) is a preliminary estimate of most of the significant materials required including those provided directly by contractors. This list will be provided to Matrix who will determine what if any of this equipment already exists on site that can be applied to the JMM Reclamation Project. Also, this list is intended to be a living document and will be updated periodically as necessary to reflect updated plans just before purchases are made to support the field work.

**Table 3-1: 2021 Material List**

<b>Material</b>	<b>Quantity</b>	<b>Weight lbs.</b>	<b>Dimensions</b>	<b>Purpose</b>	<b>Provided by</b>
Oil Gator	200 bags	6,600	bags	In-Situ Soil Remediation	SnipGold
Fertilizer	3 bags	4,400	780 kg bags	In-Situ Soil Remediation	SnipGold
Hydrated Lime	1,544 bags	77,160	50 lb. bags	Waste Rock	SnipGold
8" PVC Pipe	30m			Lower water elevation in TSF	SnipGold
Silt Curtain	1 – 10m length			Place on the upstream of TSF outlet	SnipGold



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**3.2.1 EQUIPMENT LIST**

All excavation and earth moving will be undertaken using the existing SnipGold equipment currently on site. The intention in the 2021 season is to use one piece of equipment for multiple tasks as discussed in Table 3-2:

**Table 3-2: Equipment List**

<b>Equipment</b>	<b>Alternate</b>	<b>Purpose</b>	<b>Contractor</b>	<b>Comments</b>
Excavator – CAT 312E	CAT 235	Ditch & culvert repair/replace on the JMM access road, Excavation of burial sites, excavate test pits for investigations as necessary, assist in partial demolition of Mill building, In-Situ Soil Remediation tank farm area.	SnipGold	Multipurpose (full time on site, will require tight coordination)
Excavator – CAT 235	CAT 312E	Load soils in Tandem truck at waste burial sites, In-Situ Soil Remediation, Excavate test pits for investigation as necessary,	SnipGold	Used sparingly due to the age of the machine.
Kenworth Dump Truck		Haul waste from burial sites to upgraded landfill. Haul waste from partial Mill demolition to landfill	SnipGold	May require ongoing maintenance due to age of truck
CAT DJB Rock Truck		Haul waste rock from portals to TSF	SnipGold	Ongoing mechanical repairs possible
Dozer (D8L)	Dozer D8K	Site grading, moving equipment and spreading at landfill	SnipGold	Ongoing mechanical repairs possible
3 x (4-Person) UTVs	2 x (6-Person) UTVs	Personnel transport from Bronson camp to JMM site	Matrix	Requires safety training to operate and seatbelt.

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<b>Equipment</b>	<b>Alternate</b>	<b>Purpose</b>	<b>Contractor</b>	<b>Comments</b>
2 x Ford F-150 pickups	UTVs	Personnel transport from Bronson camp to JMM site	Matrix	Driver's license required, seatbelt when driving
Equipment fueling station		Fuel required for onsite equipment	SnipGold / Matrix	One tank located at the Bronson Airstrip, another at the JMM site
Generator set with fuel tankage		Contractor required	Contractor	
Water Pumps / Trash Pumps		Contractor required	Contractor	
Hazardous Wastes Equipment:		To sample and remove hazardous wastes from site as required	Contractor	Additional equipment may be required by contractor
Handheld GPS and radios		Local on-site communication and direction/location	SnipGold	

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### **3.3 PLANNING, SCHEDULING AND COORDINATION**

The planning and scheduling of all the data collection and reclamation activities necessary to execute the project must consider the implications of the master schedule listed in Appendix A.

#### **3.3.1 PROCUREMENT**

Matrix, as directed by SnipGold Management, will have overall responsibility for ensuring that the procurement strategy forms the basis for managing the execution and administration of all contracts and purchase order scopes of supply.

The procurement plan for the project shall be developed in conjunction with SnipGold and will be based on the scopes of work, the quantified purchasing and contract packages and the proposed project procurement strategy.

#### **3.3.2 EXPEDITING**

Matrix shall manage and co-ordinate expediting activities on the project.

Matrix has overall responsibility for ensuring that the expediting strategy forms the basis for managing the delivery of all purchase order scope of supply to meet the project schedule.

#### **3.3.3 SHIPPING AND LOGISTICS**

Matrix shall be responsible for daily activities related to planning and interfacing between suppliers and the Client's freight forwarder.

Matrix has overall responsibility for ensuring that the shipping and logistics strategy forms the basis for managing the delivery of purchase order scope of supply to site, except as supplemented by SnipGold (e.g. small items delivered to SnipGold's Smithers office to be forwarded to site).

Interface between the supplier and the Client's freight forwarder will be facilitated by Matrix.

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## **4.0 SECTION 4 – RECLAMATION MANAGEMENT EXECUTION PLAN**

### **4.1 RECLAMATION SCOPE AND ORGANISATION - EXECUTION APPROACH AND EXECUTION STRATEGY**

#### **4.1.1 INTRODUCTION**

The engineering design and execution plans are being executed or managed by a number of consultants: - See Section: 3.1.1 – JMM Contracting Plan 2021. Supply chain management, including procurement management will be conducted by Matrix. Engineering coordination will be executed by WOOD.

Contract tendering, and award will be conducted by SnipGold. Reclamation management will be based on the site under the direction of SnipGold's Field Manager.

#### **4.1.2 RECLAMATION MANAGEMENT PLAN**

The SnipGold Field Manager will play a key role in the early reclamation planning process. Field managers will assist in the planning and preparation of critical documentation ahead of the field season.

2021 activities will include:

- holding a kick-off meeting,
- identifying early field season reclamation activities,
- defining temporary reclamation facilities and services to be provided by the logistics contractor,
- defining reclamation equipment and material procurement responsibilities that will be split between SnipGold and the logistics contractor,
- preparing reclamation management, and health & safety procedures and a detailed execution plan,
- reviewing onsite access constraints and related safety issues,
- reviewing HSE requirements,
- mobilising the reclamation team to site, including the establishment of reclamation facilities and services.

#### **4.1.3 PROJECT SERVICES EXECUTION PLAN**

SnipGold's Project Manager will provide the following project services.

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**4.1.3.1 Cost Management**

- cost control
- contingency management
- earned value management and reclamation progress monitoring
- project accounting

**4.1.3.2 Planning and Scheduling**

- Maintaining and updating the overall execution schedule

**4.1.3.3 Field Execution**

- Direct management and supervision of multiple contractors.
- Provide guidance and assistance to various technical staff on site to allow them to safely conduct their work,
- Develop the comprehensive asset register, using WBS coding,
- Coordinate with the logistics coordinator the import/export to site of equipment, materials and personnel required to complete the work,
- Collect data and information to assist in planning the 2021 field season and develop an initial draft of the 2021 project execution plan and schedule,
- Communicate often and openly with SnipGold Field Manager to provide updates and discuss program objectives and results, scheduling, cost control, and potential synergies with SnipGold Gold's other properties.

**4.1.4 RECLAMATION STRATEGY**

The following strategy for the execution plan will be used.

**4.1.4.1 Reclamation Material and Equipment Inbound Freight**

In-bound freight during reclamation is classified into the following types, and reclamation infrastructure and supplies that are to be provided by SnipGold, must be discussed and arranged in advance of the field season commencing:

- *Project-Supplied Equipment and Materials* – All project-supplied equipment and materials procured will be assembled by the logistics contractor at a designated staging location and delivered to site.

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- *Contractors' Reclamation Equipment and Materials* – Contractors will be responsible for transport and logistics of all their own Equipment and materials necessary to a laydown yard designated by SnipGold for the completion of their scope of work, with the exception of temporary reclamation infrastructure and facilities to be supplied at the project site by SnipGold.
- *Project-Supplied Infrastructure and Facilities* – The project-supplied facilities and equipment will be procured and delivered to the project site by SnipGold. Major facilities include but are not limited to reclamation camp, waste collection and disposal, laydown area and warehousing.
- *Project-Supplied Reclamation Consumables* – These include food, supplies for the reclamation camp, and other reclamation consumables, which will be by Matrix as directed by SnipGold.

#### **4.1.4.2 Road Safety and Security**

All drivers and vehicles must comply with the requirements of SnipGold's Iskut Camp Standard Operating Procedures and may be required to produce tickets for equipment operation or pass an operator's competency test.

Contractors off-loading materials and/or equipment at the laydown yard must observe all on-site traffic control rules and regulations and must be placed in suitable locations so that they do not block traffic.

#### **4.1.4.3 Transportation of Workers**

Transportation of workers from Smithers to McLymont Laydown will be arranged by SnipGold and will likely include a combination of shuttle or charter air service combined with helicopter support, as there is no road access into the Iskut Project. Transportation on site will include all-terrain vehicles and /or trucks and helicopter services. Transportation from Iskut camp to the JMM Reclamation site will be supplied by SnipGold in suitable vehicles to safely navigate the 10+ km track up the hill.

#### **4.1.4.4 Project Storage and Containers**

If required, temporary covered storage will be made available at the Iskut camp and will be made available to all consultants and contractors up at JMM site.

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## **4.1.5 CONSTRUCTABILITY AND RECLAMATION MANAGEMENT PLAN**

### **4.1.5.1 General**

SnipGold has appointed an experienced field manager to provide input to the planning and who will be responsible for its implementation.

### **4.1.5.2 Field Working Conditions**

JMM is a brownfield project including an existing closed mine and ancillary facilities. Access is limited to mobilization by fixed wing aircraft or helicopter to the Bronson Slope air strip. Access to the JMM site will be by surface vehicles travelling up a 10-kilometer single lane dirt road.

### **4.1.5.3 Weather Considerations**

The site can be subject to extreme weather, especially during winter months, with heavy snow loads. However, the reclamation work will only be conducted over summer, so extreme weather is not anticipated to be a major issue, although occasionally caution may need to be exercised and emergency procedures applied (e.g. severe thunderstorms).

### **4.1.5.4 Temporary and Preparatory Works**

All site capture and temporary facilities required by the contractors will be completed during the Early Works phase of their various contracts. This will include the laydowns, offices, demolitions, relocations, and concrete and aggregate supply.

Being a brownfield project, reclamation will be provided with temporary services such as water, power, and communications from limited existing facilities.

### **4.1.5.5 Camp Requirements**

It is anticipated that a peak labour force of up to 30 people combined during July to September will be required for JMM reclamation, Bronson slope work and Iskut Exploration, including all site and camp services staff. All personnel will be housed at the Iskut camp.

### **4.1.5.6 Field Offices, Facilities, and Services**

#### **Main Field Office**

SnipGold, contractors and consultant personnel will use available office space located at Bronson camp and main Mill building at JMM site.

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### **Washroom Facilities**

SnipGold will provide washroom facilities in strategic locations on the project site as necessary. A “Dry” is supplied by Matrix at the Bronson camp.

### **Communication**

SnipGold has existing radio communications, as well as limited telephone and internet services which will be available for reclamation project purposes. There is no cell phone service at or near the project site.

### **Fuel Storage and Distribution**

The logistics contractor will manage fuel supply and distribution, having fill points both at Bronson camp and a 4500L fuel tank located at JMM site.

### **Reclamation Water Supply and Distribution**

Reclamation water will be provided from local ponds and streams.

### **Access Roads and Temporary Laydown Areas**

Access roads, temporary reclamation access and laydown areas, warehouse/ storage structures will be provided by SnipGold.

Reclamation laydown areas include:

- engineered Equipment and materials storage yard(s),
- demolished facilities, structural steel, tank, and equipment storage,
- reclamation contractor laydown, storage, equipment rental, and maintenance.

### **Airstrip**

The existing Bronson airstrip will be available for transporting reclamation project workers. The airstrip located at the JMM site has been decommissioned and is not available for use for landing fixed wing aircraft.

### **Reclamation Power and Distribution**

Reclamation project contractors will be responsible to provide their own generators as part of their equipment imported to site to complete their work. Fuel will be distributed by the logistics coordinator as required.



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#### **4.1.6 FUTURE RECLAMATION SCOPE**

The following yearly scopes is predicated on a remote (fly-in) site, with support equipment flown to site by heavy lift chopper in support of ongoing reclamation activities started in 2017.

##### **4.1.6.1 2022 Reclamation Scope**

- Ongoing In-Situ soils management to encourage aeration and treatment of soils.
- Completion of ML/ARD waste relocation from portals #10, 11, 12 and airstrip to TSF basin, placed below water cover elevation,
- TSF downstream embankment modifications for final closure.
- Decommission all exploration roads on JMM Site,
- Dam safety inspection,
- Annual environmental monitoring (water quality, hydrology, weather station, weirs and groundwater wells).

##### **4.1.6.2 2023 Reclamation Scope**

- Complete Mill building demolition and site grading,
- Final upgrades and closure of JMM landfill,
- Finalize In-Situ soil management to encourage aeration and treatment of soils,
- Completion of TSF embankment modifications for final closure with water cover. Will include dewatering and may include water treatment.
- Dam safety inspection,
- Annual environmental monitoring (water quality, hydrology, weather station, weirs and groundwater wells),
- Final closure grading:
  - Bulk earthworks,
  - Establish permanent drainages,
  - Cover all infrastructure foundations
- Site auction or transport off site of all mobile stock,
- Vegetation planting,
- Dam safety inspection,

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- Annual environmental monitoring (water quality, hydrology, weather station, weirs and groundwater wells).

## **4.2 PROJECT DOCUMENTATION**

### **4.2.1 PROJECT PROCEDURES, INSTRUCTIONS, AND FORMS (PIFS) – RECLAMATION**

The SnipGold Field Manager is responsible for assembling and approving general reclamation procedures, work instructions, checklists, forms, and guidelines, collectively known as PIFs. All PIFs that relate directly to the project quality management system in reclamation will be defined and approved by the SnipGold Project Managers.

*Documents include:*

- SnipGold mandated policies
- Project policies and job rules
- Project procedures
- Project work instructions
- Forms
- Manuals
- Standards
- Codes of practice
- Standard details
- Regulatory agency documents
- Other relevant documents for use on the project

## **4.3 RECLAMATION COORDINATION AND MANAGEMENT**

The SnipGold Field Manager has an essential role and responsibility in managing and coordinating all key interfaces between the various parties participating in the JMM Reclamation Project.

### **4.3.1 RECLAMATION COORDINATION – KEY INTERFACES**

The project baseline schedule is a SnipGold living document, primarily used as a coordination schedule driven by the reclamation manpower and equipment loading.

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## **4.4 RECLAMATION PLANNING AND EXECUTION**

The reclamation work for the project will be planned, scheduled, and managed to meet the project objectives, ensuring cross function compatibility with Engineering and Procurement and in accordance with the project execution plans provided in the other sections of the PEP.

### **4.4.1 DETAILED PLANNING AND SCHEDULING**

The overall project plan and baseline schedule will be compiled by the SnipGold Project Manager, in conjunction with other support groups. The schedule will be reclamation-driven and based on logical reclamation and closeout methodologies and work sequencing for each discrete site area. Managing and updating the schedule will be the responsibility of the SnipGold Field Manager. The approved reclamation work plans and schedule will establish the priorities for Engineering, Design, Procurement Management, and Closeout.

### **4.4.2 CONSTRUCTION WORK PACKAGES (CWP)**

CWPs if required will be compiled by the SnipGold Field Manager and will be based on the construction/reclamation and closeout methodology, and planning as applied to the investigation program, engineering, procurement, and contracting strategies.

The SnipGold Field Manager is responsible for identifying and defining the scope and schedule of each CWP for the project.

The CWP will be further defined by including the inspection test plan requirements and the HSE safety plan covering the work activities involved with each CWP.

### **4.4.3 FIELD ENGINEERING**

Office based engineering personnel will respond to requests for on-site clarifications, where necessary.

## **4.5 RECLAMATION CONTRACTS ADMINISTRATION**

The SnipGold Project Manager will participate in all phases for establishing field service contracts, including activities related to the following:

- Contract strategy,
- Contract document preparation (reclamation specifications, terms, and conditions),
- Bid evaluation and award,

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- Contract orientation.

#### **4.5.1 FIELD WORK ORDERS (FWO)**

Field work orders will be managed in accordance with project procedure and the terms of conditions applicable to each contract.

The SnipGold Project Manager will ensure that any changes (extras, additions, or decreases) to the contract scope of work, beyond what is covered by the adjusted contract sum, will be negotiated with the contractor.

#### **4.5.2 SUPPLIER/CONTRACTOR REQUESTS FOR FIELD INFORMATION AND CHANGES**

The SnipGold Field Manager will be responsible for the timely processing of supplier/contractor requests for information or changes to field work.

The formal Request for Information (RFI) procedure will be used to request information. A record of all RFIs will be maintained, along with details of responses.

#### **4.5.3 EXTRA WORK TO CONTRACT**

Both SnipGold Field Manager and SnipGold Project Manager will be responsible for managing extra work (not covered by existing contracts) in the most expedient schedule and cost-effective manner, in accordance with best practices and project procedures.

Extra work will be managed in accordance with the provisions of the terms and conditions applicable to each contract and project procedures.

#### **4.5.4 CLAIMS AND DISPUTES**

Contractual claims and disputes will be managed in accordance with the provisions of the terms of conditions applicable to each contract and project procedures.

#### **4.5.5 COMPLETION**

The SnipGold Field Manager will be responsible for ensuring that the completion dates are met and that they comply with all contractual commitments.

Completion defines the verified handover interface of a plant (or system) between the reclamation, completions and the closeout of the project to ensure safe handover.

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#### **4.5.6 RECORD DOCUMENTS**

All reclamation records and electronic and hardcopy documents prepared and approved during reclamation execution will be filed for safe keeping in SnipGold's Smithers office, in accordance with the project instructions and procedures.

### **4.6 PROJECT SERVICES – RECLAMATION**

The SnipGold Project Manager is responsible for the overall reclamation planning and the entire scope of reclamation cost and scheduling. The SnipGold Field Manager is responsible for ensuring that all aspects of the field work are properly set up with the necessary project controls for monitoring of performance.

#### **4.6.1 PLANNING – RECLAMATION**

The SnipGold Field Manager is responsible for conducting day to day reclamation planning for the project.

The SnipGold Field Manager will participate in determining the priorities and sequence for the delivery of engineering work and procurement packages. The SnipGold Field Manager will ensure mutually agreed-upon dates are established.

#### **4.6.2 SCHEDULING – RECLAMATION**

Reclamation planning will be integrated with all other phases and disciplines involved with the project, and in the overall project planning and development of baseline schedules for coordinating and controlling the work.

##### **4.6.2.1 Basis of Schedule**

###### **Introduction**

Calendars have been allocated to the following work assignments as follows:

- Design/technical services, procurement and contract formation – 5 days / week
- Field execution work – 7 days / week

The following constraints have been incorporated in the schedule:

- Camp size,
- Current exploration work,
- No current road access from McLymont to Bronson Camp.
- Travel time from Bronson Camp to the JMM site.

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- Limited duration of field execution work.

### **Schedule Development**

The schedule was developed with input from project team members and includes the following key tasks for the 2021 field execution work at Bronson Slope and at the mine site:

- Engage the services of engineering consultants to provide execution plans and engineering deliverables,
- Procure material and equipment,
- Engage contractors to perform the work,
- Engage logistic services to ensure the camp is available.

Planning work will be advanced to allow procuring of material/equipment and contracts are formalized to ensure that all goods are shipped to McLymont staging area by 01 June 2021 for transport to the mine site.

Mobilization to site to commence field work is anticipated to commence on 1-11 May 2021 depending on weather and snow depth.

### **Procurement**

Material/equipment required for the 2021 field execution work are listed in Section 3.2.

#### **4.6.2.2 Schedule**

Refer to Appendix A for the Master Schedule.

## **4.7 RECLAMATION SITE ADMINISTRATION**

This section provides instructions specifically related to administration requirements at the reclamation field offices, including communications and document control.

### **4.7.1 RECLAMATION OFFICE ADMINISTRATION**

JMM Reclamation site administration will run through the SnipGold Field Manager who reports to the Project Manager and is responsible for the overall administration of the reclamation office. Management support activities include:

#### **4.7.1.1 Filing Systems**

The field office will adopt the same filing system for both electronic and hardcopy filing practices. The field office will add additional categories to the filing systems for site-

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specific document requirements. All project staff responsible for maintaining the project records will use the same filing system.

Files containing documents destined for archiving will be designated as such in the project file system.

#### **4.7.1.2 Request for Information (RFI)**

The project will use a formal Request for Information (RFI) procedure to record issues requiring clarification and requests for information received from contractors and for the responses to the RFI providing the clarification and information requested.

All RFIs will be logged in a register to ensure that a timely response is issued and that contractors are not delayed in their work.

#### **4.7.1.3 Reclamation Progress Reports**

Progress status reports will be prepared and issued in accordance with procedures and instructions issued by the Project Manager.

Each function and discipline will be required to submit status reports for work under their responsibility. The SnipGold Field Manager will compile the reports which will be submitted to the SnipGold Project Manager before distribution.

#### **4.7.1.4 Record Documents**

All formal documents related to reclamation, interfaces with other project functions, SnipGold, and administrative documents issued for contracts management will be retained for record purposes. Documents to be retained include, but are not limited to:

- Minutes of meetings,
- Instructions given and received (written and record of verbal instructions),
- Record of telephone conversations,
- Progress reports,
- Correspondence between reclamation personnel and other project stakeholders.

## **4.8 RECLAMATION CLOSE-OUT REPORTS**

On completion of the work, the SnipGold Field Manager will prepare reclamation close-out reports and submit to the SnipGold Project Manager for inclusion in the project close-out report.

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Details to be included in the report will be in accordance with project procedures and instructions.

## **5.0 SECTION 5 – COMPLETIONS/RECLAMATION EXECUTION PLAN**

### **5.1 RESPONSIBILITY**

The SnipGold Project Manager is responsible for defining the completions and reclamation of the facilities.

### **5.2 DEFICIENCIES**

Deficiencies will be the responsibility of the contractor, as directed by the SnipGold Field Manager.

The Field Manager is responsible for developing various turnover packages that may include the following documents:

- Notice of completion,
- Scope summary of the turnover package,
- Copy of the contract deficiency list. If more than one contract is involved in a turnover package, then a commensurate number of deficiency lists will be included. The list will be in the format prescribed by the reclamation contract,
- Copies of licenses, permits, and other regulatory paperwork as related to the turnover scope.

### **5.3 RECORD DRAWINGS AND REPORTS**

At the end of the project, all reclamation and inspection activities must be recorded and included in any QA reports prepared for the project. This will provide:

- A list of drawings and specifications covering the work,
- A record of each test and measurements conducted for each work element,
- Confirmation records that test results and inspection checks comply with requirements stipulated in the specifications and codes applicable to the work.

These activities should be carried out in conjunction with the records management activities outlined in the project close-out procedure.



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## **6.0 SECTION 6 – HEALTH, SAFETY, AND ENVIRONMENT (HSE) EXECUTION PLAN**

The existing SnipGold HSE plan, with current policies and practices at site which will focus primarily on safety for an exploration site, will be upgraded for the project as applicable.

While executing the work, all personnel will adhere to HSE policies, procedures, rules and all applicable governmental and regulatory requirements.

All site personnel will comply with SnipGold's HSE Plan and Policies for SnipGold's Site. SnipGold's HSE Plan and Policies will take precedence and will be supported and/or supplemented by the Contractor's Plans and Policies, the most stringent will apply.

## **7.0 SECTION 7 - PROJECT PROCEDURES, INSTRUCTIONS, AND FORMS (PIFS) – PROJECT CONTROLS AND SERVICES**

### **7.1 PROCEDURES AND INSTRUCTIONS**

The SnipGold Field Manager is responsible for the sections of work covered in this section of the PEP and will ensure that approved procedures and work instructions are available, that all project personnel working under his/her direction are familiar with the applicable procedures, and that the procedures are being followed.

### **7.2 PROJECT MANAGEMENT CONTROLS AND SERVICES SOFTWARE**

The following software will be used in the execution of the project controls and services work for the project:

- MPP – Planning and scheduling and schedule risk analysis software
- Microsoft – Office software
- SharePoint – Document management, collaboration, portals, and extranets

### **7.3 PROJECT CONTROLS**

The SnipGold Field Manager is responsible for supporting other project functions in formulating the planning and implementation of project controls, and for reporting on the project through all phases.

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### **7.3.1 COST CONTROL**

Actual costs will come from SnipGold's principal office in Toronto, incorporation into reports for actual vs programmed, progress, etc. will be done on site by field managers.

## **7.4 PROJECT FINANCIAL AND ACCOUNTING**

### **7.4.1 PROJECT ACCOUNTING**

The SnipGold Project and Field Managers are responsible for coordinating and approving accounting requirements for the project, including:

- Reviewing monthly invoices for Engineering & Procurement Services,
- Reviewing vendor invoices and issuing notification to the client that payment may proceed.

### **7.4.2 INVOICES FROM SUPPLIERS/CONTRACTORS AND ACCOUNTS PAYABLE**

All invoices from all contractors will be delivered straight to SnipGold for review and payment processing. SnipGold field manager and project manager will review prior to providing SnipGold accounting approval.

### **7.4.3 REPORTING AND ACCOUNTING RECORDS**

SnipGold Project Manager will maintain a method of accounting in accordance with generally accepted accounting principles and practices, respecting all matters pertinent to the project.

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## Appendix A – Schedule

Bronson Camp Open - Matrix (approximate)	04 May 2021
Seabridge Reclamation Management Team – Preseason meetings and scheduling	04 May 2021
Seabridge JMM Reclamation Team Mobilize to Iskut Camp	18 May 2021
Start Improvements to JMM Access Road and snow removal	19 May 2021
Matrix Mechanic - Begin repairs to site equipment	19 May 2021
JMM access Road – Repair washout and snow removal	25 May 2021
Stage all reclamation equipment and supplies at McLymont for transfer to site. (Lime, Oil Gator, PVC Pipe)	01 June 2021
Conduct Dam Safety Inspection (DSI)	03 June 2021
Begin In-Situ Soil Remediation - Tank Farm area	03 June 2021
Training of Crew – “Working near Water”	4-6 June 2021
Begin Relocation of Waste Rock to TSF – Level 10	07 June 2021
Begin Relocation of Waste Rock to TSF – Level 11	04 July 2021
Conduct Dam Safety Inspection (DSI)	04 July 2021
Begin Relocation of Waste Rock to TSF – JMM Runway	20 August 2021
Disposal of old mine equipment to JMM landfill	08 Sept 2021
KCB – Conduct Dam Safety Inspection (DSI) on the TSF	08 Sept 2021
End of 2021 reclamation season at JMM	02 Oct 2021

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## **Appendix B – Governing Regulations and Acts**

**Guidelines for Workers Compensation Act** (<https://www.worksafebc.com/en/law-policy/occupational-health-safety/searchable-ohs-regulation/ohs-guidelines/guidelines-for-workers-compensation-act>)

**Guidelines Workers Compensation Act Part 3 Division 1 – Interpretation and Purposes**

**G-D1-108-7 Jurisdiction over mines**

Issued June 18, 2008; Editorial Revision September 19, 2014

### **Regulatory excerpt**

WorkSafeBC's prevention jurisdiction is set out in section 108 of Part 3 (Occupational Health and Safety) of the *Workers Compensation Act* ("Act"):

(1) Subject to subsection (2), this Part applies to

(a) the Provincial government and every agency of the Provincial government,

(b) every employer and worker whose occupational health and safety are ordinarily within the jurisdiction of the Provincial government, and

(c) the federal government, every agency of the federal government and every other person whose occupational health and safety are ordinarily within the jurisdiction of the Parliament of Canada, to the extent that the federal government submits to the application of this Part.

(2) This Part and the regulations do not apply in respect of

(a) mines to which the [Mines Act](#) applies,

(b) [Repealed 2004-8-33.]

(c) subject to subsection (3), the operation of industrial camps to the extent their operation is subject to regulations under the [Public Health Act](#).

(3) The Lieutenant Governor in Council may, by regulation, provide that all aspects of this Part and the regulations apply to camps referred to in subsection (2) (c), in which case this Part and the regulations prevail over the regulations under the [Public Health Act](#) to the extent of any conflict.

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### **Purpose of guideline**

The purpose of this guideline is to clarify the authority of WorkSafeBC over the occupational health and safety ("OHS") of organizations that conduct operations on or around mines.

### **Ministry of Energy and Mines OHS Jurisdiction**

WorkSafeBC's prevention jurisdiction does not extend to mines to which the *Mines Act* applies. Under the *Mines Act*, a "mine" includes

- (a) a place where mechanical disturbance of the ground or any excavation is made to explore for or to produce coal, mineral bearing substances, placer minerals, rock, limestone, earth, clay, sand or gravel
- (b) all cleared areas, machinery and equipment for use in servicing a mine or for use in connection with a mine and buildings other than bunkhouses, cook houses and related residential facilities
- (c) all activities including exploratory drilling, excavation, processing, concentrating, waste disposal and site reclamation
- (d) closed and abandoned mines
- (e) a place designated by the chief inspector as a mine

The approval of mining projects under the [\*Mines Act and the Health, Safety and Reclamation Code for Mines in British Columbia\*](#) is administered by the Ministry of Energy and Mines ("MEM"). A permit from MEM is required for coal and mineral exploration programs, placer mining, sand and gravel pits and quarries, proposed coal or hardrock mineral mines, major expansions or modifications of producing coal and hardrock mineral mines, as well as large pilot projects, bulk samples, trial cargoes and test shipments.

All activities conducted in relation to mining within the boundaries of a *Mines Act* permit area fall within the OHS jurisdiction of MEM. Examples include mining drilling and exploration; construction and blasting on mine property; operation of mining company labs and mobile equipment at a mine site; roads on mine property; and processing facilities, power lines and pipelines that service the mine and are situated within the mine boundaries. Sites outside of the mine permit area that are designated as "mines" by the Chief Inspector of Mines will also fall under MEM's OHS jurisdiction.

Aggregate pits, such as gravel pits, that are exploited primarily for commercial purposes constitute "mines" under the *Mines Act* and are thus within the OHS jurisdiction of MEM. In other words, if the primary purpose of the excavation is to extract aggregate, OHS over the pit will be the responsibility of MEM. Examples of such pits include gravel pits primarily used for building a logging road (unless the pit is situated within the road's right-of-way) or for selling

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gravel. On the other hand, if the excavation is primarily conducted for development purposes (for example, for erecting a foundation structure for a building) under a development or building permit from another level of government (such as a municipality or regional district), the aggregate pit will fall within the jurisdiction of WorkSafeBC, even if the excavated material is eventually sold.

### **WorkSafeBC OHS Jurisdiction**

WorkSafeBC has jurisdiction over OHS with respect to areas, machinery, equipment and buildings that are not used to service or in connection with a "mine" as defined above. This includes, for example, access roads outside of the mine boundaries, and timber removal operations that are not connected to the mining activity (even if they are carried out within the mine boundaries). Likewise, WorkSafeBC has OHS jurisdiction over bunkhouses, cook houses and related residential facilities that are used to service a mine or in connection with a mine, to the extent that they are workplaces in which workers such as cooks, maintenance people and others are employed.

WorkSafeBC's jurisdiction also extends to service roads running through mine boundaries that are used to access areas beyond the mine, such as forestry or oil and gas operations. It should also be noted that oil and gas exploration and production activities are within WorkSafeBC's jurisdiction.

### **Dual OHS Jurisdiction**

While WorkSafeBC is excluded from enforcing OHS requirements at a "mine" site, there are employers in respect of which jurisdiction will be divided between WorkSafeBC and MEM. In other words, there are employers who are under WorkSafeBC jurisdiction for much of their business, but who operate on some "mine" workplaces where WorkSafeBC has no jurisdiction. In these situations, WorkSafeBC requirements will apply in general to the employers, but WorkSafeBC has no jurisdiction to enforce specific requirements with respect to those "mine" workplaces. For example, a road construction firm that operates a gravel pit to build an industrial road (such as a logging road) will be subject to general WorkSafeBC requirements around safety programs and health and safety committees. However, WorkSafeBC may not enforce specific requirements around the firm's operation of mobile equipment at the gravel pit.

Other examples of situations where dual jurisdiction may arise include concrete plants with associated gravel pits. In these situations, the jurisdictional dividing line will vary from case to case. The more direct and regular the connection between the activity and the mine site, the more likely it is to be "for use in servicing a mine or for use in connection with a mine." For instance, a loader that is routinely used to dump gravel into the processing plant will fall within WorkSafeBC's jurisdiction. In contrast, if the loader constitutes a significant part of the operation of the gravel pit and is only used occasionally in relation to the processing plant, OHS over that piece of equipment will be the responsibility of MEM.

### **Further information**

When faced with assertions that OHS over a particular facility or activity falls outside of

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WorkSafeBC's jurisdiction, or situations where the jurisdictional divide is unclear, prevention officers may contact MEM to obtain further information about the operations in question. In addition, prevention officers should consult with their manager.

Questions about jurisdiction over mines, and other questions relating to the jurisdiction of WorkSafeBC over OHS, may be directed to the Regulatory Practices Department of WorkSafeBC.

### **Requirements for notifying and cooperating with MEM**

Prevention Manual Policy Item [D1-108-1 Application of Part 3 - Where Jurisdictional Limits Exist](#) provides that WorkSafeBC prevention officers will not issue an order or exercise another power to directly enforce a statute or regulation administered by MEM. The policy also requires prevention officers who observe what they believe to be a violation of a statute or a regulation administered by MEM to

- Notify MEM of the details of the observation that they believe to be a violation of its statute or regulation. As part of this notification, it is recommended that prevention officers forward a copy of the inspection report, if one was prepared, to MEM. It should be noted, for further clarity, that if the workplace is outside of WorkSafeBC's jurisdiction, the inspection report must not include an order and it is not required to be posted.
- Cooperate with MEM in dealing with the situation to the extent this is consistent with WorkSafeBC's mandate and prevention officers' duties under the *Act*.

Before notifying MEM, the prevention officer should inform the employer of the situation that may be a violation of a statute or regulation of MEM and that the prevention officer will be contacting MEM for their follow-up.

Contact information for MEM regional offices is available online at [Office of the Chief Inspector of Mines](#)

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## Appendix C – WBS Procedure

### Johnny Mountain Mine Closure Bond Estimate- Work Breakdown Structure (WBS)

- 1100 Mine Adits
- 1200 Vent Raises
- 2100 Waste Dumps (Waste Rock)
- 2200 Landfills / Landfarm
- 2300 Surface Water Management
- 3100 Mill Demolition
- 3200 Tank Farm Deconstruction
- 4100 Civil Works associated with TSF Design
- 5100 Mine Access Road
- 8100 General and Administration Costs
- 8200 Asset Management
- 8300 Permitting, Regulatory, Road Usage Costs
- 9100 Engineering and Technical
- 9300 Temporary Construction Utilities
- 9400 Construction Support
- 9600 Site Survey
- 9700 Health, Safety, Security and Environmental
- 9800 Temporary Camp and Catering
- 9900 Freight and Logistics/Contractor Support
- P200 Taxes
- P900 Contingency



APPENDIX C      JOHNNY MOUNTAIN MINE RECLAMATION PROJECT:  
2020 MAIN LANDFILL EROSION PREVENTION AND  
SEDIMENT CONTROLS INSPECTION MEMORANDUM  
(WOOD 2021A)

# Memo

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**To:** Elizabeth Miller, M.Sc., R.P. Bio., Vice President Environment  
Jessy Chaplin, M.Sc., R.P.Bio., Director of Permitting  
Kevin Hidber, ASCT, Field Manager

**From:** Mark Anthony Pernito, P.Geo., Megan Gardner, EIT      **Reviewer:** Dean Wall, M.Sc., P.Eng.

**cc:** Mario Bianchin, Ph.D., P.Geo.      **Wood File No.:** VE52655D

**Date:** 3 March 2021

**Re:** **Johnny Mountain Mine Reclamation Project – 2020 Main Landfill Erosion Prevention and Sediment Controls Inspection Memorandum**

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## 1.0 Introduction

Wood Environment & Infrastructure Solutions (Wood) prepared this memorandum for SnipGold Corporation (SnipGold) in lieu of the annual Post Construction Report for Main Landfill Upgrades. Due to the Covid-19 provincial health restrictions, no mine reclamation works or landfill upgrades took place during 2020. However, Permit PR-7927 requires an annual inspection of erosion prevention and sediment control measures. Therefore, this memorandum is intended to provide a review of the erosion prevention and sediment control measures currently in place at the Johnny Mountain Mine (JMM) Main Landfill (Main Landfill).

### 1.1 Background

The Main Landfill has been operating since 1994 at the current location on the west side of the Tailings Storage Facility (TSF). Landfill upgrades are currently underway as part of SnipGold's JMM Reclamation Project. The design of these upgrades is described in detail in the Main Landfill Technical Assessment Report (TAR) dated 31 January 2018, which was completed by Amec Foster Wheeler (now Wood). Following the Ministry of Environment and Climate Change Strategy (ENV) review of the TAR, an amendment to Permit PR-7927 was issued on 31 May 2018. One of the conditions stipulated in the permit requires that at the start of the reclamation activities the Permittee must develop, implement and maintain erosion prevention and sediment control measures. During each snow-free season, a Qualified Professional must assess whether those controls are being undertaken and are effective which are described in the sections below. This assessment, including recommended upgrades to the control measures, shall then be submitted as part of the Permit PR7927 Annual Report.

The Main Landfill upgrades, as outlined in the TAR, began in June 2018. During the 2018 construction season (June to October 2018), the upgrades included re-grading of the Phase 1 Main Landfill floor to ensure that waste material within the landfill was placed at a minimum of 1.22 m above the inferred groundwater table as per Permit PR-7927. The Phase 1 - Cell 1 development included placement of



demolition waste which was subsequently covered with soil. Levelling of the Main Landfill Cell 2 base was partially completed with grade elevations ranging from 1097.0 m to 1098.0 m.

Additional upgrades also included dewatering in Main Landfill area and provision of perimeter ditches around the Landfill facility. On 27 June 2018, a design change was implemented which allowed for drainage to continue to be directed to the TSF, rather than to the north as was originally planned. These changes simplified the erosion prevention and sediment control plan (EPSCP) measures for 2018, as all run-off was directed to the TSF where any remaining sediment would settle.

During the 2019 construction season, no significant earthwork construction activities were observed with the exception of waste placement within the Phase 1 – Cell 2 footprint of the main Landfill, as well as, the placement of leveling fill material to extend the landfill base eastward. The levelling fill terminated slightly above the toe of the western embankment slope of the TSF.

Minor deficiencies were noted during the start-up inspection, which included minor erosion of the embankment slope of the western access road; minor erosion of cover material northwest of the Main Landfill; and ponding of water northeast of the Main Landfill. These deficiencies were addressed by Snipgold during the 2019 construction season and were confirmed during the follow-up inspection carried out on September 6 to 7, 2019 by Wood personnel.

Further details of 2018 and 2019 JMM's Main Landfill Upgrades construction were documented as construction inspection records, which are included in the Post Construction Report – 2018 Main Landfill Upgrades and the Post Construction Report – 2019 Main Landfill Upgrades, issued by Wood dated 19 March 2019 and 20 February 2020, respectively.

## **2.0 Summary of 2020 Erosion Prevention and Sediment Control Measures and Site Inspection**

As noted above, due to the Covid-19 provincial health restrictions, no mine reclamation works or landfill upgrades took place during 2020. However, Permit PR-7927 requires an annual inspection of erosion prevention and sediment control measures. On 29 August, 2020, the Main Landfill inspection was conducted in parallel with the 2020 Site Environmental Investigation carried out by the following personnel:

- Ardavan Mansourpour, M.Sc., Environmental Scientist, Wood

As outlined in the 2020 site inspection record included in Appendix A, minor erosion, ponding and sedimentation deficiencies were noted. These include minor erosion on the north slopes of Cell 2, west slopes of Cell 1, and south slopes of Cell 2. Some metal was also exposed where surface water had eroded the interim cover material along the north slopes of Cell 2. Although, self armoring of gravel and cobbles in the silty kame material was observed in these erosional locations.

Additionally, minor ponding of water was observed in the following locations:

- Northeast access road of the Main Landfill;
- along the north edge of Cell 2; and,
- along the borrow area in the immediate southern edge of Cell 1, west of the culvert.

Since no construction work took place during 2020, it is recommended that these deficiencies are addressed in 2021 prior to the continuation of any waste placement or landfill upgrades.

## 2.1 Survey Layout

Since no Main Landfill upgrades or waste filling activities took place during 2020, an updated survey of the landfill area was not completed. However, on 7 September 2019, a post-construction survey was carried out by AllNorth personnel, which was used by Wood to produce Record Drawings for 2019 construction works included in Appendix B.

## 2.2 Erosion Prevention and Sediment Controls

Wood developed an Erosion Prevention and Sediment Control Plan for the Main Landfill Upgrades. The most current version, Revision 0, is provided for information in Appendix C. SnipGold retains overall responsibility for implementation and maintenance of the erosion prevention and sediment control (EPSC) measures while Wood provides training, ongoing support, inspections, and assessment of the effectiveness of the controls. As outlined previously, minor erosion was noted during the 2020 site inspection, however, the EPSC measures were observed to be effective.

## 3.0 Concluding Statement on Erosion Prevention and Sediment Control Measures and Site Inspection

Wood is of the professional opinion that the Erosion Prevention and Sediment Control measures substantially comply with the plans and supporting documents referenced herein.

## 4.0 Closure

This report has been prepared for the exclusive use of the SnipGold Corporation and their agents, for the specific application described within. Any use which a third party makes of this document, or any reliance on or decisions to be made based on this document are the sole responsibility of such third parties.

Wood cannot accept responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this memo.

The fieldwork completed in this program was completed in general accordance with industry standards with limits imposed by existing infrastructure including roads and buried utilities. Interpretations and conclusions made within this report were based upon the fieldwork and discussions with SnipGold Corporation staff.

This report has been prepared in accordance with generally accepted practices in the environmental industry. No other warranty, expressed or implied, is made. This report is also subject to the further Limitations contained in Appendix D.

Respectfully submitted,

**Wood Environment & Infrastructure Solutions,  
a Division of Wood Canada Limited**

**Prepared by:**



**Megan Gardner, EIT**  
Intermediate Environmental/Civil Engineer



**Mark Anthony Pernito, P.Geo.**  
Sr. Hydro-Geotechnical Specialist

**Reviewed by:**



**Dean K. Wall, M.Sc., P.Eng.**  
Principal Engineer

**Approved by:**



**Mario Bianchin, Ph.D., P.Geo.**  
Project Manager

The logo for the company 'wood.' is located in the top right corner. It consists of the word 'wood.' in a dark blue, lowercase, sans-serif font. The period at the end of the word is a small dot. The background of the page features large, light grey, curved shapes that resemble stylized letters or abstract forms.

## **Appendix A**

### **29 August 2020 Inspection Report**

**2020 JMM CONSTRUCTION REVIEW  
MAIN LANDFILL PHASE 1, CELL 1 AND CELL 2  
INSPECTION REPORT**



<b>Date:</b>	29 August 2020
<b>Reported by:</b>	Megan Gardner, E.I.T., Wood
<b>SnipGold Field Lead:</b>	Kevin Hidber, AScT, SnipGold
<b>Wood Personnel:</b>	Ardavan Mansourpour (Construction Reviewer)
<b>Weather:</b>	12° to 15° Cloudy with Sun

**Introduction and Background:**

Wood Environment & Infrastructure Solutions, a division of Wood Canada Limited (Wood) is the current design engineer for upgrades at the Main Landfill at the Johnny Mountain Mine (JMM) Site owned by SnipGold Corporation (SnipGold), a subsidiary of Seabridge Gold Incorporated.

**2020 Main Landfill Inspection:**

Due to Covid-19 provincial health restrictions, no mine reclamation works or landfill upgrades took place during 2020. However, Permit PR-7927 requires an annual inspection of erosion prevention and sediment control measures, and therefore, on 29 August 2020, an inspection of the JMM Main Landfill was conducted in parallel with the 2020 JMM Site Environmental Monitoring.

Field Personnel

- Ardavan Mansourpour, M.Sc., Environmental Scientist, Wood
- Danielle Amaral, Environmental Resources Management (ERM)

Overview

- Groundwater Sampling
- Soil Sampling of Hydrocarbon Biopile remediation
- Main Landfill Inspection
- Surface Water Sampling

The observations/findings during the Main Landfill inspection are outlined below.

**Erosion Prevention and Sediment Control Measures Inspection:**

- The interim cover material consisted of silty kame material and was observed to be intact.

- Run-off was observed flowing from the south-east corner of the Main Landfill over the low spot of the Tailings Storage Facility (TSF) berm and into the TSF as designed.
- The ditch to the south of the Cell 2 was noted to be dry.
- Minor erosion of the interim cover material was observed on the north side of Cell 2. Some metal was exposed where surface water had eroded the interim cover material.
- Ponding of water was observed along the northern access road of the Main Landfill.
- Minor erosion was observed along the western slope of Cell 1 and southern slope of Cell 2. Gravel and cobbles in the silty kame material were observed to be migrating towards the surface in erosional areas which provided self armoured measures.
- Minor ponding of water was observed in the northeast corner of Cell 2 and along the south side of Cell 1.
- As per the landfill design, water is generally being directed away from the Landfill via the outer ditches and the upgradient berms to the west and directed towards the TSF. In the Cell 1 area, flowing water was observed in the outer ditches and directed away from the Landfill.
- Water collected within the Landfill footprint is drained towards the southeast corner of the Landfill as per the landfill design.
- No significant erosion or sediment issues were observed.

#### Photos:



**Photo 1:** Vantage point photo of southeast corner of the Main Landfill looking east. Ponding water over low section of TSF where drainage from Main Landfill enters TSF.





**Photo 2:** Vantage point photo of southeast Corner of Cell-2 looking northwest. South ditch east of culvert observed to be dry.



**Photo 3:** Vantage point photo along northern edge of the Main Landfill. Minor erosion observed along north slope. Ponding of water was observed in the northern access road..



**Photo 4:** Close up of erosion noted on north slope including some exposed metal.



**Photo 5:** Close up of erosion noted on north slope including some exposed metal.



**Photo 6:** Vantage point photo along northern access road of the Main Landfill. Ponding of water was observed in this area.



**Photo 7:** Vantage point photo along western slope of the Main Landfill looking northeast. Minor rill erosion was noted.



**Photo 8:** Vantage point photo along western slope of the Main Landfill looking east. Minor rill erosion was noted.



**Photo 9:** Vantage point photo of southwest corner of Main Landfill looking south. Minor erosion was noted on west slope of western surface water ditch.



**Photo 10:** Vantage point photo of south edge of Main Landfill looking east. Minor erosion was noted on south slope of Main Landfill.



**Photo 11:** Vantage point photo of south edge of Main Landfill looking northeast. Minor erosion was noted on south slope of Main Landfill.



**Photo 12:** Vantage point photo of northeast corner of Main Landfill looking northeast. Minor ponding water was observed in this area.



**Photo 13:** Vantage point photo of southwestern edge of Main Landfill looking east towards the culvert. Ponding water was observed in this area.

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**wood.**

**Appendix B**  
**2019 Record Drawing Package**



**LEGEND**

- 2018/2019 PROJECT BOUNDARY
- EXISTING DITCH FLOW
- EXISTING CULVERT
- EXISTING BASE OF DITCH
- LIDAR/FIELD TOPO MERGE LINE
- WASTE PLACED IN 2018 EXTENTS
- LANDFILL BOUNDARY
- 2019 LANDFILL AS-BUILT SURVEY LIMITS
- 2019 LANDFILL AS-BUILT SURVEY
- 2019 TEST PIT

- NOTE:**
1. DRAWING BASED ON 2017 LIDAR TOPOGRAPHY MERGED WITH 2018 FIELD SURVEY PROVIDED BY ALLNORTH.
  2. SEDIMENT AND EROSION CONTROL MEASURES TO BE RESPONSIBILITY OF CONTRACTOR. ROCK AND/OR CURLEX SEDIMENT LOG CHECK DAMS TO BE USED AS NEEDED AS PER EROSION AND SEDIMENT CONTROL PLAN.

SURFACE WATER DRAINAGE DITCH AND RIPRAP BETWEEN LANDFILL AND TSF, AND NORTH ALONG THE TSF PERIMETER DESIGNED BY TSF ENGINEER OF RECORD KLOHN CRIPPEN BERGER

EXISTING TAILINGS STORAGE FACILITY (TSF)

NEED FOR REPAIR OF LOW SECTION OF TSF PERIMETER ROAD TO BE DETERMINED BY TSF ENGINEER OF RECORD KLOHN CRIPPEN BERGER

**RECORD DRAWING**

REV	D	M	Y	ISSUE/REVISION DESCRIPTION	ENG.	APPR.
4	11	2019		RECORD DRAWING	MAP	DW
14	12	2018		2018 CONSTRUCTION RECORD AND 2019 DESIGN	D.W.	I.B.M.
01	11	2018		2018 CONSTRUCTION SUMMARY AND FOR CLIENT REVIEW	D.W.	I.B.M.
22	06	2018		PRE-CONSTRUCTION FOR REVIEW	D.W.	M.B.
14	06	2018		ISSUED FOR 90% REVIEW	K.F.	D.W.

REV	D	M	Y	ISSUE/REVISION DESCRIPTION	ENG.	APPR.
4	11	2019		RECORD DRAWING	MAP	DW
14	12	2018		2018 CONSTRUCTION RECORD AND 2019 DESIGN	D.W.	I.B.M.
01	11	2018		2018 CONSTRUCTION SUMMARY AND FOR CLIENT REVIEW	D.W.	I.B.M.
22	06	2018		PRE-CONSTRUCTION FOR REVIEW	D.W.	M.B.
14	06	2018		ISSUED FOR 90% REVIEW	K.F.	D.W.

**SNIPGOLD CORP**

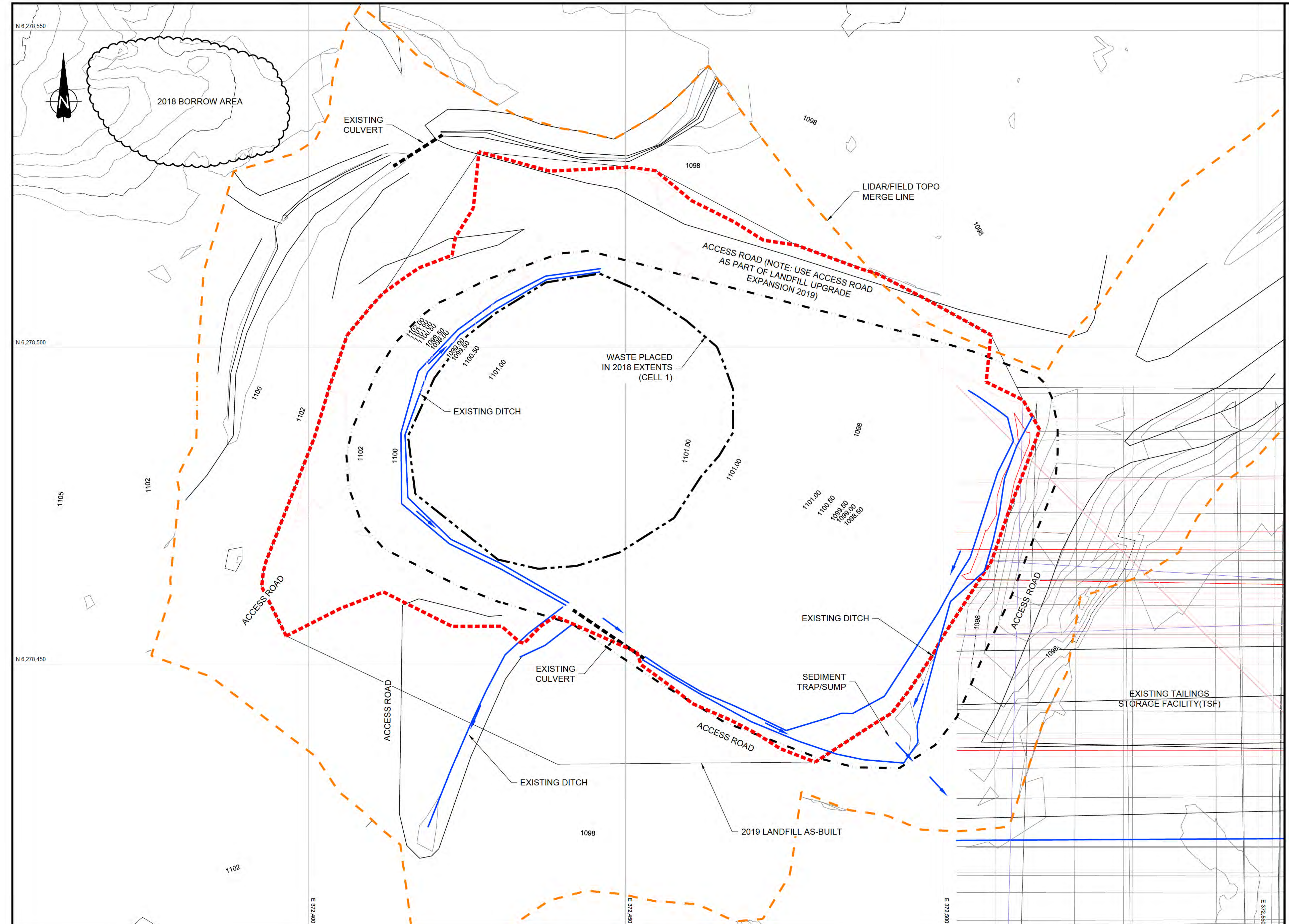
**wood.**  
Environment & Infrastructure Solutions  
Suite 600 - 4445 Lougheed Highway, Burnaby, BC V5C 0E4  
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DRAWN BY:	KL
REVIEWED BY:	DW
DATUM:	
PROJECTION:	
SCALE:	AS SHOWN

**JOHNNY MOUNTAIN MINE RECLAMATION PLAN**  
**PHASE 1 MAIN LANDFILL UPGRADES**

**MAIN LANDFILL DEVELOPEMENT**  
**GENERAL SITE PLAN**

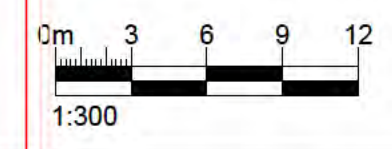
DATE:	NOV. 2019
PROJECT No.:	VE52655C.001.02
DRAWING No.:	JML-DES-001
REV. No.:	1
SHEET No.:	1 of 2



- LEGEND**
- 2018/2019 PROJECT BOUNDARY
  - EXISTING DITCH FLOW
  - EXISTING CULVERT
  - EXISTING BASE OF DITCH
  - LIDAR/FIELD TOPO MERGE LINE
  - WASTE PLACED IN 2018 EXTENTS
  - 2019 LANDFILL SURVEY AS-BUILT LIMITS
  - 2019 LANDFILL AS-BUILT SURVEY

- NOTE:**
1. DRAWING BASED ON 2017 LIDAR TOPOGRAPHY MERGED WITH 2018 FIELD SURVEY PROVIDED BY ALLNORTH.
  2. ESTIMATED WASTE AND COVER SOIL PLACED IN 2018 = 3800m<sup>3</sup>

**RECORD DRAWING**



REV	D	M	Y	ISSUE/REVISION DESCRIPTION	ENG.	APPR.
4	11	2019		RECORD DRAWING	MAP	DW
14	12	2018		2018 CONSTRUCTION RECORD AND 2019 DESIGN	D.W.	I.B.M.
01	11	2018		2018 CONSTRUCTION SUMMARY AND FOR CLIENT REVIEW	D.W.	I.B.M.
22	06	2018		PRE-CONSTRUCTION FOR REVIEW	D.W.	M.B.
14	06	2018		ISSUED FOR 90% REVIEW	K.F.	D.W.

**SNIPGOLD CORP**

**wood.**  
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DRAWN BY:	KL
REVIEWED BY:	DW
DATUM:	
PROJECTION:	
SCALE:	AS SHOWN

**JOHNNY MOUNTAIN MINE RECLAMATION PLAN  
 PHASE 1 MAIN LANDFILL UPGRADES**

**GENERAL SITE PLAN  
 2018 CONSTRUCTION**

DATE:	NOV. 2019
PROJECT No.:	VE52655B.001.02
DRAWING No.:	JML-DES-002
REV. No.:	1
SHEET No.:	2 of 2

**Appendix C**  
**Erosion Prevention and Sediment Control**  
**Plan**

# Technical Memo

**To:** Elizabeth Miller, M.Sc., R.P.Bio.                      **Date:** 18 December 2018  
**From:** Matthew Graham, M.Sc., PMP, CSci, CPESC, CAN-CISEC                      **Email:** [elizabeth@seabridgegold.net](mailto:elizabeth@seabridgegold.net)  
**Review:** Dean Wall, M.Sc., P.Eng.  
**cc:** Mario Bianchin, Ph.D., P. Geo.  
**Ref:** VE52655B – Johnny Mountain Mine Reclamation Plan 2018  
Phase 1 Main Landfill Upgrades  
**Re:** Surface Erosion and Sediment Control Plan

---

## 1.0 Introduction

Wood Environment & Infrastructure Solutions, a division of Wood Canada Limited (Wood) has been retained by SnipGold Corp. (SnipGold) to upgrade the Main Landfill at the former Johnny Mountain Mine to receive relocated wastes from Burial Sites 1 and 2 (and other reclamation materials) as described in Permit PR-7927 (amended May 31, 2018). As required by PR-7927, Wood has developed a surface erosion prevention and sediment control plan as described in the following sections to ensure that appropriate mitigative controls are in place during and after construction.

### 1.1 Purpose

The overall purpose of this Surface Erosion Prevention and Sediment Control Plan (SEPSCP) is to minimize the potential for mobilizing sediment, destabilizing slopes, and compromising surface water quality during and after the construction of the landfill foundation and cover. The plan outlines key roles, as well as provides guidance on assessing erosion potential and developing prescriptions for event-based control strategies.

Developing strategies using best management practices (BMPs) during construction requires an understanding of the factors affecting erosion and measures used to control and manage erosion and sedimentation. This plan provides a structured approach to preventing surface erosion ensuring that designated control efforts correspond to best management practices. It includes:

- Guidance for assessing erosion potential and consequence;
- Direction to a set of management tools available for controlling sediment transport;
- Details for controlling erosion and sediment on disturbed surfaces and soil stockpiles;
- Event-based effectiveness monitoring program; and
- Reporting requirements.

The SEPSCP serves to achieve the following:

- Develop effective management strategies that will minimize surface erosion;
- Optimize the operation of drainage-related features consistently throughout the reclamation area;



- Implement environmental protection measures to manage sedimentation in areas subject to erosion using site-specific erosion and sediment control (ESC) techniques;
- Protect environmentally sensitive areas and natural watercourses from sedimentation; and
- Provide guidance to personnel to understand the suitability of sediment control methods used for different erosional circumstances and adapt them to variable site conditions.

The format of this Plan reads with the Construction Phase at the forefront of its guidance. As the Project moves towards the steady state of Closure, this plan will be revisited and updated to ensure that it meets the needs of each phase of the Project.

## 2.0 Surface Preparation Activities and Implementation

### 2.1 Natural Processes

Understanding critical steps in the natural landform recovery process can assist in the identification of site-specific prescriptions for surface erosion and can provide direction for the most applicable techniques for overcoming the obstacles to disturbance recovery. The key is to identify the factors limiting or preventing natural recovery and tailor mitigation strategies to address these factors in a manner similar to what would occur naturally in the long-term (Polster, 2009).

Some of the most basic processes of primary succession, as noted by Bradshaw (2000) are: (1) immigration and establishment of appropriate species, which can be improved by strategically planting species to minimize dispersion distances and prepare the growing surfaces to assist in germination success, (2) stabilization and accumulation of fine-textured soil, which may be accomplished by applying growth media and large woody debris to coarse ground, and (3) soil nitrogen accumulation, which can be assisted by planting nitrogen-fixing species.

Appropriate efforts made during the planning stage to address the processes described above can reduce both the application and maintenance costs of erosion control. Erosion control prescriptions suitable for specific land disturbance areas can also enhance the natural recovery process. Table 2.1-1 indicates some limiting factors that may impede natural recovery, solutions that occur naturally to overcome these obstacles, and general options for strategies to enhance or induce natural solutions. Note that many of these principles overlap those of effective erosion prevention.

Table 2.1-1 List of Limiting Factors that Impede Natural Recovery Process

Obstacle	Natural Solution	Enhanced Solution
Steep slopes	Erosion occurs until slopes are stable; pockets of growth in areas of collected organic matter.	Recontour slopes; strategically select locations for planting or application of erosion control blanket.
Rapid erosion	Rough and loose surfaces; large woody debris; vegetative covers that minimize erosion.	Mechanically roughen up surfaces, apply large woody debris, select species mixes for quick establishment and effective ground cover.
Compaction	Vegetation and weathering promotes decompaction.	Mechanically roughen up surfaces.
Moisture deficit	Weathering to small particle sizes.	Apply growth media and/or engineered mulch.



Obstacle	Natural Solution	Enhanced Solution
Nutrient deficiency	Nitrogen fixing pioneering species.	Apply growth media and or mulch, select nutrient fixing species, fertilize.
Lack of seed sources	Pioneering species with widely dispersed seed.	Pocket planting to provide seed sources over large areas.
Lack of micro-sites	Rough and loose surfaces.	Mechanically roughen up surfaces.

\*Modified from Polster (2009).

## 2.2 General Construction Approach

The SEPSCP focusses on the use of source control measures to prevent sediment from getting entrained in surface water runoff and the use of sediment control measures to manage construction affected water.

The ESC measures outlined in Table 2.2-1 have been selected for general application to construction of the major components of the Project. Selected mitigation measures may be applied individually or combined to deliver the required level of ESC. For higher risk and higher consequence works (e.g., constructing access roads, diversion channels, etc.), a multi-barrier or 'systems approach' may be utilized, in which a combination of ESC measures are combined in series to reduce potential for sediment transport. Adaptive ESC material selection in the field will be dependent on local site conditions, schedule, weather, and available equipment and manpower.

Table 2.2-1: Work Activity, Potential Erosion Hazard and Associated ESC Measures

Type of Work	Potential Hazard	Possible ESC Measures (Best Management Practices)
Disturbed soils (grading, cut and fill)	<ul style="list-style-type: none"> <li>Splash, sheet, rill and wind erosion; and sediment transport off-site.</li> </ul>	<ul style="list-style-type: none"> <li>Limit size of disturbed area to the extent practical.</li> <li>Minimize time of exposure of disturbed soils.</li> <li>Runoff to be directed away from exposed soil surfaces or into contained areas, when practical.</li> <li>Areas of exposed soil to be covered and re-vegetated (if needed) as soon as possible following construction completion or before winter shut down in preparation for freshet (typically by mid-September).</li> <li>Isolate areas of disturbance as needed using fibre roll logs.</li> <li>Use downgradient sediment traps (sumps) to capture runoff and allow settling.</li> <li>Work will stop or be redirected to accommodate heavy rainfall events when the site shows signs of deterioration.</li> <li>ESC measures will be inspected daily and checked after rain events (&gt;10 mm) and repaired as required. The structures will be cleaned out when sediment has accumulated.</li> </ul>
Construction Dewatering	<ul style="list-style-type: none"> <li>Rill and gully erosion and sediment transport off-site.</li> <li>Entrained sediments during pumping associated with dewatering.</li> </ul>	<ul style="list-style-type: none"> <li>Dewatering discharge to outlet onto an energy dissipation splash pad or into a pond (e.g. the Tailings Storage Facility, TSF) to reduce discharge velocity.</li> <li>Dewatering discharge into a pond (e.g. the TSF) or to run through a sediment filter log or a vegetated area or both to reduce suspended solids.</li> <li>Discharge location shall be a minimum of 30 m from any natural watercourse.</li> </ul>

Type of Work	Potential Hazard	Possible ESC Measures (Best Management Practices)
	<ul style="list-style-type: none"> <li>Increase instream turbidity.</li> </ul>	<ul style="list-style-type: none"> <li>Instream isolation method will avoid earthen berm. Appropriate isolation method will be discussed and agreed with QP-ESC.</li> <li>Construct any ditches, water bars, or water diversions within the work area so they do not directly discharge sediment-laden surface flows into any stream. Divert such flows into a pond (e.g. the TSF) or to a vegetated area where flows can slowly infiltrate.</li> <li>Monitor instream turbidity visually as needed when construction activity is within proximity of any watercourse or waterbody including wetlands.</li> <li>Implement sedimentation sump/trap or discharge into pond/TSF.</li> </ul>
Traffic and equipment maintenance	<ul style="list-style-type: none"> <li>Track out.</li> <li>Dust generation.</li> <li>Soil compaction.</li> </ul>	<ul style="list-style-type: none"> <li>Gravel armour key high construction traffic exit areas.</li> <li>Dust suppression with water, calcium chloride, or polymers (as required).</li> <li>Prevent unacceptable damage to soils by using swamp mats, wood pads or work when the soil is frozen.</li> </ul>

Erosion prevention is the most effective measure. The emphasis of ESC prescriptions should strive to prevent erosion, with sediment control as the last resort. Types of control strategies that will be employed are listed in Table 2.2-2.

Table 2.2-2 General ESC Control Strategies Applied at Johnny Mountain Mine

Control Strategy	Application
Limit Exposure of Bare Soil	The timing of construction activities will be phased to avoid large areas of disturbance. Construction activities will be planned to coincide with periods of drier weather (i.e. summer). Disturbance in areas that do not require clearing will be restricted.
	To the extent practical, the Contractor/Owner will minimize disturbance of existing vegetation as a first defense in the control of erosion and sediment release. Areas of highly erodible soils will be avoided.
	Machinery will be operated on land in a manner that minimizes disturbance to existing named and unnamed watercourses or ephemeral streams.
Keep Construction Work Areas Dry	Surface water flowing toward construction work areas shall be diverted to keep the construction area dry. Perimeter diversion swales will be considered and implemented, as required, to divert surface water to a designated area(s).
	Muddy water pumped from excavation work areas will be held (stored) in designated areas prior to its discharge into sediment sumps, the TSF or natural vegetated areas. Work will stop or be redirected to accommodate a heavy rainfall event (approx. 20 mm for 24 hours period) or when the site shows signs of deterioration.
Protection of Watercourses	All watercourses will be identified and disturbance adjacent to them will be avoided. Buffer zones will be applied where disturbance is planned in the vicinity of restricted riparian areas and environmentally sensitive areas. Turbidity monitoring will be conducted according to existing Permit requirements.



Control Strategy	Application
	<p>If unsuitable surface water conditions are encountered in wetlands or at ephemeral streams, work locations may be moved to avoid locations where surface water is an issue; work may be postponed until later in the year when ephemeral surface water has subsided; or activity in work areas may be temporarily halted if work is not feasible due to surface water.</p> <p>Stockpiles of borrow material will be kept a minimum of 30m from a watercourse or waterbody with the appropriate erosion control mitigation in place (e.g., sediment control fibre roll logs, erosion control blankets and/or silt fences to prevent sediment from entering a watercourse or waterbody).</p>
Soil Stockpiles	<p>If soil stockpiles are in environmentally sensitive areas and will be on site for more than 72 hours, they shall be covered in plastic sheeting (minimum thickness 8 mm) or rolled erosion control product (RECP) to protect them from wind, rain, and contact with surface water flow.</p>
Soil and Slope Protection	<p>All areas with steep slopes will be examined closely prior to stripping to ensure accurate work limits are established.</p> <p>The rough and loose surface technique will be applied will be applied to exposed soils in a timely manner.</p> <p>Fibre roll logs will be considered as a sediment control measure at the base of excavated slopes, fills, stockpiles, and borrow areas until vegetative cover is established. Such measures will be placed down slope of the exposed soil areas to intercept the maximum amount of silt contained in runoff.</p>
Avoid cutting steep slopes	<p>Erosion occurs on steep slopes until they are stabilized. Where possible, steep slopes will be recontoured to reduce the slope steepness. Alternatively, methods to reduce the length of the slope will be used (e.g., bench, terrace, drainage control).</p>
Install appropriate perimeter controls	<p>Runoff interception ditches and sediment control traps will be installed as needed prior to ground disturbance activities.</p>
Install Drainage Control Measures	<p>Drainage ditches, riprap, check dams and sediment ponds will be implemented, where appropriate.</p> <p>All practical precautions shall be made to ensure that sediment does not get entrained in surface water discharge flowing to ephemeral or permanent streams.</p>
Ensure site personnel are familiar with the SEPSCP	<p>Contractors and equipment operators will be educated on the SEPSCP.</p>
Monitoring	<p>Event-based visual effectiveness monitoring will be conducted during spring freshet and after large rainstorms. Any damage to control measures will be assessed and modified accordingly. Regular inspections to ensure that control measures are intact and functioning will be carried out.</p> <p>Sediment control structures to be maintained and cleaned out on a regular basis to remain functional. Erosion and sediment control measures shall remain in place and functioning until the disturbed areas have been permanently stabilized.</p>



Control Strategy	Application
	Additional contingency measures are likely required during periods of heavy or persistent precipitation. Work must stop if continuing the work will result in sediment delivery downstream of the immediate work site.
	Erosion and sediment control measures will be inspected by the Owner within 24 hours after each rainfall event of more than 15 mm of rain and maintained/repared by the Contractor, as necessary during the construction season.
Contingency plan	Keep extra ESC material and equipment onsite to repair and correct situations as needed.
Modify the plans as required	The control plans will be adaptable to variable site conditions and modified accordingly.

### 2.3 Erosion and Sediment Control Product List

A comprehensive ESC products list has been provided in Table 2.3-1.

Table 2.3-1 Erosion and Sediment Control Product List

Product	Components	General Description	Potential Uses
Fibre roll logs	Woven Geotextile / stakes	Preassembled woven geotextile mounted to 1.2 m stakes.	Toe of slope of stockpiles or berms containing exposed soils. Downgradient of exposed soil on slopes where rainfall could entrain and transport sediment. Can also be used to construct check dams. See Figure 1.
Rock Check Dams	75 - 300 mm diameter, clean rock	Non-woven geotextile required for core.	Installed in drainage ditches to slow velocity of water and allow entrained sediment to settle upstream of the check dam. See Figure 1.
Coir Logs	20 cm Diameter	Log manufactured from coconut fibres which is staked into the ground.	Same purpose as a silt fence. Requires embedment thus minimizes ground disturbance and effort required for installation. Larger diameter logs should be used to protect ecologically sensitive areas, or to provide basic filtration of water draining from larger areas of exposed soil. Can also be used to construct check dams. See Figure 1.
Erosion Control Blanket	Rolled erosion control blanket (Coir or Straw)	Erosion control blanket made of either coir or straw materials and provided in a roll which can be rolled out to cover exposed soil.	Slopes can be stabilized with erosion control blanket to minimize erosion. Also used in channels which will be exposed to water flow before vegetation establishment.
Riprap	Riprap	As per project specifications.	Steep slopes can be immediately stabilized with riprap to minimize erosion and ensure long-term stability.



Product	Components	General Description	Potential Uses
Clean Gravel	25 mm washed stone	Washed stone.	Used for construction of berms, winter installation of silt fence, temporary cover, etc.
Geotextile	Class I Non-Woven 2 m wide roll	Class I Non-Woven Geotextile. (OPSS 1860)	Used for lining rock check dams or construction of silt fence.

## 2.4 Erosion and Sediment Control Construction Inspection Points

Key construction inspection points for ESC are shown below (Table 2.4-1) and on Figure 2. This allows for quality assurance inspections and a temporary hold on a specific construction activity until an inspection is passed. Wood will inspect ESC measures during periods when personnel are onsite. The Contractor and SnipGold site supervisor will conduct regular inspections throughout the remainder of the project and report findings to Wood for preparation of the annual report as required by Permit PR-7927.

Table 2.4-1 Erosion and Sediment Inspection Point Table

ESC Requirement:	Prior to proceeding with this:
ESC contingency supplies ordered, and inventoried on site.	Construction start.
Surface water management measures.	Construction start.
Baseline ESC prescription development. Provide field map (if required) and instructions to site supervision.	Site specific ESC measure installation and construction start.
Wood review and verification of ESC measures.	Finalization of ESC prescriptions during pre-construction site inspection.
Wood and Contractor inspection of ESC measures, including identification of repairs or maintenance required.	Ongoing. ESC measures to be modified throughout construction as required.
Re-inspect ESC measures after significant rainfall events and identify repairs and remedial measures.	Ongoing.

## 2.5 Phasing of Construction and Intended Sequence of Major Activities

The following is a suggested construction phasing list to be implemented by the Contractor when planning construction activities for the Johnny Mountain Main Landfill upgrades:

1. Identify applicable cut/fill phasing of grading activities. SnipGold will work with Wood to establish a grading plan so that large areas are not cleared without the provision of adequate erosion and sediment control measures.
2. Prepare Erosion and Sediment Control Plan drawings and details for erosion and sediment control measures prescribed for the site (if needed).
3. Install strategic ESC measures (fibre roll logs, silt fence, erosion control blankets and check dams) downgradient of active construction work areas as required.

4. Construct temporary diversion and drainage swales to direct water to designated area(s) and stabilize as required.
5. If spoil stockpiles are in environmentally sensitive areas and are intended to remain in place longer than 72 hours, the stockpile soil will be covered with appropriate materials to prevent erosion and or dust formation.
6. It is anticipated that the SEPSCP would need to be revisited throughout the Construction phase to ensure that controls are being implemented correctly and that adjustments to the plan can be made following heavy rainfall events, or after major construction segments are completed.
7. Once the conveyance ditches are completed and commissioned, all temporary bypass flows will be re-directed to convey surface water to newly constructed conveyance ditches.
8. Monitor and remove accumulated sediment from traps and temporary measures as needed. Following heavy rainfall events ESC measures will be inspected to ensure effectiveness and maintenance will be conducted as required.
9. Based on inspections conducted by Wood during the construction phase in 2018 and by SnipGold and the Contractor, Wood will assess the effectiveness of prescribed ESC measures. The assessment along with recommended updates to the control measures will be included in the annual report specified in Section 2.13 of the May 2018 amendment to permit PR-7927.

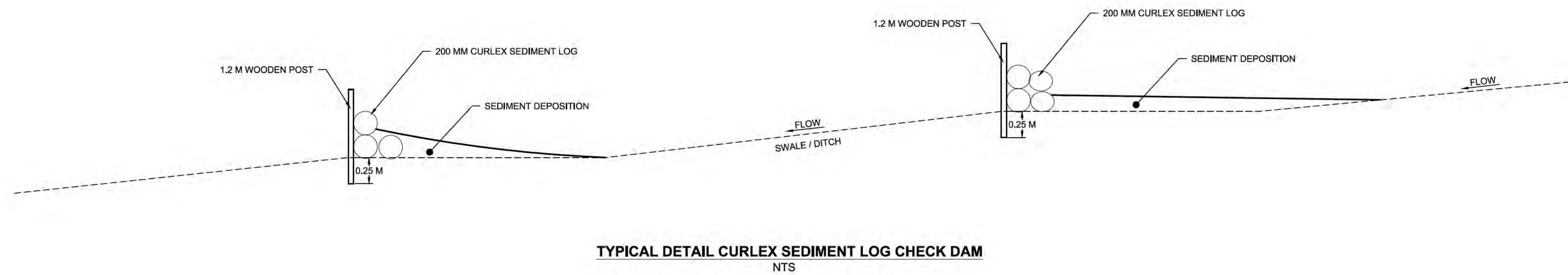
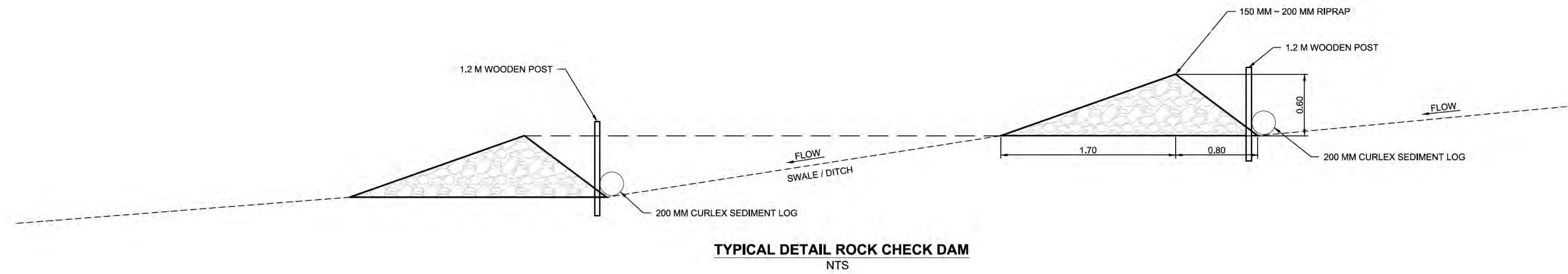
### 3.0 Limitations

The recommended ESC measures presented in this report were selected based on our understanding of current and anticipated site conditions as well as best management practices. The following factors are beyond the control of Wood and may impact the effectiveness of the recommended ESC measures:

- Improper or incorrect implementation of the recommended ESC measures could hinder the performance of the measures and lead to erosion or sedimentation issues;
- Non-adherence to the recommendations contained in this report could result in soils left un-stabilized, areas prone to erosion left unprotected, or TSS laden water to discharge from the site due to insufficient settlement or filtration;
- Extreme rainfall, in excess of the 1 in 10-year annual exceedance probability (AEP) event, could yield runoff in excess of the flow rates that could reasonably be anticipated for a relatively short construction window scheduled during summer months; and
- Conditions encountered in the field may require changes to the design including steeper gradients or alternative water management strategies, which may require additional or more robust ESC measures to limit erosion or sedimentation issues.

### References

- Bradshaw, A. 2000. The use of natural processes in reclamation — advantages and difficulties. *Landscape and Urban Planning*, 51: 89-100.
- Polster, D., 2009. *Natural Processes: The Application of Natural Systems for the Reclamation of Drastically Disturbed Sites*. Proceedings of the 33rd Annual British Columbia Mine Reclamation Symposium. Cranbrook, BC. Technical and Research Committee on Reclamation. BC Ministry of Energy, Mines and Petroleum Resources. September 14-17, 2009.



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DRAWN BY: MDDS  
REVIEWED BY: DW  
DATUM: -  
PROJECTION: -  
SCALE: AS SHOWN

**JOHNNY MOUNTAIN MINE RECLAMATION PLAN**  
**EROSION AND SEDIMENT CONTROL PLAN**

**CHECK DAM DETAILS**

DATE: DEC. 2018  
PROJECT No.: VE52656B.001.02  
DRAWING No.: FIGURE 1  
REV. No.: 0  
SHEET No.: 1 of 2

C:\MSR\PROJECTS\VE52656B\FIG1\FIG1.dwg - P1 - Dec 12, 2018 8:29 AM - ANDREW BIRCH





- LEGEND**
- 201/8/2019 PROJECT BOUNDARY
  - ➔ EXISTING DITCH FLOW
  - EXISTING CULVERT
  - EXISTING BASE OF DITCH
  - LIDAR/FIELD TOPO MERGE LINE
  - LANDFILL BOUNDARY
  - KEY EROSION AND SEDIMENT CONTROL POINTS

- NOTE:**
1. DRAWING BASED ON 2017 LIDAR TOPOGRAPHY MERGED WITH 2018 FIELD SURVEY PROVIDED BY ALLNORTH.
  2. SEDIMENT AND EROSION CONTROL MEASURES TO BE RESPONSIBILITY OF CONTRACTOR. ROCK AND/OR CURLEX SEDIMENT LOG CHECK DAMS TO BE USED AS NEEDED AS PER EROSION AND SEDIMENT CONTROL PLAN.
  3. ALL PHASE 1 SURFACE WATER TO BE DISCHARGED TO TSF.
  4. PHASE 2 SEDIMENT AND EROSION CONTROL MEASURES TO USE ROCK AND/OR CURLEX LOG CHECK DAMS AS NEEDED.

SURFACE WATER DRAINAGE DITCH AND RIPRAP BETWEEN LANDFILL AND TSF, AND NORTH ALONG THE TSF PERIMETER DESIGNED BY TSF ENGINEER OF RECORD KLOHN CRIPPEN BERGER

EXISTING TAILINGS STORAGE FACILITY (TSF)

NEED FOR REPAIR OF LOW SECTION OF TSF PERIMETER ROAD TO BE DETERMINED BY TSF ENGINEER OF RECORD KLOHN CRIPPEN BERGER

(SEE NOTE 4)

(SEE NOTE 4)

(SEE NOTE 3)

PHASE 1

PHASE 2

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DRAWN BY:	MDDS
REVIEWED BY:	DW
DATUM:	-
PROJECTION:	-
SCALE:	AS SHOWN

JOHNNY MOUNTAIN MINE RECLAMATION PLAN  
EROSION AND SEDIMENT CONTROL PLAN

KEY EROSION AND SEDIMENT CONTROL POINTS

DATE:	DEC. 2018
PROJECT No.:	VE52655B.001.02
DRAWING No.:	FIGURE 2
REV. No.:	0
SHEET No.:	2 of 2

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**wood.**

**Appendix D**  
**Limitations**



## Limitations

1. The work performed in the preparation of this report and the conclusions presented are subject to the following:
  - a. The Standard Terms and Conditions which form a part of our Professional Services Contract;
  - b. The Scope of Services;
  - c. Time and Budgetary limitations as described in our Contract; and
  - d. The Limitations stated herein.
2. No other warranties or representations, either expressed or implied, are made as to the professional services provided under the terms of our Contract, or the conclusions presented.
3. The conclusions presented in this report were based, in part, on visual observations of the Site and attendant structures. Our conclusions cannot and are not extended to include those portions of the Site or structures, which are not reasonably available, in Wood's opinion, for direct observation.
4. The environmental conditions at the Site were assessed, within the limitations set out above, having due regard for applicable environmental regulations as of the date of the inspection. A review of compliance by past owners or occupants of the Site with any applicable local, provincial or federal bylaws, orders-in-council, legislative enactments and regulations was not performed.
5. The Site history research included obtaining information from third parties and employees or agents of the owner. No attempt has been made to verify the accuracy of any information provided, unless specifically noted in our report.
6. Where testing was performed, it was carried out in accordance with the terms of our contract providing for testing. Other substances, or different quantities of substances testing for, may be present on-site and may be revealed by different or other testing not provided for in our contract.
7. Because of the limitations referred to above, different environmental conditions from those stated in our report may exist. Should such different conditions be encountered, Wood must be notified in order that it may determine if modifications to the conclusions in the report are necessary.
8. The utilization of Wood's services during the implementation of any remedial measures will allow Wood to observe compliance with the conclusions and recommendations contained in the report. Wood's involvement will also allow for changes to be made as necessary to suit field conditions as they are encountered.
9. This report is for the sole use of the party to whom it is addressed unless expressly stated otherwise in the report or contract. Any use which any third party makes of the report, in whole or the part, or any reliance thereon or decisions made based on any information or conclusions in the report is the sole responsibility of such third party. Wood accepts no responsibility whatsoever for damages or loss of any nature or kind suffered by any such third party as a result of actions taken or not taken or decisions made in reliance on the report or anything set out therein.
10. This report is not to be given over to any third party for any purpose whatsoever without the written permission of Wood.

11. Provided that the report is still reliable, and less than 12 months old, Wood will issue a third-party reliance letter to parties that the client identifies in writing, upon payment of the then current fee for such letters. All third parties relying on Wood's report, by such reliance agree to be bound by our proposal and Wood's standard reliance letter. Wood's standard reliance letter indicates that in no event shall Wood be liable for any damages, howsoever arising, relating to third-party reliance on Wood's report. No reliance by any party is permitted without such agreement.

APPENDIX D      SUPPLEMENTARY ENVIRONMENTAL SITE  
INVESTIGATION REPORT (WOOD 2021B)

# 2020 Supplementary Site Investigation Report

Johnny Mountain Mine Reclamation Project  
British Columbia

Rev. 3  
Project # VE52655D

Prepared for:

**SNIPGOLD CORPORATION**

4 March 2021



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4 March 2021

Elizabeth Miller, M.Sc., R.P.Bio.  
Vice President Environment and Social Responsibility  
SnipGold Corporation  
1235 Main St., PO Box 2536  
Smithers, BC  
V0J 2N0

Dear Elizabeth,

Wood Environment & Infrastructure Solutions, a Division of Wood Canada Ltd. (Wood), is pleased to submit the 2020 Site Investigation Report in support of the Johnny Mountain Mine Reclamation Plan.

Should you have any questions, please contact Mario Bianchin at (604) 295-1634 or Jeremiah Gladu (604) 295-6144.

Respectfully submitted,

**Wood Environment & Infrastructure Solutions**  
**a Division of Wood Canada Limited**

**Jeremiah Gladu, P.Ag., CSAP**  
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# 2020 Supplementary Site Investigation Report

Johnny Mountain Mine Reclamation Project  
British Columbia

Rev. 3

Project # VE52655D

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## Executive Summary

Wood Environment & Infrastructure Solutions (Wood) was retained by SnipGold Corporation (SnipGold) to complete a Supplementary Site Investigation (SSI) at the Johnny Mountain Mine (JMM) Site to support and inform the mine reclamation efforts currently in progress. The objective of the 2020 SSI was to determine current concentrations of petroleum hydrocarbons in the in-situ treatment areas; to complete further evaluation of concentrations of metals in groundwater in upstream, midstream and downstream locations and groundwater sampling required to support annual compliance monitoring requirements for Permit PR-7927. Also conducted was the sampling of surface water samples to acquire data to support an Ecological Risk Assessment (ERA) completed under separate scope and cover.

The in-field portion of the 2020 SSI was conducted in August 2020. The objectives of the 2020 SSI, built on the results of the 2019 SSI, included specific tasks to support ongoing Site reclamation work, including:

- Continuing an environmental site investigation of specific areas of environmental concern (AECs) and areas of potential environmental concern (APECs) to assess hydrocarbon impacts in groundwater within the following APECs/AECs:
  - AEC 1: Mill/10 Level Portal;
  - AEC 2: Tank Farm and Fuel Lines and AEC 3 – Fuel Pump Shed;
  - AEC 5: Main Landfill; and
  - APEC 7: Tailings Storage Facility (TSF).
- Evaluation of petroleum hydrocarbon levels in material located in the Treatment Areas 1 and 2;
- Continuing evaluation of background concentration of metals in groundwater by completing additional groundwater monitoring and sampling activities;
- Collection of surface water samples at strategic locations to support the ERA; and
- Collection of groundwater quality data at the Main Landfill, required to support annual compliance reporting requirements for Permit PR-7927.

The following conclusions were made during this assessment as they relate to the objectives and scope of work defined within this report.

### Physical Remediation – Shallow Soil Hydrocarbon Contamination

In 2020, Wood completed a year-end sampling of Treatment Area 1 and Treatment Area 2 to determine the effectiveness of the remediation program. Based on the results of the 2020 soil sampling and the data collected during the 2017 Site Investigation (2017 SI), 2018 SSI and 2019 SSI, concentrations of light extractable petroleum hydrocarbons (LEPH) have decreased significantly as shown in the following tables.

**Treatment Area 1 – 95<sup>th</sup> Percentile Over Time**

Sampling Event	95 <sup>th</sup> Percentile (mg/kg)	Average Concentration (mg/kg)
2017 In-Situ (LEPH)	3748	3138
2018 (Year End) LEPH	3582	1857
2019 (Mid-Year) LEPH	2005	1217
2019 (Year End) LEPH	1394	738
2020 (Year End) LEPH	1164	710

**Treatment Area 2 – 95<sup>th</sup> Percentile 2019 Year End Sampling**

Sampling Event	95 <sup>th</sup> Percentile (mg/kg)	Average Concentration (mg/kg)
2017 In-Situ (LEPH)	3748	3138
2019 (Year End) LEPH	2772	1619
2020 (Year End) LEPH	1292	813

**Groundwater Sampling Program - Hydrocarbons**

Groundwater impacted by petroleum hydrocarbons was identified at AEC 1 and AEC 2. Light non-aqueous phase liquid (LNAPL) was identified at monitoring well MW17-17B. Soil impacted by petroleum hydrocarbons has also been identified at those AECs during previous assessments. Contamination identified within those AECs have impacted groundwater quality.

Concentrations observed in 2020 for polycyclic aromatic hydrocarbons (PAHs) downstream of the Tailings Impoundment (MW17-20A) were lower than the previous groundwater sampling events completed in July and October 2017. The groundwater quality in that area has improved since 2017. Natural attenuation seems to be present and concentrations are decreasing with time.

Concentrations observed in 2020 for benzene, toluene, ethylbenzene and xylenes (BTEX) and PAHs at the Main Landfill (APEC 9) (MW17-22A) were lower than the previous groundwater sampling events completed in July and October 2017. The groundwater quality in that area has improved since 2017. Natural attenuation is likely occurring, and concentrations are decreasing with time.

**Background Groundwater Assessment**

The 2017 to 2020 field investigations identified elevated concentrations of dissolved metals: antimony, cobalt, manganese, cadmium, copper, lithium, iron, uranium and arsenic in groundwater. An assessment of background concentrations of dissolved metals has indicated that antimony, arsenic, uranium, iron, lithium, cobalt and manganese are elevated compared to background concentrations and could be attributed to historical mining activities. Wood observed that the concentrations of dissolved metals are generally decreasing over time. When compared to the BC Contaminated Sites Regulation (CSR), many of the dissolved metals concentrations that are elevated are still less than BC Contaminated Site Regulation (CSR) aquatic life (AW<sub>F</sub>) water use standards. Additionally, many of the observed exceedances were not reproduced during groundwater well resampling events. When taking the CSR into consideration manganese appears to be the remaining dissolved metal that would require further assessment.

Elevated dissolved concentrations of manganese appear to be associated with the AEC 1 – Mill Building and 10 Level Portal; however, elevated manganese was also identified at APEC 10 – Burial Site # 1, APEC 12 – Burial Site # 2 and at AEC 2 – Tank Farm and Fuel Line area. The location where elevated manganese is identified were all in disturbed areas and the highest concentrations were found around the AEC 1 – Mill Building and 10 Level Portal.

**Surface Water Sampling**

Surface water sample SW20-02, located at AEC 1 (Mill – 10 Level Portal), contained a detectable concentration of methylnaphthalene. It has not been determined if the detectable concentration can be related to former activities at AEC 1 or were introduced during laboratory testing. Traces of contaminants are commonly introduced during laboratory testing; however, the concentrations are not considered significant by the laboratory if they are less than a pre-determined limit. Wood recommends to re-sample this location during the next field season for analysis of methylnaphthalene to confirm the detection in surface water.

**Summary of APECs and AECs**

Based on the result of the 2020 SSI, the following APECs/AECs are recommended to be carried forward for additional assessment and/or remediation work.

**Summary of APECs and AECs**

Initial APEC	Description	2019 Classification	Contaminant Type	Potential contaminants of concern (PCOCs) <sup>1</sup>	Contaminants of Concern (COCs) <sup>2</sup>
APEC 1	Mill / 10 Level Portal	AEC 1	Diesel fuel and lubricants	Groundwater: cobalt, manganese	Soil: heavy extractable petroleum hydrocarbons (HEPH)  Groundwater: manganese, acenaphthene, methylnaphthalene, LEPH <sub>w</sub> , extractable petroleum hydrocarbons (EPH <sub>w10-19</sub> )
APEC 2 / APEC 14	Tank Farm Area / Fuel Lines	AEC 2	Diesel fuel, aviation fuels and possibly gasoline, waste rock	Groundwater: manganese	Soil: volatile petroleum hydrocarbons (VPHs), LEPH <sub>s</sub>  Groundwater: Groundwater: manganese, LNAPL, methylnaphthalene and LEPH <sub>w</sub>
APEC 4	Fuel Pump Shed	AEC 3	Diesel fuel and Avgas	-	Soil: LEPH
APEC 5	Mechanical Shop / 11 Level Portal	AEC 4	Fuels, lubricants, and waste rock storage	-	Soil: toluene, xylenes, VPHs, LEPH and HEPH



Initial APEC	Description	2019 Classification	Contaminant Type	Potential contaminants of concern (PCOCs) <sup>1</sup>	Contaminants of Concern (COCs) <sup>2</sup>
APEC 9	Main Landfill	AEC 5	Inferred to be diesel fuel	-	Groundwater: BTEX, LEPHW, methylnaphthalene, naphthalene and metals
APEC 10	Burial Site 1 (Fmr. Chalet)	APEC 10	Waste rock	Groundwater: manganese	Groundwater: manganese
APEC 11	Airstrip	AEC 6	Waste rock	Groundwater: metals	-
APEC 12	Burial Site #2	APEC 12	Contents of burial site, waste rock	Groundwater: manganese	Groundwater: manganese
APEC 13	Warehouse East Area	AEC 7	Stored / used fuel and lubricants	Groundwater: BTEX, LEPHW, naphthalene and metals	Soil: LEPH, HEPH

**Notes:**

- <sup>1</sup> Elevated metal concentrations in soil are expected across the surface of a mine site. Elevated metals in soil may need to be addressed through determining background concentrations or through a risk assessment.
- <sup>2</sup> Note, potentially acid generating (PAG) material is identified in other locations within the mine site; however, those areas have been identified by SnipGold and are scheduled for removal to the tailing storage facility (TSF). This has been included as an APEC due to potential for metals leaching.



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### List of Acronyms and Abbreviations

AEC	Areas of Environmental Concern
APEC	Area of Potential Environmental Concern
ARR	Annual Reclamation Report
AW	Aquatic Life Water Use
BC	British Columbia
BTEX	Benzene, Toluene, Ethylbenzene and Xylenes
CALA	Canadian Association for Laboratory Accreditation
CFU	Colony Forming Units
COCs	Contaminants of Concern
COD	Chemical Oxygen Demand

CSR	BC Contaminated Site Regulation
EC	Electrical Conductivity
ENV	BC Ministry of Environment and Climate Change Strategy
EPH	Extractable Petroleum Hydrocarbons
ERA	Ecological Risk Assessment
HEPH	Heavy Extractable Petroleum Hydrocarbons
HUB	Hydrocarbon Utilizing Bacteria
JMM	Johnny Mountain Mine
Kg	Kilogram
L	Litre
LEPH	Light Extractable Petroleum Hydrocarbons
LNAPL	Light Non-Aqueous Phase Liquid
masl	Metres Above Sea Level
mbgl	Metre Below Ground Level
MDL	Method Detection Limit
mg	Milligram
µg	Microgram
PAH	Polycyclic Aromatic Hydrocarbons
PAG	Potentially Acid Generating
PCOCs	Potential Contaminants of Concern
POL	Practical Quantitation Limit
PVC	Polyvinyl Chloride
QA	Quality Assurance
QC	Quality Control
SI	Site Investigation
SSI	Supplementary Site Investigation
TDS	Total Dissolved Solids
TGD	Technical Guidance Document
TIC	Total Inorganic Carbon
TOC	Total Organic Carbon
TOP	Top of Pipe
TSF	Tailing Storage Facility
USCS	Unified Soil Classification System
VH	Volatile Hydrocarbons
VPH	Volatile Petroleum Hydrocarbons
WAD	Weak Acid Dissociable
WL <sub>R</sub>	Reverted Wildlands





## 1.0 Introduction

Wood Environment & Infrastructure Solutions (Wood) was retained by SnipGold Corporation (SnipGold) to complete a Supplementary Site Investigation (SSI) at the Johnny Mountain Mine (JMM) Site to provide supplemental information to support and inform the mine reclamation efforts currently in progress. Site investigation work has been ongoing since 2017 and the following reports were issued: 1) 2017 Site Investigation (2017 SI) report, 2) 2018 Supplementary Site Investigation (SSI) report, and 3) 2019 SSI report. The objective of the 2020 SSI was to 1) determine existing concentrations of petroleum hydrocarbons in the in-situ treatment areas; 2) further evaluate concentrations of metals in groundwater in upstream, midstream and downstream locations, 3) groundwater sampling required to support annual compliance monitoring requirements for Permit PR-7927, and 4) conduct the sampling of surface water samples to acquire data to support an Ecological Risk Assessment (ERA) completed under separate scope and cover.

The in-field portion of the 2020 SSI was conducted in August 2020. The results of the 2017 through 2020 field investigation, laboratory analyses, and data evaluation are provided in this report.

### 1.1 Site Background

A brief discussion of the history of the JMM Site, the Site reclamation activities conducted to date, and the results of previously conducted environmental investigations are provided in the following sections.

#### 1.1.1 Site History

The Johnny Mountain Mine was an underground mine that saw development from 1986 to 1988 with mining/milling beginning in 1988. Mine production included producing gold, silver, and copper concentrate. The mine location is shown on Figure 1 and a Site Plan is shown on Figure 2 (see Appendices). Mining operations were relatively short-lived and occurred from November 1988 to August 1990 and from September to November 1993 when operations were stopped. Mining facilities included three adits (numbered 10, 11, and 12), five vent shafts, a mill building, a tailings facility, an air strip (at the Mine Site), a fuel tank farm, several ancillary buildings, waste rock piles, a 10-km road from the Bronson Camp to the mine, a septic bed, and a few other minor components. The milling process comprised conventional grinding and gravity separation, which initially included a cyanide leach process. Due to inefficiencies, the cyanide leach process ceased during active mining operation.

The Johnny Mountain Mine was owned and operated by International Skyline Gold Corporation (Skyline). During a share roll-back in May 2012, Skyline changed its name to SnipGold Corporation. SnipGold was subsequently acquired by Seabridge Gold in 2016 and currently operates as a subsidiary of Seabridge Gold. SnipGold currently maintains exploration activities on its mineral claims in the area of the Site focusing on the Quartz Rise area.

#### 1.1.2 Pre-2016 Reclamation Activities

Following mine closure, limited reclamation activities began in 1995. A formal Reclamation Plan was prepared in 1999 (Woznow and Yeager, 1999) and approved by the BC Ministry of Energy and Mines in October 15, 1999. Following a period between 2002 through 2008 during which minimal reclamation work was completed, the Site reclamation was progressed in 2009 following a list of prioritized tasks. The history of JMM reclamation during these years can be reviewed in the 2015 annual reclamation report (ARR) (Greenwood 2015).

### 1.1.3 Reclamation Activities Since 2016

Following acquisition of SnipGold and the Johnny Mountain Mine in 2016, SnipGold continued with mine reclamation activities. During their inaugural reclamation season in 2016, SnipGold reviewed the reclamation activities which had been completed to date and developed a five-year Johnny Mountain Mine Project Execution Plan (PEP) that meets the requirements of the approved Closure and Reclamation Plan. The 2016 reclamation activities were focused on the clean-up of the Bronson airstrip area and the engineering evaluation of the road connecting Bronson airstrip with the JMM Site as part of preparation for future reclamation activities, the long-term stability of the tailings dam was examined and a dam safety review (DSR) was conducted in August 2016. A detailed account of Site Reclamation activities up to and including the 2016 field season is provided in the 2016 Annual Reclamation Report (RTEC, 2017).

In the summer of 2017, SnipGold continued reclamation activities at the JMM Site, undertaking the following main activities:

- Investigation of the Site to determine the presence/absence of environmental contamination in areas of environmental concern;
- Mill building clean-up, inspection of and improvements to the TSF;
- Completion of a borrow source investigation program; and
- Demolition of the Tank Farm.

In 2017 Wood completed a Site Investigation (2017 SI) which included the identification and investigation of fourteen (14) areas of potential environmental concern (APECs 1-14) relating to historic mining operations (Amec Foster Wheeler, 2018). The locations of APECs and areas of environmental concern (AECs) are presented on Figures 3 and 4 (see Appendices) and the sampling locations are presented on Figures 5 to 12 (see Appendices). The results of the 2017 SI indicated that there was contamination present related to former operations within six (6) APECs. These APECs were carried forward as areas of environmental concern (AECs). Table 1 below lists the APECs assessed during the 2017 SI.

The 2017 SI results indicated that further investigation work was required at four (4) of the APECs to confirm the presence/absence of contamination.

A follow-up Supplemental Site Investigation SSI was completed in 2018 (2018 SSI) by Wood. At the conclusion of the 2018 SSI there remained six (6) AECs at which contamination was identified as present related to former operations and four (4) APECs where additional assessment work was recommended. Table 1 below lists the APECs assessed during 2018 SSI.

Additionally, in 2018 SnipGold continued reclamation activities at the JMM Site, undertaking the following main activities (by area):

- Construction of Phase 1 (Cell 1) of the Main Landfill;
- Burial Site 1 (APEC 10);
  - Excavation of waste material and placement in Main Landfill. The remediation work was conducted by Northwest Response (Northwest Response, 2018b);
- Burial Site 2 (APEC 12);
  - Excavation of waste material and placement in Main Landfill. The remediation work was conducted by Northwest Response (Northwest Response, 2018b);
- Mill Building (AEC 1);

- Removal of landfillable demolition debris from inside the building and placement in the main landfill;
- Removal of concentrate from within the mill building and placement below water within the tailings impoundment;
- Removed 4000 kg of hazardous material offsite to a certified landfill;
- Initiate demolition of infrastructure at the 10-Level Portal;
- Tank Farm and Fuel Lines (AEC 2);
  - Initiate in-situ remediation of hydrocarbon contaminated soil. The remediation work was conducted by Northwest Response (Northwest Response, 2018a);
  - Removal of demolished tanks and placement in the Main Landfill;
- JMM Airstrip (AEC 6);
  - Mapping of potentially acid generating (PAG) materials that was historically added to the airstrip as surfacing material

In 2019 Wood completed a Supplemental Site Investigation (2019 SSI). The 2019 SSI was completed to further delineate contamination identified by the 2017 Site Investigations (SI) and 2018 SSI conducted by Wood and to conduct further presence/absence investigation in potentially contaminated areas. Also conducted was the investigation into the potential presence of PAG within the airstrip and sampling to determine the efficacy of the 2019 hydrocarbon remediation work.

The objectives of the 2019 SSI included specific tasks to support ongoing Site reclamation work, including:

- Continuing an environmental site investigation of specific areas of AECs and APECs to delineate previously identified hydrocarbon impacts or to assess areas with potential hydrocarbon impacts within the following APECs/AECs:
  - APEC 12 – Burial Site 2;
  - APEC 13 – Warehouse East;
  - APEC 8 – 12 Level Portal;
  - AEC 1 – Mill /10 Level Portal;
  - AEC 2 – Tank Farm and Fuel Lines and AEC 3 – Fuel Pump Shed;
  - AEC 4 – Mechanical Shop / 11-Level Portal;
- Continuing in-situ hydrocarbon remediation of contaminated soil in the area adjacent to the Tank Farm and Fuelling Facilities;
- Evaluation of petroleum hydrocarbon levels in material to be placed in the TSF;
- Continuing evaluation of background concentration of metals in groundwater by completing Site wide additional groundwater monitoring and sampling activities;
- Delineation of PAG material along the Airstrip; and
- Collection of groundwater quality data required to support annual compliance reporting requirements for Permit PR-7927.

The sampling locations of 2019 SSI are presented on Figures 5 to 12 (see Appendices).

Table 1 below lists the APECs assessed during the 2019 SSI and the final classification of the APEC. APECs 2 and 14 were combined into one AEC as they represented a single contaminant plume. The following four APECs were removed from the list :

- APEC 3 and APEC 6 were removed as the 2018 SSI that determined that no further investigation was required; and
- APEC 8 was removed as the 2019 SSI that determined that no further investigation was required.

**Table 1: Summary of APECs and AECs 2017 to 2019**

#	Description	Investigated in 2017	2017 Classification	Investigated in 2018	Investigated in 2019	2019 Classification
APEC 1	Mill / 10 Level Portal	Yes	AEC 1	Yes	Yes	AEC 1
APEC 2 / APEC 14	Tank Farm Area / Fuel Lines <sup>1</sup>	Yes	AEC 2	Yes	Yes	AEC 2
APEC 3	Main Warehouses	Yes	<b>Removed</b>			
APEC 4	Fuel Pump Shed	Yes	AEC 3	No	No	AEC 3
APEC 5	Mechanical Shop / 11 Level Portal	Yes	AEC 4	Yes	Yes	AEC 4
APEC 6	Septic Field	Yes	<b>Removed</b>			
APEC 7	Tailings Impoundment	Yes	APEC 7	Yes	No	APEC 7
APEC 8	12 Level Portal	No	<b>Removed</b>			
APEC 9	Main Landfill	Yes	AEC 5	Yes	No	AEC 5
APEC 10	Burial Site 1 (Former Chalet)	Yes	APEC 10	Yes	No	APEC 10
APEC 11	Airstrip	Yes	AEC 6	Yes	No	AEC 6
APEC 12	Burial Site 2	Yes	APEC 12	No	Yes	APEC 12
APEC 13	Warehouse East Area	Yes	APEC 13	No	Yes	AEC 7

In 2020 Wood prepared a draft ERA for the JMM Site. The draft ERA was prepared to quantitatively assess the potential risks to ecological receptors associated with exposure to potential contaminants of concern (PCOC) in various media (e.g., soil, groundwater). This information will be used to identify risk-based closure criteria for elevated dissolved metals in groundwater and elevated petroleum hydrocarbons in soil and groundwater. The draft ERA was also prepared to identify AECs where SnipGold should focus their reclamation efforts based on potential risk identified to ecological receptors.



## 2.0 Objectives

At the conclusion of the 2019 SSI an APEC/AEC list and their associated PCOC/COCs was prepared. This list formed the basis of the 2020 objectives. The 2019 APEC/AEC list is presented in Table 2.

**Table 2: Summary of APECs/AECs and Associated PCOCs/COCs After 2019**

2019 Classification	Contaminant Type)	PCOCs <sup>1</sup>	COCs <sup>2</sup>	Summary of 2019 Recommendations
AEC 1 – Mill / 10 Level Portal	Diesel fuel and lubricants	Groundwater: cobalt, manganese	Soil: Heavy extractable petroleum hydrocarbons (HEPH)  Groundwater: Light extractable petroleum hydrocarbons (LEPH <sub>w</sub> ), Extractable petroleum hydrocarbons (EPH <sub>w10-19</sub> )	Groundwater sampling  HC remediation of soil
AEC 2 – Tank Farm and Fuel Lines	Diesel fuel, aviation fuels and possibly gasoline, waste rock	Groundwater: manganese	Soil: VPH <sub>s</sub> , LEPH <sub>s</sub>  Groundwater: LEPH <sub>w</sub>	Groundwater sampling  HC remediation of soil
AEC 3 – Fuel Pump Shed	Diesel fuel and Avgas	-	Soil: LEPH	HC remediation of soil
AEC 4 – Mechanical Shop / 11 Level Portal	Fuels, lubricants, and waste rock storage	-	Soil: toluene, xylenes, VPH <sub>s</sub> , LEPH and HEPH	HC remediation of soil
AEC 5 – Main Landfill	Inferred to be diesel fuel	-	Groundwater: benzene, toluene, ethylbenzene and xylenes (BTEX,) LEPH <sub>w</sub> , methylnaphthalene, naphthalene and metals	Groundwater sampling
APEC 10 - Burial Site #1 (Fmr. Chalet)	Waste rock	Groundwater: manganese	-	Groundwater sampling

2019 Classification	Contaminant Type)	PCOCs <sup>1</sup>	COCs <sup>2</sup>	Summary of 2019 Recommendations
AEC 6 – JMM Airstrip	Waste rock	Groundwater: metals	-	Groundwater sampling
APEC 12 - Burial Site #2	Contents of burial site, waste rock	Groundwater: manganese	-	Groundwater sampling
AEC 7 – Warehouse Area East	Stored / used fuel and lubricants	Groundwater: BTEX, LEPH <sub>w</sub> , naphthalene and metals	Soil: LEPH, HEPH	Groundwater sampling Additional soil sampling
APEC 7 - Tailings Impoundment	Tailing Storage Facility (TSF)	Groundwater: metals	-	Groundwater sampling

**Notes:**

APEC = area of potential environmental concern

AEC = area of environmental concern

BTEX = benzene, toluene, ethylbenzene and xylene

COCs = contaminants of concern

HEPH = heavy extractable petroleum hydrocarbons

LEPH<sub>s</sub> = light extractable petroleum hydrocarbons in soil

LEPH<sub>w</sub> = light extractable petroleum hydrocarbons in water

VPH<sub>s</sub> = volatile petroleum hydrocarbons in soil

EPH<sub>w10-19</sub> = extractable petroleum hydrocarbons in water (C10 – C19)

<sup>1</sup> Elevated metal concentrations in soil are expected across the surface of a mine site. Elevated metals in soil may need to be addressed through determining background concentrations or through a risk assessment.

<sup>2</sup> Note that PAG material is identified in other locations within the mine site; however, those areas have been identified by SnipGold and are scheduled for removal to the TSF. This has been included as an APEC due to potential for metals leaching.

In 2020, to limit exposure from outbreak of the Covid-19 virus, heavy equipment was not available at the Site. The scope was modified as test pitting with an excavator could not be completed. Additionally, excavation of hydrocarbon contaminated soil for further soil remediation or mechanical aeration of treatment areas could not be completed in 2020. The modified 2020 objectives to support ongoing Site reclamation work included:

- Continue an environmental site investigation of specific AECs and APECs to assess hydrocarbon impacts in groundwater within the following APECs/AECs were prioritized:
  - AEC 1: Mill/10 Level Portal;
  - AEC 2: Tank Farm and Fuel Lines and AEC 3 – Fuel Pump Shed;
  - AEC 5: Main Landfill; and
  - Tailings storage facility (TSF).
- Evaluation of petroleum hydrocarbon levels in material located in the Treatment Areas 1 and 2 by hand digging test pits into the material;



- Continuing evaluation of background concentration of metals in groundwater by completing additional groundwater monitoring and sampling activities;
- Collection of surface water samples at strategic locations to support the ERA; and
- Collection of groundwater quality data at the Main Landfill, required to support annual compliance reporting requirements for Permit PR-7927.

### 3.0 Scope of Work

The scope of work for the 2020 SSI was outlined in the proposal document titled “*Jonny Mountain Mine Reclamation Plan 2020 Scope of Work: Remediation of Hydrocarbons in Soil, Environmental Investigation, and Landfill Design and Construction Services*”, dated January 25, 2020 (Rev1). The scope of work was subsequently modified as heavy equipment was not available for the 2020 field season. The modified scope of work included the following tasks:

#### 3.1 In-Situ Hydrocarbon Remediation

SnipGold has undertaken the physical remediation of hydrocarbons in soil within AEC 2 – Tank Farm and Fuel Line area. Remediation of petroleum hydrocarbon soil contamination in the area of the Fuel Tank Farm and Fuel Lines (AEC 2) was commenced by NorthWest Response during the 2018 and 2019 field season. As a result of the remediation program, there is a stockpile of soil excavated in 2018 that contains approximately 3,000 m<sup>3</sup> of soil, hereafter referred to as Treatment Area 1 (see Figure 7). Treatment Area 1 is located in the Fuel Line area portion of AEC 2 (see Figure 7). In 2019 an additional 6,000 m<sup>3</sup> of soil was excavated in 2019 from AEC 2 and placed into a stockpile, hereafter referred to as Treatment Area 2. Treatment Area 2 is located in the former Tank Farm portion of AEC 2.

Wood’s 2020 scope of work included the completion of year-end sampling of Treatment Area 1 and Treatment Area 2. The treated soil was evaluated for petroleum hydrocarbon constituents, nutrients, moisture content, pH and hydrocarbon utilizing bacteria (HUB). The assessment of the efficacy of the remediation program was also included within the 2020 scope of work.

#### 3.2 Groundwater Sampling Program - Hydrocarbons

The 2017 to 2019 field investigations identified elevated concentrations of dissolved hydrocarbons in groundwater wells MW17-04B, MW17-13, MW17-20A, MW17-22A and MW17-23A. To assess current concentrations and the fate of dissolved hydrocarbons in groundwater over time, the following wells were proposed to be sampled for benzene, toluene, ethylbenzene and xylenes (BTEX), light and heavy extractable petroleum hydrocarbons (LEPH<sub>w</sub>/HEPH<sub>w</sub>) and polycyclic aromatic hydrocarbons in water (PAH<sub>w</sub>) and some selected wells on volatile hydrocarbons (VH<sub>w</sub>) and volatile petroleum hydrocarbons (VPH<sub>w</sub>):

- AEC 1 – Mill /10 Level Portal: MW17-04A, MW17-04B, MW17-06A, MW17-06B, MW17-07A, MW17-07B
- AEC 2 – Tank Farm and Fuel Lines: MW17-12A, MW17-12B, MW17-13, MW17-17A, MW17-17B
- AEC 5 - Main Landfill: MW17-22A, MW17-22B.
- APEC 7 -TSF: MW17-20A, MW17-20B and MW17-23A.

The rationale for the completion of groundwater sampling on these wells is presented in Table 3 in Section 4.4. The location of those wells is presented on Figures 5 through 12 appended to this report.

### 3.3 Background Groundwater Assessment

The Site investigation work completed by Wood during the 2017 to 2019 field seasons identified elevated concentrations of dissolved metals: cobalt, manganese, cadmium, copper and arsenic in groundwater. Wood completed a background groundwater assessment using available data supplemented with additional groundwater sampling completed in 2019. By using the information obtained during the 2017 to 2020 field sampling programs, Wood completed the following:

- Updated the 2019 dataset to demonstrate background groundwater quality. Background concentrations can be used for a direct comparison to groundwater quality data from within APECs and AECs;
- Complete a trend analysis of specific water quality parameters to assess if dissolved metals concentrations vary significantly over time in a manner indicative of the presence of a contaminant source; and
- Complete graphical analyses of the expanded groundwater quality dataset to identify groundwater geochemical anomalies along inferred groundwater flow paths. A statistical evaluation of outliers was completed using various outlier tests.

The rationale for the completion of groundwater sampling for background dissolved metals is presented in Table 3 in Section 4.4.

### 3.4 2020 Landfill Compliance Sampling

Permit PR-7927 authorizes the discharge of waste to the Main Landfill and includes conditions requiring annual groundwater monitoring for a period of five years starting in the summer of 2018. The permit requires annual groundwater sampling be conducted at groundwater monitoring wells MW17-22A and MW17-22B during summer months. Part of the 2020 scope of work for Wood was to ensure that groundwater samples were collected from MW17-22A and MW17-22B in compliance with permit PR-7927.

### 3.5 2020 Surface Water Sampling

The ERA being prepared by Wood in 2019 recommended collection of surface water samples at strategic locations across the Site, particularly upstream to establish background concentrations and to determine concentrations at select compliance points. To assess current concentrations in surface water, the following locations were sampled:

- Camp Creek (South of AEC 2: Tank Farm and Fuel Lines) (SW20-01);
- Unnamed stream located at AEC 1: Mill -10 Level Portal (East of the mill building) (SW20-02); and
- Stonehouse Creek (South of 12 Level Portal) (SW20-03).

## 4.0 2020 Investigation Methodology

The methodologies used to conduct the individual tasks as part of the overall 2020 scope of work are discussed in the following sections and include detailed discussions of:

- In-situ hydrocarbon stockpile sampling in remediation areas;
- Soil field screening;
- Surface water Sampling;
- Groundwater monitoring wells sampling; and



- Quality assurance and quality control.

#### 4.1 In-Situ Hydrocarbon Remediation Area Sampling

SnipGold has undertaken the physical remediation of hydrocarbons in soil within AEC 2 – Tank Farm and Fuel Line area. Remediation of petroleum hydrocarbon soil contamination in the area of the Fuel Tank Farm and Fuel Lines (AEC 2) was commenced by NorthWest Response during the 2018 and 2019 field season. As a result of the remediation program, there is a stockpile of soil excavated in 2018 that contains approximately 3,000 m<sup>3</sup> of soil, hereafter referred to as Treatment Area 1. Treatment Area 1 is located in the Fuel Line area portion of AEC 2. There is also an additional 6,000 m<sup>3</sup> of soil that was excavated in 2019 from AEC 2 and placed into a stockpile, hereafter referred to as Treatment Area 2. Treatment Area 2 is located in the former Tank Farm portion of AEC 2. Within these treatment areas, a total of 9,000 m<sup>3</sup> of soil was treated during the 2018 and 2019 reclamation season. The approximate locations of the treatment areas are presented on Figure 7 (see Appendices).

On August 29 2020, Wood completed six hand dug test pits (TP20-1-1 to TP20-1-6) until a depth of 1 metre below ground level (mbgl) within Treatment Area 1 and twelve test pits (TP20-2-1 to TP20-2-12) until a depth of 1 mbgl within Treatment Area 2 to assess hydrocarbon concentrations in soil. One sample was collected from each test pit, and two duplicate soil samples were obtained from each treatment area.

#### 4.2 Soil Sampling

A new pair of nitrile gloves was worn for the collection of each of the soil samples. Each soil sample was split with a portion of the sample placed into laboratory supplied containers for laboratory analysis, and the remaining sample was placed into a plastic bag for field screening. The laboratory-supplied containers were specific to the analysis requested. This included the use of methanol vials for containing samples submitted for analysis on volatile organic compound (VOC) parameters.

All soil samples collected for VOCs were field-screened for sample headspace vapours using the ambient temperature headspace technique and an RKI Eagle 2PID in methane elimination mode. The RKI Eagle 2 was calibrated at the start of each workday using hexane. Additionally, each soil sample was visually examined for indicators of potential contamination (e.g., staining, discoloration and debris inclusions) and to classify the soil type in accordance with the Unified Soil Classification System (USCS) based on applicable ASTM International standards (2011). Although not part of the screening procedure, olfactory indicators of contamination were recorded among the field observations.

Each sample jar and vial to be submitted for laboratory analysis was labelled with a unique sample number, registered on a chain of custody form, and stored in a cooler with ice packs before transport to the laboratory. Sufficient ice packs were placed within the coolers to maintain (as close as possible) a temperature of 4°C for the period of transport. Samples were couriered to ALS in Burnaby, BC.

#### 4.3 Soil Field Screening

Soil field screening was completed on site by Wood field staff. Each soil sample was visually examined and physically classified in accordance with the modified Unified Soil Classification System (USCS). The grab samples were also examined for indicators of hydrocarbon contamination (e.g. black staining and hydrocarbon odour).

#### 4.4 Groundwater Monitoring and Sampling

The location of the monitoring wells is presented on Figures 5 to 12 (see Appendices). Groundwater samples were submitted for laboratory analysis of dissolved metals, ions and nutrients, and some samples on BTEX<sub>w</sub>, LEPH<sub>w</sub>/HEPH<sub>w</sub>, PAH<sub>w</sub>, VHW and VPH<sub>w</sub>. The rationale for the completion of groundwater sampling on these wells is presented in the table below.

**Table 3: Rationale for Groundwater Sampling**

Monitoring Well ID	Sampling Period	Area	Rationale for Analysis
MW17-04A	August 23, 2020	AEC 1: Mill / 10 Level Portal	Determine the current concentrations of hydrocarbons in groundwater in the Mill Building Area.
MW17-04B	August 23, 2020	AEC 1: Mill / 10 Level Portal Midstream	Confirm repeatability of dissolved manganese observed in 2019 in groundwater in the Mill Building Area  Confirm the current concentrations of hydrocarbons in groundwater in the Mill Building Area.
MW17-05B	August 23, 2020	AEC 1: Mill / 10 Level Portal Midstream	Confirm repeatability of dissolved cobalt and manganese observed in 2019 in groundwater in the Mill Building Area
MW17-06A	August 23, 2020	AEC 1: Mill / 10 Level Portal	Determine the current concentrations of hydrocarbons in groundwater in the Mill Building Area.
MW17-06B	August 23, 2020	AEC 1: Mill / 10 Level Portal Midstream	Confirm repeatability of dissolved manganese observed in 2019 in groundwater in the Mill Building Area.  Determine the current concentrations of hydrocarbons in groundwater in the Mill Building Area.
MW17-07A	August 23, 2020	AEC 1: Mill / 10 Level Portal	Determine the current concentrations of hydrocarbons in groundwater in the Mill Building Area.
MW17-07B	August 23, 2020	AEC 1: Mill / 10 Level Portal	Determine the current concentrations of hydrocarbons in groundwater in the Mill Building Area.
MW17-09A	August 28, 2020	APEC 10: Burial Site 1 Midstream	Confirm repeatability of dissolved lithium and uranium observed in 2019 in this area.
MW17-09B	August 28, 2020	APEC 10: Burial Site 1 Midstream	Confirm repeatability of dissolved cobalt, and manganese observed in 2019 in this area.
MW17-11A	August 24, 2020	Stonehouse Creek Drainage Downstream	Confirm the current concentrations of dissolved metals in that area.



Monitoring Well ID	Sampling Period	Area	Rationale for Analysis
MW17-11B	August 24, 2020	Stonehouse Creek Downstream	Confirm the current concentrations of dissolved metals in that area.
MW17-12A	August 24, 2020	AEC 2: Fuel Lines	Determine the current concentrations of hydrocarbons in groundwater in the Fuel Lines area.
MW17-12B	August 24, 2020	AEC 2: Fuel Lines	Determine the current concentrations of hydrocarbons in groundwater in the Fuel Lines area.
MW17-14A	August 25, 2020	Midstream	Confirm the current concentrations of dissolved metals in that area.
MW17-17A	August 24, 2020	AEC 2: Tank Farm and Fuel Lines	Determine the current concentrations of hydrocarbons in groundwater in the Tank Farm and Fuel Lines area.
MW17-17B *	August 24, 2020	AEC 2: Tank Farm and Fuel Lines	Determine the current concentrations of hydrocarbons in groundwater in the Tank Farm and Fuel Lines area.
MW17-20A	August 25, 2020	TSF	Determine the current concentrations of hydrocarbons in groundwater in the TSF area.
MW17-20B	August 25, 2020	TSF	Determine the current concentrations of hydrocarbons in groundwater in the TSF area.
MW17-21A	August 25, 2020	Sky Creek Drainage Upstream	Confirm the current concentrations of dissolved metals in that area.
MW17-21B	August 25, 2020	Sky Creek Drainage Upstream	Confirm the current concentrations of dissolved metals in that area.
MW17-22A	August 28, 2020	AEC 5 : Main Landfill Landfill Downstream	Landfill compliance monitoring. Confirm the current concentrations of dissolved metals in that area.
MW17-22B	August 28, 2020	AEC 5 : Main Landfill Landfill Downstream	Landfill compliance monitoring. Confirm the current concentrations of dissolved metals in that area.
MW17-23A	August 28, 2020	TSF	Determine the current concentrations of dissolved hydrocarbons in groundwater in this area.
MW17-24A	August 24, 2020	Sky Creek Drainage Downstream	Confirm the current concentrations of dissolved metals in that area.
MW17-24B	August 24, 2020	Sky Creek Drainage Downstream	Confirm the current concentrations of dissolved metals in that area.



Monitoring Well ID	Sampling Period	Area	Rationale for Analysis
MW17-25A	August 24, 2020	TSF	Confirm the current concentrations of dissolved metals in that area.
MW17-26A	August 25, 2020	Johnny Creek Drainage Upstream	Confirm the current concentrations of dissolved metals in that area.
MW17-26B	August 24, 2020	Johnny Creek Drainage Upstream	Confirm the current concentrations of dissolved metals in that area.
MW17-27A	August 28, 2020	AEC 6: Airstrip Upstream	Confirm the current concentrations of dissolved metals in that area.
MW17-27B **	August 28, 2020	AEC 6: Airstrip Upstream	Confirm the current concentrations of dissolved cobalt observed in 2019 in that area.

\* Monitoring well MW17-17B was not sampled as a LNAPL was detected in that well.

\*\* Monitoring well MW17-27B was not sampled as the field technician was not able to purge that well (due to the presence of sand and sediments in the well).

On August 23, 24, 25 and 28 2020, Wood collected groundwater samples from the monitoring wells listed in Table 3 (except for wells MW17-17B and MW17-27B).

Monitoring wells MW17-22A and MW17-22B, located downgradient from the landfill, were sampled to satisfy the requirements for permit PR-7927, which authorizes the discharge of waste to the Main Landfill. The location of monitoring wells MW17-22A and MW17-22B are presented on Figure 12 (see Appendices). Groundwater samples collected from monitoring wells MW17-22A and MW17-22B were submitted for analysis of BTEX, EPHw<sub>10-19</sub>, PAHs, ion and nutrients (alkalinity, bicarbonate, carbonate, chloride, fluoride, hydroxide, nitrate, nitrite, ammonia, total potassium, total sodium, sulphate), total and dissolved metals, chemical oxygen demand (COD), cyanide, cyanate and thiocyanate, total inorganic carbon (TIC), total organic carbon (TOC), total dissolved solids (TDS), electrical conductivity (EC), hardness.

All groundwater sampling was conducted using a low-flow sampling technique as defined in ASTM Standard D4448-01 (ASTM, 2013) and consistent with the BC Ministry of Environment and Climate Change Strategy (ENV) water monitoring guidance for mines (BC MOE 2016) for groundwater wells less than 10 m in depth. For groundwater wells greater than 10 m in depth, Waterra tubing was used to purge the well. Before purging each well, the depth to water was recorded. The depth measurements were consistently recorded from the mark on top of the polyvinyl chloride (PVC) standpipe.

During purging at each monitoring well, a YSI Professional Plus multi-meter was used to measure physicochemical parameters of the purge water to determine when the measured parameters stabilized between readings. At the point at which the monitored physicochemical parameters had stabilized, the groundwater passing through the flow through cell was considered to be representative of formation water, and sample collection was commenced. The following parameter stabilization targets (parameter stabilization) were used during purging:

- pH ±0.1 units;
- temperature ±0.2 °C;
- electrical conductivity (EC) ±3%;



- oxidation/reduction potential (ORP)  $\pm 10$  mV; and
- dissolved oxygen (DO)  $\pm 10\%$ .

A groundwater sample was deemed representative of formation water if groundwater purging targets were met.

Each sample was collected in laboratory supplied containers by field personnel wearing nitrile gloves. Each sample was preserved with allocated preservatives supplied by the laboratory. Each sample container was labelled with a unique sample number, registered on a chain of custody form, and stored in a cooler with ice packs before transport to the laboratory. Sufficient ice packs were packed within the coolers to maintain (as close as possible) a temperature of 4°C for the period of transport. Samples were couriered to ALS in Burnaby, BC.

Blind duplicate samples were collected by filling the primary and duplicate sample containers simultaneously. The duplicate samples were labelled such that their duplicate pairs could not be identified by the sample name alone.

#### 4.5 Quality Assurance / Quality Control

The Quality Assurance / Quality Control (QA/QC) plan addresses analysis and the sample quality from collection to reporting. The methodology is detailed in the British Columbia Environmental Laboratory Manual, 2015 Edition (BC MOE, 2015b).

The QA program consisted of the following components:

- Each sample was collected using the same methodology;
- Sample containers were labelled with the sampling date, the project number, and the individual sample number;
- Sampler used new nitrile disposable gloves during the collection of each sample;
- Samples were stored and delivered to the laboratory in chilled insulated coolers where they arrived at the proper temperature;
- Samples were shipped under chain of custody protocols from Johnny Mountain Mine to ALS Laboratory in Terrace by Wood field staff. Samples were then transferred from ALS Laboratory Terrace to ALS Laboratory in Burnaby;
- Samples were analyzed by a laboratory accredited by the Canadian Association for Laboratory Accreditation (CALA);
- A review was conducted of data tables with original analytical records; and
- The analytical laboratory confirms that their quality assurance conforms to the British Columbia Environmental Laboratory Manual, 2015 Edition.

The QA program included procedures implemented in the field and laboratory to demonstrate the generated data were reliable.

As part of the QC program, a blind duplicate was analyzed for all parameters to verify sampling and analytical reproducibility. The respective relative percent differences (RPD) were calculated. Duplicate sample results were compared to primary sample results to flag any variations with laboratory experimental procedures. RPD is the difference in concentration between the primary and duplicate results divided by the average concentration of the primary and duplicate results. RPDs are only applied when the measured concentrations are at least five times the Method Detection Limit (MDL), which is

commonly referred to as the Practical Quantitation Limit (PQL). Error is known to increase within five times the MDL, and RPDs are generally not considered to be valid measures of sample variability at these low concentrations. The RPD calculations and concentrations are summarized in Tables 2 to 7 and 9 to 14 (in Appendices). The RPD levels used for evaluation of data quality were those identified in the British Columbia Field Sampling Manual (BC MOE, 2013).

## 5.0 Investigation Results

The results of the individual tests, laboratory analyses, and data evaluations are discussed in the following sections. The results as they pertain to the specific objectives of the 2020 SSI are discussed under Section 6.0, and the conclusions on an individual APEC/AEC basis are discussed under Section 7.0.

### 5.1 Soil Field Screening Observations

Soil samples collected during the investigation were field screened for indicators of potential contamination including visual evidence of staining and presence of free petroleum hydrocarbon product. Indirect observations of odour were also recorded where noted. A description of the soil types and USCS classification was recorded.

The soil type encountered during hand dug test pits within Treatment Areas 1 and 2 was consistent with that observed during the 2017, 2018 and 2019 works and included a variable clay/silt/sand/gravel fill.

Hydrocarbon odour was observed during test pitting for sample SP20-02-02 in Treatment Area 2. No odour was observed for all the other samples at Treatment Areas 1 and 2.

### 5.2 Groundwater Monitoring

During the 2017 SI, monitoring wells were drilled in nested pairs such that the well designated as A had a screen set within competent bedrock while the well designated as B had screen either within the weathered shallow bedrock or straddling the bedrock-quaternary sediment interface. Generally, nested well pairs were completed within 3 m of each other and were never completed within the same borehole.

One groundwater level monitoring event was performed during August 2020. The depth to groundwater at 30 monitoring wells was recorded using a calibrated electric sounder and was measured from a surveyed reference point at the top of each PVC standpipe ("top of pipe" - TOP). Results of groundwater level surveys are summarized in Table 1 (see Appendices).

Depths to groundwater ranged from artesian conditions at MW17-11A (>1,047.4 masl) to 15.80 m below TOP (1,049.68 masl) at MW17-27A.

### 5.3 Soil Analytical Results – Petroleum Hydrocarbons

The results of the soil laboratory analysis are discussed in the following sections. The results of laboratory analyses are provided in Tables 2 through 8 (see Appendices). The analytical laboratory certificates are included in Appendix B for reference.

It should be noted that for the purpose of this investigation, the soil analytical results for EPH<sub>10-19</sub> are considered equivalent to LEPH and the soil analytical results for EPH<sub>19-32</sub> are considered equivalent to HEPH. LEPH and HEPH are calculated by subtracting PAHs from the EPH<sub>10-19</sub> and EPH<sub>19-32</sub> result, respectively. By calculating the LEPH and HEPH concentrations this way the EPH<sub>10-19</sub> and EPH<sub>19-32</sub> concentrations will always be greater than or equal to the LEPH/HEPH concentrations. This fact allows the use of the EPH<sub>10-19</sub>/EPH<sub>19-32</sub> concentrations for screening for elevated LEPH/HEPH.

### 5.3.1 Treatment Area 1 Year End Sampling –August 29, 2020

#### Petroleum Hydrocarbons

In total, six (6) soil samples (SP20-01-01 to SP20-01-06) and one blind duplicate soil sample (SP20-01-56) were collected from Treatment Area 1 and submitted to ALS for analyses of BTEX, LEPH/HEPHs, VOCs and PAHs. A synopsis of the analytical results is as follows:

- Soil sample SP20-01-05 contained an elevated concentration of LEPH of 1,330 mg/kg;

Soil samples SP20-01-01 and SP20-01-04 contained detectable concentrations of LEPH and HEPH that are less than five times the MDL and are not considered a significant result.

#### Soil Amendments

Three (3) soil samples (SP20-01-01, SP20-01-03 and SP20-01-05) out of six (6) soil samples collected during the 2020 year end sampling of Treatment Area 1 were submitted to ALS for analysis soil moisture, available nitrogen as nitrate and phosphorus as phosphate, HUB and TOC. A synopsis of the analytical results is as follows:

- The soil moisture measured in soil samples collected from Treatment Area 1 ranged between 9.95% and 15%. The ideal moisture content for coarse grained soils encountered at the Site is between 12% and 30% <sup>1</sup>;
- The TOC measured in soil samples collected from Treatment Area 1 ranged between 0.32% and 1.34%;
- The available nitrogen as nitrate concentrations measured in soil samples collected from Treatment Area 1 were below the detection limit of 1 mg/kg.
- The available phosphorus as phosphate concentrations measured in soil samples collected from Treatment Area 1 ranged from <2.0 mg/kg to 4.7 mg/kg.
- The HUB count measured in soil samples from Treatment Area 1 ranged between 20,500 colony forming units per gram (CFU/g) and 56,000 CFU/g. A concentration of less than 3,000 CFU/g is an indicator of stress being placed on the microbial population <sup>2</sup>.

### 5.3.2 Treatment Area 2 Year End Sampling – August 29, 2020

#### Petroleum Hydrocarbons

In total, twelve (12) soil samples (SP20-02-01 to SP20-02-12) and one blind duplicate soil sample (SP20-02-62) were collected from Treatment Area 2 and submitted to ALS for analyses of BTEX and LEPH/HEPHs. A synopsis of the analytical results is as follows:

- Soil sample SP20-02-03 contained an elevated concentration of LEPH of 1,200 mg/kg;
- Soil sample SP20-02-05 contained an elevated concentration of LEPH of 1,050 mg/kg;
- Soil sample SP20-02-06 contained an elevated concentration of LEPH of 1,660 mg/kg;
- Soil sample SP20-02-10 contained an elevated concentration of LEPH of 1,040 mg/kg;

<sup>1</sup> Hydrocarbon Remediation Plan for Johnny Mountain Mine, British Columbia, April 2019, Wood.

<sup>2</sup> US EPA document 510-B-17-003.

Soil samples SP20-02-02, SP20-02-04, SP20-02-07, SP20-02-08 and SP20-02-11 contained detectable concentrations of LEPH and HEPH that are less than five times the MDL and are not considered significant results.

### Soil Amendments

Six (6) soil samples (SP20-02-02, SP20-02-04, SP20-02-06, SP20-02-08, SP20-02-10 and SP20-02-12) out of twelve (12) soil samples collected during the 2020 year end sampling of Treatment Area 2 were submitted to ALS for analysis soil moisture, available nitrogen as nitrate and phosphorus as phosphate, HUB and TOC. A synopsis of the analytical results is as follows:

- The soil moisture measured in samples collected from Treatment Area 2 ranged between 9.63% and 17.2%. Overall, this is within the optimal moisture content range of 12% and 30%;
- The TOC measured in soil samples collected from Treatment Area 1 ranged from 0.19% to 0.50%;
- The available nitrogen as nitrate concentrations measured in soil samples collected from Treatment Area 2 range from <1 mg/kg (three out of six samples) to 15.8 mg/kg.
- The available phosphorus as phosphate concentrations measured in soil samples collected from Treatment Area 2 ranged from <2.0 mg/kg (three out of six samples) to 5 mg/kg.
- The HUB count measured in soil samples from Treatment Area 1 ranged from 6,600 CFU/g to 1,000,000 CFU/g. A concentration of less than 3,000 CFU/g is an indicator of stress being placed on the microbial population <sup>3</sup>.

## 5.4 Groundwater Analytical Results

The results of the groundwater laboratory analysis are discussed in the following sections. The results of laboratory analyses are provided in Tables 9 through 14 and 15B through 15I (see Appendices). The analytical laboratory certificates are included in Appendix B for reference.

For discussion purpose only, when a parameter is considered elevated it exceeded 5 times the laboratory method detection limit (MDL).

### 5.4.1 Petroleum Hydrocarbons Results

Groundwater samples collected from monitoring wells MW17-04A, MW17-04B, MW17-06A, MW17-06B, MW17-07A, MW17-07B, MW17-12A, MW17-12B, MW17-13, MW17-17A, MW17-22A, MW17-22B, MW17-20A, MW17-20B and MW17-23A were submitted for analysis of BTEX, PAHs and LEPH/LEPHs.

Groundwater sample MW17-17A was also submitted for analysis on VPHs and samples MW17-22A and MW17-22B were also submitted for analysis VOCs. No sample was collected from monitoring well MW17-17B as a LNAPL was detected.

A synopsis of the analytical results is as follows:

- Groundwater sample MW17-4B, located within APEC 1 (Mill and 10 Level Portal), contained elevated concentrations of methylnaphthalene and LEPH<sub>w</sub>.
- Groundwater sample MW17-6B, located within APEC 1 (Mill and 10 Level Portal), contained elevated concentrations of acenaphthene and methylnaphthalene;

<sup>3</sup> US EPA document 510-B-17-003.



- Groundwater sample MW17-12A, located within APEC 14 (Fuel Lines), contained an elevated concentration of  $\text{LEPH}_w$ .
- Groundwater sample MW17-17A, located within APEC 14 (Fuel Lines), contained an elevated concentration of methylnaphthalene.
- Groundwater sample MW17-20A, located downstream of the Tailings Impoundment, contained elevated concentrations of methylnaphthalene and naphthalene.
- Groundwater samples collected from monitoring well MW17-22A, located at the Main Landfill, contained elevated concentrations of ethylbenzene, methylnaphthalene and naphthalene.
- A light non-aqueous phase liquid (LNAPL) (measurement of 1 cm) was measured with a Heron interface probe within monitoring well MW17-17B located within APEC 14 (Fuel Lines). The presence of LNAPL was also verified visually with a bailer.

### 5.4.2 Dissolved Metals Results

During August 2020, Wood collected groundwater samples from monitoring wells MW17-04B, MW17-05B, MW17-06B, MW17-09A, MW17-09B, MW17-11A, MW17-11B, MW17-21A, MW17-21B, MW17-14A, MW17-24A, MW17-24B, MW17-22A, MW17-22B, MW17-25A, MW17-26A, MW17-26B and MW17-27A. Groundwater samples were submitted for laboratory analysis of dissolved metals. A synopsis of the analytical results is as follows:

- Groundwater sample MW17-5B, located within APEC 1 (Mill and 10 Level Portal), contained elevated concentrations of cobalt (1.94  $\mu\text{g/L}$ ) and manganese (5,700  $\mu\text{g/L}$ );
- Groundwater sample MW17-9A, located within APEC 10 (Burial Site 1), contained an elevated concentration of iron (1,970  $\mu\text{g/L}$ ), lithium (8.5  $\mu\text{g/L}$ ) and manganese (1,760  $\mu\text{g/L}$ );
- Groundwater sample MW17-9B, located within APEC 10 (Burial Site 1), contained elevated concentrations of cobalt (2.96  $\mu\text{g/L}$ ) and manganese (3,320  $\mu\text{g/L}$ );
- Groundwater sample MW17-14A, located within APEC 12 (Burial Site 2), contained an elevated concentration of iron (3,800  $\mu\text{g/L}$ ).
- Groundwater sample MW17-27A, located within APEC 11 (Airstrip), contained elevated concentrations of cobalt (1.44  $\mu\text{g/L}$ );
- Groundwater sample MW17-24A, located downstream Sky Creek Drainage, contained an elevated concentration of Lithium (8.4  $\mu\text{g/L}$ ).
- Groundwater sample MW17-21A, located downstream Sky Creek Drainage, contained an elevated concentration of Lithium (8.5  $\mu\text{g/L}$ ).

All remaining groundwater samples analyzed for dissolved metals reported concentrations that are below the detection limits, less than five times the MDL and/or marginal and not considered significant.

### 5.4.3 Alkalinity, Ions and Nutrients

During August 2020, Wood collected groundwater samples from monitoring wells MW17-04B, MW17-05B, MW17-06B, MW17-09A, MW17-09B, MW17-11A, MW17-11B, MW17-21A, MW17-21B, MW17-14A, MW17-24A, MW17-24B, MW17-22A, MW17-22B, MW17-25A, MW17-26A, MW17-26B and MW17-27A. Groundwater samples were submitted for laboratory analysis of alkalinity, ions and nutrients. All groundwater samples analyzed for alkalinity, ions and nutrients reported concentrations that are consistent with former sampling events, are below the detection limits, less than five times the MDL and/or marginal and not considered significant.

## 5.5 Surface Water Analytical Results

The results of the surface water laboratory analysis are discussed in the following sections. The results of laboratory analyses are provided in Tables 16A through 16D (see Appendices). The analytical laboratory certificates are included in Appendix D for reference.

### 5.5.1 Petroleum Hydrocarbons, PAHs and VOCs Results

Surface water samples SW20-02 and SW20-03 collected from respectively an unnamed stream (AEC 1: Mill – 10 Level Portal) and Stonehouse Creek (South of 12 Level Portal) were submitted for analysis of BTEXw, PAHw, LEPHw/LEPHw and VOCw.

A synopsis of the analytical results is as follows:

- Surface water sample SW20-02 located at AEC 1 (Mill – 10 Level Portal) contained a detectable concentration of methylnaphthalene, however, the reported results are less than five times the method detection limit (MDL).

All remaining groundwater samples analyzed for BTEXw, PAHw, LEPHw/LEPHw and VOCw reported concentrations that are below the detection limits.

### 5.5.2 Dissolved Metals Results

Surface water samples SW20-01 collected from Camp Creek (South of AEC 2: Tank Farm and Fuel Lines) was submitted for analysis of total cadmium, iron, and magnesium, and SW20-02 collected from an unnamed stream (AEC 1: Mill – 10 Level Portal) was submitted for analysis of total manganese.

## 5.6 Quality Assurance and Quality Control Results

To ensure quality of data, a field duplicate was taken to measure possible field sampling error or local environmental variance. Duplicate samples are taken at a frequency of 1 out of 10 for groundwater and soil samples. Relative percent differences values are calculated for each duplicate that has a concentration at or greater than five times the reported detection limit (RDL). A summary of RPDs for duplicate samples collected is provided in Tables 2 to 14 (see Appendices).

The BC Field Sampling Manual identifies RPD values >20% as an indication that a possible problem exists, and >50% indicates that a definite problem exists, most likely either through contamination or lack of sample representativeness (BC MOE, 2013). During the 2017 to 2020 investigations, a total of ten soil duplicate samples and nine groundwater duplicate samples were analysed for concentrations of hydrocarbons, metals, PAHs, VOCs and major ions.

The RPD values for total of 773 groundwater parameters were calculated. Out of 743 groundwater RPDs, a total of 10 metal parameters had a calculated RPD value greater than 50% and one (1) pH parameter had a calculated RPD value greater than 20%. The remaining groundwater RPDs were either below the

target RPD of 20% or not calculable due to concentrations reported as less than detection limits. The RPD values for total of 587 soil parameters were calculated. Out of 587 soil RPDs, a total of six metal parameters had a calculated RPD value greater than 20% and four (4) metal parameters had a calculated RPD value greater than 50%. One (1) EPH<sub>10-19</sub> parameter had a calculated RPD value greater than 50%. The remaining soil RPDs were either below the target RPD of 20% or not calculable due to concentrations that are less than detection limits. Out of 773 duplicate groundwater parameters, less than 1.5% exceeded the target RPD and out of 587 duplicate soil parameters, less than 2% exceeded the target RPD. Some errors in sampling are anticipated during a large site investigation and this can be further compounded by the heterogeneity of concentrations in soil; however, overall the field QA/QC project has met Wood's data quality objectives.

To ensure data quality, a total of about 1,200 lab control parameters (Method Blank, Matrix Spike, Laboratory Control Sample, Certified Reference Material, Internal Reference Material and Calibration Verification Standard) were analyzed by the laboratory ALS for a variety of analytical parameters. The laboratory QA/QC testing indicated the results are within the ALS data quality objectives, and therefore the analytical testing is considered reliable. A full list of laboratories' COAs is included in Appendix B.

Based on the field and laboratory procedures used, QA/QC results and data validation, it is concluded that the data generated for the Site meet accuracy and precision targets and are reliable in characterizing Site environmental conditions.

## 6.0 Discussion

The investigation results as they pertain to the specific objectives of the 2020 SSI are discussed separately in the following sections. The conclusions on an individual APEC/AEC basis are discussed under Section 7.

### 6.1 In-Situ Hydrocarbon Remediation

Based on the results of the Year End sampling from Treatment Area 1 (fuel line area) and Treatment Area 2 (tank farm), Wood prepared the following box plots to show the concentrations of petroleum hydrocarbons in treated material over time. Chart 1 and Chart 2 below show the initial concentrations of LEPH and HEPH from AEC 2 plotted into a box plot. The initial concentrations are based on the in-situ sampling of hydrocarbons completed by Wood during the 2017 SI. The initial concentrations are then compared to box plots generated by measured concentrations of post-excavation interim samples. The data used to generate the box plots are included as Appendix C. For comparison purposes only, the box plot data are compared to the BC CSR (BC Regulation 375/96, last amended January 24, 2019, BC Reg. 13/2019) reverted Wildlands (WL<sub>R</sub>) standards of 1,000 mg/kg for LEPH and HEPH.

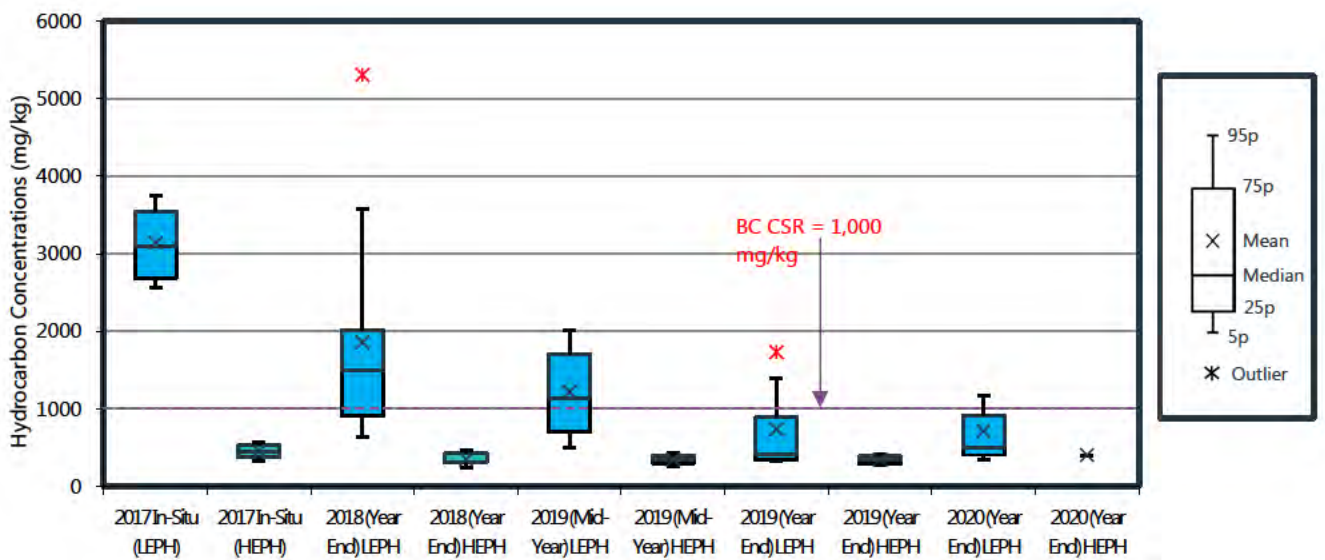
#### Treatment Area 1

The 2020-year end sampling event completed in August 2020 for Treatment Area 1 indicates that the 95<sup>th</sup> percentile of the LEPH concentration is greater than the CSR standard of 1,000 mg/kg. This is due to one soil sample (SP20-01-05) which contained a LEPH concentration of 1,330 mg/kg. All remaining samples analyzed for LEPH from Treatment Area 1 contained concentrations of LEPH that were less than 1,000 mg/kg.

All soil samples collected during the August 2020 sampling event for Treatment Area 1 contained concentrations of HEPH of less than 1,000 mg/kg, and the majority was below the method detection limit. Table 4 below shows the 95<sup>th</sup> percentile for the 2020 sampling event completed on Treatment Area 1.

**Table 4: Treatment Area 1 – 95<sup>th</sup> Percentile for LEPH by Sampling Event**

Sampling Event	95 <sup>th</sup> Percentile (mg/kg)	Average Concentration (mg/kg)
2017 In-Situ (LEPH)	3748	3138
2018 (Year End) LEPH	3582	1857
2019 (Mid-Year) LEPH	2005	1217
2019 (Year End) LEPH	1394	738
2020 (Year End) LEPH	1164	710



**Chart 1: Treatment Area 1 – Petroleum Hydrocarbon Concentrations**

**Treatment Area 2**

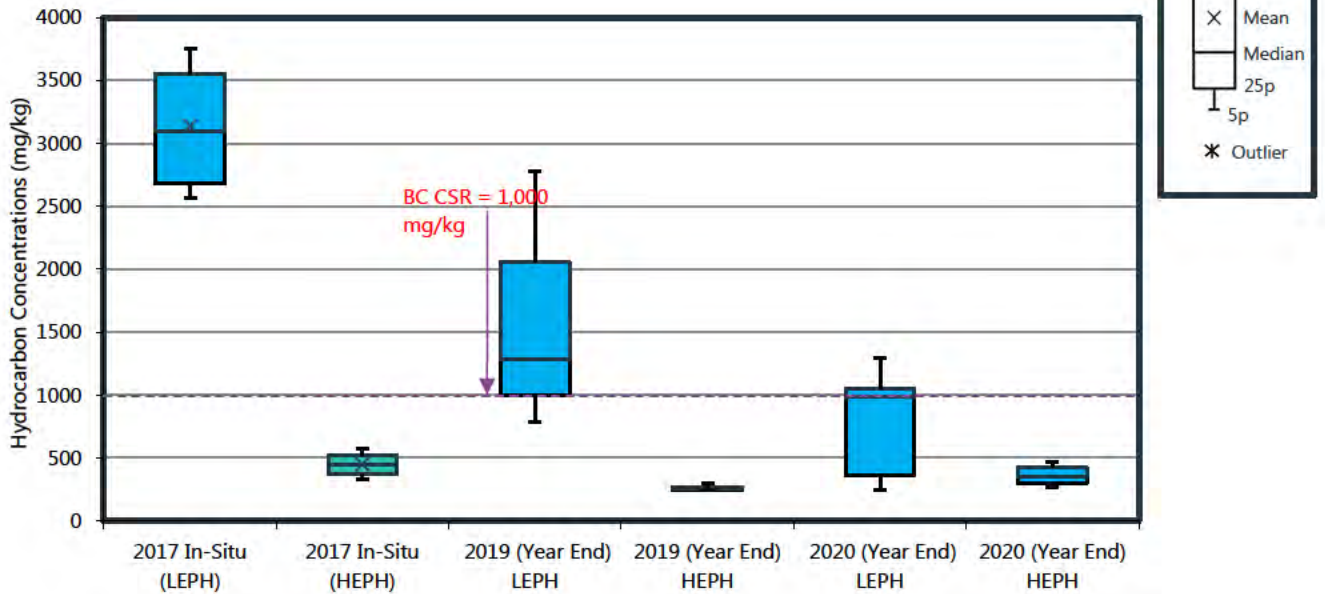
The 2020-year end sampling event completed in August 2020 for Treatment Area 2 indicates that the 95<sup>th</sup> percentile of the LEPH concentration is greater than the CSR standard of 1,000 mg/kg. This is due to four out of twelve soil samples (SP20-02-03, SP20-02-05, SP20-02-06 and SP20-02-10) which contained LEPH concentrations greater than 1,000 mg/kg (ranging from 1,040 to 1,660 mg/kg). The remaining soil samples analyzed for LEPH from Treatment Area 2 contained concentrations of LEPH that were less than 1,000 mg/kg, and four of those were below laboratory detection limits.

All soil samples collected during the August 2020 sampling event for Treatment Area 2 contained concentrations of HEPH of less than 1,000 mg/kg. Table 5 below shows the 95<sup>th</sup> percentile for the year end sampling event of Treatment Area 2.



**Table 5: Treatment Area 2 – 95<sup>th</sup> Percentile for LEPH by Sampling Event**

Sampling Event	95 <sup>th</sup> Percentile (mg/kg)	Average Concentration (mg/kg)
2017 In-Situ (LEPH)	3748	3138
2019 (Year End) LEPH	2772	1619
2020 (Year End) LEPH	1292	813



**Chart 2: Treatment Area 2 – Petroleum Hydrocarbon Concentrations**

The 95<sup>th</sup> percentile is not used to determine if the soil can be considered remediated; instead it is used to estimate the concentration of hydrocarbons in the entire stockpile based on limited soil sampling data. Based on the data in Table 5, we can infer that concentrations of LEPH have significantly decreased and 95% of the soil should contain LEPH concentrations less than 1,164 mg/kg and 1,292 mg/kg for Treatment Areas 1 and 2, respectively. The decrease of LEPHs concentrations is especially observed for Treatment Area 2 where 95<sup>th</sup> percentile concentrations in 2020 are almost 50% of those observed in 2019. The box plot is a good indicator of when confirmation of remediation sampling should be completed on treated soil.

## 6.2 Petroleum Hydrocarbons Groundwater Investigation

As mentioned before, for discussion purpose only, a parameter is considered elevated when it exceeded 5 times the laboratory MDL.

The Site investigation work completed by Wood during 2020 field season identified elevated concentrations of petroleum hydrocarbons in groundwater. Groundwater wells with elevated concentrations of petroleum hydrocarbons are shown in Figures 13 to 18 (see Appendices) and in Table 6 below.

**Table 6: Summary of Impacted Monitoring Wells with Petroleum Hydrocarbons**

APEC / AEC #	Monitoring Well	COCs*
AEC 1: Mill / 10 Level Portal	MW17-04B	methylnaphthalene,
AEC 2: Tank Farm / Fuel Lines	MW17-17A	methylnaphthalene
	MW17-17B	LNAPL measured in well
Downstream of the Tailings Impoundment	MW17-20A	methylnaphthalene and naphthalene
APEC 9: Main Landfill	MW17-22A	BTEX, methylnaphthalene and naphthalene

\* COCs considered in Table 6 are elevated concentrations identified with results more than five times the method detection limit (MDL)

Groundwater impacted by petroleum hydrocarbons was identified at AEC 1 and AEC 2. LNAPL was identified at monitoring well MW17-17B. Soil impacted by petroleum hydrocarbons was also identified within these AECs during previous assessments. Soil contamination identified within those AECs have impacted groundwater quality.

Elevated concentrations of methylnaphthalene and naphthalene were observed downstream of the Tailings Impoundment (MW17-20A) in the 2020 sampling event; however, they were lower than the previous groundwater sampling events completed in July and October 2017. The groundwater quality in that area seems to have improved since 2017. Natural attenuation is likely occurring and concentrations of PHCs appear to be decreasing with time.

Elevated concentrations of ethylbenzene, methylnaphthalene and naphthalene were observed downstream of the Main Landfill (APEC 9) (MW17-22A); however, they were lower or within the same range than the previous groundwater sampling events completed in July and October 2017, July and September 2018 and July 2019. The groundwater quality in that area seems to have improved since 2017. Natural attenuation is likely occurring and concentrations of PHCs appear to be decreasing with time.

### 6.3 Background Metals Groundwater Investigation

The Site investigation work completed by Wood during the 2017 to 2020 field seasons identified elevated concentrations of dissolved metals: aluminum, antimony, cobalt, manganese, iron, lithium, uranium and arsenic in groundwater. Groundwater wells with elevated concentrations of metals are shown in Figures 13 to 18 (see Appendices).

In 2020, Wood completed additional groundwater sampling to supplement the existing dataset. The 2020 sampling focused on groundwater wells that are considered representative of background conditions (Upstream). Wood also sampled groundwater wells located within areas where mining activity occurred (Midstream) and where PAG material was placed, in ore processing areas and in concentrate storage areas. Additionally, Wood sampled groundwater wells that are considered to be located downgradient of historical mining activity (Downstream). The following Table 7 summarizes the groundwater wells sampled during the period of 2017 and 2020 and their classification in regards to an upstream, downstream and midstream location. The geology that the well screen has been installed in is also included in Table 7.



**Table 7: Summary of Well Location and Geology at Well Screen**

<b>APEC / AEC #</b>	<b>Monitoring Well</b>	<b>Location</b>	<b>Geology at Well Screen</b>
AEC 1: Mill / 10 Level Portal	MW17-01A	Midstream	Bedrock
AEC 1: Mill / 10 Level Portal	MW17-01B	Midstream	Overburden
AEC 1: Mill / 10 Level Portal	MW17-02A	Midstream	Bedrock
AEC 1: Mill / 10 Level Portal	MW17-02B	Midstream	Bedrock
AEC 1: Mill / 10 Level Portal	MW17-03	Midstream	Bedrock
AEC 1: Mill / 10 Level Portal	MW17-04A	Midstream	Bedrock
AEC 1: Mill / 10 Level Portal	MW17-04B	Midstream	Overburden
AEC 1: Mill / 10 Level Portal	MW17-05A	Midstream	Bedrock
AEC 1: Mill / 10 Level Portal	MW17-05B	Midstream	Bedrock
AEC 1: Mill / 10 Level Portal	MW17-06A	Midstream	Bedrock
AEC 1: Mill / 10 Level Portal	MW17-06B	Midstream	Bedrock
AEC 1: Mill / 10 Level Portal	MW17-07A	Midstream	Bedrock
AEC 1: Mill / 10 Level Portal	MW17-07B	Midstream	Bedrock
AEC 1: Mill / 10 Level Portal	MW17-08A	Midstream	Bedrock
AEC 1: Mill / 10 Level Portal	MW17-08B	Midstream	Overburden
APEC 10: Burial Site 1	MW17-09A	Midstream	Bedrock
APEC 10: Burial Site 1	MW17-09B	Midstream	Overburden
APEC 6: Septic Field	MW17-10A	Midstream	Bedrock
APEC 6: Septic Field	MW17-10B	Midstream	Overburden
Stonehouse Creek	MW17-11A	Downstream	Bedrock
Stonehouse Creek	MW17-11B	Downstream	Bedrock
AEC 2: Tank Farm / Fuel Lines	MW17-12A	Midstream	Overburden
AEC 2: Tank Farm / Fuel Lines	MW17-12B	Midstream	Overburden
AEC 2: Tank Farm / Fuel Lines	MW17-13	Midstream	Overburden
APEC 12: Burial Site 2	MW17-14A	Midstream	Overburden
APEC 12: Burial Site 2	MW17-14B	Midstream	Overburden
Burial Site 2 Upstream	MW17-15A	Upstream	Overburden
Burial Site 2 Upstream	MW17-15B	Upstream	Overburden
AEC 2: Tank Farm / Fuel Lines	MW17-16	Midstream	Overburden



APEC / AEC #	Monitoring Well	Location	Geology at Well Screen
AEC 2: Tank Farm / Fuel Lines	MW17-17A	Midstream	Overburden
AEC 2: Tank Farm / Fuel Lines	MW17-17B	Midstream	Overburden
TSF	MW17-18A	Downstream Tailings	Bedrock
TSF	MW17-18B	Downstream Tailings	Overburden
TSF	MW17-19A	Upstream	Overburden
TSF	MW17-19B	Upstream	Overburden
TSF	MW17-20A	Downstream Tailings	Bedrock
TSF	MW17-20B	Downstream Tailings	Overburden
Sky Creek Drainage	MW17-21A	Upstream	Overburden
Sky Creek Drainage	MW17-21B	Upstream	Overburden
AEC 5: Main Landfill	MW17-22A	Downstream Tailings	Bedrock
AEC 5: Main Landfill	MW17-22B	Downstream Tailings	Overburden
TSF	MW17-23A	Downstream Tailings	Bedrock
TSF	MW17-23B	Downstream Tailings	Overburden
Sky Creek Drainage	MW17-24A	Downstream Tailings	Bedrock
Sky Creek Drainage	MW17-24B	Downstream Tailings	Overburden
Tailings Impoundment	MW17-25A	Downstream Tailings	Bedrock
Tailings Impoundment	MW17-25B	Downstream Tailings	Overburden
Johnny Creek Drainage	MW17-26A	Upstream	Overburden
Johnny Creek Drainage	MW17-26B	Upstream	Overburden
AEC 6: Airstrip	MW17-27A	Midstream	Bedrock
AEC 6: Airstrip	MW17-27B	Midstream	Bedrock
Stonehouse Creek	MW17-28	Downstream	Overburden

Using the upstream, midstream and downstream classification in Table 7 and the concentrations at each sample location presented in the attached Table 12, Wood prepared boxplots for each sampling location for select metals. The box plots and the data used to generate the box plots are presented as Appendix C. Box plots are generally evaluated against each other by determining if the boxes overlap with each other or if the median value overlaps with the box generated by the plots. The background concentrations were considered using the upstream monitoring wells concentrations. An increase in dissolved metals concentrations between background locations and midstream locations could indicate the groundwater has been impacted by mining activities.





The following sections discuss metal parameter and evaluate if the observed exceedances can be attributed to background or should be carried forward as a COC for groundwater. For discussion purposes, results were also compared to the Contaminated Sites Regulation (CSR) (BC Regulation 375/96, last amended January 24, 2019, BC Reg. 13/2019) Freshwater Aquatic Life use (AW<sub>F</sub>) standards. Wood notes that the CSR standards are not applicable to the core area of a permitted mine and this comparison has been used as a screening tool to focus on parameters that may require additional investigation.

### 6.3.1 Antimony

The box plots for antimony and the data used to generate the box plots are presented as Appendix C. The plots generated from the upstream areas show that the data obtained is within the background box plot range. The box plots generated for the midstream areas show that the data obtained from sampling locations MW17-01, MW17-02, MW17-08, MW17-12, and MW17-25 are outside of the background box plot range. The box plots generated for the downstream areas show that the data obtained from sampling locations MW17-27 are outside of the background box plot range.

Concentrations of antimony from sample location MW17-01, MW17-02, MW17-08, MW17-12, MW17-25 and MW17-27 are less than BC CSR AW<sub>F</sub> standard of 90 µg/L.

Additionally, groundwater wells MW17-27A and MW17-25A were resampled on August 25 and 28, 2020 and reported results of 0.98 µg/L and 1.18 µg/L, respectively. Monitoring well MW17-27B was not resampled in 2020. Groundwater well MW17-08A has not been sampled since July 24, 2017. Groundwater sample from monitoring well MW17-08A contained antimony concentrations of 6.37 µg/L, well below the CSR AW<sub>F</sub> standard of 90 µg/L.

### 6.3.2 Arsenic

The box plots for arsenic and the data used to generate the box plots are presented as Appendix C. The box plots generated for the midstream areas show that the data obtained from sampling location MW17-12 are outside of the background box plot range. The box plots generated for the downstream areas show that the data obtained from sampling locations MW17-24, MW17-27 and MW17-28 are outside of the background box plot range.

Concentrations of arsenic from sample location MW17-12, MW17-24, MW17-27A and MW17-28 are less than BC CSR AW<sub>F</sub> standard of 50 µg/L.

Monitoring well MW17-27A contained an arsenic concentration of 32.1 µg/L during the July 24, 2017 sampling event. Groundwater well MW17-27A was resampled on July 16, 2019 and August 28, 2020 and reported results were respectively 2.4 µg/L and 2.94 µg/L.

### 6.3.3 Uranium

The box plots for uranium and the data used to generate the box plots are presented as Appendix C. The box plots generated for the midstream areas show that the data obtained from sampling locations MW17-1, MW17-2, MW17-3, MW17-10 and MW17-12 are outside of the background box plot range. The box plots generated for the downstream areas show that the data obtained from sampling locations, MW17-11 and MW17-28 are outside of the background box plot range.

Concentrations of uranium from sample locations MW17-1, MW17-2, MW17-3, MW17-10, MW17-12, MW17-11 and MW17-28 are less than BC CSR AW<sub>F</sub> standard of 85 µg/L. Monitoring well MW17-09A

contained a uranium concentration of 39.1 µg/L. Groundwater well MW17-09A was previously sampled for uranium on July 28, 2017, July 2, 2018 and November 18 2018 and July 16, 2019 and the results were 11.7 µg/L, 0.079 µg/L, 1.95 µg/L and 12.8 µg/L, respectively. Monitoring well MW17-09A was resampled on August 20, 2020 and the reported result is 5.94 µg/L.

### 6.3.4 Iron

The box plots for iron and the data used to generate the box plots are presented as Appendix C. The box plots generated for the midstream areas show that the data obtained from sampling locations MW17-4, MW17-5, MW17-9, MW17-13 and MW17-14 are outside of the background box plot range. The box plots generated for the downstream areas are within the background box plot range.

No BC CSR AW<sub>F</sub> standard apply for iron. Groundwater well MW17-05B was resampled for iron on July 17, 2019 and September 5, 2019 and the results were 533 µg/L and 846 µg/L, respectively. Monitoring well MW17-05B was resampled on August 23, 2020 and the reported result is 390 µg/L.

### 6.3.5 Lithium

The box plots for lithium and the data used to generate the box plots are presented as Appendix C. The box plots generated for the midstream areas are within the background box plot range. The box plots generated for the upstream areas are within the background box plot range. No BC CSR AW<sub>F</sub> standard apply for lithium.

However, monitoring wells MW17-09A and MW17-24A located midstream contained a lithium concentration of 8.5 µg/L and 8.4 µg/L, respectively. Monitoring well MW17-21A located upstream contained a lithium concentration of 8.5 µg/L during the August 2020 sampling event. Monitoring well MW17-09A contained a lithium concentration of 9.1 µg/L during the July 24, 2017 sampling event. Groundwater well MW17-09A was previously sampled for lithium on July 28, 2017, July 2, 2018, November 18, 2018 and July 17, 2019 and the results were <50 µg/L, <1.0 µg/L, 7.5 µg/L and 7.3 µg/L, respectively. Groundwater well MW17-24A was previously sampled for lithium on July 23, 2017, July 15, 2019 and September 4, 2019 and the results were <50 µg/L, 7.6 µg/L and 7.2 µg/L, respectively.

### 6.3.6 Cobalt

The box plots for cobalt in groundwater and the data used to generate the box plots are presented as Appendix C. Wood was provided with laboratory reports containing metals analysis of surface water samples collected across the mine site by Environmental Resources Management (ERM). Using the surface water data, Wood generated similar box plots showing the cobalt concentrations in surface water at various sampling points. The box plots and the data used to generate the surface water box plots are presented as Appendix C.

The box plots generated for the midstream areas show that the data obtained from sampling locations MW17-05, MW17-06 and MW17-09 are outside of the upstream box plot range. The box plots generated for the downstream areas show that the data obtained from sampling location MW17-27 is outside of the upstream box plot range.

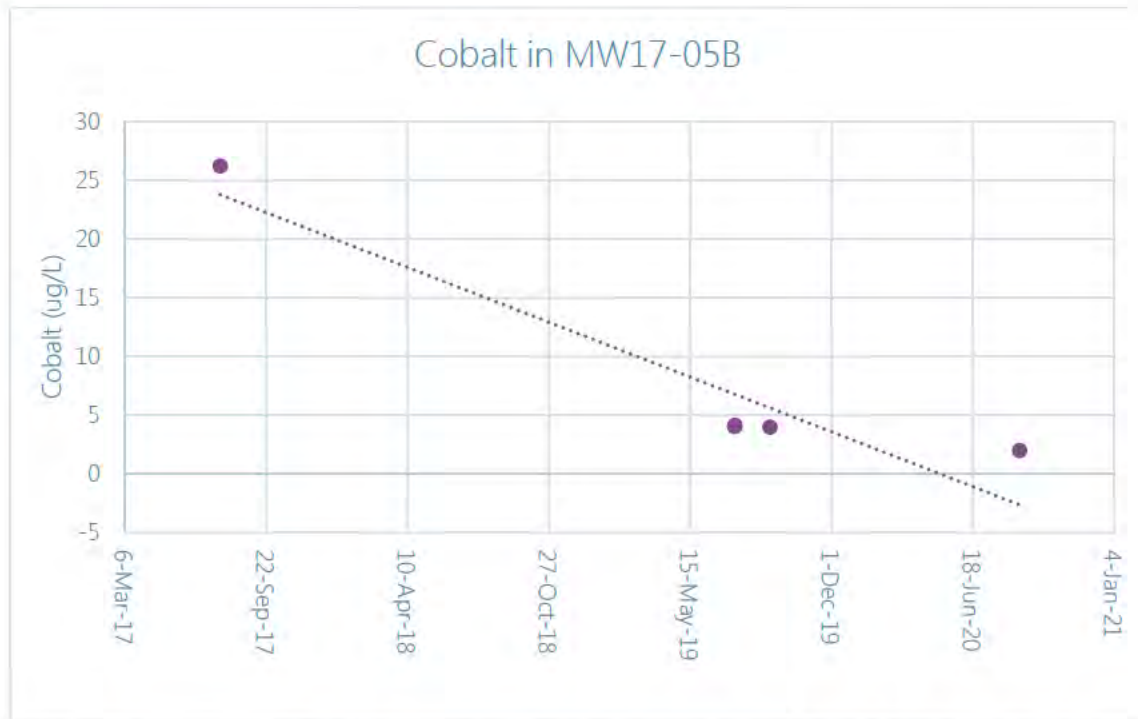
Based on the surface water data, it is likely that surface water migrating through mine impacted areas is either the source or a contributor to the elevated cobalt concentrations in groundwater. Table 8 below shows the sampling events where elevated cobalt was identified.

**Table 8: Summary of Elevated Cobalt**

APEC	Monitoring Well	Sample Date	Location	Geology	Cobalt (µg/L)
AEC 1: Mill / 10 Level Portal	MW17-05B	19-Jul-17	Midstream	Bedrock	26.2
AEC 1: Mill / 10 Level Portal	MW17-05B	17-Jul-19	Midstream	Bedrock	3.99
AEC 1: Mill / 10 Level Portal	MW17-05B (DUP)	17-Jul-19	Midstream	Bedrock	4.1
AEC 1: Mill / 10 Level Portal	MW17-05B	5-Sep-19	Midstream	Bedrock	3.94
AEC 1: Mill / 10 Level Portal	MW17-05B	23-Aug-20	Midstream	Bedrock	1.94
AEC 1: Mill / 10 Level Portal	MW17-06B	19-Jul-17	Midstream	Bedrock	1.64
APEC 10: Burial Site 1	MW17-09A	2-Jul-18	Midstream	Bedrock	14.6
APEC 10: Burial Site 1	MW17-09B	24-Jul-17	Midstream	Overburden	8.04
APEC 10: Burial Site 1	MW17-09B	2-Jul-18	Midstream	Overburden	8.38
APEC 10: Burial Site 1	MW17-09B	18-Nov-18	Midstream	Overburden	15.8
APEC 10: Burial Site 1	MW17-09B	17-Jul-19	Midstream	Overburden	13.8
APEC 10: Burial Site 1	MW17-09B	23-Aug-20	Midstream	Overburden	2.96
AEC 6: Airstrip	MW17-27A	28-Aug-20	Downstream	Overburden	1.44
AEC 6: Airstrip	MW17-27B	24-Jul-17	Downstream	Bedrock	1.9
AEC 6: Airstrip	MW17-27B	16-Jul-19	Downstream	Bedrock	1.27

Cobalt concentrations were all less than BC CSR AW<sub>F</sub> standard of 40 µg/L. However, a groundwater sample collected from monitoring well MW17-05B contained a cobalt concentration of 26.2 µg/L. Groundwater well MW17-05B was subsequently resampled for cobalt on July 17, 2019, September 5, 2019 and August 23, 2020, and the results were 3.99 µg/L, 3.94 µg/L, and 1.94 µg/L respectively. A blind duplicate groundwater sample was submitted for laboratory analysis on July 19, 2017 that contained a concentration of cobalt of 4.1 µg/L. The measured concentrations of cobalt in monitoring well MW17-05B are plotted on Chart 3 along with a linear trend line. The general trend appears to be that cobalt concentrations are decreasing over time in monitoring well MW17-05B.





**Chart 3: Cobalt Concentrations in MW17-05B (AEC 1: Mill / 10 Level Portal)**

As the subsequent analysis of groundwater from monitoring well MW17-05B indicates that the cobalt is not elevated, it is confirmed that cobalt will not be carried forward as a COC.

### 6.3.7 Manganese

The box plots for manganese in groundwater and the data used to generate the box plots are presented as Appendix C. Wood was provided with laboratory reports containing metals analysis of surface water samples collected across the mine site by RTEC. Using the surface water data, Wood generated similar box plots showing the manganese concentrations in surface water at various sampling points.

The box plots generated for the midstream areas show that the data obtained from sampling locations MW17-02, MW17-03, MW17-04, MW17-05, MW17-06, MW17-09, MW17-10 and MW17-13 are outside of the background box plot range. The box plots generated for the downstream areas show that the data obtained from sampling location MW17-11 is outside of the background box plot range. No BC CSR AWF standard apply for manganese.

Based on a review of box plots, it appears that there is elevated manganese in groundwater. Surface water migrating through mine impacted areas is a potential contributor to the elevated manganese concentrations in groundwater. Another potential source of elevated manganese concentrations at the Site may be related to elevated concentrations of hydrocarbons in some monitoring wells. Natural attenuation of hydrocarbons depletes dissolved oxygen in groundwater resulting in the reductive dissolution of manganese from soil. The resulting increase in manganese in groundwater is generally considered a short-term phenomenon as it is expected to precipitate out when aerobic conditions return after the hydrocarbon plume has sufficiently attenuated.

Elevated concentrations of manganese were observed at the groundwater wells MW17-04, MW17-06, MW17-09 and MW17-13 that were impacted with hydrocarbons or PAHs.



Chart 4 shows the concentration of manganese in monitoring wells MW17-04B, MW17-05B, MW17-06B, MW17-9A, MW17-9B, MW17-13 and MW17-14A.

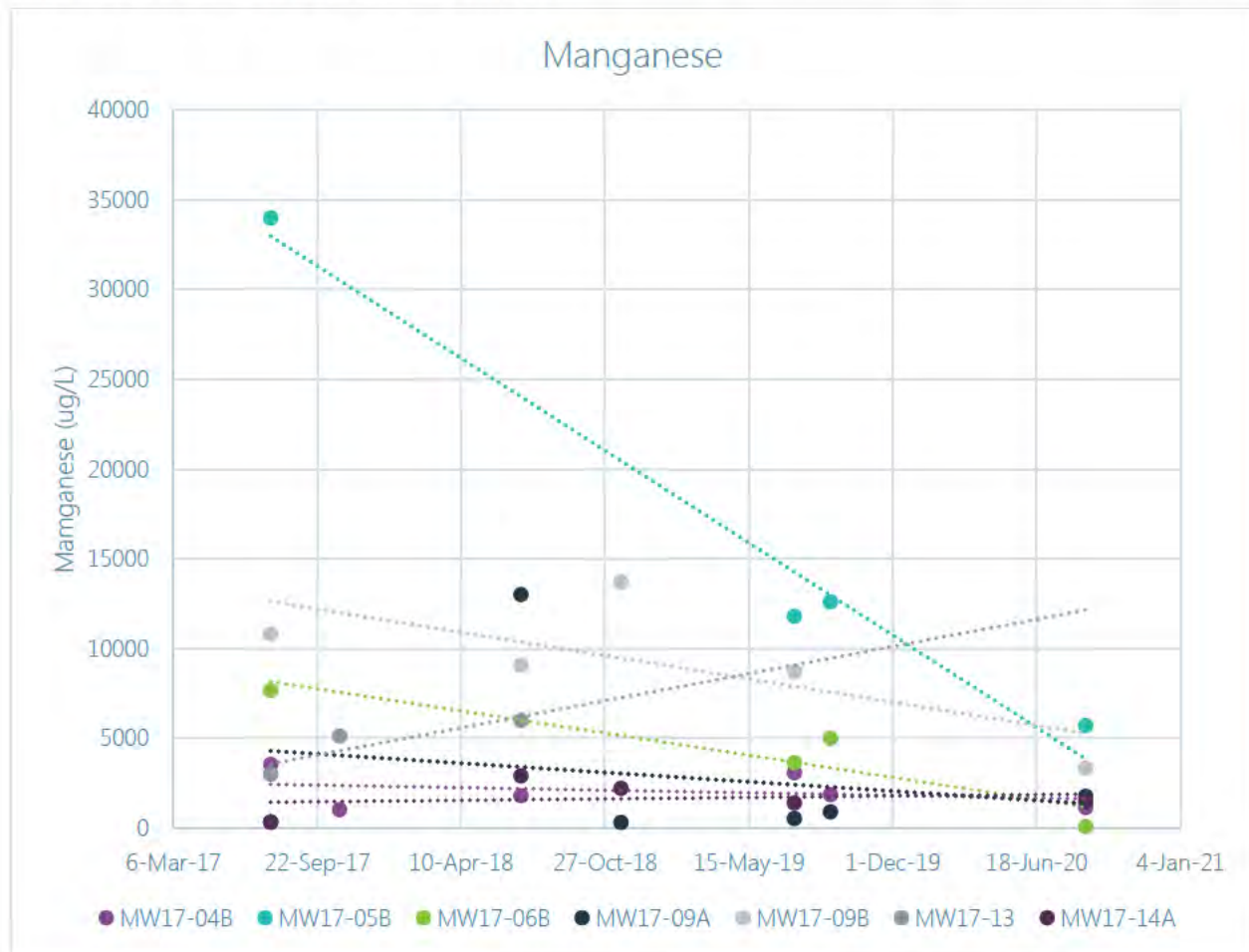


Chart 4: Manganese Concentrations in Groundwater

### 6.3.8 Landfill Compliance Groundwater Monitoring

Permit PR-7927 authorizing the discharge of waste to the Main Landfill includes provisions for annual groundwater monitoring for a period of five years starting in the summer of 2018. The permit requires annual groundwater sampling be conducted at MW17-22A and MW17-22B during summer months. Groundwater quality monitoring parameters include:

- **Field Parameters:** specific electrical conductivity, temperature, ORP, and pH; and
- **Analytical Parameters:** BTEX, EPH, PAH, dissolved metals, pH, alkalinity, bicarbonate, carbonate, chloride, electrical conductivity (EC), fluoride, hardness, hydroxide, total iron, total magnesium, total manganese, nitrate, nitrite, ammonia, total potassium, total sodium, sulphate, TDS, TIC, TOC, COD and turbidity, acidity (hot peroxide titration) and cyanides (weak acid dissociable (WAD), free, total, cyanate and thiocyanate).

Light-end petroleum hydrocarbon (BTEX) concentrations were detectable in the groundwater samples from the deep well (MW17-22A) in 2018 and 2019; however, elevated concentrations of toluene and xylenes were not identified in the 2020 sampling event, as it was during the previous groundwater sampling event. Concentrations of ethylbenzene were observed but were more than three times lower

than the one observed in 2019. Concentrations of BTEX were not detected in the groundwater samples from the shallow well (MW17-22B). Concentrations of heavier end hydrocarbons (VH<sub>w</sub>, LEPH<sub>w</sub>) were not detected in groundwater samples collected from the shallow well (MW17-22B) or in the deep well (MW17-22A) in 2020, confirming the results of 2019. Concentrations of naphthalene in groundwater from MW17-22A were elevated in 2020; and measured concentrations were slightly higher than the 2019 sampling events. However, the concentrations were still lower than those observed in 2017 and 2018. No PAHs were detected in the shallow well (MW17-22B). Concentrations of ethylbenzene, xylenes and naphthalene in groundwater at the deep well (MW17-22A) demonstrate a steady declining trend over time which is likely attributed to the natural attenuation of a finite and localized source.

Concentrations of dissolved metals in the groundwater samples from MW17-22A and MW17-22B were reported at low levels for all sampling events in 2017, 2018, 2019 and 2020. The measured dissolved metals concentrations from the 2020 sampling are consistent with concentrations observed during the previous Site Investigation.

Total metals in groundwater samples were analysed in 2019 and 2020. The results indicated that the groundwater sample collected from the shallow groundwater well MW17-22B contained an elevated concentration of total cobalt in 2019. In 2020, cobalt concentration was lower than the MDL. Total metals were detected at concentrations generally higher compared to 2019 results for MW17-22A, and at concentrations generally lower compared to 2019 results for MW17-22B. It should be noted that analysis of dissolved metals in groundwater well MW17-22B in 2017, 2018, 2019 and 2020 did not identify elevated concentrations of metals.

All cyanide species were reported at low concentrations in groundwater samples collected from both MW17-22A and MW17-22B during the 2017, 2018, 2019 and 2020 sampling events.

## 6.4 Surface Water Investigation

Surface water sample SW20-02 located at AEC 1 (Mill – 10 Level Portal) contained a detectable concentration of methylnaphthalene.

## 7.0 Conclusions

The following conclusions were made during this assessment as they relate to the objectives and scope of work defined in Sections 2.0 and 3.0.

### 7.1 Physical Remediation – Soil Hydrocarbon Contamination

In 2020, Wood completed a year-end sampling of Treatment Area 1 and Treatment Area 2 to determine the effectiveness of the remediation program. Based on the results of the 2020 soil sampling and the data collected during the 2017 SI, 2018 SSI and 2019 SSI, concentrations of LEPH have decreased significantly as shown in the following tables.

**Treatment Area 1 – 95<sup>th</sup> Percentile Over Time**

Sampling Event	95 <sup>th</sup> Percentile (mg/kg)	Average Concentration (mg/kg)
2017 In-Situ (LEPH)	3748	3138
2018 (Year End) LEPH	3582	1857
2019 (Mid-Year) LEPH	2005	1217
2019 (Year End) LEPH	1394	738
2020 (Year End) LEPH	1164	710

**Treatment Area 2 – 95<sup>th</sup> Percentile 2019 Year End Sampling**

Sampling Event	95 <sup>th</sup> Percentile (mg/kg)	Average Concentration (mg/kg)
2017 In-Situ (LEPH)	3748	3138
2019 (Year End) LEPH	2772	1619
2020 (Year End) LEPH	1292	813

### 7.2 Groundwater Sampling Program - Hydrocarbons

Groundwater impacted by petroleum hydrocarbons was identified at AEC 1 and AEC 2. LNAPL was identified at monitoring well MW17-17B. Soil impacted by petroleum hydrocarbons has also been identified at those AECs during previous assessments. Contamination identified within those AECs have impacted groundwater quality.

Concentrations observed in 2020 for PAHs downstream of the TSF (MW17-20A) were lower than the previous groundwater sampling events completed in July and October 2017. The groundwater quality in that area has improved since 2017. Natural attenuation is present and concentrations are decreasing with time.

Concentrations observed in 2020 for BTEX and PAHs at the Main Landfill (APEC 9) (MW17-22A) were lower than the previous groundwater sampling events completed in July and October 2017. The groundwater quality in that area has improved since 2017. Natural attenuation is present and concentrations are decreasing with time.

### 7.3 Background Groundwater Assessment

The 2017 to 2020 field investigations identified elevated concentrations of dissolved metals: antimony, cobalt, manganese, cadmium, copper, lithium, iron, uranium and arsenic in groundwater. An assessment of background concentrations of dissolved metals has indicated that antimony, arsenic, uranium, iron, lithium, cobalt and manganese are elevated compared to background concentrations and could be attributed to historical mining activities. Wood observed that the concentrations of dissolved metals are generally decreasing over time. When compared to the CSR, many of the dissolved metals concentrations that are elevated are still less than CSR AW<sub>F</sub>. Based on observed concentrations compared to background, manganese appears to be the remaining dissolved metals that would require further assessment.

Elevated dissolved concentrations of manganese appear to be associated with the AEC 1 – Mill Building and 10 Level Portal; however, elevated manganese was also identified at APEC 10 – Burial Site # 1, APEC 12 – Burial Site # 2 and at AEC 2 – Tank Farm and Fuel Line area. The location where elevated manganese is identified were all in disturbed areas and the highest concentrations were found around the AEC 1 – Mill Building and 10 Level Portal.

### 7.4 Surface Water Sampling

Surface water sample SW20-02, located at AEC 1 (Mill – 10 Level Portal), contained a detectable concentration of methylnaphthalene. It has not been determined if the detectable concentration can be related to former activities at AEC 1 or were introduced during laboratory testing. Traces of contaminants are commonly introduced during laboratory testing; however, the concentrations are not considered significant by the lab if they are less than a pre-determined limit. Wood recommends to re-sample this location during the next field season for analysis of methylnaphthalene to confirm the detection in surface water.

### 7.5 Summary of APECs and AECs

Based on the results of the 2020 SSI, the following APECs/AECs in the table below are recommended to be carried forward for additional assessment and/or remediation work.

Summary of AECs and Associated PCOCs and COCs

Initial APEC	Description	2019 Classification	Contaminant Type	Potential contaminants of concern (PCOCs) <sup>1</sup>	Contaminants of Concern (COCs) <sup>2</sup>
APEC 1	Mill / 10 Level Portal	AEC 1	Diesel fuel and lubricants	Groundwater: cobalt, manganese	Soil: heavy extractable petroleum hydrocarbons (HEPH) Groundwater: manganese, acenaphthene, methylnaphthalene, LEPH <sub>w</sub> , extractable petroleum hydrocarbons (EPH <sub>w10-19</sub> )
APEC 2 / APEC 14	Tank Farm Area / Fuel Lines	AEC 2	Diesel fuel, aviation fuels and possibly	Groundwater: manganese	Soil: volatile petroleum hydrocarbons (VPH <sub>s</sub> ), LEPH <sub>s</sub> Groundwater: Groundwater: manganese, LNAPL,





Initial APEC	Description	2019 Classification	Contaminant Type	Potential contaminants of concern (PCOCs) <sup>1</sup>	Contaminants of Concern (COCs) <sup>2</sup>
			gasoline, waste rock		methylnaphthalene and LEPH <sub>w</sub>
APEC 4	Fuel Pump Shed	AEC 3	Diesel fuel and Avgas		Soil: LEPH
APEC 5	Mechanical Shop / 11 Level Portal	AEC 4	Fuels, lubricants, and waste rock storage		Soil: toluene, xylenes, VPHs, LEPH and HEPH
APEC 9	Main Landfill	AEC 5	Inferred to be diesel fuel	-	Groundwater: BTEX, LEPHW, methylnaphthalene, naphthalene and metals
APEC 10	Burial Site 1 (Fmr. Chalet)	APEC 10	Waste rock	Groundwater: manganese	Groundwater: manganese
APEC 11	Airstrip	AEC 6	Waste rock	Groundwater: metals	-
APEC 12	Burial Site #2	APEC 12	Contents of burial site, waste rock	Groundwater: manganese	Groundwater: manganese
APEC 13	Warehouse East Area	AEC 7	Stored / used fuel and lubricants	Groundwater: BTEX, LEPH <sub>w</sub> , naphthalene and metals	Soil: LEPH, HEPH

**Notes:**

- <sup>1</sup> Elevated metal concentrations in soil are expected across the surface of a mine site. Elevated metals in soil may need to be addressed through determining background concentrations or through a risk assessment.
- <sup>2</sup> Note, PAG material is identified in other locations within the mine site; however, those areas have been identified by SnipGold and are scheduled for removal to the TSF. This has been included as an APEC due to potential for metals leaching.



## 8.0 Closure

This report was prepared exclusively for SnipGold Corporation by Wood Environment & Infrastructure Solutions (Wood). The information, conclusions and estimates contained in this report are based exclusively on: i) information available at the time of preparation, ii) the accuracy and completeness of data supplied by the Client or by third parties as instructed by the Client, and iii) the assumptions, conditions and qualifications/limitations set forth in this report.

The field work completed in this program was completed in general accordance with industry standards with limits imposed by existing infrastructure and site conditions. Interpretations and conclusions made within this report were based upon the field work and discussions with SnipGold Corporation staff.

This report has been prepared in accordance with generally accepted practices in the environmental industry. No other warranty, expressed or implied, is made.

Respectfully submitted,

**Wood Environment & Infrastructure Solutions**  
a Division of Wood Canada Limited

**Prepared by:**



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Associate Environmental Scientist

**Approved by:**



**Mario Bianchin, Ph.D., P.Geo.**  
Principal Hydrogeologist  
Group Manager,  
Environmental Engineering and Contaminants

## 9.0 References

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**wood.**

**Figures**



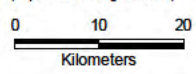


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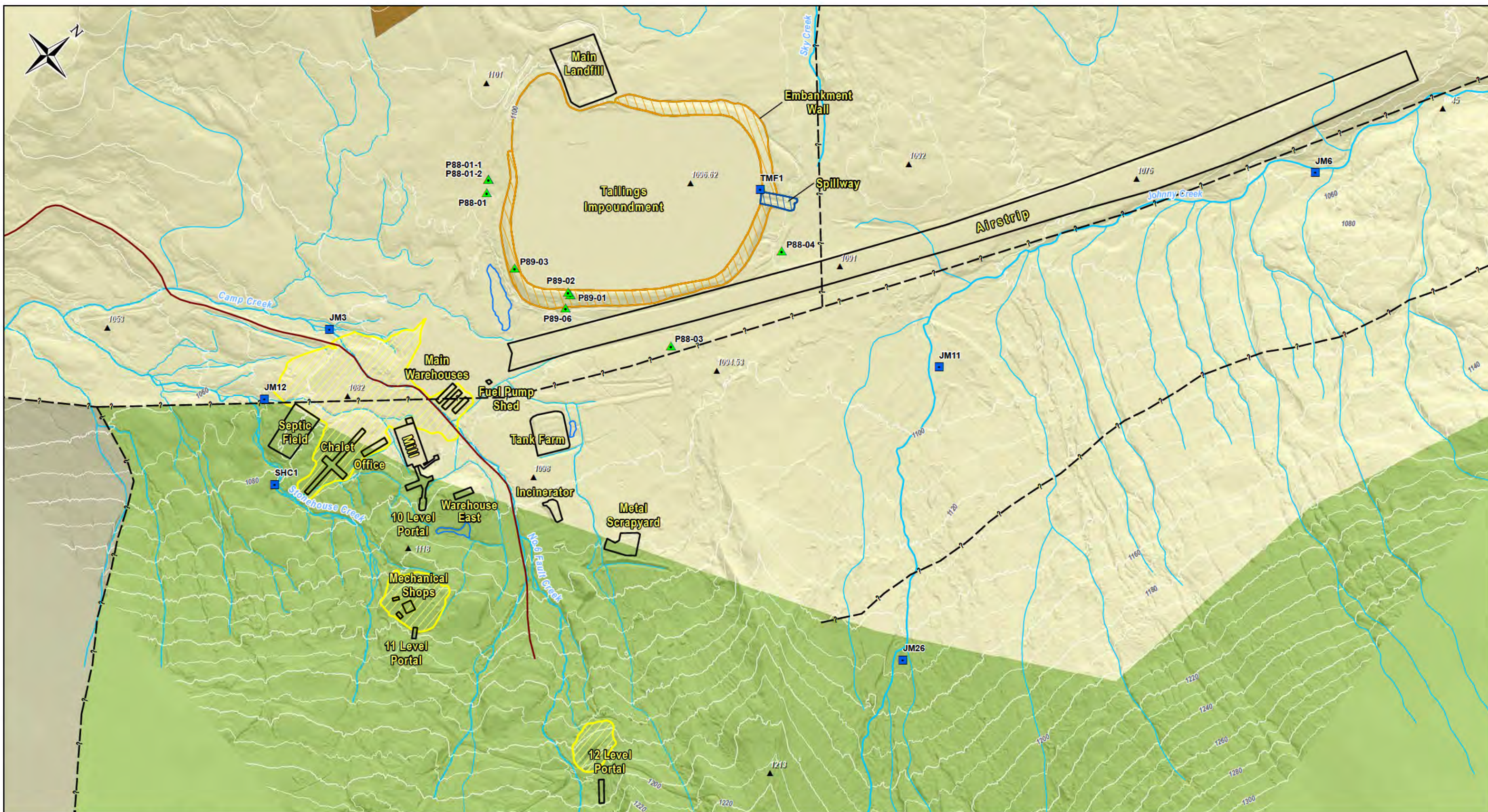
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- ✈ Airfield
- ⬡ Mine
- ⬢ Camp
- Laydown area
- ▲ Mountain
- Highway
- Access roads
- Watercourse
- Lake
- Protected area

References:  
 DataBC Data Distribution Service  
 Open Government License  
 (<http://www.data.gov.bc.ca/>)



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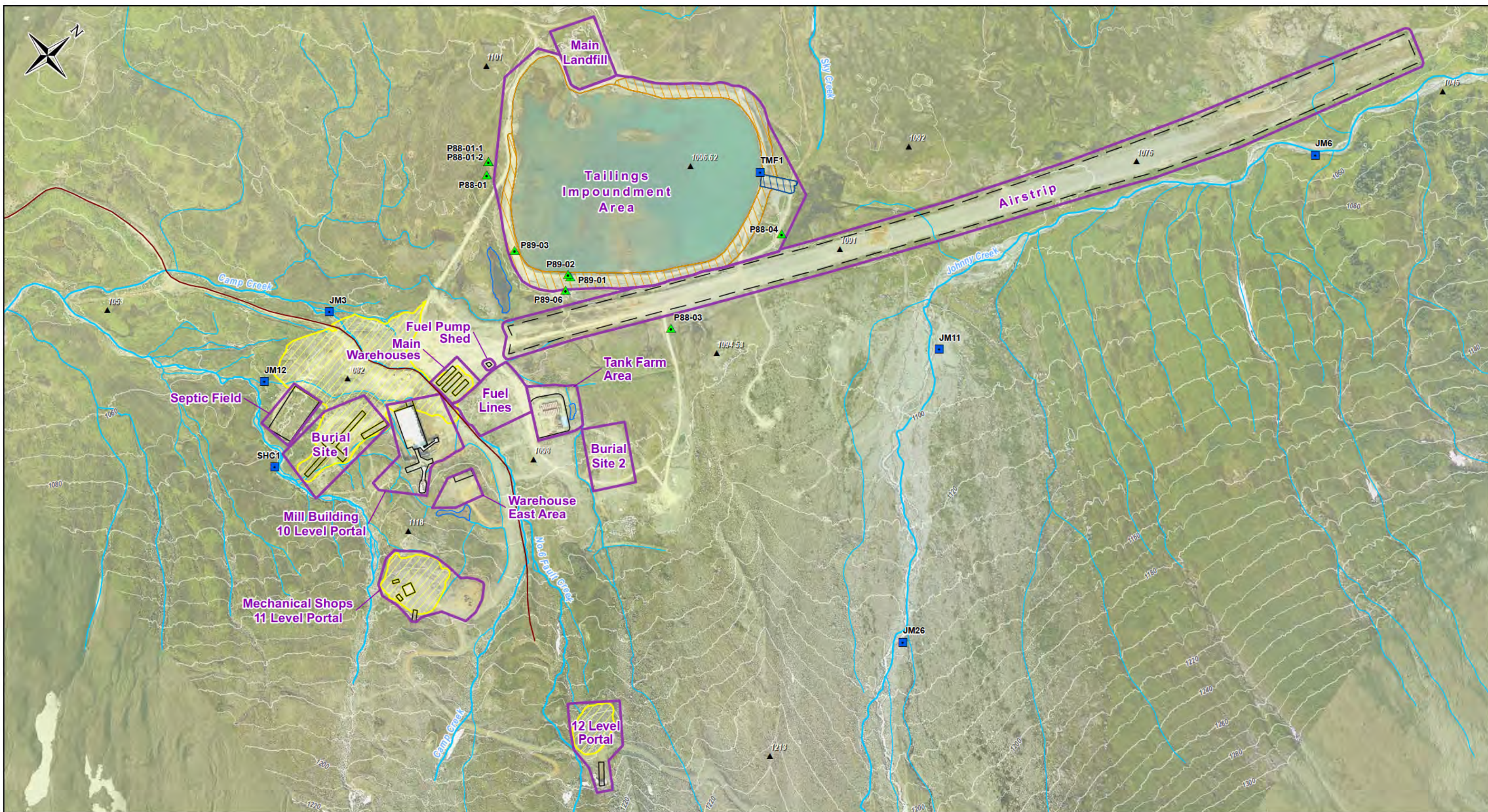
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Surface Water Station	Pond	<b>Geological Units</b>
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Access road	Embankment Wall	Lower Jurassic - Hazelton Group
Watercourse	Spillway	Upper Triassic - Stuhini Group
LiDAR contour (10m)	Waste Rock Storage	Devonian to Permian - Stikine Assemblage
		Early Jurassic - Eskay Porphyry, Knipple Porphyry or Inel Stock



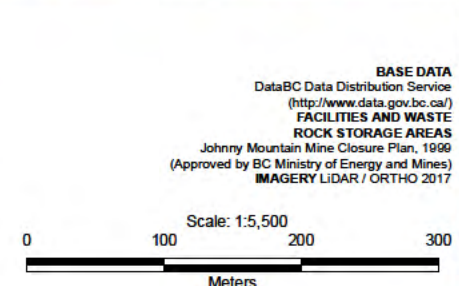
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COORDINATE SYSTEM: NAD 1983 UTM Zone 9N			



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- Legend**
- ▲ Spot height (m)
  - Access road
  - Watercourse
  - LiDAR contour (10m)
  - ▭ Historic Services and Facilities
  - Airstrip
  - ▭ Pond
  - ▭ Tailings Impoundment
  - ▭ Embankment Wall
  - ▭ Spillway
  - ▭ Waste Rock Storage
  - ▲ Existing Piezometers
  - Surface Water Station
  - ▭ Areas of Potential Environmental Concern (APECs)



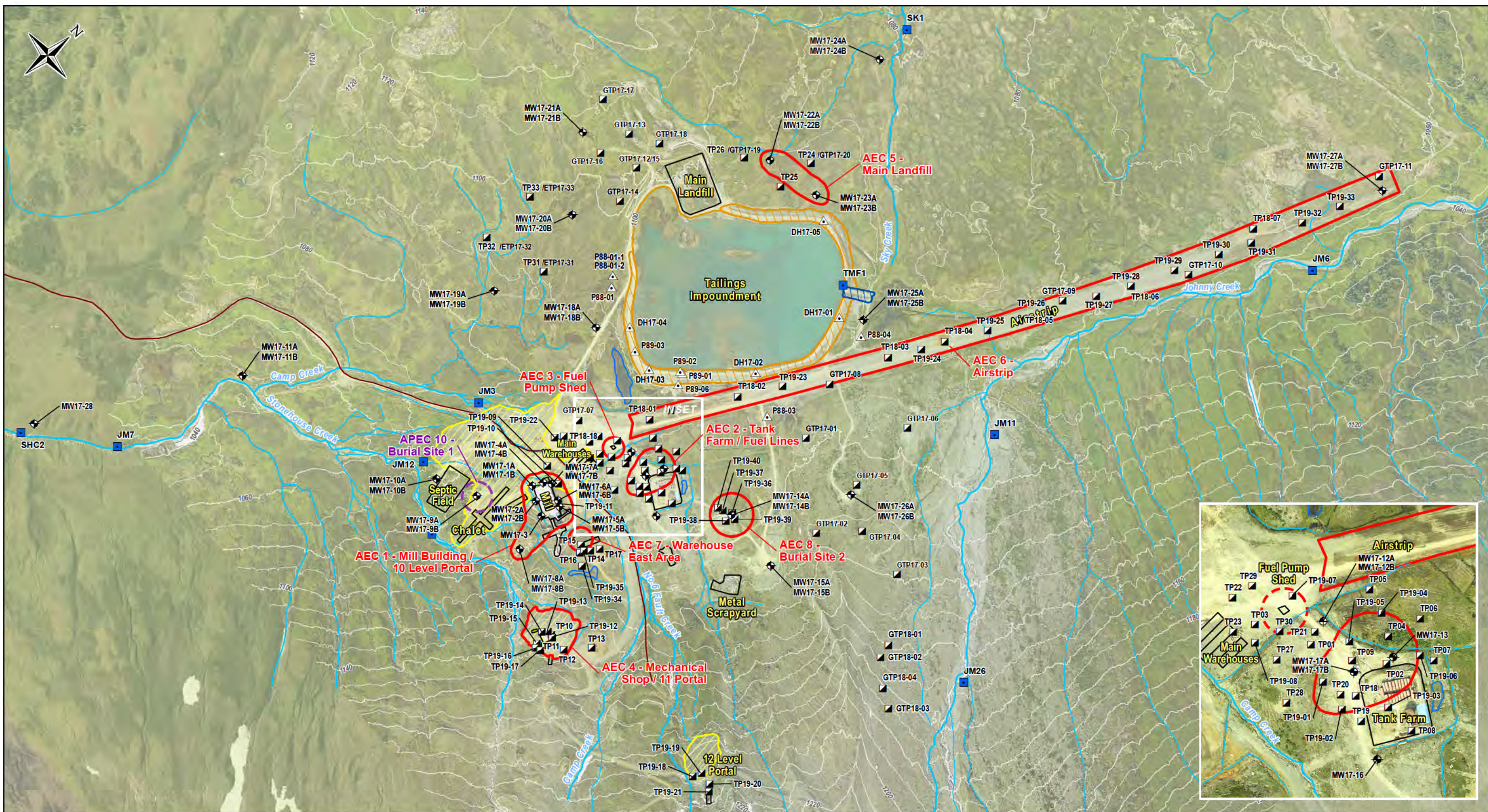
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**SNIPGOLD CORPORATION**

TITLE:  
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PROJECT: <b>Johnny Mountain Mine Reclamation Project</b>			
DATE: December, 2020	ANALYST: PK	QA/QC: AD	<b>Figure 3</b>
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JOB No: VE52655D			
COORDINATE SYSTEM: NAD 1983 UTM Zone 9N			



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 Last updated by paul.kwon

**Legend**

Access road	Historic Services and Facilities	Monitoring Well
Watercourse	Pond	Test Pit
LiDAR contour (10m)	Tailings Impoundment	Piezometer
	Embankment Wall	Surface Water Station
	Spillway	AEC
	Waste Rock Storage	Undelineated extent (APEC)

For nested wells A suffix designate Deep, B suffix designate Shallow

BASE DATA  
 DataBC Data Distribution Service  
 (http://www.data.gov.bc.ca/)  
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 (Approved by BC Ministry of Energy and Mines)  
 IMAGERY LIDAR / ORTHO 2017

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CLIENT:  
**SNIPGOLD CORPORATION**

TITLE:  
**Areas of Potential Environmental  
 Concern and Areas of  
 Environment Concern**

PROJECT:  
**Johnny Mountain  
 Mine Reclamation Project**


DATE: December, 2020 ANALYST: PK QA/QC: AD

Figure 4

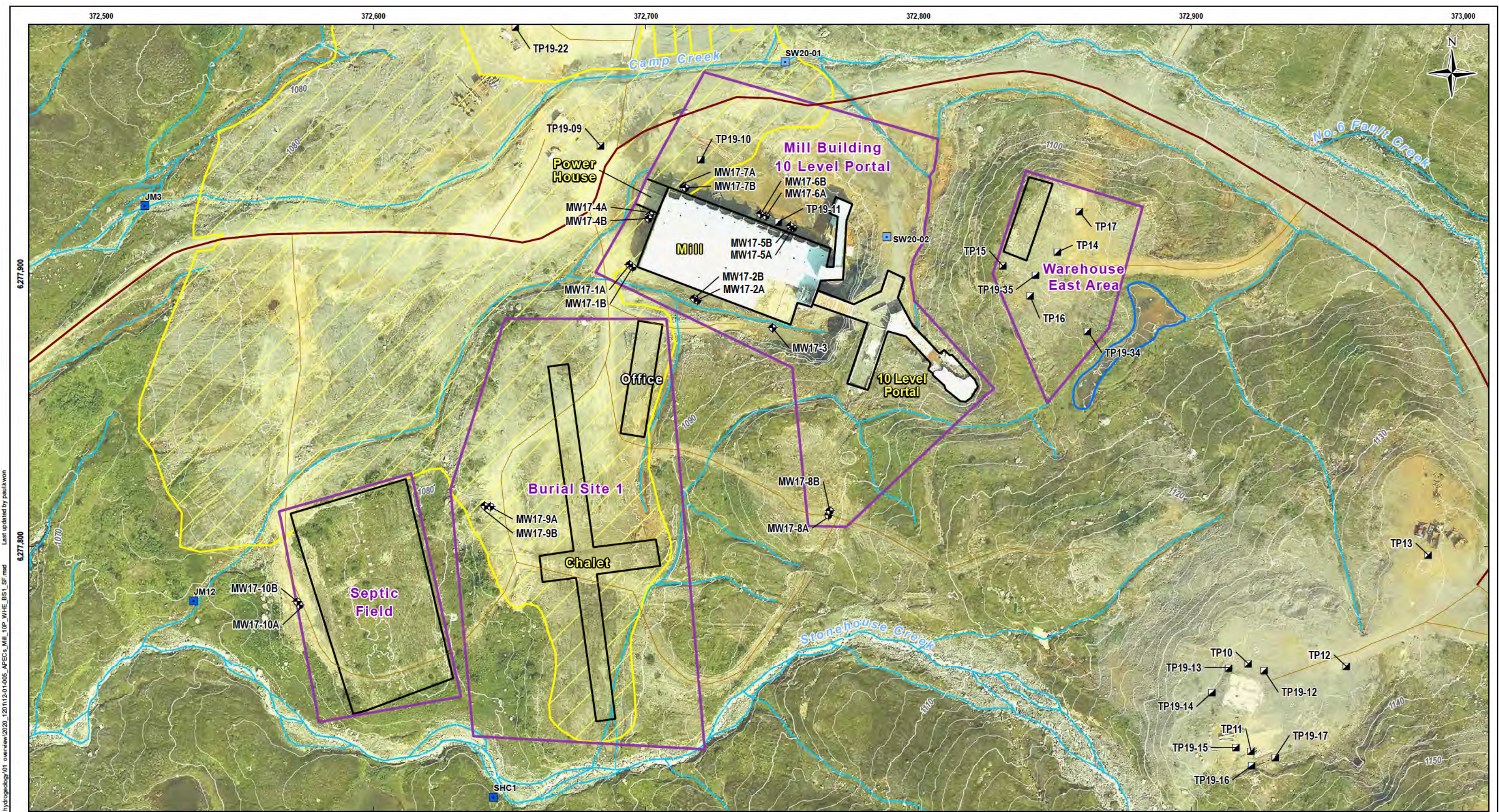
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JOB No:  
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COORDINATE SYSTEM:  
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**Legend**

- Access road
- Mine road
- Watercourse
- LiDAR contour (2m)
- Historic Services and Facilities
- Pond
- Waste Rock Storage
- Areas of Potential Environmental Concern (APECs)
- ⊕ Monitoring Well
- ⊠ Test Pit
- ⊠ Surface Water Station
- ⊠ Surface Water Sample

BASE DATA  
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(http://www.data.gov.bc.ca/)  
FACILITIES AND WASTE  
ROCK STORAGE AREAS  
Johnny Mountain Mine Closure Plan, 1999  
(Approved by BC Ministry of Energy and Mines)  
IMAGERY LIDAR / ORTHO 2017

Scale: 1:1,300

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Meters



CLIENT:  
**SNIPGOLD CORPORATION**

TITLE:  
**Sample Location Plan:  
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Area East**

PROJECT:  
**Johnny Mountain  
Mine Reclamation Project**

DATE: December, 2020    ANALYST: PK    QA/QC: AD    **Figure 5**

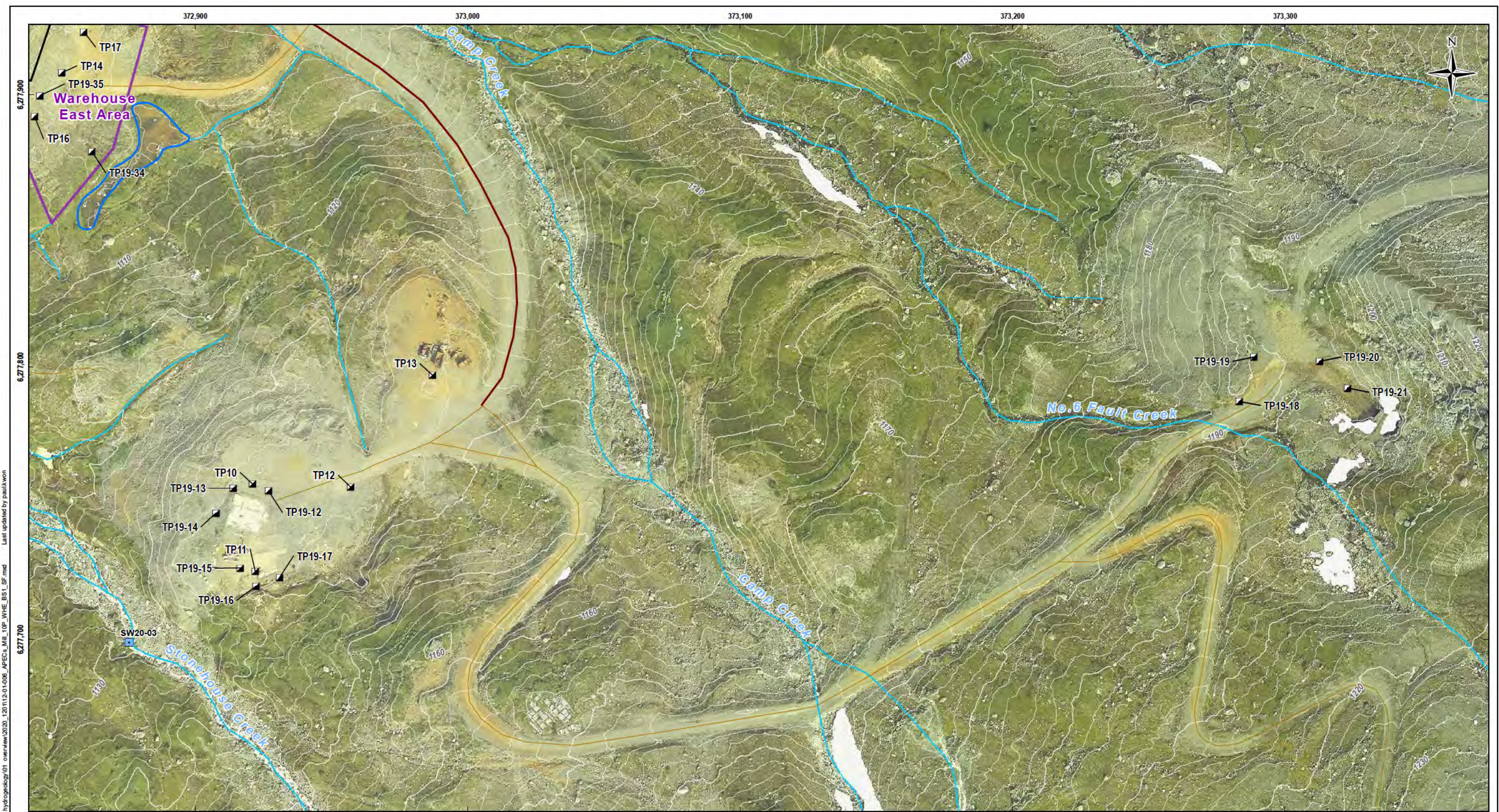
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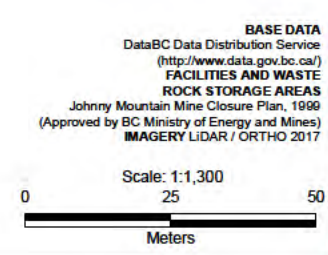
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 Last updated by paulkwon

- Legend**
- Access road
  - Mine road
  - Watercourse
  - LIDAR contour (2m)
  - Historic Services and Facilities
  - Pond
  - Waste Rock Storage
  - Areas of Potential Environmental Concern (APECs)
  - ◆ Monitoring Well
  - Test Pit
  - Surface Water Sample

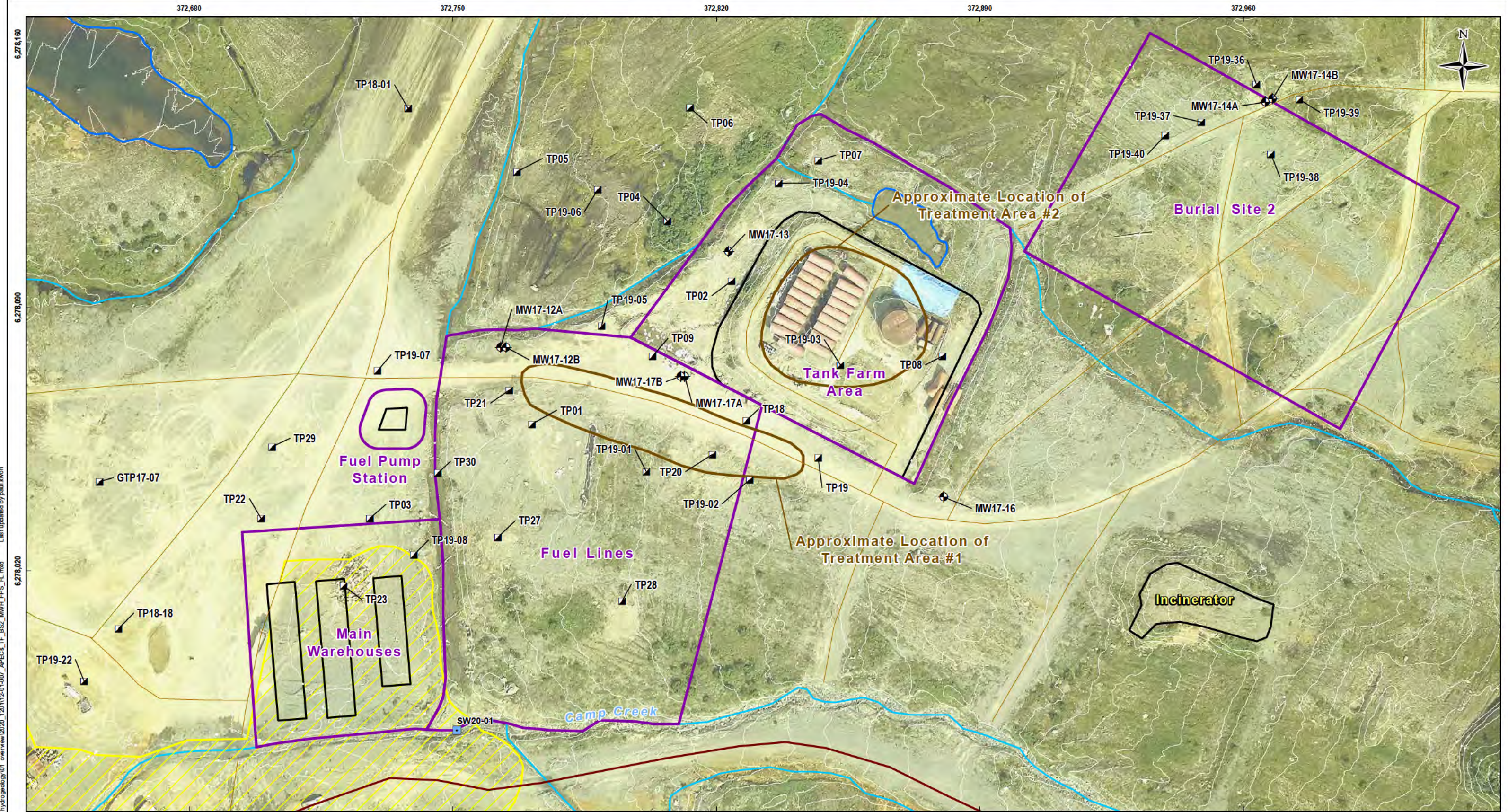


CLIENT:  
**SNIPGOLD CORPORATION**

TITLE:  
**Sample Location Plan:  
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 Portal / Level 12 Portal**

PROJECT:		<b>Johnny Mountain Mine Reclamation Project</b>	
DATE: December, 2020	ANALYST: PK	QA/QC: AD	<b>Figure 6</b>
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JOB No: VE52655D			
COORDINATE SYSTEM: NAD 1983 UTM Zone 9N			





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- Legend**
- Access road
  - Mine road
  - Watercourse
  - LiDAR contour (1m)
  - Historic Services and Facilities
  - Pond
  - Waste Rock Storage
  - Areas of Potential Environmental Concern (APECs)
  - Approximate Treatment Area
  - ⊕ Monitoring Well
  - ⊠ Test Pit
  - ⊠ Surface Water Sample

BASE DATA  
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**FACILITIES AND WASTE  
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 (Approved by BC Ministry of Energy and Mines)  
 IMAGERY LIDAR / ORTHO 2017

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CLIENT:  
**SNIPGOLD CORPORATION**

TITLE:  
**Sample Location Plan:  
 Tank Farm and Fuel Line  
 Area / Pump Island Station**

PROJECT: <b>Johnny Mountain Mine Reclamation Project</b>			
DATE: December, 2020	ANALYST: PK	QA/QC: AD	<b>Figure 7</b>
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JOB No: VE52655D			
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373,450

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GTP17-04

GTP17-03

GTP17-02

GTP18-01

GTP18-02

GTP18-04

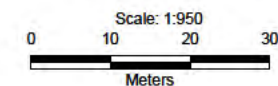
MW17-15A MW17-15B

GTP18-03

**Legend**

-  Access road
-  Mine road
-  Watercourse
-  LiDAR contour (1m)
-  Historic Services and Facilities
-  Pond
-  Waste Rock Storage
-  Areas of Potential Environmental Concern (APECs)
-  Monitoring Well
-  Test Pit

BASE DATA  
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(http://www.data.gov.bc.ca/)  
FACILITIES AND WASTE  
ROCK STORAGE AREAS  
Johnny Mountain Mine Closure Plan, 1999  
(Approved by BC Ministry of Energy and Mines)  
IMAGERY LIDAR / ORTHO 2017



CLIENT:  
**SNIPGOLD CORPORATION**

TITLE:  
**Sample Location Plan:  
Burial Site 2 Downstream**

PROJECT:  
**Johnny Mountain  
Mine Reclamation Project**

DATE: December, 2020    ANALYST: PK    QA/QC: AD    **Figure 8**

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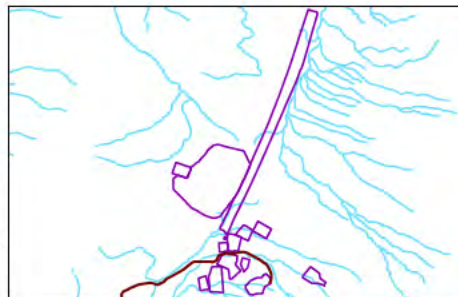
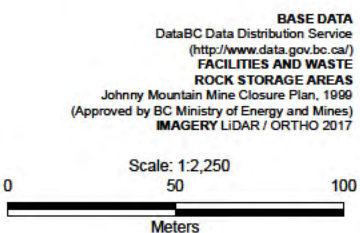


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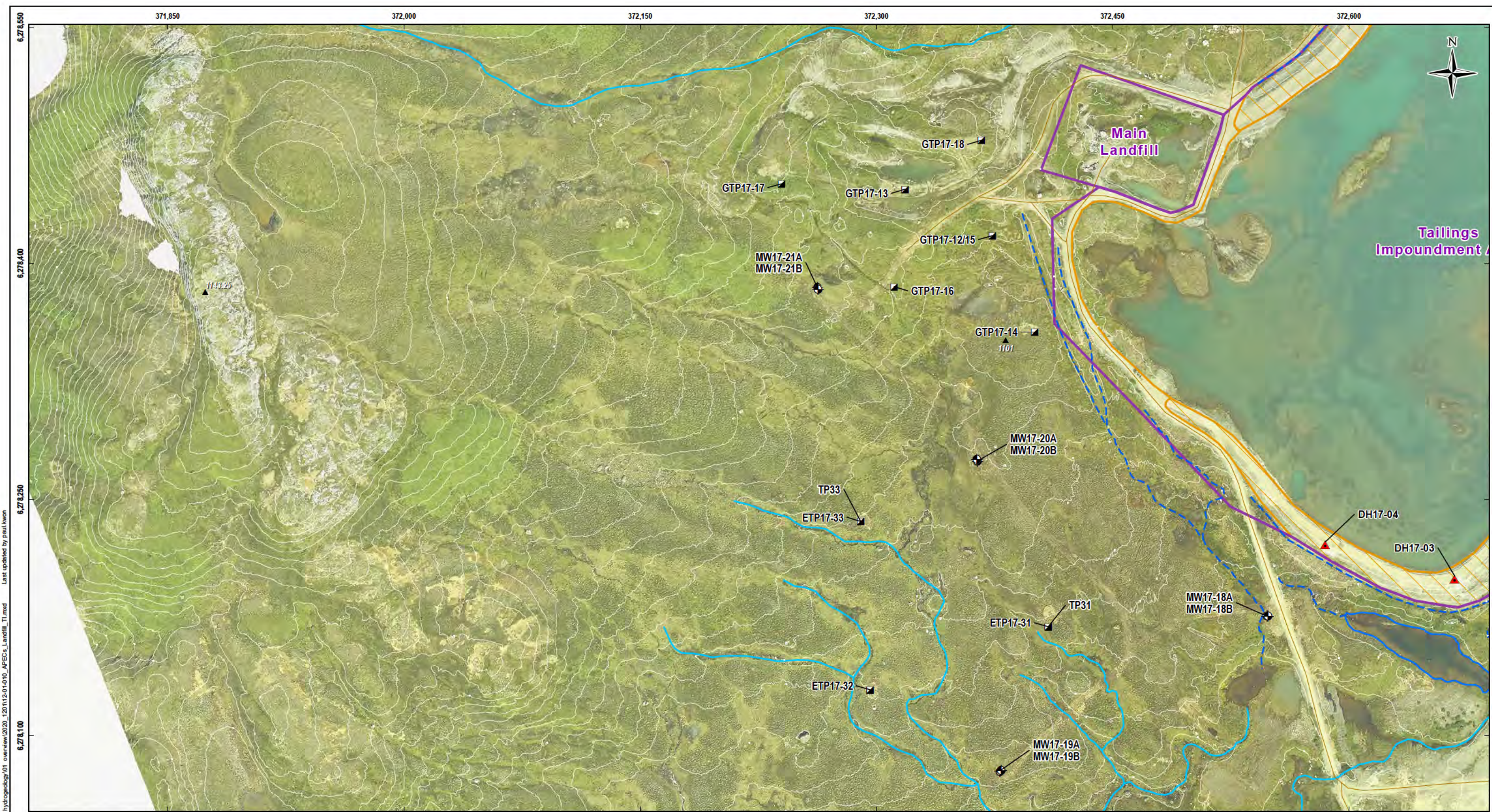
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  - ▭ Tailings Impoundment
  - ▨ Embankment Wall
  - ▩ Spillway
  - ▭ Pond
  - ▭ Areas of Potential Environmental Concern (APECs)
  - ⊕ Monitoring Well
  - ⊠ Test Pit
  - ▲ Piezometer
  - Surface Water Station



CLIENT:  
**SNIPGOLD CORPORATION**

TITLE:  
**Sample Location Plan:  
 Main Landfill / Tailings  
 Impoundment Area 1**

PROJECT: <b>Johnny Mountain Mine Reclamation Project</b>		DATE: December, 2020		ANALYST: PK	QA/QC: AD	<b>Figure 9</b>	<b>wood.</b>
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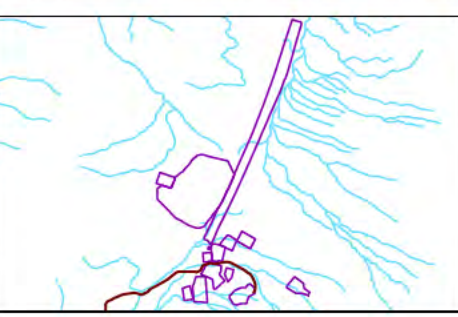


- Legend**
- ▲ Spot height (m)
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  - Mine road
  - Watercourse
  - LiDAR contour (2m)
  - Interceptor Ditch / Toe Drainage
  - ▭ Tailings Impoundment
  - ▨ Embankment Wall
  - ▩ Spillway
  - ▭ Pond
  - ▭ Areas of Potential Environmental Concern (APECs)
  - ⊕ Monitoring Well
  - ▣ Test Pit
  - ▲ Piezometer

BASE DATA  
DataBC Data Distribution Service  
(http://www.data.gov.bc.ca/)  
**FACILITIES AND WASTE  
ROCK STORAGE AREAS**  
Johnny Mountain Mine Closure Plan, 1999  
(Approved by BC Ministry of Energy and Mines)  
IMAGERY LIDAR / ORTHO 2017

Scale: 1:2,250

0 50 100  
Meters

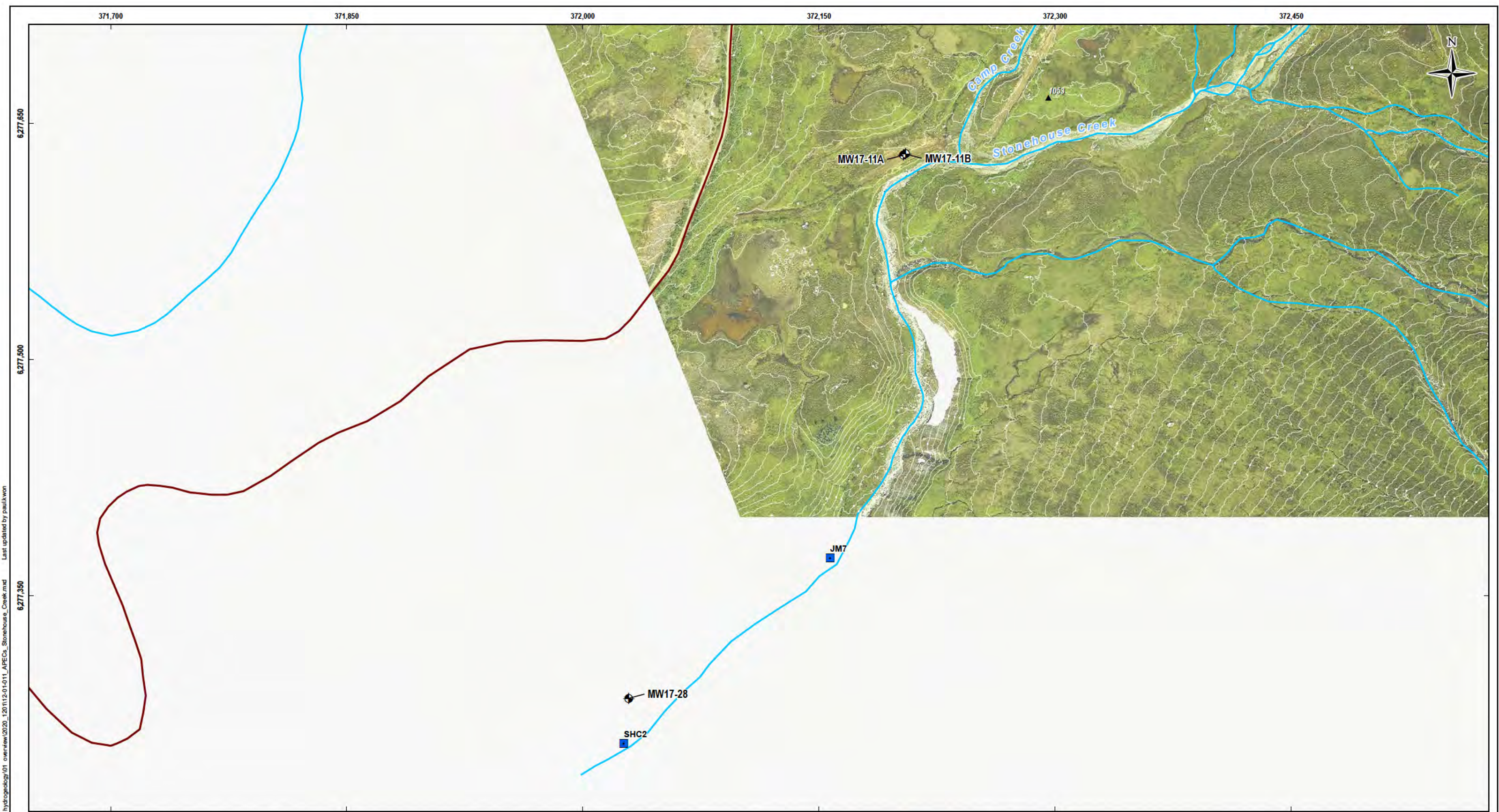


CLIENT:  
**SNIPGOLD CORPORATION**

TITLE:  
**Sample Location Plan:  
Main Landfill / Tailings  
Impoundment Area 2**

PROJECT: <b>Johnny Mountain Mine Reclamation Project</b>		DATE: December, 2020		ANALYST: PK	QA/QC: AD	<b>Figure 10</b>
GIS FILE: 12-01-010_APECs_Landfill_TI.mxd		JOB No: VE52655D		COORDINATE SYSTEM: NAD 1983 UTM Zone 9N		
						<b>wood.</b>

Y:\GIS\Projects\MM\0649\_Johnny Mt\Mapping\12\_hydrology\01\_overview\2020\_12\11\2-01-10\_APECs\_Landfill\_TI.mxd Last updated by paul.kwon



Y:\GIS\Projects\MM\MM0649\_Johnny Mt\Mapping\12\_hydrology\01\_overview\020\_120\112-011\_APECs\_Stonehouse\_Creek.mxd Last updated by paulkwon

- Legend**
- ▲ Spot height (m)
  - Access road
  - Mine road
  - Watercourse
  - LiDAR contour (2m)
  - ⊕ Monitoring Well
  - Surface Water Station

BASE DATA  
DataBC Data Distribution Service  
(<http://www.data.gov.bc.ca/>)  
FACILITIES AND WASTE  
ROCK STORAGE AREAS  
Johnny Mountain Mine Closure Plan, 1999  
(Approved by BC Ministry of Energy and Mines)  
IMAGERY LIDAR / ORTHO 2017

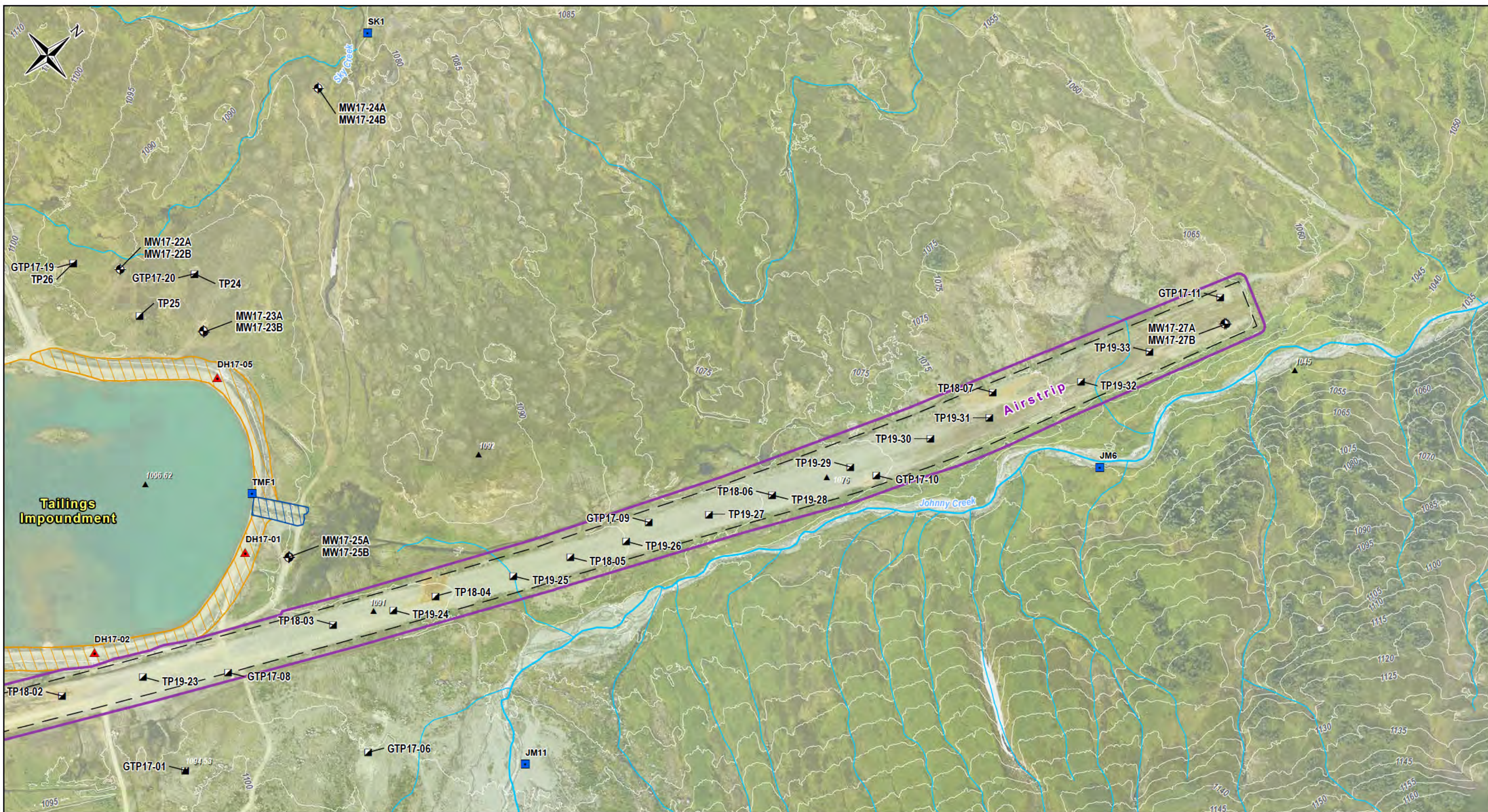
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Meters



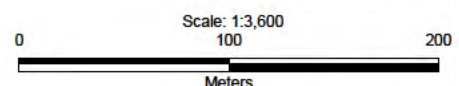
CLIENT: <b>SNIPGOLD CORPORATION</b>	PROJECT: <b>Johnny Mountain Mine Reclamation Project</b>
TITLE: <b>Sample Location Plan: Stonehouse Creek</b>	DATE: December, 2020
	ANALYST: PK
	QA/QC: AD
	<b>Figure 11</b>
	GIS FILE: 12-01-011_APECs_Stonehouse_Creek.mxd
	JOB No: VE52655D
	COORDINATE SYSTEM: NAD 1983 UTM Zone 9N





- Legend**
- ▲ Spot height (m)
  - Access road
  - Watercourse
  - LiDAR contour (5m)
  - Airstrip
  - Pond
  - Tailings Impoundment
  - Embankment Wall
  - Spillway
  - ⊕ Monitoring Well
  - ⬛ Test Pit
  - ▲ Piezometer
  - Surface Water Station
  - ▭ Areas of Potential Environmental Concern (APECs)

BASE DATA  
DataBC Data Distribution Service  
(<http://www.data.gov.bc.ca/>)  
FACILITIES AND WASTE  
ROCK STORAGE AREAS  
Johnny Mountain Mine Closure Plan, 1999  
(Approved by BC Ministry of Energy and Mines)  
IMAGERY LIDAR / ORTHO 2017



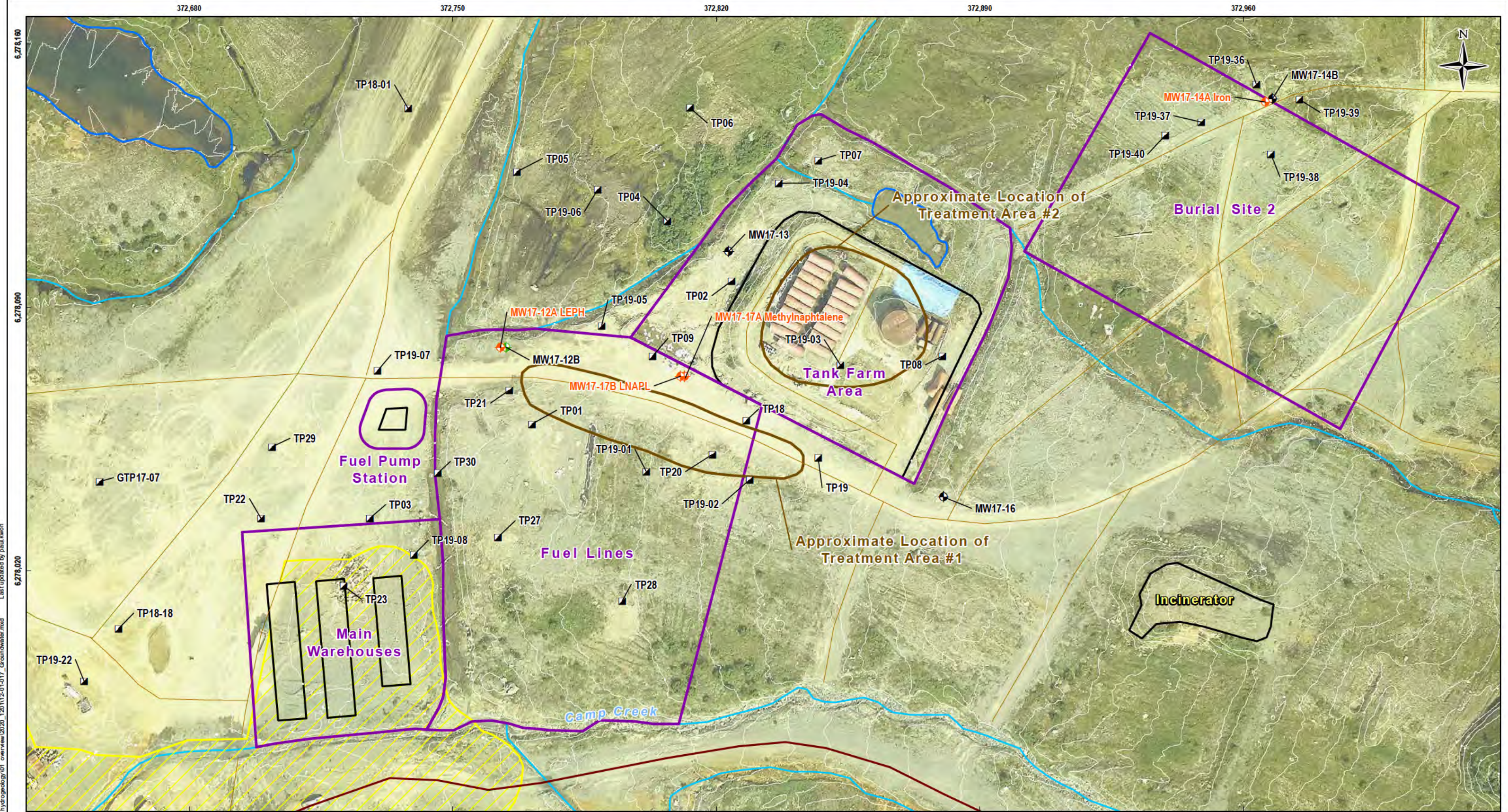
CLIENT:  
**SNIPGOLD CORPORATION**

TITLE:  
**Sample Location Plan:  
Airstrip**

PROJECT: <b>Johnny Mountain Mine Reclamation Project</b>			
DATE: December, 2020	ANALYST: PK	QA/QC: AD	<b>Figure 12</b>
GIS FILE: 12-01-012_APECs_Airstrip_v2.mxd			
JOB No: VE52655D			
COORDINATE SYSTEM: NAD 1983 UTM Zone 9N			

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Y:\GIS\Projects\MM\0649\_Johnny Mt\Mining\12\_hydrology\01\_overview\020\_120112-01-017\_Groundwater.mxd  
 Last updated by paul.kwon  
 6278,020  
 6278,160

**Legend**

- Access road
- Mine road
- Watercourse
- LiDAR contour (1m)
- Historic Services and Facilities
- Pond
- Waste Rock Storage
- Areas of Potential Environmental Concern (APECs)
- Approximate Treatment Area
- ◉ Monitoring Well
- ◼ Test Pit
- ◉ Elevated Metals or Hydrocarbons in Groundwater
- ◉ Elevated Metals or Hydrocarbons not Identified

BASE DATA  
 DataBC Data Distribution Service  
 (http://www.data.gov.bc.ca/)  
**FACILITIES AND WASTE  
 ROCK STORAGE AREAS**  
 Johnny Mountain Mine Closure Plan, 1999  
 (Approved by BC Ministry of Energy and Mines)  
**IMAGERY LIDAR / ORTHO 2017**

Scale: 1:950  
 0 10 20 30  
 Meters



CLIENT: <b>SNIPGOLD CORPORATION</b>	PROJECT: <b>Johnny Mountain          Mine Reclamation Project</b>		
TITLE: <b>Elevated Metals and Petroleum          Hydrocarbons in Groundwater -          Tank Farm Area / Burial Site 2 /          Main Warehouses / Fuel Pump          Station / Fuel Lines</b>	DATE: December, 2020	ANALYST: PK	QA/QC: AD
Figure 13			
GIS FILE: 12-01-017_Groundwater.mxd			
JOB No: VE52655D			
COORDINATE SYSTEM: NAD 1983 UTM Zone 9N			



Y:\GIS\Projects\MM\MM0649 Johnny Mt\Mapping\12 hydrogeology\01 overview\020\_120\112-01-18\_Groundwater.mxd  
 Last updated by paul.kwon

**Legend**

- ▲ Spot height (m)
- Access road
- Mine road
- Watercourse
- LiDAR contour (2m)
- Interceptor Ditch / Toe Drainage
- ▭ Tailings Impoundment
- ▨ Embankment Wall
- ▩ Spillway
- ▭ Pond
- ▭ Areas of Potential Environmental Concern (APECs)
- ⊕ Monitoring Well
- ⊠ Test Pit
- ▲ Piezometer
- ⬮ Elevated Metals or Hydrocarbons in Groundwater
- ⬮ Elevated Metals or Hydrocarbons not Identified
- Surface Water Station

BASE DATA  
 DataBC Data Distribution Service  
 (http://www.data.gov.bc.ca/)  
**FACILITIES AND WASTE  
 ROCK STORAGE AREAS**  
 Johnny Mountain Mine Closure Plan, 1999  
 (Approved by BC Ministry of Energy and Mines)  
**IMAGERY LIDAR / ORTHO 2017**

Scale: 1:2,250

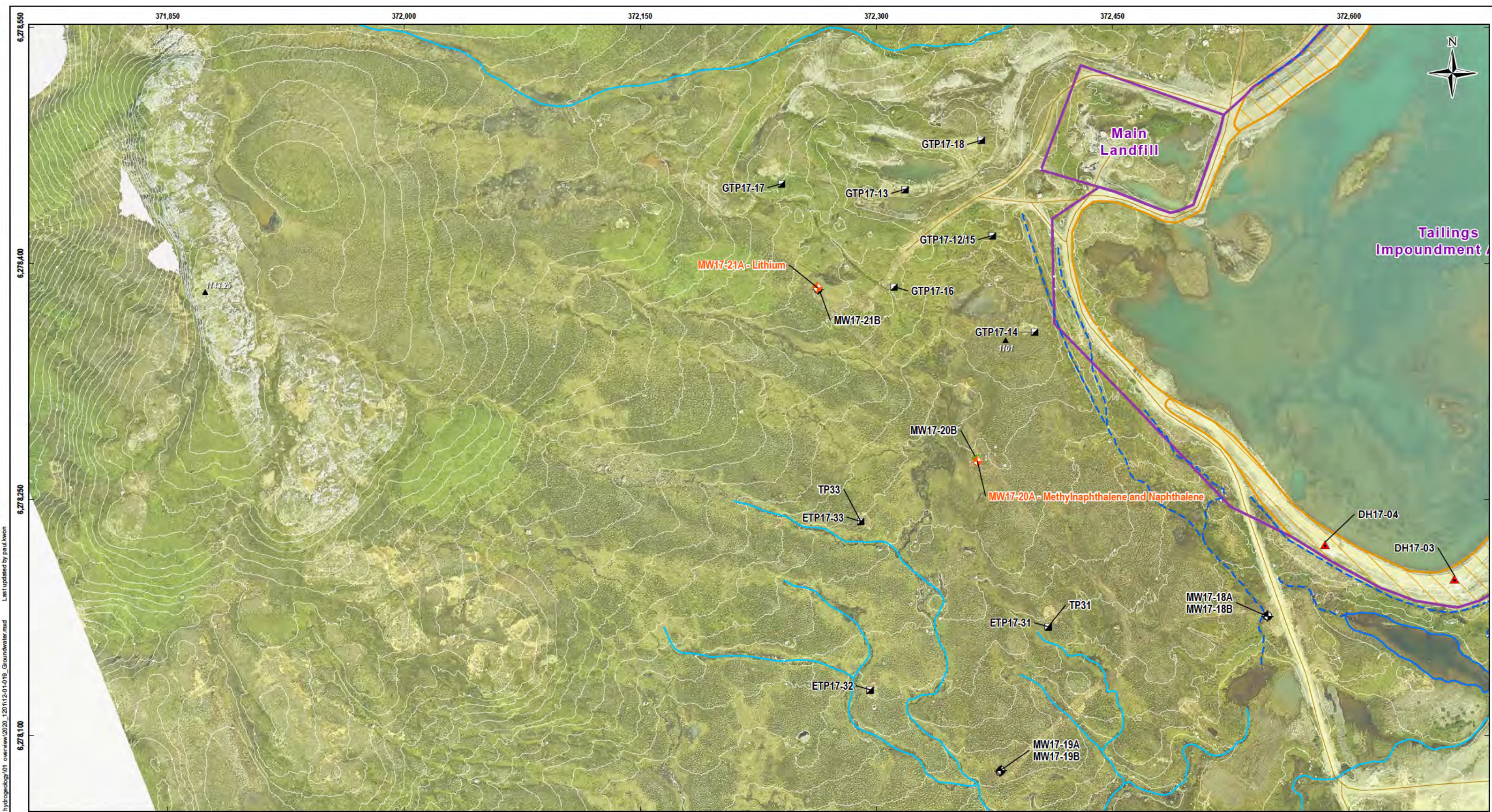
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Meters



CLIENT:  
**SNIPGOLD CORPORATION**

TITLE:  
**Elevated Metals and Petroleum Hydrocarbons in Groundwater - Main Landfill / Tailings Impoundment Area**

PROJECT: <b>Johnny Mountain Mine Reclamation Project</b>			
DATE: December, 2020	ANALYST: PK	QA/QC: AD	<b>Figure 14</b>
GIS FILE: 12-01-018_Groundwater.mxd			<b>wood.</b>
JOB No: VE52655D			
COORDINATE SYSTEM: NAD 1983 UTM Zone 9N			



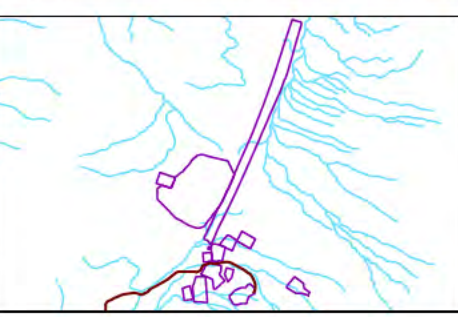
**Legend**

▲ Spot height (m)	--- Interceptor Ditch / Toe Drainage	⊕ Monitoring Well
— Access road	▭ Tailings Impoundment	▣ Test Pit
— Mine road	▨ Embankment Wall	▲ Piezometer
— Watercourse	▩ Spillway	◆ Elevated Metals or Hydrocarbons in Groundwater
— LiDAR contour (2m)	▭ Pond	◆ Elevated Metals or Hydrocarbons not Identified
	▭ Areas of Potential Environmental Concern (APECs)	

BASE DATA  
DataBC Data Distribution Service  
(http://www.data.gov.bc.ca/)  
FACILITIES AND WASTE  
ROCK STORAGE AREAS  
Johnny Mountain Mine Closure Plan, 1999  
(Approved by BC Ministry of Energy and Mines)  
IMAGERY LIDAR / ORTHO 2017

Scale: 1:2,250

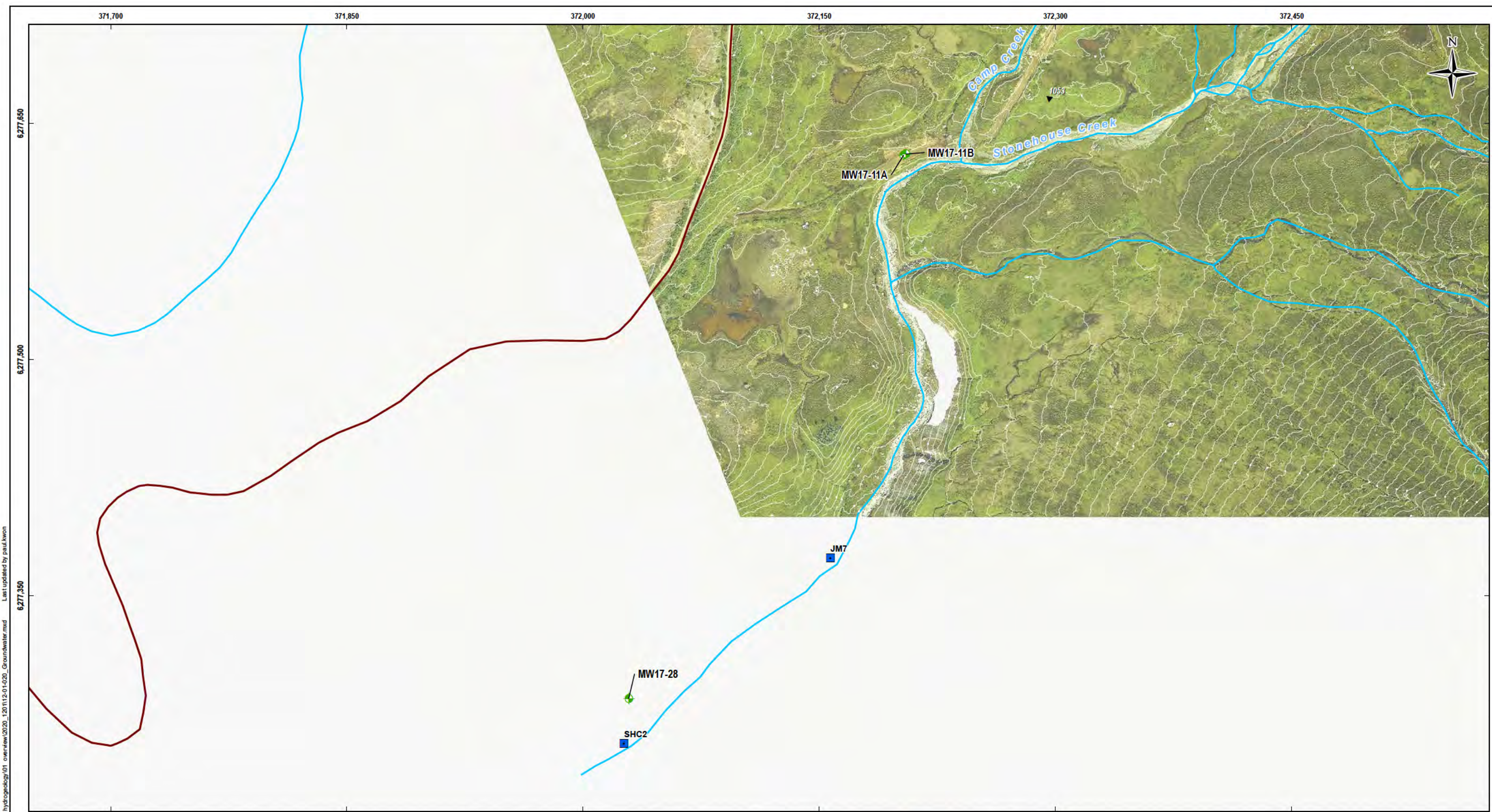
0 50 100  
Meters



CLIENT: <b>SNIPGOLD CORPORATION</b>
TITLE: <b>Elevated Metals and Petroleum Hydrocarbons in Groundwater - Main Landfill / Tailings Impoundment Area</b>

PROJECT: <b>Johnny Mountain Mine Reclamation Project</b>			
DATE: December, 2020	ANALYST: PK	QA/QC: AD	<b>Figure 15</b>
GIS FILE: 12-01-019_Groundwater.mxd			<b>wood.</b>
JOB No: VE52655D			
COORDINATE SYSTEM: NAD 1983 UTM Zone 9N			

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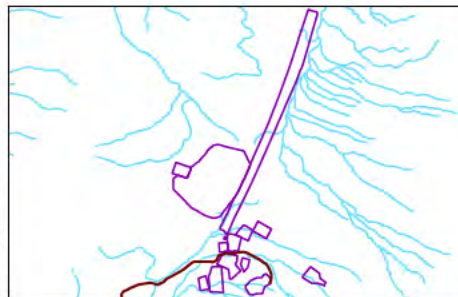
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- Legend**
- ▲ Spot height (m)
  - Elevated Metals or Hydrocarbons not Identified
  - Access road
  - Surface Water Station
  - Mine road
  - Watercourse
  - LiDAR contour (2m)

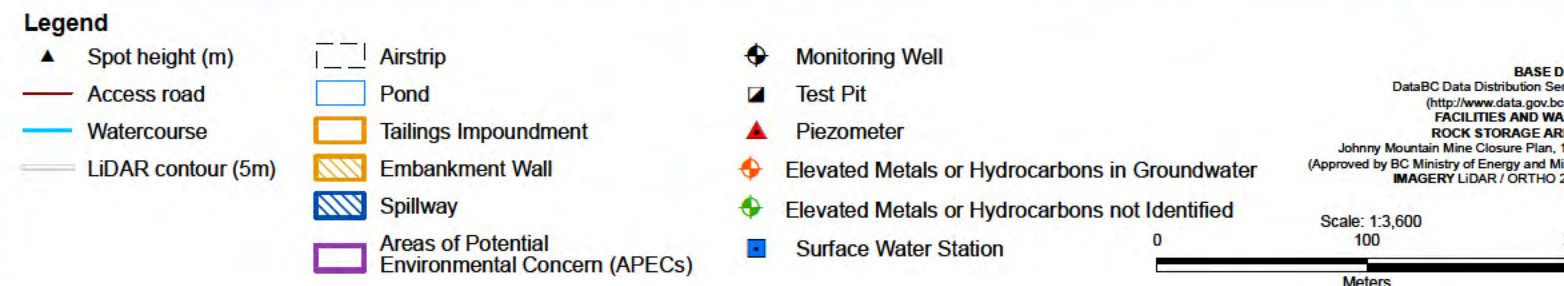
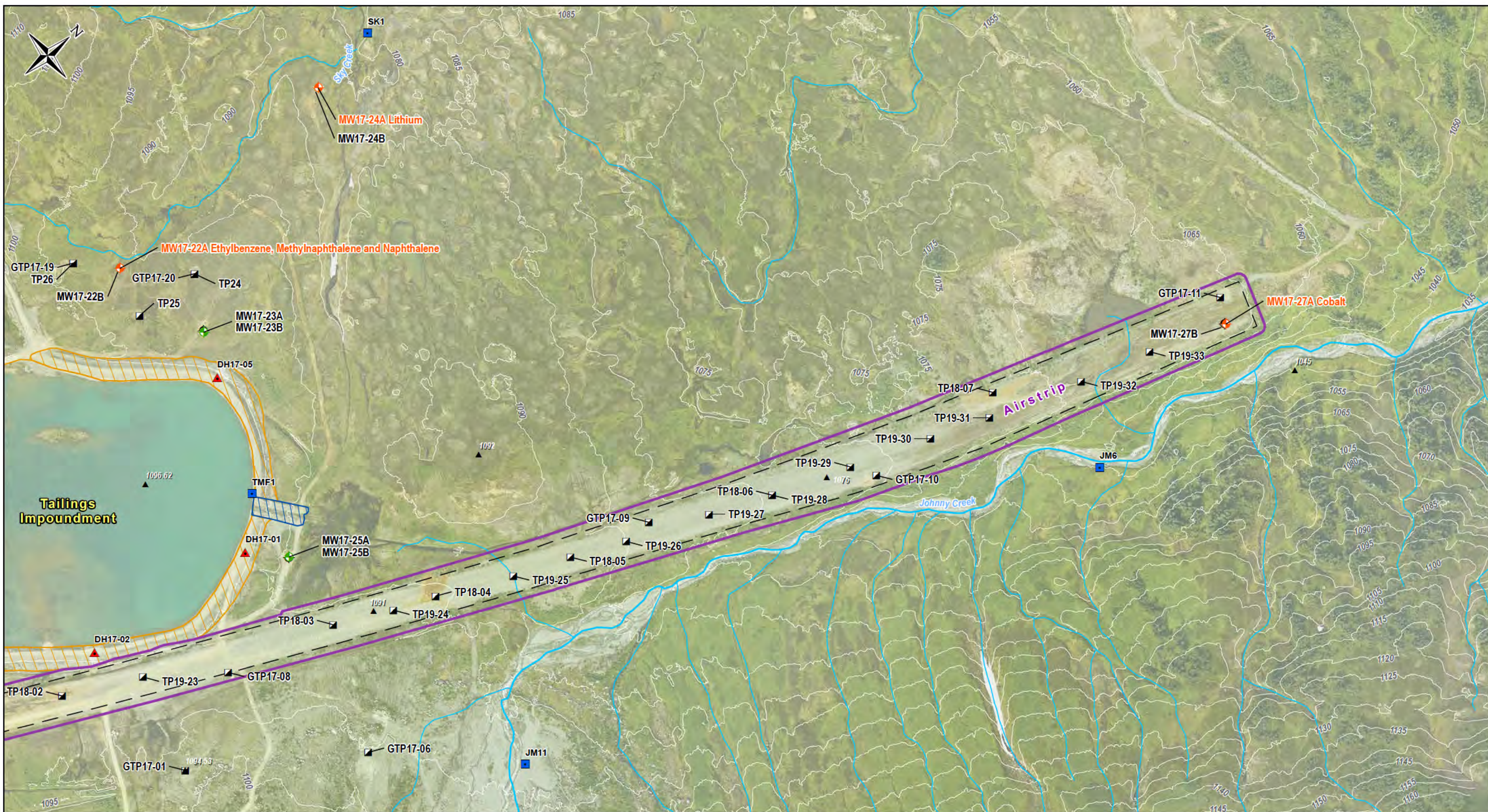
BASE DATA  
DataBC Data Distribution Service  
(<http://www.data.gov.bc.ca/>)  
FACILITIES AND WASTE  
ROCK STORAGE AREAS  
Johnny Mountain Mine Closure Plan, 1999  
(Approved by BC Ministry of Energy and Mines)  
IMAGERY LIDAR / ORTHO 2017

Scale: 1:2,250

0 50 100  
Meters

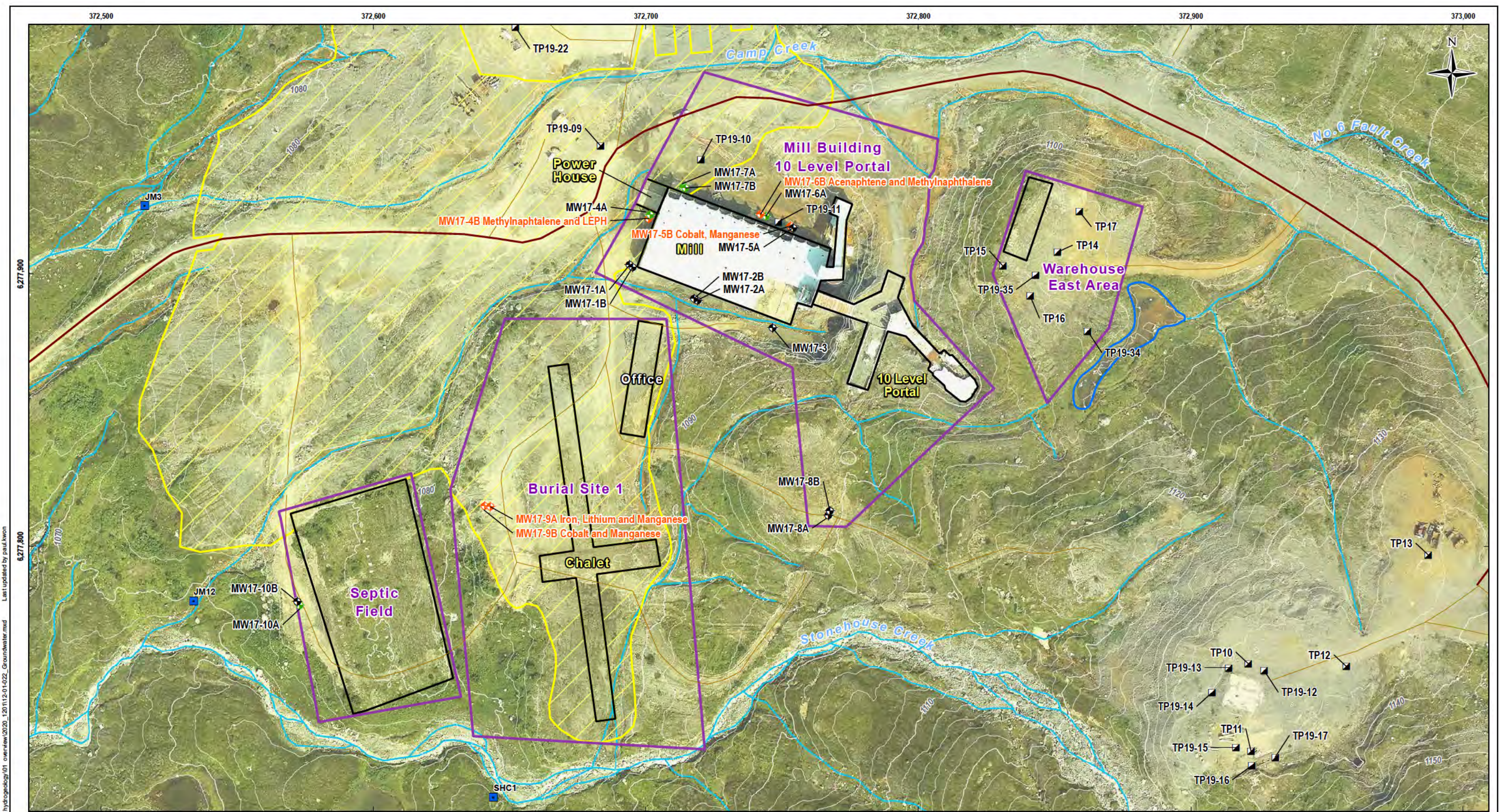


CLIENT: <b>SNIPGOLD CORPORATION</b>	PROJECT: <b>Johnny Mountain Mine Reclamation Project</b>		
TITLE: <b>Elevated Metals or Petroleum Hydrocarbons in Groundwater - Stonehouse Creek</b>	DATE: December, 2020	ANALYST: PK	QA/QC: AD
	GIS FILE: 12-01-020_Groundwater.mxd		<b>Figure 16</b>
	JOB No: VE52655D		<b>wood.</b>
	COORDINATE SYSTEM: NAD 1983 UTM Zone 9N		

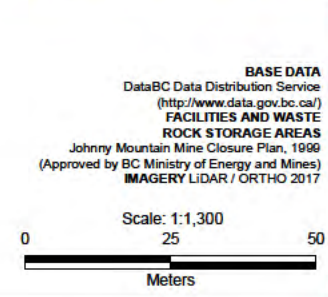


CLIENT: <b>SNIPGOLD CORPORATION</b>	PROJECT: <b>Johnny Mountain          Mine Reclamation Project</b>		
TITLE: <b>Elevated Metals and Petroleum          Hydrocarbons in Groundwater -          Airstrip</b>	DATE: December, 2020	ANALYST: PK	QA/QC: AD
<b>Figure 17</b>			
GIS FILE: 12-01-021_Groundwater.mxd			
JOB No: VE52655D			
COORDINATE SYSTEM: NAD 1983 UTM Zone 9N			

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 Last updated by paul.kwon



- Legend**
- Access road
  - Mine road
  - Watercourse
  - LiDAR contour (2m)
  - Historic Services and Facilities
  - Pond
  - Waste Rock Storage
  - Areas of Potential Environmental Concern (APECs)
  - ⊕ Monitoring Well
  - ⊠ Test Pit
  - ⊕ Elevated Metals or Hydrocarbons in Groundwater
  - ⊕ Elevated Metals or Hydrocarbons not Identified
  - ⊠ Surface Water Station



CLIENT:  
**SNIPGOLD CORPORATION**

TITLE:  
**Elevated Metals and Petroleum Hydrocarbons in Groundwater - Mill Building / 10 Level Portal / Warehouse East Area / Burial Site 1 / Septic Field**

PROJECT: <b>Johnny Mountain Mine Reclamation Project</b>			
DATE: December, 2020	ANALYST: PK	QA/QC: AD	<b>Figure 18</b>
GIS FILE: 12-01-022_Groundwater.mxd			
JOB No: VE52655D			
COORDINATE SYSTEM: NAD 1983 UTM Zone 9N			



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**wood.**

**Tables**



Table 1: Groundwater Monitoring Data

Well ID	Elevation top of PVC pipe (m)	Ground Elevation (m)	Stick up length (m)	WL Elevation (m)	Date Monitored	Depth to Water (mbtop)	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (uS/cm)	ORP (mV)	Well Headspace (%LEL)	Well Headspace (ppm)
MW17-01A	1083.79	1082.94	0.85	1,080.69	17-Jul-17	3.097	-	-	-	-	-	-	-
MW17-01A	1083.79	1082.94	0.85	1,081.34	19-Jul-17	2.444	7.8	6.62	4.61	455	41.3	-	-
MW17-01A	1083.79	1082.94	0.85	1,081.95	28-Jul-17	1.831	-	-	-	-	-	-	-
MW17-01A	1083.79	1082.94	0.85	1,082.20	7-Sep-19	1.581	-	-	-	-	-	1	0
MW17-01B	1083.70	1082.89	0.81	1,082.47	17-Jul-17	1.231	-	-	-	-	-	-	-
MW17-01B	1083.70	1082.89	0.81	1,082.40	19-Jul-17	1.293	7.49	8.95	4.4	285	111.1	-	-
MW17-01B	1083.70	1082.89	0.81	1,082.53	28-Jul-17	1.166	-	-	-	-	-	-	-
MW17-01B	1083.70	1082.89	0.81	1,082.52	7-Sep-19	1.174	-	-	-	-	-	0	1
MW17-02A	1083.46	1082.72	0.74	1,082.85	17-Jul-17	0.615	-	-	-	-	-	-	-
MW17-02A	1083.46	1082.72	0.74	1,082.84	19-Jul-17	0.622	7.95	6.62	0.7	209	76.3	-	-
MW17-02A	1083.46	1082.72	0.74	1,082.86	28-Jul-17	0.604	-	-	-	-	-	-	-
MW17-02A	1083.46	1082.72	0.74	1,082.88	9-Jul-19	0.583	-	-	-	-	-	1	0
MW17-02B	1083.67	1082.69	0.98	1,082.74	17-Jul-17	0.926	-	-	-	-	-	-	-
MW17-02B	1083.67	1082.69	0.98	1,082.74	19-Jul-17	0.931	7.74	9.2	6.34	487	97.8	-	-
MW17-02B	1083.67	1082.69	0.98	1,082.82	28-Jul-17	0.849	-	-	-	-	-	-	-
MW17-02B	1083.67	1082.69	0.98	1,082.79	9-Jul-19	0.876	-	-	-	-	-	1	0
MW17-03	1083.98	1083.18	0.80	1,082.94	17-Jul-17	1.042	-	-	-	-	-	-	-
MW17-03	1083.98	1083.18	0.80	1,082.94	19-Jul-17	1.04	7.54	8.14	0.26	329	-7	-	-
MW17-03	1083.98	1083.18	0.80	1,082.95	28-Jul-17	1.038	-	-	-	-	-	-	-
MW17-03	1083.98	1083.18	0.80	1,082.84	9-Jul-19	1.148	-	-	-	-	-	0	0
MW17-04A	1083.78	1082.90	0.88	1,082.73	17-Jul-17	1.046	-	-	-	-	-	-	-
MW17-04A	1083.78	1082.90	0.88	1,082.69	19-Jul-17	1.092	7.95	5.85	5.02	287	93.6	-	-
MW17-04A	1083.78	1082.90	0.88	1,082.72	28-Jul-17	1.064	-	-	-	-	-	-	-
MW17-04A	1083.78	1082.90	0.88	1,082.75	2-Jul-18	1.034	10.44	3.1	0.3	147.1	-133.7	-	-
MW17-04A	1083.78	1082.90	0.88	1,082.89	5-Sep-19	0.89	7.75	5.19	2.82	152	0	-	-
MW17-04A	1083.78	1082.90	0.88	1,082.86	7-Sep-19	0.92	-	-	-	-	-	0	0
MW17-04A	1083.78	1082.90	0.88	1,082.32	23-Aug-20	1.46	7.99	5.4	1.12	180.2	-207	-	-
MW17-04B	1083.81	1083.00	0.81	1,082.74	17-Jul-17	1.070	-	-	-	-	-	-	-
MW17-04B	1083.81	1083.00	0.81	1,082.72	19-Jul-17	1.093	7.1	8.62	0.51	366	-66.9	-	-
MW17-04B	1083.81	1083.00	0.81	1,082.78	28-Jul-17	1.028	-	-	-	-	-	-	-
MW17-04B	1083.81	1083.00	0.81	1,082.82	24-Oct-17	0.99	-	-	-	-	-	-	-
MW17-04B	1083.81	1083.00	0.81	1,082.73	2-Jul-18	1.085	9.21	5.1	0.36	288	-64.6	-	-
MW17-04B	1083.81	1083.00	0.81	1,082.77	17-Jul-19	1.044	6.92	9.25	2.28	781	-56.2	-	-
MW17-04B	1083.81	1083.00	0.81	1,082.71	5-Sep-19	1.1	6.92	8.36	0.37	450	-	-	-
MW17-04B	1083.81	1083.00	0.81	1,082.66	7-Sep-19	1.152	-	-	-	-	-	1	0
MW17-04B	1083.81	1083.00	0.81	1,082.29	23-Aug-20	1.52	6.93	8.2	0.54	317.1	-34.9	-	-
MW17-05A	1083.96	1083.23	0.72	1,083.84	17-Jul-17	0.120	-	-	-	-	-	-	-
MW17-05A	1083.96	1083.23	0.72	1,083.78	19-Jul-17	0.173	7.28	4.81	1.06	456	98.6	-	-
MW17-05A	1083.96	1083.23	0.72	1,083.84	28-Jul-17	0.121	-	-	-	-	-	-	-
MW17-05A	1083.96	1083.23	0.72	1,083.81	7-Sep-19	0.15	-	-	-	-	-	0	1





**Table 1: Groundwater Monitoring Data**

Well ID	Elevation top of PVC pipe (m)	Ground Elevation (m)	Stick up length (m)	WL Elevation (m)	Date Monitored	Depth to Water (mbtop)	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (uS/cm)	ORP (mV)	Well Headspace (%LEL)	Well Headspace (ppm)
MW17-05B	1084.06	1083.25	0.81	1,083.04	17-Jul-17	1.016	-	-	-	-	-	-	-
MW17-05B	1084.06	1083.25	0.81	1,083.04	19-Jul-17	1.014	6.6	6.49	2.17	1307	21.2	-	-
MW17-05B	1084.06	1083.25	0.81	1,083.03	28-Jul-17	1.029	-	-	-	-	-	-	-
MW17-05B	1084.06	1083.25	0.81	1,082.87	17-Jul-19	1.189	7.03	9.49	0.41	785	-16.4	-	-
MW17-05B	1084.06	1083.25	0.81	1,082.92	5-Sep-19	1.14	7.21	7.56	0.52	610	0	-	-
MW17-05B	1084.06	1083.25	0.81	1,082.87	7-Sep-19	1.19	-	-	-	-	-	0	0
MW17-05B	1084.06	1083.25	0.81	1,082.56	23-Aug-20	1.5	6.96	7.4	1.15	441.8	7.7	-	-
MW17-06A	1083.92	1083.12	0.80	1,080.85	17-Jul-17	3.073	-	-	-	-	-	-	-
MW17-06A	1083.92	1083.12	0.80	1,083.05	19-Jul-17	0.867	8.14	5.33	3.69	497	41.4	-	-
MW17-06A	1083.92	1083.12	0.80	1,083.69	28-Jul-17	0.233	-	-	-	-	-	-	-
MW17-06A	1083.92	1083.12	0.80	1,083.72	7-Sep-19	0.2	-	-	-	-	-	0	0
MW17-06A	1083.92	1083.12	0.80	1,083.47	23-Aug-20	0.45	7.73	4.5	4.37	176.6	1.9	-	-
MW17-06B	1083.92	1083.11	0.81	1,083.03	17-Jul-17	0.891	-	-	-	-	-	-	-
MW17-06B	1083.92	1083.11	0.81	1,083.03	19-Jul-17	0.892	7.28	6.15	0.94	1,189	91.7	-	-
MW17-06B	1083.92	1083.11	0.81	1,083.02	28-Jul-17	0.902	-	-	-	-	-	-	-
MW17-06B	1083.92	1083.11	0.81	1,082.94	17-Jul-19	0.974	7.42	7.84	0.37	845	-8.6	-	-
MW17-06B	1083.92	1083.11	0.81	1,082.92	5-Sep-19	1	7.55	7.08	1.05	578	0	-	-
MW17-06B	1083.92	1083.11	0.81	1,082.91	7-Sep-19	1.01	-	-	-	-	-	0	0
MW17-06B	1083.92	1083.11	0.81	1,082.82	23-Aug-20	1.1	11.01	6.9	1.46	320.5	-23.6	-	-
MW17-07A	1083.77	1083.04	0.74	1,083.24	17-Jul-17	0.531	-	-	-	-	-	-	-
MW17-07A	1083.77	1083.04	0.74	1,083.38	19-Jul-17	0.39	7.91	5.27	0.43	267	65.9	-	-
MW17-07A	1083.77	1083.04	0.74	1,083.41	28-Jul-17	0.368	-	-	-	-	-	-	-
MW17-07A	1083.77	1083.04	0.74	1,083.44	4-Sep-19	0.33	8.07	3.69	0.43	160	0	-	-
MW17-07A	1083.77	1083.04	0.74	1,083.31	7-Sep-19	0.46	-	-	-	-	-	0	0
MW17-07A	1083.77	1083.04	0.74	1,083.25	23-Aug-20	0.52	7.71	4.7	0.85	191.5	-49.1	-	-
MW17-07B	1083.80	1082.96	0.84	1,082.82	17-Jul-17	0.976	-	-	-	-	-	-	-
MW17-07B	1083.80	1082.96	0.84	1,082.81	19-Jul-17	0.985	7.03	5.66	1.08	545	92.2	-	-
MW17-07B	1083.80	1082.96	0.84	1,082.86	28-Jul-17	0.940	-	-	-	-	-	-	-
MW17-07B	1083.80	1082.96	0.84	1,082.79	5-Sep-19	1.01	7.11	6.41	1.16	394	0	-	-
MW17-07B	1083.80	1082.96	0.84	1,082.80	7-Sep-19	1	-	-	-	-	-	0	0
MW17-07B	1083.80	1082.96	0.84	1,082.22	23-Aug-20	1.58	6.84	5.4	1.36	453.9	82	-	-
MW17-08A	1098.83	1098.13	0.70	1,070.05	17-Jul-17	28.777	-	-	-	-	-	-	-
MW17-08A	1098.83	1098.13	0.70	1,073.75	24-Jul-17	25.081	8.3	5.21	15.22	207	42	-	-
MW17-08A	1098.83	1098.13	0.70	1,070.94	28-Jul-17	27.883	-	-	-	-	-	-	-
MW17-08A	1098.83	1098.13	0.70	1,091.82	2-Jul-18	7.011	7.84	7.1	0.44	515	-99.5	-	-
MW17-08A	1098.83	1098.13	0.70	1,090.96	9-Jul-19	7.869	-	-	-	-	-	0	0
MW17-08A	1098.83	1098.13	0.70	1,090.91	18-Jul-19	7.914	-	-	-	-	-	-	-
MW17-08B	1098.83	1098.12	0.71	1,096.77	17-Jul-17	2.062	-	-	-	-	-	-	-
MW17-08B	1098.83	1098.12	0.71	1,096.54	24-Jul-17	2.286	6.56	4.92	8.52	345	110.2	-	-
MW17-08B	1098.83	1098.12	0.71	1,096.68	28-Jul-17	2.149	-	-	-	-	-	-	-



Table 1: Groundwater Monitoring Data

Well ID	Elevation top of PVC pipe (m)	Ground Elevation (m)	Stick up length (m)	WL Elevation (m)	Date Monitored	Depth to Water (mbtop)	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (uS/cm)	ORP (mV)	Well Headspace (%LEL)	Well Headspace (ppm)
MW17-08B	1098.83	1098.12	0.71	1,096.10	9-Jul-19	2.728	-	-	-	-	-	1	0
MW17-09A	1084.58	1083.76	0.81	1,065.08	17-Jul-17	19.491	-	-	-	-	-	-	-
MW17-09A	1084.58	1083.76	0.81	1,071.94	24-Jul-17	12.631	7.68	4.69	10.27	755	116.1	-	-
MW17-09A	1084.58	1083.76	0.81	1,071.94	28-Jul-17	12.631	-	-	-	-	-	-	-
MW17-09A	1084.58	1083.76	0.81	1,075.08	9-Jul-19	9.492	-	-	-	-	-	1	0
MW17-09A	1084.58	1083.76	0.81	1,075.16	15-Jul-19	9.412	7.48	5.85	5.97	461	-66	-	-
MW17-09A	1084.58	1083.76	0.81	1,065.98	6-Sep-19	18.6	7.58	5.06	6	344	-21.4	-	-
MW17-09A	1084.58	1083.76	0.81	1,077.42	29-Aug-20	7.156	7.21	4	7.44	123	-5.2	-	-
MW17-09B	1084.38	1083.68	0.70	1,080.29	17-Jul-17	4.092	-	-	-	-	-	-	-
MW17-09B	1084.38	1083.68	0.70	1,080.26	24-Jul-17	4.119	6.63	6.76	1.21	473	120	-	-
MW17-09B	1084.38	1083.68	0.70	1,080.32	28-Jul-17	4.056	-	-	-	-	-	-	-
MW17-09B	1084.38	1083.68	0.70	1,080.24	2-Jul-18	4.142	6.93	3.8	0.61	250.8	-29.8	-	-
MW17-09B	1084.38	1083.68	0.70	1,080.10	9-Jul-19	4.275	-	-	-	-	-	0	0
MW17-09B	1084.38	1083.68	0.70	1,080.20	17-Jul-19	4.174	6.46	5.07	1.09	457	50.1	-	-
MW17-09B	1084.38	1083.68	0.70	1,080.54	28-Aug-20	3.836	6.37	4.6	1.7	175.6	58.7	-	-
MW17-10A	1076.47	1075.62	0.85	1,072.56	17-Jul-17	3.911	-	-	-	-	-	-	-
MW17-10A	1076.47	1075.62	0.85	1,072.52	24-Jul-17	3.953	-	-	-	-	-	-	-
MW17-10A	1076.47	1075.62	0.85	1,072.53	28-Jul-17	3.944	-	-	-	-	-	-	-
MW17-10A	1076.47	1075.62	0.85	1,072.38	10-Jul-19	4.087	-	-	-	-	-	-	-
MW17-10A	1076.47	1075.62	0.85	1,071.83	15-Jul-19	4.64	7.79	6.91	2.46	376	-115.5	-	-
MW17-10A	1076.47	1075.62	0.85	1,072.58	4-Sep-19	3.89	7.88	5.53	1.22	237	0	-	-
MW17-10B	1076.34	1075.61	0.73	1,072.27	17-Jul-17	4.070	-	-	-	-	-	-	-
MW17-10B	1076.34	1075.61	0.73	1,072.16	24-Jul-17	4.175	6.27	4.77	1.99	349	103.6	-	-
MW17-10B	1076.34	1075.61	0.73	1,072.26	28-Jul-17	4.081	-	-	-	-	-	-	-
MW17-10B	1076.34	1075.61	0.73	1,071.90	10-Jul-19	4.435	-	-	-	-	-	1	0
MW17-11A*	1047.41	1047.35	0.06	1,053.44	17-Jul-17	-6.030	-	-	-	-	-	-	-
MW17-11A*	1047.41	1047.35	0.06	-	24-Jul-17	artesian	7.45	4.96	0.2	251	47.1	-	-
MW17-11A*	1047.41	1047.35	0.06	1,053.44	28-Jul-17	-6.030	-	-	-	-	-	-	-
MW17-11A*	1047.41	1047.35	0.06	-	10-Jul-19	artesian	-	-	-	-	-	1	0
MW17-11A*	1047.41	1047.35	0.06	-	15-Jul-19	artesian	7.83	3.26	0.1	240	-28.3	-	-
MW17-11A*	1047.41	1047.35	0.06	-	4-Sep-19	artesian	7.82	3.8	0.37	142	0	-	-
MW17-11A*	1047.41	1047.35	0.06	-	24-Aug-20	artesian	7.55	3.4	0.3	181	-33	-	-
MW17-11B	1048.09	1047.24	0.85	1,048.11	17-Jul-17	-0.022	-	-	-	-	-	-	-
MW17-11B	1048.09	1047.24	0.85	1,047.53	24-Jul-17	0.559	8	9.2	2.62	256	-105.4	-	-
MW17-11B	1048.09	1047.24	0.85	1,047.93	28-Jul-17	0.160	-	-	-	-	-	-	-
MW17-11B	1048.09	1047.24	0.85	1,047.84	10-Jul-19	0.25	-	-	-	-	-	0	0
MW17-11B	1048.09	1047.24	0.85	1,047.89	15-Jul-19	0.2	8.06	5.44	2.02	194	-54.5	-	-
MW17-11B	1048.09	1047.24	0.85	-	4-Sep-19	-	8.02	7.52	0.93	140	0	-	-
MW17-11B	1048.09	1047.24	0.85	-	24-Aug-20	0.07	7.89	5.3	1.1	159.5	-147	-	-
MW17-12A	1087.82	1087.02	0.80	1,087.04	17-Jul-17	0.777	-	-	-	-	-	-	-

**Table 1: Groundwater Monitoring Data**

Well ID	Elevation top of PVC pipe (m)	Ground Elevation (m)	Stick up length (m)	WL Elevation (m)	Date Monitored	Depth to Water (mbtop)	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (uS/cm)	ORP (mV)	Well Headspace (%LEL)	Well Headspace (ppm)
MW17-12A	1087.82	1087.02	0.80	1,087.03	24-Jul-17	0.791	8.73	6.32	0.28	302	-250.7	-	-
MW17-12A	1087.82	1087.02	0.80	1,087.05	28-Jul-17	0.764	-	-	-	-	-	-	-
MW17-12A	1087.82	1087.02	0.80	1,086.82	7-Sep-19	1	-	-	-	-	-	1	2
MW17-12A	1087.82	1087.02	0.80	1,086.66	24-Aug-20	1.16	7.9	4.3	0.23	158.1	-147	-	-
MW17-12B	1087.80	1087.04	0.76	1,086.93	17-Jul-17	0.875	-	-	-	-	-	-	-
MW17-12B	1087.80	1087.04	0.76	1,086.91	20-Jul-17	0.892	7.87	7.69	5.22	276	82.9	-	-
MW17-12B	1087.80	1087.04	0.76	1,087.08	28-Jul-17	0.719	-	-	-	-	-	-	-
MW17-12B	1087.80	1087.04	0.76	1,086.53	7-Sep-19	1.27	-	-	-	-	-	1	0
MW17-12B	1087.80	1087.04	0.76	1,086.99	24-Aug-20	0.815	7.09	6.2	1	291.8	43.3	-	-
MW17-13	1091.94	1091.07	0.88	1,090.41	17-Jul-17	1.532	-	-	-	-	-	-	-
MW17-13	1091.94	1091.07	0.88	1,090.40	24-Jul-17	1.541	7.09	5.75	5.61	27.5	21.7	-	-
MW17-13	1091.94	1091.07	0.88	1,090.50	28-Jul-17	1.441	-	-	-	-	-	-	-
MW17-13	1091.94	1091.07	0.88	1,090.45	24-Oct-17	1.49	-	-	-	-	-	-	-
MW17-13	1091.94	1091.07	0.88	1,090.11	2-Jul-18	1.832	8.54	3.8	3.06	179.4	-49	-	-
MW17-13	1091.94	1091.07	0.88	1,090.04	18-Jul-19	1.904	7.51	5.88	6.9	313	53	-	-
MW17-13	1091.94	1091.07	0.88	1,090.04	7-Sep-19	1.9	-	-	-	-	-	1	3
MW17-14A	1099.53	1098.59	0.94	1,095.38	17-Jul-17	4.149	-	-	-	-	-	-	-
MW17-14A	1099.53	1098.59	0.94	1,095.20	24-Jul-17	4.331	8.02	8.42	0.44	264	-184.9	-	-
MW17-14A	1099.53	1098.59	0.94	1,095.18	28-Jul-17	4.351	-	-	-	-	-	-	-
MW17-14A	1099.53	1098.59	0.94	1,095.66	2-Jul-18	3.875	8.76	5.6	0.25	184.4	-217.7	-	-
MW17-14A	1099.53	1098.59	0.94	1,094.91	16-Jul-19	4.626	8.11	7.86	4.32	356	-192.8	-	-
MW17-14A	1099.53	1098.59	0.94	1,094.90	7-Sep-19	4.63	-	-	-	-	-	0	0
MW17-14A	1099.53	1098.59	0.94	1,095.79	25-Aug-20	3.742	7.56	5.5	0.21	235.7	-218	-	-
MW17-14B	1099.43	1098.54	0.89	1,096.35	17-Jul-17	3.083	-	-	-	-	-	-	-
MW17-14B	1099.43	1098.54	0.89	1,096.05	24-Jul-17	3.38	7.43	6.59	9.01	192	108.1	-	-
MW17-14B	1099.43	1098.54	0.89	1,096.20	28-Jul-17	3.232	-	-	-	-	-	-	-
MW17-14B	1099.43	1098.54	0.89	1,097.01	2-Jul-18	2.421	12.64	3.4	9.95	108.6	8.3	-	-
MW17-14B	1099.43	1098.54	0.89	1,096.37	5-Sep-19	3.06	7.75	9.7	10.68	120	0	-	-
MW17-14B	1099.43	1098.54	0.89	-	7-Sep-19	Dry	-	-	-	-	-	1	0
MW17-15A	1104.78	1103.93	0.85	1,102.22	17-Jul-17	2.558	-	-	-	-	-	-	-
MW17-15A	1104.78	1103.93	0.85	1,102.01	24-Jul-17	2.763	7.63	6.16	9.62	177	13.9	-	-
MW17-15A	1104.78	1103.93	0.85	1,101.62	28-Jul-17	3.161	-	-	-	-	-	-	-
MW17-15A	1104.78	1103.93	0.85	1,100.53	7-Sep-19	4.25	-	-	-	-	-	0	0
MW17-15B	1104.87	1104.01	0.86	1,102.27	17-Jul-17	2.593	-	-	-	-	-	-	-
MW17-15B	1104.87	1104.01	0.86	1,102.07	24-Jul-17	2.794	8.04	7.94	9.54	147	68.6	-	-
MW17-15B	1104.87	1104.01	0.86	1,101.67	28-Jul-17	3.198	-	-	-	-	-	-	-
MW17-15B	1104.87	1104.01	0.86	1,101.64	7-Sep-19	3.23	-	-	-	-	-	1	0
MW17-16	1096.10	1095.23	0.87	1,093.37	17-Jul-17	2.732	-	-	-	-	-	-	-
MW17-16	1096.10	1095.23	0.87	1,093.08	24-Jul-17	3.017	7.46	6.89	9.38	170	79.2	-	-
MW17-16	1096.10	1095.23	0.87	1,093.39	28-Jul-17	2.711	-	-	-	-	-	-	-



**Table 1: Groundwater Monitoring Data**

Well ID	Elevation top of PVC pipe (m)	Ground Elevation (m)	Stick up length (m)	WL Elevation (m)	Date Monitored	Depth to Water (mbtop)	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (uS/cm)	ORP (mV)	Well Headspace (%LEL)	Well Headspace (ppm)
MW17-16	1096.10	1095.23	0.87	1,091.60	18-Jul-19	4.499	7.78	6.67	8.27	227	70.5	-	-
MW17-16	1096.10	1095.23	0.87	1,091.55	7-Sep-19	4.55	-	-	-	-	-	1	0
MW17-17A	1091.47	1090.63	0.84	1,089.44	17-Jul-17	2.033	-	-	-	-	-	-	-
MW17-17A	1091.47	1090.63	0.84	1,089.41	24-Jul-17	2.059	8.9	6.08	4.64	37.9	39.9	-	-
MW17-17A	1091.47	1090.63	0.84	1,089.57	28-Jul-17	1.898	-	-	-	-	-	-	-
MW17-17A	1091.47	1090.63	0.84	1,088.89	2-Jul-18	2.58	8.5	3.4	2.1	139.2	-42.7	-	-
MW17-17A	1091.47	1090.63	0.84	1,088.20	7-Sep-19	3.27	-	-	-	-	-	1	3
MW17-17A	1091.47	1090.63	0.84	1,087.75	24-Aug-20	3.716	-	-	-	-	-	-	-
MW17-17B	1090.85	1090.00	0.85	1,088.97	17-Jul-17	1.877	-	-	-	-	-	-	-
MW17-17B	1090.85	1090.00	0.85	1,088.93	24-Jul-17	1.922	7.55	5.62	6.9	194	76.3	-	-
MW17-17B	1090.85	1090.00	0.85	1,089.08	28-Jul-17	1.766	-	-	-	-	-	-	-
MW17-17B	1090.85	1090.00	0.85	1,088.72	1-Jul-18	2.134	8.78	2.7	5.96	115.8	23.2	-	-
MW17-17B	1090.85	1090.00	0.85	1,087.46	7-Sep-19	3.39	-	-	-	-	-	4	311
MW17-17B	1090.85	1090.00	0.85	1,087.20	24-Aug-20	3.649	6.72	6.9	1.91	322.3	-40.5	-	-
MW17-18A	1088.47	1087.66	0.81	1,086.26	17-Jul-17	2.211	-	-	-	-	-	-	-
MW17-18A	1088.47	1087.66	0.81	1,086.29	24-Jul-17	2.176	7.31	8.22	2.3	462	-88.2	-	-
MW17-18A	1088.47	1087.66	0.81	1,086.35	28-Jul-17	2.117	-	-	-	-	-	-	-
MW17-18A	1088.47	1087.66	0.81	1,086.13	7-Sep-19	2.34	-	-	-	-	-	1	0
MW17-18B	1088.41	1087.62	0.79	1,086.65	17-Jul-17	1.756	-	-	-	-	-	-	-
MW17-18B	1088.41	1087.62	0.79	1,086.61	24-Jul-17	1.802	6.74	6.58	5.98	151	98.7	-	-
MW17-18B	1088.41	1087.62	0.79	1,086.75	28-Jul-17	1.654	-	-	-	-	-	-	-
MW17-18B	1088.41	1087.62	0.79	-	7-Sep-19	Dry	-	-	-	-	-	1	0
MW17-19A	1085.62	1084.84	0.78	1,084.70	17-Jul-17	0.922	-	-	-	-	-	-	-
MW17-19A	1085.62	1084.84	0.78	1,081.64	23-Jul-17	3.984	7.85	4.06	6.38	587	562	-	-
MW17-19A	1085.62	1084.84	0.78	1,084.71	28-Jul-17	0.916	-	-	-	-	-	-	-
MW17-19A	1085.62	1084.84	0.78	1,084.31	10-Jul-19	1.318	-	-	-	-	-	1	0
MW17-19B	1085.50	1084.82	0.68	1,084.63	17-Jul-17	0.877	-	-	-	-	-	-	-
MW17-19B	1085.50	1084.82	0.68	1,084.62	23-Jul-17	0.885	8.09	5.15	0.79	153	68.7	-	-
MW17-19B	1085.50	1084.82	0.68	1,084.76	28-Jul-17	0.745	-	-	-	-	-	-	-
MW17-19B	1085.50	1084.82	0.68	1,083.43	10-Jul-19	2.075	-	-	-	-	-	1	0
MW17-20A	1096.74	1095.95	0.79	1,094.84	17-Jul-17	1.904	-	-	-	-	-	-	-
MW17-20A	1096.74	1095.95	0.79	1,094.76	23-Jul-17	1.98	7.81	5.57	3.28	273	28.8	-	-
MW17-20A	1096.74	1095.95	0.79	1,094.83	28-Jul-17	1.917	-	-	-	-	-	-	-
MW17-20A	1096.74	1095.95	0.79	1,094.89	21-Oct-17	1.85	-	-	-	-	-	-	-
MW17-20A	1096.74	1095.95	0.79	1,094.48	10-Jul-19	2.262	-	-	-	-	-	0	3
MW17-20A	1096.74	1095.95	0.79	1,094.64	18-Jul-19	2.099	7.92	6.23	1.21	276	-82.1	-	-
MW17-20A	1096.74	1095.95	0.79	1,093.96	25-Aug-20	2.78	6.68	5	4.24	104.9	-122.7	-	-
MW17-20B	1096.74	1095.93	0.81	1,095.43	17-Jul-17	1.307	-	-	-	-	-	-	-
MW17-20B	1096.74	1095.93	0.81	1,095.40	23-Jul-17	1.339	6.73	5.54	9.37	78	121.8	-	-
MW17-20B	1096.74	1095.93	0.81	1,095.60	28-Jul-17	1.138	-	-	-	-	-	-	-



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Well ID	Elevation top of PVC pipe (m)	Ground Elevation (m)	Stick up length (m)	WL Elevation (m)	Date Monitored	Depth to Water (mbtop)	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (uS/cm)	ORP (mV)	Well Headspace (%LEL)	Well Headspace (ppm)
MW17-20B	1096.74	1095.93	0.81	1,095.40	21-Oct-17	1.335	-	-	-	-	-	-	-
MW17-20B	1096.74	1095.93	0.81	1,094.97	10-Jul-19	1.765	-	-	-	-	-	0	2
MW17-20B	1096.74	1095.93	0.81	1,095.34	18-Jul-19	1.404	6.7	7.33	7.29	57	79	-	-
MW17-20B	1096.74	1095.93	0.81	1,095.84	25-Aug-20	0.9	6.38	6.7	9.24	27.3	46.6	-	-
MW17-21A	1105.50	1104.79	0.71	1,103.75	17-Jul-17	1.751	-	-	-	-	-	-	-
MW17-21A	1105.50	1104.79	0.71	1,103.78	23-Jul-17	1.722	7.83	4.79	1.96	284	18.6	-	-
MW17-21A	1105.50	1104.79	0.71	1,103.80	28-Jul-17	1.699	-	-	-	-	-	-	-
MW17-21A	1105.50	1104.79	0.71	1,103.66	10-Jul-19	1.844	-	-	-	-	-	0	1
MW17-21A	1105.50	1104.79	0.71	1,103.64	18-Jul-19	1.862	8.14	5.96	0.34	270	-17.8	-	-
MW17-21A	1105.50	1104.79	0.71	1,104.10	4-Sep-19	1.4	8.05	5.49	0.32	173	0	-	-
MW17-21A	1105.50	1104.79	0.71	1,104.29	25-Aug-20	1.21	7.96	3.9	0.38	194.3	-119.9	-	-
MW17-21B	1105.46	1104.71	0.75	1,104.47	17-Jul-17	0.996	-	-	-	-	-	-	-
MW17-21B	1105.46	1104.71	0.75	1,104.48	23-Jul-17	0.985	6.49	6.29	5.91	265	141.2	-	-
MW17-21B	1105.46	1104.71	0.75	1,104.55	28-Jul-17	0.911	-	-	-	-	-	-	-
MW17-21B	1105.46	1104.71	0.75	1,104.27	10-Jul-19	1.192	-	-	-	-	-	0	0
MW17-21B	1105.46	1104.71	0.75	1,104.36	25-Aug-20	1.1	6.12	6.4	6.52	46.6	73	0	0
MW17-22A	1090.67	1089.90	0.77	1,089.56	17-Jul-17	1.113	-	-	-	-	-	-	-
MW17-22A	1090.67	1089.90	0.77	1,084.85	23-Jul-17	5.823	7.89	5.08	4.13	0.21	129.9	-	-
MW17-22A	1090.67	1089.90	0.77	1,083.23	28-Jul-17	7.444	-	-	-	-	-	-	-
MW17-22A	1090.67	1089.90	0.77	1,089.64	22-Oct-17	1.035	-	-	-	-	-	-	-
MW17-22A	1090.67	1089.90	0.77	1,089.58	9-Jul-18	1.092	8.09	5.6	0.81	198.6	-55.3	-	-
MW17-22A	1090.67	1089.90	0.77	1,089.51	10-Sep-18	1.161	7.63	6	7.06	320.8	-77	-	-
MW17-22A	1090.67	1089.90	0.77	1,089.42	17-Jul-19	1.249	7.57	6.95	2.38	345	-25.2	-	-
MW17-22A	1090.67	1089.90	0.77	1,087.89	4-Sep-19	2.78	7.78	4.65	0.56	206	0	-	-
MW17-22A	1090.67	1089.90	0.77	1,089.31	7-Sep-19	1.36	-	-	-	-	-	1	0
MW17-22A	1090.67	1089.90	0.77	1,089.77	28-Aug-20	0.905	7.42	4.5	4.18	238.7	-40	-	-
MW17-22B	1090.78	1089.96	0.82	1,089.17	17-Jul-17	1.605	-	-	-	-	-	-	-
MW17-22B	1090.78	1089.96	0.82	1,089.18	23-Jul-17	1.6	5.71	4.49	9.27	63	196.1	-	-
MW17-22B	1090.78	1089.96	0.82	1,089.25	28-Jul-17	1.526	-	-	-	-	-	-	-
MW17-22B	1090.78	1089.96	0.82	1,089.01	9-Jul-18	1.764	6.95	4.6	7.93	42.3	22.4	-	-
MW17-22B	1090.78	1089.96	0.82	1,089.10	10-Sep-18	1.68	6.37	7.5	6.74	77	39	-	-
MW17-22B	1090.78	1089.96	0.82	1,089.09	17-Jul-19	1.682	6.75	6.32	8.72	70	46.6	-	-
MW17-22B	1090.78	1089.96	0.82	1,088.94	4-Sep-19	1.84	6.31	7.82	9.96	42	20.3	-	-
MW17-22B	1090.78	1089.96	0.82	-	7-Sep-19	Dry	-	-	-	-	-	-	-
MW17-22B	1090.78	1089.96	0.82	1,089.40	28-Aug-20	1.375	6.39	5.7	8.06	30.3	109.7	-	-
MW17-23A	1092.82	1092.03	0.79	1,090.82	17-Jul-17	2.005	-	-	-	-	-	-	-
MW17-23A	1092.82	1092.03	0.79	1,090.72	23-Jul-17	2.101	8.73	5.74	1.71	257	31.7	-	-
MW17-23A	1092.82	1092.03	0.79	1,090.82	28-Jul-17	2.002	-	-	-	-	-	-	-
MW17-23A	1092.82	1092.03	0.79	1,090.80	22-Oct-17	2.02	-	-	-	-	-	-	-
MW17-23A	1092.82	1092.03	0.79	1,090.40	10-Jul-19	2.426	-	-	-	-	-	0	0



**Table 1: Groundwater Monitoring Data**

Well ID	Elevation top of PVC pipe (m)	Ground Elevation (m)	Stick up length (m)	WL Elevation (m)	Date Monitored	Depth to Water (mbtop)	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (uS/cm)	ORP (mV)	Well Headspace (%LEL)	Well Headspace (ppm)
MW17-23A	1092.82	1092.03	0.79	1,090.51	16-Jul-19	2.308	8.05	5.37	7.74	229	-57.7	-	-
MW17-23A	1092.82	1092.03	0.79	1,090.94	28-Aug-20	1.885	7.79	3.9	1.55	144.8	-46.5	-	-
MW17-23B	1092.85	1092.04	0.81	1,090.60	17-Jul-17	2.256	-	-	-	-	-	-	-
MW17-23B	1092.85	1092.04	0.81	1,090.39	23-Jul-17	2.459	7.58	5.71	9.65	152	32.6	-	-
MW17-23B	1092.85	1092.04	0.81	1,090.62	28-Jul-17	2.230	-	-	-	-	-	-	-
MW17-23B	1092.85	1092.04	0.81	1,089.87	10-Jul-19	2.984	-	-	-	-	-	1	0
MW17-24A	1082.01	1081.18	0.83	1,078.71	17-Jul-17	3.303	-	-	-	-	-	-	-
MW17-24A	1082.01	1081.18	0.83	1,078.70	23-Jul-17	3.307	7.61	5.28	1.02	322	116.9	-	-
MW17-24A	1082.01	1081.18	0.83	1,078.74	28-Jul-17	3.267	-	-	-	-	-	-	-
MW17-24A	1082.01	1081.18	0.83	1,078.67	10-Jul-19	3.342	-	-	-	-	-	1	0
MW17-24A	1082.01	1081.18	0.83	1,078.66	15-Jul-19	3.348	7.72	5.211	0.33	308	-87.6	-	-
MW17-24A	1082.01	1081.18	0.83	1,078.78	4-Sep-19	3.23	7.46	4.01	9.96	173	0	-	-
MW17-24A	1082.01	1081.18	0.83	1,078.91	24-Aug-20	3.1	7.4	3.5	0.44	228	-60.3	-	-
MW17-24B	1082.07	1081.24	0.83	1,078.93	17-Jul-17	3.146	-	-	-	-	-	-	-
MW17-24B	1082.07	1081.24	0.83	1,078.89	23-Jul-17	3.184	8.18	5.21	10.07	69	53.6	-	-
MW17-24B	1082.07	1081.24	0.83	1,078.94	28-Jul-17	3.129	-	-	-	-	-	-	-
MW17-24B	1082.07	1081.24	0.83	1,078.77	10-Jul-19	3.304	-	-	-	-	-	1	0
MW17-24B	1082.07	1081.24	0.83	1,078.80	18-Jul-19	3.275	7.11	3.95	10.3	38	24	-	-
MW17-24B	1082.07	1081.24	0.83	1,078.92	4-Sep-19	3.15	6.68	5.22	12.76	22	12.12	-	-
MW17-24B	1082.07	1081.24	0.83	1,079.18	24-Aug-20	2.895	6.48	4.7	11.49	18.5	100.5	-	-
MW17-25A	1088.44	1087.56	0.88	1,086.24	17-Jul-17	2.205	-	-	-	-	-	-	-
MW17-25A	1088.44	1087.56	0.88	1,086.08	23-Jul-17	2.364	7.92	5.92	4.32	348	54.7	-	-
MW17-25A	1088.44	1087.56	0.88	1,086.17	28-Jul-17	2.275	-	-	-	-	-	-	-
MW17-25A	1088.44	1087.56	0.88	1,085.93	7-Sep-19	2.51	-	-	-	-	-	1	0
MW17-25A	1088.44	1087.56	0.88	1,086.30	25-Aug-20	2.141	7.48	4.7	3.5	258.9	1.7	-	-
MW17-25B	1088.38	1087.50	0.88	1,086.18	17-Jul-17	2.202	-	-	-	-	-	-	-
MW17-25B	1088.38	1087.50	0.88	1,085.94	23-Jul-17	2.439	7.92	6.66	6	137	108.3	-	-
MW17-25B	1088.38	1087.50	0.88	1,086.09	28-Jul-17	2.292	-	-	-	-	-	-	-
MW17-25B	1088.38	1087.50	0.88	-	7-Sep-19	Dry	-	-	-	-	-	1	0
MW17-26A	1105.43	1104.51	0.92	1,098.68	17-Jul-17	6.752	-	-	-	-	-	-	-
MW17-26A	1105.43	1104.51	0.92	1,096.73	23-Jul-17	8.694	7.32	5.62	9.38	260	119.2	-	-
MW17-26A	1105.43	1104.51	0.92	1,096.44	28-Jul-17	8.992	-	-	-	-	-	-	-
MW17-26A	1105.43	1104.51	0.92	1,095.32	15-Jul-19	10.105	7.85	5.11	8.45	285	24.5	-	-
MW17-26A	1105.43	1104.51	0.92	1,096.59	5-Sep-19	8.84	8.01	4.07	8.4	179	0	-	-
MW17-26A	1105.43	1104.51	0.92	1,098.06	25-Aug-20	7.365	7.61	4.4	8.18	190.5	76.3	-	-
MW17-26B	1105.70	1104.80	0.90	1,100.56	17-Jul-17	5.138	-	-	-	-	-	-	-
MW17-26B	1105.70	1104.80	0.90	1,101.23	24-Jul-17	4.469	7.88	8.35	9.3	302	82.2	-	-
MW17-26B	1105.70	1104.80	0.90	1,101.49	28-Jul-17	4.213	-	-	-	-	-	-	-
MW17-26B	1105.70	1104.80	0.90	1,099.76	18-Jul-19	5.942	7.71	6.19	5.83	297	42.8	-	-
MW17-26B	1105.70	1104.80	0.90	1,100.75	5-Sep-19	4.95	8.1	6.02	6.93	196	5	-	-



**Table 1: Groundwater Monitoring Data**

Well ID	Elevation top of PVC pipe (m)	Ground Elevation (m)	Stick up length (m)	WL Elevation (m)	Date Monitored	Depth to Water (mbtop)	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (uS/cm)	ORP (mV)	Well Headspace (%LEL)	Well Headspace (ppm)
MW17-26B	1105.70	1104.80	0.90	1,102.35	25-Aug-20	3.352	7.59	5.6	6.44	200.5	74.1	-	-
MW17-27A	1065.48	1064.67	0.81	1,049.00	17-Jul-17	16.488	-	-	-	-	-	-	-
MW17-27A	1065.48	1064.67	0.81	1,048.64	24-Jul-17	16.842	7.92	4.45	1	383	40	-	-
MW17-27A	1065.48	1064.67	0.81	1,048.69	28-Jul-17	16.792	-	-	-	-	-	-	-
MW17-27A	1065.48	1064.67	0.81	1,048.40	16-Jul-19	17.088	7.85	5.62	2.23	288	-78.8	-	-
MW17-27A	1065.48	1064.67	0.81	1,048.46	7-Sep-19	17.02	-	-	-	-	-	1	0
MW17-27A	1065.48	1064.67	0.81	1,049.68	28-Aug-20	15.805	7.33	4.1	4.1	270.2	-24	-	-
MW17-27B	1065.35	1064.53	0.82	1,048.82	17-Jul-17	16.527	-	-	-	-	-	-	-
MW17-27B	1065.35	1064.53	0.82	1,048.07	24-Jul-17	17.275	8.1	4.11	0.2	383	-55.1	-	-
MW17-27B	1065.35	1064.53	0.82	1,048.10	28-Jul-17	17.251	-	-	-	-	-	-	-
MW17-27B	1065.35	1064.53	0.82	1,047.71	16-Jul-19	17.639	7.57	6.3	4.5	429	-	-	-
MW17-27B	1065.35	1064.53	0.82	1,047.93	7-Sep-19	17.42	-	-	-	-	-	1	1
MW17-27B	1065.35	1064.53	0.82	-	28-Aug-20	No purge or water sampling possible (mix of sand and water)							
MW17-28	1007.90	1007.18	0.72	1,003.55	23-Jul-17	4.342	8.07	6.04	7.46	346	156.5	-	-
MW17-28	1007.90	1007.18	0.72	1,003.55	28-Jul-17	4.342	-	-	-	-	-	-	-
MW17-28	1007.90	1007.18	0.72	1,003.59	7-Sep-19	4.31	8.47	6.98	16.68	155	65.9	-	-

**Notes:**

LEL = Lower explosive limit

ppm = parts per million

mbtop = meters below top of pipe



**Table 2: PETROLEUM HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

			AEC 2 : Fuel Lines										
			MW17-12A		MW17-17A				TP1 3	TP09		TP18	
			MW17-12A 2-4	MW17-12A 8-10	MW17-17A 6-8	MW17-17A 16-18	MW17-17A 18-20	MW17-17A 30-35	TP1 3-4	TP-09 6-8	TP-09 8-10	TP-18 6-8	TP-18 8-10
			0.6-1.2	2.4-3.0	1.8-2.4	4.9-5.5	5.5-6.1	9.1-10.7	0.9-1.2	1.8-2.4	2.4-3.0	1.8-2.4	2.4-3.0
			20-Jun-17	20-Jun-17	06-Jul-17	06-Jul-17	06-Jul-17	06-Jul-17	21-Jun-17	25-Jun-17	25-Jun-17	26-Jun-17	26-Jun-17
			L1948071-2	L1948071-5	L1957720-25	L1957720-31	L1957720-32	L1957720-36	L1948071-26	L1951378-63	L1951378-64	L1951378-96	L1951378-97
Parameters	Units	MDL											
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	0.00	5.00	45.00	10.00	30.00	5.00	0.00	5.00	10.00	nm	nm
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no	no
<b>Petroleum Hydrocarbons (PHCs)</b>													
Benzene	µg/g	0.0050	na	na	na	na	na	na	na	na	na	na	na
Ethylbenzene	µg/g	0.015	na	na	na	na	na	na	na	na	na	na	na
Toluene	µg/g	0.050	na	na	na	na	na	na	na	na	na	na	na
ortho-Xylene	µg/g	0.050	na	na	na	na	na	na	na	na	na	na	na
meta- & para-Xylene	µg/g	0.050	na	na	na	na	na	na	na	na	na	na	na
Xylenes, Total	µg/g	0.075	na	na	na	na	na	na	na	na	na	na	na
Volatile Hydrocarbons (VH <sub>6-10</sub> )	µg/g	100	<100	<100	<100	<100	na	<100	<100	260	330	620	960
VPH <sub>5</sub> <sup>1</sup>	µg/g	100	<100	<100	<100	<100	na	<100	<100	250	330	620	960
Styrene	µg/g	0.050	na	na	na	na	na	na	na	na	na	na	na
Methyl tert-butyl ether [MTBE]	µg/g	0.20	na	na	na	na	na	na	na	na	na	na	na
EPH <sub>10-19</sub>	µg/g	200	<200	<200	2300	na	<200	<200	<200	4660	2480	7620	11100
EPH <sub>19-32</sub>	µg/g	200	<200	<200	410	na	<200	<200	<200	270	<200	950	1390
LEPH <sub>5</sub>	µg/g	200	<200	<200	2300	na	<200	<200	<200	4650	2470	7600	11000
HEPH <sub>5</sub>	µg/g	200	<200	<200	410	na	<200	<200	<200	270	<200	950	1390
<b>Taxonomy (Soil)</b>													
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	na	na	na	na	na	na	na	na	na	na	na
<b>Organic / Inorganic Carbon (Soil)</b>													
Total Organic Carbon	%	0.0500	na	na	na	na	na	na	na	na	na	na	na

**Notes:**

- MDL = Method Detection Limit
- EPH<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPH<sub>5</sub> = light extractable petroleum hydrocarbons in soil
- HEPH<sub>5</sub> = heavy extractable petroleum hydrocarbons in soil
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- VPHS = volatile petroleum hydrocarbons in soil
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit



**Table 2: PETROLEUM HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

			AEC 2 : Fuel Lines												
			TP20		TP21	TP27		TP28			TP19-01	TP19-02	TP19-05		
			TP-20 4-6	TP-20 8-10	TP-21 6-8	TP27 2-4	TP27 6-8	TP28 2-4	TP28 6-8	TP28 DUP A	TP19-01-04	TP19-02-04	TP19-05-01		
			Sample Depth (mbg)	Sample Date	Lab ID #										
			1.2-1.8	2.4-3.0	1.8-2.4	0.6-1.2	1.8-2.4	0.6-1.2	1.8-2.4	1.8-2.4	4.0	3.5	0.5		
			26-Jun-17	26-Jun-17	26-Jun-17	21-Jul-17	21-Jul-17	21-Jul-17	21-Jul-17	21-Jul-17	10-Jul-19	10-Jul-19	10-Jul-19		
			L1951378-105	L1951378-107	L1951378-111	L1965813-2	L1965813-4	L1965813-6	L1965813-8	L1965813-9	L2313880-4	L2313880-10	L2313880-26		
Parameters	Units	MDL													
<b>Field Screening</b>															
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm	175.00	290.00	190.00		
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no	no		
<b>Petroleum Hydrocarbons (PHCs)</b>															
Benzene	µg/g	0.0050	na	na	na	na	na	na	na	na	<0.0050	<0.0050	<0.0050		
Ethylbenzene	µg/g	0.015	na	na	na	na	na	na	na	na	<0.015	<0.015	<0.015		
Toluene	µg/g	0.050	na	na	na	na	na	na	na	na	<0.050	<0.050	<0.050		
ortho-Xylene	µg/g	0.050	na	na	na	na	na	na	na	na	<0.050	<0.050	<0.050		
meta- & para-Xylene	µg/g	0.050	na	na	na	na	na	na	na	na	<0.050	<0.050	<0.050		
Xylenes, Total	µg/g	0.075	na	na	na	na	na	na	na	na	<0.075	<0.075	<0.075		
Volatile Hydrocarbons (VH <sub>6-10</sub> )	µg/g	100	<100	220	<100	<100	<100	<100	<100	<100	<100	<100	<100		
VPH <sub>5</sub> <sup>1</sup>	µg/g	100	<100	220	<100	<100	<100	<100	<100	<100	<100	<100	<100		
Styrene	µg/g	0.050	na	na	na	na	na	na	na	na	<0.050	<0.050	<0.050		
Methyl tert-butyl ether [MTBE]	µg/g	0.20	na	na	na	na	na	na	na	na	<0.20	<0.20	<0.20		
EPH <sub>10-19</sub>	µg/g	200	900	590	<200	<200	<200	<200	<200	<200	<200	<200	<200		
EPH <sub>19-32</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200		
LEPH <sub>5</sub>	µg/g	200	900	590	<200	<200	<200	<200	<200	<200	na	na	na		
HEPH <sub>5</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	<200	<200	na	na	na		
<b>Taxonomy (Soil)</b>															
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	na	na	na	na	na	na	na	na	na	na	na		
<b>Organic / Inorganic Carbon (Soil)</b>															
Total Organic Carbon	%	0.0500	na	na	na	na	na	na	na	na	na	na	na		

**Notes:**

- MDL = Method Detection Limit
- EPH<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPH<sub>5</sub> = light extractable petroleum hydrocarbons in soil
- HEPH<sub>5</sub> = heavy extractable petroleum hydrocarbons in soil
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- VPHS = volatile petroleum hydrocarbons in soil
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**Table 2: PETROLEUM HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

			APEC/Issue	AEC 2 : Fuel Lines		AEC 1 : Mill / 10 Level Portal								
			Sample Station	TP19-05	MW17-1A	MW17-3		MW17-2B	MW17-4B		MW17-5B	MW17-6A	MW17-7A	
			Sample ID	TP19-05-03	MW17-1A 7-9	MW17-3 0-2	MW17-3 2-4	MW17-2B 2-4	MW17-4B 3-4	MW17-4B 4-7	MW17-5B 2-3	MW17-6A 0-1	MW17-7A 0-1	MW17-7A 2-3.5
			Sample Depth (mbg)	2.4	2.1-2.7	0.0-0.6	0.6-1.2	0.6-1.2	0.9-1.2	1.2-2.1	0.6-0.9	0.0-0.3	0.0-0.3	0.6-1.1
			Sample Date	10-Jul-19	10-Jun-17	11-Jun-17	11-Jun-17	11-Jun-17	12-Jun-17	12-Jun-17	13-Jun-17	13-Jun-17	14-Jun-17	14-Jun-17
			Lab ID #	L2313880-28	L1942125-5	L1942125-15	L1942125-16	L1942125-29	L1942125-48	L1942125-49	L1945466-2	L1945466-6	L1945466-22	L1945466-23
Parameters	Units	MDL												
<b>Field Screening</b>														
Sample Headspace Vapour Concentration	ppmv	5.00	100.00	0.00	45.00	0.00	0.00	0.00	5.00	0.00	0.00	5.00	35.00	0.00
Observable Staining	-	-	no	no	no	no	no	no	no	yes	no	no	no	no
<b>Petroleum Hydrocarbons (PHCs)</b>														
Benzene	µg/g	0.0050	<0.0050	na	na	na	na	na	na	na	na	na	na	na
Ethylbenzene	µg/g	0.015	<0.015	na	na	na	na	na	na	na	na	na	na	na
Toluene	µg/g	0.050	<0.050	na	na	na	na	na	na	na	na	na	na	na
ortho-Xylene	µg/g	0.050	<0.050	na	na	na	na	na	na	na	na	na	na	na
meta- & para-Xylene	µg/g	0.050	<0.050	na	na	na	na	na	na	na	na	na	na	na
Xylenes, Total	µg/g	0.075	<0.075	na	na	na	na	na	na	na	na	na	na	na
Volatile Hydrocarbons (VH <sub>6-10</sub> )	µg/g	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
VPH <sub>5</sub> <sup>1</sup>	µg/g	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Styrene	µg/g	0.050	<0.050	na	na	na	na	na	na	na	na	na	na	na
Methyl tert-butyl ether [MTBE]	µg/g	0.20	<0.20	na	na	na	na	na	na	na	na	na	na	na
EPH <sub>10-19</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	470	490	<200	210	260	<200
EPH <sub>19-32</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	250	<200	<200	400	2030	<200
LEPH <sub>5</sub>	µg/g	200	na	<200	<200	<200	<200	<200	470	490	<200	210	260	<200
HEPH <sub>5</sub>	µg/g	200	na	<200	<200	<200	<200	<200	250	<200	<200	400	2030	<200
<b>Taxonomy (Soil)</b>														
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	na	na	na	na	na	na	na	na	na	na	na	na
<b>Organic / Inorganic Carbon (Soil)</b>														
Total Organic Carbon	%	0.0500	na	na	na	na	na	na	na	na	na	na	na	na

**Notes:**

- MDL = Method Detection Limit
- EPH<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPH<sub>5</sub> = light extractable petroleum hydrocarbons in soil
- HEPH<sub>5</sub> = heavy extractable petroleum hydrocarbons in soil
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- VPHS = volatile petroleum hydrocarbons in soil
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**Table 2: PETROLEUM HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue			AEC 1 : Mill / 10 Level Portal				AEC 2 : Tank Farm Area						
Sample Station	MW17-7B	MW17-8A	TP19-10	TP19-11	MW17-13			MW17-16 2-4		TP2			
Sample ID	MW17-7B 0-1	MW17-8A 3-4	TP19-10-01	TP19-11-01	MW17-13 2-3	MW17-13 6-8	MW17-13 10-12	MW17-16 2-4	MW17-16 2-4 DUP	TP2 3-4	TP2 6-9		
Sample Depth (mbg)	0.0-0.3	0.9-1.2	0.8	0.5	0.6-0.9	1.8-2.4	3.0-3.6	0.6-1.2	0.6-1.2	0.9-1.2	1.8-2.7		
Sample Date	14-Jun-17	15-Jun-17	11-Jul-19	11-Jul-19	22-Jun-17	22-Jun-17	22-Jun-17	05-Jul-17	05-Jul-17	21-Jun-17	21-Jun-17		
Lab ID #	L1945466-35	L1945466-42	L2313896-17	L2313896-19	L1948071-51	L1948071-53	L1948071-55	L1957720-16	L1957720-17	L1948071-32	L1948071-33		
Parameters	Units	MDL											
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	30.00	0.00	0.00	0.00	80.00	10.00	0.00	35.00	35.00	0.00	140.00
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no	yes
<b>Petroleum Hydrocarbons (PHCs)</b>													
Benzene	µg/g	0.0050	na	na	<0.0050	<0.0050	na	na	na	na	na	na	na
Ethylbenzene	µg/g	0.015	na	na	<0.015	<0.015	na	na	na	na	na	na	na
Toluene	µg/g	0.050	na	na	<0.050	<0.050	na	na	na	na	na	na	na
ortho-Xylene	µg/g	0.050	na	na	<0.050	<0.050	na	na	na	na	na	na	na
meta- & para-Xylene	µg/g	0.050	na	na	<0.050	<0.050	na	na	na	na	na	na	na
Xylenes, Total	µg/g	0.075	na	na	<0.075	<0.075	na	na	na	na	na	na	na
Volatile Hydrocarbons (VH <sub>6-10</sub> )	µg/g	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	360	420
VPH <sub>5</sub> <sup>1</sup>	µg/g	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	360	420
Styrene	µg/g	0.050	na	na	<0.050	<0.050	na	na	na	na	na	na	na
Methyl tert-butyl ether [MTBE]	µg/g	0.20	na	na	<0.20	<0.20	na	na	na	na	na	na	na
EPH <sub>10-19</sub>	µg/g	200	<200	<200	<200	<200	2750	870	<200	<200	<200	3440	3880
EPH <sub>19-32</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	<200	<200	<200	600	300
LEPH <sub>5</sub>	µg/g	200	<200	<200	na	na	2750	870	<200	<200	<200	3440	3880
HEPH <sub>5</sub>	µg/g	200	<200	<200	na	na	<200	<200	<200	<200	<200	600	300
<b>Taxonomy (Soil)</b>													
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	na	na	na	na	na	na	na	na	na	na	na
<b>Organic / Inorganic Carbon (Soil)</b>													
Total Organic Carbon	%	0.0500	na	na	na	na	na	na	na	na	na	na	na

**Notes:**

- MDL = Method Detection Limit
- EPH<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPH<sub>5</sub> = light extractable petroleum hydrocarbons in soil
- HEPH<sub>5</sub> = heavy extractable petroleum hydrocarbons in soil
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- VPHS = volatile petroleum hydrocarbons in soil
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
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**Table 2: PETROLEUM HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

			AEC 2 : Tank Farm Area										
APEC/Issue			TP04		TP05		TP06	TP06	TP07		TP08		TP19-06
Sample Station													
Sample ID			TP-04 2-3	TP-04 6-8	TP-05 4-6	TP-05 8-10	TP-06 4-6	TP-06 8-10	TP-07 2-3	TP-07 6-8	TP-08 4-6	TP-08 8-10	TP-19 6-8
Sample Depth (mbg)			0.6-0.9	1.8-2.4	1.2-1.8	2.4-3.0	1.2-1.8	2.4-3.0	0.6-0.9	1.8-2.4	1.2-1.8	2.4-3.0	1.8-2.4
Sample Date			24-Jun-17	24-Jun-17	25-Jun-17	25-Jun-17	25-Jun-17	25-Jun-17	25-Jun-17	25-Jun-17	25-Jun-17	25-Jun-17	26-Jun-17
Lab ID #			L1951378-38	L1951378-40	L1951378-43	L1951378-45	L1951378-48	L1951378-50	L1951378-52	L1951378-54	L1951378-57	L1951378-59	L1951378-101
Parameters	Units	MDL											
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	160.00	0.00	nm	nm	nm	nm	nm	nm	nm	nm	nm
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no	no
<b>Petroleum Hydrocarbons (PHCs)</b>													
Benzene	µg/g	0.0050	na	na	na	na	na	na	na	na	na	na	na
Ethylbenzene	µg/g	0.015	na	na	na	na	na	na	na	na	na	na	na
Toluene	µg/g	0.050	na	na	na	na	na	na	na	na	na	na	na
ortho-Xylene	µg/g	0.050	na	na	na	na	na	na	na	na	na	na	na
meta- & para-Xylene	µg/g	0.050	na	na	na	na	na	na	na	na	na	na	na
Xylenes, Total	µg/g	0.075	na	na	na	na	na	na	na	na	na	na	na
Volatile Hydrocarbons (VH <sub>6-10</sub> )	µg/g	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
VPH <sub>5</sub> <sup>1</sup>	µg/g	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Styrene	µg/g	0.050	na	na	na	na	na	na	na	na	na	na	na
Methyl tert-butyl ether [MTBE]	µg/g	0.20	na	na	na	na	na	na	na	na	na	na	na
EPH <sub>10-19</sub>	µg/g	200	2480	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
EPH <sub>19-32</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
LEPH <sub>5</sub>	µg/g	200	2480	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
HEPH <sub>5</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
<b>Taxonomy (Soil)</b>													
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	na	na	na	na	na	na	na	na	na	na	na
<b>Organic / Inorganic Carbon (Soil)</b>													
Total Organic Carbon	%	0.0500	na	na	na	na	na	na	na	na	na	na	na

**Notes:**

- MDL = Method Detection Limit
- EPH<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPH<sub>5</sub> = light extractable petroleum hydrocarbons in soil
- HEPH<sub>5</sub> = heavy extractable petroleum hydrocarbons in soil
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- VPHS = volatile petroleum hydrocarbons in soil
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**Table 2: PETROLEUM HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

			AEC 2 : Tank Farm Area									AEC 3 : Fuel Pump Shed	
APEC/Issue			TP19-03				TP19-04		TP19-06			TP29	TP30
Sample Station			TP19-03-02	TP19-03-03	TP19-03-04	TP19-03-07	TP19-04-01	TP19-04-03	TP19-06-02	TP19-06-03	TP19-06-04	TP29 2-4	TP30 2-4
Sample ID													
Sample Depth (mbg)			1.8	1.8	2.7	4.4	0.5	2.6	1.7	2.4	2.4	0.6-1.2	0.6-1.2
Sample Date			10-Jul-19	10-Jul-19	10-Jul-19	10-Jul-19	10-Jul-19	10-Jul-19	11-Jul-19	11-Jul-19	11-Jul-19	21-Jul-17	21-Jul-17
Lab ID #			L2313880-15	L2313880-16	L2313880-17	L2313880-20	L2313880-21	L2313880-23	L2313896-2	L2313896-3	L2313896-4	L1965813-11	L1965813-16
Parameters	Units	MDL											
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	105.00	105.00	1150.00	200.00	280.00	105.00	80.00	60.00	60.00	nm	nm
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no	yes
<b>Petroleum Hydrocarbons (PHCs)</b>													
Benzene	µg/g	0.0050	<0.0050	<0.0050	na	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	na	na
Ethylbenzene	µg/g	0.015	0.437	0.271	na	0.042	<0.015	<0.015	<0.015	<0.015	<0.015	na	na
Toluene	µg/g	0.050	<0.050	<0.050	na	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	na	na
ortho-Xylene	µg/g	0.050	0.251	0.29	na	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	na	na
meta- & para-Xylene	µg/g	0.050	0.461	0.524	na	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	na	na
Xylenes, Total	µg/g	0.075	0.712	0.814	na	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	na	na
Volatile Hydrocarbons (VH <sub>6-10</sub> )	µg/g	100	260	250	na	<100	<100	<100	<100	<100	<100	<100	190
VPH <sub>5</sub> <sup>1</sup>	µg/g	100	260	250	na	<100	<100	<100	<100	<100	<100	<100	190
Styrene	µg/g	0.050	<0.050	<0.050	na	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	na	na
Methyl tert-butyl ether [MTBE]	µg/g	0.20	<0.20	<0.20	na	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	na	na
EPH <sub>10-19</sub>	µg/g	200	1450	1790	4300	<200	<200	<200	<200	<200	<200	<200	4950
EPH <sub>19-32</sub>	µg/g	200	<200	<200	340	<200	<200	<200	<200	<200	<200	<200	<200
LEPH <sub>5</sub>	µg/g	200	na	na	na	na	na	na	na	na	na	<200	4950
HEPH <sub>5</sub>	µg/g	200	na	na	na	na	na	na	na	na	na	<200	<200
<b>Taxonomy (Soil)</b>													
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	na	na	na	na	na	na	na	na	na	na	na
<b>Organic / Inorganic Carbon (Soil)</b>													
Total Organic Carbon	%	0.0500	na	na	na	na	na	na	na	na	na	na	na

**Notes:**

- MDL = Method Detection Limit
- EPH<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPH<sub>5</sub> = light extractable petroleum hydrocarbons in soil
- HEPH<sub>5</sub> = heavy extractable petroleum hydrocarbons in soil
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- VPHS = volatile petroleum hydrocarbons in soil
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**Table 2: PETROLEUM HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VES2655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue			AEC 3 : Fuel Pump Shed			APEC 6 : Septic Field				APEC 10 : Burial Site 1		AEC 4 : Mechanical Shop 11 Level Portal	
Sample Station			TP19-07	TP19-08		MW17-10A				MW17-9B		TP10	TP11
Sample ID			TP19-07-02	TP19-08-01	TP19-08-02	MW17-10A 2-4	MW17-10A 12-14	MW17-10A 16-18	MW17-10A 18-20	MW17-9B 3-4	MW17-9B 6-10	TP-10 8-10	TP-11 4-6
Sample Depth (mbg)			1.7	0.5	2.3	0.6-1.2	3.6-4.3	4.9-5.5	5.5-6.1	0.9-1.2	1.8-3.0	2.4-3.0	1.2-1.8
Sample Date			11-Jul-19	11-Jul-19	11-Jul-19	17-Jun-17	17-Jun-17	17-Jun-17	17-Jun-17	16-Jun-17	16-Jun-17	26-Jun-17	26-Jun-17
Lab ID #			L2313896-6	L2313896-9	L2313896-10	L1946419-28	L1946419-33	L1946419-35	L1946419-36	L1946419-2	L1946419-4	L1951378-69	L1951378-72
Parameters	Units	MDL											
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	40.00	95.00	60.00	20.00	15.00	55.00	0.00	35.00	0.00	10.00	5.00
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no	no
<b>Petroleum Hydrocarbons (PHCs)</b>													
Benzene	µg/g	0.0050	<0.0050	<0.0050	<0.0050	na	na	na	na	na	na	na	na
Ethylbenzene	µg/g	0.015	<0.015	<0.015	<0.015	na	na	na	na	na	na	na	na
Toluene	µg/g	0.050	<0.050	<0.050	<0.050	na	na	na	na	na	na	na	na
ortho-Xylene	µg/g	0.050	<0.050	<0.050	<0.050	na	na	na	na	na	na	na	na
meta- & para-Xylene	µg/g	0.050	<0.050	<0.050	<0.050	na	na	na	na	na	na	na	na
Xylenes, Total	µg/g	0.075	<0.075	<0.075	<0.075	na	na	na	na	na	na	na	na
Volatile Hydrocarbons (VH <sub>6-10</sub> )	µg/g	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	1220
VPH <sub>5</sub> <sup>1</sup>	µg/g	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	1210
Styrene	µg/g	0.050	<0.050	<0.050	<0.050	na	na	na	na	na	na	na	na
Methyl tert-butyl ether [MTBE]	µg/g	0.20	<0.20	<0.20	<0.20	na	na	na	na	na	na	na	na
EPH <sub>10-19</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	10500
EPH <sub>19-32</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	<200	<200	380	700	2630
LEPH <sub>5</sub>	µg/g	200	na	na	na	<200	<200	<200	<200	<200	<200	<200	10500
HEPH <sub>5</sub>	µg/g	200	na	na	na	<200	<200	<200	<200	<200	380	700	2630
<b>Taxonomy (Soil)</b>													
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	na	na	na	na	na	na	na	na	na	na	na
<b>Organic / Inorganic Carbon (Soil)</b>													
Total Organic Carbon	%	0.0500	na	na	na	na	na	na	na	na	na	na	na

**Notes:**

- MDL = Method Detection Limit
- EPH<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPH<sub>5</sub> = light extractable petroleum hydrocarbons in soil
- HEPH<sub>5</sub> = heavy extractable petroleum hydrocarbons in soil
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- VPHS = volatile petroleum hydrocarbons in soil
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**Table 2: PETROLEUM HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

			AEC 4 : Mechanical Shop 11 Level Portal												
			APEC/Issue												
			Sample Station		TP11	TP12	TP13	TP19-12		TP19-13		TP19-14		TP19-15	TP19-16
			Sample ID		TP-11 8-10	TP-12 4-6	TP-13 6-8	TP19-12-03	TP19-12-04	TP19-13-02	TP19-13-03	TP19-14-01	TP19-14-02	TP19-15-02	TP19-16-01
			Sample Depth (mbg)		2.4-3.0	1.2-1.8	1.8-2.4	2.9	2.9	2.9	3.7	0.7	2.4	2.4	0.5
			Sample Date		26-Jun-17	26-Jun-17	26-Jun-17	11-Jul-19	11-Jul-19	11-Jul-19	11-Jul-19	12-Jul-19	12-Jul-19	12-Jul-19	12-Jul-19
			Lab ID #		L1951378-74	L1951378-77	L1951378-81	L2313896-22	L2313896-23	L2313896-27	L2313896-28	L2313895-1	L2313895-2	L2313895-5	L2313895-8
Parameters	Units	MDL													
<b>Field Screening</b>															
Sample Headspace Vapour Concentration	ppmv	5.00	5.00	0.00	15.00	0.00	0.00	0.00	0.00	0.00	20.00	95.00	20.00	25.00	
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	Yes	no	no	
<b>Petroleum Hydrocarbons (PHCs)</b>															
Benzene	µg/g	0.0050	na	na	na	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
Ethylbenzene	µg/g	0.015	na	na	na	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	0.409	<0.015	<0.015	
Toluene	µg/g	0.050	na	na	na	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
ortho-Xylene	µg/g	0.050	na	na	na	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
meta- & para-Xylene	µg/g	0.050	na	na	na	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.643	<0.050	<0.050	
Xylenes, Total	µg/g	0.075	na	na	na	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	0.643	<0.075	<0.075	
Volatile Hydrocarbons (VH <sub>6-10</sub> )	µg/g	100	940	<100	<100	<100	<100	<100	<100	<100	<100	480	<100	<100	
VPH <sub>5</sub> <sup>1</sup>	µg/g	100	930	<100	<100	<100	<100	<100	<100	<100	<100	480	<100	<100	
Styrene	µg/g	0.050	na	na	na	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
Methyl tert-butyl ether [MTBE]	µg/g	0.20	na	na	na	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	
EPH <sub>10-19</sub>	µg/g	200	8600	<200	<200	<200	<200	<200	<200	<200	<200	3520	2950	<200	
EPH <sub>19-32</sub>	µg/g	200	1330	<200	<200	220	250	<200	830	1450	310	<200	<200	390	
LEPH <sub>5</sub>	µg/g	200	8600	<200	<200	na	na	na	na	na	na	na	na	na	
HEPH <sub>5</sub>	µg/g	200	1330	<200	<200	na	na	na	na	na	na	na	na	na	
<b>Taxonomy (Soil)</b>															
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	na	na	na	na	na	na	na	na	na	na	na	na	
<b>Organic / Inorganic Carbon (Soil)</b>															
Total Organic Carbon	%	0.0500	na	na	na	na	na	na	na	na	na	na	na	na	

**Notes:**

- MDL = Method Detection Limit
- EPH<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPH<sub>5</sub> = light extractable petroleum hydrocarbons in soil
- HEPH<sub>5</sub> = heavy extractable petroleum hydrocarbons in soil
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- VPHS = volatile petroleum hydrocarbons in soil
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**Table 2: PETROLEUM HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue			AEC 4 : Mechanical Shop 11 Level Portal					APEC 8: Level 12 Portal					
Sample Station			TP19-16		TP19-17			TP19-18		TP19-19		TP19-20	TP19-21
Sample ID			TP19-16-02	TP19-16-03	TP19-17-01	TP19-17-02	TP19-17-03	TP19-18-01	TP19-18-02	TP19-19-01	TP19-19-02	TP19-20-01	TP19-21-01
Sample Depth (mbg)			2.9	3.3	0.5	2.7	3.9	0.9	1.9	1.0	2.6	0.4	0.2
Sample Date			12-Jul-19	12-Jul-19	12-Jul-19	12-Jul-19	12-Jul-19	12-Jul-19	12-Jul-19	12-Jul-19	12-Jul-19	12-Jul-19	12-Jul-19
Lab ID #			L2313895-9	L2313895-10	L2313895-13	L2313895-14	L2313895-15	L2313895-16	L2313895-17	L2313895-18	L2313895-19	L2313895-22	L2313895-23
Parameters	Units	MDL											
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	25.00	15.00	45.00	20.00	0.00	10.00	15.00	25.00	25.00	25.00	30.00
Observable Staining	-	-	Yes	Yes	Yes	Yes	no	no	no	no	no	no	no
<b>Petroleum Hydrocarbons (PHCs)</b>													
Benzene	µg/g	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Ethylbenzene	µg/g	0.015	<0.015	0.158	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
Toluene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
ortho-Xylene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
meta- & para-Xylene	µg/g	0.050	<0.050	0.075	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Xylenes, Total	µg/g	0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075
Volatile Hydrocarbons (VH <sub>6-10</sub> )	µg/g	100	<100	200	<100	<100	<100	<100	<100	<100	<100	<100	<100
VPH <sub>5</sub> <sup>1</sup>	µg/g	100	<100	200	<100	<100	<100	<100	<100	<100	<100	<100	<100
Styrene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Methyl tert-butyl ether [MTBE]	µg/g	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
EPH <sub>10-19</sub>	µg/g	200	<200	5230	2140	<200	<200	<200	<200	<200	<200	<200	<200
EPH <sub>19-32</sub>	µg/g	200	<200	1250	1600	<200	<200	<200	<200	<200	<200	<200	670
LEPH <sub>5</sub>	µg/g	200	na	na	na	na	na	na	na	na	na	na	na
HEPH <sub>5</sub>	µg/g	200	na	na	na	na	na	na	na	na	na	na	na
<b>Taxonomy (Soil)</b>													
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	na	na	na	na	na	na	na	na	na	na	na
<b>Organic / Inorganic Carbon (Soil)</b>													
Total Organic Carbon	%	0.0500	na	na	na	na	na	na	na	na	na	na	na

**Notes:**

- MDL = Method Detection Limit
- EPH<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPH<sub>5</sub> = light extractable petroleum hydrocarbons in soil
- HEPH<sub>5</sub> = heavy extractable petroleum hydrocarbons in soil
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- VPHS = volatile petroleum hydrocarbons in soil
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit



**Table 2: PETROLEUM HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue			Main Warehouses					AEC 7: Warehouse East Area					
Sample Station			TP3		TP22		TP23	TP14	TP15	TP16	TP17	TP19-34	
Sample ID			TP3 4-6	TP3 6-9	TP22 4-6	TP22 6-8	TP23 6-8	TP-14 2-3	TP-15 2-3	TP-16 4-6	TP-17 4-6	TP19-34-03	TP19-34-04
Sample Depth (mbg)			1.2-1.8	1.8-2.7	1.2-1.8	1.8-2.4	1.8-2.4	0.6-0.9	0.6-0.9	1.2-1.8	1.2-1.8	1.8	3.5
Sample Date			21-Jun-17	21-Jun-17	04-Jul-17	04-Jul-17	04-Jul-17	26-Jun-17	26-Jun-17	26-Jun-17	26-Jun-17	14-Jul-19	14-Jul-19
Lab ID #			L1948071-37	L1948071-38	L1957720-3	L1957720-4	L1957720-8	L1951378-83	L1951378-86	L1951378-89	L1951378-92	L2313897-3	L2313897-4
Parameters	Units	MDL											
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	85.00	100.00	nm	nm	nm	nm	nm	15.00	25.00	100.00	5.00
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no	no
<b>Petroleum Hydrocarbons (PHCs)</b>													
Benzene	µg/g	0.0050	na	na	na	na	na	na	na	na	na	0.031	<0.0050
Ethylbenzene	µg/g	0.015	na	na	na	na	na	na	na	na	na	0.309	<0.015
Toluene	µg/g	0.050	na	na	na	na	na	na	na	na	na	<0.050	<0.050
ortho-Xylene	µg/g	0.050	na	na	na	na	na	na	na	na	na	0.079	<0.050
meta- & para-Xylene	µg/g	0.050	na	na	na	na	na	na	na	na	na	0.245	<0.050
Xylenes, Total	µg/g	0.075	na	na	na	na	na	na	na	na	na	0.324	<0.075
Volatile Hydrocarbons (VH <sub>6-10</sub> )	µg/g	100	170	<100	<100	na	<100	<100	<100	<100	<100	<100	<100
VPH <sub>5</sub> <sup>1</sup>	µg/g	100	170	<100	<100	na	<100	<100	<100	<100	<100	<100	<100
Styrene	µg/g	0.050	na	na	na	na	na	na	na	na	na	<0.050	<0.050
Methyl tert-butyl ether [MTBE]	µg/g	0.20	na	na	na	na	na	na	na	na	na	<0.20	<0.20
EPH <sub>10-19</sub>	µg/g	200	3090	1150	na	<200	<200	<200	<200	<200	<200	<200	<200
EPH <sub>19-32</sub>	µg/g	200	450	<200	na	<200	570	<200	3110	<200	<200	<200	<200
LEPH <sub>5</sub>	µg/g	200	3090	1150	na	<200	<200	<200	<200	<200	<200	na	na
HEPH <sub>5</sub>	µg/g	200	450	<200	na	<200	570	<200	3110	<200	<200	na	na
<b>Taxonomy (Soil)</b>													
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	na	na	na	na	na	na	na	na	na	na	na
<b>Organic / Inorganic Carbon (Soil)</b>													
Total Organic Carbon	%	0.0500	na	na	na	na	na	na	na	na	na	na	na

**Notes:**

- MDL = Method Detection Limit
- EPH<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPH<sub>5</sub> = light extractable petroleum hydrocarbons in soil
- HEPH<sub>5</sub> = heavy extractable petroleum hydrocarbons in soil
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- VPHS = volatile petroleum hydrocarbons in soil
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
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**Table 2: PETROLEUM HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue			AEC 7 : Warehouse East Area						APEC 12: Burial Site 2				
Sample Station			TP19-35		EX19-01				MW17-14A 18-20		MW17-14B	TP19-36	
Sample ID			TP19-35-01	TP19-35-02	EX19-01-01	EX19-01-02	EX19-01-03	EX19-01-04	MW17-14A 4-6	MW17-14A 18-20	MW17-14B 6-8	TP19-36-02	TP19-36-04
Sample Depth (mbg)			0.5	1.5	2.5	2.0	1.8	3.5	1.2-1.8	5.5-6.1	1.8-2.4	1.5	3.5
Sample Date			14-Jul-19	14-Jul-19	14-Jul-19	14-Jul-19	14-Jul-19	14-Jul-19	22-Jun-17	22-Jun-17	23-Jun-17	14-Jul-19	14-Jul-19
Lab ID #			L2313897-5	L2313897-6	L2313899-1	L2313899-2	L2313899-3	L2313899-4	L1948071-63	L1948071-69	L1951378-14	L2313897-10	L2313897-12
Parameters	Units	MDL											
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	0.00	0.00	nm	nm	nm	nm	20.00	0.00	20.00	0.00	0.00
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no	no
<b>Petroleum Hydrocarbons (PHCs)</b>													
Benzene	µg/g	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	na	na	na	<0.0050	<0.0050
Ethylbenzene	µg/g	0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	na	na	na	<0.015	<0.015
Toluene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	na	na	na	<0.050	<0.050
ortho-Xylene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	na	na	na	<0.050	<0.050
meta- & para-Xylene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	na	na	na	<0.050	<0.050
Xylenes, Total	µg/g	0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	na	na	na	<0.075	<0.075
Volatile Hydrocarbons (VH <sub>6-10</sub> )	µg/g	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
VPH <sub>5</sub> <sup>1</sup>	µg/g	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Styrene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	na	na	na	<0.050	<0.050
Methyl tert-butyl ether [MTBE]	µg/g	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	na	na	na	<0.20	<0.20
EPH <sub>10-19</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
EPH <sub>19-32</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	<200	<200	1010	<200	<200
LEPH <sub>5</sub>	µg/g	200	na	na	na	na	na	na	<200	<200	<200	na	na
HEPH <sub>5</sub>	µg/g	200	na	na	na	na	na	na	<200	<200	1010	na	na
<b>Taxonomy (Soil)</b>													
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	na	na	na	na	na	na	na	na	na	na	na
<b>Organic / Inorganic Carbon (Soil)</b>													
Total Organic Carbon	%	0.0500	na	na	na	na	na	na	na	na	na	na	na

**Notes:**

- MDL = Method Detection Limit
- EPH<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPH<sub>5</sub> = light extractable petroleum hydrocarbons in soil
- HEPH<sub>5</sub> = heavy extractable petroleum hydrocarbons in soil
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- VPHS = volatile petroleum hydrocarbons in soil
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**Table 2: PETROLEUM HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue			APEC 12 : Burial Site 2										Burial Site 2 Upstream
Sample Station	TP19-36	TP19-37	TP19-38			TP19-39			TP19-40			MW17-15B	
Sample ID	TP19-36-05	TP19-37-02	TP19-38-01	TP19-38-03	TP19-38-04	TP19-39-01	TP19-39-02	TP19-39-03	TP19-40-01	TP19-40-02	MW17-15B 4-6		
Sample Depth (mbg)	3.5	1.6	0.6	2.6	3.4	0.7	1.5	3.3	1.8	3.2			
Sample Date	14-Jul-19	14-Jul-19	14-Jul-19	14-Jul-19	14-Jul-19	14-Jul-19	14-Jul-19	14-Jul-19	14-Jul-19	14-Jul-19	23-Jun-17		
Lab ID #	L2313897-13	L2313897-16	L2313897-17	L2313897-19	L2313897-20	L2313897-21	L2313897-22	L2313897-23	L2313897-24	L2313897-25	L1951378-23		
Parameters	Units	MDL											
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	0.00	10.00	0.00	20.00	25.00	25.00	25.00	25.00	40.00	35.00	0.00
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no	no
<b>Petroleum Hydrocarbons (PHCs)</b>													
Benzene	µg/g	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	na
Ethylbenzene	µg/g	0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	na
Toluene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	na
ortho-Xylene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	na
meta- & para-Xylene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	na
Xylenes, Total	µg/g	0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	na
Volatile Hydrocarbons (VH <sub>6-10</sub> )	µg/g	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
VPH <sub>5</sub> <sup>1</sup>	µg/g	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Styrene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	na
Methyl tert-butyl ether [MTBE]	µg/g	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	na
EPH <sub>10-19</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
EPH <sub>19-32</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	680
LEPH <sub>5</sub>	µg/g	200	na	na	na	na	na	na	na	na	na	na	<200
HEPH <sub>5</sub>	µg/g	200	na	na	na	na	na	na	na	na	na	na	680
<b>Taxonomy (Soil)</b>													
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	na	na	na	na	na	na	na	na	na	na	na
<b>Organic / Inorganic Carbon (Soil)</b>													
Total Organic Carbon	%	0.0500	na	na	na	na	na	na	na	na	na	na	na

**Notes:**

- MDL = Method Detection Limit
- EPH<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPH<sub>5</sub> = light extractable petroleum hydrocarbons in soil
- HEPH<sub>5</sub> = heavy extractable petroleum hydrocarbons in soil
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- VPHS = volatile petroleum hydrocarbons in soil
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**Table 2: PETROLEUM HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

			APEC 7 : Tailings Impoundment Area									AEC 5 : Main Landfill		
APEC/Issue														
Sample Station			MW17-18A	MW17-19A			MW17-20B	MW17-23A		MW17-25A	TP32 2-4	TP33	MW17-22A	
Sample ID			MW17-18A 10-12	MW17-19A 6-8	MW17-19A 6-8 DUPA	MW17-20B 2-4	MW17-23A 4-6	MW17-23A 4-6 DUPA	MW17-25A 10-12	TP32 2-4	TP33 2-4	MW17-22A 6-8	MW17-22A 6-8 DUPA	
Sample Depth (mbg)			3.0-3.6	1.8-2.4	1.8-2.4	0.6-1.2	1.2-1.8	1.2-1.8	3.0-3.6	0.6-1.2	0.6-1.2	1.8-2.4	1.8-2.4	
Sample Date			07-Jul-17	08-Jul-17	08-Jul-17	10-Jul-17	12-Jul-17	12-Jul-17	13-Jul-17	22-Jul-17	22-Jul-17	10-Jul-17	10-Jul-17	
Lab ID #			L1957720-44	L1957720-63	L1957720-64	L1957720-89	L1959270-26	L1959270-27	L1959270-66	L1965813-23	L1965813-27	L1957720-112	L1957720-113	
Parameters	Units	MDL												
<b>Field Screening</b>														
Sample Headspace Vapour Concentration	ppmv	5.00	65.00	0.00	0.00	nm	5.00	5.00	5.00	nm	nm	30.00	30.00	
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no	no	
<b>Petroleum Hydrocarbons (PHCs)</b>														
Benzene	µg/g	0.0050	na	na	na	na	na	na	na	na	na	na	na	
Ethylbenzene	µg/g	0.015	na	na	na	na	na	na	na	na	na	na	na	
Toluene	µg/g	0.050	na	na	na	na	na	na	na	na	na	na	na	
ortho-Xylene	µg/g	0.050	na	na	na	na	na	na	na	na	na	na	na	
meta- & para-Xylene	µg/g	0.050	na	na	na	na	na	na	na	na	na	na	na	
Xylenes, Total	µg/g	0.075	na	na	na	na	na	na	na	na	na	na	na	
Volatile Hydrocarbons (VH <sub>6-10</sub> )	µg/g	100	<100	<100	<100	<100	<100	<100	<100	<100	na	<100	<100	
VPH <sub>5</sub> <sup>1</sup>	µg/g	100	<100	<100	<100	<100	<100	<100	<100	<100	na	<100	<100	
Styrene	µg/g	0.050	na	na	na	na	na	na	na	na	na	na	na	
Methyl tert-butyl ether [MTBE]	µg/g	0.20	na	na	na	na	na	na	na	na	na	na	na	
EPH <sub>10-19</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	
EPH <sub>19-32</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	<200	<200	<200	210	<200	
LEPH <sub>5</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	
HEPH <sub>5</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	<200	<200	<200	210	<200	
<b>Taxonomy (Soil)</b>														
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	na	na	na	na	na	na	na	na	na	na	na	
<b>Organic / Inorganic Carbon (Soil)</b>														
Total Organic Carbon	%	0.0500	na	na	na	na	na	na	na	na	na	na	na	

**Notes:**

- MDL = Method Detection Limit
- EPH<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPH<sub>5</sub> = light extractable petroleum hydrocarbons in soil
- HEPH<sub>5</sub> = heavy extractable petroleum hydrocarbons in soil
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- VPHS = volatile petroleum hydrocarbons in soil
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**Table 2: PETROLEUM HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue			AEC 5 : Main Landfill			Stonehouse Creek Drainage Downstream			Sky Creek Drainage Downstream		Sky Creek Drainage Upstream		Soil Treatment Area - 1
Sample Station			TP24	TP25		MW17-11A			MW17-24A		MW17-21A		LF1
Sample ID			TP24 2-4	TP25 4-6	TP26 4-6	MW17-11A 2-3	MW17-11A 6-8	MW17-11A 12-14	MW17-24A 6-8	MW17-24A 6-8 DUPA	MW17-21A 6-8	MW17-21A 8-10	LF1
Sample Depth (mbg)			0.6-1.2	1.2-1.8	1.2-1.8	0.6-0.9	1.8-2.4	3.6-4.3	1.8-2.4	1.8-2.4	1.8-2.4	2.4-3.0	0.1 (sfc)
Sample Date			12-Jul-17	11-Jul-17	11-Jul-17	19-Jun-17	19-Jun-17	19-Jun-17	13-Jul-17	13-Jul-17	10-Jul-17	10-Jul-17	11-Sep-18
Lab ID #			L1959270-20	L1959270-13	L1959270-17	L1946419-52	L1946419-55	L1946419-58	L1959270-43	L1959270-44	L1957720-95	L1957720-96	L2162701-1
Parameters	Units	MDL											
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	70.00	5.00	5.00	10.00	10.00	0.00	10.00	nm
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no	no
<b>Petroleum Hydrocarbons (PHCs)</b>													
Benzene	µg/g	0.0050	na	na	na	na	na	na	na	na	na	na	na
Ethylbenzene	µg/g	0.015	na	na	na	na	na	na	na	na	na	na	na
Toluene	µg/g	0.050	na	na	na	na	na	na	na	na	na	na	na
ortho-Xylene	µg/g	0.050	na	na	na	na	na	na	na	na	na	na	na
meta- & para-Xylene	µg/g	0.050	na	na	na	na	na	na	na	na	na	na	na
Xylenes, Total	µg/g	0.075	na	na	na	na	na	na	na	na	na	na	na
Volatile Hydrocarbons (VH <sub>6-10</sub> )	µg/g	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	na	na
VPH <sub>5</sub> <sup>1</sup>	µg/g	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	na	na
Styrene	µg/g	0.050	na	na	na	na	na	na	na	na	na	na	na
Methyl tert-butyl ether [MTBE]	µg/g	0.20	na	na	na	na	na	na	na	na	na	na	na
EPH <sub>10-19</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	<200	<200	na	<200	370
EPH <sub>19-32</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	<200	<200	na	340	<200
LEPH <sub>5</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	<200	<200	na	<200	370
HEPH <sub>5</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	<200	<200	na	340	<200
<b>Taxonomy (Soil)</b>													
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	na	na	na	na	na	na	na	na	na	na	2100000
<b>Organic / Inorganic Carbon (Soil)</b>													
Total Organic Carbon	%	0.0500	na	na	na	na	na	na	na	na	na	na	na

**Notes:**

- MDL = Method Detection Limit
- EPH<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPH<sub>5</sub> = light extractable petroleum hydrocarbons in soil
- HEPH<sub>5</sub> = heavy extractable petroleum hydrocarbons in soil
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- VPHS = volatile petroleum hydrocarbons in soil
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
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**Table 2: PETROLEUM HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

			Soil Treatment Area - 1											
APEC/Issue														
Sample Station			LF2	LF3	LF4	LF5	LF6	LF7	TP19-41	TP19-42	TP19-43	TP19-44	TP19-45	TP19-46
Sample ID			LF2	LF3	LF4	LF5	LF6	LF7	TP19-41-01	TP19-42-01	TP19-43-01	TP19-44-01	TP19-45-01	TP19-46-01
Sample Depth (mbg)			0.1 (sfc)	0.1 (sfc)	0.1 (sfc)	0.1 (sfc)	0.1 (sfc)	0.1 (sfc)	-	-	-	-	-	-
Sample Date			11-Sep-18	11-Sep-18	11-Sep-18	11-Sep-18	11-Sep-18	11-Sep-18	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19
Lab ID #			L2162701-2	L2162701-3	L2162701-4	L2162701-5	L2162701-6	L2162701-7	L2312978-1	L2312978-2	L2312978-3	L2312978-4	L2312978-5	L2312978-6
Parameters	Units	MDL												
<b>Field Screening</b>														
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no	no	no
<b>Petroleum Hydrocarbons (PHCs)</b>														
Benzene	µg/g	0.0050	na	na	na	na	na	na	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Ethylbenzene	µg/g	0.015	na	na	na	na	na	na	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
Toluene	µg/g	0.050	na	na	na	na	na	na	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
ortho-Xylene	µg/g	0.050	na	na	na	na	na	na	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
meta- & para-Xylene	µg/g	0.050	na	na	na	na	na	na	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Xylenes, Total	µg/g	0.075	na	na	na	na	na	na	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075
Volatile Hydrocarbons (VH <sub>6-10</sub> )	µg/g	100	na	na	na	na	na	na	<100	<100	<100	<100	<100	<100
VPH <sub>5</sub> <sup>1</sup>	µg/g	100	na	na	na	na	na	na	<100	<100	<100	<100	<100	<100
Styrene	µg/g	0.050	na	na	na	na	na	na	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Methyl tert-butyl ether [MTBE]	µg/g	0.20	na	na	na	na	na	na	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
EPH <sub>10-19</sub>	µg/g	200	980	1600	2430	1490	820	5310	1780	1450	830	350	660	2230
EPH <sub>19-32</sub>	µg/g	200	200	310	430	300	<200	490	380	320	230	<200	<200	440
LEPH <sub>5</sub>	µg/g	200	980	1600	2430	1490	820	5310	na	na	na	na	na	na
HEPH <sub>5</sub>	µg/g	200	200	310	430	300	<200	490	na	na	na	na	na	na
<b>Taxonomy (Soil)</b>														
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	1490000	915000	1430000	480000	2400000	215000	na	na	na	na	na	na
<b>Organic / Inorganic Carbon (Soil)</b>														
Total Organic Carbon	%	0.0500	na	na	na	na	na	na	na	na	na	na	na	na

**Notes:**

- MDL = Method Detection Limit
- EPH<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPH<sub>5</sub> = light extractable petroleum hydrocarbons in soil
- HEPH<sub>5</sub> = heavy extractable petroleum hydrocarbons in soil
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- VPHS = volatile petroleum hydrocarbons in soil
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**Table 2: PETROLEUM HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue			Soil Treatment Area - 1							Soil Treatment Area - 1						
Sample Station			TP19-41	TP19-42	TP19-43	TP19-44	TP19-45	TP19-46		SP20-01-01	SP20-01-02	SP20-01-03	SP20-01-04	SP20-01-05	SP20-01-06	
Sample ID			TP19-41	TP19-42	TP19-43	TP19-44	TP19-45	TP19-46	TP19-46A	SP20-01-01	SP20-01-02	SP20-01-03	SP20-01-04	SP20-01-05	SP20-01-06	DUP SP20-01-06 (SP20-01-56)
Sample Depth (mbg)			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sample Date			6-Sep-19	06-Sep-19	06-Sep-19	06-Sep-19	06-Sep-19	06-Sep-19	06-Sep-19	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020
Lab ID #			L2345252-1	L2345252-2	L2345252-3	L2345252-4	L2345252-5	L2345252-6	L2345252-7	VA20B4299-001	VA20B4299-002	VA20B4299-003	VA20B4299-004	VA20B4299-005	VA20B4299-006	VA20B4299-007
Parameters	Units	MDL														
<b>Field Screening</b>																
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no	no	no	no	no
<b>Petroleum Hydrocarbons (PHCs)</b>																
Benzene	µg/g	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Ethylbenzene	µg/g	0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
Toluene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
ortho-Xylene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
meta- & para-Xylene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Xylenes, Total	µg/g	0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075
Volatile Hydrocarbons (VH <sub>6-10</sub> )	µg/g	100	<100	<100	<100	<100	<100	<100	<100	na	na	na	na	na	na	na
VPH <sub>5</sub> <sup>1</sup>	µg/g	100	<100	<100	<100	<100	<100	<100	<100	na	na	na	na	na	na	na
Styrene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Methyl tert-butyl ether [MTBE]	µg/g	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
EPH <sub>10-19</sub>	µg/g	200	<200	320	<200	1730	890	340	410	300	<200	<200	500	1330	<200	<200
EPH <sub>19-32</sub>	µg/g	200	<200	<200	<200	430	250	<200	<200	<200	<200	<200	<200	440	<200	<200
LEPH <sub>5</sub>	µg/g	200	na	na	na	na	na	na	na	300	<200	<200	500	1330	<200	<200
HEPH <sub>5</sub>	µg/g	200	na	na	na	na	na	na	na	<200	<200	<200	<200	440	<200	<200
<b>Taxonomy (Soil)</b>																
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	na	50000	na	260000	na	340000	na	27000	20500	na	na	56000	na	na
<b>Organic / Inorganic Carbon (Soil)</b>																
Total Organic Carbon	%	0.0500	na	0.151	na	0.295	na	0.216	na	1.34	na	0.324	na	0.477	na	na

- Notes:**
- MDL = Method Detection Limit
  - EPH<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
  - EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
  - LEPH<sub>5</sub> = light extractable petroleum hydrocarbons in soil
  - HEPH<sub>5</sub> = heavy extractable petroleum hydrocarbons in soil
  - mbg = metres below grade
  - na = not analyzed
  - nm = not measured
  - no = none observed
  - ns = no applicable standard
  - ppmv = parts per million by volume
  - VPHS = volatile petroleum hydrocarbons in soil
  - µg/g = micrograms per gram (parts per million)
  - < = concentration is less than reported method detection limit
  - = no applicable units / method detection limit

**Table 2: PETROLEUM HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue			Soil Treatment Area - 2				Soil Treatment Area - 2		
Sample Station			TP19-47	TP19-48	TP19-49	TP19-50	TP19-51	TP19-52	
Sample ID			TP19-47	TP19-48	TP19-49	TP19-50	TP19-51	TP19-52	TP19-52A
Sample Depth (mbg)			-	-	-	-	-	-	-
Sample Date			7-Sep-19	07-Sep-19	07-Sep-19	07-Sep-19	07-Sep-19	07-Sep-19	07-Sep-19
Lab ID #			L2345249-1	L2345249-2	L2345249-3	L2345249-4	L2345249-5	L2345249-6	L2345249-7
Parameters	Units	MDL							
<b>Field Screening</b>									
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm
Observable Staining	-	-	no	no	no	no	no	no	no
<b>Petroleum Hydrocarbons (PHCs)</b>									
Benzene	µg/g	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Ethylbenzene	µg/g	0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
Toluene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
ortho-Xylene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
meta- & para-Xylene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Xylenes, Total	µg/g	0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075
Volatile Hydrocarbons (VH <sub>6-10</sub> )	µg/g	100	<100	<100	<100	<100	<100	<100	<100
VPH <sub>5</sub> <sup>1</sup>	µg/g	100	<100	<100	<100	<100	<100	<100	<100
Styrene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Methyl tert-butyl ether [MTBE]	µg/g	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
EPH <sub>10-19</sub>	µg/g	200	3420	530	950	1040	1770	2340	1280
EPH <sub>19-32</sub>	µg/g	200	320	<200	250	240	270	240	<200
LEPH <sub>5</sub>	µg/g	200	na	na	na	na	na	na	na
HEPH <sub>5</sub>	µg/g	200	na	na	na	na	na	na	na
<b>Taxonomy (Soil)</b>									
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	13100000	na	4400000	na	27600000	na	na
<b>Organic / Inorganic Carbon (Soil)</b>									
Total Organic Carbon	%	0.0500	0.317	na	0.265	na	0.268	na	na

**Notes:**

- MDL = Method Detection Limit
- EPH<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPH<sub>5</sub> = light extractable petroleum hydrocarbons in soil
- HEPH<sub>5</sub> = heavy extractable petroleum hydrocarbons in soil
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- VPHS = volatile petroleum hydrocarbons in soil
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit



**Table 2: PETROLEUM HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue			Soil Treatment Area - 2												
Sample Station			SP20-02-01	SP20-02-02	SP20-02-03	SP20-02-04	SP20-02-05	SP20-02-06	SP20-02-07	SP20-02-08	SP20-02-09	SP20-02-10	SP20-02-11	SP20-02-12	
Sample ID			SP20-02-01	SP20-02-02	SP20-02-03	SP20-02-04	SP20-02-05	SP20-02-06	SP20-02-07	SP20-02-08	SP20-02-09	SP20-02-10	SP20-02-11	SP20-02-12	DUP SP20-02-12 (SP20-02-62)
Sample Depth (mbg)			-	-	-	-	-	-	-	-	-	-	-	-	-
Sample Date			29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020
Lab ID #			VA20B4301-001	VA20B4301-002	VA20B4301-003	VA20B4301-004	VA20B4301-005	VA20B4301-006	VA20B4301-007	VA20B4301-008	VA20B4301-009	VA20B4301-010	VA20B4301-011	VA20B4301-012	VA20B4301-013
Parameters	Units	MDL													
<b>Field Screening</b>															
Sample Headspace Vapour Concentration	ppmv	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Observable Staining	-	-	no	HC odeour	no	no	no	no	no	no	no	no	no	no	no
<b>Petroleum Hydrocarbons (PHCs)</b>															
Benzene	µg/g	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Ethylbenzene	µg/g	0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
Toluene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
ortho-Xylene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
meta- & para-Xylene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Xylenes, Total	µg/g	0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075
Volatile Hydrocarbons (VH <sub>6-10</sub> )	µg/g	100	na	na	na	na	na	na	na	na	na	na	na	na	na
VPH <sub>5</sub> <sup>1</sup>	µg/g	100	na	na	na	na	na	na	na	na	na	na	na	na	na
Styrene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Methyl tert-butyl ether [MTBE]	µg/g	0.20	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
EPH <sub>10-19</sub>	µg/g	200	<200	990	1200	560	1050	1660	360	250	<200	1040	210	<200	<200
EPH <sub>19-32</sub>	µg/g	200	<200	350	250	<200	<200	500	<200	<200	<200	<200	<200	<200	<200
LEPH <sub>5</sub>	µg/g	200	<200	990	1200	560	1050	1660	360	250	<200	1040	210	<200	<200
HEPH <sub>5</sub>	µg/g	200	<200	350	250	<200	<200	500	<200	<200	<200	<200	<200	<200	<200
<b>Taxonomy (Soil)</b>															
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	na	56000	na	1000000	na	34000	na	64000	na	99500	na	6600	na
<b>Organic / Inorganic Carbon (Soil)</b>															
Total Organic Carbon	%	0.0500	na	0.498	na	0.387	na	0.377	na	0.220	na	0.479	na	0.186	na

**Notes:**

- MDL = Method Detection Limit
- EPH<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPH<sub>5</sub> = light extractable petroleum hydrocarbons in soil
- HEPH<sub>5</sub> = heavy extractable petroleum hydrocarbons in soil
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- VPHS = volatile petroleum hydrocarbons in soil
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**Table 2: PETROLEUM HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

			QA/QC									
			APEC/Issue									
			Sample Station									
			Sample ID									
			Sample Depth (mbg)									
			Sample Date									
			Lab ID #									
Parameters	Units	MDL	Allowable RPD <sup>3</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)
<b>Field Screening</b>												
Sample Headspace Vapour Concentration	ppmv	5.00	-	-	-	-	-	-	-	-	-	-
Observable Staining	-	-	-	-	-	-	-	-	-	-	-	-
<b>Petroleum Hydrocarbons (PHCs)</b>												
Benzene	µg/g	0.0050	20	-	-	-	-	-	-	-	-	-
Ethylbenzene	µg/g	0.015	20	-	-	-	-	-	-	-	-	-
Toluene	µg/g	0.050	20	-	-	-	-	-	-	-	-	-
ortho-Xylene	µg/g	0.050	20	-	-	-	-	-	-	-	-	-
meta- & para-Xylene	µg/g	0.050	20	-	-	-	-	-	-	-	-	-
Xylenes, Total	µg/g	0.075	20	-	-	-	-	-	-	-	-	-
Volatile Hydrocarbons (VH <sub>6-10</sub> )	µg/g	100	20	-	-	-	-	-	-	-	-	-
VPH <sub>5</sub> <sup>1</sup>	µg/g	100	20	-	-	-	-	-	-	-	-	-
Styrene	µg/g	0.050	20	-	-	-	-	-	-	-	-	-
Methyl tert-butyl ether (MTBE)	µg/g	0.20	20	-	-	-	-	-	-	-	-	-
EPH <sub>10-19</sub>	µg/g	200	20	-	-	-	-	-	-	58.56	-	-
EPH <sub>19-32</sub>	µg/g	200	20	-	-	-	-	-	-	-	-	-
LEPH <sub>5</sub>	µg/g	200	20	-	-	-	-	-	-	-	-	-
HEPH <sub>5</sub>	µg/g	200	20	-	-	-	-	-	-	-	-	-
<b>Taxonomy (Soil)</b>												
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000										
<b>Organic / Inorganic Carbon (Soil)</b>												
Total Organic Carbon	%	0.0500										

**Notes:**

- MDL = Method Detection Limit
- EPH<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPH<sub>5</sub> = light extractable petroleum hydrocarbons in soil
- HEPH<sub>5</sub> = heavy extractable petroleum hydrocarbons in soil
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- VPHS = volatile petroleum hydrocarbons in soil
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**QA/QC**

- nc = not calculated
- RPD = Representative percent difference
- 1** = calculated RPD exceeds allowable RPD

**Table 3: POLYCYCLIC AROMATIC HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue			AEC 1 : Mill / 10 Level Portal										
Sample Station	MW17-1A	MW17-3		MW17-2B	MW17-4B		MW17-5B	MW17-6A	MW17-7A		MW17-7B		
Sample ID	MW17-1A 7-9	MW17-3 0-2	MW17-3 2-4	MW17-2B 2-4	MW17-4B 3-4	MW17-4B 4-7	MW17-5B 2-3	MW17-6A 0-1	MW17-7A 0-1	MW17-7A 2-3.5	MW17-7B 0-1		
Sample Depth (mbg)	2.1-2.7	0.0-0.6	0.6-1.2	0.6-1.2	0.9-1.2	1.2-2.1	0.6-0.9	0.0-0.3	0.0-0.3	0.6-1.1	0.0-0.3		
Sample Collection Date	10-Jun-17	11-Jun-17	11-Jun-17	11-Jun-17	12-Jun-17	12-Jun-17	13-Jun-17	13-Jun-17	14-Jun-17	14-Jun-17	14-Jun-17		
Lab ID #	L1942125-5	L1942125-15	L1942125-16	L1942125-29	L1942125-48	L1942125-49	L1945466-2	L1945466-6	L1945466-22	L1945466-23	L1945466-35		
Parameters	Units	MDL											
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	0.00	45.00	0.00	0.00	5.00	0.00	0.00	5.00	35.00	0.00	30.00
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no	no
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>													
Acenaphthene	µg/g	0.0050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.20	<0.050	<0.050	<0.050	<0.050	<0.050
Acenaphthylene	µg/g	0.0050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Anthracene	µg/g	0.0040	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benz(a)anthracene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(a)pyrene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(b+j)fluoranthenes <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(g,h,i)perylene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(k)fluoranthene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chrysene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dibenz(a,h)anthracene <sup>1</sup>	µg/g	0.0050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluoranthene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluorene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.20	<0.050	<0.050	<0.050	<0.050	<0.050
Indeno(1,2,3-cd)pyrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Methylnaphthalene, 2-	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	0.409	<0.050	0.186	<0.050	<0.050	<0.050
Naphthalene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.060	<0.050	<0.050	<0.050	<0.050	<0.050
Phenanthrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	0.384	<0.050	0.108	<0.050	<0.050	<0.050
Pyrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	0.057	<0.050	<0.050	<0.050	<0.050	<0.050

**Notes:**

- MDL = Method Detection Limit
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- PAH = polyaromatic hydrocarbon
- ppmv = parts per million by volume
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**Table 3: POLYCYCLIC AROMATIC HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue		AEC 1 : Mill / 10 Level Portal	APEC 10 : Burial Site 1		APEC 6 : Septic Field				AEC 2 : Fuel Lines				
Sample Station		MW17-8A	MW17-9B		MW17-10A				MW17-12A		MW17-17A		
Sample ID		MW17-8A 3-4	MW17-9B 3-4	MW17-9B 6-10	MW17-10A 2-4	MW17-10A 12-14	MW17-10A 16-18	MW17-10A 18-20	MW17-12A 2-4	MW17-12A 8-10	MW17-17A 6-8	MW17-17A 18-20	
Sample Depth (mbg)		0.9-1.2	0.9-1.2	1.8-3.0	0.6-1.2	3.6-4.3	4.8-5.5	5.5-6.1	0.6-1.2	2.4-3.0	1.8-2.4	5.5-6.1	
Sample Collection Date		15-Jun-17	16-Jun-17	16-Jun-17	17-Jun-17	17-Jun-17	17-Jun-17	17-Jun-17	20-Jun-17	20-Jun-17	06-Jul-17	06-Jul-17	
Lab ID #		L1945466-42	L1946419-2	L1946419-4	L1946419-28	L1946419-33	L1946419-35	L1946419-36	L1948071-2	L1948071-5	L1957720-25	L1957720-32	
Parameters	Units	MDL											
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	0.00	35.00	0.00	20.00	15.00	55.00	0.00	0.00	5.00	45.00	30.00
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no	no
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>													
Acenaphthene	µg/g	0.0050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.50	<0.050
Acenaphthylene	µg/g	0.0050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.20	<0.050
Anthracene	µg/g	0.0040	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.20	<0.050
Benzo(a)anthracene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(a)pyrene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(b+j)fluoranthenes <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(g,h,i)perylene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(k)fluoranthene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chrysene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dibenz(a,h)anthracene <sup>1</sup>	µg/g	0.0050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluoranthene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluorene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.665	<0.050
Indeno(1,2,3-cd)pyrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Methylnaphthalene, 2-	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	8.73	<0.050
Naphthalene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	1.96	<0.050
Phenanthrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	1.02	<0.050
Pyrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.092	<0.050

**Notes:**

- MDL = Method Detection Limit
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- PAH = polyaromatic hydrocarbon
- ppmv = parts per million by volume
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**Table 3: POLYCYCLIC AROMATIC HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue			AEC 2 : Fuel Lines									
Sample Station	MW17-17A	TP1 3-4	TP09		TP18		TP20		TP21	TP27		
Sample ID	MW17-17A 30-35	TP1 3-4	TP-09 6-8	TP-09 8-10	TP-18 6-8	TP-18 8-10	TP-20 4-6	TP-20 8-10	TP-21 6-8	TP27 2-4	TP27 6-8	
Sample Depth (mbg)	9.1-10.1	0.9-1.2	1.8-2.4	2.4-3.0	1.8-2.4	2.4-3.0	1.2-1.8	2.4-3.0	1.8-2.4	0.6-1.2	1.8-2.4	
Sample Collection Date	06-Jul-17	21-Jun-17	25-Jun-17	25-Jun-17	26-Jun-17	26-Jun-17	26-Jun-17	26-Jun-17	26-Jun-17	21-Jul-17	21-Jul-17	
Lab ID #	L1957720-36	L1948071-26	L1951378-63	L1951378-64	L1951378-96	L1951378-97	L1951378-105	L1951378-107	L1951378-111	L1965813-2	L1965813-4	
Parameters	Units	MDL										
<b>Field Screening</b>												
Sample Headspace Vapour Concentration	ppmv	5.00	5.00	0.00	nm	nm	nm	nm	nm	nm	nm	nm
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>												
Acenaphthene	µg/g	0.0050	<0.050	<0.050	<0.80	<0.50	<2.0	<3.0	<0.050	<0.20	<0.050	<0.050
Acenaphthylene	µg/g	0.0050	<0.050	<0.050	<0.30	<0.20	<0.40	<0.60	<0.050	<0.050	<0.050	<0.050
Anthracene	µg/g	0.0040	<0.050	<0.050	<0.30	<0.090	<0.40	<0.50	<0.050	<0.050	<0.050	<0.050
Benzo(a)anthracene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	0.099	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(a)pyrene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(b+j)fluoranthenes <sup>1</sup>	µg/g	0.010	<0.050	<0.050	0.084	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(g,h,i)perylene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(k)fluoranthene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chrysene	µg/g	0.010	<0.050	<0.050	0.11	<0.050	<0.050	<0.080	<0.050	<0.050	<0.050	<0.050
Dibenz(a,h)anthracene <sup>1</sup>	µg/g	0.0050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluoranthene	µg/g	0.010	<0.050	<0.050	0.491	<0.050	<0.090	<0.20	<0.050	<0.050	<0.050	<0.050
Fluorene	µg/g	0.010	<0.050	<0.050	1.06	0.539	2.05	3.01	<0.050	0.188	<0.050	<0.050
Indeno(1,2,3-cd)pyrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Methylnaphthalene, 2-	µg/g	0.010	<0.050	<0.050	27.1	12.8	33.7	61.1	<0.050	2.48	<0.050	<0.050
Naphthalene	µg/g	0.010	<0.050	<0.050	7.98	4.24	10.1	18.8	<0.050	<0.70	<0.050	<0.050
Phenanthrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	2.18	0.936	4.58	6.98	<0.050	0.318	<0.050	<0.050
Pyrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	0.448	0.077	0.424	0.626	<0.050	<0.050	<0.050	<0.050

**Notes:**

- MDL = Method Detection Limit
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- PAH = polyaromatic hydrocarbon
- ppmv = parts per million by volume
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
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**Table 3: POLYCYCLIC AROMATIC HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue			AEC 2 : Fuel Lines			AEC 2 : Tank Farm Area							
Sample Station			TP28			MW17-13			MW17-16		TP02		TP04
Sample ID			TP28 2-4	TP28 6-8	TP28 6-8 DUP A	MW17-13 2-3	MW17-13 6-8	MW17-13 10-12	MW17-16 2-4	MW17-16 2-4 DUP	TP2 3-4	TP2 6-9	TP-04 2-3
Sample Depth (mbg)			0.6-1.2	1.8-2.4	1.8-2.4	0.6-0.9	1.8-2.4	3.0-3.6	0.6-1.2	0.6-1.2	0.9-1.2	1.8-2.7	0.6-0.9
Sample Collection Date			21-Jul-17	21-Jul-17	21-Jul-17	22-Jun-17	22-Jun-17	22-Jun-17	05-Jul-17	05-Jul-17	21-Jun-17	21-Jun-17	24-Jun-17
Lab ID #			L1965813-6	L1965813-8	L1965813-9	L1948071-51	L1948071-53	L1948071-55	L1957720-16	L1957720-17	L1948071-32	L1948071-33	L1951378-38
Parameters	Units	MDL											
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	80.00	10.00	0.00	35.00	35.00	130.00	140.00	160.00
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	yes	no
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>													
Acenaphthene	µg/g	0.0050	<0.050	<0.050	<0.050	<0.30	<0.050	<0.050	<0.050	<0.050	<0.10	<0.50	<0.050
Acenaphthylene	µg/g	0.0050	<0.050	<0.050	<0.050	<0.080	<0.050	<0.050	<0.050	<0.050	<0.050	<0.20	<0.050
Anthracene	µg/g	0.0040	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.060	<0.20	<0.050
Benz(a)anthracene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(a)pyrene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(b+j)fluoranthenes <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(g,h,i)perylene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(k)fluoranthene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chrysene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dibenz(a,h)anthracene <sup>1</sup>	µg/g	0.0050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluoranthene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluorene	µg/g	0.010	<0.050	<0.050	<0.050	0.296	<0.050	<0.050	<0.050	<0.050	<0.20	0.531	<0.050
Indeno(1,2,3-cd)pyrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Methylnaphthalene, 2-	µg/g	0.010	<0.050	<0.050	<0.050	4.32	0.185	<0.050	<0.050	<0.050	0.252	6.08	<0.050
Naphthalene	µg/g	0.010	<0.050	<0.050	<0.050	<2.0	<0.050	<0.050	<0.050	<0.050	<0.20	<2.0	<0.050
Phenanthrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	0.471	<0.050	<0.050	<0.050	<0.050	0.124	0.895	<0.050
Pyrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	0.064	<0.050	<0.050	<0.050	<0.050	0.114	0.104	<0.050

**Notes:**

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- ns = no applicable standard
- PAH = polyaromatic hydrocarbon
- ppmv = parts per million by volume
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
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**Table 3: POLYCYCLIC AROMATIC HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue			AEC 2 : Tank Farm Area									
Sample Station	TP04		TP05		TP06		TP07		TP08		TP19	
Sample ID	TP-04 6-8	TP-05 4-6	TP-05 8-10	TP-06 4-6	TP-06 8-10	TP-07 2-3	TP-07 6-8	TP-08 4-6	TP-08 8-10	TP-19 6-8	TP29 2-4	
Sample Depth (mbg)	1.8-2.4	1.2-1.8	2.4-3.0	1.2-1.8	2.4-3.0	0.6-0.9	1.8-2.4	1.2-1.8	2.4-3.0	1.8-2.4	0.6-1.2	
Sample Collection Date	24-Jun-17	25-Jun-17	25-Jun-17	25-Jun-17	25-Jun-17	25-Jun-17	25-Jun-17	25-Jun-17	25-Jun-17	26-Jun-17	21-Jul-17	
Lab ID #	L1951378-40	L1951378-43	L1951378-45	L1951378-48	L1951378-50	L1951378-52	L1951378-54	L1951378-57	L1951378-59	L1951378-101	L1965813-11	
Parameters	Units	MDL										
<b>Field Screening</b>												
Sample Headspace Vapour Concentration	ppmv	5.00	0.00	nm	nm	nm	nm	nm	nm	nm	nm	nm
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>												
Acenaphthene	µg/g	0.0050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Acenaphthylene	µg/g	0.0050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Anthracene	µg/g	0.0040	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benz(a)anthracene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(a)pyrene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(b+j)fluoranthenes <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(g,h,i)perylene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(k)fluoranthene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chrysene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dibenz(a,h)anthracene <sup>1</sup>	µg/g	0.0050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluoranthene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluorene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Indeno(1,2,3-cd)pyrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Methylnaphthalene, 2-	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Naphthalene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Phenanthrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Pyrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050

**Notes:**

- MDL = Method Detection Limit
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- PAH = polyaromatic hydrocarbon
- ppmv = parts per million by volume
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
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**Table 3: POLYCYCLIC AROMATIC HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

Parameters	Units	MDL	APEC/Issue	APEC 3 : Main Warehouses				APEC 12 : Burial Site 2			Burial Site 2 Upstream	AEC 4 : Mechanical Shop 11 Level Portal	
			AEC 2 : Tank Farm Area	TP03	TP22	TP23	MW17-14A	MW17-14B	MW17-15B	TP10	TP11		
Sample Station			TP30										
Sample ID			TP30 2-4	TP3 4-6	TP3 6-9	TP22 6-8	TP23 6-8	MW17-14A 4-6	MW17-14A 18-20	MW17-14B 6-8	MW17-15B 4-6	TP-10 8-10	TP-11 4-6
Sample Depth (mbg)			0.6-1.2	1.2-1.8	1.8-2.7	1.8-2.4	1.8-2.4	1.2-1.8	5.5-6.1	1.8-2.4	1.2-1.8	2.4-3.0	1.2-1.8
Sample Collection Date			21-Jul-17	21-Jun-17	21-Jun-17	04-Jul-17	04-Jul-17	22-Jun-17	22-Jun-17	23-Jun-17	23-Jun-17	26-Jun-17	26-Jun-17
Lab ID #			L1965813-16	L1948071-37	L1948071-38	L1957720-4	L1957720-8	L1948071-63	L1948071-69	L1951378-14	L1951378-23	L1951378-69	L1951378-72
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	nm	0.00	85.00	nm	nm	20.00	0.00	20.00	0.00	10.00	5.00
Observable Staining	-	-	yes	no	no	no	no	no	no	no	no	no	no
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>													
Acenaphthene	µg/g	0.0050	<0.70	<0.80	<0.30	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<3.0
Acenaphthylene	µg/g	0.0050	<0.20	<0.30	<0.070	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.70
Anthracene	µg/g	0.0040	<0.080	<0.40	<0.20	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.40
Benz(a)anthracene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(a)pyrene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(b+j)fluoranthenes <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(g,h,i)perylene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(k)fluoranthene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chrysene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dibenz(a,h)anthracene <sup>1</sup>	µg/g	0.0050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluoranthene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.070
Fluorene	µg/g	0.010	0.705	1.1	0.316	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	2.58
Indeno(1,2,3-cd)pyrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Methylnaphthalene, 2-	µg/g	0.010	4.98	11	2.72	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.086	62.6
Naphthalene	µg/g	0.010	<1.0	<3.0	<0.30	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	14.3
Phenanthrene <sup>1</sup>	µg/g	0.010	0.926	2.68	0.925	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	4.71
Pyrene <sup>1</sup>	µg/g	0.010	0.071	0.257	0.109	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.294

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**Table 3: POLYCYCLIC AROMATIC HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

Parameters	Units	MDL	AEC 4 : Mechanical Shop 11 Level Portal			AEC 7 : Warehouse East Area				APEC 7 : Tailings Impoundment Area						
			Sample Station	Sample ID	Sample Depth (mbg)	Sample Collection Date	Lab ID #	TP11	TP12	TP13	TP14	TP15	TP16	TP17	MW17-18A	MW17-19A
Field Screening																
Sample Headspace Vapour Concentration	ppmv	5.00	5.00	0.00	15.00	nm	nm	0.00	0.00	65.00	0.00	0.00	nm			
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no	no			
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>																
Acenaphthene	µg/g	0.0050	<2.0	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Acenaphthylene	µg/g	0.0050	<0.60	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Anthracene	µg/g	0.0040	<0.50	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benz(a)anthracene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	0.089	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(a)pyrene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.070	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(b+j)fluoranthenes <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	0.106	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(g,h,i)perylene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(k)fluoranthene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chrysene	µg/g	0.010	<0.070	<0.050	<0.050	<0.050	<0.20	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dibenz(a,h)anthracene <sup>1</sup>	µg/g	0.0050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluoranthene	µg/g	0.010	0.266	<0.050	<0.050	<0.050	0.079	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluorene	µg/g	0.010	2.38	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Indeno(1,2,3-cd)pyrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Methylnaphthalene, 2-	µg/g	0.010	47.7	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Naphthalene	µg/g	0.010	<4.0	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Phenanthrene <sup>1</sup>	µg/g	0.010	4.95	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Pyrene <sup>1</sup>	µg/g	0.010	0.438	<0.050	<0.050	<0.050	0.292	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050

- Notes:**
- MDL = Method Detection Limit
  - mbg = metres below grade
  - na = not analyzed
  - nm = not measured
  - no = none observed
  - ns = no applicable standard
  - PAH = polyaromatic hydrocarbon
  - ppmv = parts per million by volume
  - µg/g = micrograms per gram (parts per million)
  - < = concentration is less than reported method detection limit
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**Table 3: POLYCYCLIC AROMATIC HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

Parameters	Units	MDL	APEC 7 : Tailings Impoundment Area					AEC 5 : Main Landfill					Stonehouse Creek Drainage Downstream
			Sample Station	Sample ID	Sample Depth (mbg)	Sample Collection Date	Lab ID #	MW17-23A	MW17-25A	TP32	TP33	MW17-22A	TP24
			MW17-23A 4-6	MW17-23A 4-6 DUPA	MW17-25A 10-12	TP32 2-4	TP33 2-4	MW17-22A 6-8	MW17-22A 6-8 DUPA	TP24 2-4	TP25 4-6	TP26 4-6	MW17-11A 2-3
			1.2-1.8	1.2-1.8	3.0-3.6	0.6-1.2	0.6-1.2	1.8-2.4	1.8-2.4	0.6-1.2	1.2-1.8	1.2-1.8	0.6-0.9
			12-Jul-17	12-Jul-17	13-Jul-17	22-Jul-17	22-Jul-17	10-Jul-17	10-Jul-17	12-Jul-17	11-Jul-17	11-Jul-17	19-Jun-17
			L1959270-26	L1959270-27	L1959270-66	L1965813-23	L1965813-27	L1957720-112	L1957720-113	L1959270-20	L1959270-13	L1959270-17	L1946419-52
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	5.00	5.00	5.00	nm	nm	30.00	30.00	nm	nm	nm	5.00
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no	no
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>													
Acenaphthene	µg/g	0.0050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Acenaphthylene	µg/g	0.0050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Anthracene	µg/g	0.0040	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benz(a)anthracene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(a)pyrene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(b+j)fluoranthenes <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(g,h,i)perylene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(k)fluoranthene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chrysene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dibenz(a,h)anthracene <sup>1</sup>	µg/g	0.0050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluoranthene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluorene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Indeno(1,2,3-cd)pyrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Methylnaphthalene, 2-	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Naphthalene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Phenanthrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Pyrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050

**Notes:**  
 MDL = Method Detection Limit  
 mbg = metres below grade  
 na = not analyzed  
 nm = not measured  
 no = none observed  
 ns = no applicable standard  
 PAH = polyaromatic hydrocarbon  
 ppmv = parts per million by volume  
 µg/g = micrograms per gram (parts per million)  
 < = concentration is less than reported method detection limit  
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**Table 3: POLYCYCLIC AROMATIC HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

Parameters	Units	MDL	Stonehouse Creek Drainage Downstream		Sky Creek Drainage Downstream		Sky Creek Drainage Upstream	Soil Treatment Area - 1						
			MW17-11A	MW17-11A 12-14	MW17-24A	MW17-24A 6-8 DUPA	MW17-21A	LF1	LF2	LF3	LF4	LF5	LF6	LF7
Sample Station			MW17-11A 6-8	MW17-11A 12-14	MW17-24A 6-8	MW17-24A 6-8 DUPA	MW17-21A 8-10	LF1	LF2	LF3	LF4	LF5	LF6	LF7
Sample ID														
Sample Depth (mbg)			1.8-2.4	3.6-4.3	1.8-2.4	1.8-2.4	2.4-3.0	0.1 (sfc)	0.1 (sfc)	0.1 (sfc)	0.1 (sfc)	0.1 (sfc)	0.1 (sfc)	0.1 (sfc)
Sample Collection Date			19-Jun-17	19-Jun-17	13-Jul-17	13-Jul-17	10-Jul-17	11-Sep-18	11-Sep-18	11-Sep-18	11-Sep-18	11-Sep-18	11-Sep-18	11-Sep-18
Lab ID #			L1946419-55	L1946419-58	L1959270-43	L1959270-44	L1957720-96	L2162701-1	L2162701-2	L2162701-3	L2162701-4	L2162701-5	L2162701-6	L2162701-7
Field Screening														
Sample Headspace Vapour Concentration	ppmv	5.00	70.00	5.00	10.00	10.00	10.00	nm	nm	nm	nm	nm	nm	nm
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no	no	no
Polycyclic Aromatic Hydrocarbons (PAHs)														
Acenaphthene	µg/g	0.0050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0050	<0.050	<0.20	<0.50	<0.20	<0.020	<2.0
Acenaphthylene	µg/g	0.0050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0060	<0.020	<0.030	<0.20	<0.030	<0.0090	<0.40
Anthracene	µg/g	0.0040	<0.050	<0.050	<0.050	<0.050	<0.050	<0.020	<0.020	<0.040	<0.080	<0.060	<0.020	<0.20
Benz(a)anthracene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.010	<0.010	<0.010	<0.020	<0.010	<0.010	<0.010
Benzo(a)pyrene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.010	<0.010	<0.010	0.014	<0.010	<0.010	<0.010
Benzo(b+j)fluoranthenes <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.010	<0.010	<0.010	0.018	<0.010	0.013	<0.010
Benzo(g,h,i)perylene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.010	<0.010	<0.010	0.021	<0.010	<0.010	<0.010
Benzo(k)fluoranthene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Chrysene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.010	<0.020	<0.020	<0.040	<0.020	<0.020	<0.030
Dibenz(a,h)anthracene <sup>1</sup>	µg/g	0.0050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluoranthene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.010	<0.010	<0.020	<0.030	<0.020	<0.010	<0.040
Fluorene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.010	0.043	0.119	0.425	0.138	<0.020	1.48
Indeno(1,2,3-cd)pyrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.010	<0.010	<0.010	0.018	<0.010	<0.010	<0.010
Methylnaphthalene, 2-	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.010	<0.020	<0.040	0.671	<0.080	<0.010	22.7
Naphthalene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.010	<0.040	<0.20	<0.60	<0.10	<0.030	<6.01
Phenanthrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.010	<0.020	0.126	0.651	0.167	<0.010	2.2
Pyrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	0.019	0.052	0.072	0.122	0.076	0.04	0.221

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  - ppmv = parts per million by volume
  - µg/g = micrograms per gram (parts per million)
  - < = concentration is less than reported method detection limit
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**Table 3: POLYCYCLIC AROMATIC HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue		Soil Treatment Area - 1							
		Sample Station	SP20-01-01	SP20-01-02	SP20-01-03	SP20-01-04	SP20-01-05	SP20-01-06	
Sample ID		SP20-01-01	SP20-01-02	SP20-01-03	SP20-01-04	SP20-01-05	SP20-01-06	DUP SP20-01-06 (SP20-01-56)	
Sample Depth (mbg)		-	-	-	-	-	-	-	
Sample Collection Date		29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	
Lab ID #		VA20B4299-001	VA20B4299-002	VA20B4299-003	VA20B4299-004	VA20B4299-005	VA20B4299-006	VA20B4299-007	
Parameters	Units	MDL							
<b>Field Screening</b>									
Sample Headspace Vapour Concentration	ppmv	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Observable Staining	-	-	no	no	no	no	no	no	no
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>									
Acenaphthene	µg/g	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0200	<0.0050	<0.0050
Acenaphthylene	µg/g	0.0050	<0.0070	<0.0050	<0.0050	<0.0060	<0.0200	<0.0050	<0.0050
Anthracene	µg/g	0.0040	<0.0040	<0.0040	<0.0040	<0.0050	<0.0200	<0.0040	<0.0040
Benz(a)anthracene <sup>1</sup>	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(a)pyrene	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b+j)fluoranthenes <sup>1</sup>	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(g,h,i)perylene	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(k)fluoranthene <sup>1</sup>	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Chrysene	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Dibenz(a,h)anthracene <sup>1</sup>	µg/g	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluoranthene	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Fluorene	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Indeno(1,2,3-cd)pyrene <sup>1</sup>	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Methylnaphthalene, 2-	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Naphthalene	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Phenanthrene <sup>1</sup>	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.020	<0.010	<0.010
Pyrene <sup>1</sup>	µg/g	0.010	<0.010	<0.010	<0.010	0.017	0.090	<0.010	<0.010

**Notes:**

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- ns = no applicable standard
- PAH = polyaromatic hydrocarbon
- ppmv = parts per million by volume
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
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**Table 3: POLYCYCLIC AROMATIC HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue		Soil Treatment Area - 2													
Sample Station	SP20-02-01	SP20-02-02	SP20-02-03	SP20-02-04	SP20-02-05	SP20-02-06	SP20-02-07	SP20-02-08	SP20-02-09	SP20-02-10	SP20-02-11	SP20-02-12			
Sample ID	SP20-02-01	SP20-02-02	SP20-02-03	SP20-02-04	SP20-02-05	SP20-02-06	SP20-02-07	SP20-02-08	SP20-02-09	SP20-02-10	SP20-02-11	SP20-02-12	DUP SP20-02-12 (SP20-02-62)		
Sample Depth (mbg)	-	-	-	-	-	-	-	-	-	-	-	-	-		
Sample Collection Date	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020		
Lab ID #	VA20B4301-001	VA20B4301-002	VA20B4301-003	VA20B4301-004	VA20B4301-005	VA20B4301-006	VA20B4301-007	VA20B4301-008	VA20B4301-009	VA20B4301-010	VA20B4301-011	VA20B4301-012	VA20B4301-013		
Parameters	Units	MDL													
<b>Field Screening</b>															
Sample Headspace Vapour Concentration	ppmv	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Observable Staining	-	-	no	HC odour	no	no	no	no	no	no	no	no	no	no	
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>															
Acenaphthene	µg/g	0.0050	<0.0050	<0.0060	<0.0060	<0.0050	<0.0070	<0.0060	<0.0060	<0.0050	<0.0050	<0.0090	<0.0050	<0.0050	
Acenaphthylene	µg/g	0.0050	<0.0050	<0.0300	<0.0200	<0.0200	<0.0200	<0.0200	<0.0080	<0.0060	<0.0050	<0.0200	<0.0060	<0.0050	
Anthracene	µg/g	0.0040	<0.0040	<0.0090	<0.0080	<0.0040	<0.0050	<0.0200	<0.0040	<0.0040	<0.0040	<0.0050	<0.0040	<0.0040	
Benz(a)anthracene <sup>1</sup>	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Benzo(a)pyrene	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Benzo(b+j)fluoranthenes <sup>1</sup>	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Benzo(g,h,i)perylene	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Benzo(k)fluoranthene <sup>1</sup>	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Chrysene	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.020	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Dibenz(a,h)anthracene <sup>1</sup>	µg/g	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
Fluoranthene	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Fluorene	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Indeno(1,2,3-cd)pyrene <sup>1</sup>	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Methylnaphthalene, 2-	µg/g	0.010	<0.010	<0.020	<0.010	<0.010	<0.020	<0.020	0.011	<0.010	0.042	<0.030	<0.010	<0.010	
Naphthalene	µg/g	0.010	<0.010	<0.010	<0.020	<0.010	<0.030	<0.010	<0.010	<0.010	0.012	<0.010	<0.010	<0.010	
Phenanthrene <sup>1</sup>	µg/g	0.010	<0.010	<0.030	<0.030	<0.020	<0.010	<0.030	<0.020	<0.010	<0.010	<0.040	<0.010	<0.010	
Pyrene <sup>1</sup>	µg/g	0.010	<0.010	<0.020	0.052	<0.010	0.014	0.100	0.011	<0.010	<0.010	0.021	<0.010	<0.010	

- Notes:**
- MDL = Method Detection Limit
  - mbg = metres below grade
  - na = not analyzed
  - nm = not measured
  - no = none observed
  - ns = no applicable standard
  - PAH = polyaromatic hydrocarbon
  - ppmv = parts per million by volume
  - µg/g = micrograms per gram (parts per million)
  - < = concentration is less than reported method detection limit
  - = no applicable units / method detection limit

**Table 3: POLYCYCLIC AROMATIC HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue			QA/QC							
Sample Station										
Sample ID		TP28 6-8 DUP A	MW17-16 2-4 DUP	MW17-19A 6-8 DUPA	MW17-23A 4-6 DUPA	MW17-22A 6-8 DUPA	MW17-24A 6-8 DUPA	SP20-01-56	SP20-02-12	
Sample Depth (mbg)		1.8-2.4	0.6-1.2	1.8-2.4	1.2-1.8	1.8-2.4	1.8-2.4	-	-	
Sample Collection Date		21-Jul-17	05-Jul-17	08-Jul-17	12-Jul-17	10-Jul-17	13-Jul-17	29-Aug-2020	29-Aug-2020	
Lab ID #		L1965813-9	L1957720-17	L1957720-64	L1959270-27	L1957720-113	L1959270-44	VA20B4299-007	VA20B4301-013	
Parameters	Units	MDL	Allowable RPD <sup>3</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	
<b>Field Screening</b>										
Sample Headspace Vapour Concentration	ppmv	5.00	-	-	-	-	-	-	-	-
Observable Staining	-	-	-	-	-	-	-	-	-	-
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>										
Acenaphthene	µg/g	0.0050	20	-	-	-	-	-	-	-
Acenaphthylene	µg/g	0.0050	20	-	-	-	-	-	-	-
Anthracene	µg/g	0.0040	20	-	-	-	-	-	-	-
Benz(a)anthracene <sup>1</sup>	µg/g	0.010	20	-	-	-	-	-	-	-
Benzo(a)pyrene	µg/g	0.010	20	-	-	-	-	-	-	-
Benzo(b+j)fluoranthenes <sup>1</sup>	µg/g	0.010	20	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	µg/g	0.010	20	-	-	-	-	-	-	-
Benzo(k)fluoranthene <sup>1</sup>	µg/g	0.010	20	-	-	-	-	-	-	-
Chrysene	µg/g	0.010	20	-	-	-	-	-	-	-
Dibenz(a,h)anthracene <sup>1</sup>	µg/g	0.0050	20	-	-	-	-	-	-	-
Fluoranthene	µg/g	0.010	20	-	-	-	-	-	-	-
Fluorene	µg/g	0.010	20	-	-	-	-	-	-	-
Indeno(1,2,3-cd)pyrene <sup>1</sup>	µg/g	0.010	20	-	-	-	-	-	-	-
Methylnaphthalene, 2-	µg/g	0.010	20	-	-	-	-	-	-	-
Naphthalene	µg/g	0.010	20	-	-	-	-	-	-	-
Phenanthrene <sup>1</sup>	µg/g	0.010	20	-	-	-	-	-	-	-
Pyrene <sup>1</sup>	µg/g	0.010	20	-	-	-	-	-	-	-

**Notes:**

- MDL = Method Detection Limit
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- PAH = polyaromatic hydrocarbon
- ppmv = parts per million by volume
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**QA/QC**

3 = allowable RPDs as identified in BC Environmental Laboratory Manual (February 2016), Section A, Table 2

1 = calculated RPD exceeds allowable RPD







**Table 4: METALS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

			APEC 3 : Main Warehouses	APEC 12 : Burial Site 2		Burial Site 2 Upstream			AEC 4 : Mechanical Shop 11 Level Portal		AEC 7 : Warehouse East Area		APEC 7 : Tailings Impoundment Area					
Parameters			Units	MDL														
<b>Field Screening</b>																		
Sample Headspace Vapour Concentration			ppmv	5.00	nm	20.00	0.00	nm	0.00	0.00	5.00	0.00	nm	nm	65.00	0.00	0.00	5.00
Observable Staining			-	-	no	no	no	no	no	no	no	no	no	no	no	no	no	no
<b>Physiochemical Parameters</b>																		
Moisture			%	0.25	11.8	6.55	17.7		15.4	na	10.2	6.58	11.1	18.2	6.16	9.41	10.6	12.1
pH			unitless	0.10	7.40	8.07	8.25	8.64	8.87	8.79	8.02	7.97	4.98	6.88	8.10	7.87	8.13	6.56
<b>Metals (General)</b>																		
Aluminum			µg/g	50	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Antimony <sup>1</sup>			µg/g	0.10	53.6	1.09	0.91	1.06	1.14	0.9	7.11	1.46	0.77	1.61	0.98	1.7	1.78	0.97
Arsenic			µg/g	0.10	14.6	11.5	9.98	8.18	5.78	5.95	17.6	17.4	6.52	8.93	19.4	28	20.2	43.2
Barium			µg/g	0.50	205	241	269	251	266	229	155	160	177	166	182	166	160	226
Beryllium			µg/g	0.10	0.34	0.20	0.57	0.20	0.27	0.24	0.27	0.19	0.89	0.74	0.37	0.42	0.39	0.63
Bismuth			µg/g	0.20	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Boron			µg/g	5.0	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Cadmium			µg/g	0.020	2.04	4.70	3.78	4.81	6.20	0.94	1.52	0.32	0.48	3.01	7.21	1.09	0.96	1.57
Calcium			µg/g	50	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Chromium (Total)			µg/g	0.50	8.29	5.78	6.88	3.15	2.32	3.59	17.9	1.5	2.97	9.06	11.4	28.1	25.1	20.4
Cobalt			µg/g	0.10	11.4	10.5	9.38	11.1	11.3	7.88	32.1	11.1	11	10.6	14.1	13.9	12.8	12.3
Copper			µg/g	0.50	137.00	138.00	67.60	58.80	53.70	24.90	734.00	291.00	57.10	96.50	84.70	59.00	41.30	55.90
Iron			µg/g	50	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Lead			µg/g	0.50	3160.00	47.70	44.50	60.00	48.50	27.30	64.80	22.60	23.60	39.80	51.90	31.70	34.60	40.30
Lithium			µg/g	2.0	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Magnesium			µg/g	20	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Manganese			µg/g	1.0	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Mercury			µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.055	<0.050	<0.050	<0.050	<0.050
Molybdenum			µg/g	0.10	1.11	0.97	0.91	0.73	0.54	0.58	4.09	1.23	0.87	1.72	1.57	1.59	1.3	0.66
Nickel			µg/g	0.50	7.14	3.79	5.52	3.97	2.83	2.53	10.70	2.13	3.17	8.24	21.70	25.70	24.30	16.90
Phosphorus			µg/g	50	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Potassium			µg/g	100	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Selenium			µg/g	0.20	0.66	<0.20	<0.20	<0.20	<0.20	<0.20	1.76	1.41	0.26	0.9	0.36	0.71	0.6	<0.20
Silver <sup>1</sup>			µg/g	0.10	0.5	0.43	0.38	0.31	0.25	0.22	1.76	0.8	0.17	0.44	0.81	0.55	0.53	0.34
Sodium			µg/g	50	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Strontium			µg/g	0.50	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Sulfur, elemental			µg/g	1000	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Thallium <sup>1</sup>			µg/g	0.050	0.346	0.462	0.33	0.504	0.413	0.315	0.32	0.474	0.402	0.38	0.385	0.251	0.274	0.343
Tin			µg/g	2.0	2.4	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Titanium			µg/g	1.0	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Tungsten			µg/g	0.50	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Uranium			µg/g	0.050	0.518	0.464	0.749	0.415	0.636	0.608	0.808	0.605	0.562	0.674	0.321	0.568	0.609	0.511
Vanadium			µg/g	0.2	53.8	45.1	44.4	50.5	57.8	44.2	27.7	34	39.8	47.8	61.1	45.8	46.7	68.5
Zinc			µg/g	2.0	299.00	601.00	575.00	623.00	774.00	176.00	448.00	129.00	158.00	384.00	769.00	165.00	156.00	268.00
Zirconium			µg/g	1.0	na	na	na	na	na	na	na	na	na	na	na	na	na	na

- Notes:**
- MDL = Method Detection Limit
  - mbg = metres below grade
  - na = not analyzed
  - nm = not measured
  - no = none observed
  - ns = no applicable standard
  - µg/g = micrograms per gram (equivalent to mg/kg and parts per million (ppm)
  - < = concentration is less than reported method detection limit
  - > = reported greater than value due to instrumentation and method limita
  - = no applicable units / method detection limit

**Table 4: METALS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

		APEC/Issue		APEC 7 : Tailings Impoundment Area					AEC 5 : Main Landfill				Stonehouse Creek Drainage Downstream	Stonehouse Creek Drainage Upstream	Sky Creek Background Downstream		Sky Creek Background Upstream	
Parameters		Units	MDL															
<b>Field Screening</b>																		
Sample Headspace Vapour Concentration		ppmv	5.00	5.00	5.00	nm	nm	nm	30.00	30.00	nm	nm	nm	5.00	25.00	10.00	10.00	10.00
Observable Staining		-	-	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no
<b>Physiochemical Parameters</b>																		
Moisture		%	0.25	11.4	13.1	16.7	na	18.3	13.9	13.7	18.7	12.8	25.7	na	na	8.43	6.77	14.2
pH		unitless	0.10	6.51	7.97	6.00	6.72	5.83	7.41	7.35	6.68	7.93	6.11	5.93	6.40	7.25	7.27	7.86
<b>Metals (General)</b>																		
Aluminum		µg/g	50	na	na	15200	17400	16300	na	na	na	na	na	na	na	na	na	na
Antimony <sup>1</sup>		µg/g	0.10	0.9	2.61	1.41	1.67	1.76	1.86	1.79	1.58	0.78	1.89	0.88	1	1.88	1.73	2.43
Arsenic		µg/g	0.10	39.4	50.9	57.1	32.7	32.5	34.9	35.3	29.4	11.6	53.9	14.6	13	192	165	45.8
Barium		µg/g	0.50	283	98	120	432	113	102	95.2	194	222	110	167	151	65	60	191
Beryllium		µg/g	0.10	0.58	0.63	0.63	0.71	1.14	1.09	1.06	0.57	0.43	1.32	0.91	1.65	0.49	0.46	0.38
Bismuth		µg/g	0.20	na	na	0.28	0.23	<0.20	na	na	na	na	na	na	na	na	na	na
Boron		µg/g	5.0	na	na	<5.0	<5.0	<5.0	na	na	na	na	na	na	na	na	na	na
Cadmium		µg/g	0.020	1.65	5.23	1.88	1.81	0.68	1.92	1.75	1.54	1.20	1.27	0.81	0.44	5.36	5.18	2.02
Calcium		µg/g	50	na	na	2660	4430	2200	na	na	na	na	na	na	na	na	na	na
Chromium (Total)		µg/g	0.50	22.9	17	13.4	35.4	15	24.4	23.6	22	13.6	31.4	15.1	14.9	16.1	15.7	46.7
Cobalt		µg/g	0.10	13.4	23.1	13.7	15.5	14.4	20.8	19.9	16.9	10.9	14.2	10.9	7.39	13.2	12.1	13.7
Copper		µg/g	0.50	69.40	151.00	70.10	54.90	64.90	113.00	108.00	66.30	44.70	69.50	133.00	34.00	71.00	62.90	64.30
Iron		µg/g	50	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Lead		µg/g	0.50	37.10	82.70	45.60	48.80	36.50	48.80	48.60	60.50	22.80	70.60	27.80	29.30	217.00	205.00	119.00
Lithium		µg/g	2.0	na	na	12.6	17.1	15.3	na	na	na	na	na	na	na	na	na	na
Magnesium		µg/g	20	na	na	8080	10300	7940	na	na	na	na	na	na	na	na	na	na
Manganese		µg/g	1.0	na	na	1660	4650	19658	na	na	na	na	na	na	na	na	na	na
Mercury		µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Molybdenum		µg/g	0.10	0.68	3.48	1.21	0.95	1.17	3.24	3.17	1.06	0.57	2.96	2.87	2.79	3.67	3.65	6.14
Nickel		µg/g	0.50	18.60	35.20	19.30	30.80	22.10	40.70	37.50	26.70	11.20	36.80	11.10	10.90	33.20	34.80	32.20
Phosphorus		µg/g	50	na	na	1490	1400	1250	na	na	na	na	na	na	na	na	na	na
Potassium		µg/g	100	na	na	3050	4980	2780	na	na	na	na	na	na	na	na	na	na
Selenium		µg/g	0.20	0.37	1.73	0.31	<0.20	0.27	0.58	0.56	<0.20	<0.20	0.52	0.32	0.35	<0.20	<0.20	0.68
Silver <sup>1</sup>		µg/g	0.10	0.44	1.08	0.4	0.51	0.29	0.77	0.78	0.47	0.22	0.72	0.29	0.44	1.32	1.18	1.18
Sodium		µg/g	50	na	na	120	146	109	na	na	na	na	na	na	na	na	na	na
Strontium		µg/g	0.50	na	na	19.1	39.9	22.7	na	na	na	na	na	na	na	na	na	na
Sulfur, elemental		µg/g	1000	na	na	<1000	<1000	<1000	na	na	na	na	na	na	na	na	na	na
Thallium <sup>1</sup>		µg/g	0.050	0.343	0.321	0.364	0.338	0.332	0.316	0.302	0.341	0.316	0.387	0.36	0.282	0.165	0.143	0.261
Tin		µg/g	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	3.4	<2.0	<2.0
Titanium		µg/g	1.0	na	na	743	719	751	na	na	na	na	na	na	na	na	na	na
Tungsten		µg/g	0.50	na	na	<0.50	<0.50	<0.50	na	na	na	na	na	na	na	na	na	na
Uranium		µg/g	0.050	0.418	0.409	0.481	0.462	0.64	0.325	0.328	0.852	0.366	1.05	1.2	1.58	0.608	0.618	0.347
Vanadium		µg/g	0.2	73	50.5	48.2	57.6	46.7	41.3	40	54.2	80.8	53.3	58.3	51.5	21	19.1	49.6
Zinc		µg/g	2.0	287.00	562.00	335.00	265.00	236.00	237.00	223.00	283.00	169.00	310.00	169.00	194.00	877.00	751.00	281.00
Zirconium		µg/g	1.0	na	na	8	11.1	3.8	na	na	na	na	na	na	na	na	na	na

- Notes:**  
 MDL = Method Detection Limit  
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 nm = not measured  
 no = none observed  
 ns = no applicable standard  
 µg/g = micrograms per gram (equivalent to mg/kg and parts per million (ppm)  
 < = concentration is less than reported method detection limit  
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**Table 4: METALS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

			QA/QC				
APEC/Issue							
Sample Station							
Sample ID				MW17-16 2-4 DUP	MW17-19A 6-8 DUPA	MW17-23A DUPA	MW17-22A 6-8 DUPA
Sample Depth (mbg)				0.6-1.2	1.8-2.4	1.2-1.8	1.8-2.4
Sample Collection Date				05-Jul-17	08-Jul-17	12-Jul-17	10-Jul-17
Lab ID #				L1957720-17	L1957720-64	L1959270-27	L1957720-113
Parameters	Units	MDL	Allowable RPD <sup>3</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)
<b>Field Screening</b>							
Sample Headspace Vapour Concentration	ppmv	5.00					
Observable Staining	-	-	-	-			
<b>Physiochemical Parameters</b>							
Moisture	%	0.25	-	-			
pH	unitless	0.10	-	-			
<b>Metals (General)</b>							
Aluminum	µg/g	50	20	-	-	-	-
Antimony <sup>1</sup>	µg/g	0.10	20	-	4.60	7.49	3.84
Arsenic	µg/g	0.10	20	-	<b>32.37</b>	9.20	1.14
Barium	µg/g	0.50	20	<b>184.22</b>	3.68	<b>22.40</b>	6.90
Beryllium	µg/g	0.10	20	-	-	8.26	2.79
Bismuth	µg/g	0.20	20	-	-	-	-
Boron	µg/g	5.0	20	-	-	-	-
Cadmium	µg/g	0.020	20	<b>177.72</b>	13.20	4.97	9.26
Calcium	µg/g	50	20	-	-	-	-
Chromium (Total)	µg/g	0.50	20	-	11.28	11.55	3.33
Cobalt	µg/g	0.10	20	-	8.24	8.56	4.42
Copper	µg/g	0.50	20	-	<b>35.29</b>	<b>21.55</b>	4.52
Iron	µg/g	50	20	-	-	-	-
Lead	µg/g	0.50	20	-	8.75	8.27	0.41
Lithium	µg/g	2.0	20	-	-	-	-
Magnesium	µg/g	20	20	-	-	-	-
Manganese	µg/g	1.0	20	-	-	-	-
Mercury	µg/g	0.050	20	-	-	-	-
Molybdenum	µg/g	0.10	20	-	<b>20.07</b>	2.99	2.18
Nickel	µg/g	0.50	20	-	5.60	9.58	8.18
Phosphorus	µg/g	50	20	-	-	-	-
Potassium	µg/g	100	20	-	-	-	-
Selenium	µg/g	0.20	20	-	-	-	-
Silver <sup>1</sup>	µg/g	0.10	20	-	3.70	-	1.29
Sodium	µg/g	50	20	-	-	-	-
Strontium	µg/g	0.50	20	-	-	-	-
Sulfur, elemental	µg/g	1000	20	-	-	-	-
Thallium <sup>1</sup>	µg/g	0.050	20	-	8.76	0.00	4.53
Tin	µg/g	2.0	20	-	-	-	-
Titanium	µg/g	1.0	20	-	-	-	-
Tungsten	µg/g	0.50	20	-	-	-	-
Uranium	µg/g	0.050	20	-	6.97	<b>20.02</b>	0.92
Vanadium	µg/g	0.2	20	<b>182.08</b>	1.95	6.36	3.20
Zinc	µg/g	2.0	20	<b>181.27</b>	5.61	6.85	6.09
Zirconium	µg/g	1.0	20	-	-	-	-

**Notes:**

- MDL = Method Detection Limit
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- µg/g = micrograms per gram (equivalent to mg/kg and parts per million (ppm))
- < = concentration is less than reported method detection limit
- > = reported greater than value due to instrumentation and method limita
- = no applicable units / method detection limit

**QA/QC**

- 3 = allowable RPDs as identified in BC Environmental Laboratory Manual (February 2016), Section A, Table 2
- nc = not calculated
- RPD = Representative percent difference
- 1** = calculated RPD exceeds allowable RPD













**Table 5: VOCs**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

Parameters	APEC/Issue		AEC 4 : Mechanical Shop 11 Level Portal				AEC 7: Warehouse East			
	Units	MDL	TP11		TP12	TP13	TP14	TP15	TP16	TP17
<b>Field Screening</b>										
Sample Headspace Vapour Concentration	ppmv	5	5.00	5.00	0.00	15.00	nm	nm	15.00	0.00
Noticable Odour	-	-	no	no	no	no	no	no	no	no
Observable Staining	-	-	no	no	no	no	no	no	no	no
<b>Volatile Organic Compounds (VOCs)</b>										
Benzene	µg/g	0.0050	<0.0050	0.0082	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromodichloromethane	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Bromoform	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Carbon Tetrachloride	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chlorobenzene	µg/g	0.050	<0.16	<0.20	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dibromochloromethane [DBCM]	µg/g	0.050	<1.6	<0.40	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloroethane	µg/g	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Chloroform	µg/g	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Chloromethane	µg/g	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Dichlorobenzene, 1,2-	µg/g	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichlorobenzene, 1,3-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichlorobenzene, 1,4-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichloroethane, 1,1-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichloroethane, 1,2-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichloroethylene, 1,1-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichloroethylene, 1,2-cis-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichloroethylene, 1,2-trans-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichloromethane	µg/g	0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Dichloropropane, 1,2-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
cis-1,3-Dichloropropylene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
trans-1,3-Dichloropropylene	µg/g	0.050	<0.33	<0.30	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Ethylbenzene	µg/g	0.015	2.4	0.372	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
Methyl tert-butyl ether [MTBE]	µg/g	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Styrene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Tetrachloroethane, 1,1,1,2-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Tetrachloroethane, 1,1,2,2-	µg/g	0.050	<4.1	<6.0	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Tetrachloroethylene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Toluene	µg/g	0.050	<0.050	0.627	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Trichloroethane, 1,1,1-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Trichloroethane, 1,1,2-	µg/g	0.050	<1.2	<0.70	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Trichloroethylene	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.04	<0.010	<0.010
Trichlorofluoromethane	µg/g	0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Vinyl Chloride	µg/g	0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
ortho-Xylene	µg/g	0.050	3.99	<0.060	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
meta- & para-Xylene	µg/g	0.050	4.06	0.868	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Xylenes, Total	µg/g	0.075	8.05	0.868	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075

**Notes:**

- MDL = Method Detection Limit
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/g = micrograms per gram (parts per million)
- VOC = volatile organic compound
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**Table 5: VOCs**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue		APEC 7 :Tailings Impoundment Area								
Sample Station	MW17-18A	MW17-19A			MW17-20B	MW17-23A	MW17-23A	MW17-25A	TP32	
Sample ID	MW17-18A 10-12	MW17-19A 6-8	MW17-19A 6-8 DUPA	MW17-20B 2-4	MW17-23A 4-6	MW17-23A 4-6 DUPA	MW17-25A 10-12	TP32 2-4		
Sample Depth (mbg)	3.0-3.6	1.8-2.4	1.8-2.4	0.6-1.2	1.2-1.8	1.2-1.8	3.0-3.6	0.6-1.2		
Sample Collection Date	07-Jul-17	08-Jul-17	08-Jul-17	10-Jul-17	12-Jul-17	12-Jul-17	13-Jul-17	22-Jul-17		
Lab ID #	L1957720-44	L1957720-63	L1957720-64	L1957720-89	L1959270-26	L1959270-27	L1959270-66	L1965813-23		
Parameters	Units	MDL								
<b>Field Screening</b>										
Sample Headspace Vapour Concentration	ppmv	5	65.00	0.00	0.00	nm	5.00	5.00	5.00	nm
Noticable Odour	-	-	no	no	no	no	no	no	no	no
Observable Staining	-	-	no	no	no	no	no	no	no	no
<b>Volatile Organic Compounds (VOCs)</b>										
Benzene	µg/g	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromodichloromethane	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Bromoform	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Carbon Tetrachloride	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chlorobenzene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dibromochloromethane [DBCM]	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloroethane	µg/g	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Chloroform	µg/g	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Chloromethane	µg/g	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Dichlorobenzene, 1,2-	µg/g	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichlorobenzene, 1,3-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichlorobenzene, 1,4-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichloroethane, 1,1-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichloroethane, 1,2-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichloroethylene, 1,1-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichloroethylene, 1,2-cis-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichloroethylene, 1,2-trans-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichloromethane	µg/g	0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Dichloropropane, 1,2-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
cis-1,3-Dichloropropylene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
trans-1,3-Dichloropropylene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Ethylbenzene	µg/g	0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
Methyl tert-butyl ether [MTBE]	µg/g	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Styrene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Tetrachloroethane, 1,1,1,2-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Tetrachloroethane, 1,1,2,2-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Tetrachloroethylene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Toluene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.055	<0.050
Trichloroethane, 1,1,1-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Trichloroethane, 1,1,2-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Trichloroethylene	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Trichlorofluoromethane	µg/g	0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Vinyl Chloride	µg/g	0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
ortho-Xylene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
meta- & para-Xylene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Xylenes, Total	µg/g	0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075

**Notes:**

- MDL = Method Detection Limit
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/g = micrograms per gram (parts per million)
- VOC = volatile organic compound
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit



**Table 5: VOCs**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

			QA/QC							
APEC/Issue										
Sample Station										
Parameters	Units	MDL	Allowable RPD <sup>3</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)
Sample ID			TP28 6-8 DUP A	MW17-16 2-4 DUP	MW17-19A 6-8 DUPA	MW17-23A 4-6 DUPA	MW17-22A 6-8 DUPA	MW17-24A 6-8 DUPA	DUP SP20-01-06	
Sample Depth (mbg)			1.8-2.4	0.6-1.2	1.8-2.4	1.2-1.8	1.8-2.4	1.8-2.4	-	
Sample Collection Date			21-Jul-17	05-Jul-17	08-Jul-17	12-Jul-17	10-Jul-17	13-Jul-17	29-Aug-2020	
Lab ID #			L1965813-9	L1957720-17	L1957720-64	L1959270-27	L1957720-113	L1959270-44	VA20B4299-007	
Field Screening										
Sample Headspace Vapour Concentration	ppmv	5	-	-	-	-	-	-	-	-
Noticable Odour	-	-	-	-	-	-	-	-	-	-
Observable Staining	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)										
Benzene	µg/g	0.0050	20	-	-	-	-	-	-	-
Bromodichloromethane	µg/g	0.050	20	-	-	-	-	-	-	-
Bromoform	µg/g	0.050	20	-	-	-	-	-	-	-
Carbon Tetrachloride	µg/g	0.050	20	-	-	-	-	-	-	-
Chlorobenzene	µg/g	0.050	20	-	-	-	-	-	-	-
Dibromochloromethane [DBCM]	µg/g	0.050	20	-	-	-	-	-	-	-
Chloroethane	µg/g	0.10	20	-	-	-	-	-	-	-
Chloroform	µg/g	0.10	20	-	-	-	-	-	-	-
Chloromethane	µg/g	0.10	20	-	-	-	-	-	-	-
Dichlorobenzene, 1,2-	µg/g	0.05	20	-	-	-	-	-	-	-
Dichlorobenzene, 1,3-	µg/g	0.050	20	-	-	-	-	-	-	-
Dichlorobenzene, 1,4-	µg/g	0.050	20	-	-	-	-	-	-	-
Dichloroethane, 1,1-	µg/g	0.050	20	-	-	-	-	-	-	-
Dichloroethane, 1,2-	µg/g	0.050	20	-	-	-	-	-	-	-
Dichloroethylene, 1,1-	µg/g	0.050	20	-	-	-	-	-	-	-
Dichloroethylene, 1,2-cis-	µg/g	0.050	20	-	-	-	-	-	-	-
Dichloroethylene, 1,2-trans-	µg/g	0.050	20	-	-	-	-	-	-	-
Dichloromethane	µg/g	0.30	20	-	-	-	-	-	-	-
Dichloropropane, 1,2-	µg/g	0.050	20	-	-	-	-	-	-	-
cis-1,3-Dichloropropylene	µg/g	0.050	20	-	-	-	-	-	-	-
trans-1,3-Dichloropropylene	µg/g	0.050	20	-	-	-	-	-	-	-
Ethylbenzene	µg/g	0.015	20	-	-	-	-	-	-	-
Methyl tert-butyl ether [MTBE]	µg/g	0.20	20	-	-	-	-	-	-	-
Styrene	µg/g	0.050	20	-	-	-	-	-	-	-
Tetrachloroethane, 1,1,1,2-	µg/g	0.050	20	-	-	-	-	-	-	-
Tetrachloroethane, 1,1,2,2-	µg/g	0.050	20	-	-	-	-	-	-	-
Tetrachloroethylene	µg/g	0.050	20	-	-	-	-	-	-	-
Toluene	µg/g	0.050	20	-	-	-	-	-	-	-
Trichloroethane, 1,1,1-	µg/g	0.050	20	-	-	-	-	-	-	-
Trichloroethane, 1,1,2-	µg/g	0.050	20	-	-	-	-	-	-	-
Trichloroethylene	µg/g	0.010	20	-	-	-	-	-	-	-
Trichlorofluoromethane	µg/g	0.100	20	-	-	-	-	-	-	-
Vinyl Chloride	µg/g	0.100	20	-	-	-	-	-	-	-
ortho-Xylene	µg/g	0.050	20	-	-	-	-	-	-	-
meta- & para-Xylene	µg/g	0.050	20	-	-	-	-	-	-	-
Xylenes, Total	µg/g	0.075	20	-	-	-	-	-	-	-

**Notes:**

- MDL = Method Detection Limit
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/g = micrograms per gram (parts per million)
- VOC = volatile organic compound
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**QA/QC**

- 3 = allowable RPDs as identified in BC Environmental Laboratory Manual (February 2016), Section A, Table 2
- nc = not calculated
- RPD = Representative percent difference
- 1** = calculated RPD exceeds allowable RPD

**Table 6: POLYCHLORINATED BIPHENYLS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

Parameters	Units	MDL	APEC/Issue		AEC 1 : Mill / 10 Level Portal	APEC 10 : Burial Site 1	APEC 3 : Main Warehouses	APEC 12 : Burial Site 2			
			Sample Station	Sample ID	Sample Depth (mbg)	Sample Collection Date	Lab ID #				
<b>Polychlorinated biphenyls</b>											
PCB-1016	µg/g	0.020	MW17-3	MW17-3 0-2	0.0-0.6	11-Jun-17	L1942125-15	MW17-7A MW17-7A 0-1 0.0-0.3 14-Jun-17 L1945466-22	MW17-9B MW17-9B 3-4 0.9-1.2 16-Jun-17 L1946419-2	TP03 TP3 4-6 1.2-1.8 21-Jun-17 L1948071-37	MW17-14A MW17-14A 4-6 1.2-1.8 22-Jun-17 L1948071-63
PCB-1221	µg/g	0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020			
PCB-1232	µg/g	0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020			
PCB-1242	µg/g	0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020			
PCB-1248	µg/g	0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020			
PCB-1254	µg/g	0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020			
PCB-1260	µg/g	0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020			
PCB-1262	µg/g	0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020			
PCB-1268	µg/g	0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020			
Polychlorinated Biphenyls, Total	µg/g	0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020			

**Notes:**

- MDL = Method Detection Limit
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- PCB = polychlorinated biphenyl
- ppmv = parts per million by volume
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**Table 7: CYANIDE AND GLYCOLS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue		AEC 1 : Mill / 10 Level Portal									AEC 2 : Fuel Lines	APEC 3 : Main Warehouses	APEC 12 : Burial Site 2	
Sample Station		MW17-1B	MW17-3	MW17-2B	MW17-4A	MW17-4B	MW17-5B	MW17-6B	MW17-7A	MW17-8A	TP01	TP03	MW17-14A	
Sample ID		MW17-1B-3-4	MW17-3 0-2	MW17-2B 2-4	MW17-4A 3-4	MW17-4B 1-2	MW17-5B 2-3	MW17-6B 0-1	MW17-7A 0-1	MW17-8A 3-4	TP1 3-4	TP3 4-6	MW17-14A 4-6	
Sample Depth (mbg)		0.9-1.2	0.0-0.6	0.6-1.2	0.9-1.2	0.3-0.6	0.6-0.9	0.0-0.3	0.0-0.3	0.9-1.2	0.0-1.2	1.2-1.8	1.2-1.8	
Sample Collection Date		11-Jun-17	11-Jun-17	11-Jun-17	11-Jun-17	12-Jun-17	13-Jun-17	13-Jun-17	14-Jun-17	15-Jun-17	21-Jun-17	21-Jun-17	22-Jun-17	
Lab ID #		L1942125-13	L1942125-15	L1942125-29	L1942125-32	L1942125-47	L1945466-2	L1945466-18	L1945466-22	L1945466-42	L1948071-26	L1948071-37	L1948071-63	
Parameters	Units	MDL												
Cyanide														
Cyanide, Total	µg/g	0.05	0.206	<0.050	0.051	5.25	3.48	<0.050	7.15	3.83	0.128	<0.050	<0.050	<0.050

**Notes:**

- MDL = Method Detection Limit
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**Table 7: CYANIDE AND GLYCOLS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue	Burial Site 2 Upstream	APEC 7 : Tailings Impoundment Area					AEC 5 : Main Landfill					Sky Creek Drainage Upstream
Sample Station	MW17-15B	MW17-23A	MW17-23A	MW17-25A	TP31	TP33	MW17-22A		TP24	TP25	TP26	MW17-21A
Sample ID	MW17-15B 4-6	MW17-23A 4-6	MW17-23A 4-6 DUPA	MW17-25A 10-12	TP31 2-4	TP33 2-4	MW17-22A 6-8	MW17-22A 6-8 DUPA	TP24 2-4	TP25 4-6	TP26 4-6	MW17-21A 8-10
Sample Depth (mbg)	1.2-1.8	1.2-1.8	1.2-1.8	3.0-3.6	0.6-1.2	0.6-1.2	1.8-2.4	1.8-2.4	0.6-1.2	1.2-1.8	1.2-1.8	2.4-3.0
Sample Collection Date	23-Jun-17	12-Jul-17	12-Jul-17	13-Jul-17	22-Jul-17	22-Jul-17	10-Jul-17	10-Jul-17	12-Jul-17	11-Jul-17	11-Jul-17	10-Jul-17
Lab ID #	L1951378-23	L1959270-26	L1959270-27	L1959270-66	L1965813-19	L1965813-27	L1957720-112	L1957720-113	L1959270-20	L1959270-13	L1959270-17	L1957720-96
Parameters	Units	MDL										
Cyanide												
Cyanide, Total	µg/g	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050

**Notes:**

- MDL = Method Detection Limit
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**Table 7: CYANIDE AND GLYCOLS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue			QA/QC		
Sample Station					
Sample ID			MW17-23A 4-6 DUPA	MW17-22A 6-8 DUPA	
Sample Depth (mbg)			1.2-1.8	1.8-2.4	
Sample Collection Date			12-Jul-17	10-Jul-17	
Lab ID #			L1959270-27	L1957720-113	
Parameters	Units	MDL	Allowable RPD <sup>3</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)
<b>Cyanide</b>					
Cyanide, Total	µg/g	0.05	20	-	-

**Notes:**

- MDL = Method Detection Limit
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**QA/QC**

- 3 = allowable RPDs as identified in BC Environmental Laboratory Manual (February 2016), Section A, Table 2
- nc = not calculated
- RPD = Representative percent difference
- 1** = calculated RPD exceeds allowable RPD





**Table 8: Soil Amendments**

Johnny Mountain Mine Reclamation Project

SnipGold Corporation

VE52655D

Johnny Mountain Mine

Nov - 20

APEC/Issue			Soil Treatment Area - 1 (Sept 2018)							Soil Treatment Area - 1 (July 2019)	
Sample Station			LF1	LF2	LF3	LF4	LF5	LF6	LF7	TP19-41	TP19-42
Sample ID			LF1	LF2	LF3	LF4	LF5	LF6	LF7	TP19-41-01	TP19-42-01
Sample Depth (mbg)			0.1 (sfc)	0.1 (sfc)	0.1 (sfc)	0.1 (sfc)	0.1 (sfc)	0.1 (sfc)	0.1 (sfc)	-	-
Sample Collection Date			11-Sep-18	11-Sep-18	11-Sep-18	11-Sep-18	11-Sep-18	11-Sep-18	11-Sep-18	17-Jul-19	17-Jul-19
Lab ID #			L2162701-1	L2162701-2	L2162701-3	L2162701-4	L2162701-5	L2162701-6	L2162701-7	L2312978-1	L2312978-2
Parameters	Units	MDL									
<b>Physiochemical Parameters</b>											
Moisture	%	0.25	10.90	12.70	13.60	12.20	11.00	12.10	13.90	14.30	14.20
pH	unitless	0.10	7.66	7.52	7.53	7.57	7.51	7.48	7.90	na	na
<b>Plant Available Nutrients</b>											
Available Nitrate-N	µg/g	1.00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	na	na
Available Phosphate-P	µg/g	2.00	2.8	3.4	3.1	3.1	3.1	3	<2.0	na	na
Available Potassium	µg/g	20.0	71	87	77	82	84	66	103	na	na
Available Sulfate-S	µg/g	4.00	na	na	na	na	na	na	na	na	na
<b>Anions and Nutrients (Leachable)</b>											
Ammonia (as N)	µg/g	0.50	na	na	na	na	na	na	na	na	na
Total Nitrogen	µg/g	0.02	na	na	na	na	na	na	na	<0.020	<0.020
Total Dissolved Phosphate	µg/g	5.00	na	na	na	na	na	na	na	na	na
<b>Taxonomy (Soil)</b>											
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	na	50000	na	260000	na	340000	na	151000	72500
<b>Organic / Inorganic Carbon (Soil)</b>											
Total Organic Carbon	%	0.0500	0.24	0.4	0.49	0.42	0.35	0.33	0.36	0.404	0.286

**Notes:**

- MDL = Method Detection Limit
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit
- CFU/g = Colony forming unit per gram

**Table 8: Soil Amendments**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue			Soil Treatment Area - 1 (July 2019)				Soil Treatment Area - 1 (Sept 2019)		
Sample Station			TP19-43	TP19-44	TP19-45	TP19-46	TP19-42	TP19-44	TP19-46
Sample ID			TP19-43-01	TP19-44-01	TP19-45-01	TP19-46-01	TP19-42	TP19-44	TP19-46
Sample Depth (mbg)			-	-	-	-	-	-	-
Sample Collection Date			17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	06-Sep-19	06-Sep-19	06-Sep-19
Lab ID #			L2312978-3	L2312978-4	L2312978-5	L2312978-6	L2345252-2	L2345252-4	L2345252-6
Parameters	Units	MDL							
<b>Physiochemical Parameters</b>									
Moisture	%	0.25	13.80	12.90	12.90	13.50	9.69	9.33	11.80
pH	unitless	0.10	na	na	na	na	na	na	na
<b>Plant Available Nutrients</b>									
Available Nitrate-N	µg/g	1.00	na	na	na	na	<1.0	<1.0	<1.0
Available Phosphate-P	µg/g	2.00	na	na	na	na	8.4	<2.0	2.2
Available Potassium	µg/g	20.0	na	na	na	na	45	64	50
Available Sulfate-S	µg/g	4.00	na	na	na	na	23.1	16.6	17.4
<b>Anions and Nutrients (Leachable)</b>									
Ammonia (as N)	µg/g	0.50	na	na	na	na	<5.0	<5.0	<5.0
Total Nitrogen	µg/g	0.02	<0.020	<0.020	<0.020	<0.020	na	na	na
Total Dissolved Phosphate	µg/g	5.00	na	na	na	na	7.8	5.6	4.2
<b>Taxonomy (Soil)</b>									
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	167000	580000	295000	159000	50000	260000	340000
<b>Organic / Inorganic Carbon (Soil)</b>									
Total Organic Carbon	%	0.0500	0.263	0.219	0.268	0.354	0.151	0.295	0.216

**Notes:**

- MDL = Method Detection Limit
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit
- CFU/g = Colony forming unit per gram

**Table 8: Soil Amendments**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue			Soil Treatment Area - 1 (August 2020)							Soil Treatment Area - 2 (Sept 2019)		
Sample Station	SP20-01-01	SP20-01-02	SP20-01-03	SP20-01-04	SP20-01-05	SP20-01-06		TP19-47	TP19-49	TP19-51		
Sample ID	SP20-01-01	SP20-01-02	SP20-01-03	SP20-01-04	SP20-01-05	SP20-01-06	DUP SP20-01-06 (SP20-01-56)	TP19-47	TP19-49	TP19-51		
Sample Depth (mbg)	-	-	-	-	-	-	-	-	-	-		
Sample Collection Date	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	7-Sep-19	07-Sep-19	07-Sep-19		
Lab ID #	VA20B4299-001	VA20B4299-002	VA20B4299-003	VA20B4299-004	VA20B4299-005	VA20B4299-006	VA20B4299-007	L2345249-1	L2345249-3	L2345249-5		
Parameters	Units	MDL										
<b>Physiochemical Parameters</b>												
Moisture	%	0.25	11.0	9.95	12.8	11.4	11.3	14.9	15.0	13.40	12.00	11.50
pH	unitless	0.10	na	na	na	na	na	na	na	na	ns	ns
<b>Plant Available Nutrients</b>												
Available Nitrate-N	µg/g	1.00	<1.0	na	<1.0	na	<1.0	na	na	<1.0	<1.0	<1.0
Available Phosphate-P	µg/g	2.00	2.6	na	4.7	na	<2.0	na	na	3.1	2.2	<2.0
Available Potassium	µg/g	20.0	67	na	63	na	70	na	na	57	76	89
Available Sulfate-S	µg/g	4.00	7.2	na	3.6	na	7.6	na	na	29.1	30.7	26.2
<b>Anions and Nutrients (Leachable)</b>												
Ammonia (as N)	µg/g	0.50	na	na	na	na	na	na	na	<5.0	528	8830
Total Nitrogen	µg/g	0.02	na	na	na	na	na	na	na	na	na	na
Total Dissolved Phosphate	µg/g	5.00	na	na	na	na	na	na	na	10.4	20.3	12
<b>Taxonomy (Soil)</b>												
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	27000	20500	na	na	56000	na	na	13100000	4400000	27600000
<b>Organic / Inorganic Carbon (Soil)</b>												
Total Organic Carbon	%	0.0500	1.34	na	0.324	na	0.477	na	na	0.317	0.265	0.268

**Notes:**

- MDL = Method Detection Limit
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit
- CFU/g = Colony forming unit per gram

**Table 8: Soil Amendments**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue			Soil Treatment Area - 2 (August 2020)												
Sample Station	SP20-02-01	SP20-02-02	SP20-02-03	SP20-02-04	SP20-02-05	SP20-02-06	SP20-02-07	SP20-02-08	SP20-02-09	SP20-02-10	SP20-02-11	SP20-02-12			
Sample ID	SP20-02-01	SP20-02-02	SP20-02-03	SP20-02-04	SP20-02-05	SP20-02-06	SP20-02-07	SP20-02-08	SP20-02-09	SP20-02-10	SP20-02-11	SP20-02-12	DUP SP20-02-12 (SP20-02-62)		
Sample Depth (mbg)	-	-	-	-	-	-	-	-	-	-	-	-	-		
Sample Collection Date	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020		
Lab ID #	VA20B4301-001	VA20B4301-002	VA20B4301-003	VA20B4301-004	VA20B4301-005	VA20B4301-006	VA20B4301-007	VA20B4301-008	VA20B4301-009	VA20B4301-010	VA20B4301-011	VA20B4301-012	VA20B4301-013		
Parameters	Units	MDL													
<b>Physiochemical Parameters</b>															
Moisture	%	0.25	12.3	15.1	12.6	12.9	17.2	13.9	10.5	11.0	9.63	14.1	10.4	12.6	10.8
pH	unitless	0.10	na	na	na	na	na	na	na	na	na	na	na	na	na
<b>Plant Available Nutrients</b>															
Available Nitrate-N	µg/g	1.00	na	<1.0	na	15.8	na	<1.0	na	5.0	na	4.2	na	<1.0	na
Available Phosphate-P	µg/g	2.00	na	<2.0	na	4.2	na	<2.0	na	5.0	na	3.1	na	<2.0	na
Available Potassium	µg/g	20.0	na	82	na	84	na	96	na	96	na	78	na	82	na
Available Sulfate-S	µg/g	4.00	na	11.0	na	20.6	na	8.7	na	9.5	na	9.0	na	17.8	na
<b>Anions and Nutrients (Leachable)</b>															
Ammonia (as N)	µg/g	0.50	na	na	na	na	na	na	na	na	na	na	na	na	na
Total Nitrogen	µg/g	0.02	na	na	na	na	na	na	na	na	na	na	na	na	na
Total Dissolved Phosphate	µg/g	5.00	na	na	na	na	na	na	na	na	na	na	na	na	na
<b>Taxonomy (Soil)</b>															
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	na	56000	na	1000000	na	34000	na	64000	na	99500	na	6600	na
<b>Organic / Inorganic Carbon (Soil)</b>															
Total Organic Carbon	%	0.0500	na	0.498	na	0.387	na	0.377	na	0.220	na	0.479	na	0.186	na

**Notes:**

- MDL = Method Detection Limit
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit
- CFU/g = Colony forming unit per gram

**Table 9: Groundwater Analytical Results – PHCs**

Johnny Mountain Mine Reclamation Project

SnipGold Corporation

VE52655D

Johnny Mountain Mine

Nov-20

APEC/AEC/Issue			APEC 1 / AEC 1 : Mill / 10 Level Portal										
Sample Station			MW17-1		MW17-2		MW17-3	MW17-4					
Sample ID			MW17-1A	MW17-1B	MW17-2A	MW17-2B	MW17-3	MW17-4A	BH17-04A	MW17-4B	MW17-4B DUP A	MW17-4B	MW17-4B "DUP 1"
Sample Collection Date			19-Jul-17	19-Jul-17	19-Jul-17	19-Jul-17	19-Jul-17	19-Jul-17	23-Aug-2020	19-Jul-17	19-Jul-17	22-Oct-17	23-Oct-17
Lab ID #			L1962977-1	L1962977-2	L1962977-3	L1962977-4	L1962977-5	L1962977-6	VA20B3890-001	L1962977-7	L1962977-8	L2014860-1	L2014860-4
Sample Analysis Date													
Parameters	Units	MDL											
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Noticable Odour	-	-	no	no	no	no	no	no	no	no	no	no	no
Conductivity	µs/cm	2	455	285	209	487	329	387	180.2	366	366	404	408
<b>Petroleum Hydrocarbons (PHCs)</b>													
Benzene	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	na
Ethylbenzene	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	na
Toluene	µg/L	0.45	<0.45	<0.45	0.86	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	na
ortho-Xylene	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	na
meta- & para-Xylene	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	na
Xylenes (Total)	µg/L	0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	na
VHw6-10	µg/L	100	<100	<100	<100	<100	<100	<100	na	<100	<100	na	na
VPHw	µg/L	100	<100	<100	<100	<100	<100	<100	na	<100	<100	na	na
Methyl-tert-butyl ether [MTBE]	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	na
Styrene	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	na
EPHw10-19	µg/L	250	<250	<250	<250	<250	<250	<250	<250	1870	2060	1560	1530
EPH19-32	µg/L	250	<250	<250	<250	<250	<250	<250	<250	330	330	300	<250
LEPHw	µg/L	250	<250	<250	<250	<250	<250	<250	<250	1870	2060	1560	1530
HEPH	µg/L	250	<250	<250	<250	<250	<250	<250	<250	330	330	300	<250

**Notes:**

- MDL = Method detection limit
- EPHw<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPHw = light extractable petroleum hydrocarbons in water
- HEPH = heavy extractable petroleum hydrocarbons
- VPHw = volatile petroleum hydrocarbons in water
- VHw(6-10) = volatile hydrocarbons in water
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit

**Table 9: Groundwater Analytical Results – PHCs**

Johnny Mountain Mine Reclamation Project

SnipGold Corporation

VE52655D

Johnny Mountain Mine

Nov-20

APEC/AEC/Issue			APEC 1 / AEC 1: Mill / 10 Level Portal														
			MW17-4			MW17-5		MW17-6				MW17-7				MW17-8	
Sample Station	Sample ID	Sample Collection Date	MW17-4B	MW17-4B	BH17-04B	MW17-5A	MW17-5B	MW17-6A	BH17-06A	MW17-6B	BH17-06B	MW17-7A	BH17-07A	MW17-7B	BH17-07B	MW17-8A	MW17-8B
Lab ID #	Sample Analysis Date																
Parameters	Units	MDL															
<b>Field Screening</b>																	
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Noticable Odour	-	-	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no
Conductivity	µs/cm	2	288	781	317.1	456	1307	497	176.6	1189	320.5	267	191.5	545	453.9	207	345
<b>Petroleum Hydrocarbons (PHCs)</b>																	
Benzene	µg/L	0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Ethylbenzene	µg/L	0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Toluene	µg/L	0.45	na	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45
ortho-Xylene	µg/L	0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
meta- & para-Xylene	µg/L	0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Xylenes (Total)	µg/L	0.75	na	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75
VHw6-10	µg/L	100	<100	<100	na	<100	<100	<100	na	<100	na	<100	na	<100	na	<100	<100
VPHw	µg/L	100	<100	<100	na	<100	<100	<100	na	<100	na	<100	na	<100	na	<100	<100
Methyl-tert-butyl ether [MTBE]	µg/L	0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Styrene	µg/L	0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
EPHw10-19	µg/L	250	1730	1030	600	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250
EPH19-32	µg/L	250	420	270	300	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	1210	<250
LEPHw	µg/L	250	1730	1030	600	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250
HEPH	µg/L	250	420	270	300	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	1210	<250

**Notes:**

- MDL = Method detection limit
- EPHw<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPHw = light extractable petroleum hydrocarbons in water
- HEPH = heavy extractable petroleum hydrocarbons
- VPHw = volatile petroleum hydrocarbons in water
- VHw(6-10) = volatile hydrocarbons in water
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit

**Table 9: Groundwater Analytical Results – PHCs**

Johnny Mountain Mine Reclamation Project

SnipGold Corporation

VE52655D

Johnny Mountain Mine

Nov-20

APEC/AEC/Issue			APEC 1: Mill / 10 Level Portal				APEC 10: Burial Site 1				APEC9 / AEC 5: Main Landfill				
Sample Station			MW17-8				MW17-9				MW17-22				
Sample ID			MW17-8B DUP C				MW17-9A	MW17-9A	MW17-9B	MW17-9BFD	MW17-9B	MW17-22A	MW17-22A	MW17-22A	MW17-22A
Sample Collection Date			24-Jul-17				28-Jul-17	2-Jul-18	24-Jul-17	2-Jul-18	2-Jul-18	28-Jul-17	22-Oct-17	9-Jul-18	11-Sep-18
Lab ID #			L1966041-18				L1966936-1	L2123781-6	L1966041-19	L2123781-10	L2123781-5	L1966936-2	L2014860-3	L2127140-1	L2162703-1
Sample Analysis Date															
Parameters	Units	MDL													
<b>Field Screening</b>															
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	
Noticable Odour	-	-	no	no	no	no	no	no	no	no	no	no	no	no	
Conductivity	µs/cm	2	345	755	515	473	250.8	250.8	210	322	198.6	320.8			
<b>Petroleum Hydrocarbons (PHCs)</b>															
Benzene	µg/L	0.50	<0.50	<0.50	na	<0.50	na	na	na	na	na	na	na	na	
Ethylbenzene	µg/L	0.50	<0.50	<0.50	na	<0.50	na	na	na	na	na	na	na	na	
Toluene	µg/L	0.45	<0.45	<0.45	na	<0.45	na	na	na	na	na	na	na	na	
ortho-Xylene	µg/L	0.50	<0.50	<0.50	na	<0.50	na	na	na	na	na	na	na	na	
meta- & para-Xylene	µg/L	0.50	<0.50	<0.50	na	<0.50	na	na	na	na	na	na	na	na	
Xylenes (Total)	µg/L	0.75	<0.75	<0.75	na	<0.75	na	na	na	na	na	na	na	na	
VHw6-10	µg/L	100	<100	300	<100	<100	<100	<100	<100	2260	na	730	360		
VPHw	µg/L	100	<100	300	<100	<100	<100	<100	<100	900	na	330	130		
Methyl-tert-butyl ether [MTBE]	µg/L	0.50	<0.50	<0.50	na	<0.50	na	na	na	na	na	na	na	na	
Styrene	µg/L	0.50	<0.50	<0.50	na	<0.50	na	na	na	na	na	na	na	na	
EPHw10-19	µg/L	250	<250	<250	<250	<250	<250	<250	<250	870	570	370	<250		
EPH19-32	µg/L	250	<250	520	<250	<250	<250	<250	<250	<250	<250	<250	<250		
LEPHw	µg/L	250	<250	<250	<250	<250	<250	<250	<250	790	520	340	<250		
HEPH	µg/L	250	<250	520	<250	<250	<250	<250	<250	<250	<250	<250	<250		

**Notes:**

- MDL = Method detection limit
- EPHw<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPHw = light extractable petroleum hydrocarbons in water
- HEPH = heavy extractable petroleum hydrocarbons
- VPHw = volatile petroleum hydrocarbons in water
- VHw(6-10) = volatile hydrocarbons in water
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
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**Table 9: Groundwater Analytical Results – PHCs**

Johnny Mountain Mine Reclamation Project

SnipGold Corporation

VE52655D

Johnny Mountain Mine

Nov-20

APEC/AEC/Issue			AEC 5: Main Landfill					APEC 6: Septic Field		APEC 2 / AEC 2: Tank Farm Area		
Sample Station			MW17-22					MW17-10		MW17-13		
Sample ID			MW17-22A	MW17-22B	MW17-22B DUP A	MW17-22B	MW17-22B	MW17-22B	MW17-10A	MW17-10B	MW17-13	MW17-13
Sample Collection Date			17-Jul-19	23-Jul-17	23-Jul-17	9-Jul-18	10-Sep-18	17-Jul-19	24-Jul-17	24-Jul-17	20-Jul-17	24-Oct-17
Lab ID #			L2312976-1	L1966041-7	L1966041-8	L2127140-2	L2162703-2	L2312976-2	L1966041-20	L1966041-21	L1962977-17	L2014860-2
Sample Analysis Date												
Parameters	Units	MDL										
<b>Field Screening</b>												
Sample Headspace Vapour Concentration	ppmv	5.00	na	nm	nm	nm	nm	na	nm	nm	nm	nm
Noticable Odour	-	-	na	no	no	no	no	na	no	no	no	no
Conductivity	µs/cm	2	na	63	63	42.3	77	na	362	349	275	303
<b>Petroleum Hydrocarbons (PHCs)</b>												
Benzene	µg/L	0.50	<0.50	na	na	na	na	<0.50	<0.50	<0.50	<0.50	<0.5
Ethylbenzene	µg/L	0.50	6.74	na	na	na	na	<0.50	<0.50	<0.50	0.76	1.84
Toluene	µg/L	0.45	1.91	na	na	na	na	<0.45	0.52	<0.45	<0.45	<0.45
ortho-Xylene	µg/L	0.50	<0.50	na	na	na	na	<0.50	<0.50	<0.50	<0.50	2.21
meta- & para-Xylene	µg/L	0.50	8.51	na	na	na	na	<0.50	<0.50	<0.50	<0.50	3.44
Xylenes (Total)	µg/L	0.75	8.51	na	na	na	na	<0.75	<0.75	<0.75	<0.75	5.64
VHw6-10	µg/L	100	na	<100	<100	<100	<100		<100	<100	<100	na
VPHw	µg/L	100	na	<100	<100	<100	<100		<100	<100	<100	na
Methyl-tert-butyl ether [MTBE]	µg/L	0.50	<0.50	na	na	na	na	<0.50	<0.50	<0.50	<0.50	<0.5
Styrene	µg/L	0.50	<0.50	na	na	na	na	<0.50	<0.50	<0.50	<0.50	<0.5
EPHw10-19	µg/L	250	<250	<250	<250	<250	<250	<250	<250	<250	420	370
EPH19-32	µg/L	250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250
LEPHw	µg/L	250	<250	<250	<250	<250	<250	<250	<250	<250	400	350
HEPH	µg/L	250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250

**Notes:**

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- EPHw<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
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**Table 9: Groundwater Analytical Results – PHCs**

Johnny Mountain Mine Reclamation Project

SnipGold Corporation

VE52655D

Johnny Mountain Mine

Nov-20

APEC/AEC/Issue			APEC 2 / AEC 2: Tank Farm Area		APEC 12: Burial Site 2				APEC 14 /AEC 2: Fuel Lines									
Sample Station			MW17-13	MW17-16	MW17-14				MW17-12				MW17-17				MW17-17	
Sample ID			MW17-13	MW17-16	MW17-14A	MW17-14A	MW17-14B	MW17-14B	MW17-12A	MW17-12A	MW17-12B	MW17-12B	MW17-12B-DUP (MW17-62B)	MW17-17A	MW17-17A	MW17-17B	MW17-17B	MW17-17B
Sample Collection Date			2-Jul-18	20-Jul-17	24-Jul-17	1-Jul-18	24-Jul-17	1-Jul-18	20-Jul-17	24-Aug-20	20-Jul-17	24-Aug-20	24-Aug-20	20-Jul-17	24-Aug-20	20-Jul-17	1-Jul-18	24-Aug-20
Lab ID #			L2123781-9	L1962977-20	L1966041-24	L2123781-3	L1966041-25	L2123781-4	L1962977-15	VA20B3891-001	L1962977-16	VA20B3891-002	VA20B3891-009	L1962977-21	VA20B3891-003	L1962977-22	L2123781-2	-
Sample Analysis Date																		
Parameters	Units	MDL																
<b>Field Screening</b>																		
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Noticable Odour	-	-	no	no	no	no	no	no	no	rotten egg	no	no	no	no	no	no	no	hydrocarbons (LNAP)
Conductivity	µs/cm	2	179.4	170	264	184.4	192	108.6	302	158.1	276	291.8	291.8	379	nm	194	115.8	-
<b>Petroleum Hydrocarbons (PHCs)</b>																		
Benzene	µg/L	0.50	na	<0.50	<0.50	na	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	na
Ethylbenzene	µg/L	0.50	na	<0.50	<0.50	na	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	na
Toluene	µg/L	0.45	na	<0.45	<0.45	na	<0.45	na	<0.45	<0.50	<0.45	<0.50	<0.50	0.59	<0.50	<0.45	na	na
ortho-Xylene	µg/L	0.50	na	<0.50	<0.50	na	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	na
meta- & para-Xylene	µg/L	0.50	na	<0.50	<0.50	na	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	na
Xylenes (Total)	µg/L	0.75	na	<0.75	<0.75	na	<0.75	na	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	na	na
VHw6-10	µg/L	100	120	<100	<100	<100	<100	<100	<100	na	<100	na	na	<100	<100	<100	<100	na
VPHw	µg/L	100	110	<100	<100	<100	<100	<100	<100	na	<100	na	na	<100	<100	<100	<100	na
Methyl-tert-butyl ether [MTBE]	µg/L	0.50	na	<0.50	<0.50	na	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	na
Styrene	µg/L	0.50	na	<0.50	<0.50	na	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	na
EPHw10-19	µg/L	250	800	<250	<250	<250	<250	<250	<250	530	<250	<250	<250	<250	<250	<250	<250	na
EPH19-32	µg/L	250	<250	<250	<250	260	<250	<250	<250	280	<250	<250	<250	<250	<250	<250	<250	na
LEPHw	µg/L	250	760	<250	<250	<250	<250	<250	<250	530	<250	<250	<250	<250	<250	<250	<250	na
HEPH	µg/L	250	<250	<250	<250	260	<250	<250	<250	280	<250	<250	<250	<250	<250	<250	<250	na

**Notes:**

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- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPHw = light extractable petroleum hydrocarbons in water
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- VPHw = volatile petroleum hydrocarbons in water
- VHw(6-10) = volatile hydrocarbons in water
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
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**Table 9: Groundwater Analytical Results – PHCs**

Johnny Mountain Mine Reclamation Project

SnipGold Corporation

VE52655D

Johnny Mountain Mine

Nov-20

APEC/AEC/Issue			Tailings Impoundment Downstream												
			MW17-20					MW17-23							
Sample Station	Sample ID	Sample Collection Date	Lab ID #	Sample Analysis Date	MW17-20A	MW17-20A	MW17-20A	MW17-20B	MW17-20B	MW17-20B	MW17-23A	MW17-23A	MW17-23B	MW17-23A	MW17-23A
		23-Jul-17	L1966041-3												
		21-Oct-17	L2014861-1												
		25-Aug-2020	VA20B3887-005												
		23-Jul-17	L1966041-4												
		21-Oct-17	L2014861-2												
		25-Aug-2020	VA20B3887-006												
		23-Jul-17	L1966041-12												
		22-Oct-17	L2014861-3												
		23-Jul-17	L1966041-13												
		16-Jul-19	L2313901-4												
		28-Aug-2020	VA20B4083-003												
Parameters	Units	MDL													
<b>Field Screening</b>															
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Noticable Odour	-	-	no	no	no	no	no	no	no	no	no	no	no	no	no
Conductivity	µs/cm	2	273	78	104.9	278	58	27.3	257	213	157	229	144.8		
<b>Petroleum Hydrocarbons (PHCs)</b>															
Benzene	µg/L	0.50	17.1	3.41	<0.50	2.6	<0.5	na	<0.50	<0.5	<0.50	<0.50	<0.50	<0.50	<0.50
Ethylbenzene	µg/L	0.50	64.4	23.2	<0.50	65.5	1.8	na	<0.50	<0.5	<0.50	<0.50	<0.50	<0.50	<0.50
Toluene	µg/L	0.45	263	25.2	<0.50	112	2.51	na	21.3	7.34	<0.45	<0.45	<0.45	<0.50	<0.50
ortho-Xylene	µg/L	0.50	128	41.7	<0.50	123	3.3	na	<0.50	<0.5	<0.50	<0.50	<0.50	<0.50	<0.50
meta- & para-Xylene	µg/L	0.50	304	93.7	<0.50	310	7.86	na	<0.50	<0.5	<0.50	<0.50	<0.50	<0.50	<0.50
Xylenes (Total)	µg/L	0.75	433	135	<0.75	433	11.2	na	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75
VHw6-10	µg/L	100	1080	na	na	1180	na	na	<100	na	<100	<100	<100	na	na
VPHw	µg/L	100	300	na	na	560	na	na	<100	na	<100	<100	<100	na	na
Methyl-tert-butyl ether [MTBE]	µg/L	0.50	<0.50	<0.5	<0.50	<0.50	<0.5	na	<0.50	<0.5	<0.50	<0.50	<0.50	<0.50	<0.50
Styrene	µg/L	0.50	<0.50	<0.5	<0.50	<0.50	<0.5	na	<0.50	<0.5	<0.50	<0.50	<0.50	<0.50	<0.50
EPHw10-19	µg/L	250	280	270	<250	430	<250	<250	<250	<250	<250	<250	<250	<250	<250
EPH19-32	µg/L	250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250
LEPHw	µg/L	250	270	270	<250	400	<250	<250	<250	<250	<250	<250	<250	<250	<250
HEPH	µg/L	250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250

**Notes:**

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- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
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- VHw(6-10) = volatile hydrocarbons in water
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- no = none observed
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**Table 9: Groundwater Analytical Results – PHCs**

Johnny Mountain Mine Reclamation Project

SnipGold Corporation

VE52655D

Johnny Mountain Mine

Nov-20

APEC/AEC/Issue		Sky Creek Drainage Upstream	Sky Creek Drainage Upstream	APEC 9 / AEC 5 : Main Landfill								QA/QC				
Sample Station		MW17-21	MW17-21	MW17-22								FIELD BLANK				
Sample ID		MW17-21A	MW17-21B	MW17-22A	MW17-22A	MW17-22A DUP 1	MW17-22A	MW17-22B	MW17-22B DUP A	MW17-22B	FIELD BLANK	-	MW17-4B "DUP 1"	MW17-22B DUP A	MW17-12B-DUP (MW17-62B)	
Sample Collection Date		23-Jul-17	23-Jul-17	28-Jul-17	22-Oct-17	22-Oct-17	28-Aug-2020	23-Jul-17	23-Jul-17	28-Aug-2020	24-Oct-17	-	23-Oct-17	23-Jul-17	24-Aug-20	
Lab ID #		L1966041-5	L1966041-6	L1966936-2	L2014860-3	L2014860-4	VA20B4087-001	L1966041-7	L1966041-8	VA20B4087-002	L2014860-5	-	L2014860-4	L1966041-8	VA20B3891-009	
Sample Analysis Date												-				
Parameters	Units	MDL										Allowable RPD <sup>1</sup> (%)	Calculated RPD <sup>2</sup> (%)	Calculated RPD <sup>2</sup> (%)	Calculated RPD <sup>2</sup> (%)	
<b>Field Screening</b>																
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	-	-	-	-
Noticable Odour	-	-	no	no	no	no	no	no	no	no	no	no	-	-	-	-
Conductivity	µs/cm	2	284	235	353	210	210	238.7	63	63	30.3	na	-	-	-	-
<b>Petroleum Hydrocarbons (PHCs)</b>																
Benzene	µg/L	0.50	<0.50	<0.50	5.46	2.57	<0.5	<0.5	<0.50	<0.50	<0.5	<0.5	20	-	-	-
Ethylbenzene	µg/L	0.50	1.11	<0.50	160	92.5	<0.5	2.14	0.74	0.51	<0.5	<0.5	20	-	-	-
Toluene	µg/L	0.45	2.75	<0.45	178	98.4	<0.45	<0.45	0.99	0.69	<0.45	<0.45	20	-	-	-
ortho-Xylene	µg/L	0.50	2.43	<0.50	363	238	<0.5	0.65	1.35	0.93	<0.50	<0.5	20	-	-	-
meta- & para-Xylene	µg/L	0.50	5.39	<0.50	655	417	<0.5	<0.50	2.17	1.45	<0.50	<0.5	20	-	-	-
Xylenes (Total)	µg/L	0.75	7.82	<0.75	1020	654	<0.75	<0.75	3.52	2.39	<0.75	<0.75	20	-	-	-
VHw6-10	µg/L	100	<100	<100	2260	na	na	na	<100	<100	na	na	20	-	-	-
VPHw	µg/L	100	<100	<100	900	na	na	na	<100	<100	na	na	20	-	-	-
Methyl-tert-butyl ether [MTBE]	µg/L	0.50	<0.50	<0.50	<0.50	<0.5	<0.5	<0.50	<0.50	<0.50	<0.50	<0.5	20	-	-	-
Styrene	µg/L	0.50	<0.50	<0.50	<0.50	<0.5	<0.5	<0.5	<0.50	<0.50	<0.5	<0.5	20	-	-	-
EPHw10-19	µg/L	250	<250	<250	870	570	1530	<250	<250	<250	<250	<250	20	1.94	-	-
EPH19-32	µg/L	250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	20	-	-	-
LEPHw	µg/L	250	<250	<250	790	520	1530	<250	<250	<250	<250	<250	20	1.94	-	-
HEPH	µg/L	250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	20	-	-	-

**Notes:**

- MDL = Method detection limit
- EPHw<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPHw = light extractable petroleum hydrocarbons in water
- HEPH = heavy extractable petroleum hydrocarbons
- VPHw = volatile petroleum hydrocarbons in water
- VHw(6-10) = volatile hydrocarbons in water
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit

**QA/QC**

1. Allowable RPDs as identified in BC Environmental Laboratory Manual (February 2016), Section A, Table 2
2. RPDs calculated only where both values are greater than 5 times the method detection limit

-	= not calculated
RPD	= Representative percent difference
1	= calculated RPD exceeds allowable RPD



**Table 10: Groundwater Analytical Results – PAHs**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

Parameters	APEC/Issue		APEC 1: Mill / 10 Level Portal												
	Sample Station		MW17-1		MW17-2		MW17-3			MW17-4					
	Sample ID		MW17-1A	MW17-1B	MW17-2A	MW17-2B	MW17-3	MW17-4A	MW17-4A	BH17-04A	MW17-4B	MW17-4B DUP A	MW17-4B	MW17-4B "DUP 1"	
	Sample Collection Date		19-Jul-17	19-Jul-17	19-Jul-17	19-Jul-17	19-Jul-17	19-Jul-17	02-Jul-18	23-Aug-2020	19-Jul-17	19-Jul-17	23-Oct-17	23-Oct-17	
	Units	MDL	Lab ID #	L1962977-1	L1962977-2	L1962977-3	L1962977-4	L1962977-5	L1962977-6	L2123781-8	VA20B3890-001	L1962977-7	L1962977-8	L2014860-1	L2014860-4
<b>Field Screening</b>															
Sample Headspace Vapour Concentration	ppmv	5.00		nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Noticable Odour	-	-		no	no	no	no	no	no	no	no	no	no	no	no
Conductivity	µs/cm	1		455	285	209	487	329	287	147.1	180.2	366	366	408	408
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>															
Acenaphthene	µg/L	0.01		<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.010	<0.010	<0.20	<0.20	<0.05	<0.05
Acenaphthylene	µg/L	0.01		<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.010	<0.010	<0.20	<0.20	<0.05	<0.05
Acridine	µg/L	0.01		<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.010	<0.010	<0.30	<0.10	<0.05	<0.05
Anthracene	µg/L	0.01		<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.010	<0.010	<0.10	<0.05	<0.05	<0.05
Benz(a)anthracene	µg/L	0.01		<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/L	0.005		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.005	<0.0050	<0.0050	<0.005	<0.005	<0.005	<0.005
Benzo(b+j)fluoranthenes	µg/L	0.01		<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05
Benzo(b+j+k)fluoranthene	µg/L	0.015		na	na	na	na	na	na	<0.015	<0.015	na	na	na	na
Benzo(g,h,i)perylene	µg/L	0.01		<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/L	0.01		<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05
Chrysene	µg/L	0.01		<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	µg/L	0.005		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.005	<0.0050	<0.0050	<0.005	<0.005	<0.005	<0.005
Fluoranthene	µg/L	0.01		<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05
Fluorene	µg/L	0.01		<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.010	0.014	<0.20	<0.06	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	µg/L	0.01		<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05
Methylnaphthalene, 1-	µg/L	0.01		na	na	na	na	na	na	<0.050	0.036	na	na	na	na
Methylnaphthalene, 2-	µg/L	0.01		na	na	na	na	na	na	<0.050	0.04	na	na	na	na
Naphthalene	µg/L	0.05		<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.050	<0.050	<0.40	<0.40	<0.05	<0.05
Phenanthrene	µg/L	0.02		<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.020	<0.020	<0.20	<0.05	<0.05	<0.05
Pyrene	µg/L	0.01		<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.010	<0.010	<0.10	<0.20	0.062	0.057
Quinoline	µg/L	0.05		<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.050	<0.050	<3.00	<3.00	<0.05	<0.05

**Notes:**

- MDL = Method detection limit
- nm = not measured
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit



**Table 10: Groundwater Analytical Results – PAHs**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

			APEC 1: Mill / 10 Level Portal															
APEC/Issue			MW17-4			MW17-5		MW17-6				MW17-7				MW17-8		
Sample Station			MW17-4B	MW17-4B	BH17-04B	MW17-5A	MW17-5B	MW17-6A	BH17-06A	MW17-6B	BH17-06B	MW17-7A	BH17-07A	MW17-7B	BH17-07B	MW17-8A	MW17-8B	MW17-8B "DUP C"
Sample ID																		
Sample Collection Date			2-Jul-18	17-Jul-19	23-Aug-2020	19-Jul-17	19-Jul-17	19-Jul-17	23-Aug-2020	19-Jul-17	23-Aug-2020	19-Jul-17	23-Aug-2020	19-Jul-17	23-Aug-2020	24-Jul-17	24-Jul-17	24-Jul-17
Lab ID #			L2123781-7	L2317077-3	VA20B3890-002	L1962977-9	L1962977-10	L1962977-11	VA20B3890-004	L1962977-12	VA20B3890-005	L1962977-13	VA20B3890-006	L1962977-14	VA20B3890-007	L1966041-16	L1966041-17	L1966041-18
Parameters	Units	MDL																
<b>Field Screening</b>																		
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Noticable Odour	-	-	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no
Conductivity	µs/cm	1	288	781	317.1	456	1307	497	176.6	1189	320.5	267	191.5	545	453.9	207	345	345
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>																		
Acenaphthene	µg/L	0.01	<0.20	<0.30	<0.040	<0.05	<0.05	<0.05	<0.010	<0.05	0.061	<0.05	<0.010	<0.05	<0.010	<0.05	<0.05	<0.05
Acenaphthylene	µg/L	0.01	<0.20	<0.20	<0.030	<0.05	<0.05	<0.05	<0.010	<0.05	<0.010	<0.05	<0.010	<0.05	<0.010	<0.05	<0.05	<0.05
Acridine	µg/L	0.01	<0.20	<0.20	<0.080	<0.05	<0.05	<0.05	<0.040	<0.05	<0.013	<0.05	<0.010	<0.05	<0.010	<0.05	<0.05	<0.05
Anthracene	µg/L	0.01	<0.080	<0.040	<0.020	<0.05	<0.05	<0.05	<0.010	<0.05	<0.010	<0.05	<0.010	<0.05	<0.010	<0.05	<0.05	<0.05
Benz(a)anthracene	µg/L	0.01	<0.080	<0.010	<0.010	<0.05	<0.05	<0.05	<0.010	<0.05	<0.010	<0.05	<0.010	<0.05	<0.010	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/L	0.005	<0.0050	<0.0050	<0.0050	<0.005	<0.005	<0.005	<0.0050	<0.005	<0.0050	<0.005	<0.0050	<0.005	<0.0050	<0.005	<0.005	<0.005
Benzo(b+j)fluoranthenes	µg/L	0.01	<0.010	<0.010	<0.010	<0.05	<0.05	<0.05	<0.010	<0.05	<0.010	<0.05	<0.010	<0.05	<0.010	<0.05	<0.05	<0.05
Benzo(b+j+k)fluoranthene	µg/L	0.015	<0.015	<0.015	<0.015	na	na	na	<0.015	na	<0.015	na	<0.015	na	<0.015	na	na	na
Benzo(g,h,i)perylene	µg/L	0.01	<0.010	<0.010	<0.010	<0.05	<0.05	<0.05	<0.010	<0.05	<0.010	<0.05	<0.010	<0.05	<0.010	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/L	0.01	<0.010	<0.010	<0.010	<0.05	<0.05	<0.05	<0.010	<0.05	<0.010	<0.05	<0.010	<0.05	<0.010	<0.05	<0.05	<0.05
Chrysene	µg/L	0.01	<0.080	<0.010	<0.010	<0.05	<0.05	<0.05	<0.010	<0.05	<0.010	<0.05	<0.010	<0.05	<0.010	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	µg/L	0.005	<0.0090	<0.0050	<0.0050	<0.005	<0.005	<0.005	<0.0050	<0.005	<0.0050	<0.005	<0.0050	<0.005	<0.0050	<0.005	<0.005	<0.005
Fluoranthene	µg/L	0.01	<0.080	<0.020	<0.010	<0.05	<0.05	<0.05	<0.010	<0.05	<0.010	<0.05	<0.010	<0.05	<0.010	<0.05	<0.05	<0.05
Fluorene	µg/L	0.01	<0.20	0.207	0.024	<0.05	<0.05	<0.05	<0.010	<0.05	0.046	<0.05	0.01	<0.05	<0.010	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	µg/L	0.01	<0.020	<0.010	<0.010	<0.05	<0.05	<0.05	<0.010	<0.05	<0.010	<0.05	<0.010	<0.05	<0.010	<0.05	<0.05	<0.05
Methylnaphthalene, 1-	µg/L	0.01	<2.0	2.68	0.205	na	na	na	<0.010	na	0.084	na	<0.010	na	<0.010	na	na	na
Methylnaphthalene, 2-	µg/L	0.01	<0.80	2.99	0.217	na	na	na	<0.010	na	0.056	na	<0.010	na	<0.010	na	na	na
Naphthalene	µg/L	0.05	<0.50	<0.50	<0.050	<0.05	<0.05	<0.05	<0.050	<0.05	<0.050	<0.05	<0.050	<0.05	<0.050	0.093	<0.05	<0.05
Phenanthrene	µg/L	0.02	<0.16	0.23	0.024	<0.05	<0.05	<0.05	<0.020	<0.05	<0.020	<0.05	<0.020	<0.05	<0.020	<0.05	<0.05	<0.05
Pyrene	µg/L	0.01	<0.080	0.058	0.034	<0.05	<0.05	<0.05	<0.010	<0.05	<0.010	<0.05	<0.010	<0.05	<0.010	<0.05	<0.05	<0.05
Quinoline	µg/L	0.05	<0.40	<3.0	<0.600	<0.05	<0.05	<0.05	<0.050	<0.05	<0.050	<0.05	<0.050	<0.05	<0.050	<0.05	<0.05	<0.05

**Notes:**

- MDL = Method detection limit
- nm = not measured
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit

**Table 10: Groundwater Analytical Results – PAHs**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

Parameters	APEC/Issue		AEC 5: Main Landfill									
	Sample Station		MW17-22									
	Sample ID		MW17-22A	MW17-22A	MW17-22A	MW17-22A	MW17-22A	MW17-22B	MW17-22B DUP A	MW17-22B	MW17-22B	MW17-22B
	Sample Collection Date		28-Jul-17	22-Oct-17	9-Jul-18	11-Sep-18	17-Jul-19	23-Jul-17	23-Jul-17	9-Jul-18	10-Sep-18	17-Jul-19
	Lab ID #		L1966936-2	L2014860-3	L2127140-1	L2162703-1	L2312976-1	L1966041-7	L1966041-8	L2127140-2	L2162703-2	L2312976-2
Units	MDL											
<b>Field Screening</b>												
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	na	nm	nm	nm	nm	na
Noticable Odour	-	-	no	no	no	no	na	no	no	no	no	na
Conductivity	µs/cm	1	210	322	198.6	320.8	na	63	63	42.3	77	na
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>												
Acenaphthene	µg/L	0.01	<0.05	<0.05	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010
Acenaphthylene	µg/L	0.01	<0.05	<0.05	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010
Acridine	µg/L	0.01	<0.05	<0.05	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010
Anthracene	µg/L	0.01	<0.05	<0.05	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010
Benz(a)anthracene	µg/L	0.01	<0.05	<0.05	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010
Benzo(a)pyrene	µg/L	0.005	<0.005	<0.005	<0.0050	<0.0050	<0.0050	<0.005	<0.005	<0.0050	<0.0050	<0.0050
Benzo(b+j)fluoranthenes	µg/L	0.01	<0.05	<0.05	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010
Benzo(b+j+k)fluoranthene	µg/L	0.015	na	na	<0.015	<0.015	<0.015	na	na	<0.015	<0.015	<0.015
Benzo(g,h,i)perylene	µg/L	0.01	<0.05	<0.05	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010
Benzo(k)fluoranthene	µg/L	0.01	<0.05	<0.05	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010
Chrysene	µg/L	0.01	<0.05	<0.05	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010
Dibenz(a,h)anthracene	µg/L	0.005	<0.005	<0.005	<0.0050	<0.0050	<0.0050	<0.005	<0.005	<0.0050	<0.0050	<0.0050
Fluoranthene	µg/L	0.01	<0.05	<0.05	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010
Fluorene	µg/L	0.01	<0.05	<0.05	<0.020	<0.030	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010
Indeno(1,2,3-c,d)pyrene	µg/L	0.01	<0.05	<0.05	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010
Methylnaphthalene, 1-	µg/L	0.01	na	na	5.11	2.36	1.63	na	na	<0.050	<0.050	<0.050
Methylnaphthalene, 2-	µg/L	0.01	na	na	8.91	4.14	3.18	na	na	<0.050	<0.050	<0.050
Naphthalene	µg/L	0.05	82.9	43.9	20.7	9.2	3.17	1.87	1.93	<0.050	<0.050	<0.050
Phenanthrene	µg/L	0.02	<0.05	<0.05	<0.020	<0.020	<0.020	<0.05	<0.05	<0.020	<0.020	<0.020
Pyrene	µg/L	0.01	<0.05	<0.05	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010
Quinoline	µg/L	0.05	<4.0	<0.05	<0.90	<0.502	<0.60	<0.40	<0.40	<0.050	<0.050	<0.050

**Notes:**

- MDL = Method detection limit
- nm = not measured
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit



**Table 10: Groundwater Analytical Results – PAHs**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

Parameters	APEC/Issue		AEC 2: Tank Farm / Fuel Lines														
	Sample Station		MW17-13			MW17-16	MW17-12				MW17-12B-DUP (MW17-62B)	MW17-17					
	Sample ID		MW17-13	MW17-13	MW17-13	MW17-16	MW17-12A	MW17-12A	MW17-12B	MW17-12B	MW17-12B-DUP (MW17-62B)	MW17-17A	MW17-17A	MW17-17A	MW17-17B	MW17-17B	
	Sample Collection Date		20-Jul-17	24-Oct-17	2-Jul-18	20-Jul-17	20-Jul-17	24-Aug-20	20-Jul-17	24-Aug-20	24-Aug-20	20-Jul-17	1-Jul-18	24-Aug-20	20-Jul-17	1-Jul-18	
	Units	MDL	Lab ID #														
<b>Field Screening</b>																	
Sample Headspace Vapour Concentration	ppmv	5.00		nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	
Noticable Odour	-	-		no	no	no	no	no	rotten egg	no	no	no	no	no	no	no	
Conductivity	µs/cm	1		275	305	179.4	170	302	158.1	276	291.8	291.8	379	139.2	139.2	194	
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>																	
Acenaphthene	µg/L	0.01		0.531	0.43	0.872	<0.05	<0.05	<0.010	<0.05	0.011	<0.010	<0.05	<0.010	<0.012	<0.05	<0.010
Acenaphthylene	µg/L	0.01		<0.20	<0.05	<0.30	<0.05	<0.05	0.011	<0.05	<0.010	<0.010	<0.05	<0.010	<0.010	<0.05	<0.010
Acridine	µg/L	0.01		<0.05	<0.05	<0.080	<0.05	<0.05	0.025	<0.05	<0.010	<0.010	<0.05	<0.010	<0.017	<0.05	<0.010
Anthracene	µg/L	0.01		<0.05	<0.05	<0.080	<0.05	<0.05	<0.010	<0.05	<0.010	<0.010	<0.05	<0.010	<0.010	<0.05	<0.010
Benz(a)anthracene	µg/L	0.01		<0.05	<0.05	<0.080	<0.05	<0.05	<0.010	<0.05	<0.010	<0.010	<0.05	<0.010	<0.010	<0.05	<0.010
Benzo(a)pyrene	µg/L	0.005		<0.005	<0.005	<0.0050	<0.005	<0.005	<0.0050	<0.005	<0.0050	<0.0050	<0.005	<0.0050	<0.0050	<0.005	<0.0050
Benzo(b+j)fluoranthenes	µg/L	0.01		<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.05	<0.010	<0.010	<0.05	<0.010	<0.010	<0.05	<0.010
Benzo(b+j+k)fluoranthene	µg/L	0.015		na	na	<0.015	na	na	<0.015	na	<0.015	<0.015	na	<0.015	<0.015	na	<0.015
Benzo(g,h,i)perylene	µg/L	0.01		<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.05	<0.010	<0.010	<0.05	<0.010	<0.010	<0.05	<0.010
Benzo(k)fluoranthene	µg/L	0.01		<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.05	<0.010	<0.010	<0.05	<0.010	<0.010	<0.05	<0.010
Chrysene	µg/L	0.01		<0.05	<0.05	<0.080	<0.05	<0.05	<0.010	<0.05	<0.010	<0.010	<0.05	<0.010	<0.010	<0.05	<0.010
Dibenz(a,h)anthracene	µg/L	0.005		<0.005	<0.005	<0.0050	<0.005	<0.005	<0.0050	<0.005	<0.0050	<0.0050	<0.005	<0.0050	<0.0050	<0.005	<0.0050
Fluoranthene	µg/L	0.01		<0.05	<0.05	<0.080	<0.05	<0.05	<0.010	<0.05	<0.010	<0.010	<0.05	<0.010	<0.010	<0.05	<0.010
Fluorene	µg/L	0.01		0.572	0.451	1.02	<0.05	<0.05	<0.010	<0.05	<0.010	<0.010	<0.05	<0.010	0.014	<0.05	<0.010
Indeno(1,2,3-c,d)pyrene	µg/L	0.01		<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.05	<0.010	<0.010	<0.05	<0.010	<0.010	<0.05	<0.010
Methylnaphthalene, 1-	µg/L	0.01		na	na	28.4	na	na	0.024	na	0.026	<0.010	na	<0.050	0.116	na	<0.050
Methylnaphthalene, 2-	µg/L	0.01		na	na	15.7	na	na	0.04	na	<0.010	<0.010	na	<0.050	0.124	na	<0.050
Naphthalene	µg/L	0.05		19.6	14.9	35.1	<0.05	0.055	<0.050	<0.05	<0.050	<0.050	<0.10	<0.050	<0.050	<0.05	<0.050
Phenanthrene	µg/L	0.02		0.311	0.258	0.54	<0.05	<0.05	<0.020	<0.05	<0.020	<0.020	<0.05	<0.020	<0.020	<0.05	<0.020
Pyrene	µg/L	0.01		<0.05	<0.05	<0.080	<0.05	<0.05	0.035	<0.05	<0.010	<0.010	<0.05	<0.010	<0.010	<0.05	<0.010
Quinoline	µg/L	0.05		<1.0	<0.05	<2.0	<0.05	<0.05	<0.050	<0.05	<0.050	<0.050	<0.05	<0.050	<0.050	<0.05	<0.050

**Notes:**

- MDL = Method detection limit
- nm = not measured
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit



**Table 10: Groundwater Analytical Results – PAHs**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

Parameters	Units	MDL	APEC/Issue		Tailings Impoundment Downstream									APEC 6: Septic Field		APEC 10: Burial Site 1			
			Sample Station	Tailings Impoundment Downstream		MW17-20			MW17-23			MW17-10		MW17-9					
			Sample ID	MW17-20A	MW17-20A	MW17-20A	MW17-20B	MW17-20B	MW17-20B	MW17-23A	MW17-23A	MW17-23A	MW17-23A	MW17-23B	MW17-10A	MW17-10B	MW17-9A	MW17-9A	MW17-9B
			Sample Collection Date	23-Jul-17	21-Oct-17	25-Aug-2020	23-Jul-17	21-Oct-17	25-Aug-2020	23-Jul-17	22-Oct-17	16-Jul-19	28-Aug-2020	23-Jul-17	24-Jul-17	24-Jul-17	28-Jul-17	2-Jul-18	24-Jul-17
Lab ID #	L1966041-3	L2014861-1	VA20B3887-005	L1966041-4	L2014861-2	VA20B3887-006	L1966041-12	L2014861-3	L2313901-4	VA20B4083-003	L1966041-13	L1966041-20	L1966041-21	L1966936-1	L2123781-6	L1966041-19			
<b>Field Screening</b>																			
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	
Noticable Odour	-	-	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	
Conductivity	µs/cm	1	273	278	104.9	78	58.2	27.3	257	213	229	144.8	157	362	349	755	515	473	
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>																			
Acenaphthene	µg/L	0.01	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.010	0.215	
Acenaphthylene	µg/L	0.01	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.010	<0.05	
Acridine	µg/L	0.01	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.010	<0.05	
Anthracene	µg/L	0.01	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.010	<0.05	
Benz(a)anthracene	µg/L	0.01	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.010	<0.05	
Benzo(a)pyrene	µg/L	0.005	<0.005	<0.005	<0.0050	<0.005	<0.005	<0.0050	<0.005	<0.005	<0.0050	<0.0050	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.005	
Benzo(b+j)fluoranthenes	µg/L	0.01	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.010	<0.05	
Benzo(b+j+k)fluoranthene	µg/L	0.015	na	na	<0.015	na	na	<0.015	na	na	<0.015	<0.015	na	na	na	na	<0.015	na	
Benzo(g,h,i)perylene	µg/L	0.01	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.010	<0.05	
Benzo(k)fluoranthene	µg/L	0.01	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.010	<0.05	
Chrysene	µg/L	0.01	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.010	<0.05	
Dibenz(a,h)anthracene	µg/L	0.005	<0.005	<0.005	<0.0050	<0.005	<0.005	<0.0050	<0.005	<0.005	<0.0050	<0.0050	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.005	
Fluoranthene	µg/L	0.01	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.010	<0.05	
Fluorene	µg/L	0.01	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	0.052	<0.010	0.259
Indeno(1,2,3-c,d)pyrene	µg/L	0.01	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.010	<0.05	
Methylnaphthalene, 1-	µg/L	0.01	na	na	0.112	na	na	<0.010	na	na	<0.050	<0.010	na	na	na	na	<0.050	na	
Methylnaphthalene, 2-	µg/L	0.01	na	na	0.182	na	na	<0.010	na	na	<0.050	<0.010	na	na	na	na	<0.050	na	
Naphthalene	µg/L	0.05	17	6.65	0.165	24.4	0.734	<0.050	<0.05	<0.05	<0.050	<0.050	<0.05	<0.05	<0.05	<0.20	<0.050	<0.30	
Phenanthrene	µg/L	0.02	<0.05	<0.05	<0.020	<0.05	<0.05	<0.020	<0.05	<0.05	<0.020	<0.020	<0.05	<0.05	<0.05	<0.05	<0.020	<0.05	
Pyrene	µg/L	0.01	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.010	<0.05	
Quinoline	µg/L	0.05	<0.20	<0.05	<0.050	<0.40	<0.05	<0.050	<0.05	<0.05	<0.050	<0.050	<0.05	<0.05	<0.05	<0.10	<0.050	<0.40	

**Notes:**

- MDL = Method detection limit
- nm = not measured
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit



**Table 10: Groundwater Analytical Results – PAHs**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

Parameters	APEC/Issue		APEC 9: Main Landfill		APEC 10: Burial Site 1		APEC 12: Burial Site 2			
	Sample Station		MW17-22		MW17-9		MW17-14			
	Sample ID		MW17-22A	MW17-22B	MW17-9B	MW17-9BFD	MW17-14A	MW17-14A	MW17-14B	MW17-14B
	Sample Collection Date		28-Aug-2020	28-Aug-2020	2-Jul-18	2-Jul-18	24-Jul-17	1-Jul-18	24-Jul-17	1-Jul-18
	Lab ID #		VA20B4087-001	VA20B4087-002	L2123781-5	L2123781-10	L1966041-24	L2123781-3	L1966041-25	L2123781-4
	Units	MDL								
<b>Field Screening</b>										
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm
Noticable Odour	-	-	no	no	no	no	no	no	no	no
Conductivity	µs/cm	1	238.7	30.3	250.8	250.8	264	184.4	192	108.6
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>										
Acenaphthene	µg/L	0.01	<0.010	<0.010	0.113	0.093	<0.05	<0.010	<0.05	<0.010
Acenaphthylene	µg/L	0.01	<0.010	<0.010	<0.020	<0.020	<0.05	<0.010	<0.05	<0.010
Acridine	µg/L	0.01	<0.010	<0.010	<0.020	<0.010	<0.05	<0.010	<0.05	<0.010
Anthracene	µg/L	0.01	<0.010	<0.010	<0.040	<0.040	<0.05	<0.010	<0.05	<0.010
Benz(a)anthracene	µg/L	0.01	<0.010	<0.010	<0.010	<0.010	<0.05	<0.010	<0.05	<0.010
Benzo(a)pyrene	µg/L	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.005	<0.0050	<0.005	<0.0050
Benzo(b+j)fluoranthenes	µg/L	0.01	<0.010	<0.010	<0.010	<0.010	<0.05	<0.010	<0.05	<0.010
Benzo(b+j+k)fluoranthene	µg/L	0.015	<0.015	<0.015	<0.015	<0.015	na	<0.015	na	<0.015
Benzo(g,h,i)perylene	µg/L	0.01	<0.010	<0.010	<0.010	<0.010	<0.05	<0.010	<0.05	<0.010
Benzo(k)fluoranthene	µg/L	0.01	<0.010	<0.010	<0.010	<0.010	<0.05	<0.010	<0.05	<0.010
Chrysene	µg/L	0.01	<0.010	<0.010	<0.010	<0.010	<0.05	<0.010	<0.05	<0.010
Dibenz(a,h)anthracene	µg/L	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.005	<0.0050	<0.005	<0.0050
Fluoranthene	µg/L	0.01	<0.010	<0.010	<0.010	<0.010	<0.05	<0.010	<0.05	<0.010
Fluorene	µg/L	0.01	<0.010	<0.010	0.257	0.238	<0.05	<0.010	<0.05	<0.010
Indeno(1,2,3-c,d)pyrene	µg/L	0.01	<0.010	<0.010	<0.010	<0.010	<0.05	<0.010	<0.05	<0.010
Methylnaphthalene, 1-	µg/L	0.01	2.9	<0.010	<0.050	<0.050	na	<0.050	na	<0.050
Methylnaphthalene, 2-	µg/L	0.01	3.63	<0.010	<0.050	<0.050	na	<0.050	na	<0.050
Naphthalene	µg/L	0.05	4.27	<0.050	<0.070	<0.070	<0.05	<0.050	<0.05	<0.050
Phenanthrene	µg/L	0.02	<0.020	<0.020	0.028	0.024	<0.05	<0.020	<0.05	<0.020
Pyrene	µg/L	0.01	<0.010	<0.010	0.015	0.014	<0.05	<0.010	<0.05	<0.010
Quinoline	µg/L	0.05	<5.50	<0.050	<0.40	<0.40	<0.05	<0.050	<0.05	<0.050

**Notes:**

- MDL = Method detection limit
- nm = not measured
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit



**Table 10: Groundwater Analytical Results – PAHs**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

APEC/Issue			QA/QC						
Sample Station									
Parameters	Units	MDL	Allowable	Calculated RPD <sup>2</sup>	Calculated RPD <sup>2</sup> (%)	Calculated RPD <sup>2</sup>	Calculated RPD <sup>2</sup>	Calculated RPD <sup>2</sup>	Calculated RPD <sup>2</sup>
<b>Field Screening</b>									
Sample Headspace Vapour Concentration	ppmv	5.00	-	-	-	-	-	-	-
Noticable Odour	-	-	-	-	-	-	-	-	-
Conductivity	µs/cm	1	-	-	-	-	-	-	-
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>									
Acenaphthene	µg/L	0.01	20	-	-	-	-	19.42	-
Acenaphthylene	µg/L	0.01	20	-	-	-	-	-	-
Acridine	µg/L	0.01	20	-	-	-	-	-	-
Anthracene	µg/L	0.01	20	-	-	-	-	-	-
Benz(a)anthracene	µg/L	0.01	20	-	-	-	-	-	-
Benzo(a)pyrene	µg/L	0.005	20	-	-	-	-	-	-
Benzo(b+j)fluoranthenes	µg/L	0.01	20	-	-	-	-	-	-
Benzo(b+j+k)fluoranthene	µg/L	0.015	20	-	-	-	-	-	-
Benzo(g,h,i)perylene	µg/L	0.01	20	-	-	-	-	-	-
Benzo(k)fluoranthene	µg/L	0.01	20	-	-	-	-	-	-
Chrysene	µg/L	0.01	20	-	-	-	-	-	-
Dibenz(a,h)anthracene	µg/L	0.005	20	-	-	-	-	-	-
Fluoranthene	µg/L	0.01	20	-	-	-	-	-	-
Fluorene	µg/L	0.01	20	-	-	-	-	7.68	-
Indeno(1,2,3-c,d)pyrene	µg/L	0.01	20	-	-	-	-	-	-
Methylnaphthalene, 1-	µg/L	0.01	20	-	-	-	-	-	-
Methylnaphthalene, 2-	µg/L	0.01	20	-	-	-	-	-	-
Naphthalene	µg/L	0.05	20	-	-	-	3.16	-	-
Phenanthrene	µg/L	0.02	20	-	-	-	-	-	-
Pyrene	µg/L	0.01	20	-	8.40	-	-	-	-
Quinoline	µg/L	0.05	20	-	-	-	-	-	-

**Notes:**

- MDL = Method detection limit
- nm = not measured
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit

**QA/QC**

1. Allowable RPDs as identified in BC Environmental Laboratory Manual (February 2016), Section A, Table 2
  2. RPDs calculated only where both values are greater than 5 times the method detection limit
- = not calculated
  - RPD = Representative percent difference
  - 1 = calculated RPD exceeds allowable RPD



**Table 11: Groundwater Analytical Results – VOCs**

Johnny Mountain Mine Reclamation Project  
 Johnny Mountain Mine  
 VE52655D  
 Nov-20

APEC/Issue			AEC 1: Mill / 10 Level Portal										
			Sample Station		MW17-1		MW17-2		MW17-3	MW17-4			MW17-4B
Sample ID			MW17-1A	MW17-1B	MW17-2A	MW17-2B	MW17-3	MW17-4A	MW17-4A	MW17-4B	MW17-4B DUP A	MW17-4B	MW17-4B
Sample Collection Date			19-Jul-17	19-Jul-17	19-Jul-17	19-Jul-17	19-Jul-17	19-Jul-17	2-Jul-18	19-Jul-17	19-Jul-17	22-Oct-17	02-Jul-18
Lab ID #			L1962977-1	L1962977-2	L1962977-3	L1962977-4	L1962977-5	L1962977-6	L2123781-8	L1962977-7	L1962977-8	L2014860-1	L2123781-7
Parameters	Units	MDL											
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Noticable Odour	-	-	no	no	no	no	no	no	no	no	no	no	no
Conductivity	µs/cm	1	455	285	209	487	329	387	147.1	366	366	404	288
<b>Volatile Organic Compounds (VOCs)</b>													
Bromodichloromethane [BDCM]	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromoform	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Carbon tetrachloride	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chlorobenzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dibromochloromethane [DBCM]	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroethane	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroform	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloromethane	µg/L	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Dichlorobenzene, 1,2-	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dichlorobenzene, 1,3-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dichlorobenzene, 1,4-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dichloroethane, 1,1-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dichloroethane, 1,2-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dichloroethene, 1,1-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dichloroethylene, 1,2-cis-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dichloroethylene, 1,2-trans-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dichloromethane	µg/L	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Dichloropropane, 1,2-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,3-Dichloropropylene	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,3-Dichloropropylene	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
dichloropropene, 1,3- (cis + trans)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethane, 1,1,1,2-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethane, 1,1,2,2-	µg/L	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Tetrachloroethylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethane, 1,1,1-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethane, 1,1,2-	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Trichloroethylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichlorofluoromethane	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl Chloride	µg/L	0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40

**Notes:**

- MDL = Method detection limit
- no = none observed
- nm = not measured
- ns = no applicable standard
- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit

**Table 11: Groundwater Analytical Results – VOCs**

Johnny Mountain Mine Reclamation Project  
 Johnny Mountain Mine  
 VE52655D  
 Nov-20

APEC/Issue			AEC 1: Mill / 10 Level Portal									APEC 10: Burial Site 1	
Sample Station			MW17-5		MW17-6		MW17-7		MW17-8			MW17-9	
Sample ID			MW17-5A	MW17-5B	MW17-6A	MW17-6B	MW17-7A	MW17-7B	MW17-8A	MW17-8B	MW17-8B DUP C	MW17-9A	MW17-9A
Sample Collection Date			19-Jul-17	19-Jul-17	19-Jul-17	19-Jul-17	19-Jul-17	19-Jul-17	24-Jul-17	24-Jul-17	24-Jul-17	28-Jul-17	02-Jul-18
Lab ID #			L1962977-9	L1962977-10	L1962977-11	L1962977-12	L1962977-13	L1962977-14	L1966041-16	L1966041-17	L1966041-18	L1966936-1	L2123781-6
Parameters	Units	MDL											
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Noticable Odour	-	-	no	no	no	no	no	no	no	no	no	no	no
Conductivity	µs/cm	1	456	1307	497	1189	267	545	207	345	345	755	515
<b>Volatile Organic Compounds (VOCs)</b>													
Bromodichloromethane [BDCM]	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromoform	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Carbon tetrachloride	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chlorobenzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dibromochloromethane [DBCM]	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroethane	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroform	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloromethane	µg/L	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Dichlorobenzene, 1,2-	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dichlorobenzene, 1,3-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dichlorobenzene, 1,4-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dichloroethane, 1,1-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dichloroethane, 1,2-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dichloroethene, 1,1-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dichloroethylene, 1,2-cis-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dichloroethylene, 1,2-trans-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dichloromethane	µg/L	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Dichloropropane, 1,2-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,3-Dichloropropylene	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,3-Dichloropropylene	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
dichloropropene, 1,3- (cis + trans)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethane, 1,1,1,2-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethane, 1,1,2,2-	µg/L	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Tetrachloroethylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethane, 1,1,1-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethane, 1,1,2-	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Trichloroethylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichlorofluoromethane	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl Chloride	µg/L	0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40

**Notes:**

- MDL = Method detection limit
- no = none observed
- nm = not measured
- ns = no applicable standard
- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit

**Table 11: Groundwater Analytical Results – VOCs**

Johnny Mountain Mine Reclamation Project  
 Johnny Mountain Mine  
 VE52655D  
 Nov-20

Parameters	APEC/Issue		APEC 10: Burial Site 1			APEC 6: Septic Field		AEC 2: Tank Farm / Fuel Lines					
	Sample Station		MW17-9			MW17-10		MW17-13		MW17-16	MW17-12		MW17-17
	Sample ID		MW17-9B	MW17-9B	MW17-9BFD	MW17-10A	MW17-10B	MW17-13	MW17-13	MW17-16	MW17-12A	MW17-12B	MW17-17A
	Sample Collection Date		24-Jul-17	02-Jul-18	02-Jul-18	24-Jul-17	24-Jul-17	20-Jul-17	24-Oct-17	20-Jul-17	20-Jul-17	20-Jul-17	20-Jul-17
	Lab ID #		L1966041-19	L2123781-5	L2123781-10	L1966041-20	L1966041-21	L1962977-17	L2014860-2	L1962977-20	L1962977-15	L1962977-16	L1962977-21
Units	MDL												
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Noticable Odour	-	-	no	no	no	no	no	no	no	no	no	no	no
Conductivity	µs/cm	1	473	250.8	250.8	362	349	275	303	170	302	276	379
<b>Volatile Organic Compounds (VOCs)</b>													
Bromodichloromethane [BDCM]	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromoform	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Carbon tetrachloride	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chlorobenzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dibromochloromethane [DBCM]	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroethane	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroform	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloromethane	µg/L	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Dichlorobenzene, 1,2-	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dichlorobenzene, 1,3-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dichlorobenzene, 1,4-	µg/L	1.0	2	1.7	1.6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dichloroethane, 1,1-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dichloroethane, 1,2-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dichloroethene, 1,1-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dichloroethylene, 1,2-cis-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dichloroethylene, 1,2-trans-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dichloromethane	µg/L	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Dichloropropane, 1,2-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,3-Dichloropropylene	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,3-Dichloropropylene	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
dichloropropene, 1,3- (cis + trans)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethane, 1,1,1,2-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethane, 1,1,2,2-	µg/L	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Tetrachloroethylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethane, 1,1,1-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethane, 1,1,2-	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Trichloroethylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichlorofluoromethane	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl Chloride	µg/L	0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40

**Notes:**

- MDL = Method detection limit
- no = none observed
- nm = not measured
- ns = no applicable standard
- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit

**Table 11: Groundwater Analytical Results – VOCs**

Johnny Mountain Mine Reclamation Project  
 Johnny Mountain Mine  
 VE52655D  
 Nov-20

Parameters	APEC/Issue		AEC 2: Tank Farm / Fuel Lines			APEC 12: Burial Site 2				Tailings Impoundment Downstream			
	Sample Station		MW17-17			MW17-14				MW17-20			
	Sample ID		MW17-17A	MW17-17B	MW17-17B	MW17-14A	MW17-14A	MW17-14B	MW17-14B	MW17-20A	MW17-20B	MW17-20A	MW17-20B
	Sample Collection Date		1-Jul-18	20-Jul-17	1-Jul-18	20-Jul-17	01-Jul-18	20-Jul-17	01-Jul-18	21-Oct-17	21-Oct-17	23-Jul-17	23-Jul-17
	Lab ID #		L2123781-1	L1962977-22	L2123781-2	L1966041-24	L2123781-3	L1966041-25	L2123781-4	L1966041-3	L1966041-4	L2014861-1	L2014861-2
Units	MDL												
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Noticable Odour	-	-	no	no	no	no	no	no	no	no	no	no	no
Conductivity	µs/cm	1	139.2	194	115.8	264	184.4	192	108.6	273	78	278	58
<b>Volatile Organic Compounds (VOCs)</b>													
Bromodichloromethane [BDCM]	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1
Bromoform	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1
Carbon tetrachloride	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.5	0.5
Chlorobenzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1
Dibromochloromethane [DBCM]	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1
Chloroethane	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1
Chloroform	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1
Chloromethane	µg/L	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5	<5
Dichlorobenzene, 1,2-	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.5	0.5
Dichlorobenzene, 1,3-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1
Dichlorobenzene, 1,4-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1
Dichloroethane, 1,1-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1
Dichloroethane, 1,2-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1
Dichloroethene, 1,1-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1
Dichloroethylene, 1,2-cis-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1
Dichloroethylene, 1,2-trans-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1
Dichloromethane	µg/L	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5	<5
Dichloropropane, 1,2-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1
cis-1,3-Dichloropropylene	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	<0.5
trans-1,3-Dichloropropylene	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.5	<0.5
dichloropropene, 1,3- (cis + trans)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1
Tetrachloroethane, 1,1,1,2-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1
Tetrachloroethane, 1,1,2,2-	µg/L	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2	<0.2
Tetrachloroethylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1
Trichloroethane, 1,1,1-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1	1
Trichloroethane, 1,1,2-	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	<0.5
Trichloroethylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1
Trichlorofluoromethane	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1
Vinyl Chloride	µg/L	0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.4	<0.4

**Notes:**

- MDL = Method detection limit
- no = none observed
- nm = not measured
- ns = no applicable standard
- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit

**Table 11: Groundwater Analytical Results – VOCs**

Johnny Mountain Mine Reclamation Project  
 Johnny Mountain Mine  
 VE52655D  
 Nov-20

Parameters	Units	MDL	Tailings Impoundment Downstream			Sky Creek Drainage Upstream		AEC 5: Main Landfill							AEC 5: Main Landfill	FIELD BLANK		
			MW17-23			MW17-21		MW17-22							MW17-22			
Sample Station	Sample ID	Sample Collection Date	Lab ID #	MW17-23A	MW17-23A	MW17-23B	MW17-21A	MW17-21B	MW17-22A	MW17-22A	MW17-22A DUP 1	MW17-22A	MW17-22A	MW17-22B	MW17-22B DUP A	MW17-22B	MW17-22B	
				L2014861-3	L1966041-12	L1966041-13	L1966041-5	L1966041-6	L1966936-2	L2014860-3	L2014860-4	L2312976-1	VA20B4087-001	L1966041-7	L1966041-8	VA20B4087-002	L2312976-2	L2014860-5
<b>Field Screening</b>																		
Sample Headspace Vapour Concentration	ppmv	5.00		nm	nm	nm	nm	nm	nm	nm	nm		nm	nm	nm	nm		nm
Noticable Odour	-	-		no	no	no	no	no	no	no	no		no	no	no	no		no
Conductivity	µs/cm	1		257	213	157	284	235	353	210	210		238.7	63	63	30.3		
<b>Volatile Organic Compounds (VOCs)</b>																		
Bromodichloromethane [BDCM]	µg/L	1.0		<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<1.0	<1.0	<1.0
Bromoform	µg/L	1.0		<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<1.0	<1.0	<1.0
Carbon tetrachloride	µg/L	0.50		0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chlorobenzene	µg/L	1.0		<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<1.0	<1.0	<1.0
Dibromochloromethane [DBCM]	µg/L	1.0		<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroethane	µg/L	1.0		<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroform	µg/L	1.0		<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<1.0	<1.0	<1.0
Chloromethane	µg/L	5.0		<5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Dichlorobenzene, 1,2-	µg/L	0.50		0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dichlorobenzene, 1,3-	µg/L	1.0		<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<1.0	<1.0	<1.0
Dichlorobenzene, 1,4-	µg/L	1.0		<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<1.0	<1.0	<1.0
Dichloroethane, 1,1-	µg/L	1.0		<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<1.0	<1.0	<1.0
Dichloroethane, 1,2-	µg/L	1.0		<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<1.0	<1.0	<1.0
Dichloroethene, 1,1-	µg/L	1.0		<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<1.0	<1.0	<1.0
Dichloroethylene, 1,2-cis-	µg/L	1.0		<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<1.0	<1.0	<1.0
Dichloroethylene, 1,2-trans-	µg/L	1.0		<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<1.0	<1.0	<1.0
Dichloromethane	µg/L	5.0		<5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<0.50	<5.0	<5.0	<5.0	<5.0	<5.0
Dichloropropane, 1,2-	µg/L	1.0		<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,3-Dichloropropylene	µg/L	0.50		<0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,3-Dichloropropylene	µg/L	0.50		<0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
dichloropropene, 1,3- (cis + trans)	µg/L	1.0		<1	<1.0	<1.0	<1.0	<1.0	<2.1	<1.0	<1.0	<1.0	<0.75	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethane, 1,1,1,2-	µg/L	1.0		<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<0.50	<1.0	<1.0
Tetrachloroethane, 1,1,2,2-	µg/L	0.20		<0.2	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Tetrachloroethylene	µg/L	1.0		<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<0.50	<1.0	<1.0
Trichloroethane, 1,1,1-	µg/L	1.0		1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<0.50	<1.0	<1.0
Trichloroethane, 1,1,2-	µg/L	0.50		<0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Trichloroethylene	µg/L	1.0		<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<0.50	<1.0	<1.0
Trichlorofluoromethane	µg/L	1.0		<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<0.50	<1.0	<1.0
Vinyl Chloride	µg/L	0.40		<0.4	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40

**Notes:**

- MDL = Method detection limit
- no = none observed
- nm = not measured
- ns = no applicable standard
- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit

**Table 11: Groundwater Analytical Results – VOCs**

Johnny Mountain Mine Reclamation Project  
 Johnny Mountain Mine  
 VE52655D  
 Nov-20

APEC/Issue			QA/QC					
Sample Station								
Sample ID			-	MW17-4B DUP A	MW17-8B DUP C	MW17-9BFD	MW17-22A DUP 1	MW17-22B DUP A
Sample Collection Date			-	19-Jul-17	24-Jul-17	02-Jul-18	23-Jul-17	23-Jul-17
Lab ID #			-	L1962977-8	L1966041-18	L2123781-10	L2014860-4	L1966041-8
Parameters	Units	MDL	Allowable RPD <sup>1</sup> (%)	Calculated RPD <sup>2</sup> (%)	Calculated RPD <sup>2</sup> (%)	Calculated RPD <sup>2</sup> (%)	Calculated RPD <sup>2</sup> (%)	Calculated
<b>Field Screening</b>								
Sample Headspace Vapour Concentration	ppmv	5.00	-					
Noticable Odour	-	-	-					
Conductivity	µs/cm	1	-					
<b>Volatile Organic Compounds (VOCs)</b>								
Bromodichloromethane [BDCM]	µg/L	1.0	20	-	-	-	-	#REF!
Bromoform	µg/L	1.0	20	-	-	-	-	#REF!
Carbon tetrachloride	µg/L	0.50	20	-	-	-	-	#REF!
Chlorobenzene	µg/L	1.0	20	-	-	-	-	#REF!
Dibromochloromethane [DBCM]	µg/L	1.0	20	-	-	-	-	#REF!
Chloroethane	µg/L	1.0	20	-	-	-	-	#REF!
Chloroform	µg/L	1.0	20	-	-	-	-	#REF!
Chloromethane	µg/L	5.0	20	-	-	-	-	#REF!
Dichlorobenzene, 1,2-	µg/L	0.50	20	-	-	-	-	#REF!
Dichlorobenzene, 1,3-	µg/L	1.0	20	-	-	-	-	#REF!
Dichlorobenzene, 1,4-	µg/L	1.0	20	-	-	-	-	#REF!
Dichloroethane, 1,1-	µg/L	1.0	20	-	-	-	-	#REF!
Dichloroethane, 1,2-	µg/L	1.0	20	-	-	-	-	#REF!
Dichloroethene, 1,1-	µg/L	1.0	20	-	-	-	-	#REF!
Dichloroethylene, 1,2-cis-	µg/L	1.0	20	-	-	-	-	#REF!
Dichloroethylene, 1,2-trans-	µg/L	1.0	20	-	-	-	-	#REF!
Dichloromethane	µg/L	5.0	20	-	-	-	-	#REF!
Dichloropropane, 1,2-	µg/L	1.0	20	-	-	-	-	#REF!
cis-1,3-Dichloropropylene	µg/L	0.50	20	-	-	-	-	#REF!
trans-1,3-Dichloropropylene	µg/L	0.50	20	-	-	-	-	#REF!
dichloropropene, 1,3- (cis + trans)	µg/L	1.0	20	-	-	-	-	#REF!
Tetrachloroethane, 1,1,1,2-	µg/L	1.0	20	-	-	-	-	#REF!
Tetrachloroethane, 1,1,2,2-	µg/L	0.20	20	-	-	-	-	#REF!
Tetrachloroethylene	µg/L	1.0	20	-	-	-	-	#REF!
Trichloroethane, 1,1,1-	µg/L	1.0	20	-	-	-	-	#REF!
Trichloroethane, 1,1,2-	µg/L	0.50	20	-	-	-	-	#REF!
Trichloroethylene	µg/L	1.0	20	-	-	-	-	#REF!
Trichlorofluoromethane	µg/L	1.0	20	-	-	-	-	#REF!
Vinyl Chloride	µg/L	0.40	20	-	-	-	-	#REF!

**Notes:**

- MDL = Method detection limit
- no = none observed
- nm = not measured
- ns = no applicable standard
- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit

**QA/QC**

1. Allowable RPDs as identified in BC Environmental Laboratory Manual (February 2016), Section A, Table 2
  2. RPDs calculated only where both values are greater than 5 times the method detection limit
- = not calculated
  - RPD = Representative percent difference
  - 1 = calculated RPD exceeds allowable RPD















**Table 12: Groundwater Analytical Results – Dissolved Metals**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

Parameters	Units	MDL	APEC/Issue	Sky Creek Drainage Downstream										
			Stonehouse Creek Upstream	MW17-24					MW17-21					
			Sample Station	MW17-28	MW17-24A	MW17-24A "DUP B"	MW17-24A	MW17-24B	MW17-24B	MW17-21A	MW17-21A	MW17-21A	MW17-21B	MW17-21B
			Sample ID	MW17-28	MW17-24A	MW17-24A "DUP B"	MW17-24A	MW17-24B	MW17-24B	MW17-21A	MW17-21A	MW17-21A	MW17-21B	MW17-21B
			Sample Collection Date	29-Jul-17	23-Jul-17	23-Jul-17	24-Aug-20	23-Jul-17	24-Aug-20	23-Jul-17	Sept 5 2019	25-Aug-2020	23-Jul-17	25-Aug-2020
Lab ID #	L1966936-3	L1966041-9	L1966041-10	A20B3891-00	L1966041-11	A20B3891-00	L1966041-5	L2345256-3	A20B3887-00	L1966041-6	A20B3887-00			
<b>Field Screening</b>														
pH	unitless	0.1	8.07	7.61	4.61	7.4	8.18	6.48	7.83	8.05	7.96	6.49	6.12	
Conductivity	µs/cm	1	346	322	322	228	69	18.5	284	173	194.3	235	46.6	
<b>Physiochemical Parameters</b>														
pH	unitless	0.1	8.07	7.61	7.61	7.79	8.18	6.41	7.83	8.21	8.11	6.49	7.14	
Conductivity	µs/cm	1	345	311	313	313	249	26.3	280	282	256	185	109	
Hardness (as CaCO3)	mg/L	500	59700	143000	144000	133	31400	10.9	111000	104	97.1	91400	32.6	
<b>Metals (General)</b>														
Aluminum	µg/L	1.0	56	<10	<10	1.2	11	<1.0	<10	3.6	2.5	<10	2.6	
Antimony	µg/L	0.10	3.07	4.17	4.1	0.24	<0.5	<0.10	1.01	0.18	0.14	<0.5	<0.10	
Arsenic	µg/L	0.10	<1	3.1	3.2	3.51	1.4	0.4	<1	0.71	0.6	<1	<0.10	
Barium	µg/L	0.10	31	34	34	42.5	<20	4.34	32	28.5	28.3	25	14.8	
Beryllium	µg/L	0.10	<5	<5	<5	<0.100	<5	<0.100	<5	< 0.1	<0.100	<5	<0.100	
Bismuth	µg/L	0.050	na	na	na	<0.050	na	<0.050	na	< 0.05	<0.050	na	<0.050	
Boron	µg/L	10	<100	<100	<100	<10	<100	<10	<100	< 10	16	<100	<10	
Cadmium	µg/L	0.0050	<0.05	<0.05	<0.05	<0.0050	<0.05	0.12	<0.05	< 0.01	<0.0100	0.212	0.0779	
Calcium	mg/L	50	19.6	42.2	42.6	37.6	11	3.5	27	23.6	23	31.7	11.1	
Cesium	µg/L	0.010	na	na	na	0.016	na	<0.010	na	< 0.01	<0.010	na	<0.010	
Chromium (Total) <sup>1</sup>	µg/L	0.10	<0.5	<0.5	<0.5	<0.10	<0.5	<0.10	<0.5	< 0.1	<0.10	<0.5	<0.10	
Cobalt	µg/L	0.10	<0.5	<0.5	<0.5	<0.10	<0.5	<0.10	<0.5	< 0.1	<0.10	0.66	<0.10	
Copper	µg/L	0.20	<1	<1	<1	<0.2	<1	0.27	<1	1.17	0.68	<1	0.21	
Iron <sup>2</sup>	µg/L	10	<30	<30	<30	61	<30	<10	<30	13	11	<30	<10	
Lead	µg/L	0.050	<1	<1	<1	<0.050	<1	<0.050	<1	< 0.05	0.119	<1	<0.050	
Lithium	µg/L	1.0	<50	<50	<50	8.4	<50	<1.0	<50	9.6	8.5	<50	<1.0	
Magnesium	µg/L	5.0	2600	9120	9150	9490	980	520	10600	11000	9620	3000	1190	
Manganese <sup>2</sup>	µg/L	0.10	58	58	59	93.6	<10	0.5	80	146	117	439	44.3	
Mercury	µg/L	0.0050	<0.2	<0.2	<0.2	<0.0050	<0.2	<0.0050	<0.2	< 0.005	<0.0050	<0.2	<0.0050	
Molybdenum <sup>3</sup>	µg/L	0.050	22.8	5.2	5.1	3.03	1.4	0.069	9.8	9.66	9.34	<1	0.168	
Nickel	µg/L	0.50	<5	<5	<5	<0.50	<5	<0.50	<5	< 0.5	<0.50	<5	<0.50	
Phosphorus	µg/L	50	na	na	na	<50	na	<50	na	< 50	<50	na	<50	
Potassium	µg/L	50	15800	3500	3500	2610	<2000	181	4100	3200	3040	<2000	601	
Rubidium	µg/L	0.20	na	na	na	3.41	na	0.35	na	0.42	0.4	na	0.68	
Selenium	µg/L	0.050	1.3	<1	<1	<0.050	<1	0.285	<1	0.299	<0.050	<1	0.195	
Silicon	µg/L	50	na	na	na	7460	na	1930	na	3620	3140	na	3800	
Silver	µg/L	0.010	<0.05	<0.05	<0.05	<0.010	<0.05	<0.010	<0.05	< 0.01	<0.010	<0.05	<0.010	
Sodium	mg/L	50	42.2	18.8	18.9	12.2	<2	0.492	17.2	16.1	15.6	5.4	1.3	
Strontium	µg/L	0.20	na	na	na	511	na	20.9	na	494	459	na	56.1	
Sulfur	mg/L	0.5	na	na	na	8.49	na	<0.5	na	17.1	15.7	na	1.42	
Tellurium	µg/L	0.20	na	na	na	<0.20	na	<0.20	na	< 0.2	<0.20	na	<0.20	
Thallium	µg/L	0.010	<0.2	<0.2	<0.2	<0.010	<0.2	<0.010	<0.2	< 0.01	<0.010	<0.2	<0.010	
Thorium	µg/L	0.10	na	na	na	<0.10	na	<0.10	na	< 0.1	<0.10	na	<0.10	
Tin	µg/L	0.10	na	na	na	<0.10	na	<0.10	na	< 0.1	0.15	na	<0.10	
Titanium	µg/L	0.30	<50	<50	<50	<0.30	<50	<0.30	<50	< 0.3	<0.30	<50	<0.30	
Tungsten	µg/L	0.10	na	na	na	<0.10	na	<0.10	na	< 0.1	<0.10	na	<0.10	
Uranium	µg/L	0.010	0.75	0.78	0.79	0.06	<0.2	<0.010	0.52	0.423	0.398	<0.2	0.014	
Vanadium	µg/L	0.50	<30	<30	<30	<0.50	<30	<0.50	<30	< 0.5	<0.50	<30	<0.50	
Zinc	µg/L	1.0	<5	<5	<5	<1.0	<5	7	<5	2.80	3.6	<5	2.5	
Zirconium	µg/L	0.060	na	na	na	<0.20	na	<0.20	na	< 0.2	<0.20	na	<0.20	

**Notes:**

- MDL = Method detection limit
- na = not analyzed
- ns = no applicable standard
- mg/L = milligram per litre
- µg/L = micrograms per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit

**Table 12: Groundwater Analytical Results – Dissolved Metals**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

Parameters	APEC/Issue		QA/QC									
	Sample Station											
	Sample ID		-	MW17-4B DUP A	MW17-4B "DUP 1"	MW17-55B	MW17-7C DUP of MW17-7B	MW17-8B "DUP C"	MW17-98FD	MW17-18B DUP D	MW17-22B DUP A	DUP MW17-25A (MW17-75A )
	Sample Collection Date		-	19-Jul-17	23-Oct-17	17-Jul-19	5-Sep-19	24-Jul-17	2-Jul-18	24-Jul-17	23-Jul-17	25-Aug-2020
Units	MDL	Lab ID #	-	L1962977-8	L2014860-4	L2317077-7	L2345260-3	L1966041-18	L2123781-10	L1966041-28	L1966041-8	VA20B3887-009
Parameters	Units	MDL	Allowable RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)
<b>Field Screening</b>												
pH	unitless	0.1	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Conductivity	µs/cm	1	-	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Physiochemical Parameters</b>												
pH	unitless	0.1	-	0.00	0.00	1.89	11.63	0.00	0.00	0.00	32.06	0.37
Conductivity	µs/cm	1	-	1.07	1.07	0.93	2.91	0.61	1.19	0.66	2.25	0.86
Hardness (as CaCO3)	mg/L	500	-	-	-	-	-	-	-	-	-	-
<b>Metals (General)</b>												
Aluminum	µg/L	1.0	20	0.00	0.00	-	-	0.00	-	0.00	0.00	-
Antimony	µg/L	0.10	20	-	-	-	-	-	-	-	-	0.85
Arsenic	µg/L	0.10	20	0.00	0.00	6.62	-	0.00	-	0.00	0.00	3.92
Barium	µg/L	0.10	20	0.43	0.43	2.97	58.74	2.30	1.17	0.00	0.00	3.57
Beryllium	µg/L	0.10	20	0.00	0.00	-	-	0.00	-	0.00	0.00	-
Bismuth	µg/L	0.050	20	-	-	-	-	-	-	-	-	-
Boron	µg/L	10	20	0.00	0.00	-	-	0.00	0.55	0.00	0.00	-
Cadmium	µg/L	0.0050	20	0.00	0.00	3.41	57.91	7.26	3.74	5.83	0.00	2.68
Calcium	mg/L	50	20	-	-	-	-	-	-	-	-	-
Cesium	µg/L	0.010	20	-	-	-	-	-	-	-	-	-
Chromium (Total) <sup>1</sup>	µg/L	0.10	20	-	-	-	-	-	-	-	-	-
Cobalt	µg/L	0.10	20	7.77	7.77	2.72	-	-	2.29	-	-	-
Copper	µg/L	0.20	20	-	-	-	-	-	-	-	-	-
Iron <sup>2</sup>	µg/L	10	20	0.32	0.32	15.73	-	-	1.28	-	-	-
Lead	µg/L	0.050	20	0.00	0.00	-	-	0.00	-	0.00	0.00	-
Lithium	µg/L	1.0	20	0.00	0.00	-	-	0.00	-	0.00	0.00	-
Magnesium	µg/L	5.0	20	0.30	0.30	3.98	58.62	1.88	1.81	0.81	1.36	2.56
Manganese <sup>2</sup>	µg/L	0.10	20	1.40	1.40	7.02	63.23	0.00	1.89	1.80	0.00	3.66
Mercury	µg/L	0.0050	20	0.00	0.00	-	-	0.00	-	0.00	0.00	-
Molybdenum <sup>3</sup>	µg/L	0.050	20	0.00	0.00	6.06	-	0.00	3.40	0.00	0.00	4.24
Nickel	µg/L	0.50	20	0.00	0.00	-	-	0.00	1.03	0.00	0.00	-
Phosphorus	µg/L	50	20	-	-	-	-	-	-	-	-	-
Potassium	µg/L	50	20	2.25	2.25	8.94	59.04	9.52	2.18	4.65	0.00	5.97
Rubidium	µg/L	0.20	20	-	-	5.00	54.13	-	1.93	-	-	2.06
Selenium	µg/L	0.050	20	0.00	0.00	-	-	0.00	-	0.00	0.00	-
Silicon	µg/L	50	20	-	-	1.03	55.29	-	0.78	-	-	3.58
Silver	µg/L	0.010	20	-	-	-	-	-	-	-	-	-
Sodium	mg/L	50	20	-	-	-	-	-	-	-	-	-
Strontium	µg/L	0.20	20	-	-	2.82	51.45	-	0.00	-	-	0.41
Sulfur	mg/L	0.5	20	-	-	0.41	62.55	-	0.71	-	-	2.11
Tellurium	µg/L	0.20	20	-	-	-	-	-	-	-	-	-
Thallium	µg/L	0.010	20	0.00	0.00	-	-	0.00	-	0.00	0.00	-
Thorium	µg/L	0.10	20	-	-	-	-	-	-	-	-	-
Tin	µg/L	0.10	20	-	-	-	-	-	-	-	-	-
Titanium	µg/L	0.30	20	0.00	0.00	-	-	0.00	-	0.00	0.00	-
Tungsten	µg/L	0.10	20	-	-	-	-	-	-	-	-	-
Uranium	µg/L	0.010	20	5.26	5.26	12.59	-	0.00	0.00	0.00	0.00	2.13
Vanadium	µg/L	0.50	20	0.00	0.00	-	-	0.00	-	0.00	0.00	-
Zinc	µg/L	1.0	20	-	-	4.48	-	60.76	4.40	-	-	-
Zirconium	µg/L	0.060	20	-	-	0.00	-	-	-	-	-	-

**Notes:**

- MDL = Method detection limit
- na = not analyzed
- ns = no applicable standard
- mg/L = milligram per litre
- µg/L = micrograms per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit

**QA/QC**

- = not calculated
- RPD = Representative percent difference
- 1 = calculated RPD exceeds allowable RPD



**Table 13: Groundwater Analytical Results – Anions and Nutrients**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

APEC/Issue			APEC 1: Mill / 10 Level Portal																		
			Sample Station		MW17-1		MW17-2		MW17-3	MW17-4						MW17-5					
Sample ID			MW17-1A	MW17-1B	MW17-2A	MW17-2B	MW17-3	MW17-4A	MW17-4A	MW17-4A	MW17-4B	MW17-4B DUP A	MW17-4B	MW17-4B "DUP1"	MW17-4B	MW17-4B	MW17-4B	BH17-04B	MW17-5A	MW17-5B	MW17-5B
Sample Collection Date			19-Jul-17	19-Jul-17	19-Jul-17	19-Jul-17	19-Jul-17	19-Jul-17	2-Jul-18	5-Sep-19	19-Jul-17	19-Jul-17	23-Oct-17	23-Oct-17	2-Jul-18	17-Jul-19	05-Sep-19	23-Aug-2020	19-Jul-17	19-Jul-17	17-Jul-19
Lab ID #			L1962977-1	L1962977-2	L1962977-3	L1962977-4	L1962977-5	L1962977-6	L2123781-8	L2345256-2	L1962977-7	L1962977-8	L2014860-1	L2014860-4	L2123781-7	L2317077-3	L2345256-1	A20B3890-00	L1962977-9	L1962977-10	L2317077-1
Parameters	Units	MDL																			
<b>Field Screening</b>																					
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Conductivity	µs/cm	1	455	285	209	487	329	287	147.1	152	366	366	408	408	288	781	450	317.1	456	1307	785
<b>Physiochemical Parameters</b>																					
pH	ns	0.10	8.04	7.76	8.07	8.12	8.11	7.95	8.18	8.06	7.10	7.10	7.94	7.91	8.06	8.20	7.72	7.49	7.78	6.60	8.02
Conductivity	µs/cm	1.0	469.00	255.00	215.00	500.00	338.00	276.00	251.00	249.00	377.00	373.00	404.00	399.00	457.00	760.00	661.00	438	477.00	1340.00	750.00
Hardness (CaCO3)	mg/L	0.50	165	113	97	258	172	130	117	112	197	198	133	184	225	394	333	204	203	760	365
TSS	µg/L	3000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
TDS	µg/L	13000	n/a	n/a	n/a	n/a	n/a	na	174000.00	n/a	na	na	264000.00	252000.00	319000.00	n/a	n/a	250000.00	n/a	n/a	n/a
<b>Alkalinity Anions &amp; Nutrients</b>																					
Acidity (as CaCO3)	µg/L	1000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3900	n/a	n/a	n/a
Alkalinity, Bicarbonate (as CaCO3)	µg/L	1000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	248000	n/a	112000	n/a	n/a	130000
Alkalinity, Carbonate (as CaCO3)	µg/L	1000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	<1000	n/a	<1000	n/a	n/a	<1000
Alkalinity, Hydroxide (as CaCO3)	µg/L	1000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	<1000	n/a	<1000	n/a	n/a	<1000
Alkalinity, Total (as CaCO3)	µg/L	1000	74200	35600	60800	108000	95800	75400	83600	113000	196000	197000	172000	165000	194000	248000	293000	112000	73600	170000	130000
Bromide	µg/L	50	74	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	n/a	<50	<250	<250
Chloride	mg/L	0.50	7.98	n/a	0.88	0.73	n/a	1.31	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.5	<0.50	1.35	<0.5	<2.50
Fluoride	µg/L	20.00	245	32	108	172	82	91	105	132	34	33	49	46	35	53	68	74	125	<100	110
Nitrate as N	mg/L	0.0050	0.0273	0.134	na	0.0129	na	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0226	<0.0050	0.0267	0.01	<0.005	<0.005	<0.025
Nitrite as N	µg/L	1.0	8.8	<1.0	<1.0	4.3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	5.1	<1.0	3.6	1.2	<1	<5	<5.0
Sulfate	mg/L	0.30	137	82.4	42.2	148	75.5	59.5	45.8	24.3	4.11	4.03	42.1	41.1	60.7	165	119	114	154	625	280

**Notes:**

- MDL = Method detection limit
- nm = not measured
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- mg/L = milligram per litre
- µs/cm = microsiemens per centimeter
- na = not analyzed



**Table 13: Groundwater Analytical Results – Anions and Nutrients**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

Parameters	Units	MDL	APEC 1: Mill / 10 Level Portal														APEC 10: Burial Site 1									
			MW17-5			MW17-6			MW17-7			MW17-8			MW17-9											
			Sample Station	Sample ID	Sample Collection Date	Sample Station	Sample ID	Sample Collection Date	Sample Station	Sample ID	Sample Collection Date	Sample Station	Sample ID	Sample Collection Date	Sample Station	Sample ID	Sample Collection Date	Sample Station	Sample ID	Sample Collection Date	Sample Station	Sample ID	Sample Collection Date	Sample Station	Sample ID	Sample Collection Date
			Lab ID #	Lab ID #	Lab ID #	Lab ID #	Lab ID #	Lab ID #	Lab ID #	Lab ID #	Lab ID #	Lab ID #	Lab ID #	Lab ID #	Lab ID #	Lab ID #	Lab ID #	Lab ID #	Lab ID #	Lab ID #	Lab ID #	Lab ID #	Lab ID #	Lab ID #	Lab ID #	Lab ID #
<b>Field Screening</b>																										
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm		
Conductivity	µs/cm	1	785	610	441.8	497	1189	845	578	320.5	267	160	545	207	345	345	755	515	383	461	344	123	473			
<b>Physiochemical Parameters</b>																										
pH	ns	0.10	7.87	8.09	7.52	8.11	7.28	8.21	8.17	8.62	7.91	8.13	7.03	8.30	6.56	6.56	7.68	7.60	8.25	8.50	8.41	8.03	6.36			
Conductivity	µs/cm	1.0	757.00	895.00	746	532.00	1230.00	825.00	863.00	292	275.00	264.00	562.00	313.00	329.00	327.00	754.00	442.00	351.00	590.00	533.00	386.00	469.00			
Hardness (CaCO3)	mg/L	0.50	357	441	283	236	717	436	441	163	137	122	303	112	174	175	87	197	51	117	200	160	225			
TSS	µg/L	3000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a			
TDS	µg/L	13000	n/a	n/a	500000.00	n/a	n/a	n/a	n/a	215000.00	n/a	n/a	n/a	n/a	n/a	n/a	na	316000.00	232000.00	n/a	n/a	269000.00	na			
<b>Alkalinity Anions &amp; Nutrients</b>																										
Acidity (as CaCO3)	µg/L	1000	n/a	n/a	5100	n/a	n/a	n/a	n/a	<2000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3300	n/a			
Alkalinity, Bicarbonate (as CaCO3)	µg/L	1000	129000	n/a	121000	n/a	n/a	111000	n/a	22600	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	260000	n/a	167000	n/a			
Alkalinity, Carbonate (as CaCO3)	µg/L	1000	<1000	n/a	<1000	n/a	n/a	<1000	n/a	5600	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	8800	n/a	<1000	n/a			
Alkalinity, Hydroxide (as CaCO3)	µg/L	1000	<1000	n/a	<1000	n/a	n/a	<1000	n/a	<1000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	<1000	n/a	<1000	n/a			
Alkalinity, Total (as CaCO3)	µg/L	1000	129000	142000	121000	71100	158000	111000	114000	22600	78200	88100	122000	139000	37200	37000	336000	105000	137000	269000	225000	167000	93800			
Bromide	µg/L	50	<50	<250	n/a	<50	<250	<250	<250	n/a	<50	<50	<50	<50	<50	<50	400	<50	150	155	<50	<50	<50			
Chloride	mg/L	0.50	0.54	<2.50	<2.50	1.02	<0.5	<2.50	<2.50	<0.50	<0.5	<0.50	<0.5	3.39	<0.5	<0.5	15.3	<0.50	6.95	12.6	2.99	1.89	0.82			
Fluoride	µg/L	20.00	108	<100	126	131	<100	<100	110	82	62	65	33	288	26	25	320	35	146	537	253	178	38			
Nitrate as N	mg/L	0.0050	<0.0050	<0.025	<0.0250	<0.005	<0.005	<0.025	<0.025	0.0056	<0.005	<0.005	<0.005	<0.005	0.1	0.0986	<0.0250	0.007	0.0221	7.2	<0.005	0.0086	<0.0050			
Nitrite as N	µg/L	1.0	<1.0	<5.0	<5	<1	<5	167	6.3	3.8	<1	<1.0	<1	<1	<1	<1	<5.0	2	2	4.5	<1.0	1.1	<1.0			
Sulfate	mg/L	0.30	272	361	278	184	580	347	363	104	58	56.4	167	82.4	128	128	170	125	42.4	48.2	69.5	49.3	146			

**Notes:**

- MDL = Method detection limit
- nm = not measured
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- mg/L = milligram per litre
- µs/cm = microsiemens per centimeter
- na = not analyzed

**Table 13: Groundwater Analytical Results – Anions and Nutrients**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

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Parameters	Units	MDL	APEC 10: Burial Site 1					APEC 6: Septic Field			Stonehouse Creek Drainage Downstream						APEC 12: Burial Site 2									
			MW17-9					MW17-10			MW17-11						MW17-14									
			Sample Station	Sample ID	Sample Collection Date	Lab ID #																				
Field Screening																										
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm		
Conductivity	µs/cm	1	250.8	250.8	579	457	175.6	362	349	376	240	147	181	194	206	159.5	155	264	184.4	343	356	235.7	192	108.6		
Physiochemical Parameters																										
pH	ns	0.10	7.63	7.63	7.08	7.86	7.11	7.73	6.27	7.75	7.97	8.29	7.62	8.22	8.21	7.67	8.17	8.02	8.30	8.07	8.29	7.81	7.43	8.21		
Conductivity	µs/cm	1.0	418.00	423.00	533.00	487.00	388	355.00	336.00	377.00	239.00	247.00	250.00	205.00	206.00	223.00	219.00	259.00	337.00	338.00	355.00	339	190.00	182.00		
Hardness (CaCO3)	mg/L	0.50	196	195	250	220	187	172	175	159	102	104	103	92	88	95	74	102	121	125	115	117	107	98		
TSS	µg/L	3000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a		
TDS	µg/L	13000	281000.00	281000.00	391000.00	n/a	274000.00	n/a	n/a	n/a	n/a	n/a	146000.00	n/a	n/a	138000.00	n/a	na	254000.00	225000.00	n/a	350000.00	na	114000.00		
Alkalinity Anions & Nutrients																										
Acidity (as CaCO3)	µg/L	1000	n/a	n/a	n/a	n/a	5000	n/a	n/a	n/a	n/a	n/a	<2000	n/a	n/a	<2000	n/a	n/a	n/a	n/a	n/a	2600	n/a	n/a		
Alkalinity, Bicarbonate (as CaCO3)	µg/L	1000	n/a	n/a	n/a	87600	69800	n/a	n/a	na	na	n/a	111000	93300	n/a	100000	n/a	n/a	n/a	n/a	na	146000	n/a	n/a		
Alkalinity, Carbonate (as CaCO3)	µg/L	1000	n/a	n/a	n/a	<1000	<1000	n/a	n/a	na	na	n/a	<1000	<1000	n/a	<1000	n/a	n/a	n/a	n/a	na	<1000	n/a	n/a		
Alkalinity, Hydroxide (as CaCO3)	µg/L	1000	n/a	n/a	n/a	<1000	<1000	n/a	n/a	na	na	n/a	<1000	<1000	n/a	<1000	n/a	n/a	n/a	na	<1000	n/a	n/a			
Alkalinity, Total (as CaCO3)	µg/L	1000	90900	90400	83700	87600	69800	111000	43400	130000	108000	112000	111000	93300	91000	100000	95600	88000	171000	150000	183000	146000	87600	86100		
Bromide	µg/L	50	<50	<50	<50	<50	n/a	<50	<50	<50	<50	<50	n/a	<50	<50	n/a	<50	<50	91	<50	<50	<50	<50	<50		
Chloride	mg/L	0.50	<0.50	<0.50	0.91	0.63	<0.50	2.14	<0.5	2.4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3.19	6.68	3.22	5.56	3.92	<0.50	<0.50		
Fluoride	µg/L	20.00	29	31	31	47	43	184	<20	189	322	329	332	178	160	161	345	249	438	301	527	284	<20	<20		
Nitrate as N	mg/L	0.0050	<0.0050	<0.0050	0.0071	0.102	0.0196	<0.005	0.221	<0.0050	0.0098	<0.005	<5.0	<0.0050	<0.005	<5.0	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	0.0142	0.0153	0.0131		
Nitrite as N	µg/L	1.0	1.2	1.3	1.2	4.9	1.6	<1	<1	<1.0	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.2	<1.0	<1.0		
Sulfate	mg/L	0.30	123	124	201	154	123	73.7	121	68	19.5	22.4	22.3	11.1	15.3	16.2	22.5	39.7	3	14.8	1.21	11.2	12	12.4		

**Notes:**

- MDL = Method detection limit
- nm = not measured
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- mg/L = milligram per litre
- µs/cm = microsiemens per centimeter
- na = not analyzed



**Table 13: Groundwater Analytical Results – Anions and Nutrients**

Johnny Mountain Mine Reclamation Project

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Parameters	Units	MDL	APEC 12: Burial Site 2		Sky Creek Drainage Downstream						Johnny Creek Drainage Upstream						AEC 2: Tank Farm / Fuel Lines								
			Sample Station		MW17-24						MW17-26						MW17-13			MW17-16	MW17-12		MW17-17		
			Sample ID	Sample ID	MW17-24A	MW17-24A	MW17-24A	MW17-24B	MW17-24B	MW17-26A	MW17-26A	MW17-26A	MW17-26B	MW17-26B	MW17-13	MW17-13	MW17-13	MW17-16	MW17-12A	MW17-12B	MW17-17A	MW17-17A	MW17-17B	MW17-17B	
			Sample Collection Date	Sample Collection Date	25-Nov-18	5-Sep-19	15-Jul-19	04-Sep-19	24-Aug-20	04-Sep-19	24-Aug-20	15-Jul-19	05-Sep-19	25-Aug-2020	05-Sep-19	25-Aug-2020	20-Jul-17	24-Oct-17	2-Jul-18	20-Jul-17	20-Jul-17	20-Jul-17	1-Jul-18	20-Jul-17	1-Jul-18
Lab ID #	Lab ID #	L2203208-1	L2345260-8	L2313900-3	L2345256-4	A20B3891-00	L2345256-9	A20B3891-00	L2313900-4	L2345260-6	A20B3887-00	L2345260-7	A20B3887-00	L1962977-17	L2014860-2	L2123781-9	L1962977-20	L1962977-15	L1962977-16	L1962977-21	L2123781-1	L1962977-22	L2123781-2		
Field Screening																									
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	
Conductivity	µs/cm	1	177	120	308	175	228	22	18.5	285	179	190.5	196	200.5	275	305	179.4	170	302	276	379	139.2	194	115.8	
Physiochemical Parameters																									
pH	ns	0.10	8.07	8.12	8.09	8.32	7.79	7.42	6.41	8.07	8.23	8.1	8.29	8.08	7.09	8.14	8.22	7.46	8.73	7.69	8.90	8.23	7.55	8.17	
Conductivity	µs/cm	1.0	184.00	165.00	305.00	292.00	313	34.20	26.3	279.00	288.00	255	305.00	274	281.00	303.00	292.00	176.00	322.00	279.00	387.00	238.00	201.00	199.00	
Hardness (CaCO3)	mg/L	0.50	95	75	128	122	133	15	10.9	133	148	130	129	134	148	133	145	95	34	146	39	97	106	102	
TSS	µg/L	3000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
TDS	µg/L	13000	105000.00	n/a	n/a	n/a	172000.00	n/a	18000.00	n/a	n/a	192000.00	n/a	224000.00	na	200000.00	198000.00	n/a	n/a	n/a	na	177000.00	na	120000.00	
Alkalinity Anions & Nutrients																									
Acidity (as CaCO3)	µg/L	1000	n/a	n/a	n/a	n/a	<2000	n/a	2700	n/a	n/a	<2000	n/a	<2000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
Alkalinity, Bicarbonate (as CaCO3)	µg/L	1000	n/a	n/a	na	n/a	176000	n/a	12200	na	n/a	111000	n/a	115000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
Alkalinity, Carbonate (as CaCO3)	µg/L	1000	n/a	n/a	na	n/a	<1000	n/a	<1000	na	n/a	<1000	n/a	<1000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
Alkalinity, Hydroxide (as CaCO3)	µg/L	1000	n/a	n/a	na	n/a	<1000	n/a	<1000	na	n/a	<1000	n/a	<1000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
Alkalinity, Total (as CaCO3)	µg/L	1000	74800	71100	146000	151000	176000	15200	12200	118000	121000	111000	124000	115000	112000	128000	128000	81200	112000	96500	108000	81800	81900	86000	
Bromide	µg/L	50	<50	<50	<50	<50	n/a	<50	n/a	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	64	<50	<50	<50	
Chloride	mg/L	0.50	<0.50	<0.5	<0.50	<0.5	<0.50	<0.50	<0.50	<0.50	<0.5	<0.50	<0.5	<0.50	<0.50	<0.50	<0.50	<0.5	3.4	<0.5	6.74	134	<0.50	<0.50	
Fluoride	µg/L	20.00	<20	25	459	462	466	30	27	<20	<20	<20	<20	26	<20	<20	<20	<20	572	<20	430	69	<20	<20	
Nitrate as N	mg/L	0.0050	0.0624	0.0097	<0.0050	<0.005	<0.0050	<0.005	0.0066	0.05	<0.0428	0.0239	<0.0137	0.0187	<0.0050	<0.0050	<0.0050	0.0087	<0.005	0.0108	<0.005	<5.0	0.0194	0.017	
Nitrite as N	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1	<1.0	<1	<1.0	<1.0	1.2	<1.0	1.2	<1.0	<1.0	<1.0	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	
Sulfate	mg/L	0.30	15.9	14.8	21.5	23.8	24.4	1.67	1.11	33.1	37.6	24.3	42.5	31.8	34.9	32.7	33.3	10.5	56	48.1	75.3	39	19.8	19.3	

**Notes:**

- MDL = Method detection limit
- nm = not measured
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- mg/L = milligram per litre
- µs/cm = microsiemens per centimeter
- na = not analyzed



**Table 13: Groundwater Analytical Results – Anions and Nutrients**

Johnny Mountain Mine Reclamation Project

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APEC/Issue			Tailings Impoundment Downstream														AEC 5: Main Landfill								
			MW17-18			MW17-19		MW17-20				MW17-23			MW17-25				MW17-22						
Sample Station	Sample ID	Sample Collection Date	MW17-18A	MW17-18B	MW17-18B DUP D	MW17-19A	MW17-19B	MW17-20A	MW17-20A	MW17-20B	MW17-20B	MW17-23A	MW17-23A	MW17-23B	MW17-25A	MW17-25A	DUP MW17-25A (MW17-25A)	MW17-25B	MW17-22A	MW17-22A	MW17-22A	MW17-22A			
Lab ID #			L1966041-26	L1966041-27	L1966041-28	L1966041-1	L1966041-2	L1966041-3	L2014861-1	L1966041-4	L2014861-2	L1966041-12	L2014861-3	L1966041-13	L1966041-14	A20B3887-00	A20B3887-00	L1966041-15	L1966936-2	L2014860-3	L2127140-1	L2162703-1			
Parameters	Units	MDL																							
<b>Field Screening</b>																									
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm		
Conductivity	µs/cm	1	462	151	151	587	153	273	278	78	58.2	257	213	157	348	258.9	258.9	137	210	322	198.6	320.8			
<b>Physiochemical Parameters</b>																									
pH	ns	0.10	7.91	6.74	6.74	7.85	8.09	7.81	7.95	6.73	7.33	8.73	8.11	7.58	7.92	8.05	8.08	7.02	7.89	8.30	8.23	8.20			
Conductivity	µs/cm	1.0	449.00	151.00	150.00	570.00	133.00	272.00	278.00	66.70	58.20	340.00	213.00	148.00	342.00	352	349	130.00	343.00	353.00	367.00	357.00			
Hardness (CaCO3)	mg/L	0.50	147	72	73	180	60	111	101	31	23	37	71	64	147	151	151	64	132	114	146	131			
TSS	µg/L	3000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a			
TDS	µg/L	13000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	261000.00	256000.00	n/a	na	220000.00	233000.00	211000.00			
<b>Alkalinity Anions &amp; Nutrients</b>																									
Acidity (as CaCO3)	µg/L	1000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a			
Alkalinity, Bicarbonate (as CaCO3)	µg/L	1000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	156000	156000	n/a	n/a	n/a	n/a	n/a			
Alkalinity, Carbonate (as CaCO3)	µg/L	1000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	<1000	<1000	n/a	n/a	n/a	n/a	n/a			
Alkalinity, Hydroxide (as CaCO3)	µg/L	1000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	<1000	<1000	n/a	n/a	n/a	n/a	n/a			
Alkalinity, Total (as CaCO3)	µg/L	1000	134000	51800	51600	97600	56400	88900	109000	29400	26500	138000	79800	69500	141000	156000	156000	51200	113000	122000	181000	165000			
Bromide	µg/L	50	110	<50	<50	140	<50	<100	<50	<50	<50	<100	67	<50	<50	<50	<50	<50	<50	<50	<50	<50			
Chloride	mg/L	0.50	5.63	<0.5	<0.5	10.6	<0.5	5.65	5.1	<0.5	<0.5	3.15	1.64	<0.5	1.55	<0.50	<0.5	<0.5	3.66	2.3	0.8	<0.50			
Fluoride	µg/L	20.00	514	26	28	442	142	360	326	51	58	228	118	79	306	343	354	23	477	548	463	478			
Nitrate as N	mg/L	0.0050	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0135	0.0354	0.0104	0.0135	0.0098	<0.005	<0.005	<0.005.0	<0.0050			
Nitrite as N	µg/L	1.0	<1	<1	<1	1.5	<1	<1	<1	<1	<1	<1	<1	2	1.4	1.2	1.7	<1	<1.0	<1.0	<1.0	<1.0			
Sulfate	mg/L	0.30	93.5	23.7	23.1	180	12.3	44.5	45.4	5.4	5.1	35.1	26.7	7.16	44.9	39.5	39.6	15.4	60.5	54.3	16.3	27.1			

**Notes:**

- MDL = Method detection limit
- nm = not measured
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- mg/L = milligram per litre
- µs/cm = microsiemens per centimeter
- na = not analyzed

**Table 13: Groundwater Analytical Results – Anions and Nutrients**

Johnny Mountain Mine Reclamation Project

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Parameters	Units	MDL	AEC 5: Main Landfill										APEC 11: Airstrip					Additional Borrow Investigation						
			MW17-22										MW17-27					MW17-21A						
			Sample Station	Sample ID	Sample Collection Date	Lab ID #	MW17-22A	MW17-22A	MW17-22A	MW17-22B	MW17-22B	MW17-22B	MW17-22B	MW17-22B	MW17-22C DUP of	MW17-22B	MW17-27A	MW17-27A	MW17-27A	MW17-27B	MW17-27B	MW17-21A	MW17-21A	MW17-21B
			MW17-22A	MW17-22A	28-Aug-2020	A20B4087-00	17-Jul-19	04-Sep-19	28-Aug-2020	23-Jul-17	23-Jul-17	9-Jul-18	10-Sep-18	17-Jul-19	4-Sep-19	04-Sep-19	28-Aug-2020	24-Jul-17	16-Jul-19	28-Aug-2020	24-Jul-17	16-Jul-19	Sept 5 2019	25-Aug-2020
				L2312976-1	L2345256-5	A20B4087-00	L1966041-7	L1966041-8	L2127140-2	L2162703-2	L2312976-2	L2345256-7	L2345256-8	VA20B4087-002	L1966041-29	L2313901-3	A20B4083-00	L1966041-30	L2313901-2	L2345256-3	A20B3887-00	VA20B3887-008		
<b>Field Screening</b>																								
Sample Headspace Vapour Concentration	ppmv	5.00			nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	
Conductivity	µs/cm	1			238.7	63	63	42.3	77	nm	nm	42	30.3	383	288	270.2	383	429	173	194.3	46.6			
<b>Physiochemical Parameters</b>																								
pH	ns	0.10	n/a	n/a	8.06	5.71	5.71	7.20	7.16	n/a	n/a	7.42	6.86	7.92	8.26	7.88	8.10	8.13	8.21	8.11	7.14			
Conductivity	µs/cm	1.0	n/a	n/a	350	58.50	57.20	71.70	78.80	n/a	n/a	58.20	44.9	382.00	290.00	386	435.00	491.00	282.00	256	109			
Hardness (CaCO3)	mg/L	0.50	n/a	n/a	147	29	32	35	35	n/a	n/a	27	24	191	125	204	195	217	1040	97.1	32.6			
TSS	µg/L	3000	n/a	<3000	<3000	n/a	n/a	n/a	n/a	n/a	<3000	n/a	<3000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
TDS	µg/L	13000	n/a	n/a	213000.00	na	na	46000.00	49000.00	n/a	n/a	30000.00	n/a	n/a	n/a	255000.00	n/a	n/a	n/a	180000.00	88000.00			
<b>Alkalinity Anions &amp; Nutrients</b>																								
Acidity (as CaCO3)	µg/L	1000	n/a	<1000	<2000	n/a	n/a	n/a	n/a	n/a	1800	n/a	3400	n/a	n/a	2200	n/a	n/a	n/a	<2000	4500			
Alkalinity, Bicarbonate (as CaCO3)	µg/L	1000	142000	n/a	136000	n/a	n/a	n/a	n/a	30100	n/a	n/a	18800	n/a	na	134000	n/a	na	n/a	87600	48600			
Alkalinity, Carbonate (as CaCO3)	µg/L	1000	3800	n/a	<1000	n/a	n/a	n/a	n/a	<1000	n/a	n/a	<1000	n/a	na	<1000	n/a	na	n/a	<1000	<1000			
Alkalinity, Hydroxide (as CaCO3)	µg/L	1000	<1000	n/a	<1000	n/a	n/a	n/a	n/a	<1000	n/a	n/a	<1000	n/a	na	n/a	na	n/a	n/a	<1000	<1000			
Alkalinity, Total (as CaCO3)	µg/L	1000	146000	n/a	136000	28100	27700	33900	37100	30100	n/a	27900	18800	137000	109000	134000	625000	199000	93900	87600	48600			
Bromide	µg/L	50	<50	n/a	nm	<50	<50	<50	<50	<50	n/a	<50	nm	<50	<50	n/a	<50	<50	<50	<50	<50	<50	<50	
Chloride	mg/L	0.50	<0.50	n/a	<500	<0.50	<0.50	3.91	<0.50	<0.50	n/a	<0.50	<500	0.82	<0.50	<0.50	<0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
Fluoride	µg/L	20.00	553	n/a	584	21	21	629	<20	21	n/a	25	<20	89	66	52	162	68	652	571	432			
Nitrate as N	mg/L	0.0050	<5.0	n/a	<0.005	<0.005	<0.005	4.71	<0.0050	5.4	n/a	0.0329	0.0342	<0.005	0.0142	<0.0050	<0.005	<0.0050	<0.005	0.0244	0.0126			
Nitrite as N	µg/L	1.0	<1.0	n/a	<1	<1.0	<1.0	7.8	<1.0	1.9	n/a	<1.0	<1	<1	<1.0	<1	<1	<1.0	<1.0	<1	1.3			
Sulfate	mg/L	0.30	38	n/a	44	3.02	2.96	741	3.39	3.1	n/a	2.92	1.93	78.6	46.7	67.4	86.4	99.1	50.2	41.5	31.8			

- Notes:**
- MDL = Method detection limit
  - nm = not measured
  - ns = no applicable standard
  - ppmv = parts per million by volume
  - µg/L = microgram per litre
  - mg/L = milligram per litre
  - µs/cm = microsiemens per centimeter
  - na = not analyzed

**Table 13: Groundwater Analytical Results – Anions and Nutrients**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

APEC/Issue			QA/QC									
Sample Station												
Sample ID			-	MW17-4B DUP A	MW17-4B "DUP1"	MW17-55B	MW17-8B "DUP C"	MW17-9BFD	MW17-18B DUP D	MW17-22B DUP A	MW17-12B-DUP (MW17-62B)	
Sample Collection Date			-	19-Jul-17	23-Oct-17	17-Jul-19	24-Jul-17	2-Jul-18	24-Jul-17	23-Jul-17	22-Oct-17	
Lab ID #			-	L1962977-8	L2014860-4	L2317077-7	L1966041-18	L2123781-10	L1966041-28	L1966041-8	L2014860-3	
Parameters	Units	MDL	Allowable RPD <sup>3</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	
<b>Field Screening</b>												
Sample Headspace Vapour Concentration	ppmv	5.00	-	-	-	-	-	-	-	-	-	
Conductivity	µs/cm	1	-	-	-	-	-	-	-	-	-	
<b>Physiochemical Parameters</b>												
pH	ns	0.10	-	0.00	0.38	-	0.00	0.00	0.00	0.00	0.37	
Conductivity	µs/cm	1.0	-	1.07	1.25	-	0.61	1.19	0.66	2.25	0.86	
Hardness (CaCO <sub>3</sub> )	mg/L	0.50	-	0.51	32.18	-	0.57	0.51	0.69	0.00	0.00	
TSS	µg/L	3000	-	-	-	-	-	-	-	-	-	
TDS	µg/L	13000	-	-	4.65	-	-	0.00	-	-	1.93	
<b>Alkalinity Anions &amp; Nutrients</b>												
Acidity (as CaCO <sub>3</sub> )	µg/L	1000	20	-	-	-	-	-	-	-	-	
Alkalinity, Bicarbonate (as CaCO <sub>3</sub> )	µg/L	1000	20	-	-	0.77	-	-	-	-	0.00	
Alkalinity, Carbonate (as CaCO <sub>3</sub> )	µg/L	1000	20	-	-	-	-	-	-	-	-	
Alkalinity, Hydroxide (as CaCO <sub>3</sub> )	µg/L	1000	20	-	-	-	-	-	-	-	-	
Alkalinity, Total (as CaCO <sub>3</sub> )	µg/L	1000	20	0.51	4.15	0.77	0.54	0.55	0.39	1.43	0.00	
Bromide	µg/L	50	20	-	-	-	-	-	-	-	-	
Chloride	mg/L	0.50	20	-	-	-	-	-	-	-	-	
Fluoride	µg/L	20.00	20	-	-	1.83	-	-	-	-	3.16	
Nitrate as N	mg/L	0.0050	20	-	-	-	1.41	-	-	-	-	
Nitrite as N	µg/L	1.0	20	-	-	-	-	-	-	-	-	
Sulfate	mg/L	0.30	20	1.97	2.40	2.90	0.00	0.81	2.56	2.01	0.25	

**Notes:**

- MDL = Method detection limit
- nm = not measured
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- mg/L = milligram per litre
- µs/cm = microsiemens per centimeter
- na = not analyzed

**QA/QC**

3. Allowable RPDs as identified in BC Environmental Laboratory Manual (February 2016), Section A, Table 2

4. RPDs calculated only where both values are greater than 5 times the method detection limit

- = not calculated
- RPD = Representative percent difference
- 1 = calculated RPD exceeds allowable RPD



**Table 14: Groundwater Analytical Results – Cyanide and Glycol**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

Parameters	Units	MDL	AEC 1: Mill / 10 Level Portal														AEC 5: Main Landfill					
			MW17-1		MW17-2		MW17-3	MW17-4			MW17-5		MW17-7	MW17-8		MW17-22						
Sample Station	Sample ID	Sample Collection Date	Lab ID #	MW17-1A	MW17-1B	MW17-2A	MW17-2B	MW17-3	MW17-4A	MW17-4B	MW17-4B "DUP 1"	MW17-4B	MW17-5A	MW17-5B	MW17-7A	MW17-8A	MW17-8B	MW17-8B "DUP C"	MW17-22A	MW17-22A	MW17-22A	
Field Screening																						
Sample Headspace Vapour Concentration	ppmv	5.00		nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Conductivity	µs/cm	1		455	285	209	487	329	147.1	408	408	288	456	1307	267	207	345	345	210	322	198.6	
Cyanide and Glycols																						
Cyanide, Total	µg/L	5.0		23.3	25.5	<5.0	5.2	<5.0	<5.0	11.1	11.7	11.2	<5	<5	<5	<5	<5	<5	<5.0	<1.0	<5.0	

**Notes:**

- MDL = Method detection limit
- na = not analyzed
- nm = not measured
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- mg/L = milligram per litre
- µs/cm = microsiemens per centimeter
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit



**Table 14: Groundwater Analytical Results – Cyanide and Glycol**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

Parameters	APEC/Issue		AEC 5: Main Landfill							AEC 2: Tank Farm / Fuel Lines				Tailings Impoundment Downstream								
	Sample Station		MW17-22							MW17-13		MW17-17		MW17-18			MW17-19		MW17-20			
	Sample ID		MW17-22A	MW17-22A	MW17-22A	MW17-22B	MW17-22B DUP A	MW17-22B	MW17-22B	MW17-22B	MW17-22B	MW17-13	MW17-13	MW17-17A	MW17-17B	MW17-18A	MW17-18B	MW17-18B DUP D	MW17-19A	MW17-19B	MW17-20A	MW17-20A
	Sample Collection Date	Lab ID #	11-Sep-18	17-Jul-19	28-Aug-2020	23-Jul-17	23-Jul-17	9-Jul-18	10-Sep-18	17-Jul-19	28-Aug-2020	24-Oct-17	2-Jul-18	1-Jul-18	1-Jul-18	24-Jul-17	24-Jul-17	24-Jul-17	23-Jul-17	23-Jul-17	23-Jul-17	21-Oct-17
Units	MDL	L2162703-1	L2312976-1	A20B4087-00	L1966041-7	L1966041-8	L2127140-2	L2162703-2	L2312976-2	A20B4087-00	L2014860-2	L2123781-9	L2123781-1	L2123781-2	L1966041-26	L1966041-27	L1966041-28	L1966041-1	L1966041-2	L1966041-3	L2014861-1	
Field Screening																						
Sample Headspace Vapour Concentration	ppmv	5.00	nm		nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Conductivity	µs/cm	1	320.8		238.7	63	63	42.3	77		30.3	305	179.4	139.2	115.8	462	151	151	587	153	273	278
Cyanide and Glycols																						
Cyanide, Total	µg/L	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<1.0	<5.0	<5.0	<5.0	<5.0	<5	<5	<5	<5	<5	<5	<1

**Notes:**

- MDL = Method detection limit
- na = not analyzed
- nm = not measured
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- mg/L = milligram per litre
- µs/cm = microsiemens per centimeter
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**Table 14: Groundwater Analytical Results – Cyanide and Glycol**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

Parameters	APEC/Issue		Tailings Impoundment Downstream						APEC 10 : Burial Site 1						APEC 12: Burial Site 2				AEC 8: Burial Site 2			
	Sample Station		MW17-20		MW17-23		MW17-25		MW17-9						MW17-14				MW17-14			
	Sample ID		MW17-20B	MW17-20B	MW17-23A	MW17-23A	MW17-23B	MW17-25A	MW17-25B	MW17-9A	MW17-9A	MW17-9A	MW17-9B	MW17-9B	MW17-9B	MW17-9B	MW17-14A	MW17-14A	MW17-14A	MW17-14B	MW17-14B	MW17-14B
	Sample Collection Date		23-Jul-17	21-Oct-17	23-Jul-17	22-Oct-17	23-Jul-17	23-Jul-17	23-Jul-17	28-Jul-17	2-Jul-18	18-Nov-18	24-Jul-17	2-Jul-18	2-Jul-18	18-Nov-18	24-Jul-17	1-Jul-18	25-Nov-18	24-Jul-17	1-Jul-18	25-Nov-18
Lab ID #		L1966041-4	L2014861-2	L1966041-12	L2014861-3	L1966041-13	L1966041-14	L1966041-15	L1966936-1	L2123781-6	L2200711-2	L1966041-19	L2123781-5	L2123781-10	L2200711-3	L1966041-24	L2123781-3	L2203208-2	L1966041-25	L2123781-4	L2203208-1	
Units	MDL																					
<b>Field Screening</b>																						
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Conductivity	µs/cm	1	78	58.2	257	213	157	348	137	755	515	383	473	250.8	250.8	579	264	184.4	343	192	108.6	177
<b>Cyanide and Glycols</b>																						
Cyanide, Total	µg/L	5.0	<5	<1	<5	<1	<5	<5	<5	<5.0	<5.0	<1.0	<5.0	<5.0	<5.0	<1.0	<5.0	<5.0	<1.0	<5.0	<5.0	<1.0

**Notes:**

- MDL = Method detection limit
- na = not analyzed
- nm = not measured
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- mg/L = milligram per litre
- µs/cm = microsiemens per centimeter
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**Table 14: Groundwater Analytical Results – Cyanide and Glycol**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

APEC/Issue			QA/QC					
Sample Station								
Sample ID			-	MW17-4B "DUP 1"	MW17-8B "DUP C"	MW17-22B DUP A	MW17-18B DUP D	MW17-9BFD
Sample Collection Date			-	23-Oct-17	24-Jul-17	23-Jul-17	24-Jul-17	02-Jul-18
Lab ID #			-	L2014860-4	L1966041-18	L1966041-8	L1966041-28	L2123781-10
Parameters	Units	MDL	Allowable RPD <sup>3</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)
<b>Field Screening</b>								
Sample Headspace Vapour Concentration	ppmv	5.00	-	-	-	-	-	-
Conductivity	µs/cm	1	-	-	-	-	-	-
<b>Cyanide and Glycols</b>								
Cyanide, Total	µg/L	5.0	20	-	-	-	-	-

**Notes:**

- MDL = Method detection limit
- na = not analyzed
- nm = not measured
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- mg/L = milligram per litre
- µs/cm = microsiemens per centimeter
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

3. Allowable RPDs as identified in BC Environmental Laboratory Manual (February 2016), Section A, Table 2

4. RPDs calculated only where both values are greater than 5 times the method detection limit

- = not calculated

RPD = Representative percent difference

1 = calculated RPD exceeds allowable RPD



**Table 15A: Landfill Monitoring Field Parameters**

Johnny Mountain Mine Reclamation Project	<b>Location</b>	<b>Main Landfill</b>													
Snip Gold Corporation	<b>Sample Station</b>	MW17-22													
Johnny Mountain Mine	<b>Sample ID</b>	MW17-22A							MW17-22B						
VE52655D	<b>Sample Collection Date</b>	28-Jul-17	22-Oct-17	9-Jul-18	11-Sep-18	17-Jul-19	4-Sep-19	28-Aug-20	23-Jul-17	23-Jul-17	9-Jul-18	10-Sep-18	17-Jul-19	4-Sep-19	28-Aug-20
<b>Parameters</b>	<b>Units</b>														
<b>Field Screening</b>															
pH	unitless	7.89	7.47	8.09	7.57	7.57	7.78	7.42	5.71	5.71	6.95	6.39	6.75	6.31	6.39
Redox Potential	mV	129.9	184	-55.3	-77	-25.2	0	-40	196.1	196.1	22.4	39	46.6	2.3	109.7
Temperature	°C	nm	nm	nm	nm	6.95	4.65	4.5	nm	nm	nm	nm	6.52	7.82	5.7
Conductivity	µs/cm	210	322	198.6	320.8	34.5	60	238.7	63	63	42.3	77	70	42.0	30.3

**Notes:**

- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- mV = millivolts
- µs/cm = microsiemens per centimeter



**Table 15B: Landfill Monitoring – PHCs**

Johnny Mountain Mine Reclamation Project  
 Snip Gold Corporation  
 Johnny Mountain Mine  
 VE52655D

Parameters	Units	Method Detection Limit	Location		Main Landfill									
			Sample Station		MW17-22									
			Sample ID		MW17-22A					MW17-22B				
			Sample Collection Date		28-Jul-17	22-Oct-17	9-Jul-18	11-Sep-18	17-Jul-19	28-Aug-20	23-Jul-17	23-Jul-17	9-Jul-18	10-Sep-18
<b>Petroleum Hydrocarbons (PHCs)</b>														
VHw	µg/L	100	2260	na	730	360	nm	nm	<100	<100	<100	<100	nm	nm
VPH	µg/L	100	900	na	330	130	nm	nm	<100	<100	<100	<100	nm	nm
EPHw10-19	µg/L	250	870	570	370	<250	<250	<250	<250	<250	<250	<250	<250	<250
EPH19-32	µg/L	250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250
LEPHw	µg/L	250	790	520	340	<250	<250	<250	<250	<250	<250	<250	<250	<250
HEPH	µg/L	250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250

**Notes:**

- VPH = volatile petroleum hydrocarbons excluding BTEX.
- VH<sub>(6-10)</sub> = volatile hydrocarbons including BTEX.
- EPHw<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPHw = light extractable petroleum hydrocarbons in water
- HEPH = heavy extractable petroleum hydrocarbons
- na = not analyzed
- nm = not measured
- ppmv = parts per million by volume
- < = concentration is less than reported method detection limit
- nm = not measured

**Table 15C: Landfill Monitoring – PAHs**

Johnny Mountain Mine Reclamation Project  
 Snip Gold Corporation  
 Johnny Mountain Mine  
 VE52655D

Parameters	Units	Method Detection Limit	Main Landfill											
			MW17-22											
			MW17-22A						MW17-22B					
			Sample Collection Date	28-Jul-17	22-Oct-17	9-Jul-18	11-Sep-18	17-Jul-19	28-Aug-2020	23-Jul-17	23-Jul-17	9-Jul-18	10-Sep-18	17-Jul-19
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>														
Acenaphthene	µg/L	0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010
Acenaphthylene	µg/L	0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010
Acridine	µg/L	0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010
Anthracene	µg/L	0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010
Benz(a)anthracene	µg/L	0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010
Benzo(a)pyrene	µg/L	0.0050	<0.005	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.005	<0.005	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(b+j)fluoranthenes	µg/L	0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010
Benzo(b+j+k)fluoranthene	µg/L	0.0150	na	na	<0.015	<0.015	<0.015	<0.015	na	na	<0.015	<0.015	<0.015	<0.015
Benzo(g,h,i)perylene	µg/L	0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010
Benzo(k)fluoranthene	µg/L	0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010
Chrysene	µg/L	0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010
Dibenz(a,h)anthracene	µg/L	0.0050	<0.005	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.005	<0.005	<0.0050	<0.0050	<0.0050	<0.0050
Fluoranthene	µg/L	0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010
Fluorene	µg/L	0.010	<0.05	<0.05	<0.020	<0.030	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010
Indeno(1,2,3-c,d)pyrene	µg/L	0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010
Methylnaphthalene, 1-	µg/L	0.050	na	na	5.11	2.36	1.63	2.9	na	na	<0.050	<0.050	<0.050	<0.010
Methylnaphthalene, 2-	µg/L	0.050	na	na	8.91	4.14	3.18	3.63	na	na	<0.050	<0.050	<0.050	<0.010
Naphthalene	µg/L	0.050	82.9	43.9	20.7	9.2	3.17	4.27	1.87	1.93	<0.050	<0.050	<0.050	<0.050
Phenanthrene	µg/L	0.020	<0.05	<0.05	<0.020	<0.020	<0.020	<0.020	<0.05	<0.05	<0.020	<0.020	<0.020	<0.020
Pyrene	µg/L	0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010
Quinoline	µg/L	0.050	<4.0	<0.05	<0.90	<0.502	<0.60	<5.50	<0.40	<0.40	<0.050	<0.050	<0.050	<0.050

**Notes:**

ppmv = parts per million by volume

µg/L = microgram per litre

< = concentration is less than reported method detection limit



**Table 15D: Landfill Monitoring – VOCs**

Johnny Mountain Mine Reclamation Project  
 Snip Gold Corporation  
 Johnny Mountain Mine  
 VE52655D

Parameters	Units	Method Detection Limit	APEC/Issue		Main Landfill					
			Sample Station		MW17-22					
			Sample ID		MW17-22A			MW17-22B		
			Sample Collection Date		9-Jul-18	17-Jul-19	28-Aug-2020	09-Jul-18	17-Jul-19	28-Aug-2020
<b>Volatile Organic Compounds (VOCs)</b>										
Benzene	ug/L	0.5	1.07	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
Bromodichloromethane	ug/L	1.0	nm	<1.0	<0.50	nm	<1.0	<0.50	<0.50	
Bromoform	ug/L	1.0	nm	<1.0	<0.50	nm	<1.0	<0.50	<0.50	
Carbon Tetrachloride	ug/L	0.5	nm	<0.50	<0.50	nm	<0.50	<0.50	<0.50	
Chlorobenzene	ug/L	1.0	nm	<1.0	<0.50	nm	<1.0	<0.50	<0.50	
Dibromochloromethane	ug/L	1.0	nm	<1.0	<0.50	nm	<1.0	<0.50	<0.50	
Chloroethane	ug/L	1.0	nm	<1.0	<0.50	nm	<1.0	<0.50	<0.50	
Chloroform	ug/L	1.0	nm	<1.0	<0.50	nm	<1.0	<0.50	<0.50	
Chloromethane	ug/L	5.0	nm	<5.0	<5.0	nm	<5.0	<5.0	<5.0	
1,2-Dichlorobenzene	ug/L	0.5	nm	<0.50	<0.50	nm	<0.50	<0.50	<0.50	
1,3-Dichlorobenzene	ug/L	1.0	nm	<1.0	<0.50	nm	<1.0	<0.50	<0.50	
1,4-Dichlorobenzene	ug/L	1.0	nm	<1.0	<0.50	nm	<1.0	<0.50	<0.50	
1,1-Dichloroethane	ug/L	1.0	nm	<1.0	<0.50	nm	<1.0	<0.50	<0.50	
1,2-Dichloroethane	ug/L	1.0	nm	<1.0	<0.50	nm	<1.0	<0.50	<0.50	
1,1-Dichloroethylene	ug/L	1.0	nm	<1.0	<0.50	nm	<1.0	<0.50	<0.50	
cis-1,2-Dichloroethylene	ug/L	1.00	nm	<1.0	<0.50	nm	<1.0	<0.50	<0.50	
trans-1,2-Dichloroethylene	ug/L	1.0	nm	<1.0	<0.50	nm	<1.0	<0.50	<0.50	
Dichloromethane	ug/L	5.0	nm	<5.0	<0.50	nm	<5.0	<0.50	<0.50	
1,2-Dichloropropane	ug/L	1.0	nm	<1.0	<0.50	nm	<1.0	<0.50	<0.50	
cis-1,3-Dichloropropylene	ug/L	0.5	nm	<0.50	<0.50	nm	<0.50	<0.50	<0.50	
trans-1,3-Dichloropropylene	ug/L	0.5	nm	<0.50	<0.50	nm	<0.50	<0.50	<0.50	
1,3-Dichloropropene (cis & trans)	ug/L	1.00	nm	<1.0	<0.75	nm	<1.0	<0.75	<0.75	
Ethylbenzene	ug/L	0.5	43.9	6.74	2.14	<0.50	<0.50	<0.50	<0.50	
Methyl t-butyl ether (MTBE)	ug/L	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
Styrene	ug/L	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
1,1,1,2-Tetrachloroethane	ug/L	1.0	nm	<1.0	<0.50	nm	<1.0	<0.50	<0.50	
1,1,2,2-Tetrachloroethane	ug/L	0.2	nm	<1.0	<0.20	nm	<0.20	<0.20	<0.20	
Tetrachloroethylene	ug/L	1.0	nm	<1.0	<0.50	nm	<1.0	<0.50	<0.50	
Toluene	ug/L	0.5	31.7	1.91	<0.40	<0.45	<0.45	<0.40	<0.40	
1,1,1-Trichloroethane	ug/L	1.0	nm	<1.0	<0.50	nm	<1.0	<0.50	<0.50	
1,1,2-Trichloroethane	ug/L	0.5	nm	<0.50	<0.50	nm	<0.50	<0.50	<0.50	
Trichloroethylene	ug/L	1.00	nm	<1.0	<0.50	nm	<1.0	<0.50	<0.50	
Trichlorofluoromethane	ug/L	1.00	nm	<1.0	<0.50	nm	<1.0	<0.50	<0.50	
Vinyl Chloride	ug/L	0.4	nm	<0.40	<0.40	nm	<0.40	<0.40	<0.40	
ortho-Xylene	ug/L	0.5	nm	<0.50	0.65	nm	<0.50	<0.50	<0.50	
meta- & para-Xylene	ug/L	0.50	nm	8.51	<0.50	nm	<0.50	<0.50	<0.50	
Xylenes	ug/L	0.8	nm	8.51	<0.75	nm	<0.75	<0.75	<0.75	

**Notes:**

- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit
- nm = not measured

**Table 15E: Landfill Monitoring – Dissolved Metals**

Johnny Mountain Mine Reclamation Project  
 Snip Gold Corporation  
 Johnny Mountain Mine  
 VE52655D

			Main Landfill											
			MW17-22A						MW17-22B					
			28-Jul-17	22-Oct-17	9-Jul-18	11-Sep-18	17-Jul-19	28-Aug-2020	23-Jul-17	23-Jul-17	9-Jul-18	10-Sep-18	17-Jul-19	28-Aug-2020
Parameters	Units	Method Detection Limit												
<b>Metals (General)</b>														
Aluminum	µg/L	1.0	15	10.5	4.8	14.8	384	5.6	<10	<10	1.8	<1.0	1.9	1.7
Antimony	µg/L	0.10	3.67	1.35	<0.10	0.33	0.6	0.25	<0.5	<0.5	<0.10	<0.10	<0.10	<0.10
Arsenic	µg/L	0.10	1	1.33	3.33	2.36	3.02	1.56	<1	<1	<0.10	<0.10	<0.10	<0.10
Barium	µg/L	0.10	23	21.7	37.3	38.3	42.8	39.3	<20	<20	9.14	10.5	9.31	8.13
Beryllium	µg/L	0.10	<5	<0.1	<0.10	<0.10	<0.10	<0.100	<5	<5	<0.10	<0.10	<0.10	<0.100
Bismuth	µg/L	0.050	na	<0.050	<0.050	<0.050	<0.050	<0.050	na	na	<0.050	<0.050	<0.050	<0.050
Boron	µg/L	10	<100	24	27	28	21	14	<100	<100	<10	<10	<10	<10
Cadmium	µg/L	0.0050	<0.05	<0.005	<0.0050	0.01	0.08	0.0388	<0.05	<0.05	0.07	0.07	0.07	0.0537
Calcium	mg/L	50	42.2	35.5	42.9	38.5	43900	44800	10.3	10.3	11.2	12.3	9950	8540
Cesium	µg/L	0.010	na	na	<0.010	<0.010	0.025	<0.010	na	na	<0.010	<0.010	<0.010	<0.010
Chromium (Total) <sup>1</sup>	µg/L	0.10	<0.5	<0.1	<0.10	<0.10	0.37	<0.10	<0.5	<0.5	<0.10	<0.10	<0.10	<0.10
Cobalt	µg/L	0.10	<0.5	0.11	<0.10	<0.10	0.49	<0.10	<0.5	<0.5	<0.10	<0.10	<0.10	<0.10
Copper	µg/L	0.20	<1	0.90	<0.20	1.29	1.64	3.67	<1	<1	<0.20	<0.20	0.22	<0.20
Iron <sup>2</sup>	µg/L	10	<30	<30	366	193	978	32	<30	<30	<10	<10	<10	<10
Lead	µg/L	0.050	<1	<0.05	<0.050	0.14	0.82	0.192	<1	<1	<0.050	<0.050	<0.050	<0.050
Lithium	µg/L	1.0	<50	5.8	5.5	5.3	5.5	5.1	<50	<50	<1.0	<1.0	<1.0	<1.0
Magnesium	µg/L	5.0	6460	6220	9320	8540	9140	8590	740	730	1030	1020	835	755
Manganese	µg/L	0.10	33	147	448	452	303	183	32	32	4.8	3.24	2.05	0.99
Mercury	µg/L	0.0050	<0.2	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.2	<0.2	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum	µg/L	0.050	3.2	3.2	2.79	2.24	2.59	2.6	<1	<1	0.085	0.074	0.078	0.069
Nickel	µg/L	0.50	<5	0.57	<0.50	0.54	1.11	0.89	<5	<5	<0.50	<0.50	<0.50	<0.50
Phosphorus	µg/L	50	na	<300	<50	90	300	<50	na	na	<50	<50	<50	<50
Potassium	µg/L	50	6000	5190	4870	5050	4080	4000	<2000	<2000	401	476	444	443
Rubidium	µg/L	0.20	na	na	0.6	0.74	1.36	0.91	na	na	0.53	0.72	0.68	0.78
Selenium	µg/L	0.050	<1	0.185	1.93	0.392	0.178	0.065	<1	<1	0.069	0.11	0.101	<0.050
Silicon	µg/L	50	na	3640	5520	5060	6240	5720	na	na	2070	2380	2370	1900
Silver	µg/L	0.010	<0.05	<0.01	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010
Sodium	mg/L	50	19.1	19.1	17.8	16.8	16600	15600	<2	<2	0.65	0.806	3980	696
Strontium	µg/L	0.20	na	235	325	311	341	396	na	na	41.9	51.1	45.5	33.1
Sulfur	mg/L	500	na	na	8.66	9.01	11300	16400	na	na	0.82	1.14	1220	<500
Tellurium	µg/L	0.20	na	na	<0.20	<0.20	<0.20	<0.20	na	na	<0.20	<0.20	<0.20	<0.20
Thallium	µg/L	0.010	<0.2	<0.01	<0.010	<0.010	0.047	<0.010	<0.2	<0.2	<0.010	<0.010	<0.010	<0.010
Thorium	µg/L	0.10	na	na	<0.10	<0.10	<0.10	<0.10	na	na	<0.10	<0.10	<0.10	<0.10
Tin	µg/L	0.10	na	0.43	0.12	0.2	0.25	0.38	na	na	<0.10	<0.10	<0.10	<0.10
Titanium	µg/L	0.30	<50	<10	<0.30	<0.30	<11	<0.30	<50	<50	<0.30	<0.30	<0.30	<0.30
Tungsten	µg/L	0.10	na	na	<0.10	<0.10	<0.10	<0.10	na	na	<0.10	<0.10	<0.10	<0.10
Uranium	µg/L	0.010	1.09	1.13	0.675	0.51	0.723	0.624	<0.2	<0.2	<0.010	<0.010	<0.010	0.018
Vanadium	µg/L	0.50	<30	<0.5	<0.50	<0.50	0.96	<0.50	<30	<30	<0.50	<0.50	<0.50	<0.50
Zinc	µg/L	1.0	<5	<3	1.80	4.30	4.80	4.6	<5	<5	2.30	1.40	1.80	1.1
Zirconium	µg/L	0.200	na	na	<0.060	0.08	<0.20	<0.20	na	na	<0.060	<0.060	<0.20	<0.20

**Notes:**  
 na = not analyzed  
 mg/L = milligram per litre  
 µg/L = micrograms per litre  
 < = concentration is less than reported method detection limit



**Table 15F: Landfill Monitoring – Total Metals**

Johnny Mountain Mine Reclamation Project  
 Snip Gold Corporation  
 Johnny Mountain Mine  
 VE52655D

Parameters	Units	Method Detection Limit	Location		Main Landfill	
			Sample Station		MW17-22	
			Sample ID		MW17-22A	MW17-22B
			Sample Collection Date		17-Jul-19	28-Aug-2020
Aluminum	µg/L	15.0	33	244	1110	9.6
Antimony	µg/L	0.50	0.91	0.5	<0.50	<0.10
Arsenic	µg/L	0.50	2.64	3.24	2.67	<0.10
Barium	µg/L	0.50	27.4	43.6	22.6	6.79
Beryllium	µg/L	0.50	<0.50	<0.100	<0.50	<0.100
Bismuth	µg/L	0.250	<0.25	<0.050	<0.25	<0.050
Boron	µg/L	50	<50	13	<50	<10
Cadmium	µg/L	0.0250	0.04	0.165	0.24	0.0532
Calcium	mg/L	250	40300	41000	10500	7150
Cesium	µg/L	0.050	<0.050	0.023	0.12	<0.010
Chromium (Total) <sup>1</sup>	µg/L	0.50	<0.50	1.07	1.78	<0.10
Cobalt	µg/L	0.50	<0.50	0.3	1.55	<0.10
Copper	µg/L	2.50	<2.5	2.78	9.10	<0.50
Iron <sup>2</sup>	µg/L	50	132	840	2680	20
Lead	µg/L	0.250	0.35	1.07	2.51	<0.050
Lithium	µg/L	5.0	<5.0	5.4	<5.0	<1.0
Magnesium	µg/L	25.0	8140	8670	1380	576
Manganese	µg/L	0.50	115	337	113	1.9
Mercury	µg/L	0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum	µg/L	0.250	2.49	2.54	0.26	0.064
Nickel	µg/L	2.50	<2.5	1.73	<2.5	<0.50
Phosphorus	µg/L	250	410	85	<250	<50
Potassium	µg/L	250	3680	4170	740	421
Rubidium	µg/L	1.00	<1.0	1.32	2.2	0.67
Selenium	µg/L	0.250	<0.25	0.144	<0.25	<0.050
Silicon	µg/L	500	5530	6030	3750	2100
Silver	µg/L	0.050	<0.050	0.015	0.109	<0.010
Sodium	mg/L	250	17200	15200	810	647
Strontium	µg/L	1.00	323	372	45.2	29.9
Sulfur	mg/L	2500	13400	16600	<2500	600
Tellurium	µg/L	1.00	<1.0	<0.20	<1.0	<0.20
Thallium	µg/L	0.050	<0.050	0.012	<0.050	<0.010
Thorium	µg/L	0.50	<0.50	<0.10	<0.50	<0.10
Tin	µg/L	0.50	1.19	1.71	<0.50	<0.10
Titanium	µg/L	1.50	<1.5	9.34	63.6	0.31
Tungsten	µg/L	0.50	<0.50	<0.10	<0.50	<0.10
Uranium	µg/L	0.050	0.561	0.652	0.063	<0.010
Vanadium	µg/L	2.50	<2.5	0.64	3.6	<0.50
Zinc	µg/L	15.0	<15	10.6	<15	<3.0
Zirconium	µg/L	1.000	<1.0	0.37	<1.0	<0.20

**Notes:**

- na = not analyzed
- mg/L = milligram per litre
- µg/L = micrograms per litre
- < = concentration is less than reported method detection limit



**Table 15G: Landfill Monitoring – Anions and Nutrients**

Parameters		Units Method Detection Limit		Main Landfill												
				MW17-22												
				MW17-22A						MW17-22B						
				Sample Collection Date	28-Jul-17	22-Oct-17	9-Jul-18	11-Sep-18	17-Jul-19	4-Sep-19	28-Aug-2020	23-Jul-17	23-Jul-17	9-Jul-18	10-Sep-18	17-Jul-19
<b>Physiochemical Parameters</b>																
pH	pH	0.10	7.89	8.30	8.23	8.20	8.27	nm	8.06	5.71	5.71	7.20	7.16	7.60	nm	6.86
Conductivity	uS/cm	2.0	343.00	353.00	367.00	357.00	336.00	nm	350	58.50	57.20	71.70	78.80	60.70	nm	44.9
Hardness (CaCO3)	ug/L	500.00	132000	114000	146000	131000	147000	nm	147000	28800	28800	32200	34900	28300	nm	24400
Total Suspended Solids	ug/L	3000	nm	220000.00	233000.00	211000.00	nm	<3000	<3000	na	na	46000.00	49000.00	58100	<3000	<3000
Total Dissolved Solids	ug/L	13000	nm	nm	nm	nm	229000	nm	213000.00	nm	nm	nm	nm	50000	nm	30000.00
Turbidity	NTU	0.10	nm	3.49	16.20	3.58	3.31	nm	3.26	na	na	7.38	2.72	23.70	nm	0.17
<b>Alkalinity Anions &amp; Nutrients</b>																
Acidity (as CaCO3)	ug/L	1000	nm	nm	nm	nm	nm	<1000	<2000	nm	nm	nm	nm	<25000	1800	3400
Alkalinity, Total (as CaCO3)	ug/L	1000	113000	122000	181000	165000	146000	nm	136000	28100	27700	33900	37100	30100	nm	18800
Ammonia, Total (as N)	ug/L	5	nm	nm	nm	nm	<5.0	nm	16.9	nm	nm	nm	nm	<5.0	nm	<5
Bromide	ug/L	50	<50	<50	<50	<50	<50	nm	nm	<50	<50	<50	<50	<50	nm	nm
Chloride	ug/L	500.00	3.66	2.3	0.8	<0.50	<0.50	nm	<500	<0.50	<0.50	3.91	<0.50	<0.50	nm	<500
Fluoride	ug/L	20.00	477	548	463	478	553	nm	584	21	21	629	<20	21	nm	<20
Nitrate as N	ug/L	5.0000	<0.005	<0.005	<0.005.0	<0.0050	<5.0	nm	<5	<0.005	<0.005	4.71	<0.0050	5.4	nm	34.2
Nitrite as N	ug/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	nm	<1	<1.0	<1.0	7.8	<1.0	1.9	nm	<1
Total Kjeldahl Nitrogen	ug/L	50.0	nm	nm	nm	nm	77	nm	202	nm	nm	nm	nm	<50	nm	<50
Total Nitrogen	ug/L	30	nm	nm	nm	nm	73	nm	196	nm	nm	nm	nm	58	nm	<30
Phosphorus (P)-Total	ug/L	2	nm	nm	nm	nm	392	nm	67.6	nm	nm	nm	nm	14.3	nm	3.5
Sulfate	mg/L	0.3	60.5	54.3	16.3	27.1	38	nm	44	3.02	2.96	741	3.39	3.1	nm	1.93

- Notes:**
- nm = not measured
  - ug/L = microgram per litre
  - mg/L = milligram per litre
  - us/cm = microsiemens per centimeter



**Table 15H: Landfill Monitoring – Cyanide and Total Phenols**

Johnny Mountain Mine Reclamation Project  
 Snip Gold Corporation  
 Johnny Mountain Mine  
 VE52655D

		Location		Main Landfill											
		Sample Station		MW17-22											
		Sample ID		MW17-22A						MW17-22B					
		Sample Collection Date		28-Jul-17	22-Oct-17	9-Jul-18	11-Sep-18	17-Jul-19	28-Aug-2020	23-Jul-17	23-Jul-17	9-Jul-18	10-Sep-18	17-Jul-19	28-Aug-2020
Parameters		Units	Method Detection Limit												
<b>Cyanide</b>															
Cyanide, Total		ug/L	5.0	<5.0	<1.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	
Cyanide, Weak Acid Diss		ug/L	5	<5.0	<1.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	
Cyanate		ug/L	200.0	<200	na	<200	<200	<200	<200	<200	<200	<200	<200	<200	
Thiocyanate (SCN)		ug/L	100.0	<500	na	<500	<500	<500	<500	<500	<500	<500	580	<500	
Cyanide, Free		ug/L	5	<5.0	na	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	
<b>Phenols</b>															
Total Phenolic Compunds		ug/L	1.0	nm	nm	nm	nm	<1.0	<1.0	nm	nm	nm	nm	<1.0	

**Notes:**

- µg/L = microgram per litre
- mg/L = milligram per litre
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit
- nm = not measured

**Table 15I: Landfill Monitoring – Carbon and COD**

Johnny Mountain Mine Reclamation Project			<b>Location</b>		<b>Main Landfill</b>											
Snip Gold Corporation			<b>Sample Station</b>		MW17-22											
Johnny Mountain Mine			<b>Sample ID</b>		MW17-22A					MW17-22B						
VE52655D			<b>Sample Collection Date</b>		28-Jul-17	22-Oct-17	9-Jul-18	11-Sep-18	17-Jul-19	28-Aug-2020	23-Jul-17	23-Jul-17	9-Jul-18	10-Sep-18	17-Jul-19	28-Aug-2020
<b>Parameters</b>	<b>Units</b>	<b>Method Detection Limit</b>														
<b>Carbon</b>																
Total Inorganic Carbon	µg/L	500	28800	nm	nm	nm	33200	33300	7860	8220	nm	nm	8830	7040		
Total Organic Carbon	µg/L	500	3800	nm	nm	nm	2920	2460	640	540	nm	nm	680	520		
<b>COD</b>																
Chemical Oxygen Demand	µg/L	20000	27000	nm	nm	nm	<20000	<20000	<20,000	<20,000	nm	nm	<20000	<20000		

**Notes:**

- na = not analyzed
- nm = not measured
- µg/L = microgram per litre
- < = concentration is less than reported method detection limit



**Table 16A: Surface Water Analytical Results – PHCs**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov-20

Parameters	Units	MDL	Surface Water Sampling		
			Sample Station	Sample ID	Sample Collection Date
			SW20-01	SW20-02	SW20-03
			SW20-01	SW20-02	SW20-03
			29-Aug-2020	29-Aug-2020	29-Aug-2020
			VA20B4178-001	VA20B4178-002	VA20B4178-003
<b>Field Screening</b>					
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm
Noticable Odour	-	-	nm	nm	nm
Conductivity	µs/cm	2	nm	nm	nm
<b>Petroleum Hydrocarbons (PHCs)</b>					
Benzene	µg/L	0.50	na	<0.50	<0.50
Ethylbenzene	µg/L	0.50	na	<0.50	<0.50
Toluene	µg/L	0.45	na	<0.40	<0.40
ortho-Xylene	µg/L	0.50	na	<0.50	<0.50
meta- & para-Xylene	µg/L	0.50	na	<0.50	<0.50
Xylenes (Total)	µg/L	0.75	na	<0.75	<0.75
VHw6-10	µg/L	100	na	na	na
VPHw	µg/L	100	na	na	na
Methyl-tert-butyl ether [MTBE]	µg/L	0.50	na	<0.50	<0.50
Styrene	µg/L	0.50	na	<0.50	<0.50
EPHw10-19	µg/L	250	na	<250	<250
EPH19-32	µg/L	250	na	<250	<250
LEPHw	µg/L	250	na	<250	<250
HEPH	µg/L	250	na	<250	<250

- Notes:**
- MDL = Method detection limit
  - EPHw<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
  - EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
  - LEPHw = light extractable petroleum hydrocarbons in water
  - HEPH = heavy extractable petroleum hydrocarbons
  - VPHw = volatile petroleum hydrocarbons in water
  - VHw(6-10) = volatile hydrocarbons in water
  - na = not analyzed
  - nm = not measured
  - no = none observed
  - ns = no applicable standard
  - ppmv = parts per million by volume
  - µg/L = microgram per litre
  - µs/cm = microsiemens per centimeter
  - < = concentration is less than reported method detection limit

**Table 16B: Surface Water Analytical Results – PAHs**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

Parameters	APEC/Issue		Surface Water Sampling		
	Sample Station		SW20-01	SW20-02	SW20-03
	Sample ID		SW20-01	SW20-02	SW20-03
	Sample Collection Date		29-Aug-2020	29-Aug-2020	29-Aug-2020
	Lab ID #		VA20B4178-001	VA20B4178-002	VA20B4178-003
	Units	MDL			
<b>Field Screening</b>					
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm
Noticable Odour	-	-	nm	nm	nm
Conductivity	µs/cm	1	nm	nm	nm
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>					
Acenaphthene	µg/L	0.010	na	<0.010	<0.010
Acenaphthylene	µg/L	0.010	na	<0.010	<0.010
Acridine	µg/L	0.010	na	<0.010	<0.010
Anthracene	µg/L	0.010	na	<0.010	<0.010
Benz(a)anthracene	µg/L	0.010	na	<0.010	<0.010
Benzo(a)pyrene	µg/L	0.0050	na	<0.0050	<0.0050
Benzo(b+j)fluoranthenes	µg/L	0.010	na	<0.010	<0.010
Benzo(b+j+k)fluoranthene	µg/L	0.0150	na	<0.015	<0.015
Benzo(g,h,i)perylene	µg/L	0.010	na	<0.010	<0.010
Benzo(k)fluoranthene	µg/L	0.010	na	<0.010	<0.010
Chrysene	µg/L	0.010	na	<0.010	<0.010
Dibenz(a,h)anthracene	µg/L	0.0050	na	<0.0050	<0.0050
Fluoranthene	µg/L	0.010	na	<0.010	<0.010
Fluorene	µg/L	0.010	na	<0.010	<0.010
Indeno(1,2,3-c,d)pyrene	µg/L	0.010	na	<0.010	<0.010
Methylnaphthalene, 1-	µg/L	0.010	na	0.024	<0.010
Methylnaphthalene, 2-	µg/L	0.010	na	0.018	<0.010
Naphthalene	µg/L	0.050	na	<0.050	<0.050
Phenanthrene	µg/L	0.020	na	<0.020	<0.020
Pyrene	µg/L	0.010	na	<0.010	<0.010
Quinoline	µg/L	0.050	na	<0.050	<0.050

**Notes:**

- MDL = Method detection limit
- nm = not measured
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit

**Table 16C: Surface Water Analytical Results – Total Metals**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

	APEC/Issue		Surface Water Sampling		
	Sample Station		SW20-01	SW20-02	SW20-03
	Sample ID		SW20-01	SW20-02	SW20-03
	Sample Collection Date		29-Aug-2020	29-Aug-2020	29-Aug-2020
	Lab ID #		VA20B4178-001	VA20B4178-002	VA20B4178-003
Parameters	Units	MDL			
<b>Field Screening</b>					
pH	unitless	0.1	nm	nm	nm
Conductivity	µs/cm	1	nm	nm	nm
<b>Physiochemical Parameters</b>					
pH	unitless	0.1	na	na	na
Conductivity	µs/cm	1	na	na	na
Hardness (as CaCO <sub>3</sub> )	mg/L	500	na	na	na
<b>Metals (General)</b>					
Cadmium	µg/L	0.0050	0.316	na	na
Iron <sup>2</sup>	µg/L	10	349	na	na
Magnesium	µg/L	5.0	4230	na	na
Manganese <sup>2</sup>	µg/L	0.10	na	192	na

**Notes:**

- MDL = Method detection limit
- na = not analyzed
- ns = no applicable standard
- mg/L = milligram per litre
- µg/L = micrograms per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit

**Table 16D: Surface Water Analytical Results – VOCs**

Johnny Mountain Mine Reclamation Project  
 Johnny Mountain Mine  
 VE52655D  
 Nov-20

			APEC/Issue			Surface Water Sampling		
			Sample Station			SW20-01	SW20-02	SW20-03
			Sample ID			SW20-01	SW20-02	SW20-03
			Sample Collection Date			29-Aug-2020	29-Aug-2020	29-Aug-2020
			Lab ID #			VA20B4178-001	VA20B4178-002	VA20B4178-003
Parameters	Units	MDL						
<b>Field Screening</b>								
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm			
Noticable Odour	-	-	nm	nm	nm			
Conductivity	µs/cm	1	nm	nm	nm			
<b>Volatile Organic Compounds (VOCs)</b>								
Bromodichloromethane [BDCM]	µg/L	1.0	na	<0.50	<0.50			
Bromoform	µg/L	1.0	na	<0.50	<0.50			
Carbon tetrachloride	µg/L	0.50	na	<0.50	<0.50			
Chlorobenzene	µg/L	1.0	na	<0.50	<0.50			
Dibromochloromethane [DBCM]	µg/L	1.0	na	<0.50	<0.50			
Chloroethane	µg/L	1.0	na	<0.50	<0.50			
Chloroform	µg/L	1.0	na	<0.50	<0.50			
Chloromethane	µg/L	5.0	na	<0.50	<0.50			
Dichlorobenzene, 1,2-	µg/L	0.50	na	<0.50	<0.50			
Dichlorobenzene, 1,3-	µg/L	1.0	na	<0.50	<0.50			
Dichlorobenzene, 1,4-	µg/L	1.0	na	<0.50	<0.50			
Dichloroethane, 1,1-	µg/L	1.0	na	<0.50	<0.50			
Dichloroethane, 1,2-	µg/L	1.0	na	<0.50	<0.50			
Dichloroethene, 1,1-	µg/L	1.0	na	<0.50	<0.50			
Dichloroethylene, 1,2-cis-	µg/L	1.0	na	<0.50	<0.50			
Dichloroethylene, 1,2-trans-	µg/L	1.0	na	<0.50	<0.50			
Dichloromethane	µg/L	5.0	na	<0.50	<0.50			
Dichloropropane, 1,2-	µg/L	1.0	na	<0.50	<0.50			
cis-1,3-Dichloropropylene	µg/L	0.50	na	<0.50	<0.50			
trans-1,3-Dichloropropylene	µg/L	0.50	na	<0.50	<0.50			
dichloropropene, 1,3- (cis + trans)	µg/L	1.0	na	<0.75	<0.75			
Tetrachloroethane, 1,1,1,2-	µg/L	1.0	na	<0.50	<0.50			
Tetrachloroethane, 1,1,2,2-	µg/L	0.20	na	<0.20	<0.20			
Tetrachloroethylene	µg/L	1.0	na	<0.50	<0.50			
Trichloroethane, 1,1,1-	µg/L	1.0	na	<0.50	<0.50			
Trichloroethane, 1,1,2-	µg/L	0.50	na	<0.50	<0.50			
Trichloroethylene	µg/L	1.0	na	<0.50	<0.50			
Trichlorofluoromethane	µg/L	1.0	na	<0.50	<0.50			
Vinyl Chloride	µg/L	0.40	na	<0.40	<0.40			

**Notes:**

- MDL = Method detection limit
- no = none observed
- nm = not measured
- ns = no applicable standard
- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit





**wood.**

**Appendix A  
Site Photograph Log**



Photo 1: Setup for groundwater sampling using a hydrolift pump.  
August, 2020


	Wood Environment & Infrastructure Solutions, a Division of Wood Canada Limited #600 – 4445 Lougheed Highway Burnaby, BC V5C 0E4 Canada	PROJECT:  2020 Supplemental Site Investigation			
	CLIENT: <b>SNIPGOLD CORPORATION</b>	DATE: 04 March 2021	JOB No.: VE52655D	PAGE: 1	REV.: 0



Photo 2: LNAPL identified at MW17-17B , using a bailer.


	Wood Environment & Infrastructure Solutions, a Division of Wood Canada Limited #600 – 4445 Lougheed Highway Burnaby, BC V5C 0E4 Canada	PROJECT:  2020 Supplemental Site Investigation		
	CLIENT: <b>SNIPGOLD CORPORATION</b>	DATE: 04 March 2021	JOB No.: VE52655D	PAGE: 2



Photo 3: View of creek sampled for surface water (sample SW20-01).


	Wood Environment & Infrastructure Solutions, a Division of Wood Canada Limited #600 – 4445 Lougheed Highway Burnaby, BC V5C 0E4 Canada		PROJECT:  2020 Supplemental Site Investigation	
	CLIENT: <b>SNIPGOLD CORPORATION</b>	DATE: 04 March 2021	JOB No.: VE52655D	PAGE: 3



Photo 4: View of stream sampled for surface water (sample SW20-02).



	Wood Environment & Infrastructure Solutions, a Division of Wood Canada Limited #600 – 4445 Lougheed Highway Burnaby, BC V5C 0E4 Canada	PROJECT:  2020 Supplemental Site Investigation		
	CLIENT: <b>SNIPGOLD CORPORATION</b>	DATE: 04 March 2021	JOB No.: VE52655D	PAGE: 4



Photo 5: View of creek sampled for surface water (sample SW20-03).

	Wood Environment & Infrastructure Solutions, a Division of Wood Canada Limited #600 – 4445 Lougheed Highway Burnaby, BC V5C 0E4 Canada	PROJECT:  2020 Supplemental Site Investigation			
	CLIENT: <b>SNIPGOLD CORPORATION</b>	DATE: 04 March 2021	JOB No.: VE52655D	PAGE: 5	REV.: 0



**wood.**

**Appendix B**  
**Certificate of Analysis**



CERTIFICATE OF ANALYSIS

Work Order : **VA20B4299**  
Client : **Seabridge Gold Inc.**  
Contact : Elizabeth Miller  
Address : 1235 Main Street P.O. Box 2536  
Smithers BC Canada V0J 2N0  
Telephone : 416 367 9292  
Project : VE52655D  
PO :  
C-O-C number : ----  
Sampler : Ardy M  
Site : ----  
Quote number : VA20-SEAB100-0003 - Wood/Seabridge Gold  
No. of samples received : 10  
No. of samples analysed : 7

Page : 1 of 9  
Laboratory : Vancouver - Environmental  
Account Manager : Selam Worku  
Address : 8081 Lougheed Highway  
Burnaby BC Canada V5A 1W9  
Telephone : +1 604 253 4188  
Date Samples Received : 02-Sep-2020 10:45  
Date Analysis Commenced : 04-Sep-2020  
Issue Date : 28-Sep-2020 14:20

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

**Signatories**

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Brianna Allen	Department Manager - Organics	Organics, Burnaby, British Columbia
Dwayne Bennett	Technical Specialist	Inorganics, Saskatoon, Saskatchewan
Hedy Lai	Team Leader - Inorganics	Inorganics, Saskatoon, Saskatchewan
Jeremy Paterson	Analyst	Microbiology, Winnipeg, Manitoba
Melissa Shaw	Team Leader - Inorganics	Inorganics, Saskatoon, Saskatchewan
Xihua Yao	Laboratory Analyst	Inorganics, Saskatoon, Saskatchewan





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

Unit	Description
%	percent
CFU/g	Colony Forming Units per gram
mg/kg	milligrams per kilogram

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in reports identified as "**Preliminary Report**" are considered authorized for use.

## Workorder Comments

**Sample "SP20-01-14": client labelled one jar and one plastic bag sample as "SP20-1-4", labelled the sample as "SP20-01-14" according to the identification of the bag.**

Additional parameters were requestd via email for samples SP20-01-01, SP20-01-03, SP20-01-05 and SP20-01-05.

## Sample Comments

Sample	Client Id	Comment
VA20B4299-001	SP20-01-01	Sample(s)-007: Soil jar was submitted as VOC sample container. VOC results may be biased low, and do not meet federal (CCME) or provincial requirements (for BC, AB-Tier1, MB, ON, SK).

## Qualifiers

Qualifier	Description
DLCI	Detection Limit Raised: Chromatographic interference due to co-elution.



## Analytical Results

Sub-Matrix: Soil					Client sample ID				
(Matrix: Soil/Solid)					SP20-01-01	SP20-01-02	SP20-01-03	SP20-01-04	SP20-01-05
Client sampling date / time					29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020 12:00	29-Aug-2020 12:00
Analyte	CAS Number	Method	LOR	Unit	VA20B4299-001	VA20B4299-002	VA20B4299-003	VA20B4299-004	VA20B4299-005
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
moisture	----	E144	0.25	%	11.0	9.95	12.8	11.4	11.3
<b>Organic / Inorganic Carbon</b>									
carbon, total [TC]	----	E351	0.050	%	1.45	----	0.397	----	0.611
carbon, inorganic [IC]	----	E354	0.050	%	0.108	----	0.073	----	0.134
carbon, inorganic [IC], (as CaCO3 equivalent)	----	E354	0.40	%	0.90	----	0.61	----	1.11
carbon, total organic [TOC]	----	EC356	0.050	%	1.34	----	0.324	----	0.477
organic matter	----	EC356	0.10	%	2.31	----	0.56	----	0.82
<b>Plant Available Nutrients</b>									
phosphate, available (as P)	14265-44-2	E384	2.0	mg/kg	2.6	----	4.7	----	<2.0
potassium, available	7440-09-7	E390	20	mg/kg	67	----	63	----	70
sulfate, available (as S)	14808-79-8	E497.SO4	3.0	mg/kg	7.2	----	3.6	----	7.6
nitrate + nitrite, available (as N)	----	E269.N+N	1.0	mg/kg	<1.0	----	<1.0	----	<1.0
<b>Taxonomy</b>									
hydrocarbon utilizing bacteria [HUB]	----	E924.AR	5	CFU/g	27000	20500	----	----	56000
<b>Volatile Organic Compounds</b>									
chlorobenzene	108-90-7	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
chloromethane	74-87-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichlorobenzene, 1,2-	95-50-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichlorobenzene, 1,3-	541-73-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichlorobenzene, 1,4-	106-46-7	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloropropane, 1,2-	78-87-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloropropylene, cis+trans-1,3-	542-75-6	E611C	0.075	mg/kg	<0.075	<0.075	<0.075	<0.075	<0.075
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.250 <sup>DLCL</sup>
trichloroethane, 1,1,2-	79-00-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
trichlorofluoromethane	75-69-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>									
benzene	71-43-2	E611C	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	<0.015	<0.015	<0.015	<0.015



## Analytical Results

Sub-Matrix: Soil					Client sample ID	SP20-01-01	SP20-01-02	SP20-01-03	SP20-01-04	SP20-01-05
(Matrix: Soil/Solid)										
Client sampling date / time					29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020
								12:00		12:00
Analyte	CAS Number	Method	LOR	Unit	VA20B4299-001	VA20B4299-002	VA20B4299-003	VA20B4299-004	VA20B4299-005	
					Result	Result	Result	Result	Result	
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>										
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
styrene	100-42-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
toluene	108-88-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
xylene, m+p-	179601-23-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
xylene, o-	95-47-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
xylenes, total	1330-20-7	E611C	0.075	mg/kg	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075
<b>Volatile Organic Compounds [Drycleaning]</b>										
carbon tetrachloride	56-23-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
chloroethane	75-00-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethane, 1,1-	75-34-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethane, 1,2-	107-06-2	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethylene, 1,1-	75-35-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethylene, cis-1,2-	156-59-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethylene, trans-1,2-	156-60-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
dichloromethane	75-09-2	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
tetrachloroethylene	127-18-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
trichloroethane, 1,1,1-	71-55-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
trichloroethylene	79-01-6	E611C	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
vinyl chloride	75-01-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
<b>Volatile Organic Compounds Surrogates</b>										
bromofluorobenzene, 4-	460-00-4	E611C	0.050	%	94.5	90.3	97.5	88.4	102	
difluorobenzene, 1,4-	540-36-3	E611C	0.050	%	101	108	106	105	104	
<b>Hydrocarbons</b>										
EPH (C10-C19)	----	E601A	200	mg/kg	300	<200	<200	500	1330	
EPH (C19-C32)	----	E601A	200	mg/kg	<200	<200	<200	<200	440	
HEPHs	----	EC600A	200	mg/kg	<200	<200	<200	<200	440	
LEPHs	----	EC600A	200	mg/kg	300	<200	<200	500	1330	
<b>Hydrocarbons Surrogates</b>										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	5.0	%	87.5	85.8	95.4	86.0	91.8	
<b>Polycyclic Aromatic Hydrocarbons</b>										



## Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	SP20-01-01	SP20-01-02	SP20-01-03	SP20-01-04	SP20-01-05
Client sampling date / time						29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020 12:00	29-Aug-2020 12:00
Analyte	CAS Number	Method	LOR	Unit	VA20B4299-001	VA20B4299-002	VA20B4299-003	VA20B4299-004	VA20B4299-005	
					Result	Result	Result	Result	Result	
<b>Polycyclic Aromatic Hydrocarbons</b>										
acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0200 <sup>DLCI</sup>	
acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	<0.0070 <sup>DLCI</sup>	<0.0050	<0.0050	<0.0060 <sup>DLCI</sup>	<0.0200 <sup>DLCI</sup>	
acridine	260-94-6	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.050 <sup>DLCI</sup>	<0.200 <sup>DLCI</sup>	
anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.0040	<0.0040	<0.0040	<0.0050 <sup>DLCI</sup>	<0.0200 <sup>DLCI</sup>	
benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
benzo(b+j)fluoranthene	----	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
benzo(b+j+k)fluoranthene	----	E641A-L	0.015	mg/kg	<0.015	<0.015	<0.015	<0.015	<0.015	
benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
chrysene	218-01-9	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
fluoranthene	206-44-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
fluorene	86-73-7	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
naphthalene	91-20-3	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
phenanthrene	85-01-8	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.020 <sup>DLCI</sup>	
pyrene	129-00-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	0.017	0.090	
quinoline	6027-02-7	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
<b>B(a)P total potency equivalents [B(a)P TPE]</b>	----	E641A-L	0.020	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
<b>IACR (CCME)</b>	----	E641A-L	0.15	mg/kg	<0.11	<0.11	<0.11	<0.11	<0.11	
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>										
acridine-d9	34749-75-2	E641A-L	0.010	%	96.7	88.1	106	98.9	99.1	
chrysene-d12	1719-03-5	E641A-L	0.010	%	103	98.7	116	105	112	
naphthalene-d8	1146-65-2	E641A-L	0.010	%	90.2	88.8	103	95.8	95.6	
phenanthrene-d10	1517-22-2	E641A-L	0.010	%	96.7	91.4	108	102	105	
<b>Volatile Organic Compounds [THMs]</b>										
bromodichloromethane	75-27-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	
bromoform	75-25-2	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	



## Analytical Results

Sub-Matrix: Soil					Client sample ID	SP20-01-01	SP20-01-02	SP20-01-03	SP20-01-04	SP20-01-05
(Matrix: Soil/Solid)					Client sampling date / time	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020 12:00	29-Aug-2020 12:00
Analyte	CAS Number	Method	LOR	Unit	VA20B4299-001	VA20B4299-002	VA20B4299-003	VA20B4299-004	VA20B4299-005	
					Result	Result	Result	Result	Result	
<b>Volatile Organic Compounds [THMs]</b>										
chloroform	67-66-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
dibromochloromethane	124-48-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050

Please refer to the General Comments section for an explanation of any qualifiers detected.



## Analytical Results

Sub-Matrix: Soil					Client sample ID				
(Matrix: Soil/Solid)					SP20-01-06	SP20-01-56	----	----	----
Client sampling date / time					29-Aug-2020 12:00	29-Aug-2020 12:00	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20B4299-006	VA20B4299-007	-----	-----	-----
					Result	Result	---	---	---
<b>Physical Tests</b>									
moisture	----	E144	0.25	%	14.9	15.0	----	----	----
<b>Volatile Organic Compounds</b>									
chlorobenzene	108-90-7	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
chloromethane	74-87-3	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
dichloropropane, 1,2-	78-87-5	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
dichloropropylene, cis+trans-1,3-	542-75-6	E611C	0.075	mg/kg	<0.075	<0.075	----	----	----
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
trichlorofluoromethane	75-69-4	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>									
benzene	71-43-2	E611C	0.0050	mg/kg	<0.0050	<0.0050	----	----	----
ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	<0.015	----	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
styrene	100-42-5	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
toluene	108-88-3	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
xylene, m+p-	179601-23-1	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
xylene, o-	95-47-6	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
xylenes, total	1330-20-7	E611C	0.075	mg/kg	<0.075	<0.075	----	----	----
<b>Volatile Organic Compounds [Drycleaning]</b>									
carbon tetrachloride	56-23-5	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
chloroethane	75-00-3	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
dichloroethane, 1,1-	75-34-3	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
dichloroethane, 1,2-	107-06-2	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
dichloroethylene, 1,1-	75-35-4	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
dichloroethylene, cis-1,2-	156-59-4	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
dichloroethylene, trans-1,2-	156-60-5	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----



## Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	SP20-01-06	SP20-01-56	----	----	----
Client sampling date / time					29-Aug-2020 12:00	29-Aug-2020 12:00	---	---	---	
Analyte	CAS Number	Method	LOR	Unit	VA20B4299-006	VA20B4299-007	-----	-----	-----	
					Result	Result	---	---	---	
<b>Volatile Organic Compounds [Drycleaning]</b>										
dichloromethane	75-09-2	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----	
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----	
tetrachloroethylene	127-18-4	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----	
trichloroethane, 1,1,1-	71-55-6	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----	
trichloroethylene	79-01-6	E611C	0.010	mg/kg	<0.010	<0.010	----	----	----	
vinyl chloride	75-01-4	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----	
<b>Volatile Organic Compounds Surrogates</b>										
bromofluorobenzene, 4-	460-00-4	E611C	0.050	%	98.1	108	----	----	----	
difluorobenzene, 1,4-	540-36-3	E611C	0.050	%	97.1	103	----	----	----	
<b>Hydrocarbons</b>										
EPH (C10-C19)	----	E601A	200	mg/kg	<200	<200	----	----	----	
EPH (C19-C32)	----	E601A	200	mg/kg	<200	<200	----	----	----	
HEPHs	----	EC600A	200	mg/kg	<200	<200	----	----	----	
LEPHs	----	EC600A	200	mg/kg	<200	<200	----	----	----	
<b>Hydrocarbons Surrogates</b>										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	5.0	%	87.6	81.3	----	----	----	
<b>Polycyclic Aromatic Hydrocarbons</b>										
acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	----	----	----	
acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	----	----	----	
acridine	260-94-6	E641A-L	0.010	mg/kg	<0.010	<0.010	----	----	----	
anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.0040	<0.0040	----	----	----	
benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	<0.010	<0.010	----	----	----	
benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	<0.010	<0.010	----	----	----	
benzo(b+j)fluoranthene	----	E641A-L	0.010	mg/kg	<0.010	<0.010	----	----	----	
benzo(b+j+k)fluoranthene	----	E641A-L	0.015	mg/kg	<0.015	<0.015	----	----	----	
benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	<0.010	<0.010	----	----	----	
benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	<0.010	<0.010	----	----	----	
chrysene	218-01-9	E641A-L	0.010	mg/kg	<0.010	<0.010	----	----	----	
dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	----	----	----	
fluoranthene	206-44-0	E641A-L	0.010	mg/kg	<0.010	<0.010	----	----	----	
fluorene	86-73-7	E641A-L	0.010	mg/kg	<0.010	<0.010	----	----	----	



## Analytical Results

Sub-Matrix: Soil					Client sample ID				
(Matrix: Soil/Solid)					SP20-01-06	SP20-01-56	----	----	----
Client sampling date / time					29-Aug-2020 12:00	29-Aug-2020 12:00	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20B4299-006	VA20B4299-007	-----	-----	-----
					Result	Result	---	---	---
<b>Polycyclic Aromatic Hydrocarbons</b>									
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	<0.010	<0.010	----	----	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	<0.010	<0.010	----	----	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	<0.010	<0.010	----	----	----
naphthalene	91-20-3	E641A-L	0.010	mg/kg	<0.010	<0.010	----	----	----
phenanthrene	85-01-8	E641A-L	0.010	mg/kg	<0.010	<0.010	----	----	----
pyrene	129-00-0	E641A-L	0.010	mg/kg	<0.010	<0.010	----	----	----
quinoline	6027-02-7	E641A-L	0.010	mg/kg	<0.010	<0.010	----	----	----
B(a)P total potency equivalents [B(a)P TPE]	----	E641A-L	0.020	mg/kg	<0.010	<0.010	----	----	----
IACR (CCME)	----	E641A-L	0.15	mg/kg	<0.11	<0.11	----	----	----
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>									
acridine-d9	34749-75-2	E641A-L	0.010	%	94.2	96.8	----	----	----
chrysene-d12	1719-03-5	E641A-L	0.010	%	106	106	----	----	----
naphthalene-d8	1146-65-2	E641A-L	0.010	%	96.6	97.4	----	----	----
phenanthrene-d10	1517-22-2	E641A-L	0.010	%	101	100	----	----	----
<b>Volatile Organic Compounds [THMs]</b>									
bromodichloromethane	75-27-4	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
bromoform	75-25-2	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
chloroform	67-66-3	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
dibromochloromethane	124-48-1	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>VA20B4299</b>	Page	: 1 of 15
Client	: <b>Seabridge Gold Inc.</b>	Laboratory	: Vancouver - Environmental
Contact	: Elizabeth Miller	Account Manager	: Selam Worku
Address	: 1235 Main Street P.O. Box 2536 Smithers BC Canada V0J 2N0	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: 416 367 9292	Telephone	: +1 604 253 4188
Project	: VE52655D	Date Samples Received	: 02-Sep-2020 10:45
PO	:	Issue Date	: 28-Sep-2020 14:20
C-O-C number	: ----		
Sampler	: Ardy M		
Site	: ----		
Quote number	: VA20-SEAB100-0003 - Wood/Seabridge Gold		
No. of samples received	: 10		
No. of samples analysed	: 7		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

- Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.  
**CAS Number:** Chemical Abstracts Services number is a unique identifier assigned to discrete substances.  
**DQO:** Data Quality Objective.  
**LOR:** Limit of Reporting (detection limit).  
**RPD:** Relative Percent Difference.

## Summary of Outliers

### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Matrix Spike outliers occur.
- Laboratory Control Sample (LCS) outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.

### **Outliers : Analysis Holding Time Compliance (Breaches)**

- Analysis Holding Time Outliers exist - please see following pages for full details.

### **Outliers : Frequency of Quality Control Samples**

- No Quality Control Sample Frequency Outliers occur.





**Outliers : Quality Control Samples**

*Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes*

Matrix: **Soil/Solid**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
<b>Laboratory Control Sample (LCS) Recoveries</b>								
Volatile Organic Compounds	QC-MRG3-8244500 2	----	chloromethane	74-87-3	E611C	46.6 % LCS-ND	60.0-140%	Recovery less than lower control limit

**Result Qualifiers**

Qualifier	Description
LCS-ND	Lab Control Sample recovery was slightly outside ALS DQO. Reported non-detect results for associated samples were unaffected.



## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: Soil/Solid

Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
Glass soil jar/Teflon lined cap SP20-01-04	E601A	29-Aug-2020	09-Sep-2020	14 days	10 days	✓	10-Sep-2020	40 days	1 days	✓
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
Glass soil jar/Teflon lined cap SP20-01-05	E601A	29-Aug-2020	09-Sep-2020	14 days	10 days	✓	10-Sep-2020	40 days	1 days	✓
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
Glass soil jar/Teflon lined cap SP20-01-06	E601A	29-Aug-2020	09-Sep-2020	14 days	10 days	✓	10-Sep-2020	40 days	1 days	✓
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
Glass soil jar/Teflon lined cap SP20-01-56	E601A	29-Aug-2020	09-Sep-2020	14 days	10 days	✓	10-Sep-2020	40 days	1 days	✓
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
Glass soil jar/Teflon lined cap SP20-01-01	E601A	29-Aug-2020	09-Sep-2020	14 days	11 days	✓	10-Sep-2020	40 days	1 days	✓
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
Glass soil jar/Teflon lined cap SP20-01-02	E601A	29-Aug-2020	09-Sep-2020	14 days	11 days	✓	10-Sep-2020	40 days	1 days	✓
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
Glass soil jar/Teflon lined cap SP20-01-03	E601A	29-Aug-2020	09-Sep-2020	14 days	11 days	✓	10-Sep-2020	40 days	1 days	✓



Matrix: Soil/Solid

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Organic / Inorganic Carbon : Total Carbon by Combustion</b>											
LDPE bag SP20-01-01	E351	29-Aug-2020	----	----	----		09-Sep-2020	0 days	0 days		✔
<b>Organic / Inorganic Carbon : Total Carbon by Combustion</b>											
LDPE bag SP20-01-03	E351	29-Aug-2020	----	----	----		09-Sep-2020	0 days	0 days		✔
<b>Organic / Inorganic Carbon : Total Carbon by Combustion</b>											
LDPE bag SP20-01-05	E351	29-Aug-2020	----	----	----		09-Sep-2020	0 days	0 days		✔
<b>Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve</b>											
LDPE bag SP20-01-01	E354	29-Aug-2020	----	----	----		08-Sep-2020	----	----		
<b>Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve</b>											
LDPE bag SP20-01-03	E354	29-Aug-2020	----	----	----		08-Sep-2020	----	----		
<b>Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve</b>											
LDPE bag SP20-01-05	E354	29-Aug-2020	----	----	----		08-Sep-2020	----	----		
<b>Physical Tests : Moisture Content by Gravimetry</b>											
Glass soil jar/Teflon lined cap SP20-01-01	E144	29-Aug-2020	----	----	----		08-Sep-2020	----	----		
<b>Physical Tests : Moisture Content by Gravimetry</b>											
Glass soil jar/Teflon lined cap SP20-01-02	E144	29-Aug-2020	----	----	----		08-Sep-2020	----	----		
<b>Physical Tests : Moisture Content by Gravimetry</b>											
Glass soil jar/Teflon lined cap SP20-01-03	E144	29-Aug-2020	----	----	----		08-Sep-2020	----	----		



Matrix: Soil/Solid

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : Moisture Content by Gravimetry</b>											
Glass soil jar/Teflon lined cap SP20-01-04	E144	29-Aug-2020	----	----	----		08-Sep-2020	----	----		
<b>Physical Tests : Moisture Content by Gravimetry</b>											
Glass soil jar/Teflon lined cap SP20-01-05	E144	29-Aug-2020	----	----	----		08-Sep-2020	----	----		
<b>Physical Tests : Moisture Content by Gravimetry</b>											
Glass soil jar/Teflon lined cap SP20-01-06	E144	29-Aug-2020	----	----	----		08-Sep-2020	----	----		
<b>Physical Tests : Moisture Content by Gravimetry</b>											
Glass soil jar/Teflon lined cap SP20-01-56	E144	29-Aug-2020	----	----	----		08-Sep-2020	----	----		
<b>Plant Available Nutrients : Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride)</b>											
LDPE bag SP20-01-01	E269.N+N	29-Aug-2020	11-Sep-2020	----	----		11-Sep-2020	0 days	0 days	✔	
<b>Plant Available Nutrients : Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride)</b>											
LDPE bag SP20-01-03	E269.N+N	29-Aug-2020	11-Sep-2020	----	----		11-Sep-2020	0 days	0 days	✔	
<b>Plant Available Nutrients : Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride)</b>											
LDPE bag SP20-01-05	E269.N+N	29-Aug-2020	11-Sep-2020	----	----		11-Sep-2020	0 days	0 days	✔	
<b>Plant Available Nutrients : Available Phosphorus by FIALab (Modified Kelowna)</b>											
LDPE bag SP20-01-05	E384	29-Aug-2020	17-Sep-2020	180 days	18 days	✔	17-Sep-2020	161 days	0 days	✔	
<b>Plant Available Nutrients : Available Phosphorus by FIALab (Modified Kelowna)</b>											
LDPE bag SP20-01-01	E384	29-Aug-2020	17-Sep-2020	180 days	19 days	✔	17-Sep-2020	160 days	0 days	✔	



Matrix: Soil/Solid

Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Plant Available Nutrients : Available Phosphorus by FIALab (Modified Kelowna)</b>											
LDPE bag SP20-01-03	E384	29-Aug-2020	17-Sep-2020	180 days	19 days	✓	17-Sep-2020	160 days	0 days	✓	
<b>Plant Available Nutrients : Available Potassium by flame photometry (Modified Kelowna)</b>											
LDPE bag SP20-01-05	E390	29-Aug-2020	17-Sep-2020	180 days	18 days	✓	17-Sep-2020	161 days	0 days	✓	
<b>Plant Available Nutrients : Available Potassium by flame photometry (Modified Kelowna)</b>											
LDPE bag SP20-01-01	E390	29-Aug-2020	17-Sep-2020	180 days	19 days	✓	17-Sep-2020	160 days	0 days	✓	
<b>Plant Available Nutrients : Available Potassium by flame photometry (Modified Kelowna)</b>											
LDPE bag SP20-01-03	E390	29-Aug-2020	17-Sep-2020	180 days	19 days	✓	17-Sep-2020	160 days	0 days	✓	
<b>Plant Available Nutrients : Available Sulfate by ICPOES (0.01M Calcium Chloride Ext.)</b>											
LDPE bag SP20-01-01	E497.SO4	29-Aug-2020	11-Sep-2020	----	----		11-Sep-2020	0 days	0 days	✓	
<b>Plant Available Nutrients : Available Sulfate by ICPOES (0.01M Calcium Chloride Ext.)</b>											
LDPE bag SP20-01-03	E497.SO4	29-Aug-2020	11-Sep-2020	----	----		11-Sep-2020	0 days	0 days	✓	
<b>Plant Available Nutrients : Available Sulfate by ICPOES (0.01M Calcium Chloride Ext.)</b>											
LDPE bag SP20-01-05	E497.SO4	29-Aug-2020	11-Sep-2020	----	----		11-Sep-2020	0 days	0 days	✓	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)</b>											
Glass soil jar/Teflon lined cap SP20-01-04	E641A-L	29-Aug-2020	09-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)</b>											
Glass soil jar/Teflon lined cap SP20-01-05	E641A-L	29-Aug-2020	09-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓	



Matrix: Soil/Solid

Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)</b>											
Glass soil jar/Teflon lined cap SP20-01-06	E641A-L	29-Aug-2020	09-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)</b>											
Glass soil jar/Teflon lined cap SP20-01-56	E641A-L	29-Aug-2020	09-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)</b>											
Glass soil jar/Teflon lined cap SP20-01-01	E641A-L	29-Aug-2020	09-Sep-2020	14 days	11 days	✓	09-Sep-2020	40 days	0 days	✓	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)</b>											
Glass soil jar/Teflon lined cap SP20-01-02	E641A-L	29-Aug-2020	09-Sep-2020	14 days	11 days	✓	09-Sep-2020	40 days	0 days	✓	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)</b>											
Glass soil jar/Teflon lined cap SP20-01-03	E641A-L	29-Aug-2020	09-Sep-2020	14 days	11 days	✓	09-Sep-2020	40 days	0 days	✓	
<b>Taxonomy : Hydrocarbon Utilizing Bacteria</b>											
Glass soil jar/Teflon lined cap SP20-01-05	E924.AR	29-Aug-2020	----	----	----		24-Sep-2020	48 hrs	627 hrs	* EHTR	
<b>Taxonomy : Hydrocarbon Utilizing Bacteria</b>											
Glass soil jar/Teflon lined cap SP20-01-01	E924.AR	29-Aug-2020	----	----	----		24-Sep-2020	48 hrs	639 hrs	* EHTR	
<b>Taxonomy : Hydrocarbon Utilizing Bacteria</b>											
Glass soil jar/Teflon lined cap SP20-01-02	E924.AR	29-Aug-2020	----	----	----		24-Sep-2020	48 hrs	639 hrs	* EHTR	
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>											
Glass soil methanol vial SP20-01-01	E611C	29-Aug-2020	04-Sep-2020	----	----		04-Sep-2020	----	----		





Matrix: Soil/Solid

Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>										
Glass soil methanol vial SP20-01-02	E611C	29-Aug-2020	04-Sep-2020	----	----		04-Sep-2020	----	----	
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>										
Glass soil methanol vial SP20-01-03	E611C	29-Aug-2020	04-Sep-2020	----	----		04-Sep-2020	----	----	
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>										
Glass soil methanol vial SP20-01-04	E611C	29-Aug-2020	04-Sep-2020	----	----		04-Sep-2020	----	----	
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>										
Glass soil methanol vial SP20-01-05	E611C	29-Aug-2020	04-Sep-2020	----	----		04-Sep-2020	----	----	
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>										
Glass soil methanol vial SP20-01-06	E611C	29-Aug-2020	04-Sep-2020	----	----		04-Sep-2020	----	----	
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>										
Glass soil methanol vial SP20-01-56	E611C	29-Aug-2020	06-Sep-2020	----	----		08-Sep-2020	----	----	
<b>Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS</b>										
Glass soil methanol vial SP20-01-04	E611C	29-Aug-2020	04-Sep-2020	40 days	5 days	✓	04-Sep-2020	34 days	0 days	✓
<b>Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS</b>										
Glass soil methanol vial SP20-01-05	E611C	29-Aug-2020	04-Sep-2020	40 days	5 days	✓	04-Sep-2020	34 days	0 days	✓
<b>Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS</b>										
Glass soil methanol vial SP20-01-06	E611C	29-Aug-2020	04-Sep-2020	40 days	5 days	✓	04-Sep-2020	34 days	0 days	✓



Matrix: **Soil/Solid**

Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS</b>											
Glass soil methanol vial SP20-01-01	E611C	29-Aug-2020	04-Sep-2020	40 days	6 days	✓	04-Sep-2020	33 days	0 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS</b>											
Glass soil methanol vial SP20-01-02	E611C	29-Aug-2020	04-Sep-2020	40 days	6 days	✓	04-Sep-2020	33 days	0 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS</b>											
Glass soil methanol vial SP20-01-03	E611C	29-Aug-2020	04-Sep-2020	40 days	6 days	✓	04-Sep-2020	33 days	0 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS</b>											
Glass soil methanol vial SP20-01-56	E611C	29-Aug-2020	06-Sep-2020	40 days	7 days	✓	08-Sep-2020	32 days	1 days	✓	
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>											
Glass soil methanol vial SP20-01-01	E611C	29-Aug-2020	04-Sep-2020	----	----		04-Sep-2020	----	----		
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>											
Glass soil methanol vial SP20-01-02	E611C	29-Aug-2020	04-Sep-2020	----	----		04-Sep-2020	----	----		
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>											
Glass soil methanol vial SP20-01-03	E611C	29-Aug-2020	04-Sep-2020	----	----		04-Sep-2020	----	----		
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>											
Glass soil methanol vial SP20-01-04	E611C	29-Aug-2020	04-Sep-2020	----	----		04-Sep-2020	----	----		
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>											
Glass soil methanol vial SP20-01-05	E611C	29-Aug-2020	04-Sep-2020	----	----		04-Sep-2020	----	----		



Matrix: **Soil/Solid**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>										
Glass soil methanol vial SP20-01-06	E611C	29-Aug-2020	04-Sep-2020	----	----		04-Sep-2020	----	----	
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>										
Glass soil methanol vial SP20-01-56	E611C	29-Aug-2020	06-Sep-2020	----	----		08-Sep-2020	----	----	
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
Glass soil methanol vial SP20-01-01	E611C	29-Aug-2020	04-Sep-2020	----	----		04-Sep-2020	----	----	
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
Glass soil methanol vial SP20-01-02	E611C	29-Aug-2020	04-Sep-2020	----	----		04-Sep-2020	----	----	
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
Glass soil methanol vial SP20-01-03	E611C	29-Aug-2020	04-Sep-2020	----	----		04-Sep-2020	----	----	
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
Glass soil methanol vial SP20-01-04	E611C	29-Aug-2020	04-Sep-2020	----	----		04-Sep-2020	----	----	
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
Glass soil methanol vial SP20-01-05	E611C	29-Aug-2020	04-Sep-2020	----	----		04-Sep-2020	----	----	
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
Glass soil methanol vial SP20-01-06	E611C	29-Aug-2020	04-Sep-2020	----	----		04-Sep-2020	----	----	
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
Glass soil methanol vial SP20-01-56	E611C	29-Aug-2020	06-Sep-2020	----	----		08-Sep-2020	----	----	

**Legend & Qualifier Definitions**

EHTR: Exceeded ALS recommended hold time prior to sample receipt.

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Work Order : VA20B4299  
Client : Seabridge Gold Inc.  
Project : VE52655D

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Rec. HT: ALS recommended hold time (see units).

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## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Soil/Solid**

Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)	E269.N+N	84477	1	9	11.1	5.0	✓
Available Phosphorus by FIALab (Modified Kelowna)	E384	86217	1	9	11.1	5.0	✓
Available Potassium by flame photometry (Modified Kelowna)	E390	86218	1	9	11.1	5.0	✓
Available Sulfate by ICPOES (0.01M Calcium Chloride Ext.)	E497.SO4	84476	1	20	5.0	5.0	✓
BC PHC - EPH by GC-FID	E601A	82948	1	10	10.0	5.0	✓
Hydrocarbon Utilizing Bacteria	E924.AR	91388	1	9	11.1	5.0	✓
Moisture Content by Gravimetry	E144	82950	1	9	11.1	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	82949	1	10	10.0	5.0	✓
Total Carbon by Combustion	E351	83605	1	20	5.0	5.0	✓
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354	82926	1	10	10.0	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	81573	2	16	12.5	5.0	✓
<b>Laboratory Control Samples (LCS)</b>							
Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)	E269.N+N	84477	2	9	22.2	10.0	✓
Available Phosphorus by FIALab (Modified Kelowna)	E384	86217	2	9	22.2	10.0	✓
Available Potassium by flame photometry (Modified Kelowna)	E390	86218	2	9	22.2	10.0	✓
Available Sulfate by ICPOES (0.01M Calcium Chloride Ext.)	E497.SO4	84476	2	20	10.0	10.0	✓
BC PHC - EPH by GC-FID	E601A	82948	2	10	20.0	10.0	✓
Moisture Content by Gravimetry	E144	82950	1	9	11.1	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	82949	2	10	20.0	10.0	✓
Total Carbon by Combustion	E351	83605	2	20	10.0	10.0	✓
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354	82926	2	10	20.0	10.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	81573	2	16	12.5	5.0	✓
<b>Method Blanks (MB)</b>							
Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)	E269.N+N	84477	1	9	11.1	5.0	✓
Available Phosphorus by FIALab (Modified Kelowna)	E384	86217	1	9	11.1	5.0	✓
Available Potassium by flame photometry (Modified Kelowna)	E390	86218	1	9	11.1	5.0	✓
Available Sulfate by ICPOES (0.01M Calcium Chloride Ext.)	E497.SO4	84476	1	20	5.0	5.0	✓
BC PHC - EPH by GC-FID	E601A	82948	1	10	10.0	5.0	✓
Hydrocarbon Utilizing Bacteria	E924.AR	91388	1	9	11.1	5.0	✓
Moisture Content by Gravimetry	E144	82950	1	9	11.1	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	82949	1	10	10.0	5.0	✓
Total Carbon by Combustion	E351	83605	1	20	5.0	5.0	✓
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354	82926	1	10	10.0	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	81573	2	16	12.5	5.0	✓
<b>Matrix Spikes (MS)</b>							
VOCs (BC List) by Headspace GC-MS	E611C	81573	2	16	12.5	5.0	✓



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Moisture Content by Gravimetry	E144 Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)	E269.N+N Saskatoon - Environmental	Soil/Solid	Alberta Agriculture/APHA 4500-NO3 I (mod)	Plant available nitrate and nitrite are analyzed by colourimetry using a flow injection analyzer on a soil sample extract that has been extracted using 0.01M Calcium Chloride, then shaken well and filtered prior to analysis.
Total Carbon by Combustion	E351 Saskatoon - Environmental	Soil/Solid	CSSS (2008) 21.2 (mod)	Total Carbon is determined by the high temperature combustion method with measurement by an infrared detector.
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354 Saskatoon - Environmental	Soil/Solid	CSSS (2008) 20.2	Total Inorganic Carbon is determined by acetic acid pH standard curve, where a known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.
Available Phosphorus by FIALab (Modified Kelowna)	E384 Saskatoon - Environmental	Soil/Solid	Comm. Soil Sci. Plant Anal, 25 (5&6)	Plant available phosphorus is extracted from air dried soil using a fixed ratio Modified Kelowna extraction. Phosphorus is determined by colorimetry using a flow injection analyzer.
Available Potassium by flame photometry (Modified Kelowna)	E390 Saskatoon - Environmental	Soil/Solid	Comm. Soil Sci. Plant Anal, 25 (5&6)	Plant available potassium is extracted from soil using modified Kelowna solution. Potassium is determined by flame emission at 770 nm.
Available Sulfate by ICPOES (0.01M Calcium Chloride Ext.)	E497.SO4 Saskatoon - Environmental	Soil/Solid	Alberta Agriculture	Plant available sulfate is determined by ICPOES. Soil is extracted using a 0.01M calcium chloride solution. This extraction may also produce organic sulfur in the extracts when organic soils are analyzed.
BC PHC - EPH by GC-FID	E601A Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual (EPH in Solids by GC/FID) (mod)	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.
VOCs (BC List) by Headspace GC-MS	E611C Vancouver - Environmental	Soil/Solid	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L Vancouver - Environmental	Soil/Solid	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by GC-MS.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Hydrocarbon Utilizing Bacteria	E924.AR  Winnipeg - Environmental	Soil/Solid	Internal	Following extraction, serial dilutions are plated onto hydrocarbon-laden media and incubated at 20°C for 5 days. Observed colonies are enumerated.
Total Organic Carbon (Calculated) in soil	EC356  Saskatoon - Environmental	Soil/Solid	CSSS (2008) 21.2	Total Organic Carbon (TOC) is calculated by the difference between total carbon (TC) and total inorganic carbon (TIC).
LEPH and HEPH: EPH-PAH	EC600A  Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual (LEPH and HEPH) (mod)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(b+j+k)fluoranthene, Benzo(a)pyrene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, and Pyrene.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Fixed ratio 0.01M Calcium Chloride extraction for plant available nutrients	EP269  Saskatoon - Environmental	Soil/Solid	Alberta Agriculture	Plant available nutrients (N&S) extracted using 0.01M calcium chloride, then shaken well and filtered prior to analysis.
Modified Kelowna Extraction for soil	EP384  Saskatoon - Environmental	Soil/Solid	Comm. Soil Sci. Plant Anal, 25 (5&6)	Plant available phosphorus and potassium are extracted from the soil using fixed ratio Modified Kelowna solution.
VOCs Methanol Extraction for Headspace Analysis	EP581  Vancouver - Environmental	Soil/Solid	EPA 5035A (mod)	VOCs in samples are extracted with methanol. Extracts are then prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PHCs and PAHs Hexane-Acetone Tumbler Extraction	EP601  Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1 (mod)	Samples are subsampled and Petroleum Hydrocarbons (PHC) and PAHs are extracted with 1:1 hexane:acetone using a rotary extractor.
Dry and Grind	EPP442  Saskatoon - Environmental	Soil/Solid	Soil Sampling and Methods of Analysis, Carter 2008	After removal of any coarse fragments and reservation of wet subsamples a portion of homogenized sample is set in a tray and dried at less than 60 C until dry. The sample is then particle size reduced with an automated crusher or mortar and pestle, typically to <2 mm. Further size reduction may be needed for particular tests.

## QUALITY CONTROL REPORT

**Work Order** : **VA20B4299**

**Page** : 1 of 18

**Client** : Seabridge Gold Inc.  
**Contact** : Elizabeth Miller  
**Address** : 1235 Main Street P.O. Box 2536  
 Smithers BC Canada V0J 2N0  
**Telephone** : 416 367 9292  
**Project** : VE52655D  
**PO** :  
**C-O-C number** : ----  
**Sampler** : Ardy M  
**Site** : ----  
**Quote number** : VA20-SEAB100-0003 - Wood/Seabridge Gold  
**No. of samples received** : 10  
**No. of samples analysed** : 7

**Laboratory** : Vancouver - Environmental  
**Account Manager** : Selam Worku  
**Address** : 8081 Lougheed Highway  
 Burnaby, British Columbia Canada V5A 1W9  
**Telephone** : +1 604 253 4188  
**Date Samples Received** : 02-Sep-2020 10:45  
**Date Analysis Commenced** : 04-Sep-2020  
**Issue Date** : 28-Sep-2020 14:20

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Brianna Allen	Department Manager - Organics	Organics, Burnaby, British Columbia
Dwayne Bennett	Technical Specialist	Inorganics, Saskatoon, Saskatchewan
Hedy Lai	Team Leader - Inorganics	Inorganics, Saskatoon, Saskatchewan
Jeremy Paterson	Analyst	Microbiology, Winnipeg, Manitoba
Melissa Shaw	Team Leader - Inorganics	Inorganics, Saskatoon, Saskatchewan
Xihua Yao	Laboratory Analyst	Inorganics, Saskatoon, Saskatchewan



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Work Order : VA20B4299  
Client : Seabridge Gold Inc.  
Project : VE52655D

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## **General Comments**

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

# = Indicates a QC result that did not meet the ALS DQO.



## Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: Soil/Solid

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 82950)</b>											
VA20B4299-001	SP20-01-01	moisture	----	E144	0.25	%	11.0	13.2	18.0%	20%	----
<b>Organic / Inorganic Carbon (QC Lot: 82926)</b>											
VA20B4276-008	Anonymous	carbon, inorganic [IC]	----	E354	0.050	%	5.45	5.47	0.305%	20%	----
<b>Organic / Inorganic Carbon (QC Lot: 83605)</b>											
VA20B4276-008	Anonymous	carbon, total [TC]	----	E351	0.050	%	13.0	13.2	1.04%	20%	----
<b>Plant Available Nutrients (QC Lot: 84476)</b>											
VA20B4097-038	Anonymous	sulfate, available (as S)	14808-79-8	E497.S04	3.0	mg/kg	242	234	3.45%	30%	----
<b>Plant Available Nutrients (QC Lot: 84477)</b>											
VA20B4299-001	SP20-01-01	nitrate + nitrite, available (as N)	----	E269 N+N	1.0	mg/kg	<1.0	<1.0	0	Diff <2x LOR	----
<b>Plant Available Nutrients (QC Lot: 86217)</b>											
VA20B4299-001	SP20-01-01	phosphate, available (as P)	14265-44-2	E384	2.0	mg/kg	2.6	2.6	0.004	Diff <2x LOR	----
<b>Plant Available Nutrients (QC Lot: 86218)</b>											
VA20B4299-001	SP20-01-01	potassium, available	7440-09-7	E390	20	mg/kg	67	66	1	Diff <2x LOR	----
<b>Taxonomy (QC Lot: 91388)</b>											
VA20B4301-002	Anonymous	hydrocarbon utilizing bacteria [HUB]	----	E924 AR	5000	CFU/g	56000	49000	13.3%	50%	----
<b>Volatile Organic Compounds (QC Lot: 81573)</b>											
KS2001615-001	Anonymous	benzene	71-43-2	E611C	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		bromodichloromethane	75-27-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		bromoform	75-25-2	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		carbon tetrachloride	56-23-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chlorobenzene	108-90-7	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chloroethane	75-00-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chloroform	67-66-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chloromethane	74-87-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dibromochloromethane	124-48-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichlorobenzene, 1,2-	95-50-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichlorobenzene, 1,3-	541-73-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichlorobenzene, 1,4-	106-46-7	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethane, 1,1-	75-34-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethane, 1,2-	107-06-2	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethylene, 1,1-	75-35-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----



Sub-Matrix: Soil/Solid

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Volatile Organic Compounds (QC Lot: 81573) - continued</b>											
KS2001615-001	Anonymous	dichloroethylene, cis-1,2-	156-59-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloromethane	75-09-2	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloropropane, 1,2-	78-87-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloropropylene, cis-1,3-	10061-01-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloropropylene, trans-1,3-	10061-02-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	<0.015	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		styrene	100-42-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tetrachloroethylene	127-18-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		toluene	108-88-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		trichloroethane, 1,1,1-	71-55-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		trichloroethane, 1,1,2-	79-00-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		trichloroethylene	79-01-6	E611C	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		trichlorofluoromethane	75-69-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		vinyl chloride	75-01-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
xylene, m+p-	179601-23-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----		
xylene, o-	95-47-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----		
<b>Volatile Organic Compounds (QC Lot: 82445)</b>											
VA20B3143-018	Anonymous	benzene	71-43-2	E611C	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		bromodichloromethane	75-27-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		bromoform	75-25-2	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		carbon tetrachloride	56-23-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chlorobenzene	108-90-7	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chloroethane	75-00-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chloroform	67-66-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chloromethane	74-87-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dibromochloromethane	124-48-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichlorobenzene, 1,2-	95-50-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichlorobenzene, 1,3-	541-73-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichlorobenzene, 1,4-	106-46-7	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethane, 1,1-	75-34-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethane, 1,2-	107-06-2	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethylene, 1,1-	75-35-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----



Sub-Matrix: Soil/Solid					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Volatile Organic Compounds (QC Lot: 82445) - continued</b>											
VA20B3143-018	Anonymous	dichloroethylene, cis-1,2-	156-59-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloromethane	75-09-2	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloropropane, 1,2-	78-87-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloropropylene, cis-1,3-	10061-01-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloropropylene, trans-1,3-	10061-02-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	<0.015	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		styrene	100-42-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tetrachloroethylene	127-18-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		toluene	108-88-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		trichloroethane, 1,1,1-	71-55-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		trichloroethane, 1,1,2-	79-00-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		trichloroethylene	79-01-6	E611C	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		trichlorofluoromethane	75-69-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		vinyl chloride	75-01-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
xylene, o-	95-47-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----		
<b>Hydrocarbons (QC Lot: 82948)</b>											
VA20B4299-001	SP20-01-01	EPH (C10-C19)	----	E601A	200	mg/kg	300	340	30	Diff <2x LOR	----
		EPH (C19-C32)	----	E601A	200	mg/kg	<200	<200	0	Diff <2x LOR	----
<b>Polycyclic Aromatic Hydrocarbons (QC Lot: 82949)</b>											
VA20B4299-001	SP20-01-01	acenaphthene	83-32-9	E641A-L	0 0050	mg/kg	<0 0050	<0.0050	0	Diff <2x LOR	----
		acenaphthylene	208-96-8	E641A-L	0 0070	mg/kg	<0 0070	<0.0080	0.0010	Diff <2x LOR	----
		acridine	260-94-6	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		anthracene	120-12-7	E641A-L	0 0040	mg/kg	<0 0040	<0.0040	0	Diff <2x LOR	----
		benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(b+j)fluoranthene	----	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		chrysene	218-01-9	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		dibenz(a,h)anthracene	53-70-3	E641A-L	0 0050	mg/kg	<0 0050	<0.0050	0	Diff <2x LOR	----
		fluoranthene	206-44-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----

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 Work Order : VA20B4299  
 Client : Seabridge Gold Inc.  
 Project : VE52655D



Sub-Matrix: **Soil/Solid**

*Laboratory Duplicate (DUP) Report*

<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Original Result</i>	<i>Duplicate Result</i>	<i>RPD(%) or Difference</i>	<i>Duplicate Limits</i>	<i>Qualifier</i>
<b>Polycyclic Aromatic Hydrocarbons (QC Lot: 82949) - continued</b>											
VA20B4299-001	SP20-01-01	fluorene	86-73-7	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		naphthalene	91-20-3	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		phenanthrene	85-01-8	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		pyrene	129-00-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		quinoline	6027-02-7	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

### Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 82950)</b>						
moisture	----	E144	0.25	%	<0.25	----
<b>Organic / Inorganic Carbon (QCLot: 82926)</b>						
carbon, inorganic [IC]	----	E354	0.05	%	<0.050	----
<b>Organic / Inorganic Carbon (QCLot: 83605)</b>						
carbon, total [TC]	----	E351	0.05	%	<0.050	----
<b>Plant Available Nutrients (QCLot: 84476)</b>						
sulfate, available (as S)	14808-79-8	E497.SO4	3	mg/kg	<3.0	----
<b>Plant Available Nutrients (QCLot: 84477)</b>						
nitrate + nitrite, available (as N)	----	E269.N+N	1	mg/kg	<1.0	----
<b>Plant Available Nutrients (QCLot: 86217)</b>						
phosphate, available (as P)	14265-44-2	E384	2	mg/kg	<2.0	----
<b>Plant Available Nutrients (QCLot: 86218)</b>						
potassium, available	7440-09-7	E390	20	mg/kg	<20	----
<b>Taxonomy (QCLot: 91388)</b>						
hydrocarbon utilizing bacteria [HUB]	----	E924.AR	5	CFU/g	<5	----
<b>Volatile Organic Compounds (QCLot: 81573)</b>						
benzene	71-43-2	E611C	0.005	mg/kg	<0.0050	----
bromodichloromethane	75-27-4	E611C	0.05	mg/kg	<0.050	----
bromoform	75-25-2	E611C	0.05	mg/kg	<0.050	----
carbon tetrachloride	56-23-5	E611C	0.05	mg/kg	<0.050	----
chlorobenzene	108-90-7	E611C	0.05	mg/kg	<0.050	----
chloroethane	75-00-3	E611C	0.05	mg/kg	<0.050	----
chloroform	67-66-3	E611C	0.05	mg/kg	<0.050	----
chloromethane	74-87-3	E611C	0.05	mg/kg	<0.050	----
dibromochloromethane	124-48-1	E611C	0.05	mg/kg	<0.050	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.05	mg/kg	<0.050	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.05	mg/kg	<0.050	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.05	mg/kg	<0.050	----
dichloroethane, 1,1-	75-34-3	E611C	0.05	mg/kg	<0.050	----
dichloroethane, 1,2-	107-06-2	E611C	0.05	mg/kg	<0.050	----
dichloroethylene, 1,1-	75-35-4	E611C	0.05	mg/kg	<0.050	----
dichloroethylene, cis-1,2-	156-59-4	E611C	0.05	mg/kg	<0.050	----
dichloroethylene, trans-1,2-	156-60-5	E611C	0.05	mg/kg	<0.050	----



Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Volatile Organic Compounds (QCLot: 81573) - continued</b>						
dichloromethane	75-09-2	E611C	0.05	mg/kg	<0.050	---
dichloropropane, 1,2-	78-87-5	E611C	0.05	mg/kg	<0.050	---
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.05	mg/kg	<0.050	---
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.05	mg/kg	<0.050	---
ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	---
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.05	mg/kg	<0.050	---
styrene	100-42-5	E611C	0.05	mg/kg	<0.050	---
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.05	mg/kg	<0.050	---
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.05	mg/kg	<0.050	---
tetrachloroethylene	127-18-4	E611C	0.05	mg/kg	<0.050	---
toluene	108-88-3	E611C	0.05	mg/kg	<0.050	---
trichloroethane, 1,1,1-	71-55-6	E611C	0.05	mg/kg	<0.050	---
trichloroethane, 1,1,2-	79-00-5	E611C	0.05	mg/kg	<0.050	---
trichloroethylene	79-01-6	E611C	0.01	mg/kg	<0.010	---
trichlorofluoromethane	75-69-4	E611C	0.05	mg/kg	<0.050	---
vinyl chloride	75-01-4	E611C	0.05	mg/kg	<0.050	---
xylene, m+p-	179601-23-1	E611C	0.05	mg/kg	<0.050	---
xylene, o-	95-47-6	E611C	0.05	mg/kg	<0.050	---
<b>Volatile Organic Compounds (QCLot: 82445)</b>						
benzene	71-43-2	E611C	0.005	mg/kg	<0.0050	---
bromodichloromethane	75-27-4	E611C	0.05	mg/kg	<0.050	---
bromoform	75-25-2	E611C	0.05	mg/kg	<0.050	---
carbon tetrachloride	56-23-5	E611C	0.05	mg/kg	<0.050	---
chlorobenzene	108-90-7	E611C	0.05	mg/kg	<0.050	---
chloroethane	75-00-3	E611C	0.05	mg/kg	<0.050	---
chloroform	67-66-3	E611C	0.05	mg/kg	<0.050	---
chloromethane	74-87-3	E611C	0.05	mg/kg	<0.050	---
dibromochloromethane	124-48-1	E611C	0.05	mg/kg	<0.050	---
dichlorobenzene, 1,2-	95-50-1	E611C	0.05	mg/kg	<0.050	---
dichlorobenzene, 1,3-	541-73-1	E611C	0.05	mg/kg	<0.050	---
dichlorobenzene, 1,4-	106-46-7	E611C	0.05	mg/kg	<0.050	---
dichloroethane, 1,1-	75-34-3	E611C	0.05	mg/kg	<0.050	---
dichloroethane, 1,2-	107-06-2	E611C	0.05	mg/kg	<0.050	---
dichloroethylene, 1,1-	75-35-4	E611C	0.05	mg/kg	<0.050	---
dichloroethylene, cis-1,2-	156-59-4	E611C	0.05	mg/kg	<0.050	---
dichloroethylene, trans-1,2-	156-60-5	E611C	0.05	mg/kg	<0.050	---



Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Volatile Organic Compounds (QCLot: 82445) - continued</b>						
dichloromethane	75-09-2	E611C	0.05	mg/kg	<0.050	---
dichloropropane, 1,2-	78-87-5	E611C	0.05	mg/kg	<0.050	---
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.05	mg/kg	<0.050	---
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.05	mg/kg	<0.050	---
ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	---
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.05	mg/kg	<0.050	---
styrene	100-42-5	E611C	0.05	mg/kg	<0.050	---
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.05	mg/kg	<0.050	---
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.05	mg/kg	<0.050	---
tetrachloroethylene	127-18-4	E611C	0.05	mg/kg	<0.050	---
toluene	108-88-3	E611C	0.05	mg/kg	<0.050	---
trichloroethane, 1,1,1-	71-55-6	E611C	0.05	mg/kg	<0.050	---
trichloroethane, 1,1,2-	79-00-5	E611C	0.05	mg/kg	<0.050	---
trichloroethylene	79-01-6	E611C	0.01	mg/kg	<0.010	---
trichlorofluoromethane	75-69-4	E611C	0.05	mg/kg	<0.050	---
vinyl chloride	75-01-4	E611C	0.05	mg/kg	<0.050	---
xylene, m+p-	179601-23-1	E611C	0.05	mg/kg	<0.050	---
xylene, o-	95-47-6	E611C	0.05	mg/kg	<0.050	---
<b>Hydrocarbons (QCLot: 82948)</b>						
EPH (C10-C19)	---	E601A	200	mg/kg	<200	---
EPH (C19-C32)	---	E601A	200	mg/kg	<200	---
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 82949)</b>						
acenaphthene	83-32-9	E641A-L	0.005	mg/kg	<0.0050	---
acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	<0.0050	---
acridine	260-94-6	E641A-L	0.01	mg/kg	<0.010	---
anthracene	120-12-7	E641A-L	0.004	mg/kg	<0.0040	---
benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	<0.010	---
					<0.010	---
benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	<0.010	---
benzo(b+j)fluoranthene	---	E641A-L	0.01	mg/kg	<0.010	---
benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	<0.010	---
					<0.010	---
benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	<0.010	---
					<0.010	---
chrysene	218-01-9	E641A-L	0.01	mg/kg	<0.010	---
dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	<0.0050	---





Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 82949) - continued</b>						
fluoranthene	206-44-0	E641A-L	0.01	mg/kg	<0.010	----
fluorene	86-73-7	E641A-L	0.01	mg/kg	<0.010	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	<0.010	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	<0.010	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	<0.010	----
naphthalene	91-20-3	E641A-L	0.01	mg/kg	<0.010	----
phenanthrene	85-01-8	E641A-L	0.01	mg/kg	<0.010	----
pyrene	129-00-0	E641A-L	0.01	mg/kg	<0.010	----
quinoline	6027-02-7	E641A-L	0.01	mg/kg	<0.010	----



## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Soil/Solid

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Physical Tests (QCLot: 82950)</b>									
moisture	---	E144	0.25	%	50 %	99.8	90.0	110	---
<b>Organic / Inorganic Carbon (QCLot: 82926)</b>									
carbon, inorganic [IC]	---	E354	0.05	%	0.5 %	95.9	90.0	110	---
<b>Organic / Inorganic Carbon (QCLot: 83605)</b>									
carbon, total [TC]	---	E351	0.05	%	48 %	101	80.0	120	---
<b>Plant Available Nutrients (QCLot: 84476)</b>									
sulfate, available (as S)	14808-79-8	E497.SO4	3	mg/kg	200 mg/kg	104	70.0	130	---
<b>Plant Available Nutrients (QCLot: 84477)</b>									
nitrate + nitrite, available (as N)	---	E269.N+N	1	mg/kg	22 mg/kg	81.8	70.0	130	---
<b>Plant Available Nutrients (QCLot: 86217)</b>									
phosphate, available (as P)	14265-44-2	E384	2	mg/kg	12.5 mg/kg	96.6	80.0	120	---
<b>Plant Available Nutrients (QCLot: 86218)</b>									
potassium, available	7440-09-7	E390	20	mg/kg	125 mg/kg	94.8	70.0	130	---
<b>Volatile Organic Compounds (QCLot: 81573)</b>									
benzene	71-43-2	E611C	0.005	mg/kg	2.5 mg/kg	104	70.0	130	---
bromodichloromethane	75-27-4	E611C	0.05	mg/kg	2.5 mg/kg	104	70.0	130	---
bromoform	75-25-2	E611C	0.05	mg/kg	2.5 mg/kg	108	70.0	130	---
carbon tetrachloride	56-23-5	E611C	0.05	mg/kg	2.5 mg/kg	100	70.0	130	---
chlorobenzene	108-90-7	E611C	0.05	mg/kg	2.5 mg/kg	111	70.0	130	---
chloroethane	75-00-3	E611C	0.05	mg/kg	2.5 mg/kg	93.7	60.0	140	---
chloroform	67-66-3	E611C	0.05	mg/kg	2.5 mg/kg	103	70.0	130	---
chloromethane	74-87-3	E611C	0.05	mg/kg	2.5 mg/kg	82.7	60.0	140	---
dibromochloromethane	124-48-1	E611C	0.05	mg/kg	2.5 mg/kg	109	70.0	130	---
dichlorobenzene, 1,2-	95-50-1	E611C	0.05	mg/kg	2.5 mg/kg	111	70.0	130	---
dichlorobenzene, 1,3-	541-73-1	E611C	0.05	mg/kg	2.5 mg/kg	99.4	70.0	130	---
dichlorobenzene, 1,4-	106-46-7	E611C	0.05	mg/kg	2.5 mg/kg	113	70.0	130	---
dichloroethane, 1,1-	75-34-3	E611C	0.05	mg/kg	2.5 mg/kg	103	70.0	130	---
dichloroethane, 1,2-	107-06-2	E611C	0.05	mg/kg	2.5 mg/kg	107	70.0	130	---
dichloroethylene, 1,1-	75-35-4	E611C	0.05	mg/kg	2.5 mg/kg	98.2	70.0	130	---
dichloroethylene, cis-1,2-	156-59-4	E611C	0.05	mg/kg	2.5 mg/kg	106	70.0	130	---
dichloroethylene, trans-1,2-	156-60-5	E611C	0.05	mg/kg	2.5 mg/kg	105	70.0	130	---



Sub-Matrix: Soil/Solid

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 81573) - continued</b>									
dichloromethane	75-09-2	E611C	0.05	mg/kg	2.5 mg/kg	103	60.0	140	----
dichloropropane, 1,2-	78-87-5	E611C	0.05	mg/kg	2.5 mg/kg	101	70.0	130	----
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.05	mg/kg	2.5 mg/kg	87.1	70.0	130	----
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.05	mg/kg	2.5 mg/kg	78.4	70.0	130	----
ethylbenzene	100-41-4	E611C	0.015	mg/kg	2.5 mg/kg	102	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.05	mg/kg	2.5 mg/kg	105	70.0	130	----
styrene	100-42-5	E611C	0.05	mg/kg	2.5 mg/kg	99.1	70.0	130	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.05	mg/kg	2.5 mg/kg	104	70.0	130	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.05	mg/kg	2.5 mg/kg	114	70.0	130	----
tetrachloroethylene	127-18-4	E611C	0.05	mg/kg	2.5 mg/kg	109	70.0	130	----
toluene	108-88-3	E611C	0.05	mg/kg	2.5 mg/kg	105	70.0	130	----
trichloroethane, 1,1,1-	71-55-6	E611C	0.05	mg/kg	2.5 mg/kg	94.0	70.0	130	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.05	mg/kg	2.5 mg/kg	108	70.0	130	----
trichloroethylene	79-01-6	E611C	0.01	mg/kg	2.5 mg/kg	105	70.0	130	----
trichlorofluoromethane	75-69-4	E611C	0.05	mg/kg	2.5 mg/kg	100	60.0	140	----
vinyl chloride	75-01-4	E611C	0.05	mg/kg	2.5 mg/kg	85.3	60.0	140	----
xylene, m+p-	179601-23-1	E611C	0.05	mg/kg	5 mg/kg	110	70.0	130	----
xylene, o-	95-47-6	E611C	0.05	mg/kg	2.5 mg/kg	112	70.0	130	----
<b>Volatile Organic Compounds (QCLot: 82445)</b>									
benzene	71-43-2	E611C	0.005	mg/kg	2.5 mg/kg	91.1	70.0	130	----
bromodichloromethane	75-27-4	E611C	0.05	mg/kg	2.5 mg/kg	103	70.0	130	----
bromoform	75-25-2	E611C	0.05	mg/kg	2.5 mg/kg	113	70.0	130	----
carbon tetrachloride	56-23-5	E611C	0.05	mg/kg	2.5 mg/kg	92.0	70.0	130	----
chlorobenzene	108-90-7	E611C	0.05	mg/kg	2.5 mg/kg	96.3	70.0	130	----
chloroethane	75-00-3	E611C	0.05	mg/kg	2.5 mg/kg	61.4	60.0	140	----
chloroform	67-66-3	E611C	0.05	mg/kg	2.5 mg/kg	99.0	70.0	130	----
chloromethane	74-87-3	E611C	0.05	mg/kg	2.5 mg/kg	# 46.6	60.0	140	LCS-ND
dibromochloromethane	124-48-1	E611C	0.05	mg/kg	2.5 mg/kg	104	70.0	130	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.05	mg/kg	2.5 mg/kg	103	70.0	130	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.05	mg/kg	2.5 mg/kg	97.3	70.0	130	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.05	mg/kg	2.5 mg/kg	101	70.0	130	----
dichloroethane, 1,1-	75-34-3	E611C	0.05	mg/kg	2.5 mg/kg	82.1	70.0	130	----
dichloroethane, 1,2-	107-06-2	E611C	0.05	mg/kg	2.5 mg/kg	98.5	70.0	130	----
dichloroethylene, 1,1-	75-35-4	E611C	0.05	mg/kg	2.5 mg/kg	74.4	70.0	130	----
dichloroethylene, cis-1,2-	156-59-4	E611C	0.05	mg/kg	2.5 mg/kg	91.5	70.0	130	----
dichloroethylene, trans-1,2-	156-60-5	E611C	0.05	mg/kg	2.5 mg/kg	82.7	70.0	130	----
dichloromethane	75-09-2	E611C	0.05	mg/kg	2.5 mg/kg	89.1	60.0	140	----



Sub-Matrix: Soil/Solid

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 82445) - continued</b>									
dichloropropane, 1,2-	78-87-5	E611C	0.05	mg/kg	2.5 mg/kg	102	70.0	130	----
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.05	mg/kg	2.5 mg/kg	109	70.0	130	----
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.05	mg/kg	2.5 mg/kg	92.0	70.0	130	----
ethylbenzene	100-41-4	E611C	0.015	mg/kg	2.5 mg/kg	92.6	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.05	mg/kg	2.5 mg/kg	89.2	70.0	130	----
styrene	100-42-5	E611C	0.05	mg/kg	2.5 mg/kg	95.7	70.0	130	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.05	mg/kg	2.5 mg/kg	101	70.0	130	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.05	mg/kg	2.5 mg/kg	116	70.0	130	----
tetrachloroethylene	127-18-4	E611C	0.05	mg/kg	2.5 mg/kg	85.3	70.0	130	----
toluene	108-88-3	E611C	0.05	mg/kg	2.5 mg/kg	92.9	70.0	130	----
trichloroethane, 1,1,1-	71-55-6	E611C	0.05	mg/kg	2.5 mg/kg	92.2	70.0	130	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.05	mg/kg	2.5 mg/kg	100	70.0	130	----
trichloroethylene	79-01-6	E611C	0.01	mg/kg	2.5 mg/kg	92.6	70.0	130	----
trichlorofluoromethane	75-69-4	E611C	0.05	mg/kg	2.5 mg/kg	99.9	60.0	140	----
vinyl chloride	75-01-4	E611C	0.05	mg/kg	2.5 mg/kg	60.4	60.0	140	----
xylene, m+p-	179601-23-1	E611C	0.05	mg/kg	5 mg/kg	94.5	70.0	130	----
xylene, o-	95-47-6	E611C	0.05	mg/kg	2.5 mg/kg	94.4	70.0	130	----
<b>Hydrocarbons (QCLot: 82948)</b>									
EPH (C10-C19)	----	E601A	200	mg/kg	1134.37 mg/kg	107	70.0	130	----
EPH (C19-C32)	----	E601A	200	mg/kg	575.98 mg/kg	105	70.0	130	----
					10183 mg/kg	99.6	70.0	130	----
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 82949)</b>									
acenaphthene	83-32-9	E641A-L	0.005	mg/kg	0.5 mg/kg	101	60.0	130	----
acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	0.5 mg/kg	100	60.0	130	----
acridine	260-94-6	E641A-L	0.01	mg/kg	0.5 mg/kg	103	60.0	130	----
anthracene	120-12-7	E641A-L	0.004	mg/kg	0.5 mg/kg	105	60.0	130	----
benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	0.5 mg/kg	103	60.0	130	----
					0.545 mg/kg	97.9	60.0	130	----
benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	0.5 mg/kg	102	60.0	130	----
benzo(b+j)fluoranthene	----	E641A-L	0.01	mg/kg	0.5 mg/kg	104	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	0.5 mg/kg	102	60.0	130	----
					0.377 mg/kg	98.8	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	0.5 mg/kg	95.5	60.0	130	----
					0.34 mg/kg	99.9	60.0	130	----
chrysene	218-01-9	E641A-L	0.01	mg/kg	0.5 mg/kg	95.6	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	0.5 mg/kg	103	60.0	130	----



Sub-Matrix: Soil/Solid

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 82949) - continued</b>									
fluoranthene	206-44-0	E641A-L	0.01	mg/kg	0.5 mg/kg	101	60.0	130	----
fluorene	86-73-7	E641A-L	0.01	mg/kg	0.5 mg/kg	103	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	0.5 mg/kg	106	60.0	130	----
					0.445 mg/kg	99.2	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	0.5 mg/kg	95.9	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	0.5 mg/kg	94.8	60.0	130	----
					1.088 mg/kg	91.0	60.0	130	----
naphthalene	91-20-3	E641A-L	0.01	mg/kg	0.5 mg/kg	97.3	50.0	130	----
					1.03 mg/kg	97.0	50.0	130	----
phenanthrene	85-01-8	E641A-L	0.01	mg/kg	0.5 mg/kg	102	60.0	130	----
					1.13 mg/kg	97.3	60.0	130	----
pyrene	129-00-0	E641A-L	0.01	mg/kg	0.5 mg/kg	107	60.0	130	----
					1.325 mg/kg	96.8	60.0	130	----
quinoline	6027-02-7	E641A-L	0.01	mg/kg	0.5 mg/kg	101	60.0	130	----

**Qualifiers**

Qualifier	Description
LCS-ND	Lab Control Sample recovery was slightly outside ALS DQO. Reported non-detect results for associated samples were unaffected.



## Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level  $\geq 1 \times$  spike level.

Sub-Matrix: Soil/Solid

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 81573)</b>										
KS2001615-001	Anonymous	benzene	71-43-2	E611C	2.68 mg/kg	3.125 mg/kg	116	60 0	140	----
		bromodichloromethane	75-27-4	E611C	2.80 mg/kg	3.125 mg/kg	121	60 0	140	----
		bromoform	75-25-2	E611C	2.82 mg/kg	3.125 mg/kg	122	60 0	140	----
		carbon tetrachloride	56-23-5	E611C	2.35 mg/kg	3.125 mg/kg	102	60 0	140	----
		chlorobenzene	108-90-7	E611C	2.71 mg/kg	3.125 mg/kg	117	60 0	140	----
		chloroethane	75-00-3	E611C	2.64 mg/kg	3.125 mg/kg	114	60 0	140	----
		chloroform	67-66-3	E611C	2.69 mg/kg	3.125 mg/kg	116	60 0	140	----
		chloromethane	74-87-3	E611C	2.85 mg/kg	3.125 mg/kg	123	60 0	140	----
		dibromochloromethane	124-48-1	E611C	2.76 mg/kg	3.125 mg/kg	120	60 0	140	----
		dichlorobenzene, 1,2-	95-50-1	E611C	2.60 mg/kg	3.125 mg/kg	112	60 0	140	----
		dichlorobenzene, 1,3-	541-73-1	E611C	2.50 mg/kg	3.125 mg/kg	108	60 0	140	----
		dichlorobenzene, 1,4-	106-46-7	E611C	2.63 mg/kg	3.125 mg/kg	114	60 0	140	----
		dichloroethane, 1,1-	75-34-3	E611C	2.78 mg/kg	3.125 mg/kg	120	60 0	140	----
		dichloroethane, 1,2-	107-06-2	E611C	2.97 mg/kg	3.125 mg/kg	128	60 0	140	----
		dichloroethylene, 1,1-	75-35-4	E611C	2.68 mg/kg	3.125 mg/kg	116	60 0	140	----
		dichloroethylene, cis-1,2-	156-59-4	E611C	2.79 mg/kg	3.125 mg/kg	121	60 0	140	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	2.76 mg/kg	3.125 mg/kg	120	60 0	140	----
		dichloromethane	75-09-2	E611C	2.91 mg/kg	3.125 mg/kg	126	60 0	140	----
		dichloropropane, 1,2-	78-87-5	E611C	2.93 mg/kg	3.125 mg/kg	126	60 0	140	----
		dichloropropylene, cis-1,3-	10061-01-5	E611C	2.70 mg/kg	3.125 mg/kg	116	60 0	140	----
		dichloropropylene, trans-1,3-	10061-02-6	E611C	3.12 mg/kg	3.125 mg/kg	135	60 0	140	----
		ethylbenzene	100-41-4	E611C	2.74 mg/kg	3.125 mg/kg	118	60 0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	2.37 mg/kg	3.125 mg/kg	102	60 0	140	----
		styrene	100-42-5	E611C	2.82 mg/kg	3.125 mg/kg	122	60 0	140	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	2.64 mg/kg	3.125 mg/kg	114	60 0	140	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611C	3.01 mg/kg	3.125 mg/kg	130	60 0	140	----
		tetrachloroethylene	127-18-4	E611C	2.51 mg/kg	3.125 mg/kg	108	60 0	140	----
		toluene	108-88-3	E611C	2.58 mg/kg	3.125 mg/kg	112	60 0	140	----
		trichloroethane, 1,1,1-	71-55-6	E611C	2.71 mg/kg	3.125 mg/kg	117	60 0	140	----
		trichloroethane, 1,1,2-	79-00-5	E611C	2.64 mg/kg	3.125 mg/kg	114	60 0	140	----
		trichloroethylene	79-01-6	E611C	2.56 mg/kg	3.125 mg/kg	111	60 0	140	----
		trichlorofluoromethane	75-69-4	E611C	2.52 mg/kg	3.125 mg/kg	109	60 0	140	----



Sub-Matrix: Soil/Solid

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	Target	MS	Low	High	
<b>Volatile Organic Compounds (QCLot: 81573) - continued</b>										
KS2001615-001	Anonymous	vinyl chloride	75-01-4	E611C	2.69 mg/kg	3.125 mg/kg	116	60 0	140	----
		xylene, m+p-	179601-23-1	E611C	5.67 mg/kg	6.25 mg/kg	123	60 0	140	----
		xylene, o-	95-47-6	E611C	2.83 mg/kg	3.125 mg/kg	122	60 0	140	----
<b>Volatile Organic Compounds (QCLot: 82445)</b>										
VA20B3143-019	Anonymous	benzene	71-43-2	E611C	2.07 mg/kg	3.125 mg/kg	95.2	60 0	140	----
		bromodichloromethane	75-27-4	E611C	2.08 mg/kg	3.125 mg/kg	95.7	60 0	140	----
		bromoform	75-25-2	E611C	2.23 mg/kg	3.125 mg/kg	102	60 0	140	----
		carbon tetrachloride	56-23-5	E611C	2.11 mg/kg	3.125 mg/kg	97.0	60 0	140	----
		chlorobenzene	108-90-7	E611C	2.11 mg/kg	3.125 mg/kg	97.2	60 0	140	----
		chloroethane	75-00-3	E611C	2.03 mg/kg	3.125 mg/kg	93.2	60 0	140	----
		chloroform	67-66-3	E611C	2.13 mg/kg	3.125 mg/kg	97.8	60 0	140	----
		chloromethane	74-87-3	E611C	1.99 mg/kg	3.125 mg/kg	91.7	60 0	140	----
		dibromochloromethane	124-48-1	E611C	2.16 mg/kg	3.125 mg/kg	99.5	60 0	140	----
		dichlorobenzene, 1,2-	95-50-1	E611C	2.08 mg/kg	3.125 mg/kg	95.9	60 0	140	----
		dichlorobenzene, 1,3-	541-73-1	E611C	1.99 mg/kg	3.125 mg/kg	91.5	60 0	140	----
		dichlorobenzene, 1,4-	106-46-7	E611C	2.06 mg/kg	3.125 mg/kg	94.6	60 0	140	----
		dichloroethane, 1,1-	75-34-3	E611C	1.81 mg/kg	3.125 mg/kg	83.1	60 0	140	----
		dichloroethane, 1,2-	107-06-2	E611C	2.04 mg/kg	3.125 mg/kg	94.0	60 0	140	----
		dichloroethylene, 1,1-	75-35-4	E611C	2.08 mg/kg	3.125 mg/kg	95.4	60 0	140	----
		dichloroethylene, cis-1,2-	156-59-4	E611C	2.06 mg/kg	3.125 mg/kg	94.5	60 0	140	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	2.04 mg/kg	3.125 mg/kg	93.8	60 0	140	----
		dichloromethane	75-09-2	E611C	2.10 mg/kg	3.125 mg/kg	96.5	60 0	140	----
		dichloropropane, 1,2-	78-87-5	E611C	2.14 mg/kg	3.125 mg/kg	98.4	60 0	140	----
		dichloropropylene, cis-1,3-	10061-01-5	E611C	2.19 mg/kg	3.125 mg/kg	101	60 0	140	----
		dichloropropylene, trans-1,3-	10061-02-6	E611C	2.07 mg/kg	3.125 mg/kg	95.2	60 0	140	----
		ethylbenzene	100-41-4	E611C	2.12 mg/kg	3.125 mg/kg	97.6	60 0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	2.13 mg/kg	3.125 mg/kg	98.0	60 0	140	----
		styrene	100-42-5	E611C	2.12 mg/kg	3.125 mg/kg	97.7	60 0	140	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	2.17 mg/kg	3.125 mg/kg	99.7	60 0	140	----
		tetrachloroethane, 1,1,1,2,2-	79-34-5	E611C	2.23 mg/kg	3.125 mg/kg	102	60 0	140	----
		tetrachloroethylene	127-18-4	E611C	2.03 mg/kg	3.125 mg/kg	93.5	60 0	140	----
		toluene	108-88-3	E611C	2.19 mg/kg	3.125 mg/kg	101	60 0	140	----
		trichloroethane, 1,1,1-	71-55-6	E611C	2.12 mg/kg	3.125 mg/kg	97.3	60 0	140	----
		trichloroethane, 1,1,2-	79-00-5	E611C	2.11 mg/kg	3.125 mg/kg	96.9	60 0	140	----
trichloroethylene	79-01-6	E611C	2.04 mg/kg	3.125 mg/kg	93.8	60 0	140	----		
trichlorofluoromethane	75-69-4	E611C	2.90 mg/kg	3.125 mg/kg	134	60 0	140	----		

Page : 17 of 18  
 Work Order : VA20B4299  
 Client : Seabridge Gold Inc.  
 Project : VE52655D



Sub-Matrix: **Soil/Solid**

					<i>Matrix Spike (MS) Report</i>					
					<i>Spike</i>		<i>Recovery (%)</i>	<i>Recovery Limits (%)</i>		
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>Concentration</i>	<i>Target</i>	<i>MS</i>	<i>Low</i>	<i>High</i>	<i>Qualifier</i>
<b>Volatile Organic Compounds (QCLot: 82445) - continued</b>										
VA20B3143-019	Anonymous	vinyl chloride	75-01-4	E611C	1.95 mg/kg	3.125 mg/kg	89.7	60.0	140	----
		xylene, m+p-	179601-23-1	E611C	4.22 mg/kg	6.25 mg/kg	97.0	60.0	140	----
		xylene, o-	95-47-6	E611C	2.10 mg/kg	3.125 mg/kg	96.8	60.0	140	----





## Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be AL long term mean values (for empirical test methods)

Sub Matrix: Soil/Solid

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
							Low	High	
<b>Organic / Inorganic Carbon (QCLot: 82926)</b>									
QC-82926-003	RM	carbon, inorganic [IC]	----	E354	0.383 %	91.7	80.0	120	----
<b>Organic / Inorganic Carbon (QCLot: 83605)</b>									
QC-83605-003	RM	carbon, total [TC]	----	E351	1.4 %	103	80.0	120	----
<b>Plant Available Nutrients (QCLot: 84476)</b>									
QC-84476-003	RM	sulfate, available (as S)	14808-79-8	E497.SO4	497 mg/kg	105	70.0	130	----
<b>Plant Available Nutrients (QCLot: 84477)</b>									
QC-84477-003	RM	nitrate + nitrite, available (as N)	----	E269 N+N	16.8 mg/kg	76.7	70.0	130	----
<b>Plant Available Nutrients (QCLot: 86217)</b>									
QC-86217-003	RM	phosphate, available (as P)	14265-44-2	E384	10.47 mg/kg	100	80.0	120	----
<b>Plant Available Nutrients (QCLot: 86218)</b>									
QC-86218-003	RM	potassium, available	7440-09-7	E390	154 mg/kg	100.0	70.0	130	
<b>Hydrocarbons (QCLot: 82948)</b>									
QC-82948-003	Petroleum Hydrocarbon IRM	EPH (C10-C19)	----	E601A	7113 mg/kg	101	70.0	130	----
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 82949)</b>									
QC-82949-003	RM	acenaphthene	83-32-9	E641A-L	0.638 mg/kg	98.1	60.0	130	----
QC-82949-003	RM	acenaphthylene	208-96-8	E641A-L	0.2 mg/kg	93.6	60.0	130	----
QC-82949-003	RM	anthracene	120-12-7	E641A-L	0.32 mg/kg	97.4	60.0	130	----
QC-82949-003	RM	benzo(a)pyrene	50-32-8	E641A-L	0.135 mg/kg	99.1	60.0	130	----
QC-82949-003	RM	benzo(b+j)fluoranthene	----	E641A-L	0.793 mg/kg	99.5	60.0	130	----
QC-82949-003	RM	chrysene	218-01-9	E641A-L	0.666 mg/kg	93.8	60.0	130	----
QC-82949-003	RM	dibenz(a,h)anthracene	53-70-3	E641A-L	1.196 mg/kg	99.2	60.0	130	----
QC-82949-003	RM	fluoranthene	206-44-0	E641A-L	1.757 mg/kg	94.0	60.0	130	----
QC-82949-003	RM	fluorene	86-73-7	E641A-L	0.989 mg/kg	99.6	60.0	130	----
QC-82949-003	RM	methylnaphthalene, 1-	90-12-0	E641A-L	1.256 mg/kg	93.7	60.0	130	----



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# Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

### Affix ALS barcode label here

(lab use only)

COC Number: 17 -

Page 1 of 1

<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>			<b>Select Service Level Below - Contact your AM to confirm all E&amp;P TATs (surcharges may apply)</b>																																															
Company: Wood		Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)			Regular [R] <input checked="" type="checkbox"/> Standard TAT If received by 3 pm - business days - no surcharges apply																																															
Contact: Jeremiah Gladu		Quality Control (QC) Report with Report <input type="checkbox"/> YES <input type="checkbox"/> NO			PROPERTY (Business Days) 4 day [P4-20%] <input type="checkbox"/> 3 day [P3-25%] <input type="checkbox"/> 2 day [P2-50%] <input type="checkbox"/>		EMERGENCY 1 Business day [E - 100%] <input type="checkbox"/> Same Day, Weekend or Statutory holiday [E2 -200%] (Laboratory opening fees may apply) <input type="checkbox"/>																																													
Phone:		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked																																																		
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm																																															
Street: 4445 Lougheed Hwy.		Email 1 or Fax: jeremiah.gladu@woodplc.com			For tests that can not be performed according to the service level selected, you will be contacted.																																															
City/Province: Burnaby/BC		Email 2: a-mansourpour@woodplc.com			<b>Analysis Request</b> Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below																																															
Postal Code: V5C 0E4		Email 3:																																																		
<b>Invoice To</b>		<b>Invoice Distribution</b>			<table border="1"> <tr> <td rowspan="10" style="writing-mode: vertical-rl; transform: rotate(180deg);">NUMBER OF CONTAINERS</td> <td>BTEX/UC</td> <td>EPH/PAH</td> <td>General chemistry *</td> <td>DISSOLVED METALS</td> <td rowspan="10" style="writing-mode: vertical-rl; transform: rotate(180deg);">SAMPLES ON HOLD</td> <td rowspan="10" style="writing-mode: vertical-rl; transform: rotate(180deg);">SUSPECTED HAZARD (see Special Instructions)</td> </tr> <tr><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td></tr> </table>					NUMBER OF CONTAINERS	BTEX/UC	EPH/PAH	General chemistry *	DISSOLVED METALS	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)																																				
NUMBER OF CONTAINERS	BTEX/UC	EPH/PAH	General chemistry *	DISSOLVED METALS							SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)																																								
Same as Report To <input type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX																																																		
Copy of Invoice with Report <input type="checkbox"/> YES <input type="checkbox"/> NO		Email 1 or Fax:																																																		
Company:		Email 2:																																																		
Contact:		Email 3:																																																		
<b>Project Information</b>		<b>Oil and Gas Required Fields (client use)</b>																																																		
ALS Account # / Quote #:		AFE/Cost Center:	PO#:																																																	
Job #: VE52655D		Major/Minor Code:	Routing Code:																																																	
PO / AFE:		Requisitioner:																																																		
LSD:		Location:																																																		
ALS Lab Work Order # (lab use only): B 4299		ALS Contact: Selam Worku	Sampler: Ardy M.																																																	
<b>ALS Sample # (lab use only)</b>	<b>Sample Identification and/or Coordinates (This description will appear on the report)</b>			<b>Date (dd-mmm-yy)</b>	<b>Time (hh:mm)</b>	<b>Sample Type</b>																																														
SP20-01-01				29-Aug-20	AM	Soil	✓	✓																																												
SP20-01-02					H		✓	✓																																												
SP20-01-03					H		✓	✓																																												
SP20-01-04					PM		✓	✓																																												
SP20-01-05					PM		✓	✓																																												
SP20-01-06 **					PM		✓	✓																																												
SP20-01-56 **					PM		✓	✓																																												
SP20-01-11					AM																																															
SP20-01-14 **					H				✓																																											
SP20-01-15 **					H				✓																																											
<b>Drinking Water (DW) Samples<sup>1</sup> (client use)</b>		<b>Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)</b>			<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>																																															
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO		*GENERAL WATER CHEMISTRY TO INCLUDE: pH, Alkalinity, bicarbonate, carbonate, chloride, conductivity, fluoride, hardness, hydroxide, nitrate, nitrite, ammonia, sulphate, turbidity, TDS, acidity.			Frozen <input type="checkbox"/> SIF Observations: Yes <input type="checkbox"/> No <input type="checkbox"/>																																															
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO					Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact: Yes <input type="checkbox"/> No <input type="checkbox"/>																																															
					Cooling Initiated <input type="checkbox"/>																																															
					INITIAL COOLER TEMPERATURES °C: 24																																															
					FINAL COOLER TEMPERATURES °C: 17°C (Avg)																																															
<b>SHIPMENT RELEASE (client use)</b>		<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>			<b>FINAL SHIPMENT RECEPTION (lab use only)</b>																																															
Released by: Ardy Mansourpour	Date:	Time:	Received by: Chris Allison	Date: Aug 31/2020	Time: 1030	Received by: RSS	Date: 2 Sep 2020	Time: 17°C																																												

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

10/4/20



CERTIFICATE OF ANALYSIS

Work Order : VA20B4301
Client : Seabridge Gold Inc.
Contact : Elizabeth Miller
Address : 1235 Main Street P.O. Box 2536
Smithers BC Canada V0J 2N0
Telephone : 416 367 9292
Project : VE52655D
PO :
C-O-C number : ----
Sampler : Ardy M
Site : ----
Quote number : VA20-SEAB100-0003 - Wood/Seabridge Gold
No. of samples received : 13
No. of samples analysed : 13

Page : 1 of 11
Laboratory : Vancouver - Environmental
Account Manager : Selam Worku
Address : 8081 Lougheed Highway
Burnaby BC Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 02-Sep-2020 10:45
Date Analysis Commenced : 06-Sep-2020
Issue Date : 28-Sep-2020 11:49

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
Analytical Results
Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Table with 3 columns: Signatories, Position, Laboratory Department. Rows include Brianna Allen, Dwayne Bennett, Hedy Lai, Jeremy Paterson, Melissa Shaw, and Xihua Yao.



## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
%	percent
CFU/g	Colony Forming Units per gram
mg/kg	milligrams per kilogram

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in reports identified as "**Preliminary Report**" are considered authorized for use.

## Workorder Comments

Additional parameters added via email for samples , SP20-02-02, SP20-02-04, SP20-02-06, SP20-02-08, SP20-02-10 and SP20-02-12.

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLCI	Detection Limit Raised: Chromatographic interference due to co-elution.
DLQ	Detection Limit raised due to co-eluting interference. GCMS qualifier ion ratio did not meet acceptance criteria.



## Analytical Results

Sub-Matrix: Soil					Client sample ID				
(Matrix: Soil/Solid)					SP20-02-01	SP20-02-02	SP20-02-03	SP20-02-04	SP20-02-05
Client sampling date / time					29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00
Analyte	CAS Number	Method	LOR	Unit	VA20B4301-001	VA20B4301-002	VA20B4301-003	VA20B4301-004	VA20B4301-005
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
moisture	----	E144	0.25	%	12.3	15.1	12.6	12.9	17.2
<b>Organic / Inorganic Carbon</b>									
carbon, total [TC]	----	E351	0.050	%	----	0.674	----	0.530	----
carbon, inorganic [IC]	----	E354	0.050	%	----	0.176	----	0.143	----
carbon, inorganic [IC], (as CaCO3 equivalent)	----	E354	0.40	%	----	1.47	----	1.19	----
carbon, total organic [TOC]	----	EC356	0.050	%	----	0.498	----	0.387	----
organic matter	----	EC356	0.10	%	----	0.86	----	0.67	----
<b>Plant Available Nutrients</b>									
phosphate, available (as P)	14265-44-2	E384	2.0	mg/kg	----	<2.0	----	4.2	----
potassium, available	7440-09-7	E390	20	mg/kg	----	82	----	84	----
sulfate, available (as S)	14808-79-8	E497.SO4	3.0	mg/kg	----	11.0	----	20.6	----
nitrate + nitrite, available (as N)	----	E269.N+N	1.0	mg/kg	----	<1.0	----	15.8	----
<b>Taxonomy</b>									
hydrocarbon utilizing bacteria [HUB]	----	E924.AR	5	CFU/g	----	56000	----	1000000	----
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>									
benzene	71-43-2	E611A	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
ethylbenzene	100-41-4	E611A	0.015	mg/kg	<0.015	<0.015	<0.015	<0.015	<0.015
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
styrene	100-42-5	E611A	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
toluene	108-88-3	E611A	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
xylene, m+p-	179601-23-1	E611A	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
xylene, o-	95-47-6	E611A	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
xylenes, total	1330-20-7	E611A	0.075	mg/kg	<0.075	<0.075	<0.075	<0.075	<0.075
BTEX, total	----	E611A	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
BTEX+Styrene, total	N/A	E611A	0.15	mg/kg	<0.15	<0.15	<0.15	<0.15	<0.15
<b>Volatile Organic Compounds Surrogates</b>									
bromofluorobenzene, 4-	460-00-4	E611A	0.050	%	85.8	86.4	97.2	102	97.6
difluorobenzene, 1,4-	540-36-3	E611A	0.050	%	109	101	110	116	115
<b>Hydrocarbons</b>									
EPH (C10-C19)	----	E601A	200	mg/kg	<200	990	1200	560	1050



## Analytical Results

Sub-Matrix: Soil					Client sample ID	SP20-02-01	SP20-02-02	SP20-02-03	SP20-02-04	SP20-02-05
(Matrix: Soil/Solid)										
Client sampling date / time						29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00
Analyte	CAS Number	Method	LOR	Unit	VA20B4301-001	VA20B4301-002	VA20B4301-003	VA20B4301-004	VA20B4301-005	
					Result	Result	Result	Result	Result	
<b>Hydrocarbons</b>										
EPH (C19-C32)	----	E601A	200	mg/kg	<200	350	250	<200	<200	
HEPHs	----	EC600A	200	mg/kg	<200	350	250	<200	<200	
LEPHs	----	EC600A	200	mg/kg	<200	990	1200	560	1050	
<b>Hydrocarbons Surrogates</b>										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	5.0	%	89.7	93.3	89.0	87.9	98.7	
<b>Polycyclic Aromatic Hydrocarbons</b>										
acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	<0.0050	<0.0060 <sup>DLCI</sup>	<0.0060 <sup>DLCI</sup>	<0.0050	<0.0070 <sup>DLCI</sup>	
acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	<0.0050	<0.0300 <sup>DLCI</sup>	<0.0200 <sup>DLCI</sup>	<0.0200 <sup>DLCI</sup>	<0.0200 <sup>DLCI</sup>	
acridine	260-94-6	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.090 <sup>DLCI</sup>	<0.010	<0.020 <sup>DLCI</sup>	
anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.0040	<0.0090 <sup>DLCI</sup>	<0.0080 <sup>DLCI</sup>	<0.0040	<0.0050 <sup>DLCI</sup>	
benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
benzo(b+j)fluoranthene	----	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
benzo(b+j+k)fluoranthene	----	E641A-L	0.015	mg/kg	<0.015	<0.015	<0.015	<0.015	<0.015	
benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
chrysene	218-01-9	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
fluoranthene	206-44-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
fluorene	86-73-7	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	<0.010	<0.020 <sup>DLCI</sup>	<0.030 <sup>DLCI</sup>	<0.010	<0.010	
methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	<0.010	<0.020 <sup>DLCI</sup>	<0.010	<0.010	<0.020 <sup>DLCI</sup>	
naphthalene	91-20-3	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.020 <sup>DLCI</sup>	<0.010	<0.030 <sup>DLCI</sup>	
phenanthrene	85-01-8	E641A-L	0.010	mg/kg	<0.010	<0.030 <sup>DLCI</sup>	<0.030 <sup>DLCI</sup>	<0.020 <sup>DLCI</sup>	<0.010	
pyrene	129-00-0	E641A-L	0.010	mg/kg	<0.010	<0.020 <sup>DLCI</sup>	0.052	<0.010	0.014	
quinoline	6027-02-7	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
B(a)P total potency equivalents [B(a)P TPE]	----	E641A-L	0.020	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
IACR (CCME)	----	E641A-L	0.15	mg/kg	<0.11	<0.11	<0.11	<0.11	<0.11	
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>										
acridine-d9	34749-75-2	E641A-L	0.010	%	107	107	96.0	102	108	



## Analytical Results

Sub-Matrix: Soil					Client sample ID				
(Matrix: Soil/Solid)					SP20-02-01	SP20-02-02	SP20-02-03	SP20-02-04	SP20-02-05
Client sampling date / time					29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00
Analyte	CAS Number	Method	LOR	Unit	VA20B4301-001	VA20B4301-002	VA20B4301-003	VA20B4301-004	VA20B4301-005
					Result	Result	Result	Result	Result
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>									
chrysene-d12	1719-03-5	E641A-L	0.010	%	118	119	105	113	117
naphthalene-d8	1146-65-2	E641A-L	0.010	%	105	106	92.7	99.5	106
phenanthrene-d10	1517-22-2	E641A-L	0.010	%	107	111	97.1	104	108

Please refer to the General Comments section for an explanation of any qualifiers detected.



## Analytical Results

Sub-Matrix: Soil					Client sample ID				
(Matrix: Soil/Solid)					SP20-02-06	SP20-02-07	SP20-02-08	SP20-02-09	SP20-02-10
Client sampling date / time					29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00
Analyte	CAS Number	Method	LOR	Unit	VA20B4301-006	VA20B4301-007	VA20B4301-008	VA20B4301-009	VA20B4301-010
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
moisture	----	E144	0.25	%	13.9	10.5	11.0	9.63	14.1
<b>Organic / Inorganic Carbon</b>									
carbon, total [TC]	----	E351	0.050	%	0.545	----	0.353	----	0.613
carbon, inorganic [IC]	----	E354	0.050	%	0.168	----	0.133	----	0.134
carbon, inorganic [IC], (as CaCO3 equivalent)	----	E354	0.40	%	1.40	----	1.10	----	1.11
carbon, total organic [TOC]	----	EC356	0.050	%	0.377	----	0.220	----	0.479
organic matter	----	EC356	0.10	%	0.65	----	0.38	----	0.82
<b>Plant Available Nutrients</b>									
phosphate, available (as P)	14265-44-2	E384	2.0	mg/kg	<2.0	----	5.0	----	3.1
potassium, available	7440-09-7	E390	20	mg/kg	96	----	96	----	78
sulfate, available (as S)	14808-79-8	E497.SO4	3.0	mg/kg	8.7	----	9.5	----	9.0
nitrate + nitrite, available (as N)	----	E269.N+N	1.0	mg/kg	<1.0	----	5.0	----	4.2
<b>Taxonomy</b>									
hydrocarbon utilizing bacteria [HUB]	----	E924.AR	5	CFU/g	34000	----	64000	----	99500
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>									
benzene	71-43-2	E611A	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
ethylbenzene	100-41-4	E611A	0.015	mg/kg	<0.015	<0.015	<0.015	<0.015	<0.015
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
styrene	100-42-5	E611A	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
toluene	108-88-3	E611A	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
xylene, m+p-	179601-23-1	E611A	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
xylene, o-	95-47-6	E611A	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
xylenes, total	1330-20-7	E611A	0.075	mg/kg	<0.075	<0.075	<0.075	<0.075	<0.075
BTEX, total	----	E611A	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
BTEX+Styrene, total	N/A	E611A	0.15	mg/kg	<0.15	<0.15	<0.15	<0.15	<0.15
<b>Volatile Organic Compounds Surrogates</b>									
bromofluorobenzene, 4-	460-00-4	E611A	0.050	%	93.9	90.4	96.7	90.2	90.6
difluorobenzene, 1,4-	540-36-3	E611A	0.050	%	107	103	113	103	103
<b>Hydrocarbons</b>									
EPH (C10-C19)	----	E601A	200	mg/kg	1660	360	250	<200	1040





## Analytical Results

Sub-Matrix: Soil					Client sample ID				
(Matrix: Soil/Solid)					SP20-02-06	SP20-02-07	SP20-02-08	SP20-02-09	SP20-02-10
Client sampling date / time					29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00
Analyte	CAS Number	Method	LOR	Unit	VA20B4301-006	VA20B4301-007	VA20B4301-008	VA20B4301-009	VA20B4301-010
					Result	Result	Result	Result	Result
<b>Hydrocarbons</b>									
EPH (C19-C32)	----	E601A	200	mg/kg	500	<200	<200	<200	<200
HEPHs	----	EC600A	200	mg/kg	500	<200	<200	<200	<200
LEPHs	----	EC600A	200	mg/kg	1660	360	250	<200	1040
<b>Hydrocarbons Surrogates</b>									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	5.0	%	93.8	97.0	93.1	88.0	92.6
<b>Polycyclic Aromatic Hydrocarbons</b>									
acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	<0.0060 <sup>DLCI</sup>	<0.0060 <sup>DLCI</sup>	<0.0050	<0.0050	<0.0090 <sup>DLCI</sup>
acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	<0.0200 <sup>DLCI</sup>	<0.0080 <sup>DLCI</sup>	<0.0060 <sup>DLCI</sup>	<0.0050	<0.0200 <sup>DLCI</sup>
acridine	260-94-6	E641A-L	0.010	mg/kg	<0.300 <sup>DLCI</sup>	<0.010	<0.010	<0.010	<0.070 <sup>DLCI</sup>
anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.0200 <sup>DLCI</sup>	<0.0040	<0.0040	<0.0040	<0.0050 <sup>DLCI</sup>
benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(b+j)fluoranthene	----	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(b+j+k)fluoranthene	----	E641A-L	0.015	mg/kg	<0.015	<0.015	<0.015	<0.015	<0.015
benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
chrysene	218-01-9	E641A-L	0.010	mg/kg	<0.020 <sup>DLCI</sup>	<0.010	<0.010	<0.010	<0.010
dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
fluoranthene	206-44-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
fluorene	86-73-7	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	<0.020 <sup>DLCI</sup>	0.010	<0.010	0.025	<0.030 <sup>DLCI</sup>
methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	<0.020 <sup>DLCI</sup>	0.011	<0.010	0.042	<0.030 <sup>DLCI</sup>
naphthalene	91-20-3	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	0.012	<0.010
phenanthrene	85-01-8	E641A-L	0.010	mg/kg	<0.030 <sup>DLCI</sup>	<0.020 <sup>DLCI</sup>	<0.010	<0.010	<0.040 <sup>DLCI</sup>
pyrene	129-00-0	E641A-L	0.010	mg/kg	0.100	0.011	<0.010	<0.010	0.021
quinoline	6027-02-7	E641A-L	0.010	mg/kg	<0.020 <sup>DLCI</sup>	<0.010	<0.010	<0.010	<0.020 <sup>DLCI</sup>
B(a)P total potency equivalents [B(a)P TPE]	----	E641A-L	0.020	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
IACR (CCME)	----	E641A-L	0.15	mg/kg	<0.11	<0.11	<0.11	<0.11	<0.11
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>									
acridine-d9	34749-75-2	E641A-L	0.010	%	100	113	104	98.4	103



## Analytical Results

Sub-Matrix: Soil					Client sample ID				
(Matrix: Soil/Solid)					SP20-02-06	SP20-02-07	SP20-02-08	SP20-02-09	SP20-02-10
Client sampling date / time					29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00
Analyte	CAS Number	Method	LOR	Unit	VA20B4301-006	VA20B4301-007	VA20B4301-008	VA20B4301-009	VA20B4301-010
					Result	Result	Result	Result	Result
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>									
chrysene-d12	1719-03-5	E641A-L	0.010	%	115	125	110	107	117
naphthalene-d8	1146-65-2	E641A-L	0.010	%	95.9	111	98.8	95.8	100
phenanthrene-d10	1517-22-2	E641A-L	0.010	%	103	118	102	100	106

Please refer to the General Comments section for an explanation of any qualifiers detected.



## Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	SP20-02-11	SP20-02-12	SP20-02-62	----	----
Client sampling date / time					29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA20B4301-011	VA20B4301-012	VA20B4301-013	-----	-----	
					Result	Result	Result	---	---	
<b>Physical Tests</b>										
moisture	----	E144	0.25	%	10.4	12.6	10.8	----	----	
<b>Organic / Inorganic Carbon</b>										
carbon, total [TC]	----	E351	0.050	%	----	0.290	----	----	----	
carbon, inorganic [IC]	----	E354	0.050	%	----	0.104	----	----	----	
carbon, inorganic [IC], (as CaCO3 equivalent)	----	E354	0.40	%	----	0.86	----	----	----	
carbon, total organic [TOC]	----	EC356	0.050	%	----	0.186	----	----	----	
organic matter	----	EC356	0.10	%	----	0.32	----	----	----	
<b>Plant Available Nutrients</b>										
phosphate, available (as P)	14265-44-2	E384	2.0	mg/kg	----	<2.0	----	----	----	
potassium, available	7440-09-7	E390	20	mg/kg	----	82	----	----	----	
sulfate, available (as S)	14808-79-8	E497.SO4	3.0	mg/kg	----	17.8	----	----	----	
nitrate + nitrite, available (as N)	----	E269.N+N	1.0	mg/kg	----	<1.0	----	----	----	
<b>Taxonomy</b>										
hydrocarbon utilizing bacteria [HUB]	----	E924.AR	5	CFU/g	----	6600	----	----	----	
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>										
benzene	71-43-2	E611A	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	----	----	
ethylbenzene	100-41-4	E611A	0.015	mg/kg	<0.015	<0.015	<0.015	----	----	
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.050	mg/kg	<0.050	<0.050	<0.050	----	----	
styrene	100-42-5	E611A	0.050	mg/kg	<0.050	<0.050	<0.050	----	----	
toluene	108-88-3	E611A	0.050	mg/kg	<0.050	<0.050	<0.050	----	----	
xylene, m+p-	179601-23-1	E611A	0.050	mg/kg	<0.050	<0.050	<0.050	----	----	
xylene, o-	95-47-6	E611A	0.050	mg/kg	<0.050	<0.050	<0.050	----	----	
xylenes, total	1330-20-7	E611A	0.075	mg/kg	<0.075	<0.075	<0.075	----	----	
BTEX, total	----	E611A	0.10	mg/kg	<0.10	<0.10	<0.10	----	----	
BTEX+Styrene, total	N/A	E611A	0.15	mg/kg	<0.15	<0.15	<0.15	----	----	
<b>Volatile Organic Compounds Surrogates</b>										
bromofluorobenzene, 4-	460-00-4	E611A	0.050	%	97.7	88.1	96.8	----	----	
difluorobenzene, 1,4-	540-36-3	E611A	0.050	%	117	109	113	----	----	
<b>Hydrocarbons</b>										
EPH (C10-C19)	----	E601A	200	mg/kg	210	<200	<200	----	----	



## Analytical Results

Sub-Matrix: Soil					Client sample ID	SP20-02-11	SP20-02-12	SP20-02-62	----	----
(Matrix: Soil/Solid)					Client sampling date / time	29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B4301-011	VA20B4301-012	VA20B4301-013	-----	-----	
					Result	Result	Result	---	---	
<b>Hydrocarbons</b>										
EPH (C19-C32)	----	E601A	200	mg/kg	<200	<200	<200	----	----	
HEPHs	----	EC600A	200	mg/kg	<200	<200	<200	----	----	
LEPHs	----	EC600A	200	mg/kg	210	<200	<200	----	----	
<b>Hydrocarbons Surrogates</b>										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	5.0	%	96.4	91.2	98.0	----	----	
<b>Polycyclic Aromatic Hydrocarbons</b>										
acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	----	----	
acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	<0.0060 <sup>DLCL</sup>	<0.0050	<0.0050	----	----	
acridine	260-94-6	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----	
anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.0040	<0.0040	<0.0040	----	----	
benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----	
benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----	
benzo(b+j)fluoranthene	----	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----	
benzo(b+j+k)fluoranthene	----	E641A-L	0.015	mg/kg	<0.015	<0.015	<0.015	----	----	
benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----	
benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----	
chrysene	218-01-9	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----	
dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	----	----	
fluoranthene	206-44-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----	
fluorene	86-73-7	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----	
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----	
methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----	
methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----	
naphthalene	91-20-3	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----	
phenanthrene	85-01-8	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----	
pyrene	129-00-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----	
quinoline	6027-02-7	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----	
B(a)P total potency equivalents [B(a)P TPE]	----	E641A-L	0.020	mg/kg	<0.010	<0.010	<0.010	----	----	
IACR (CCME)	----	E641A-L	0.15	mg/kg	<0.11	<0.11	<0.11	----	----	
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>										
acridine-d9	34749-75-2	E641A-L	0.010	%	104	106	106	----	----	



## Analytical Results

Sub-Matrix: Soil					Client sample ID	SP20-02-11	SP20-02-12	SP20-02-62	----	----
(Matrix: Soil/Solid)					Client sampling date / time	29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B4301-011	VA20B4301-012	VA20B4301-013	-----	-----	
					Result	Result	Result	---	---	
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>										
chrysene-d12	1719-03-5	E641A-L	0.010	%	115	117	117	----	----	
naphthalene-d8	1146-65-2	E641A-L	0.010	%	101	103	105	----	----	
phenanthrene-d10	1517-22-2	E641A-L	0.010	%	106	108	109	----	----	

Please refer to the General Comments section for an explanation of any qualifiers detected.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>VA20B4301</b>	Page	: 1 of 16
Client	: <b>Seabridge Gold Inc.</b>	Laboratory	: Vancouver - Environmental
Contact	: Elizabeth Miller	Account Manager	: Selam Worku
Address	: 1235 Main Street P.O. Box 2536 Smithers BC Canada V0J 2N0	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: 416 367 9292	Telephone	: +1 604 253 4188
Project	: VE52655D	Date Samples Received	: 02-Sep-2020 10:45
PO	:	Issue Date	: 28-Sep-2020 11:49
C-O-C number	: ----		
Sampler	: Ardy M		
Site	: ----		
Quote number	: VA20-SEAB100-0003 - Wood/Seabridge Gold		
No. of samples received	: 13		
No. of samples analysed	: 13		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

## Summary of Outliers

### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.

### **Outliers : Analysis Holding Time Compliance (Breaches)**

- Analysis Holding Time Outliers exist - please see following pages for full details.

### **Outliers : Frequency of Quality Control Samples**

- No Quality Control Sample Frequency Outliers occur.

RIGHT SOLUTIONS | RIGHT PARTNER



## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: Soil/Solid

Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
Glass soil jar/Teflon lined cap SP20-02-01	E601A	29-Aug-2020	08-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
Glass soil jar/Teflon lined cap SP20-02-02	E601A	29-Aug-2020	08-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
Glass soil jar/Teflon lined cap SP20-02-03	E601A	29-Aug-2020	08-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
Glass soil jar/Teflon lined cap SP20-02-04	E601A	29-Aug-2020	08-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
Glass soil jar/Teflon lined cap SP20-02-05	E601A	29-Aug-2020	08-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
Glass soil jar/Teflon lined cap SP20-02-06	E601A	29-Aug-2020	08-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
Glass soil jar/Teflon lined cap SP20-02-07	E601A	29-Aug-2020	08-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓





Matrix: Soil/Solid

Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Glass soil jar/Teflon lined cap</b> SP20-02-08	E601A	29-Aug-2020	08-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Glass soil jar/Teflon lined cap</b> SP20-02-09	E601A	29-Aug-2020	08-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Glass soil jar/Teflon lined cap</b> SP20-02-10	E601A	29-Aug-2020	08-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Glass soil jar/Teflon lined cap</b> SP20-02-11	E601A	29-Aug-2020	08-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Glass soil jar/Teflon lined cap</b> SP20-02-12	E601A	29-Aug-2020	08-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Glass soil jar/Teflon lined cap</b> SP20-02-62	E601A	29-Aug-2020	08-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓	
<b>Organic / Inorganic Carbon : Total Carbon by Combustion</b>											
<b>LDPE bag</b> SP20-02-02	E351	29-Aug-2020	----	----	----		09-Sep-2020	0 days	0 days	✓	
<b>Organic / Inorganic Carbon : Total Carbon by Combustion</b>											
<b>LDPE bag</b> SP20-02-04	E351	29-Aug-2020	----	----	----		09-Sep-2020	0 days	0 days	✓	
<b>Organic / Inorganic Carbon : Total Carbon by Combustion</b>											
<b>LDPE bag</b> SP20-02-06	E351	29-Aug-2020	----	----	----		09-Sep-2020	0 days	0 days	✓	



Matrix: Soil/Solid

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Organic / Inorganic Carbon : Total Carbon by Combustion</b>											
LDPE bag SP20-02-08	E351	29-Aug-2020	----	----	----		09-Sep-2020	0 days	0 days		✔
<b>Organic / Inorganic Carbon : Total Carbon by Combustion</b>											
LDPE bag SP20-02-10	E351	29-Aug-2020	----	----	----		09-Sep-2020	0 days	0 days		✔
<b>Organic / Inorganic Carbon : Total Carbon by Combustion</b>											
LDPE bag SP20-02-12	E351	29-Aug-2020	----	----	----		09-Sep-2020	0 days	0 days		✔
<b>Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve</b>											
LDPE bag SP20-02-02	E354	29-Aug-2020	----	----	----		09-Sep-2020	----	----		
<b>Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve</b>											
LDPE bag SP20-02-04	E354	29-Aug-2020	----	----	----		09-Sep-2020	----	----		
<b>Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve</b>											
LDPE bag SP20-02-06	E354	29-Aug-2020	----	----	----		09-Sep-2020	----	----		
<b>Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve</b>											
LDPE bag SP20-02-08	E354	29-Aug-2020	----	----	----		09-Sep-2020	----	----		
<b>Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve</b>											
LDPE bag SP20-02-10	E354	29-Aug-2020	----	----	----		09-Sep-2020	----	----		
<b>Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve</b>											
LDPE bag SP20-02-12	E354	29-Aug-2020	----	----	----		09-Sep-2020	----	----		



Matrix: Soil/Solid

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap SP20-02-01	E144	29-Aug-2020	----	----	----		08-Sep-2020	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap SP20-02-02	E144	29-Aug-2020	----	----	----		08-Sep-2020	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap SP20-02-03	E144	29-Aug-2020	----	----	----		08-Sep-2020	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap SP20-02-04	E144	29-Aug-2020	----	----	----		08-Sep-2020	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap SP20-02-05	E144	29-Aug-2020	----	----	----		08-Sep-2020	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap SP20-02-06	E144	29-Aug-2020	----	----	----		08-Sep-2020	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap SP20-02-07	E144	29-Aug-2020	----	----	----		08-Sep-2020	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap SP20-02-08	E144	29-Aug-2020	----	----	----		08-Sep-2020	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap SP20-02-09	E144	29-Aug-2020	----	----	----		08-Sep-2020	----	----	



Matrix: Soil/Solid

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : Moisture Content by Gravimetry</b>											
Glass soil jar/Teflon lined cap SP20-02-10	E144	29-Aug-2020	----	----	----		08-Sep-2020	----	----		
<b>Physical Tests : Moisture Content by Gravimetry</b>											
Glass soil jar/Teflon lined cap SP20-02-11	E144	29-Aug-2020	----	----	----		08-Sep-2020	----	----		
<b>Physical Tests : Moisture Content by Gravimetry</b>											
Glass soil jar/Teflon lined cap SP20-02-12	E144	29-Aug-2020	----	----	----		08-Sep-2020	----	----		
<b>Physical Tests : Moisture Content by Gravimetry</b>											
Glass soil jar/Teflon lined cap SP20-02-62	E144	29-Aug-2020	----	----	----		08-Sep-2020	----	----		
<b>Plant Available Nutrients : Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride)</b>											
LDPE bag SP20-02-02	E269.N+N	29-Aug-2020	11-Sep-2020	----	----		11-Sep-2020	0 days	0 days		✔
<b>Plant Available Nutrients : Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride)</b>											
LDPE bag SP20-02-04	E269.N+N	29-Aug-2020	11-Sep-2020	----	----		11-Sep-2020	0 days	0 days		✔
<b>Plant Available Nutrients : Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride)</b>											
LDPE bag SP20-02-06	E269.N+N	29-Aug-2020	11-Sep-2020	----	----		11-Sep-2020	0 days	0 days		✔
<b>Plant Available Nutrients : Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride)</b>											
LDPE bag SP20-02-08	E269.N+N	29-Aug-2020	11-Sep-2020	----	----		11-Sep-2020	0 days	0 days		✔



Matrix: Soil/Solid

Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Plant Available Nutrients : Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride)</b>											
LDPE bag SP20-02-10	E269.N+N	29-Aug-2020	11-Sep-2020	----	----		11-Sep-2020	0 days	0 days	✓	
<b>Plant Available Nutrients : Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride)</b>											
LDPE bag SP20-02-12	E269.N+N	29-Aug-2020	11-Sep-2020	----	----		11-Sep-2020	0 days	0 days	✓	
<b>Plant Available Nutrients : Available Phosphorus by FIALab (Modified Kelowna)</b>											
LDPE bag SP20-02-02	E384	29-Aug-2020	17-Sep-2020	180 days	18 days	✓	17-Sep-2020	161 days	0 days	✓	
<b>Plant Available Nutrients : Available Phosphorus by FIALab (Modified Kelowna)</b>											
LDPE bag SP20-02-04	E384	29-Aug-2020	17-Sep-2020	180 days	18 days	✓	17-Sep-2020	161 days	0 days	✓	
<b>Plant Available Nutrients : Available Phosphorus by FIALab (Modified Kelowna)</b>											
LDPE bag SP20-02-06	E384	29-Aug-2020	17-Sep-2020	180 days	18 days	✓	17-Sep-2020	161 days	0 days	✓	
<b>Plant Available Nutrients : Available Phosphorus by FIALab (Modified Kelowna)</b>											
LDPE bag SP20-02-08	E384	29-Aug-2020	17-Sep-2020	180 days	18 days	✓	17-Sep-2020	161 days	0 days	✓	
<b>Plant Available Nutrients : Available Phosphorus by FIALab (Modified Kelowna)</b>											
LDPE bag SP20-02-10	E384	29-Aug-2020	17-Sep-2020	180 days	18 days	✓	17-Sep-2020	161 days	0 days	✓	
<b>Plant Available Nutrients : Available Phosphorus by FIALab (Modified Kelowna)</b>											
LDPE bag SP20-02-12	E384	29-Aug-2020	17-Sep-2020	180 days	18 days	✓	17-Sep-2020	161 days	0 days	✓	
<b>Plant Available Nutrients : Available Potassium by flame photometry (Modified Kelowna)</b>											
LDPE bag SP20-02-02	E390	29-Aug-2020	17-Sep-2020	180 days	18 days	✓	17-Sep-2020	161 days	0 days	✓	



Matrix: Soil/Solid

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Plant Available Nutrients : Available Potassium by flame photometry (Modified Kelowna)</b>											
LDPE bag SP20-02-04	E390	29-Aug-2020	17-Sep-2020	180 days	18 days	✔	17-Sep-2020	161 days	0 days	✔	
<b>Plant Available Nutrients : Available Potassium by flame photometry (Modified Kelowna)</b>											
LDPE bag SP20-02-06	E390	29-Aug-2020	17-Sep-2020	180 days	18 days	✔	17-Sep-2020	161 days	0 days	✔	
<b>Plant Available Nutrients : Available Potassium by flame photometry (Modified Kelowna)</b>											
LDPE bag SP20-02-08	E390	29-Aug-2020	17-Sep-2020	180 days	18 days	✔	17-Sep-2020	161 days	0 days	✔	
<b>Plant Available Nutrients : Available Potassium by flame photometry (Modified Kelowna)</b>											
LDPE bag SP20-02-10	E390	29-Aug-2020	17-Sep-2020	180 days	18 days	✔	17-Sep-2020	161 days	0 days	✔	
<b>Plant Available Nutrients : Available Potassium by flame photometry (Modified Kelowna)</b>											
LDPE bag SP20-02-12	E390	29-Aug-2020	17-Sep-2020	180 days	18 days	✔	17-Sep-2020	161 days	0 days	✔	
<b>Plant Available Nutrients : Available Sulfate by ICPOES (0.01M Calcium Chloride Ext.)</b>											
LDPE bag SP20-02-02	E497.SO4	29-Aug-2020	11-Sep-2020	----	----		11-Sep-2020	0 days	0 days	✔	
<b>Plant Available Nutrients : Available Sulfate by ICPOES (0.01M Calcium Chloride Ext.)</b>											
LDPE bag SP20-02-04	E497.SO4	29-Aug-2020	11-Sep-2020	----	----		11-Sep-2020	0 days	0 days	✔	
<b>Plant Available Nutrients : Available Sulfate by ICPOES (0.01M Calcium Chloride Ext.)</b>											
LDPE bag SP20-02-06	E497.SO4	29-Aug-2020	11-Sep-2020	----	----		11-Sep-2020	0 days	0 days	✔	
<b>Plant Available Nutrients : Available Sulfate by ICPOES (0.01M Calcium Chloride Ext.)</b>											
LDPE bag SP20-02-08	E497.SO4	29-Aug-2020	11-Sep-2020	----	----		11-Sep-2020	0 days	0 days	✔	



Matrix: Soil/Solid

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Plant Available Nutrients : Available Sulfate by ICPOES (0.01M Calcium Chloride Ext.)</b>											
<b>LDPE bag</b> SP20-02-10	E497.SO4	29-Aug-2020	11-Sep-2020	----	----		11-Sep-2020	0 days	0 days	✔	
<b>Plant Available Nutrients : Available Sulfate by ICPOES (0.01M Calcium Chloride Ext.)</b>											
<b>LDPE bag</b> SP20-02-12	E497.SO4	29-Aug-2020	11-Sep-2020	----	----		11-Sep-2020	0 days	0 days	✔	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)</b>											
<b>Glass soil jar/Teflon lined cap</b> SP20-02-01	E641A-L	29-Aug-2020	08-Sep-2020	14 days	10 days	✔	09-Sep-2020	40 days	0 days	✔	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)</b>											
<b>Glass soil jar/Teflon lined cap</b> SP20-02-02	E641A-L	29-Aug-2020	08-Sep-2020	14 days	10 days	✔	09-Sep-2020	40 days	0 days	✔	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)</b>											
<b>Glass soil jar/Teflon lined cap</b> SP20-02-03	E641A-L	29-Aug-2020	08-Sep-2020	14 days	10 days	✔	09-Sep-2020	40 days	0 days	✔	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)</b>											
<b>Glass soil jar/Teflon lined cap</b> SP20-02-04	E641A-L	29-Aug-2020	08-Sep-2020	14 days	10 days	✔	09-Sep-2020	40 days	0 days	✔	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)</b>											
<b>Glass soil jar/Teflon lined cap</b> SP20-02-05	E641A-L	29-Aug-2020	08-Sep-2020	14 days	10 days	✔	09-Sep-2020	40 days	0 days	✔	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)</b>											
<b>Glass soil jar/Teflon lined cap</b> SP20-02-06	E641A-L	29-Aug-2020	08-Sep-2020	14 days	10 days	✔	09-Sep-2020	40 days	0 days	✔	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)</b>											
<b>Glass soil jar/Teflon lined cap</b> SP20-02-07	E641A-L	29-Aug-2020	08-Sep-2020	14 days	10 days	✔	09-Sep-2020	40 days	0 days	✔	



Matrix: Soil/Solid

Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)</b>											
Glass soil jar/Teflon lined cap SP20-02-08	E641A-L	29-Aug-2020	08-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)</b>											
Glass soil jar/Teflon lined cap SP20-02-09	E641A-L	29-Aug-2020	08-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)</b>											
Glass soil jar/Teflon lined cap SP20-02-10	E641A-L	29-Aug-2020	08-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)</b>											
Glass soil jar/Teflon lined cap SP20-02-11	E641A-L	29-Aug-2020	08-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)</b>											
Glass soil jar/Teflon lined cap SP20-02-12	E641A-L	29-Aug-2020	08-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)</b>											
Glass soil jar/Teflon lined cap SP20-02-62	E641A-L	29-Aug-2020	08-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓	
<b>Taxonomy : Hydrocarbon Utilizing Bacteria</b>											
Glass soil jar/Teflon lined cap SP20-02-02	E924.AR	29-Aug-2020	----	----	----		24-Sep-2020	48 hrs	627 hrs	* EHTR	
<b>Taxonomy : Hydrocarbon Utilizing Bacteria</b>											
Glass soil jar/Teflon lined cap SP20-02-04	E924.AR	29-Aug-2020	----	----	----		24-Sep-2020	48 hrs	627 hrs	* EHTR	
<b>Taxonomy : Hydrocarbon Utilizing Bacteria</b>											
Glass soil jar/Teflon lined cap SP20-02-06	E924.AR	29-Aug-2020	----	----	----		24-Sep-2020	48 hrs	627 hrs	* EHTR	





Matrix: Soil/Solid

Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Taxonomy : Hydrocarbon Utilizing Bacteria</b>											
<b>Glass soil jar/Teflon lined cap</b> SP20-02-08	E924.AR	29-Aug-2020	----	----	----		24-Sep-2020	48 hrs	627 hrs	*	EHTR
<b>Taxonomy : Hydrocarbon Utilizing Bacteria</b>											
<b>Glass soil jar/Teflon lined cap</b> SP20-02-10	E924.AR	29-Aug-2020	----	----	----		24-Sep-2020	48 hrs	627 hrs	*	EHTR
<b>Taxonomy : Hydrocarbon Utilizing Bacteria</b>											
<b>Glass soil jar/Teflon lined cap</b> SP20-02-12	E924.AR	29-Aug-2020	----	----	----		24-Sep-2020	48 hrs	627 hrs	*	EHTR
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
<b>Glass soil methanol vial</b> SP20-02-01	E611A	29-Aug-2020	06-Sep-2020	40 days	8 days	✓	08-Sep-2020	31 days	1 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
<b>Glass soil methanol vial</b> SP20-02-02	E611A	29-Aug-2020	06-Sep-2020	40 days	8 days	✓	08-Sep-2020	31 days	1 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
<b>Glass soil methanol vial</b> SP20-02-03	E611A	29-Aug-2020	06-Sep-2020	40 days	8 days	✓	08-Sep-2020	31 days	1 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
<b>Glass soil methanol vial</b> SP20-02-04	E611A	29-Aug-2020	06-Sep-2020	40 days	8 days	✓	08-Sep-2020	31 days	1 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
<b>Glass soil methanol vial</b> SP20-02-05	E611A	29-Aug-2020	06-Sep-2020	40 days	8 days	✓	08-Sep-2020	31 days	1 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
<b>Glass soil methanol vial</b> SP20-02-06	E611A	29-Aug-2020	06-Sep-2020	40 days	8 days	✓	08-Sep-2020	31 days	1 days	✓	



Matrix: Soil/Solid

Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
Glass soil methanol vial SP20-02-07	E611A	29-Aug-2020	06-Sep-2020	40 days	8 days	✓	08-Sep-2020	31 days	1 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
Glass soil methanol vial SP20-02-08	E611A	29-Aug-2020	06-Sep-2020	40 days	8 days	✓	08-Sep-2020	31 days	1 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
Glass soil methanol vial SP20-02-09	E611A	29-Aug-2020	06-Sep-2020	40 days	8 days	✓	08-Sep-2020	31 days	1 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
Glass soil methanol vial SP20-02-10	E611A	29-Aug-2020	06-Sep-2020	40 days	8 days	✓	08-Sep-2020	31 days	1 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
Glass soil methanol vial SP20-02-11	E611A	29-Aug-2020	06-Sep-2020	40 days	8 days	✓	08-Sep-2020	31 days	1 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
Glass soil methanol vial SP20-02-12	E611A	29-Aug-2020	06-Sep-2020	40 days	8 days	✓	08-Sep-2020	31 days	1 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
Glass soil methanol vial SP20-02-62	E611A	29-Aug-2020	06-Sep-2020	40 days	8 days	✓	08-Sep-2020	31 days	1 days	✓	

**Legend & Qualifier Definitions**

EHTR: Exceeded ALS recommended hold time prior to sample receipt.  
 Rec. HT: ALS recommended hold time (see units).



## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Soil/Solid**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)	E269.N+N	84477	1	9	11.1	5.0	✔
Available Phosphorus by FIALab (Modified Kelowna)	E384	86217	1	9	11.1	5.0	✔
Available Potassium by flame photometry (Modified Kelowna)	E390	86218	1	9	11.1	5.0	✔
Available Sulfate by ICPOES (0.01M Calcium Chloride Ext.)	E497.SO4	84476	1	20	5.0	5.0	✔
BC PHC - EPH by GC-FID	E601A	82900	1	13	7.6	5.0	✔
BTEX by Headspace GC-MS	E611A	82438	1	19	5.2	5.0	✔
Hydrocarbon Utilizing Bacteria	E924.AR	91388	1	9	11.1	5.0	✔
Moisture Content by Gravimetry	E144	82902	1	13	7.6	5.0	✔
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	82901	1	13	7.6	5.0	✔
Total Carbon by Combustion	E351	83605	1	20	5.0	5.0	✔
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354	83524	1	10	10.0	5.0	✔
<b>Laboratory Control Samples (LCS)</b>							
Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)	E269.N+N	84477	2	9	22.2	10.0	✔
Available Phosphorus by FIALab (Modified Kelowna)	E384	86217	2	9	22.2	10.0	✔
Available Potassium by flame photometry (Modified Kelowna)	E390	86218	2	9	22.2	10.0	✔
Available Sulfate by ICPOES (0.01M Calcium Chloride Ext.)	E497.SO4	84476	2	20	10.0	10.0	✔
BC PHC - EPH by GC-FID	E601A	82900	2	13	15.3	10.0	✔
BTEX by Headspace GC-MS	E611A	82438	1	19	5.2	5.0	✔
Moisture Content by Gravimetry	E144	82902	1	13	7.6	5.0	✔
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	82901	2	13	15.3	10.0	✔
Total Carbon by Combustion	E351	83605	2	20	10.0	10.0	✔
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354	83524	2	10	20.0	10.0	✔
<b>Method Blanks (MB)</b>							
Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)	E269.N+N	84477	1	9	11.1	5.0	✔
Available Phosphorus by FIALab (Modified Kelowna)	E384	86217	1	9	11.1	5.0	✔
Available Potassium by flame photometry (Modified Kelowna)	E390	86218	1	9	11.1	5.0	✔
Available Sulfate by ICPOES (0.01M Calcium Chloride Ext.)	E497.SO4	84476	1	20	5.0	5.0	✔
BC PHC - EPH by GC-FID	E601A	82900	1	13	7.6	5.0	✔
BTEX by Headspace GC-MS	E611A	82438	1	19	5.2	5.0	✔
Hydrocarbon Utilizing Bacteria	E924.AR	91388	1	9	11.1	5.0	✔
Moisture Content by Gravimetry	E144	82902	1	13	7.6	5.0	✔
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	82901	1	13	7.6	5.0	✔
Total Carbon by Combustion	E351	83605	1	20	5.0	5.0	✔
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354	83524	1	10	10.0	5.0	✔
<b>Matrix Spikes (MS)</b>							
BTEX by Headspace GC-MS	E611A	82438	1	19	5.2	5.0	✔



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Moisture Content by Gravimetry	E144 Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)	E269.N+N Saskatoon - Environmental	Soil/Solid	Alberta Agriculture/APHA 4500-NO3 I (mod)	Plant available nitrate and nitrite are analyzed by colourimetry using a flow injection analyzer on a soil sample extract that has been extracted using 0.01M Calcium Chloride, then shaken well and filtered prior to analysis.
Total Carbon by Combustion	E351 Saskatoon - Environmental	Soil/Solid	CSSS (2008) 21.2 (mod)	Total Carbon is determined by the high temperature combustion method with measurement by an infrared detector.
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354 Saskatoon - Environmental	Soil/Solid	CSSS (2008) 20.2	Total Inorganic Carbon is determined by acetic acid pH standard curve, where a known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.
Available Phosphorus by FIALab (Modified Kelowna)	E384 Saskatoon - Environmental	Soil/Solid	Comm. Soil Sci. Plant Anal, 25 (5&6)	Plant available phosphorus is extracted from air dried soil using a fixed ratio Modified Kelowna extraction. Phosphorus is determined by colorimetry using a flow injection analyzer.
Available Potassium by flame photometry (Modified Kelowna)	E390 Saskatoon - Environmental	Soil/Solid	Comm. Soil Sci. Plant Anal, 25 (5&6)	Plant available potassium is extracted from soil using modified Kelowna solution. Potassium is determined by flame emission at 770 nm.
Available Sulfate by ICPOES (0.01M Calcium Chloride Ext.)	E497.SO4 Saskatoon - Environmental	Soil/Solid	Alberta Agriculture	Plant available sulfate is determined by ICPOES. Soil is extracted using a 0.01M calcium chloride solution. This extraction may also produce organic sulfur in the extracts when organic soils are analyzed.
BC PHC - EPH by GC-FID	E601A Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual (EPH in Solids by GC/FID) (mod)	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.
BTEX by Headspace GC-MS	E611A Vancouver - Environmental	Soil/Solid	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L Vancouver - Environmental	Soil/Solid	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by GC-MS.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Hydrocarbon Utilizing Bacteria	E924.AR  Winnipeg - Environmental	Soil/Solid	Internal	Following extraction, serial dilutions are plated onto hydrocarbon-laden media and incubated at 20°C for 5 days. Observed colonies are enumerated.
Total Organic Carbon (Calculated) in soil	EC356  Saskatoon - Environmental	Soil/Solid	CSSS (2008) 21.2	Total Organic Carbon (TOC) is calculated by the difference between total carbon (TC) and total inorganic carbon (TIC).
LEPH and HEPH: EPH-PAH	EC600A  Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual (LEPH and HEPH) (mod)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(b+j+k)fluoranthene, Benzo(a)pyrene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, and Pyrene.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Fixed ratio 0.01M Calcium Chloride extraction for plant available nutrients	EP269  Saskatoon - Environmental	Soil/Solid	Alberta Agriculture	Plant available nutrients (N&S) extracted using 0.01M calcium chloride, then shaken well and filtered prior to analysis.
Modified Kelowna Extraction for soil	EP384  Saskatoon - Environmental	Soil/Solid	Comm. Soil Sci. Plant Anal, 25 (5&6)	Plant available phosphorus and potassium are extracted from the soil using fixed ratio Modified Kelowna solution.
VOCs Methanol Extraction for Headspace Analysis	EP581  Vancouver - Environmental	Soil/Solid	EPA 5035A (mod)	VOCs in samples are extracted with methanol. Extracts are then prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PHCs and PAHs Hexane-Acetone Tumbler Extraction	EP601  Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1 (mod)	Samples are subsampled and Petroleum Hydrocarbons (PHC) and PAHs are extracted with 1:1 hexane:acetone using a rotary extractor.
Dry and Grind	EPP442  Saskatoon - Environmental	Soil/Solid	Soil Sampling and Methods of Analysis, Carter 2008	After removal of any coarse fragments and reservation of wet subsamples a portion of homogenized sample is set in a tray and dried at less than 60 C until dry. The sample is then particle size reduced with an automated crusher or mortar and pestle, typically to <2 mm. Further size reduction may be needed for particular tests.

## QUALITY CONTROL REPORT

**Work Order** : **VA20B4301**

**Page** : 1 of 10

**Client** : Seabridge Gold Inc.  
**Contact** : Elizabeth Miller  
**Address** : 1235 Main Street P.O. Box 2536  
 Smithers BC Canada V0J 2N0  
**Telephone** : 416 367 9292  
**Project** : VE52655D  
**PO** :  
**C-O-C number** : ----  
**Sampler** : Ardy M  
**Site** : ----  
**Quote number** : VA20-SEAB100-0003 - Wood/Seabridge Gold  
**No. of samples received** : 13  
**No. of samples analysed** : 13

**Laboratory** : Vancouver - Environmental  
**Account Manager** : Selam Worku  
**Address** : 8081 Lougheed Highway  
 Burnaby, British Columbia Canada V5A 1W9  
**Telephone** : +1 604 253 4188  
**Date Samples Received** : 02-Sep-2020 10:45  
**Date Analysis Commenced** : 06-Sep-2020  
**Issue Date** : 28-Sep-2020 11:49

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Brianna Allen	Department Manager - Organics	Organics, Burnaby, British Columbia
Dwayne Bennett	Technical Specialist	Inorganics, Saskatoon, Saskatchewan
Hedy Lai	Team Leader - Inorganics	Inorganics, Saskatoon, Saskatchewan
Jeremy Paterson	Analyst	Microbiology, Winnipeg, Manitoba
Melissa Shaw	Team Leader - Inorganics	Inorganics, Saskatoon, Saskatchewan
Xihua Yao	Laboratory Analyst	Inorganics, Saskatoon, Saskatchewan

Page : 2 of 10  
Work Order : VA20B4301  
Client : Seabridge Gold Inc.  
Project : VE52655D

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## **General Comments**

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

# = Indicates a QC result that did not meet the ALS DQO.



### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: Soil/Solid

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 82902)</b>											
VA20B4301-001	SP20-02-01	moisture	----	E144	0.25	%	12.3	12.8	4.14%	20%	----
<b>Organic / Inorganic Carbon (QC Lot: 83524)</b>											
VA20B4301-002	SP20-02-02	carbon, inorganic [IC]	----	E354	0.050	%	0.176	0.180	0.003	Diff <2x LOR	----
<b>Organic / Inorganic Carbon (QC Lot: 83605)</b>											
VA20B4276-008	Anonymous	carbon, total [TC]	----	E351	0.050	%	13.0	13.2	1.04%	20%	----
<b>Plant Available Nutrients (QC Lot: 84476)</b>											
VA20B4097-038	Anonymous	sulfate, available (as S)	14808-79-8	E497.S04	3.0	mg/kg	242	234	3.45%	30%	----
<b>Plant Available Nutrients (QC Lot: 84477)</b>											
VA20B4299-001	Anonymous	nitrate + nitrite, available (as N)	----	E269 N+N	1.0	mg/kg	<1.0	<1.0	0	Diff <2x LOR	----
<b>Plant Available Nutrients (QC Lot: 86217)</b>											
VA20B4299-001	Anonymous	phosphate, available (as P)	14265-44-2	E384	2.0	mg/kg	2.6	2.6	0.004	Diff <2x LOR	----
<b>Plant Available Nutrients (QC Lot: 86218)</b>											
VA20B4299-001	Anonymous	potassium, available	7440-09-7	E390	20	mg/kg	67	66	1	Diff <2x LOR	----
<b>Taxonomy (QC Lot: 91388)</b>											
VA20B4301-002	SP20-02-02	hydrocarbon utilizing bacteria [HUB]	----	E924 AR	5000	CFU/g	56000	49000	13.3%	50%	----
<b>Volatile Organic Compounds (QC Lot: 82438)</b>											
VA20B4301-001	SP20-02-01	benzene	71-43-2	E611A	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.015	mg/kg	<0.015	<0.015	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
<b>Hydrocarbons (QC Lot: 82900)</b>											
VA20B4301-001	SP20-02-01	EPH (C10-C19)	----	E601A	200	mg/kg	<200	<200	0	Diff <2x LOR	----
		EPH (C19-C32)	----	E601A	200	mg/kg	<200	<200	0	Diff <2x LOR	----
<b>Polycyclic Aromatic Hydrocarbons (QC Lot: 82901)</b>											
VA20B4301-001	SP20-02-01	acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		acridine	260-94-6	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.0040	<0.0040	0	Diff <2x LOR	----





Sub-Matrix: **Soil/Solid**

*Laboratory Duplicate (DUP) Report*

<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Original Result</i>	<i>Duplicate Result</i>	<i>RPD(%) or Difference</i>	<i>Duplicate Limits</i>	<i>Qualifier</i>
<b>Polycyclic Aromatic Hydrocarbons (QC Lot: 82901) - continued</b>											
VA20B4301-001	SP20-02-01	benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(b+j)fluoranthene	----	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		chrysene	218-01-9	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		fluoranthene	206-44-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		fluorene	86-73-7	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		naphthalene	91-20-3	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		phenanthrene	85-01-8	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		pyrene	129-00-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		quinoline	6027-02-7	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 82902)</b>						
moisture	----	E144	0.25	%	<0.25	----
<b>Organic / Inorganic Carbon (QCLot: 83524)</b>						
carbon, inorganic [IC]	----	E354	0.05	%	<0.050	----
<b>Organic / Inorganic Carbon (QCLot: 83605)</b>						
carbon, total [TC]	----	E351	0.05	%	<0.050	----
<b>Plant Available Nutrients (QCLot: 84476)</b>						
sulfate, available (as S)	14808-79-8	E497.SO4	3	mg/kg	<3.0	----
<b>Plant Available Nutrients (QCLot: 84477)</b>						
nitrate + nitrite, available (as N)	----	E269.N+N	1	mg/kg	<1.0	----
<b>Plant Available Nutrients (QCLot: 86217)</b>						
phosphate, available (as P)	14265-44-2	E384	2	mg/kg	<2.0	----
<b>Plant Available Nutrients (QCLot: 86218)</b>						
potassium, available	7440-09-7	E390	20	mg/kg	<20	----
<b>Taxonomy (QCLot: 91388)</b>						
hydrocarbon utilizing bacteria [HUB]	----	E924.AR	5	CFU/g	<5	----
<b>Volatile Organic Compounds (QCLot: 82438)</b>						
benzene	71-43-2	E611A	0.005	mg/kg	<0.0050	----
ethylbenzene	100-41-4	E611A	0.015	mg/kg	<0.015	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.05	mg/kg	<0.050	----
styrene	100-42-5	E611A	0.05	mg/kg	<0.050	----
toluene	108-88-3	E611A	0.05	mg/kg	<0.050	----
xylene, m+p-	179601-23-1	E611A	0.05	mg/kg	<0.050	----
xylene, o-	95-47-6	E611A	0.05	mg/kg	<0.050	----
<b>Hydrocarbons (QCLot: 82900)</b>						
EPH (C10-C19)	----	E601A	200	mg/kg	<200	----
EPH (C19-C32)	----	E601A	200	mg/kg	<200	----
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 82901)</b>						
acenaphthene	83-32-9	E641A-L	0.005	mg/kg	<0.0050	----
acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	<0.0050	----
acridine	260-94-6	E641A-L	0.01	mg/kg	<0.010	----



Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 82901) - continued</b>						
anthracene	120-12-7	E641A-L	0.004	mg/kg	<0.0040	----
					<0.0040	----
benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	<0.010	----
benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
benzo(b+j)fluoranthene	----	E641A-L	0.01	mg/kg	<0.010	----
benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	<0.010	----
chrysene	218-01-9	E641A-L	0.01	mg/kg	<0.010	----
dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	<0.0050	----
fluoranthene	206-44-0	E641A-L	0.01	mg/kg	<0.010	----
fluorene	86-73-7	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	<0.010	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	<0.010	----
naphthalene	91-20-3	E641A-L	0.01	mg/kg	<0.010	----
phenanthrene	85-01-8	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
pyrene	129-00-0	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
quinoline	6027-02-7	E641A-L	0.01	mg/kg	<0.010	----



## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Soil/Solid

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Physical Tests (QCLot: 82902)</b>									
moisture	---	E144	0.25	%	50 %	98.5	90.0	110	---
<b>Organic / Inorganic Carbon (QCLot: 83524)</b>									
carbon, inorganic [IC]	---	E354	0.05	%	0.5 %	96.0	90.0	110	---
<b>Organic / Inorganic Carbon (QCLot: 83605)</b>									
carbon, total [TC]	---	E351	0.05	%	48 %	101	80.0	120	---
<b>Plant Available Nutrients (QCLot: 84476)</b>									
sulfate, available (as S)	14808-79-8	E497.S04	3	mg/kg	200 mg/kg	104	70.0	130	---
<b>Plant Available Nutrients (QCLot: 84477)</b>									
nitrate + nitrite, available (as N)	---	E269.N+N	1	mg/kg	22 mg/kg	81.8	70.0	130	---
<b>Plant Available Nutrients (QCLot: 86217)</b>									
phosphate, available (as P)	14265-44-2	E384	2	mg/kg	12.5 mg/kg	96.6	80.0	120	---
<b>Plant Available Nutrients (QCLot: 86218)</b>									
potassium, available	7440-09-7	E390	20	mg/kg	125 mg/kg	94.8	70.0	130	---
<b>Volatile Organic Compounds (QCLot: 82438)</b>									
benzene	71-43-2	E611A	0.005	mg/kg	2.5 mg/kg	89.7	70.0	130	---
ethylbenzene	100-41-4	E611A	0.015	mg/kg	2.5 mg/kg	93.4	70.0	130	---
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.05	mg/kg	2.5 mg/kg	96.9	70.0	130	---
styrene	100-42-5	E611A	0.05	mg/kg	2.5 mg/kg	95.8	70.0	130	---
toluene	108-88-3	E611A	0.05	mg/kg	2.5 mg/kg	102	70.0	130	---
xylene, m+p-	179601-23-1	E611A	0.05	mg/kg	5 mg/kg	103	70.0	130	---
xylene, o-	95-47-6	E611A	0.05	mg/kg	2.5 mg/kg	97.4	70.0	130	---
<b>Hydrocarbons (QCLot: 82900)</b>									
EPH (C10-C19)	---	E601A	200	mg/kg	1134.37 mg/kg	99.9	70.0	130	---
					7113 mg/kg	101	70.0	130	---
EPH (C19-C32)	---	E601A	200	mg/kg	575.98 mg/kg	96.3	70.0	130	---
					10183 mg/kg	98.3	70.0	130	---
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 82901)</b>									
acenaphthene	83-32-9	E641A-L	0.005	mg/kg	0.5 mg/kg	99.3	60.0	130	---
					0.638 mg/kg	97.7	60.0	130	---



Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 82901) - continued</b>									
acenaphthylene	208-96-8	E641A-L	0 005	mg/kg	0.5 mg/kg	98 0	60.0	130	----
					0.2 mg/kg	96 8	60.0	130	----
acridine	260-94-6	E641A-L	0.01	mg/kg	0.5 mg/kg	98.7	60.0	130	----
anthracene	120-12-7	E641A-L	0 004	mg/kg	0.5 mg/kg	101	60.0	130	----
					0.32 mg/kg	99 3	60.0	130	----
benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	0.5 mg/kg	101	60.0	130	----
benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	0.5 mg/kg	104	60.0	130	----
					0.135 mg/kg	103	60.0	130	----
benzo(b+j)fluoranthene	----	E641A-L	0.01	mg/kg	0.5 mg/kg	106	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	0.5 mg/kg	99.4	60.0	130	----
					0 377 mg/kg	104	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	0.5 mg/kg	96 8	60.0	130	----
chrysene	218-01-9	E641A-L	0.01	mg/kg	0.5 mg/kg	90 0	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A-L	0 005	mg/kg	0.5 mg/kg	101	60.0	130	----
fluoranthene	206-44-0	E641A-L	0.01	mg/kg	0.5 mg/kg	99 2	60.0	130	----
fluorene	86-73-7	E641A-L	0.01	mg/kg	0.5 mg/kg	100	60.0	130	----
					0 989 mg/kg	99 0	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	0.5 mg/kg	105	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	0.5 mg/kg	92 9	60.0	130	----
					1 256 mg/kg	94 3	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	0.5 mg/kg	91 9	60.0	130	----
naphthalene	91-20-3	E641A-L	0.01	mg/kg	0.5 mg/kg	92 2	50.0	130	----
phenanthrene	85-01-8	E641A-L	0.01	mg/kg	0.5 mg/kg	99 2	60.0	130	----
					1.13 mg/kg	97 6	60.0	130	----
pyrene	129-00-0	E641A-L	0.01	mg/kg	0.5 mg/kg	105	60.0	130	----
					1 325 mg/kg	100.0	60.0	130	----
quinoline	6027-02-7	E641A-L	0.01	mg/kg	0.5 mg/kg	92.1	60.0	130	----



### Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level  $\geq$  1x spike level.

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 82438)</b>										
VA20B4301-002	SP20-02-02	benzene	71-43-2	E611A	2.12 mg/kg	3.125 mg/kg	99.6	60 0	140	----
		ethylbenzene	100-41-4	E611A	2.00 mg/kg	3.125 mg/kg	94.3	60 0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	2.17 mg/kg	3.125 mg/kg	102	60 0	140	----
		styrene	100-42-5	E611A	1.98 mg/kg	3.125 mg/kg	93.4	60 0	140	----
		toluene	108-88-3	E611A	2.02 mg/kg	3.125 mg/kg	94.8	60 0	140	----
		xylene, m+p-	179601-23-1	E611A	4.32 mg/kg	6.25 mg/kg	102	60 0	140	----
		xylene, o-	95-47-6	E611A	2.06 mg/kg	3.125 mg/kg	96.8	60 0	140	----



## Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be AL long term mean values (for empirical test methods)

Sub Matrix: Soil/Solid

					Reference Material (RM) Report				
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
							Low	High	
<b>Organic / Inorganic Carbon (QCLot: 83524)</b>									
QC-83524-003	RM	carbon, inorganic [IC]	----	E354	0.383 %	91.9	80.0	120	----
<b>Organic / Inorganic Carbon (QCLot: 83605)</b>									
QC-83605-003	RM	carbon, total [TC]	----	E351	1.4 %	103	80.0	120	----
<b>Plant Available Nutrients (QCLot: 84476)</b>									
QC-84476-003	RM	sulfate, available (as S)	14808-79-8	E497.SO4	497 mg/kg	105	70.0	130	----
<b>Plant Available Nutrients (QCLot: 84477)</b>									
QC-84477-003	RM	nitrate + nitrite, available (as N)	----	E269 N+N	16.8 mg/kg	76.7	70.0	130	----
<b>Plant Available Nutrients (QCLot: 86217)</b>									
QC-86217-003	RM	phosphate, available (as P)	14265-44-2	E384	10.47 mg/kg	100	80.0	120	----
<b>Plant Available Nutrients (QCLot: 86218)</b>									
QC-86218-003	RM	potassium, available	7440-09-7	E390	154 mg/kg	100.0	70.0	130	
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 82901)</b>									
QC-82901-003	RM	benz(a)anthracene	56-55-3	E641A-L	0.545 mg/kg	101	60.0	130	----
QC-82901-003	RM	benzo(b+j)fluoranthene	----	E641A-L	0.793 mg/kg	102	60.0	130	----
QC-82901-003	RM	benzo(k)fluoranthene	207-08-9	E641A-L	0.34 mg/kg	108	60.0	130	----
QC-82901-003	RM	chrysene	218-01-9	E641A-L	0.666 mg/kg	99.9	60.0	130	----
QC-82901-003	RM	dibenz(a,h)anthracene	53-70-3	E641A-L	1.196 mg/kg	101	60.0	130	----
QC-82901-003	RM	fluoranthene	206-44-0	E641A-L	1.757 mg/kg	96.9	60.0	130	----
QC-82901-003	RM	indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.445 mg/kg	103	60.0	130	----
QC-82901-003	RM	methylnaphthalene, 2-	91-57-6	E641A-L	1.088 mg/kg	92.0	60.0	130	----
QC-82901-003	RM	naphthalene	91-20-3	E641A-L	1.03 mg/kg	98.1	50.0	130	----



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Company: Wood		Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)			Regular [R] <input checked="" type="checkbox"/> Standard TAT If received by 3 pm - business days - no surcharges apply																																																													
Contact: Jeremiah Gladu		Quality Control (QC) Report with Report <input type="checkbox"/> YES <input type="checkbox"/> NO			PROPERTY (Business Days) 4 day [P4-20%] <input type="checkbox"/> 3 day [P3-25%] <input type="checkbox"/> 2 day [P2-60%] <input type="checkbox"/>		EMERGENCY 1 Business day [E - 100%] <input type="checkbox"/> Same Day, Weekend or Statutory holiday [E2 -200%] (Laboratory opening fees may apply) <input type="checkbox"/>																																																											
Phone:		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked																																																																
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm																																																													
Street: 4445 Lougheed Hwy.		Email 1 or Fax jeremiah.gladu@woodplc.com			For tests that cannot be performed according to the service level selected, you will be contacted.																																																													
City/Province: Burnaby/BC		Email 2			<b>Analysis Request</b>																																																													
Postal Code: V5C 0E4		Email 3																																																																
<b>Invoice To</b>		<b>Invoice Distribution</b>			<table border="1"> <tr> <td colspan="5">Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below</td> <td rowspan="10"><b>NUMBER OF CONTAINERS</b></td> <td rowspan="10">BTEX</td> <td rowspan="10">EPIPAH</td> <td rowspan="10">General chemistry *</td> <td rowspan="10">DISSOLVED METALS</td> <td rowspan="10"><b>SAMPLES ON HOLD</b></td> <td rowspan="10">SUSPECTED HAZARD (see Special Instructions)</td> </tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </table>					Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below					<b>NUMBER OF CONTAINERS</b>	BTEX	EPIPAH	General chemistry *	DISSOLVED METALS	<b>SAMPLES ON HOLD</b>	SUSPECTED HAZARD (see Special Instructions)																																													
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Same as Report To <input type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX																																																																
Copy of Invoice with Report <input type="checkbox"/> YES <input type="checkbox"/> NO		Email 1 or Fax																																																																
Company:		Email 2																																																																
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		Sampler: Ardy M.																																																																
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SP20-02-01					29-Aug-20			PM			Soil																																																							
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SP20-02-11																																																																		
SP20-02-12																																																																		
<b>Drinking Water (DW) Samples<sup>1</sup> (client use)</b>		<b>Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)</b>			<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>																																																													
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO					Frozen <input type="checkbox"/>		SIF Observations: Yes <input type="checkbox"/> No <input type="checkbox"/>			Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/>		Custody seal intact: Yes <input type="checkbox"/> No <input type="checkbox"/>																																																						
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										17 C (AV. 9/1)																																																								
<b>SHIPMENT RELEASE (client use)</b>				<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>				<b>FINAL SHIPMENT RECEPTION (lab use only)</b>																																																										
Released by: Ardy Mansourpour		Date:		Received by: Chris Allison		Date: Aug 31 2020		Received by: RSS		Date: 2 Sep 2020																																																								
Time:		Time:		Time: 1030		Time:		Time:		Time: 1045																																																								

Environmental Division  
Vancouver  
Work Order Reference  
**VA20B4301**

Telephone: +1 604 253 4188

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.





www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 688 9878

Affix ALS barcode label here

(lab use only)

COC Number: 17 -

Page 2 of 2

Report To		Report Format / Distribution			Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)																																														
Company:	Wood.	Select Report Format:	<input checked="" type="checkbox"/> PDF	<input checked="" type="checkbox"/> EXCEL	<input type="checkbox"/> EDD (DIGITAL)	Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply																																													
Contact:	Jeremiah Gladu	Quality Control (QC) Report with Report	<input type="checkbox"/> YES <input type="checkbox"/> NO			PRIORITY (Business Days)	4 day [P4-20%]	<input type="checkbox"/>	EMERGENCY	1 Business day [E - 100%]	<input type="checkbox"/>																																								
Phone:		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked			3 day [P3-25%]		<input type="checkbox"/>	Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)]		<input type="checkbox"/>																																									
Company address below will appear on the final report		Select Distribution:	<input checked="" type="checkbox"/> EMAIL	<input type="checkbox"/> MAIL	<input type="checkbox"/> FAX	2 day [P2-50%]		<input type="checkbox"/>	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm																																										
Street:	4445 Lougheed Hwy.	Email 1 or Fax:	jeremiah.glsdu@woodplc.com			For tests that can not be performed according to the service level selected, you will be contacted.																																													
City/Province:	Burnaby/BC	Email 2:				Analysis Request																																													
Postal Code:	V5C 0E4	Email 3:																																																	
Invoice To	Same as Report To <input type="checkbox"/> YES <input type="checkbox"/> NO	Invoice Distribution			NUMBER OF CONTAINERS																																														
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	SP20-02-62	29-Aug-20	PM	Soil	Frozen: <input type="checkbox"/> SIF Observations: Yes <input type="checkbox"/> No <input type="checkbox"/> Ice Packs: <input type="checkbox"/> Ice Cubes: <input type="checkbox"/> Custody seal intact: Yes <input type="checkbox"/> No <input type="checkbox"/> Cooling Initiated: <input type="checkbox"/> INITIAL COOLER TEMPERATURES °C: _____ FINAL COOLER TEMPERATURES °C: 17.4																																														
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Released by: Ardy Mansourpour		Date:	Time:	INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)																																												
Date:		Date:	Date:	Received by:	Date:	Received by:	Date:	Received by:	Date:	Received by:																																									
								RSS	2 Sept 2020	10:45																																									



CERTIFICATE OF ANALYSIS

Work Order : VA20B3887
Amendment : 1
Client : Wood Canada Ltd.
Contact : Jeremiah Gladu
Address : 600 - 4445 Lougheed Hwy
Burnaby BC Canada V5C 0E4
Telephone : 604 294 3811
Project : VE52655D
PO : ---
C-O-C number : ---
Sampler : Ardy M.
Site : ---
Quote number : VA20-SEAB100-0003 - Wood/Seabridge Gold
No. of samples received : 9
No. of samples analysed : 9

Page : 1 of 10
Laboratory : Vancouver - Environmental
Account Manager : Selam Worku
Address : 8081 Lougheed Highway
Burnaby BC Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 28-Aug-2020 10:10
Date Analysis Commenced : 01-Sep-2020
Issue Date : 27-Oct-2020 09:43

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
Analytical Results
Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Table with 3 columns: Signatories, Position, Laboratory Department. Lists names like Annabelle Prasad, Bruna Botti, Caitlin Macey, Cristina Alexandre, Kevin Duarte, Lindsay Gung, Ophelia Chiu, Shaneel Dayal and their respective roles and departments.



## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
-	No Unit
µg/L	micrograms per litre
µS/cm	Microsiemens per centimetre
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in reports identified as "Preliminary Report" are considered authorized for use.

## Workorder Comments

**Sample "BH17-20B": 2 40mL glass VOC vials received broken. BTEX analysis not possible.**

**All Samples: Labelling Issues. On CofC, Sample IDs start with "BH17" but on bottles Sample IDs start with "MW17". Samples labelled as per CofC.**

The units for trace metals have been updated to ug/L in this report.

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					MW17-25A	MW17-26A	MW17-26B	MW17-14A	MW17-20A
Client sampling date / time					25-Aug-2020 11:00	25-Aug-2020 12:00	25-Aug-2020 11:30	25-Aug-2020 13:10	25-Aug-2020 14:35
Analyte	CAS Number	Method	LOR	Unit	VA20B3887-001	VA20B3887-002	VA20B3887-003	VA20B3887-004	VA20B3887-005
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
acidity (as CaCO3)	----	E283	2.0	mg/L	<2.0	<2.0	<2.0	2.6	----
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	156	111	115	146	----
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	----
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	----
alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	----
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	156	111	115	146	----
conductivity	----	E100	2.0	µS/cm	352	255	274	339	----
pH	----	E108	0.10	pH units	8.05	8.10	8.08	7.81	----
solids, total dissolved [TDS]	----	E162	10	mg/L	261	192	224	350	----
turbidity	----	E121	0.10	NTU	726	155	441	2720	----
hardness (as CaCO3), dissolved	----	EC100	600	µg/L	151000	130000	134000	117000	----
<b>Anions and Nutrients</b>									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0229	<0.0050	0.0080	0.0346	----
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	----
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	<0.50	3.92	----
fluoride	16984-48-8	E235.F	0.020	mg/L	0.343	<0.020	0.026	0.284	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0104	0.0239	0.0187	0.0142	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0012	0.0012	0.0012	0.0012	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	39.5	24.3	31.8	11.2	----
<b>Dissolved Metals</b>									
aluminum, dissolved	7429-90-5	E421	1.0	µg/L	3.0	2.4	2.6	268	----
antimony, dissolved	7440-36-0	E421	0.10	µg/L	1.18	0.16	0.15	<0.10	----
arsenic, dissolved	7440-38-2	E421	0.10	µg/L	2.00	0.12	0.15	2.01	----
barium, dissolved	7440-39-3	E421	0.10	µg/L	33.0	58.1	36.8	349	----
beryllium, dissolved	7440-41-7	E421	0.100	µg/L	<0.100	<0.100	<0.100	<0.100	----
bismuth, dissolved	7440-69-9	E421	0.050	µg/L	<0.050	<0.050	<0.050	<0.050	----
boron, dissolved	7440-42-8	E421	10	µg/L	<10	<10	<10	29	----
cadmium, dissolved	7440-43-9	E421	0.0050	µg/L	0.0340	0.0186	0.0146	0.0687	----
calcium, dissolved	7440-70-2	E421	50	µg/L	47000	43600	42700	37000	----
cesium, dissolved	7440-46-2	E421	0.010	µg/L	0.011	<0.010	<0.010	0.052	----



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					MW17-25A	MW17-26A	MW17-26B	MW17-14A	MW17-20A
Client sampling date / time					25-Aug-2020 11:00	25-Aug-2020 12:00	25-Aug-2020 11:30	25-Aug-2020 13:10	25-Aug-2020 14:35
Analyte	CAS Number	Method	LOR	Unit	VA20B3887-001	VA20B3887-002	VA20B3887-003	VA20B3887-004	VA20B3887-005
					Result	Result	Result	Result	Result
<b>Dissolved Metals</b>									
chromium, dissolved	7440-47-3	E421.Cr-L	0.10	µg/L	<0.10	<0.10	<0.10	0.22	----
cobalt, dissolved	7440-48-4	E421	0.10	µg/L	0.12	<0.10	<0.10	0.81	----
copper, dissolved	7440-50-8	E421	0.20	µg/L	0.22	<0.20	<0.20	1.74	----
iron, dissolved	7439-89-6	E421	10	µg/L	30	<10	<10	3800	----
lead, dissolved	7439-92-1	E421	0.050	µg/L	<0.050	<0.050	<0.050	1.36	----
lithium, dissolved	7439-93-2	E421	1.0	µg/L	5.0	2.8	3.4	3.9	----
magnesium, dissolved	7439-95-4	E421	5.0	µg/L	8110	5210	6540	6030	----
manganese, dissolved	7439-96-5	E421	0.10	µg/L	134	<0.10	1.69	1450	----
mercury, dissolved	7439-97-6	E509	0.0050	µg/L	<0.0050	<0.0050	<0.0050	<0.0050	----
molybdenum, dissolved	7439-98-7	E421	0.050	µg/L	4.34	0.678	0.892	16.6	----
nickel, dissolved	7440-02-0	E421	0.50	µg/L	0.54	<0.50	<0.50	0.99	----
phosphorus, dissolved	7723-14-0	E421	50	µg/L	<50	<50	<50	<50	----
potassium, dissolved	7440-09-7	E421	50	µg/L	3900	3330	3960	3740	----
rubidium, dissolved	7440-17-7	E421	0.20	µg/L	1.92	0.87	1.30	1.00	----
selenium, dissolved	7782-49-2	E421	0.050	µg/L	0.051	0.220	0.385	<0.050	----
silicon, dissolved	7440-21-3	E421	50	µg/L	6860	2040	2160	3310	----
silver, dissolved	7440-22-4	E421	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
sodium, dissolved	17341-25-2	E421	50	µg/L	17400	926	2490	28200	----
strontium, dissolved	7440-24-6	E421	0.20	µg/L	484	271	298	423	----
sulfur, dissolved	7704-34-9	E421	500	µg/L	14400	8400	11400	2460	----
tellurium, dissolved	13494-80-9	E421	0.20	µg/L	<0.20	<0.20	<0.20	<0.20	----
thallium, dissolved	7440-28-0	E421	0.010	µg/L	0.020	<0.010	<0.010	<0.010	----
thorium, dissolved	7440-29-1	E421	0.10	µg/L	<0.10	<0.10	<0.10	<0.10	----
tin, dissolved	7440-31-5	E421	0.10	µg/L	<0.10	<0.10	<0.10	<0.10	----
titanium, dissolved	7440-32-6	E421	0.30	µg/L	<0.30	<0.30	<0.30	17.8	----
tungsten, dissolved	7440-33-7	E421	0.10	µg/L	<0.10	<0.10	<0.10	<0.10	----
uranium, dissolved	7440-61-1	E421	0.010	µg/L	0.325	0.298	0.393	0.100	----
vanadium, dissolved	7440-62-2	E421	0.50	µg/L	<0.50	<0.50	<0.50	1.05	----
zinc, dissolved	7440-66-6	E421	1.0	µg/L	<1.0	1.1	<1.0	15.1	----
zirconium, dissolved	7440-67-7	E421	0.20	µg/L	<0.20	<0.20	<0.20	0.44	----
dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	Field	----



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					MW17-25A	MW17-26A	MW17-26B	MW17-14A	MW17-20A
Client sampling date / time					25-Aug-2020 11:00	25-Aug-2020 12:00	25-Aug-2020 11:30	25-Aug-2020 13:10	25-Aug-2020 14:35
Analyte	CAS Number	Method	LOR	Unit	VA20B3887-001	VA20B3887-002	VA20B3887-003	VA20B3887-004	VA20B3887-005
					Result	Result	Result	Result	Result
<b>Dissolved Metals</b>									
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	Field	----
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>									
benzene	71-43-2	E611A	0.50	µg/L	----	----	----	----	<0.50
ethylbenzene	100-41-4	E611A	0.50	µg/L	----	----	----	----	0.50
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	----	----	----	----	<0.50
styrene	100-42-5	E611A	0.50	µg/L	----	----	----	----	<0.50
toluene	108-88-3	E611A	0.50	µg/L	----	----	----	----	<0.50
xylene, m+p-	179601-23-1	E611A	0.50	µg/L	----	----	----	----	0.50
xylene, o-	95-47-6	E611A	0.50	µg/L	----	----	----	----	<0.50
xylenes, total	1330-20-7	E611A	0.75	µg/L	----	----	----	----	<0.75
BTEX, total	----	E611A	1.2	µg/L	----	----	----	----	<1.2
<b>Volatile Organic Compounds Surrogates</b>									
bromofluorobenzene, 4-	460-00-4	E611A	0.50	%	----	----	----	----	93.7
difluorobenzene, 1,4	540-36-3	E611A	0.50	%	----	----	----	----	108
<b>Hydrocarbons</b>									
EPH (C10-C19)	----	E601A	250	µg/L	----	----	----	----	<250
EPH (C19-C32)	----	E601A	250	µg/L	----	----	----	----	<250
HEPHw	----	EC600A	250	µg/L	----	----	----	----	<250
LEPHw	----	EC600A	250	µg/L	----	----	----	----	<250
<b>Hydrocarbons Surrogates</b>									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%	----	----	----	----	88.0
<b>Polycyclic Aromatic Hydrocarbons</b>									
acenaphthene	83-32-9	E641A	0.010	µg/L	----	----	----	----	<0.010
acenaphthylene	208-96-8	E641A	0.010	µg/L	----	----	----	----	<0.010
acridine	260-94-6	E641A	0.010	µg/L	----	----	----	----	<0.010
anthracene	120-12-7	E641A	0.010	µg/L	----	----	----	----	<0.010
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	----	----	----	----	<0.010
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	----	----	----	----	<0.0050
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	----	----	----	----	<0.010
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	----	----	----	----	<0.015
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	----	----	----	----	<0.010



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					MW17-25A	MW17-26A	MW17-26B	MW17-14A	MW17-20A
Client sampling date / time					25-Aug-2020 11:00	25-Aug-2020 12:00	25-Aug-2020 11:30	25-Aug-2020 13:10	25-Aug-2020 14:35
Analyte	CAS Number	Method	LOR	Unit	VA20B3887-001	VA20B3887-002	VA20B3887-003	VA20B3887-004	VA20B3887-005
					Result	Result	Result	Result	Result
<b>Polycyclic Aromatic Hydrocarbons</b>									
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	----	----	----	----	<0.010
chrysene	218-01-9	E641A	0.010	µg/L	----	----	----	----	<0.010
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	----	----	----	----	<0.0050
fluoranthene	206-44-0	E641A	0.010	µg/L	----	----	----	----	<0.010
fluorene	86-73-7	E641A	0.010	µg/L	----	----	----	----	<0.010
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	----	----	----	----	<0.010
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	----	----	----	----	0.112
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	----	----	----	----	0.182
naphthalene	91-20-3	E641A	0.050	µg/L	----	----	----	----	0.165
phenanthrene	85-01-8	E641A	0.020	µg/L	----	----	----	----	<0.020
pyrene	129-00-0	E641A	0.010	µg/L	----	----	----	----	<0.010
quinoline	6027-02-7	E641A	0.050	µg/L	----	----	----	----	<0.050
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>									
acridine-d9	34749-75-2	E641A	0.010	%	----	----	----	----	91.6
chrysene-d12	1719-03-5	E641A	0.010	%	----	----	----	----	102
naphthalene-d8	1146-65-2	E641A	0.010	%	----	----	----	----	98.0
phenanthrene-d10	1517-22-2	E641A	0.010	%	----	----	----	----	102

Please refer to the General Comments section for an explanation of any qualifiers detected.



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

					MW17-20B	MW17-21A	MW17-21B	MW17-75A	----
					25-Aug-2020 14:15	25-Aug-2020 16:00	25-Aug-2020 16:30	25-Aug-2020 11:00	----
Analyte	CAS Number	Method	LOR	Unit	VA20B3887-006	VA20B3887-007	VA20B3887-008	VA20B3887-009	-----
					Result	Result	Result	Result	---
<b>Physical Tests</b>									
acidity (as CaCO3)	----	E283	2.0	mg/L	----	<2.0	4.5	<2.0	----
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	----	87.6	48.6	156	----
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	----	<1.0	<1.0	<1.0	----
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	----	<1.0	<1.0	<1.0	----
alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L	----	<1.0	<1.0	<1.0	----
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	----	87.6	48.6	156	----
conductivity	----	E100	2.0	µS/cm	----	256	109	349	----
pH	----	E108	0.10	pH units	----	8.11	7.14	8.08	----
solids, total dissolved [TDS]	----	E162	10	mg/L	----	180	88	256	----
turbidity	----	E121	0.10	NTU	----	0.95	73.4	618	----
hardness (as CaCO3), dissolved	----	EC100	600	µg/L	----	97100	32600	151000	----
<b>Anions and Nutrients</b>									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	----	0.0273	0.0053	0.0244	----
bromide	24959-67-9	E235.Br-L	0.050	mg/L	----	<0.050	<0.050	<0.050	----
chloride	16887-00-6	E235.Cl	0.50	mg/L	----	<0.50	<0.50	<0.50	----
fluoride	16984-48-8	E235.F	0.020	mg/L	----	0.571	0.432	0.354	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	----	0.0244	0.0126	0.0135	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	----	<0.0010	0.0013	0.0017	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	----	41.5	31.8	39.6	----
<b>Dissolved Metals</b>									
aluminum, dissolved	7429-90-5	E421	1.0	µg/L	----	2.5	2.6	3.3	----
antimony, dissolved	7440-36-0	E421	0.10	µg/L	----	0.14	<0.10	1.17	----
arsenic, dissolved	7440-38-2	E421	0.10	µg/L	----	0.60	<0.10	2.08	----
barium, dissolved	7440-39-3	E421	0.10	µg/L	----	28.3	14.8	34.2	----
beryllium, dissolved	7440-41-7	E421	0.100	µg/L	----	<0.100	<0.100	<0.100	----
bismuth, dissolved	7440-69-9	E421	0.050	µg/L	----	<0.050	<0.050	<0.050	----
boron, dissolved	7440-42-8	E421	10	µg/L	----	16	<10	10	----
cadmium, dissolved	7440-43-9	E421	0.0050	µg/L	----	<0.0100 <sup>DLM</sup>	0.0779	0.0331	----
calcium, dissolved	7440-70-2	E421	50	µg/L	----	23000	11100	46800	----
cesium, dissolved	7440-46-2	E421	0.010	µg/L	----	<0.010	<0.010	0.010	----
chromium, dissolved	7440-47-3	E421.Cr-L	0.10	µg/L	----	<0.10	<0.10	<0.10	----





## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					MW17-20B	MW17-21A	MW17-21B	MW17-75A	----
					25-Aug-2020 14:15	25-Aug-2020 16:00	25-Aug-2020 16:30	25-Aug-2020 11:00	----
Analyte	CAS Number	Method	LOR	Unit	VA20B3887-006	VA20B3887-007	VA20B3887-008	VA20B3887-009	-----
					Result	Result	Result	Result	---
<b>Dissolved Metals</b>									
cobalt, dissolved	7440-48-4	E421	0.10	µg/L	----	<0.10	<0.10	0.13	----
copper, dissolved	7440-50-8	E421	0.20	µg/L	----	0.68	0.21	0.25	----
iron, dissolved	7439-89-6	E421	10	µg/L	----	11	<10	32	----
lead, dissolved	7439-92-1	E421	0.050	µg/L	----	0.119	<0.050	<0.050	----
lithium, dissolved	7439-93-2	E421	1.0	µg/L	----	8.5	<1.0	5.0	----
magnesium, dissolved	7439-95-4	E421	5.0	µg/L	----	9620	1190	8320	----
manganese, dissolved	7439-96-5	E421	0.10	µg/L	----	117	44.3	139	----
mercury, dissolved	7439-97-6	E509	0.0050	µg/L	----	<0.0050	<0.0050	<0.0050	----
molybdenum, dissolved	7439-98-7	E421	0.050	µg/L	----	9.34	0.168	4.16	----
nickel, dissolved	7440-02-0	E421	0.50	µg/L	----	<0.50	<0.50	0.54	----
phosphorus, dissolved	7723-14-0	E421	50	µg/L	----	<50	<50	<50	----
potassium, dissolved	7440-09-7	E421	50	µg/L	----	3040	601	4140	----
rubidium, dissolved	7440-17-7	E421	0.20	µg/L	----	0.40	0.68	1.96	----
selenium, dissolved	7782-49-2	E421	0.050	µg/L	----	<0.050	0.195	<0.050	----
silicon, dissolved	7440-21-3	E421	50	µg/L	----	3140	3800	7110	----
silver, dissolved	7440-22-4	E421	0.010	µg/L	----	<0.010	<0.010	<0.010	----
sodium, dissolved	17341-25-2	E421	50	µg/L	----	15600	1300	17800	----
strontium, dissolved	7440-24-6	E421	0.20	µg/L	----	459	56.1	482	----
sulfur, dissolved	7704-34-9	E421	500	µg/L	----	15700	1420	14100	----
tellurium, dissolved	13494-80-9	E421	0.20	µg/L	----	<0.20	<0.20	<0.20	----
thallium, dissolved	7440-28-0	E421	0.010	µg/L	----	<0.010	<0.010	0.018	----
thorium, dissolved	7440-29-1	E421	0.10	µg/L	----	<0.10	<0.10	<0.10	----
tin, dissolved	7440-31-5	E421	0.10	µg/L	----	0.15	<0.10	<0.10	----
titanium, dissolved	7440-32-6	E421	0.30	µg/L	----	<0.30	<0.30	<0.30	----
tungsten, dissolved	7440-33-7	E421	0.10	µg/L	----	<0.10	<0.10	<0.10	----
uranium, dissolved	7440-61-1	E421	0.010	µg/L	----	0.398	0.014	0.332	----
vanadium, dissolved	7440-62-2	E421	0.50	µg/L	----	<0.50	<0.50	<0.50	----
zinc, dissolved	7440-66-6	E421	1.0	µg/L	----	3.6	2.5	<1.0	----
zirconium, dissolved	7440-67-7	E421	0.20	µg/L	----	<0.20	<0.20	<0.20	----
dissolved mercury filtration location	----	EP509	-	-	----	Field	Field	Field	----
dissolved metals filtration location	----	EP421	-	-	----	Field	Field	Field	----



**Analytical Results**

Sub-Matrix: Groundwater (Matrix: Water)					Client sample ID	MW17-20B	MW17-21A	MW17-21B	MW17-75A	----
Client sampling date / time					25-Aug-2020 14:15	25-Aug-2020 16:00	25-Aug-2020 16:30	25-Aug-2020 11:00	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B3887-006	VA20B3887-007	VA20B3887-008	VA20B3887-009	-----	----
					Result	Result	Result	Result	----	----
<b>Hydrocarbons</b>										
EPH (C10-C19)	----	E601A	250	µg/L	<250	----	----	----	----	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	----	----	----	----	----
HEPHw	----	EC600A	250	µg/L	<250	----	----	----	----	----
LEPHw	----	EC600A	250	µg/L	<250	----	----	----	----	----
<b>Hydrocarbons Surrogates</b>										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%	83.9					
<b>Polycyclic Aromatic Hydrocarbons</b>										
acenaphthene	83-32-9	E641A	0.010	µg/L	<0.010	----	----	----	----	----
acenaphthylene	208-96-8	E641A	0.010	µg/L	<0.010	----	----	----	----	----
acridine	260-94-6	E641A	0.010	µg/L	<0.010	----	----	----	----	----
anthracene	120-12-7	E641A	0.010	µg/L	<0.010	----	----	----	----	----
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	<0.010	----	----	----	----	----
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	<0.0050	----	----	----	----	----
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	<0.010	----	----	----	----	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	----	----	----	----	----
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	<0.010	----	----	----	----	----
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	<0.010	----	----	----	----	----
chrysene	218-01-9	E641A	0.010	µg/L	<0.010	----	----	----	----	----
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	<0.0050	----	----	----	----	----
fluoranthene	206-44-0	E641A	0.010	µg/L	<0.010	----	----	----	----	----
fluorene	86-73-7	E641A	0.010	µg/L	<0.010	----	----	----	----	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	<0.010	----	----	----	----	----
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	<0.010	----	----	----	----	----
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	<0.010	----	----	----	----	----
naphthalene	91-20-3	E641A	0.050	µg/L	<0.050	----	----	----	----	----
phenanthrene	85-01-8	E641A	0.020	µg/L	<0.020	----	----	----	----	----
pyrene	129-00-0	E641A	0.010	µg/L	<0.010	----	----	----	----	----
quinoline	6027-02-7	E641A	0.050	µg/L	<0.050	----	----	----	----	----
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>										
acridine-d9	34749-75-2	E641A	0.010	%	95.1	----	----	----	----	----
chrysene-d12	1719-03-5	E641A	0.010	%	111	----	----	----	----	----



## Analytical Results

Sub-Matrix: Groundwater (Matrix: Water)					Client sample ID	MW17-20B	MW17-21A	MW17-21B	MW17-75A	----
Client sampling date / time					25-Aug-2020 14:15	25-Aug-2020 16:00	25-Aug-2020 16:30	25-Aug-2020 11:00	----	
Analyte	CAS Number	Method	LOR	Unit	VA20B3887-006	VA20B3887-007	VA20B3887-008	VA20B3887-009	-----	
					Result	Result	Result	Result	----	
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>										
naphthalene-d8	1146-65-2	E641A	0.010	%	100	----	----	----	----	----
phenanthrene-d10	1517-22-2	E641A	0.010	%	108	----	----	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>VA20B3887</b>	Page	: 1 of 21
Amendment	: 1		
Client	: <b>Wood Canada Ltd.</b>	Laboratory	: Vancouver - Environmental
Contact	: Jeremiah Gladu	Account Manager	: Selam Worku
Address	: 600 - 4445 Lougheed Hwy Burnaby BC Canada V5C 0E4	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: VE52655D	Date Samples Received	: 28-Aug-2020 10:10
PO	: ----	Issue Date	: 27-Oct-2020 09:43
C-O-C number	: ----		
Sampler	: Ardy M.		
Site	: ----		
Quote number	: VA20-SEAB100-0003 - Wood/Seabridge Gold		
No. of samples received	: 9		
No. of samples analysed	: 9		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

## Summary of Outliers

### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.

### **Outliers : Analysis Holding Time Compliance (Breaches)**

- Analysis Holding Time Outliers exist - please see following pages for full details.

### **Outliers : Frequency of Quality Control Samples**

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> MW17-21A	E298	25-Aug-2020	----	----	----		03-Sep-2020	28 days	8 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> MW17-21B	E298	25-Aug-2020	----	----	----		03-Sep-2020	28 days	8 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> MW17-14A	E298	25-Aug-2020	----	----	----		03-Sep-2020	28 days	9 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> MW17-25A	E298	25-Aug-2020	----	----	----		03-Sep-2020	28 days	9 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> MW17-26A	E298	25-Aug-2020	----	----	----		03-Sep-2020	28 days	9 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> MW17-26B	E298	25-Aug-2020	----	----	----		03-Sep-2020	28 days	9 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> MW17-75A	E298	25-Aug-2020	----	----	----		03-Sep-2020	28 days	9 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE MW17-21A	E235.Br-L	25-Aug-2020	----	----	----		01-Sep-2020	28 days	6 days	✔
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE MW17-21B	E235.Br-L	25-Aug-2020	----	----	----		01-Sep-2020	28 days	6 days	✔
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE MW17-14A	E235.Br-L	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✔
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE MW17-25A	E235.Br-L	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✔
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE MW17-26A	E235.Br-L	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✔
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE MW17-26B	E235.Br-L	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✔
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE MW17-75A	E235.Br-L	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✔
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE MW17-21A	E235.Cl	25-Aug-2020	----	----	----		01-Sep-2020	28 days	6 days	✔
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE MW17-21B	E235.Cl	25-Aug-2020	----	----	----		01-Sep-2020	28 days	6 days	✔



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE MW17-14A	E235.Cl	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE MW17-25A	E235.Cl	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE MW17-26A	E235.Cl	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE MW17-26B	E235.Cl	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE MW17-75A	E235.Cl	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE MW17-21A	E235.F	25-Aug-2020	----	----	----		01-Sep-2020	28 days	6 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE MW17-21B	E235.F	25-Aug-2020	----	----	----		01-Sep-2020	28 days	6 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE MW17-14A	E235.F	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE MW17-25A	E235.F	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE MW17-26A	E235.F	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE MW17-26B	E235.F	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE MW17-75A	E235.F	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE MW17-21A	E235.NO3-L	25-Aug-2020	----	----	----		01-Sep-2020	3 days	6 days	* EHTL
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE MW17-21B	E235.NO3-L	25-Aug-2020	----	----	----		01-Sep-2020	3 days	6 days	* EHTL
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE MW17-14A	E235.NO3-L	25-Aug-2020	----	----	----		01-Sep-2020	3 days	7 days	* EHTL
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE MW17-25A	E235.NO3-L	25-Aug-2020	----	----	----		01-Sep-2020	3 days	7 days	* EHTL
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE MW17-26A	E235.NO3-L	25-Aug-2020	----	----	----		01-Sep-2020	3 days	7 days	* EHTL
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE MW17-26B	E235.NO3-L	25-Aug-2020	----	----	----		01-Sep-2020	3 days	7 days	* EHTL



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE MW17-75A	E235.NO3-L	25-Aug-2020	----	----	----		01-Sep-2020	3 days	7 days	*	EHTL
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE MW17-21A	E235.NO2-L	25-Aug-2020	----	----	----		01-Sep-2020	3 days	6 days	*	EHTL
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE MW17-21B	E235.NO2-L	25-Aug-2020	----	----	----		01-Sep-2020	3 days	6 days	*	EHTL
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE MW17-14A	E235.NO2-L	25-Aug-2020	----	----	----		01-Sep-2020	3 days	7 days	*	EHTL
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE MW17-25A	E235.NO2-L	25-Aug-2020	----	----	----		01-Sep-2020	3 days	7 days	*	EHTL
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE MW17-26A	E235.NO2-L	25-Aug-2020	----	----	----		01-Sep-2020	3 days	7 days	*	EHTL
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE MW17-26B	E235.NO2-L	25-Aug-2020	----	----	----		01-Sep-2020	3 days	7 days	*	EHTL
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE MW17-75A	E235.NO2-L	25-Aug-2020	----	----	----		01-Sep-2020	3 days	7 days	*	EHTL
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE MW17-21A	E235.SO4	25-Aug-2020	----	----	----		01-Sep-2020	28 days	6 days	✓	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
<b>HDPE</b> MW17-21B	E235.SO4	25-Aug-2020	----	----	----		01-Sep-2020	28 days	6 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
<b>HDPE</b> MW17-14A	E235.SO4	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
<b>HDPE</b> MW17-25A	E235.SO4	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
<b>HDPE</b> MW17-26A	E235.SO4	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
<b>HDPE</b> MW17-26B	E235.SO4	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
<b>HDPE</b> MW17-75A	E235.SO4	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> MW17-14A	E421.Cr-L	25-Aug-2020	01-Sep-2020	180 days	7 days	✓	02-Sep-2020	172 days	0 days	✓
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> MW17-21A	E421.Cr-L	25-Aug-2020	01-Sep-2020	180 days	7 days	✓	02-Sep-2020	172 days	0 days	✓
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> MW17-21B	E421.Cr-L	25-Aug-2020	01-Sep-2020	180 days	7 days	✓	02-Sep-2020	172 days	0 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> MW17-25A	E421.Cr-L	25-Aug-2020	01-Sep-2020	180 days	7 days	✓	02-Sep-2020	172 days	0 days	✓	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> MW17-26A	E421.Cr-L	25-Aug-2020	01-Sep-2020	180 days	7 days	✓	02-Sep-2020	172 days	0 days	✓	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> MW17-26B	E421.Cr-L	25-Aug-2020	01-Sep-2020	180 days	7 days	✓	02-Sep-2020	172 days	0 days	✓	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> MW17-75A	E421.Cr-L	25-Aug-2020	01-Sep-2020	180 days	7 days	✓	02-Sep-2020	172 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> MW17-14A	E509	25-Aug-2020	03-Sep-2020	28 days	8 days	✓	03-Sep-2020	19 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> MW17-21A	E509	25-Aug-2020	03-Sep-2020	28 days	8 days	✓	03-Sep-2020	19 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> MW17-21B	E509	25-Aug-2020	03-Sep-2020	28 days	8 days	✓	03-Sep-2020	19 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> MW17-25A	E509	25-Aug-2020	03-Sep-2020	28 days	8 days	✓	03-Sep-2020	19 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> MW17-26A	E509	25-Aug-2020	03-Sep-2020	28 days	8 days	✓	03-Sep-2020	19 days	0 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> MW17-26B	E509	25-Aug-2020	03-Sep-2020	28 days	8 days	✓	03-Sep-2020	19 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> MW17-75A	E509	25-Aug-2020	03-Sep-2020	28 days	8 days	✓	03-Sep-2020	19 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> MW17-14A	E421	25-Aug-2020	01-Sep-2020	180 days	7 days	✓	02-Sep-2020	172 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> MW17-21A	E421	25-Aug-2020	01-Sep-2020	180 days	7 days	✓	02-Sep-2020	172 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> MW17-21B	E421	25-Aug-2020	01-Sep-2020	180 days	7 days	✓	02-Sep-2020	172 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> MW17-25A	E421	25-Aug-2020	01-Sep-2020	180 days	7 days	✓	02-Sep-2020	172 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> MW17-26A	E421	25-Aug-2020	01-Sep-2020	180 days	7 days	✓	02-Sep-2020	172 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> MW17-26B	E421	25-Aug-2020	01-Sep-2020	180 days	7 days	✓	02-Sep-2020	172 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> MW17-75A	E421	25-Aug-2020	01-Sep-2020	180 days	7 days	✓	02-Sep-2020	172 days	0 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> MW17-20A	E601A	25-Aug-2020	01-Sep-2020	14 days	7 days	✓	02-Sep-2020	40 days	0 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> MW17-20B	E601A	25-Aug-2020	01-Sep-2020	14 days	7 days	✓	02-Sep-2020	40 days	0 days	✓	
<b>Physical Tests : Acidity by Titration</b>											
<b>HDPE</b> MW17-14A	E283	25-Aug-2020	----	----	----		01-Sep-2020	14 days	7 days	✓	
<b>Physical Tests : Acidity by Titration</b>											
<b>HDPE</b> MW17-21A	E283	25-Aug-2020	----	----	----		01-Sep-2020	14 days	7 days	✓	
<b>Physical Tests : Acidity by Titration</b>											
<b>HDPE</b> MW17-21B	E283	25-Aug-2020	----	----	----		01-Sep-2020	14 days	7 days	✓	
<b>Physical Tests : Acidity by Titration</b>											
<b>HDPE</b> MW17-25A	E283	25-Aug-2020	----	----	----		01-Sep-2020	14 days	7 days	✓	
<b>Physical Tests : Acidity by Titration</b>											
<b>HDPE</b> MW17-26A	E283	25-Aug-2020	----	----	----		01-Sep-2020	14 days	7 days	✓	
<b>Physical Tests : Acidity by Titration</b>											
<b>HDPE</b> MW17-26B	E283	25-Aug-2020	----	----	----		01-Sep-2020	14 days	7 days	✓	
<b>Physical Tests : Acidity by Titration</b>											
<b>HDPE</b> MW17-75A	E283	25-Aug-2020	----	----	----		01-Sep-2020	14 days	7 days	✓	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE MW17-14A	E290	25-Aug-2020	----	----	----		01-Sep-2020	14 days	7 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE MW17-21A	E290	25-Aug-2020	----	----	----		01-Sep-2020	14 days	7 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE MW17-21B	E290	25-Aug-2020	----	----	----		01-Sep-2020	14 days	7 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE MW17-25A	E290	25-Aug-2020	----	----	----		01-Sep-2020	14 days	7 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE MW17-26A	E290	25-Aug-2020	----	----	----		01-Sep-2020	14 days	7 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE MW17-26B	E290	25-Aug-2020	----	----	----		01-Sep-2020	14 days	7 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE MW17-75A	E290	25-Aug-2020	----	----	----		01-Sep-2020	14 days	7 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE MW17-14A	E100	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE MW17-21A	E100	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : Conductivity in Water</b>											
HDPE MW17-21B	E100	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
HDPE MW17-25A	E100	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
HDPE MW17-26A	E100	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
HDPE MW17-26B	E100	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
HDPE MW17-75A	E100	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓	
<b>Physical Tests : pH by Meter</b>											
HDPE MW17-21B	E108	25-Aug-2020	----	----	----		01-Sep-2020	0.25 hrs	168 hrs	* EHTR-FM	
<b>Physical Tests : pH by Meter</b>											
HDPE MW17-21A	E108	25-Aug-2020	----	----	----		01-Sep-2020	0.25 hrs	169 hrs	* EHTR-FM	
<b>Physical Tests : pH by Meter</b>											
HDPE MW17-14A	E108	25-Aug-2020	----	----	----		01-Sep-2020	0.25 hrs	172 hrs	* EHTR-FM	
<b>Physical Tests : pH by Meter</b>											
HDPE MW17-26A	E108	25-Aug-2020	----	----	----		01-Sep-2020	0.25 hrs	173 hrs	* EHTR-FM	





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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : pH by Meter</b>											
HDPE MW17-26B	E108	25-Aug-2020	----	----	----		01-Sep-2020	0.25 hrs	173 hrs	*	EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE MW17-25A	E108	25-Aug-2020	----	----	----		01-Sep-2020	0.25 hrs	174 hrs	*	EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE MW17-75A	E108	25-Aug-2020	----	----	----		01-Sep-2020	0.25 hrs	174 hrs	*	EHTR-FM
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE MW17-14A	E162	25-Aug-2020	----	----	----		01-Sep-2020	7 days	6 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE MW17-21A	E162	25-Aug-2020	----	----	----		01-Sep-2020	7 days	6 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE MW17-21B	E162	25-Aug-2020	----	----	----		01-Sep-2020	7 days	6 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE MW17-25A	E162	25-Aug-2020	----	----	----		01-Sep-2020	7 days	7 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE MW17-26A	E162	25-Aug-2020	----	----	----		01-Sep-2020	7 days	7 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE MW17-26B	E162	25-Aug-2020	----	----	----		01-Sep-2020	7 days	7 days	✓	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE MW17-75A	E162	25-Aug-2020	----	----	----		01-Sep-2020	7 days	7 days	✓
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE MW17-14A	E121	25-Aug-2020	----	----	----		01-Sep-2020	3 days	6 days	* EHTL
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE MW17-21A	E121	25-Aug-2020	----	----	----		01-Sep-2020	3 days	6 days	* EHTL
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE MW17-21B	E121	25-Aug-2020	----	----	----		01-Sep-2020	3 days	6 days	* EHTL
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE MW17-26A	E121	25-Aug-2020	----	----	----		01-Sep-2020	3 days	6 days	* EHTL
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE MW17-26B	E121	25-Aug-2020	----	----	----		01-Sep-2020	3 days	6 days	* EHTL
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE MW17-25A	E121	25-Aug-2020	----	----	----		01-Sep-2020	3 days	7 days	* EHTL
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE MW17-75A	E121	25-Aug-2020	----	----	----		01-Sep-2020	3 days	7 days	* EHTL
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>										
Amber glass/Teflon lined cap (sodium bisulfate) MW17-20A	E641A	25-Aug-2020	01-Sep-2020	14 days	7 days	✓	02-Sep-2020	40 days	0 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>										
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> MW17-20B	E641A	25-Aug-2020	01-Sep-2020	14 days	7 days	✓	02-Sep-2020	40 days	0 days	✓
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> MW17-20A	E611A	25-Aug-2020	02-Sep-2020	14 days	8 days	✓	03-Sep-2020	5 days	0 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended  
 EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.  
 Rec. HT: ALS recommended hold time (see units).



## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Acidity by Titration	E283	79843	1	7	14.2	5.0	✓
Alkalinity Species by Titration	E290	79835	1	19	5.2	5.0	✓
Ammonia by Fluorescence	E298	80950	1	18	5.5	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	79839	1	18	5.5	5.0	✓
BTEX by Headspace GC-MS	E611A	80458	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	79837	1	18	5.5	5.0	✓
Conductivity in Water	E100	79836	1	19	5.2	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	79884	1	14	7.1	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	80793	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	79885	1	17	5.8	5.0	✓
Fluoride in Water by IC	E235.F	79838	1	18	5.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	79840	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	79841	1	18	5.5	5.0	✓
pH by Meter	E108	79834	1	19	5.2	5.0	✓
Sulfate in Water by IC	E235.SO4	79842	1	18	5.5	5.0	✓
TDS by Gravimetry	E162	79768	1	20	5.0	5.0	✓
Turbidity by Nephelometry	E121	79729	1	20	5.0	5.0	✓
<b>Laboratory Control Samples (LCS)</b>							
Acidity by Titration	E283	79843	1	7	14.2	5.0	✓
Alkalinity Species by Titration	E290	79835	1	19	5.2	5.0	✓
Ammonia by Fluorescence	E298	80950	1	18	5.5	5.0	✓
BC PHC - EPH by GC-FID	E601A	79806	1	20	5.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	79839	1	18	5.5	5.0	✓
BTEX by Headspace GC-MS	E611A	80458	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	79837	1	18	5.5	5.0	✓
Conductivity in Water	E100	79836	1	19	5.2	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	79884	1	14	7.1	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	80793	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	79885	1	17	5.8	5.0	✓
Fluoride in Water by IC	E235.F	79838	1	18	5.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	79840	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	79841	1	18	5.5	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	79807	1	20	5.0	5.0	✓
pH by Meter	E108	79834	1	19	5.2	5.0	✓
Sulfate in Water by IC	E235.SO4	79842	1	18	5.5	5.0	✓
TDS by Gravimetry	E162	79768	1	20	5.0	5.0	✓
Turbidity by Nephelometry	E121	79729	1	20	5.0	5.0	✓



Matrix: **Water**

Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<b>Analytical Methods</b>							
<b>Method Blanks (MB)</b>							
Acidity by Titration	E283	79843	1	7	14.2	5.0	✓
Alkalinity Species by Titration	E290	79835	1	19	5.2	5.0	✓
Ammonia by Fluorescence	E298	80950	1	18	5.5	5.0	✓
BC PHC - EPH by GC-FID	E601A	79806	1	20	5.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	79839	1	18	5.5	5.0	✓
BTEX by Headspace GC-MS	E611A	80458	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	79837	1	18	5.5	5.0	✓
Conductivity in Water	E100	79836	1	19	5.2	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	79884	1	14	7.1	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	80793	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	79885	2	17	11.7	5.0	✓
Fluoride in Water by IC	E235.F	79838	1	18	5.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	79840	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	79841	1	18	5.5	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	79807	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	79842	1	18	5.5	5.0	✓
TDS by Gravimetry	E162	79768	1	20	5.0	5.0	✓
Turbidity by Nephelometry	E121	79729	1	20	5.0	5.0	✓
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	80950	1	18	5.5	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	79839	1	18	5.5	5.0	✓
BTEX by Headspace GC-MS	E611A	80458	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	79837	1	18	5.5	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	79884	1	14	7.1	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	80793	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	79885	1	17	5.8	5.0	✓
Fluoride in Water by IC	E235.F	79838	1	18	5.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	79840	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	79841	1	18	5.5	5.0	✓
Sulfate in Water by IC	E235.SO4	79842	1	18	5.5	5.0	✓



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 Vancouver - Environmental	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TDS by Gravimetry	E162 Vancouver - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Bromide in Water by IC (Low Level)	E235.Br-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Acidity by Titration	E283  Vancouver - Environmental	Water	APHA 2310 B (mod)	Acidity is determined by potentiometric titration to a specified endpoint.
Alkalinity Species by Titration	E290  Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298  Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
Dissolved Metals in Water by CRC ICPMS	E421  Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L  Vancouver - Environmental	Water	APHA 3030 B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS
Dissolved Mercury in Water by CVAAS	E509  Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
BC PHC - EPH by GC-FID	E601A  Vancouver - Environmental	Water	BC MOE Lab Manual	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.
BTEX by Headspace GC-MS	E611A  Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by Hexane LVI GC-MS	E641A  Vancouver - Environmental	Water	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by large volume injection (LVI) GC-MS.
Dissolved Hardness (Calculated)	EC100  Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> ), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
LEPH and HEPH: EPH-PAH	EC600A  Vancouver - Environmental	Water	BC MOE Lab Manual (LEPH and HEPH) (mod)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Acenaphthene, Acridine, Anthracene, Fluorene, Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(a)pyrene, Fluoranthene, and Pyrene.
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Dissolved Metals Water Filtration	EP421  Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO <sub>3</sub> .
Dissolved Mercury Water Filtration	EP509  Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
VOCs Preparation for Headspace Analysis	EP581  Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601  Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.



## QUALITY CONTROL REPORT

**Work Order** : **VA20B3887**  
**Amendment** : **1**

Page : 1 of 15

Client : Wood Canada Ltd.  
 Contact : Jeremiah Gladu  
 Address : 1235 Main Street P.O. Box 2536  
           Smithers BC Canada V0J 2N0  
 Telephone : ----  
 Project : VE52655D  
 PO : ----  
 C-O-C number : ----  
 Sampler : Ardy M.  
 Site : ----  
 Quote number : VA20-SEAB100-0003 - Wood/Seabridge Gold  
 No. of samples received : 9  
 No. of samples analysed : 9

Laboratory : Vancouver - Environmental  
 Account Manager : Selam Worku  
 Address : 8081 Lougheed Highway  
           Burnaby, British Columbia Canada V5A 1W9  
 Telephone : +1 604 253 4188  
 Date Samples Received : 28-Aug-2020 10:10  
 Date Analysis Commenced : 01-Sep-2020  
 Issue Date : 27-Oct-2020 09:43

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Annabelle Prasad	Analyst	Metals, Burnaby, British Columbia
Bruna Botti	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Cristina Alexandre	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kevin Duarte	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics - Water Quality, Burnaby, British Columbia
Ophelia Chiu	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Shaneel Dayal	Analyst	Metals, Burnaby, British Columbia



## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

# = Indicates a QC result that did not meet the ALS DQO.



### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 79729)</b>											
VA20B3887-001	MW17-25A	turbidity	----	E121	0.10	NTU	726	767	5.49%	15%	----
<b>Physical Tests (QC Lot: 79768)</b>											
VA20B3617-004	Anonymous	solids, total dissolved [TDS]	----	E162	20	mg/L	2650	2610	1.79%	20%	----
<b>Physical Tests (QC Lot: 79834)</b>											
VA20B3728-003	Anonymous	pH	----	E108	0.10	pH units	7.86	7.89	0.356%	4%	----
<b>Physical Tests (QC Lot: 79835)</b>											
VA20B3728-003	Anonymous	alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	61.3	61.1	0.327%	20%	----
		alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	61.3	61.1	0.327%	20%	----
<b>Physical Tests (QC Lot: 79836)</b>											
VA20B3728-003	Anonymous	conductivity	----	E100	2.0	µS/cm	118	119	0.0844%	10%	----
<b>Physical Tests (QC Lot: 79843)</b>											
VA20B3887-002	MW17-26A	acidity (as CaCO3)	----	E283	2.0	mg/L	<2.0	<2.0	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 79837)</b>											
VA20B3728-001	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	1.25	1.24	0.003	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 79838)</b>											
VA20B3728-001	Anonymous	fluoride	16984-48-8	E235.F	0.020	mg/L	0.090	0.088	0.002	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 79839)</b>											
VA20B3728-001	Anonymous	bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 79840)</b>											
VA20B3728-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 79841)</b>											
VA20B3728-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 79842)</b>											
VA20B3728-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	24.5	24.4	0.0399%	20%	----
<b>Anions and Nutrients (QC Lot: 80950)</b>											
VA20B3854-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0124	0.0120	0.0005	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 79884)</b>											
VA20B3887-001	MW17-25A	chromium, dissolved	7440-47-3	E421.Cr-L	0.100	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----



Sub-Matrix: **Water**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 79885)</b>											
VA20B3887-001	MW17-25A	aluminum, dissolved	7429-90-5	E421	1.00	mg/L	3.0 µg/L	0.0027	0.0003	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E421	0.100	mg/L	1.18 µg/L	0.00121	2.65%	20%	----
		arsenic, dissolved	7440-38-2	E421	0.100	mg/L	2.00 µg/L	0.00195	2.61%	20%	----
		barium, dissolved	7440-39-3	E421	0.100	mg/L	33 0 µg/L	0.0345	4.40%	20%	----
		beryllium, dissolved	7440-41-7	E421	0.100	mg/L	<0.100 µg/L	<0 000100	0	Diff <2x LOR	----
		bismuth, dissolved	7440-69-9	E421	0 0500	mg/L	<0.050 µg/L	<0 000050	0	Diff <2x LOR	----
		boron, dissolved	7440-42-8	E421	10 0	mg/L	<10 µg/L	<0.010	0	Diff <2x LOR	----
		cadmium, dissolved	7440-43-9	E421	0.00500	mg/L	0 0340 µg/L	0.0000304	0.0000036	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E421	50 0	mg/L	47000 µg/L	44.6	5.07%	20%	----
		cesium, dissolved	7440-46-2	E421	0 0100	mg/L	0.011 µg/L	0 000012	0 000001	Diff <2x LOR	----
		cobalt, dissolved	7440-48-4	E421	0.100	mg/L	0.12 µg/L	0.00011	0 000008	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.200	mg/L	0.22 µg/L	0.00020	0.00002	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E421	10 0	mg/L	30 µg/L	0.031	0.0002	Diff <2x LOR	----
		lead, dissolved	7439-92-1	E421	0 0500	mg/L	<0.050 µg/L	<0 000050	0	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E421	1.00	mg/L	5.0 µg/L	0.0050	0.00003	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	5.00	mg/L	8110 µg/L	8.12	0.0781%	20%	----
		manganese, dissolved	7439-96-5	E421	0.100	mg/L	134 µg/L	0.130	2.21%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0 0500	mg/L	4.34 µg/L	0.00441	1.69%	20%	----
		nickel, dissolved	7440-02-0	E421	0.500	mg/L	0.54 µg/L	<0.00050	0.00004	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E421	50 0	mg/L	<50 µg/L	<0.050	0	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	50 0	mg/L	3900 µg/L	3 89	0.103%	20%	----
		rubidium, dissolved	7440-17-7	E421	0.200	mg/L	1.92 µg/L	0.00183	0.00009	Diff <2x LOR	----
		selenium, dissolved	7782-49-2	E421	0 0500	mg/L	0.051 µg/L	<0 000050	0 000001	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	50 0	mg/L	6860 µg/L	6 82	0.641%	20%	----
		silver, dissolved	7440-22-4	E421	0 0100	mg/L	<0.010 µg/L	<0 000010	0	Diff <2x LOR	----
		sodium, dissolved	17341-25-2	E421	50 0	mg/L	17400 µg/L	17.2	1.11%	20%	----
		strontium, dissolved	7440-24-6	E421	0.200	mg/L	484 µg/L	0.510	5.24%	20%	----
		sulfur, dissolved	7704-34-9	E421	500	mg/L	14400 µg/L	14.0	2.06%	20%	----
		tellurium, dissolved	13494-80-9	E421	0.200	mg/L	<0.20 µg/L	<0.00020	0	Diff <2x LOR	----
		thallium, dissolved	7440-28-0	E421	0 0100	mg/L	0.020 µg/L	0 000020	0.00000003	Diff <2x LOR	----
		thorium, dissolved	7440-29-1	E421	0.100	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		tin, dissolved	7440-31-5	E421	0.100	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		titanium, dissolved	7440-32-6	E421	0.300	mg/L	<0.30 µg/L	<0.00030	0	Diff <2x LOR	----
		tungsten, dissolved	7440-33-7	E421	0.100	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E421	0 0100	mg/L	0.325 µg/L	0 000324	0.167%	20%	----
		vanadium, dissolved	7440-62-2	E421	0.500	mg/L	<0.50 µg/L	<0.00050	0	Diff <2x LOR	----



Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 79885) - continued</b>											
VA20B3887-001	MW17-25A	zinc, dissolved	7440-66-6	E421	1.00	mg/L	<1 0 µg/L	<0.0010	0	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.200	mg/L	<0.20 µg/L	<0.00020	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 80793)</b>											
VA20B3887-001	MW17-25A	mercury, dissolved	7439-97-6	E509	0.00500	mg/L	<0.0050 µg/L	<0.0000050	0	Diff <2x LOR	----
<b>Volatile Organic Compounds (QC Lot: 80458)</b>											
VA20B3842-017	Anonymous	benzene	71-43-2	E611A	0 0005	µg/L	<0 00050 mg/L	<0 50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0 0005	µg/L	<0 00050 mg/L	<0 50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0 0005	µg/L	<0 00050 mg/L	<0 50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0 0005	µg/L	<0 00050 mg/L	<0 50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0 0005	µg/L	<0 00050 mg/L	<0 50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0 0005	µg/L	<0 00050 mg/L	<0 50	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0 0005	µg/L	<0 00050 mg/L	<0 50	0	Diff <2x LOR	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 79729)</b>						
turbidity	----	E121	0.1	NTU	<0.10	----
<b>Physical Tests (QCLot: 79768)</b>						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
<b>Physical Tests (QCLot: 79835)</b>						
alkalinity, bicarbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, carbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, hydroxide (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
<b>Physical Tests (QCLot: 79836)</b>						
conductivity	----	E100	1	µS/cm	<1.0	----
<b>Physical Tests (QCLot: 79843)</b>						
acidity (as CaCO3)	----	E283	2	mg/L	2.1	----
<b>Anions and Nutrients (QCLot: 79837)</b>						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
<b>Anions and Nutrients (QCLot: 79838)</b>						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
<b>Anions and Nutrients (QCLot: 79839)</b>						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
<b>Anions and Nutrients (QCLot: 79840)</b>						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 79841)</b>						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 79842)</b>						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
<b>Anions and Nutrients (QCLot: 80950)</b>						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
<b>Dissolved Metals (QCLot: 79884)</b>						
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	<0.00010	----
<b>Dissolved Metals (QCLot: 79885)</b>						
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 79885) - continued</b>						
barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
sodium, dissolved	17341-25-2	E421	0.05	mg/L	<0.050	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
<b>Dissolved Metals (QCLot: 80793)</b>						



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 80793) - continued</b>						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	---
<b>Volatile Organic Compounds (QCLot: 80458)</b>						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	---
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	---
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	---
styrene	100-42-5	E611A	0.5	µg/L	<0.50	---
toluene	108-88-3	E611A	0.5	µg/L	<0.50	---
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	<0.50	---
xylene, o-	95-47-6	E611A	0.5	µg/L	<0.50	---
<b>Hydrocarbons (QCLot: 79806)</b>						
EPH (C10-C19)	---	E601A	250	µg/L	<250	---
EPH (C19-C32)	---	E601A	250	µg/L	<250	---
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 79807)</b>						
acenaphthene	83-32-9	E641A	0.01	µg/L	<0.010	---
acenaphthylene	208-96-8	E641A	0.01	µg/L	<0.010	---
acridine	260-94-6	E641A	0.01	µg/L	<0.010	---
anthracene	120-12-7	E641A	0.01	µg/L	<0.010	---
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	<0.010	---
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	---
benzo(b+j)fluoranthene	---	E641A	0.01	µg/L	<0.010	---
benzo(b+j+k)fluoranthene	---	E641A	0.015	µg/L	<0.015	---
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	<0.010	---
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	<0.010	---
chrysene	218-01-9	E641A	0.01	µg/L	<0.010	---
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	<0.0050	---
fluoranthene	206-44-0	E641A	0.01	µg/L	<0.010	---
fluorene	86-73-7	E641A	0.01	µg/L	<0.010	---
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	<0.010	---
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	<0.010	---
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	<0.010	---
naphthalene	91-20-3	E641A	0.05	µg/L	<0.050	---
phenanthrene	85-01-8	E641A	0.02	µg/L	<0.020	---
pyrene	129-00-0	E641A	0.01	µg/L	<0.010	---
quinoline	6027-02-7	E641A	0.05	µg/L	<0.050	---



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Work Order : VA20B3887 Amendment 1  
Client : Wood Canada Ltd.  
Project : VE52655D

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## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Physical Tests (QCLot: 79729)</b>									
turbidity	----	E121	0.1	NTU	200 NTU	100	85.0	115	----
<b>Physical Tests (QCLot: 79768)</b>									
solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	100	85.0	115	----
<b>Physical Tests (QCLot: 79834)</b>									
pH	----	E108	----	pH units	7 pH units	99.9	98.0	102	----
<b>Physical Tests (QCLot: 79835)</b>									
alkalinity, phenolphthalein (as CaCO <sub>3</sub> )	----	E290	1	mg/L	229 mg/L	96.4	75.0	125	----
alkalinity, total (as CaCO <sub>3</sub> )	----	E290	1	mg/L	500 mg/L	97.5	85.0	115	----
<b>Physical Tests (QCLot: 79836)</b>									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	103	90.0	110	----
<b>Physical Tests (QCLot: 79843)</b>									
acidity (as CaCO <sub>3</sub> )	----	E283	2	mg/L	50 mg/L	100	85.0	115	----
<b>Anions and Nutrients (QCLot: 79837)</b>									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	----
<b>Anions and Nutrients (QCLot: 79838)</b>									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	101	90.0	110	----
<b>Anions and Nutrients (QCLot: 79839)</b>									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	101	85.0	115	----
<b>Anions and Nutrients (QCLot: 79840)</b>									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	101	90.0	110	----
<b>Anions and Nutrients (QCLot: 79841)</b>									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.8	90.0	110	----
<b>Anions and Nutrients (QCLot: 79842)</b>									
sulfate (as SO <sub>4</sub> )	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 80950)</b>									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.12 mg/L	99.6	85.0	115	----
<b>Dissolved Metals (QCLot: 79884)</b>									
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	0.25 mg/L	101	80.0	120	----
<b>Dissolved Metals (QCLot: 79885)</b>									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	103	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	101	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	102	80.0	120	----



Sub-Matrix: Water

Laboratory Control Sample (LCS) Report

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Concentration	Recovery (%)	Recovery Limits (%)		Qualifier
					LCS	Low	High		
<b>Dissolved Metals (QCLot: 79885) - continued</b>									
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	104	80.0	120	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	101	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	97.1	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	102	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	100	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	103	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	107	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	104	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	102	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	100	80.0	120	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	99.9	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	99.3	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	101	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	108	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	108	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	104	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	101	70.0	130	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	104	80.0	120	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	100	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	100	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	104	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	108	80.0	120	----
sodium, dissolved	17341-25-2	E421	0.05	mg/L	50 mg/L	106	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	112	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	91.2	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	94.7	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	100	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	95.5	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	99.4	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	102	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	103	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	100	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	104	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	104	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	110	80.0	120	----
<b>Dissolved Metals (QCLot: 80793)</b>									
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	93.3	80.0	120	----



Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 80458)</b>									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	92.7	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	85.1	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	108	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	85.0	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	89.9	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	200 µg/L	90.8	70.0	130	----
xylene, o-	95-47-6	E611A	0.5	µg/L	100 µg/L	88.9	70.0	130	----
<b>Hydrocarbons (QCLot: 79806)</b>									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	109	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	104	70.0	130	----
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 79807)</b>									
acenaphthene	83-32-9	E641A	0.01	µg/L	0.5 µg/L	107	60.0	130	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5 µg/L	108	60.0	130	----
acridine	260-94-6	E641A	0.01	µg/L	0.5 µg/L	93.0	60.0	130	----
anthracene	120-12-7	E641A	0.01	µg/L	0.5 µg/L	103	60.0	130	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5 µg/L	102	60.0	130	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5 µg/L	105	60.0	130	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	0.5 µg/L	105	60.0	130	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	1 µg/L	111	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5 µg/L	107	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5 µg/L	116	60.0	130	----
chrysene	218-01-9	E641A	0.01	µg/L	0.5 µg/L	111	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	0.5 µg/L	110	60.0	130	----
fluoranthene	206-44-0	E641A	0.01	µg/L	0.5 µg/L	105	60.0	130	----
fluorene	86-73-7	E641A	0.01	µg/L	0.5 µg/L	97.1	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5 µg/L	109	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5 µg/L	108	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	0.5 µg/L	103	60.0	130	----
naphthalene	91-20-3	E641A	0.05	µg/L	0.5 µg/L	101	50.0	130	----
phenanthrene	85-01-8	E641A	0.02	µg/L	0.5 µg/L	101	60.0	130	----
pyrene	129-00-0	E641A	0.01	µg/L	0.5 µg/L	109	60.0	130	----
quinoline	6027-02-7	E641A	0.05	µg/L	0.5 µg/L	111	60.0	130	----



### Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 79837)</b>										
VA20B3728-002	Anonymous	chloride	16887-00-6	E235.Cl	92.3 mg/L	100 mg/L	92.3	75 0	125	----
<b>Anions and Nutrients (QCLot: 79838)</b>										
VA20B3728-002	Anonymous	fluoride	16984-48-8	E235 F	0.905 mg/L	1 mg/L	90.5	75 0	125	----
<b>Anions and Nutrients (QCLot: 79839)</b>										
VA20B3728-002	Anonymous	bromide	24959-67-9	E235 Br-L	0.464 mg/L	0.5 mg/L	92.8	75 0	125	----
<b>Anions and Nutrients (QCLot: 79840)</b>										
VA20B3728-002	Anonymous	nitrate (as N)	14797-55-8	E235 NO3-L	2.31 mg/L	2.5 mg/L	92.4	75 0	125	----
<b>Anions and Nutrients (QCLot: 79841)</b>										
VA20B3728-002	Anonymous	nitrite (as N)	14797-65-0	E235 NO2-L	0.453 mg/L	0.5 mg/L	90.6	75 0	125	----
<b>Anions and Nutrients (QCLot: 79842)</b>										
VA20B3728-002	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	91.2 mg/L	100 mg/L	91.2	75 0	125	----
<b>Anions and Nutrients (QCLot: 80950)</b>										
VA20B3854-002	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.220 mg/L	0.2 mg/L	110	75 0	125	----
<b>Dissolved Metals (QCLot: 79884)</b>										
VA20B3887-002	MW17-26A	chromium, dissolved	7440-47-3	E421.Cr-L	0.0394 mg/L	0.04 mg/L	98.5	70 0	130	----
<b>Dissolved Metals (QCLot: 79885)</b>										
VA20B3887-002	MW17-26A	aluminum, dissolved	7429-90-5	E421	0.196 mg/L	0.2 mg/L	98.1	70 0	130	----
		antimony, dissolved	7440-36-0	E421	0.0201 mg/L	0.02 mg/L	101	70 0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0206 mg/L	0.02 mg/L	103	70 0	130	----
		barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70 0	130	----
		beryllium, dissolved	7440-41-7	E421	0.0404 mg/L	0.04 mg/L	101	70 0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00888 mg/L	0.01 mg/L	88.8	70 0	130	----
		boron, dissolved	7440-42-8	E421	0.096 mg/L	0.1 mg/L	96.0	70 0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00388 mg/L	0.004 mg/L	97.1	70 0	130	----
		calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70 0	130	----
		cesium, dissolved	7440-46-2	E421	0.00967 mg/L	0.01 mg/L	96.7	70 0	130	----
		cobalt, dissolved	7440-48-4	E421	0.0195 mg/L	0.02 mg/L	97.7	70 0	130	----
		copper, dissolved	7440-50-8	E421	0.0196 mg/L	0.02 mg/L	97.9	70 0	130	----
		iron, dissolved	7439-89-6	E421	1.93 mg/L	2 mg/L	96.7	70 0	130	----



Sub-Matrix: **Water**

					<i>Matrix Spike (MS) Report</i>					
					<i>Spike</i>		<i>Recovery (%)</i>	<i>Recovery Limits (%)</i>		
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>Concentration</i>	<i>Target</i>	<i>MS</i>	<i>Low</i>	<i>High</i>	<i>Qualifier</i>
<b>Dissolved Metals (QCLot: 79885) - continued</b>										
VA20B3887-002	MW17-26A	lead, dissolved	7439-92-1	E421	0.0195 mg/L	0.02 mg/L	97.4	70.0	130	----
		lithium, dissolved	7439-93-2	E421	0.0984 mg/L	0.1 mg/L	98.4	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, dissolved	7439-96-5	E421	0.0201 mg/L	0.02 mg/L	100	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	0.0195 mg/L	0.02 mg/L	97.6	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0391 mg/L	0.04 mg/L	97.8	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	10.2 mg/L	10 mg/L	102	70.0	130	----
		potassium, dissolved	7440-09-7	E421	4.34 mg/L	4 mg/L	108	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.0186 mg/L	0.02 mg/L	93.1	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0412 mg/L	0.04 mg/L	103	70.0	130	----
		silicon, dissolved	7440-21-3	E421	8.88 mg/L	10 mg/L	88.8	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00389 mg/L	0.004 mg/L	97.3	70.0	130	----
		sodium, dissolved	17341-25-2	E421	2.18 mg/L	2 mg/L	109	70.0	130	----
		strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		sulfur, dissolved	7704-34-9	E421	19.1 mg/L	20 mg/L	95.6	70.0	130	----
		tellurium, dissolved	13494-80-9	E421	0.0385 mg/L	0.04 mg/L	96.3	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00387 mg/L	0.004 mg/L	96.7	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0209 mg/L	0.02 mg/L	104	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0192 mg/L	0.02 mg/L	96.3	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0395 mg/L	0.04 mg/L	98.8	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0201 mg/L	0.02 mg/L	100	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.00407 mg/L	0.004 mg/L	102	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.104 mg/L	0.1 mg/L	104	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.399 mg/L	0.4 mg/L	99.7	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0412 mg/L	0.04 mg/L	103	70.0	130	----
<b>Dissolved Metals (QCLot: 80793)</b>										
VA20B3887-002	MW17-26A	mercury, dissolved	7439-97-6	E509	0.0000940 mg/L	0.0001 mg/L	94.0	70.0	130	----
<b>Volatile Organic Compounds (QCLot: 80458)</b>										
VA20B3846-006	Anonymous	benzene	71-43-2	E611A	101 µg/L	100 µg/L	101	60.0	140	----
		ethylbenzene	100-41-4	E611A	92.7 µg/L	100 µg/L	92.7	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	113 µg/L	100 µg/L	113	60.0	140	----
		styrene	100-42-5	E611A	94.3 µg/L	100 µg/L	94.3	60.0	140	----
		toluene	108-88-3	E611A	95.8 µg/L	100 µg/L	95.8	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	200 µg/L	200 µg/L	99.8	60.0	140	----
		xylene, o-	95-47-6	E611A	96.4 µg/L	100 µg/L	96.4	60.0	140	----

Page : 15 of 15  
Work Order : VA20B3887 Amendment 1  
Client : Wood Canada Ltd.  
Project : VE52655D

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Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 17 -

Page 1 of 1

<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>			<b>Select Service Level Below - Contact your AM to confirm all E&amp;P TATs (surcharges may apply)</b>																	
Company:	Wood.	Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)			Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply																	
Contact:	Jeremiah Gladu	Quality Control (QC) Report with Report <input type="checkbox"/> YES <input type="checkbox"/> NO			PRIORITY (Business Days)	4 day [P4-20%] <input type="checkbox"/>		EMERGENCY	1 Business day [E - 100%] <input type="checkbox"/>													
Phone:		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked				3 day [P3-25%] <input type="checkbox"/>			Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] <input type="checkbox"/>													
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX				2 day [P2-50%] <input type="checkbox"/>																
Street:	4445 Lougheed Hwy.	Email 1 or Fax jeremiah.gladu@woodplc.com			Date and Time Required for all E&P TATs:		dd-mmm-yy hh:mm															
City/Province:	Burnaby/BC	Email 2			For tests that can not be performed according to the service level selected, you will be contacted.																	
Postal Code:	V5C 0E4	Email 3			<b>Analysis Request</b>																	
Invoice To	Same as Report To <input type="checkbox"/> YES <input type="checkbox"/> NO	<b>Invoice Distribution</b>			<b>NUMBER OF CONTAINERS</b>	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below																
Copy of invoice with Report <input type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX				BTEX	EPH/PAH	General chemistry *	DISSOLVED METALS													
Company:		Email 1 or Fax																				
Contact:		Email 2																				
<b>Project Information</b>		<b>Oil and Gas Required Fields (client use)</b>																				
ALS Account # / Quote #:		AFE/Cost Center:		PO#																		
Job #:		Major/Minor Code:		Routing Code:																		
PO / AFE:		Requisitioner:																				
LSD:		Location:																				
ALS Lab Work Order # (lab use only):		ALS Contact:		Sampler:																		
3877		Selam Worku		Ardy M.																		
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type																		
1	BH17-25A	25-Aug-20	11:00	GW																		
2	BH17-26A		12:00																			
3	BH17-26B		11:30																			
4	BH17-14A		13:10																			
5	BH17-20A		14:35																			
6	BH17-20B		14:15																			
7	BH17-21A		16:00																			
8	BH17-21B		16:30																			
9	BH17-75A		11:00																			
Terrace Shipping Coolers x 4																						
<b>Drinking Water (DW) Samples<sup>1</sup> (client use)</b>		<b>Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)</b>			<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>																	
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO		*GENERAL WATER CHEMISTRY TO INCLUDE: pH, Alkalinity, bicarbonate, carbonate, chloride, conductivity, fluoride, hardness, hydroxide, nitrate, nitrite, ammonia, sulphate, turbidity, TDS, acidity			Frozen <input type="checkbox"/>		SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>															
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO					Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/>		Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>		Cooling Initiated <input type="checkbox"/>													
					INITIAL COOLER TEMPERATURES °C		FINAL COOLER TEMPERATURES °C															
					7.1		12.5 -2.3 4.1															
<b>SHIPMENT RELEASE (client use)</b>				<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>				<b>FINAL SHIPMENT RECEPTION (lab use only)</b>														
Released by: Ardy Mansourpour		Date: Aug 26, 2020		Received by: [Signature]		Date: Aug 26, 2020		Received by: [Signature]		Date: 28 Aug, 2020		Received by: [Signature]		Date: 10:10am								

Environmental Division  
Vancouver  
Work Order Reference  
**VA20B3887**  
  
Telephone: +1 604 253 4188

SAMPLES ON HOLD  
SUSPECTED HAZARD (see Special Instructions)





CERTIFICATE OF ANALYSIS

Work Order : VA20B3890
Amendment : 1
Client : Wood Canada Ltd.
Contact : Jeremiah Gladu
Address : 600 - 4445 Lougheed Hwy
Burnaby BC Canada V5C 0E4
Telephone : 604 294 3811
Project : VE52655D
PO : ---
C-O-C number : ---
Sampler : Ardy M.
Site : ---
Quote number : VA20-SEAB100-0003 - Wood/Seabridge Gold
No. of samples received : 7
No. of samples analysed : 7

Page : 1 of 8
Laboratory : Vancouver - Environmental
Account Manager : Selam Worku
Address : 8081 Lougheed Highway
Burnaby BC Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 28-Aug-2020 10:10
Date Analysis Commenced : 28-Aug-2020
Issue Date : 27-Oct-2020 16:09

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
Analytical Results
Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Table with 3 columns: Signatories, Position, Laboratory Department. Lists names like Brianna Allen, Bruna Botti, Caitlin Macey, etc., along with their roles and departments.



## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
-	No Unit
µg/L	micrograms per litre
µS/cm	Microsiemens per centimetre
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in reports identified as "Preliminary Report" are considered authorized for use.

## Workorder Comments

Samples "BH17-04B" & "BH17-07A" One VOC vials received broken in Transit.

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLCI	Detection Limit Raised: Chromatographic interference due to co-elution.
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
RRV	Reported result verified by repeat analysis.



## Analytical Results

Sub-Matrix: Groundwater  
 (Matrix: Water)

Client sample ID

					BH17-04A	BH17-04B	BH17-05B	BH17-06A	BH17-06B
Client sampling date / time					23-Aug-2020 16:30	23-Aug-2020 14:30	23-Aug-2020 10:00	23-Aug-2020 16:24	23-Aug-2020 11:00
Analyte	CAS Number	Method	LOR	Unit	VA20B3890-001	VA20B3890-002	VA20B3890-003	VA20B3890-004	VA20B3890-005
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
acidity (as CaCO3)	----	E283	2.0	mg/L	----	3.9	5.1	----	<2.0
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	----	112	121	----	22.6
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	----	<1.0	<1.0	----	11.2
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	----	<1.0	<1.0	----	<1.0
alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L	----	<1.0	<1.0	----	5.6
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	----	112	121	----	33.8
conductivity	----	E100	2.0	µS/cm	----	438	746	----	292
pH	----	E108	0.10	pH units	----	7.49	7.52	----	8.62
solids, total dissolved [TDS]	----	E162	10	mg/L	----	250	500	----	215
turbidity	----	E121	0.10	NTU	----	0.90	4.94	----	0.55
hardness (as CaCO3), dissolved	----	EC100	600	µg/L	----	204000	283000	----	163000
<b>Anions and Nutrients</b>									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	----	0.105	0.180	----	0.138
chloride	16887-00-6	E235.Cl	0.50	mg/L	----	<0.50	<2.50 <sup>DLDS</sup>	----	<0.50
fluoride	16984-48-8	E235.F	0.020	mg/L	----	0.074	0.126	----	0.082
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	----	0.0100	<0.0250 <sup>DLDS</sup>	----	0.0056
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	----	0.0012	<0.0050 <sup>DLDS</sup>	----	0.0038
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	----	114	278	----	104
<b>Dissolved Metals</b>									
aluminum, dissolved	7429-90-5	E421	1.0	µg/L	----	2.9	<1.0	----	203
antimony, dissolved	7440-36-0	E421	0.10	µg/L	----	0.17	<0.10	----	1.11
arsenic, dissolved	7440-38-2	E421	0.10	µg/L	----	0.74	0.86	----	4.23
barium, dissolved	7440-39-3	E421	0.10	µg/L	----	61.8	18.7	----	33.3
beryllium, dissolved	7440-41-7	E421	0.100	µg/L	----	<0.100	<0.100	----	<0.100
bismuth, dissolved	7440-69-9	E421	0.050	µg/L	----	<0.050	<0.050	----	<0.050
boron, dissolved	7440-42-8	E421	10	µg/L	----	44	21	----	57
cadmium, dissolved	7440-43-9	E421	0.0050	µg/L	----	0.0269	0.839	----	0.0093
calcium, dissolved	7440-70-2	E421	50	µg/L	----	74500	98300	----	63000
cesium, dissolved	7440-46-2	E421	0.010	µg/L	----	0.016	<0.010	----	<0.010
chromium, dissolved	7440-47-3	E421.Cr-L	0.10	µg/L	----	<0.10	<0.10	----	0.94



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					BH17-04A	BH17-04B	BH17-05B	BH17-06A	BH17-06B
Client sampling date / time					23-Aug-2020 16:30	23-Aug-2020 14:30	23-Aug-2020 10:00	23-Aug-2020 16:24	23-Aug-2020 11:00
Analyte	CAS Number	Method	LOR	Unit	VA20B3890-001	VA20B3890-002	VA20B3890-003	VA20B3890-004	VA20B3890-005
					Result	Result	Result	Result	Result
<b>Dissolved Metals</b>									
cobalt, dissolved	7440-48-4	E421	0.10	µg/L	----	0.41	1.94	----	0.17
copper, dissolved	7440-50-8	E421	0.20	µg/L	----	0.84	0.36	----	2.32
iron, dissolved	7439-89-6	E421	10	µg/L	----	374	390	----	118
lead, dissolved	7439-92-1	E421	0.050	µg/L	----	0.059	<0.050	----	0.237
lithium, dissolved	7439-93-2	E421	1.0	µg/L	----	1.9	3.3	----	3.7
magnesium, dissolved	7439-95-4	E421	5.0	µg/L	----	4370	9200	----	1440
manganese, dissolved	7439-96-5	E421	0.10	µg/L	----	1140	5700	----	71.3
mercury, dissolved	7439-97-6	E509	0.0050	µg/L	----	<0.0050	<0.0050	----	<0.0050
molybdenum, dissolved	7439-98-7	E421	0.050	µg/L	----	0.348	3.38	----	5.16
nickel, dissolved	7440-02-0	E421	0.50	µg/L	----	<0.50	0.68	----	<0.50
phosphorus, dissolved	7723-14-0	E421	50	µg/L	----	<50	<50	----	<50
potassium, dissolved	7440-09-7	E421	50	µg/L	----	4050	5430	----	5260
rubidium, dissolved	7440-17-7	E421	0.20	µg/L	----	5.22	3.86	----	2.62
selenium, dissolved	7782-49-2	E421	0.050	µg/L	----	0.073	0.067	----	1.92
silicon, dissolved	7440-21-3	E421	50	µg/L	----	3390	3990	----	4020
silver, dissolved	7440-22-4	E421	0.010	µg/L	----	<0.010	<0.010	----	<0.010
sodium, dissolved	17341-25-2	E421	50	µg/L	----	1150	7140	----	3780
strontium, dissolved	7440-24-6	E421	0.20	µg/L	----	357	432	----	278
sulfur, dissolved	7704-34-9	E421	500	µg/L	----	37300	71500	----	35000
tellurium, dissolved	13494-80-9	E421	0.20	µg/L	----	<0.20	<0.20	----	<0.20
thallium, dissolved	7440-28-0	E421	0.010	µg/L	----	<0.010	0.017	----	<0.010
thorium, dissolved	7440-29-1	E421	0.10	µg/L	----	<0.10	<0.10	----	<0.10
tin, dissolved	7440-31-5	E421	0.10	µg/L	----	<0.10	<0.10	----	<0.10
titanium, dissolved	7440-32-6	E421	0.30	µg/L	----	<0.30	<0.30	----	<0.30
tungsten, dissolved	7440-33-7	E421	0.10	µg/L	----	<0.10	<0.10	----	0.46
uranium, dissolved	7440-61-1	E421	0.010	µg/L	----	0.390	0.173	----	0.063
vanadium, dissolved	7440-62-2	E421	0.50	µg/L	----	<0.50	<0.50	----	5.64
zinc, dissolved	7440-66-6	E421	1.0	µg/L	----	5.8	30.1	----	1.1
zirconium, dissolved	7440-67-7	E421	0.20	µg/L	----	<0.20	<0.20	----	<0.20
dissolved mercury filtration location	----	EP509	-	-	----	Field	Field	----	Field
dissolved metals filtration location	----	EP421	-	-	----	Field	Field	----	Field



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					BH17-04A	BH17-04B	BH17-05B	BH17-06A	BH17-06B
Client sampling date / time					23-Aug-2020 16:30	23-Aug-2020 14:30	23-Aug-2020 10:00	23-Aug-2020 16:24	23-Aug-2020 11:00
Analyte	CAS Number	Method	LOR	Unit	VA20B3890-001	VA20B3890-002	VA20B3890-003	VA20B3890-004	VA20B3890-005
					Result	Result	Result	Result	Result
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>									
benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	----	<0.50	<0.50
ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	----	<0.50	<0.50
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	----	<0.50	<0.50
styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	----	<0.50	<0.50
toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	----	<0.50	<0.50
xylene, m+p-	179601-23-1	E611A	0.50	µg/L	<0.50	<0.50	----	<0.50	<0.50
xylene, o-	95-47-6	E611A	0.50	µg/L	<0.50	<0.50	----	<0.50	<0.50
xylenes, total	1330-20-7	E611A	0.75	µg/L	<0.75	<0.75	----	<0.75	<0.75
BTEX, total	----	E611A	1.2	µg/L	<1.2	<1.2	----	<1.2	<1.2
<b>Volatile Organic Compounds Surrogates</b>									
bromofluorobenzene, 4-	460-00-4	E611A	0.50	%	93.8	95.1	----	91.7	94.2
difluorobenzene, 1,4-	540-36-3	E611A	0.50	%	93.8	111	----	105	108
<b>Hydrocarbons</b>									
EPH (C10-C19)	----	E601A	250	µg/L	<250	600	----	<250	<250
EPH (C19-C32)	----	E601A	250	µg/L	<250	300	----	<250	<250
HEPHw	----	EC600A	250	µg/L	<250	300	----	<250	<250
LEPHw	----	EC600A	250	µg/L	<250	600	----	<250	<250
<b>Hydrocarbons Surrogates</b>									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%	89.4	92.6	----	69.9	90.9
<b>Polycyclic Aromatic Hydrocarbons</b>									
acenaphthene	83-32-9	E641A	0.010	µg/L	<0.010	<0.040 <sup>DLCI</sup>	----	<0.010	0.061
acenaphthylene	208-96-8	E641A	0.010	µg/L	<0.010	<0.030 <sup>DLCI</sup>	----	<0.010	<0.010
acridine	260-94-6	E641A	0.010	µg/L	<0.010	<0.080 <sup>DLCI</sup>	----	<0.040 <sup>DLCI</sup>	<0.013 <sup>DLCI</sup>
anthracene	120-12-7	E641A	0.010	µg/L	<0.010	<0.020 <sup>DLCI</sup>	----	<0.010	<0.010
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	<0.010	<0.010	----	<0.010	<0.010
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	<0.0050	<0.0050	----	<0.0050	<0.0050
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	<0.010	<0.010	----	<0.010	<0.010
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	<0.015	----	<0.015	<0.015
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	<0.010	<0.010	----	<0.010	<0.010
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	<0.010	<0.010	----	<0.010	<0.010
chrysene	218-01-9	E641A	0.010	µg/L	<0.010	<0.010	----	<0.010	<0.010



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					BH17-04A	BH17-04B	BH17-05B	BH17-06A	BH17-06B
Client sampling date / time					23-Aug-2020 16:30	23-Aug-2020 14:30	23-Aug-2020 10:00	23-Aug-2020 16:24	23-Aug-2020 11:00
Analyte	CAS Number	Method	LOR	Unit	VA20B3890-001	VA20B3890-002	VA20B3890-003	VA20B3890-004	VA20B3890-005
					Result	Result	Result	Result	Result
<b>Polycyclic Aromatic Hydrocarbons</b>									
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	<0.0050	<0.0050	----	<0.0050	<0.0050
fluoranthene	206-44-0	E641A	0.010	µg/L	<0.010	<0.010	----	<0.010	<0.010
fluorene	86-73-7	E641A	0.010	µg/L	0.014	0.024	----	<0.010	0.046
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	<0.010	<0.010	----	<0.010	<0.010
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	0.036	0.205	----	<0.010	0.084
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	0.040	0.217	----	<0.010	0.056
naphthalene	91-20-3	E641A	0.050	µg/L	<0.050	<0.050	----	<0.050	<0.050
phenanthrene	85-01-8	E641A	0.020	µg/L	<0.020	0.024	----	<0.020	<0.020
pyrene	129-00-0	E641A	0.010	µg/L	<0.010	0.034	----	<0.010	<0.010
quinoline	6027-02-7	E641A	0.050	µg/L	<0.050	<0.600 <sup>DLCI</sup>	----	<0.050	<0.050
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>									
acridine-d9	34749-75-2	E641A	0.010	%	91.7	86.9	----	7.09 <sup>RRV</sup>	98.5
chrysene-d12	1719-03-5	E641A	0.010	%	93.9	102	----	102	102
naphthalene-d8	1146-65-2	E641A	0.010	%	91.8	99.9	----	95.7	98.5
phenanthrene-d10	1517-22-2	E641A	0.010	%	96.6	92.7	----	108	104

Please refer to the General Comments section for an explanation of any qualifiers detected.



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					BH17-07A	BH17-07B	----	----	----
					23-Aug-2020 13:35	23-Aug-2020 13:00	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20B3890-006	VA20B3890-007	-----	-----	-----
					Result	Result	---	---	---
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>									
benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	----	----	----
ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	----	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	----	----	----
styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	----	----	----
toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	----	----	----
xylene, m+p-	179601-23-1	E611A	0.50	µg/L	<0.50	<0.50	----	----	----
xylene, o-	95-47-6	E611A	0.50	µg/L	<0.50	<0.50	----	----	----
xylenes, total	1330-20-7	E611A	0.75	µg/L	<0.75	<0.75	----	----	----
BTEX, total	----	E611A	1.2	µg/L	<1.2	<1.2	----	----	----
<b>Volatile Organic Compounds Surrogates</b>									
bromofluorobenzene, 4-	460-00-4	E611A	0.50	%	91.7	94.6	----	----	----
difluorobenzene, 1,4-	540-36-3	E611A	0.50	%	90.0	107	----	----	----
<b>Hydrocarbons</b>									
EPH (C10-C19)	----	E601A	250	µg/L	<250	<250	----	----	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	<250	----	----	----
HEPHw	----	EC600A	250	µg/L	<250	<250	----	----	----
LEPHw	----	EC600A	250	µg/L	<250	<250	----	----	----
<b>Hydrocarbons Surrogates</b>									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%	90.5	90.6	----	----	----
<b>Polycyclic Aromatic Hydrocarbons</b>									
acenaphthene	83-32-9	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
acenaphthylene	208-96-8	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
acridine	260-94-6	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
anthracene	120-12-7	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	<0.0050	<0.0050	----	----	----
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	<0.015	----	----	----
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
chrysene	218-01-9	E641A	0.010	µg/L	<0.010	<0.010	----	----	----



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					BH17-07A	BH17-07B	----	----	----
Client sampling date / time					23-Aug-2020 13:35	23-Aug-2020 13:00	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20B3890-006	VA20B3890-007	-----	-----	-----
					Result	Result	---	---	---
<b>Polycyclic Aromatic Hydrocarbons</b>									
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	<0.0050	<0.0050	----	----	----
fluoranthene	206-44-0	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
fluorene	86-73-7	E641A	0.010	µg/L	0.010	<0.010	----	----	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
naphthalene	91-20-3	E641A	0.050	µg/L	<0.050	<0.050	----	----	----
phenanthrene	85-01-8	E641A	0.020	µg/L	<0.020	<0.020	----	----	----
pyrene	129-00-0	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
quinoline	6027-02-7	E641A	0.050	µg/L	<0.050	<0.050	----	----	----
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>									
acridine-d9	34749-75-2	E641A	0.010	%	95.1	92.5	----	----	----
chrysene-d12	1719-03-5	E641A	0.010	%	94.5	104	----	----	----
naphthalene-d8	1146-65-2	E641A	0.010	%	95.6	96.0	----	----	----
phenanthrene-d10	1517-22-2	E641A	0.010	%	101	101	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>VA20B3890</b>	Page	: 1 of 16
Amendment	: 1		
Client	: <b>Wood Canada Ltd.</b>	Laboratory	: Vancouver - Environmental
Contact	: Jeremiah Gladu	Account Manager	: Selam Worku
Address	: 600 - 4445 Lougheed Hwy Burnaby BC Canada V5C 0E4	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: VE52655D	Date Samples Received	: 28-Aug-2020 10:10
PO	: ----	Issue Date	: 27-Oct-2020 16:09
C-O-C number	: ----		
Sampler	: Ardy M.		
Site	: ----		
Quote number	: VA20-SEAB100-0003 - Wood/Seabridge Gold		
No. of samples received	: 7		
No. of samples analysed	: 7		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

## Summary of Outliers

### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- Test sample Surrogate recovery outliers exist for all regular sample matrices - please see following pages for full details.

### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.

### **Outliers : Analysis Holding Time Compliance (Breaches)**

- Analysis Holding Time Outliers exist - please see following pages for full details.

### **Outliers : Frequency of Quality Control Samples**

- No Quality Control Sample Frequency Outliers occur.



Page : 3 of 16  
Work Order : VA20B3890 Amendment 1  
Client : Wood Canada Ltd.  
Project : VE52655D



**Regular Sample Surrogates**

Sub-Matrix: **Groundwater**

Analyte Group	Laboratory sample ID	Client/Ref Sample D	Analyte	CAS Number	Result	Limits	Comment
<b>Samples Submitted</b>							
Polycyclic Aromatic Hydrocarbons Surrogates	VA20B3890-004	BH17-06A	acridine-d9	34749-75-2	7.09 %	60.0-130 %	Recovery less than lower data quality objective



## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> BH17-04B	E298	23-Aug-2020	----	----	----		04-Sep-2020	28 days	11 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> BH17-05B	E298	23-Aug-2020	----	----	----		04-Sep-2020	28 days	11 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> BH17-06B	E298	23-Aug-2020	----	----	----		04-Sep-2020	28 days	11 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> BH17-04B	E235.Cl	23-Aug-2020	----	----	----		30-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> BH17-06B	E235.Cl	23-Aug-2020	----	----	----		30-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> BH17-05B	E235.Cl	23-Aug-2020	----	----	----		30-Aug-2020	28 days	7 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
<b>HDPE</b> BH17-04B	E235.F	23-Aug-2020	----	----	----		30-Aug-2020	28 days	6 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE BH17-06B	E235.F	23-Aug-2020	----	----	----		30-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE BH17-05B	E235.F	23-Aug-2020	----	----	----		30-Aug-2020	28 days	7 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE BH17-04B	E235.NO3-L	23-Aug-2020	----	----	----		30-Aug-2020	3 days	6 days	* EHTR	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE BH17-06B	E235.NO3-L	23-Aug-2020	----	----	----		30-Aug-2020	3 days	6 days	* EHTR	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE BH17-05B	E235.NO3-L	23-Aug-2020	----	----	----		30-Aug-2020	3 days	7 days	* EHTR	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE BH17-04B	E235.NO2-L	23-Aug-2020	----	----	----		30-Aug-2020	3 days	6 days	* EHTR	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE BH17-06B	E235.NO2-L	23-Aug-2020	----	----	----		30-Aug-2020	3 days	6 days	* EHTR	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE BH17-05B	E235.NO2-L	23-Aug-2020	----	----	----		30-Aug-2020	3 days	7 days	* EHTR	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE BH17-04B	E235.SO4	23-Aug-2020	----	----	----		30-Aug-2020	28 days	6 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
<b>HDPE</b> BH17-06B	E235.SO4	23-Aug-2020	----	----	----		30-Aug-2020	28 days	6 days	✔
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
<b>HDPE</b> BH17-05B	E235.SO4	23-Aug-2020	----	----	----		30-Aug-2020	28 days	7 days	✔
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> BH17-04B	E421.Cr-L	23-Aug-2020	31-Aug-2020	180 days	8 days	✔	01-Sep-2020	171 days	1 days	✔
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> BH17-05B	E421.Cr-L	23-Aug-2020	31-Aug-2020	180 days	8 days	✔	01-Sep-2020	171 days	1 days	✔
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> BH17-06B	E421.Cr-L	23-Aug-2020	31-Aug-2020	180 days	8 days	✔	01-Sep-2020	171 days	1 days	✔
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
<b>Glass vial dissolved (hydrochloric acid)</b> BH17-05B	E509	23-Aug-2020	02-Sep-2020	28 days	10 days	✔	02-Sep-2020	17 days	0 days	✔
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
<b>Glass vial dissolved (hydrochloric acid)</b> BH17-06B	E509	23-Aug-2020	02-Sep-2020	28 days	10 days	✔	02-Sep-2020	17 days	0 days	✔
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
<b>Glass vial dissolved (hydrochloric acid)</b> BH17-04B	E509	23-Aug-2020	02-Sep-2020	28 days	9 days	✔	02-Sep-2020	18 days	0 days	✔
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> BH17-04B	E421	23-Aug-2020	31-Aug-2020	180 days	8 days	✔	01-Sep-2020	171 days	1 days	✔



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> BH17-05B	E421	23-Aug-2020	31-Aug-2020	180 days	8 days	✓	01-Sep-2020	171 days	1 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> BH17-06B	E421	23-Aug-2020	31-Aug-2020	180 days	8 days	✓	01-Sep-2020	171 days	1 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> BH17-04A	E601A	23-Aug-2020	01-Sep-2020	14 days	9 days	✓	02-Sep-2020	40 days	0 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> BH17-04B	E601A	23-Aug-2020	01-Sep-2020	14 days	9 days	✓	02-Sep-2020	40 days	0 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> BH17-06A	E601A	23-Aug-2020	01-Sep-2020	14 days	9 days	✓	02-Sep-2020	40 days	0 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> BH17-06B	E601A	23-Aug-2020	01-Sep-2020	14 days	9 days	✓	02-Sep-2020	40 days	0 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> BH17-07A	E601A	23-Aug-2020	01-Sep-2020	14 days	9 days	✓	02-Sep-2020	40 days	0 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> BH17-07B	E601A	23-Aug-2020	01-Sep-2020	14 days	9 days	✓	02-Sep-2020	40 days	0 days	✓	
<b>Physical Tests : Acidity by Titration</b>											
<b>HDPE</b> BH17-04B	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	6 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : Acidity by Titration</b>											
HDPE BH17-05B	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	6 days	✓	
<b>Physical Tests : Acidity by Titration</b>											
HDPE BH17-06B	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	6 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE BH17-04B	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE BH17-05B	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	6 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE BH17-06B	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	6 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
HDPE BH17-04B	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
HDPE BH17-05B	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
HDPE BH17-06B	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Physical Tests : pH by Meter</b>											
HDPE BH17-04B	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	140 hrs	* EHTR-FM	





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval
<b>Physical Tests : pH by Meter</b>										
HDPE BH17-06B	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	144 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE BH17-05B	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	145 hrs	* EHTR-FM
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE BH17-04B	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE BH17-05B	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE BH17-06B	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE BH17-05B	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	7 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE BH17-04B	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	8 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE BH17-06B	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	8 days	* EHTR
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>										
Amber glass/Teflon lined cap (sodium bisulfate) BH17-04A	E641A	23-Aug-2020	01-Sep-2020	14 days	9 days	✓	02-Sep-2020	40 days	0 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> BH17-04B	E641A	23-Aug-2020	01-Sep-2020	14 days	9 days	✔	02-Sep-2020	40 days	0 days	✔	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> BH17-06A	E641A	23-Aug-2020	01-Sep-2020	14 days	9 days	✔	02-Sep-2020	40 days	0 days	✔	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> BH17-06B	E641A	23-Aug-2020	01-Sep-2020	14 days	9 days	✔	02-Sep-2020	40 days	0 days	✔	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> BH17-07A	E641A	23-Aug-2020	01-Sep-2020	14 days	9 days	✔	02-Sep-2020	40 days	0 days	✔	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> BH17-07B	E641A	23-Aug-2020	01-Sep-2020	14 days	9 days	✔	02-Sep-2020	40 days	0 days	✔	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> BH17-04A	E611A	23-Aug-2020	31-Aug-2020	14 days	7 days	✔	01-Sep-2020	6 days	0 days	✔	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> BH17-06A	E611A	23-Aug-2020	31-Aug-2020	14 days	7 days	✔	01-Sep-2020	6 days	0 days	✔	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> BH17-04B	E611A	23-Aug-2020	31-Aug-2020	14 days	8 days	✔	01-Sep-2020	5 days	0 days	✔	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> BH17-06B	E611A	23-Aug-2020	31-Aug-2020	14 days	8 days	✔	01-Sep-2020	5 days	0 days	✔	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> BH17-07A	E611A	23-Aug-2020	31-Aug-2020	14 days	8 days	✓	01-Sep-2020	5 days	0 days	✓
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> BH17-07B	E611A	23-Aug-2020	31-Aug-2020	14 days	8 days	✓	01-Sep-2020	5 days	0 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHTR: Exceeded ALS recommended hold time prior to sample receipt.

Rec. HT: ALS recommended hold time (see units).



## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Acidity by Titration	E283	78895	1	16	6.2	5.0	✓
Alkalinity Species by Titration	E290	78897	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	80951	1	14	7.1	5.0	✓
BTEX by Headspace GC-MS	E611A	79341	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	78889	1	7	14.2	5.0	✓
Conductivity in Water	E100	78898	1	7	14.2	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	79472	1	19	5.2	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	80466	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	79473	2	20	10.0	5.0	✓
Fluoride in Water by IC	E235.F	78890	1	7	14.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	78892	1	7	14.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	78893	1	7	14.2	5.0	✓
pH by Meter	E108	78896	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	78894	1	7	14.2	5.0	✓
TDS by Gravimetry	E162	78768	1	20	5.0	5.0	✓
Turbidity by Nephelometry	E121	79259	2	40	5.0	5.0	✓
<b>Laboratory Control Samples (LCS)</b>							
Acidity by Titration	E283	78895	1	16	6.2	5.0	✓
Alkalinity Species by Titration	E290	78897	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	80951	1	14	7.1	5.0	✓
BC PHC - EPH by GC-FID	E601A	79806	1	20	5.0	5.0	✓
BTEX by Headspace GC-MS	E611A	79341	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	78889	1	7	14.2	5.0	✓
Conductivity in Water	E100	78898	1	7	14.2	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	79472	1	19	5.2	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	80466	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	79473	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	78890	1	7	14.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	78892	1	7	14.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	78893	1	7	14.2	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	79807	2	21	9.5	5.0	✓
pH by Meter	E108	78896	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	78894	1	7	14.2	5.0	✓
TDS by Gravimetry	E162	78768	1	20	5.0	5.0	✓
Turbidity by Nephelometry	E121	79259	2	40	5.0	5.0	✓
<b>Method Blanks (MB)</b>							
Acidity by Titration	E283	78895	1	16	6.2	5.0	✓



Matrix: **Water**

Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<i>Analytical Methods</i>							
<b>Method Blanks (MB) - Continued</b>							
Alkalinity Species by Titration	E290	78897	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	80951	1	14	7.1	5.0	✓
BC PHC - EPH by GC-FID	E601A	79806	1	20	5.0	5.0	✓
BTEX by Headspace GC-MS	E611A	79341	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	78889	1	7	14.2	5.0	✓
Conductivity in Water	E100	78898	1	7	14.2	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	79472	1	19	5.2	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	80466	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	79473	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	78890	1	7	14.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	78892	1	7	14.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	78893	1	7	14.2	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	79807	2	21	9.5	5.0	✓
Sulfate in Water by IC	E235.SO4	78894	1	7	14.2	5.0	✓
TDS by Gravimetry	E162	78768	1	20	5.0	5.0	✓
Turbidity by Nephelometry	E121	79259	2	40	5.0	5.0	✓
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	80951	1	14	7.1	5.0	✓
BTEX by Headspace GC-MS	E611A	79341	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	78889	1	7	14.2	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	79472	1	19	5.2	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	80466	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	79473	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	78890	1	7	14.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	78892	1	7	14.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	78893	1	7	14.2	5.0	✓
Sulfate in Water by IC	E235.SO4	78894	1	7	14.2	5.0	✓



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 Vancouver - Environmental	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TDS by Gravimetry	E162 Vancouver - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Acidity by Titration	E283 Vancouver - Environmental	Water	APHA 2310 B (mod)	Acidity is determined by potentiometric titration to a specified endpoint.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L Vancouver - Environmental	Water	APHA 3030 B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS
Dissolved Mercury in Water by CVAAS	E509 Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
BC PHC - EPH by GC-FID	E601A Vancouver - Environmental	Water	BC MOE Lab Manual	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.
BTEX by Headspace GC-MS	E611A Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by Hexane LVI GC-MS	E641A Vancouver - Environmental	Water	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by large volume injection (LVI) GC-MS.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> ), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
LEPH and HEPH: EPH-PAH	EC600A Vancouver - Environmental	Water	BC MOE Lab Manual (LEPH and HEPH) (mod)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Acenaphthene, Acridine, Anthracene, Fluorene, Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(a)pyrene, Fluoranthene, and Pyrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
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<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO <sub>3</sub> .
Dissolved Mercury Water Filtration	EP509 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
VOCs Preparation for Headspace Analysis	EP581 Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.



## QUALITY CONTROL REPORT

**Work Order** : **VA20B3890**

Page : 1 of 16

**Amendment** : **1**

Client : Wood Canada Ltd.  
 Contact : Jeremiah Gladu  
 Address : 1235 Main Street P.O. Box 2356  
 Smithers BC Canada V0J 2N0  
 Telephone : ----  
 Project : VE52655D  
 PO : ----  
 C-O-C number : ----  
 Sampler : Ardy M.  
 Site : ----  
 Quote number : VA20-SEAB100-0003 - Wood/Seabridge Gold  
 No. of samples received : 7  
 No. of samples analysed : 7

Laboratory : Vancouver - Environmental  
 Account Manager : Selam Worku  
 Address : 8081 Lougheed Highway  
 Burnaby, British Columbia Canada V5A 1W9  
 Telephone : +1 604 253 4188  
 Date Samples Received : 28-Aug-2020 10:10  
 Date Analysis Commenced : 28-Aug-2020  
 Issue Date : 27-Oct-2020 16:09

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

### *Signatories*

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Brianna Allen	Department Manager - Organics	Organics, Burnaby, British Columbia
Bruna Botti	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Clarie Tejano		Metals, Burnaby, British Columbia
Cristina Alexandre	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Harsha Attanayake	Laboratory Analyst	Organics, Burnaby, British Columbia
Kevin Duarte	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics - Water Quality, Burnaby, British Columbia
Shaneel Dayal	Analyst	Metals, Burnaby, British Columbia



## **General Comments**

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

# = Indicates a QC result that did not meet the ALS DQO.



### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 78768)</b>											
VA20B3842-021	Anonymous	solids, total dissolved [TDS]	----	E162	13	mg/L	47	48	1	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 78895)</b>											
VA20B3839-003	Anonymous	acidity (as CaCO3)	----	E283	2.0	mg/L	19.0	19.0	0	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 78896)</b>											
VA20B3890-002	BH17-04B	pH	----	E108	0.10	pH units	7.49	7.54	0.665%	4%	----
<b>Physical Tests (QC Lot: 78897)</b>											
VA20B3890-002	BH17-04B	alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	112	112	0.00%	20%	----
		alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	112	112	0.00%	20%	----
<b>Physical Tests (QC Lot: 78898)</b>											
VA20B3890-002	BH17-04B	conductivity	----	E100	2.0	µS/cm	438	443	1.14%	10%	----
<b>Physical Tests (QC Lot: 79259)</b>											
KS2001568-001	Anonymous	turbidity	----	E121	0.10	NTU	0.11	<0.10	0.01	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 79432)</b>											
VA20B3890-002	BH17-04B	turbidity	----	E121	0.10	NTU	0.90	0.91	0.004	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78889)</b>											
VA20B3890-002	BH17-04B	chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78890)</b>											
VA20B3890-002	BH17-04B	fluoride	16984-48-8	E235.F	0.020	mg/L	0.074	0.072	0.002	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78892)</b>											
VA20B3890-002	BH17-04B	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0100	0.0093	0.0008	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78893)</b>											
VA20B3890-002	BH17-04B	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0012	0.0015	0.0003	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78894)</b>											
VA20B3890-002	BH17-04B	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	114	114	0.0216%	20%	----
<b>Anions and Nutrients (QC Lot: 80951)</b>											
VA20B3890-002	BH17-04B	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.105	0.105	0.0477%	20%	----
<b>Dissolved Metals (QC Lot: 79472)</b>											
VA20B3811-001	Anonymous	chromium, dissolved	7440-47-3	E421.Cr-L	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----



Sub-Matrix: **Water**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 79473)</b>											
VA20B3811-001	Anonymous	selenium, dissolved	7782-49-2	E421	0.000250	mg/L	0.000558	0.000508	0.000050	Diff <2x LOR	----
VA20B3811-001	Anonymous	aluminum, dissolved	7429-90-5	E421	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		arsenic, dissolved	7440-38-2	E421	0.00050	mg/L	0.0366	0.0363	0.800%	20%	----
		barium, dissolved	7440-39-3	E421	0.00050	mg/L	0.0270	0.0265	1.83%	20%	----
		beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		bismuth, dissolved	7440-69-9	E421	0.000250	mg/L	<0.000250	<0.000250	0	Diff <2x LOR	----
		boron, dissolved	7440-42-8	E421	0.050	mg/L	0.211	0.209	0.002	Diff <2x LOR	----
		cadmium, dissolved	7440-43-9	E421	0.0000500	mg/L	<0.0000500	<0.0000500	0	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E421	0.250	mg/L	566	552	2.42%	20%	----
		cesium, dissolved	7440-46-2	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		cobalt, dissolved	7440-48-4	E421	0.00050	mg/L	1.93	1.89	2.06%	20%	----
		copper, dissolved	7440-50-8	E421	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E421	0.050	mg/L	1.30	1.34	3.65%	20%	----
		lead, dissolved	7439-92-1	E421	0.000250	mg/L	<0.000250	<0.000250	0	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E421	0.0050	mg/L	0.0135	0.0135	0.000007	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	0.500	mg/L	35.0	34.2	2.14%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00050	mg/L	15.0	15.0	0.0850%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.000250	mg/L	0.105	0.106	0.484%	20%	----
		nickel, dissolved	7440-02-0	E421	0.00250	mg/L	0.0142	0.0142	0.00009	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E421	0.250	mg/L	<0.250	<0.250	0	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	0.500	mg/L	9.37	9.35	0.237%	20%	----
		rubidium, dissolved	7440-17-7	E421	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	0.250	mg/L	10.6	10.8	1.39%	20%	----
		silver, dissolved	7440-22-4	E421	0.000050	mg/L	0.000110	<0.000050	0.000060	Diff <2x LOR	----
		sodium, dissolved	17341-25-2	E421	0.250	mg/L	759	774	1.92%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00100	mg/L	3.06	3.19	4.22%	20%	----
		sulfur, dissolved	7704-34-9	E421	2.50	mg/L	1160	1200	3.30%	20%	----
		tellurium, dissolved	13494-80-9	E421	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		thallium, dissolved	7440-28-0	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		thorium, dissolved	7440-29-1	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		tin, dissolved	7440-31-5	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		titanium, dissolved	7440-32-6	E421	0.00150	mg/L	<0.00150	<0.00150	0	Diff <2x LOR	----
		tungsten, dissolved	7440-33-7	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E421	0.000050	mg/L	0.00311	0.00313	0.406%	20%	----
		vanadium, dissolved	7440-62-2	E421	0.00250	mg/L	<0.00250	<0.00250	0	Diff <2x LOR	----

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 Work Order : VA20B3890 Amendment 1  
 Client : Wood Canada Ltd.  
 Project : VE52655D



Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 79473) - continued</b>											
VA20B3811-001	Anonymous	zinc, dissolved	7440-66-6	E421	0.0050	mg/L	0.0116	0.0120	0.0004	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 80466)</b>											
VA20B3851-006	Anonymous	mercury dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Volatile Organic Compounds (QC Lot: 79341)</b>											
VA20B3890-001	BH17-04A	benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

### Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 78768)</b>						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
<b>Physical Tests (QCLot: 78895)</b>						
acidity (as CaCO3)	----	E283	2	mg/L	2.0	----
<b>Physical Tests (QCLot: 78897)</b>						
alkalinity, bicarbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, carbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, hydroxide (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
<b>Physical Tests (QCLot: 78898)</b>						
conductivity	----	E100	1	µS/cm	<1.0	----
<b>Physical Tests (QCLot: 79259)</b>						
turbidity	----	E121	0.1	NTU	<0.10	----
<b>Physical Tests (QCLot: 79432)</b>						
turbidity	----	E121	0.1	NTU	<0.10	----
<b>Anions and Nutrients (QCLot: 78889)</b>						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
<b>Anions and Nutrients (QCLot: 78890)</b>						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
<b>Anions and Nutrients (QCLot: 78892)</b>						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 78893)</b>						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 78894)</b>						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
<b>Anions and Nutrients (QCLot: 80951)</b>						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
<b>Dissolved Metals (QCLot: 79472)</b>						
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	<0.00010	----
<b>Dissolved Metals (QCLot: 79473)</b>						
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 79473) - continued</b>						
barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
sodium, dissolved	17341-25-2	E421	0.05	mg/L	<0.050	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
<b>Dissolved Metals (QCLot: 80466)</b>						



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 80466) - continued</b>						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	---
<b>Volatile Organic Compounds (QCLot: 79341)</b>						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	---
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	---
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	---
styrene	100-42-5	E611A	0.5	µg/L	<0.50	---
toluene	108-88-3	E611A	0.5	µg/L	<0.50	---
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	<0.50	---
xylene, o-	95-47-6	E611A	0.5	µg/L	<0.50	---
<b>Hydrocarbons (QCLot: 79806)</b>						
EPH (C10-C19)	---	E601A	250	µg/L	<250	---
EPH (C19-C32)	---	E601A	250	µg/L	<250	---
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 79807)</b>						
acenaphthene	83-32-9	E641A	0.01	µg/L	<0.010	---
acenaphthylene	208-96-8	E641A	0.01	µg/L	<0.010	---
acridine	260-94-6	E641A	0.01	µg/L	<0.010	---
anthracene	120-12-7	E641A	0.01	µg/L	<0.010	---
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	<0.010	---
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	---
benzo(b+j)fluoranthene	---	E641A	0.01	µg/L	<0.010	---
benzo(b+j+k)fluoranthene	---	E641A	0.015	µg/L	<0.015	---
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	<0.010	---
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	<0.010	---
chrysene	218-01-9	E641A	0.01	µg/L	<0.010	---
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	<0.0050	---
fluoranthene	206-44-0	E641A	0.01	µg/L	<0.010	---
fluorene	86-73-7	E641A	0.01	µg/L	<0.010	---
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	<0.010	---
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	<0.010	---
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	<0.010	---
naphthalene	91-20-3	E641A	0.05	µg/L	<0.050	---
phenanthrene	85-01-8	E641A	0.02	µg/L	<0.020	---
pyrene	129-00-0	E641A	0.01	µg/L	<0.010	---
quinoline	6027-02-7	E641A	0.05	µg/L	<0.050	---
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 82054)</b>						
acenaphthene	83-32-9	E641A	0.01	µg/L	<0.010	---





Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 82054) - continued</b>						
acenaphthylene	208-96-8	E641A	0.01	µg/L	<0.010	---
acridine	260-94-6	E641A	0.01	µg/L	<0.010	---
anthracene	120-12-7	E641A	0.01	µg/L	<0.010	---
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	<0.010	---
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	---
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	<0.010	---
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	---
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	<0.010	---
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	<0.010	---
chrysene	218-01-9	E641A	0.01	µg/L	<0.010	---
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	<0.0050	---
fluoranthene	206-44-0	E641A	0.01	µg/L	<0.010	---
fluorene	86-73-7	E641A	0.01	µg/L	<0.010	---
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	<0.010	---
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	<0.010	---
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	<0.010	---
naphthalene	91-20-3	E641A	0.05	µg/L	<0.050	---
phenanthrene	85-01-8	E641A	0.02	µg/L	<0.020	---
pyrene	129-00-0	E641A	0.01	µg/L	<0.010	---
quinoline	6027-02-7	E641A	0.05	µg/L	<0.050	---



## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Physical Tests (QCLot: 78768)</b>									
solids, total dissolved [TDS]	---	E162	10	mg/L	1000 mg/L	102	85.0	115	---
<b>Physical Tests (QCLot: 78895)</b>									
acidity (as CaCO3)	---	E283	2	mg/L	50 mg/L	102	85.0	115	---
<b>Physical Tests (QCLot: 78896)</b>									
pH	---	E108	---	pH units	7 pH units	100	98.0	102	---
<b>Physical Tests (QCLot: 78897)</b>									
alkalinity, phenolphthalein (as CaCO3)	---	E290	1	mg/L	229 mg/L	97.2	75.0	125	---
alkalinity, total (as CaCO3)	---	E290	1	mg/L	500 mg/L	113	85.0	115	---
<b>Physical Tests (QCLot: 78898)</b>									
conductivity	---	E100	1	µS/cm	146.9 µS/cm	102	90.0	110	---
<b>Physical Tests (QCLot: 79259)</b>									
turbidity	---	E121	0.1	NTU	200 NTU	97.5	85.0	115	---
<b>Physical Tests (QCLot: 79432)</b>									
turbidity	---	E121	0.1	NTU	200 NTU	102	85.0	115	---
<b>Anions and Nutrients (QCLot: 78889)</b>									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	95.0	90.0	110	---
<b>Anions and Nutrients (QCLot: 78890)</b>									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	95.1	90.0	110	---
<b>Anions and Nutrients (QCLot: 78892)</b>									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	95.1	90.0	110	---
<b>Anions and Nutrients (QCLot: 78893)</b>									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	95.6	90.0	110	---
<b>Anions and Nutrients (QCLot: 78894)</b>									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	96.0	90.0	110	---
<b>Anions and Nutrients (QCLot: 80951)</b>									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.12 mg/L	105	85.0	115	---
<b>Dissolved Metals (QCLot: 79472)</b>									
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	0.25 mg/L	99.5	80.0	120	---
<b>Dissolved Metals (QCLot: 79473)</b>									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	103	80.0	120	---
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	96.4	80.0	120	---
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	98.0	80.0	120	---



Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 79473) - continued</b>									
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	106	80.0	120	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	101	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	98.9	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	97.6	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	98.8	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	103	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	101	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	101	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	99.8	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	98.6	80.0	120	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	101	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	104	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	97.9	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	101	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	99.6	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	98.8	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	102	70.0	130	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	99.7	80.0	120	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	99.7	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	97.5	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	106	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	102	80.0	120	----
sodium, dissolved	17341-25-2	E421	0.05	mg/L	50 mg/L	98.8	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	104	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	107	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	106	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	99.2	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	93.1	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	100	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	90.7	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	95.1	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	97.2	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	100	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	104	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	97.8	80.0	120	----
<b>Dissolved Metals (QCLot: 80466)</b>									
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	87.7	80.0	120	----



Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 79341)</b>									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	95.1	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	90.2	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	110	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	90.4	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	93.9	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	200 µg/L	93.8	70.0	130	----
xylene, o-	95-47-6	E611A	0.5	µg/L	100 µg/L	92.4	70.0	130	----
<b>Hydrocarbons (QCLot: 79806)</b>									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	109	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	104	70.0	130	----
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 79807)</b>									
acenaphthene	83-32-9	E641A	0.01	µg/L	0.5 µg/L	107	60.0	130	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5 µg/L	108	60.0	130	----
acridine	260-94-6	E641A	0.01	µg/L	0.5 µg/L	93.0	60.0	130	----
anthracene	120-12-7	E641A	0.01	µg/L	0.5 µg/L	103	60.0	130	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5 µg/L	102	60.0	130	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5 µg/L	105	60.0	130	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	0.5 µg/L	105	60.0	130	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	1 µg/L	111	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5 µg/L	107	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5 µg/L	116	60.0	130	----
chrysene	218-01-9	E641A	0.01	µg/L	0.5 µg/L	111	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	0.5 µg/L	110	60.0	130	----
fluoranthene	206-44-0	E641A	0.01	µg/L	0.5 µg/L	105	60.0	130	----
fluorene	86-73-7	E641A	0.01	µg/L	0.5 µg/L	97.1	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5 µg/L	109	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5 µg/L	108	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	0.5 µg/L	103	60.0	130	----
naphthalene	91-20-3	E641A	0.05	µg/L	0.5 µg/L	101	50.0	130	----
phenanthrene	85-01-8	E641A	0.02	µg/L	0.5 µg/L	101	60.0	130	----
pyrene	129-00-0	E641A	0.01	µg/L	0.5 µg/L	109	60.0	130	----
quinoline	6027-02-7	E641A	0.05	µg/L	0.5 µg/L	111	60.0	130	----
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 82054)</b>									
acenaphthene	83-32-9	E641A	0.01	µg/L	0.5 µg/L	106	60.0	130	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5 µg/L	111	60.0	130	----
acridine	260-94-6	E641A	0.01	µg/L	0.5 µg/L	113	60.0	130	----



Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 82054) - continued</b>									
anthracene	120-12-7	E641A	0.01	µg/L	0.5 µg/L	117	60.0	130	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5 µg/L	120	60.0	130	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5 µg/L	117	60.0	130	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	0.5 µg/L	118	60.0	130	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	1 µg/L	122	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5 µg/L	107	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5 µg/L	126	60.0	130	----
chrysene	218-01-9	E641A	0.01	µg/L	0.5 µg/L	114	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	0.5 µg/L	107	60.0	130	----
fluoranthene	206-44-0	E641A	0.01	µg/L	0.5 µg/L	112	60.0	130	----
fluorene	86-73-7	E641A	0.01	µg/L	0.5 µg/L	101	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5 µg/L	120	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5 µg/L	104	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	0.5 µg/L	99.3	60.0	130	----
naphthalene	91-20-3	E641A	0.05	µg/L	0.5 µg/L	99.1	50.0	130	----
phenanthrene	85-01-8	E641A	0.02	µg/L	0.5 µg/L	110	60.0	130	----
pyrene	129-00-0	E641A	0.01	µg/L	0.5 µg/L	117	60.0	130	----
quinoline	6027-02-7	E641A	0.05	µg/L	0.5 µg/L	119	60.0	130	----



### Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 78889)</b>										
VA20B3890-003	BH17-05B	chloride	16887-00-6	E235.Cl	520 mg/L	500 mg/L	104	75 0	125	----
<b>Anions and Nutrients (QCLot: 78890)</b>										
VA20B3890-003	BH17-05B	fluoride	16984-48-8	E235 F	5.33 mg/L	5 mg/L	107	75 0	125	----
<b>Anions and Nutrients (QCLot: 78892)</b>										
VA20B3890-003	BH17-05B	nitrate (as N)	14797-55-8	E235 NO3-L	13.0 mg/L	12.5 mg/L	104	75 0	125	----
<b>Anions and Nutrients (QCLot: 78893)</b>										
VA20B3890-003	BH17-05B	nitrite (as N)	14797-65-0	E235 NO2-L	2.61 mg/L	2.5 mg/L	104	75 0	125	----
<b>Anions and Nutrients (QCLot: 78894)</b>										
VA20B3890-003	BH17-05B	sulfate (as SO4)	14808-79-8	E235.SO4	536 mg/L	500 mg/L	107	75 0	125	----
<b>Anions and Nutrients (QCLot: 80951)</b>										
VA20B3890-003	BH17-05B	ammonia, total (as N)	7664-41-7	E298	0.209 mg/L	0.2 mg/L	104	75 0	125	----
<b>Dissolved Metals (QCLot: 79472)</b>										
VA20B3811-002	Anonymous	chromium, dissolved	7440-47-3	E421.Cr-L	0.197 mg/L	0.2 mg/L	98.7	70 0	130	----
<b>Dissolved Metals (QCLot: 79473)</b>										
VA20B3811-002	Anonymous	aluminum, dissolved	7429-90-5	E421	1.01 mg/L	1 mg/L	101	70 0	130	----
		antimony, dissolved	7440-36-0	E421	0.100 mg/L	0.1 mg/L	100	70 0	130	----
		arsenic, dissolved	7440-38-2	E421	0.102 mg/L	0.1 mg/L	102	70 0	130	----
		barium, dissolved	7440-39-3	E421	0.0990 mg/L	0.1 mg/L	99.0	70 0	130	----
		beryllium, dissolved	7440-41-7	E421	0.201 mg/L	0.2 mg/L	100	70 0	130	----
		bismuth, dissolved	7440-69-9	E421	0.0443 mg/L	0.05 mg/L	88.6	70 0	130	----
		boron, dissolved	7440-42-8	E421	0.466 mg/L	0.5 mg/L	93.3	70 0	130	----
		cadmium, dissolved	7440-43-9	E421	0.0190 mg/L	0.02 mg/L	95.2	70 0	130	----
		calcium, dissolved	7440-70-2	E421	ND mg/L	20 mg/L	ND	70 0	130	----
		cesium, dissolved	7440-46-2	E421	0.0494 mg/L	0.05 mg/L	98.7	70 0	130	----
		cobalt, dissolved	7440-48-4	E421	ND mg/L	0.1 mg/L	ND	70 0	130	----
		copper, dissolved	7440-50-8	E421	0.0915 mg/L	0.1 mg/L	91.5	70 0	130	----
		iron, dissolved	7439-89-6	E421	9.19 mg/L	10 mg/L	91.9	70 0	130	----
		lead, dissolved	7439-92-1	E421	0.0909 mg/L	0.1 mg/L	90.9	70 0	130	----
		lithium, dissolved	7439-93-2	E421	0.530 mg/L	0.5 mg/L	106	70 0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 79473) - continued</b>										
VA20B3811-002	Anonymous	magnesium, dissolved	7439-95-4	E421	ND mg/L	5 mg/L	ND	70.0	130	----
		manganese, dissolved	7439-96-5	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.183 mg/L	0.2 mg/L	91.4	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	54.0 mg/L	50 mg/L	108	70.0	130	----
		potassium, dissolved	7440-09-7	E421	20.6 mg/L	20 mg/L	103	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.101 mg/L	0.1 mg/L	101	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.200 mg/L	0.2 mg/L	100	70.0	130	----
		silicon, dissolved	7440-21-3	E421	46.7 mg/L	50 mg/L	93.4	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.0188 mg/L	0.02 mg/L	93.8	70.0	130	----
		sodium, dissolved	17341-25-2	E421	ND mg/L	10 mg/L	ND	70.0	130	----
		strontium, dissolved	7440-24-6	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		sulfur, dissolved	7704-34-9	E421	ND mg/L	100 mg/L	ND	70.0	130	----
		tellurium, dissolved	13494-80-9	E421	0.203 mg/L	0.2 mg/L	102	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.0178 mg/L	0.02 mg/L	88.9	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0994 mg/L	0.1 mg/L	99.4	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.100 mg/L	0.1 mg/L	100	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.202 mg/L	0.2 mg/L	101	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0961 mg/L	0.1 mg/L	96.1	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.0191 mg/L	0.02 mg/L	95.6	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.519 mg/L	0.5 mg/L	104	70.0	130	----
		zinc, dissolved	7440-66-6	E421	1.85 mg/L	2 mg/L	92.7	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.214 mg/L	0.2 mg/L	107	70.0	130	----
<b>Dissolved Metals (QCLot: 80466)</b>										
VA20B3851-007	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000993 mg/L	0.0001 mg/L	99.3	70.0	130	----
<b>Volatile Organic Compounds (QCLot: 79341)</b>										
VA20B3890-002	BH17-04B	benzene	71-43-2	E611A	94.4 µg/L	100 µg/L	94.4	60.0	140	----
		ethylbenzene	100-41-4	E611A	89.3 µg/L	100 µg/L	89.3	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	111 µg/L	100 µg/L	111	60.0	140	----
		styrene	100-42-5	E611A	89.6 µg/L	100 µg/L	89.6	60.0	140	----
		toluene	108-88-3	E611A	92.9 µg/L	100 µg/L	92.9	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	185 µg/L	200 µg/L	92.7	60.0	140	----
		xylene, o-	95-47-6	E611A	92.1 µg/L	100 µg/L	92.1	60.0	140	----

Page : 16 of 16  
Work Order : VA20B3890 Amendment 1  
Client : Wood Canada Ltd.  
Project : VE52655D

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Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here

(lab use only)

COC Number: 17 -

Page 1 of 1

<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>			<b>Select Service Level Below - Contact your AM to confirm all E&amp;P TATs (surcharges may apply)</b>																																																																																																																																																
Company: Wood.		Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)			<b>Regular [R]</b> <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply																																																																																																																																																
Contact: Jeremiah Gladu		Quality Control (QC) Report with Report <input type="checkbox"/> YES <input type="checkbox"/> NO			<b>PROSITY (Business Day)</b>		<b>EMERGENCY</b>		1 Business day [E - 100%] <input type="checkbox"/>																																																																																																																																												
Phone:		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked			4 day [P4-20%] <input type="checkbox"/>		3 day [P3-25%] <input type="checkbox"/>		Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] <input type="checkbox"/>																																																																																																																																												
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			2 day [P2-60%] <input type="checkbox"/>		Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm																																																																																																																																														
Street: 4445 Lougheed Hwy.		Email 1 or Fax jeremiah.gladu@woodplc.com			For tests that can not be performed according to the service level selected, you will be contacted.																																																																																																																																																
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Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.  
1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.



## CERTIFICATE OF ANALYSIS

**Work Order** : **VA20B3891**  
**Amendment** : **2**  
**Client** : **Wood Canada Ltd.**  
**Contact** : Jeremiah Gladu  
**Address** : 600 - 4445 Lougheed Hwy  
Burnaby BC Canada V5C 0E4  
**Telephone** : 604 294 3811  
**Project** : VE52655D  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : Ardy M.  
**Site** : ----  
**Quote number** : VA20-SEAB100-0003 - Wood/Seabridge Gold  
**No. of samples received** : 9  
**No. of samples analysed** : 8

**Page** : 1 of 11  
**Laboratory** : Vancouver - Environmental  
**Account Manager** : Selam Worku  
**Address** : 8081 Lougheed Highway  
Burnaby BC Canada V5A 1W9  
**Telephone** : +1 604 253 4188  
**Date Samples Received** : 28-Aug-2020 10:10  
**Date Analysis Commenced** : 29-Aug-2020  
**Issue Date** : 27-Oct-2020 16:09

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Brianna Allen	Department Manager - Organics	Organics, Burnaby, British Columbia
Bruna Botti	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Clarie Tejano		Metals, Burnaby, British Columbia
Cristina Alexandre	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Harsha Attanayake	Laboratory Analyst	Organics, Burnaby, British Columbia
Kevin Duarte	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics - Water Quality, Burnaby, British Columbia
Ophelia Chiu	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Shaneel Dayal	Analyst	Metals, Burnaby, British Columbia





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
-	No Unit
µg/L	micrograms per litre
µS/cm	Microsiemens per centimetre
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in reports identified as "Preliminary Report" are considered authorized for use.

## Workorder Comments

Sample "BH17-17A" VOC vials received broken in Transit.

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLCI	Detection Limit Raised: Chromatographic interference due to co-elution.
RRV	Reported result verified by repeat analysis.



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					BH17-12A	BH17-12B	BH17-17A	BH17-24A	BH17-24B
Client sampling date / time					24-Aug-2020 11:05	24-Aug-2020 09:43	24-Aug-2020 13:00	24-Aug-2020 15:00	24-Aug-2020 14:40
Analyte	CAS Number	Method	LOR	Unit	VA20B3891-001	VA20B3891-002	VA20B3891-003	VA20B3891-005	VA20B3891-006
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
acidity (as CaCO3)	----	E283	2.0	mg/L	----	----	----	<2.0	2.7
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	----	----	----	176	12.2
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	----	----	----	<1.0	<1.0
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	----	----	----	<1.0	<1.0
alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L	----	----	----	<1.0	<1.0
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	----	----	----	176	12.2
conductivity	----	E100	2.0	µS/cm	----	----	----	313	26.3
pH	----	E108	0.10	pH units	----	----	----	7.79	6.41
solids, total dissolved [TDS]	----	E162	10	mg/L	----	----	----	172	18
turbidity	----	E121	0.10	NTU	----	----	----	7.00	0.69
hardness (as CaCO3), dissolved	----	EC100	600	µg/L	----	----	----	133000	10900
<b>Anions and Nutrients</b>									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	----	----	----	0.0266	<0.0050
chloride	16887-00-6	E235.Cl	0.50	mg/L	----	----	----	<0.50	<0.50
fluoride	16984-48-8	E235.F	0.020	mg/L	----	----	----	0.466	0.027
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	----	----	----	<0.0050	0.0066
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	----	----	----	<0.0010	<0.0010
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	----	----	----	24.4	1.11
<b>Dissolved Metals</b>									
aluminum, dissolved	7429-90-5	E421	1.0	µg/L	----	----	----	1.2	<1.0
antimony, dissolved	7440-36-0	E421	0.10	µg/L	----	----	----	0.24	<0.10
arsenic, dissolved	7440-38-2	E421	0.10	µg/L	----	----	----	3.51	0.40
barium, dissolved	7440-39-3	E421	0.10	µg/L	----	----	----	42.5	4.34
beryllium, dissolved	7440-41-7	E421	0.100	µg/L	----	----	----	<0.100	<0.100
bismuth, dissolved	7440-69-9	E421	0.050	µg/L	----	----	----	<0.050	<0.050
boron, dissolved	7440-42-8	E421	10	µg/L	----	----	----	<10	<10
cadmium, dissolved	7440-43-9	E421	0.0050	µg/L	----	----	----	<0.0050	0.120
calcium, dissolved	7440-70-2	E421	50	µg/L	----	----	----	37600	3500
cesium, dissolved	7440-46-2	E421	0.010	µg/L	----	----	----	0.016	<0.010
chromium, dissolved	7440-47-3	E421.Cr-L	0.10	µg/L	----	----	----	<0.10	<0.10



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					BH17-12A	BH17-12B	BH17-17A	BH17-24A	BH17-24B
Client sampling date / time					24-Aug-2020 11:05	24-Aug-2020 09:43	24-Aug-2020 13:00	24-Aug-2020 15:00	24-Aug-2020 14:40
Analyte	CAS Number	Method	LOR	Unit	VA20B3891-001	VA20B3891-002	VA20B3891-003	VA20B3891-005	VA20B3891-006
					Result	Result	Result	Result	Result
<b>Dissolved Metals</b>									
cobalt, dissolved	7440-48-4	E421	0.10	µg/L	----	----	----	<0.10	<0.10
copper, dissolved	7440-50-8	E421	0.20	µg/L	----	----	----	<0.20	0.27
iron, dissolved	7439-89-6	E421	10	µg/L	----	----	----	61	<10
lead, dissolved	7439-92-1	E421	0.050	µg/L	----	----	----	<0.050	<0.050
lithium, dissolved	7439-93-2	E421	1.0	µg/L	----	----	----	8.4	<1.0
magnesium, dissolved	7439-95-4	E421	5.0	µg/L	----	----	----	9490	520
manganese, dissolved	7439-96-5	E421	0.10	µg/L	----	----	----	93.6	0.50
mercury, dissolved	7439-97-6	E509	0.0050	µg/L	----	----	----	<0.0050	<0.0050
molybdenum, dissolved	7439-98-7	E421	0.050	µg/L	----	----	----	3.03	0.069
nickel, dissolved	7440-02-0	E421	0.50	µg/L	----	----	----	<0.50	<0.50
phosphorus, dissolved	7723-14-0	E421	50	µg/L	----	----	----	<50	<50
potassium, dissolved	7440-09-7	E421	50	µg/L	----	----	----	2610	181
rubidium, dissolved	7440-17-7	E421	0.20	µg/L	----	----	----	3.41	0.35
selenium, dissolved	7782-49-2	E421	0.050	µg/L	----	----	----	<0.050	0.285
silicon, dissolved	7440-21-3	E421	50	µg/L	----	----	----	7460	1930
silver, dissolved	7440-22-4	E421	0.010	µg/L	----	----	----	<0.010	<0.010
sodium, dissolved	17341-25-2	E421	50	µg/L	----	----	----	12200	492
strontium, dissolved	7440-24-6	E421	0.20	µg/L	----	----	----	511	20.9
sulfur, dissolved	7704-34-9	E421	500	µg/L	----	----	----	8490	<500
tellurium, dissolved	13494-80-9	E421	0.20	µg/L	----	----	----	<0.20	<0.20
thallium, dissolved	7440-28-0	E421	0.010	µg/L	----	----	----	<0.010	<0.010
thorium, dissolved	7440-29-1	E421	0.10	µg/L	----	----	----	<0.10	<0.10
tin, dissolved	7440-31-5	E421	0.10	µg/L	----	----	----	<0.10	<0.10
titanium, dissolved	7440-32-6	E421	0.30	µg/L	----	----	----	<0.30	<0.30
tungsten, dissolved	7440-33-7	E421	0.10	µg/L	----	----	----	<0.10	<0.10
uranium, dissolved	7440-61-1	E421	0.010	µg/L	----	----	----	0.060	<0.010
vanadium, dissolved	7440-62-2	E421	0.50	µg/L	----	----	----	<0.50	<0.50
zinc, dissolved	7440-66-6	E421	1.0	µg/L	----	----	----	<1.0	7.0
zirconium, dissolved	7440-67-7	E421	0.20	µg/L	----	----	----	<0.20	<0.20
dissolved mercury filtration location	----	EP509	-	-	----	----	----	Field	Field
dissolved metals filtration location	----	EP421	-	-	----	----	----	Field	Field



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					BH17-12A	BH17-12B	BH17-17A	BH17-24A	BH17-24B
Client sampling date / time					24-Aug-2020 11:05	24-Aug-2020 09:43	24-Aug-2020 13:00	24-Aug-2020 15:00	24-Aug-2020 14:40
Analyte	CAS Number	Method	LOR	Unit	VA20B3891-001	VA20B3891-002	VA20B3891-003	VA20B3891-005	VA20B3891-006
					Result	Result	Result	Result	Result
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>									
benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	<0.50	----	----
ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	<0.50	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	<0.50	----	----
styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	<0.50	----	----
toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	<0.50	----	----
xylene, m+p-	179601-23-1	E611A	0.50	µg/L	<0.50	<0.50	<0.50	----	----
xylene, o-	95-47-6	E611A	0.50	µg/L	<0.50	<0.50	<0.50	----	----
xylenes, total	1330-20-7	E611A	0.75	µg/L	<0.75	<0.75	<0.75	----	----
BTEX, total	----	E611A	1.2	µg/L	<1.2	<1.2	----	----	----
<b>Volatile Organic Compounds Surrogates</b>									
bromofluorobenzene, 4-	460-00-4	E611A	0.50	%	92.8	92.7	99.4	----	----
difluorobenzene, 1,4-	540-36-3	E611A	0.50	%	118	115	105	----	----
<b>Hydrocarbons</b>									
EPH (C10-C19)	----	E601A	250	µg/L	530	<250	<250	----	----
EPH (C19-C32)	----	E601A	250	µg/L	280	<250	<250	----	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	----	----	<100	----	----
HEPHw	----	EC600A	250	µg/L	280	<250	<250	----	----
LEPHw	----	EC600A	250	µg/L	530	<250	<250	----	----
VPHw	----	EC580A	100	µg/L	----	----	<100	----	----
<b>Hydrocarbons Surrogates</b>									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%	93.0	91.2	88.5	----	----
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	----	----	99.5	----	----
<b>Polycyclic Aromatic Hydrocarbons</b>									
acenaphthene	83-32-9	E641A	0.010	µg/L	<0.010	0.011	<0.012 <sup>DLCI</sup>	----	----
acenaphthylene	208-96-8	E641A	0.010	µg/L	0.011	<0.010	<0.010	----	----
acridine	260-94-6	E641A	0.010	µg/L	0.025	<0.010	<0.017 <sup>DLCI</sup>	----	----
anthracene	120-12-7	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	<0.0050	<0.0050	<0.0050	----	----
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	<0.015	<0.015	----	----



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					BH17-12A	BH17-12B	BH17-17A	BH17-24A	BH17-24B
Client sampling date / time					24-Aug-2020 11:05	24-Aug-2020 09:43	24-Aug-2020 13:00	24-Aug-2020 15:00	24-Aug-2020 14:40
Analyte	CAS Number	Method	LOR	Unit	VA20B3891-001	VA20B3891-002	VA20B3891-003	VA20B3891-005	VA20B3891-006
					Result	Result	Result	Result	Result
<b>Polycyclic Aromatic Hydrocarbons</b>									
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----
chrysene	218-01-9	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	<0.0050	<0.0050	<0.0050	----	----
fluoranthene	206-44-0	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----
fluorene	86-73-7	E641A	0.010	µg/L	<0.010	<0.010	0.014	----	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	0.024	0.026	0.116	----	----
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	0.040	<0.010	0.124	----	----
naphthalene	91-20-3	E641A	0.050	µg/L	<0.050	<0.050	<0.050	----	----
phenanthrene	85-01-8	E641A	0.020	µg/L	<0.020	<0.020	<0.020	----	----
pyrene	129-00-0	E641A	0.010	µg/L	0.035	<0.010	<0.010	----	----
quinoline	6027-02-7	E641A	0.050	µg/L	<0.050	<0.050	<0.050	----	----
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>									
acridine-d9	34749-75-2	E641A	0.010	%	109	23.0 <sup>RRV</sup>	89.5	----	----
chrysene-d12	1719-03-5	E641A	0.010	%	121	101	104	----	----
naphthalene-d8	1146-65-2	E641A	0.010	%	105	95.3	105	----	----
phenanthrene-d10	1517-22-2	E641A	0.010	%	109	102	102	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.





## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

					BH17-11A	BH17-11B	BH17-62B	----	----
					24-Aug-2020 16:30	24-Aug-2020 16:30	24-Aug-2020 11:05	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B3891-007	VA20B3891-008	VA20B3891-009	-----	-----
					Result	Result	Result	---	---
<b>Physical Tests</b>									
acidity (as CaCO3)	---	E283	2.0	mg/L	<2.0	<2.0	---	---	---
alkalinity, bicarbonate (as CaCO3)	---	E290	1.0	mg/L	111	100	---	---	---
alkalinity, carbonate (as CaCO3)	---	E290	1.0	mg/L	<1.0	<1.0	---	---	---
alkalinity, hydroxide (as CaCO3)	---	E290	1.0	mg/L	<1.0	<1.0	---	---	---
alkalinity, phenolphthalein (as CaCO3)	---	E290	1.0	mg/L	<1.0	<1.0	---	---	---
alkalinity, total (as CaCO3)	---	E290	1.0	mg/L	111	100	---	---	---
conductivity	---	E100	2.0	µS/cm	250	223	---	---	---
pH	---	E108	0.10	pH units	7.62	7.67	---	---	---
solids, total dissolved [TDS]	---	E162	10	mg/L	146	138	---	---	---
turbidity	---	E121	0.10	NTU	0.21	99.3	---	---	---
hardness (as CaCO3), dissolved	---	EC100	600	µg/L	103000	95000	---	---	---
<b>Anions and Nutrients</b>									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	0.0118	---	---	---
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	---	---	---
fluoride	16984-48-8	E235.F	0.020	mg/L	0.332	0.161	---	---	---
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0050	---	---	---
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	---	---	---
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	22.3	16.2	---	---	---
<b>Dissolved Metals</b>									
aluminum, dissolved	7429-90-5	E421	1.0	µg/L	<1.0	3.4	---	---	---
antimony, dissolved	7440-36-0	E421	0.10	µg/L	<0.10	<0.10	---	---	---
arsenic, dissolved	7440-38-2	E421	0.10	µg/L	0.19	1.87	---	---	---
barium, dissolved	7440-39-3	E421	0.10	µg/L	39.4	45.8	---	---	---
beryllium, dissolved	7440-41-7	E421	0.100	µg/L	<0.100	<0.100	---	---	---
bismuth, dissolved	7440-69-9	E421	0.050	µg/L	<0.050	<0.050	---	---	---
boron, dissolved	7440-42-8	E421	10	µg/L	<10	<10	---	---	---
cadmium, dissolved	7440-43-9	E421	0.0050	µg/L	0.0346	<0.0050	---	---	---
calcium, dissolved	7440-70-2	E421	50	µg/L	34300	32300	---	---	---
cesium, dissolved	7440-46-2	E421	0.010	µg/L	<0.010	<0.010	---	---	---
chromium, dissolved	7440-47-3	E421.Cr-L	0.10	µg/L	<0.10	<0.10	---	---	---
cobalt, dissolved	7440-48-4	E421	0.10	µg/L	<0.10	<0.10	---	---	---



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					BH17-11A	BH17-11B	BH17-62B	----	----
Client sampling date / time					24-Aug-2020 16:30	24-Aug-2020 16:30	24-Aug-2020 11:05	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B3891-007	VA20B3891-008	VA20B3891-009	-----	-----
					Result	Result	Result	---	---
<b>Dissolved Metals</b>									
copper, dissolved	7440-50-8	E421	0.20	µg/L	<0.20	<0.20	----	----	----
iron, dissolved	7439-89-6	E421	10	µg/L	<10	106	----	----	----
lead, dissolved	7439-92-1	E421	0.050	µg/L	<0.050	<0.050	----	----	----
lithium, dissolved	7439-93-2	E421	1.0	µg/L	2.5	1.9	----	----	----
magnesium, dissolved	7439-95-4	E421	5.0	µg/L	4280	3490	----	----	----
manganese, dissolved	7439-96-5	E421	0.10	µg/L	217	389	----	----	----
mercury, dissolved	7439-97-6	E509	0.0050	µg/L	<0.0050	<0.0050	----	----	----
molybdenum, dissolved	7439-98-7	E421	0.050	µg/L	7.98	8.37	----	----	----
nickel, dissolved	7440-02-0	E421	0.50	µg/L	<0.50	<0.50	----	----	----
phosphorus, dissolved	7723-14-0	E421	50	µg/L	<50	<50	----	----	----
potassium, dissolved	7440-09-7	E421	50	µg/L	2240	2990	----	----	----
rubidium, dissolved	7440-17-7	E421	0.20	µg/L	0.28	0.56	----	----	----
selenium, dissolved	7782-49-2	E421	0.050	µg/L	<0.050	<0.050	----	----	----
silicon, dissolved	7440-21-3	E421	50	µg/L	6310	4710	----	----	----
silver, dissolved	7440-22-4	E421	0.010	µg/L	<0.010	<0.010	----	----	----
sodium, dissolved	17341-25-2	E421	50	µg/L	8770	4580	----	----	----
strontium, dissolved	7440-24-6	E421	0.20	µg/L	422	295	----	----	----
sulfur, dissolved	7704-34-9	E421	500	µg/L	7660	5170	----	----	----
tellurium, dissolved	13494-80-9	E421	0.20	µg/L	<0.20	<0.20	----	----	----
thallium, dissolved	7440-28-0	E421	0.010	µg/L	<0.010	<0.010	----	----	----
thorium, dissolved	7440-29-1	E421	0.10	µg/L	<0.10	<0.10	----	----	----
tin, dissolved	7440-31-5	E421	0.10	µg/L	<0.10	<0.10	----	----	----
titanium, dissolved	7440-32-6	E421	0.30	µg/L	<0.30	<0.30	----	----	----
tungsten, dissolved	7440-33-7	E421	0.10	µg/L	<0.10	<0.10	----	----	----
uranium, dissolved	7440-61-1	E421	0.010	µg/L	1.07	0.574	----	----	----
vanadium, dissolved	7440-62-2	E421	0.50	µg/L	<0.50	<0.50	----	----	----
zinc, dissolved	7440-66-6	E421	1.0	µg/L	<1.0	<1.0	----	----	----
zirconium, dissolved	7440-67-7	E421	0.20	µg/L	<0.20	<0.20	----	----	----
dissolved mercury filtration location	----	EP509	-	-	Field	Field	----	----	----
dissolved metals filtration location	----	EP421	-	-	Field	Field	----	----	----
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>									



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					BH17-11A	BH17-11B	BH17-62B	----	----
Client sampling date / time					24-Aug-2020 16:30	24-Aug-2020 16:30	24-Aug-2020 11:05	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B3891-007	VA20B3891-008	VA20B3891-009	-----	-----
					Result	Result	Result	---	---
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>									
benzene	71-43-2	E611A	0.50	µg/L	----	----	<0.50	----	----
ethylbenzene	100-41-4	E611A	0.50	µg/L	----	----	<0.50	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	----	----	<0.50	----	----
styrene	100-42-5	E611A	0.50	µg/L	----	----	<0.50	----	----
toluene	108-88-3	E611A	0.50	µg/L	----	----	<0.50	----	----
xylene, m+p-	179601-23-1	E611A	0.50	µg/L	----	----	<0.50	----	----
xylene, o-	95-47-6	E611A	0.50	µg/L	----	----	<0.50	----	----
xylenes, total	1330-20-7	E611A	0.75	µg/L	----	----	<0.75	----	----
BTEX, total	----	E611A	1.2	µg/L	----	----	<1.2	----	----
<b>Volatile Organic Compounds Surrogates</b>									
bromofluorobenzene, 4-	460-00-4	E611A	0.50	%	----	----	92.8	----	----
difluorobenzene, 1,4-	540-36-3	E611A	0.50	%	----	----	119	----	----
<b>Hydrocarbons</b>									
EPH (C10-C19)	----	E601A	250	µg/L	----	----	<250	----	----
EPH (C19-C32)	----	E601A	250	µg/L	----	----	<250	----	----
HEPHw	----	EC600A	250	µg/L	----	----	<250	----	----
LEPHw	----	EC600A	250	µg/L	----	----	<250	----	----
<b>Hydrocarbons Surrogates</b>									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%	----	----	91.8	----	----
<b>Polycyclic Aromatic Hydrocarbons</b>									
acenaphthene	83-32-9	E641A	0.010	µg/L	----	----	<0.010	----	----
acenaphthylene	208-96-8	E641A	0.010	µg/L	----	----	<0.010	----	----
acridine	260-94-6	E641A	0.010	µg/L	----	----	<0.010	----	----
anthracene	120-12-7	E641A	0.010	µg/L	----	----	<0.010	----	----
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	----	----	<0.010	----	----
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	----	----	<0.0050	----	----
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	----	----	<0.010	----	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	----	----	<0.015	----	----
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	----	----	<0.010	----	----
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	----	----	<0.010	----	----
chrysene	218-01-9	E641A	0.010	µg/L	----	----	<0.010	----	----



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					BH17-11A	BH17-11B	BH17-62B	----	----
Client sampling date / time					24-Aug-2020 16:30	24-Aug-2020 16:30	24-Aug-2020 11:05	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B3891-007	VA20B3891-008	VA20B3891-009	-----	-----
					Result	Result	Result	---	---
<b>Polycyclic Aromatic Hydrocarbons</b>									
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	----	----	<0.0050	----	----
fluoranthene	206-44-0	E641A	0.010	µg/L	----	----	<0.010	----	----
fluorene	86-73-7	E641A	0.010	µg/L	----	----	<0.010	----	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	----	----	<0.010	----	----
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	----	----	<0.010	----	----
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	----	----	<0.010	----	----
naphthalene	91-20-3	E641A	0.050	µg/L	----	----	<0.050	----	----
phenanthrene	85-01-8	E641A	0.020	µg/L	----	----	<0.020	----	----
pyrene	129-00-0	E641A	0.010	µg/L	----	----	<0.010	----	----
quinoline	6027-02-7	E641A	0.050	µg/L	----	----	<0.050	----	----
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>									
acridine-d9	34749-75-2	E641A	0.010	%	----	----	44.1 <sup>RRV</sup>	----	----
chrysene-d12	1719-03-5	E641A	0.010	%	----	----	106	----	----
naphthalene-d8	1146-65-2	E641A	0.010	%	----	----	99.2	----	----
phenanthrene-d10	1517-22-2	E641A	0.010	%	----	----	106	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>VA20B3891</b>	Page	: 1 of 17
Amendment	: <b>2</b>		
Client	: <b>Wood Canada Ltd.</b>	Laboratory	: Vancouver - Environmental
Contact	: Jeremiah Gladu	Account Manager	: Selam Worku
Address	: 600 - 4445 Lougheed Hwy Burnaby BC Canada V5C 0E4	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: VE52655D	Date Samples Received	: 28-Aug-2020 10:10
PO	: ----	Issue Date	: 27-Oct-2020 16:09
C-O-C number	: ----		
Sampler	: Ardy M.		
Site	: ----		
Quote number	: VA20-SEAB100-0003 - Wood/Seabridge Gold		
No. of samples received	: 9		
No. of samples analysed	: 8		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

## Summary of Outliers

### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- Test sample Surrogate recovery outliers exist for all regular sample matrices - please see following pages for full details.

### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.

### **Outliers : Analysis Holding Time Compliance (Breaches)**

- Analysis Holding Time Outliers exist - please see following pages for full details.

### **Outliers : Frequency of Quality Control Samples**

- No Quality Control Sample Frequency Outliers occur.





**Regular Sample Surrogates**

Sub-Matrix: **Groundwater**

Analyte Group	Laboratory sample ID	Client/Ref Sample D	Analyte	CAS Number	Result	Limits	Comment
<b>Samples Submitted</b>							
Polycyclic Aromatic Hydrocarbons Surrogates	VA20B3891-002	BH17-12B	acridine-d9	34749-75-2	23.0 %	60.0-130 %	Recovery less than lower data quality objective
Polycyclic Aromatic Hydrocarbons Surrogates	VA20B3891-009	BH17-62B	acridine-d9	34749-75-2	44.1 %	60.0-130 %	Recovery less than lower data quality objective



## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> BH17-11A	E298	24-Aug-2020	----	----	----		04-Sep-2020	28 days	10 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> BH17-11B	E298	24-Aug-2020	----	----	----		04-Sep-2020	28 days	10 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> BH17-24A	E298	24-Aug-2020	----	----	----		04-Sep-2020	28 days	10 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> BH17-24B	E298	24-Aug-2020	----	----	----		04-Sep-2020	28 days	10 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> BH17-11A	E235.Cl	24-Aug-2020	----	----	----		30-Aug-2020	28 days	5 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> BH17-11B	E235.Cl	24-Aug-2020	----	----	----		30-Aug-2020	28 days	5 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> BH17-24A	E235.Cl	24-Aug-2020	----	----	----		30-Aug-2020	28 days	5 days	✓





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE BH17-24B	E235.Cl	24-Aug-2020	----	----	----		30-Aug-2020	28 days	5 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE BH17-11A	E235.F	24-Aug-2020	----	----	----		30-Aug-2020	28 days	5 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE BH17-11B	E235.F	24-Aug-2020	----	----	----		30-Aug-2020	28 days	5 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE BH17-24A	E235.F	24-Aug-2020	----	----	----		30-Aug-2020	28 days	5 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE BH17-24B	E235.F	24-Aug-2020	----	----	----		30-Aug-2020	28 days	5 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE BH17-11A	E235.NO3-L	24-Aug-2020	----	----	----		30-Aug-2020	3 days	5 days	* EHTR	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE BH17-11B	E235.NO3-L	24-Aug-2020	----	----	----		30-Aug-2020	3 days	5 days	* EHTR	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE BH17-24A	E235.NO3-L	24-Aug-2020	----	----	----		30-Aug-2020	3 days	5 days	* EHTR	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE BH17-24B	E235.NO3-L	24-Aug-2020	----	----	----		30-Aug-2020	3 days	5 days	* EHTR	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE BH17-11A	E235.NO2-L	24-Aug-2020	----	----	----		30-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE BH17-11B	E235.NO2-L	24-Aug-2020	----	----	----		30-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE BH17-24A	E235.NO2-L	24-Aug-2020	----	----	----		30-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE BH17-24B	E235.NO2-L	24-Aug-2020	----	----	----		30-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE BH17-11A	E235.SO4	24-Aug-2020	----	----	----		30-Aug-2020	28 days	5 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE BH17-11B	E235.SO4	24-Aug-2020	----	----	----		30-Aug-2020	28 days	5 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE BH17-24A	E235.SO4	24-Aug-2020	----	----	----		30-Aug-2020	28 days	5 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE BH17-24B	E235.SO4	24-Aug-2020	----	----	----		30-Aug-2020	28 days	5 days	✓	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
HDPE dissolved (nitric acid) BH17-11A	E421.Cr-L	24-Aug-2020	31-Aug-2020	180 days	7 days	✓	02-Sep-2020	172 days	1 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> BH17-11B	E421.Cr-L	24-Aug-2020	31-Aug-2020	180 days	7 days	✓	02-Sep-2020	172 days	1 days	✓	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> BH17-24A	E421.Cr-L	24-Aug-2020	31-Aug-2020	180 days	7 days	✓	02-Sep-2020	172 days	1 days	✓	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> BH17-24B	E421.Cr-L	24-Aug-2020	31-Aug-2020	180 days	7 days	✓	02-Sep-2020	172 days	1 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> BH17-11A	E509	24-Aug-2020	02-Sep-2020	28 days	8 days	✓	02-Sep-2020	19 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> BH17-11B	E509	24-Aug-2020	02-Sep-2020	28 days	8 days	✓	02-Sep-2020	19 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> BH17-24A	E509	24-Aug-2020	02-Sep-2020	28 days	8 days	✓	02-Sep-2020	19 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> BH17-24B	E509	24-Aug-2020	02-Sep-2020	28 days	8 days	✓	02-Sep-2020	19 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> BH17-11A	E421	24-Aug-2020	31-Aug-2020	180 days	7 days	✓	02-Sep-2020	172 days	1 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> BH17-11B	E421	24-Aug-2020	31-Aug-2020	180 days	7 days	✓	02-Sep-2020	172 days	1 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> BH17-24A	E421	24-Aug-2020	31-Aug-2020	180 days	7 days	✓	02-Sep-2020	172 days	1 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> BH17-24B	E421	24-Aug-2020	31-Aug-2020	180 days	7 days	✓	02-Sep-2020	172 days	1 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> BH17-17A	E601A	24-Aug-2020	24-Sep-2020	14 days	31 days	* EHT	25-Sep-2020	40 days	0 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> BH17-12A	E601A	24-Aug-2020	01-Sep-2020	14 days	8 days	✓	02-Sep-2020	40 days	0 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> BH17-12B	E601A	24-Aug-2020	01-Sep-2020	14 days	8 days	✓	02-Sep-2020	40 days	0 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> BH17-62B	E601A	24-Aug-2020	01-Sep-2020	14 days	8 days	✓	02-Sep-2020	40 days	0 days	✓	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> BH17-17A	E581.VH+F1	24-Aug-2020	24-Sep-2020	14 days	31 days	* EHT	25-Sep-2020	-18 days	0 days	*	
<b>Physical Tests : Acidity by Titration</b>											
<b>HDPE</b> BH17-11A	E283	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✓	
<b>Physical Tests : Acidity by Titration</b>											
<b>HDPE</b> BH17-11B	E283	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Acidity by Titration</b>										
HDPE BH17-24A	E283	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Acidity by Titration</b>										
HDPE BH17-24B	E283	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE BH17-11A	E290	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE BH17-11B	E290	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE BH17-24A	E290	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE BH17-24B	E290	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE BH17-11A	E100	24-Aug-2020	----	----	----		29-Aug-2020	28 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE BH17-11B	E100	24-Aug-2020	----	----	----		29-Aug-2020	28 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE BH17-24A	E100	24-Aug-2020	----	----	----		29-Aug-2020	28 days	4 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times Rec Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval	
<b>Physical Tests : Conductivity in Water</b>											
HDPE BH17-24B	E100	24-Aug-2020	----	----	----		29-Aug-2020	28 days	4 days	✓	
<b>Physical Tests : pH by Meter</b>											
HDPE BH17-11A	E108	24-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	114 hrs	* EHTR-FM	
<b>Physical Tests : pH by Meter</b>											
HDPE BH17-11B	E108	24-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	114 hrs	* EHTR-FM	
<b>Physical Tests : pH by Meter</b>											
HDPE BH17-24A	E108	24-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	116 hrs	* EHTR-FM	
<b>Physical Tests : pH by Meter</b>											
HDPE BH17-24B	E108	24-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	116 hrs	* EHTR-FM	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE BH17-11A	E162	24-Aug-2020	----	----	----		10-Sep-2020	7 days	16 days	* EHT	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE BH17-11B	E162	24-Aug-2020	----	----	----		10-Sep-2020	7 days	16 days	* EHT	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE BH17-24A	E162	24-Aug-2020	----	----	----		10-Sep-2020	7 days	17 days	* EHT	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE BH17-24B	E162	24-Aug-2020	----	----	----		10-Sep-2020	7 days	17 days	* EHT	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE BH17-11A	E121	24-Aug-2020	----	----	----		31-Aug-2020	3 days	7 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE BH17-11B	E121	24-Aug-2020	----	----	----		31-Aug-2020	3 days	7 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE BH17-24A	E121	24-Aug-2020	----	----	----		31-Aug-2020	3 days	7 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE BH17-24B	E121	24-Aug-2020	----	----	----		31-Aug-2020	3 days	7 days	* EHTR
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>										
Amber glass/Teflon lined cap (sodium bisulfate) BH17-17A	E641A	24-Aug-2020	24-Sep-2020	14 days	31 days	* EHT	25-Sep-2020	40 days	0 days	✓
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>										
Amber glass/Teflon lined cap (sodium bisulfate) BH17-12A	E641A	24-Aug-2020	01-Sep-2020	14 days	8 days	✓	02-Sep-2020	40 days	0 days	✓
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>										
Amber glass/Teflon lined cap (sodium bisulfate) BH17-12B	E641A	24-Aug-2020	01-Sep-2020	14 days	8 days	✓	02-Sep-2020	40 days	0 days	✓
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>										
Amber glass/Teflon lined cap (sodium bisulfate) BH17-62B	E641A	24-Aug-2020	01-Sep-2020	14 days	8 days	✓	02-Sep-2020	40 days	0 days	✓
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>										
Amber glass/Teflon lined cap (sodium bisulfate) BH17-17A	E611A	24-Aug-2020	24-Sep-2020	14 days	31 days	* EHT	25-Sep-2020	-18 days	0 days	* EHTR



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> BH17-12A	E611A	24-Aug-2020	31-Aug-2020	14 days	7 days	✓	01-Sep-2020	6 days	0 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> BH17-12B	E611A	24-Aug-2020	31-Aug-2020	14 days	7 days	✓	01-Sep-2020	6 days	0 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> BH17-62B	E611A	24-Aug-2020	31-Aug-2020	14 days	7 days	✓	01-Sep-2020	6 days	0 days	✓	

**Legend & Qualifier Definitions**

- EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended
- EHTR: Exceeded ALS recommended hold time prior to sample receipt.
- EHT: Exceeded ALS recommended hold time prior to analysis.
- Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Acidity by Titration	E283	78895	1	16	6.2	5.0	✔
Alkalinity Species by Titration	E290	78897	1	16	6.2	5.0	✔
Ammonia by Fluorescence	E298	80951	1	14	7.1	5.0	✔
BTEX by Headspace GC-MS	E611A	79394	2	15	13.3	5.0	✔
Chloride in Water by IC	E235.Cl	78889	1	7	14.2	5.0	✔
Conductivity in Water	E100	78898	1	7	14.2	5.0	✔
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	79471	1	18	5.5	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	80466	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	79470	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	78890	1	7	14.2	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	78892	1	7	14.2	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	78893	1	7	14.2	5.0	✔
pH by Meter	E108	78896	1	16	6.2	5.0	✔
Sulfate in Water by IC	E235.SO4	78894	1	7	14.2	5.0	✔
TDS by Gravimetry	E162	84100	1	4	25.0	5.0	✔
Turbidity by Nephelometry	E121	79452	1	20	5.0	5.0	✔
VH and F1 by Headspace GC-FID	E581.VH+F1	91133	1	20	5.0	5.0	✔
<b>Laboratory Control Samples (LCS)</b>							
Acidity by Titration	E283	78895	1	16	6.2	5.0	✔
Alkalinity Species by Titration	E290	78897	1	16	6.2	5.0	✔
Ammonia by Fluorescence	E298	80951	1	14	7.1	5.0	✔
BC PHC - EPH by GC-FID	E601A	79806	2	21	9.5	5.0	✔
BTEX by Headspace GC-MS	E611A	79394	2	15	13.3	5.0	✔
Chloride in Water by IC	E235.Cl	78889	1	7	14.2	5.0	✔
Conductivity in Water	E100	78898	1	7	14.2	5.0	✔
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	79471	1	18	5.5	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	80466	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	79470	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	78890	1	7	14.2	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	78892	1	7	14.2	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	78893	1	7	14.2	5.0	✔
PAHs by Hexane LVI GC-MS	E641A	79807	2	21	9.5	5.0	✔
pH by Meter	E108	78896	1	16	6.2	5.0	✔
Sulfate in Water by IC	E235.SO4	78894	1	7	14.2	5.0	✔
TDS by Gravimetry	E162	84100	1	4	25.0	5.0	✔
Turbidity by Nephelometry	E121	79452	1	20	5.0	5.0	✔
VH and F1 by Headspace GC-FID	E581.VH+F1	91133	1	20	5.0	5.0	✔



Matrix: **Water**

Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<b>Analytical Methods</b>							
<b>Method Blanks (MB)</b>							
Acidity by Titration	E283	78895	1	16	6.2	5.0	✓
Alkalinity Species by Titration	E290	78897	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	80951	1	14	7.1	5.0	✓
BC PHC - EPH by GC-FID	E601A	79806	2	21	9.5	5.0	✓
BTEX by Headspace GC-MS	E611A	79394	2	15	13.3	5.0	✓
Chloride in Water by IC	E235.Cl	78889	1	7	14.2	5.0	✓
Conductivity in Water	E100	78898	1	7	14.2	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	79471	1	18	5.5	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	80466	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	79470	2	20	10.0	5.0	✓
Fluoride in Water by IC	E235.F	78890	1	7	14.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	78892	1	7	14.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	78893	1	7	14.2	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	79807	2	21	9.5	5.0	✓
Sulfate in Water by IC	E235.SO4	78894	1	7	14.2	5.0	✓
TDS by Gravimetry	E162	84100	1	4	25.0	5.0	✓
Turbidity by Nephelometry	E121	79452	1	20	5.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	91133	1	20	5.0	5.0	✓
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	80951	1	14	7.1	5.0	✓
BTEX by Headspace GC-MS	E611A	79394	2	15	13.3	5.0	✓
Chloride in Water by IC	E235.Cl	78889	1	7	14.2	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	79471	1	18	5.5	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	80466	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	79470	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	78890	1	7	14.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	78892	1	7	14.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	78893	1	7	14.2	5.0	✓
Sulfate in Water by IC	E235.SO4	78894	1	7	14.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	91133	1	20	5.0	5.0	✓



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 Vancouver - Environmental	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TDS by Gravimetry	E162 Vancouver - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Acidity by Titration	E283 Vancouver - Environmental	Water	APHA 2310 B (mod)	Acidity is determined by potentiometric titration to a specified endpoint.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Alkalinity Species by Titration	E290  Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298  Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
Dissolved Metals in Water by CRC ICPMS	E421  Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L  Vancouver - Environmental	Water	APHA 3030 B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS
Dissolved Mercury in Water by CVAAS	E509  Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
VH and F1 by Headspace GC-FID	E581.VH+F1  Vancouver - Environmental	Water	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
BC PHC - EPH by GC-FID	E601A  Vancouver - Environmental	Water	BC MOE Lab Manual	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.
BTEX by Headspace GC-MS	E611A  Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by Hexane LVI GC-MS	E641A  Vancouver - Environmental	Water	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by large volume injection (LVI) GC-MS.
Dissolved Hardness (Calculated)	EC100  Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> ), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
VPH: VH-BTEX-Styrene	EC580A  Vancouver - Environmental	Water	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VPHw = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
LEPH and HEPH: EPH-PAH	EC600A  Vancouver - Environmental	Water	BC MOE Lab Manual (LEPH and HEPH) (mod)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Acenaphthene, Acridine, Anthracene, Fluorene, Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(a)pyrene, Fluoranthene, and Pyrene.
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Dissolved Metals Water Filtration	EP421  Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO <sub>3</sub> .
Dissolved Mercury Water Filtration	EP509  Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
VOCs Preparation for Headspace Analysis	EP581  Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601  Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

## QUALITY CONTROL REPORT

**Work Order** : **VA20B3891**  
**Amendment** : **2**

Page : 1 of 17

Client : Wood Canada Ltd.  
 Contact : Jeremiah Gladu  
 Address : 1235 Main Street P.O. Box 2356  
 Smithers BC Canada V0J 2N0  
 Telephone : ----  
 Project : VE52655D  
 PO : ----  
 C-O-C number : ----  
 Sampler : Ardy M.  
 Site : ----  
 Quote number : VA20-SEAB100-0003 - Wood/Seabridge Gold  
 No. of samples received : 9  
 No. of samples analysed : 8

Laboratory : Vancouver - Environmental  
 Account Manager : Selam Worku  
 Address : 8081 Lougheed Highway  
 Burnaby, British Columbia Canada V5A 1W9  
 Telephone : +1 604 253 4188  
 Date Samples Received : 28-Aug-2020 10:10  
 Date Analysis Commenced : 29-Aug-2020  
 Issue Date : 27-Oct-2020 16:09

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Brianna Allen	Department Manager - Organics	Organics, Burnaby, British Columbia
Bruna Botti	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Clarie Tejano		Metals, Burnaby, British Columbia
Cristina Alexandre	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Harsha Attanayake	Laboratory Analyst	Organics, Burnaby, British Columbia
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Lindsay Gung	Supervisor - Water Chemistry	Inorganics - Water Quality, Burnaby, British Columbia
Ophelia Chiu	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Shaneel Dayal	Analyst	Metals, Burnaby, British Columbia



## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

# = Indicates a QC result that did not meet the ALS DQO.



### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 78895)</b>											
VA20B3839-003	Anonymous	acidity (as CaCO3)	----	E283	2.0	mg/L	19.0	19.0	0	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 78896)</b>											
VA20B3890-002	Anonymous	pH	----	E108	0.10	pH units	7.49	7.54	0.665%	4%	----
<b>Physical Tests (QC Lot: 78897)</b>											
VA20B3890-002	Anonymous	alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	112	112	0.00%	20%	----
		alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	112	112	0.00%	20%	----
<b>Physical Tests (QC Lot: 78898)</b>											
VA20B3890-002	Anonymous	conductivity	----	E100	2.0	µS/cm	438	443	1.14%	10%	----
<b>Physical Tests (QC Lot: 79452)</b>											
VA20B3728-001	Anonymous	turbidity	----	E121	0.10	NTU	23.6	24.2	2.51%	15%	----
<b>Physical Tests (QC Lot: 84100)</b>											
VA20B3891-005	BH17-24A	solids, total dissolved [TDS]	----	E162	20	mg/L	172	180	7	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78889)</b>											
VA20B3890-002	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78890)</b>											
VA20B3890-002	Anonymous	fluoride	16984-48-8	E235.F	0.020	mg/L	0.074	0.072	0.002	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78892)</b>											
VA20B3890-002	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0100	0.0093	0.0008	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78893)</b>											
VA20B3890-002	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0012	0.0015	0.0003	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78894)</b>											
VA20B3890-002	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	114	114	0.0216%	20%	----
<b>Anions and Nutrients (QC Lot: 80951)</b>											
VA20B3890-002	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.105	0.105	0.0477%	20%	----
<b>Dissolved Metals (QC Lot: 79470)</b>											
VA20B3891-005	BH17-24A	aluminum, dissolved	7429-90-5	E421	1.00	mg/L	1.2 µg/L	0.0011	0.00009	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E421	0.100	mg/L	0.24 µg/L	0.00024	0.0000006	Diff <2x LOR	----
		arsenic, dissolved	7440-38-2	E421	0.100	mg/L	3.51 µg/L	0.00354	0.618%	20%	----





Sub-Matrix: **Water**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 79470) - continued</b>											
VA20B3891-005	BH17-24A	barium, dissolved	7440-39-3	E421	0.100	mg/L	42.5 µg/L	0.0423	0.594%	20%	----
		beryllium, dissolved	7440-41-7	E421	0.100	mg/L	<0.100 µg/L	<0.000100	0	Diff <2x LOR	----
		bismuth, dissolved	7440-69-9	E421	0.0500	mg/L	<0.050 µg/L	<0.000050	0	Diff <2x LOR	----
		boron, dissolved	7440-42-8	E421	10.0	mg/L	<10 µg/L	<0.010	0	Diff <2x LOR	----
		cadmium, dissolved	7440-43-9	E421	0.00500	mg/L	<0.0050 µg/L	<0.0000050	0	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E421	50.0	mg/L	37600 µg/L	37.1	1.34%	20%	----
		cesium, dissolved	7440-46-2	E421	0.0100	mg/L	0.016 µg/L	0.000015	0.000001	Diff <2x LOR	----
		cobalt, dissolved	7440-48-4	E421	0.100	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.200	mg/L	<0.20 µg/L	<0.00020	0	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E421	10.0	mg/L	61 µg/L	0.060	0.002	Diff <2x LOR	----
		lead, dissolved	7439-92-1	E421	0.0500	mg/L	<0.050 µg/L	<0.000050	0	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E421	1.00	mg/L	8.4 µg/L	0.0082	0.0001	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	5.00	mg/L	9490 µg/L	9.43	0.676%	20%	----
		manganese, dissolved	7439-96-5	E421	0.100	mg/L	93.6 µg/L	0.0929	0.839%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.0500	mg/L	3.03 µg/L	0.00302	0.444%	20%	----
		nickel, dissolved	7440-02-0	E421	0.500	mg/L	<0.50 µg/L	<0.00050	0	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E421	50.0	mg/L	<50 µg/L	<0.050	0	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	50.0	mg/L	2610 µg/L	2.63	0.770%	20%	----
		rubidium, dissolved	7440-17-7	E421	0.200	mg/L	3.41 µg/L	0.00368	7.61%	20%	----
		selenium, dissolved	7782-49-2	E421	0.0500	mg/L	<0.050 µg/L	<0.000050	0	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	50.0	mg/L	7460 µg/L	7.16	4.12%	20%	----
		silver, dissolved	7440-22-4	E421	0.0100	mg/L	<0.010 µg/L	<0.000010	0	Diff <2x LOR	----
		sodium, dissolved	17341-25-2	E421	50.0	mg/L	12200 µg/L	12.2	0.236%	20%	----
		strontium, dissolved	7440-24-6	E421	0.200	mg/L	511 µg/L	0.525	2.71%	20%	----
		sulfur, dissolved	7704-34-9	E421	500	mg/L	8490 µg/L	8.43	0.650%	20%	----
		tellurium, dissolved	13494-80-9	E421	0.200	mg/L	<0.20 µg/L	<0.00020	0	Diff <2x LOR	----
		thallium, dissolved	7440-28-0	E421	0.0100	mg/L	<0.010 µg/L	<0.000010	0	Diff <2x LOR	----
		thorium, dissolved	7440-29-1	E421	0.100	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		tin, dissolved	7440-31-5	E421	0.100	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		titanium, dissolved	7440-32-6	E421	0.300	mg/L	<0.30 µg/L	<0.00030	0	Diff <2x LOR	----
		tungsten, dissolved	7440-33-7	E421	0.100	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E421	0.0100	mg/L	0.060 µg/L	0.000064	0.000004	Diff <2x LOR	----
		vanadium, dissolved	7440-62-2	E421	0.500	mg/L	<0.50 µg/L	<0.00050	0	Diff <2x LOR	----
		zinc, dissolved	7440-66-6	E421	1.00	mg/L	<1.0 µg/L	<0.0010	0	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.200	mg/L	<0.20 µg/L	<0.00020	0	Diff <2x LOR	----

**Dissolved Metals (QC Lot: 79471)**



Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 79471) - continued</b>											
VA20B3891-005	BH17-24A	chromium, dissolved	7440-47-3	E421.Cr-L	0.100	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 80466)</b>											
VA20B3851-006	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Volatile Organic Compounds (QC Lot: 79394)</b>											
VA20B3891-001	BH17-12A	benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
<b>Volatile Organic Compounds (QC Lot: 91134)</b>											
VA20B3891-003	BH17-17A	benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
<b>Hydrocarbons (QC Lot: 91133)</b>											
VA20B3891-003	BH17-17A	VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.00%	30%	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

### Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 78895)</b>						
acidity (as CaCO3)	----	E283	2	mg/L	2.0	----
<b>Physical Tests (QCLot: 78897)</b>						
alkalinity, bicarbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, carbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, hydroxide (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
<b>Physical Tests (QCLot: 78898)</b>						
conductivity	----	E100	1	µS/cm	<1.0	----
<b>Physical Tests (QCLot: 79452)</b>						
turbidity	----	E121	0.1	NTU	<0.10	----
<b>Physical Tests (QCLot: 84100)</b>						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
<b>Anions and Nutrients (QCLot: 78889)</b>						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
<b>Anions and Nutrients (QCLot: 78890)</b>						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
<b>Anions and Nutrients (QCLot: 78892)</b>						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 78893)</b>						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 78894)</b>						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
<b>Anions and Nutrients (QCLot: 80951)</b>						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
<b>Dissolved Metals (QCLot: 79470)</b>						
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 79470) - continued</b>						
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
sodium, dissolved	17341-25-2	E421	0.05	mg/L	<0.050	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	MBRR
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
<b>Dissolved Metals (QCLot: 79471)</b>						
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	<0.00010	----
<b>Dissolved Metals (QCLot: 80466)</b>						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
<b>Volatile Organic Compounds (QCLot: 79394)</b>						



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Volatile Organic Compounds (QCLot: 79394) - continued</b>						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	----
styrene	100-42-5	E611A	0.5	µg/L	<0.50	----
toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	<0.50	----
xylene, o-	95-47-6	E611A	0.5	µg/L	<0.50	----
<b>Volatile Organic Compounds (QCLot: 91134)</b>						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	----
styrene	100-42-5	E611A	0.5	µg/L	<0.50	----
toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	<0.50	----
xylene, o-	95-47-6	E611A	0.5	µg/L	<0.50	----
<b>Hydrocarbons (QCLot: 79806)</b>						
EPH (C10-C19)	----	E601A	250	µg/L	<250	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	----
<b>Hydrocarbons (QCLot: 91133)</b>						
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
<b>Hydrocarbons (QCLot: 91254)</b>						
EPH (C10-C19)	----	E601A	250	µg/L	<250	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	----
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 79807)</b>						
acenaphthene	83-32-9	E641A	0.01	µg/L	<0.010	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	<0.010	----
acridine	260-94-6	E641A	0.01	µg/L	<0.010	----
anthracene	120-12-7	E641A	0.01	µg/L	<0.010	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	<0.010	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	<0.010	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	<0.010	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	<0.010	----
chrysene	218-01-9	E641A	0.01	µg/L	<0.010	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	<0.0050	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 79807) - continued</b>						
fluoranthene	206-44-0	E641A	0.01	µg/L	<0.010	----
fluorene	86-73-7	E641A	0.01	µg/L	<0.010	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	<0.010	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	<0.010	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	<0.010	----
naphthalene	91-20-3	E641A	0.05	µg/L	<0.050	----
phenanthrene	85-01-8	E641A	0.02	µg/L	<0.020	----
pyrene	129-00-0	E641A	0.01	µg/L	<0.010	----
quinoline	6027-02-7	E641A	0.05	µg/L	<0.050	----
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 91255)</b>						
acenaphthene	83-32-9	E641A	0.01	µg/L	<0.010	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	<0.010	----
acridine	260-94-6	E641A	0.01	µg/L	<0.010	----
anthracene	120-12-7	E641A	0.01	µg/L	<0.010	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	<0.010	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	<0.010	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	<0.010	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	<0.010	----
chrysene	218-01-9	E641A	0.01	µg/L	<0.010	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	<0.0050	----
fluoranthene	206-44-0	E641A	0.01	µg/L	<0.010	----
fluorene	86-73-7	E641A	0.01	µg/L	<0.010	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	<0.010	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	<0.010	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	<0.010	----
naphthalene	91-20-3	E641A	0.05	µg/L	<0.050	----
phenanthrene	85-01-8	E641A	0.02	µg/L	<0.020	----
pyrene	129-00-0	E641A	0.01	µg/L	<0.010	----
quinoline	6027-02-7	E641A	0.05	µg/L	<0.050	----



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## Qualifiers

Qualifier	Description
MBRR	<i>Initial MB for this submission had positive results for flagged analyte (data not shown). Low level samples were repeated with new QC (2nd MB results shown). High level results (&gt;5x initial MB level) and non-detect results were reported and are defensible</i>

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## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: <b>Water</b>					Laboratory Control Sample (LCS) Report				
					Spike Concentration	Recovery (%) LCS	Recovery Limits (%)		Qualifier
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Physical Tests (QCLot: 78895)</b>									
acidity (as CaCO3)	---	E283	2	mg/L	50 mg/L	102	85.0	115	----
<b>Physical Tests (QCLot: 78896)</b>									
pH	---	E108	----	pH units	7 pH units	100	98.0	102	----
<b>Physical Tests (QCLot: 78897)</b>									
alkalinity, phenolphthalein (as CaCO3)	---	E290	1	mg/L	229 mg/L	97.2	75.0	125	----
alkalinity, total (as CaCO3)	---	E290	1	mg/L	500 mg/L	113	85.0	115	----
<b>Physical Tests (QCLot: 78898)</b>									
conductivity	---	E100	1	µS/cm	146.9 µS/cm	102	90.0	110	----
<b>Physical Tests (QCLot: 79452)</b>									
turbidity	---	E121	0.1	NTU	200 NTU	101	85.0	115	----
<b>Physical Tests (QCLot: 84100)</b>									
solids, total dissolved [TDS]	---	E162	10	mg/L	1000 mg/L	95.4	85.0	115	----
<b>Anions and Nutrients (QCLot: 78889)</b>									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	95.0	90.0	110	----
<b>Anions and Nutrients (QCLot: 78890)</b>									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	95.1	90.0	110	----
<b>Anions and Nutrients (QCLot: 78892)</b>									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	95.1	90.0	110	----
<b>Anions and Nutrients (QCLot: 78893)</b>									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	95.6	90.0	110	----
<b>Anions and Nutrients (QCLot: 78894)</b>									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	96.0	90.0	110	----
<b>Anions and Nutrients (QCLot: 80951)</b>									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.12 mg/L	105	85.0	115	----
<b>Dissolved Metals (QCLot: 79470)</b>									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	105	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	102	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	100	80.0	120	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	102	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	102	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	94.8	80.0	120	----





Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 79470) - continued</b>									
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	98.4	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	100	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	101	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	100	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	99.7	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	98.3	80.0	120	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	100	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	102	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	97.3	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	99.1	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	102	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	96.5	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	98.4	70.0	130	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	99.0	80.0	120	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	98.7	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	98.3	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	107	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	103	80.0	120	----
sodium, dissolved	17341-25-2	E421	0.05	mg/L	50 mg/L	98.5	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	105	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	95.6	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	109	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	99.3	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	97.1	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	99.6	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	95.2	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	97.4	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	102	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	99.6	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	101	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	98.2	80.0	120	----
<b>Dissolved Metals (QCLot: 79471)</b>									
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	0.25 mg/L	97.6	80.0	120	----
<b>Dissolved Metals (QCLot: 80466)</b>									
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	87.7	80.0	120	----
<b>Volatile Organic Compounds (QCLot: 79394)</b>									



Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 79394) - continued</b>									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	97.3	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	92.9	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	105	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	93.2	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	93.9	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	200 µg/L	98.7	70.0	130	----
xylene, o-	95-47-6	E611A	0.5	µg/L	100 µg/L	94.9	70.0	130	----
<b>Volatile Organic Compounds (QCLot: 91134)</b>									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	107	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	110	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	109	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	106	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	106	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	200 µg/L	103	70.0	130	----
xylene, o-	95-47-6	E611A	0.5	µg/L	100 µg/L	102	70.0	130	----
<b>Hydrocarbons (QCLot: 79806)</b>									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	109	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	104	70.0	130	----
<b>Hydrocarbons (QCLot: 91133)</b>									
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	86.0	70.0	130	----
<b>Hydrocarbons (QCLot: 91254)</b>									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	110	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	110	70.0	130	----
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 79807)</b>									
acenaphthene	83-32-9	E641A	0.01	µg/L	0.5 µg/L	107	60.0	130	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5 µg/L	108	60.0	130	----
acridine	260-94-6	E641A	0.01	µg/L	0.5 µg/L	93.0	60.0	130	----
anthracene	120-12-7	E641A	0.01	µg/L	0.5 µg/L	103	60.0	130	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5 µg/L	102	60.0	130	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5 µg/L	105	60.0	130	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	0.5 µg/L	105	60.0	130	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	1 µg/L	111	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5 µg/L	107	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5 µg/L	116	60.0	130	----
chrysene	218-01-9	E641A	0.01	µg/L	0.5 µg/L	111	60.0	130	----



Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 79807) - continued</b>									
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	0.5 µg/L	110	60.0	130	----
fluoranthene	206-44-0	E641A	0.01	µg/L	0.5 µg/L	105	60.0	130	----
fluorene	86-73-7	E641A	0.01	µg/L	0.5 µg/L	97.1	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5 µg/L	109	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5 µg/L	108	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	0.5 µg/L	103	60.0	130	----
naphthalene	91-20-3	E641A	0.05	µg/L	0.5 µg/L	101	50.0	130	----
phenanthrene	85-01-8	E641A	0.02	µg/L	0.5 µg/L	101	60.0	130	----
pyrene	129-00-0	E641A	0.01	µg/L	0.5 µg/L	109	60.0	130	----
quinoline	6027-02-7	E641A	0.05	µg/L	0.5 µg/L	111	60.0	130	----
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 91255)</b>									
acenaphthene	83-32-9	E641A	0.01	µg/L	0.5 µg/L	121	60.0	130	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5 µg/L	117	60.0	130	----
acridine	260-94-6	E641A	0.01	µg/L	0.5 µg/L	94.7	60.0	130	----
anthracene	120-12-7	E641A	0.01	µg/L	0.5 µg/L	110	60.0	130	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5 µg/L	106	60.0	130	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5 µg/L	120	60.0	130	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	0.5 µg/L	108	60.0	130	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	1 µg/L	113	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5 µg/L	120	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5 µg/L	118	60.0	130	----
chrysene	218-01-9	E641A	0.01	µg/L	0.5 µg/L	109	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	0.5 µg/L	117	60.0	130	----
fluoranthene	206-44-0	E641A	0.01	µg/L	0.5 µg/L	116	60.0	130	----
fluorene	86-73-7	E641A	0.01	µg/L	0.5 µg/L	106	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5 µg/L	112	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5 µg/L	126	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	0.5 µg/L	122	60.0	130	----
naphthalene	91-20-3	E641A	0.05	µg/L	0.5 µg/L	120	50.0	130	----
phenanthrene	85-01-8	E641A	0.02	µg/L	0.5 µg/L	109	60.0	130	----
pyrene	129-00-0	E641A	0.01	µg/L	0.5 µg/L	118	60.0	130	----
quinoline	6027-02-7	E641A	0.05	µg/L	0.5 µg/L	124	60.0	130	----



### Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 78889)</b>										
VA20B3890-003	Anonymous	chloride	16887-00-6	E235.Cl	520 mg/L	500 mg/L	104	75 0	125	----
<b>Anions and Nutrients (QCLot: 78890)</b>										
VA20B3890-003	Anonymous	fluoride	16984-48-8	E235 F	5.33 mg/L	5 mg/L	107	75 0	125	----
<b>Anions and Nutrients (QCLot: 78892)</b>										
VA20B3890-003	Anonymous	nitrate (as N)	14797-55-8	E235 NO3-L	13.0 mg/L	12.5 mg/L	104	75 0	125	----
<b>Anions and Nutrients (QCLot: 78893)</b>										
VA20B3890-003	Anonymous	nitrite (as N)	14797-65-0	E235 NO2-L	2.61 mg/L	2.5 mg/L	104	75 0	125	----
<b>Anions and Nutrients (QCLot: 78894)</b>										
VA20B3890-003	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	536 mg/L	500 mg/L	107	75 0	125	----
<b>Anions and Nutrients (QCLot: 80951)</b>										
VA20B3890-003	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.209 mg/L	0.2 mg/L	104	75 0	125	----
<b>Dissolved Metals (QCLot: 79470)</b>										
VA20B3891-006	BH17-24B	aluminum, dissolved	7429-90-5	E421	0.204 mg/L	0.2 mg/L	102	70 0	130	----
		antimony, dissolved	7440-36-0	E421	0.0206 mg/L	0.02 mg/L	103	70 0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0205 mg/L	0.02 mg/L	102	70 0	130	----
		barium, dissolved	7440-39-3	E421	0.0201 mg/L	0.02 mg/L	101	70 0	130	----
		beryllium, dissolved	7440-41-7	E421	0.0420 mg/L	0.04 mg/L	105	70 0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00996 mg/L	0.01 mg/L	99.6	70 0	130	----
		boron, dissolved	7440-42-8	E421	0.096 mg/L	0.1 mg/L	95.6	70 0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00405 mg/L	0.004 mg/L	101	70 0	130	----
		calcium, dissolved	7440-70-2	E421	3.99 mg/L	4 mg/L	99.8	70 0	130	----
		cesium, dissolved	7440-46-2	E421	0.0101 mg/L	0.01 mg/L	101	70 0	130	----
		cobalt, dissolved	7440-48-4	E421	0.0203 mg/L	0.02 mg/L	102	70 0	130	----
		copper, dissolved	7440-50-8	E421	0.0203 mg/L	0.02 mg/L	102	70 0	130	----
		iron, dissolved	7439-89-6	E421	1.89 mg/L	2 mg/L	94.6	70 0	130	----
		lead, dissolved	7439-92-1	E421	0.0204 mg/L	0.02 mg/L	102	70 0	130	----
		lithium, dissolved	7439-93-2	E421	0.102 mg/L	0.1 mg/L	102	70 0	130	----
		magnesium, dissolved	7439-95-4	E421	0.962 mg/L	1 mg/L	96.2	70 0	130	----
		manganese, dissolved	7439-96-5	E421	0.0200 mg/L	0.02 mg/L	99.8	70 0	130	----
		molybdenum, dissolved	7439-98-7	E421	0.0199 mg/L	0.02 mg/L	99.6	70 0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 79470) - continued</b>										
VA20B3891-006	BH17-24B	nickel, dissolved	7440-02-0	E421	0.0398 mg/L	0.04 mg/L	99.5	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	9.88 mg/L	10 mg/L	98.8	70.0	130	----
		potassium, dissolved	7440-09-7	E421	3.96 mg/L	4 mg/L	99.0	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.0199 mg/L	0.02 mg/L	99.5	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0437 mg/L	0.04 mg/L	109	70.0	130	----
		silicon, dissolved	7440-21-3	E421	9.28 mg/L	10 mg/L	92.8	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00407 mg/L	0.004 mg/L	102	70.0	130	----
		sodium, dissolved	17341-25-2	E421	1.97 mg/L	2 mg/L	98.3	70.0	130	----
		strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		sulfur, dissolved	7704-34-9	E421	19.6 mg/L	20 mg/L	98.3	70.0	130	----
		tellurium, dissolved	13494-80-9	E421	0.0454 mg/L	0.04 mg/L	114	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00399 mg/L	0.004 mg/L	99.8	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0209 mg/L	0.02 mg/L	105	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0200 mg/L	0.02 mg/L	100.0	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0380 mg/L	0.04 mg/L	95.1	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0198 mg/L	0.02 mg/L	98.8	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.00401 mg/L	0.004 mg/L	100	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.0989 mg/L	0.1 mg/L	98.9	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.446 mg/L	0.4 mg/L	111	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0411 mg/L	0.04 mg/L	103	70.0	130	----
<b>Dissolved Metals (QCLot: 79471)</b>										
VA20B3891-006	BH17-24B	chromium, dissolved	7440-47-3	E421.Cr-L	0.0392 mg/L	0.04 mg/L	97.9	70.0	130	----
<b>Dissolved Metals (QCLot: 80466)</b>										
VA20B3851-007	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000993 mg/L	0.0001 mg/L	99.3	70.0	130	----
<b>Volatile Organic Compounds (QCLot: 79394)</b>										
VA20B3891-002	BH17-12B	benzene	71-43-2	E611A	100 µg/L	100 µg/L	100	60.0	140	----
		ethylbenzene	100-41-4	E611A	96.3 µg/L	100 µg/L	96.3	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	106 µg/L	100 µg/L	106	60.0	140	----
		styrene	100-42-5	E611A	94.2 µg/L	100 µg/L	94.2	60.0	140	----
		toluene	108-88-3	E611A	108 µg/L	100 µg/L	108	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	203 µg/L	200 µg/L	102	60.0	140	----
		xylene, o-	95-47-6	E611A	97.7 µg/L	100 µg/L	97.7	60.0	140	----
<b>Volatile Organic Compounds (QCLot: 91134)</b>										
VA20B5408-001	Anonymous	benzene	71-43-2	E611A	103 µg/L	100 µg/L	103	60.0	140	----
		ethylbenzene	100-41-4	E611A	106 µg/L	100 µg/L	106	60.0	140	----



Sub-Matrix: **Water**

					<i>Matrix Spike (MS) Report</i>					
					<i>Spike</i>		<i>Recovery (%)</i>	<i>Recovery Limits (%)</i>		
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>Concentration</i>	<i>Target</i>	<i>MS</i>	<i>Low</i>	<i>High</i>	<i>Qualifier</i>
<b>Volatile Organic Compounds (QCLot: 91134) - continued</b>										
VA20B5408-001	Anonymous	methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	103 µg/L	100 µg/L	103	60 0	140	----
		styrene	100-42-5	E611A	99.8 µg/L	100 µg/L	99.8	60 0	140	----
		toluene	108-88-3	E611A	101 µg/L	100 µg/L	101	60 0	140	----
		xylene, m+p-	179601-23-1	E611A	201 µg/L	200 µg/L	100	60 0	140	----
		xylene, o-	95-47-6	E611A	99.4 µg/L	100 µg/L	99.4	60 0	140	----
<b>Hydrocarbons (QCLot: 91133)</b>										
VA20B3891-003	BH17-17A	VHw (C6-C10)	----	E581.VH+F1	4510 µg/L	6310 µg/L	71.5	60 0	140	----



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# Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

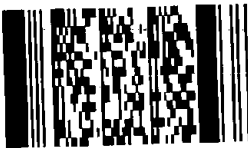
Affix ALS barcode label here  
(lab use only)

COC Number: 17 -

Page 1 of 1

<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>			<b>Select Service Level Below - Contact your AM to confirm all E&amp;P TATs (surcharges may apply)</b>											
Company: Wood.		Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)			Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply											
Contact: Jeremiah Gladu		Quality Control (QC) Report with Report <input type="checkbox"/> YES <input type="checkbox"/> NO			PROPERTY (Business Days)	4 day [P4-20%] <input type="checkbox"/>		EMERGENCY	1 Business day [E - 100%] <input type="checkbox"/>							
Phone:		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked				3 day [P3-25%] <input type="checkbox"/>			Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] <input type="checkbox"/>							
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm											
Street: 4445 Loughheed Hwy.		Email 1 or Fax: jeremiah.gladu@woodplc.com			For tests that can not be performed according to the service level selected, you will be contacted.											
City/Province: Burnaby/BC		Email 2			<b>Analysis Request</b>											
Postal Code: V5C 0E4		Email 3														
<b>Invoice To</b>		<b>Invoice Distribution</b>			<b>NUMBER OF CONTAINERS</b>	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below							<b>SAMPLES ON HOLD</b>	<b>SUSPECTED HAZARD (see Special Instructions)</b>		
Same as Report To <input type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX				BTEX	EPH/PAH	General chemistry *	DISSOLVED METALS							
Copy of Invoice with Report <input type="checkbox"/> YES <input type="checkbox"/> NO		Email 1 or Fax														
Company:		Email 2														
Contact:		Project Information														
ALS Account # / Quote #:		Oil and Gas Required Fields (client use)														
Job #: VE52855D		AFE/Cost Center: PO#														
PO / AFE:		Major/Minor Code: Routing Code:														
LSD:		Requisitioner:														
ALS Lab Work Order # (lab use only): 3891		Location:														
ALS Contact: Selam Worku		Sampler: Ardy M.														
ALS Sample # (lab use only)		Sample Identification and/or Coordinates (This description will appear on the report)			Date (dd-mmm-yy)	Time (hh:mm)	Sample Type									
1		BH17-12A			24-Aug-20	11:05	GW	R	R							
2		BH17-12B			24-Aug-20	9:43	GW	R	R							
3		BH17-17A			24-Aug-20	13:00	GW						HOLD			
4		BH17-17B			24-Aug-20	12:00	GW						HOLD			
5		BH17-24A			24-Aug-20	15:00	GW		R	R						
6		BH17-24B			24-Aug-20	14:40	GW		R	R						
7		BH17-11A			24-Aug-20	16:30	GW		R	R						
8		BH17-11B			24-Aug-20	16:30	GW		R	R						
9		BH17-62B			24-Aug-20	11:05	GW	R	R							
<b>Drinking Water (DW) Samples<sup>1</sup> (client use)</b>		<b>Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)</b>			<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>											
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO		*GENERAL WATER CHEMISTRY TO INCLUDE: pH, Alkalinity, bicarbonate, carbonate, chloride, conductivity, fluoride, hardness, hydroxide, nitrate, nitrite, ammonia, sulphate, turbidity, TDS, acidity.			Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>											
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO					Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>											
					Cooling Initiated <input type="checkbox"/>											
					INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C								
								5.2								
<b>SHIPMENT RELEASE (client use)</b>				<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>				<b>FINAL SHIPMENT RECEPTION (lab use only)</b>								
Released by: Ardy Mansourpour		Date: Aug 26 20		Time: 9:15		Received by:		Date: 28 Aug. 2020		Time: 10:10am						

Environmental Division  
Vancouver  
Work Order Reference  
**VA20B3891**



Telephone : + 1 604 253 4188



CERTIFICATE OF ANALYSIS

Work Order : VA20B4083
Amendment : 1
Client : Wood Canada Ltd.
Contact : Jeremiah Gladu
Address : 600 - 4445 Lougheed Hwy
Burnaby BC Canada V5C 0E4
Telephone : 604 294 3811
Project : VE52655D
PO : ---
C-O-C number : ---
Sampler : Ardy M.
Site : ---
Quote number : VA20-SEAB100-0003 - Wood/Seabridge Gold
No. of samples received : 3
No. of samples analysed : 3

Page : 1 of 6
Laboratory : Vancouver - Environmental
Account Manager : Selam Worku
Address : 8081 Lougheed Highway
Burnaby BC Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 29-Aug-2020 08:10
Date Analysis Commenced : 01-Sep-2020
Issue Date : 27-Oct-2020 09:32

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
Analytical Results
Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Table with 3 columns: Signatories, Position, Laboratory Department. Lists names like Caitlin Macey, Clarie Tejano, Cristina Alexandre, Kevin Duarte, Lindsay Gung, Ophelia Chiu, Shaneel Dayal and their respective roles and departments.





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
-	No Unit
µg/L	micrograms per litre
µS/cm	Microsiemens per centimetre
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in reports identified as "Preliminary Report" are considered authorized for use.

## Workorder Comments

The units for trace metals have been updated to ug/L in this report.



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					MW17-09B	MW17-27A	MW17-23A	----	----
Client sampling date / time					28-Aug-2020 15:00	28-Aug-2020 13:00	28-Aug-2020 11:00	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B4083-001	VA20B4083-002	VA20B4083-003	-----	-----
					Result	Result	Result	----	----
<b>Physical Tests</b>									
acidity (as CaCO3)	----	E283	2.0	mg/L	5.0	2.2	----	----	----
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	69.8	134	----	----	----
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	----	----	----
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	----	----	----
alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	----	----	----
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	69.8	134	----	----	----
conductivity	----	E100	2.0	µS/cm	388	386	----	----	----
pH	----	E108	0.10	pH units	7.11	7.88	----	----	----
solids, total dissolved [TDS]	----	E162	10	mg/L	274	255	----	----	----
turbidity	----	E121	0.10	NTU	7.91	45.3	----	----	----
hardness (as CaCO3), dissolved	----	EC100	600	µg/L	187000	204000	----	----	----
<b>Anions and Nutrients</b>									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0311	0.0187	----	----	----
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	----	----	----
fluoride	16984-48-8	E235.F	0.020	mg/L	0.043	0.052	----	----	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0196	<0.0050	----	----	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0016	<0.0010	----	----	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	123	67.4	----	----	----
<b>Dissolved Metals</b>									
aluminum, dissolved	7429-90-5	E421	1.0	µg/L	2.2	2.1	----	----	----
antimony, dissolved	7440-36-0	E421	0.10	µg/L	<0.10	0.98	----	----	----
arsenic, dissolved	7440-38-2	E421	0.10	µg/L	0.11	2.94	----	----	----
barium, dissolved	7440-39-3	E421	0.10	µg/L	18.5	53.6	----	----	----
beryllium, dissolved	7440-41-7	E421	0.100	µg/L	<0.100	<0.100	----	----	----
bismuth, dissolved	7440-69-9	E421	0.050	µg/L	<0.050	<0.050	----	----	----
boron, dissolved	7440-42-8	E421	10	µg/L	108	<10	----	----	----
cadmium, dissolved	7440-43-9	E421	0.0050	µg/L	0.0802	0.114	----	----	----
calcium, dissolved	7440-70-2	E421	50	µg/L	66700	73100	----	----	----
cesium, dissolved	7440-46-2	E421	0.010	µg/L	0.015	<0.010	----	----	----
chromium, dissolved	7440-47-3	E421.Cr-L	0.10	µg/L	0.14	<0.10	----	----	----



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					MW17-09B	MW17-27A	MW17-23A	----	----
Client sampling date / time					28-Aug-2020 15:00	28-Aug-2020 13:00	28-Aug-2020 11:00	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B4083-001	VA20B4083-002	VA20B4083-003	-----	-----
					Result	Result	Result	---	---
<b>Dissolved Metals</b>									
cobalt, dissolved	7440-48-4	E421	0.10	µg/L	2.96	1.44	----	----	----
copper, dissolved	7440-50-8	E421	0.20	µg/L	0.28	<0.20	----	----	----
iron, dissolved	7439-89-6	E421	10	µg/L	335	62	----	----	----
lead, dissolved	7439-92-1	E421	0.050	µg/L	<0.050	<0.050	----	----	----
lithium, dissolved	7439-93-2	E421	1.0	µg/L	<1.0	1.6	----	----	----
magnesium, dissolved	7439-95-4	E421	5.0	µg/L	5000	5140	----	----	----
manganese, dissolved	7439-96-5	E421	0.10	µg/L	3320	653	----	----	----
mercury, dissolved	7439-97-6	E509	0.0050	µg/L	<0.0050	<0.0050	----	----	----
molybdenum, dissolved	7439-98-7	E421	0.050	µg/L	0.221	0.514	----	----	----
nickel, dissolved	7440-02-0	E421	0.50	µg/L	1.43	0.92	----	----	----
phosphorus, dissolved	7723-14-0	E421	50	µg/L	<50	<50	----	----	----
potassium, dissolved	7440-09-7	E421	50	µg/L	2430	3490	----	----	----
rubidium, dissolved	7440-17-7	E421	0.20	µg/L	3.84	2.09	----	----	----
selenium, dissolved	7782-49-2	E421	0.050	µg/L	<0.050	0.052	----	----	----
silicon, dissolved	7440-21-3	E421	50	µg/L	2140	4860	----	----	----
silver, dissolved	7440-22-4	E421	0.010	µg/L	<0.010	<0.010	----	----	----
sodium, dissolved	17341-25-2	E421	50	µg/L	4400	1860	----	----	----
strontium, dissolved	7440-24-6	E421	0.20	µg/L	257	394	----	----	----
sulfur, dissolved	7704-34-9	E421	500	µg/L	39700	22500	----	----	----
tellurium, dissolved	13494-80-9	E421	0.20	µg/L	<0.20	<0.20	----	----	----
thallium, dissolved	7440-28-0	E421	0.010	µg/L	<0.010	<0.010	----	----	----
thorium, dissolved	7440-29-1	E421	0.10	µg/L	<0.10	<0.10	----	----	----
tin, dissolved	7440-31-5	E421	0.10	µg/L	<0.10	<0.10	----	----	----
titanium, dissolved	7440-32-6	E421	0.30	µg/L	<0.30	<0.30	----	----	----
tungsten, dissolved	7440-33-7	E421	0.10	µg/L	<0.10	<0.10	----	----	----
uranium, dissolved	7440-61-1	E421	0.010	µg/L	0.206	0.264	----	----	----
vanadium, dissolved	7440-62-2	E421	0.50	µg/L	<0.50	<0.50	----	----	----
zinc, dissolved	7440-66-6	E421	1.0	µg/L	6.6	2.0	----	----	----
zirconium, dissolved	7440-67-7	E421	0.20	µg/L	<0.20	<0.20	----	----	----
dissolved mercury filtration location	----	EP509	-	-	Field	Field	----	----	----
dissolved metals filtration location	----	EP421	-	-	Field	Field	----	----	----



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					MW17-09B	MW17-27A	MW17-23A	----	----
Client sampling date / time					28-Aug-2020 15:00	28-Aug-2020 13:00	28-Aug-2020 11:00	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B4083-001	VA20B4083-002	VA20B4083-003	-----	-----
					Result	Result	Result	---	---
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>									
benzene	71-43-2	E611A	0.50	µg/L	----	----	<0.50	----	----
ethylbenzene	100-41-4	E611A	0.50	µg/L	----	----	<0.50	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	----	----	<0.50	----	----
styrene	100-42-5	E611A	0.50	µg/L	----	----	<0.50	----	----
toluene	108-88-3	E611A	0.50	µg/L	----	----	<0.50	----	----
xylene, m+p-	179601-23-1	E611A	0.50	µg/L	----	----	<0.50	----	----
xylene, o-	95-47-6	E611A	0.50	µg/L	----	----	<0.50	----	----
xylenes, total	1330-20-7	E611A	0.75	µg/L	----	----	<0.75	----	----
BTEX, total	----	E611A	1.2	µg/L	----	----	<1.2	----	----
<b>Volatile Organic Compounds Surrogates</b>									
bromofluorobenzene, 4-	460-00-4	E611A	0.50	%	----	----	91.0	----	----
difluorobenzene, 1,4-	540-36-3	E611A	0.50	%	----	----	110	----	----
<b>Hydrocarbons</b>									
EPH (C10-C19)	----	E601A	250	µg/L	----	----	<250	----	----
EPH (C19-C32)	----	E601A	250	µg/L	----	----	<250	----	----
HEPHw	----	EC600A	250	µg/L	----	----	<250	----	----
LEPHw	----	EC600A	250	µg/L	----	----	<250	----	----
<b>Hydrocarbons Surrogates</b>									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%	----	----	95.3	----	----
<b>Polycyclic Aromatic Hydrocarbons</b>									
acenaphthene	83-32-9	E641A	0.010	µg/L	----	----	<0.010	----	----
acenaphthylene	208-96-8	E641A	0.010	µg/L	----	----	<0.010	----	----
acridine	260-94-6	E641A	0.010	µg/L	----	----	<0.010	----	----
anthracene	120-12-7	E641A	0.010	µg/L	----	----	<0.010	----	----
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	----	----	<0.010	----	----
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	----	----	<0.0050	----	----
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	----	----	<0.010	----	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	----	----	<0.015	----	----
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	----	----	<0.010	----	----
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	----	----	<0.010	----	----
chrysene	218-01-9	E641A	0.010	µg/L	----	----	<0.010	----	----



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					MW17-09B	MW17-27A	MW17-23A	----	----
					28-Aug-2020 15:00	28-Aug-2020 13:00	28-Aug-2020 11:00	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B4083-001	VA20B4083-002	VA20B4083-003	-----	-----
					Result	Result	Result	---	---
<b>Polycyclic Aromatic Hydrocarbons</b>									
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	----	----	<0.0050	----	----
fluoranthene	206-44-0	E641A	0.010	µg/L	----	----	<0.010	----	----
fluorene	86-73-7	E641A	0.010	µg/L	----	----	<0.010	----	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	----	----	<0.010	----	----
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	----	----	<0.010	----	----
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	----	----	<0.010	----	----
naphthalene	91-20-3	E641A	0.050	µg/L	----	----	<0.050	----	----
phenanthrene	85-01-8	E641A	0.020	µg/L	----	----	<0.020	----	----
pyrene	129-00-0	E641A	0.010	µg/L	----	----	<0.010	----	----
quinoline	6027-02-7	E641A	0.050	µg/L	----	----	<0.050	----	----
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>									
acridine-d9	34749-75-2	E641A	0.010	%	----	----	79.2	----	----
chrysene-d12	1719-03-5	E641A	0.010	%	----	----	78.4	----	----
naphthalene-d8	1146-65-2	E641A	0.010	%	----	----	91.0	----	----
phenanthrene-d10	1517-22-2	E641A	0.010	%	----	----	95.8	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>VA20B4083</b>	Page	: 1 of 11
Amendment	: 1		
Client	: <b>Wood Canada Ltd.</b>	Laboratory	: Vancouver - Environmental
Contact	: Jeremiah Gladu	Account Manager	: Selam Worku
Address	: 600 - 4445 Lougheed Hwy Burnaby BC Canada V5C 0E4	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: VE52655D	Date Samples Received	: 29-Aug-2020 08:10
PO	: ----	Issue Date	: 27-Oct-2020 09:32
C-O-C number	: ----		
Sampler	: Ardy M.		
Site	: ----		
Quote number	: VA20-SEAB100-0003 - Wood/Seabridge Gold		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

## Summary of Outliers

### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.

### **Outliers : Analysis Holding Time Compliance (Breaches)**

- Analysis Holding Time Outliers exist - please see following pages for full details.

### **Outliers : Frequency of Quality Control Samples**

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> MW17-09B	E298	28-Aug-2020	----	----	----		05-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> MW17-27A	E298	28-Aug-2020	----	----	----		05-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> MW17-09B	E235.Cl	28-Aug-2020	----	----	----		01-Sep-2020	28 days	4 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> MW17-27A	E235.Cl	28-Aug-2020	----	----	----		01-Sep-2020	28 days	4 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
<b>HDPE</b> MW17-09B	E235.F	28-Aug-2020	----	----	----		01-Sep-2020	28 days	4 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
<b>HDPE</b> MW17-27A	E235.F	28-Aug-2020	----	----	----		01-Sep-2020	28 days	4 days	✓
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
<b>HDPE</b> MW17-09B	E235.NO3-L	28-Aug-2020	----	----	----		01-Sep-2020	3 days	4 days	* EHT





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE MW17-27A	E235.NO3-L	28-Aug-2020	----	----	----		01-Sep-2020	3 days	4 days	* EHT
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE MW17-09B	E235.NO2-L	28-Aug-2020	----	----	----		01-Sep-2020	3 days	4 days	* EHT
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE MW17-27A	E235.NO2-L	28-Aug-2020	----	----	----		01-Sep-2020	3 days	4 days	* EHT
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE MW17-09B	E235.SO4	28-Aug-2020	----	----	----		01-Sep-2020	28 days	4 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE MW17-27A	E235.SO4	28-Aug-2020	----	----	----		01-Sep-2020	28 days	4 days	✓
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
HDPE dissolved (nitric acid) MW17-27A	E421.Cr-L	28-Aug-2020	02-Sep-2020	180 days	5 days	✓	04-Sep-2020	174 days	2 days	✓
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
HDPE dissolved (nitric acid) MW17-09B	E421.Cr-L	28-Aug-2020	02-Sep-2020	180 days	5 days	✓	04-Sep-2020	175 days	2 days	✓
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
Glass vial dissolved (hydrochloric acid) MW17-09B	E509	28-Aug-2020	03-Sep-2020	28 days	6 days	✓	03-Sep-2020	21 days	0 days	✓
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
Glass vial dissolved (hydrochloric acid) MW17-27A	E509	28-Aug-2020	03-Sep-2020	28 days	6 days	✓	03-Sep-2020	21 days	0 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> MW17-27A	E421	28-Aug-2020	02-Sep-2020	180 days	5 days	✓	04-Sep-2020	174 days	2 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> MW17-09B	E421	28-Aug-2020	02-Sep-2020	180 days	5 days	✓	04-Sep-2020	175 days	2 days	✓
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> MW17-23A	E601A	28-Aug-2020	03-Sep-2020	14 days	6 days	✓	04-Sep-2020	40 days	1 days	✓
<b>Physical Tests : Acidity by Titration</b>										
<b>HDPE</b> MW17-09B	E283	28-Aug-2020	----	----	----		01-Sep-2020	14 days	4 days	✓
<b>Physical Tests : Acidity by Titration</b>										
<b>HDPE</b> MW17-27A	E283	28-Aug-2020	----	----	----		01-Sep-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
<b>HDPE</b> MW17-09B	E290	28-Aug-2020	----	----	----		01-Sep-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
<b>HDPE</b> MW17-27A	E290	28-Aug-2020	----	----	----		01-Sep-2020	14 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
<b>HDPE</b> MW17-09B	E100	28-Aug-2020	----	----	----		01-Sep-2020	28 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
<b>HDPE</b> MW17-27A	E100	28-Aug-2020	----	----	----		01-Sep-2020	28 days	4 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : pH by Meter</b>											
HDPE MW17-27A	E108	28-Aug-2020	----	----	----		01-Sep-2020	0.25 hrs	100 hrs	*	EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE MW17-09B	E108	28-Aug-2020	----	----	----		01-Sep-2020	0.25 hrs	98 hrs	*	EHTR-FM
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE MW17-09B	E162	28-Aug-2020	----	----	----		03-Sep-2020	7 days	6 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE MW17-27A	E162	28-Aug-2020	----	----	----		03-Sep-2020	7 days	6 days	✓	
<b>Physical Tests : Turbidity by Nephelometry</b>											
HDPE MW17-09B	E121	28-Aug-2020	----	----	----		01-Sep-2020	3 days	3 days	✓	
<b>Physical Tests : Turbidity by Nephelometry</b>											
HDPE MW17-27A	E121	28-Aug-2020	----	----	----		01-Sep-2020	3 days	3 days	✓	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>											
Amber glass/Teflon lined cap (sodium bisulfate) MW17-23A	E641A	28-Aug-2020	03-Sep-2020	14 days	6 days	✓	04-Sep-2020	40 days	0 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
Glass vial (sodium bisulfate) MW17-23A	E611A	28-Aug-2020	01-Sep-2020	14 days	4 days	✓	01-Sep-2020	9 days	0 days	✓	

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended  
 EHT: Exceeded ALS recommended hold time prior to analysis.  
 Rec. HT: ALS recommended hold time (see units).



## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Acidity by Titration	E283	79811	1	6	16.6	5.0	✓
Alkalinity Species by Titration	E290	79809	1	10	10.0	5.0	✓
Ammonia by Fluorescence	E298	81571	1	19	5.2	5.0	✓
BTEX by Headspace GC-MS	E611A	79732	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	79791	1	20	5.0	5.0	✓
Conductivity in Water	E100	79810	1	16	6.2	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	80477	1	13	7.6	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	81229	1	11	9.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	80476	1	16	6.2	5.0	✓
Fluoride in Water by IC	E235.F	79792	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	79794	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	79795	1	20	5.0	5.0	✓
pH by Meter	E108	79808	1	15	6.6	5.0	✓
Sulfate in Water by IC	E235.SO4	79796	1	20	5.0	5.0	✓
TDS by Gravimetry	E162	81419	1	20	5.0	5.0	✓
Turbidity by Nephelometry	E121	79730	1	18	5.5	5.0	✓
<b>Laboratory Control Samples (LCS)</b>							
Acidity by Titration	E283	79811	1	6	16.6	5.0	✓
Alkalinity Species by Titration	E290	79809	1	10	10.0	5.0	✓
Ammonia by Fluorescence	E298	81571	1	19	5.2	5.0	✓
BC PHC - EPH by GC-FID	E601A	81020	1	17	5.8	5.0	✓
BTEX by Headspace GC-MS	E611A	79732	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	79791	1	20	5.0	5.0	✓
Conductivity in Water	E100	79810	1	16	6.2	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	80477	1	13	7.6	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	81229	1	11	9.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	80476	1	16	6.2	5.0	✓
Fluoride in Water by IC	E235.F	79792	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	79794	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	79795	1	20	5.0	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	81019	1	17	5.8	5.0	✓
pH by Meter	E108	79808	1	15	6.6	5.0	✓
Sulfate in Water by IC	E235.SO4	79796	1	20	5.0	5.0	✓
TDS by Gravimetry	E162	81419	1	20	5.0	5.0	✓
Turbidity by Nephelometry	E121	79730	1	18	5.5	5.0	✓
<b>Method Blanks (MB)</b>							
Acidity by Titration	E283	79811	1	6	16.6	5.0	✓



Matrix: **Water**

Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<i>Analytical Methods</i>							
<b>Method Blanks (MB) - Continued</b>							
Alkalinity Species by Titration	E290	79809	1	10	10.0	5.0	✓
Ammonia by Fluorescence	E298	81571	1	19	5.2	5.0	✓
BC PHC - EPH by GC-FID	E601A	81020	1	17	5.8	5.0	✓
BTEX by Headspace GC-MS	E611A	79732	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	79791	1	20	5.0	5.0	✓
Conductivity in Water	E100	79810	1	16	6.2	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	80477	1	13	7.6	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	81229	1	11	9.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	80476	1	16	6.2	5.0	✓
Fluoride in Water by IC	E235.F	79792	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	79794	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	79795	1	20	5.0	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	81019	1	17	5.8	5.0	✓
Sulfate in Water by IC	E235.SO4	79796	1	20	5.0	5.0	✓
TDS by Gravimetry	E162	81419	1	20	5.0	5.0	✓
Turbidity by Nephelometry	E121	79730	1	18	5.5	5.0	✓
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	81571	1	19	5.2	5.0	✓
BTEX by Headspace GC-MS	E611A	79732	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	79791	1	20	5.0	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	80477	1	13	7.6	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	81229	1	11	9.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	80476	1	16	6.2	5.0	✓
Fluoride in Water by IC	E235.F	79792	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	79794	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	79795	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	79796	1	20	5.0	5.0	✓



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 Vancouver - Environmental	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TDS by Gravimetry	E162 Vancouver - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Acidity by Titration	E283 Vancouver - Environmental	Water	APHA 2310 B (mod)	Acidity is determined by potentiometric titration to a specified endpoint.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L Vancouver - Environmental	Water	APHA 3030 B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS
Dissolved Mercury in Water by CVAAS	E509 Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
BC PHC - EPH by GC-FID	E601A Vancouver - Environmental	Water	BC MOE Lab Manual	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.
BTEX by Headspace GC-MS	E611A Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by Hexane LVI GC-MS	E641A Vancouver - Environmental	Water	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by large volume injection (LVI) GC-MS.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> ), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
LEPH and HEPH: EPH-PAH	EC600A Vancouver - Environmental	Water	BC MOE Lab Manual (LEPH and HEPH) (mod)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Acenaphthene, Acridine, Anthracene, Fluorene, Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(a)pyrene, Fluoranthene, and Pyrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
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<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Dissolved Metals Water Filtration	EP421  Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO <sub>3</sub> .
Dissolved Mercury Water Filtration	EP509  Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
VOCs Preparation for Headspace Analysis	EP581  Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601  Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.



## QUALITY CONTROL REPORT

**Work Order** : **VA20B4083**

**Page** : 1 of 14

**Amendment** : **1**

**Client** : Wood Canada Ltd.  
**Contact** : Jeremiah Gladu  
**Address** : 1235 Main Street P.O. Box 2356  
 Smithers BC Canada V0J 2N0

**Laboratory** : Vancouver - Environmental  
**Account Manager** : Selam Worku  
**Address** : 8081 Lougheed Highway  
 Burnaby, British Columbia Canada V5A 1W9

**Telephone** : ----  
**Project** : VE52655D  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : Ardy M.  
**Site** : ----  
**Quote number** : VA20-SEAB100-0003 - Wood/Seabridge Gold  
**No. of samples received** : 3  
**No. of samples analysed** : 3

**Telephone** : +1 604 253 4188  
**Date Samples Received** : 29-Aug-2020 08:10  
**Date Analysis Commenced** : 01-Sep-2020  
**Issue Date** : 27-Oct-2020 09:32

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Caitlin Macey	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Clarie Tejano		Metals, Burnaby, British Columbia
Cristina Alexandre	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kevin Duarte	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics - Water Quality, Burnaby, British Columbia
Ophelia Chiu	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Shaneel Dayal	Analyst	Metals, Burnaby, British Columbia

Page : 2 of 14  
Work Order : VA20B4083 Amendment 1  
Client : Wood Canada Ltd.  
Project : VE52655D

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## **General Comments**

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

# = Indicates a QC result that did not meet the ALS DQO.



### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 79730)</b>											
VA20B4059-008	Anonymous	turbidity	----	E121	0.10	NTU	5.35	5.75	7.21%	15%	----
<b>Physical Tests (QC Lot: 79808)</b>											
VA20B4067-002	Anonymous	pH	----	E108	0.10	pH units	7.92	7.93	0.101%	4%	----
<b>Physical Tests (QC Lot: 79809)</b>											
VA20B4067-002	Anonymous	alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	53.2	53.1	0.188%	20%	----
		alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	53.2	53.1	0.188%	20%	----
<b>Physical Tests (QC Lot: 79810)</b>											
VA20B4067-002	Anonymous	conductivity	----	E100	2.0	µS/cm	278	278	0.00%	10%	----
<b>Physical Tests (QC Lot: 79811)</b>											
VA20B4067-002	Anonymous	acidity (as CaCO3)	----	E283	2.0	mg/L	<2.0	<2.0	0	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 81419)</b>											
VA20B3998-001	Anonymous	solids, total dissolved [TDS]	----	E162	20	mg/L	663	640	3.53%	20%	----
<b>Anions and Nutrients (QC Lot: 79791)</b>											
VA20B3928-009	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 79792)</b>											
VA20B3928-009	Anonymous	fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 79794)</b>											
VA20B3928-009	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 79795)</b>											
VA20B3928-009	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 79796)</b>											
VA20B3928-009	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	<0.30	<0.30	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 81571)</b>											
VA20B3953-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 80476)</b>											
VA20B3998-001	Anonymous	aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0028	0.0021	0.0008	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00014	0.00014	0.000007	Diff <2x LOR	----
		arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00012	0.00011	0.000007	Diff <2x LOR	----



Sub-Matrix: **Water**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 80476) - continued</b>											
VA20B3998-001	Anonymous	barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0914	0.0913	0.0803%	20%	----
		beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		cadmium, dissolved	7440-43-9	E421	0.000050	mg/L	0.0000585	0.0000698	17.6%	20%	----
		calcium, dissolved	7440-70-2	E421	0.050	mg/L	115	117	1.42%	20%	----
		cesium, dissolved	7440-46-2	E421	0.000010	mg/L	0.000011	<0.000010	0.0000007	Diff <2x LOR	----
		cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00045	0.00046	0.000002	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0091	0.0092	0.0001	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	58.4	58.8	0.689%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00018	0.00022	0.00004	Diff <2x LOR	----
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000806	0.000755	6.51%	20%	----
		nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00179	0.00187	0.00008	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	0.050	mg/L	1.20	1.22	1.22%	20%	----
		rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00102	0.00100	0.00002	Diff <2x LOR	----
		selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.0121	0.0116	4.23%	20%	----
		silicon, dissolved	7440-21-3	E421	0.050	mg/L	1.84	1.79	2.89%	20%	----
		silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		sodium, dissolved	17341-25-2	E421	0.050	mg/L	3.27	3.19	2.42%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.280	0.279	0.534%	20%	----
		sulfur, dissolved	7704-34-9	E421	0.50	mg/L	98.7	96.2	2.59%	20%	----
		tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.00276	0.00278	0.757%	20%	----
		vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0029	0.0036	0.0008	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----

**Dissolved Metals (QC Lot: 80477)**



Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 80477) - continued</b>											
VA20B3998-001	Anonymous	chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 81229)</b>											
VA20B4067-005	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Volatile Organic Compounds (QC Lot: 79732)</b>											
VA20B3842-009	Anonymous	benzene	71-43-2	E611A	0.0005	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.0005	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.0005	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.0005	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.0005	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		xylylene, m+p-	179601-23-1	E611A	0.0005	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		xylylene, o-	95-47-6	E611A	0.0005	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

### Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 79730)</b>						
turbidity	---	E121	0.1	NTU	<0.10	---
<b>Physical Tests (QCLot: 79809)</b>						
alkalinity, bicarbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
alkalinity, carbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
alkalinity, hydroxide (as CaCO3)	---	E290	1	mg/L	<1.0	---
alkalinity, phenolphthalein (as CaCO3)	---	E290	1	mg/L	<1.0	---
alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
<b>Physical Tests (QCLot: 79810)</b>						
conductivity	---	E100	1	µS/cm	<1.0	---
<b>Physical Tests (QCLot: 79811)</b>						
acidity (as CaCO3)	---	E283	2	mg/L	2.2	---
<b>Physical Tests (QCLot: 81419)</b>						
solids, total dissolved [TDS]	---	E162	10	mg/L	<10	---
<b>Anions and Nutrients (QCLot: 79791)</b>						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
<b>Anions and Nutrients (QCLot: 79792)</b>						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
<b>Anions and Nutrients (QCLot: 79794)</b>						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	---
<b>Anions and Nutrients (QCLot: 79795)</b>						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	---
<b>Anions and Nutrients (QCLot: 79796)</b>						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
<b>Anions and Nutrients (QCLot: 81571)</b>						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
<b>Dissolved Metals (QCLot: 80476)</b>						
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	---
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	---
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	---
barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	---
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	---
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	---
boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	---



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 80476) - continued</b>						
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
sodium, dissolved	17341-25-2	E421	0.05	mg/L	<0.050	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
<b>Dissolved Metals (QCLot: 80477)</b>						
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	<0.00010	----
<b>Dissolved Metals (QCLot: 81229)</b>						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
<b>Volatile Organic Compounds (QCLot: 79732)</b>						



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Volatile Organic Compounds (QCLot: 79732) - continued</b>						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	----
styrene	100-42-5	E611A	0.5	µg/L	<0.50	----
toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	<0.50	----
xylene, o-	95-47-6	E611A	0.5	µg/L	<0.50	----
<b>Hydrocarbons (QCLot: 81020)</b>						
EPH (C10-C19)	----	E601A	250	µg/L	<250	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	----
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 81019)</b>						
acenaphthene	83-32-9	E641A	0.01	µg/L	<0.010	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	<0.010	----
acridine	260-94-6	E641A	0.01	µg/L	<0.010	----
anthracene	120-12-7	E641A	0.01	µg/L	<0.010	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	<0.010	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	<0.010	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	<0.010	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	<0.010	----
chrysene	218-01-9	E641A	0.01	µg/L	<0.010	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	<0.0050	----
fluoranthene	206-44-0	E641A	0.01	µg/L	<0.010	----
fluorene	86-73-7	E641A	0.01	µg/L	<0.010	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	<0.010	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	<0.010	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	<0.010	----
naphthalene	91-20-3	E641A	0.05	µg/L	<0.050	----
phenanthrene	85-01-8	E641A	0.02	µg/L	<0.020	----
pyrene	129-00-0	E641A	0.01	µg/L	<0.010	----
quinoline	6027-02-7	E641A	0.05	µg/L	<0.050	----





## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Physical Tests (QCLot: 79730)</b>									
turbidity	---	E121	0.1	NTU	200 NTU	99.0	85.0	115	---
<b>Physical Tests (QCLot: 79808)</b>									
pH	---	E108	---	pH units	7 pH units	99.8	98.0	102	---
<b>Physical Tests (QCLot: 79809)</b>									
alkalinity, phenolphthalein (as CaCO <sub>3</sub> )	---	E290	1	mg/L	229 mg/L	104	75.0	125	---
alkalinity, total (as CaCO <sub>3</sub> )	---	E290	1	mg/L	500 mg/L	101	85.0	115	---
<b>Physical Tests (QCLot: 79810)</b>									
conductivity	---	E100	1	µS/cm	146.9 µS/cm	100	90.0	110	---
<b>Physical Tests (QCLot: 79811)</b>									
acidity (as CaCO <sub>3</sub> )	---	E283	2	mg/L	50 mg/L	102	85.0	115	---
<b>Physical Tests (QCLot: 81419)</b>									
solids, total dissolved [TDS]	---	E162	10	mg/L	1000 mg/L	104	85.0	115	---
<b>Anions and Nutrients (QCLot: 79791)</b>									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	---
<b>Anions and Nutrients (QCLot: 79792)</b>									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	101	90.0	110	---
<b>Anions and Nutrients (QCLot: 79794)</b>									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	101	90.0	110	---
<b>Anions and Nutrients (QCLot: 79795)</b>									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.6	90.0	110	---
<b>Anions and Nutrients (QCLot: 79796)</b>									
sulfate (as SO <sub>4</sub> )	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	102	90.0	110	---
<b>Anions and Nutrients (QCLot: 81571)</b>									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.12 mg/L	99.7	85.0	115	---
<b>Dissolved Metals (QCLot: 80476)</b>									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	100	80.0	120	---
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	98.4	80.0	120	---
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	95.4	80.0	120	---
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	97.9	80.0	120	---
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	100	80.0	120	---
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	110	80.0	120	---
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	98.8	80.0	120	---



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 80476) - continued</b>									
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	97.8	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	105	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	100.0	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	95.3	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	95.1	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	90.0	80.0	120	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	105	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	102	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	102	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	95.8	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	101	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	92.3	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	101	70.0	130	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	98.1	80.0	120	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	101	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	93.0	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	102	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	102	80.0	120	----
sodium, dissolved	17341-25-2	E421	0.05	mg/L	50 mg/L	99.6	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	106	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	114	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	101	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	105	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	97.7	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	98.2	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	89.4	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	106	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	107	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	101	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	95.8	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	97.6	80.0	120	----
<b>Dissolved Metals (QCLot: 80477)</b>									
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	0.25 mg/L	96.9	80.0	120	----
<b>Dissolved Metals (QCLot: 81229)</b>									
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	96.8	80.0	120	----
<b>Volatile Organic Compounds (QCLot: 79732)</b>									



Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 79732) - continued</b>									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	98.2	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	91.3	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	113	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	91.4	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	97.3	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	200 µg/L	108	70.0	130	----
xylene, o-	95-47-6	E611A	0.5	µg/L	100 µg/L	94.4	70.0	130	----
<b>Hydrocarbons (QCLot: 81020)</b>									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	114	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	111	70.0	130	----
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 81019)</b>									
acenaphthene	83-32-9	E641A	0.01	µg/L	0.5 µg/L	112	60.0	130	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5 µg/L	113	60.0	130	----
acridine	260-94-6	E641A	0.01	µg/L	0.5 µg/L	97.5	60.0	130	----
anthracene	120-12-7	E641A	0.01	µg/L	0.5 µg/L	115	60.0	130	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5 µg/L	106	60.0	130	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5 µg/L	130	60.0	130	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	0.5 µg/L	117	60.0	130	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	1 µg/L	121	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5 µg/L	115	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5 µg/L	126	60.0	130	----
chrysene	218-01-9	E641A	0.01	µg/L	0.5 µg/L	114	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	0.5 µg/L	116	60.0	130	----
fluoranthene	206-44-0	E641A	0.01	µg/L	0.5 µg/L	111	60.0	130	----
fluorene	86-73-7	E641A	0.01	µg/L	0.5 µg/L	103	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5 µg/L	119	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5 µg/L	117	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	0.5 µg/L	109	60.0	130	----
naphthalene	91-20-3	E641A	0.05	µg/L	0.5 µg/L	105	50.0	130	----
phenanthrene	85-01-8	E641A	0.02	µg/L	0.5 µg/L	109	60.0	130	----
pyrene	129-00-0	E641A	0.01	µg/L	0.5 µg/L	115	60.0	130	----
quinoline	6027-02-7	E641A	0.05	µg/L	0.5 µg/L	121	60.0	130	----



### Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 79791)</b>										
VA20B3997-003	Anonymous	chloride	16887-00-6	E235.Cl	519 mg/L	500 mg/L	104	75 0	125	----
<b>Anions and Nutrients (QCLot: 79792)</b>										
VA20B3997-003	Anonymous	fluoride	16984-48-8	E235 F	4.92 mg/L	5 mg/L	98.5	75 0	125	----
<b>Anions and Nutrients (QCLot: 79794)</b>										
VA20B3997-003	Anonymous	nitrate (as N)	14797-55-8	E235 NO3-L	13.0 mg/L	12.5 mg/L	104	75 0	125	----
<b>Anions and Nutrients (QCLot: 79795)</b>										
VA20B3997-003	Anonymous	nitrite (as N)	14797-65-0	E235 NO2-L	2.45 mg/L	2.5 mg/L	98.1	75 0	125	----
<b>Anions and Nutrients (QCLot: 79796)</b>										
VA20B3997-003	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	ND mg/L	500 mg/L	ND	75 0	125	----
<b>Anions and Nutrients (QCLot: 81571)</b>										
VA20B3953-002	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.203 mg/L	0.2 mg/L	102	75 0	125	----
<b>Dissolved Metals (QCLot: 80476)</b>										
VA20B3998-002	Anonymous	aluminum, dissolved	7429-90-5	E421	0.394 mg/L	0.4 mg/L	98.5	70 0	130	----
		antimony, dissolved	7440-36-0	E421	0.0413 mg/L	0.04 mg/L	103	70 0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0377 mg/L	0.04 mg/L	94.2	70 0	130	----
		barium, dissolved	7440-39-3	E421	0.0375 mg/L	0.04 mg/L	93.8	70 0	130	----
		beryllium, dissolved	7440-41-7	E421	0.0773 mg/L	0.08 mg/L	96.6	70 0	130	----
		bismuth, dissolved	7440-69-9	E421	0.0178 mg/L	0.02 mg/L	89.3	70 0	130	----
		boron, dissolved	7440-42-8	E421	0.169 mg/L	0.2 mg/L	84.6	70 0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00789 mg/L	0.008 mg/L	98.6	70 0	130	----
		calcium, dissolved	7440-70-2	E421	ND mg/L	8 mg/L	ND	70 0	130	----
		cesium, dissolved	7440-46-2	E421	0.0204 mg/L	0.02 mg/L	102	70 0	130	----
		cobalt, dissolved	7440-48-4	E421	0.0370 mg/L	0.04 mg/L	92.4	70 0	130	----
		copper, dissolved	7440-50-8	E421	0.0362 mg/L	0.04 mg/L	90.5	70 0	130	----
		iron, dissolved	7439-89-6	E421	3.76 mg/L	4 mg/L	93.9	70 0	130	----
		lead, dissolved	7439-92-1	E421	0.0366 mg/L	0.04 mg/L	91.6	70 0	130	----
		lithium, dissolved	7439-93-2	E421	0.194 mg/L	0.2 mg/L	97.1	70 0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	2 mg/L	ND	70 0	130	----
		manganese, dissolved	7439-96-5	E421	0.0382 mg/L	0.04 mg/L	95.5	70 0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 80476) - continued</b>										
VA20B3998-002	Anonymous	molybdenum, dissolved	7439-98-7	E421	0.0432 mg/L	0.04 mg/L	108	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0725 mg/L	0.08 mg/L	90.6	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	20.3 mg/L	20 mg/L	102	70.0	130	----
		potassium, dissolved	7440-09-7	E421	8.20 mg/L	8 mg/L	102	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.0393 mg/L	0.04 mg/L	98.3	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0868 mg/L	0.08 mg/L	108	70.0	130	----
		silicon, dissolved	7440-21-3	E421	19.5 mg/L	20 mg/L	97.6	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00833 mg/L	0.008 mg/L	104	70.0	130	----
		sodium, dissolved	17341-25-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		strontium, dissolved	7440-24-6	E421	ND mg/L	0.04 mg/L	ND	70.0	130	----
		sulfur, dissolved	7704-34-9	E421	ND mg/L	40 mg/L	ND	70.0	130	----
		tellurium, dissolved	13494-80-9	E421	0.0835 mg/L	0.08 mg/L	104	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00733 mg/L	0.008 mg/L	91.7	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0419 mg/L	0.04 mg/L	105	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0408 mg/L	0.04 mg/L	102	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0778 mg/L	0.08 mg/L	97.2	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0406 mg/L	0.04 mg/L	102	70.0	130	----
		uranium, dissolved	7440-61-1	E421	ND mg/L	0.008 mg/L	ND	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.203 mg/L	0.2 mg/L	102	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.723 mg/L	0.8 mg/L	90.4	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0827 mg/L	0.08 mg/L	103	70.0	130	----
<b>Dissolved Metals (QCLot: 80477)</b>										
VA20B3998-002	Anonymous	chromium, dissolved	7440-47-3	E421.Cr-L	0.0784 mg/L	0.08 mg/L	97.9	70.0	130	----
<b>Dissolved Metals (QCLot: 81229)</b>										
VA20B4067-006	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000970 mg/L	0.0001 mg/L	97.0	70.0	130	----
<b>Volatile Organic Compounds (QCLot: 79732)</b>										
VA20B3842-011	Anonymous	benzene	71-43-2	E611A	93.2 µg/L	100 µg/L	93.2	60.0	140	----
		ethylbenzene	100-41-4	E611A	87.3 µg/L	100 µg/L	87.3	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	110 µg/L	100 µg/L	110	60.0	140	----
		styrene	100-42-5	E611A	89.2 µg/L	100 µg/L	89.2	60.0	140	----
		toluene	108-88-3	E611A	91.9 µg/L	100 µg/L	91.9	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	207 µg/L	200 µg/L	103	60.0	140	----
		xylene, o-	95-47-6	E611A	90.6 µg/L	100 µg/L	90.6	60.0	140	----





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# Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

## Affix ALS barcode label here

(lab use only)

COC Number: 17 -

Page of

<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>			<b>Select Service Level Below - Contact your AM to confirm all E&amp;P TATs (surcharges may apply)</b>							
Company: Wood		Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)			Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply							
Contact: Jeremiah Gladu		Quality Control (QC) Report with Report <input type="checkbox"/> YES <input type="checkbox"/> NO			PRIORITY (Business Days)	4 day [P4-20%] <input type="checkbox"/>		EMERGENCY	1 Business day [E - 100%] <input type="checkbox"/>			
Phone:		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked				3 day [P3-25%] <input type="checkbox"/>			Same Day, Weekend or Statutory holiday [E2 -200%] <input type="checkbox"/>			
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX				2 day [P2-50%] <input type="checkbox"/>			(Laboratory opening fees may apply) ]			
Street: 4445 Lougheed Hwy.		Email 1 or Fax jeremiah.glsdu@woodplc.com			Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm							
City/Province: Burnaby/BC		Email 2			For tests that can not be performed according to the service level selected, you will be contacted.							
Postal Code: V5C 0E4		Email 3			<b>Analysis Request</b>							
Invoice To Same as Report To <input type="checkbox"/> YES <input type="checkbox"/> NO		<b>Invoice Distribution</b>			<b>NUMBER OF CONTAINERS</b>	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below					<b>SAMPLES ON HOLD</b>	
Copy of Invoice with Report <input type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX				BTEX	EPH/PAH	General chemistry *	DISSOLVED METALS			
Company:		Email 1 or Fax										
Contact:		Email 2										
<b>Project Information</b>		<b>Oil and Gas Required Fields (client use)</b>										
ALS Account # / Quote #:		AFE/Cost Center:	PO#									
Job #: VE52855D		Major/Minor Code:	Routing Code:									
PO / AFE:		Requisitioner:										
LSD:		Location:										
ALS Lab Work Order # (lab use only): <b>B4083</b>		ALS Contact: Selam Worku	Sampler: Ardy M.									
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type								
	<del>MW 17-09B</del>	<del>25-04-20</del>	<del>15:00</del>	<del>"</del>								
2	MW 17-09B	"	15:00	"								
	<del>MW 17-27A</del>	<del>"</del>	<del>13:00</del>	<del>"</del>								
3	MW 17-27A	"	13:00	"								
	<del>MW 17-23A</del>	<del>"</del>	<del>11:00</del>	<del>"</del>								
	MW 17-23A	"	11:00	"								

Environmental Division  
Vancouver  
Work Order Reference  
**VA20B4083**



Telephone : + 1 604 253 4188

<b>Drinking Water (DW) Samples<sup>1</sup> (client use)</b>		<b>Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)</b>			<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>				
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO		*GENERAL WATER CHEMISTRY TO INCLUDE: pH, Alkalinity, bicarbonate, carbonate, chloride, conductivity, fluoride, hardness, hydroxide, nitrate, nitrite, ammonia, sulphate, turbidity, TDS, acidity			Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>				
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO					Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>				
<b>SHIPMENT RELEASE (client use)</b>		<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>			Cooling Initiated <input type="checkbox"/>				
Released by: Ardy Mansourpour	Date: Aug 28, 2020	Time:	Received by: Ardy Mansourpour	Date: Aug 29, 2020	Time: 8:10	INITIAL COOLER TEMPERATURES °C		FINAL COOLER TEMPERATURES °C	
					Received by: P. Chawera				
					Date: Aug 29, 2020				
					Time: 8:10				



**CERTIFICATE OF ANALYSIS**

**Work Order** : **VA20B4496**  
**Amendment** : **2**  
**Client** : **Wood Canada Ltd.**  
**Contact** : Jeremiah Gladu  
**Address** : 600 - 4445 Lougheed Hwy  
 Burnaby BC Canada V5C 0E4  
**Telephone** : 604 294 3811  
**Project** : VE52655D  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : Ardy M.  
**Site** : ----  
**Quote number** : VA20-SEAB100-0003 - Wood/Seabridge Gold  
**No. of samples received** : 1  
**No. of samples analysed** : 1

**Page** : 1 of 5  
**Laboratory** : Vancouver - Environmental  
**Account Manager** : Selam Worku  
**Address** : 8081 Lougheed Highway  
 Burnaby BC Canada V5A 1W9  
**Telephone** : +1 604 253 4188  
**Date Samples Received** : 04-Sep-2020 12:20  
**Date Analysis Commenced** : 05-Sep-2020  
**Issue Date** : 29-Oct-2020 09:48

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

**Signatories**

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Angelo Salandanan	Lab Assistant	Metals, Burnaby, British Columbia
Bruna Botti	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Cristina Alexandre	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics - Water Quality, Burnaby, British Columbia
Shaneel Dayal	Analyst	Metals, Burnaby, British Columbia





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
-	No Unit
µg/L	micrograms per litre
µS/cm	Microsiemens per centimetre
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in reports identified as "Preliminary Report" are considered authorized for use.

## Workorder Comments

Cesium, Rubidium, Tellurium, Thorium and Tungsten have been added to the report.



## Analytical Results

Sub-Matrix: Water					Client sample ID	MW17-09A	---	---	---	---
(Matrix: Water)					Client sampling date / time	29-Aug-2020	---	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20B4496-001	-----	-----	-----	-----	
					Result	---	---	---	---	
<b>Physical Tests</b>										
acidity (as CaCO3)	---	E283	2.0	mg/L	3.3	---	---	---	---	
alkalinity, bicarbonate (as CaCO3)	---	E290	1.0	mg/L	167	---	---	---	---	
alkalinity, carbonate (as CaCO3)	---	E290	1.0	mg/L	<1.0	---	---	---	---	
alkalinity, hydroxide (as CaCO3)	---	E290	1.0	mg/L	<1.0	---	---	---	---	
alkalinity, phenolphthalein (as CaCO3)	---	E290	1.0	mg/L	<1.0	---	---	---	---	
alkalinity, total (as CaCO3)	---	E290	1.0	mg/L	167	---	---	---	---	
conductivity	---	E100	2.0	µS/cm	386	---	---	---	---	
hardness (as CaCO3), dissolved	---	EC100	600	µg/L	160000	---	---	---	---	
pH	---	E108	0.10	pH units	8.03	---	---	---	---	
solids, total dissolved [TDS]	---	E162	10	mg/L	269	---	---	---	---	
turbidity	---	E121	0.10	NTU	149	---	---	---	---	
<b>Anions and Nutrients</b>										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0102	---	---	---	---	
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	---	---	---	---	
chloride	16887-00-6	E235.Cl	0.50	mg/L	1.89	---	---	---	---	
fluoride	16984-48-8	E235.F	0.020	mg/L	0.178	---	---	---	---	
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0086	---	---	---	---	
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0011	---	---	---	---	
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	49.3	---	---	---	---	
<b>Dissolved Metals</b>										
aluminum, dissolved	7429-90-5	E421	1.0	µg/L	66.5	---	---	---	---	
antimony, dissolved	7440 36 0	E421	0.10	µg/L	0.36	---	---	---	---	
arsenic, dissolved	7440-38-2	E421	0.10	µg/L	3.03	---	---	---	---	
barium, dissolved	7440 39 3	E421	0.10	µg/L	90.4	---	---	---	---	
beryllium, dissolved	7440-41-7	E421	0.020	µg/L	<0.020	---	---	---	---	
bismuth, dissolved	7440-69-9	E421	0.050	µg/L	<0.050	---	---	---	---	
boron, dissolved	7440-42-8	E421	10	µg/L	66	---	---	---	---	
cadmium, dissolved	7440-43-9	E421	0.0050	µg/L	0.0174	---	---	---	---	
calcium, dissolved	7440-70-2	E421	50	µg/L	53200	---	---	---	---	
cesium, dissolved	7440-46-2	E421	0.010	µg/L	0.029	---	---	---	---	
chromium, dissolved	7440-47-3	E421.Cr-L	0.10	µg/L	<0.10	---	---	---	---	



## Analytical Results

Sub-Matrix: Water					Client sample ID	MW17-09A	----	----	----	----
(Matrix: Water)					Client sampling date / time	29-Aug-2020	----	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B4496-001	-----	-----	-----	-----	
					Result	---	---	---	---	
<b>Dissolved Metals</b>										
cobalt, dissolved	7440-48-4	E421	0.10	µg/L	0.56	----	----	----	----	
copper, dissolved	7440-50-8	E421	0.20	µg/L	<0.20	----	----	----	----	
iron, dissolved	7439-89-6	E421	10	µg/L	1970	----	----	----	----	
lead, dissolved	7439-92-1	E421	0.050	µg/L	0.437	----	----	----	----	
lithium, dissolved	7439-93-2	E421	1.0	µg/L	8.5	----	----	----	----	
magnesium, dissolved	7439-95-4	E421	100	µg/L	6630	----	----	----	----	
manganese, dissolved	7439-96-5	E421	0.10	µg/L	1760	----	----	----	----	
mercury, dissolved	7439-97-6	E509	0.0050	µg/L	<0.0050	----	----	----	----	
molybdenum, dissolved	7439-98-7	E421	0.050	µg/L	4.08	----	----	----	----	
nickel, dissolved	7440-02-0	E421	0.50	µg/L	1.95	----	----	----	----	
phosphorus, dissolved	7723-14-0	E421	50	µg/L	<50	----	----	----	----	
potassium, dissolved	7440-09-7	E421	100	µg/L	6360	----	----	----	----	
rubidium, dissolved	7440-17-7	E421	0.20	µg/L	2.11	----	----	----	----	
selenium, dissolved	7782-49-2	E421	0.050	µg/L	0.217	----	----	----	----	
silicon, dissolved	7440-21-3	E421	50	µg/L	5470	----	----	----	----	
silver, dissolved	7440-22-4	E421	0.010	µg/L	<0.010	----	----	----	----	
sodium, dissolved	17341-25-2	E421	50	µg/L	36300	----	----	----	----	
strontium, dissolved	7440-24-6	E421	0.20	µg/L	332	----	----	----	----	
sulfur, dissolved	7704-34-9	E421	500	µg/L	21200	----	----	----	----	
tellurium, dissolved	13494-80-9	E421	0.20	µg/L	<0.20	----	----	----	----	
thallium, dissolved	7440-28-0	E421	0.010	µg/L	<0.010	----	----	----	----	
thorium, dissolved	7440-29-1	E421	0.10	µg/L	<0.10	----	----	----	----	
tin, dissolved	7440-31-5	E421	0.10	µg/L	0.28	----	----	----	----	
titanium, dissolved	7440-32-6	E421	0.30	µg/L	7.02	----	----	----	----	
tungsten, dissolved	7440-33-7	E421	0.10	µg/L	<0.10	----	----	----	----	
uranium, dissolved	7440-61-1	E421	0.010	µg/L	5.94	----	----	----	----	
vanadium, dissolved	7440-62-2	E421	0.50	µg/L	<0.50	----	----	----	----	
zinc, dissolved	7440-66-6	E421	1.0	µg/L	9.3	----	----	----	----	
zirconium, dissolved	7440-67-7	E421	0.30	µg/L	<0.30	----	----	----	----	
dissolved mercury filtration location	----	EP509	-	-	Field	----	----	----	----	
dissolved metals filtration location	----	EP421	-	-	Field	----	----	----	----	



Please refer to the General Comments section for an explanation of any qualifiers detected.

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## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>VA20B4496</b>	Page	: 1 of 9
Amendment	: <b>2</b>		
Client	: <b>Wood Canada Ltd.</b>	Laboratory	: Vancouver - Environmental
Contact	: Jeremiah Gladu	Account Manager	: Selam Worku
Address	: 600 - 4445 Lougheed Hwy Burnaby BC Canada V5C 0E4	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: VE52655D	Date Samples Received	: 04-Sep-2020 12:20
PO	: ----	Issue Date	: 29-Oct-2020 09:48
C-O-C number	: ----		
Sampler	: Ardy M.		
Site	: ----		
Quote number	: VA20-SEAB100-0003 - Wood/Seabridge Gold		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

## Summary of Outliers

### Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

### Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

### Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

### Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers occur - please see following pages for full details.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> MW17-09A	E298	29-Aug-2020	----	----	----		11-Sep-2020	28 days	12 days	✓
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
<b>HDPE</b> MW17-09A	E235.Br-L	29-Aug-2020	----	----	----		05-Sep-2020	28 days	6 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> MW17-09A	E235.Cl	29-Aug-2020	----	----	----		05-Sep-2020	28 days	6 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
<b>HDPE</b> MW17-09A	E235.F	29-Aug-2020	----	----	----		05-Sep-2020	28 days	6 days	✓
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
<b>HDPE</b> MW17-09A	E235.NO3-L	29-Aug-2020	----	----	----		05-Sep-2020	3 days	6 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
<b>HDPE</b> MW17-09A	E235.NO2-L	29-Aug-2020	----	----	----		05-Sep-2020	3 days	6 days	* EHTR
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
<b>HDPE</b> MW17-09A	E235.SO4	29-Aug-2020	----	----	----		05-Sep-2020	28 days	6 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> MW17-09A	E421.Cr-L	29-Aug-2020	11-Sep-2020	180 days	12 days	✓	11-Sep-2020	167 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> MW17-09A	E509	29-Aug-2020	06-Sep-2020	28 days	7 days	✓	06-Sep-2020	20 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> MW17-09A	E421	29-Aug-2020	11-Sep-2020	180 days	12 days	✓	11-Sep-2020	167 days	0 days	✓	
<b>Physical Tests : Acidity by Titration</b>											
<b>HDPE</b> MW17-09A	E283	29-Aug-2020	----	----	----		05-Sep-2020	14 days	6 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> MW17-09A	E290	29-Aug-2020	----	----	----		05-Sep-2020	14 days	6 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
<b>HDPE</b> MW17-09A	E100	29-Aug-2020	----	----	----		05-Sep-2020	28 days	6 days	✓	
<b>Physical Tests : pH by Meter</b>											
<b>HDPE</b> MW17-09A	E108	29-Aug-2020	----	----	----		05-Sep-2020	0.25 hrs	163 hrs	* EHTR-FM	
<b>Physical Tests : TDS by Gravimetry</b>											
<b>HDPE</b> MW17-09A	E162	29-Aug-2020	----	----	----		05-Sep-2020	7 days	6 days	✓	
<b>Physical Tests : Turbidity by Nephelometry</b>											
<b>HDPE</b> MW17-09A	E121	29-Aug-2020	----	----	----		08-Sep-2020	3 days	9 days	* EHTR	

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHTR: Exceeded ALS recommended hold time prior to sample receipt.



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Work Order : VA20B4496 Amendment 2  
Client : Wood Canada Ltd.  
Project : VE52655D

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Rec. HT: ALS recommended hold time (see units).

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## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Acidity by Titration	E283	82123	0	1	0.0	5.0	✖
Alkalinity Species by Titration	E290	82120	0	2	0.0	5.0	✖
Ammonia by Fluorescence	E298	84471	1	19	5.2	5.0	✔
Bromide in Water by IC (Low Level)	E235.Br-L	82109	1	14	7.1	5.0	✔
Chloride in Water by IC	E235.Cl	82107	1	14	7.1	5.0	✔
Conductivity in Water	E100	82121	1	2	50.0	5.0	✔
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	84373	1	1	100.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	82452	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	84372	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	82108	1	14	7.1	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	82110	1	15	6.6	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	82111	1	15	6.6	5.0	✔
pH by Meter	E108	82119	1	3	33.3	5.0	✔
Sulfate in Water by IC	E235.SO4	82112	1	14	7.1	5.0	✔
TDS by Gravimetry	E162	82114	1	19	5.2	5.0	✔
Turbidity by Nephelometry	E121	82696	1	20	5.0	5.0	✔
<b>Laboratory Control Samples (LCS)</b>							
Acidity by Titration	E283	82123	1	1	100.0	5.0	✔
Alkalinity Species by Titration	E290	82120	1	2	50.0	5.0	✔
Ammonia by Fluorescence	E298	84471	1	19	5.2	5.0	✔
Bromide in Water by IC (Low Level)	E235.Br-L	82109	1	14	7.1	5.0	✔
Chloride in Water by IC	E235.Cl	82107	1	14	7.1	5.0	✔
Conductivity in Water	E100	82121	1	2	50.0	5.0	✔
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	84373	1	1	100.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	82452	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	84372	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	82108	1	14	7.1	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	82110	1	15	6.6	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	82111	1	15	6.6	5.0	✔
pH by Meter	E108	82119	1	3	33.3	5.0	✔
Sulfate in Water by IC	E235.SO4	82112	1	14	7.1	5.0	✔
TDS by Gravimetry	E162	82114	1	19	5.2	5.0	✔
Turbidity by Nephelometry	E121	82696	1	20	5.0	5.0	✔
<b>Method Blanks (MB)</b>							
Acidity by Titration	E283	82123	1	1	100.0	5.0	✔
Alkalinity Species by Titration	E290	82120	1	2	50.0	5.0	✔
Ammonia by Fluorescence	E298	84471	1	19	5.2	5.0	✔



Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<i>Analytical Methods</i>							
<b>Method Blanks (MB) - Continued</b>							
Bromide in Water by IC (Low Level)	E235.Br-L	82109	1	14	7.1	5.0	✔
Chloride in Water by IC	E235.Cl	82107	1	14	7.1	5.0	✔
Conductivity in Water	E100	82121	1	2	50.0	5.0	✔
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	84373	1	1	100.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	82452	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	84372	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	82108	1	14	7.1	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	82110	1	15	6.6	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	82111	1	15	6.6	5.0	✔
Sulfate in Water by IC	E235.SO4	82112	1	14	7.1	5.0	✔
TDS by Gravimetry	E162	82114	1	19	5.2	5.0	✔
Turbidity by Nephelometry	E121	82696	1	20	5.0	5.0	✔
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	84471	1	19	5.2	5.0	✔
Bromide in Water by IC (Low Level)	E235.Br-L	82109	1	14	7.1	5.0	✔
Chloride in Water by IC	E235.Cl	82107	1	14	7.1	5.0	✔
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	84373	0	1	0.0	5.0	✖
Dissolved Mercury in Water by CVAAS	E509	82452	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	84372	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	82108	1	14	7.1	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	82110	1	15	6.6	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	82111	1	15	6.6	5.0	✔
Sulfate in Water by IC	E235.SO4	82112	1	14	7.1	5.0	✔



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 Vancouver - Environmental	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TDS by Gravimetry	E162 Vancouver - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Bromide in Water by IC (Low Level)	E235.Br-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Acidity by Titration	E283  Vancouver - Environmental	Water	APHA 2310 B (mod)	Acidity is determined by potentiometric titration to a specified endpoint.
Alkalinity Species by Titration	E290  Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298  Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
Dissolved Metals in Water by CRC ICPMS	E421  Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L  Vancouver - Environmental	Water	APHA 3030 B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS
Dissolved Mercury in Water by CVAAS	E509  Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
Dissolved Hardness (Calculated)	EC100  Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> ), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals Water Filtration	EP421  Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO <sub>3</sub> .
Dissolved Mercury Water Filtration	EP509  Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.

## QUALITY CONTROL REPORT

**Work Order** : **VA20B4496**

**Page** : 1 of 11

**Amendment** : **2**

**Client** : Wood Canada Ltd.  
**Contact** : Jeremiah Gladu  
**Address** : 1235 Main Street P.O. Box 2536  
 Smithers BC Canada V0J 2N0

**Laboratory** : Vancouver - Environmental  
**Account Manager** : Selam Worku  
**Address** : 8081 Lougheed Highway  
 Burnaby, British Columbia Canada V5A 1W9

**Telephone** : ----  
**Project** : VE52655D  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : Ardy M.  
**Site** : ----  
**Quote number** : VA20-SEAB100-0003 - Wood/Seabridge Gold  
**No. of samples received** : 1  
**No. of samples analysed** : 1

**Telephone** : +1 604 253 4188  
**Date Samples Received** : 04-Sep-2020 12:20  
**Date Analysis Commenced** : 05-Sep-2020  
**Issue Date** : 29-Oct-2020 09:48

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Angelo Salandanan	Lab Assistant	Metals, Burnaby, British Columbia
Bruna Botti	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Cristina Alexandre	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics - Water Quality, Burnaby, British Columbia
Shaneel Dayal	Analyst	Metals, Burnaby, British Columbia



## **General Comments**

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

# = Indicates a QC result that did not meet the ALS DQO.



### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 82114)</b>											
VA20B4461-001	Anonymous	solids, total dissolved [TDS]	----	E162	20	mg/L	251	243	3.24%	20%	----
<b>Physical Tests (QC Lot: 82119)</b>											
VA20B4492-001	Anonymous	pH	----	E108	0.10	pH units	8.27	8.28	0.121%	4%	----
<b>Physical Tests (QC Lot: 82121)</b>											
VA20B4492-001	Anonymous	conductivity	----	E100	2.0	µS/cm	390	389	0.257%	10%	----
<b>Physical Tests (QC Lot: 82696)</b>											
KS2001625-001	Anonymous	turbidity	----	E121	0.10	NTU	2.76	2.82	1.79%	15%	----
<b>Anions and Nutrients (QC Lot: 82107)</b>											
KS2001630-002	Anonymous	chloride	16887-00-6	E235.Cl	2.50	mg/L	46.8	47.1	0.696%	20%	----
<b>Anions and Nutrients (QC Lot: 82108)</b>											
KS2001630-002	Anonymous	fluoride	16984-48-8	E235.F	0.100	mg/L	0.202	0.197	0.006	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 82109)</b>											
KS2001630-002	Anonymous	bromide	24959-67-9	E235.Br-L	0.250	mg/L	<0.250	<0.250	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 82110)</b>											
KS2001630-002	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	<0.0250	<0.0250	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 82111)</b>											
KS2001630-002	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 82112)</b>											
KS2001630-002	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	1.50	mg/L	406	417	2.61%	20%	----
<b>Anions and Nutrients (QC Lot: 84471)</b>											
VA20B4374-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.500	mg/L	8.22	8.31	1.13%	20%	----
<b>Dissolved Metals (QC Lot: 82452)</b>											
VA20B4493-010	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 84372)</b>											
VA20B4496-001	MW17-09A	aluminum, dissolved	7429-90-5	E421	1.00	mg/L	66.5 µg/L	0.0656	1.35%	20%	----
		antimony, dissolved	7440-36-0	E421	0.100	mg/L	0.36 µg/L	0.00036	0.000003	Diff <2x LOR	----
		arsenic, dissolved	7440-38-2	E421	0.100	mg/L	3.03 µg/L	0.00316	4.35%	20%	----
		barium, dissolved	7440-39-3	E421	0.100	mg/L	90.4 µg/L	0.0908	0.487%	20%	----
		beryllium, dissolved	7440-41-7	E421	0.0200	mg/L	<0.020 µg/L	<0.000020	0	Diff <2x LOR	----
		bismuth, dissolved	7440-69-9	E421	0.0500	mg/L	<0.050 µg/L	<0.000050	0	Diff <2x LOR	----
		boron, dissolved	7440-42-8	E421	10.0	mg/L	66 µg/L	0.065	0.001	Diff <2x LOR	----





Sub-Matrix: **Water** *Laboratory Duplicate (DUP) Report*

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 84372) - continued</b>											
VA20B4496-001	MW17-09A	cadmium, dissolved	7440-43-9	E421	0.00500	mg/L	0 0174 µg/L	0.0000143	0.0000031	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E421	50 0	mg/L	53200 µg/L	53.5	0.495%	20%	----
		cesium, dissolved	7440-46-2	E421	0 0100	mg/L	0.029 µg/L	0 000028	0.0000005	Diff <2x LOR	----
		cobalt, dissolved	7440-48-4	E421	0.100	mg/L	0.56 µg/L	0.00055	0 000005	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.200	mg/L	<0.20 µg/L	<0.00020	0	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E421	10 0	mg/L	1970 µg/L	2 04	3.53%	20%	----
		lead, dissolved	7439-92-1	E421	0 0500	mg/L	0.437 µg/L	0 000447	0 000009	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E421	1.00	mg/L	8.5 µg/L	0.0084	0.0002	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	100	mg/L	6630 µg/L	6 88	3.67%	20%	----
		manganese, dissolved	7439-96-5	E421	0.100	mg/L	1760 µg/L	1.77	0.516%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0 0500	mg/L	4.08 µg/L	0.00403	1.29%	20%	----
		nickel, dissolved	7440-02-0	E421	0.500	mg/L	1.95 µg/L	0.00199	0.00004	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E421	50 0	mg/L	<50 µg/L	<0.050	0	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	100	mg/L	6360 µg/L	6 51	2.40%	20%	----
		rubidium, dissolved	7440-17-7	E421	0.200	mg/L	2.11 µg/L	0.00207	1.81%	20%	----
		selenium, dissolved	7782-49-2	E421	0 0500	mg/L	0.217 µg/L	0 000178	0 000039	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	50 0	mg/L	5470 µg/L	5.72	4.34%	20%	----
		silver, dissolved	7440-22-4	E421	0 0100	mg/L	<0.010 µg/L	<0 000010	0	Diff <2x LOR	----
		sodium, dissolved	17341-25-2	E421	50 0	mg/L	36300 µg/L	37.4	3.10%	20%	----
		strontium, dissolved	7440-24-6	E421	0.200	mg/L	332 µg/L	0.333	0.139%	20%	----
		sulfur, dissolved	7704-34-9	E421	500	mg/L	21200 µg/L	21.9	3.15%	20%	----
		tellurium, dissolved	13494-80-9	E421	0.200	mg/L	<0.20 µg/L	<0.00020	0	Diff <2x LOR	----
		thallium, dissolved	7440-28-0	E421	0 0100	mg/L	<0.010 µg/L	<0 000010	0	Diff <2x LOR	----
		thorium, dissolved	7440-29-1	E421	0.100	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		tin, dissolved	7440-31-5	E421	0.100	mg/L	0.28 µg/L	0.00030	0.00002	Diff <2x LOR	----
		titanium, dissolved	7440-32-6	E421	0.300	mg/L	7.02 µg/L	0.00667	5.07%	20%	----
		tungsten, dissolved	7440-33-7	E421	0.100	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E421	0 0100	mg/L	5.94 µg/L	0.00610	2.56%	20%	----
		vanadium, dissolved	7440-62-2	E421	0.500	mg/L	<0.50 µg/L	<0.00050	0	Diff <2x LOR	----
		zinc, dissolved	7440-66-6	E421	1.00	mg/L	9.3 µg/L	0.0096	0.0002	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.300	mg/L	<0.30 µg/L	<0.00030	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 84373)</b>											
VA20B4496-001	MW17-09A	chromium, dissolved	7440-47-3	E421.Cr-L	0.100	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 82114)</b>						
solids, total dissolved [TDS]	---	E162	10	mg/L	<10	---
<b>Physical Tests (QCLot: 82120)</b>						
alkalinity, bicarbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
alkalinity, carbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
alkalinity, hydroxide (as CaCO3)	---	E290	1	mg/L	<1.0	---
alkalinity, phenolphthalein (as CaCO3)	---	E290	1	mg/L	<1.0	---
alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
<b>Physical Tests (QCLot: 82121)</b>						
conductivity	---	E100	1	µS/cm	<1.0	---
<b>Physical Tests (QCLot: 82123)</b>						
acidity (as CaCO3)	---	E283	2	mg/L	<2.0	---
<b>Physical Tests (QCLot: 82696)</b>						
turbidity	---	E121	0.1	NTU	<0.10	---
<b>Anions and Nutrients (QCLot: 82107)</b>						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
<b>Anions and Nutrients (QCLot: 82108)</b>						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
<b>Anions and Nutrients (QCLot: 82109)</b>						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	---
<b>Anions and Nutrients (QCLot: 82110)</b>						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	---
<b>Anions and Nutrients (QCLot: 82111)</b>						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	---
<b>Anions and Nutrients (QCLot: 82112)</b>						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
<b>Anions and Nutrients (QCLot: 84471)</b>						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
<b>Dissolved Metals (QCLot: 82452)</b>						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	---
<b>Dissolved Metals (QCLot: 84372)</b>						
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	---
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	---
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	---



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 84372) - continued</b>						
barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	---
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	---
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	---
boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	---
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	---
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	---
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	---
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	---
copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	---
iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	---
lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	---
lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	---
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	---
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	---
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	---
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	---
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	---
potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	---
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	---
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	---
silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	---
silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	---
sodium, dissolved	17341-25-2	E421	0.05	mg/L	<0.050	---
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	---
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	---
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	---
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	---
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	---
tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	---
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	---
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	---
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	---
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	---
zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	---
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	---
<b>Dissolved Metals (QCLot: 84373)</b>						

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Work Order : VA20B4496 Amendment 2  
Client : Wood Canada Ltd.  
Project : VE52655D



Sub-Matrix: **Water**

<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Result</i>	<i>Qualifier</i>
<b>Dissolved Metals (QCLot: 84373) - continued</b>						
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	<0.00010	----



## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Physical Tests (QCLot: 82114)</b>									
solids, total dissolved [TDS]	---	E162	10	mg/L	1000 mg/L	105	85.0	115	---
<b>Physical Tests (QCLot: 82119)</b>									
pH	---	E108	---	pH units	7 pH units	100	98.0	102	---
<b>Physical Tests (QCLot: 82120)</b>									
alkalinity, phenolphthalein (as CaCO3)	---	E290	1	mg/L	229 mg/L	87.4	75.0	125	---
alkalinity, total (as CaCO3)	---	E290	1	mg/L	500 mg/L	102	85.0	115	---
<b>Physical Tests (QCLot: 82121)</b>									
conductivity	---	E100	1	µS/cm	146.9 µS/cm	103	90.0	110	---
<b>Physical Tests (QCLot: 82123)</b>									
acidity (as CaCO3)	---	E283	2	mg/L	50 mg/L	97.8	85.0	115	---
<b>Physical Tests (QCLot: 82696)</b>									
turbidity	---	E121	0.1	NTU	200 NTU	101	85.0	115	---
<b>Anions and Nutrients (QCLot: 82107)</b>									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	100	90.0	110	---
<b>Anions and Nutrients (QCLot: 82108)</b>									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	100	90.0	110	---
<b>Anions and Nutrients (QCLot: 82109)</b>									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	94.4	85.0	115	---
<b>Anions and Nutrients (QCLot: 82110)</b>									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	100	90.0	110	---
<b>Anions and Nutrients (QCLot: 82111)</b>									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.6	90.0	110	---
<b>Anions and Nutrients (QCLot: 82112)</b>									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	101	90.0	110	---
<b>Anions and Nutrients (QCLot: 84471)</b>									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.12 mg/L	94.0	85.0	115	---
<b>Dissolved Metals (QCLot: 82452)</b>									
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	102	80.0	120	---
<b>Dissolved Metals (QCLot: 84372)</b>									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	107	80.0	120	---
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	99.2	80.0	120	---
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	103	80.0	120	---



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Dissolved Metals (QCLot: 84372) - continued</b>									
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	109	80.0	120	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	104	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	106	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	105	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	108	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	103	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	98.7	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	105	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	104	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	99.7	80.0	120	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	106	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	105	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	92.2	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	118	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	100	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	103	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	97.7	70.0	130	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	107	80.0	120	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	105	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	104	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	106	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	102	80.0	120	----
sodium, dissolved	17341-25-2	E421	0.05	mg/L	50 mg/L	108	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	101	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	89.0	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	102	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	105	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	99.8	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	102	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	103	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	104	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	107	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	105	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	110	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	98.3	80.0	120	----
<b>Dissolved Metals (QCLot: 84373)</b>									
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	0.25 mg/L	106	80.0	120	----



### Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 82107)</b>										
KS2001630-003	Anonymous	chloride	16887-00-6	E235.Cl	507 mg/L	500 mg/L	101	75 0	125	----
<b>Anions and Nutrients (QCLot: 82108)</b>										
KS2001630-003	Anonymous	fluoride	16984-48-8	E235 F	5.04 mg/L	5 mg/L	101	75 0	125	----
<b>Anions and Nutrients (QCLot: 82109)</b>										
KS2001630-003	Anonymous	bromide	24959-67-9	E235 Br-L	2.40 mg/L	2.5 mg/L	95.8	75 0	125	----
<b>Anions and Nutrients (QCLot: 82110)</b>										
KS2001630-003	Anonymous	nitrate (as N)	14797-55-8	E235 NO3-L	12.6 mg/L	12.5 mg/L	101	75 0	125	----
<b>Anions and Nutrients (QCLot: 82111)</b>										
KS2001630-003	Anonymous	nitrite (as N)	14797-65-0	E235 NO2-L	2.50 mg/L	2.5 mg/L	100	75 0	125	----
<b>Anions and Nutrients (QCLot: 82112)</b>										
KS2001630-003	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	500 mg/L	500 mg/L	100	75 0	125	----
<b>Anions and Nutrients (QCLot: 84471)</b>										
VA20B4378-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	11.4 mg/L	10 mg/L	114	75 0	125	----
<b>Dissolved Metals (QCLot: 82452)</b>										
VA20B4493-011	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000929 mg/L	0 0001 mg/L	92.9	70 0	130	----
<b>Dissolved Metals (QCLot: 84372)</b>										
VA20B4470-002	Anonymous	aluminum, dissolved	7429-90-5	E421	0.198 mg/L	0.2 mg/L	98.8	70 0	130	----
		antimony, dissolved	7440-36-0	E421	0 0201 mg/L	0.02 mg/L	101	70 0	130	----
		arsenic, dissolved	7440-38-2	E421	0 0185 mg/L	0.02 mg/L	92.3	70 0	130	----
		barium, dissolved	7440-39-3	E421	0 0198 mg/L	0.02 mg/L	98.9	70 0	130	----
		beryllium, dissolved	7440-41-7	E421	0 0414 mg/L	0.04 mg/L	104	70 0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00985 mg/L	0.01 mg/L	98.5	70 0	130	----
		boron, dissolved	7440-42-8	E421	0.097 mg/L	0.1 mg/L	97.0	70 0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00389 mg/L	0.004 mg/L	97.4	70 0	130	----
		calcium, dissolved	7440-70-2	E421	3.97 mg/L	4 mg/L	99.4	70 0	130	----
		cesium, dissolved	7440-46-2	E421	0.00985 mg/L	0.01 mg/L	98.5	70 0	130	----
		cobalt, dissolved	7440-48-4	E421	0 0192 mg/L	0.02 mg/L	96.1	70 0	130	----
		copper, dissolved	7440-50-8	E421	0 0190 mg/L	0.02 mg/L	95.1	70 0	130	----
		iron, dissolved	7439-89-6	E421	1.86 mg/L	2 mg/L	93.3	70 0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 84372) - continued</b>										
VA20B4470-002	Anonymous	lead, dissolved	7439-92-1	E421	0.0203 mg/L	0.02 mg/L	102	70.0	130	----
		lithium, dissolved	7439-93-2	E421	0.101 mg/L	0.1 mg/L	101	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	0.993 mg/L	1 mg/L	99.3	70.0	130	----
		manganese, dissolved	7439-96-5	E421	0.0187 mg/L	0.02 mg/L	93.5	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	0.0199 mg/L	0.02 mg/L	99.4	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0385 mg/L	0.04 mg/L	96.2	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	9.80 mg/L	10 mg/L	98.0	70.0	130	----
		potassium, dissolved	7440-09-7	E421	3.92 mg/L	4 mg/L	97.9	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.0187 mg/L	0.02 mg/L	93.6	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0392 mg/L	0.04 mg/L	97.9	70.0	130	----
		silicon, dissolved	7440-21-3	E421	9.07 mg/L	10 mg/L	90.7	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00407 mg/L	0.004 mg/L	102	70.0	130	----
		sodium, dissolved	17341-25-2	E421	2.21 mg/L	2 mg/L	110	70.0	130	----
		strontium, dissolved	7440-24-6	E421	0.0193 mg/L	0.02 mg/L	96.6	70.0	130	----
		sulfur, dissolved	7704-34-9	E421	20.4 mg/L	20 mg/L	102	70.0	130	----
		tellurium, dissolved	13494-80-9	E421	0.0428 mg/L	0.04 mg/L	107	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00402 mg/L	0.004 mg/L	100	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0204 mg/L	0.02 mg/L	102	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0188 mg/L	0.02 mg/L	94.3	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0379 mg/L	0.04 mg/L	94.7	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0200 mg/L	0.02 mg/L	100	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.00388 mg/L	0.004 mg/L	97.0	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.0947 mg/L	0.1 mg/L	94.7	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.403 mg/L	0.4 mg/L	101	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0402 mg/L	0.04 mg/L	100	70.0	130	----





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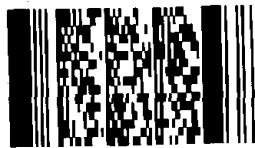
# Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here  
(lab use only)

COC Number: 17 -

Page of

<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>			<b>Select Service Level Below - Contact your AM to confirm all E&amp;P TATs (surcharges may apply)</b>						
Company:	Wood.	Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)			Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply						
Contact:	Jeremiah Gladu	Quality Control (QC) Report with Report <input type="checkbox"/> YES <input type="checkbox"/> NO			PROPERTY (Business Days)	4 day [P4-20%] <input type="checkbox"/>		EMERGENCY	1 Business day [E - 100%] <input type="checkbox"/>		
Phone:		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked				3 day [P3-25%] <input type="checkbox"/>			Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] <input type="checkbox"/>		
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm						
Street:	4445 Lougheed Hwy.	Email 1 or Fax jeremiah.gladu@woodpic.com			For tests that can not be performed according to the service level selected, you will be contacted.						
City/Province:	Burnaby/BC	Email 2 <i>a.mansour</i>			<b>Analysis Request</b> Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below						
Postal Code:	V5C 0E4	Email 3									
<b>Invoice To</b>		<b>Invoice Distribution</b>			<b>NUMBER OF CONTAINERS</b>	<div style="text-align: center;"> <p>Environmental Division Vancouver Work Order Reference <b>VA20B4496</b></p>  <p>Telephone: +1 604 253 4188</p> </div>					
Same as Report To <input type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX*									
Copy of Invoice with Report <input type="checkbox"/> YES <input type="checkbox"/> NO		Email 1 or Fax									
Company:		Email 2									
Contact:											
<b>Project Information</b>		<b>Oil and Gas Required Fields (client use)</b>									
ALS Account # / Quote #:		AFE/Cost Center:	PO#:								
Job #:		Major/Minor Code:	Routing Code:								
PO / AFE:		Requisitioner:									
LSD:		Location:									
ALS Lab Work Order # (lab use only):		ALS Contact: Selam Worku	Sampler: Ardy M.								
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BTEX	EPH/PAH	General chemistry*	DISSOLVED METALS	<b>SAMPLES ON HOLD</b> SUSPECTED HAZARD (see Special Instructions)		
	<del>XXXXXX</del> MW17-09A	29-Aug-20	AM	GW			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			
<b>Drinking Water (DW) Samples<sup>1</sup> (client use)</b>		Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)			<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>						
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO		*GENERAL WATER CHEMISTRY TO INCLUDE: pH, Alkalinity, bicarbonate, carbonate, chloride, conductivity, fluoride, hardness, hydroxide, nitrate, nitrite, ammonia, sulphate, turbidity, TDS, acidity.			Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>						
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO					Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>						
					Cooling Initiated <input type="checkbox"/>						
					INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C			
					2.1°C			4.5			
<b>SHIPMENT RELEASE (client use)</b>		<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>			<b>FINAL SHIPMENT RECEPTION (lab use only)</b>						
Released by: Ardy Mansourpour		Date: 02-09-2020	Time:	Received by: <i>USA</i>	Date: Sept 3 2020	Time: 9:20	Received by: <i>em</i>	Date: 04 Sept. 2020	Time: 12:20pm		



CERTIFICATE OF ANALYSIS

Work Order : VA20B4087
Amendment : 2
Client : Wood Canada Ltd.
Contact : Jeremiah Gladu
Address : 600 - 4445 Lougheed Hwy
Burnaby BC Canada V5C 0E4
Telephone : 604 294 3811
Project : VE52655D
PO : ---
C-O-C number : ---
Sampler : Ardy M.
Site : ---
Quote number : VA20-SEAB100-0003 - Wood/Seabridge Gold
No. of samples received : 6
No. of samples analysed : 2

Page : 1 of 9
Laboratory : Vancouver - Environmental
Account Manager : Selam Worku
Address : 8081 Lougheed Highway
Burnaby BC Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 29-Aug-2020 08:10
Date Analysis Commenced : 01-Sep-2020
Issue Date : 27-Oct-2020 09:39

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
Analytical Results
Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Table with 3 columns: Signatories, Position, Laboratory Department. Lists names like Annabelle Prasad, Bruna Botti, Caitlin Macey, etc., along with their roles and departments.



## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
-	No Unit
µg/L	micrograms per litre
µS/cm	Microsiemens per centimetre
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in reports identified as "Preliminary Report" are considered authorized for use.

## Workorder Comments

Sample "MW-17-72B": Sample Not Received At Laboratory.

**Multiple Samples Received but not listed on submitted Chain of Custody: Sample "MW17-22A\*", Sample "MW17-22B\*", Sample "DUP", and Sample "MW17-13". All samples placed on hold. Please contact Account Manager.**

**Total Metals and Total Mercury bottles received for Samples "MW17-22A" and "MW17-22B". Samples logged in for Total Metals and Total Mercury Analyses.**

The units for trace metals have been updated to ug/L in this report.

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLQ	Detection Limit raised due to co-eluting interference. GCMS qualifier ion ratio did not meet acceptance criteria.



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					MW17-22A	MW17-22B	----	----	----
					28-Aug-2020 16:30	28-Aug-2020 16:30	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B4087-001	VA20B4087-002	-----	-----	-----
					Result	Result	----	----	----
<b>Physical Tests</b>									
acidity (as CaCO3)	----	E283	2.0	mg/L	<2.0	3.4	----	----	----
acidity, hot peroxide treated (as CaCO3)	----	E284A	25	mg/L	-114	<25	----	----	----
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	136	18.8	----	----	----
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	----	----	----
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	----	----	----
alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	----	----	----
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	136	18.8	----	----	----
conductivity	----	E100	2.0	µS/cm	350	44.9	----	----	----
hardness (as CaCO3), from total Ca/Mg	----	EC100A	600	µg/L	138000	----	----	----	----
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	----	20.2	----	----	----
pH	----	E108	0.10	pH units	8.06	6.86	----	----	----
solids, total dissolved [TDS]	----	E162	10	mg/L	213	30	----	----	----
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	<3.0	<3.0	----	----	----
turbidity	----	E121	0.10	NTU	3.26	0.17	----	----	----
hardness (as CaCO3), dissolved	----	EC100	600	µg/L	147000	24400	----	----	----
<b>Anions and Nutrients</b>									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0169	<0.0050	----	----	----
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	----	----	----
cyanate	88402-73-7	E343	0.20	mg/L	<0.20	<0.20	----	----	----
fluoride	16984-48-8	E235.F	0.020	mg/L	0.584	<0.020	----	----	----
Kjeldahl nitrogen, total [TKN]	----	E318	0.200	mg/L	0.202	<0.050	----	----	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	0.0342	----	----	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	----	----	----
nitrogen, total	7727-37-9	E366	0.030	mg/L	0.196	<0.030	----	----	----
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0676	0.0035	----	----	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	44.0	1.93	----	----	----
<b>Cyanides</b>									
cyanide, free	----	E339	0.0050	mg/L	<0.0050	<0.0050	----	----	----
cyanide, strong acid dissociable (total)	----	E333	0.0050	mg/L	<0.0050	<0.0050	----	----	----
cyanide, weak acid dissociable	----	E336	0.0050	mg/L	<0.0050	<0.0050	----	----	----



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					MW17-22A	MW17-22B	----	----	----
Client sampling date / time					28-Aug-2020 16:30	28-Aug-2020 16:30	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20B4087-001	VA20B4087-002	-----	-----	-----
					Result	Result	---	---	---
<b>Cyanides</b>									
thiocyanate	302-04-5	E344	0.50	mg/L	<0.50	<0.50	----	----	----
<b>Organic / Inorganic Carbon</b>									
carbon, total inorganic [TIC]	----	E354-L	0.50	mg/L	33.3	7.04	----	----	----
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	2.46	0.52	----	----	----
<b>Total Metals</b>									
aluminum, total	7429-90-5	E420	3.0	µg/L	244	9.6	----	----	----
antimony, total	7440-36-0	E420	0.10	µg/L	0.50	<0.10	----	----	----
arsenic, total	7440-38-2	E420	0.10	µg/L	3.24	<0.10	----	----	----
barium, total	7440-39-3	E420	0.10	µg/L	43.6	6.79	----	----	----
beryllium, total	7440-41-7	E420	0.100	µg/L	<0.100	<0.100	----	----	----
bismuth, total	7440-69-9	E420	0.050	µg/L	<0.050	<0.050	----	----	----
boron, total	7440-42-8	E420	10	µg/L	13	<10	----	----	----
cadmium, total	7440-43-9	E420	0.0050	µg/L	0.165	0.0532	----	----	----
calcium, total	7440-70-2	E420	50	µg/L	41000	7150	----	----	----
cesium, total	7440-46-2	E420	0.010	µg/L	0.023	<0.010	----	----	----
chromium, total	7440-47-3	E420.Cr-L	0.10	µg/L	1.07	<0.10	----	----	----
cobalt, total	7440-48-4	E420	0.10	µg/L	0.30	<0.10	----	----	----
copper, total	7440-50-8	E420	0.50	µg/L	2.78	<0.50	----	----	----
iron, total	7439-89-6	E420	10	µg/L	840	20	----	----	----
lead, total	7439-92-1	E420	0.050	µg/L	1.07	<0.050	----	----	----
lithium, total	7439-93-2	E420	1.0	µg/L	5.4	<1.0	----	----	----
magnesium, total	7439-95-4	E420	5.0	µg/L	8670	576	----	----	----
manganese, total	7439-96-5	E420	0.10	µg/L	337	1.90	----	----	----
mercury, total	7439-97-6	E508	0.0050	µg/L	<0.0050	<0.0050	----	----	----
molybdenum, total	7439-98-7	E420	0.050	µg/L	2.54	0.064	----	----	----
nickel, total	7440-02-0	E420	0.50	µg/L	1.73	<0.50	----	----	----
phosphorus, total	7723-14-0	E420	50	µg/L	85	<50	----	----	----
potassium, total	7440-09-7	E420	50	µg/L	4170	421	----	----	----
rubidium, total	7440-17-7	E420	0.20	µg/L	1.32	0.67	----	----	----
selenium, total	7782-49-2	E420	0.050	µg/L	0.144	<0.050	----	----	----
silicon, total	7440-21-3	E420	100	µg/L	6030	2100	----	----	----



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					MW17-22A	MW17-22B	----	----	----
					28-Aug-2020 16:30	28-Aug-2020 16:30	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20B4087-001	VA20B4087-002	-----	-----	-----
					Result	Result	---	---	---
<b>Total Metals</b>									
silver, total	7440-22-4	E420	0.010	µg/L	0.015	<0.010	----	----	----
sodium, total	17341-25-2	E420	50	µg/L	15200	647	----	----	----
strontium, total	7440-24-6	E420	0.20	µg/L	372	29.9	----	----	----
sulfur, total	7704-34-9	E420	500	µg/L	16600	600	----	----	----
tellurium, total	13494-80-9	E420	0.20	µg/L	<0.20	<0.20	----	----	----
thallium, total	7440-28-0	E420	0.010	µg/L	0.012	<0.010	----	----	----
thorium, total	7440-29-1	E420	0.10	µg/L	<0.10	<0.10	----	----	----
tin, total	7440-31-5	E420	0.10	µg/L	1.71	<0.10	----	----	----
titanium, total	7440-32-6	E420	0.30	µg/L	9.34	0.31	----	----	----
tungsten, total	7440-33-7	E420	0.10	µg/L	<0.10	<0.10	----	----	----
uranium, total	7440-61-1	E420	0.010	µg/L	0.652	<0.010	----	----	----
vanadium, total	7440-62-2	E420	0.50	µg/L	0.64	<0.50	----	----	----
zinc, total	7440-66-6	E420	3.0	µg/L	10.6	<3.0	----	----	----
zirconium, total	7440-67-7	E420	0.20	µg/L	0.37	<0.20	----	----	----
<b>Dissolved Metals</b>									
aluminum, dissolved	7429-90-5	E421	1.0	µg/L	5.6	1.7	----	----	----
antimony, dissolved	7440-36-0	E421	0.10	µg/L	0.25	<0.10	----	----	----
arsenic, dissolved	7440-38-2	E421	0.10	µg/L	1.56	<0.10	----	----	----
barium, dissolved	7440-39-3	E421	0.10	µg/L	39.3	8.13	----	----	----
beryllium, dissolved	7440-41-7	E421	0.100	µg/L	<0.100	<0.100	----	----	----
bismuth, dissolved	7440-69-9	E421	0.050	µg/L	<0.050	<0.050	----	----	----
boron, dissolved	7440-42-8	E421	10	µg/L	14	<10	----	----	----
cadmium, dissolved	7440-43-9	E421	0.0050	µg/L	0.0388	0.0537	----	----	----
calcium, dissolved	7440-70-2	E421	50	µg/L	44800	8540	----	----	----
cesium, dissolved	7440-46-2	E421	0.010	µg/L	<0.010	<0.010	----	----	----
chromium, dissolved	7440-47-3	E421.Cr-L	0.10	µg/L	<0.10	<0.10	----	----	----
cobalt, dissolved	7440-48-4	E421	0.10	µg/L	<0.10	<0.10	----	----	----
copper, dissolved	7440-50-8	E421	0.20	µg/L	3.67	<0.20	----	----	----
iron, dissolved	7439-89-6	E421	10	µg/L	32	<10	----	----	----
lead, dissolved	7439-92-1	E421	0.050	µg/L	0.192	<0.050	----	----	----
lithium, dissolved	7439-93-2	E421	1.0	µg/L	5.1	<1.0	----	----	----



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					MW17-22A	MW17-22B	----	----	----
Client sampling date / time					28-Aug-2020 16:30	28-Aug-2020 16:30	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20B4087-001	VA20B4087-002	-----	-----	-----
					Result	Result	---	---	---
<b>Dissolved Metals</b>									
magnesium, dissolved	7439-95-4	E421	5.0	µg/L	8590	755	----	----	----
manganese, dissolved	7439-96-5	E421	0.10	µg/L	183	0.99	----	----	----
mercury, dissolved	7439-97-6	E509	0.0050	µg/L	<0.0050	<0.0050	----	----	----
molybdenum, dissolved	7439-98-7	E421	0.050	µg/L	2.60	0.069	----	----	----
nickel, dissolved	7440-02-0	E421	0.50	µg/L	0.89	<0.50	----	----	----
phosphorus, dissolved	7723-14-0	E421	50	µg/L	<50	<50	----	----	----
potassium, dissolved	7440-09-7	E421	50	µg/L	4000	443	----	----	----
rubidium, dissolved	7440-17-7	E421	0.20	µg/L	0.91	0.78	----	----	----
selenium, dissolved	7782-49-2	E421	0.050	µg/L	0.065	<0.050	----	----	----
silicon, dissolved	7440-21-3	E421	50	µg/L	5720	1900	----	----	----
silver, dissolved	7440-22-4	E421	0.010	µg/L	<0.010	<0.010	----	----	----
sodium, dissolved	17341-25-2	E421	50	µg/L	15600	696	----	----	----
strontium, dissolved	7440-24-6	E421	0.20	µg/L	396	33.1	----	----	----
sulfur, dissolved	7704-34-9	E421	500	µg/L	16400	<500	----	----	----
tellurium, dissolved	13494-80-9	E421	0.20	µg/L	<0.20	<0.20	----	----	----
thallium, dissolved	7440-28-0	E421	0.010	µg/L	<0.010	<0.010	----	----	----
thorium, dissolved	7440-29-1	E421	0.10	µg/L	<0.10	<0.10	----	----	----
tin, dissolved	7440-31-5	E421	0.10	µg/L	0.38	<0.10	----	----	----
titanium, dissolved	7440-32-6	E421	0.30	µg/L	<0.30	<0.30	----	----	----
tungsten, dissolved	7440-33-7	E421	0.10	µg/L	<0.10	<0.10	----	----	----
uranium, dissolved	7440-61-1	E421	0.010	µg/L	0.624	0.018	----	----	----
vanadium, dissolved	7440-62-2	E421	0.50	µg/L	<0.50	<0.50	----	----	----
zinc, dissolved	7440-66-6	E421	1.0	µg/L	4.6	1.1	----	----	----
zirconium, dissolved	7440-67-7	E421	0.20	µg/L	<0.20	<0.20	----	----	----
dissolved mercury filtration location	----	EP509	-	-	Field	Field	----	----	----
dissolved metals filtration location	----	EP421	-	-	Field	Field	----	----	----
<b>Aggregate Organics</b>									
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	<20	----	----	----
phenols, total (4AAP)	----	E562	0.0010	mg/L	<0.0010	<0.0010	----	----	----
<b>Volatile Organic Compounds</b>									
chlorobenzene	108-90-7	E611C	0.50	µg/L	<0.50	<0.50	----	----	----



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					MW17-22A	MW17-22B	----	----	----
Client sampling date / time					28-Aug-2020 16:30	28-Aug-2020 16:30	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20B4087-001	VA20B4087-002	-----	-----	-----
					Result	Result	---	---	---
<b>Volatile Organic Compounds</b>									
chloromethane	74-87-3	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
dichloropropane, 1,2-	78-87-5	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
dichloropropylene, cis+trans-1,3-	542-75-6	E611C	0.75	µg/L	<0.75	<0.75	----	----	----
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.20	µg/L	<0.20	<0.20	----	----	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
trichlorofluoromethane	75-69-4	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>									
benzene	71-43-2	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
ethylbenzene	100-41-4	E611C	0.50	µg/L	2.14	<0.50	----	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
styrene	100-42-5	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
toluene	108-88-3	E611C	0.40	µg/L	<0.40	<0.40	----	----	----
xylene, m+p-	179601-23-1	E611C	0.50	µg/L	0.65	<0.50	----	----	----
xylene, o-	95-47-6	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
xylenes, total	1330-20-7	E611C	0.75	µg/L	<0.75	<0.75	----	----	----
<b>Volatile Organic Compounds [Drycleaning]</b>									
carbon tetrachloride	56-23-5	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
chloroethane	75-00-3	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
dichloroethane, 1,1-	75-34-3	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
dichloroethane, 1,2-	107-06-2	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
dichloroethylene, 1,1-	75-35-4	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
dichloroethylene, cis-1,2-	156-59-4	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
dichloroethylene, trans-1,2-	156-60-5	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
dichloromethane	75-09-2	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
tetrachloroethylene	127-18-4	E611C	0.50	µg/L	<0.50	<0.50	----	----	----





## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					MW17-22A	MW17-22B	----	----	----
Client sampling date / time					28-Aug-2020 16:30	28-Aug-2020 16:30	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20B4087-001	VA20B4087-002	-----	-----	-----
					Result	Result	---	---	---
<b>Volatile Organic Compounds [Drycleaning]</b>									
trichloroethane, 1,1,1-	71-55-6	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
trichloroethylene	79-01-6	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
vinyl chloride	75-01-4	E611C	0.40	µg/L	<0.40	<0.40	----	----	----
<b>Volatile Organic Compounds Surrogates</b>									
bromofluorobenzene, 4-	460-00-4	E611C	0.50	%	91.6	89.1	----	----	----
difluorobenzene, 1,4-	540-36-3	E611C	0.50	%	102	102	----	----	----
<b>Hydrocarbons</b>									
EPH (C10-C19)	----	E601A	250	µg/L	<250	<250	----	----	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	<250	----	----	----
HEPHw	----	EC600A	250	µg/L	<250	<250	----	----	----
LEPHw	----	EC600A	250	µg/L	<250	<250	----	----	----
<b>Hydrocarbons Surrogates</b>									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%	97.4	89.8	----	----	----
<b>Polycyclic Aromatic Hydrocarbons</b>									
acenaphthene	83-32-9	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
acenaphthylene	208-96-8	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
acridine	260-94-6	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
anthracene	120-12-7	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	<0.0050	<0.0050	----	----	----
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	<0.015	----	----	----
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
chrysene	218-01-9	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	<0.0050	<0.0050	----	----	----
fluoranthene	206-44-0	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
fluorene	86-73-7	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	2.90	<0.010	----	----	----
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	3.63	<0.010	----	----	----



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					MW17-22A	MW17-22B	----	----	----
					28-Aug-2020 16:30	28-Aug-2020 16:30	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20B4087-001	VA20B4087-002	-----	-----	-----
					Result	Result	---	---	---
<b>Polycyclic Aromatic Hydrocarbons</b>									
naphthalene	91-20-3	E641A	0.050	µg/L	4.27	<0.050	----	----	----
phenanthrene	85-01-8	E641A	0.020	µg/L	<0.020	<0.020	----	----	----
pyrene	129-00-0	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
quinoline	6027-02-7	E641A	0.050	µg/L	<5.50 <sup>DLO</sup>	<0.050	----	----	----
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>									
acridine-d9	34749-75-2	E641A	0.010	%	92.1	89.7			
chrysene-d12	1719-03-5	E641A	0.010	%	93.6	98.4	----	----	----
naphthalene-d8	1146-65-2	E641A	0.010	%	97.5	93.8	----	----	----
phenanthrene-d10	1517-22-2	E641A	0.010	%	104	104	----	----	----
<b>Volatile Organic Compounds [THMs]</b>									
bromodichloromethane	75-27-4	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
bromoform	75-25-2	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
chloroform	67-66-3	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
dibromochloromethane	124-48-1	E611C	0.50	µg/L	<0.50	<0.50	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>VA20B4087</b>	Page	: 1 of 20
Amendment	: <b>2</b>		
Client	: <b>Wood Canada Ltd.</b>	Laboratory	: Vancouver - Environmental
Contact	: Jeremiah Gladu	Account Manager	: Selam Worku
Address	: 600 - 4445 Lougheed Hwy Burnaby BC Canada V5C 0E4	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: VE52655D	Date Samples Received	: 29-Aug-2020 08:10
PO	: ----	Issue Date	: 27-Oct-2020 09:39
C-O-C number	: ----		
Sampler	: Ardy M.		
Site	: ----		
Quote number	: VA20-SEAB100-0003 - Wood/Seabridge Gold		
No. of samples received	: 6		
No. of samples analysed	: 2		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

## Summary of Outliers

### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.

### **Outliers : Analysis Holding Time Compliance (Breaches)**

- Analysis Holding Time Outliers exist - please see following pages for full details.

### **Outliers : Frequency of Quality Control Samples**

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>										
<b>Amber glass total (sulfuric acid)</b> MW17-22A	E559	28-Aug-2020	----	----	----		03-Sep-2020	28 days	5 days	✓
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>										
<b>Amber glass total (sulfuric acid)</b> MW17-22B	E559	28-Aug-2020	----	----	----		03-Sep-2020	28 days	5 days	✓
<b>Aggregate Organics : Phenols (4AAP) in Water by Colorimetry</b>										
<b>Amber glass total (sulfuric acid)</b> MW17-22A	E562	28-Aug-2020	----	----	----		03-Sep-2020	28 days	5 days	✓
<b>Aggregate Organics : Phenols (4AAP) in Water by Colorimetry</b>										
<b>Amber glass total (sulfuric acid)</b> MW17-22B	E562	28-Aug-2020	----	----	----		03-Sep-2020	28 days	5 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> MW17-22A	E298	28-Aug-2020	----	----	----		05-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> MW17-22B	E298	28-Aug-2020	----	----	----		05-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> MW17-22A	E235.Cl	28-Aug-2020	----	----	----		01-Sep-2020	28 days	3 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Chloride in Water by IC</b>											
<b>HDPE</b> MW17-22B	E235.Cl	28-Aug-2020	----	----	----		01-Sep-2020	28 days	3 days		✓
<b>Anions and Nutrients : Cyanate by Ion Selective Electrode</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> MW17-22A	E343	28-Aug-2020	----	----	----		08-Sep-2020	----	----		
<b>Anions and Nutrients : Cyanate by Ion Selective Electrode</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> MW17-22B	E343	28-Aug-2020	----	----	----		08-Sep-2020	----	----		
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
<b>HDPE</b> MW17-22A	E235.F	28-Aug-2020	----	----	----		01-Sep-2020	28 days	3 days		✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
<b>HDPE</b> MW17-22B	E235.F	28-Aug-2020	----	----	----		01-Sep-2020	28 days	3 days		✓
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
<b>HDPE</b> MW17-22A	E235.NO3-L	28-Aug-2020	----	----	----		01-Sep-2020	3 days	3 days		✓
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
<b>HDPE</b> MW17-22B	E235.NO3-L	28-Aug-2020	----	----	----		01-Sep-2020	3 days	3 days		✓
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
<b>HDPE</b> MW17-22A	E235.NO2-L	28-Aug-2020	----	----	----		01-Sep-2020	3 days	3 days		✓
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
<b>HDPE</b> MW17-22B	E235.NO2-L	28-Aug-2020	----	----	----		01-Sep-2020	3 days	3 days		✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
<b>HDPE</b> MW17-22A	E235.SO4	28-Aug-2020	----	----	----		01-Sep-2020	28 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
<b>HDPE</b> MW17-22B	E235.SO4	28-Aug-2020	----	----	----		01-Sep-2020	28 days	3 days	✓	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> MW17-22A	E318	28-Aug-2020	04-Sep-2020	28 days	6 days	✓	07-Sep-2020	21 days	2 days	✓	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> MW17-22B	E318	28-Aug-2020	04-Sep-2020	28 days	6 days	✓	07-Sep-2020	21 days	2 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> MW17-22A	E366	28-Aug-2020	04-Sep-2020	28 days	6 days	✓	08-Sep-2020	21 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> MW17-22B	E366	28-Aug-2020	04-Sep-2020	28 days	6 days	✓	08-Sep-2020	21 days	3 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> MW17-22A	E372-U	28-Aug-2020	04-Sep-2020	28 days	6 days	✓	05-Sep-2020	21 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> MW17-22B	E372-U	28-Aug-2020	04-Sep-2020	28 days	6 days	✓	05-Sep-2020	21 days	0 days	✓	
<b>Cyanides : Free Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> MW17-22A	E339	28-Aug-2020	----	----	----		04-Sep-2020	14 days	6 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> MW17-22B	E339	28-Aug-2020	----	----	----		04-Sep-2020	14 days	6 days	✓
<b>Cyanides : Thiocyanate by Colourimetry</b>										
<b>HDPE total (nitric acid)</b> MW17-22A	E344	28-Aug-2020	----	----	----		04-Sep-2020	14 days	7 days	✓
<b>Cyanides : Thiocyanate by Colourimetry</b>										
<b>HDPE total (nitric acid)</b> MW17-22B	E344	28-Aug-2020	----	----	----		04-Sep-2020	14 days	7 days	✓
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> MW17-22A	E333	28-Aug-2020	----	----	----		04-Sep-2020	14 days	6 days	✓
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> MW17-22B	E333	28-Aug-2020	----	----	----		04-Sep-2020	14 days	6 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> MW17-22A	E336	28-Aug-2020	----	----	----		04-Sep-2020	14 days	6 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> MW17-22B	E336	28-Aug-2020	----	----	----		04-Sep-2020	14 days	6 days	✓
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> MW17-22A	E421.Cr-L	28-Aug-2020	01-Sep-2020	180 days	4 days	✓	02-Sep-2020	175 days	0 days	✓
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> MW17-22B	E421.Cr-L	28-Aug-2020	01-Sep-2020	180 days	4 days	✓	02-Sep-2020	175 days	0 days	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> MW17-22A	E509	28-Aug-2020	03-Sep-2020	28 days	5 days	✔	03-Sep-2020	22 days	0 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> MW17-22B	E509	28-Aug-2020	03-Sep-2020	28 days	5 days	✔	03-Sep-2020	22 days	0 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> MW17-22A	E421	28-Aug-2020	01-Sep-2020	180 days	4 days	✔	02-Sep-2020	175 days	0 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> MW17-22B	E421	28-Aug-2020	01-Sep-2020	180 days	4 days	✔	02-Sep-2020	175 days	0 days	✔	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> MW17-22A	E601A	28-Aug-2020	03-Sep-2020	14 days	5 days	✔	04-Sep-2020	40 days	1 days	✔	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> MW17-22B	E601A	28-Aug-2020	03-Sep-2020	14 days	5 days	✔	04-Sep-2020	40 days	1 days	✔	
<b>Organic / Inorganic Carbon : Total Inorganic Carbon by Combustion (Low Level)</b>											
<b>HDPE</b> MW17-22A	E354-L	28-Aug-2020	----	----	----		02-Sep-2020	14 days	4 days	✔	
<b>Organic / Inorganic Carbon : Total Inorganic Carbon by Combustion (Low Level)</b>											
<b>HDPE</b> MW17-22B	E354-L	28-Aug-2020	----	----	----		02-Sep-2020	14 days	4 days	✔	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> MW17-22A	E355-L	28-Aug-2020	----	----	----		05-Sep-2020	28 days	7 days	✔	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>										
<b>Amber glass total (sulfuric acid)</b> MW17-22B	E355-L	28-Aug-2020	----	----	----		05-Sep-2020	28 days	7 days	✓
<b>Physical Tests : Acidity by Titration (Peroxide Treated)</b>										
<b>HDPE</b> MW17-22A	E284A	28-Aug-2020	----	----	----		15-Sep-2020	14 days	17 days	* EHT
<b>Physical Tests : Acidity by Titration (Peroxide Treated)</b>										
<b>HDPE</b> MW17-22B	E284A	28-Aug-2020	----	----	----		15-Sep-2020	14 days	17 days	* EHT
<b>Physical Tests : Acidity by Titration</b>										
<b>HDPE</b> MW17-22A	E283	28-Aug-2020	----	----	----		01-Sep-2020	14 days	4 days	✓
<b>Physical Tests : Acidity by Titration</b>										
<b>HDPE</b> MW17-22B	E283	28-Aug-2020	----	----	----		01-Sep-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
<b>HDPE</b> MW17-22A	E290	28-Aug-2020	----	----	----		01-Sep-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
<b>HDPE</b> MW17-22B	E290	28-Aug-2020	----	----	----		01-Sep-2020	14 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
<b>HDPE</b> MW17-22A	E100	28-Aug-2020	----	----	----		01-Sep-2020	28 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
<b>HDPE</b> MW17-22B	E100	28-Aug-2020	----	----	----		01-Sep-2020	28 days	4 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : pH by Meter</b>											
HDPE MW17-22A	E108	28-Aug-2020	----	----	----		01-Sep-2020	0.25 hrs	96 hrs	*	EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE MW17-22B	E108	28-Aug-2020	----	----	----		01-Sep-2020	0.25 hrs	96 hrs	*	EHTR-FM
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE MW17-22A	E162	28-Aug-2020	----	----	----		03-Sep-2020	7 days	6 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE MW17-22B	E162	28-Aug-2020	----	----	----		03-Sep-2020	7 days	6 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE MW17-22A	E160-H	28-Aug-2020	----	----	----		01-Sep-2020	7 days	4 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE MW17-22B	E160-H	28-Aug-2020	----	----	----		01-Sep-2020	7 days	4 days	✓	
<b>Physical Tests : Turbidity by Nephelometry</b>											
HDPE MW17-22A	E121	28-Aug-2020	----	----	----		01-Sep-2020	3 days	4 days	*	EHT
<b>Physical Tests : Turbidity by Nephelometry</b>											
HDPE MW17-22B	E121	28-Aug-2020	----	----	----		01-Sep-2020	3 days	4 days	*	EHT
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>											
Amber glass/Teflon lined cap (sodium bisulfate) MW17-22A	E641A	28-Aug-2020	03-Sep-2020	14 days	5 days	✓	04-Sep-2020	40 days	0 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> MW17-22B	E641A	28-Aug-2020	03-Sep-2020	14 days	5 days	✓	04-Sep-2020	40 days	0 days	✓	
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE total (nitric acid)</b> MW17-22A	E420.Cr-L	28-Aug-2020	----	----	----		05-Sep-2020	180 days	7 days	✓	
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE total (nitric acid)</b> MW17-22B	E420.Cr-L	28-Aug-2020	----	----	----		05-Sep-2020	180 days	7 days	✓	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
<b>Glass vial total (hydrochloric acid)</b> MW17-22A	E508	28-Aug-2020	----	----	----		03-Sep-2020	28 days	5 days	✓	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
<b>Glass vial total (hydrochloric acid)</b> MW17-22B	E508	28-Aug-2020	----	----	----		03-Sep-2020	28 days	5 days	✓	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE total (nitric acid)</b> MW17-22A	E420	28-Aug-2020	----	----	----		05-Sep-2020	180 days	7 days	✓	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE total (nitric acid)</b> MW17-22B	E420	28-Aug-2020	----	----	----		05-Sep-2020	180 days	7 days	✓	
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> MW17-22A	E611C	28-Aug-2020	03-Sep-2020	----	----		04-Sep-2020	----	----		
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> MW17-22B	E611C	28-Aug-2020	03-Sep-2020	----	----		04-Sep-2020	----	----		



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> MW17-22A	E611C	28-Aug-2020	03-Sep-2020	14 days	5 days	✓	04-Sep-2020	8 days	0 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> MW17-22B	E611C	28-Aug-2020	03-Sep-2020	14 days	5 days	✓	04-Sep-2020	8 days	0 days	✓	
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> MW17-22A	E611C	28-Aug-2020	03-Sep-2020	----	----		04-Sep-2020	----	----		
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> MW17-22B	E611C	28-Aug-2020	03-Sep-2020	----	----		04-Sep-2020	----	----		
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> MW17-22A	E611C	28-Aug-2020	03-Sep-2020	----	----		04-Sep-2020	----	----		
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> MW17-22B	E611C	28-Aug-2020	03-Sep-2020	----	----		04-Sep-2020	----	----		

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended  
 EHT: Exceeded ALS recommended hold time prior to analysis.  
 Rec. HT: ALS recommended hold time (see units).



## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Acidity by Titration	E283	79811	1	6	16.6	5.0	✔
Acidity by Titration (Peroxide Treated)	E284A	86039	1	2	50.0	5.0	✔
Alkalinity Species by Titration	E290	79809	1	10	10.0	5.0	✔
Ammonia by Fluorescence	E298	81674	1	11	9.0	5.0	✔
Chemical Oxygen Demand by Colourimetry	E559	81008	1	18	5.5	5.0	✔
Chloride in Water by IC	E235.Cl	79791	1	20	5.0	5.0	✔
Conductivity in Water	E100	79810	1	16	6.2	5.0	✔
Cyanate by Ion Selective Electrode	E343	82829	1	6	16.6	5.0	✔
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	79884	1	14	7.1	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	81229	1	11	9.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	79885	1	17	5.8	5.0	✔
Fluoride in Water by IC	E235.F	79792	1	20	5.0	5.0	✔
Free Cyanide by CFA	E339	81653	1	2	50.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	79794	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	79795	1	20	5.0	5.0	✔
pH by Meter	E108	79808	1	15	6.6	5.0	✔
Phenols (4AAP) in Water by Colorimetry	E562	81035	1	3	33.3	5.0	✔
Sulfate in Water by IC	E235.SO4	79796	1	20	5.0	5.0	✔
TDS by Gravimetry	E162	81419	1	20	5.0	5.0	✔
Thiocyanate by Colourimetry	E344	81891	1	2	50.0	5.0	✔
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	81131	1	18	5.5	5.0	✔
Total Cyanide by CFA	E333	81651	1	6	16.6	5.0	✔
Total Inorganic Carbon by Combustion (Low Level)	E354-L	80229	1	3	33.3	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	81719	1	18	5.5	5.0	✔
Total Mercury in Water by CVAAS	E508	81242	1	20	5.0	5.0	✔
Total Metals in Water by CRC ICPMS	E420	81130	1	19	5.2	5.0	✔
Total Nitrogen by Colourimetry	E366	81675	1	10	10.0	5.0	✔
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	81678	1	4	25.0	5.0	✔
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	81676	1	15	6.6	5.0	✔
TSS by Gravimetry	E160-H	79933	1	9	11.1	5.0	✔
Turbidity by Nephelometry	E121	79936	1	7	14.2	5.0	✔
VOCs (BC List) by Headspace GC-MS	E611C	81017	1	6	16.6	5.0	✔
WAD Cyanide by CFA	E336	81652	1	6	16.6	5.0	✔
<b>Laboratory Control Samples (LCS)</b>							
Acidity by Titration	E283	79811	1	6	16.6	5.0	✔
Acidity by Titration (Peroxide Treated)	E284A	86039	1	2	50.0	5.0	✔
Alkalinity Species by Titration	E290	79809	1	10	10.0	5.0	✔



Matrix: **Water**

Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<i>Analytical Methods</i>							
<b>Laboratory Control Samples (LCS) - Continued</b>							
Ammonia by Fluorescence	E298	81674	1	11	9.0	5.0	✓
BC PHC - EPH by GC-FID	E601A	81020	1	17	5.8	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	81008	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	79791	1	20	5.0	5.0	✓
Conductivity in Water	E100	79810	1	16	6.2	5.0	✓
Cyanate by Ion Selective Electrode	E343	82829	1	6	16.6	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	79884	1	14	7.1	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	81229	1	11	9.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	79885	1	17	5.8	5.0	✓
Fluoride in Water by IC	E235.F	79792	1	20	5.0	5.0	✓
Free Cyanide by CFA	E339	81653	1	2	50.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	79794	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	79795	1	20	5.0	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	81019	1	17	5.8	5.0	✓
pH by Meter	E108	79808	1	15	6.6	5.0	✓
Phenols (4AAP) in Water by Colorimetry	E562	81035	1	3	33.3	5.0	✓
Sulfate in Water by IC	E235.SO4	79796	1	20	5.0	5.0	✓
TDS by Gravimetry	E162	81419	1	20	5.0	5.0	✓
Thiocyanate by Colourimetry	E344	81891	1	2	50.0	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	81131	1	18	5.5	5.0	✓
Total Cyanide by CFA	E333	81651	1	6	16.6	5.0	✓
Total Inorganic Carbon by Combustion (Low Level)	E354-L	80229	1	3	33.3	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	81719	1	18	5.5	5.0	✓
Total Mercury in Water by CVAAS	E508	81242	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	81130	1	19	5.2	5.0	✓
Total Nitrogen by Colourimetry	E366	81675	1	10	10.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	81678	1	4	25.0	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	81676	1	15	6.6	5.0	✓
TSS by Gravimetry	E160-H	79933	1	9	11.1	5.0	✓
Turbidity by Nephelometry	E121	79936	1	7	14.2	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	81017	1	6	16.6	5.0	✓
WAD Cyanide by CFA	E336	81652	1	6	16.6	5.0	✓
<b>Method Blanks (MB)</b>							
Acidity by Titration	E283	79811	1	6	16.6	5.0	✓
Acidity by Titration (Peroxide Treated)	E284A	86039	1	2	50.0	5.0	✓
Alkalinity Species by Titration	E290	79809	1	10	10.0	5.0	✓
Ammonia by Fluorescence	E298	81674	1	11	9.0	5.0	✓
BC PHC - EPH by GC-FID	E601A	81020	1	17	5.8	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	81008	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	79791	1	20	5.0	5.0	✓
Conductivity in Water	E100	79810	1	16	6.2	5.0	✓



Matrix: **Water**

Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Method Blanks (MB) - Continued</b>							
Cyanate by Ion Selective Electrode	E343	82829	1	6	16.6	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	79884	1	14	7.1	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	81229	1	11	9.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	79885	2	17	11.7	5.0	✓
Fluoride in Water by IC	E235.F	79792	1	20	5.0	5.0	✓
Free Cyanide by CFA	E339	81653	1	2	50.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	79794	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	79795	1	20	5.0	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	81019	1	17	5.8	5.0	✓
Phenols (4AAP) in Water by Colorimetry	E562	81035	1	3	33.3	5.0	✓
Sulfate in Water by IC	E235.SO4	79796	1	20	5.0	5.0	✓
TDS by Gravimetry	E162	81419	1	20	5.0	5.0	✓
Thiocyanate by Colourimetry	E344	81891	1	2	50.0	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	81131	1	18	5.5	5.0	✓
Total Cyanide by CFA	E333	81651	1	6	16.6	5.0	✓
Total Inorganic Carbon by Combustion (Low Level)	E354-L	80229	1	3	33.3	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	81719	1	18	5.5	5.0	✓
Total Mercury in Water by CVAAS	E508	81242	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	81130	1	19	5.2	5.0	✓
Total Nitrogen by Colourimetry	E366	81675	1	10	10.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	81678	1	4	25.0	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	81676	1	15	6.6	5.0	✓
TSS by Gravimetry	E160-H	79933	1	9	11.1	5.0	✓
Turbidity by Nephelometry	E121	79936	1	7	14.2	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	81017	1	6	16.6	5.0	✓
WAD Cyanide by CFA	E336	81652	1	6	16.6	5.0	✓
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	81674	1	11	9.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	81008	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	79791	1	20	5.0	5.0	✓
Cyanate by Ion Selective Electrode	E343	82829	1	6	16.6	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	79884	1	14	7.1	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	81229	1	11	9.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	79885	1	17	5.8	5.0	✓
Fluoride in Water by IC	E235.F	79792	1	20	5.0	5.0	✓
Free Cyanide by CFA	E339	81653	1	2	50.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	79794	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	79795	1	20	5.0	5.0	✓
Phenols (4AAP) in Water by Colorimetry	E562	81035	1	3	33.3	5.0	✓
Sulfate in Water by IC	E235.SO4	79796	1	20	5.0	5.0	✓
Thiocyanate by Colourimetry	E344	81891	1	2	50.0	5.0	✓





Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<i>Analytical Methods</i>							
<b>Matrix Spikes (MS) - Continued</b>							
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	81131	1	18	5.5	5.0	✔
Total Cyanide by CFA	E333	81651	1	6	16.6	5.0	✔
Total Inorganic Carbon by Combustion (Low Level)	E354-L	80229	1	3	33.3	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	81719	1	18	5.5	5.0	✔
Total Mercury in Water by CVAAS	E508	81242	1	20	5.0	5.0	✔
Total Metals in Water by CRC ICPMS	E420	81130	1	19	5.2	5.0	✔
Total Nitrogen by Colourimetry	E366	81675	1	10	10.0	5.0	✔
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	81678	1	4	25.0	5.0	✔
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	81676	1	15	6.6	5.0	✔
VOCs (BC List) by Headspace GC-MS	E611C	81017	1	6	16.6	5.0	✔
WAD Cyanide by CFA	E336	81652	1	6	16.6	5.0	✔



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 Vancouver - Environmental	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TSS by Gravimetry	E160-H Vancouver - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
TDS by Gravimetry	E162 Vancouver - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Acidity by Titration	E283 Vancouver - Environmental	Water	APHA 2310 B (mod)	Acidity is determined by potentiometric titration to a specified endpoint.
Acidity by Titration (Peroxide Treated)	E284A Vancouver - Environmental	Water	APHA 2310 B (mod)	Acidity is determined by potentiometric titration with preliminary hot peroxide treatment to a specified endpoint.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Total Kjeldahl Nitrogen is determined using block digestion followed by flow-injection analysis with fluorescence detection.
Total Cyanide by CFA	E333 Vancouver - Environmental	Water	ISO 14403 (mod)	Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.
WAD Cyanide by CFA	E336 Vancouver - Environmental	Water	APHA 4500-CN I (mod)	Weak Acid Dissociable (WAD) cyanide is determined by in-line sample distillation with final determination by colourimetric analysis.
Free Cyanide by CFA	E339 Vancouver - Environmental	Water	ASTM D7237 (mod)	Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.
Cyanate by Ion Selective Electrode	E343 Waterloo - Environmental	Water	APHA 4500-CN L (mod)	This analysis is carried out using procedures adapted from APHA method 4500-CN "Cyanide". Cyanate is determined by the Cyanate hydrolysis method using an ammonia selective electrode
Thiocyanate by Colourimetry	E344 Vancouver - Environmental	Water	APHA 4500-CN M (mod)	Thiocyanate is determined by the ferric nitrate colourimetric method. Water samples containing high levels of hexavalent chromium, cyanide (together with sulfide), reducing agents, or hydrocarbons may cause negative or positive interferences with this method.
Total Inorganic Carbon by Combustion (Low Level)	E354-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Inorganic Carbon is determined by the high temperature combustion method with measurement by an infrared detector, where the sample is acidified in a reaction chamber to convert all inorganic carbons (carbonates) to carbon dioxide for analysis.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L  Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO <sub>2</sub> . NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Total Nitrogen by Colourimetry	E366  Vancouver - Environmental	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U  Vancouver - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Metals in Water by CRC ICPMS	E420  Vancouver - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L  Vancouver - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS.
Dissolved Metals in Water by CRC ICPMS	E421  Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L  Vancouver - Environmental	Water	APHA 3030 B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS
Total Mercury in Water by CVAAS	E508  Vancouver - Environmental	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
Dissolved Mercury in Water by CVAAS	E509  Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
Chemical Oxygen Demand by Colourimetry	E559  Vancouver - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Phenols (4AAP) in Water by Colorimetry	E562 Waterloo - Environmental	Water	EPA 9066	This automated method is based on the distillation of phenol and subsequent reaction of the distillate with alkaline ferricyanide (K <sub>3</sub> Fe(CN) <sub>6</sub> ) and 4-amino-antipyrine (4-AAP) to form a red complex which is measured colorimetrically.
BC PHC - EPH by GC-FID	E601A Vancouver - Environmental	Water	BC MOE Lab Manual	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.
VOCs (BC List) by Headspace GC-MS	E611C Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by Hexane LVI GC-MS	E641A Vancouver - Environmental	Water	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by large volume injection (LVI) GC-MS.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> ), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Hardness (Calculated) from Total Ca/Mg	EC100A Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> ), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
LEPH and HEPH: EPH-PAH	EC600A Vancouver - Environmental	Water	BC MOE Lab Manual (LEPH and HEPH) (mod)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Acenaphthene, Acridine, Anthracene, Fluorene, Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(a)pyrene, Fluoranthene, and Pyrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Digestion for TKN in water	EP318 Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Samples are digested using block digestion with Copper Sulfate Digestion Reagent.
Digestion for Total Nitrogen in water	EP366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
Digestion for Total Phosphorus in water	EP372 Vancouver - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO <sub>3</sub> .
Dissolved Mercury Water Filtration	EP509 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
VOCs Preparation for Headspace Analysis	EP581 Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

## QUALITY CONTROL REPORT

**Work Order** : **VA20B4087**

**Page** : 1 of 26

**Amendment** : **2**

**Client** : Wood Canada Ltd.  
**Contact** : Jeremiah Gladu  
**Address** : 1235 Main Street P.O. Box 2356  
 Smithers BC Canada V0J 2N0

**Laboratory** : Vancouver - Environmental  
**Account Manager** : Selam Worku  
**Address** : 8081 Lougheed Highway  
 Burnaby, British Columbia Canada V5A 1W9

**Telephone** : ----  
**Project** : VE52655D  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : Ardy M.  
**Site** : ----  
**Quote number** : VA20-SEAB100-0003 - Wood/Seabridge Gold  
**No. of samples received** : 6  
**No. of samples analysed** : 2

**Telephone** : +1 604 253 4188  
**Date Samples Received** : 29-Aug-2020 08:10  
**Date Analysis Commenced** : 01-Sep-2020  
**Issue Date** : 27-Oct-2020 09:39

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Annabelle Prasad	Analyst	Metals, Burnaby, British Columbia
Bruna Botti	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Cristina Alexandre	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kevin Duarte	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics - Water Quality, Burnaby, British Columbia
Ophelia Chiu	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Shaneel Dayal	Analyst	Metals, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics - Water Quality, Burnaby, British Columbia
Walt Kippenhuck	Team Leader - Inorganics	Inorganics, Waterloo, Ontario

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Work Order : VA20B4087 Amendment 2  
Client : Wood Canada Ltd.  
Project : VE52655D

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## **General Comments**

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

# = Indicates a QC result that did not meet the ALS DQO.





### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 79808)</b>											
VA20B4067-002	Anonymous	pH	----	E108	0.10	pH units	7.92	7.93	0.101%	4%	----
<b>Physical Tests (QC Lot: 79809)</b>											
VA20B4067-002	Anonymous	alkalinity, bicarbonate (as CaCO <sub>3</sub> )	----	E290	1.0	mg/L	53.2	53.1	0.188%	20%	----
		alkalinity, carbonate (as CaCO <sub>3</sub> )	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, hydroxide (as CaCO <sub>3</sub> )	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, phenolphthalein (as CaCO <sub>3</sub> )	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, total (as CaCO <sub>3</sub> )	----	E290	1.0	mg/L	53.2	53.1	0.188%	20%	----
<b>Physical Tests (QC Lot: 79810)</b>											
VA20B4067-002	Anonymous	conductivity	----	E100	2.0	µS/cm	278	278	0.00%	10%	----
<b>Physical Tests (QC Lot: 79811)</b>											
VA20B4067-002	Anonymous	acidity (as CaCO <sub>3</sub> )	----	E283	2.0	mg/L	<2.0	<2.0	0	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 79933)</b>											
VA20B4087-001	MW17-22A	solids, total suspended [TSS]	----	E160-H	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 79936)</b>											
VA20B4061-001	Anonymous	turbidity	----	E121	0.10	NTU	<0.10	<0.10	0	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 81419)</b>											
VA20B3998-001	Anonymous	solids, total dissolved [TDS]	----	E162	20	mg/L	663	640	3.53%	20%	----
<b>Physical Tests (QC Lot: 86039)</b>											
VA20B4087-001	MW17-22A	acidity, hot peroxide treated (as CaCO <sub>3</sub> )	----	E284A	25	mg/L	-114	-113	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 79791)</b>											
VA20B3928-009	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 79792)</b>											
VA20B3928-009	Anonymous	fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 79794)</b>											
VA20B3928-009	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 79795)</b>											
VA20B3928-009	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 79796)</b>											
VA20B3928-009	Anonymous	sulfate (as SO <sub>4</sub> )	14808-79-8	E235.SO4	0.30	mg/L	<0.30	<0.30	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 81674)</b>											



Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Anions and Nutrients (QC Lot: 81674) - continued</b>											
VA20B4023-009	Anonymous	ammonia, total (as N)	7664-41-7	E298	0 0050	mg/L	0 0082	0.0078	0.0003	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 81675)</b>											
VA20B4023-009	Anonymous	nitrogen, total	7727-37-9	E366	0.030	mg/L	0.205	0.202	0.002	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 81676)</b>											
VA20B4036-001	Anonymous	phosphorus, total	7723-14-0	E372-U	0 0020	mg/L	0 0052	0.0049	0.0003	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 81719)</b>											
VA20B4157-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.250	mg/L	6.91	7 00	1.18%	20%	----
<b>Anions and Nutrients (QC Lot: 82829)</b>											
WT2000114-010	Anonymous	cyanate	88402-73-7	E343	0.20	mg/L	800	780	2.47%	20%	----
<b>Cyanides (QC Lot: 81651)</b>											
VA20B4084-008	Anonymous	cyanide, strong acid dissociable (total)	----	E333	0 0050	mg/L	<0 0050	<0.0050	0	Diff <2x LOR	----
<b>Cyanides (QC Lot: 81652)</b>											
VA20B4084-008	Anonymous	cyanide, weak acid dissociable	----	E336	0 0050	mg/L	<0 0050	<0.0050	0	Diff <2x LOR	----
<b>Cyanides (QC Lot: 81653)</b>											
VA20B4087-001	MW17-22A	cyanide, free	----	E339	0 0050	mg/L	<0 0050	<0.0050	0	Diff <2x LOR	----
<b>Cyanides (QC Lot: 81891)</b>											
VA20B4087-001	MW17-22A	thiocyanate	302-04-5	E344	0.50	mg/L	<0.50	<0 50	0	Diff <2x LOR	----
<b>Organic / Inorganic Carbon (QC Lot: 80229)</b>											
VA20B3842-017	Anonymous	carbon, total inorganic [TIC]	----	E354-L	0.50	mg/L	13 2	13.3	0.798%	20%	----
<b>Organic / Inorganic Carbon (QC Lot: 81678)</b>											
VA20B4023-009	Anonymous	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	8.28	8 25	0.376%	20%	----
<b>Total Metals (QC Lot: 81130)</b>											
VA20B4084-001	Anonymous	aluminum, total	7429-90-5	E420	0 0030	mg/L	3.19	3 22	1.05%	20%	----
		antimony, total	7440-36-0	E420	0.00010	mg/L	0.00314	0.00319	1.61%	20%	----
		arsenic, total	7440-38-2	E420	0.00010	mg/L	0.131	0.129	1.40%	20%	----
		barium, total	7440-39-3	E420	0.00010	mg/L	0 0209	0.0201	3.67%	20%	----
		beryllium, total	7440-41-7	E420	0.000020	mg/L	0.000373	0 000373	0.0448%	20%	----
		bismuth, total	7440-69-9	E420	0.000050	mg/L	0.00126	0.00122	2.85%	20%	----
		boron, total	7440-42-8	E420	0.010	mg/L	0.138	0.141	2.36%	20%	----
		cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.00118	0.00122	3.18%	20%	----
		calcium, total	7440-70-2	E420	0.050	mg/L	114	116	1.30%	20%	----
		cesium, total	7440-46-2	E420	0.000010	mg/L	0.00716	0.00725	1.24%	20%	----
		cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00189	0.00190	0.279%	20%	----
		copper, total	7440-50-8	E420	0.00050	mg/L	0 0170	0.0169	0.396%	20%	----
		iron, total	7439-89-6	E420	0.010	mg/L	5.29	5 36	1.42%	20%	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Total Metals (QC Lot: 81130) - continued</b>											
VA20B4084-001	Anonymous	lead, total	7439-92-1	E420	0.000050	mg/L	0.427	0.422	1.34%	20%	----
		lithium, total	7439-93-2	E420	0.0010	mg/L	0.0184	0.0189	2.47%	20%	----
		magnesium, total	7439-95-4	E420	0.0050	mg/L	10.3	9.89	3.86%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	2.34	2.37	1.04%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00728	0.00730	0.317%	20%	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	0.0218	0.0218	0.0497%	20%	----
		phosphorus, total	7723-14-0	E420	0.050	mg/L	0.068	0.070	0.001	Diff <2x LOR	----
		potassium, total	7440-09-7	E420	0.050	mg/L	8.84	9.07	2.61%	20%	----
		rubidium, total	7440-17-7	E420	0.00020	mg/L	0.0286	0.0288	0.640%	20%	----
		selenium, total	7782-49-2	E420	0.000050	mg/L	0.000449	0.000525	0.000076	Diff <2x LOR	----
		silicon, total	7440-21-3	E420	0.10	mg/L	20.1	20.2	0.245%	20%	----
		silver, total	7440-22-4	E420	0.000010	mg/L	0.000965	0.000987	2.24%	20%	----
		sodium, total	17341-25-2	E420	0.050	mg/L	17.3	17.2	0.591%	20%	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	0.312	0.313	0.456%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	43.2	43.2	0.0585%	20%	----
		tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		thallium, total	7440-28-0	E420	0.000010	mg/L	0.000268	0.000256	4.48%	20%	----
		thorium, total	7440-29-1	E420	0.00010	mg/L	0.00042	0.00037	0.00005	Diff <2x LOR	----
		tin, total	7440-31-5	E420	0.00010	mg/L	0.00224	0.00228	1.96%	20%	----
		titanium, total	7440-32-6	E420	0.00030	mg/L	0.230	0.233	1.08%	20%	----
		tungsten, total	7440-33-7	E420	0.00010	mg/L	0.0270	0.0265	2.06%	20%	----
		uranium, total	7440-61-1	E420	0.000010	mg/L	0.000646	0.000684	5.79%	20%	----
		vanadium, total	7440-62-2	E420	0.00050	mg/L	0.00942	0.00947	0.600%	20%	----
		zinc, total	7440-66-6	E420	0.0030	mg/L	0.301	0.297	1.38%	20%	----
		zirconium, total	7440-67-7	E420	0.00020	mg/L	0.00074	0.00066	0.00008	Diff <2x LOR	----
<b>Total Metals (QC Lot: 81131)</b>											
VA20B4084-001	Anonymous	chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	0.0111	0.0109	2.40%	20%	----
<b>Total Metals (QC Lot: 81242)</b>											
VA20B4067-005	Anonymous	mercury total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 79884)</b>											
VA20B3887-001	Anonymous	chromium, dissolved	7440-47-3	E421.Cr-L	0.100	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 79885)</b>											
VA20B3887-001	Anonymous	aluminum, dissolved	7429-90-5	E421	1.00	mg/L	3.0 µg/L	0.0027	0.0003	Diff <2x LOR	----
		antimony, dissolved	7440 36 0	E421	0.100	mg/L	1.18 µg/L	0.00121	2.65%	20%	----
		arsenic, dissolved	7440-38-2	E421	0.100	mg/L	2.00 µg/L	0.00195	2.61%	20%	----



Sub-Matrix: **Water** *Laboratory Duplicate (DUP) Report*

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 79885) - continued</b>											
VA20B3887-001	Anonymous	barium, dissolved	7440-39-3	E421	0.100	mg/L	33 0 µg/L	0.0345	4.40%	20%	----
		beryllium, dissolved	7440-41-7	E421	0.100	mg/L	<0.100 µg/L	<0 000100	0	Diff <2x LOR	----
		bismuth, dissolved	7440-69-9	E421	0 0500	mg/L	<0.050 µg/L	<0 000050	0	Diff <2x LOR	----
		boron, dissolved	7440-42-8	E421	10 0	mg/L	<10 µg/L	<0.010	0	Diff <2x LOR	----
		cadmium, dissolved	7440-43-9	E421	0.00500	mg/L	0 0340 µg/L	0.0000304	0.0000036	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E421	50 0	mg/L	47000 µg/L	44.6	5.07%	20%	----
		cesium, dissolved	7440-46-2	E421	0 0100	mg/L	0.011 µg/L	0 000012	0 000001	Diff <2x LOR	----
		cobalt, dissolved	7440-48-4	E421	0.100	mg/L	0.12 µg/L	0.00011	0 000008	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.200	mg/L	0.22 µg/L	0.00020	0.00002	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E421	10 0	mg/L	30 µg/L	0.031	0.0002	Diff <2x LOR	----
		lead, dissolved	7439-92-1	E421	0 0500	mg/L	<0.050 µg/L	<0 000050	0	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E421	1.00	mg/L	5.0 µg/L	0.0050	0.00003	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	5.00	mg/L	8110 µg/L	8.12	0.0781%	20%	----
		manganese, dissolved	7439-96-5	E421	0.100	mg/L	134 µg/L	0.130	2.21%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0 0500	mg/L	4.34 µg/L	0.00441	1.69%	20%	----
		nickel, dissolved	7440-02-0	E421	0.500	mg/L	0.54 µg/L	<0.00050	0.00004	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E421	50 0	mg/L	<50 µg/L	<0.050	0	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	50 0	mg/L	3900 µg/L	3 89	0.103%	20%	----
		rubidium, dissolved	7440-17-7	E421	0.200	mg/L	1.92 µg/L	0.00183	0.00009	Diff <2x LOR	----
		selenium, dissolved	7782-49-2	E421	0 0500	mg/L	0.051 µg/L	<0 000050	0 000001	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	50 0	mg/L	6860 µg/L	6 82	0.641%	20%	----
		silver, dissolved	7440-22-4	E421	0 0100	mg/L	<0.010 µg/L	<0 000010	0	Diff <2x LOR	----
		sodium, dissolved	17341-25-2	E421	50 0	mg/L	17400 µg/L	17.2	1.11%	20%	----
		strontium, dissolved	7440-24-6	E421	0.200	mg/L	484 µg/L	0.510	5.24%	20%	----
		sulfur, dissolved	7704-34-9	E421	500	mg/L	14400 µg/L	14.0	2.06%	20%	----
		tellurium, dissolved	13494-80-9	E421	0.200	mg/L	<0.20 µg/L	<0.00020	0	Diff <2x LOR	----
		thallium, dissolved	7440-28-0	E421	0 0100	mg/L	0.020 µg/L	0 000020	0.00000003	Diff <2x LOR	----
		thorium, dissolved	7440-29-1	E421	0.100	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		tin, dissolved	7440-31-5	E421	0.100	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		titanium, dissolved	7440-32-6	E421	0.300	mg/L	<0.30 µg/L	<0.00030	0	Diff <2x LOR	----
		tungsten, dissolved	7440-33-7	E421	0.100	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E421	0 0100	mg/L	0.325 µg/L	0 000324	0.167%	20%	----
		vanadium, dissolved	7440-62-2	E421	0.500	mg/L	<0.50 µg/L	<0.00050	0	Diff <2x LOR	----
		zinc, dissolved	7440-66-6	E421	1.00	mg/L	<1 0 µg/L	<0.0010	0	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.200	mg/L	<0.20 µg/L	<0.00020	0	Diff <2x LOR	----

**Dissolved Metals (QC Lot: 81229)**



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 81229) - continued</b>											
VA20B4067-005	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Aggregate Organics (QC Lot: 81008)</b>											
VA20B3842-017	Anonymous	chemical oxygen demand [COD]	----	E559	20	mg/L	<20	<20	0	Diff <2x LOR	----
<b>Aggregate Organics (QC Lot: 81035)</b>											
VA20B4087-001	MW17-22A	phenols, total (4AAP)	----	E562	0 0010	mg/L	<0 0010	<0.0010	0	Diff <2x LOR	----
<b>Volatile Organic Compounds (QC Lot: 81017)</b>											
VA20B4016-001	Anonymous	benzene	71-43-2	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		bromodichloromethane	75-27-4	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		bromoform	75-25-2	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		carbon tetrachloride	56-23-5	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		chlorobenzene	108-90-7	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		chloroethane	75-00-3	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		chloroform	67-66-3	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		chloromethane	74-87-3	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		dibromochloromethane	124-48-1	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		dichlorobenzene, 1,2-	95-50-1	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		dichlorobenzene, 1,3-	541-73-1	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		dichlorobenzene, 1,4-	106-46-7	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		dichloroethane, 1,1-	75-34-3	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		dichloroethane, 1,2-	107-06-2	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		dichloroethylene, 1,1-	75-35-4	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		dichloroethylene, cis-1,2-	156-59-4	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		dichloromethane	75-09-2	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		dichloropropane, 1,2-	78-87-5	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		dichloropropylene, cis-1,3-	10061-01-5	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		dichloropropylene, trans-1,3-	10061-02-6	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		styrene	100-42-5	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.20	µg/L	<0.20	<0 20	0	Diff <2x LOR	----
		tetrachloroethylene	127-18-4	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		toluene	108-88-3	E611C	0.40	µg/L	0.80	0 67	0.13	Diff <2x LOR	----
		trichloroethane, 1,1,1-	71-55-6	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----

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 Work Order : VA20B4087 Amendment 2  
 Client : Wood Canada Ltd.  
 Project : VE52655D



Sub-Matrix: <b>Water</b>					<i>Laboratory Duplicate (DUP) Report</i>						
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Original Result</i>	<i>Duplicate Result</i>	<i>RPD(%) or Difference</i>	<i>Duplicate Limits</i>	<i>Qualifier</i>
<b>Volatile Organic Compounds (QC Lot: 81017) - continued</b>											
VA20B4016-001	Anonymous	trichloroethane, 1,1,2-	79-00-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		trichloroethylene	79-01-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		trichlorofluoromethane	75-69-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		vinyl chloride	75-01-4	E611C	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611C	0.50	µg/L	0.65	<0.50	0.15	Diff <2x LOR	----
		xylene, o-	95-47-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

### Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 79809)</b>						
alkalinity, bicarbonate (as CaCO <sub>3</sub> )	----	E290	1	mg/L	<1.0	----
alkalinity, carbonate (as CaCO <sub>3</sub> )	----	E290	1	mg/L	<1.0	----
alkalinity, hydroxide (as CaCO <sub>3</sub> )	----	E290	1	mg/L	<1.0	----
alkalinity, phenolphthalein (as CaCO <sub>3</sub> )	----	E290	1	mg/L	<1.0	----
alkalinity, total (as CaCO <sub>3</sub> )	----	E290	1	mg/L	<1.0	----
<b>Physical Tests (QCLot: 79810)</b>						
conductivity	----	E100	1	µS/cm	<1.0	----
<b>Physical Tests (QCLot: 79811)</b>						
acidity (as CaCO <sub>3</sub> )	----	E283	2	mg/L	2.2	----
<b>Physical Tests (QCLot: 79933)</b>						
solids, total suspended [TSS]	----	E160-H	3	mg/L	<3.0	----
<b>Physical Tests (QCLot: 79936)</b>						
turbidity	----	E121	0.1	NTU	<0.10	----
<b>Physical Tests (QCLot: 81419)</b>						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
<b>Physical Tests (QCLot: 86039)</b>						
acidity, hot peroxide treated (as CaCO <sub>3</sub> )	----	E284A	25	mg/L	<25	----
<b>Anions and Nutrients (QCLot: 79791)</b>						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
<b>Anions and Nutrients (QCLot: 79792)</b>						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
<b>Anions and Nutrients (QCLot: 79794)</b>						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 79795)</b>						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 79796)</b>						
sulfate (as SO <sub>4</sub> )	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
<b>Anions and Nutrients (QCLot: 81674)</b>						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 81675)</b>						
nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
<b>Anions and Nutrients (QCLot: 81676)</b>						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Anions and Nutrients (QCLot: 81719)</b>						
Kjeldahl nitrogen, total [TKN]	---	E318	0.05	mg/L	<0.050	---
<b>Anions and Nutrients (QCLot: 82829)</b>						
cyanate	88402-73-7	E343	0.2	mg/L	<0.20	---
<b>Cyanides (QCLot: 81651)</b>						
cyanide, strong acid dissociable (total)	---	E333	0.002	mg/L	<0.0020	---
<b>Cyanides (QCLot: 81652)</b>						
cyanide, weak acid dissociable	---	E336	0.002	mg/L	<0.0020	---
<b>Cyanides (QCLot: 81653)</b>						
cyanide, free	---	E339	0.002	mg/L	<0.0020	---
<b>Cyanides (QCLot: 81891)</b>						
thiocyanate	302-04-5	E344	0.5	mg/L	<0.50	---
<b>Organic / Inorganic Carbon (QCLot: 81678)</b>						
carbon, total organic [TOC]	---	E355-L	0.5	mg/L	<0.50	---
<b>Total Metals (QCLot: 81130)</b>						
aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	---
antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	---
arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	---
barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	---
beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	---
bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	---
boron, total	7440-42-8	E420	0.01	mg/L	<0.010	---
cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	---
calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	---
cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	---
cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	---
copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	---
iron, total	7439-89-6	E420	0.01	mg/L	<0.010	---
lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	---
lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	---
magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	---
manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	---
molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	---
nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	---
phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	---
potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	---
rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	---





Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Total Metals (QCLot: 81130) - continued</b>						
selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
sodium, total	17341-25-2	E420	0.05	mg/L	<0.050	----
strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
<b>Total Metals (QCLot: 81131)</b>						
chromium, total	7440-47-3	E420.Cr-L	0.0001	mg/L	<0.00010	----
<b>Total Metals (QCLot: 81242)</b>						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
<b>Dissolved Metals (QCLot: 79884)</b>						
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	<0.00010	----
<b>Dissolved Metals (QCLot: 79885)</b>						
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 79885) - continued</b>						
lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
sodium, dissolved	17341-25-2	E421	0.05	mg/L	<0.050	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
<b>Dissolved Metals (QCLot: 81229)</b>						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
<b>Aggregate Organics (QCLot: 81008)</b>						
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	----
<b>Aggregate Organics (QCLot: 81035)</b>						
phenols, total (4AAP)	----	E562	0.001	mg/L	<0.0010	----
<b>Volatile Organic Compounds (QCLot: 81017)</b>						
benzene	71-43-2	E611C	0.5	µg/L	<0.50	----
bromodichloromethane	75-27-4	E611C	0.5	µg/L	<0.50	----
bromoform	75-25-2	E611C	0.5	µg/L	<0.50	----
carbon tetrachloride	56-23-5	E611C	0.5	µg/L	<0.50	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Volatile Organic Compounds (QCLot: 81017) - continued</b>						
chlorobenzene	108-90-7	E611C	0.5	µg/L	<0.50	---
chloroethane	75-00-3	E611C	0.5	µg/L	<0.50	---
chloroform	67-66-3	E611C	0.5	µg/L	<0.50	---
chloromethane	74-87-3	E611C	0.5	µg/L	<0.50	---
dibromochloromethane	124-48-1	E611C	0.5	µg/L	<0.50	---
dichlorobenzene, 1,2-	95-50-1	E611C	0.5	µg/L	<0.50	---
dichlorobenzene, 1,3-	541-73-1	E611C	0.5	µg/L	<0.50	---
dichlorobenzene, 1,4-	106-46-7	E611C	0.5	µg/L	<0.50	---
dichloroethane, 1,1-	75-34-3	E611C	0.5	µg/L	<0.50	---
dichloroethane, 1,2-	107-06-2	E611C	0.5	µg/L	<0.50	---
dichloroethylene, 1,1-	75-35-4	E611C	0.5	µg/L	<0.50	---
dichloroethylene, cis-1,2-	156-59-4	E611C	0.5	µg/L	<0.50	---
dichloroethylene, trans-1,2-	156-60-5	E611C	0.5	µg/L	<0.50	---
dichloromethane	75-09-2	E611C	0.5	µg/L	<0.50	---
dichloropropane, 1,2-	78-87-5	E611C	0.5	µg/L	<0.50	---
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.5	µg/L	<0.50	---
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.5	µg/L	<0.50	---
ethylbenzene	100-41-4	E611C	0.5	µg/L	<0.50	---
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.5	µg/L	<0.50	---
styrene	100-42-5	E611C	0.5	µg/L	<0.50	---
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.5	µg/L	<0.50	---
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.2	µg/L	<0.20	---
tetrachloroethylene	127-18-4	E611C	0.5	µg/L	<0.50	---
toluene	108-88-3	E611C	0.4	µg/L	<0.40	---
trichloroethane, 1,1,1-	71-55-6	E611C	0.5	µg/L	<0.50	---
trichloroethane, 1,1,2-	79-00-5	E611C	0.5	µg/L	<0.50	---
trichloroethylene	79-01-6	E611C	0.5	µg/L	<0.50	---
trichlorofluoromethane	75-69-4	E611C	0.5	µg/L	<0.50	---
vinyl chloride	75-01-4	E611C	0.4	µg/L	<0.40	---
xylene, m+p-	179601-23-1	E611C	0.5	µg/L	<0.50	---
xylene, o-	95-47-6	E611C	0.5	µg/L	<0.50	---
<b>Hydrocarbons (QCLot: 81020)</b>						
EPH (C10-C19)	---	E601A	250	µg/L	<250	---
EPH (C19-C32)	---	E601A	250	µg/L	<250	---
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 81019)</b>						
acenaphthene	83-32-9	E641A	0.01	µg/L	<0.010	---



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 81019) - continued</b>						
acenaphthylene	208-96-8	E641A	0.01	µg/L	<0.010	---
acridine	260-94-6	E641A	0.01	µg/L	<0.010	---
anthracene	120-12-7	E641A	0.01	µg/L	<0.010	---
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	<0.010	---
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	---
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	<0.010	---
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	---
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	<0.010	---
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	<0.010	---
chrysene	218-01-9	E641A	0.01	µg/L	<0.010	---
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	<0.0050	---
fluoranthene	206-44-0	E641A	0.01	µg/L	<0.010	---
fluorene	86-73-7	E641A	0.01	µg/L	<0.010	---
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	<0.010	---
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	<0.010	---
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	<0.010	---
naphthalene	91-20-3	E641A	0.05	µg/L	<0.050	---
phenanthrene	85-01-8	E641A	0.02	µg/L	<0.020	---
pyrene	129-00-0	E641A	0.01	µg/L	<0.010	---
quinoline	6027-02-7	E641A	0.05	µg/L	<0.050	---



## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: <b>Water</b>					Laboratory Control Sample (LCS) Report				
					Spike Concentration	Recovery (%) LCS	Recovery Limits (%)		Qualifier
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Physical Tests (QCLot: 79808)</b>									
pH	---	E108	---	pH units	7 pH units	99.8	98.0	102	---
<b>Physical Tests (QCLot: 79809)</b>									
alkalinity, phenolphthalein (as CaCO <sub>3</sub> )	---	E290	1	mg/L	229 mg/L	104	75.0	125	---
alkalinity, total (as CaCO <sub>3</sub> )	---	E290	1	mg/L	500 mg/L	101	85.0	115	---
<b>Physical Tests (QCLot: 79810)</b>									
conductivity	---	E100	1	µS/cm	146.9 µS/cm	100	90.0	110	---
<b>Physical Tests (QCLot: 79811)</b>									
acidity (as CaCO <sub>3</sub> )	---	E283	2	mg/L	50 mg/L	102	85.0	115	---
<b>Physical Tests (QCLot: 79933)</b>									
solids, total suspended [TSS]	---	E160-H	3	mg/L	150 mg/L	103	85.0	115	---
<b>Physical Tests (QCLot: 79936)</b>									
turbidity	---	E121	0.1	NTU	200 NTU	104	85.0	115	---
<b>Physical Tests (QCLot: 81419)</b>									
solids, total dissolved [TDS]	---	E162	10	mg/L	1000 mg/L	104	85.0	115	---
<b>Physical Tests (QCLot: 86039)</b>									
acidity, hot peroxide treated (as CaCO <sub>3</sub> )	---	E284A	25	mg/L	2500 mg/L	98.6	85.0	115	---
<b>Anions and Nutrients (QCLot: 79791)</b>									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	---
<b>Anions and Nutrients (QCLot: 79792)</b>									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	101	90.0	110	---
<b>Anions and Nutrients (QCLot: 79794)</b>									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	101	90.0	110	---
<b>Anions and Nutrients (QCLot: 79795)</b>									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.6	90.0	110	---
<b>Anions and Nutrients (QCLot: 79796)</b>									
sulfate (as SO <sub>4</sub> )	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	102	90.0	110	---
<b>Anions and Nutrients (QCLot: 81674)</b>									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.12 mg/L	99.2	85.0	115	---
<b>Anions and Nutrients (QCLot: 81675)</b>									
nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	99.1	75.0	125	---
<b>Anions and Nutrients (QCLot: 81676)</b>									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	95.0	80.0	120	---



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 81719)</b>									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	104	75.0	125	----
<b>Anions and Nutrients (QCLot: 82829)</b>									
cyanate	88402-73-7	E343	0.2	mg/L	1 mg/L	90.2	85.0	115	----
<b>Cyanides (QCLot: 81651)</b>									
cyanide, strong acid dissociable (total)	----	E333	0.002	mg/L	0.25 mg/L	94.5	80.0	120	----
<b>Cyanides (QCLot: 81652)</b>									
cyanide, weak acid dissociable	----	E336	0.002	mg/L	0.125 mg/L	96.1	80.0	120	----
<b>Cyanides (QCLot: 81653)</b>									
cyanide, free	----	E339	0.002	mg/L	0.125 mg/L	94.2	80.0	120	----
<b>Cyanides (QCLot: 81891)</b>									
thiocyanate	302-04-5	E344	0.5	mg/L	10 mg/L	94.5	85.0	115	----
<b>Organic / Inorganic Carbon (QCLot: 81678)</b>									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	101	80.0	120	----
<b>Total Metals (QCLot: 81130)</b>									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	101	80.0	120	----
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	102	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	101	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	104	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	98.8	80.0	120	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	101	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	99.3	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	101	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	98.2	80.0	120	----
cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	98.3	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	100.0	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	98.4	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	107	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	104	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	98.2	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	100	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	106	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	99.3	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	99.3	80.0	120	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	98.1	80.0	120	----



Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Total Metals (QCLot: 81130) - continued</b>									
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	106	80.0	120	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	106	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	105	80.0	120	----
silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	107	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	102	80.0	120	----
sodium, total	17341-25-2	E420	0.05	mg/L	50 mg/L	103	80.0	120	----
strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	99.8	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	100.0	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	95.6	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	105	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	105	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	100	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	100	80.0	120	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	103	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	105	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	102	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	97.1	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	99.7	80.0	120	----
<b>Total Metals (QCLot: 81131)</b>									
chromium, total	7440-47-3	E420.Cr-L	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
<b>Total Metals (QCLot: 81242)</b>									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	92.8	80.0	120	----
<b>Dissolved Metals (QCLot: 79884)</b>									
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	0.25 mg/L	101	80.0	120	----
<b>Dissolved Metals (QCLot: 79885)</b>									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	103	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	101	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	102	80.0	120	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	104	80.0	120	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	101	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	97.1	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	102	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	100	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	103	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	107	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	104	80.0	120	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Dissolved Metals (QCLot: 79885) - continued</b>									
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	102	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	100	80.0	120	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	99.9	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	99.3	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	101	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	108	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	108	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	104	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	101	70.0	130	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	104	80.0	120	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	100	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	100	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	104	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	108	80.0	120	----
sodium, dissolved	17341-25-2	E421	0.05	mg/L	50 mg/L	106	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	112	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	91.2	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	94.7	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	100	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	95.5	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	99.4	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	102	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	103	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	100	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	104	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	104	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	110	80.0	120	----
<b>Dissolved Metals (QCLot: 81229)</b>									
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	96.8	80.0	120	----
<b>Aggregate Organics (QCLot: 81008)</b>									
chemical oxygen demand [COD]	----	E559	20	mg/L	750 mg/L	101	85.0	115	----
<b>Aggregate Organics (QCLot: 81035)</b>									
phenols, total (4AAP)	----	E562	0.001	mg/L	0.02 mg/L	100	85.0	115	----
<b>Volatile Organic Compounds (QCLot: 81017)</b>									
benzene	71-43-2	E611C	0.5	µg/L	100 µg/L	91.8	70.0	130	----





Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 81017) - continued</b>									
bromodichloromethane	75-27-4	E611C	0.5	µg/L	100 µg/L	98.6	70.0	130	----
bromoform	75-25-2	E611C	0.5	µg/L	100 µg/L	96.6	70.0	130	----
carbon tetrachloride	56-23-5	E611C	0.5	µg/L	100 µg/L	91.6	70.0	130	----
chlorobenzene	108-90-7	E611C	0.5	µg/L	100 µg/L	95.7	70.0	130	----
chloroethane	75-00-3	E611C	0.5	µg/L	100 µg/L	77.5	60.0	140	----
chloroform	67-66-3	E611C	0.5	µg/L	100 µg/L	96.7	70.0	130	----
chloromethane	74-87-3	E611C	0.5	µg/L	100 µg/L	61.6	60.0	140	----
dibromochloromethane	124-48-1	E611C	0.5	µg/L	100 µg/L	96.4	70.0	130	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.5	µg/L	100 µg/L	99.6	70.0	130	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.5	µg/L	100 µg/L	88.3	70.0	130	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.5	µg/L	100 µg/L	101	70.0	130	----
dichloroethane, 1,1-	75-34-3	E611C	0.5	µg/L	100 µg/L	94.6	70.0	130	----
dichloroethane, 1,2-	107-06-2	E611C	0.5	µg/L	100 µg/L	97.3	70.0	130	----
dichloroethylene, 1,1-	75-35-4	E611C	0.5	µg/L	100 µg/L	83.1	70.0	130	----
dichloroethylene, cis-1,2-	156-59-4	E611C	0.5	µg/L	100 µg/L	94.9	70.0	130	----
dichloroethylene, trans-1,2-	156-60-5	E611C	0.5	µg/L	100 µg/L	85.0	70.0	130	----
dichloromethane	75-09-2	E611C	0.5	µg/L	100 µg/L	90.9	70.0	130	----
dichloropropane, 1,2-	78-87-5	E611C	0.5	µg/L	100 µg/L	94.0	70.0	130	----
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.5	µg/L	100 µg/L	99.4	70.0	130	----
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.5	µg/L	100 µg/L	70.3	70.0	130	----
ethylbenzene	100-41-4	E611C	0.5	µg/L	100 µg/L	86.0	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.5	µg/L	100 µg/L	108	70.0	130	----
styrene	100-42-5	E611C	0.5	µg/L	100 µg/L	85.3	70.0	130	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.5	µg/L	100 µg/L	93.4	70.0	130	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.2	µg/L	100 µg/L	103	70.0	130	----
tetrachloroethylene	127-18-4	E611C	0.5	µg/L	100 µg/L	88.7	70.0	130	----
toluene	108-88-3	E611C	0.4	µg/L	100 µg/L	87.0	70.0	130	----
trichloroethane, 1,1,1-	71-55-6	E611C	0.5	µg/L	100 µg/L	86.9	70.0	130	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.5	µg/L	100 µg/L	96.7	70.0	130	----
trichloroethylene	79-01-6	E611C	0.5	µg/L	100 µg/L	92.8	70.0	130	----
trichlorofluoromethane	75-69-4	E611C	0.5	µg/L	100 µg/L	87.3	60.0	140	----
vinyl chloride	75-01-4	E611C	0.4	µg/L	100 µg/L	67.7	60.0	140	----
xylene, m+p-	179601-23-1	E611C	0.5	µg/L	200 µg/L	92.3	70.0	130	----
xylene, o-	95-47-6	E611C	0.5	µg/L	100 µg/L	88.1	70.0	130	----
<b>Hydrocarbons (QCLot: 81020)</b>									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	114	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	111	70.0	130	----



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 81019)</b>									
acenaphthene	83-32-9	E641A	0.01	µg/L	0.5 µg/L	112	60.0	130	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5 µg/L	113	60.0	130	----
acridine	260-94-6	E641A	0.01	µg/L	0.5 µg/L	97.5	60.0	130	----
anthracene	120-12-7	E641A	0.01	µg/L	0.5 µg/L	115	60.0	130	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5 µg/L	106	60.0	130	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5 µg/L	130	60.0	130	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	0.5 µg/L	117	60.0	130	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	1 µg/L	121	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5 µg/L	115	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5 µg/L	126	60.0	130	----
chrysene	218-01-9	E641A	0.01	µg/L	0.5 µg/L	114	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	0.5 µg/L	116	60.0	130	----
fluoranthene	206-44-0	E641A	0.01	µg/L	0.5 µg/L	111	60.0	130	----
fluorene	86-73-7	E641A	0.01	µg/L	0.5 µg/L	103	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5 µg/L	119	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5 µg/L	117	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	0.5 µg/L	109	60.0	130	----
naphthalene	91-20-3	E641A	0.05	µg/L	0.5 µg/L	105	50.0	130	----
phenanthrene	85-01-8	E641A	0.02	µg/L	0.5 µg/L	109	60.0	130	----
pyrene	129-00-0	E641A	0.01	µg/L	0.5 µg/L	115	60.0	130	----
quinoline	6027-02-7	E641A	0.05	µg/L	0.5 µg/L	121	60.0	130	----



## Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level  $\geq 1 \times$  spike level.

Sub-Matrix: **Water**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	Target		MS	Low	
<b>Anions and Nutrients (QCLot: 79791)</b>										
VA20B3997-003	Anonymous	chloride	16887-00-6	E235.Cl	519 mg/L	500 mg/L	104	75.0	125	----
<b>Anions and Nutrients (QCLot: 79792)</b>										
VA20B3997-003	Anonymous	fluoride	16984-48-8	E235.F	4.92 mg/L	5 mg/L	98.5	75.0	125	----
<b>Anions and Nutrients (QCLot: 79794)</b>										
VA20B3997-003	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	13.0 mg/L	12.5 mg/L	104	75.0	125	----
<b>Anions and Nutrients (QCLot: 79795)</b>										
VA20B3997-003	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	2.45 mg/L	2.5 mg/L	98.1	75.0	125	----
<b>Anions and Nutrients (QCLot: 79796)</b>										
VA20B3997-003	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	ND mg/L	500 mg/L	ND	75.0	125	----
<b>Anions and Nutrients (QCLot: 81674)</b>										
VA20B4023-010	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.206 mg/L	0.2 mg/L	103	75.0	125	----
<b>Anions and Nutrients (QCLot: 81675)</b>										
VA20B4023-010	Anonymous	nitrogen, total	7727-37-9	E366	0.390 mg/L	0.4 mg/L	97.6	70.0	130	----
<b>Anions and Nutrients (QCLot: 81676)</b>										
VA20B4036-002	Anonymous	phosphorus, total	7723-14-0	E372-U	ND mg/L	0.05 mg/L	ND	70.0	130	----
<b>Anions and Nutrients (QCLot: 81719)</b>										
VA20B4157-002	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	13.0 mg/L	2.5 mg/L	104	70.0	130	----
<b>Anions and Nutrients (QCLot: 82829)</b>										
WT2000114-010	Anonymous	cyanate	88402-73-7	E343	ND mg/L	2 mg/L	ND	70.0	130	----
<b>Cyanides (QCLot: 81651)</b>										
VA20B4084-009	Anonymous	cyanide, strong acid dissociable (total)	----	E333	0.461 mg/L	0.5 mg/L	92.2	75.0	125	----
<b>Cyanides (QCLot: 81652)</b>										
VA20B4084-009	Anonymous	cyanide, weak acid dissociable	----	E336	0.247 mg/L	0.25 mg/L	98.8	75.0	125	----
<b>Cyanides (QCLot: 81653)</b>										
VA20B4087-002	MW17-22B	cyanide, free	----	E339	0.124 mg/L	0.125 mg/L	99.1	75.0	125	----
<b>Cyanides (QCLot: 81891)</b>										
VA20B4087-002	MW17-22B	thiocyanate	302-04-5	E344	9.97 mg/L	10 mg/L	99.7	75.0	125	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Lab rat ry sample ID	Client sample ID	Analyte	CAS Number	Method	C n entrati n	Target	MS	L w	High	Qualifier
<b>Organic / Inorganic Carbon (QCLot: 80229)</b>										
VA20B4087-001	MW17-22A	carbon, total inorganic [TIC]	----	E354-L	ND mg/L	10 mg/L	ND	70 0	130	----
<b>Organic / Inorganic Carbon (QCLot: 81678)</b>										
VA20B4023-010	Anonymous	carbon, total organic [TOC]	----	E355-L	4.70 mg/L	5 mg/L	94.0	70 0	130	----
<b>Total Metals (QCLot: 81130)</b>										
VA20B4084-002	Anonymous	aluminum, total	7429-90-5	E420	ND mg/L	0.2 mg/L	ND	70 0	130	----
		antimony, total	7440-36-0	E420	0.0212 mg/L	0.02 mg/L	106	70 0	130	----
		arsenic, total	7440-38-2	E420	ND mg/L	0.02 mg/L	ND	70 0	130	----
		barium, total	7440-39-3	E420	0.0210 mg/L	0.02 mg/L	105	70 0	130	----
		beryllium, total	7440-41-7	E420	0.0414 mg/L	0.04 mg/L	104	70 0	130	----
		bismuth, total	7440-69-9	E420	0.00999 mg/L	0.01 mg/L	99.9	70 0	130	----
		boron, total	7440-42-8	E420	ND mg/L	0.1 mg/L	ND	70 0	130	----
		cadmium, total	7440-43-9	E420	0.00411 mg/L	0.004 mg/L	103	70 0	130	----
		calcium, total	7440-70-2	E420	ND mg/L	4 mg/L	ND	70 0	130	----
		cesium, total	7440-46-2	E420	0.0102 mg/L	0.01 mg/L	102	70 0	130	----
		cobalt, total	7440-48-4	E420	0.0199 mg/L	0.02 mg/L	99.3	70 0	130	----
		copper, total	7440-50-8	E420	0.0186 mg/L	0.02 mg/L	93.1	70 0	130	----
		iron, total	7439-89-6	E420	ND mg/L	2 mg/L	ND	70 0	130	----
		lead, total	7439-92-1	E420	ND mg/L	0.02 mg/L	ND	70 0	130	----
		lithium, total	7439-93-2	E420	0.0997 mg/L	0.1 mg/L	99.7	70 0	130	----
		magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70 0	130	----
		manganese, total	7439-96-5	E420	ND mg/L	0.02 mg/L	ND	70 0	130	----
		molybdenum, total	7439-98-7	E420	0.0212 mg/L	0.02 mg/L	106	70 0	130	----
		nickel, total	7440-02-0	E420	0.0397 mg/L	0.04 mg/L	99.3	70 0	130	----
		phosphorus, total	7723-14-0	E420	10.9 mg/L	10 mg/L	109	70 0	130	----
		potassium, total	7440-09-7	E420	ND mg/L	4 mg/L	ND	70 0	130	----
		rubidium, total	7440-17-7	E420	ND mg/L	0.02 mg/L	ND	70 0	130	----
		selenium, total	7782-49-2	E420	0.0448 mg/L	0.04 mg/L	112	70 0	130	----
		silicon, total	7440-21-3	E420	ND mg/L	10 mg/L	ND	70 0	130	----
		silver, total	7440-22-4	E420	0.00391 mg/L	0.004 mg/L	97.7	70 0	130	----
		sodium, total	17341-25-2	E420	ND mg/L	2 mg/L	ND	70 0	130	----
		strontium, total	7440-24-6	E420	ND mg/L	0.02 mg/L	ND	70 0	130	----
		sulfur, total	7704-34-9	E420	ND mg/L	20 mg/L	ND	70 0	130	----
		tellurium, total	13494-80-9	E420	0.0400 mg/L	0.04 mg/L	99.9	70 0	130	----
		thallium, total	7440-28-0	E420	0.00401 mg/L	0.004 mg/L	100	70 0	130	----
		thorium, total	7440-29-1	E420	0.0217 mg/L	0.02 mg/L	108	70 0	130	----
		tin, total	7440-31-5	E420	0.0205 mg/L	0.02 mg/L	103	70 0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Lab rat ry sample ID	Client sample ID	Analyte	CAS Number	Method	C n entrati n	Target	MS	L w	High	Qualifier
<b>Total Metals (QCLot: 81130) - continued</b>										
VA20B4084-002	Anonymous	titanium, total	7440-32-6	E420	ND mg/L	0.04 mg/L	ND	70 0	130	----
		tungsten, total	7440-33-7	E420	ND mg/L	0.02 mg/L	ND	70 0	130	----
		uranium, total	7440-61-1	E420	0.00437 mg/L	0.004 mg/L	109	70 0	130	----
		vanadium, total	7440-62-2	E420	0.104 mg/L	0.1 mg/L	104	70 0	130	----
		zinc, total	7440-66-6	E420	0.383 mg/L	0.4 mg/L	95.9	70 0	130	----
		zirconium, total	7440-67-7	E420	0 0413 mg/L	0.04 mg/L	103	70 0	130	----
<b>Total Metals (QCLot: 81131)</b>										
VA20B4084-002	Anonymous	chromium, total	7440-47-3	E420.Cr-L	0 0409 mg/L	0.04 mg/L	102	70 0	130	----
<b>Total Metals (QCLot: 81242)</b>										
VA20B4067-006	Anonymous	mercury, total	7439-97-6	E508	0.000103 mg/L	0 0001 mg/L	103	70 0	130	----
<b>Dissolved Metals (QCLot: 79884)</b>										
VA20B3887-002	Anonymous	chromium, dissolved	7440-47-3	E421.Cr-L	0 0394 mg/L	0.04 mg/L	98.5	70 0	130	----
<b>Dissolved Metals (QCLot: 79885)</b>										
VA20B3887-002	Anonymous	aluminum, dissolved	7429-90-5	E421	0.196 mg/L	0.2 mg/L	98.1	70 0	130	----
		antimony, dissolved	7440-36-0	E421	0 0201 mg/L	0.02 mg/L	101	70 0	130	----
		arsenic, dissolved	7440-38-2	E421	0 0206 mg/L	0.02 mg/L	103	70 0	130	----
		barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70 0	130	----
		beryllium, dissolved	7440-41-7	E421	0 0404 mg/L	0.04 mg/L	101	70 0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00888 mg/L	0.01 mg/L	88.8	70 0	130	----
		boron, dissolved	7440-42-8	E421	0.096 mg/L	0.1 mg/L	96.0	70 0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00388 mg/L	0.004 mg/L	97.1	70 0	130	----
		calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70 0	130	----
		cesium, dissolved	7440-46-2	E421	0.00967 mg/L	0.01 mg/L	96.7	70 0	130	----
		cobalt, dissolved	7440-48-4	E421	0 0195 mg/L	0.02 mg/L	97.7	70 0	130	----
		copper, dissolved	7440-50-8	E421	0 0196 mg/L	0.02 mg/L	97.9	70 0	130	----
		iron, dissolved	7439-89-6	E421	1.93 mg/L	2 mg/L	96.7	70 0	130	----
		lead, dissolved	7439-92-1	E421	0 0195 mg/L	0.02 mg/L	97.4	70 0	130	----
		lithium, dissolved	7439-93-2	E421	0 0984 mg/L	0.1 mg/L	98.4	70 0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70 0	130	----
		manganese, dissolved	7439-96-5	E421	0 0201 mg/L	0.02 mg/L	100	70 0	130	----
		molybdenum, dissolved	7439-98-7	E421	0 0195 mg/L	0.02 mg/L	97.6	70 0	130	----
		nickel, dissolved	7440-02-0	E421	0 0391 mg/L	0.04 mg/L	97.8	70 0	130	----
		phosphorus, dissolved	7723-14-0	E421	10.2 mg/L	10 mg/L	102	70 0	130	----
		potassium, dissolved	7440-09-7	E421	4.34 mg/L	4 mg/L	108	70 0	130	----
		rubidium, dissolved	7440-17-7	E421	0 0186 mg/L	0.02 mg/L	93.1	70 0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 79885) - continued</b>										
VA20B3887-002	Anonymous	selenium, dissolved	7782-49-2	E421	0.0412 mg/L	0.04 mg/L	103	70.0	130	----
		silicon, dissolved	7440-21-3	E421	8.88 mg/L	10 mg/L	88.8	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00389 mg/L	0.004 mg/L	97.3	70.0	130	----
		sodium, dissolved	17341-25-2	E421	2.18 mg/L	2 mg/L	109	70.0	130	----
		strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		sulfur, dissolved	7704-34-9	E421	19.1 mg/L	20 mg/L	95.6	70.0	130	----
		tellurium, dissolved	13494-80-9	E421	0.0385 mg/L	0.04 mg/L	96.3	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00387 mg/L	0.004 mg/L	96.7	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0209 mg/L	0.02 mg/L	104	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0192 mg/L	0.02 mg/L	96.3	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0395 mg/L	0.04 mg/L	98.8	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0201 mg/L	0.02 mg/L	100	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.00407 mg/L	0.004 mg/L	102	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.104 mg/L	0.1 mg/L	104	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.399 mg/L	0.4 mg/L	99.7	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0412 mg/L	0.04 mg/L	103	70.0	130	----
<b>Dissolved Metals (QCLot: 81229)</b>										
VA20B4067-006	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000970 mg/L	0.0001 mg/L	97.0	70.0	130	----
<b>Aggregate Organics (QCLot: 81008)</b>										
VA20B4087-001	MW17-22A	chemical oxygen demand [COD]	----	E559	480 mg/L	500 mg/L	95.9	75.0	125	----
<b>Aggregate Organics (QCLot: 81035)</b>										
VA20B4087-001	MW17-22A	phenols, total (4AAP)	----	E562	0.0206 mg/L	0.02 mg/L	103	75.0	125	----
<b>Volatile Organic Compounds (QCLot: 81017)</b>										
VA20B4016-003	Anonymous	benzene	71-43-2	E611C	91.4 µg/L	100 µg/L	91.4	60.0	140	----
		bromodichloromethane	75-27-4	E611C	95.3 µg/L	100 µg/L	95.3	60.0	140	----
		bromoform	75-25-2	E611C	95.1 µg/L	100 µg/L	95.1	60.0	140	----
		carbon tetrachloride	56-23-5	E611C	91.7 µg/L	100 µg/L	91.7	60.0	140	----
		chlorobenzene	108-90-7	E611C	100 µg/L	100 µg/L	100	60.0	140	----
		chloroethane	75-00-3	E611C	75.6 µg/L	100 µg/L	75.6	50.0	150	----
		chloroform	67-66-3	E611C	95.4 µg/L	100 µg/L	95.4	60.0	140	----
		chloromethane	74-87-3	E611C	60.2 µg/L	100 µg/L	60.2	50.0	150	----
		dibromochloromethane	124-48-1	E611C	96.8 µg/L	100 µg/L	96.8	60.0	140	----
		dichlorobenzene, 1,2-	95-50-1	E611C	99.5 µg/L	100 µg/L	99.5	60.0	140	----
		dichlorobenzene, 1,3-	541-73-1	E611C	92.9 µg/L	100 µg/L	92.9	60.0	140	----
		dichlorobenzene, 1,4-	106-46-7	E611C	105 µg/L	100 µg/L	105	60.0	140	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 81017) - continued</b>										
VA20B4016-003	Anonymous	dichloroethane, 1,1-	75-34-3	E611C	94.4 µg/L	100 µg/L	94.4	60.0	140	----
		dichloroethane, 1,2-	107-06-2	E611C	95.4 µg/L	100 µg/L	95.4	60.0	140	----
		dichloroethylene, 1,1-	75-35-4	E611C	82.5 µg/L	100 µg/L	82.5	60.0	140	----
		dichloroethylene, cis-1,2-	156-59-4	E611C	94.1 µg/L	100 µg/L	94.1	60.0	140	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	84.2 µg/L	100 µg/L	84.2	60.0	140	----
		dichloromethane	75-09-2	E611C	89.6 µg/L	100 µg/L	89.6	60.0	140	----
		dichloropropane, 1,2-	78-87-5	E611C	92.3 µg/L	100 µg/L	92.3	60.0	140	----
		dichloropropylene, cis-1,3-	10061-01-5	E611C	76.1 µg/L	100 µg/L	76.1	60.0	140	----
		dichloropropylene, trans-1,3-	10061-02-6	E611C	69.5 µg/L	100 µg/L	69.5	60.0	140	----
		ethylbenzene	100-41-4	E611C	90.6 µg/L	100 µg/L	90.6	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	109 µg/L	100 µg/L	109	60.0	140	----
		styrene	100-42-5	E611C	86.9 µg/L	100 µg/L	86.9	60.0	140	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	95.5 µg/L	100 µg/L	95.5	60.0	140	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611C	97.1 µg/L	100 µg/L	97.1	60.0	140	----
		tetrachloroethylene	127-18-4	E611C	96.2 µg/L	100 µg/L	96.2	60.0	140	----
		toluene	108-88-3	E611C	103 µg/L	100 µg/L	103	60.0	140	----
		trichloroethane, 1,1,1-	71-55-6	E611C	87.4 µg/L	100 µg/L	87.4	60.0	140	----
		trichloroethane, 1,1,2-	79-00-5	E611C	98.4 µg/L	100 µg/L	98.4	60.0	140	----
		trichloroethylene	79-01-6	E611C	91.8 µg/L	100 µg/L	91.8	60.0	140	----
		trichlorofluoromethane	75-69-4	E611C	95.7 µg/L	100 µg/L	95.7	50.0	150	----
		vinyl chloride	75-01-4	E611C	64.2 µg/L	100 µg/L	64.2	50.0	150	----
		xylene, m+p-	179601-23-1	E611C	198 µg/L	200 µg/L	98.8	60.0	140	----
		xylene, o-	95-47-6	E611C	92.6 µg/L	100 µg/L	92.6	60.0	140	----

**Reference Material (RM) Report**

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix: **Water**

					Reference Material (RM) Report					
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)			
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method			Low	High	Qualifier	
<b>Organic / Inorganic Carbon (QCLot: 80229)</b>										
QC-80229-002	RM	carbon, total inorganic [TIC]	----	E354-L	8 mg/L	97.9	80.0	120	----	

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Work Order : VA20B4087 Amendment 2  
Client : Wood Canada Ltd.  
Project : VE52655D

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Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here  
(lab use only)

COC Number: 17 -

Page of

<b>Report To</b> Contact and company name below will appear on the final report Company: Wood Contact: Jeremiah Gladu Phone: _____ Company address below will appear on the final report Street: 4445 Loughheed Hwy. City/Province: Burnaby/BC Postal Code: V5C 0E4		<b>Report Format / Distribution</b> Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL) Quality Control (QC) Report with Report <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX Email 1 or Fax: jeremiah.gladu@woodplc.com Email 2: a.mansour@woodplc.com Email 3: _____			<b>Select Service Level Below - Contact your AM to confirm all E&amp;P TATs (surcharges may apply)</b> Regular [R] <input checked="" type="checkbox"/> Standard TAT If received by 3 pm - business days - no surcharges apply 4 day [P4-20%] <input type="checkbox"/> 3 day [P3-25%] <input type="checkbox"/> 2 day [P2-50%] <input type="checkbox"/> EMERGENCY 1 Business day [E - 100%] <input type="checkbox"/> Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] <input type="checkbox"/> Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm For tests that can not be performed according to the service level selected, you will be contacted.																																																									
<b>Invoice To</b> Same as Report To <input type="checkbox"/> YES <input type="checkbox"/> NO Copy of Invoice with Report <input type="checkbox"/> YES <input type="checkbox"/> NO Company: _____ Contact: _____		<b>Invoice Distribution</b> Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX Email 1 or Fax: _____ Email 2: _____			<table border="1"> <tr> <td rowspan="4" style="writing-mode: vertical-rl; text-orientation: mixed;">NUMBER OF CONTAINERS</td> <td colspan="12">Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below</td> <td rowspan="4" style="writing-mode: vertical-rl; text-orientation: mixed;">SAMPLES ON HOLD</td> <td rowspan="4" style="writing-mode: vertical-rl; text-orientation: mixed;">SUSPECTED HAZARD (see Special Instructions)</td> </tr> <tr> <td>BTEX / Vol (BC)</td> <td>EPH/PAH</td> <td>General chemistry *</td> <td>DISSOLVED METALS</td> <td>Cyanide (CB)</td> <td>Cyanides (CB)</td> <td>General TIC (BC)</td> <td>NO<sub>3</sub>/TOC/COD/TKN</td> <td>TN / TP</td> <td>NH<sub>3</sub> / PHEN</td> <td>SCN (BC)</td> <td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table>					NUMBER OF CONTAINERS	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below												SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)	BTEX / Vol (BC)	EPH/PAH	General chemistry *	DISSOLVED METALS	Cyanide (CB)	Cyanides (CB)	General TIC (BC)	NO <sub>3</sub> /TOC/COD/TKN	TN / TP	NH <sub>3</sub> / PHEN	SCN (BC)																											
NUMBER OF CONTAINERS	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below												SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)																																																
	BTEX / Vol (BC)	EPH/PAH	General chemistry *	DISSOLVED METALS							Cyanide (CB)	Cyanides (CB)			General TIC (BC)	NO <sub>3</sub> /TOC/COD/TKN	TN / TP	NH <sub>3</sub> / PHEN	SCN (BC)																																											
<b>Project Information</b> ALS Account # / Quote #: VE52655D Job #: _____ PO / AFE: _____ LSD: _____		<b>Oil and Gas Required Fields (client use)</b> AFE/Cost Center: _____ PO#: _____ Major/Minor Code: _____ Routing Code: _____ Requisitioner: _____ Location: _____																																																												
ALS Lab Work Order # (lab use only): <b>B4087</b>		ALS Contact: Selam Worku Sampler: Ardy M.																																																												
<b>ALS Sample # (lab use only)</b>	<b>Sample Identification and/or Coordinates</b> (This description will appear on the report)	<b>Date</b> (dd-mmm-yy)	<b>Time</b> (hh:mm)	<b>Sample Type</b>																																																										
1	MW17-22A	23 Aug 20	16:30	GW																																																										
2	MW17-22B	"	16:30	GW																																																										
3	MW17-72B	"	"	"																																																										

Environmental Division  
Vancouver  
Work Order Reference  
**VA20B4087**



Telephone: +1 604 253 4188

**Drinking Water (DW) Samples<sup>1</sup> (client use)**

Are samples taken from a Regulated DW System?  
 YES  NO

Are samples for human consumption/ use?  
 YES  NO

Special instructions / specify criteria to add on report by clicking on the drop-down list below (electronic COC only)

\*GENERAL WATER CHEMISTRY TO INCLUDE: pH, Alkalinity, bicarbonate, carbonate, chloride, conductivity, fluoride, hardness, hydroxide, nitrate, nitrite, ammonia, sulphate, turbidity TDS acidity **TSS, BOR**

**SAMPLE CONDITION AS RECEIVED (lab use only)**

Frozen  SIF Observations Yes  No   
Ice Packs  Ice Cubes  Custody seal intact Yes  No   
Cooling Initiated

INITIAL COOLER TEMPERATURES °C FINAL COOLER TEMPERATURES °C

**SHIPMENT RELEASE (client use)**

**INITIAL SHIPMENT RECEPTION (lab use only)**

**FINAL SHIPMENT RECEPTION (lab use only)**

Released by: Ardy Mansour Date: **Aug 28, 2020** Time: \_\_\_\_\_ Received by: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_  
Received by: **PAUL CHAND** Date: **AUG 29 2020** Time: **8:10**

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Ensure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.



**CERTIFICATE OF ANALYSIS**

**Work Order** : **VA20B4178**  
**Client** : **Wood Canada Ltd.**  
**Contact** : Jeremiah Gladu  
**Address** : 600 - 4445 Lougheed Hwy  
Burnaby BC Canada V5C 0E4  
**Telephone** : 604 294 3811  
**Project** : VE52655D  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : Ardy M.  
**Site** : ----  
**Quote number** : VA20-SEAB100-0003 - Wood/Seabridge Gold  
**No. of samples received** : 3  
**No. of samples analysed** : 3

**Page** : 1 of 5  
**Laboratory** : Vancouver - Environmental  
**Account Manager** : Selam Worku  
**Address** : 8081 Lougheed Highway  
Burnaby BC Canada V5A 1W9  
**Telephone** : +1 604 253 4188  
**Date Samples Received** : 01-Sep-2020 11:20  
**Date Analysis Commenced** : 03-Sep-2020  
**Issue Date** : 10-Sep-2020 17:44

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

**Signatories**

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Brianna Allen	Department Manager - Organics	Organics, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia



## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
µg/L	micrograms per litre
mg/L	milligrams per litre

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in reports identified as "Preliminary Report" are considered authorized for use.



## Analytical Results

Sub-Matrix: Water					Client sample ID	SW20-01	SW20-02	SW20-03	----	----
(Matrix: Water)										
Client sampling date / time					29-Aug-2020	29-Aug-2020	29-Aug-2020	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA20B4178-001	VA20B4178-002	VA20B4178-003	-----	-----	
					Result	Result	Result	----	----	
<b>Total Metals</b>										
cadmium, total	7440-43-9	E420	0.000050	mg/L	0.000316	----	----	----	----	----
iron, total	7439-89-6	E420	0.010	mg/L	0.349	----	----	----	----	----
magnesium, total	7439-95-4	E420	0.0050	mg/L	4.23	----	----	----	----	----
manganese, total	7439-96-5	E420	0.00010	mg/L	----	0.192	----	----	----	----
<b>Volatile Organic Compounds</b>										
chlorobenzene	108-90-7	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	----
chloromethane	74-87-3	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	----
dichloropropane, 1,2-	78-87-5	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	----
dichloropropylene, cis+trans-1,3-	542-75-6	E611C	0.75	µg/L	----	<0.75	<0.75	----	----	----
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.20	µg/L	----	<0.20	<0.20	----	----	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	----
trichlorofluoromethane	75-69-4	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	----
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>										
benzene	71-43-2	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	----
ethylbenzene	100-41-4	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	----
styrene	100-42-5	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	----
toluene	108-88-3	E611C	0.40	µg/L	----	<0.40	<0.40	----	----	----
xylene, m+p-	179601 23 1	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	----
xylene, o-	95-47-6	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	----
xylenes, total	1330-20-7	E611C	0.75	µg/L	----	<0.75	<0.75	----	----	----
<b>Volatile Organic Compounds [Drycleaning]</b>										
carbon tetrachloride	56-23-5	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	----
chloroethane	75-00-3	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	----
dichloroethane, 1,1-	75-34-3	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	----
dichloroethane, 1,2-	107-06-2	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	----



## Analytical Results

Sub-Matrix: Water					Client sample ID	SW20-01	SW20-02	SW20-03	----	----
(Matrix: Water)										
Client sampling date / time					29-Aug-2020	29-Aug-2020	29-Aug-2020	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA20B4178-001	VA20B4178-002	VA20B4178-003	-----	-----	
					Result	Result	Result	----	----	
<b>Volatile Organic Compounds [Drycleaning]</b>										
dichloroethylene, 1,1-	75-35-4	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	
dichloroethylene, cis-1,2-	156-59-4	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	
dichloroethylene, trans-1,2-	156-60-5	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	
dichloromethane	75-09-2	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	
tetrachloroethylene	127-18-4	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	
trichloroethane, 1,1,1-	71-55-6	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	
trichloroethylene	79-01-6	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	
vinyl chloride	75-01-4	E611C	0.40	µg/L	----	<0.40	<0.40	----	----	
<b>Volatile Organic Compounds Surrogates</b>										
bromofluorobenzene, 4-	460-00-4	E611C	0.50	%	----	107	111	----	----	
difluorobenzene, 1,4-	540-36-3	E611C	0.50	%	----	111	106	----	----	
<b>Hydrocarbons</b>										
EPH (C10-C19)	----	E601A	250	µg/L	----	<250	<250	----	----	
EPH (C19-C32)	----	E601A	250	µg/L	----	<250	<250	----	----	
HEPHw	----	EC600A	250	µg/L	----	<250	<250	----	----	
LEPHw	----	EC600A	250	µg/L	----	<250	<250	----	----	
<b>Hydrocarbons Surrogates</b>										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%	----	85.9	88.4	----	----	
<b>Polycyclic Aromatic Hydrocarbons</b>										
acenaphthene	83-32-9	E641A	0.010	µg/L	----	<0.010	<0.010	----	----	
acenaphthylene	208-96-8	E641A	0.010	µg/L	----	<0.010	<0.010	----	----	
acridine	260-94-6	E641A	0.010	µg/L	----	<0.010	<0.010	----	----	
anthracene	120-12-7	E641A	0.010	µg/L	----	<0.010	<0.010	----	----	
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	----	<0.010	<0.010	----	----	
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	----	<0.0050	<0.0050	----	----	
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	----	<0.010	<0.010	----	----	
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	----	<0.015	<0.015	----	----	
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	----	<0.010	<0.010	----	----	
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	----	<0.010	<0.010	----	----	
chrysene	218-01-9	E641A	0.010	µg/L	----	<0.010	<0.010	----	----	
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	----	<0.0050	<0.0050	----	----	



## Analytical Results

Sub-Matrix: Water

Client sample ID

(Matrix: Water)

					SW20-01	SW20-02	SW20-03	----	----
Client sampling date / time					29-Aug-2020	29-Aug-2020	29-Aug-2020	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B4178-001	VA20B4178-002	VA20B4178-003	-----	-----
					Result	Result	Result	----	----
<b>Polycyclic Aromatic Hydrocarbons</b>									
fluoranthene	206-44-0	E641A	0.010	µg/L	----	<0.010	<0.010	----	----
fluorene	86-73-7	E641A	0.010	µg/L	----	<0.010	<0.010	----	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	----	<0.010	<0.010	----	----
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	----	0.024	<0.010	----	----
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	----	0.018	<0.010	----	----
naphthalene	91-20-3	E641A	0.050	µg/L	----	<0.050	<0.050	----	----
phenanthrene	85-01-8	E641A	0.020	µg/L	----	<0.020	<0.020	----	----
pyrene	129-00-0	E641A	0.010	µg/L	----	<0.010	<0.010	----	----
quinoline	6027-02-7	E641A	0.050	µg/L	----	<0.050	<0.050	----	----
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>									
acridine-d9	34749-75-2	E641A	0.010	%	----	103	103	----	----
chrysene-d12	1719-03-5	E641A	0.010	%	----	102	106	----	----
naphthalene-d8	1146-65-2	E641A	0.010	%	----	90.0	90.6	----	----
phenanthrene-d10	1517-22-2	E641A	0.010	%	----	102	103	----	----
<b>Volatile Organic Compounds [THMs]</b>									
bromodichloromethane	75-27-4	E611C	0.50	µg/L	----	<0.50	<0.50	----	----
bromoform	75-25-2	E611C	0.50	µg/L	----	<0.50	<0.50	----	----
chloroform	67-66-3	E611C	0.50	µg/L	----	<0.50	<0.50	----	----
dibromochloromethane	124-48-1	E611C	0.50	µg/L	----	<0.50	<0.50	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>VA20B4178</b>	Page	: 1 of 6
Client	: <b>Wood Canada Ltd.</b>	Laboratory	: Vancouver - Environmental
Contact	: Jeremiah Gladu	Account Manager	: Selam Worku
Address	: 600 - 4445 Lougheed Hwy Burnaby BC Canada V5C 0E4	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: VE52655D	Date Samples Received	: 01-Sep-2020 11:20
PO	: ----	Issue Date	: 10-Sep-2020 17:44
C-O-C number	: ----		
Sampler	: Ardy M.		
Site	: ----		
Quote number	: VA20-SEAB100-0003 - Wood/Seabridge Gold		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

## Summary of Outliers

### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.

### **Outliers : Analysis Holding Time Compliance (Breaches)**

- No Analysis Holding Time Outliers exist.

### **Outliers : Frequency of Quality Control Samples**

- No Quality Control Sample Frequency Outliers occur.

RIGHT SOLUTIONS | RIGHT PARTNER





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> SW20-02	E601A	29-Aug-2020	04-Sep-2020	14 days	5 days	✓	08-Sep-2020	40 days	3 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> SW20-03	E601A	29-Aug-2020	04-Sep-2020	14 days	5 days	✓	08-Sep-2020	40 days	3 days	✓	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> SW20-02	E641A	29-Aug-2020	04-Sep-2020	14 days	5 days	✓	05-Sep-2020	40 days	0 days	✓	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> SW20-03	E641A	29-Aug-2020	04-Sep-2020	14 days	5 days	✓	05-Sep-2020	40 days	0 days	✓	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE total (nitric acid)</b> SW20-01	E420	29-Aug-2020	----	----	----		04-Sep-2020	180 days	5 days	✓	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE total (nitric acid)</b> SW20-02	E420	29-Aug-2020	----	----	----		04-Sep-2020	180 days	5 days	✓	
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> SW20-02	E611C	29-Aug-2020	03-Sep-2020	----	----		04-Sep-2020	----	----		



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) SW20-03	E611C	29-Aug-2020	03-Sep-2020	----	----		04-Sep-2020	----	----	
<b>Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) SW20-02	E611C	29-Aug-2020	03-Sep-2020	14 days	4 days	✓	04-Sep-2020	9 days	0 days	✓
<b>Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) SW20-03	E611C	29-Aug-2020	03-Sep-2020	14 days	4 days	✓	04-Sep-2020	9 days	0 days	✓
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) SW20-02	E611C	29-Aug-2020	03-Sep-2020	----	----		04-Sep-2020	----	----	
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) SW20-03	E611C	29-Aug-2020	03-Sep-2020	----	----		04-Sep-2020	----	----	
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) SW20-02	E611C	29-Aug-2020	03-Sep-2020	----	----		04-Sep-2020	----	----	
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) SW20-03	E611C	29-Aug-2020	03-Sep-2020	----	----		04-Sep-2020	----	----	

**Legend & Qualifier Definitions**

Rec. HT: ALS recommended hold time (see units).



## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Total Metals in Water by CRC ICPMS	E420	81440	1	18	5.5	5.0	✔
VOCs (BC List) by Headspace GC-MS	E611C	81036	1	14	7.1	5.0	✔
<b>Laboratory Control Samples (LCS)</b>							
BC PHC - EPH by GC-FID	E601A	81695	1	7	14.2	5.0	✔
PAHs by LVI GC-MS	E641A	81694	1	20	5.0	5.0	✔
Total Metals in Water by CRC ICPMS	E420	81440	1	18	5.5	5.0	✔
VOCs (BC List) by Headspace GC-MS	E611C	81036	1	14	7.1	5.0	✔
<b>Method Blanks (MB)</b>							
BC PHC - EPH by GC-FID	E601A	81695	1	7	14.2	5.0	✔
PAHs by LVI GC-MS	E641A	81694	1	20	5.0	5.0	✔
Total Metals in Water by CRC ICPMS	E420	81440	1	18	5.5	5.0	✔
VOCs (BC List) by Headspace GC-MS	E611C	81036	1	14	7.1	5.0	✔
<b>Matrix Spikes (MS)</b>							
Total Metals in Water by CRC ICPMS	E420	81440	1	18	5.5	5.0	✔
VOCs (BC List) by Headspace GC-MS	E611C	81036	1	14	7.1	5.0	✔



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Metals in Water by CRC ICPMS	E420 Vancouver - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
BC PHC - EPH by GC-FID	E601A Vancouver - Environmental	Water	BC MOE Lab Manual	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.
VOCs (BC List) by Headspace GC-MS	E611C Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by LVI GC-MS	E641A Vancouver - Environmental	Water	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by large volume injection (LVI) GC-MS.
LEPH and HEPH: EPH-PAH	EC600A Vancouver - Environmental	Water	BC MOE Lab Manual (LEPH and HEPH) (mod)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Acenaphthene, Acridine, Anthracene, Fluorene, Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(a)pyrene, Fluoranthene, and Pyrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
VOCs Preparation for Headspace Analysis	EP581 Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

## QUALITY CONTROL REPORT

<b>Work Order</b>	<b>: VA20B4178</b>	<b>Page</b>	<b>: 1 of 10</b>
<b>Client</b>	: Wood Canada Ltd.	<b>Laboratory</b>	: Vancouver - Environmental
<b>Contact</b>	: Jeremiah Gladu	<b>Account Manager</b>	: Selam Worku
<b>Address</b>	: 1235 Main Street P.O. Box 2356 Smithers BC Canada V0J 2N0	<b>Address</b>	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
<b>Telephone</b>	: ----	<b>Telephone</b>	: +1 604 253 4188
<b>Project</b>	: VE52655D	<b>Date Samples Received</b>	: 01-Sep-2020 11:20
<b>PO</b>	: ----	<b>Date Analysis Commenced</b>	: 03-Sep-2020
<b>C-O-C number</b>	: ----	<b>Issue Date</b>	: 10-Sep-2020 17:44
<b>Sampler</b>	: Ardy M.		
<b>Site</b>	: ----		
<b>Quote number</b>	: VA20-SEAB100-0003 - Wood/Seabridge Gold		
<b>No. of samples received</b>	: 3		
<b>No. of samples analysed</b>	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

### *Signatories*

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Brianna Allen	Department Manager - Organics	Organics, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia

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Work Order : VA20B4178  
Client : Wood Canada Ltd.  
Project : VE52655D

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## **General Comments**

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

# = Indicates a QC result that did not meet the ALS DQO.



### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Total Metals (QC Lot: 81440)</b>											
VA20B4106-002	Anonymous	cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000076	0.0000114	0.0000038	Diff <2x LOR	----
		iron, total	7439-89-6	E420	0.010	mg/L	0.036	0.040	0.003	Diff <2x LOR	----
		magnesium, total	7439-95-4	E420	0.0050	mg/L	0.570	0.579	1.51%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	0.00317	0.00302	4.71%	20%	----
<b>Volatile Organic Compounds (QC Lot: 81036)</b>											
VA20B4168-002	Anonymous	benzene	71-43-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		bromodichloromethane	75-27-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		bromoform	75-25-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		carbon tetrachloride	56-23-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		chlorobenzene	108-90-7	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		chloroethane	75-00-3	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		chloroform	67-66-3	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		chloromethane	74-87-3	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dibromochloromethane	124-48-1	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichlorobenzene, 1,2-	95-50-1	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichlorobenzene, 1,3-	541-73-1	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichlorobenzene, 1,4-	106-46-7	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloroethane, 1,1-	75-34-3	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloroethane, 1,2-	107-06-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloroethylene, 1,1-	75-35-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloroethylene, cis-1,2-	156-59-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloromethane	75-09-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloropropane, 1,2-	78-87-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloropropylene, cis-1,3-	10061-01-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloropropylene, trans-1,3-	10061-02-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.20	µg/L	<0.20	<0.20	0	Diff <2x LOR	----
		tetrachloroethylene	127-18-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----

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 Project : VE52655D



Sub-Matrix: <b>Water</b>					<i>Laboratory Duplicate (DUP) Report</i>						
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Original Result</i>	<i>Duplicate Result</i>	<i>RPD(%) or Difference</i>	<i>Duplicate Limits</i>	<i>Qualifier</i>
<b>Volatile Organic Compounds (QC Lot: 81036) - continued</b>											
VA20B4168-002	Anonymous	toluene	108-88-3	E611C	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		trichloroethane, 1,1,1-	71-55-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		trichloroethane, 1,1,2-	79-00-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		trichloroethylene	79-01-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		trichlorofluoromethane	75-69-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		vinyl chloride	75-01-4	E611C	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----





## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

### Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Total Metals (QCLot: 81440)</b>						
cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
<b>Volatile Organic Compounds (QCLot: 81036)</b>						
benzene	71-43-2	E611C	0.5	µg/L	<0.50	----
bromodichloromethane	75-27-4	E611C	0.5	µg/L	<0.50	----
bromoform	75-25-2	E611C	0.5	µg/L	<0.50	----
carbon tetrachloride	56-23-5	E611C	0.5	µg/L	<0.50	----
chlorobenzene	108-90-7	E611C	0.5	µg/L	<0.50	----
chloroethane	75-00-3	E611C	0.5	µg/L	<0.50	----
chloroform	67-66-3	E611C	0.5	µg/L	<0.50	----
chloromethane	74-87-3	E611C	0.5	µg/L	<0.50	----
dibromochloromethane	124-48-1	E611C	0.5	µg/L	<0.50	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.5	µg/L	<0.50	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.5	µg/L	<0.50	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.5	µg/L	<0.50	----
dichloroethane, 1,1-	75-34-3	E611C	0.5	µg/L	<0.50	----
dichloroethane, 1,2-	107-06-2	E611C	0.5	µg/L	<0.50	----
dichloroethylene, 1,1-	75-35-4	E611C	0.5	µg/L	<0.50	----
dichloroethylene, cis-1,2-	156-59-4	E611C	0.5	µg/L	<0.50	----
dichloroethylene, trans-1,2-	156-60-5	E611C	0.5	µg/L	<0.50	----
dichloromethane	75-09-2	E611C	0.5	µg/L	<0.50	----
dichloropropane, 1,2-	78-87-5	E611C	0.5	µg/L	<0.50	----
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.5	µg/L	<0.50	----
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.5	µg/L	<0.50	----
ethylbenzene	100-41-4	E611C	0.5	µg/L	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.5	µg/L	<0.50	----
styrene	100-42-5	E611C	0.5	µg/L	<0.50	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.5	µg/L	<0.50	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.2	µg/L	<0.20	----
tetrachloroethylene	127-18-4	E611C	0.5	µg/L	<0.50	----
toluene	108-88-3	E611C	0.4	µg/L	<0.40	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Volatile Organic Compounds (QCLot: 81036) - continued</b>						
trichloroethane, 1,1,1-	71-55-6	E611C	0.5	µg/L	<0.50	---
trichloroethane, 1,1,2-	79-00-5	E611C	0.5	µg/L	<0.50	---
trichloroethylene	79-01-6	E611C	0.5	µg/L	<0.50	---
trichlorofluoromethane	75-69-4	E611C	0.5	µg/L	<0.50	---
vinyl chloride	75-01-4	E611C	0.4	µg/L	<0.40	---
xylene, m+p-	179601-23-1	E611C	0.5	µg/L	<0.50	---
xylene, o-	95-47-6	E611C	0.5	µg/L	<0.50	---
<b>Hydrocarbons (QCLot: 81695)</b>						
EPH (C10-C19)	---	E601A	250	µg/L	<250	---
EPH (C19-C32)	---	E601A	250	µg/L	<250	---
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 81694)</b>						
acenaphthene	83-32-9	E641A	0.01	µg/L	<0.010	---
acenaphthylene	208-96-8	E641A	0.01	µg/L	<0.010	---
acridine	260-94-6	E641A	0.01	µg/L	<0.010	---
anthracene	120-12-7	E641A	0.01	µg/L	<0.010	---
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	<0.010	---
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	---
benzo(b+j)fluoranthene	---	E641A	0.01	µg/L	<0.010	---
benzo(b+j+k)fluoranthene	---	E641A	0.015	µg/L	<0.015	---
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	<0.010	---
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	<0.010	---
chrysene	218-01-9	E641A	0.01	µg/L	<0.010	---
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	<0.0050	---
fluoranthene	206-44-0	E641A	0.01	µg/L	<0.010	---
fluorene	86-73-7	E641A	0.01	µg/L	<0.010	---
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	<0.010	---
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	<0.010	---
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	<0.010	---
naphthalene	91-20-3	E641A	0.05	µg/L	<0.050	---
phenanthrene	85-01-8	E641A	0.02	µg/L	<0.020	---
pyrene	129-00-0	E641A	0.01	µg/L	<0.010	---
quinoline	6027-02-7	E641A	0.05	µg/L	<0.050	---



## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Total Metals (QCLot: 81440)</b>									
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	99.2	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	93.7	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	98.3	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	101	80.0	120	----
<b>Volatile Organic Compounds (QCLot: 81036)</b>									
benzene	71-43-2	E611C	0.5	µg/L	100 µg/L	119	70.0	130	----
bromodichloromethane	75-27-4	E611C	0.5	µg/L	100 µg/L	127	70.0	130	----
bromoform	75-25-2	E611C	0.5	µg/L	100 µg/L	101	70.0	130	----
carbon tetrachloride	56-23-5	E611C	0.5	µg/L	100 µg/L	111	70.0	130	----
chlorobenzene	108-90-7	E611C	0.5	µg/L	100 µg/L	115	70.0	130	----
chloroethane	75-00-3	E611C	0.5	µg/L	100 µg/L	95.4	60.0	140	----
chloroform	67-66-3	E611C	0.5	µg/L	100 µg/L	129	70.0	130	----
chloromethane	74-87-3	E611C	0.5	µg/L	100 µg/L	83.9	60.0	140	----
dibromochloromethane	124-48-1	E611C	0.5	µg/L	100 µg/L	123	70.0	130	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.5	µg/L	100 µg/L	96.6	70.0	130	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.5	µg/L	100 µg/L	87.7	70.0	130	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.5	µg/L	100 µg/L	92.4	70.0	130	----
dichloroethane, 1,1-	75-34-3	E611C	0.5	µg/L	100 µg/L	124	70.0	130	----
dichloroethane, 1,2-	107-06-2	E611C	0.5	µg/L	100 µg/L	97.3	70.0	130	----
dichloroethylene, 1,1-	75-35-4	E611C	0.5	µg/L	100 µg/L	106	70.0	130	----
dichloroethylene, cis-1,2-	156-59-4	E611C	0.5	µg/L	100 µg/L	125	70.0	130	----
dichloroethylene, trans-1,2-	156-60-5	E611C	0.5	µg/L	100 µg/L	106	70.0	130	----
dichloromethane	75-09-2	E611C	0.5	µg/L	100 µg/L	126	70.0	130	----
dichloropropane, 1,2-	78-87-5	E611C	0.5	µg/L	100 µg/L	130	70.0	130	----
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.5	µg/L	100 µg/L	124	70.0	130	----
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.5	µg/L	100 µg/L	122	70.0	130	----
ethylbenzene	100-41-4	E611C	0.5	µg/L	100 µg/L	112	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.5	µg/L	100 µg/L	113	70.0	130	----
styrene	100-42-5	E611C	0.5	µg/L	100 µg/L	119	70.0	130	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.5	µg/L	100 µg/L	120	70.0	130	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.2	µg/L	100 µg/L	108	70.0	130	----
tetrachloroethylene	127-18-4	E611C	0.5	µg/L	100 µg/L	94.4	70.0	130	----
toluene	108-88-3	E611C	0.4	µg/L	100 µg/L	103	70.0	130	----



Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 81036) - continued</b>									
trichloroethane, 1,1,1-	71-55-6	E611C	0.5	µg/L	100 µg/L	119	70.0	130	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.5	µg/L	100 µg/L	111	70.0	130	----
trichloroethylene	79-01-6	E611C	0.5	µg/L	100 µg/L	114	70.0	130	----
trichlorofluoromethane	75-69-4	E611C	0.5	µg/L	100 µg/L	116	60.0	140	----
vinyl chloride	75-01-4	E611C	0.4	µg/L	100 µg/L	87.8	60.0	140	----
xylene, m+p-	179601-23-1	E611C	0.5	µg/L	200 µg/L	120	70.0	130	----
xylene, o-	95-47-6	E611C	0.5	µg/L	100 µg/L	120	70.0	130	----
<b>Hydrocarbons (QCLot: 81695)</b>									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	116	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	113	70.0	130	----
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 81694)</b>									
acenaphthene	83-32-9	E641A	0.01	µg/L	0.5 µg/L	104	60.0	130	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5 µg/L	108	60.0	130	----
acridine	260-94-6	E641A	0.01	µg/L	0.5 µg/L	108	60.0	130	----
anthracene	120-12-7	E641A	0.01	µg/L	0.5 µg/L	113	60.0	130	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5 µg/L	118	60.0	130	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5 µg/L	119	60.0	130	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	0.5 µg/L	108	60.0	130	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	1 µg/L	108	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5 µg/L	113	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5 µg/L	108	60.0	130	----
chrysene	218-01-9	E641A	0.01	µg/L	0.5 µg/L	123	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	0.5 µg/L	118	60.0	130	----
fluoranthene	206-44-0	E641A	0.01	µg/L	0.5 µg/L	109	60.0	130	----
fluorene	86-73-7	E641A	0.01	µg/L	0.5 µg/L	99.0	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5 µg/L	120	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5 µg/L	105	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	0.5 µg/L	101	60.0	130	----
naphthalene	91-20-3	E641A	0.05	µg/L	0.5 µg/L	98.3	50.0	130	----
phenanthrene	85-01-8	E641A	0.02	µg/L	0.5 µg/L	107	60.0	130	----
pyrene	129-00-0	E641A	0.01	µg/L	0.5 µg/L	113	60.0	130	----
quinoline	6027-02-7	E641A	0.05	µg/L	0.5 µg/L	124	60.0	130	----



### Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Total Metals (QCLot: 81440)</b>										
KS2001604-002	Anonymous	cadmium, total	7440-43-9	E420	0.0198 mg/L	0.02 mg/L	99.0	70.0	130	----
		iron, total	7439-89-6	E420	9.01 mg/L	10 mg/L	90.1	70.0	130	----
		magnesium, total	7439-95-4	E420	ND mg/L	5 mg/L	ND	70.0	130	----
		manganese, total	7439-96-5	E420	0.102 mg/L	0.1 mg/L	102	70.0	130	----
<b>Volatile Organic Compounds (QCLot: 81036)</b>										
VA20B4168-003	Anonymous	benzene	71-43-2	E611C	115 µg/L	100 µg/L	115	60.0	140	----
		bromodichloromethane	75-27-4	E611C	138 µg/L	100 µg/L	138	60.0	140	----
		bromoform	75-25-2	E611C	105 µg/L	100 µg/L	105	60.0	140	----
		carbon tetrachloride	56-23-5	E611C	111 µg/L	100 µg/L	111	60.0	140	----
		chlorobenzene	108-90-7	E611C	117 µg/L	100 µg/L	117	60.0	140	----
		chloroethane	75-00-3	E611C	82.6 µg/L	100 µg/L	82.6	50.0	150	----
		chloroform	67-66-3	E611C	126 µg/L	100 µg/L	126	60.0	140	----
		chloromethane	74-87-3	E611C	62.4 µg/L	100 µg/L	62.4	50.0	150	----
		dibromochloromethane	124-48-1	E611C	125 µg/L	100 µg/L	125	60.0	140	----
		dichlorobenzene, 1,2-	95-50-1	E611C	101 µg/L	100 µg/L	101	60.0	140	----
		dichlorobenzene, 1,3-	541-73-1	E611C	93.9 µg/L	100 µg/L	93.9	60.0	140	----
		dichlorobenzene, 1,4-	106-46-7	E611C	99.6 µg/L	100 µg/L	99.6	60.0	140	----
		dichloroethane, 1,1-	75-34-3	E611C	129 µg/L	100 µg/L	129	60.0	140	----
		dichloroethane, 1,2-	107-06-2	E611C	137 µg/L	100 µg/L	137	60.0	140	----
		dichloroethylene, 1,1-	75-35-4	E611C	98.3 µg/L	100 µg/L	98.3	60.0	140	----
		dichloroethylene, cis-1,2-	156-59-4	E611C	130 µg/L	100 µg/L	130	60.0	140	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	108 µg/L	100 µg/L	108	60.0	140	----
		dichloromethane	75-09-2	E611C	130 µg/L	100 µg/L	130	60.0	140	----
		dichloropropane, 1,2-	78-87-5	E611C	136 µg/L	100 µg/L	136	60.0	140	----
		dichloropropylene, cis-1,3-	10061-01-5	E611C	129 µg/L	100 µg/L	129	60.0	140	----
		dichloropropylene, trans-1,3-	10061-02-6	E611C	124 µg/L	100 µg/L	124	60.0	140	----
		ethylbenzene	100-41-4	E611C	108 µg/L	100 µg/L	108	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	116 µg/L	100 µg/L	116	60.0	140	----
		styrene	100-42-5	E611C	118 µg/L	100 µg/L	118	60.0	140	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	135 µg/L	100 µg/L	135	60.0	140	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611C	116 µg/L	100 µg/L	116	60.0	140	----



Sub-Matrix: **Water**

					<i>Matrix Spike (MS) Report</i>					
					<i>Spike</i>		<i>Recovery (%)</i>	<i>Recovery Limits (%)</i>		
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>Concentration</i>	<i>Target</i>	<i>MS</i>	<i>Low</i>	<i>High</i>	<i>Qualifier</i>
<b>Volatile Organic Compounds (QCLot: 81036) - continued</b>										
VA20B4168-003	Anonymous	tetrachloroethylene	127-18-4	E611C	94.9 µg/L	100 µg/L	94.9	60.0	140	----
		toluene	108-88-3	E611C	100 µg/L	100 µg/L	100	60.0	140	----
		trichloroethane, 1,1,1-	71-55-6	E611C	127 µg/L	100 µg/L	127	60.0	140	----
		trichloroethane, 1,1,2-	79-00-5	E611C	114 µg/L	100 µg/L	114	60.0	140	----
		trichloroethylene	79-01-6	E611C	119 µg/L	100 µg/L	119	60.0	140	----
		trichlorofluoromethane	75-69-4	E611C	136 µg/L	100 µg/L	136	50.0	150	----
		vinyl chloride	75-01-4	E611C	66.3 µg/L	100 µg/L	66.3	50.0	150	----
		xylene, m+p-	179601-23-1	E611C	241 µg/L	200 µg/L	120	60.0	140	----
		xylene, o-	95-47-6	E611C	118 µg/L	100 µg/L	118	60.0	140	----



**Chain of Custody (COC) / Analytical Request Form**

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here  
(lab use only)

COC Number: 17 -

Page 1 of 1

<b>Report To</b> Contact and company name below will appear on the final report			<b>Report Format / Distribution</b>			<b>Select Service Level Below - Contact your AM to confirm all E&amp;P TATs (surcharges may apply)</b>																			
Company: Wood.			Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)			<b>Regular [R]</b> <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply																			
Contact: Jeremiah Gladu			Quality Control (QC) Report with Report <input type="checkbox"/> YES <input type="checkbox"/> NO			<b>PRIORITY (Business Days)</b>	4 day [P4-20%] <input type="checkbox"/>			<b>EMERGENCY</b>	1 Business day [E - 100%] <input type="checkbox"/>														
Phone:			<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked				3 day [P3-25%] <input type="checkbox"/>				Same Day, Weekend or Statutory holiday [E2 -200%] <input type="checkbox"/> (Laboratory opening fees may apply)														
Company address below will appear on the final report			Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX				2 day [P2-50%] <input type="checkbox"/>																		
Street: 4445 Loughheed Hwy.			Email 1 or Fax jeremiah.glsdu@woodplc.com			Date and Time Required for all E&P TATs:			dd-mmm-yy hh:mm																
City/Province: Burnaby/BC			Email 2			For tests that can not be performed according to the service level selected, you will be contacted.																			
Postal Code: V5C 0E4			Email 3			<b>Analysis Request</b>																			
Invoice To: Same as Report To <input type="checkbox"/> YES <input type="checkbox"/> NO			<b>Invoice Distribution</b>			<b>NUMBER OF CONTAINERS</b>	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below											<b>SAMPLES ON HOLD</b>							
Copy of Invoice with Report <input type="checkbox"/> YES <input type="checkbox"/> NO			Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX				<b>BTEX / VOC</b>	<b>EPH/PAH</b>	<b>General chemistry *</b>	<b>DISSOLVED METALS</b>	<b>Manganese (total)</b>	<b>Iron (total)</b>	<b>Cadmium (total)</b>												
Company:			Email 1 or Fax																						
Contact:			Email 2																						
<b>Project Information</b>														<b>Oil and Gas Required Fields (client use)</b>											
ALS Account # / Quote #:			AFE/Cost Center:											PO#:											
Job #: VE52855D			Major/Minor Code:											Routing Code:											
PO / AFE:			Requisitioner:																						
LSD:			Location:																						
ALS Lab Work Order # (lab use only):			ALS Contact: Selam Worku		Sampler: Ardy M.																				
<b>ALS Sample # (lab use only)</b>	<b>Sample Identification and/or Coordinates (This description will appear on the report)</b>				<b>Date (dd-mmm-yy)</b>	<b>Time (hh:mm)</b>								<b>Sample Type</b>											
	SW20-01				29-Aug-20	PM	Water																		
	SW20-02																								
	SW20-03																								
	Terrace Shipping Coolers x 5																								
<b>Drinking Water (DW) Samples<sup>1</sup> (client use)</b>						<b>Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)</b>						<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>													
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO						*GENERAL WATER CHEMISTRY TO INCLUDE: pH, Alkalinity, bicarbonate, carbonate, chloride, conductivity, fluoride, hardness, hydroxide, nitrate, nitrite, ammonia, sulphate, turbidity, TDS, acidity						Frozen <input checked="" type="checkbox"/> SIF Observations: Yes <input type="checkbox"/> No <input type="checkbox"/>													
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO												Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact: Yes <input type="checkbox"/> No <input type="checkbox"/>													
<b>SHIPMENT RELEASE (client use)</b>						<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>						Cooling Initiated <input type="checkbox"/>													
												INITIAL COOLER TEMPERATURES °C: 28 0.8 32 44						FINAL COOLER TEMPERATURES °C: 4							
Released by: Ardy Mansourpour			Date: Time:			Received by: Chris Allison			Date: Aug 31 2020			Time: 10:30			Received by: cm			Date: 01 Sept. 2020			Time: 11:20 am				

Environmental Division  
 Vancouver  
 Work Order Reference  
**VA20B4178**  
  
 Telephone: +1 604 253 4188

**Appendix C  
Box Plot Data**





**Treatment Area 1 - Hydrocarbons Box Plot Data**

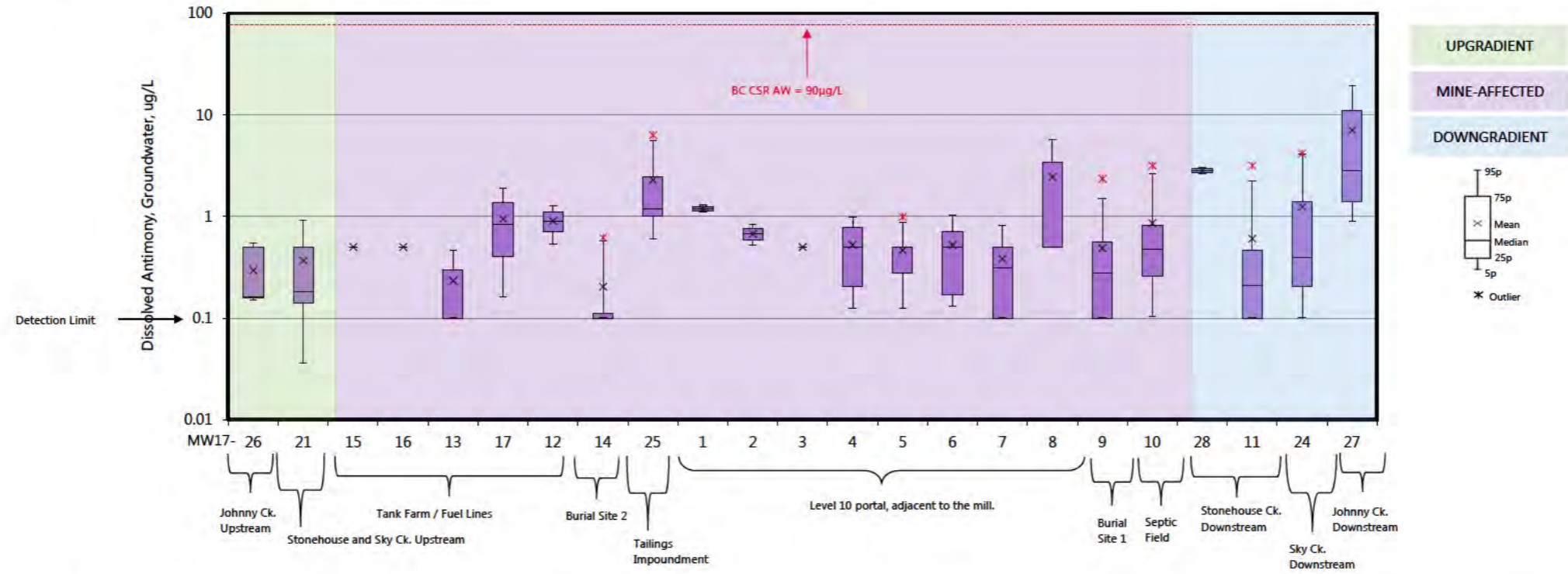
Sampling Event	2017 In-Situ (LEPH)	2017 In-Situ (HEPH)	2018 (Year End) LEPH	2018 (Year End) HEPH	2019 (Mid-Year) LEPH	2019 (Mid-Year) HEPH	2019 (Year End) LEPH	2019 (Year End) HEPH	2020 (Year End) LEPH	2020 (Year End) HEPH
Min	2480	300	370	200	350	230	320	250	300	400
Q1	2683	375	900	300	703	298	340	295	400	400
Median	3095	450	1490	310	1140	350	410	340	500	400
Q3	3550	525	2015	430	1698	395	890	385	915	400
Max	3880	600	5310	490	2230	440	1730	430	1330	400
IQR	868	150	1115	130	995	98	550	90	515	0
Upper Outliers	0	0	1	0	0	0	1	0	0	0
Lower Outliers	0	0	0	0	0	0	0	0	0	0
Q2-Q1	412.5	75.0	590	10	437.5	52.5	70	45	100	0
Q3-Q2	455	75	525	120	557.5	45	480	45	415	0
Q3+1.5*IQR	4851.25	750	3687.5	625	3190	541.25	1715	520	1687.5	400
Q1-1.5*IQR	1381.25	150	-772.5	105	-790	151.25	-485	160	-372.5	400
Upper Whisker (95P)	3748	570	3582	466	2005	422	1394	412	1164	400
Lower Whisker (5P)	2561	330	640	240	505	257	328	268	340	400
Wupper-Q3	198	45	1567	36	307.5	27	504	27	249	0
Q1-Wlower	121.5	45	260	60	197.5	40.5	12	27	60	0
Data Table - LEPH and HEPH Concentrations (mg/kg)	2750	<200	370	<200	350	<200	<200	<200	<200	<200
	3440	< 600	820	<200	660	<200	<200	<200	<200	<200
	3880	< 300	980	< 200	830	230	320	<200	<200	<200
	2480	<200	1490	< 300	1450	320	340	<200	<200	<200
			1600	< 310	1780	380	410	<200	300	<200
			2430	< 430	2230	440	890	250	500	<200
		5310	490			1730	430	1330	400	

**Treatment Area 2 - Hydrocarbons Box Plot Data**

<b>Sampling Event</b>	<b>2017 In-Situ (LEPH)</b>	<b>2017 In-Situ (HEPH)</b>	<b>2019 (Year End) LEPH</b>	<b>2019 (Year End) HEPH</b>	<b>2020 (Year End) LEPH</b>	<b>2020 (Year End) HEPH</b>
<b>Min</b>	2480	300	530	240	210	250
<b>Q1</b>	2683	375	995	240	360	300
<b>Median</b>	3095	450	1280	250	990	350
<b>Q3</b>	3550	525	2055	270	1050	425
<b>Max</b>	3880	600	3420	320	1660	500
<b>IQR</b>	868	150	1060	30	690	125
<b>Upper Outliers</b>	0	0	0	1	0	0
<b>Lower Outliers</b>	0	0	0	0	0	0
<b>Q2-Q1</b>	412.5	75.0	285	10	630	50
<b>Q3-Q2</b>	455	75	775	20	60	75
<b>Q3+1.5*IQR</b>	4851.25	750	3645	315	2085	612.5
<b>Q1-1.5*IQR</b>	1381.25	150	-595	195	-675	112.5
<b>Upper Whisker (95P)</b>	3748	570	2772	300	1292	470
<b>Lower Whisker (5P)</b>	2561	330	782	240	242	270
<b>Upper-Q3</b>	198	45	717	30	242	45
<b>Q1-Whisker</b>	121.5	45	213	0	118	30
<b>Data Table - LEPH and HEPH Concentrations</b>	< 2750	<200	530	<200	<200	<200
	< 3440	< 600	950	<200	<200	<200
	< 3880	< 300	1040	< 240	<200	<200
	< 2480	<200	1280	< 240	<200	<200
	-	-	1770	< 250	210	<200
	-	-	2340	< 270	250	<200
	-	-	3420	320	360	<200



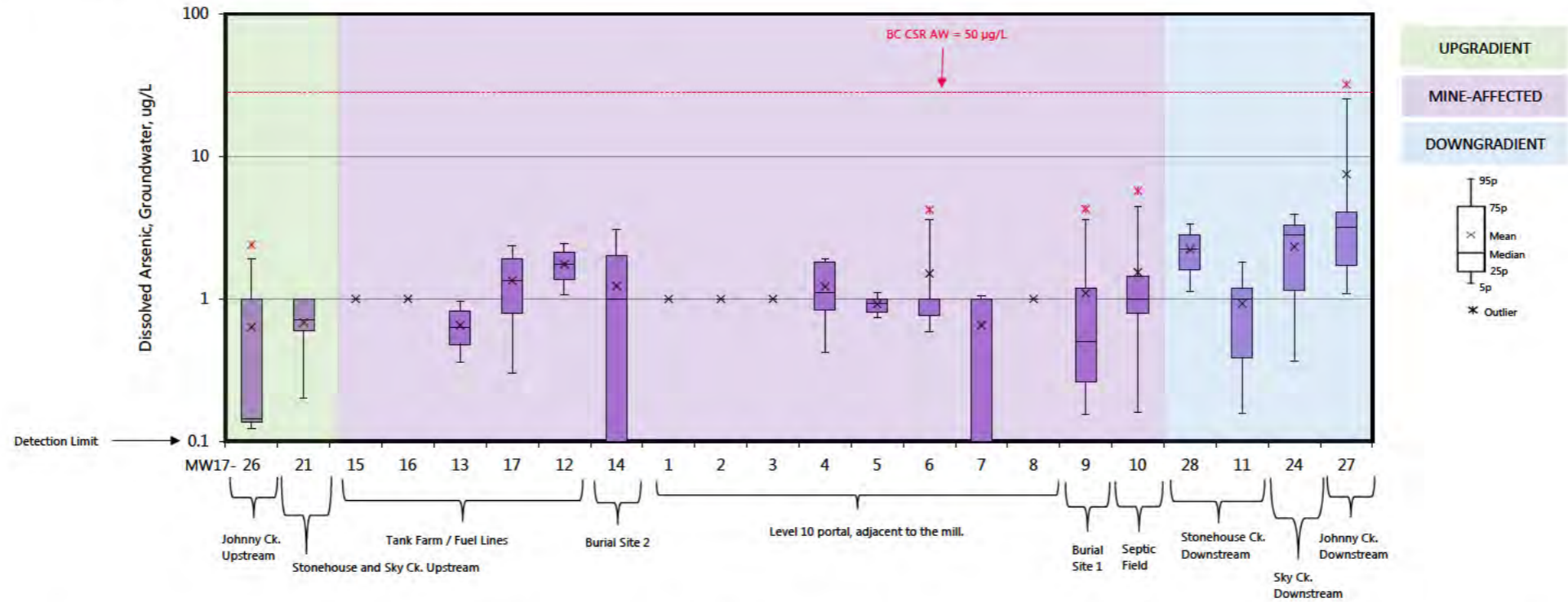
# Box Plot - Antimony in Groundwater



Monitoring Well	26	21	15	16	13	17	12	14	25	1	2	3	4	5	6	7	8	9	10	28	11	24	27
Min	0.2	0.0	0.5	0.5	0.1	0.1	0.5	0.1	0.5	1.1	0.5	0.5	0.1	0.1	0.1	0.1	0.5	0.1	0.1	0.5	0.1	0.1	0.9
Q <sub>1</sub>	0.2	0.1	0.5	0.5	0.1	0.4	0.7	0.1	1.0	1.1	0.6	0.5	0.2	0.3	0.2	0.1	0.5	0.1	0.3	2.7	0.1	0.2	1.4
Median	0.2	0.2	0.5	0.5	0.1	0.8	0.9	0.1	1.2	1.2	0.7	0.5	0.5	0.5	0.5	0.3	0.5	0.3	0.5	2.8	0.2	0.4	2.8
Q <sub>3</sub>	0.5	0.5	0.5	0.5	0.3	1.4	1.1	0.1	2.5	1.3	0.8	0.5	0.8	0.5	0.7	0.5	3.4	0.6	0.8	3.0	0.5	1.4	11.0
Max	0.6	1.0	0.5	0.5	0.5	2.0	1.3	0.6	6.3	1.3	0.9	0.5	1.1	1.0	1.1	0.9	6.4	2.4	3.2	3.1	3.2	4.2	21.2
IQR	0.3	0.4	0.0	0.0	0.2	1.0	0.4	0.0	1.5	0.1	0.2	0.0	0.6	0.2	0.5	0.4	2.9	0.5	0.5	0.2	0.4	1.2	9.7
Upper Outliers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	2.0	0.0	1.0	2.0	0.0
Lower Outliers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>For the Box (IQR and Median)</b>																							
Q <sub>2</sub> -Q <sub>1</sub>	0.0025	0.04	0	0	0	0.43	0.2025	0	0.1725	0.055	0.1	0	0.295	0.225	0.33	0.21	0	0.18	0.22	0.115	0.11	0.19	1.4525
Q <sub>3</sub> -Q <sub>2</sub>	0.34	0.32	0	0	0.2	0.5475	0.2025	0.01	1.2925	0.055	0.0875	0	0.27	0	0.21	0.19	2.935	0.28	0.3275	0.115	0.26	1.005	8.2025
<b>For the Whiskers</b>																							
Q <sub>3</sub> +1.5*IQR	1.01375	1.04	0.5	0.5	0.6	2.84375	1.715	0.125	4.665	1.42	1.025	0.5	1.6175	0.8375	1.52	1.1	7.8375	1.25	1.62875	3.3	1.025	3.1925	25.525
Q <sub>1</sub> -1.5*IQR	-0.35625	-0.4	0.5	0.5	-0.2	-1.06625	0.095	0.085	-1.195	0.98	0.325	0.5	-0.6425	-0.0625	-0.64	-0.5	-3.9025	-0.59	-0.56125	2.38	-0.455	-1.5875	-13.095
5P	0.5455	0.908	0.5	0.5	0.46	1.8995	1.2695	0.572	5.5575	1.299	0.8325	0.5	0.99	0.8675	1.03	0.82	5.783	1.5085	2.666	3.047	2.2355	4.1455	19.325
95P	0.15	0.036	0.5	0.5	0.1	0.16	0.5405	0.1	0.6005	1.101	0.5175	0.5	0.125	0.125	0.13	0.1	0.5	0.1	0.1035	2.633	0.1	0.1	0.8975
W <sub>upper</sub> -Q <sub>3</sub>	0.0455	0.408	0	0	0.16	0.522	0.162	0.462	3.09	0.044	0.07	0	0.22	0.3675	0.32	0.32	2.3	0.9485	1.8585	0.092	1.7655	2.7455	8.2825
Q <sub>1</sub> -W <sub>lower</sub>	0.0075	0.104	0	0	0	0.24	0.162	0	0.402	0.044	0.07	0	0.08	0.15	0.04	0	0.0	0	0.1565	0.1	0	0.105	0.49
Mean	0.3	0.4	0.5	0.5	0.2	0.9	0.9	0.2	2.3	1.2	0.7	0.5	0.5	0.5	0.5	0.4	2.5	0.5	0.9	2.8	0.6	1.3	7.1
<b>Data Table</b>																							
	0.15	1.01	0.5	0.5	0.1	1.16	1.31	0.1	6.33	1.31	0.85	0.5	0.15	0.99	0.71	0.9	6.37	2.35	1.73	2.61	0.11	0.48	21.2
	0.16	0.18	0.5		0.5	2.03	0.5	0.62	1.18	1.09	0.5		1.14	0.5	0.5	0.31	0.5	0.82	0.5	3.07	0.1	0.31	0.87
	0.5	0.5			0.1	0.1		0.1	1.17				0.1	0.5	0.12	0.5	0.5	0.74	0.11		0.5	4.17	13.7
	0.16	0.14				0.5		0.1	0.5				0.84	0.2	0.17	0.1		0.1	0.1		0.46	4.1	0.98
	0.5	0.01						0.1					0.59	0.5	1.11	0.1		0.4	0.5		0.31	0.24	2.61
	0.16							0.1					0.5	0.1				0.36	0.46		3.17	0.1	3.07
	0.15							0.5					0.24					0.2	0.31		0.1	0.5	
	0.57							0.11					0.7					0.1	3.17		0.1	0.1	
								0.1					0.84					0.1					
													0.5					0.5					
													0.17					0.1					

**Notes:**  
 Well installed in overburden.  
 Well installed in bedrock.

# Box Plot - Arsenic in Groundwater



Monitoring Well	26	21	15	16	13	17	12	14	1	2	3	4	5	6	7	8	9	10	28	11	24	27
Min	0.1	0.1	1.0	1.0	0.3	0.2	1.0	0.1	1.0	1.0	1.0	0.4	0.7	0.5	0.1	1.0	0.1	0.2	1.0	0.2	0.4	1.0
Q <sub>1</sub>	0.1	0.6	1.0	1.0	0.5	0.8	1.4	0.1	1.0	1.0	1.0	0.8	0.8	0.8	0.1	1.0	0.3	0.8	1.6	0.4	1.2	1.7
Median	0.1	0.7	1.0	1.0	0.6	1.4	1.8	1.0	1.0	1.0	1.0	1.1	0.9	1.0	1.0	1.0	1.0	1.0	2.2	1.0	2.8	3.2
Q <sub>3</sub>	1.0	1.0	1.0	1.0	0.8	1.9	2.1	2.0	1.0	1.0	1.0	1.8	1.0	1.0	1.0	1.0	1.0	1.2	2.8	1.2	3.3	4.1
Max	2.4	1.0	1.0	1.0	1.0	2.5	2.5	3.4	1.0	1.0	1.0	2.0	1.1	4.2	1.1	1.0	4.3	3.5	2.0	4.2	32.1	
IQR	0.9	0.4	0.0	0.0	0.3	1.1	0.8	1.9	0.0	0.0	0.0	1.0	0.2	0.2	0.9	0.0	0.9	0.6	1.2	0.8	2.1	2.4
Upper Outliers	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	1.0	0.0	0.0	0.0	1.0
Lower Outliers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

**For the Box (IQR and Median)**

Q <sub>2</sub> -Q <sub>1</sub>	0.0075	0.11	0	0	0.15	0.555	0.375	0.9	0	0.0	0	0.28	0.13	0.24	0.9	0	0.24	0.205	0.6125	0.615	1.665	1.47
Q <sub>3</sub> -Q <sub>2</sub>	0.855	0.29	0	0	0.185	0.5475	0.375	1.01	0	0	0	0.69	0.07	0	0	0	0.6775	0.4425	0.6125	0.195	0.4625	0.8925

**For the Whiskers**

Q <sub>3</sub> +1.5*IQR	2.29375	1.6	1	1	1.3175	3.55125	3.25	4.875	1	1	1	3.255	1.3	1.36	2.35	1	2.55375	2.41375	4.675	2.41	6.46875	7.63125
Q <sub>1</sub> -1.5*IQR	-1.15625	0	1	1	-0.0225	-0.85875	0.25	-2.765	1	1	1	-0.625	0.5	0.4	-1.25	1	-1.11625	-0.17625	-0.225	-0.83	-2.04125	-1.81875
5P	1.91	1	1	1	0.963	2.3715	2.425	3.092	1	1	1	1.925	1.105	3.584	1.048	1	3.5925	4.4275	3.3275	1.8075	3.926	25.15
95P	0.1235	0.2	1	1	0.36	0.303	1.075	0.1	1	1	1	0.42	0.7425	0.584	0.1	1	0.154	0.1605	1.1225	0.1575	0.3675	1.08
W <sub>upper</sub> -Q <sub>3</sub>	0.91	0	0	0	0.148	0.474	0.3	1.082	0	0	0	0.125	0.105	2.584	0.048	0	2.415	2.985	0.49	0.6125	0.6485	21.0625
Q <sub>1</sub> -W <sub>lower</sub>	0.014	0.4	0	0	0.12	0.492	0.3	0	0	0	0	0.41	0.0575	0.176	0	0	0.106	0.6345	0.49	0.2275	0.7825	0.645
Mean	0.6	0.7	1.0	1.0	0.7	1.3	1.8	1.2	1.0	1.0	1.0	1.2	0.9	1.5	0.7	1.0	1.1	1.5	2.2	0.9	2.3	7.5

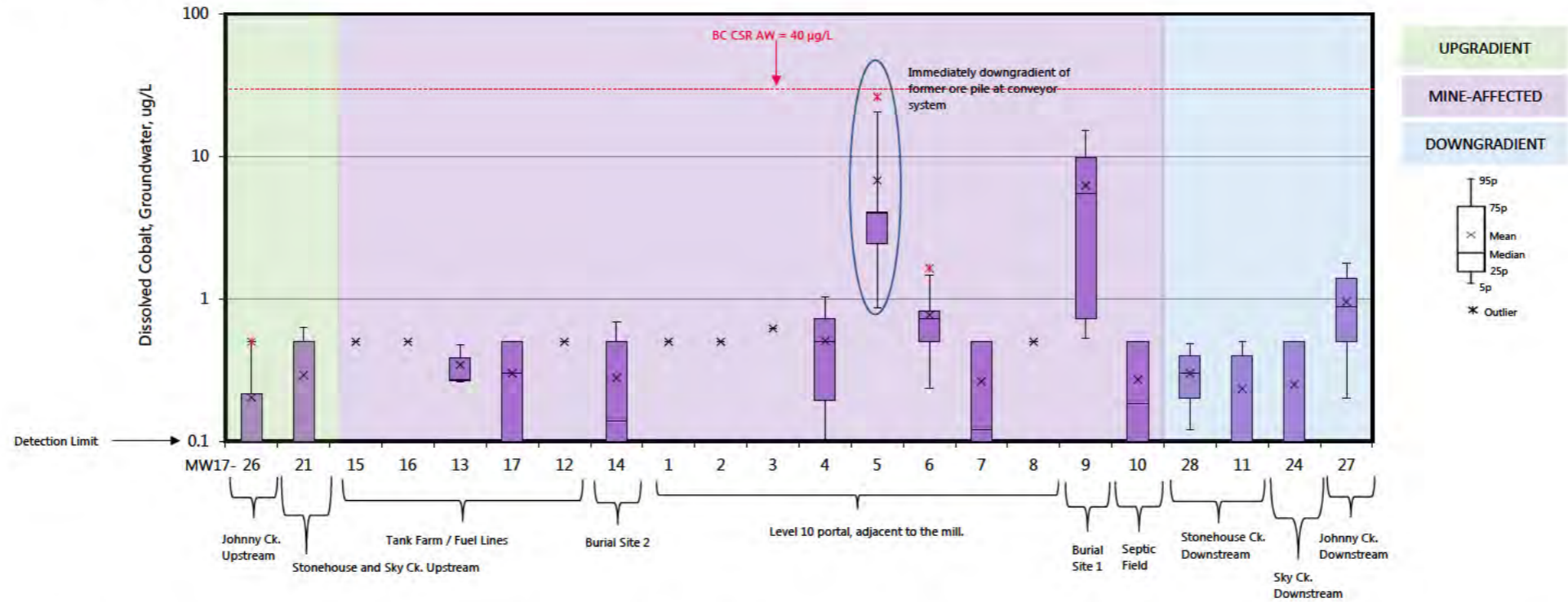
**Data Table**

0.13	1	1	1	0.33	2.49	2.5	0.76	1	1	1	1.88	1	1	1	1	4.28	5.74	3.45	0.18	4.15	32.1
0.14	0.71	1		1	1.7	1	1	1	1		1	1	1	1.06	1	0.66	1	1	0.15	2.53	1.32
1	1			0.63	0.18		2.63				1.97	0.78	0.54	1	1	1	0.18		1	3.1	4.3
0.14	0.6				1		3.4				0.41	1.14	0.76	0.1		0.28	0.15		1.99	3.2	2.94
1	0.1						0.1				1.36	0.73	4.23	0.1		1.71	1		1.26	3.51	3.45
0.12							0.1				1.8	0.86				3.03	1.99		1	0.35	1
0.15							1				0.92					0.34	1.26			1.4	
2.4							0.1				1.11					0.2	1			0.4	
							2.01				0.43					0.32					
											1.8					1					
											0.74					0.19					
																0.11					

**Notes:**

- Well installed in overburden.
- Well installed in bedrock.

# Box Plot - Cobalt in Groundwater



Monitoring Well	26	21	15	16	13	17	12	14	1	2	3	4	5	6	7	8	9	10	28	11	24	27
Min	0.1	0.1	0.5	0.5	0.3	0.1	0.5	0.1	0.5	0.5	0.6	0.1	0.5	0.2	0.1	0.5	0.5	0.1	0.1	0.1	0.1	0.1
Q1	0.1	0.1	0.5	0.5	0.3	0.1	0.5	0.1	0.5	0.5	0.6	0.2	2.4	0.5	0.1	0.5	0.7	0.1	0.2	0.1	0.1	0.5
Median	0.1	0.1	0.5	0.5	0.3	0.3	0.5	0.1	0.5	0.5	0.6	0.5	4.0	0.7	0.1	0.5	5.5	0.2	0.3	0.1	0.1	0.9
Q3	0.2	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.7	4.1	0.8	0.5	0.5	9.7	0.5	0.4	0.4	0.5	1.4
Max	0.5	0.7	0.5	0.5	0.5	0.5	0.5	0.8	0.5	0.5	0.6	1.1	26.2	1.6	0.5	0.5	15.8	0.5	0.5	0.5	0.5	1.9
IQR	0.1	0.4	0.0	0.0	0.1	0.4	0.0	0.4	0.0	0.0	0.0	0.5	1.6	0.3	0.4	0.0	9.0	0.4	0.2	0.3	0.4	0.9
Upper Outliers	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lower Outliers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

**For the Box (IQR and Median)**

Q2-Q1	0	0	0	0	0.005	0.2	0	0.04	0	0.0	0	0.305	1.525	0.22	0.02	0	4.7725	0.085	0.1	0	0	0.385
Q3-Q2	0.115	0.4	0	0	0.115	0.2	0	0.36	0	0	0	0.23	0.1075	0.1	0.38	0	4.235	0.315	0.1	0.3	0.4	0.5125

**For the Whiskers**

Q3+1.5*IQR	0.3875	1.1	0.5	0.5	0.565	1.1	0.5	1.1	0.5	0.5	0.62	1.5325	6.52125	1.3	1.1	0.5	23.24625	1.1	0.7	0.85	1.1	2.74375
Q1-1.5*IQR	-0.0725	-0.5	0.5	0.5	0.085	-0.5	0.5	-0.5	0.5	0.5	0.62	-0.6075	-0.00875	0.02	-0.5	0.5	-12.7838	-0.5	-0.1	-0.35	-0.5	-0.84625
5P	0.5	0.628	0.5	0.5	0.477	0.5	0.5	0.686	0.5	0.5	0.62	1.03	20.675	1.476	0.5	0.5	15.14	0.5	0.48	0.5	0.5	1.785
95P	0.1	0.1	0.5	0.5	0.261	0.1	0.5	0.1	0.5	0.5	0.62	0.1	0.86	0.236	0.1	0.5	0.533	0.1	0.12	0.1	0.1	0.2
W <sub>upper</sub> -Q <sub>3</sub>	0.285	0.128	0	0	0.092	0	0	0.186	0	0	0	0.3	16.6025	0.656	0	0	5.405	0	0.08	0.1	0	0.3875
Q <sub>1</sub> -W <sub>lower</sub>	0	0	0	0	0.004	0	0	0	0	0	0	0.095	1.58	0.264	0	0	0.1945	0	0.08	0	0	0.3
Mean	0.2	0.3	0.5	0.5	0.3	0.3	0.5	0.3	0.5	0.5	0.6	0.5	6.8	0.8	0.3	0.5	6.3	0.3	0.3	0.2	0.3	1.0

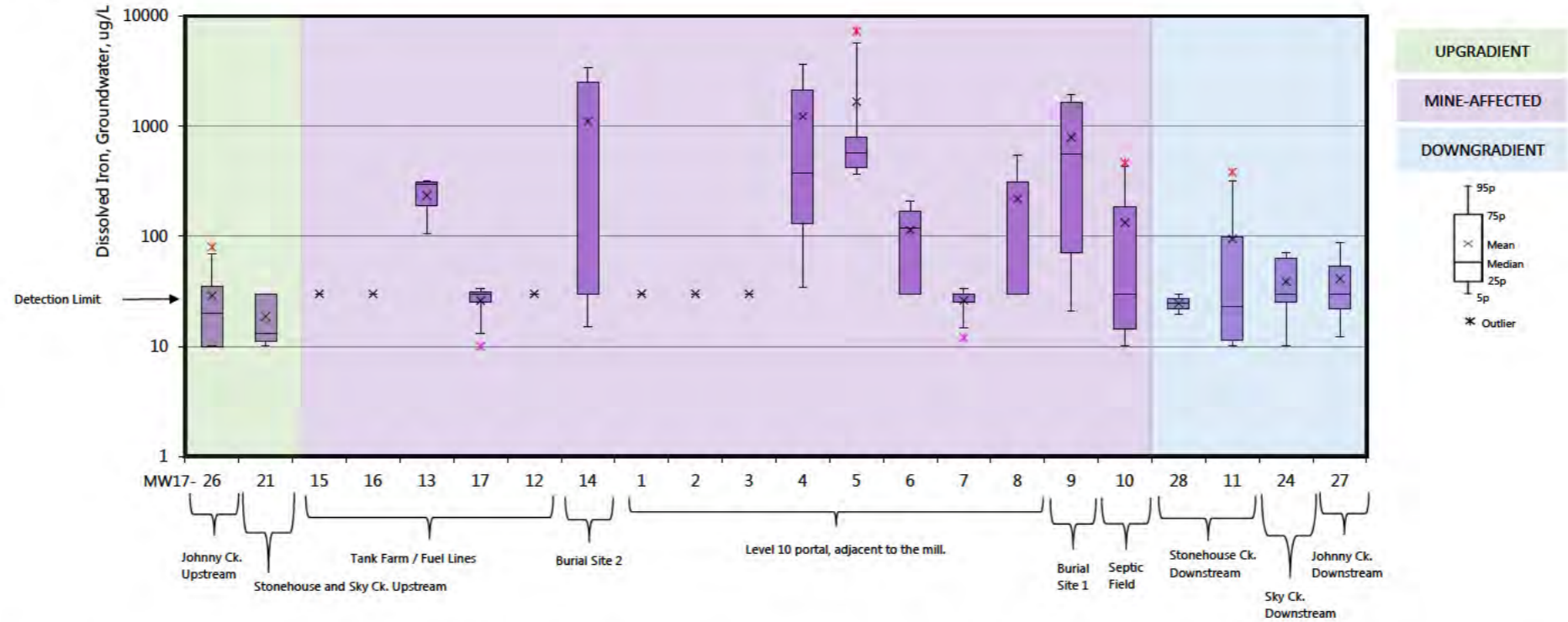
**Data Table**

0.1	0.5	0.5	0.5	0.26	0.1	0.5	0.1	0.5	0.5	0.62	0.1	0.5	0.5	0.5	0.5	0.76	0.27	0.1	0.1	0.1	0.5
0.1	0.1	0.5		0.5	0.5	0.5	0.5	0.5	0.5		0.5	26.2	1.64	0.12	0.5	0.93	0.5	0.5	0.1	0.1	1.27
0.5	0.66			0.27	0.1		0.14				0.1	3.99	0.72	0.5	0.5	0.5	0.1		0.5	0.5	1.9
0.1	0.1				0.5		0.16				0.18	3.94	0.82	0.1		14.6	0.1		0.1	0.5	1.44
0.5	0.1						0.1				0.74	4.1	0.17	0.1		0.63	0.5		0.1	0.1	0.1
0.1							0.1				0.99	1.94				0.56	0.1		0.5	0.1	0.5
0.1							0.5				0.72					13.8	0.1				0.1
0.12							0.1				0.56					8.38	0.5				0.1
							0.81				0.21					15.8					
											1.07					8.04					
											0.41					8.19					
																2.96					

**Notes:**

- Well installed in overburden.
- Well installed in bedrock.

# Box Plot - Iron in Groundwater



Monitoring Well	26	21	15	16	13	17	12	14	1	2	3	4	5	6	7	8	9	10	28	11	24	27
Min	10.0	10.0	30.0	30.0	85.0	10.0	30.0	10.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	12.0	30.0	10.0	10.0	19.0	10.0	10.0
Q <sub>1</sub>	10.0	11.0	30.0	30.0	189.5	25.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	25.0	30.0	30.0	71.5	14.5	21.8	25.0
Median	20.0	13.0	30.0	30.0	294.0	30.0	30.0	30.0	30.0	30.0	30.0	374.0	578.5	118.0	30.0	30.0	30.0	557.0	30.0	24.5	23.0	30.0
Q <sub>3</sub>	35.3	30.0	30.0	30.0	309.0	31.0	30.0	2480.0	30.0	30.0	30.0	2130.0	790.5	170.0	30.0	313.5	1645.0	185.5	27.3	97.5	62.5	54.0
Max	80.0	30.0	30.0	30.0	324.0	34.0	30.0	3800.0	30.0	30.0	30.0	4170.0	7290.0	221.0	34.0	597.0	1970.0	465.0	30.0	382.0	72.0	96.0
IQR	25.3	19.0	0.0	0.0	119.5	6.0	0.0	2450.0	0.0	0.0	0.0	1999.5	364.8	140.0	5.0	283.5	1573.5	171.0	5.5	86.0	37.5	32.3
Upper Outliers	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0
Lower Outliers	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

**For the Box (IQR and Median)**

Q <sub>2</sub> -Q <sub>1</sub>	10	2	0	0	104.5	5	0	0	0	0.0	0	243.5	152.75	88	5	0	485.5	15.5	2.75	11.5	5	8.25
Q <sub>3</sub> -Q <sub>2</sub>	15.25	17	0	0	15	1	0	2450	0	0	0	1756	212	52	0	283.5	1088	155.5	2.75	74.5	32.5	24

**For the Whiskers**

Q <sub>3</sub> +1.5*IQR	73.125	58.5	30	30	488.25	40	30	6155	30	30	30	5129.25	1337.625	380	37.5	738.75	4005.25	442	35.5	226.5	118.75	102.375
Q <sub>1</sub> -1.5*IQR	-27.875	-17.5	30	30	10.25	16	30	-3645	30	30	30	-2868.75	-121.375	-180	17.5	-395.25	-2288.75	-242	13.5	-117.5	-31.25	-26.625
5P	69.85	30	30	30	321	33.4	30	3436	30	30	30	3640	5679	210.8	33.2	540.3	1915	435.95	29.45	316.5	70.25	87.5
95P	10	10.2	30	30	105.9	13	30	15.2	30	30	30	34.5	366	30	14.6	30	21	10	19.55	10	10	12.25
W <sub>upper</sub> -Q <sub>3</sub>	34.6	0	0	0	12	2.4	0	956	0	0	0	1510	4888.5	40.8	3.2	226.8	270	250.45	2.2	219	7.75	33.5
Q <sub>1</sub> -W <sub>lower</sub>	0	0.8	0	0	83.6	12	0	14.8	0	0	0	96	59.75	0	10.4	0	50.5	4.5	2.2	1.5	15	9.5
Mean	28.9	18.8	30.0	30.0	234.3	26.0	30.0	1101.4	30.0	30.0	30.0	1223.7	1673.5	113.8	26.2	219.0	787.8	132.9	24.5	94.7	38.8	41.2

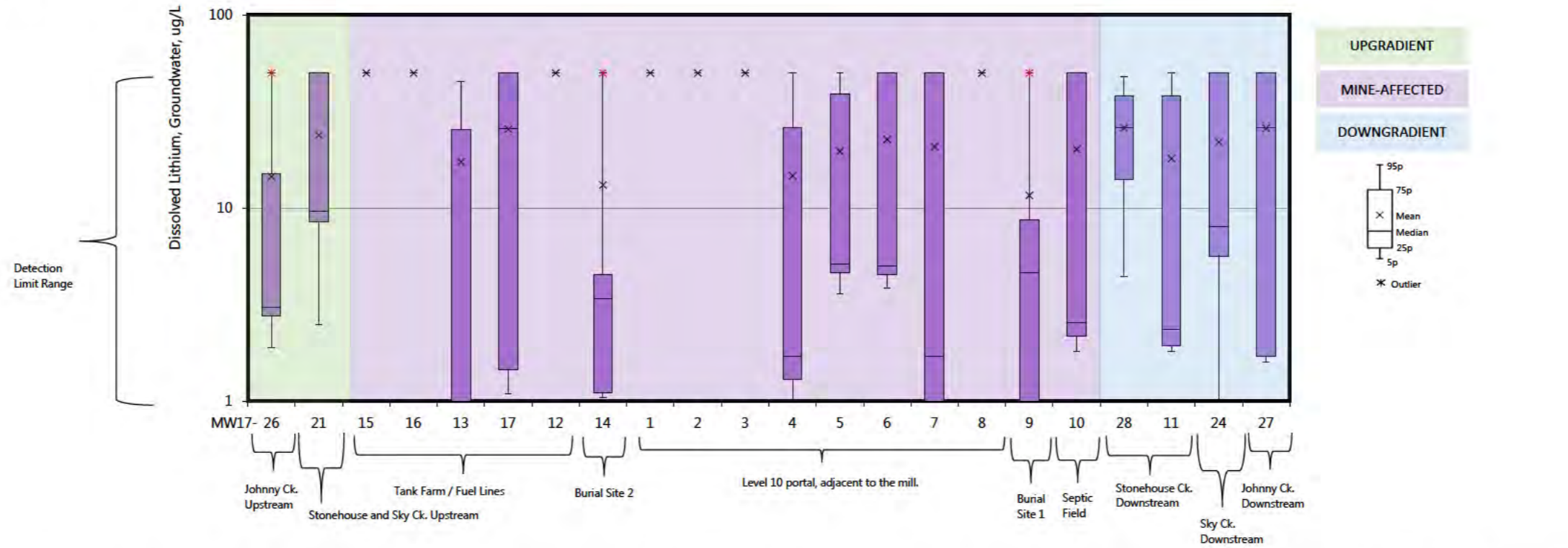
**Data Table**

51	30	30	30	294	34	30	620	30	30	30	335	358	30	30	597	10	465	19	10	67	30
10	13	30		85	30	30	30	30	30		30	7290	30	34	30	37	30	30	10	72	10
30	30			324	10		2890				39	533	170	30	30	30	10		30	30	96
10	11				30		2480				123	846	221	25		1640	10		120	30	62
30	10						10				882	624	118	12		250	30		16	61	19
10							30				3110	390				1970	120		382	10	30
10							30				4170					1660	16			30	
80							23				1160					789	382				10
							3800				138					1870					
											3100					83					
											374					779					
																335					

**Notes:**

- Well installed in overburden.
- Well installed in bedrock.

# Box Plot - Lithium in Groundwater



Monitoring Well	26	21	15	16	13	17	12	14	1	2	3	4	5	6	7	8	9	10	28	11	24	27
Min	1.5	1.0	50.0	50.0	1.0	1.0	50.0	1.0	50.0	50.0	50.0	1.0	3.3	3.7	1.0	50.0	1.0	1.8	2.0	1.8	1.0	1.6
Q <sub>1</sub>	2.8	8.5	50.0	50.0	1.0	1.5	50.0	1.1	50.0	50.0	50.0	1.3	4.6	4.5	1.0	50.0	1.0	2.2	14.0	1.9	5.7	1.7
Median	3.1	9.6	50.0	50.0	1.0	25.8	50.0	3.4	50.0	50.0	50.0	1.7	5.1	5.0	1.7	50.0	4.7	2.6	26.0	2.4	8.0	26.0
Q <sub>3</sub>	15.1	50.0	50.0	50.0	25.5	50.0	50.0	4.5	50.0	50.0	50.0	26.0	38.8	50.0	50.0	50.0	8.7	50.0	38.0	38.1	50.0	50.0
Max	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
IQR	12.3	41.5	0.0	0.0	24.5	48.6	0.0	3.4	0.0	0.0	0.0	24.7	34.2	45.5	49.0	0.0	7.7	47.8	24.0	36.2	44.4	48.3
Upper Outliers	2.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0
Lower Outliers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

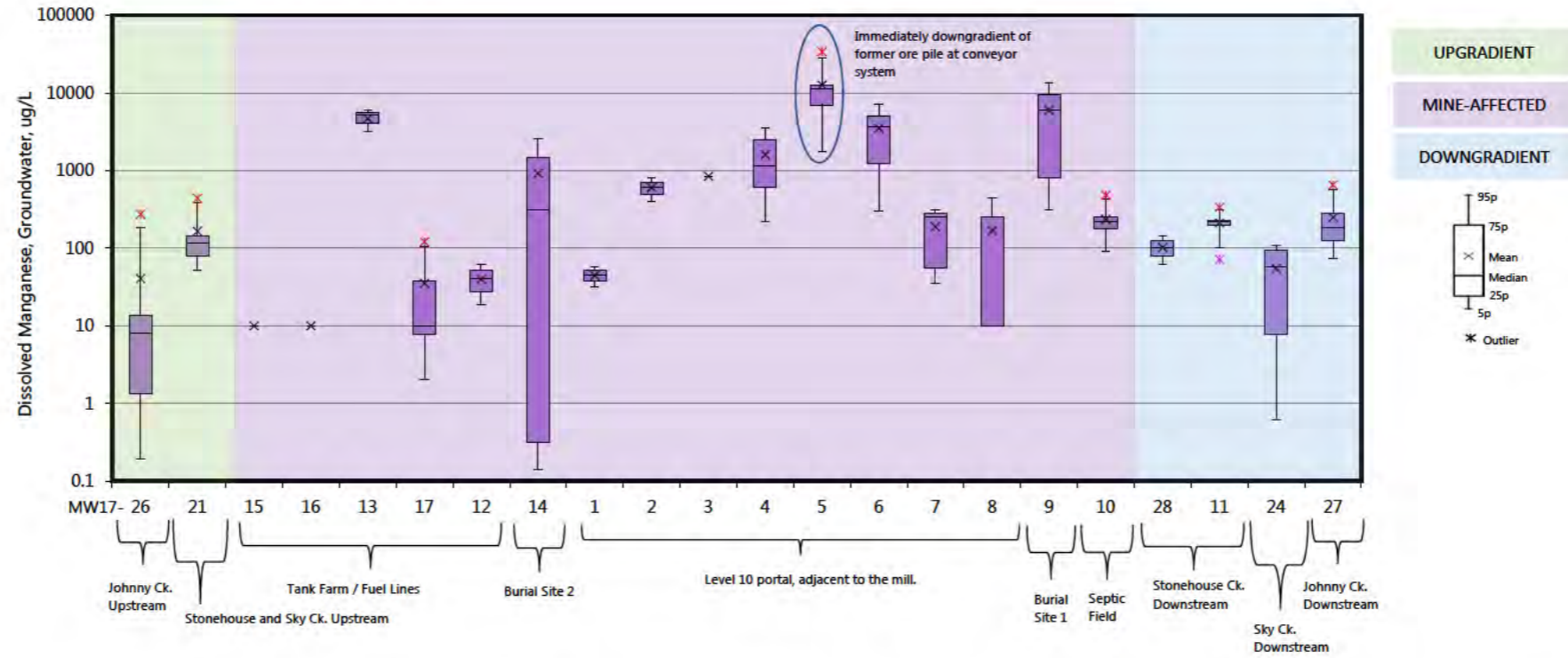
For the Box (IQR and Median)		26	21	15	16	13	17	12	14	1	2	3	4	5	6	7	8	9	10	28	11	24	27
Q <sub>2</sub> -Q <sub>1</sub>	0.3	1.1	0	0	0	24.35	0	2.3	0	0.0	0	0.4	0.475	0.5	0.7	0	3.65	0.375	12	0.425	2.35	24.3	
Q <sub>3</sub> -Q <sub>2</sub>	12	40.4	0	0	24.5	24.2	0	1.1	0	0	0	24.25	33.7	45	48.3	0	4	47.45	12	35.75	42	24	

For the Whiskers		26	21	15	16	13	17	12	14	1	2	3	4	5	6	7	8	9	10	28	11	24	27
Q <sub>3</sub> +1.5*IQR	33.5	112.25	50	50	62.25	122.825	50	9.6	50	50	50	62.925	90.0625	118.25	123.5	50	20.125	121.738	74	92.3625	116.525	122.45	
Q <sub>1</sub> -1.5*IQR	-15.7	-53.75	50	50	-35.75	-71.375	50	-4	50	50	50	-35.675	-46.6375	-63.75	-72.5	50	-10.475	-69.5625	-22	-52.3375	-60.875	-70.75	
5P	50	50	50	50	45.1	50	50	50	50	50	50	50	50	50	50	50	50	50	47.6	50	50	50	
95P	1.885	2.5	50	50	1	1.09	50	1.04	50	50	50	1	3.6	3.86	1	50	1	1.8	4.4	1.8	1	1.6	
W <sub>upper</sub> -Q <sub>3</sub>	34.95	0	0	0	19.6	0	0	45.5	0	0	0	24.05	11.2	0	0	0	41.35	0	9.6	11.9	0	0	
Q <sub>1</sub> -W <sub>lower</sub>	0.865	6	0	0	0	0.36	0	0.06	0	0	0	0.3	1.025	0.64	0	0	0	0.375	9.6	0.125	4.65	0.1	
Mean	14.6	23.8	50.0	50.0	17.3	25.7	50.0	13.2	50.0	50.0	50.0	14.7	19.7	22.6	20.7	50.0	11.6	20.1	26.0	18.1	21.9	25.9	

Data Table		26	21	15	16	13	17	12	14	1	2	3	4	5	6	7	8	9	10	28	11	24	27
	2.6	50	50	50	1	1.6	50	3.4	50	50	50	1.7	50	50	50	50	7.3	2.7	2	2.3	7.6	50	
	3	9.6	50		50	50	50	50	50	50		50	50	50	1.7	50	7.5	50	50	2.4	7.2	1.6	
	50	50			1	1		4.5				1.8	5	4.5	50	50	50	2.3		50	50	50	
	3.1	8.5				50		3.4				1	4.5	5	1		1	2.4		1.8	50	1.6	
	50	1						1.1				1.1	5.2	3.7	1		9.1	50		1.8	8.4	2	
	2.8							1				50	3.3				8.5	1.8		50	1	50	
	3.4							50				1.5					2	1.8			50		
	1.5							1.1				1.6					1	50			1		
								3.9				1					1						
												50					50						
												1.9					1						

**Notes:**  
 Well installed in overburden.  
 Well installed in bedrock.

# Box Plot - Manganese in Groundwater



Monitoring Well	26	21	15	16	13	17	12	14	1	2	3	4	5	6	7	8	9	10	28	11	24	27
Min	0.1	44.3	10.0	10.0	2980.0	0.6	16.0	0.1	30.0	384.0	843.0	128.0	434.0	71.3	29.2	10.0	303.0	71.6	58.0	198.8	0.5	58.0
Q <sub>1</sub>	1.4	80.0	10.0	10.0	4050.0	7.7	28.0	0.3	37.3	492.8	843.0	619.0	7025.0	1220.0	56.2	10.0	792.5	177.3	80.0	198.8	7.7	126.5
Median	8.0	117.0	10.0	10.0	5120.0	10.0	40.0	315.0	44.5	601.5	843.0	1140.0	11400.0	3620.0	251.0	10.0	6015.0	218.0	102.0	218.0	58.5	181.5
Q <sub>3</sub>	13.5	146.0	10.0	10.0	5550.0	37.8	52.0	1450.0	51.8	710.3	843.0	2455.0	12400.0	4990.0	283.0	249.0	9510.0	256.3	124.0	227.5	95.7	276.3
Max	274.0	439.0	10.0	10.0	5980.0	121.0	64.0	2890.0	59.0	819.0	843.0	3590.0	34000.0	7660.0	321.0	488.0	13700.0	481.0	146.0	335.0	114.0	653.0
IQR	12.1	66.0	0.0	0.0	1500.0	30.1	24.0	1449.7	14.5	217.5	0.0	1836.0	5375.0	3770.0	226.8	239.0	8717.5	79.0	44.0	28.8	88.0	149.8
Upper Outliers	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0	0.0	1.0
Lower Outliers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0

**For the Box (IQR and Median)**

	26	21	15	16	13	17	12	14	1	2	3	4	5	6	7	8	9	10	28	11	24	27
Q <sub>2</sub> -Q <sub>1</sub>	6.6875	37	0	0	1070	2.3475	12	314.68	7.25	108.8	0	521	4375	2400	194.8	0	5222.5	40.75	22	19.25	50.7925	55
Q <sub>3</sub> -Q <sub>2</sub>	5.455	29	0	0	430	27.75	12	1135	7.25	108.75	0	1315	1000	1370	32	239	3495	38.25	22	9.5	37.2	94.75

**For the Whiskers**

	26	21	15	16	13	17	12	14	1	2	3	4	5	6	7	8	9	10	28	11	24	27
Q <sub>3</sub> +1.5*IQR	31.71375	245	10	10	7800	82.89625	88	3624.52	73.5	1036.5	843	5209	20462.5	10645	623.2	607.5	22586.25	374.75	190	270.625	227.6888	500.875
Q <sub>1</sub> -1.5*IQR	-16.8563	-19	10	10	1800	-37.4938	-8	-2174.2	15.5	166.5	843	-2135	-1037.5	-4435	-284	-348.5	-12283.8	58.75	14	155.625	-124.281	-98.125
5P	185.45	380.4	10	10	5894	104.35	61.6	2618	57.55	797.25	843	3565	28650	7126	313.4	440.2	13315	429.9	141.6	308.75	109.8	563.75
95P	0.191	51.44	10	10	3194	2.0185	18.4	0.14	31.45	405.75	843	216	1750.5	301.04	34.6	10	309.05	92.04	62.4	101.95	0.6155	73.5
W <sub>upper</sub> -Q <sub>3</sub>	171.95	234.4	0	0	344	66.6	9.6	1168	5.8	87	0	1110	16250	2136	30.4	191.2	3805	173.65	17.6	81.25	14.1	287.5
Q <sub>1</sub> -W <sub>lower</sub>	1.1665	28.56	0	0	856	5.634	9.6	0.18	5.8	87	0	403	5274.5	918.96	21.6	0	483.45	85.21	17.6	96.8	7.092	53
Mean	40.5	165.3	10.0	10.0	4693.3	35.4	40.0	917.3	44.5	601.5	843.0	1605.5	12589.0	3512.3	188.1	169.3	5941.1	234.6	102.0	210.9	54.7	248.3

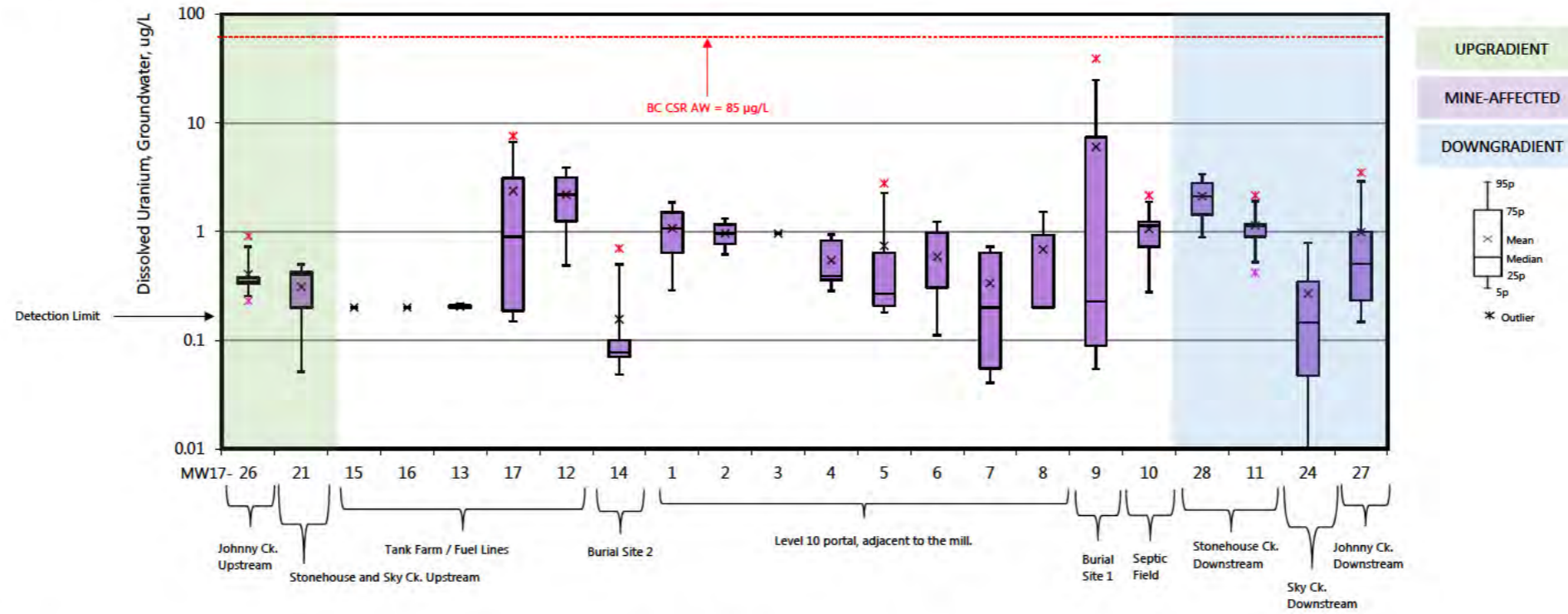
**Data Table**

	26	21	15	16	13	17	12	14	1	2	3	4	5	6	7	8	9	10	28	11	24	27
	6.09	80	10	10	5980	121	64	1380	59	384	843	304	434	1220	251	488	509	481	146	216	102	296
	0.36	146	10		2980	10	16	315	30	819		128	34000	7660	321	10	303	130	58	230	114	120
	10	439			5120	0.61		2890				383	11000	3620	283	10	314	216		220	58	217
	11	117				10		2210				855	12600	4990	56.2		13000	230		335	59	653
	21	44.3						0.2				1800	11800	71.3	29.2		887	220		71.6	93.6	146
	0.1							0.1				3540	5700				1760	335		193	0.83	58
	1.69							10				3070					8710	71.6			10	
	274							0.32				1840					9080	193			0.5	
								1450				1010					13700					
												3590					10800					
												1140					8910					
																	3320					

**Notes:**  
Well installed in overburden.  
Well installed in bedrock.



# Box Plot - Uranium in Groundwater



Monitoring Well	26	21	15	16	13	17	12	14	1	2	3	4	5	6	7	8	9	10	28	11	24	27
Min	0.2	0.0	0.2	0.2	0.2	0.1	0.3	0.0	0.2	0.6	1.0	0.2	0.2	0.1	0.0	0.2	0.1	0.2	0.1	0.2	0.1	0.2
Q <sub>1</sub>	0.3	0.2	0.2	0.2	0.2	0.2	1.2	0.1	0.6	0.8	1.0	0.4	0.2	0.3	0.1	0.2	0.1	0.2	0.1	0.7	1.4	0.9
Median	0.3	0.4	0.2	0.2	0.2	0.9	2.2	0.1	1.1	1.0	1.0	0.4	0.3	0.3	0.2	0.2	0.2	1.1	2.1	1.1	0.1	0.5
Q <sub>3</sub>	0.4	0.4	0.2	0.2	0.2	3.1	3.1	0.1	1.5	1.2	1.0	0.8	0.6	1.0	0.6	0.9	7.4	1.2	2.8	1.2	0.3	1.0
Max	0.9	0.5	0.2	0.2	0.2	7.6	4.1	0.7	1.9	1.4	1.0	1.0	2.8	1.3	0.8	1.7	39.1	2.2	3.5	2.2	0.8	3.5
IQR	0.0	0.2	0.0	0.0	0.0	2.9	1.9	0.0	0.9	0.4	0.0	0.5	0.4	0.7	0.6	0.7	7.3	0.5	1.4	0.3	0.3	0.8
Upper Outliers	1.0	0.0	0.0	0.0	0.0	1.0	0.0	2.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0	1.0
Lower Outliers	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0

For the Box (IQR and Median)																							
Q <sub>2</sub> -Q <sub>1</sub>	0.01725	0.198	0	0	0.002	0.71475	0.945	0.007	0.435	0.2	0	0.0315	0.06125	0.004	0.145	0	0.13775	0.4065	0.685	0.23125	0.098	0.276	
Q <sub>3</sub> -Q <sub>2</sub>	0.03125	0.025	0	0	0.0085	2.195	0.945	0.023	0.435	0.1925	0	0.439	0.371	0.671	0.436	0.73	7.1535	0.105	0.685	0.04	0.1995	0.483	

For the Whiskers																							
Q <sub>3</sub> +1.5*IQR	0.45	0.7575	0.2	0.2	0.22425	7.459625	5.97	0.145	2.81	1.735	0.96	1.53475	1.288375	1.9925	1.5075	2.025	18.31688	2.00225	4.86	1.576875	0.79125	2.1285	
Q <sub>1</sub> -1.5*IQR	0.256	-0.1345	0.2	0.2	0.18225	-4.17938	-1.59	0.025	-0.67	0.195	0.96	-0.34725	-0.44063	-0.7075	-0.8165	-0.895	-10.8481	-0.04375	-0.62	0.491875	-0.39875	-0.9075	
5P	0.72905	0.5006	0.2	0.2	0.2153	6.683	3.891	0.5	1.853	1.3115	0.96	0.9395	2.2725	1.228	0.7272	1.514	24.635	1.8875	3.353	1.9075	0.7865	2.885	
95P	0.2538	0.0512	0.2	0.2	0.1964	0.14985	0.489	0.0484	0.287	0.6185	0.96	0.2845	0.18	0.1114	0.0406	0.2	0.054	0.27665	0.887	0.5205	0.01	0.1465	
W <sub>upper</sub> -Q <sub>3</sub>	0.3518	0.0776	0	0	0.0068	3.588	0.756	0.4	0.348	0.154	0	0.1105	1.6325	0.248	0.0912	0.584	17.255	0.6525	0.548	0.7375	0.4415	1.895	
Q <sub>1</sub> -W <sub>lower</sub>	0.07495	0.1488	0	0	0.0016	0.0354	0.756	0.0216	0.348	0.154	0	0.074	0.02775	0.1936	0.0144	0	0.03475	0.44685	0.548	0.37825	0.0375	0.0845	
Mean	0.4	0.3	0.2	0.2	0.2	2.4	2.2	0.2	1.1	1.0	1.0	0.5	0.7	0.6	0.3	0.7	6.0	1.1	2.1	1.1	0.3	1.0	

Data Table																							
	0.352	0.52	0.2	0.2	0.217	1.6	4.08	0.04	1.94	0.58	0.96	0.357	2.78	1.29	0.75	1.66	39.1	1.4	3.49	1.18	0.109	1.07	
	0.339	0.423	0.2		0.2	7.58	0.3	0.7	0.2	1.35		0.89	0.75	0.98	0.636	0.2	1.95	0.2	0.75	1.14	0.182	0.122	
	0.34	0.2			0.196	0.141		0.083				0.212	0.228	0.305	0.2	0.2	11.7	1.18		1.12	0.78	0.22	
	0.372	0.398				0.2		0.077				0.357	0.31	0.309	0.055		0.079	1.14		0.419	0.79	0.264	
	0.91	0.014						0.061				0.835	0.201	0.063	0.037		12.8	1.12		0.825	0.06	3.49	
	0.298							0.077				0.37	0.173				5.94	0.419		2.15	0.01	0.75	
	0.393							0.2				0.823					0.247	0.825		0.2			
	0.23							0.07				0.989					0.054	2.15		0.01			
								0.1				0.36					0.092						
												0.39					0.2						
												0.39					0.054						
																	0.206						

**Notes:**  
 Well installed in overburden.  
 Well installed in bedrock.



**wood.**

**Appendix D**  
**Surface Water Monitoring Certificate of**  
**Analysis**





ERM Consultants Canada Ltd.  
ATTN: Elizabeth Boyle  
1500-1111 West Hastings Street  
Vancouver BC V6E 2J3

Date Received: 09-JUL-19  
Report Date: 18-JUL-19 13:14 (MT)  
Version: FINAL

Client Phone: 604-689-9460

## Certificate of Analysis

**Lab Work Order #:** L2306476  
Project P.O. #: NOT SUBMITTED  
Job Reference: 0492759-0004  
C of C Numbers: 17-756320, 17-756321  
Legal Site Desc:

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Amber Springer, B.Sc  
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 8081 Lougheed Hwy, Suite 100, Burnaby, BC V5A 1W9 Canada | Phone: +1 604 253 4188 | Fax: +1 604 253 6700  
ALS CANADA LTD Part of the ALS Group An ALS Limited Company

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2306476-1	L2306476-2	L2306476-3	L2306476-4	L2306476-5
		Description	WATER	WATER	WATER	WATER	WATER
		Sampled Date	07-JUL-19	07-JUL-19	07-JUL-19	07-JUL-19	07-JUL-19
		Sampled Time	09:55	11:00	10:35	11:36	11:52
		Client ID	JM14	JM11	JM6	JM5	TMF1
Grouping	Analyte						
<b>WATER</b>							
<b>Physical Tests</b>	Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
	Conductivity (uS/cm)	53.0	50.4	50.5	276	50.5	50.5
	Hardness (as CaCO3) (mg/L)	22.2	21.1	21.1	149	20.3	20.3
	pH (pH)	7.88	7.84	7.82	8.25	7.40	7.40
	Total Suspended Solids (mg/L)	93.6	120	100	3.0	<3.0	<3.0
	Total Dissolved Solids (mg/L)	35	36	35	160	30	30
	Turbidity (NTU)	40.5	42.7	33.6	0.51	0.50	0.50
<b>Anions and Nutrients</b>	Acidity (as CaCO3) (mg/L)	1.5	1.5	1.6	<1.0	1.7	1.7
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	25.3	24.0	24.1	124	9.6	9.6
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	25.3	24.0	24.1	124	9.6	9.6
	Ammonia, Total (as N) (mg/L)	<0.0050	<0.0050	0.0234	0.0122	0.0074	0.0074
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	<0.020	<0.020	<0.020	0.026	<0.020	<0.020
	Nitrate (as N) (mg/L)	<0.0050	0.0055	<0.0050 <sup>HTD</sup>	<0.0050	<0.0050	<0.0050
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010 <sup>HTD</sup>	<0.0010	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	<0.050	<0.050	<0.050	0.116	<0.050	<0.050
	Total Nitrogen (mg/L)	<0.030	<0.030	0.047	0.095	0.061	0.061
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total (mg/L)	0.0691	0.110	0.119	<0.0020	<0.0020	<0.0020
	Sulfate (SO4) (mg/L)	2.66	2.55	2.92	27.4	12.2	12.2
<b>Cyanides</b>	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Cyanide, Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Cyanide, Free (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
<b>Organic / Inorganic Carbon</b>	Dissolved Organic Carbon (mg/L)	0.76	1.05	1.02	1.52	1.04	1.04
	Total Organic Carbon (mg/L)	<0.50	0.56	0.72	1.64	0.80	0.80
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	1.75	2.25	2.06	<0.0030	0.0200	0.0200
	Antimony (Sb)-Total (mg/L)	0.00017	0.00021	0.00021	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00055	0.00065	0.00061	0.00039	0.00013	0.00013
	Barium (Ba)-Total (mg/L)	0.0735	0.0842	0.0842	0.0325	0.00833	0.00833
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Total (mg/L)	0.000059	0.000085	0.000075	<0.000050	<0.000050	<0.000050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	0.000736	0.00121	0.000918	0.0000503	0.0000299	0.0000299

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2306476-6	L2306476-7	L2306476-8	L2306476-9	L2306476-10
		Description	WATER	WATER	WATER	WATER	WATER
		Sampled Date	07-JUL-19	07-JUL-19	07-JUL-19	07-JUL-19	07-JUL-19
		Sampled Time	11:08	12:20	12:55	13:23	13:59
		Client ID	DUP1	JM4	JM26	SHCR3	SHC5
Grouping	Analyte						
<b>WATER</b>							
<b>Physical Tests</b>	Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	<5.0	
	Conductivity (uS/cm)	51.9	380	51.0	63.0	149	
	Hardness (as CaCO3) (mg/L)	21.1	186	19.6	26.4	72.4	
	pH (pH)	7.88	7.96	8.13	8.02	8.20	
	Total Suspended Solids (mg/L)	125	5.0	203	358	<3.0	
	Total Dissolved Solids (mg/L)	36	265	40	55	85	
	Turbidity (NTU)	37.4	1.86	136	190	0.12	
<b>Anions and Nutrients</b>	Acidity (as CaCO3) (mg/L)	1.3	2.4	<1.0	<1.0	<1.0	
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	24.5	57.5	25.3	27.9	62.5	
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Total (as CaCO3) (mg/L)	24.5	57.5	25.3	27.9	62.5	
	Ammonia, Total (as N) (mg/L)	<0.0050	0.405	<0.0050	<0.0050	0.0093	
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050	
	Chloride (Cl) (mg/L)	<0.50	0.60	<0.50	<0.50	<0.50	
	Fluoride (F) (mg/L)	<0.020	0.060	<0.020	<0.020	<0.020	
	Nitrate (as N) (mg/L)	0.0057	0.0794	0.0072	0.0197	<0.0050	
	Nitrite (as N) (mg/L)	<0.0010	0.0030	<0.0010	<0.0010	<0.0010	
	Total Kjeldahl Nitrogen (mg/L)	<0.050	0.742	<0.050	<0.050	<0.050	
	Total Nitrogen (mg/L)	<0.030	0.853	<0.030	0.038	<0.030	
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	0.0186	0.0011	0.0017	<0.0010	
	Phosphorus (P)-Total (mg/L)	0.119	0.0516	0.201	0.153	<0.0020	
	Sulfate (SO4) (mg/L)	2.60	131	2.35	6.30	15.2	
<b>Cyanides</b>	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
	Cyanide, Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
	Cyanide, Free (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
<b>Organic / Inorganic Carbon</b>	Dissolved Organic Carbon (mg/L)	1.41 <sup>RRV</sup>	1.99	1.59 <sup>RRV</sup>	1.78 <sup>RRV</sup>	<0.50	
	Total Organic Carbon (mg/L)	<0.50 <sup>RRV</sup>	2.02	0.65 <sup>RRV</sup>	0.55 <sup>RRV</sup>	<0.50	
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	0.876	0.0537	3.13	5.47	0.0165	
	Antimony (Sb)-Total (mg/L)	0.00010	0.00046	0.00026	0.00055	0.00011	
	Arsenic (As)-Total (mg/L)	0.00034	0.00014	0.00081	0.00367	0.00036	
	Barium (Ba)-Total (mg/L)	0.0531	0.0406	0.114	0.253	0.0466	
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	0.00021	<0.00010	
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	0.000121	<0.000050	<0.000050	
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010	
	Cadmium (Cd)-Total (mg/L)	0.000868	0.000233	0.00170	0.000548	0.0000118	

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2306476-11	L2306476-12	L2306476-13	L2306476-14	L2306476-15
		Description	WATER	WATER	WATER	WATER	WATER
		Sampled Date	07-JUL-19	07-JUL-19	07-JUL-19	07-JUL-19	07-JUL-19
		Sampled Time	14:28	15:20	15:35	16:09	16:26
		Client ID	SHC3	JM1	JM10	SHC1	JM12
Grouping	Analyte						
<b>WATER</b>							
<b>Physical Tests</b>	Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
	Conductivity (uS/cm)	109	361	70.2	75.7	77.3	
	Hardness (as CaCO3) (mg/L)	52.0	194	31.7	33.5	35.8	
	pH (pH)	7.99	8.06	7.99	8.11	8.06	
	Total Suspended Solids (mg/L)	45.6	15.4	698	564	657	
	Total Dissolved Solids (mg/L)	69	248	91	68	93	
	Turbidity (NTU)	15.2	15.9	371	399	420	
<b>Anions and Nutrients</b>	Acidity (as CaCO3) (mg/L)	1.5	2.3	1.4	1.1	1.4	
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	40.0	87.8	33.0	34.3	34.0	
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Total (as CaCO3) (mg/L)	40.0	87.8	33.0	34.3	34.0	
	Ammonia, Total (as N) (mg/L)	<0.0050	<0.0050	0.0052	0.0121	0.0139	
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050	
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50	
	Fluoride (F) (mg/L)	<0.020	0.044	<0.020	<0.020	<0.020	
	Nitrate (as N) (mg/L)	<0.0050	<0.0050 <sup>HTD</sup>	0.0244 <sup>HTD</sup>	<0.0050	<0.0050	
	Nitrite (as N) (mg/L)	<0.0010	<0.0010 <sup>HTD</sup>	<0.0010 <sup>HTD</sup>	<0.0010	<0.0010	
	Total Kjeldahl Nitrogen (mg/L)	<0.050	<0.050	<0.050	<0.050	0.067	
	Total Nitrogen (mg/L)	<0.030	<0.030	<0.030	0.036	0.043	
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	0.0014	<0.0010	<0.0010	
	Phosphorus (P)-Total (mg/L)	0.0284	0.0369	0.282	0.251	0.530	
	Sulfate (SO4) (mg/L)	14.3	103	6.18	6.11	6.24	
<b>Cyanides</b>	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
	Cyanide, Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
	Cyanide, Free (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
<b>Organic / Inorganic Carbon</b>	Dissolved Organic Carbon (mg/L)	0.89	0.87	2.05 <sup>RRV</sup>	2.06 <sup>RRV</sup>	1.83 <sup>RRV</sup>	
	Total Organic Carbon (mg/L)	<0.50	<0.50	0.75 <sup>RRV</sup>	0.67 <sup>RRV</sup>	0.66 <sup>RRV</sup>	
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	0.817	0.646	5.12	6.66	1.95	
	Antimony (Sb)-Total (mg/L)	0.00013	0.00020	0.00050	0.00061	0.00021	
	Arsenic (As)-Total (mg/L)	0.00044	0.00211	0.00283	0.00363	0.00104	
	Barium (Ba)-Total (mg/L)	0.0624	0.0252	0.257	0.292	0.157	
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	0.00020	0.00024	0.00010	
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010	
	Cadmium (Cd)-Total (mg/L)	0.000102	0.00615	0.000541	0.000585	0.000360	

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID	L2306476-16 WATER 07-JUL-19 16:44 JM3	L2306476-17 WATER 07-JUL-19 16:55 JM13	L2306476-18 WATER 07-JUL-19 17:17 JM7	L2306476-19 WATER 07-JUL-19 12:01 DUP2	L2306476-20 WATER 07-JUL-19 TRAVEL BLANK	
Grouping	Analyte					
<b>WATER</b>						
<b>Physical Tests</b>	Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	<5.0
	Conductivity (uS/cm)	203	210	104	49.9	<2.0
	Hardness (as CaCO3) (mg/L)	101	104	49.6	20.9	
	pH (pH)	8.13	8.13	8.03	7.37	5.61
	Total Suspended Solids (mg/L)	86.2	54.6	406	3.6	<3.0
	Total Dissolved Solids (mg/L)	127	140	100	33	<10
	Turbidity (NTU)	62.8	40.6	255	0.64	<0.10
<b>Anions and Nutrients</b>	Acidity (as CaCO3) (mg/L)	1.4	1.4	1.4	1.8	1.9 <sup>RRV</sup>
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	65.8	67.6	41.3	9.7	<1.0
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	65.8	67.6	41.3	9.7	<1.0
	Ammonia, Total (as N) (mg/L)	<0.0050	0.0234	0.0086	<0.0050	<0.0050
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Nitrate (as N) (mg/L)	0.0057	<0.0050	<0.0050	<0.0050	<0.0050
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	<0.050	0.053	0.057	<0.050	<0.050
	Total Nitrogen (mg/L)	<0.030	0.041	0.037	0.056	<0.030
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total (mg/L)	0.0384	0.0277	0.191	0.0021	<0.0020
	Sulfate (SO4) (mg/L)	39.6	39.5	12.3	12.3	<0.30
<b>Cyanides</b>	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Cyanide, Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Cyanide, Free (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
<b>Organic / Inorganic Carbon</b>	Dissolved Organic Carbon (mg/L)	1.41 <sup>RRV</sup>	0.92	3.27 <sup>RRV</sup>	1.00	<0.50
	Total Organic Carbon (mg/L)	0.58 <sup>RRV</sup>	0.55	0.76 <sup>RRV</sup>	0.83	<0.50
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	1.64	1.49	4.26	0.0323	<0.0030
	Antimony (Sb)-Total (mg/L)	0.00028	0.00025	0.00040	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00086	0.00074	0.00203	0.00012	<0.00010
	Barium (Ba)-Total (mg/L)	0.0983	0.0880	0.230	0.00861	<0.00010
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	0.00016	<0.00010	<0.00010
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	0.000283	0.000252	0.000532	0.0000256	<0.000050

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	Sample ID	Description	Sampled Date	Sampled Time	Client ID
		L2306476-21	WATER	07-JUL-19		F ELD BLANK
<b>WATER</b>						
<b>Physical Tests</b>	Colour, True (CU)			<5.0		
	Conductivity (uS/cm)			<2.0		
	Hardness (as CaCO3) (mg/L)			<0.50		
	pH (pH)			5.59		
	Total Suspended Solids (mg/L)			<3.0		
	Total Dissolved Solids (mg/L)			<10		
	Turbidity (NTU)			<0.10		
<b>Anions and Nutrients</b>	Acidity (as CaCO3) (mg/L)			2.1 <sup>RRV</sup>		
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)			<1.0		
	Alkalinity, Carbonate (as CaCO3) (mg/L)			<1.0		
	Alkalinity, Hydroxide (as CaCO3) (mg/L)			<1.0		
	Alkalinity, Total (as CaCO3) (mg/L)			<1.0		
	Ammonia, Total (as N) (mg/L)			<0.0050		
	Bromide (Br) (mg/L)			<0.050		
	Chloride (Cl) (mg/L)			<0.50		
	Fluoride (F) (mg/L)			<0.020		
	Nitrate (as N) (mg/L)			<0.0050		
	Nitrite (as N) (mg/L)			<0.0010		
	Total Kjeldahl Nitrogen (mg/L)			<0.050		
	Total Nitrogen (mg/L)			<0.030		
	Orthophosphate-Dissolved (as P) (mg/L)			<0.0010		
	Phosphorus (P)-Total (mg/L)			<0.0020		
	Sulfate (SO4) (mg/L)			<0.30		
<b>Cyanides</b>	Cyanide, Weak Acid Diss (mg/L)			<0.0050		
	Cyanide, Total (mg/L)			<0.0050		
	Cyanide, Free (mg/L)			<0.0050		
<b>Organic / Inorganic Carbon</b>	Dissolved Organic Carbon (mg/L)			<0.50		
	Total Organic Carbon (mg/L)			<0.50		
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)			<0.0030		
	Antimony (Sb)-Total (mg/L)			<0.00010		
	Arsenic (As)-Total (mg/L)			<0.00010		
	Barium (Ba)-Total (mg/L)			<0.00010		
	Beryllium (Be)-Total (mg/L)			<0.00010		
	Bismuth (Bi)-Total (mg/L)			<0.000050		
	Boron (B)-Total (mg/L)			<0.010		
	Cadmium (Cd)-Total (mg/L)			<0.000050		

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.



## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2306476-1	L2306476-2	L2306476-3	L2306476-4	L2306476-5
		Description	WATER	WATER	WATER	WATER	WATER
		Sampled Date	07-JUL-19	07-JUL-19	07-JUL-19	07-JUL-19	07-JUL-19
		Sampled Time	09:55	11:00	10:35	11:36	11:52
		Client ID	JM14	JM11	JM6	JM5	TMF1
Grouping	Analyte						
<b>WATER</b>							
<b>Total Metals</b>	Calcium (Ca)-Total (mg/L)		8.53	9.06	9.09	49.1	7.13
	Chromium (Cr)-Total (mg/L)		0.00013	0.00019	0.00018	0.00031	<0.00010
	Cobalt (Co)-Total (mg/L)		0.00090	0.00118	0.00108	<0.00010	<0.00010
	Copper (Cu)-Total (mg/L)		0.0106	0.0163	0.0132	0.00132	0.00130
	Iron (Fe)-Total (mg/L)		2.06	2.76	2.50	0.104	<0.030
	Lead (Pb)-Total (mg/L)		0.0127	0.0195	0.0162	<0.000050	0.000065
	Lithium (Li)-Total (mg/L)		0.0015	0.0018	0.0019	<0.0010	<0.0010
	Magnesium (Mg)-Total (mg/L)		1.37	1.60	1.47	4.43	0.897
	Manganese (Mn)-Total (mg/L)		0.182	0.273	0.212	0.312	0.0113
	Mercury (Hg)-Total (mg/L)		<0.000025 <sup>DLM</sup>	<0.000025 <sup>DLM</sup>	<0.000025 <sup>DLM</sup>	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)		0.000165	0.000175	0.000179	0.000713	<0.000050
	Nickel (Ni)-Total (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Total (mg/L)		<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Total (mg/L)		1.56	1.83	1.95	1.36	0.549
	Selenium (Se)-Total (mg/L)		0.000056	<0.000050	0.000059	0.000171	0.000060
	Silicon (Si)-Total (mg/L)		3.46	4.28	4.66	1.20	0.16
	Silver (Ag)-Total (mg/L)		0.000034	0.000045	0.000042	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)		<2.0	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Total (mg/L)		0.0557	0.0569	0.0584	0.256	0.0338
	Sulfur (S)-Total (mg/L)		0.69	0.71	0.63	9.74	3.84
	Thallium (Tl)-Total (mg/L)		0.000051	0.000069	0.000065	<0.000010	<0.000010
	Tin (Sn)-Total (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)		0.095	0.123	0.115	<0.010	<0.010
	Uranium (U)-Total (mg/L)		0.000116	0.000129	0.000126	0.000127	<0.000010
	Vanadium (V)-Total (mg/L)		0.00399	0.00515	0.00529	<0.00050	<0.00050
	Zinc (Zn)-Total (mg/L)		0.139	0.200	0.157	<0.0030	<0.0030
<b>Dissolved Metals</b>	Dissolved Mercury Filtration Location		LAB	LAB	LAB	LAB	LAB
	Dissolved Metals Filtration Location		LAB	LAB	LAB	LAB	LAB
	Aluminum (Al)-Dissolved (mg/L)		0.0438	0.0557	0.0368	<0.0030	0.0072
	Antimony (Sb)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	0.00034	<0.00010
	Barium (Ba)-Dissolved (mg/L)		0.0213	0.0212	0.0215	0.0339	0.00835
	Beryllium (Be)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Dissolved (mg/L)		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)		<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)		0.000327	0.000420	0.000384	0.0000428	0.0000173
	Calcium (Ca)-Dissolved (mg/L)		8.09	7.71	7.64	52.7	6.83

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2306476-6	L2306476-7	L2306476-8	L2306476-9	L2306476-10
		Description	WATER	WATER	WATER	WATER	WATER
		Sampled Date	07-JUL-19	07-JUL-19	07-JUL-19	07-JUL-19	07-JUL-19
		Sampled Time	11:08	12:20	12:55	13:23	13:59
		Client ID	DUP1	JM4	JM26	SHCR3	SHC5
Grouping	Analyte						
<b>WATER</b>							
<b>Total Metals</b>	Calcium (Ca)-Total (mg/L)		8.48	57.5	9.48	16.6	24.3
	Chromium (Cr)-Total (mg/L)		<0.00010	<0.00010	0.00026	0.00066	<0.00010
	Cobalt (Co)-Total (mg/L)		0.00056	0.00038	0.00158	0.00372	<0.00010
	Copper (Cu)-Total (mg/L)		0.00925	0.0261	0.0222	0.0111	<0.00050
	Iron (Fe)-Total (mg/L)		1.10	0.213	3.71	7.93	<0.030
	Lead (Pb)-Total (mg/L)		0.0121	0.000390	0.0275	0.0296	<0.000050
	Lithium (Li)-Total (mg/L)		0.0010	0.0014	0.0025	0.0048	<0.0010
	Magnesium (Mg)-Total (mg/L)		0.888	9.86	1.86	4.23	2.50
	Manganese (Mn)-Total (mg/L)		0.176	0.400	0.354	0.808	0.00086
	Mercury (Hg)-Total (mg/L)		<0.000025 <sup>DLM</sup>	<0.0000050	<0.000025 <sup>DLM</sup>	<0.000025 <sup>DLM</sup>	<0.0000050
	Molybdenum (Mo)-Total (mg/L)		0.000135	0.000276	0.000179	0.000493	0.000728
	Nickel (Ni)-Total (mg/L)		<0.00050	<0.00050	<0.00050	0.00083	<0.00050
	Phosphorus (P)-Total (mg/L)		<0.30	<0.30	<0.30	0.57	<0.30
	Potassium (K)-Total (mg/L)		1.09	2.50	2.65	4.15	1.87
	Selenium (Se)-Total (mg/L)		0.000066	0.000230	0.000068	0.000095	0.000233
	Silicon (Si)-Total (mg/L)		2.03	2.48	7.04	12.3	1.13
	Silver (Ag)-Total (mg/L)		0.000019	<0.000010	0.000062	0.000152	<0.000010
	Sodium (Na)-Total (mg/L)		<2.0	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Total (mg/L)		0.0519	0.426	0.0570	0.115	0.174
	Sulfur (S)-Total (mg/L)		0.71	46.5	0.56	1.85	5.06
	Thallium (Tl)-Total (mg/L)		0.000031	0.000018	0.000092	0.000224	<0.000010
	Tin (Sn)-Total (mg/L)		<0.00010	<0.00010	<0.00010	0.00012	<0.00010
	Titanium (Ti)-Total (mg/L)		0.047	<0.010	0.170	0.342	<0.010
	Uranium (U)-Total (mg/L)		0.000102	0.000489	0.000161	0.000416	0.000124
	Vanadium (V)-Total (mg/L)		0.00234	<0.00050	0.00818	0.0136	<0.00050
	Zinc (Zn)-Total (mg/L)		0.119	0.0749	0.270	0.0950	<0.0030
<b>Dissolved Metals</b>	Dissolved Mercury Filtration Location		LAB	LAB	LAB	LAB	LAB
	Dissolved Metals Filtration Location		LAB	LAB	LAB	LAB	LAB
	Aluminum (Al)-Dissolved (mg/L)		0.0750	0.0373	0.0832	0.0891	0.0094
	Antimony (Sb)-Dissolved (mg/L)		<0.00010	0.00047	<0.00010	<0.00010	0.00011
	Arsenic (As)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	0.00025	0.00032
	Barium (Ba)-Dissolved (mg/L)		0.0210	0.0433	0.0197	0.0265	0.0519
	Beryllium (Be)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Dissolved (mg/L)		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)		<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)		0.000412	0.000217	0.000530	0.0000261	0.0000103
	Calcium (Ca)-Dissolved (mg/L)		7.69	58.5	7.17	9.59	25.1

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2306476-11	L2306476-12	L2306476-13	L2306476-14	L2306476-15
		Description	WATER	WATER	WATER	WATER	WATER
		Sampled Date	07-JUL-19	07-JUL-19	07-JUL-19	07-JUL-19	07-JUL-19
		Sampled Time	14:28	15:20	15:35	16:09	16:26
		Client ID	SHC3	JM1	JM10	SHC1	JM12
Grouping	Analyte						
<b>WATER</b>							
<b>Total Metals</b>	Calcium (Ca)-Total (mg/L)		18.2	63.6	16.2	16.5	13.8
	Chromium (Cr)-Total (mg/L)		0.00016	0.00032	0.00053	0.00079	0.00020
	Cobalt (Co)-Total (mg/L)		0.00046	0.00205	0.00350	0.00437	0.00149
	Copper (Cu)-Total (mg/L)		0.00831	0.326	0.0107	0.0143	0.00652
	Iron (Fe)-Total (mg/L)		0.922	5.44	7.41	9.00	2.60
	Lead (Pb)-Total (mg/L)		0.00387	0.00775	0.0310	0.0357	0.0197
	Lithium (Li)-Total (mg/L)		0.0011	0.0021	0.0047	0.0058	0.0021
	Magnesium (Mg)-Total (mg/L)		2.00	11.1	4.05	5.05	1.87
	Manganese (Mn)-Total (mg/L)		0.0975	0.376	0.769	0.850	0.442
	Mercury (Hg)-Total (mg/L)		<0.0000050	<0.000025 <sup>DLM</sup>	<0.000025 <sup>DLM</sup>	0.0000073	<0.000025 <sup>DLM</sup>
	Molybdenum (Mo)-Total (mg/L)		0.000401	0.000328	0.000434	0.000493	0.000255
	Nickel (Ni)-Total (mg/L)		<0.00050	<0.00050	0.00067	0.00104	<0.00050
	Phosphorus (P)-Total (mg/L)		<0.30	<0.30	0.44	0.44	<0.30
	Potassium (K)-Total (mg/L)		1.72	1.87	3.96	4.91	2.26
	Selenium (Se)-Total (mg/L)		0.000093	0.000542	0.000069	0.000060	0.000067
	Silicon (Si)-Total (mg/L)		2.80	2.63	10.8	14.2	4.04
	Silver (Ag)-Total (mg/L)		0.000016	0.000044	0.000119	0.000179	0.000060
	Sodium (Na)-Total (mg/L)		<2.0	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Total (mg/L)		0.132	0.357	0.110	0.115	0.0948
	Sulfur (S)-Total (mg/L)		4.99	39.0	1.73	1.89	2.13
	Thallium (Tl)-Total (mg/L)		0.000035	0.000019	0.000208	0.000273	0.000088
	Tin (Sn)-Total (mg/L)		<0.00010	<0.00010	0.00012	0.00017	<0.00010
	Titanium (Ti)-Total (mg/L)		0.047	0.015	0.315	0.413	0.104
	Uranium (U)-Total (mg/L)		0.000212	0.000655	0.000358	0.000419	0.000247
	Vanadium (V)-Total (mg/L)		0.00210	0.00069	0.0130	0.0164	0.00478
	Zinc (Zn)-Total (mg/L)		0.0163	1.16	0.0944	0.115	0.0466
<b>Dissolved Metals</b>	Dissolved Mercury Filtration Location		LAB	LAB	LAB	LAB	LAB
	Dissolved Metals Filtration Location		LAB	LAB	LAB	LAB	LAB
	Aluminum (Al)-Dissolved (mg/L)		0.0466	0.0244	0.0963	0.0993	0.103
	Antimony (Sb)-Dissolved (mg/L)		<0.00010	0.00012	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)		0.00016	<0.00010	0.00024	0.00025	0.00026
	Barium (Ba)-Dissolved (mg/L)		0.0339	0.0212	0.0300	0.0332	0.0335
	Beryllium (Be)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Dissolved (mg/L)		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)		<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)		0.0000381	0.00398	0.0000336	0.0000391	0.0000368
	Calcium (Ca)-Dissolved (mg/L)		18.4	62.4	11.7	12.3	13.2

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2306476-16	L2306476-17	L2306476-18	L2306476-19	L2306476-20
		Description	WATER	WATER	WATER	WATER	WATER
		Sampled Date	07-JUL-19	07-JUL-19	07-JUL-19	07-JUL-19	07-JUL-19
		Sampled Time	16:44	16:55	17:17	12:01	
		Client ID	JM3	JM13	JM7	DUP2	TRAVEL BLANK
Grouping	Analyte						
<b>WATER</b>							
<b>Total Metals</b>	Calcium (Ca)-Total (mg/L)		33.0	36.7	20.4	7.14	<0.050
	Chromium (Cr)-Total (mg/L)		0.00023	0.00026	0.00050	<0.00010	<0.00010
	Cobalt (Co)-Total (mg/L)		0.00131	0.00103	0.00285	<0.00010	<0.00010
	Copper (Cu)-Total (mg/L)		0.0871	0.0714	0.0199	0.00170	0.00074 <sup>RRV</sup>
	Iron (Fe)-Total (mg/L)		2.25	1.84	5.65	0.031	<0.030
	Lead (Pb)-Total (mg/L)		0.00772	0.00625	0.0277	0.000084	<0.000050
	Lithium (Li)-Total (mg/L)		0.0025	0.0023	0.0039	<0.0010	<0.0010
	Magnesium (Mg)-Total (mg/L)		5.51	5.04	4.10	0.907	<0.0050
	Manganese (Mn)-Total (mg/L)		0.323	0.292	0.720	0.0120	<0.00010
	Mercury (Hg)-Total (mg/L)		<0.000025 <sup>DLM</sup>	<0.000025 <sup>DLM</sup>	<0.000025 <sup>DLM</sup>	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)		0.000402	0.000431	0.000404	<0.000050	<0.000050
	Nickel (Ni)-Total (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Total (mg/L)		<0.30	<0.30	0.40	<0.30	<0.30
	Potassium (K)-Total (mg/L)		2.53	2.61	3.63	0.544	<0.050
	Selenium (Se)-Total (mg/L)		0.000140	0.000154	0.000099	<0.000050	<0.000050
	Silicon (Si)-Total (mg/L)		4.63	4.41	9.20	0.18	<0.10
	Silver (Ag)-Total (mg/L)		0.000037	0.000031	0.000112	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)		<2.0	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Total (mg/L)		0.378	0.357	0.147	0.0329	<0.00020
	Sulfur (S)-Total (mg/L)		13.5	14.2	4.04	3.73	<0.50
	Thallium (Tl)-Total (mg/L)		0.000073	0.000062	0.000174	<0.000010	<0.000010
	Tin (Sn)-Total (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)		0.093	0.080	0.259	<0.010	<0.010
	Uranium (U)-Total (mg/L)		0.000664	0.000556	0.000378	<0.000010	<0.000010
	Vanadium (V)-Total (mg/L)		0.00400	0.00339	0.0105	<0.00050	<0.00050
	Zinc (Zn)-Total (mg/L)		0.0520	0.0438	0.0809	0.0034	<0.0030
<b>Dissolved Metals</b>	Dissolved Mercury Filtration Location		LAB	LAB	LAB	LAB	
	Dissolved Metals Filtration Location		LAB	LAB	LAB	LAB	
	Aluminum (Al)-Dissolved (mg/L)		0.0434	0.0383	0.0917	0.0074	
	Antimony (Sb)-Dissolved (mg/L)		0.00015	0.00014	<0.00010	<0.00010	
	Arsenic (As)-Dissolved (mg/L)		0.00015	0.00012	0.00018	0.00011	
	Barium (Ba)-Dissolved (mg/L)		0.0401	0.0407	0.0374	0.00895	
	Beryllium (Be)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	
	Bismuth (Bi)-Dissolved (mg/L)		<0.000050	<0.000050	<0.000050	<0.000050	
	Boron (B)-Dissolved (mg/L)		<0.010	<0.010	<0.010	<0.010	
	Cadmium (Cd)-Dissolved (mg/L)		0.000129	0.000117	0.0000534	0.0000191	
	Calcium (Ca)-Dissolved (mg/L)		33.3	35.3	17.9	7.02	

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	Sample ID	Description	Sampled Date	Sampled Time	Client ID
		L2306476-21	WATER	07-JUL-19		F ELD BLANK
<b>WATER</b>						
<b>Total Metals</b>	Calcium (Ca)-Total (mg/L)			<0.050		
	Chromium (Cr)-Total (mg/L)			<0.00010		
	Cobalt (Co)-Total (mg/L)			<0.00010		
	Copper (Cu)-Total (mg/L)			<0.00050		
	Iron (Fe)-Total (mg/L)			<0.030		
	Lead (Pb)-Total (mg/L)			<0.000050		
	Lithium (Li)-Total (mg/L)			<0.0010		
	Magnesium (Mg)-Total (mg/L)			<0.0050		
	Manganese (Mn)-Total (mg/L)			<0.00010		
	Mercury (Hg)-Total (mg/L)			<0.0000050		
	Molybdenum (Mo)-Total (mg/L)			<0.000050		
	Nickel (Ni)-Total (mg/L)			<0.00050		
	Phosphorus (P)-Total (mg/L)			<0.30		
	Potassium (K)-Total (mg/L)			<0.050		
	Selenium (Se)-Total (mg/L)			<0.000050		
	Silicon (Si)-Total (mg/L)			<0.10		
	Silver (Ag)-Total (mg/L)			<0.000010		
	Sodium (Na)-Total (mg/L)			<2.0		
	Strontium (Sr)-Total (mg/L)			<0.00020		
	Sulfur (S)-Total (mg/L)			<0.50		
	Thallium (Tl)-Total (mg/L)			<0.000010		
	Tin (Sn)-Total (mg/L)			<0.00010		
	Titanium (Ti)-Total (mg/L)			<0.010		
	Uranium (U)-Total (mg/L)			<0.000010		
	Vanadium (V)-Total (mg/L)			<0.00050		
	Zinc (Zn)-Total (mg/L)			<0.0030		
<b>Dissolved Metals</b>	Dissolved Mercury Filtration Location		LAB			
	Dissolved Metals Filtration Location		LAB			
	Aluminum (Al)-Dissolved (mg/L)			<0.0030		
	Antimony (Sb)-Dissolved (mg/L)			<0.00010		
	Arsenic (As)-Dissolved (mg/L)			<0.00010		
	Barium (Ba)-Dissolved (mg/L)			<0.00010		
	Beryllium (Be)-Dissolved (mg/L)			<0.00010		
	Bismuth (Bi)-Dissolved (mg/L)			<0.000050		
	Boron (B)-Dissolved (mg/L)			<0.010		
	Cadmium (Cd)-Dissolved (mg/L)			<0.0000050		
	Calcium (Ca)-Dissolved (mg/L)			<0.050		

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID	L2306476-1 WATER 07-JUL-19 09:55 JM14	L2306476-2 WATER 07-JUL-19 11:00 JM11	L2306476-3 WATER 07-JUL-19 10:35 JM6	L2306476-4 WATER 07-JUL-19 11:36 JM5	L2306476-5 WATER 07-JUL-19 11:52 TMF1
Grouping	Analyte				
<b>WATER</b>					
<b>Dissolved Metals</b>	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Dissolved (mg/L)	<0.00050	0.00056	<0.00050	0.00082
	Iron (Fe)-Dissolved (mg/L)	<0.030	0.037	<0.030	<0.030
	Lead (Pb)-Dissolved (mg/L)	0.000200	0.000357	0.000197	<0.000050
	Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Dissolved (mg/L)	0.484	0.459	0.479	4.13
	Manganese (Mn)-Dissolved (mg/L)	0.0514	0.0675	0.0611	0.333
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000144	0.000141	0.000146	0.000654
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)	0.510	0.478	0.488	1.39
	Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	0.000166
	Silicon (Si)-Dissolved (mg/L)	0.624	0.576	0.611	1.33
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Dissolved (mg/L)	0.0500	0.0489	0.0508	0.260
	Sulfur (S)-Dissolved (mg/L)	0.74	1.03	0.71	8.99
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	0.000056	0.000042	0.000052	0.000128
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	0.0054	0.0071	0.0051	0.0019

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	Description	Sampled Date	Sampled Time	Client ID	L2306476-6	L2306476-7	L2306476-8	L2306476-9	L2306476-10
					WATER	WATER	WATER	WATER	WATER
		07-JUL-19	11:08	DUP1	07-JUL-19	07-JUL-19	07-JUL-19	07-JUL-19	07-JUL-19
					11:08	12:20	12:55	13:23	13:59
					DUP1	JM4	JM26	SHCR3	SHC5
Grouping	Analyte								
<b>WATER</b>									
<b>Dissolved Metals</b>	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	0.00040	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Dissolved (mg/L)	0.00068	0.0165	0.00093	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Iron (Fe)-Dissolved (mg/L)	0.052	0.030	0.066	0.064	<0.030			
	Lead (Pb)-Dissolved (mg/L)	0.000451	<0.000050	0.000587	0.000252	<0.000050			
	Lithium (Li)-Dissolved (mg/L)	<0.0010	0.0014	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Dissolved (mg/L)	0.457	9.59	0.424	0.604	2.35			
	Manganese (Mn)-Dissolved (mg/L)	0.0716	0.438	0.0864	0.0356	0.00021			
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000126	0.000271	0.000137	0.000296	0.000678			
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)	0.481	2.57	0.459	0.694	1.95			
	Selenium (Se)-Dissolved (mg/L)	<0.000050	0.000332 <sup>DTSE</sup>	<0.000050	<0.000050	0.000239			
	Silicon (Si)-Dissolved (mg/L)	0.692	2.57	0.643	0.819	1.26			
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Dissolved (mg/L)	0.0484	0.427	0.0459	0.0716	0.179			
	Sulfur (S)-Dissolved (mg/L)	0.83	45.2	0.56	1.99	5.57			
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	0.000015	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	0.000046	0.000476	0.000034	0.000122	0.000124			
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	0.0088	0.0594	0.0115	0.0012	<0.0010			

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	Description	Sampled Date	Sampled Time	Client ID	L2306476-11	L2306476-12	L2306476-13	L2306476-14	L2306476-15
					WATER	WATER	WATER	WATER	WATER
		07-JUL-19	14:28	SHC3	07-JUL-19	07-JUL-19	07-JUL-19	07-JUL-19	07-JUL-19
					14:28	15:20	15:35	16:09	16:26
					SHC3	JM1	JM10	SHC1	JM12
Grouping	Analyte								
<b>WATER</b>									
<b>Dissolved Metals</b>	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	0.00141	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Dissolved (mg/L)	0.00206	0.0151	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Iron (Fe)-Dissolved (mg/L)	<0.030	<0.030	0.070	0.071	0.067	0.067	0.067	0.067
	Lead (Pb)-Dissolved (mg/L)	0.000101	<0.000050	0.000296	0.000302	0.000280	0.000280	0.000280	0.000280
	Lithium (Li)-Dissolved (mg/L)	<0.0010	0.0018	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Dissolved (mg/L)	1.46	9.20	0.619	0.694	0.671	0.671	0.671	0.671
	Manganese (Mn)-Dissolved (mg/L)	0.0202	0.302	0.0429	0.0492	0.0530	0.0530	0.0530	0.0530
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000372	0.000228	0.000324	0.000324	0.000311	0.000311	0.000311	0.000311
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	0.00057	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)	1.25	1.85	0.833	0.910	0.893	0.893	0.893	0.893
	Selenium (Se)-Dissolved (mg/L)	0.000056	0.000423	0.000054	0.000061	0.000057	0.000057	0.000057	0.000057
	Silicon (Si)-Dissolved (mg/L)	1.30	2.11	0.924	1.02	0.916	0.916	0.916	0.916
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Dissolved (mg/L)	0.125	0.342	0.0774	0.0830	0.0837	0.0837	0.0837	0.0837
	Sulfur (S)-Dissolved (mg/L)	4.88	38.7	2.20	2.19	1.98	1.98	1.98	1.98
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	0.000012	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	0.00017	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	0.000158	0.000204	0.000121	0.000112	0.000115	0.000115	0.000115	0.000115
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	0.0017	0.645	0.0015	0.0012	0.0012	0.0012	0.0012	0.0012

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.



## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID	L2306476-16 WATER 07-JUL-19 16:44 JM3	L2306476-17 WATER 07-JUL-19 16:55 JM13	L2306476-18 WATER 07-JUL-19 17:17 JM7	L2306476-19 WATER 07-JUL-19 12:01 DUP2	L2306476-20 WATER 07-JUL-19 TRAVEL BLANK
Grouping	Analyte				
<b>WATER</b>					
<b>Dissolved Metals</b>	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	0.00026
	Cobalt (Co)-Dissolved (mg/L)	0.00036	0.00028	<0.00010	<0.00010
	Copper (Cu)-Dissolved (mg/L)	0.0109	0.0102	0.00102	0.00094
	Iron (Fe)-Dissolved (mg/L)	<0.030	<0.030	0.057	<0.030
	Lead (Pb)-Dissolved (mg/L)	0.000053	<0.000050	0.000246	<0.000050
	Lithium (Li)-Dissolved (mg/L)	0.0012	0.0011	<0.0010	<0.0010
	Magnesium (Mg)-Dissolved (mg/L)	4.35	3.80	1.22	0.822
	Manganese (Mn)-Dissolved (mg/L)	0.186	0.175	0.0647	0.00086
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000375	0.000370	0.000341	<0.000050
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)	1.60	1.73	1.07	0.579
	Selenium (Se)-Dissolved (mg/L)	0.000104	0.00010	0.000078	0.000051
	Silicon (Si)-Dissolved (mg/L)	1.49	1.63	1.08	0.281
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Dissolved (mg/L)	0.364	0.350	0.125	0.0343
	Sulfur (S)-Dissolved (mg/L)	14.0	13.9	4.35	3.81
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	0.000557	0.000457	0.000165	<0.000010
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	0.0095	0.0096	0.0014	0.0021

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	Sample ID	Description	Sampled Date	Sampled Time	Client ID
		L2306476-21	WATER	07-JUL-19		F ELD BLANK
<b>WATER</b>						
<b>Dissolved Metals</b>	Chromium (Cr)-Dissolved (mg/L)					<0.00010
	Cobalt (Co)-Dissolved (mg/L)					<0.00010
	Copper (Cu)-Dissolved (mg/L)					<0.00050
	Iron (Fe)-Dissolved (mg/L)					<0.030
	Lead (Pb)-Dissolved (mg/L)					<0.000050
	Lithium (Li)-Dissolved (mg/L)					<0.0010
	Magnesium (Mg)-Dissolved (mg/L)					<0.0050
	Manganese (Mn)-Dissolved (mg/L)					<0.00010
	Mercury (Hg)-Dissolved (mg/L)					<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)					<0.000050
	Nickel (Ni)-Dissolved (mg/L)					<0.00050
	Phosphorus (P)-Dissolved (mg/L)					<0.30
	Potassium (K)-Dissolved (mg/L)					<0.050
	Selenium (Se)-Dissolved (mg/L)					<0.000050
	Silicon (Si)-Dissolved (mg/L)					0.126
	Silver (Ag)-Dissolved (mg/L)					<0.000010
	Sodium (Na)-Dissolved (mg/L)					<2.0
	Strontium (Sr)-Dissolved (mg/L)					<0.00020
	Sulfur (S)-Dissolved (mg/L)					<0.50
	Thallium (Tl)-Dissolved (mg/L)					<0.000010
	Tin (Sn)-Dissolved (mg/L)					<0.00010
	Titanium (Ti)-Dissolved (mg/L)					<0.010
	Uranium (U)-Dissolved (mg/L)					<0.000010
	Vanadium (V)-Dissolved (mg/L)					<0.00050
	Zinc (Zn)-Dissolved (mg/L)					<0.0010

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## Reference Information

## Qualifiers for Individual Samples Listed:

Sample Number	Client Sample ID	Qualifier	Description
L2306476-14	SHC1	WSMT	Water sample(s) for total mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.

## QC Samples with Qualifiers &amp; Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Cyanide, Total	B	L2306476-10, -11, -12, -13, -14, -15, -16
Method Blank	Cyanide, Weak Acid Diss	B	L2306476-10, -11, -12, -13, -14, -15, -16
Method Blank	Cyanide, Weak Acid Diss	B	L2306476-10, -9
Method Blank	Ammonia, Total (as N)	B	L2306476-21
Laboratory Control Sample	Cyanide, Weak Acid Diss	LCS-H	L2306476-11, -12, -13, -14, -15, -16
Laboratory Control Sample	Sulfur (S)-Total	MES	L2306476-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2306476-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -21, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2306476-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -21, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2306476-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -21, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2306476-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -21, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Aluminum (Al)-Total	MS-B	L2306476-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Aluminum (Al)-Total	MS-B	L2306476-20, -21
Matrix Spike	Arsenic (As)-Total	MS-B	L2306476-21
Matrix Spike	Barium (Ba)-Total	MS-B	L2306476-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Total	MS-B	L2306476-21
Matrix Spike	Calcium (Ca)-Total	MS-B	L2306476-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Total	MS-B	L2306476-21
Matrix Spike	Calcium (Ca)-Total	MS-B	L2306476-20, -21
Matrix Spike	Iron (Fe)-Total	MS-B	L2306476-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2306476-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2306476-21
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2306476-20, -21
Matrix Spike	Manganese (Mn)-Total	MS-B	L2306476-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Manganese (Mn)-Total	MS-B	L2306476-21
Matrix Spike	Manganese (Mn)-Total	MS-B	L2306476-20, -21
Matrix Spike	Potassium (K)-Total	MS-B	L2306476-21
Matrix Spike	Potassium (K)-Total	MS-B	L2306476-20, -21
Matrix Spike	Sodium (Na)-Total	MS-B	L2306476-21
Matrix Spike	Sodium (Na)-Total	MS-B	L2306476-20, -21
Matrix Spike	Strontium (Sr)-Total	MS-B	L2306476-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Total	MS-B	L2306476-21
Matrix Spike	Strontium (Sr)-Total	MS-B	L2306476-20, -21
Matrix Spike	Titanium (Ti)-Total	MS-B	L2306476-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Nitrate (as N)	MS-B	L2306476-12, -13
Matrix Spike	Phosphorus (P)-Total	MS-B	L2306476-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Orthophosphate-Dissolved (as P)	MS-B	L2306476-1, -10, -2, -3, -4, -5, -6, -7, -8, -9

## Qualifiers for Individual Parameters Listed:

Qualifier	Description
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## Reference Information

B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
DTSE	Dissolved Se concentration exceeds total. Positive bias on D-Se suspected due to signal enhancement from volatile selenium species. Contact ALS if an alternative test to address this interference is needed.
HTD	Hold time exceeded for re-analysis or dilution, but initial testing was conducted within hold time.
LCS-H	Lab Control Sample recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

### Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
<b>ACY-PCT-VA</b>	Water	Acidity by Automatic Titration	APHA 2310 Acidity
This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.			
Samples of industrial wastes, acid mine drainage, or other solutions that contain appreciable amounts of hydrolyzable metal ions such as aluminum, iron, and manganese may require hot peroxide treatment to ensure oxidation and hydrolysis of reduced forms of polyvalent cations. Acidity results may be highly variable if this procedure is not followed. Results in this report for 'Acidity (as CaCO3)' have not been peroxide treated.			
<b>ALK-TITR-VA</b>	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity
This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.			
<b>BR-L-IC-N-VA</b>	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
<b>CARBONS-DOC-VA</b>	Water	Dissolved organic carbon by combustion	APHA 5310B
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.			
<b>CARBONS-TOC-VA</b>	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
<b>CL-IC-N-VA</b>	Water	Chloride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
<b>CN-FREE-CFA-VA</b>	Water	Free Cyanide in water by CFA	ASTM 7237
This analysis is carried out using procedures adapted from ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.			
<b>CN-T-CFA-VA</b>	Water	Total Cyanide in water by CFA	ISO 14403:2002
This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.			
<b>CN-WAD-CFA-VA</b>	Water	Weak Acid Diss. Cyanide in water by CFA	APHA 4500-CN CYANIDE
This analysis is carried out using procedures adapted from APHA Method 4500-CN I. "Weak Acid Dissociable Cyanide". Weak Acid Dissociable (WAD) cyanide is determined by in-line sample distillation with final determination by colourimetric analysis.			
<b>COLOUR-TRUE-VA</b>	Water	Colour (True) by Spectrometer	BCMOE Colour Single Wavelength
This analysis is carried out using procedures adapted from British Columbia Environmental Manual "Colour- Single Wavelength." Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.			
<b>EC-PCT-VA</b>	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.
This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.			
<b>EC-SCREEN-VA</b>	Water	Conductivity Screen (Internal Use Only)	APHA 2510

## Reference Information

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

**F-IC-N-VA** Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**HARDNESS-CALC-VA** Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO<sub>3</sub> equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

**HG-D-CVAA-VA** Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

**HG-T-CVAA-VA** Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

**MET-D-CCMS-VA** Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

**MET-T-CCMS-VA** Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

**N-T-COL-VA** Water Total Nitrogen in water by Colour APHA4500-P(J)/NEMI9171/USGS03-4174

This analysis is carried out using procedures adapted from APHA Method 4500-P (J) "Persulphate Method for Simultaneous Determination of Total Nitrogen and Total Phosphorus" and National Environmental Methods Index - Nemi method 5735.

**NH3-F-VA** Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

**NO2-L-IC-N-VA** Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**NO3-L-IC-N-VA** Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**P-T-PRES-COL-VA** Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

**PH-PCT-VA** Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

**PO4-DO-COL-VA** Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

**SO4-IC-N-VA** Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**TDS-VA** Water Total Dissolved Solids by Gravimetric APHA 2540 C - GRAVIMETRIC

## Reference Information

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

**TKN-F-VA** Water TKN in Water by Fluorescence APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

**TSS-VA** Water Total Suspended Solids by Gravimetric APHA 2540 D - GRAVIMETRIC

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

**TURBIDITY-VA** Water Turbidity by Meter APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

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\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

*The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:*

---

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

---

### Chain of Custody Numbers:

17-756320 17-756321

### GLOSSARY OF REPORT TERMS

*Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.*

*mg/kg - milligrams per kilogram based on dry weight of sample.*

*mg/kg wwt - milligrams per kilogram based on wet weight of sample.*

*mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.*

*mg/L - milligrams per litre.*

*< - Less than.*

*D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).*

*N/A - Result not available. Refer to qualifier code and definition for explanation.*

*Test results reported relate only to the samples as received by the laboratory.*

**UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.**

*Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.*



Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878



L2306476-COFC

COC Number: 17 - 756320

Page 2 of 2

www.alsglobal.com

<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>			Below - Contact your AM to confirm all E&P TATs (surcharges may apply)														
Company: <b>ERM</b>		Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL   <input type="checkbox"/> EDD (DIGITAL)			Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply														
Contact: <b>Elizabeth Boyle</b>		Quality Control (QC) Report with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO			Priority (Business days): 4 day [P4-20%] <input type="checkbox"/> 3 day [P3-25%] <input type="checkbox"/> 2 day [P2-50%] <input type="checkbox"/>														
Phone: <b>604-689-9460</b>		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked			EMERGENCY: 1 Business day [E - 100%] Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)]														
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL   <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm														
Street: <b>1111 Hastings (West)</b>		Email 1 or Fax: <b>elizabeth.boyle@erm.com</b>			For tests that can not be performed according to the service level selected, you will be contacted.														
City/Province: <b>Vancouver, BC</b>		Email 2: <b>wade.burnham@erm.com</b>			<b>Analysis Request</b>														
Postal Code:		Email 3:			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (FP) below														
Invoice To: Same as Report To <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		<b>Invoice Distribution</b>			<table border="1"> <tr> <td colspan="12" style="text-align: center;">074326</td> </tr> </table>			074326											
074326																			
Copy of Invoice with Report <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		Select Invoice Distribution: <input type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX																	
Company: <b>Seabridge Gold</b>		Email 1 or Fax:																	
Contact: <b>Elizabeth Miller</b>		Email 2:																	
<b>Project Information</b>		<b>Oil and Gas Required Fields (client use)</b>																	
ALS Account # / Quote #: <b>Q74326</b>		AFE/Cost Center: PO#																	
Job #: <b>0492759-0004</b>		Major/Minor Code: Routing Code:																	
PO / AFE:		Requisitioner:																	
LSD:		Location:																	
ALS Lab Work Order # (lab use only):		ALS Contact: <b>A. Springer</b> Sampler: <b>R. Qin</b>																	
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	<table border="1"> <tr> <td colspan="12" style="text-align: center;">074326</td> </tr> </table>	074326												<b>SAMPLES ON HOLD</b> SUSPECTED HAZARD (see Special Instructions)	
074326																			
	JM10	07-07-19	15:35	water															
	SHC1	07-July-19	16:09																
	JM12		16:26																
	JM3		16:44																
	JM13		16:55																
	JM7		17:17																
	DUP 2		12:01																
	Travel Blank																		
	Field Blank																		
<b>Drinking Water (DW) Samples<sup>1</sup> (client use)</b>		<b>Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)</b>			<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>														
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO					Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>														
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO					Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>														
					Cooling Initiated <input checked="" type="checkbox"/>														
					INITIAL COOLER TEMPERATURES °C														
					FINAL COOLER TEMPERATURES °C														
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<b>SHIPMENT RELEASE (client use)</b>		<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>			<b>FINAL SHIPMENT RECEPTION (lab use only)</b>														
Released by: <b>Coby Hall</b>	Date: <b>July 8/2019</b>	Time:	Received by:	Date:	Time:	Received by: <b>HA</b>	Date: <b>7/9</b>	Time: <b>12 PM</b>											

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JUNE 2010 PRINT

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.



L2306476-COFC

COC Number: 17-756321

Page 1 of 2

<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b> Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)		contact your AM to confirm all E&P TATs (surcharges may apply)																																																													
Company: <u>ERM</u>		Quality Control (QC) Report with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		<b>Regular [R]</b> <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply																																																													
Contact: <u>Elizabeth Boyle</u>		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked		<b>PRIORITY (Business Days)</b>																																																													
Phone: <u>604-689-9460</u>		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX		4 day [P4-20%] <input type="checkbox"/>																																																													
Company address below will appear on the final report		Email 1 or Fax: <u>elizabeth.boyle@erm.com</u>		3 day [P3-25%] <input type="checkbox"/>																																																													
Street: <u>111 West Hastings</u>		Email 2: <u>wade.burham@erm.com</u>		2 day [P2-50%] <input type="checkbox"/>																																																													
City/Province: <u>Vancouver, BC</u>		Email 3:		<b>EMERGENCY</b>																																																													
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Same as Report To <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		Select Invoice Distribution: <input type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX		For tests that can not be performed according to the service level selected, you will be contacted.																																																													
Copy of Invoice with Report <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		Email 1 or Fax:		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td colspan="12" style="text-align: center;">Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below</td> </tr> <tr> <td colspan="12" style="text-align: center; font-size: 2em;">Q74326</td> </tr> <tr> <td colspan="12" style="text-align: center; font-size: 2em;">NUMBER OF CONTAINERS</td> </tr> <tr> <td colspan="12" style="text-align: center; font-size: 2em;">SAMPLES ON HOLD</td> </tr> <tr> <td colspan="12" style="text-align: center; font-size: 0.8em;">SUSPECTED HAZARD (see Special Instructions)</td> </tr> </table>		Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below												Q74326												NUMBER OF CONTAINERS												SAMPLES ON HOLD												SUSPECTED HAZARD (see Special Instructions)											
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				Sample Type																																																													
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		<u>JM11</u>		<u>09:55</u>																																																													
		<input checked="" type="checkbox"/> <u>JM6</u>		<u>11:00</u>																																																													
		<u>JM5</u>		<u>10:35</u>																																																													
		<u>TMF1</u>		<u>11:36</u>																																																													
		<u>Dup 1</u>		<u>11:52</u>																																																													
		<u>JM4</u>		<u>11:08</u>																																																													
		<u>JM26</u>		<u>12:20</u>																																																													
		<u>SHCR3</u>		<u>12:55</u>																																																													
		<u>SHC5</u>		<u>13:23</u>																																																													
		<u>EH63 - SHC3</u>		<u>13:59</u>																																																													
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1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.





ERM Consultants Canada Ltd.  
ATTN: Wade Brunham  
1500-1111 West Hastings Street  
Vancouver BC V6E 2J3

Date Received: 25-AUG-19  
Report Date: 03-OCT-19 11:37 (MT)  
Version: FINAL REV. 3

Client Phone: 604-689-9460

## Certificate of Analysis

Lab Work Order #: L2335590  
Project P.O. #: NOT SUBMITTED  
Job Reference: 492759-0005  
C of C Numbers:  
Legal Site Desc:

Comments:

16-SEP-2019 TIC data has been added.  
3-OCT-2019 Free Cyanide data has been added.

---

Amber Springer, B.Sc  
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 8081 Lougheed Hwy, Suite 100, Burnaby, BC V5A 1W9 Canada | Phone: +1 604 253 4188 | Fax: +1 604 253 6700  
ALS CANADA LTD Part of the ALS Group An ALS Limited Company

# ALS ENVIRONMENTAL ANALYTICAL REPORT

	<b>Sample ID</b> <b>Description</b> <b>Sampled Date</b> <b>Sampled Time</b> <b>Client ID</b>	L2335590-1			
		WATER	23-AUG-19	16:00	JM10-2018
<b>Grouping</b>	<b>Analyte</b>				
<b>WATER</b>					
<b>Physical Tests</b>	Conductivity (uS/cm)	104			
	Hardness (as CaCO3) (mg/L)	14.4 <sup>HTC</sup>			
	pH (pH)	7.80			
	Total Dissolved Solids (mg/L)	76			
	Turbidity (NTU)	10.7			
<b>Anions and Nutrients</b>	Acidity-Hot Peroxide Treated (as CaCO3) (mg/L)	<25			
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	34.3			
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0			
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0			
	Alkalinity, Total (as CaCO3) (mg/L)	34.3			
	Ammonia, Total (as N) (mg/L)	0.0057			
	Bromide (Br) (mg/L)	<0.050			
	Chloride (Cl) (mg/L)	<0.50			
	Fluoride (F) (mg/L)	0.021			
	Nitrate (as N) (mg/L)	<0.0050			
	Nitrite (as N) (mg/L)	<0.0010			
	Sulfate (SO4) (mg/L)	15.9			
<b>Cyanides</b>	Cyanide, Weak Acid Diss (mg/L)	<0.0050			
	Cyanide, Total (mg/L)	<0.0050			
	Cyanate (mg/L)	<0.20			
	Thiocyanate (SCN) (mg/L)	0.69			
	Cyanide, Free (mg/L)	<0.0050			
<b>Organic / Inorganic Carbon</b>	Total Inorganic Carbon (mg/L)	8.23			
	Total Organic Carbon (mg/L)	1.42			
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	0.631			
	Antimony (Sb)-Total (mg/L)	0.00010			
	Arsenic (As)-Total (mg/L)	0.00161			
	Barium (Ba)-Total (mg/L)	0.0113			
	Beryllium (Be)-Total (mg/L)	<0.00010			
	Bismuth (Bi)-Total (mg/L)	<0.000050			
	Boron (B)-Total (mg/L)	<0.010			
	Cadmium (Cd)-Total (mg/L)	0.0000682			
	Calcium (Ca)-Total (mg/L)	4.72			
	Chromium (Cr)-Total (mg/L)	0.00092			
	Cobalt (Co)-Total (mg/L)	0.00042			
	Copper (Cu)-Total (mg/L)	0.00271			

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

# ALS ENVIRONMENTAL ANALYTICAL REPORT

	<b>Sample ID</b> <b>Description</b> <b>Sampled Date</b> <b>Sampled Time</b> <b>Client ID</b>	L2335590-1 WATER 23-AUG-19 16:00 JM10-2018			
Grouping	Analyte				
<b>WATER</b>					
<b>Total Metals</b>	Iron (Fe)-Total (mg/L)	1.01			
	Lead (Pb)-Total (mg/L)	0.00137			
	Lithium (Li)-Total (mg/L)	<0.0010			
	Magnesium (Mg)-Total (mg/L)	0.630			
	Manganese (Mn)-Total (mg/L)	0.0458			
	Mercury (Hg)-Total (mg/L)	<0.0000050			
	Molybdenum (Mo)-Total (mg/L)	0.000126			
	Nickel (Ni)-Total (mg/L)	0.00125			
	Phosphorus (P)-Total (mg/L)	<0.30			
	Potassium (K)-Total (mg/L)	0.564			
	Selenium (Se)-Total (mg/L)	0.000054			
	Silicon (Si)-Total (mg/L)	2.09			
	Silver (Ag)-Total (mg/L)	0.000032			
	Sodium (Na)-Total (mg/L)	<2.0			
	Strontium (Sr)-Total (mg/L)	0.0229			
	Sulfur (S)-Total (mg/L)	0.82			
	Thallium (Tl)-Total (mg/L)	0.000011			
	Tin (Sn)-Total (mg/L)	<0.00010			
	Titanium (Ti)-Total (mg/L)	0.025			
	Uranium (U)-Total (mg/L)	0.000013			
	Vanadium (V)-Total (mg/L)	0.00157			
	Zinc (Zn)-Total (mg/L)	0.0119			
<b>Aggregate Organics</b>	COD (mg/L)	<20			
<b>Volatile Organic Compounds</b>	Benzene (mg/L)	<0.00050			
	Bromodichloromethane (mg/L)	<0.0010			
	Bromoform (mg/L)	<0.0010			
	Carbon Tetrachloride (mg/L)	<0.00050			
	Chlorobenzene (mg/L)	<0.0010			
	Dibromochloromethane (mg/L)	<0.0010			
	Chloroethane (mg/L)	<0.0010			
	Chloroform (mg/L)	<0.0010			
	Chloromethane (mg/L)	<0.0050			
	1,2-Dichlorobenzene (mg/L)	<0.00050			
	1,3-Dichlorobenzene (mg/L)	<0.0010			
	1,4-Dichlorobenzene (mg/L)	<0.0010			
	1,1-Dichloroethane (mg/L)	<0.0010			

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

# ALS ENVIRONMENTAL ANALYTICAL REPORT

	<b>Sample ID</b> <b>Description</b> <b>Sampled Date</b> <b>Sampled Time</b> <b>Client ID</b>	L2335590-1	WATER	23-AUG-19	16:00	JM10-2018
Grouping	Analyte					
<b>WATER</b>						
<b>Volatile Organic Compounds</b>	1,2-Dichloroethane (mg/L)	<0.0010				
	1,1-Dichloroethylene (mg/L)	<0.0010				
	cis-1,2-Dichloroethylene (mg/L)	<0.0010				
	trans-1,2-Dichloroethylene (mg/L)	<0.0010				
	Dichloromethane (mg/L)	<0.0050				
	1,2-Dichloropropane (mg/L)	<0.0010				
	cis-1,3-Dichloropropylene (mg/L)	<0.00050				
	trans-1,3-Dichloropropylene (mg/L)	<0.00050				
	1,3-Dichloropropene (cis & trans) (mg/L)	<0.0010				
	Ethy benzene (mg/L)	<0.00050				
	Methyl t-butyl ether (MTBE) (mg/L)	<0.00050				
	Styrene (mg/L)	<0.00050				
	1,1,1,2-Tetrachloroethane (mg/L)	<0.0010				
	1,1,2,2-Tetrachloroethane (mg/L)	<0.00020				
	Tetrachloroethylene (mg/L)	<0.0010				
	Toluene (mg/L)	<0.00045				
	1,1,1-Trichloroethane (mg/L)	<0.0010				
	1,1,2-Trichloroethane (mg/L)	<0.00050				
	Trichloroethylene (mg/L)	<0.0010				
	Trichlorofluoromethane (mg/L)	<0.0010				
	Vinyl Chloride (mg/L)	<0.00040				
	ortho-Xylene (mg/L)	<0.00050				
	meta- & para-Xylene (mg/L)	<0.00050				
Xylenes (mg/L)	<0.00075					
F1 (C6-C10) (mg/L)	<0.10					
Surrogate: 4-Bromofluorobenzene (SS) (%)	78.2					
Surrogate: 1,4-Difluorobenzene (SS) (%)	104.4					
<b>Hydrocarbons</b>	EPH10-19 (mg/L)	<0.25				
	EPH19-32 (mg/L)	<0.25				
	LEPH (mg/L)	<0.25				
	HEPH (mg/L)	<0.25				
	F1-BTEX (mg/L)	<0.10				
	F2 (C10-C16) (mg/L)	<0.30				
	F3 (C16-C34) (mg/L)	<0.30				
	F4 (C34-C50) (mg/L)	<0.30				
	Volatile Hydrocarbons (VH6-10) (mg/L)	<0.10				
	VPH (C6-C10) (mg/L)	<0.10				

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

# ALS ENVIRONMENTAL ANALYTICAL REPORT

	<b>Sample ID</b> <b>Description</b> <b>Sampled Date</b> <b>Sampled Time</b> <b>Client ID</b>	L2335590-1	WATER	23-AUG-19	16:00	JM10-2018
Grouping	Analyte					
<b>WATER</b>						
<b>Hydrocarbons</b>	Surrogate: 2-Bromobenzotrifluoride (%)	86.9				
	Surrogate: 2-Bromobenzotrifluoride, F2-F4 (%)	84.8				
	Surrogate: 3,4-Dichlorotoluene (SS) (%)	110.1				
<b>Polycyclic Aromatic Hydrocarbons</b>	Acenaphthene (mg/L)	<0.000010				
	Acenaphthylene (mg/L)	<0.000010				
	Acridine (mg/L)	<0.000010				
	Anthracene (mg/L)	<0.000010				
	Benz(a)anthracene (mg/L)	<0.000010				
	Benzo(a)pyrene (mg/L)	<0.0000050				
	Benzo(b&j)fluoranthene (mg/L)	<0.000010				
	Benzo(b+j+k)fluoranthene (mg/L)	<0.000015				
	Benzo(g,h,i)perylene (mg/L)	<0.000010				
	Benzo(k)fluoranthene (mg/L)	<0.000010				
	Chrysene (mg/L)	<0.000010				
	Dibenz(a,h)anthracene (mg/L)	<0.0000050				
	Fluoranthene (mg/L)	<0.000010				
	Fluorene (mg/L)	<0.000010				
	Indeno(1,2,3-c,d)pyrene (mg/L)	<0.000010				
	1-Methylnaphthalene (mg/L)	<0.000050				
	2-Methylnaphthalene (mg/L)	<0.000050				
	Naphthalene (mg/L)	<0.000050				
	Phenanthrene (mg/L)	<0.000020				
	Pyrene (mg/L)	<0.000010				
	Quinoline (mg/L)	<0.000050				
	Surrogate: Acridine d9 (%)	108.4				
	Surrogate: Chrysene d12 (%)	105.5				
Surrogate: Naphthalene d8 (%)	86.4					
Surrogate: Phenanthrene d10 (%)	98.3					

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## Reference Information

### QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Laboratory Control Sample	Benz(a)anthracene	LCS-ND	L2335590-1
Matrix Spike	Total Inorganic Carbon	MS-B	L2335590-1
Matrix Spike	Barium (Ba)-Total	MS-B	L2335590-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L2335590-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2335590-1
Matrix Spike	Manganese (Mn)-Total	MS-B	L2335590-1
Matrix Spike	Sodium (Na)-Total	MS-B	L2335590-1
Matrix Spike	Strontium (Sr)-Total	MS-B	L2335590-1

### Qualifiers for Individual Parameters Listed:

Qualifier	Description
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
LCS-ND	Lab Control Sample recovery was slightly outside ALS DQO. Reported non-detect results for associated samples were unaffected.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

### Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
<b>ACY-H2O2-MAN-VA</b>	Water	Acidity by Hot Peroxide Titration	APHA - ACIDITY (2310)
This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". The procedure involves preliminary sample treatment by the hot peroxide procedure, and Acidity is subsequently determined by potentiometric titration to a specified endpoint (i.e. pH = 8.3).			
<b>ALK-TITR-VA</b>	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity
This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.			
<b>BR-L-IC-N-VA</b>	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
<b>CARBONS-TIC-VA</b>	Water	Total inorganic carbon by CO2 purge	APHA 5310B TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
<b>CARBONS-TOC-VA</b>	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
<b>CL-IC-N-VA</b>	Water	Chloride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
<b>CN-CNO-WT</b>	Water	Cyanate	APHA 4500-CN-L
This analysis is carried out using procedures adapted from APHA method 4500-CN "Cyanide". Cyanate is determined by the Cyanate hydrolysis method using an ammonia selective electrode			
<b>CN-FREE-CFA-VA</b>	Water	Free Cyanide in water by CFA	ASTM 7237
This analysis is carried out using procedures adapted from ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.			
<b>CN-SCN-VA</b>	Water	Thiocyanate by Colour	APHA 4500-CN CYANIDE
This analysis is carried out using procedures adapted from APHA Method 4500-CN- M "Thiocyanate" Thiocyanate is determined by the ferric nitrate colourimetric method. Water samples containing high levels of hexavalent chromium, cyanide (together with sulfide), reducing agents, or hydrocarbons may cause negative or positive interferences with this method. Contact ALS for additional information if required.			
<b>CN-T-CFA-VA</b>	Water	Total Cyanide in water by CFA	ISO 14403:2002
This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.			
<b>CN-WAD-CFA-VA</b>	Water	Weak Acid Diss. Cyanide in water by CFA	APHA 4500-CN CYANIDE
This analysis is carried out using procedures adapted from APHA Method 4500-CN I. "Weak Acid Dissociable Cyanide". Weak Acid Dissociable (WAD) cyanide is determined by in-line sample distillation with final determination by colourimetric analysis.			
<b>COD-COL-VA</b>	Water	Chemical Oxygen Demand by Colorimetric	APHA 5220 D. CHEMICAL OXYGEN DEMAND

## Reference Information

This analysis is carried out using procedures adapted from APHA Method 5220 "Chemical Oxygen Demand (COD)". Chemical oxygen demand is determined using the closed reflux colourimetric method.

**EC-PCT-VA** Water Conductivity (Automated) APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

**EC-SCREEN-VA** Water Conductivity Screen (Internal Use Only) APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

**EPH-ME-FID-VA** Water EPH in Water BC Lab Manual

EPH is extracted from water using a hexane micro-extraction technique, with analysis by GC-FID, as per the BC Lab Manual. EPH results include PAHs and are therefore not equivalent to LEPH or HEPH.

**F-IC-N-VA** Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**F1-BTX-CALC-VA** Water F1-Total BTX CCME CWS PHC TIER 1 (2001)

This analysis is based on the "Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1 Method, Canadian Council of Ministers of the Environment, December 2000." For F1 (C6-C10), the sample undergoes a purge and trap extraction prior to analysis by GC/FID. The F1-BTEX result is calculated as follows:

F1-BTEX: F1 (C6-C10) minus benzene, toluene, ethyl benzene and xylenes (BTEX).

**F1-HSFID-VA** Water CCME F1 By Headspace with GCFID EPA 5021A/CCME CWS PHC (Pub# 1310)

This analysis is based on the "Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1 Method, Canadian Council of Ministers of the Environment, December 2000." For F1 (C6-C10), the sample undergoes a headspace purge prior to analysis by GC/FID.

F1 (C6-C10): Sum of all hydrocarbons that elute between nC6 and nC10.

**F2-F4-ME-FID-VA** Water CCME F2-F4 Hydrocarbons in Water CCME CWS-PHC, Pub #1310, Dec 2001

F2-F4 is extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Tier 1 Method, CCME, Dec 2001.

**HARDNESS-CALC-VA** Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO<sub>3</sub> equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

**HG-T-CVAA-VA** Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

**LEPH/HEPH-CALC-VA** Water LEPHs and HEPHs BC MOE LEPH/HEPH

LEPHw and HEPHw are measures of Light and Heavy Extractable Petroleum Hydrocarbons in water. Results are calculated by subtraction of applicable PAH concentrations from EPH10-19 and EPH19-32, as per the BC Lab Manual LEPH/HEPH calculation procedure.

LEPHw = EPH10-19 minus Acenaphthene, Acridine, Anthracene, Fluorene, Naphthalene and Phenanthrene.

HEPHw = EPH19-32 minus Benz(a)anthracene, Benzo(a)pyrene, Fluoranthene, and Pyrene.

**MET-T-CCMS-VA** Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

**NH3-F-VA** Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

**NO2-L-IC-N-VA** Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**NO3-L-IC-N-VA** Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**PAH-ME-MS-VA** Water PAHs in Water EPA 3511/8270D (mod)

PAHs are extracted from water using a hexane micro-extraction technique, with analysis by GC/MS. Because the two isomers cannot be readily separated chromatographically, benzo(j)fluoranthene is reported as part of the benzo(b)fluoranthene parameter.

## Reference Information

<b>PH-PCT-VA</b>	Water	pH by Meter (Automated)	APHA 4500-H pH Value
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode			
It is recommended that this analysis be conducted in the field.			
<b>SO4-IC-N-VA</b>	Water	Sulfate in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
<b>TDS-VA</b>	Water	Total Dissolved Solids by Gravimetric	APHA 2540 C - GRAVIMETRIC
This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.			
<b>TURBIDITY-VA</b>	Water	Turbidity by Meter	APHA 2130 Turbidity
This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.			
<b>VH-HSFID-VA</b>	Water	VH in Water by Headspace GCFID	BC Env. Lab Manual (VH in Water)
The water sample, with added reagents, is heated in a sealed vial to equilibrium. The headspace from the vial is transferred into a gas chromatograph. Compounds eluting between n-hexane and n-decane are measured and summed together using flame-ionization detection.			
<b>VH-SURR-FID-VA</b>	Water	VH Surrogates for Waters	BC Env. Lab Manual (VH in Solids)
<b>VOC-HSMS-VA</b>	Water	VOCs in water by Headspace GCMS	EPA 5021A/8260C
The water sample, with added reagents, is heated in a sealed vial to equilibrium. The headspace from the vial is transferred into a gas chromatograph. Target compound concentrations are measured using mass spectrometry detection.			
<b>VOC7-HSMS-VA</b>	Water	BTEX/MTBE/Styrene by Headspace GCMS	EPA 5021A/8260C
The water sample, with added reagents, is heated in a sealed vial to equilibrium. The headspace from the vial is transferred into a gas chromatograph. Target compound concentrations are measured using mass spectrometry detection.			
<b>VOC7/VOC-SURR-MS-VA</b>	Water	VOC7 and/or VOC Surrogates for Waters	EPA 5035A/5021A/8260C
<b>VPH-CALC-VA</b>	Water	VPH is VH minus select aromatics	BC MOE VPH
VPHw measures Volatile Petroleum Hydrocarbons in water. Results are calculated by subtraction of specific Monocyclic Aromatic Hydrocarbons from VH6-10, as per the BC Lab Manual VPH calculation procedure. VPHw = VH6-10 minus Benzene, Toluene, Ethylbenzene, Xylenes, and Styrene			
<b>XYLENES-CALC-VA</b>	Water	Sum of Xylene Isomer Concentrations	CALCULATION
Calculation of Total Xylenes			
Total Xylenes is the sum of the concentrations of the ortho, meta, and para Xylene isomers. Results below detection limit (DL) are treated as zero. The DL for Total Xylenes is set to a value no less than the square root of the sum of the squares of the DLs of the individual Xylenes.			

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

### Chain of Custody Numbers:

#### GLOSSARY OF REPORT TERMS

*Surrogate* - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

*mg/kg* - milligrams per kilogram based on dry weight of sample.

*mg/kg wwt* - milligrams per kilogram based on wet weight of sample.

*mg/kg lwt* - milligrams per kilogram based on lipid-adjusted weight of sample.

*mg/L* - milligrams per litre.

< - Less than.

*D.L.* - The reported Detection Limit, also known as the Limit of Reporting (LOR).

*N/A* - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

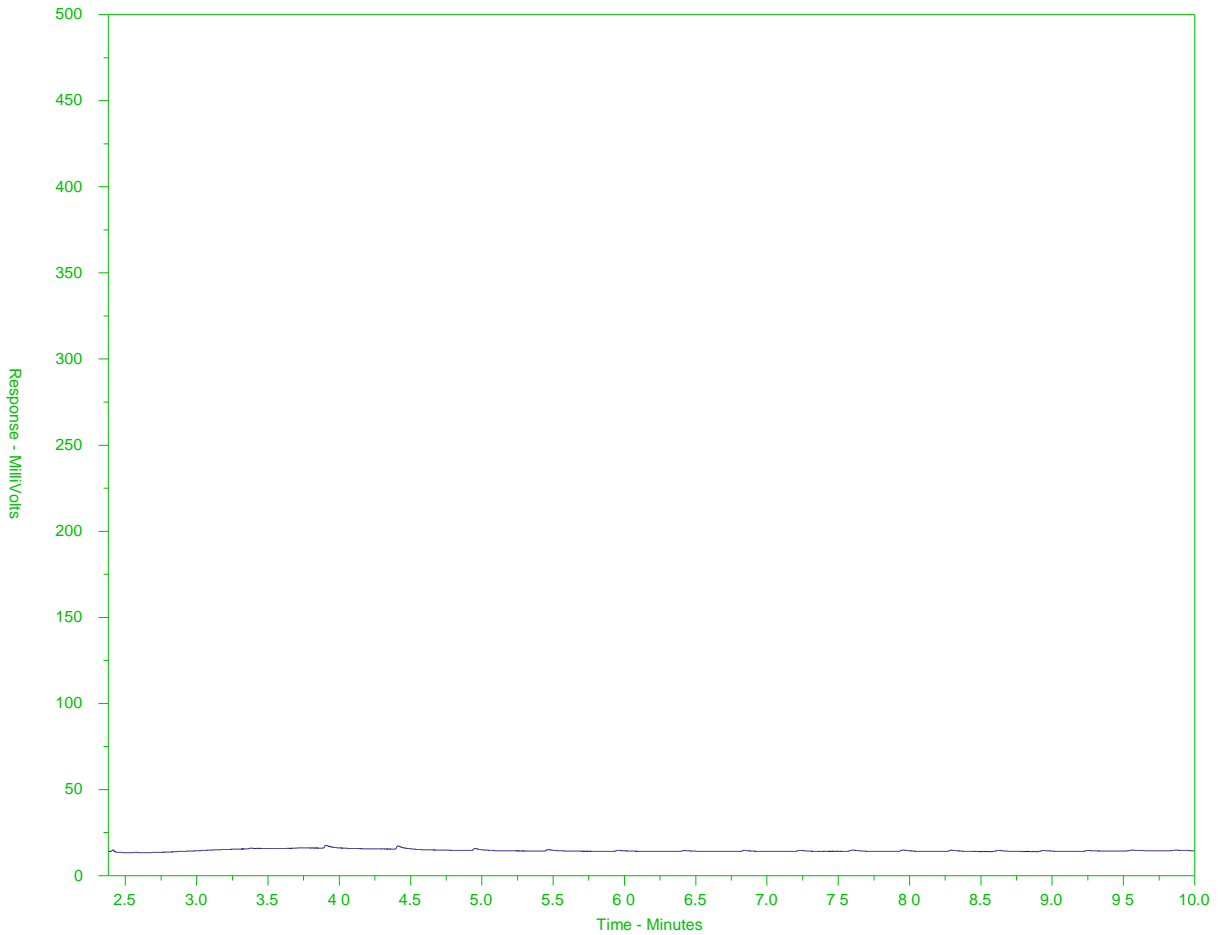
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



# BC EPH HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2335590-1  
 Client Sample ID: JM10-2018



← EPH10-19 →		← EPH19-32 →	
nC10	nC19	nC29	nC32
174°C	330°C	467°C	
346°F	626°F	873°F	
← Gasoline →		← Diesel/ Jet Fuels →	
		← Motor Oils/ Lube Oils/ Grease →	

The BC EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

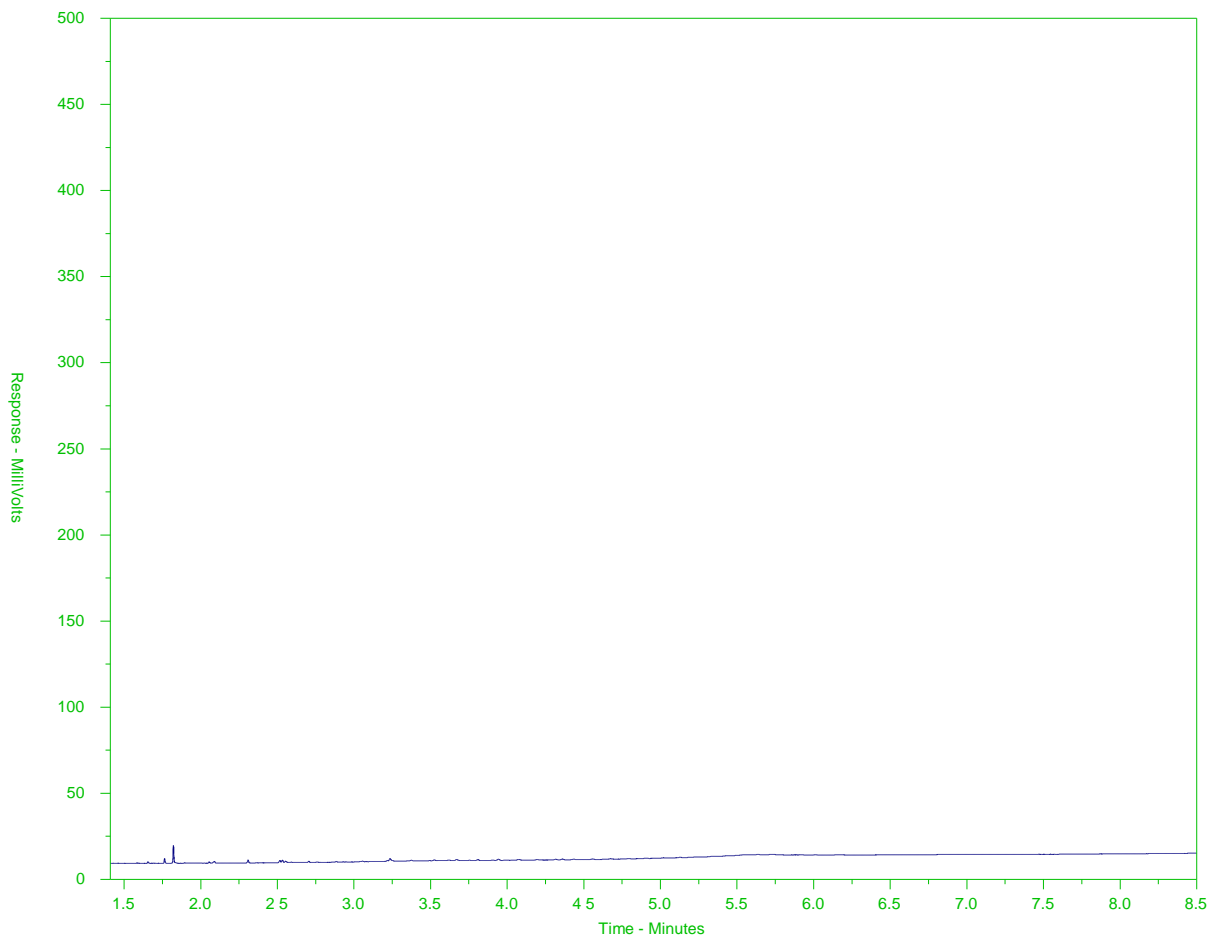
A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Note: This chromatogram was produced using GC conditions that are specific to the ALS Canada EPH method. Refer to the ALS Canada EPH Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at [www.alsglobal.com](http://www.alsglobal.com).

# CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2335590-C-1  
 Client Sample ID: JM10-2018



← F2 →		← F3 →		← F4 →	
nC10	nC16		nC34	nC50	
174°C	287°C		481°C	575°C	
346°F	549°F		898°F	1067°F	
← Gasoline →		← Motor Oils/ Lube Oils/ Grease →			
← Diesel/ Jet Fuels →					

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at [www.alsglobal.com](http://www.alsglobal.com).



Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com



L2335590-COFC

COC Number: 15 -

Page 1 of 1

<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>				<b>Select Service Level Below - Please confirm all E&amp;P TATs with your AM - surcharges will apply</b>											
Company:	ERM CONSULTANTS CANADA	Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input checked="" type="checkbox"/> EDD (DIGITAL)				<b>Regular [R]</b> <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply											
Contact:	WADE BRUNHAM	Quality Control (QC) Report with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO				<b>PRIORITY</b> (Business days)	4 day [P4] <input type="checkbox"/>				<b>EMERGENCY</b>	1 Business day [E1] <input type="checkbox"/>					
Phone:	250-877-7838	<input checked="" type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked					3 day [P3] <input type="checkbox"/>					Same Day, Weekend or Statutory holiday [E0] <input type="checkbox"/>					
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX					2 day [P2] <input type="checkbox"/>										
Street:	3790 ALFRED AVENUE	Email 1 or Fax WADE.BRUNHAM@ERM.COM				<b>Date and Time Required for all E&amp;P TATs:</b>						dd-mmm-yy hh:mm					
City/Province:	SMITHERS, BC	Email 2 Elizabeth.Boyle@erm.com				<b>For tests that can not be performed according to the service level selected, you will be contacted.</b>											
Postal Code:	V0J2N0	Email 3 jill.zyla@erm.com				<b>Analysis Request</b>											
<b>Invoice To</b>		<b>Invoice Distribution</b>				Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below											
Same as Report To <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX															
Copy of Invoice with Report <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		Email 1 or Fax ELIZABETH@SEABRIDGEGOLD.NET															
Company:	SEABRIDGE GOLD	Email 2 KSMADMIN@SEABRIDGEGOLD.NET															
Contact:	ELIZABETH MILLER	<b>Oil and Gas Required Fields (client use)</b>															
<b>Project Information</b>		AFE/Cost Center:				PO#											
ALS Account # / Quote #: (Q75476)		Major/Minor Code:				Routing Code:											
Job #:	492759-0005	Requisitioner:															
PO / AFE:		Location:															
LSD:																	
<b>ALS Lab Work Order # (lab use only)</b>		<b>ALS Contact:</b> Amber Springer		<b>Sampler:</b> Tyler Gale, Liam Clerke													
<b>ALS Sample # (lab use only)</b>	<b>Sample Identification and/or Coordinates (This description will appear on the report)</b>	<b>Field Site ID</b>	<b>Date (dd-mmm-yy)</b>	<b>Time (hh:mm)</b>	<b>Sample Type</b>	<b>GENERAL PARAMETERS / ANIONS</b>	<b>TOTAL METALS</b>	<b>TOTAL MERCURY</b>	<b>NUTRIENTS (TOC)</b>	<b>TOTAL AND WAD CYANIDE</b>	<b>BTEX, VOC, F1, VPH</b>	<b>SCN</b>	<b>PAH/EPH/F2-F4</b>	<b>Cyanate</b>	<b>Number of Containers</b>		
	JM10-2018		23-Aug-19	16:00	WATER	R	R	R	R	R	R	R	R	R	12		
<b>Drinking Water (DW) Samples<sup>1</sup> (client use)</b>		<b>Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)</b>				<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>											
Are samples taken from a Regulated DW System? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Please send the EDD to jill.zyla@erm.com				Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>											
Are samples for human drinking water use? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO						Ice Packs <input type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>											
						Cooling Initiated <input type="checkbox"/>											
						INITIAL COOLER TEMPERATURES °C					FINAL COOLER TEMPERATURES °C						
											19.6°C						
<b>SHIPMENT RELEASE (client use)</b>				<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>				<b>FINAL SHIPMENT RECEPTION (lab use only)</b>									
Released by: Tyler Gale	Date: 25-Aug-2019	Time: AM	Received by:	Date:	Time:	Received by: RT	Date: 25/08/19	Time: 3:30									

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FORM

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.



ERM Consultants Canada Ltd.  
ATTN: Wade Brunham  
1500-1111 West Hastings Street  
Vancouver BC V6E 2J3

Date Received: 25-AUG-19  
Report Date: 09-SEP-19 16:33 (MT)  
Version: FINAL

Client Phone: 604-689-9460

## Certificate of Analysis

**Lab Work Order #:** L2335592  
Project P.O. #: NOT SUBMITTED  
Job Reference: 492759-0004  
C of C Numbers:  
Legal Site Desc:

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Amber Springer, B.Sc  
Account Manager

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ADDRESS: 8081 Lougheed Hwy, Suite 100, Burnaby, BC V5A 1W9 Canada | Phone: +1 604 253 4188 | Fax: +1 604 253 6700  
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## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2335592-1	L2335592-2	L2335592-3	L2335592-4	L2335592-5
		Description	WATER	WATER	WATER	WATER	WATER
		Sampled Date	23-AUG-19	24-AUG-19	23-AUG-19	23-AUG-19	23-AUG-19
		Sampled Time	10:15	10:45	11:45	13:00	12:25
		Client ID	JM1	JM1-ALT	JM2	JM3	JM4
Grouping	Analyte						
<b>WATER</b>							
<b>Physical Tests</b>	Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	<5.0	
	Conductivity (uS/cm)	97.5	308	805	181	412	
	Hardness (as CaCO3) (mg/L)	40.2	136	409	80.9	173	
	pH (pH)	7.88	7.17	4.84	7.95	4.38	
	Total Suspended Solids (mg/L)	<3.0	31.0	26.2	21.8	198	
	Total Dissolved Solids (mg/L)	52	203	705	111	319	
	Turbidity (NTU)	0.28	33.4	23.0	10.6	196	
<b>Anions and Nutrients</b>	Acidity (as CaCO3) (mg/L)	1.7	2.7 <sup>RRR</sup>	26.6	1.5	26.5	
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	38.2	18.5	<1.0	48.9	<1.0	
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Total (as CaCO3) (mg/L)	38.2	18.5	<1.0	48.9	<1.0	
	Ammonia, Total (as N) (mg/L)	0.0135	<0.0050	0.0245	0.0607	0.0323	
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.25 <sup>DLDS</sup>	<0.050	<0.050	
	Chloride (Cl) (mg/L)	<0.50	<0.50	<2.5 <sup>DLDS</sup>	<0.50	0.62	
	Fluoride (F) (mg/L)	<0.020	0.055	0.13	0.024	0.066	
	Nitrate (as N) (mg/L)	<0.0050	<0.0050	0.134	0.0062	0.370	
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0050 <sup>DLDS</sup>	0.0012	0.0022	
	Total Kjeldahl Nitrogen (mg/L)	<0.050	<0.050	0.057	0.560	0.287	
	Total Nitrogen (mg/L)	0.059	<0.030	0.118	0.584	0.575	
	Orthophosphate-Dissolved (as P) (mg/L)	0.0014	<0.0010	<0.0010	<0.0010	<0.0010	
	Phosphorus (P)-Total (mg/L)	0.010	0.0620	0.0022	0.0165	0.223	
Sulfate (SO4) (mg/L)	10.4	126	407	38.3	181		
<b>Cyanides</b>	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
	Cyanide, Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
<b>Organic / Inorganic Carbon</b>	Dissolved Organic Carbon (mg/L)	<0.50	1.46	1.32	0.54	0.66	
	Total Organic Carbon (mg/L)	<0.50	2.40	1.33	<0.50	3.85	
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	0.0329	1.17	6.65	0.563	7.40	
	Antimony (Sb)-Total (mg/L)	<0.00010	0.00014	<0.00010	0.00013	0.00147	
	Arsenic (As)-Total (mg/L)	0.00014	0.00549	0.00042	0.00038	0.00593	
	Barium (Ba)-Total (mg/L)	0.0231	0.0265	0.0313	0.0384	0.134	
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	0.00057	<0.00010	0.00032	
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	0.00195	
	Boron (B)-Total (mg/L)	<0.010	<0.010	0.013	<0.010	0.013	
	Cadmium (Cd)-Total (mg/L)	0.0000634	0.00855	0.00943	0.000620	0.00618	
	Calcium (Ca)-Total (mg/L)	16.0	44.3	110	26.6	50.2	

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L2335592-6 WATER 23-AUG-19 09:05 JM5	L2335592-7 WATER 23-AUG-19 08:20 JM6	L2335592-8 WATER 23-AUG-19 14:20 JM7	L2335592-9 WATER 23-AUG-19 11:10 JM10	L2335592-10 WATER 23-AUG-19 08:45 JM11
Grouping	Analyte					
<b>WATER</b>						
<b>Physical Tests</b>	Colour, True (CU)	<5.0	5.8	<5.0	<5.0	<5.0
	Conductivity (uS/cm)	58.3	73.3	112	102	79.7
	Hardness (as CaCO3) (mg/L)	24.3	32.8	52.0	42.2	33.5
	pH (pH)	7.29	7.79	7.79	7.86	7.81
	Total Suspended Solids (mg/L)	4.6	17.8	216	103	27.8
	Total Dissolved Solids (mg/L)	38	52	89	80	56
	Turbidity (NTU)	2.99	6.52	128	75.9	13.1
<b>Anions and Nutrients</b>	Acidity (as CaCO3) (mg/L)	1.6	1.6	1.7	1.5	1.4
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	9.7	31.7	35.8	40.0	34.5
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	9.7	31.7	35.8	40.0	34.5
	Ammonia, Total (as N) (mg/L)	<0.0050	0.0122	0.0246	0.0060	<0.0050
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Nitrate (as N) (mg/L)	<0.0050	0.0201	0.0132	0.0290	0.0219
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	0.095	<0.050	0.135	<0.050	<0.050
	Total Nitrogen (mg/L)	0.091	0.069	0.168	0.057	0.047
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	<0.0010	0.0018	0.0011
	Phosphorus (P)-Total (mg/L)	0.0090	0.0247	0.111	0.096	0.0305
Sulfate (SO4) (mg/L)	16.2	6.23	20.3	11.7	6.42	
<b>Cyanides</b>	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Cyanide, Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
<b>Organic / Inorganic Carbon</b>	Dissolved Organic Carbon (mg/L)	1.16	<0.50	<0.50	<0.50	<0.50
	Total Organic Carbon (mg/L)	1.28	0.57	1.05	<0.50	<0.50
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	0.140	0.389	2.21	2.58	0.570
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	0.00020	0.00022	<0.00010
	Arsenic (As)-Total (mg/L)	0.00031	0.00022	0.00120	0.00111	0.00029
	Barium (Ba)-Total (mg/L)	0.0130	0.0442	0.0884	0.117	0.0534
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	0.000053	<0.000050	<0.000050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	0.0000825	0.000247	0.000574	0.000298	0.000329
	Calcium (Ca)-Total (mg/L)	7.64	11.3	17.7	16.6	13.3

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2335592-11	L2335592-12	L2335592-13	L2335592-14	L2335592-15
		Description	WATER	WATER	WATER	WATER	WATER
		Sampled Date	23-AUG-19	23-AUG-19	23-AUG-19	23-AUG-19	23-AUG-19
		Sampled Time	13:45	14:10	08:00	09:20	17:40
		Client ID	JM12	JM13	JM14	TMF1	JM26
Grouping	Analyte						
<b>WATER</b>							
<b>Physical Tests</b>	Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	<5.0	
	Conductivity (uS/cm)	345	152	72.7	57.2	83.2	
	Hardness (as CaCO3) (mg/L)	152	63.3	29.6	22.4	34.0	
	pH (pH)	5.47	7.82	7.78	7.31	7.84	
	Total Suspended Solids (mg/L)	73.4	113	21.6	6.6	26.6	
	Total Dissolved Solids (mg/L)	273	104	48	38	58	
	Turbidity (NTU)	79.5	61.4	11.2	3.65	22.8	
<b>Anions and Nutrients</b>	Acidity (as CaCO3) (mg/L)	9.2	1.9	1.8	1.8	1.7	
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	<1.0	39.5	29.6	10.4	32.0	
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Total (as CaCO3) (mg/L)	<1.0	39.5	29.6	10.4	32.0	
	Ammonia, Total (as N) (mg/L)	0.0090	0.0423	0.0158	0.0316	<0.0050	
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050	
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50	
	Fluoride (F) (mg/L)	0.052	0.022	<0.020	<0.020	<0.020	
	Nitrate (as N) (mg/L)	0.153	0.0051	0.0173	<0.0050	0.0238	
	Nitrite (as N) (mg/L)	0.0012	<0.0010	<0.0010	<0.0010	<0.0010	
	Total Kjeldahl Nitrogen (mg/L)	0.130	0.339	<0.050	0.155	<0.050	
	Total Nitrogen (mg/L)	0.259	0.343	0.083	0.123	0.056	
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	
	Phosphorus (P)-Total (mg/L)	0.0669	<0.0020	0.0047	0.0093	0.0325	
Sulfate (SO4) (mg/L)	154	33.7	5.74	14.3	7.96		
<b>Cyanides</b>	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
	Cyanide, Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
<b>Organic / Inorganic Carbon</b>	Dissolved Organic Carbon (mg/L)	<0.50	0.67	<0.50	1.23	<0.50	
	Total Organic Carbon (mg/L)	1.27	0.69	<0.50	1.32	<0.50	
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	3.26	0.610	0.669	0.151	0.740	
	Antimony (Sb)-Total (mg/L)	0.00062	0.00013	<0.00010	<0.00010	0.00010	
	Arsenic (As)-Total (mg/L)	0.00224	0.00044	0.00029	0.00037	0.00032	
	Barium (Ba)-Total (mg/L)	0.0675	0.0331	0.0497	0.0129	0.0605	
	Beryllium (Be)-Total (mg/L)	0.00017	<0.00010	<0.00010	<0.00010	<0.00010	
	Bismuth (Bi)-Total (mg/L)	0.000798	<0.000050	<0.000050	<0.000050	<0.000050	
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010	
	Cadmium (Cd)-Total (mg/L)	0.00448	0.000600	0.000284	0.0000905	0.000406	
	Calcium (Ca)-Total (mg/L)	47.8	23.4	11.4	7.75	13.0	

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2335592-16	L2335592-17	L2335592-18	L2335592-19	L2335592-20
		Description	WATER	WATER	WATER	WATER	WATER
		Sampled Date	23-AUG-19	23-AUG-19	22-AUG-19	23-AUG-19	23-AUG-19
		Sampled Time	09:45	13:20	17:15	17:00	10:15
		Client ID	SHC5	SHC1	SHCR3	SHC3	FIELD BLANK
Grouping	Analyte						
<b>WATER</b>							
<b>Physical Tests</b>	Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	<5.0	
	Conductivity (uS/cm)	151	105	108	105	<2.0	
	Hardness (as CaCO3) (mg/L)	67.9	52.0	43.0	43.8	<0.50	
	pH (pH)	8.08	8.06	7.80	7.83	5.59	
	Total Suspended Solids (mg/L)	4.0	273	55.5	23.8	<3.0	
	Total Dissolved Solids (mg/L)	91	89	80	70	<10	
	Turbidity (NTU)	0.96	166	70.1	6.52	<0.10	
<b>Anions and Nutrients</b>	Acidity (as CaCO3) (mg/L)	1.5	1.6	1.6	1.4	1.4	
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	58.3	38.3	36.4	35.4	<1.0	
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Total (as CaCO3) (mg/L)	58.3	38.3	36.4	35.4	<1.0	
	Ammonia, Total (as N) (mg/L)	<0.0050	<0.0050	0.0099	<0.0050	0.0170 <sup>RRV</sup>	
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050	
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50	
	Fluoride (F) (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020	
	Nitrate (as N) (mg/L)	0.0191	0.0205	0.0430	0.0778	<0.0050	
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Total Kjeldahl Nitrogen (mg/L)	<0.050	<0.050	<0.050	0.095	<0.050	
	Total Nitrogen (mg/L)	0.042	0.051	0.070	0.192	<0.030	
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	0.0016	<0.0010	<0.0010	
	Phosphorus (P)-Total (mg/L)	0.0063	0.220	0.0584	0.0244	<0.0020	
Sulfate (SO4) (mg/L)	15.3	11.9	16.6	15.9	<0.30		
<b>Cyanides</b>	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
	Cyanide, Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
<b>Organic / Inorganic Carbon</b>	Dissolved Organic Carbon (mg/L)	<0.50	<0.50	<0.50	0.54	<0.50	
	Total Organic Carbon (mg/L)	<0.50	<0.50	<0.50	0.66	<0.50	
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	0.100	5.57	2.16	0.434	<0.0030	
	Antimony (Sb)-Total (mg/L)	<0.00010	0.00043	0.00019	<0.00010	<0.00010	
	Arsenic (As)-Total (mg/L)	0.00039	0.00264	0.00077	0.00044	<0.00010	
	Barium (Ba)-Total (mg/L)	0.0443	0.199	0.101	0.0363	<0.00010	
	Beryllium (Be)-Total (mg/L)	<0.00010	0.00019	<0.00010	<0.00010	<0.00010	
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010	
	Cadmium (Cd)-Total (mg/L)	0.0000303	0.000825	0.000247	0.000157	<0.0000050	
	Calcium (Ca)-Total (mg/L)	24.8	21.0	17.3	16.8	<0.050	

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.



## ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L2335592-21 WATER 23-AUG-19 10:15 DUP1	L2335592-22 WATER 23-AUG-19 12:25 DUP2	L2335592-23 WATER 23-AUG-19 10:45 JM1-SEEPAGE	L2335592-24 WATER 24-AUG-19 10:00 JM2-SEEPAGE	L2335592-25 WATER 23-AUG-19 10:15 TRAVEL BLANK
Grouping	Analyte					
<b>WATER</b>						
<b>Physical Tests</b>	Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	<5.0
	Conductivity (uS/cm)	96.5	425	279	909	<2.0
	Hardness (as CaCO3) (mg/L)	42.5	160	129	444	<0.50
	pH (pH)	7.86	4.29	8.12	4.29	5.57
	Total Suspended Solids (mg/L)	<3.0	169	<3.0	17.0	<3.0
	Total Dissolved Solids (mg/L)	49	336	179	870	<10
	Turbidity (NTU)	0.26	186	<0.10	41.1	<0.10
<b>Anions and Nutrients</b>	Acidity (as CaCO3) (mg/L)	1.7	28.6	1.2	58.6	1.7
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	38.6	<1.0	75.6	<1.0	<1.0
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	38.6	<1.0	75.6	<1.0	<1.0
	Ammonia, Total (as N) (mg/L)	0.0058	0.0396	0.0566	0.0114	<0.0050
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.25 <sup>DLDS</sup>	<0.050
	Chloride (Cl) (mg/L)	<0.50	0.63	<0.50	<2.5 <sup>DLDS</sup>	<0.50
	Fluoride (F) (mg/L)	<0.020	0.079	<0.020	0.16	<0.020
	Nitrate (as N) (mg/L)	<0.0050	0.365	0.0248	0.125	<0.0050
	Nitrite (as N) (mg/L)	<0.0010	0.0022	<0.0010	<0.0050 <sup>DLDS</sup>	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	<0.050	0.271	<0.050	0.063	<0.050
	Total Nitrogen (mg/L)	0.102	0.643	0.115	0.138	<0.030
	Orthophosphate-Dissolved (as P) (mg/L)	0.0017	<0.0010	<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total (mg/L)	0.0082	0.224	<0.0020	0.0133	<0.0020
	Sulfate (SO4) (mg/L)	10.4	184	63.1	469	<0.30
<b>Cyanides</b>	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050 <sup>CNP</sup>	<0.0050
	Cyanide, Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.010	<0.0050
<b>Organic / Inorganic Carbon</b>	Dissolved Organic Carbon (mg/L)	<0.50	0.73	0.59	1.32	<0.50
	Total Organic Carbon (mg/L)	<0.50	3.50	<0.50	1.51 <sup>HTP</sup>	<0.50
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	0.0291	8.05	<0.0030	6.95	<0.0030
	Antimony (Sb)-Total (mg/L)	<0.00010	0.00156	0.00015	0.00011	<0.00010
	Arsenic (As)-Total (mg/L)	0.00014	0.00664	<0.00010	0.00121	<0.00010
	Barium (Ba)-Total (mg/L)	0.0239	0.142	0.0542	0.0318	<0.00010
	Beryllium (Be)-Total (mg/L)	<0.00010	0.00034	<0.00010	0.00061	<0.00010
	Bismuth (Bi)-Total (mg/L)	<0.000050	0.00203	<0.000050	<0.000050	<0.000050
	Boron (B)-Total (mg/L)	<0.010	0.012	<0.010	0.015	<0.010
	Cadmium (Cd)-Total (mg/L)	0.0000565	0.00653	0.0000320	0.0101	<0.0000050
	Calcium (Ca)-Total (mg/L)	15.0	50.6	43.3	117	<0.050

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID	L2335592-1 WATER 23-AUG-19 10:15 JM1	L2335592-2 WATER 24-AUG-19 10:45 JM1-ALT	L2335592-3 WATER 23-AUG-19 11:45 JM2	L2335592-4 WATER 23-AUG-19 13:00 JM3	L2335592-5 WATER 23-AUG-19 12:25 JM4	
Grouping	Analyte					
<b>WATER</b>						
<b>Total Metals</b>	Chromium (Cr)-Total (mg/L)	<0.00010	0.00057	0.00017	0.00015	0.00356
	Cobalt (Co)-Total (mg/L)	<0.00010	0.00928	0.0266	0.00197	0.0204
	Copper (Cu)-Total (mg/L)	0.00265	0.926	2.29	0.213	2.08
	Iron (Fe)-Total (mg/L)	0.038	13.7	1.51	1.51	20.3
	Lead (Pb)-Total (mg/L)	0.000125	0.00511	0.00364	0.00191	0.0764
	Lithium (Li)-Total (mg/L)	<0.0010	0.0024	0.0052	0.0012	0.0064
	Magnesium (Mg)-Total (mg/L)	1.37	6.81	31.2	2.95	10.2
	Manganese (Mn)-Total (mg/L)	0.00758	1.27	4.93	0.328	2.68
	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000239
	Molybdenum (Mo)-Total (mg/L)	0.000380	0.000218	0.000230	0.000345	0.000980
	Nickel (Ni)-Total (mg/L)	<0.00050	0.00143	0.00889	<0.00050	0.00548
	Phosphorus (P)-Total (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Total (mg/L)	1.09	1.57	4.07	1.76	4.70
	Selenium (Se)-Total (mg/L)	0.000089	0.000457	0.000707	0.000156	0.00123
	Silicon (Si)-Total (mg/L)	1.36	2.24	4.60	1.86	10.5
	Silver (Ag)-Total (mg/L)	<0.000010	0.000061	0.000050	0.000024	0.00204
	Sodium (Na)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Total (mg/L)	0.138	0.229	0.702	0.212	0.349
	Sulfur (S)-Total (mg/L)	3.78	46.0	154	14.1	65.9
	Thallium (Tl)-Total (mg/L)	0.000011	0.000015	0.000025	0.000013	0.000161
	Tin (Sn)-Total (mg/L)	<0.00010	0.00066	<0.00010	<0.00010	0.00038
	Titanium (Ti)-Total (mg/L)	<0.010	<0.010	<0.010	0.015	0.290
	Uranium (U)-Total (mg/L)	0.000037	0.000563	0.000840	0.000273	0.00118
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	0.00082	0.0123
	Zinc (Zn)-Total (mg/L)	0.0039	1.44	1.23	0.0668	0.883
<b>Dissolved Metals</b>	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0115	0.0178	3.52	0.0622	2.15
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	0.00011	0.00011
	Arsenic (As)-Dissolved (mg/L)	0.00017	<0.00010	0.00039	<0.00010	0.00021
	Barium (Ba)-Dissolved (mg/L)	0.0215	0.0314	0.0327	0.0354	0.0462
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	0.00045	<0.00010	0.00017
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010	0.014	<0.010	0.010
	Cadmium (Cd)-Dissolved (mg/L)	0.0000489	0.00808	0.00935	0.000527	0.00614
	Calcium (Ca)-Dissolved (mg/L)	14.1	42.9	115	27.6	56.1
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	0.00015	<0.00010	<0.00010	0.00016

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID	L2335592-6 WATER 23-AUG-19 09:05 JM5	L2335592-7 WATER 23-AUG-19 08:20 JM6	L2335592-8 WATER 23-AUG-19 14:20 JM7	L2335592-9 WATER 23-AUG-19 11:10 JM10	L2335592-10 WATER 23-AUG-19 08:45 JM11	
Grouping	Analyte					
<b>WATER</b>						
<b>Total Metals</b>	Chromium (Cr)-Total (mg/L)	0.00015	<0.00010	0.00037	0.00029	<0.00010
	Cobalt (Co)-Total (mg/L)	0.00013	0.00028	0.00245	0.00171	0.00041
	Copper (Cu)-Total (mg/L)	0.00525	0.00349	0.133	0.00571	0.00440
	Iron (Fe)-Total (mg/L)	0.192	0.550	3.73	3.47	0.811
	Lead (Pb)-Total (mg/L)	0.000612	0.00303	0.0158	0.0175	0.00437
	Lithium (Li)-Total (mg/L)	<0.0010	<0.0010	0.0022	0.0025	<0.0010
	Magnesium (Mg)-Total (mg/L)	0.973	1.04	2.85	2.58	1.24
	Manganese (Mn)-Total (mg/L)	0.0337	0.0592	0.416	0.291	0.0847
	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)	0.000123	0.000166	0.000294	0.000459	0.000188
	Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050	0.00067	<0.00050	<0.00050
	Phosphorus (P)-Total (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Total (mg/L)	0.708	0.969	2.37	2.82	1.16
	Selenium (Se)-Total (mg/L)	0.000086	0.000067	0.000116	0.000108	0.000094
	Silicon (Si)-Total (mg/L)	0.36	1.52	4.64	5.45	1.73
	Silver (Ag)-Total (mg/L)	0.000014	0.000012	0.000091	0.000060	0.000016
	Sodium (Na)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Total (mg/L)	0.0393	0.0769	0.116	0.114	0.0870
	Sulfur (S)-Total (mg/L)	5.38	2.02	7.93	4.18	2.45
	Thallium (Tl)-Total (mg/L)	<0.000010	0.000015	0.000076	0.000095	0.000021
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)	<0.010	0.027	0.151	0.183	0.040
	Uranium (U)-Total (mg/L)	<0.000010	0.000107	0.000226	0.000234	0.000137
	Vanadium (V)-Total (mg/L)	<0.00050	0.00108	0.00611	0.00776	0.00152
	Zinc (Zn)-Total (mg/L)	0.0076	0.0361	0.0732	0.0417	0.0503
<b>Dissolved Metals</b>	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0131	0.0248	0.0678	0.0415	0.0264
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.00017	0.00012	0.00010	0.00023	0.00013
	Barium (Ba)-Dissolved (mg/L)	0.0107	0.0343	0.0335	0.0399	0.0365
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)	0.0000692	0.000145	0.000264	0.0000341	0.000161
	Calcium (Ca)-Dissolved (mg/L)	8.14	11.7	18.2	15.1	11.9
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2335592-11	L2335592-12	L2335592-13	L2335592-14	L2335592-15
		Description	WATER	WATER	WATER	WATER	WATER
		Sampled Date	23-AUG-19	23-AUG-19	23-AUG-19	23-AUG-19	23-AUG-19
		Sampled Time	13:45	14:10	08:00	09:20	17:40
		Client ID	JM12	JM13	JM14	TMF1	JM26
Grouping	Analyte						
<b>WATER</b>							
<b>Total Metals</b>	Chromium (Cr)-Total (mg/L)		0.00151	0.00017	0.00011	0.00015	<0.00010
	Cobalt (Co)-Total (mg/L)		0.0134	0.00214	0.00038	0.00017	0.00049
	Copper (Cu)-Total (mg/L)		1.49	0.228	0.00403	0.00366	0.00484
	Iron (Fe)-Total (mg/L)		9.51	1.63	0.820	0.219	0.985
	Lead (Pb)-Total (mg/L)		0.0319	0.00294	0.00346	0.000775	0.00526
	Lithium (Li)-Total (mg/L)		0.0039	0.0011	<0.0010	<0.0010	0.0010
	Magnesium (Mg)-Total (mg/L)		7.62	2.27	1.10	0.962	1.33
	Manganese (Mn)-Total (mg/L)		1.75	0.320	0.0704	0.0441	0.0934
	Mercury (Hg)-Total (mg/L)		<0.0000050	0.0000060	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)		0.000516	0.000298	0.000166	0.000180	0.000202
	Nickel (Ni)-Total (mg/L)		0.00322	<0.00050	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Total (mg/L)		<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Total (mg/L)		3.10	1.53	1.10	0.698	1.24
	Selenium (Se)-Total (mg/L)		0.000610	0.000122	0.000071	0.000065	0.000101
	Silicon (Si)-Total (mg/L)		6.24	1.96	2.10	0.38	2.02
	Silver (Ag)-Total (mg/L)		0.000900	0.000040	0.000012	0.000013	0.000019
	Sodium (Na)-Total (mg/L)		<2.0	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Total (mg/L)		0.294	0.148	0.0780	0.0378	0.0893
	Sulfur (S)-Total (mg/L)		55.7	11.7	2.22	4.85	2.93
	Thallium (Tl)-Total (mg/L)		0.000070	0.000015	0.000022	<0.000010	0.000026
	Tin (Sn)-Total (mg/L)		0.00014	<0.00010	0.00012	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)		0.108	0.018	0.038	<0.010	0.047
	Uranium (U)-Total (mg/L)		0.000699	0.000239	0.000103	0.000016	0.000151
	Vanadium (V)-Total (mg/L)		0.00446	0.00079	0.00166	<0.00050	0.00190
	Zinc (Zn)-Total (mg/L)		0.606	0.0674	0.0438	0.0080	0.0644
<b>Dissolved Metals</b>	Dissolved Mercury Filtration Location		FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location		FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)		0.133	0.0604	0.0244	0.0117	0.0246
	Antimony (Sb)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)		0.00011	<0.00010	0.00012	0.00019	0.00014
	Barium (Ba)-Dissolved (mg/L)		0.0369	0.0293	0.0310	0.0100	0.0381
	Beryllium (Be)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Dissolved (mg/L)		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)		<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)		0.00435	0.000490	0.000133	0.0000612	0.000212
	Calcium (Ca)-Dissolved (mg/L)		50.1	22.0	10.5	7.49	12.1
	Chromium (Cr)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

# ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2335592-16	L2335592-17	L2335592-18	L2335592-19	L2335592-20
		Description	WATER	WATER	WATER	WATER	WATER
		Sampled Date	23-AUG-19	23-AUG-19	22-AUG-19	23-AUG-19	23-AUG-19
		Sampled Time	09:45	13:20	17:15	17:00	10:15
		Client ID	SHC5	SHC1	SHCR3	SHC3	FIELD BLANK
Grouping	Analyte						
<b>WATER</b>							
<b>Total Metals</b>	Chromium (Cr)-Total (mg/L)		0.00012	0.00068	0.00017	0.00018	<0.00010
	Cobalt (Co)-Total (mg/L)		0.00011	0.00459	0.00139	0.00048	<0.00010
	Copper (Cu)-Total (mg/L)		0.00068	0.122	0.00441	0.0340	<0.00050
	Iron (Fe)-Total (mg/L)		0.176	8.08	2.76	0.826	<0.030
	Lead (Pb)-Total (mg/L)		0.000345	0.0374	0.0141	0.00257	<0.000050
	Lithium (Li)-Total (mg/L)		<0.0010	0.0056	0.0023	<0.0010	<0.0010
	Magnesium (Mg)-Total (mg/L)		2.15	5.41	2.48	1.48	<0.0050
	Manganese (Mn)-Total (mg/L)		0.00941	0.762	0.231	0.0953	<0.00010
	Mercury (Hg)-Total (mg/L)		<0.0000050	0.0000081	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)		0.000578	0.000611	0.000559	0.000335	<0.000050
	Nickel (Ni)-Total (mg/L)		<0.00050	0.00127	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Total (mg/L)		<0.30	0.31	<0.30	<0.30	<0.30
	Potassium (K)-Total (mg/L)		1.67	4.25	2.45	1.41	<0.050
	Selenium (Se)-Total (mg/L)		0.000221	0.000097	0.000101	0.000128	<0.000050
	Silicon (Si)-Total (mg/L)		1.08	10.9	5.03	2.26	<0.10
	Silver (Ag)-Total (mg/L)		<0.000010	0.000135	0.000047	0.000025	<0.000010
	Sodium (Na)-Total (mg/L)		<2.0	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Total (mg/L)		0.151	0.136	0.125	0.0992	<0.00020
	Sulfur (S)-Total (mg/L)		5.72	8.55	5.72	5.22	<0.50
	Thallium (Tl)-Total (mg/L)		<0.000010	0.000196	0.000081	0.000016	<0.000010
	Tin (Sn)-Total (mg/L)		<0.00010	0.00013	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)		<0.010	0.390	0.155	0.027	<0.010
	Uranium (U)-Total (mg/L)		0.000091	0.000349	0.000274	0.000110	<0.000010
	Vanadium (V)-Total (mg/L)		0.00058	0.0159	0.00677	0.00128	<0.00050
	Zinc (Zn)-Total (mg/L)		<0.0030	0.129	0.0370	0.0179	<0.0030
<b>Dissolved Metals</b>	Dissolved Mercury Filtration Location		FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location		FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)		0.0078	0.0719	0.0448	0.0397	<0.0030
	Antimony (Sb)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)		0.00027	0.00010	0.00025	0.00012	<0.00010
	Barium (Ba)-Dissolved (mg/L)		0.0432	0.0443	0.0389	0.0281	<0.00010
	Beryllium (Be)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Dissolved (mg/L)		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)		<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)		0.0000140	0.000250	0.0000384	0.0000947	<0.0000050
	Calcium (Ca)-Dissolved (mg/L)		23.7	17.8	15.3	15.4	<0.050
	Chromium (Cr)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	Description	Sampled Date	Sampled Time	Client ID	L2335592-21	L2335592-22	L2335592-23	L2335592-24	L2335592-25
					WATER	WATER	WATER	WATER	WATER
		23-AUG-19	10:15	DUP1	23-AUG-19	23-AUG-19	23-AUG-19	24-AUG-19	23-AUG-19
					10:15	12:25	10:45	10:00	10:15
					DUP1	DUP2	JM1-SEEPAGE	JM2-SEEPAGE	TRAVEL BLANK
Grouping	Analyte								
<b>WATER</b>									
<b>Total Metals</b>	Chromium (Cr)-Total (mg/L)	<0.00010	0.00367	<0.00010	0.00030	<0.00010			
	Cobalt (Co)-Total (mg/L)	<0.00010	0.0210	<0.00010	0.0323	<0.00010			
	Copper (Cu)-Total (mg/L)	0.00268	2.13	<0.00050	3.08	<0.00050			
	Iron (Fe)-Total (mg/L)	0.036	21.7	<0.030	8.64	<0.030			
	Lead (Pb)-Total (mg/L)	0.000177	0.0761	<0.000050	0.00463	<0.000050			
	Lithium (Li)-Total (mg/L)	<0.0010	0.0072	<0.0010	0.0067	<0.0010			
	Magnesium (Mg)-Total (mg/L)	1.27	10.1	5.02	34.1	<0.0050			
	Manganese (Mn)-Total (mg/L)	0.00744	2.87	0.00026	5.19	<0.00010			
	Mercury (Hg)-Total (mg/L)	<0.0000050	0.0000275	<0.0000050	<0.0000050	<0.0000050			
	Molybdenum (Mo)-Total (mg/L)	0.000374	0.000968	0.000385	0.000144	<0.000050			
	Nickel (Ni)-Total (mg/L)	<0.00050	0.00577	<0.00050	0.0111	<0.00050			
	Phosphorus (P)-Total (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30			
	Potassium (K)-Total (mg/L)	1.11	5.04	2.63	4.24	<0.050			
	Selenium (Se)-Total (mg/L)	0.000088	0.00111	0.000323	0.000982	<0.000050			
	Silicon (Si)-Total (mg/L)	1.42	12.0	1.61	5.19	<0.10			
	Silver (Ag)-Total (mg/L)	<0.000010	0.00209	<0.000010	0.000063	<0.000010			
	Sodium (Na)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0			
	Strontium (Sr)-Total (mg/L)	0.133	0.327	0.210	0.747	<0.00020			
	Sulfur (S)-Total (mg/L)	3.51	69.9	25.3	188	<0.50			
	Thallium (Tl)-Total (mg/L)	<0.000010	0.000166	<0.000010	0.000030	<0.000010			
	Tin (Sn)-Total (mg/L)	<0.00010	0.00038	<0.00010	<0.00010	<0.00010			
	Titanium (Ti)-Total (mg/L)	<0.010	0.341	<0.010	<0.010	<0.010			
	Uranium (U)-Total (mg/L)	0.000037	0.00131	0.000120	0.000980	<0.000010			
	Vanadium (V)-Total (mg/L)	<0.00050	0.0134	<0.00050	<0.00050	<0.00050			
	Zinc (Zn)-Total (mg/L)	0.0041	0.947	<0.0030	1.36	<0.0030			
<b>Dissolved Metals</b>	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD			
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD			
	Aluminum (Al)-Dissolved (mg/L)	0.0107	1.96	<0.0030	6.02	<0.0030			
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	0.00011	<0.00010	<0.00010			
	Arsenic (As)-Dissolved (mg/L)	0.00010	0.00015	<0.00010	0.00037	<0.00010			
	Barium (Ba)-Dissolved (mg/L)	0.0229	0.0416	0.0535	0.0310	<0.00010			
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	0.00015	<0.00010	0.00059	<0.00010			
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050			
	Boron (B)-Dissolved (mg/L)	<0.010	0.011	<0.010	0.015	<0.010			
	Cadmium (Cd)-Dissolved (mg/L)	0.0000469	0.00543	0.0000318	0.00981	<0.0000050			
	Calcium (Ca)-Dissolved (mg/L)	14.9	50.9	43.5	123	<0.050			
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	0.00011	<0.00010	0.00010	<0.00010			

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	Description	Sampled Date	Sampled Time	Client ID	L2335592-1	L2335592-2	L2335592-3	L2335592-4	L2335592-5
					WATER	WATER	WATER	WATER	WATER
		23-AUG-19	10:15	JM1	23-AUG-19	24-AUG-19	23-AUG-19	23-AUG-19	23-AUG-19
					JM1	JM1-ALT	JM2	JM3	JM4
Grouping	Analyte								
<b>WATER</b>									
<b>Dissolved Metals</b>	Cobalt (Co)-Dissolved (mg/L)	<0.00010	0.00900	0.0257	0.00183	0.0185			
	Copper (Cu)-Dissolved (mg/L)	0.00162	0.123	2.13	0.0232	2.06			
	Iron (Fe)-Dissolved (mg/L)	<0.030	0.084	0.040	<0.030	2.15			
	Lead (Pb)-Dissolved (mg/L)	<0.000050	0.000070	0.00116	<0.000050	0.00649			
	Lithium (Li)-Dissolved (mg/L)	<0.0010	0.0024	0.0054	0.0012	0.0039			
	Magnesium (Mg)-Dissolved (mg/L)	1.23	6.91	29.5	2.90	8.04			
	Manganese (Mn)-Dissolved (mg/L)	0.00432	1.29	4.76	0.298	2.40			
	Mercury (Hg)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050			
	Molybdenum (Mo)-Dissolved (mg/L)	0.000359	0.000055	0.000167	0.000264	<0.000050			
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	0.00126	0.00875	<0.00050	0.00371			
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30			
	Potassium (K)-Dissolved (mg/L)	0.991	1.57	3.88	1.73	2.63			
	Selenium (Se)-Dissolved (mg/L)	0.000075	0.000328	0.000738	0.000087	0.000419			
	Silicon (Si)-Dissolved (mg/L)	1.41	1.91	4.54	1.52	3.25			
	Silver (Ag)-Dissolved (mg/L)	<0.000010	0.000016	0.000022	<0.000010	0.000025			
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0			
	Strontium (Sr)-Dissolved (mg/L)	0.123	0.227	0.672	0.208	0.345			
	Sulfur (S)-Dissolved (mg/L)	4.37	41.1	150	13.3	63.5			
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	0.000013	0.000026	0.000011	0.000035			
	Tin (Sn)-Dissolved (mg/L)	<0.00010	0.00448 <sup>DTC</sup>	<0.00010	<0.00010	<0.00010			
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010			
	Uranium (U)-Dissolved (mg/L)	0.000033	0.000015	0.000491	0.000101	0.000844			
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050			
	Zinc (Zn)-Dissolved (mg/L)	0.0027	1.24	1.19	0.0414	0.811			

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	Description	Sampled Date	Sampled Time	Client ID	L2335592-6	L2335592-7	L2335592-8	L2335592-9	L2335592-10
					WATER	WATER	WATER	WATER	WATER
		23-AUG-19	09:05	JM5	23-AUG-19	08:20	23-AUG-19	14:20	23-AUG-19
					JM5	JM6	JM7	JM10	JM11
Grouping	Analyte								
<b>WATER</b>									
<b>Dissolved Metals</b>	Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	0.00091	<0.00010	<0.00010	0.00091	<0.00010	<0.00010
	Copper (Cu)-Dissolved (mg/L)	0.00263	0.00092	0.0144	<0.00050	<0.00050	0.0144	<0.00050	<0.00050
	Iron (Fe)-Dissolved (mg/L)	<0.030	<0.030	0.033	<0.030	<0.030	0.033	<0.030	<0.030
	Lead (Pb)-Dissolved (mg/L)	<0.000050	0.000117	0.000172	0.000236	0.000236	0.000172	0.000236	0.000111
	Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Dissolved (mg/L)	0.953	0.896	1.62	1.10	1.10	1.62	1.10	0.897
	Manganese (Mn)-Dissolved (mg/L)	0.0132	0.0156	0.155	0.0169	0.0169	0.155	0.0169	0.0182
	Mercury (Hg)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000067	0.000153	0.000263	0.000402	0.000402	0.000263	0.000402	0.000169
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)	0.659	0.804	1.25	1.23	1.23	1.25	1.23	0.796
	Selenium (Se)-Dissolved (mg/L)	0.000075	0.000071	0.000102	0.000062	0.000062	0.000102	0.000062	0.000085
	Silicon (Si)-Dissolved (mg/L)	0.153	0.953	1.13	0.868	0.868	1.13	0.868	0.816
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Dissolved (mg/L)	0.0382	0.0788	0.111	0.103	0.103	0.111	0.103	0.0834
	Sulfur (S)-Dissolved (mg/L)	5.50	2.30	7.17	4.20	4.20	7.17	4.20	2.38
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	<0.000010	0.000094	0.000091	0.000163	0.000163	0.000091	0.000163	0.000106
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	0.0029	0.0037	0.0176	<0.0010	<0.0010	0.0176	<0.0010	0.0042

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.



## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	Description	Sampled Date	Sampled Time	Client ID	L2335592-11	L2335592-12	L2335592-13	L2335592-14	L2335592-15
					WATER	WATER	WATER	WATER	WATER
		23-AUG-19	13:45	JM12	23-AUG-19	14:10	23-AUG-19	08:00	23-AUG-19
					JM12	JM13	JM14	TMF1	JM26
Grouping	Analyte								
<b>WATER</b>									
<b>Dissolved Metals</b>	Cobalt (Co)-Dissolved (mg/L)	0.0123	0.00185	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Dissolved (mg/L)	1.23	0.0369	0.00084	0.00130	<0.00050			
	Iron (Fe)-Dissolved (mg/L)	1.11	0.033	<0.030	<0.030	<0.030			
	Lead (Pb)-Dissolved (mg/L)	0.000611	0.000069	0.000104	<0.000050	0.000127			
	Lithium (Li)-Dissolved (mg/L)	0.0030	<0.0010	<0.0010	<0.0010	<0.0010			
	Magnesium (Mg)-Dissolved (mg/L)	6.55	2.06	0.815	0.886	0.939			
	Manganese (Mn)-Dissolved (mg/L)	1.64	0.281	0.0136	0.0162	0.0219			
	Mercury (Hg)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050			
	Molybdenum (Mo)-Dissolved (mg/L)	<0.000050	0.000265	0.000146	0.000074	0.000191			
	Nickel (Ni)-Dissolved (mg/L)	0.00245	<0.00050	<0.00050	<0.00050	<0.00050			
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30			
	Potassium (K)-Dissolved (mg/L)	2.32	1.37	0.686	0.593	0.731			
	Selenium (Se)-Dissolved (mg/L)	0.000278	0.000073	0.000064	<0.000050	0.000082			
	Silicon (Si)-Dissolved (mg/L)	2.64	1.53	1.01	0.135	0.857			
	Silver (Ag)-Dissolved (mg/L)	0.000015	<0.000010	<0.000010	<0.000010	<0.000010			
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0			
	Strontium (Sr)-Dissolved (mg/L)	0.287	0.145	0.0688	0.0375	0.0869			
	Sulfur (S)-Dissolved (mg/L)	54.8	12.2	2.11	5.35	3.00			
	Thallium (Tl)-Dissolved (mg/L)	0.000026	<0.000010	<0.000010	<0.000010	<0.000010			
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010			
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010			
	Uranium (U)-Dissolved (mg/L)	0.000321	0.000083	0.000081	<0.000010	0.000132			
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050			
	Zinc (Zn)-Dissolved (mg/L)	0.547	0.0395	0.0036	0.0018	0.0038			

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	Description	Sampled Date	Sampled Time	Client ID	L2335592-16	L2335592-17	L2335592-18	L2335592-19	L2335592-20
					WATER	WATER	WATER	WATER	WATER
		23-AUG-19	09:45	SHC5	23-AUG-19	13:20	22-AUG-19	23-AUG-19	23-AUG-19
					SHC5	SHC1	SHCR3	SHC3	FIELD BLANK
Grouping	Analyte								
<b>WATER</b>									
<b>Dissolved Metals</b>	Cobalt (Co)-Dissolved (mg/L)	<0.00010	0.00082	<0.00010	0.00017	<0.00010			<0.00010
	Copper (Cu)-Dissolved (mg/L)	<0.00050	0.00683	<0.00050	0.00796	<0.00050			<0.00050
	Iron (Fe)-Dissolved (mg/L)	<0.030	<0.030	0.030	<0.030	<0.030			<0.030
	Lead (Pb)-Dissolved (mg/L)	<0.000050	0.000110	0.000303	0.000073	<0.000050			<0.000050
	Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010			<0.0010
	Magnesium (Mg)-Dissolved (mg/L)	2.11	1.81	1.16	1.28	<0.0050			<0.0050
	Manganese (Mn)-Dissolved (mg/L)	0.00071	0.144	0.0159	0.0410	<0.00010			<0.00010
	Mercury (Hg)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050			<0.000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000568	0.000484	0.000548	0.000323	<0.000050			<0.000050
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30			<0.30
	Potassium (K)-Dissolved (mg/L)	1.60	1.27	1.11	1.24	<0.050			<0.050
	Selenium (Se)-Dissolved (mg/L)	0.000231	0.000121	0.000104	0.000115	<0.000050			<0.000050
	Silicon (Si)-Dissolved (mg/L)	0.973	0.925	1.01	1.75	<0.050			<0.050
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010			<0.000010
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0			<2.0
	Strontium (Sr)-Dissolved (mg/L)	0.148	0.121	0.116	0.0966	<0.00020			<0.00020
	Sulfur (S)-Dissolved (mg/L)	5.96	8.15	6.56	5.73	<0.50			<0.50
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010			<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010			<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010			<0.010
	Uranium (U)-Dissolved (mg/L)	0.000088	0.000048	0.000224	0.000077	<0.000010			<0.000010
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050
	Zinc (Zn)-Dissolved (mg/L)	<0.0010	0.0135	<0.0010	0.0049	<0.0010			<0.0010

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L2335592-21 WATER 23-AUG-19 10:15 DUP1	L2335592-22 WATER 23-AUG-19 12:25 DUP2	L2335592-23 WATER 23-AUG-19 10:45 JM1-SEEPAGE	L2335592-24 WATER 24-AUG-19 10:00 JM2-SEEPAGE	L2335592-25 WATER 23-AUG-19 10:15 TRAVEL BLANK
Grouping	Analyte					
<b>WATER</b>						
<b>Dissolved Metals</b>	Cobalt (Co)-Dissolved (mg/L)	<0.00010	0.0165	<0.00010	0.0314	<0.00010
	Copper (Cu)-Dissolved (mg/L)	0.00178	1.81	<0.00050	3.07	<0.00050
	Iron (Fe)-Dissolved (mg/L)	<0.030	1.87	<0.030	0.539	<0.030
	Lead (Pb)-Dissolved (mg/L)	<0.000050	0.00561	<0.000050	0.00271	<0.000050
	Lithium (Li)-Dissolved (mg/L)	<0.0010	0.0037	<0.0010	0.0066	<0.0010
	Magnesium (Mg)-Dissolved (mg/L)	1.28	7.96	5.08	33.3	<0.0050
	Manganese (Mn)-Dissolved (mg/L)	0.00470	2.29	<0.00010	4.95	<0.00010
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000379	<0.000050	0.000344	<0.000050	<0.000050
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	0.00327	<0.00050	0.0109	<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)	0.996	2.30	2.30	3.91	<0.050
	Selenium (Se)-Dissolved (mg/L)	0.000088	0.000524	0.000371	0.000923	<0.000050
	Silicon (Si)-Dissolved (mg/L)	1.31	3.29	1.52	4.73	<0.050
	Silver (Ag)-Dissolved (mg/L)	<0.000010	0.000020	<0.000010	0.000023	<0.000010
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Dissolved (mg/L)	0.130	0.325	0.205	0.712	<0.00020
	Sulfur (S)-Dissolved (mg/L)	3.65	68.3	24.1	179	<0.50
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	0.000031	<0.000010	0.000027	<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	0.000032	0.000757	0.000103	0.000778	<0.000010
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	0.0028	0.739	0.0016	1.30	<0.0010

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## Reference Information

## QC Samples with Qualifiers &amp; Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Acidity (as CaCO3)	B	L2335592-1, -10, -12, -18, -19, -21, -22, -23, -24, -3, -4, -5, -6, -7, -8, -9
Method Blank	Acidity (as CaCO3)	B	L2335592-13, -14, -15, -16, -17
Method Blank	Acidity (as CaCO3)	B	L2335592-2
Laboratory Control Sample	Acidity (as CaCO3)	LCS-H	L2335592-13, -14, -15, -16, -17
Method Blank	Selenium (Se)-Total	MB-LOR	L2335592-25
Method Blank	Silver (Ag)-Total	MB-LOR	L2335592-25
Matrix Spike	Dissolved Organic Carbon	MS-B	L2335592-2
Matrix Spike	Total Organic Carbon	MS-B	L2335592-16
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2335592-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2335592-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2335592-24, -25
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2335592-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2335592-24, -25
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2335592-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2335592-24, -25
Matrix Spike	Barium (Ba)-Total	MS-B	L2335592-25
Matrix Spike	Barium (Ba)-Total	MS-B	L2335592-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Total	MS-B	L2335592-21, -22, -23, -24
Matrix Spike	Barium (Ba)-Total	MS-B	L2335592-2
Matrix Spike	Calcium (Ca)-Total	MS-B	L2335592-25
Matrix Spike	Calcium (Ca)-Total	MS-B	L2335592-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Total	MS-B	L2335592-21, -22, -23, -24
Matrix Spike	Calcium (Ca)-Total	MS-B	L2335592-2
Matrix Spike	Cobalt (Co)-Total	MS-B	L2335592-25
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2335592-25
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2335592-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2335592-21, -22, -23, -24
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2335592-2
Matrix Spike	Manganese (Mn)-Total	MS-B	L2335592-25
Matrix Spike	Molybdenum (Mo)-Total	MS-B	L2335592-25
Matrix Spike	Nickel (Ni)-Total	MS-B	L2335592-25
Matrix Spike	Potassium (K)-Total	MS-B	L2335592-25
Matrix Spike	Sodium (Na)-Total	MS-B	L2335592-25
Matrix Spike	Strontium (Sr)-Total	MS-B	L2335592-25
Matrix Spike	Strontium (Sr)-Total	MS-B	L2335592-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Total	MS-B	L2335592-21, -22, -23, -24
Matrix Spike	Strontium (Sr)-Total	MS-B	L2335592-2
Matrix Spike	Sulfur (S)-Total	MS-B	L2335592-25
Matrix Spike	Uranium (U)-Total	MS-B	L2335592-25
Matrix Spike	Total Nitrogen	MS-B	L2335592-22, -23, -24, -25
Matrix Spike	Ammonia, Total (as N)	MS-B	L2335592-22, -23, -24, -25
Matrix Spike	Orthophosphate-Dissolved (as P)	MS-B	L2335592-18, -19
Matrix Spike	Sulfate (SO4)	MS-B	L2335592-10, -11, -12, -13, -14, -15, -16, -17

## Qualifiers for Individual Parameters Listed:

Qualifier	Description
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Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered

## Reference Information

B	reliable.
CNP	Cyanide test sample appears to have been preserved, but pH was <10 at time of testing. Results may be biased low, particularly for Free CN species.
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DTC	Dissolved concentration exceeds total. Results were confirmed by re-analysis.
HTP	Sample preparation or preservation hold time was exceeded.
LCS-H	Lab Control Sample recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRR	Refer to Report Remarks for issues regarding this analysis
RRV	Reported Result Verified By Repeat Analysis

### Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
<b>ACY-PCT-VA</b>	Water	Acidity by Automatic Titration	APHA 2310 Acidity
This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.			
Samples of industrial wastes, acid mine drainage, or other solutions that contain appreciable amounts of hydrolyzable metal ions such as aluminum, iron, and manganese may require hot peroxide treatment to ensure oxidation and hydrolysis of reduced forms of polyvalent cations. Acidity results may be highly variable if this procedure is not followed. Results in this report for 'Acidity (as CaCO3)' have not been peroxide treated.			
<b>ALK-TITR-VA</b>	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity
This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.			
<b>BR-L-IC-N-VA</b>	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
<b>CARBONS-DOC-VA</b>	Water	Dissolved organic carbon by combustion	APHA 5310B
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.			
<b>CARBONS-TOC-VA</b>	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
<b>CL-IC-N-VA</b>	Water	Chloride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
<b>CN-T-CFA-VA</b>	Water	Total Cyanide in water by CFA	ISO 14403:2002
This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.			
<b>CN-WAD-CFA-VA</b>	Water	Weak Acid Diss. Cyanide in water by CFA	APHA 4500-CN CYANIDE
This analysis is carried out using procedures adapted from APHA Method 4500-CN I. "Weak Acid Dissociable Cyanide". Weak Acid Dissociable (WAD) cyanide is determined by in-line sample distillation with final determination by colourimetric analysis.			
<b>COLOUR-TRUE-VA</b>	Water	Colour (True) by Spectrometer	BCMOE Colour Single Wavelength
This analysis is carried out using procedures adapted from British Columbia Environmental Manual "Colour- Single Wavelength." Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method.			
Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.			
<b>EC-PCT-VA</b>	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.
This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.			
<b>EC-SCREEN-VA</b>	Water	Conductivity Screen (Internal Use Only)	APHA 2510
Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.			
<b>F-IC-N-VA</b>	Water	Fluoride in Water by IC	EPA 300.1 (mod)

## Reference Information

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**HARDNESS-CALC-VA** Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO<sub>3</sub> equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

**HG-D-CVAA-VA** Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

**HG-T-CVAA-VA** Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

**MET-D-CCMS-VA** Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

**MET-T-CCMS-VA** Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

**N-T-COL-VA** Water Total Nitrogen in water by Colour APHA4500-P(J)/NEMI9171/USGS03-4174

This analysis is carried out using procedures adapted from APHA Method 4500-P (J) "Persulphate Method for Simultaneous Determination of Total Nitrogen and Total Phosphorus" and National Environmental Methods Index - Nemi method 5735.

**NH3-F-VA** Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

**NO2-L-IC-N-VA** Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**NO3-L-IC-N-VA** Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**P-T-PRES-COL-VA** Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

**PH-PCT-VA** Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

**PO4-DO-COL-VA** Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

**SO4-IC-N-VA** Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**TDS-VA** Water Total Dissolved Solids by Gravimetric APHA 2540 C - GRAVIMETRIC

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

**TKN-F-VA** Water TKN in Water by Fluorescence APHA 4500-NORG D.

## Reference Information

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

**TSS-VA**                      Water              Total Suspended Solids by Gravimetric                      APHA 2540 D - GRAVIMETRIC

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

**TURBIDITY-VA**                      Water              Turbidity by Meter                      APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

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\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

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*The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:*

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Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

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### Chain of Custody Numbers:

#### GLOSSARY OF REPORT TERMS

*Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.*

*mg/kg - milligrams per kilogram based on dry weight of sample.*

*mg/kg wwt - milligrams per kilogram based on wet weight of sample.*

*mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.*

*mg/L - milligrams per litre.*

*< - Less than.*

*D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).*

*N/A - Result not available. Refer to qualifier code and definition for explanation.*

*Test results reported relate only to the samples as received by the laboratory.*

**UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.**

*Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.*







ALS Environmental

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Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878



L2335592-COFC

COC Number: 15 -

Page 2 of 3

<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>				Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply																													
Company:	ERM CONSULTANTS CANADA	Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input checked="" type="checkbox"/> EDD (DIGITAL)				Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply																													
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Street:	3790 ALFRED AVENUE	Email 1 or Fax WADE.BRUNHAM@ERM.COM				For tests that can not be performed according to the service level selected, you will be contacted.																													
City/Province:	SMITHERS, BC	Email 2 Elizabeth.Boyle@erm.com				<b>Analysis Request</b>																													
Postal Code:	V0J2N0	Email 3 jill.zyla@erm.com				Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below																													
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11	JM12		23-Aug-19	13:45	WATER	R	R	R	R	R	R	R	R							8															
12	JM13		23-Aug-19	14:10	WATER	R	R	R	R	R	R	R	R								8														
13	JM14		23-Aug-19	8:00	WATER	R	R	R	R	R	R	R	R								8														
14	TMF1		23-Aug-19	9:20	WATER	R	R	R	R	R	R	R	R								8														
15	JM26		23-Aug-19	17:40	WATER	R	R	R	R	R	R	R	R								8														
16	SHC5		23-Aug-19	9:45	WATER	R	R	R	R	R	R	R	R								8														
17	SHC1		23-Aug-19	13:20	WATER	R	R	R	R	R	R	R	R								8														
18	SHCR3		22-Aug-19	17:15	WATER	R	R	R	R	R	R	R	R								8														
19	SHC3		23-Aug-19	17:00	WATER	R	R	R	R	R	R	R	R								8														
20	Field Blank		23-Aug-19	10:15	WATER	R	R	R	R	R	R	R	R								8														
21	DUP1		23-Aug-19	10:15	WATER	R	R	R	R	R	R	R	R								8														
22	DUP2		23-Aug-19	12:25	WATER	R	R	R	R	R	R	R	R								8														
<b>Drinking Water (DW) Samples<sup>1</sup> (client use)</b>		<b>Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)</b>				<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>																													
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Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy. 1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

4c/8c/14c/8c/11c/4c/9c/6c/10c/11c


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Report To			Report Format / Distribution				Select Service Level below - Please confirm all E&P TATs with your AM - surcharges will apply																																																																
Contact and company name below will appear on the final report							<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td colspan="6">Regular [R] <input checked="" type="checkbox"/></td> <td colspan="6">Standard TAT if received by 3 pm - business days - no surcharges apply</td> </tr> <tr> <td rowspan="3" style="writing-mode: vertical-rl; transform: rotate(180deg);">PRIORITY (Business Days)</td> <td colspan="3">4 day [P4] <input type="checkbox"/></td> <td colspan="3">3 day [P3] <input type="checkbox"/></td> <td colspan="3">2 day [P2] <input type="checkbox"/></td> <td rowspan="3" style="writing-mode: vertical-rl; transform: rotate(180deg);">EMERGENCY</td> <td colspan="6">1 Business day [E1] <input type="checkbox"/></td> </tr> <tr> <td colspan="12">Same Day, Weekend or Statutory holiday [E0] <input type="checkbox"/></td> </tr> <tr> <td colspan="12">Date and Time Required for all E&amp;P TATs: dd-mm-yy hh:mm</td> </tr> </table>												Regular [R] <input checked="" type="checkbox"/>						Standard TAT if received by 3 pm - business days - no surcharges apply						PRIORITY (Business Days)	4 day [P4] <input type="checkbox"/>			3 day [P3] <input type="checkbox"/>			2 day [P2] <input type="checkbox"/>			EMERGENCY	1 Business day [E1] <input type="checkbox"/>						Same Day, Weekend or Statutory holiday [E0] <input type="checkbox"/>												Date and Time Required for all E&P TATs: dd-mm-yy hh:mm											
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OCTOBER 2015 PR021

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1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

4°C/8°C/14°C/8°C/11°C/4°C/9°C/6°C/10°C/11°C



ERM Consultants Canada Ltd.  
ATTN: Elizabeth Boyle  
1500-1111 West Hastings Street  
Vancouver BC V6E 2J3

Date Received: 01-OCT-19  
Report Date: 18-OCT-19 12:37 (MT)  
Version: FINAL

Client Phone: 604-689-9460

## Certificate of Analysis

Lab Work Order #: L2357754  
Project P.O. #: NOT SUBMITTED  
Job Reference: RES100-SBG100-VA  
C of C Numbers: 17-763276  
Legal Site Desc:

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Amber Springer, B.Sc  
Account Manager

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## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2357754-1	L2357754-2	L2357754-3	L2357754-4	L2357754-5
		Description	Water	Water	Water	Water	Water
		Sampled Date	29-SEP-19	29-SEP-19	29-SEP-19	29-SEP-19	29-SEP-19
		Sampled Time	08:30	09:00	10:50	11:30	11:50
		Client ID	SHC3	SHCR3	JM14	JM6	JM11
Grouping	Analyte						
<b>WATER</b>							
<b>Physical Tests</b>	Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	<5.0	
	Conductivity (uS/cm)	126	134	82.9	95.9	113	
	Hardness (as CaCO3) (mg/L)	56.3	60.7	41.7	45.1	54.1	
	pH (pH)	7.86	7.89	7.74	7.87	7.96	
	Total Suspended Solids (mg/L)	3.3	22.3	<3.0	<3.0	<3.0	
	Total Dissolved Solids (mg/L)	82	82	50	67	73	
	Turbidity (NTU)	1.45	9.93	1.38	1.68	1.86	
<b>Anions and Nutrients</b>	Acidity (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0	
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	43.4	43.4	34.2	38.1	50.0	
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Total (as CaCO3) (mg/L)	43.4	43.4	34.2	38.1	50.0	
	Ammonia, Total (as N) (mg/L)	0.0066	<0.0050	<0.0050	0.0063	<0.0050	
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050	
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50	
	Fluoride (F) (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020	
	Nitrate (as N) (mg/L)	0.102	0.0665	<0.0050	<0.0050	<0.0050	
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Total Kjeldahl Nitrogen (mg/L)	0.070	<0.050	<0.050	<0.050	<0.050	
	Total Nitrogen (mg/L)	0.182	0.105	0.032	0.081	0.035	
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Phosphorus (P)-Total (mg/L)	0.0056	0.0240	0.0024	0.0029	0.0026	
	Sulfate (SO4) (mg/L)	19.8	23.1	8.23	8.20	9.65	
<b>Cyanides</b>	Cyanide, Weak Acid Diss (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	
	Cyanide, Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	
	Cyanide, Free (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	
<b>Organic / Inorganic Carbon</b>	Dissolved Organic Carbon (mg/L)	<0.50	<0.50	0.54	<0.50	<0.50	
	Total Organic Carbon (mg/L)	0.67	<0.50	<0.50	<0.50	<0.50	
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	0.0991	0.621	0.0673	0.0808	0.0886	
	Antimony (Sb)-Total (mg/L)	<0.00010	0.00012	<0.00010	<0.00010	<0.00010	
	Arsenic (As)-Total (mg/L)	0.00012	0.00047	0.00014	<0.00010	0.00013	
	Barium (Ba)-Total (mg/L)	0.0288	0.0603	0.0341	0.0403	0.0501	
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010	
	Cadmium (Cd)-Total (mg/L)	0.000107	0.0000526	0.0000913	0.0000578	0.0000722	

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2357754-6	L2357754-7	L2357754-8	L2357754-9	L2357754-10
		Description	Water	Water	Water	Water	Water
		Sampled Date	29-SEP-19	29-SEP-19	29-SEP-19	29-SEP-19	29-SEP-19
		Sampled Time	12:10	12:40	14:00	14:50	15:20
		Client ID	JM5	TMF1	JM26	SHC5	JM7
Grouping	Analyte						
<b>WATER</b>							
<b>Physical Tests</b>	Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	<5.0	
	Conductivity (uS/cm)	65.9	63.8	99.6	171	179	
	Hardness (as CaCO3) (mg/L)	27.8	27.1	47.1	83.7	83.9	
	pH (pH)	7.23	7.29	7.90	8.14	7.98	
	Total Suspended Solids (mg/L)	<3.0	9.0	7.2	3.2	7.4	
	Total Dissolved Solids (mg/L)	50	45	70	106	114	
	Turbidity (NTU)	2.08	3.59	3.40	0.49	1.76	
<b>Anions and Nutrients</b>	Acidity (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0	
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	12.0	10.1	42.8	46.9	37.2	
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Total (as CaCO3) (mg/L)	12.0	10.1	42.8	46.9	37.2	
	Ammonia, Total (as N) (mg/L)	<0.0050	0.0067	<0.0050	<0.0050	0.0128	
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050	
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50	
	Fluoride (F) (mg/L)	<0.020	<0.020	<0.020	<0.020	0.021	
	Nitrate (as N) (mg/L)	<0.0050	<0.0050	0.0076	<0.0050	0.0245	
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Total Kjeldahl Nitrogen (mg/L)	0.055	0.086	<0.050	<0.050	0.107	
	Total Nitrogen (mg/L)	0.10	0.106	0.031	0.035	0.150	
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Phosphorus (P)-Total (mg/L)	0.0049	0.0061	0.0097	0.0022	0.0075	
	Sulfate (SO4) (mg/L)	18.2	17.6	10.1	16.4	36.1	
<b>Cyanides</b>	Cyanide, Weak Acid Diss (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	
	Cyanide, Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	
	Cyanide, Free (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	
<b>Organic / Inorganic Carbon</b>	Dissolved Organic Carbon (mg/L)	1.34	1.39	<0.50	0.51	0.54	
	Total Organic Carbon (mg/L)	1.17	1.04	<0.50	<0.50	0.59	
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	0.114	0.0830	0.246	0.0591	0.186	
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
	Arsenic (As)-Total (mg/L)	0.00027	0.00024	0.00020	0.00031	0.00021	
	Barium (Ba)-Total (mg/L)	0.0129	0.0119	0.0532	0.0507	0.0376	
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010	
	Cadmium (Cd)-Total (mg/L)	0.0000578	0.0000494	0.000140	0.0000207	0.000225	

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2357754-11	L2357754-12	L2357754-13	L2357754-14
		Description	Water	Water	Water	Water
		Sampled Date	29-SEP-19	29-SEP-19	29-SEP-19	29-SEP-19
		Sampled Time	15:30	15:40		
		Client ID	JM13	JM3	DUP1	TRAVEL BLANK
Grouping	Analyte					
<b>WATER</b>						
<b>Physical Tests</b>	Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	<5.0
	Conductivity (uS/cm)	248	319	66.0	<2.0	<2.0
	Hardness (as CaCO3) (mg/L)	119	158	27.4		
	pH (pH)	8.08	8.17	7.25	5.43	5.43
	Total Suspended Solids (mg/L)	3.2	4.0	<3.0	<3.0	<3.0
	Total Dissolved Solids (mg/L)	161	213	49	<10	<10
	Turbidity (NTU)	1.26	1.38	1.83	<0.10	<0.10
<b>Anions and Nutrients</b>	Acidity (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	73.0	58.0	9.6	<1.0	<1.0
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	73.0	58.0	9.6	<1.0	<1.0
	Ammonia, Total (as N) (mg/L)	0.0371	0.0698	0.0095	<0.0050	<0.0050
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	0.028	0.033	<0.020	<0.020	<0.020
	Nitrate (as N) (mg/L)	0.0393	0.0284	<0.0050	<0.0050	<0.0050
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	0.262	0.662	0.071	<0.050	<0.050
	Total Nitrogen (mg/L)	0.343	0.567	0.100	<0.030	<0.030
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total (mg/L)	<0.0020	<0.0020	0.0050	<0.0020	<0.0020
	Sulfate (SO4) (mg/L)	50.9	72.9	18.3	<0.30	<0.30
<b>Cyanides</b>	Cyanide, Weak Acid Diss (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Cyanide, Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Cyanide, Free (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
<b>Organic / Inorganic Carbon</b>	Dissolved Organic Carbon (mg/L)	0.68	0.53	1.21	<0.50	<0.50
	Total Organic Carbon (mg/L)	<0.50	<0.50	1.20	<0.50	<0.50
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	0.102	0.133	0.0720	<0.0030	<0.0030
	Antimony (Sb)-Total (mg/L)	<0.00010	0.00014	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00020	0.00032	0.00022	<0.00010	<0.00010
	Barium (Ba)-Total (mg/L)	0.0346	0.0352	0.0122	<0.00010	<0.00010
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	0.000304	0.000484	0.0000414	<0.000050	<0.000050

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2357754-1	L2357754-2	L2357754-3	L2357754-4	L2357754-5
		Description	Water	Water	Water	Water	Water
		Sampled Date	29-SEP-19	29-SEP-19	29-SEP-19	29-SEP-19	29-SEP-19
		Sampled Time	08:30	09:00	10:50	11:30	11:50
		Client ID	SHC3	SHCR3	JM14	JM6	JM11
Grouping	Analyte						
<b>WATER</b>							
<b>Total Metals</b>	Calcium (Ca)-Total (mg/L)		20.0	21.1	14.5	16.0	18.8
	Chromium (Cr)-Total (mg/L)		<0.00010	0.00017	0.00011	<0.00010	0.00014
	Cobalt (Co)-Total (mg/L)		0.00015	0.00022	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Total (mg/L)		0.0151	0.00073	0.00085	0.00089	0.00054
	Iron (Fe)-Total (mg/L)		0.133	0.518	0.063	0.071	0.079
	Lead (Pb)-Total (mg/L)		0.000437	0.00246	0.000322	0.000410	0.000437
	Lithium (Li)-Total (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Total (mg/L)		1.71	1.78	1.07	1.20	1.35
	Manganese (Mn)-Total (mg/L)		0.0478	0.0444	0.00633	0.00706	0.00633
	Mercury (Hg)-Total (mg/L)		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)		0.000339	0.000740	0.000199	0.000216	0.000251
	Nickel (Ni)-Total (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Total (mg/L)		<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Total (mg/L)		1.28	1.40	0.875	0.997	1.18
	Selenium (Se)-Total (mg/L)		0.000104	0.000140	0.000089	0.000082	0.000118
	Silicon (Si)-Total (mg/L)		2.09	2.16	1.39	1.40	1.18
	Silver (Ag)-Total (mg/L)		<0.000010	0.000012	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)		<2.0	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Total (mg/L)		0.132	0.183	0.101	0.111	0.126
	Sulfur (S)-Total (mg/L)		6.80	7.40	2.75	2.70	3.03
	Thallium (Tl)-Total (mg/L)		<0.000010	0.000018	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Total (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)		<0.010	0.026	<0.010	<0.010	<0.010
	Uranium (U)-Total (mg/L)		0.000130	0.000367	0.000103	0.000126	0.000166
	Vanadium (V)-Total (mg/L)		<0.00050	0.00129	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Total (mg/L)		0.0092	0.0064	0.0108	0.0069	0.0072
<b>Dissolved Metals</b>	Dissolved Mercury Filtration Location		LAB	LAB	LAB	LAB	LAB
	Dissolved Metals Filtration Location		LAB	LAB	LAB	LAB	LAB
	Aluminum (Al)-Dissolved (mg/L)		0.0220	0.0107	0.0115	0.0119	0.0104
	Antimony (Sb)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)		<0.00010	0.00031	0.00011	<0.00010	<0.00010
	Barium (Ba)-Dissolved (mg/L)		0.0279	0.0487	0.0361	0.0410	0.0497
	Beryllium (Be)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Dissolved (mg/L)		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)		<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)		0.0000855	0.0000105	0.0000817	0.0000467	0.0000521
	Calcium (Ca)-Dissolved (mg/L)		19.8	21.5	14.9	16.1	19.4

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2357754-6	L2357754-7	L2357754-8	L2357754-9	L2357754-10
		Description	Water	Water	Water	Water	Water
		Sampled Date	29-SEP-19	29-SEP-19	29-SEP-19	29-SEP-19	29-SEP-19
		Sampled Time	12:10	12:40	14:00	14:50	15:20
		Client ID	JM5	TMF1	JM26	SHC5	JM7
Grouping	Analyte						
<b>WATER</b>							
<b>Total Metals</b>	Calcium (Ca)-Total (mg/L)		9.26	8.95	16.4	28.7	28.8
	Chromium (Cr)-Total (mg/L)		0.00019	0.00016	0.00012	0.00015	0.00011
	Cobalt (Co)-Total (mg/L)		<0.00010	<0.00010	0.00012	<0.00010	0.00044
	Copper (Cu)-Total (mg/L)		0.00459	0.00270	0.00139	<0.00050	0.0476
	Iron (Fe)-Total (mg/L)		0.143	0.113	0.265	0.092	0.260
	Lead (Pb)-Total (mg/L)		0.000469	0.000394	0.00154	0.000171	0.000932
	Lithium (Li)-Total (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Total (mg/L)		1.00	0.916	1.40	2.70	2.74
	Manganese (Mn)-Total (mg/L)		0.0354	0.0341	0.0238	0.00484	0.138
	Mercury (Hg)-Total (mg/L)		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)		0.000054	<0.000050	0.000296	0.000488	0.000357
	Nickel (Ni)-Total (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Total (mg/L)		<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Total (mg/L)		0.768	0.683	1.22	1.81	1.55
	Selenium (Se)-Total (mg/L)		0.000073	0.000070	0.000121	0.000194	0.000163
	Silicon (Si)-Total (mg/L)		0.32	0.26	1.45	1.26	1.84
	Silver (Ag)-Total (mg/L)		0.000014	0.000013	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)		<2.0	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Total (mg/L)		0.0428	0.0404	0.123	0.202	0.211
	Sulfur (S)-Total (mg/L)		6.11	5.91	3.26	5.36	11.9
	Thallium (Tl)-Total (mg/L)		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Total (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)		<0.010	<0.010	0.015	<0.010	<0.010
	Uranium (U)-Total (mg/L)		<0.000010	<0.000010	0.000197	0.000153	0.000275
	Vanadium (V)-Total (mg/L)		<0.00050	<0.00050	0.00073	0.00051	<0.00050
	Zinc (Zn)-Total (mg/L)		0.0058	0.0045	0.0190	<0.0030	0.0197
<b>Dissolved Metals</b>	Dissolved Mercury Filtration Location		LAB	LAB	LAB	LAB	LAB
	Dissolved Metals Filtration Location		LAB	LAB	LAB	LAB	LAB
	Aluminum (Al)-Dissolved (mg/L)		0.0068	0.0076	0.0141	0.0034	0.0397
	Antimony (Sb)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)		<0.00010	0.00012	0.00011	0.00020	<0.00010
	Barium (Ba)-Dissolved (mg/L)		0.0115	0.0113	0.0502	0.0538	0.0374
	Beryllium (Be)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Dissolved (mg/L)		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)		<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)		0.0000296	0.0000397	0.0000865	0.0000111	0.000198
	Calcium (Ca)-Dissolved (mg/L)		9.52	9.26	16.6	28.9	28.9

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.



## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2357754-11	L2357754-12	L2357754-13	L2357754-14
		Description	Water	Water	Water	Water
		Sampled Date	29-SEP-19	29-SEP-19	29-SEP-19	29-SEP-19
		Sampled Time	15:30	15:40		
		Client ID	JM13	JM3	DUP1	TRAVEL BLANK
Grouping	Analyte					
<b>WATER</b>						
<b>Total Metals</b>	Calcium (Ca)-Total (mg/L)		41.5	53.3	9.32	<0.050
	Chromium (Cr)-Total (mg/L)		0.00012	0.00012	0.00015	<0.00010
	Cobalt (Co)-Total (mg/L)		0.00058	0.00097	<0.00010	<0.00010
	Copper (Cu)-Total (mg/L)		0.102	0.193	0.00307	<0.00050
	Iron (Fe)-Total (mg/L)		0.411	0.777	0.085	<0.030
	Lead (Pb)-Total (mg/L)		0.000431	0.000585	0.000272	<0.000050
	Lithium (Li)-Total (mg/L)		0.0012	0.0018	<0.0010	<0.0010
	Magnesium (Mg)-Total (mg/L)		4.33	6.86	0.975	<0.0050
	Manganese (Mn)-Total (mg/L)		0.250	0.347	0.0228	<0.00010
	Mercury (Hg)-Total (mg/L)		<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)		0.000290	0.000340	<0.000050	<0.000050
	Nickel (Ni)-Total (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Total (mg/L)		<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Total (mg/L)		1.86	2.00	0.725	<0.050
	Selenium (Se)-Total (mg/L)		0.000194	0.000198	0.000052	<0.000050
	Silicon (Si)-Total (mg/L)		2.05	2.15	0.26	<0.10
	Silver (Ag)-Total (mg/L)		<0.000010	<0.000010	0.000012	<0.000010
	Sodium (Na)-Total (mg/L)		<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Total (mg/L)		0.352	0.570	0.0444	<0.00020
	Sulfur (S)-Total (mg/L)		17.8	25.1	6.24	<0.50
	Thallium (Tl)-Total (mg/L)		<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Total (mg/L)		0.00201	0.00011	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)		<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Total (mg/L)		0.000451	0.000859	<0.000010	<0.000010
	Vanadium (V)-Total (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Total (mg/L)		0.0349	0.0565	0.0060	<0.0030
<b>Dissolved Metals</b>	Dissolved Mercury Filtration Location		LAB	LAB	LAB	
	Dissolved Metals Filtration Location		LAB	LAB	LAB	
	Aluminum (Al)-Dissolved (mg/L)		0.0352	0.0404	0.0072	
	Antimony (Sb)-Dissolved (mg/L)		0.00011	0.00016	<0.00010	
	Arsenic (As)-Dissolved (mg/L)		<0.00010	0.00011	<0.00010	
	Barium (Ba)-Dissolved (mg/L)		0.0358	0.0356	0.0116	
	Beryllium (Be)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	
	Bismuth (Bi)-Dissolved (mg/L)		<0.000050	<0.000050	<0.000050	
	Boron (B)-Dissolved (mg/L)		<0.010	<0.010	<0.010	
	Cadmium (Cd)-Dissolved (mg/L)		0.000257	0.000387	0.0000293	
	Calcium (Ca)-Dissolved (mg/L)		40.5	51.3	9.36	

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID	L2357754-1 Water 29-SEP-19 08:30 SHC3	L2357754-2 Water 29-SEP-19 09:00 SHCR3	L2357754-3 Water 29-SEP-19 10:50 JM14	L2357754-4 Water 29-SEP-19 11:30 JM6	L2357754-5 Water 29-SEP-19 11:50 JM11	
Grouping	Analyte					
<b>WATER</b>						
<b>Dissolved Metals</b>	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Dissolved (mg/L)	0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Dissolved (mg/L)	0.00689	<0.00050	<0.00050	<0.00050	<0.00050
	Iron (Fe)-Dissolved (mg/L)	<0.030	<0.030	<0.030	<0.030	<0.030
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Dissolved (mg/L)	1.69	1.70	1.12	1.18	1.38
	Manganese (Mn)-Dissolved (mg/L)	0.0341	0.00244	0.00287	0.00261	0.00158
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000343	0.000741	0.000189	0.000205	0.000259
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)	1.25	1.22	0.904	0.960	1.20
	Selenium (Se)-Dissolved (mg/L)	0.000088	0.000143	0.000085	0.000107	0.000117
	Silicon (Si)-Dissolved (mg/L)	2.03	1.36	1.36	1.27	1.07
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Dissolved (mg/L)	0.124	0.183	0.0987	0.103	0.127
	Sulfur (S)-Dissolved (mg/L)	6.66	7.78	2.51	2.53	3.22
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	0.000104	0.000334	0.000100	0.000120	0.000163
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	0.0068	<0.0010	0.0065	0.0015	0.0012

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	Description	Sampled Date	Sampled Time	Client ID	L2357754-6	L2357754-7	L2357754-8	L2357754-9	L2357754-10
					Water	Water	Water	Water	Water
		29-SEP-19	12:10	JM5	29-SEP-19	12:40	29-SEP-19	14:00	29-SEP-19
					JM5	TMF1	JM26	SHC5	JM7
Grouping	Analyte								
<b>WATER</b>									
<b>Dissolved Metals</b>	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00038
	Copper (Cu)-Dissolved (mg/L)	0.00150	0.00103	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.0151
	Iron (Fe)-Dissolved (mg/L)	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Dissolved (mg/L)	0.977	0.955	1.38	2.80	2.85			
	Manganese (Mn)-Dissolved (mg/L)	0.00206	0.00509	0.00320	0.00017	0.126			
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000052	0.000054	0.000298	0.000516	0.000367			
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)	0.730	0.711	1.14	1.90	1.55			
	Selenium (Se)-Dissolved (mg/L)	0.000062	<0.000050	0.000151	0.000223	0.000151			
	Silicon (Si)-Dissolved (mg/L)	0.153	0.149	1.11	1.19	1.69			
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Dissolved (mg/L)	0.0410	0.0399	0.121	0.199	0.213			
	Sulfur (S)-Dissolved (mg/L)	6.07	5.92	3.18	5.65	12.5			
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	<0.000010	<0.000010	0.000175	0.000151	0.000193			
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	0.0022	0.0016	0.0019	<0.0010	0.0147			

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2357754-11	L2357754-12	L2357754-13	L2357754-14	
Description	Water	Water	Water	Water	
Sampled Date	29-SEP-19	29-SEP-19	29-SEP-19	29-SEP-19	
Sampled Time	15:30	15:40			
Client ID	JM13	JM3	DUP1	TRAVEL BLANK	
Grouping	Analyte				
<b>WATER</b>					
<b>Dissolved Metals</b>	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	
	Cobalt (Co)-Dissolved (mg/L)	0.00058	0.00090	<0.00010	
	Copper (Cu)-Dissolved (mg/L)	0.0244	0.0372	0.00151	
	Iron (Fe)-Dissolved (mg/L)	<0.030	<0.030	<0.030	
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	
	Lithium (Li)-Dissolved (mg/L)	0.0011	0.0018	<0.0010	
	Magnesium (Mg)-Dissolved (mg/L)	4.39	7.34	0.979	
	Manganese (Mn)-Dissolved (mg/L)	0.240	0.337	0.00227	
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	
	Molybdenum (Mo)-Dissolved (mg/L)	0.000287	0.000347	<0.000050	
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	
	Potassium (K)-Dissolved (mg/L)	1.91	2.08	0.720	
	Selenium (Se)-Dissolved (mg/L)	0.000178	0.000212	0.000050	
	Silicon (Si)-Dissolved (mg/L)	2.01	2.09	0.142	
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0	
	Strontium (Sr)-Dissolved (mg/L)	0.339	0.547	0.0406	
	Sulfur (S)-Dissolved (mg/L)	17.4	25.5	5.70	
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	
	Uranium (U)-Dissolved (mg/L)	0.000405	0.000748	<0.000010	
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	
	Zinc (Zn)-Dissolved (mg/L)	0.0235	0.0370	0.0022	

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## Reference Information

### QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Laboratory Control Sample	Conductivity	LCS-H	L2357754-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Dissolved Organic Carbon	MS-B	L2357754-10, -11, -12, -13, -14, -8, -9
Matrix Spike	Total Organic Carbon	MS-B	L2357754-10
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2357754-1, -10, -11, -12, -13, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2357754-1, -10, -11, -12, -13, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2357754-1, -10, -11, -12, -13, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2357754-1, -10, -11, -12, -13, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Total	MS-B	L2357754-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Total	MS-B	L2357754-2
Matrix Spike	Calcium (Ca)-Total	MS-B	L2357754-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Total	MS-B	L2357754-2
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2357754-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2357754-2
Matrix Spike	Manganese (Mn)-Total	MS-B	L2357754-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Manganese (Mn)-Total	MS-B	L2357754-2
Matrix Spike	Molybdenum (Mo)-Total	MS-B	L2357754-2
Matrix Spike	Nickel (Ni)-Total	MS-B	L2357754-2
Matrix Spike	Potassium (K)-Total	MS-B	L2357754-2
Matrix Spike	Sodium (Na)-Total	MS-B	L2357754-2
Matrix Spike	Strontium (Sr)-Total	MS-B	L2357754-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Total	MS-B	L2357754-2
Matrix Spike	Sulfur (S)-Total	MS-B	L2357754-2
Matrix Spike	Uranium (U)-Total	MS-B	L2357754-2
Matrix Spike	Phosphorus (P)-Total	MS-B	L2357754-10, -11, -12, -8, -9
Matrix Spike	Phosphorus (P)-Total	MS-B	L2357754-1, -2, -3, -4, -5, -6, -7

### Qualifiers for Individual Parameters Listed:

Qualifier	Description
LCS-H	Lab Control Sample recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

### Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
<b>ACY-PCT-VA</b>	Water	Acidity by Automatic Titration	APHA 2310 Acidity
This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.			
Samples of industrial wastes, acid mine drainage, or other solutions that contain appreciable amounts of hydrolyzable metal ions such as aluminum, iron, and manganese may require hot peroxide treatment to ensure oxidation and hydrolysis of reduced forms of polyvalent cations. Acidity results may be highly variable if this procedure is not followed. Results in this report for 'Acidity (as CaCO3)' have not been peroxide treated.			
<b>ALK-TITR-VA</b>	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity
This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.			
<b>BR-L-IC-N-VA</b>	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
<b>CARBONS-DOC-VA</b>	Water	Dissolved organic carbon by combustion	APHA 5310B
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.			
<b>CARBONS-TOC-VA</b>	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

## Reference Information

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

**CL-IC-N-VA** Water Chloride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**CN-FREE-CFA-WT** Water Free Cyanide in water by CFA ASTM 7237

This analysis is carried out using procedures adapted from ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.

**CN-TOT-WT** Water Cyanide, Total ISO 14403-2

Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference

**CN-WAD-WT** Water Cyanide, Weak Acid Diss APHA 4500CN I-Weak acid Dist Colorimet

Weak acid dissociable cyanide (WAD) is determined by undergoing a distillation procedure. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

**COLOUR-TRUE-VA** Water Colour (True) by Spectrometer BCMOE Colour Single Wavelength

This analysis is carried out using procedures adapted from British Columbia Environmental Manual "Colour- Single Wavelength." Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method.

Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.

**EC-PCT-VA** Water Conductivity (Automated) APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

**EC-SCREEN-VA** Water Conductivity Screen (Internal Use Only) APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

**F-IC-N-VA** Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**HARDNESS-CALC-VA** Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO<sub>3</sub> equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

**HG-D-CVAA-VA** Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

**HG-T-CVAA-VA** Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

**MET-D-CCMS-VA** Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

**MET-T-CCMS-VA** Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

**N-T-COL-VA** Water Total Nitrogen in water by Colour APHA4500-P(J)/NEMI9171/USGS03-4174

This analysis is carried out using procedures adapted from APHA Method 4500-P (J) "Persulphate Method for Simultaneous Determination of Total Nitrogen and Total Phosphorus" and National Environmental Methods Index - Nemi method 5735.

**NH3-F-VA** Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

**NO2-L-IC-N-VA** Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

## Reference Information

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**NO3-L-IC-N-VA** Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**P-T-PRES-COL-VA** Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

**PH-PCT-VA** Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

**PO4-DO-COL-VA** Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

**SO4-IC-N-VA** Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**TDS-VA** Water Total Dissolved Solids by Gravimetric APHA 2540 C - GRAVIMETRIC

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

**TKN-F-VA** Water TKN in Water by Fluorescence APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

**TSS-VA** Water Total Suspended Solids by Gravimetric APHA 2540 D - GRAVIMETRIC

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.

Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

**TURBIDITY-VA** Water Turbidity by Meter APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

*The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:*

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

### Chain of Custody Numbers:

17-763276

## Reference Information

### GLOSSARY OF REPORT TERMS

*Surrogate* - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

*mg/kg* - milligrams per kilogram based on dry weight of sample.

*mg/kg wwt* - milligrams per kilogram based on wet weight of sample.

*mg/kg lwt* - milligrams per kilogram based on lipid-adjusted weight of sample.

*mg/L* - milligrams per litre.

*<* - Less than.

*D.L.* - The reported Detection Limit, also known as the Limit of Reporting (LOR).

*N/A* - Result not available. Refer to qualifier code and definition for explanation.

*Test results reported relate only to the samples as received by the laboratory.*

**UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.**

*Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.*





Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com



L2357754-COFC

COC Number: 17 - 763276

Page 1 of 2

<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>			Low - Contact your AM to confirm all E&P TATs (surcharges may apply)						
Company:	ERM Consultants Canada	Select Report Format:	<input type="checkbox"/> PDF <input type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)	<b>Regular [R]</b>		Standard TAT if received by 3 pm - business days - no surcharges apply					
Contact:		Quality Control (QC) Report with Report	<input type="checkbox"/> YES <input type="checkbox"/> NO	<b>4 day [P4-20%]</b>	<input type="checkbox"/>	<b>1 Business day [E - 100%]</b>					
Phone:		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked		<b>3 day [P3-25%]</b>	<input type="checkbox"/>	<b>Same Day, Weekend or Statutory holiday [E2 -200%]</b>					
Company address below will appear on the final report		Select Distribution:	<input type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX	<b>2 day [P2-50%]</b>	<input type="checkbox"/>	<b>(Laboratory opening fees may apply)</b>					
Street:		Email 1 or Fax		<b>Date and Time Required for all E&amp;P TATs:</b>		dd-mmm-yy hh:mm					
City/Province:		Email 2		For tests that can not be performed according to the service level selected, you will be contacted.							
Postal Code:		Email 3		<b>Analysis Request</b>							
<b>Invoice To</b>	Same as Report To <input type="checkbox"/> YES <input type="checkbox"/> NO	<b>Invoice Distribution</b>			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below						
	Copy of Invoice with Report <input type="checkbox"/> YES <input type="checkbox"/> NO	Select Invoice Distribution:	<input type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX	<b>NUMBER OF CONTAINERS</b> As Per Q 74326					<b>SAMPLES ON HOLD</b>		
Company:		Email 1 or Fax									
Contact:		Email 2									
<b>Project Information</b>		<b>Oil and Gas Required Fields (client use)</b>									
ALS Account # / Quote #:	Q 74326	AFE/Cost Center:	PO#								
Job #:		Major/Minor Code:	Routing Code:								
PO / AFE:		Requisitioner:									
LSD:		Location:									
ALS Lab Work Order # (lab use only):		ALS Contact:	A. Springer							Sampler:	K. Hort
<b>ALS Sample # (lab use only)</b>	<b>Sample Identification and/or Coordinates (This description will appear on the report)</b>	<b>Date (dd-mmm-yy)</b>	<b>Time (hh:mm)</b>							<b>Sample Type</b>	
	SHC3	29-09-19	08:30	Water	8						
	SHCR3		09:00		8						
	JM14		10:50		8						
	JM6		11:30		8						
	JM11		11:50		8						
	JM5		12:10		8						
	TMF1		12:40		8						
	JM26		14:00		8						
	SHC5		14:50		8						
	JM7		15:20		8						
	JM13		15:30		8						
	JM3	29-09-19	15:40	Water	8						
<b>Drinking Water (DW) Samples (client use)</b>		<b>Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)</b>			<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>						
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO					Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>						
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO					Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>						
					Cooling Initiated <input type="checkbox"/>						
					INITIAL COOLER TEMPERATURES °C		FINAL COOLER TEMPERATURES °C				
							3				
<b>SHIPMENT RELEASE (client use)</b>			<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>			<b>FINAL SHIPMENT RECEPTION (lab use only)</b>					
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:			
Kimberley Hort	Sep 30, 2019	08:00				CW	Oct 1	2045			

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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JUNE 2018 FRONT

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.



Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878



L2357754-COFC

COC Number: 17-763277

Page 2 of 2

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<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b> Select Report Format: <input type="checkbox"/> PDF <input type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)			<b>Priority</b> Regular [R] <input type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply					
Company: <u>ERM Consultants Canada</u>		Quality Control (QC) Report with Report <input type="checkbox"/> YES <input type="checkbox"/> NO			<b>Priority (Business Days)</b>		<b>EMERGENCY</b>			
Contact:		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked			4 day [P4-20%] <input type="checkbox"/>		1 Business day [E - 100%] <input type="checkbox"/>			
Phone:		Select Distribution: <input type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			3 day [P3-25%] <input type="checkbox"/>		Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] <input type="checkbox"/>			
Company address below will appear on the final report		Email 1 or Fax			Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm					
Street:		Email 2			For tests that cannot be performed according to the service level selected, you will be contacted.					
City/Province:		Email 3			<b>Analysis Request</b>					
Postal Code:					Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below					
<b>Invoice To</b>		<b>Invoice Distribution</b>			<b>NUMBER OF CONTAINERS</b> As per Q 74326					
Same as Report To <input type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution: <input type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX								
Copy of Invoice with Report <input type="checkbox"/> YES <input type="checkbox"/> NO		Email 1 or Fax								
Company:		Email 2								
Contact:										
<b>Project Information</b>		<b>Oil and Gas Required Fields (client use)</b>								
ALS Account # / Quote #: <u>Q 74326</u>		AFE/Cost Center: PO#								
Job #:		Major/Minor Code: Routing Code:								
PO / AFE:		Requisitioner:								
LSD:		Location:								
ALS Lab Work Order # (lab use only):		ALS Contact: <u>A. Springer</u> Sampler: <u>K. Hort.</u>			<b>SAMPLES ON HOLD</b> SUSPECTED HAZARD (see Special Instructions)					
<b>ALS Sample # (lab use only)</b>		<b>Sample Identification and/or Coordinates</b> (This description will appear on the report)		<b>Date</b> (dd-mmm-yy)					<b>Time</b> (hh:mm)	<b>Sample Type</b>
<u>DUP1</u>		<u>Travel Blank</u>		<u>29-09-19</u>					<u>---</u>	<u>Water</u>
				<u>29-09-19</u>					<u>---</u>	<u>Water</u>
<b>Drinking Water (DW) Samples<sup>1</sup> (client use)</b>		<b>Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below</b> (electronic COC only)			<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>					
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO					Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>					
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO					Ice Packs <input type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>					
					Cooling Initiated <input type="checkbox"/>					
					INITIAL COOLER TEMPERATURES °C					
					FINAL COOLER TEMPERATURES °C					
<b>SHIPMENT RELEASE (client use)</b>		<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>			<b>FINAL SHIPMENT RECEPTION (lab use only)</b>					
Released by: <u>Kimberley Hort</u>		Received by:			Received by:					
Date: <u>Sep 30, 2019</u>		Date:			Date:					
Time: <u>08:00</u>		Time:			Time:					

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - LABORATORY COPY YELLOW - CLIENT COPY JUNE 2018 FRONT

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.



ERM Consultants Canada Ltd.  
ATTN: Elizabeth Boyle  
1500-1111 West Hastings Street  
Vancouver BC V6E 2J3

Date Received: 03-OCT-19  
Report Date: 17-OCT-19 12:26 (MT)  
Version: FINAL

Client Phone: 604-689-9460

## Certificate of Analysis

Lab Work Order #: L2359242  
Project P.O. #: NOT SUBMITTED  
Job Reference: 0492759-0004  
C of C Numbers: 17-763278  
Legal Site Desc:

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Amber Springer, B.Sc  
Account Manager

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ADDRESS: 8081 Lougheed Hwy, Suite 100, Burnaby, BC V5A 1W9 Canada | Phone: +1 604 253 4188 | Fax: +1 604 253 6700  
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## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2359242-1	L2359242-2	L2359242-3	L2359242-4	L2359242-5
		Description	Water	Water	Water	Water	Water
		Sampled Date	30-SEP-19	30-SEP-19	30-SEP-19	30-SEP-19	30-SEP-19
		Sampled Time	09:14	08:50	08:40	09:40	08:30
		Client ID	JM10	JM1-SEEPAGE	JM1	JM2	JM1-ALT
Grouping	Analyte						
<b>WATER</b>							
<b>Physical Tests</b>	Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
	Conductivity (uS/cm)	138	259	122	741	333	
	Hardness (as CaCO3) (mg/L)	61.6	129	57.1	353	165	
	pH (pH)	7.91	8.00	7.90	4.78	7.97	
	Total Suspended Solids (mg/L)	6.0	<3.0	<3.0	23.3	9.1	
	Total Dissolved Solids (mg/L)	97	183	83	618	222	
	Turbidity (NTU)	2.13	0.37	<0.10	15.3	9.77	
<b>Anions and Nutrients</b>	Acidity (as CaCO3) (mg/L)	2.1	<2.0	<2.0	32.5	2.3	
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	46.5	79.3	45.9	<1.0	77.8	
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Total (as CaCO3) (mg/L)	46.5	79.3	45.9	<1.0	77.8	
	Ammonia, Total (as N) (mg/L)	0.0152	<0.0050	<0.0050	0.0124	<0.0050	
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.25 <sup>DLDS</sup>	<0.050	
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<2.5 <sup>DLDS</sup>	<0.50	
	Fluoride (F) (mg/L)	<0.020	0.021	<0.020	0.12	0.051	
	Nitrate (as N) (mg/L)	0.0343	0.0297	<0.0050	0.136 <sup>DLDS</sup>	<0.0050	
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0050 <sup>TKNI</sup>	<0.0010	
	Total Kjeldahl Nitrogen (mg/L)	0.068	<0.050	<0.050	<0.050	<0.050	
	Total Nitrogen (mg/L)	0.081	0.067	0.035	0.151	0.032	
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	0.0020	<0.0010 <sup>DLM</sup>	<0.0010	
	Phosphorus (P)-Total (mg/L)	0.0076	0.0031	0.0031	<0.0050	0.0150	
Sulfate (SO4) (mg/L)	21.5	51.9	15.1	396	95.7		
<b>Cyanides</b>	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
	Cyanide, Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
	Cyanide, Free (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
<b>Organic / Inorganic Carbon</b>	Dissolved Organic Carbon (mg/L)	<0.50	<0.50	<0.50	1.54	<0.50	
	Total Organic Carbon (mg/L)	<0.50	<0.50	1.75	1.36	<0.50	
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	0.0913	0.0143	0.0128	8.90	0.381	
	Antimony (Sb)-Total (mg/L)	<0.00010	0.00011	<0.00010	<0.00010	0.00012	
	Arsenic (As)-Total (mg/L)	0.00029	0.00010	0.00012	0.00065	0.00122	
	Barium (Ba)-Total (mg/L)	0.0526	0.0501	0.0251	0.0273	0.0247	
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	0.00072	<0.00010	
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010	
	Cadmium (Cd)-Total (mg/L)	0.0000179	0.0000311	0.0000620	0.00769	0.00687	

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2359242-6	L2359242-7	L2359242-8	L2359242-9	L2359242-10
		Description	Water	Water	Water	Water	Water
		Sampled Date	30-SEP-19	30-SEP-19	30-SEP-19	30-SEP-19	30-SEP-19
		Sampled Time	10:00	10:30	10:40	11:10	
		Client ID	JM2-SEEPAGE	JM4	SHC1	JM12	DUP2
Grouping	Analyte						
<b>WATER</b>							
<b>Physical Tests</b>	Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
	Conductivity (uS/cm)	725	337	156	425	153	
	Hardness (as CaCO3) (mg/L)	356	157	69.2	196	68.1	
	pH (pH)	5.00	7.70	7.88	7.81	7.91	
	Total Suspended Solids (mg/L)	23.9	<3.0	4.7	3.5	3.7	
	Total Dissolved Solids (mg/L)	622	245	94	311	95	
	Turbidity (NTU)	17.2	3.38	3.21	4.94	1.91	
<b>Anions and Nutrients</b>	Acidity (as CaCO3) (mg/L)	19.1	2.5	<2.0	2.3	<2.0	
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	<1.0	38.0	46.2	46.5	45.8	
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Total (as CaCO3) (mg/L)	<1.0	38.0	46.2	46.5	45.8	
	Ammonia, Total (as N) (mg/L)	0.0126	<0.0050	<0.0050	<0.0050	<0.0050	
	Bromide (Br) (mg/L)	<0.25 <sup>DLDS</sup>	<0.050	<0.050	<0.050	<0.050	
	Chloride (Cl) (mg/L)	<2.5 <sup>DLDS</sup>	<0.50	<0.50	<0.50	<0.50	
	Fluoride (F) (mg/L)	<0.10 <sup>DLDS</sup>	0.037	<0.020	0.039	<0.020	
	Nitrate (as N) (mg/L)	0.141	0.209	0.0210	0.137	0.0208	
	Nitrite (as N) (mg/L)	<0.0050 <sup>DLDS</sup>	0.0013	<0.0010	<0.0010	<0.0010	
	Total Kjeldahl Nitrogen (mg/L)	0.064 <sup>TKNI</sup>	0.098	<0.050	<0.050	<0.050	
	Total Nitrogen (mg/L)	0.146	0.286	0.060	0.193	0.063	
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Phosphorus (P)-Total (mg/L)	<0.0050 <sup>DLM</sup>	<0.0020	0.0075	<0.0020	0.0076	
Sulfate (SO4) (mg/L)	384	125	29.9	163	29.1		
<b>Cyanides</b>	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
	Cyanide, Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
	Cyanide, Free (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
<b>Organic / Inorganic Carbon</b>	Dissolved Organic Carbon (mg/L)	1.33	0.74	<0.50	0.77	<0.50	
	Total Organic Carbon (mg/L)	1.17	<0.50	1.03	<0.50	<0.50	
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	8.35	0.355	0.269	0.330	0.269	
	Antimony (Sb)-Total (mg/L)	<0.00010	0.00011	<0.00010	0.00011	<0.00010	
	Arsenic (As)-Total (mg/L)	0.00059	0.00024	0.00023	0.00019	0.00025	
	Barium (Ba)-Total (mg/L)	0.0262	0.0377	0.0505	0.0345	0.0498	
	Beryllium (Be)-Total (mg/L)	0.00064	<0.00010	<0.00010	<0.00010	<0.00010	
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010	
	Cadmium (Cd)-Total (mg/L)	0.00738	0.00101	0.000187	0.00131	0.000173	

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

# ALS ENVIRONMENTAL ANALYTICAL REPORT

	<b>Sample ID</b> <b>Description</b> <b>Sampled Date</b> <b>Sampled Time</b> <b>Client ID</b>	L2359242-11			
		Water			
		30-SEP-19			
		F ELD BLANK			
Grouping	Analyte				
<b>WATER</b>					
<b>Physical Tests</b>	Colour, True (CU)	<5.0			
	Conductivity (uS/cm)	<2.0			
	Hardness (as CaCO3) (mg/L)	<0.50			
	pH (pH)	5.74			
	Total Suspended Solids (mg/L)	<3.0			
	Total Dissolved Solids (mg/L)	<10			
	Turbidity (NTU)	<0.10			
<b>Anions and Nutrients</b>	Acidity (as CaCO3) (mg/L)	2.0			
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	<1.0			
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0			
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0			
	Alkalinity, Total (as CaCO3) (mg/L)	<1.0			
	Ammonia, Total (as N) (mg/L)	<0.0050			
	Bromide (Br) (mg/L)	<0.050			
	Chloride (Cl) (mg/L)	<0.50			
	Fluoride (F) (mg/L)	<0.020			
	Nitrate (as N) (mg/L)	<0.0050			
	Nitrite (as N) (mg/L)	<0.0010			
	Total Kjeldahl Nitrogen (mg/L)	<0.050			
	Total Nitrogen (mg/L)	<0.030			
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010			
	Phosphorus (P)-Total (mg/L)	<0.0020			
	Sulfate (SO4) (mg/L)	<0.30			
	<b>Cyanides</b>	Cyanide, Weak Acid Diss (mg/L)	<0.0050		
Cyanide, Total (mg/L)		<0.0050			
Cyanide, Free (mg/L)		<0.0050			
<b>Organic / Inorganic Carbon</b>	Dissolved Organic Carbon (mg/L)	<0.50			
	Total Organic Carbon (mg/L)	<0.50			
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	<0.0030			
	Antimony (Sb)-Total (mg/L)	<0.00010			
	Arsenic (As)-Total (mg/L)	<0.00010			
	Barium (Ba)-Total (mg/L)	<0.00010			
	Beryllium (Be)-Total (mg/L)	<0.00010			
	Bismuth (Bi)-Total (mg/L)	<0.000050			
	Boron (B)-Total (mg/L)	<0.010			
	Cadmium (Cd)-Total (mg/L)	<0.000050			

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2359242-1	L2359242-2	L2359242-3	L2359242-4	L2359242-5
		Description	Water	Water	Water	Water	Water
		Sampled Date	30-SEP-19	30-SEP-19	30-SEP-19	30-SEP-19	30-SEP-19
		Sampled Time	09:14	08:50	08:40	09:40	08:30
		Client ID	JM10	JM1-SEEPAGE	JM1	JM2	JM1-ALT
Grouping	Analyte						
<b>WATER</b>							
<b>Total Metals</b>	Calcium (Ca)-Total (mg/L)		22.6	44.4	20.0	113	52.2
	Chromium (Cr)-Total (mg/L)		0.00017	0.00030	0.00019	0.00023	0.00027
	Cobalt (Co)-Total (mg/L)		<0.00010	<0.00010	<0.00010	0.0237	0.00243
	Copper (Cu)-Total (mg/L)		<0.00050	<0.00050	0.00124	2.54	0.252
	Iron (Fe)-Total (mg/L)		0.118	<0.030	<0.030	0.835	3.56
	Lead (Pb)-Total (mg/L)		0.000744	0.000058	<0.000050	0.00395	0.00312
	Lithium (Li)-Total (mg/L)		<0.0010	<0.0010	<0.0010	0.0046	0.0016
	Magnesium (Mg)-Total (mg/L)		1.72	4.17	1.76	28.6	8.49
	Manganese (Mn)-Total (mg/L)		0.0153	0.00156	0.00419	4.04	0.437
	Mercury (Hg)-Total (mg/L)		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)		0.000651	0.000521	0.000392	0.000217	0.000243
	Nickel (Ni)-Total (mg/L)		<0.00050	<0.00050	<0.00050	0.00740	0.00074
	Phosphorus (P)-Total (mg/L)		<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Total (mg/L)		1.45	2.64	1.16	3.75	1.74
	Selenium (Se)-Total (mg/L)		0.000105	0.000208	0.000119	0.000594	0.000448
	Silicon (Si)-Total (mg/L)		1.31	1.47	1.27	4.21	2.01
	Silver (Ag)-Total (mg/L)		<0.000010	<0.000010	<0.000010	0.000029	0.000021
	Sodium (Na)-Total (mg/L)		<2.0	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Total (mg/L)		0.190	0.206	0.181	0.660	0.321
	Sulfur (S)-Total (mg/L)		6.30	18.4	4.95	139	32.9
	Thallium (Tl)-Total (mg/L)		<0.000010	<0.000010	<0.000010	0.000016	0.000012
	Tin (Sn)-Total (mg/L)		<0.00010	<0.00010	<0.00010	0.00012	<0.00010
	Titanium (Ti)-Total (mg/L)		<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Total (mg/L)		0.000273	0.000089	0.000049	0.000823	0.000342
	Vanadium (V)-Total (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Total (mg/L)		<0.0030	<0.0030	0.0036	0.873	1.16
<b>Dissolved Metals</b>	Dissolved Mercury Filtration Location		LAB	LAB	LAB	LAB	LAB
	Dissolved Metals Filtration Location		LAB	LAB	LAB	LAB	LAB
	Aluminum (Al)-Dissolved (mg/L)		0.0082	<0.0030	0.0064	3.52	0.0325
	Antimony (Sb)-Dissolved (mg/L)		<0.00010	0.00012	<0.00010	<0.00010	0.00013
	Arsenic (As)-Dissolved (mg/L)		0.00024	<0.00010	0.00010	0.00057	<0.00010
	Barium (Ba)-Dissolved (mg/L)		0.0533	0.0527	0.0275	0.0286	0.0224
	Beryllium (Be)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	0.00056	<0.00010
	Bismuth (Bi)-Dissolved (mg/L)		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)		<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)		0.0000068	0.0000318	0.0000578	0.00783	0.00493
	Calcium (Ca)-Dissolved (mg/L)		21.8	44.0	19.8	96.6	50.6

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2359242-6	L2359242-7	L2359242-8	L2359242-9	L2359242-10
		Description	Water	Water	Water	Water	Water
		Sampled Date	30-SEP-19	30-SEP-19	30-SEP-19	30-SEP-19	30-SEP-19
		Sampled Time	10:00	10:30	10:40	11:10	
		Client ID	JM2-SEEPAGE	JM4	SHC1	JM12	DUP2
Grouping	Analyte						
<b>WATER</b>							
<b>Total Metals</b>	Calcium (Ca)-Total (mg/L)		102	50.5	24.0	74.5	23.7
	Chromium (Cr)-Total (mg/L)		0.00024	0.00035	0.00018	0.00032	0.00020
	Cobalt (Co)-Total (mg/L)		0.0211	0.00230	0.00058	0.00279	0.00055
	Copper (Cu)-Total (mg/L)		2.29	0.226	0.0469	0.213	0.0465
	Iron (Fe)-Total (mg/L)		1.38	1.47	0.126	1.29	0.119
	Lead (Pb)-Total (mg/L)		0.00445	0.00189	0.000729	0.00166	0.000694
	Lithium (Li)-Total (mg/L)		0.0041	<0.0010	<0.0010	0.0012	<0.0010
	Magnesium (Mg)-Total (mg/L)		28.0	6.94	2.23	8.14	2.22
	Manganese (Mn)-Total (mg/L)		4.03	0.607	0.0915	0.806	0.0887
	Mercury (Hg)-Total (mg/L)		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)		0.000231	0.000167	0.000580	0.000171	0.000543
	Nickel (Ni)-Total (mg/L)		0.00721	0.00080	<0.00050	0.00102	<0.00050
	Phosphorus (P)-Total (mg/L)		<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Total (mg/L)		3.81	2.19	1.54	2.79	1.56
	Selenium (Se)-Total (mg/L)		0.000553	0.000238	0.000134	0.000171	0.000170
	Silicon (Si)-Total (mg/L)		3.85	2.51	1.36	2.69	1.38
	Silver (Ag)-Total (mg/L)		0.000028	0.000018	<0.000010	0.000023	<0.000010
	Sodium (Na)-Total (mg/L)		<2.0	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Total (mg/L)		0.587	0.336	0.176	0.473	0.181
	Sulfur (S)-Total (mg/L)		133	41.0	9.93	56.4	9.90
	Thallium (Tl)-Total (mg/L)		0.000015	0.000010	<0.000010	0.000012	<0.000010
	Tin (Sn)-Total (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)		<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Total (mg/L)		0.000838	0.000260	0.000260	0.000242	0.000243
	Vanadium (V)-Total (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Total (mg/L)		0.880	0.129	0.0210	0.138	0.0194
<b>Dissolved Metals</b>	Dissolved Mercury Filtration Location		LAB	LAB	LAB	LAB	LAB
	Dissolved Metals Filtration Location		LAB	LAB	LAB	LAB	LAB
	Aluminum (Al)-Dissolved (mg/L)		1.81	0.010	0.0323	0.0161	0.0309
	Antimony (Sb)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)		0.00046	<0.00010	0.00014	<0.00010	0.00013
	Barium (Ba)-Dissolved (mg/L)		0.0294	0.0409	0.0514	0.0364	0.0514
	Beryllium (Be)-Dissolved (mg/L)		0.00038	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Dissolved (mg/L)		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)		<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)		0.00716	0.000936	0.000176	0.00118	0.000158
	Calcium (Ca)-Dissolved (mg/L)		96.8	49.9	23.9	63.8	23.4

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.



# ALS ENVIRONMENTAL ANALYTICAL REPORT

	<b>Sample ID</b> <b>Description</b> <b>Sampled Date</b> <b>Sampled Time</b> <b>Client ID</b>	L2359242-11			
		Water	30-SEP-19		
		F ELD BLANK			
Grouping	Analyte				
<b>WATER</b>					
<b>Total Metals</b>	Calcium (Ca)-Total (mg/L)	<0.050			
	Chromium (Cr)-Total (mg/L)	0.00019 <sup>RRV</sup>			
	Cobalt (Co)-Total (mg/L)	<0.00010			
	Copper (Cu)-Total (mg/L)	<0.00050			
	Iron (Fe)-Total (mg/L)	<0.030			
	Lead (Pb)-Total (mg/L)	<0.000050			
	Lithium (Li)-Total (mg/L)	<0.0010			
	Magnesium (Mg)-Total (mg/L)	<0.0050			
	Manganese (Mn)-Total (mg/L)	<0.00010			
	Mercury (Hg)-Total (mg/L)	<0.0000050			
	Molybdenum (Mo)-Total (mg/L)	<0.000050			
	Nickel (Ni)-Total (mg/L)	<0.00050			
	Phosphorus (P)-Total (mg/L)	<0.30			
	Potassium (K)-Total (mg/L)	<0.050			
	Selenium (Se)-Total (mg/L)	<0.000050			
	Silicon (Si)-Total (mg/L)	<0.10			
	Silver (Ag)-Total (mg/L)	<0.000010			
	Sodium (Na)-Total (mg/L)	<2.0			
	Strontium (Sr)-Total (mg/L)	<0.00020			
	Sulfur (S)-Total (mg/L)	<0.50			
	Thallium (Tl)-Total (mg/L)	<0.000010			
	Tin (Sn)-Total (mg/L)	<0.00010			
	Titanium (Ti)-Total (mg/L)	<0.010			
	Uranium (U)-Total (mg/L)	<0.000010			
	Vanadium (V)-Total (mg/L)	<0.00050			
	Zinc (Zn)-Total (mg/L)	<0.0030			
<b>Dissolved Metals</b>	Dissolved Mercury Filtration Location	LAB			
	Dissolved Metals Filtration Location	LAB			
	Aluminum (Al)-Dissolved (mg/L)	<0.0030			
	Antimony (Sb)-Dissolved (mg/L)	<0.00010			
	Arsenic (As)-Dissolved (mg/L)	<0.00010			
	Barium (Ba)-Dissolved (mg/L)	<0.00010			
	Beryllium (Be)-Dissolved (mg/L)	<0.00010			
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050			
	Boron (B)-Dissolved (mg/L)	<0.010			
	Cadmium (Cd)-Dissolved (mg/L)	<0.0000050			
	Calcium (Ca)-Dissolved (mg/L)	<0.050			

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2359242-1	L2359242-2	L2359242-3	L2359242-4	L2359242-5
		Description	Water	Water	Water	Water	Water
		Sampled Date	30-SEP-19	30-SEP-19	30-SEP-19	30-SEP-19	30-SEP-19
		Sampled Time	09:14	08:50	08:40	09:40	08:30
		Client ID	JM10	JM1-SEEPAGE	JM1	JM2	JM1-ALT
Grouping	Analyte						
<b>WATER</b>							
<b>Dissolved Metals</b>	Chromium (Cr)-Dissolved (mg/L)		<0.00010	0.00010	0.00011	<0.00010	<0.00010
	Cobalt (Co)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	0.0243	0.00230
	Copper (Cu)-Dissolved (mg/L)		<0.00050	<0.00050	0.00106	2.26	0.0173
	Iron (Fe)-Dissolved (mg/L)		<0.030	<0.030	<0.030	0.040	<0.030
	Lead (Pb)-Dissolved (mg/L)		<0.000050	<0.000050	<0.000050	0.00245	<0.000050
	Lithium (Li)-Dissolved (mg/L)		<0.0010	<0.0010	<0.0010	0.0041	0.0016
	Magnesium (Mg)-Dissolved (mg/L)		1.76	4.70	1.85	27.2	9.27
	Manganese (Mn)-Dissolved (mg/L)		0.00165	<0.00010	0.00375	3.71	0.430
	Mercury (Hg)-Dissolved (mg/L)		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)		0.000592	0.000543	0.000329	0.000090	0.000220
	Nickel (Ni)-Dissolved (mg/L)		<0.00050	<0.00050	<0.00050	0.00756	0.00076
	Phosphorus (P)-Dissolved (mg/L)		<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)		1.41	2.78	1.21	3.78	1.75
	Selenium (Se)-Dissolved (mg/L)		0.000133	0.000256	0.000098	0.000589	0.000394
	Silicon (Si)-Dissolved (mg/L)		1.20	1.48	1.30	3.76	1.91
	Silver (Ag)-Dissolved (mg/L)		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)		<2.0	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Dissolved (mg/L)		0.170	0.200	0.176	0.604	0.299
	Sulfur (S)-Dissolved (mg/L)		6.96	17.0	4.64	128	30.8
	Thallium (Tl)-Dissolved (mg/L)		<0.000010	<0.000010	<0.000010	0.000018	0.000012
	Tin (Sn)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)		<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)		0.000279	0.000092	0.000048	0.000612	0.000186
	Vanadium (V)-Dissolved (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)		<0.0010	<0.0010	0.0033	1.01	0.908

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2359242-6	L2359242-7	L2359242-8	L2359242-9	L2359242-10
		Description	Water	Water	Water	Water	Water
		Sampled Date	30-SEP-19	30-SEP-19	30-SEP-19	30-SEP-19	30-SEP-19
		Sampled Time	10:00	10:30	10:40	11:10	
		Client ID	JM2-SEEPAGE	JM4	SHC1	JM12	DUP2
Grouping	Analyte						
<b>WATER</b>							
<b>Dissolved Metals</b>	Chromium (Cr)-Dissolved (mg/L)		<0.00010	0.00010	0.00011	<0.00010	<0.00010
	Cobalt (Co)-Dissolved (mg/L)		0.0215	0.00230	0.00049	0.00276	0.00048
	Copper (Cu)-Dissolved (mg/L)		1.97	0.0255	0.0229	0.0281	0.0229
	Iron (Fe)-Dissolved (mg/L)		0.036	<0.030	<0.030	<0.030	<0.030
	Lead (Pb)-Dissolved (mg/L)		0.00152	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Dissolved (mg/L)		0.0044	<0.0010	<0.0010	0.0012	<0.0010
	Magnesium (Mg)-Dissolved (mg/L)		27.6	7.89	2.32	8.91	2.34
	Manganese (Mn)-Dissolved (mg/L)		3.56	0.616	0.0770	0.808	0.0761
	Mercury (Hg)-Dissolved (mg/L)		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)		0.000124	0.000143	0.000547	0.000152	0.000543
	Nickel (Ni)-Dissolved (mg/L)		0.00721	0.00088	<0.00050	0.00108	<0.00050
	Phosphorus (P)-Dissolved (mg/L)		<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)		3.77	2.26	1.50	2.81	1.52
	Selenium (Se)-Dissolved (mg/L)		0.000512	0.000238	0.000138	0.000217	0.000168
	Silicon (Si)-Dissolved (mg/L)		3.39	2.41	1.19	2.57	1.19
	Silver (Ag)-Dissolved (mg/L)		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)		<2.0	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Dissolved (mg/L)		0.603	0.336	0.176	0.415	0.175
	Sulfur (S)-Dissolved (mg/L)		128	41.0	9.41	55.1	9.64
	Thallium (Tl)-Dissolved (mg/L)		0.000017	0.000010	<0.000010	0.000013	<0.000010
	Tin (Sn)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)		<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)		0.000464	0.000145	0.000058	0.000133	0.000063
	Vanadium (V)-Dissolved (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)		1.01	0.126	0.0169	0.129	0.0167

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

# ALS ENVIRONMENTAL ANALYTICAL REPORT

	<b>Sample ID</b> <b>Description</b> <b>Sampled Date</b> <b>Sampled Time</b> <b>Client ID</b>	L2359242-11	Water	30-SEP-19	F ELD BLANK
Grouping	Analyte				
<b>WATER</b>					
<b>Dissolved Metals</b>	Chromium (Cr)-Dissolved (mg/L)	<0.00010			
	Cobalt (Co)-Dissolved (mg/L)	<0.00010			
	Copper (Cu)-Dissolved (mg/L)	<0.00050			
	Iron (Fe)-Dissolved (mg/L)	<0.030			
	Lead (Pb)-Dissolved (mg/L)	<0.000050			
	Lithium (Li)-Dissolved (mg/L)	<0.0010			
	Magnesium (Mg)-Dissolved (mg/L)	<0.0050			
	Manganese (Mn)-Dissolved (mg/L)	<0.00010			
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050			
	Molybdenum (Mo)-Dissolved (mg/L)	<0.000050			
	Nickel (Ni)-Dissolved (mg/L)	<0.00050			
	Phosphorus (P)-Dissolved (mg/L)	<0.30			
	Potassium (K)-Dissolved (mg/L)	<0.050			
	Selenium (Se)-Dissolved (mg/L)	<0.000050			
	Silicon (Si)-Dissolved (mg/L)	<0.050			
	Silver (Ag)-Dissolved (mg/L)	<0.000010			
	Sodium (Na)-Dissolved (mg/L)	<2.0			
	Strontium (Sr)-Dissolved (mg/L)	<0.00020			
	Sulfur (S)-Dissolved (mg/L)	<0.50			
	Thallium (Tl)-Dissolved (mg/L)	<0.000010			
	Tin (Sn)-Dissolved (mg/L)	<0.00010			
	Titanium (Ti)-Dissolved (mg/L)	<0.010			
	Uranium (U)-Dissolved (mg/L)	<0.000010			
	Vanadium (V)-Dissolved (mg/L)	<0.00050			
	Zinc (Zn)-Dissolved (mg/L)	<0.0010			

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## Reference Information

### Qualifiers for Individual Samples Listed:

Sample Number	Client Sample ID	Qualifier	Description
L2359242-10	DUP2	WSMD	Water sample(s) for dissolved mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.
L2359242-4	JM2	WSMT	Water sample(s) for total mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.

### QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Laboratory Control Sample	Lithium (Li)-Dissolved	MES	L2359242-1, -10, -11, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Total Organic Carbon	MS-B	L2359242-10, -11, -3, -4, -5, -6, -7, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2359242-1, -10, -11, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2359242-1, -10, -11, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2359242-1, -10, -11, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2359242-1, -10, -11, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2359242-1, -10, -11, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Aluminum (Al)-Total	MS-B	L2359242-1, -10, -11, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Arsenic (As)-Total	MS-B	L2359242-11
Matrix Spike	Barium (Ba)-Total	MS-B	L2359242-11
Matrix Spike	Calcium (Ca)-Total	MS-B	L2359242-11
Matrix Spike	Calcium (Ca)-Total	MS-B	L2359242-11
Matrix Spike	Iron (Fe)-Total	MS-B	L2359242-1, -10, -11, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2359242-1, -10, -11, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2359242-11
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2359242-11
Matrix Spike	Manganese (Mn)-Total	MS-B	L2359242-1, -10, -11, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Total	MS-B	L2359242-11
Matrix Spike	Strontium (Sr)-Total	MS-B	L2359242-11
Matrix Spike	Strontium (Sr)-Total	MS-B	L2359242-11
Matrix Spike	Titanium (Ti)-Total	MS-B	L2359242-1, -10, -11, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Phosphorus (P)-Total	MS-B	L2359242-10, -11, -3, -4, -5, -6, -7, -8, -9

### Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis
TKNI	TKN result may be biased low due to Nitrate interference. Nitrate-N is > 10x TKN.

### Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
<b>ACY-PCT-VA</b>	Water	Acidity by Automatic Titration	APHA 2310 Acidity
This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.			
Samples of industrial wastes, acid mine drainage, or other solutions that contain appreciable amounts of hydrolyzable metal ions such as aluminum, iron, and manganese may require hot peroxide treatment to ensure oxidation and hydrolysis of reduced forms of polyvalent cations. Acidity results may be highly variable if this procedure is not followed. Results in this report for 'Acidity (as CaCO3)' have not been peroxide treated.			
<b>ALK-TITR-VA</b>	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity
This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.			
<b>BR-L-IC-N-VA</b>	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			

## Reference Information

<b>CARBONS-DOC-VA</b>	Water	Dissolved organic carbon by combustion	APHA 5310B
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.			
<b>CARBONS-TOC-VA</b>	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
<b>CL-IC-N-VA</b>	Water	Chloride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
<b>CN-FREE-CFA-VA</b>	Water	Free Cyanide in water by CFA	ASTM 7237
This analysis is carried out using procedures adapted from ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.			
<b>CN-T-CFA-VA</b>	Water	Total Cyanide in water by CFA	ISO 14403:2002
This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.			
<b>CN-WAD-CFA-VA</b>	Water	Weak Acid Diss. Cyanide in water by CFA	APHA 4500-CN CYANIDE
This analysis is carried out using procedures adapted from APHA Method 4500-CN I. "Weak Acid Dissociable Cyanide". Weak Acid Dissociable (WAD) cyanide is determined by in-line sample distillation with final determination by colourimetric analysis.			
<b>COLOUR-TRUE-VA</b>	Water	Colour (True) by Spectrometer	BCMOE Colour Single Wavelength
This analysis is carried out using procedures adapted from British Columbia Environmental Manual "Colour- Single Wavelength." Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method.			
Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.			
<b>EC-PCT-VA</b>	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.
This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.			
<b>EC-SCREEN-VA</b>	Water	Conductivity Screen (Internal Use Only)	APHA 2510
Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.			
<b>F-IC-N-VA</b>	Water	Fluoride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
<b>HARDNESS-CALC-VA</b>	Water	Hardness	APHA 2340B
Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.			
<b>HG-D-CVAA-VA</b>	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)
Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.			
<b>HG-T-CVAA-VA</b>	Water	Total Mercury in Water by CVAAS or CVAFS	EPA 1631E (mod)
Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.			
<b>MET-D-CCMS-VA</b>	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)
Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.			
Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.			
<b>MET-T-CCMS-VA</b>	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)
Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.			
Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.			
<b>N-T-COL-VA</b>	Water	Total Nitrogen in water by Colour	APHA4500-P(J)/NEMI9171/USGS03-4174
This analysis is carried out using procedures adapted from APHA Method 4500-P (J) "Persulphate Method for Simultaneous Determination of Total Nitrogen and Total Phosphorus" and National Environmental Methods Index - Nemi method 5735.			
<b>NH3-F-VA</b>	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

## Reference Information

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

**NO2-L-IC-N-VA**                      Water              Nitrite in Water by IC (Low Level)                      EPA 300.1 (mod)  
 Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**NO3-L-IC-N-VA**                      Water              Nitrate in Water by IC (Low Level)                      EPA 300.1 (mod)  
 Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**P-T-PRES-COL-VA**                      Water              Total P in Water by Colour                      APHA 4500-P Phosphorus  
 This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.  
 Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

**PH-PCT-VA**                      Water              pH by Meter (Automated)                      APHA 4500-H pH Value  
 This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

**PO4-DO-COL-VA**                      Water              Diss. Orthophosphate in Water by Colour                      APHA 4500-P Phosphorus  
 This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.  
 Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

**SO4-IC-N-VA**                      Water              Sulfate in Water by IC                      EPA 300.1 (mod)  
 Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**TDS-VA**                      Water              Total Dissolved Solids by Gravimetric                      APHA 2540 C - GRAVIMETRIC  
 This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

**TKN-F-VA**                      Water              TKN in Water by Fluorescence                      APHA 4500-NORG D.  
 This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

**TSS-VA**                      Water              Total Suspended Solids by Gravimetric                      APHA 2540 D - GRAVIMETRIC  
 This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.  
 Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

**TURBIDITY-VA**                      Water              Turbidity by Meter                      APHA 2130 Turbidity  
 This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

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\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

*The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:*

---

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

---

**Chain of Custody Numbers:**

17-763278

## Reference Information

### GLOSSARY OF REPORT TERMS

*Surrogate* - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

*mg/kg* - milligrams per kilogram based on dry weight of sample.

*mg/kg wwt* - milligrams per kilogram based on wet weight of sample.

*mg/kg lwt* - milligrams per kilogram based on lipid-adjusted weight of sample.

*mg/L* - milligrams per litre.

*<* - Less than.

*D.L.* - The reported Detection Limit, also known as the Limit of Reporting (LOR).

*N/A* - Result not available. Refer to qualifier code and definition for explanation.

*Test results reported relate only to the samples as received by the laboratory.*

**UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.**

*Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.*





Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com



L2359242-COFC

COC Number: 17-763278

Page 1 of 1

<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>		<b>Select Service Level Below - Contact your AM to confirm all E&amp;P TATs (surcharges may apply)</b>									
Company: <u>ERM Cons. Hants Canada</u>		Select Report Format: <input type="checkbox"/> PDF <input type="checkbox"/> EXCEL <input type="checkbox"/> EDC (DIGITAL)		Regular [R] <input type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply									
Contact: <u>As per Quote: Q14326</u>		Quality Control (QC) Report with Report <input type="checkbox"/> YES <input type="checkbox"/> NO		4 day [P4-20%] <input type="checkbox"/>									
Phone: <u>As per Quote: Q14326</u>		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked		3 day [P3-25%] <input type="checkbox"/>									
Company address below will appear on the final report		Select Distribution: <input type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX		2 day [P2-50%] <input type="checkbox"/>									
Street:		Email 1 or Fax:		Date and Time Required for all E&P TATs: dd-mm-yy hh:mm									
City/Province:		Email 2:		For tests that can not be performed according to the service level selected, you will be contacted.									
Postal Code:		Email 3:		<b>Analysis Request</b>									
Invoice To: Same as Report To <input type="checkbox"/> YES <input type="checkbox"/> NO		Invoice Distribution		<table border="1"> <tr> <td colspan="2">Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below</td> </tr> <tr> <td colspan="2" style="text-align: center;"> <b>NUMBER OF CONTAINERS</b>  <u>As per: Q14326</u> </td> </tr> <tr> <td colspan="2" style="text-align: center;"> <b>SAMPLES ON HOLD</b> </td> </tr> <tr> <td colspan="2" style="text-align: center;">           SUSPECTED HAZARD (see Special Instructions)         </td> </tr> </table>		Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below		<b>NUMBER OF CONTAINERS</b> <u>As per: Q14326</u>		<b>SAMPLES ON HOLD</b>		SUSPECTED HAZARD (see Special Instructions)	
Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below													
<b>NUMBER OF CONTAINERS</b> <u>As per: Q14326</u>													
<b>SAMPLES ON HOLD</b>													
SUSPECTED HAZARD (see Special Instructions)													
Copy of Invoice with Report <input type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX											
Company:		Email 1 or Fax: <u>elizabeth@seabridgegold.net</u>											
Contact:		Email 2:											
<b>Project Information</b>		<b>Oil and Gas Required Fields (client use)</b>											
ALS Account # / Quote #:		AFE/Cost Center:											
Job #: <u>0492759-0004</u>		Major/Minor Code:											
PO / AFE:		Routing Code:											
LSD:		Requisitioner:											
ALS Lab Work Order # (lab use only):		Location:											
ALS Contact: <u>A. Springer</u>		Sampler: <u>K. Hort</u>											
<b>ALS Sample # (lab use only)</b>	<b>Sample Identification and/or Coordinates (This description will appear on the report)</b>	<b>Date (dd-mm-yy)</b>	<b>Time (hh:mm)</b>	<b>Sample Type</b>									
	<u>JM #10</u>	<u>30-Sep-19</u>	<u>09:14</u>	<u>Water</u>	<u>8</u>								
	<u>JM 1 - Seepage</u>		<u>08:50</u>		<u>8</u>								
	<u>JM 1</u>		<u>08:40</u>		<u>8</u>								
	<u>JM 2</u>		<u>09:40</u>		<u>8</u>								
	<u>JM 1 - alt</u>		<u>08:30</u>		<u>8</u>								
	<u>JM 2 - Seepage</u>		<u>10:00</u>		<u>8</u>								
	<u>JM 4</u>		<u>10:30</u>		<u>8</u>								
	<u>SAC 1</u>		<u>10:40</u>		<u>8</u>								
	<u>JM 12</u>		<u>11:10</u>		<u>8</u>								
	<u>DUP 2</u>				<u>8</u>								
	<u>Field Blank</u>	<u>30-Sep-19</u>		<u>Water</u>	<u>8</u>								
<b>Drinking Water (DW) Samples<sup>1</sup> (client use)</b>		<b>Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)</b>		<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>									
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO				Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>									
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO				Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>									
				Cooling Initiated <input type="checkbox"/>									
				INITIAL COOLER TEMPERATURES °C									
				FINAL COOLER TEMPERATURES °C <u>2, 3, 3°C</u>									
<b>SHIPMENT RELEASE (client use)</b>		<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>		<b>FINAL SHIPMENT RECEPTION (lab use only)</b>									
Released by: <u>Kimberley Hort</u>	Date: <u>Oct 1 2019</u>	Time: <u>08:00</u>	Received by:	Date: <u>3 Oct 19</u>	Time: <u>12:00PM</u>								

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JUNE 2018 FRONT

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.



**Environmental**

## CERTIFICATE OF ANALYSIS

**Work Order** : **VA20B3842**  
**Client** : **ERM Consultants Canada Ltd.**  
**Contact** : Jill Zyla  
**Address** : 3790 Alfred Ave  
Smithers BC Canada V0J 2N0  
**Telephone** : (250) 877-7838  
**Project** : 0539378-0012 (WQ ISKUT)  
**PO** : ----  
**C-O-C number** : 17-841428, 17-841426  
**Sampler** : ----  
**Site** : ----  
**Quote number** : Q74326  
**No. of samples received** : 24  
**No. of samples analysed** : 24

**Page** : 1 of 29  
**Laboratory** : Vancouver - Environmental  
**Account Manager** : Amber Springer  
**Address** : 8081 Lougheed Highway  
Burnaby BC Canada V5A 1W9  
**Telephone** : +1 604 253 4188  
**Date Samples Received** : 28-Aug-2020 10:10  
**Date Analysis Commenced** : 28-Aug-2020  
**Issue Date** : 10-Sep-2020 14:18

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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

---

## Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Brieanna Allen	Department Manager - Organics	Organics, Burnaby, British Columbia
Bruna Botti	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Clarie Tejano		Metals, Burnaby, British Columbia
Cristina Alexandre	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Ian Cronshaw	Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics - Water Quality, Burnaby, British Columbia
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Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Shaneel Dayal	Analyst	Metals, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics - Water Quality, Burnaby, British Columbia
Walt Kippenhuck	Team Leader - Inorganics	Inorganics, Waterloo, Ontario



## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
-	No Unit
µg/L	micrograms per litre
µS/cm	Microsiemens per centimetre
CU	colour units
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in reports identified as "**Preliminary Report**" are considered authorized for use.

## Workorder Comments

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
DLQ	Detection Limit raised due to co-eluting interference. GCMS qualifier ion ratio did not meet acceptance criteria.
DTC	Dissolved concentration exceeds total. Results were confirmed by re-analysis.
RRV	Reported result verified by repeat analysis.



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					BR4	BR3	DUP1	DUP2	JM13
Client sampling date / time					22-Aug-2020 14:34	22-Aug-2020 14:53	22-Aug-2020 09:50	22-Aug-2020	23-Aug-2020 09:00
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-001	VA20B3842-002	VA20B3842-003	VA20B3842-004	VA20B3842-005
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
acidity (as CaCO3)	----	E283	2.0	mg/L	<2.0	<2.0	<2.0	<2.0	<2.0
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	43.6	42.9	30.2	35.1	42.5
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	43.6	42.9	30.2	35.1	42.5
colour, true	----	E329	5.0	CU	<5.0	<5.0	<5.0	<5.0	<5.0
conductivity	----	E100	2.0	µS/cm	156	153	103	97.3	136
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	71.6	69.3	46.6	47.6	66.3
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	85.6	84.1	45.2	44.4	61.3
pH	----	E108	0.10	pH units	7.63	7.63	7.39	7.46	7.54
solids, total dissolved [TDS]	----	E162	10	mg/L	103	112	69	65	81
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	183	253	17.9	<3.0	<3.0
turbidity	----	E121	0.10	NTU	75.3	106	7.96	0.97	1.48
<b>Anions and Nutrients</b>									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0154	0.0116	0.0102	0.0190	0.0248
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50
fluoride	16984-48-8	E235.F	0.020	mg/L	0.041	0.041	0.023	<0.020	0.022
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	<0.050	0.052	<0.050	<0.050	0.062
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0834	0.0881	0.0534	0.0453	0.0406
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0105
nitrogen, total	7727-37-9	E366	0.030	mg/L	0.119	0.118	0.076	0.084	0.090
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0015	0.0017	<0.0010	<0.0010	<0.0010
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.216	0.302	0.0200	0.0030	<0.0020
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	30.5	30.4	18.9	13.2	25.1
<b>Cyanides</b>									
cyanide, free	----	E339	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cyanide, strong acid dissociable (total)	----	E333	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cyanide, weak acid dissociable	----	E336	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
<b>Organic / Inorganic Carbon</b>									



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	BR4	BR3	DUP1	DUP2	JM13
Client sampling date / time					22-Aug-2020 14:34	22-Aug-2020 14:53	22-Aug-2020 09:50	22-Aug-2020	23-Aug-2020 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-001	VA20B3842-002	VA20B3842-003	VA20B3842-004	VA20B3842-005	
					Result	Result	Result	Result	Result	
<b>Organic / Inorganic Carbon</b>										
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	2.35	1.75	1.27	0.86	0.75	
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	0.58	0.57	<0.50	0.54	0.80	
<b>Total Metals</b>										
aluminum, total	7429-90-5	E420	0.0030	mg/L	4.98	4.29	0.321	0.0864	0.134	
antimony, total	7440-36-0	E420	0.00010	mg/L	0.00025	0.00021	0.00016	<0.00010	<0.00010	
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00259	0.00217	0.00067	0.00014	0.00016	
barium, total	7440-39-3	E420	0.00010	mg/L	0.112	0.108	0.0420	0.0250	0.0258	
beryllium, total	7440-41-7	E420	0.000020	mg/L	0.000100	0.000072	<0.000020	<0.000020	<0.000020	
bismuth, total	7440-69-9	E420	0.000050	mg/L	0.000075	0.000083	<0.000050	<0.000050	<0.000050	
boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.000320	0.000291	0.000123	0.0000538	0.000293	
calcium, total	7440-70-2	E420	0.050	mg/L	26.1	25.8	15.8	15.7	21.4	
chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	0.00740	0.00666	0.00113	<0.00010	<0.00010	
cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00272	0.00259	0.00026	<0.00010	0.00082	
copper, total	7440-50-8	E420	0.00050	mg/L	0.0205	0.0194	0.00161	0.00980	0.0868	
iron, total	7439-89-6	E420	0.010	mg/L	6.20	5.68	0.417	0.120	0.433	
lead, total	7439-92-1	E420	0.000050	mg/L	0.00686	0.00721	0.00118	0.000516	0.000627	
lithium, total	7439-93-2	E420	0.0010	mg/L	0.0032	0.0030	<0.0010	<0.0010	<0.0010	
magnesium, total	7439-95-4	E420	0.100	mg/L	4.97	4.80	1.41	1.28	1.91	
manganese, total	7439-96-5	E420	0.00010	mg/L	0.255	0.268	0.0400	0.0239	0.146	
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00118	0.000869	0.000380	0.000288	0.000172	
nickel, total	7440-02-0	E420	0.00050	mg/L	0.00521	0.00478	0.00052	<0.00050	<0.00050	
phosphorus, total	7723-14-0	E420	0.050	mg/L	0.246	0.252	<0.050	<0.050	<0.050	
potassium, total	7440-09-7	E420	0.100	mg/L	3.64	3.49	1.42	1.08	1.25	
selenium, total	7782-49-2	E420	0.000050	mg/L	0.000352	0.000356	0.000125	0.000095	0.000087	
silicon, total	7440-21-3	E420	0.10	mg/L	8.84	7.25	1.50	1.62	1.39	
silver, total	7440-22-4	E420	0.000010	mg/L	0.000113	0.000106	0.000010	<0.000010	<0.000010	
sodium, total	7440-23-5	E420	0.050	mg/L	0.977	0.761	0.470	0.592	0.480	
strontium, total	7440-24-6	E420	0.00020	mg/L	0.162	0.150	0.0875	0.0965	0.141	
sulfur, total	7704-34-9	E420	0.50	mg/L	11.3	10.4	6.23	4.73	8.64	



## Analytical Results

Sub-Matrix: Water					Client sample ID	BR4	BR3	DUP1	DUP2	JM13
(Matrix: Water)										
Client sampling date / time					22-Aug-2020 14:34	22-Aug-2020 14:53	22-Aug-2020 09:50	22-Aug-2020	23-Aug-2020 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-001	VA20B3842-002	VA20B3842-003	VA20B3842-004	VA20B3842-005	
					Result	Result	Result	Result	Result	
<b>Total Metals</b>										
thallium, total	7440-28-0	E420	0.000010	mg/L	0.000134	0.000130	<0.000010	<0.000010	<0.000010	
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
titanium, total	7440-32-6	E420	0.00030	mg/L	0.308	0.268	0.0177	0.00471	0.00144	
uranium, total	7440-61-1	E420	0.000010	mg/L	0.000178	0.000175	0.000053	0.000096	0.000164	
vanadium, total	7440-62-2	E420	0.00050	mg/L	0.0192	0.0185	0.00128	<0.00050	<0.00050	
zinc, total	7440-66-6	E420	0.0030	mg/L	0.0418	0.0379	0.0131	0.0052	0.0277	
zirconium, total	7440-67-7	E420	0.00030	mg/L	0.00063	<0.00030	<0.00030	<0.00030	<0.00030	
<b>Dissolved Metals</b>										
aluminum, dissolved	7429-90-5	E421	0.0030	mg/L	0.0472	0.0441	0.0271	0.0251	0.0397	
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00011	0.00010	0.00011	<0.00010	<0.00010	
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00025	0.00022	0.00035	<0.00010	<0.00010	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0288	0.0280	0.0366	0.0240	0.0252	
beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000575	0.0000617	0.0000979	0.0000486	0.000252	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	24.7	23.8	16.7	17.2	23.6	
chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00017	0.00018	<0.00010	<0.00010	0.00077	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00046	0.00053	0.00035	0.00558	0.0278	
iron, dissolved	7439-89-6	E421	0.010	mg/L	0.014	0.013	<0.010	0.016	0.045	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	0.000050	0.000073	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
magnesium, dissolved	7439-95-4	E421	0.100	mg/L	2.42	2.40	1.19	1.17	1.82	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0347	0.0358	0.0158	0.0157	0.141	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000969	0.000868	0.000441	0.000307	0.000187	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00053	0.00051	<0.00050	<0.00050	<0.00050	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
potassium, dissolved	7440-09-7	E421	0.100	mg/L	1.88	1.79	1.38	1.04	1.25	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000343	0.000338	0.000067	0.000108	0.000053	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	BR4	BR3	DUP1	DUP2	JM13
Client sampling date / time					22-Aug-2020 14:34	22-Aug-2020 14:53	22-Aug-2020 09:50	22-Aug-2020	23-Aug-2020 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-001	VA20B3842-002	VA20B3842-003	VA20B3842-004	VA20B3842-005	
					Result	Result	Result	Result	Result	
<b>Dissolved Metals</b>										
silicon, dissolved	7440-21-3	E421	0.050	mg/L	1.15	1.13	1.02	1.40	1.21	
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
sodium, dissolved	7440-23-5	E421	0.050	mg/L	0.584	0.590	0.499	0.605	0.527	
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.132	0.131	0.0833	0.0989	0.147	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	10.1	10.0	5.81	4.09	8.34	
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	0.000011	0.000011	<0.000010	<0.000010	<0.000010	
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	0.00064	0.00056	<0.00030	<0.00030	<0.00030	
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000082	0.000081	0.000032	0.000083	0.000092	
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0017	0.0021	0.0053	0.0032	0.0252	
zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	
dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	Field	Field	
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	Field	Field	

Please refer to the General Comments section for an explanation of any qualifiers detected.





## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					JM12	SCH1	DUP3	JM3	DUP4
Client sampling date / time					23-Aug-2020 09:32	23-Aug-2020 09:59	23-Aug-2020 09:59	23-Aug-2020 10:14	23-Aug-2020 10:14
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-006	VA20B3842-007	VA20B3842-008	VA20B3842-009	VA20B3842-010
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
acidity (as CaCO3)	----	E283	2.0	mg/L	2.4	<2.0	<2.0	<2.0	<2.0
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	20.8	33.7	33.4	50.6	50.1
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	20.8	33.7	33.4	50.6	50.1
colour, true	----	E329	5.0	CU	<5.0	<5.0	<5.0	<5.0	<5.0
conductivity	----	E100	2.0	µS/cm	233	86.7	87.7	166	167
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	108	41.7	41.7	79.3	78.0
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	103	40.2	40.8	75.1	75.7
pH	----	E108	0.10	pH units	7.08	7.38	7.38	7.57	7.56
solids, total dissolved [TDS]	----	E162	10	mg/L	158	60	62	91	100
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	6.5	23.5	25.9	<3.0	<3.0
turbidity	----	E121	0.10	NTU	8.05	6.89	9.85	2.23	1.98
<b>Anions and Nutrients</b>									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0056	<0.0050	0.0085	0.0390 <sup>RRV</sup>	0.0609 <sup>RRV</sup>
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50
fluoride	16984-48-8	E235.F	0.020	mg/L	0.041	<0.020	<0.020	0.024	0.023
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	<0.050	<0.050	<0.050	0.089	0.096
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0178	<0.0050	<0.0050	0.0678	0.0665
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	<0.0010	0.0200	0.0189
nitrogen, total	7727-37-9	E366	0.030	mg/L	0.038	<0.030	<0.030	0.133	0.157
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	0.0013	<0.0010	<0.0010	<0.0010
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	<0.0020	0.0236	0.0208	<0.0020	<0.0020
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	88.5	9.93	10.3	30.9	30.8
<b>Cyanides</b>									
cyanide, free	----	E339	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cyanide, strong acid dissociable (total)	----	E333	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cyanide, weak acid dissociable	----	E336	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
<b>Organic / Inorganic Carbon</b>									
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	0.62	1.07	1.10	<0.50	0.52



## Analytical Results

Sub-Matrix: Water					Client sample ID	JM12	SCH1	DUP3	JM3	DUP4
(Matrix: Water)										
Client sampling date / time					23-Aug-2020 09:32	23-Aug-2020 09:59	23-Aug-2020 09:59	23-Aug-2020 10:14	23-Aug-2020 10:14	
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-006	VA20B3842-007	VA20B3842-008	VA20B3842-009	VA20B3842-010	
					Result	Result	Result	Result	Result	
<b>Organic / Inorganic Carbon</b>										
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	0.58	<0.50	<0.50	0.57	<0.50	
<b>Total Metals</b>										
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.508	0.362	0.394	0.141	0.139	
antimony, total	7440-36-0	E420	0.00010	mg/L	0.00020	<0.00010	<0.00010	0.00012	0.00012	
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00023	0.00031	0.00038	0.00017	0.00015	
barium, total	7440-39-3	E420	0.00010	mg/L	0.0261	0.0389	0.0402	0.0292	0.0292	
beryllium, total	7440-41-7	E420	0.000020	mg/L	0.000043	<0.000020	<0.000020	<0.000020	<0.000020	
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.00107	0.0000902	0.0000997	0.000351	0.000358	
calcium, total	7440-70-2	E420	0.050	mg/L	34.7	14.1	14.3	25.7	26.0	
chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	0.00014	<0.00010	<0.00010	<0.00010	<0.00010	
cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00369	0.00031	0.00034	0.00073	0.00074	
copper, total	7440-50-8	E420	0.00050	mg/L	0.286	0.00720	0.00859	0.101	0.0985	
iron, total	7439-89-6	E420	0.010	mg/L	1.49	0.533	0.558	0.558	0.535	
lead, total	7439-92-1	E420	0.000050	mg/L	0.00375	0.00480	0.00496	0.000421	0.000395	
lithium, total	7439-93-2	E420	0.0010	mg/L	0.0014	<0.0010	<0.0010	<0.0010	<0.0010	
magnesium, total	7439-95-4	E420	0.100	mg/L	3.93	1.21	1.26	2.64	2.60	
manganese, total	7439-96-5	E420	0.00010	mg/L	0.486	0.0645	0.0685	0.167	0.163	
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000119	0.000347	0.000340	0.000237	0.000213	
nickel, total	7440-02-0	E420	0.00050	mg/L	0.00067	<0.00050	<0.00050	<0.00050	<0.00050	
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
potassium, total	7440-09-7	E420	0.100	mg/L	1.73	1.15	1.19	1.46	1.44	
selenium, total	7782-49-2	E420	0.000050	mg/L	0.000149	0.000100	0.000085	0.000129	0.000081	
silicon, total	7440-21-3	E420	0.10	mg/L	2.25	1.31	1.35	1.42	1.43	
silver, total	7440-22-4	E420	0.000010	mg/L	0.000057	0.000014	0.000013	<0.000010	<0.000010	
sodium, total	7440-23-5	E420	0.050	mg/L	0.639	0.452	0.447	0.552	0.539	
strontium, total	7440-24-6	E420	0.00020	mg/L	0.205	0.0934	0.0910	0.200	0.204	
sulfur, total	7704-34-9	E420	0.50	mg/L	31.3	3.46	3.54	10.5	10.6	
thallium, total	7440-28-0	E420	0.000010	mg/L	0.000016	0.000015	0.000014	<0.000010	<0.000010	



## Analytical Results

Sub-Matrix: Water					Client sample ID	JM12	SCH1	DUP3	JM3	DUP4
(Matrix: Water)										
Client sampling date / time					23-Aug-2020 09:32	23-Aug-2020 09:59	23-Aug-2020 09:59	23-Aug-2020 10:14	23-Aug-2020 10:14	
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-006	VA20B3842-007	VA20B3842-008	VA20B3842-009	VA20B3842-010	
					Result	Result	Result	Result	Result	
<b>Total Metals</b>										
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
titanium, total	7440-32-6	E420	0.00030	mg/L	0.00461	0.0287	0.0301	0.00171	0.00190	
uranium, total	7440-61-1	E420	0.000010	mg/L	0.000198	0.000134	0.000140	0.000249	0.000236	
vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	0.00134	0.00146	<0.00050	<0.00050	
zinc, total	7440-66-6	E420	0.0030	mg/L	0.132	0.0115	0.0132	0.0352	0.0342	
zirconium, total	7440-67-7	E420	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	
<b>Dissolved Metals</b>										
aluminum, dissolved	7429-90-5	E421	0.0030	mg/L	0.0128	0.0360	0.0249	0.0384	0.0371	
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00012	<0.00010	<0.00010	<0.00010	<0.00010	
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	<0.00010	0.00014	0.00013	<0.00010	<0.00010	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0245	0.0282	0.0282	0.0293	0.0291	
beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.00101	0.0000352	0.0000442	0.000309	0.000300	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	37.4	15.2	15.1	27.6	27.2	
chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00356	<0.00010	<0.00010	0.00070	0.00070	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.0812	0.00401	0.00394	0.0215	0.0215	
iron, dissolved	7439-89-6	E421	0.010	mg/L	0.109	0.032	0.013	0.017	0.019	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	0.000168	0.000120	<0.000050	<0.000050	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0013	<0.0010	<0.0010	<0.0010	<0.0010	
magnesium, dissolved	7439-95-4	E421	0.100	mg/L	3.67	0.938	0.964	2.54	2.46	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.470	0.0116	0.0135	0.160	0.157	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000092	0.000376	0.000377	0.000240	0.000234	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00064	<0.00050	<0.00050	<0.00050	<0.00050	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
potassium, dissolved	7440-09-7	E421	0.100	mg/L	1.70	0.995	0.980	1.48	1.41	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000135	0.000053	0.000105	0.000096	0.000096	
silicon, dissolved	7440-21-3	E421	0.050	mg/L	1.88	0.717	0.749	1.34	1.26	



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					JM12	SCH1	DUP3	JM3	DUP4
Client sampling date / time					23-Aug-2020 09:32	23-Aug-2020 09:59	23-Aug-2020 09:59	23-Aug-2020 10:14	23-Aug-2020 10:14
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-006	VA20B3842-007	VA20B3842-008	VA20B3842-009	VA20B3842-010
					Result	Result	Result	Result	Result
<b>Dissolved Metals</b>									
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
sodium, dissolved	7440-23-5	E421	0.050	mg/L	0.661	0.454	0.456	0.574	0.565
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.201	0.0884	0.0926	0.201	0.190
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	30.2	3.27	3.43	10.2	10.3
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	0.000013	<0.000010	<0.000010	<0.000010	<0.000010
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	0.00167	0.00067	<0.00030	<0.00030
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000013	0.000095	0.000091	0.000141	0.000144
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.118	0.0023	0.0026	0.0257	0.0265
zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	Field	Field
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	Field	Field
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>									
benzene	71-43-2	E611A	0.50	µg/L	----	----	----	<0.50	<0.50
ethylbenzene	100-41-4	E611A	0.50	µg/L	----	----	----	<0.50	<0.50
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	----	----	----	<0.50	<0.50
styrene	100-42-5	E611A	0.50	µg/L	----	----	----	<0.50	<0.50
toluene	108-88-3	E611A	0.50	µg/L	----	----	----	<0.50	<0.50
xylene, m+p-	179601-23-1	E611A	0.50	µg/L	----	----	----	<0.50	<0.50
xylene, o-	95-47-6	E611A	0.50	µg/L	----	----	----	<0.50	<0.50
xylenes, total	1330-20-7	E611A	0.75	µg/L	----	----	----	<0.75	<0.75
<b>Volatile Organic Compounds Surrogates</b>									
bromofluorobenzene, 4-	460-00-4	E611A	0.50	%	----	----	----	94.3	93.7
difluorobenzene, 1,4-	540-36-3	E611A	0.50	%	----	----	----	109	106
<b>Hydrocarbons</b>									
EPH (C10-C19)	----	E601A	250	µg/L	----	----	----	<250	<250
EPH (C19-C32)	----	E601A	250	µg/L	----	----	----	<250	<250
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	----	----	----	<100	<100
HEPHw	----	EC600A	250	µg/L	----	----	----	<250	<250
LEPHw	----	EC600A	250	µg/L	----	----	----	<250	<250



## Analytical Results

Sub-Matrix: Water					Client sample ID	JM12	SCH1	DUP3	JM3	DUP4
(Matrix: Water)										
Client sampling date / time					23-Aug-2020 09:32	23-Aug-2020 09:59	23-Aug-2020 09:59	23-Aug-2020 10:14	23-Aug-2020 10:14	
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-006	VA20B3842-007	VA20B3842-008	VA20B3842-009	VA20B3842-010	
					Result	Result	Result	Result	Result	
<b>Hydrocarbons</b>										
VPHw	----	EC580A	100	µg/L	----	----	----	<100	<100	
<b>Hydrocarbons Surrogates</b>										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%	----	----	----	91.8	93.2	
dichlorotoluene, 3,4-	97-75-0	E581 VH+F1	1.0	%	----	----	----	78.3	114	
<b>Polycyclic Aromatic Hydrocarbons</b>										
acenaphthene	83-32-9	E641A	0.010	µg/L	----	----	----	<0.010	<0.010	
acenaphthylene	208-96-8	E641A	0.010	µg/L	----	----	----	<0.010	<0.010	
acridine	260-94-6	E641A	0.010	µg/L	----	----	----	<0.010	<0.010	
anthracene	120-12-7	E641A	0.010	µg/L	----	----	----	<0.010	<0.010	
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	----	----	----	<0.010	<0.010	
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	----	----	----	<0.0050	<0.0050	
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	----	----	----	<0.010	<0.010	
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	----	----	----	<0.015	<0.015	
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	----	----	----	<0.010	<0.010	
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	----	----	----	<0.010	<0.010	
chrysene	218-01-9	E641A	0.010	µg/L	----	----	----	<0.010	<0.010	
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	----	----	----	<0.0050	<0.0050	
fluoranthene	206-44-0	E641A	0.010	µg/L	----	----	----	<0.010	<0.010	
fluorene	86-73-7	E641A	0.010	µg/L	----	----	----	<0.010	<0.010	
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	----	----	----	<0.010	<0.010	
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	----	----	----	<0.010	<0.010	
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	----	----	----	<0.010	<0.010	
naphthalene	91-20-3	E641A	0.050	µg/L	----	----	----	<0.050	<0.050	
phenanthrene	85-01-8	E641A	0.020	µg/L	----	----	----	<0.020	<0.020	
pyrene	129-00-0	E641A	0.010	µg/L	----	----	----	<0.010	<0.010	
quinoline	6027-02-7	E641A	0.050	µg/L	----	----	----	<0.050	<0.050	
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>										
acridine-d9	34749-75-2	E641A	0.010	%	----	----	----	88.2	89.2	
chrysene-d12	1719-03-5	E641A	0.010	%	----	----	----	93.4	88.8	
naphthalene-d8	1146-65-2	E641A	0.010	%	----	----	----	98.1	99.8	
phenanthrene-d10	1517-22-2	E641A	0.010	%	----	----	----	100	103	



Please refer to the General Comments section for an explanation of any qualifiers detected.

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## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					JM4	JM2 SEEPAGE	JM2	TMF1	JM5
Client sampling date / time					23-Aug-2020 10:47	23-Aug-2020 11:17	23-Aug-2020 11:35	23-Aug-2020 12:08	23-Aug-2020 12:25
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-011	VA20B3842-012	VA20B3842-013	VA20B3842-014	VA20B3842-015
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
acidity (as CaCO3)	----	E283	2.0	mg/L	3.4	7.8	<2.0	<2.0	<2.0
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	12.8	3.6	34.6	9.3	10.0
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	12.8	3.6	34.6	9.3	10.0
colour, true	----	E329	5.0	CU	<5.0	<5.0	<5.0	<5.0	<5.0
conductivity	----	E100	2.0	µS/cm	219	576	86.4	45.9	53.0
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	115	277	41.4	19.6	23.8
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	94.4	288	39.8	20.0	21.8
pH	----	E108	0.10	pH units	6.81	5.82	7.20	6.62	6.66
solids, total dissolved [TDS]	----	E162	10	mg/L	146	454	57	26	37
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	6.9	19.9	20.1	<3.0	<3.0
turbidity	----	E121	0.10	NTU	10.2	16.0	14.9	1.39	0.75
<b>Anions and Nutrients</b>									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0051	0.0128	0.0170	<0.0050	<0.0050
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50
fluoride	16984-48-8	E235.F	0.020	mg/L	0.042	0.058	<0.020	<0.020	<0.020
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	<0.050	0.067	<0.050	<0.050	<0.050
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0210	0.0616	0.0051	<0.0050	<0.0050
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
nitrogen, total	7727-37-9	E366	0.030	mg/L	0.052	0.068	0.032	0.041	<0.030
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0.0010	<0.0010	<0.0010
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	<0.0020	<0.0080 <sup>DLM</sup>	0.0221	<0.0020	<0.0020
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	85.5	279	9.33	11.3	13.5
<b>Cyanides</b>									
cyanide, free	----	E339	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cyanide, strong acid dissociable (total)	----	E333	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cyanide, weak acid dissociable	----	E336	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
<b>Organic / Inorganic Carbon</b>									
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	1.33	1.62	1.24	1.12	0.90



## Analytical Results

Sub-Matrix: Water					Client sample ID	JM4	JM2 SEEPAGE	JM2	TMF1	JM5
(Matrix: Water)										
Client sampling date / time					23-Aug-2020 10:47	23-Aug-2020 11:17	23-Aug-2020 11:35	23-Aug-2020 12:08	23-Aug-2020 12:25	
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-011	VA20B3842-012	VA20B3842-013	VA20B3842-014	VA20B3842-015	
					Result	Result	Result	Result	Result	
<b>Organic / Inorganic Carbon</b>										
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	<0.50	0.96	<0.50	0.56	<0.50	
<b>Total Metals</b>										
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.631	0.244	0.303	0.0840	0.0356	
antimony, total	7440-36-0	E420	0.00010	mg/L	0.00027	<0.00010	<0.00010	<0.00010	<0.00010	
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00025	0.00020	0.00029	0.00018	0.00012	
barium, total	7440-39-3	E420	0.00010	mg/L	0.0305	0.0278	0.0391	0.00895	0.00846	
beryllium, total	7440-41-7	E420	0.000020	mg/L	0.000058	0.000193	<0.000020	<0.000020	<0.000020	
bismuth, total	7440-69-9	E420	0.000050	mg/L	0.000069	<0.000050	<0.000050	<0.000050	<0.000050	
boron, total	7440-42-8	E420	0.010	mg/L	<0.010	0.012	<0.010	<0.010	<0.010	
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.00120	0.00511	0.0000643	0.0000300	0.0000188	
calcium, total	7440-70-2	E420	0.050	mg/L	31.3	85.6	14.2	6.80	7.43	
chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	0.00019	<0.00010	<0.00010	<0.00010	<0.00010	
cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00462	0.0144	0.00025	<0.00010	<0.00010	
copper, total	7440-50-8	E420	0.00050	mg/L	0.400	1.74	0.00101	0.00167	0.00187	
iron, total	7439-89-6	E420	0.010	mg/L	2.40	0.086	0.427	0.116	0.046	
lead, total	7439-92-1	E420	0.000050	mg/L	0.00502	0.000599	0.00420	0.000303	0.000125	
lithium, total	7439-93-2	E420	0.0010	mg/L	0.0016	0.0037	<0.0010	<0.0010	<0.0010	
magnesium, total	7439-95-4	E420	0.100	mg/L	3.94	18.0	1.07	0.732	0.779	
manganese, total	7439-96-5	E420	0.00010	mg/L	0.570	2.70	0.0530	0.0183	0.00966	
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000194	<0.000050	0.000363	<0.000050	<0.000050	
nickel, total	7440-02-0	E420	0.00050	mg/L	0.00086	0.00521	<0.00050	<0.00050	<0.00050	
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
potassium, total	7440-09-7	E420	0.100	mg/L	1.61	3.28	1.11	0.487	0.488	
selenium, total	7782-49-2	E420	0.000050	mg/L	0.000153	0.000509	0.000064	<0.000050	0.000056	
silicon, total	7440-21-3	E420	0.10	mg/L	2.76	3.81	1.32	0.23	0.19	
silver, total	7440-22-4	E420	0.000010	mg/L	0.000089	0.000020	0.000010	<0.000010	<0.000010	
sodium, total	7440-23-5	E420	0.050	mg/L	0.763	0.686	0.441	0.161	0.148	
strontium, total	7440-24-6	E420	0.00020	mg/L	0.200	0.495	0.0900	0.0308	0.0332	
sulfur, total	7704-34-9	E420	0.50	mg/L	29.4	109	3.34	3.95	4.77	
thallium, total	7440-28-0	E420	0.000010	mg/L	0.000020	0.000022	0.000012	<0.000010	<0.000010	





## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					JM4	JM2 SEEPAGE	JM2	TMF1	JM5
Client sampling date / time					23-Aug-2020 10:47	23-Aug-2020 11:17	23-Aug-2020 11:35	23-Aug-2020 12:08	23-Aug-2020 12:25
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-011	VA20B3842-012	VA20B3842-013	VA20B3842-014	VA20B3842-015
					Result	Result	Result	Result	Result
<b>Total Metals</b>									
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
titanium, total	7440-32-6	E420	0.00030	mg/L	0.00436	<0.00030	0.0218	0.00301	0.00103
uranium, total	7440-61-1	E420	0.000010	mg/L	0.000257	0.000252	0.000131	<0.000010	<0.000010
vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0.00101	<0.00050	<0.00050
zinc, total	7440-66-6	E420	0.0030	mg/L	0.164	0.641	0.0087	0.0034	<0.0030
zirconium, total	7440-67-7	E420	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
<b>Dissolved Metals</b>									
aluminum, dissolved	7429-90-5	E421	0.0030	mg/L	0.0173	3.36 <sup>DTC</sup>	0.0197	0.0080	0.0063
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00017	<0.00010	<0.00010	<0.00010	<0.00010
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00012	0.00033	0.00017	<0.00010	<0.00010
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0323	0.0241	0.0288	0.00758	0.00799
beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	0.000037	0.000352 <sup>DTC</sup>	<0.000020	<0.000020	<0.000020
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	0.012	<0.010	<0.010	<0.010
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.00186 <sup>DTC</sup>	0.00498	0.0000156	0.0000178	0.0000131
calcium, dissolved	7440-70-2	E421	0.050	mg/L	38.3	83.6	15.2	6.71	8.22
chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	<0.00010	0.00015	<0.00010	<0.00010	<0.00010
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00752 <sup>DTC</sup>	0.0127	<0.00010	<0.00010	<0.00010
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.345	1.93	<0.00020	0.00081	0.00128
iron, dissolved	7439-89-6	E421	0.010	mg/L	0.541	3.11 <sup>DTC</sup>	0.014	<0.010	<0.010
lead, dissolved	7439-92-1	E421	0.000050	mg/L	0.000060	0.00671 <sup>DTC</sup>	0.000141	<0.000050	<0.000050
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0020	0.0039	<0.0010	<0.0010	<0.0010
magnesium, dissolved	7439-95-4	E421	0.100	mg/L	4.65	16.6	0.875	0.698	0.803
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	1.00 <sup>DTC</sup>	2.48	0.00512	0.00214	0.00229
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000074	0.000131 <sup>DTC</sup>	0.000390	<0.000050	<0.000050
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00127	0.00463	<0.00050	<0.00050	<0.00050
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
potassium, dissolved	7440-09-7	E421	0.100	mg/L	1.99	2.86	0.955	0.467	0.523
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000085	0.000440	0.000107	<0.000050	<0.000050
silicon, dissolved	7440-21-3	E421	0.050	mg/L	2.64	3.68	0.745	0.104	0.117



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					JM4	JM2 SEEPAGE	JM2	TMF1	JM5
Client sampling date / time					23-Aug-2020 10:47	23-Aug-2020 11:17	23-Aug-2020 11:35	23-Aug-2020 12:08	23-Aug-2020 12:25
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-011	VA20B3842-012	VA20B3842-013	VA20B3842-014	VA20B3842-015
					Result	Result	Result	Result	Result
<b>Dissolved Metals</b>									
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	0.000029	<0.000010	<0.000010	<0.000010
sodium, dissolved	7440-23-5	E421	0.050	mg/L	0.945	0.623	0.480	0.152	0.155
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.266	0.490	0.0894	0.0289	0.0342
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	35.0	90.1	2.98	3.61	4.44
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	0.000022	0.000018	<0.000010	<0.000010	<0.000010
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	0.00035	0.00063	<0.00030	<0.00030
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000043	0.000744 <sup>DTC</sup>	0.000118	<0.000010	<0.000010
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.227 <sup>DTC</sup>	0.619	<0.0010	0.0013	0.0019
zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	0.00042	<0.00030	<0.00030	<0.00030
dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	Field	Field
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	Field	Field
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>									
benzene	71-43-2	E611A	0.50	µg/L	<0.50	----	<0.50	<0.50	<0.50
ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	----	<0.50	<0.50	<0.50
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	----	<0.50	<0.50	<0.50
styrene	100-42-5	E611A	0.50	µg/L	<0.50	----	<0.50	<0.50	<0.50
toluene	108-88-3	E611A	0.50	µg/L	<0.50	----	<0.50	<0.50	<0.50
xylene, m+p-	179601-23-1	E611A	0.50	µg/L	<0.50	----	<0.50	<0.50	<0.50
xylene, o-	95-47-6	E611A	0.50	µg/L	<0.50	----	<0.50	<0.50	<0.50
xylenes, total	1330-20-7	E611A	0.75	µg/L	<0.75	----	<0.75	<0.75	<0.75
<b>Volatile Organic Compounds Surrogates</b>									
bromofluorobenzene, 4-	460-00-4	E611A	0.50	%	96.4	----	94.7	94.3	94.8
difluorobenzene, 1,4-	540-36-3	E611A	0.50	%	106	----	104	110	111
<b>Hydrocarbons</b>									
EPH (C10-C19)	----	E601A	250	µg/L	<250	----	<250	<250	<250
EPH (C19-C32)	----	E601A	250	µg/L	<250	----	<250	<250	<250
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----	<100	<100	<100
HEPHw	----	EC600A	250	µg/L	<250	----	<250	<250	<250
LEPHw	----	EC600A	250	µg/L	<250	----	<250	<250	<250



## Analytical Results

Sub-Matrix: Water					Client sample ID	JM4	JM2 SEEPAGE	JM2	TMF1	JM5
(Matrix: Water)										
Client sampling date / time					23-Aug-2020 10:47	23-Aug-2020 11:17	23-Aug-2020 11:35	23-Aug-2020 12:08	23-Aug-2020 12:25	
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-011	VA20B3842-012	VA20B3842-013	VA20B3842-014	VA20B3842-015	
					Result	Result	Result	Result	Result	
<b>Hydrocarbons</b>										
VPHw	----	EC580A	100	µg/L	<100	----	<100	<100	<100	<100
<b>Hydrocarbons Surrogates</b>										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%	94.5	----	102	90.7	92.5	
dichlorotoluene, 3,4-	97-75-0	E581 VH+F1	1.0	%	110		106	111	112	
<b>Polycyclic Aromatic Hydrocarbons</b>										
acenaphthene	83-32-9	E641A	0.010	µg/L	0.022	----	<0.010	<0.010	<0.010	<0.010
acenaphthylene	208-96-8	E641A	0.010	µg/L	<0.010	----	<0.010	<0.010	<0.010	<0.010
acridine	260-94-6	E641A	0.010	µg/L	<0.010	----	<0.010	<0.010	<0.010	<0.010
anthracene	120-12-7	E641A	0.010	µg/L	<0.010	----	<0.010	<0.010	<0.010	<0.010
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	<0.010	----	<0.010	<0.010	<0.010	<0.010
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	<0.0050	----	<0.0050	<0.0050	<0.0050	<0.0050
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	<0.010	----	<0.010	<0.010	<0.010	<0.010
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	----	<0.015	<0.015	<0.015	<0.015
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	<0.010	----	<0.010	<0.010	<0.010	<0.010
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	<0.010	----	<0.010	<0.010	<0.010	<0.010
chrysene	218-01-9	E641A	0.010	µg/L	<0.010	----	<0.010	<0.010	<0.010	<0.010
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	<0.0050	----	<0.0050	<0.0050	<0.0050	<0.0050
fluoranthene	206-44-0	E641A	0.010	µg/L	<0.010	----	<0.010	<0.010	<0.010	<0.010
fluorene	86-73-7	E641A	0.010	µg/L	0.032	----	<0.010	<0.010	<0.010	<0.010
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	<0.010	----	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	0.351	----	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	0.090	----	<0.010	<0.010	<0.010	<0.010
naphthalene	91-20-3	E641A	0.050	µg/L	<0.070 <sup>DLC</sup>	----	<0.050	<0.050	<0.050	<0.050
phenanthrene	85-01-8	E641A	0.020	µg/L	<0.020	----	<0.020	<0.020	<0.020	<0.020
pyrene	129-00-0	E641A	0.010	µg/L	<0.010	----	<0.010	<0.010	<0.010	<0.010
quinoline	6027-02-7	E641A	0.050	µg/L	<0.050	----	<0.050	<0.050	<0.050	<0.050
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>										
acridine-d9	34749-75-2	E641A	0.010	%	91.7	----	95.7	88.1	91.9	
chrysene-d12	1719-03-5	E641A	0.010	%	96.4	----	103	96.4	91.3	
naphthalene-d8	1146-65-2	E641A	0.010	%	103	----	109	96.9	106	
phenanthrene-d10	1517-22-2	E641A	0.010	%	107	----	111	100	108	



Please refer to the General Comments section for an explanation of any qualifiers detected.

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## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					SK1	JM10-2018	JM11	JM6	JM14
Client sampling date / time					23-Aug-2020 12:48	23-Aug-2020 13:23	23-Aug-2020 14:11	23-Aug-2020 14:32	23-Aug-2020 15:02
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-016	VA20B3842-017	VA20B3842-018	VA20B3842-019	VA20B3842-020
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
acidity (as CaCO3)	---	E283	2.0	mg/L	<2.0	<2.0	<2.0	---	<2.0
acidity, hot peroxide treated (as CaCO3)	---	E284A	25	mg/L	---	-48	---	---	---
alkalinity, bicarbonate (as CaCO3)	---	E290	1.0	mg/L	16.6	55.5	29.4	---	29.0
alkalinity, carbonate (as CaCO3)	---	E290	1.0	mg/L	<1.0	<1.0	<1.0	---	<1.0
alkalinity, hydroxide (as CaCO3)	---	E290	1.0	mg/L	<1.0	<1.0	<1.0	---	<1.0
alkalinity, total (as CaCO3)	---	E290	1.0	mg/L	16.6	55.5	29.4	---	29.0
colour, true	---	E329	5.0	CU	5.1	<5.0	<5.0	---	<5.0
conductivity	---	E100	2.0	µS/cm	40.3	143	65.8	---	64.4
hardness (as CaCO3), dissolved	---	EC100	0.60	mg/L	18.8	68.8	32.0	30.7	28.9
hardness (as CaCO3), from total Ca/Mg	---	EC100A	0.60	mg/L	18.4	66.3	34.2	32.2	30.8
pH	---	E108	0.10	pH units	6.89	7.49	7.19	---	7.18
solids, total dissolved [TDS]	---	E162	10	mg/L	27	80	55	---	49
solids, total suspended [TSS]	---	E160-H	3.0	mg/L	<3.0	<3.0	58.1	<3.0	37.5
turbidity	---	E121	0.10	NTU	0.13	1.31	64.3	220	37.7
<b>Anions and Nutrients</b>									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0063	<0.0050	0.0063	<0.0050	0.0104
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50
cyanate	88402-73-7	E343	0.20	mg/L	---	<0.20	---	---	---
fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	0.020	<0.020	<0.020	<0.020
Kjeldahl nitrogen, total [TKN]	---	E318	0.050	mg/L	<0.050	0.066	<0.050	<0.050	<0.050
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
nitrogen, total	7727-37-9	E366	0.030	mg/L	0.041	0.057	<0.030	<0.030	<0.030
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0.0011	0.0013	<0.0010
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	<0.0020	0.0033	0.0531	0.0380	0.0415
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	3.06	15.4	4.74	4.83	4.64
<b>Cyanides</b>									
cyanide, free	---	E339	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cyanide, strong acid dissociable (total)	---	E333	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cyanide, weak acid dissociable	---	E336	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					SK1	JM10-2018	JM11	JM6	JM14
Client sampling date / time					23-Aug-2020 12:48	23-Aug-2020 13:23	23-Aug-2020 14:11	23-Aug-2020 14:32	23-Aug-2020 15:02
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-016	VA20B3842-017	VA20B3842-018	VA20B3842-019	VA20B3842-020
					Result	Result	Result	Result	Result
<b>Cyanides</b>									
thiocyanate	302-04-5	E344	0.50	mg/L	----	<0.50	----	----	----
<b>Organic / Inorganic Carbon</b>									
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	1.21	1.80	1.94	2.04	1.60
carbon, total inorganic [TIC]	----	E354-L	0.50	mg/L	----	13.2	----	----	----
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	0.75	1.30	<0.50	<0.50	<0.50
<b>Total Metals</b>									
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0080	0.0570	1.12	0.557	0.478
antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	0.00011	<0.00010	<0.00010
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00014	0.00037	0.00032	0.00021	0.00020
barium, total	7440-39-3	E420	0.00010	mg/L	0.00689	0.0168	0.0745	0.0542	0.0513
beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	0.000034	<0.000020	<0.000020
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000239	0.0000258	0.000310	0.000236	0.000237
calcium, total	7440-70-2	E420	0.050	mg/L	6.48	22.7	11.7	11.3	10.8
chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	<0.00010	0.00066	0.00035	0.00035
copper, total	7440-50-8	E420	0.00050	mg/L	<0.00050	0.00084	0.00384	0.00259	0.00295
iron, total	7439-89-6	E420	0.010	mg/L	0.016	0.083	1.16	0.597	0.566
lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	0.000206	0.00577	0.00381	0.00375
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	0.0013	<0.0010	<0.0010
magnesium, total	7439-95-4	E420	0.100	mg/L	0.536	2.30	1.24	0.953	0.940
manganese, total	7439-96-5	E420	0.00010	mg/L	0.00514	0.0165	0.122	0.0806	0.0802
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000051	<0.0000050
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000067	0.000293	0.000184	0.000140	0.000164
nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	0.078	<0.050	0.058
potassium, total	7440-09-7	E420	0.100	mg/L	0.340	1.11	1.28	0.922	0.903
selenium, total	7782-49-2	E420	0.000050	mg/L	0.000062	0.000075	<0.000050	0.000076	0.000070
silicon, total	7440-21-3	E420	0.10	mg/L	1.32	1.11	2.66	1.78	1.65
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0.000016	0.000010	0.000013



## Analytical Results

Sub-Matrix: Water					Client sample ID	SK1	JM10-2018	JM11	JM6	JM14
(Matrix: Water)										
Client sampling date / time					23-Aug-2020 12:48	23-Aug-2020 13:23	23-Aug-2020 14:11	23-Aug-2020 14:32	23-Aug-2020 15:02	
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-016	VA20B3842-017	VA20B3842-018	VA20B3842-019	VA20B3842-020	
					Result	Result	Result	Result	Result	
<b>Total Metals</b>										
sodium, total	7440-23-5	E420	0.050	mg/L	0.381	0.308	0.416	0.427	0.383	
strontium, total	7440-24-6	E420	0.00020	mg/L	0.0301	0.0971	0.0716	0.0676	0.0695	
sulfur, total	7704-34-9	E420	0.50	mg/L	0.96	5.44	1.52	1.58	1.60	
thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0.000037	0.000022	0.000024	
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
titanium, total	7440-32-6	E420	0.00030	mg/L	<0.00030	0.00212	0.0602	0.0305	0.0289	
uranium, total	7440-61-1	E420	0.000010	mg/L	<0.000010	0.000054	0.000139	0.000108	0.000109	
vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0.00230	0.00122	0.00114	
zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	0.0537	0.0365	0.0364	
zirconium, total	7440-67-7	E420	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	
<b>Dissolved Metals</b>										
aluminum, dissolved	7429-90-5	E421	0.0030	mg/L	0.0033	0.0145	0.0368	0.0333	0.0400	
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00012	0.00029	<0.00010	<0.00010	<0.00010	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.00667	0.0163	0.0321	0.0304	0.0301	
beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000155	0.0000205	0.000143	0.000114	0.000124	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	6.68	23.8	11.7	11.2	10.4	
chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	0.00060	0.00024	0.00030	0.00038	
iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	0.015	0.019	0.018	0.022	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	0.000051	0.000148	0.000141	0.000175	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
magnesium, dissolved	7439-95-4	E421	0.100	mg/L	0.511	2.25	0.705	0.693	0.681	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00184	0.0121	0.0273	0.0217	0.0205	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000062	0.000265	0.000178	0.000165	0.000165	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					SK1	JM10-2018	JM11	JM6	JM14
Client sampling date / time					23-Aug-2020 12:48	23-Aug-2020 13:23	23-Aug-2020 14:11	23-Aug-2020 14:32	23-Aug-2020 15:02
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-016	VA20B3842-017	VA20B3842-018	VA20B3842-019	VA20B3842-020
					Result	Result	Result	Result	Result
<b>Dissolved Metals</b>									
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
potassium, dissolved	7440-09-7	E421	0.100	mg/L	0.324	1.12	0.665	0.623	0.630
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	0.000053	<0.000050	0.000052	0.000065
silicon, dissolved	7440-21-3	E421	0.050	mg/L	1.19	0.958	0.608	0.754	0.809
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
sodium, dissolved	7440-23-5	E421	0.050	mg/L	0.377	0.336	0.352	0.368	0.404
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0305	0.0906	0.0677	0.0664	0.0627
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	1.01	5.18	1.34	1.42	1.22
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	0.00040	0.00094	0.00089	0.00103
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	<0.000010	0.000046	0.000091	0.000088	0.000084
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0014	0.0016	0.0030	0.0030	0.0034
zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	Field	Field
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	Field	Field
<b>Aggregate Organics</b>									
chemical oxygen demand [COD]	----	E559	20	mg/L	----	<20	----	----	----
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>									
benzene	71-43-2	E611A	0.50	µg/L	----	<0.50	----	<0.50	----
ethylbenzene	100-41-4	E611A	0.50	µg/L	----	<0.50	----	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	----	<0.50	----	<0.50	----
styrene	100-42-5	E611A	0.50	µg/L	----	<0.50	----	<0.50	----
toluene	108-88-3	E611A	0.50	µg/L	----	<0.50	----	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.50	µg/L	----	<0.50	----	<0.50	----
xylene, o-	95-47-6	E611A	0.50	µg/L	----	<0.50	----	<0.50	----
xylenes, total	1330-20-7	E611A	0.75	µg/L	----	<0.75	----	<0.75	----
<b>Volatile Organic Compounds Surrogates</b>									
bromofluorobenzene, 4-	460-00-4	E611A	0.50	%	----	94.4	----	93.2	----
difluorobenzene, 1,4-	540-36-3	E611A	0.50	%	----	108	----	109	----





## Analytical Results

Sub-Matrix: Water					Client sample ID	SK1	JM10-2018	JM11	JM6	JM14
(Matrix: Water)										
Client sampling date / time					23-Aug-2020 12:48	23-Aug-2020 13:23	23-Aug-2020 14:11	23-Aug-2020 14:32	23-Aug-2020 15:02	
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-016	VA20B3842-017	VA20B3842-018	VA20B3842-019	VA20B3842-020	
					Result	Result	Result	Result	Result	
<b>Hydrocarbons</b>										
EPH (C10-C19)	---	E601A	250	µg/L	---	<250	---	<250	---	
EPH (C19-C32)	---	E601A	250	µg/L	---	<250	---	<250	---	
VHw (C6-C10)	---	E581.VH+F1	100	µg/L	---	<100	---	<100	---	
HEPHw	---	EC600A	250	µg/L	---	<250	---	<250	---	
LEPHw	---	EC600A	250	µg/L	---	<250	---	<250	---	
VPHw	---	EC580A	100	µg/L	---	<100	---	<100	---	
<b>Hydrocarbons Surrogates</b>										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%	---	90.6	---	88.1	---	
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	---	105	---	110	---	
<b>Polycyclic Aromatic Hydrocarbons</b>										
acenaphthene	83-32-9	E641A	0.010	µg/L	---	<0.010	---	<0.010	---	
acenaphthylene	208-96-8	E641A	0.010	µg/L	---	<0.010	---	<0.010	---	
acridine	260-94-6	E641A	0.010	µg/L	---	<0.010	---	<0.010	---	
anthracene	120-12-7	E641A	0.010	µg/L	---	<0.010	---	<0.010	---	
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	---	<0.010	---	<0.010	---	
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	---	<0.0050	---	<0.0050	---	
benzo(b+j)fluoranthene	---	E641A	0.010	µg/L	---	<0.010	---	<0.010	---	
benzo(b+j+k)fluoranthene	---	E641A	0.015	µg/L	---	<0.015	---	<0.015	---	
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	---	<0.010	---	<0.010	---	
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	---	<0.010	---	<0.010	---	
chrysene	218-01-9	E641A	0.010	µg/L	---	<0.010	---	<0.010	---	
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	---	<0.0050	---	<0.0050	---	
fluoranthene	206-44-0	E641A	0.010	µg/L	---	<0.010	---	<0.010	---	
fluorene	86-73-7	E641A	0.010	µg/L	---	<0.010	---	<0.010	---	
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	---	<0.010	---	<0.010	---	
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	---	<0.010	---	<0.010	---	
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	---	<0.010	---	<0.010	---	
naphthalene	91-20-3	E641A	0.050	µg/L	---	<0.050	---	<0.050	---	
phenanthrene	85-01-8	E641A	0.020	µg/L	---	<0.020	---	<0.020	---	
pyrene	129-00-0	E641A	0.010	µg/L	---	<0.010	---	<0.010	---	
quinoline	6027-02-7	E641A	0.050	µg/L	---	<0.050	---	<0.050	---	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	SK1	JM10-2018	JM11	JM6	JM14
Client sampling date / time					23-Aug-2020 12:48	23-Aug-2020 13:23	23-Aug-2020 14:11	23-Aug-2020 14:32	23-Aug-2020 15:02	
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-016	VA20B3842-017	VA20B3842-018	VA20B3842-019	VA20B3842-020	
					Result	Result	Result	Result	Result	
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>										
acridine-d9	34749-75-2	E641A	0.010	%	----	85.1	----	85.4	----	
chrysene-d12	1719-03-5	E641A	0.010	%	----	87.9	----	92.5	----	
naphthalene-d8	1146-65-2	E641A	0.010	%	----	99.7	----	99.0	----	
phenanthrene-d10	1517-22-2	E641A	0.010	%	----	101	----	100	----	

Please refer to the General Comments section for an explanation of any qualifiers detected.



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					JM24	DUP5	FIELD BLANK	TRAVEL BLANK	----
Client sampling date / time					23-Aug-2020 15:26	23-Aug-2020 13:23	23-Aug-2020 13:23	23-Aug-2020	----
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-021	VA20B3842-022	VA20B3842-023	VA20B3842-024	-----
					Result	Result	Result	Result	---
<b>Physical Tests</b>									
acidity (as CaCO3)	----	E283	2.0	mg/L	2.0	2.1	<2.0	<2.0	----
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	25.5	54.1	<1.0	<1.0	----
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	----
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	----
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	25.5	54.1	<1.0	<1.0	----
colour, true	----	E329	5.0	CU	<5.0	<5.0	<5.0	<5.0	----
conductivity	----	E100	2.0	µS/cm	61.2	142	<2.0	<2.0	----
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	28.1	67.0	<0.60	----	----
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	31.4	66.1	<0.60	<0.60	----
pH	----	E108	0.10	pH units	7.70	7.87	5.46	5.66	----
solids, total dissolved [TDS]	----	E162	10	mg/L	47	82	<10	<10	----
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	40.2	<3.0	<3.0	<3.0	----
turbidity	----	E121	0.10	NTU	40.2	1.44	<0.10	<0.10	----
<b>Anions and Nutrients</b>									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0051	0.0097	<0.0050	<0.0050	----
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	----
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	<0.50	<0.50	----
fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	0.022	<0.020	<0.020	----
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	<0.050	0.067	<0.050	<0.050	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	----
nitrogen, total	7727-37-9	E366	0.030	mg/L	<0.030	0.066	<0.030	<0.030	----
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	----
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0412	0.0024	<0.0020	<0.0020	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	4.52	15.6	<0.30	<0.30	----
<b>Cyanides</b>									
cyanide, free	----	E339	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	----
cyanide, strong acid dissociable (total)	----	E333	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	----
cyanide, weak acid dissociable	----	E336	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	----
<b>Organic / Inorganic Carbon</b>									
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	1.57	1.67	<0.50	----	----



## Analytical Results

Sub-Matrix: Water					Client sample ID	JM24	DUP5	FIELD BLANK	TRAVEL BLANK	----
(Matrix: Water)										
Client sampling date / time						23-Aug-2020 15:26	23-Aug-2020 13:23	23-Aug-2020 13:23	23-Aug-2020	----
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-021	VA20B3842-022	VA20B3842-023	VA20B3842-024	-----	
					Result	Result	Result	Result	----	
<b>Organic / Inorganic Carbon</b>										
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	<0.50	1.02	<0.50	<0.50		----
<b>Total Metals</b>										
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.701	0.0560	<0.0030	<0.0030		----
antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010		----
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00028	0.00036	<0.00010	<0.00010		----
barium, total	7440-39-3	E420	0.00010	mg/L	0.0566	0.0169	<0.00010	<0.00010		----
beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020		----
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050		----
boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	<0.010	<0.010		----
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.000262	0.0000232	<0.0000050	<0.0000050		----
calcium, total	7440-70-2	E420	0.050	mg/L	10.8	22.8	<0.050	<0.050		----
chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010		----
cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00048	<0.00010	<0.00010	<0.00010		----
copper, total	7440-50-8	E420	0.00050	mg/L	0.00328	0.00075	<0.00050	<0.00050		----
iron, total	7439-89-6	E420	0.010	mg/L	0.810	0.069	<0.010	<0.010		----
lead, total	7439-92-1	E420	0.000050	mg/L	0.00494	0.000153	<0.000050	<0.000050		----
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010		----
magnesium, total	7439-95-4	E420	0.100	mg/L	1.08	2.24	<0.100	<0.100		----
manganese, total	7439-96-5	E420	0.00010	mg/L	0.0961	0.0150	<0.00010	<0.00010		----
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050		----
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000144	0.000299	<0.000050	<0.000050		----
nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050		----
phosphorus, total	7723-14-0	E420	0.050	mg/L	0.066	<0.050	<0.050	<0.050		----
potassium, total	7440-09-7	E420	0.100	mg/L	1.03	1.10	<0.100	<0.100		----
selenium, total	7782-49-2	E420	0.000050	mg/L	0.000059	0.000054	<0.000050	<0.000050		----
silicon, total	7440-21-3	E420	0.10	mg/L	2.06	1.10	<0.10	<0.10		----
silver, total	7440-22-4	E420	0.000010	mg/L	0.000013	<0.000010	<0.000010	<0.000010		----
sodium, total	7440-23-5	E420	0.050	mg/L	0.406	0.297	<0.050	<0.050		----
strontium, total	7440-24-6	E420	0.00020	mg/L	0.0680	0.0985	<0.00020	<0.00020		----
sulfur, total	7704-34-9	E420	0.50	mg/L	1.45	5.17	<0.50	<0.50		----
thallium, total	7440-28-0	E420	0.000010	mg/L	0.000029	<0.000010	<0.000010	<0.000010		----



## Analytical Results

Sub-Matrix: Water					Client sample ID	JM24	DUP5	FIELD BLANK	TRAVEL BLANK	----
(Matrix: Water)										
Client sampling date / time					23-Aug-2020 15:26	23-Aug-2020 13:23	23-Aug-2020 13:23	23-Aug-2020	----	
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-021	VA20B3842-022	VA20B3842-023	VA20B3842-024	-----	
					Result	Result	Result	Result	---	
<b>Total Metals</b>										
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----	
titanium, total	7440-32-6	E420	0.00030	mg/L	0.0412	0.00163	<0.00030	<0.00030	----	
uranium, total	7440-61-1	E420	0.000010	mg/L	0.000105	0.000054	<0.000010	<0.000010	----	
vanadium, total	7440-62-2	E420	0.00050	mg/L	0.00174	<0.00050	<0.00050	<0.00050	----	
zinc, total	7440-66-6	E420	0.0030	mg/L	0.0452	<0.0030	<0.0030	<0.0030	----	
zirconium, total	7440-67-7	E420	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	----	
<b>Dissolved Metals</b>										
aluminum, dissolved	7429-90-5	E421	0.0030	mg/L	0.0444	0.0125	<0.0030	----	----	
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----	
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00012	0.00024	<0.00010	----	----	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0279	0.0164	<0.00010	----	----	
beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	<0.000020	----	----	
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	----	
boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	<0.010	----	----	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.000118	0.0000220	<0.0000050	----	----	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	10.1	23.2	<0.050	----	----	
chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00046	0.00049	<0.00020	----	----	
iron, dissolved	7439-89-6	E421	0.010	mg/L	0.031	0.011	<0.010	----	----	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	0.000227	<0.000050	<0.000050	----	----	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	<0.0010	----	----	
magnesium, dissolved	7439-95-4	E421	0.100	mg/L	0.687	2.20	<0.100	----	----	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0204	0.0118	<0.00010	----	----	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	----	----	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000159	0.000281	<0.000050	----	----	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	<0.050	----	----	
potassium, dissolved	7440-09-7	E421	0.100	mg/L	0.629	1.11	<0.100	----	----	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000064	<0.000050	<0.000050	----	----	
silicon, dissolved	7440-21-3	E421	0.050	mg/L	0.824	0.928	<0.050	----	----	



## Analytical Results

Sub-Matrix: Water					Client sample ID	JM24	DUP5	FIELD BLANK	TRAVEL BLANK	----
(Matrix: Water)										
Client sampling date / time					23-Aug-2020 15:26	23-Aug-2020 13:23	23-Aug-2020 13:23	23-Aug-2020	----	
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-021	VA20B3842-022	VA20B3842-023	VA20B3842-024	-----	
					Result	Result	Result	Result	----	
<b>Dissolved Metals</b>										
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	----	----	
sodium, dissolved	7440-23-5	E421	0.050	mg/L	0.383	0.311	<0.050	----	----	
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0640	0.0965	<0.00020	----	----	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	1.32	4.86	<0.50	----	----	
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	----	----	
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----	
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	0.00139	<0.00030	<0.00030	----	----	
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000084	0.000051	<0.000010	----	----	
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----	
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0042	0.0013	<0.0010	----	----	
zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	<0.00030	----	----	
dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	----	----	
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	----	----	

Please refer to the General Comments section for an explanation of any qualifiers detected.

## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>VA20B3842</b>	Page	: 1 of 95
Client	: <b>ERM Consultants Canada Ltd.</b>	Laboratory	: Vancouver - Environmental
Contact	: Jill Zyla	Account Manager	: Amber Springer
Address	: 3790 Alfred Ave Smithers BC Canada V0J 2N0	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: 604 689 9460	Telephone	: +1 604 253 4188
Project	: 0539378-0012 (WQ ISKUT)	Date Samples Received	: 28-Aug-2020 10:10
PO	: ----	Issue Date	: 10-Sep-2020 14:18
C-O-C number	: 17-841428, 17-841426		
Sampler	: ----		
Site	: ----		
Quote number	: Q74326		
No. of samples received	: 24		
No. of samples analysed	: 24		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

## Summary of Outliers

### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.

### **Outliers : Analysis Holding Time Compliance (Breaches)**

- Analysis Holding Time Outliers exist - please see following pages for full details.

### **Outliers : Frequency of Quality Control Samples**

- No Quality Control Sample Frequency Outliers occur.

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## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>										
<b>Amber glass total (sulfuric acid)</b> JM10-2018	E559	23-Aug-2020	----	----	----		03-Sep-2020	28 days	10 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> DUP3	E298	23-Aug-2020	----	----	----		04-Sep-2020	28 days	12 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> DUP4	E298	23-Aug-2020	----	----	----		04-Sep-2020	28 days	12 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> JM10-2018	E298	23-Aug-2020	----	----	----		04-Sep-2020	28 days	12 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> JM11	E298	23-Aug-2020	----	----	----		04-Sep-2020	28 days	12 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> JM12	E298	23-Aug-2020	----	----	----		04-Sep-2020	28 days	12 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> JM13	E298	23-Aug-2020	----	----	----		04-Sep-2020	28 days	12 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> JM14	E298	23-Aug-2020	----	----	----		04-Sep-2020	28 days	12 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> JM2	E298	23-Aug-2020	----	----	----		04-Sep-2020	28 days	12 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> JM2 SEEPAGE	E298	23-Aug-2020	----	----	----		04-Sep-2020	28 days	12 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> JM3	E298	23-Aug-2020	----	----	----		04-Sep-2020	28 days	12 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> JM4	E298	23-Aug-2020	----	----	----		04-Sep-2020	28 days	12 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> JM5	E298	23-Aug-2020	----	----	----		04-Sep-2020	28 days	12 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> JM6	E298	23-Aug-2020	----	----	----		04-Sep-2020	28 days	12 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> SCH1	E298	23-Aug-2020	----	----	----		04-Sep-2020	28 days	12 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> SK1	E298	23-Aug-2020	----	----	----		04-Sep-2020	28 days	12 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> TMF1	E298	23-Aug-2020	----	----	----		04-Sep-2020	28 days	12 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> BR3	E298	22-Aug-2020	----	----	----		04-Sep-2020	28 days	13 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> BR4	E298	22-Aug-2020	----	----	----		04-Sep-2020	28 days	13 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> DUP1	E298	22-Aug-2020	----	----	----		04-Sep-2020	28 days	13 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> DUP2	E298	22-Aug-2020	----	----	----		04-Sep-2020	28 days	13 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> DUP5	E298	23-Aug-2020	----	----	----		01-Sep-2020	28 days	9 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> FIELD BLANK	E298	23-Aug-2020	----	----	----		01-Sep-2020	28 days	9 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> JM24	E298	23-Aug-2020	----	----	----		01-Sep-2020	28 days	9 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> TRAVEL BLANK	E298	23-Aug-2020	----	----	----		01-Sep-2020	28 days	9 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE JM6	E235.Br-L	23-Aug-2020	----	----	----		02-Sep-2020	28 days	10 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE JM14	E235.Br-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE JM24	E235.Br-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE TRAVEL BLANK	E235.Br-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE BR3	E235.Br-L	22-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE BR4	E235.Br-L	22-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE DUP2	E235.Br-L	22-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE DUP3	E235.Br-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE DUP4	E235.Br-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE DUP5	E235.Br-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE FIELD BLANK	E235.Br-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE JM10-2018	E235.Br-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE JM11	E235.Br-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE JM12	E235.Br-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE JM13	E235.Br-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE JM2	E235.Br-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE JM2 SEEPAGE	E235.Br-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE JM3	E235.Br-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE JM4	E235.Br-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE JM5	E235.Br-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE SCH1	E235.Br-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE SK1	E235.Br-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE TMF1	E235.Br-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE DUP1	E235.Br-L	22-Aug-2020	----	----	----		29-Aug-2020	28 days	7 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE JM6	E235.Cl	23-Aug-2020	----	----	----		02-Sep-2020	28 days	10 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE JM14	E235.Cl	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE JM24	E235.Cl	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE TRAVEL BLANK	E235.Cl	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE BR3	E235.Cl	22-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE BR4	E235.Cl	22-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE DUP2	E235.Cl	22-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE DUP3	E235.Cl	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE DUP4	E235.Cl	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE DUP5	E235.Cl	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE FIELD BLANK	E235.Cl	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE JM10-2018	E235.Cl	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE JM11	E235.Cl	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE JM12	E235.Cl	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE JM13	E235.Cl	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE JM2	E235.Cl	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE JM2 SEEPAGE	E235.Cl	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE JM3	E235.Cl	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE JM4	E235.Cl	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE JM5	E235.Cl	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE SCH1	E235.Cl	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓





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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE SK1	E235.Cl	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE TMF1	E235.Cl	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE DUP1	E235.Cl	22-Aug-2020	----	----	----		29-Aug-2020	28 days	7 days	✓	
<b>Anions and Nutrients : Cyanate by Ion Selective Electrode</b>											
HDPE - total (sodium hydroxide) JM10-2018	E343	23-Aug-2020	----	----	----		08-Sep-2020	----	----		
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE JM6	E378-U	23-Aug-2020	----	----	----		06-Sep-2020	3 days	13 days	* EHTR	
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE DUP3	E378-U	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	* EHTR	
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE DUP4	E378-U	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	* EHTR	
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE DUP5	E378-U	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	* EHTR	
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE FIELD BLANK	E378-U	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	* EHTR	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE JM10-2018	E378-U	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE JM11	E378-U	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE JM12	E378-U	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE JM13	E378-U	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE JM14	E378-U	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE JM2	E378-U	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE JM2 SEEPAGE	E378-U	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE JM24	E378-U	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE JM3	E378-U	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE JM4	E378-U	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE JM5	E378-U	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE SCH1	E378-U	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE SK1	E378-U	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE TMF1	E378-U	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE TRAVEL BLANK	E378-U	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE BR3	E378-U	22-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE BR4	E378-U	22-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE DUP1	E378-U	22-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE DUP2	E378-U	22-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE JM6	E235.F	23-Aug-2020	----	----	----		02-Sep-2020	28 days	10 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE JM14	E235.F	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE JM24	E235.F	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE TRAVEL BLANK	E235.F	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE BR3	E235.F	22-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE BR4	E235.F	22-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE DUP2	E235.F	22-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE DUP3	E235.F	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE DUP4	E235.F	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE DUP5	E235.F	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE FIELD BLANK	E235.F	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE JM10-2018	E235.F	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE JM11	E235.F	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE JM12	E235.F	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE JM13	E235.F	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE JM2	E235.F	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE JM2 SEEPAGE	E235.F	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✔	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE JM3	E235.F	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE JM4	E235.F	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE JM5	E235.F	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE SCH1	E235.F	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE SK1	E235.F	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE TMF1	E235.F	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE DUP1	E235.F	22-Aug-2020	----	----	----		29-Aug-2020	28 days	7 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE JM6	E235.NO3-L	23-Aug-2020	----	----	----		02-Sep-2020	3 days	10 days	* EHTR	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE JM14	E235.NO3-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	* EHTR	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE JM24	E235.NO3-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	* EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE TRAVEL BLANK	E235.NO3-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	* EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE BR3	E235.NO3-L	22-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	* EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE BR4	E235.NO3-L	22-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	* EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE DUP2	E235.NO3-L	22-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	* EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE DUP3	E235.NO3-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	* EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE DUP4	E235.NO3-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	* EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE DUP5	E235.NO3-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	* EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE FIELD BLANK	E235.NO3-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	* EHTR



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE JM10-2018	E235.NO3-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE JM11	E235.NO3-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE JM12	E235.NO3-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE JM13	E235.NO3-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE JM2	E235.NO3-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE JM2 SEEPAGE	E235.NO3-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE JM3	E235.NO3-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE JM4	E235.NO3-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE JM5	E235.NO3-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE SCH1	E235.NO3-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE SK1	E235.NO3-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE TMF1	E235.NO3-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE DUP1	E235.NO3-L	22-Aug-2020	----	----	----		29-Aug-2020	3 days	7 days	*	EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE JM6	E235.NO2-L	23-Aug-2020	----	----	----		02-Sep-2020	3 days	10 days	*	EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE JM14	E235.NO2-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE JM24	E235.NO2-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE TRAVEL BLANK	E235.NO2-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE BR3	E235.NO2-L	22-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE BR4	E235.NO2-L	22-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE DUP2	E235.NO2-L	22-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE DUP3	E235.NO2-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE DUP4	E235.NO2-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE DUP5	E235.NO2-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE FIELD BLANK	E235.NO2-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE JM10-2018	E235.NO2-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE JM11	E235.NO2-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE JM12	E235.NO2-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE JM13	E235.NO2-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE JM2	E235.NO2-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE JM2 SEEPAGE	E235.NO2-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE JM3	E235.NO2-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE JM4	E235.NO2-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE JM5	E235.NO2-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE SCH1	E235.NO2-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE SK1	E235.NO2-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE TMF1	E235.NO2-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	* EHTR



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE DUP1	E235.NO2-L	22-Aug-2020	----	----	----		29-Aug-2020	3 days	7 days	* EHTR
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE JM6	E235.SO4	23-Aug-2020	----	----	----		02-Sep-2020	28 days	10 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE JM14	E235.SO4	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE JM24	E235.SO4	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE TRAVEL BLANK	E235.SO4	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE BR3	E235.SO4	22-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE BR4	E235.SO4	22-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE DUP2	E235.SO4	22-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE DUP3	E235.SO4	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE DUP4	E235.S04	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE DUP5	E235.S04	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE FIELD BLANK	E235.S04	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE JM10-2018	E235.S04	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE JM11	E235.S04	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE JM12	E235.S04	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE JM13	E235.S04	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE JM2	E235.S04	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE JM2 SEEPAGE	E235.S04	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE JM3	E235.SO4	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE JM4	E235.SO4	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE JM5	E235.SO4	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE SCH1	E235.SO4	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE SK1	E235.SO4	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE TMF1	E235.SO4	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE DUP1	E235.SO4	22-Aug-2020	----	----	----		29-Aug-2020	28 days	7 days	✓
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>										
Amber glass total (sulfuric acid) DUP3	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	31-Aug-2020	22 days	2 days	✓
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>										
Amber glass total (sulfuric acid) DUP4	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	31-Aug-2020	22 days	2 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> DUP5	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✔	31-Aug-2020	22 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> FIELD BLANK	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✔	31-Aug-2020	22 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM10-2018	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✔	31-Aug-2020	22 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM11	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✔	31-Aug-2020	22 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM12	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✔	31-Aug-2020	22 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM13	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✔	31-Aug-2020	22 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM14	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✔	31-Aug-2020	22 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM2	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✔	31-Aug-2020	22 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM2 SEEPAGE	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✔	31-Aug-2020	22 days	2 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM24	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✔	31-Aug-2020	22 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM3	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✔	31-Aug-2020	22 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM4	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✔	31-Aug-2020	22 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM5	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✔	31-Aug-2020	22 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM6	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✔	31-Aug-2020	22 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SCH1	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✔	31-Aug-2020	22 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SK1	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✔	31-Aug-2020	22 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> TMF1	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✔	31-Aug-2020	22 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> TRAVEL BLANK	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✔	31-Aug-2020	22 days	2 days	✔	





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> BR3	E318	22-Aug-2020	29-Aug-2020	28 days	6 days	✔	31-Aug-2020	21 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> BR4	E318	22-Aug-2020	29-Aug-2020	28 days	6 days	✔	31-Aug-2020	21 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> DUP1	E318	22-Aug-2020	29-Aug-2020	28 days	6 days	✔	31-Aug-2020	21 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> DUP2	E318	22-Aug-2020	29-Aug-2020	28 days	6 days	✔	31-Aug-2020	21 days	2 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> DUP3	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✔	01-Sep-2020	22 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> DUP4	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✔	01-Sep-2020	22 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> DUP5	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✔	01-Sep-2020	22 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> FIELD BLANK	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✔	01-Sep-2020	22 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> JM10-2018	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✔	01-Sep-2020	22 days	3 days	✔	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> JM11	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	01-Sep-2020	22 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> JM12	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	01-Sep-2020	22 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> JM13	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	01-Sep-2020	22 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> JM14	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	01-Sep-2020	22 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> JM2	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	01-Sep-2020	22 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> JM2 SEEPAGE	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	01-Sep-2020	22 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> JM24	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	01-Sep-2020	22 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> JM3	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	01-Sep-2020	22 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> JM4	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	01-Sep-2020	22 days	3 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> JM5	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	01-Sep-2020	22 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> JM6	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	01-Sep-2020	22 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> SCH1	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	01-Sep-2020	22 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> SK1	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	01-Sep-2020	22 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> TMF1	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	01-Sep-2020	22 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> TRAVEL BLANK	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	01-Sep-2020	22 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> BR3	E366	22-Aug-2020	29-Aug-2020	28 days	6 days	✓	01-Sep-2020	21 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> BR4	E366	22-Aug-2020	29-Aug-2020	28 days	6 days	✓	01-Sep-2020	21 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> DUP1	E366	22-Aug-2020	29-Aug-2020	28 days	6 days	✓	01-Sep-2020	21 days	3 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> DUP2	E366	22-Aug-2020	29-Aug-2020	28 days	6 days	✓	01-Sep-2020	21 days	3 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> DUP3	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> DUP4	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> DUP5	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> FIELD BLANK	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> JM10-2018	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> JM11	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> JM12	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> JM13	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> JM14	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> JM2	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> JM2 SEEPAGE	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> JM24	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> JM3	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> JM4	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> JM5	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> JM6	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> SCH1	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> SK1	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> TMF1	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> TRAVEL BLANK	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> BR3	E372-U	22-Aug-2020	29-Aug-2020	28 days	6 days	✓	29-Aug-2020	21 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> BR4	E372-U	22-Aug-2020	29-Aug-2020	28 days	6 days	✓	29-Aug-2020	21 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> DUP1	E372-U	22-Aug-2020	29-Aug-2020	28 days	6 days	✓	29-Aug-2020	21 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> DUP2	E372-U	22-Aug-2020	29-Aug-2020	28 days	6 days	✓	29-Aug-2020	21 days	0 days	✓	
<b>Cyanides : Free Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> DUP3	E339	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓	
<b>Cyanides : Free Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> DUP4	E339	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> DUP5	E339	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> FIELD BLANK	E339	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM10-2018	E339	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM11	E339	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM12	E339	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM13	E339	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM14	E339	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM2	E339	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM2 SEEPAGE	E339	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM24	E339	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM3	E339	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM4	E339	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM5	E339	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM6	E339	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SCH1	E339	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SK1	E339	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> TMF1	E339	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> TRAVEL BLANK	E339	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Cyanides : Free Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> BR3	E339	22-Aug-2020	----	----	----		04-Sep-2020	14 days	12 days	✓	
<b>Cyanides : Free Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> BR4	E339	22-Aug-2020	----	----	----		04-Sep-2020	14 days	12 days	✓	
<b>Cyanides : Free Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> DUP1	E339	22-Aug-2020	----	----	----		04-Sep-2020	14 days	12 days	✓	
<b>Cyanides : Free Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> DUP2	E339	22-Aug-2020	----	----	----		04-Sep-2020	14 days	12 days	✓	
<b>Cyanides : Thiocyanate by Colourimetry</b>											
<b>HDPE (nitric acid)</b> JM10-2018	E344	23-Aug-2020	----	----	----		04-Sep-2020	14 days	12 days	✓	
<b>Cyanides : Total Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> DUP3	E333	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓	
<b>Cyanides : Total Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> DUP4	E333	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓	
<b>Cyanides : Total Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> DUP5	E333	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓	
<b>Cyanides : Total Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> FIELD BLANK	E333	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Cyanides : Total Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) JM10-2018	E333	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Total Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) JM11	E333	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Total Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) JM12	E333	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Total Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) JM13	E333	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Total Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) JM14	E333	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Total Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) JM2	E333	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Total Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) JM2 SEEPAGE	E333	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Total Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) JM24	E333	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Total Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) JM3	E333	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM4	E333	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✔
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM5	E333	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✔
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM6	E333	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✔
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SCH1	E333	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✔
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SK1	E333	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✔
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> TMF1	E333	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✔
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> TRAVEL BLANK	E333	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✔
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> BR3	E333	22-Aug-2020	----	----	----		04-Sep-2020	14 days	12 days	✔
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> BR4	E333	22-Aug-2020	----	----	----		04-Sep-2020	14 days	12 days	✔



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> DUP1	E333	22-Aug-2020	----	----	----		04-Sep-2020	14 days	12 days	✓
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> DUP2	E333	22-Aug-2020	----	----	----		04-Sep-2020	14 days	12 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> DUP3	E336	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> DUP4	E336	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> DUP5	E336	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> FIELD BLANK	E336	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM10-2018	E336	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM11	E336	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM12	E336	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM13	E336	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM14	E336	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM2	E336	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM2 SEEPAGE	E336	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM24	E336	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM3	E336	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM4	E336	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM5	E336	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM6	E336	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SCH1	E336	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SK1	E336	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> TMF1	E336	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> TRAVEL BLANK	E336	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> BR3	E336	22-Aug-2020	----	----	----		04-Sep-2020	14 days	12 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> BR4	E336	22-Aug-2020	----	----	----		04-Sep-2020	14 days	12 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> DUP1	E336	22-Aug-2020	----	----	----		04-Sep-2020	14 days	12 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> DUP2	E336	22-Aug-2020	----	----	----		04-Sep-2020	14 days	12 days	✓
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> BR3	E421.Cr-L	22-Aug-2020	01-Sep-2020	180 days	10 days	✓	01-Sep-2020	169 days	0 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> BR4	E421.Cr-L	22-Aug-2020	01-Sep-2020	180 days	10 days	✓	01-Sep-2020	169 days	0 days	✓	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> DUP1	E421.Cr-L	22-Aug-2020	01-Sep-2020	180 days	10 days	✓	01-Sep-2020	169 days	0 days	✓	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> DUP2	E421.Cr-L	22-Aug-2020	01-Sep-2020	180 days	10 days	✓	01-Sep-2020	169 days	0 days	✓	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> JM24	E421.Cr-L	23-Aug-2020	01-Sep-2020	180 days	8 days	✓	01-Sep-2020	171 days	0 days	✓	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> DUP3	E421.Cr-L	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> DUP4	E421.Cr-L	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> DUP5	E421.Cr-L	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> FIELD BLANK	E421.Cr-L	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> JM10-2018	E421.Cr-L	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> JM11	E421.Cr-L	23-Aug-2020	01-Sep-2020	180 days	9 days	✔	01-Sep-2020	170 days	0 days	✔
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> JM12	E421.Cr-L	23-Aug-2020	01-Sep-2020	180 days	9 days	✔	01-Sep-2020	170 days	0 days	✔
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> JM13	E421.Cr-L	23-Aug-2020	01-Sep-2020	180 days	9 days	✔	01-Sep-2020	170 days	0 days	✔
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> JM14	E421.Cr-L	23-Aug-2020	01-Sep-2020	180 days	9 days	✔	01-Sep-2020	170 days	0 days	✔
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> JM2	E421.Cr-L	23-Aug-2020	01-Sep-2020	180 days	9 days	✔	01-Sep-2020	170 days	0 days	✔
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> JM2 SEEPAGE	E421.Cr-L	23-Aug-2020	01-Sep-2020	180 days	9 days	✔	01-Sep-2020	170 days	0 days	✔
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> JM3	E421.Cr-L	23-Aug-2020	01-Sep-2020	180 days	9 days	✔	01-Sep-2020	170 days	0 days	✔
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> JM4	E421.Cr-L	23-Aug-2020	01-Sep-2020	180 days	9 days	✔	01-Sep-2020	170 days	0 days	✔
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> JM5	E421.Cr-L	23-Aug-2020	01-Sep-2020	180 days	9 days	✔	01-Sep-2020	170 days	0 days	✔





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> JM6	E421.Cr-L	23-Aug-2020	01-Sep-2020	180 days	9 days	✔	01-Sep-2020	170 days	0 days	✔
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> SCH1	E421.Cr-L	23-Aug-2020	01-Sep-2020	180 days	9 days	✔	01-Sep-2020	170 days	0 days	✔
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> SK1	E421.Cr-L	23-Aug-2020	01-Sep-2020	180 days	9 days	✔	01-Sep-2020	170 days	0 days	✔
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> TMF1	E421.Cr-L	23-Aug-2020	01-Sep-2020	180 days	9 days	✔	01-Sep-2020	170 days	0 days	✔
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
<b>Glass vial dissolved (hydrochloric acid)</b> BR3	E509	22-Aug-2020	02-Sep-2020	28 days	10 days	✔	02-Sep-2020	17 days	0 days	✔
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
<b>Glass vial dissolved (hydrochloric acid)</b> BR4	E509	22-Aug-2020	02-Sep-2020	28 days	10 days	✔	02-Sep-2020	17 days	0 days	✔
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
<b>Glass vial dissolved (hydrochloric acid)</b> DUP2	E509	22-Aug-2020	02-Sep-2020	28 days	10 days	✔	02-Sep-2020	17 days	0 days	✔
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
<b>Glass vial dissolved (hydrochloric acid)</b> DUP3	E509	23-Aug-2020	02-Sep-2020	28 days	10 days	✔	02-Sep-2020	17 days	0 days	✔
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
<b>Glass vial dissolved (hydrochloric acid)</b> DUP4	E509	23-Aug-2020	02-Sep-2020	28 days	10 days	✔	02-Sep-2020	17 days	0 days	✔



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> DUP5	E509	23-Aug-2020	02-Sep-2020	28 days	10 days	✓	02-Sep-2020	17 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> FIELD BLANK	E509	23-Aug-2020	02-Sep-2020	28 days	10 days	✓	02-Sep-2020	17 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> JM10-2018	E509	23-Aug-2020	02-Sep-2020	28 days	10 days	✓	02-Sep-2020	17 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> JM11	E509	23-Aug-2020	02-Sep-2020	28 days	10 days	✓	02-Sep-2020	17 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> JM12	E509	23-Aug-2020	02-Sep-2020	28 days	10 days	✓	02-Sep-2020	17 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> JM13	E509	23-Aug-2020	02-Sep-2020	28 days	10 days	✓	02-Sep-2020	17 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> JM2	E509	23-Aug-2020	02-Sep-2020	28 days	10 days	✓	02-Sep-2020	17 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> JM2 SEEPAGE	E509	23-Aug-2020	02-Sep-2020	28 days	10 days	✓	02-Sep-2020	17 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> JM3	E509	23-Aug-2020	02-Sep-2020	28 days	10 days	✓	02-Sep-2020	17 days	0 days	✓	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> JM4	E509	23-Aug-2020	02-Sep-2020	28 days	10 days	✓	02-Sep-2020	17 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> JM5	E509	23-Aug-2020	02-Sep-2020	28 days	10 days	✓	02-Sep-2020	17 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> SCH1	E509	23-Aug-2020	02-Sep-2020	28 days	10 days	✓	02-Sep-2020	17 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> SK1	E509	23-Aug-2020	02-Sep-2020	28 days	10 days	✓	02-Sep-2020	17 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> TMF1	E509	23-Aug-2020	02-Sep-2020	28 days	10 days	✓	02-Sep-2020	17 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> DUP1	E509	22-Aug-2020	02-Sep-2020	28 days	11 days	✓	02-Sep-2020	16 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> JM14	E509	23-Aug-2020	02-Sep-2020	28 days	9 days	✓	02-Sep-2020	18 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> JM24	E509	23-Aug-2020	02-Sep-2020	28 days	9 days	✓	02-Sep-2020	18 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> JM6	E509	23-Aug-2020	02-Sep-2020	28 days	9 days	✓	02-Sep-2020	18 days	0 days	✓	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> BR3	E421	22-Aug-2020	01-Sep-2020	180 days	10 days	✓	01-Sep-2020	169 days	0 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> BR4	E421	22-Aug-2020	01-Sep-2020	180 days	10 days	✓	01-Sep-2020	169 days	0 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> DUP1	E421	22-Aug-2020	01-Sep-2020	180 days	10 days	✓	01-Sep-2020	169 days	0 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> DUP2	E421	22-Aug-2020	01-Sep-2020	180 days	10 days	✓	01-Sep-2020	169 days	0 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> JM24	E421	23-Aug-2020	01-Sep-2020	180 days	8 days	✓	01-Sep-2020	171 days	0 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> DUP3	E421	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> DUP4	E421	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> DUP5	E421	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> FIELD BLANK	E421	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> JM10-2018	E421	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> JM11	E421	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> JM12	E421	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> JM13	E421	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> JM14	E421	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> JM2	E421	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> JM2 SEEPAGE	E421	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> JM3	E421	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> JM4	E421	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> JM5	E421	23-Aug-2020	01-Sep-2020	180 days	9 days	✔	01-Sep-2020	170 days	0 days	✔
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> JM6	E421	23-Aug-2020	01-Sep-2020	180 days	9 days	✔	01-Sep-2020	170 days	0 days	✔
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> SCH1	E421	23-Aug-2020	01-Sep-2020	180 days	9 days	✔	01-Sep-2020	170 days	0 days	✔
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> SK1	E421	23-Aug-2020	01-Sep-2020	180 days	9 days	✔	01-Sep-2020	170 days	0 days	✔
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> TMF1	E421	23-Aug-2020	01-Sep-2020	180 days	9 days	✔	01-Sep-2020	170 days	0 days	✔
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> DUP4	E601A	23-Aug-2020	02-Sep-2020	14 days	10 days	✔	03-Sep-2020	40 days	0 days	✔
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> JM2	E601A	23-Aug-2020	02-Sep-2020	14 days	10 days	✔	03-Sep-2020	40 days	0 days	✔
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> JM3	E601A	23-Aug-2020	02-Sep-2020	14 days	10 days	✔	03-Sep-2020	40 days	0 days	✔
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> JM4	E601A	23-Aug-2020	02-Sep-2020	14 days	10 days	✔	03-Sep-2020	40 days	0 days	✔



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> JM5	E601A	23-Aug-2020	02-Sep-2020	14 days	10 days	✓	03-Sep-2020	40 days	0 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> TMF1	E601A	23-Aug-2020	02-Sep-2020	14 days	10 days	✓	03-Sep-2020	40 days	0 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> JM10-2018	E601A	23-Aug-2020	02-Sep-2020	14 days	9 days	✓	03-Sep-2020	40 days	0 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> JM6	E601A	23-Aug-2020	02-Sep-2020	14 days	9 days	✓	03-Sep-2020	40 days	0 days	✓	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
<b>Glass vial (sodium bisulfate)</b> JM10-2018	E581.VH+F1	23-Aug-2020	02-Sep-2020	14 days	10 days	✓	03-Sep-2020	3 days	0 days	✓	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
<b>Glass vial (sodium bisulfate)</b> JM6	E581.VH+F1	23-Aug-2020	01-Sep-2020	14 days	8 days	✓	01-Sep-2020	5 days	0 days	✓	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
<b>Glass vial (sodium bisulfate)</b> DUP4	E581.VH+F1	23-Aug-2020	01-Sep-2020	14 days	9 days	✓	01-Sep-2020	4 days	0 days	✓	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
<b>Glass vial (sodium bisulfate)</b> JM2	E581.VH+F1	23-Aug-2020	01-Sep-2020	14 days	9 days	✓	01-Sep-2020	4 days	0 days	✓	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
<b>Glass vial (sodium bisulfate)</b> JM3	E581.VH+F1	23-Aug-2020	01-Sep-2020	14 days	9 days	✓	01-Sep-2020	4 days	0 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
<b>Glass vial (sodium bisulfate)</b> JM4	E581.VH+F1	23-Aug-2020	01-Sep-2020	14 days	9 days	✓	01-Sep-2020	4 days	0 days	✓	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
<b>Glass vial (sodium bisulfate)</b> JM5	E581.VH+F1	23-Aug-2020	01-Sep-2020	14 days	9 days	✓	01-Sep-2020	4 days	0 days	✓	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
<b>Glass vial (sodium bisulfate)</b> TMF1	E581.VH+F1	23-Aug-2020	01-Sep-2020	14 days	9 days	✓	01-Sep-2020	4 days	0 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> DUP3	E358-L	23-Aug-2020	----	----	----		05-Sep-2020	28 days	12 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> DUP4	E358-L	23-Aug-2020	----	----	----		05-Sep-2020	28 days	12 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> JM10-2018	E358-L	23-Aug-2020	----	----	----		05-Sep-2020	28 days	12 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> JM11	E358-L	23-Aug-2020	----	----	----		05-Sep-2020	28 days	12 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> JM12	E358-L	23-Aug-2020	----	----	----		05-Sep-2020	28 days	12 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> JM13	E358-L	23-Aug-2020	----	----	----		05-Sep-2020	28 days	12 days	✓	





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> JM14	E358-L	23-Aug-2020	----	----	----		05-Sep-2020	28 days	12 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> JM2	E358-L	23-Aug-2020	----	----	----		05-Sep-2020	28 days	12 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> JM2 SEEPAGE	E358-L	23-Aug-2020	----	----	----		05-Sep-2020	28 days	12 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> JM3	E358-L	23-Aug-2020	----	----	----		05-Sep-2020	28 days	12 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> JM4	E358-L	23-Aug-2020	----	----	----		05-Sep-2020	28 days	12 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> JM5	E358-L	23-Aug-2020	----	----	----		05-Sep-2020	28 days	12 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> JM6	E358-L	23-Aug-2020	----	----	----		05-Sep-2020	28 days	12 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> SCH1	E358-L	23-Aug-2020	----	----	----		05-Sep-2020	28 days	12 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> SK1	E358-L	23-Aug-2020	----	----	----		05-Sep-2020	28 days	12 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> TMF1	E358-L	23-Aug-2020	----	----	----		05-Sep-2020	28 days	12 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> BR3	E358-L	22-Aug-2020	----	----	----		05-Sep-2020	28 days	13 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> BR4	E358-L	22-Aug-2020	----	----	----		05-Sep-2020	28 days	13 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> DUP1	E358-L	22-Aug-2020	----	----	----		05-Sep-2020	28 days	13 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> DUP2	E358-L	22-Aug-2020	----	----	----		05-Sep-2020	28 days	13 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> DUP5	E358-L	23-Aug-2020	----	----	----		07-Sep-2020	28 days	14 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> FIELD BLANK	E358-L	23-Aug-2020	----	----	----		07-Sep-2020	28 days	14 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> JM24	E358-L	23-Aug-2020	----	----	----		07-Sep-2020	28 days	14 days	✓	
<b>Organic / Inorganic Carbon : Total Inorganic Carbon by Combustion (Low Level)</b>											
<b>HDPE</b> JM10-2018	E354-L	23-Aug-2020	----	----	----		02-Sep-2020	14 days	9 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> DUP3	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✔	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> DUP4	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✔	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> DUP5	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✔	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> FIELD BLANK	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✔	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM10-2018	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✔	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM11	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✔	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM12	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✔	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM13	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✔	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM14	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✔	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM2	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM2 SEEPAGE	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM24	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM3	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM4	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM5	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM6	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SCH1	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SK1	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>										
<b>Amber glass total (sulfuric acid)</b> TMF1	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>										
<b>Amber glass total (sulfuric acid)</b> TRAVEL BLANK	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>										
<b>Amber glass total (sulfuric acid)</b> BR3	E355-L	22-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>										
<b>Amber glass total (sulfuric acid)</b> BR4	E355-L	22-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>										
<b>Amber glass total (sulfuric acid)</b> DUP1	E355-L	22-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>										
<b>Amber glass total (sulfuric acid)</b> DUP2	E355-L	22-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Physical Tests : Acidity by Titration (Peroxide Treated)</b>										
<b>HDPE</b> JM10-2018	E284A	23-Aug-2020	----	----	----		01-Sep-2020	14 days	9 days	✓
<b>Physical Tests : Acidity by Titration</b>										
<b>HDPE</b> DUP3	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✓
<b>Physical Tests : Acidity by Titration</b>										
<b>HDPE</b> DUP4	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Acidity by Titration</b>										
HDPE DUP5	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✔
<b>Physical Tests : Acidity by Titration</b>										
HDPE FIELD BLANK	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✔
<b>Physical Tests : Acidity by Titration</b>										
HDPE JM10-2018	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✔
<b>Physical Tests : Acidity by Titration</b>										
HDPE JM11	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✔
<b>Physical Tests : Acidity by Titration</b>										
HDPE JM12	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✔
<b>Physical Tests : Acidity by Titration</b>										
HDPE JM13	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✔
<b>Physical Tests : Acidity by Titration</b>										
HDPE JM14	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✔
<b>Physical Tests : Acidity by Titration</b>										
HDPE JM2	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✔
<b>Physical Tests : Acidity by Titration</b>										
HDPE JM2 SEEPAGE	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : Acidity by Titration</b>											
HDPE JM24	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✔	
<b>Physical Tests : Acidity by Titration</b>											
HDPE JM3	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✔	
<b>Physical Tests : Acidity by Titration</b>											
HDPE JM4	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✔	
<b>Physical Tests : Acidity by Titration</b>											
HDPE JM5	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✔	
<b>Physical Tests : Acidity by Titration</b>											
HDPE SCH1	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✔	
<b>Physical Tests : Acidity by Titration</b>											
HDPE SK1	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✔	
<b>Physical Tests : Acidity by Titration</b>											
HDPE TMF1	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✔	
<b>Physical Tests : Acidity by Titration</b>											
HDPE TRAVEL BLANK	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✔	
<b>Physical Tests : Acidity by Titration</b>											
HDPE BR3	E283	22-Aug-2020	----	----	----		29-Aug-2020	14 days	6 days	✔	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Acidity by Titration</b>										
HDPE BR4	E283	22-Aug-2020	----	----	----		29-Aug-2020	14 days	6 days	✓
<b>Physical Tests : Acidity by Titration</b>										
HDPE DUP1	E283	22-Aug-2020	----	----	----		29-Aug-2020	14 days	6 days	✓
<b>Physical Tests : Acidity by Titration</b>										
HDPE DUP2	E283	22-Aug-2020	----	----	----		29-Aug-2020	14 days	6 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE DUP5	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE FIELD BLANK	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE JM10-2018	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE JM11	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE JM14	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE JM2	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✓





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE JM24	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE JM5	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE SK1	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE TMF1	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE TRAVEL BLANK	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE BR3	E290	22-Aug-2020	----	----	----		29-Aug-2020	14 days	6 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE BR4	E290	22-Aug-2020	----	----	----		29-Aug-2020	14 days	6 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE DUP2	E290	22-Aug-2020	----	----	----		29-Aug-2020	14 days	6 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE DUP3	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	6 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE DUP4	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	6 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE JM12	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	6 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE JM13	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	6 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE JM2 SEEPAGE	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	6 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE JM3	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	6 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE JM4	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	6 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE SCH1	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	6 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE DUP1	E290	22-Aug-2020	----	----	----		29-Aug-2020	14 days	7 days	✓
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE DUP3	E329	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	* EHTR



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE DUP4	E329	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE DUP5	E329	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE FIELD BLANK	E329	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE JM10-2018	E329	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE JM11	E329	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE JM12	E329	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE JM13	E329	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE JM14	E329	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE JM2	E329	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	* EHTR



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : Colour (True) by Spectrometer</b>											
HDPE JM2 SEEPAGE	E329	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>											
HDPE JM24	E329	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>											
HDPE JM3	E329	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>											
HDPE JM4	E329	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>											
HDPE JM5	E329	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>											
HDPE SCH1	E329	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>											
HDPE SK1	E329	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>											
HDPE TMF1	E329	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>											
HDPE TRAVEL BLANK	E329	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : Colour (True) by Spectrometer</b>											
HDPE BR3	E329	22-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>											
HDPE BR4	E329	22-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>											
HDPE DUP1	E329	22-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>											
HDPE DUP2	E329	22-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Physical Tests : Conductivity in Water</b>											
HDPE DUP5	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
HDPE FIELD BLANK	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
HDPE JM10-2018	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
HDPE JM11	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
HDPE JM14	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Conductivity in Water</b>										
HDPE JM2	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE JM24	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE JM5	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE SK1	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE TMF1	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE TRAVEL BLANK	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE BR3	E100	22-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE BR4	E100	22-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE DUP2	E100	22-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Conductivity in Water</b>										
HDPE DUP3	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✔
<b>Physical Tests : Conductivity in Water</b>										
HDPE DUP4	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✔
<b>Physical Tests : Conductivity in Water</b>										
HDPE JM12	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✔
<b>Physical Tests : Conductivity in Water</b>										
HDPE JM13	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✔
<b>Physical Tests : Conductivity in Water</b>										
HDPE JM2 SEEPAGE	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✔
<b>Physical Tests : Conductivity in Water</b>										
HDPE JM3	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✔
<b>Physical Tests : Conductivity in Water</b>										
HDPE JM4	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✔
<b>Physical Tests : Conductivity in Water</b>										
HDPE SCH1	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✔
<b>Physical Tests : Conductivity in Water</b>										
HDPE DUP1	E100	22-Aug-2020	----	----	----		29-Aug-2020	28 days	7 days	✔



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : pH by Meter</b>										
HDPE JM24	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	136 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE TRAVEL BLANK	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	137 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE DUP5	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	138 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE FIELD BLANK	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	138 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE JM14	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	140 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE JM10-2018	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	141 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE JM11	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	141 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE JM5	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	142 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE SK1	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	142 hrs	* EHTR-FM





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : pH by Meter</b>										
HDPE JM2	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	143 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE TMF1	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	143 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE JM2 SEEPAGE	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	144 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE JM4	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	144 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE DUP3	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	145 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE DUP4	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	145 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE JM12	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	145 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE JM3	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	145 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE SCH1	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	145 hrs	* EHTR-FM



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : pH by Meter</b>											
HDPE JM13	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	146 hrs	*	EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE BR3	E108	22-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	164 hrs	*	EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE BR4	E108	22-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	164 hrs	*	EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE DUP2	E108	22-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	164 hrs	*	EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE DUP1	E108	22-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	169 hrs	*	EHTR-FM
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE DUP3	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE DUP4	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE DUP5	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE FIELD BLANK	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE JM10-2018	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✔	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE JM11	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✔	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE JM12	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✔	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE JM13	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✔	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE JM14	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✔	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE JM2	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✔	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE JM2 SEEPAGE	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✔	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE JM24	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✔	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE JM3	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✔	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE JM4	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE JM5	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE SCH1	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE SK1	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE TMF1	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE TRAVEL BLANK	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE BR3	E162	22-Aug-2020	----	----	----		28-Aug-2020	7 days	6 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE BR4	E162	22-Aug-2020	----	----	----		28-Aug-2020	7 days	6 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE DUP1	E162	22-Aug-2020	----	----	----		28-Aug-2020	7 days	6 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE DUP2	E162	22-Aug-2020	----	----	----		28-Aug-2020	7 days	6 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE DUP3	E160-H	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE DUP4	E160-H	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE DUP5	E160-H	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE FIELD BLANK	E160-H	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE JM10-2018	E160-H	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE JM11	E160-H	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE JM12	E160-H	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE JM13	E160-H	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE JM14	E160-H	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE JM2	E160-H	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE JM2 SEEPAGE	E160-H	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE JM24	E160-H	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE JM3	E160-H	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE JM4	E160-H	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE JM5	E160-H	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE SCH1	E160-H	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE SK1	E160-H	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE TMF1	E160-H	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE TRAVEL BLANK	E160-H	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE BR3	E160-H	22-Aug-2020	----	----	----		28-Aug-2020	7 days	6 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE BR4	E160-H	22-Aug-2020	----	----	----		28-Aug-2020	7 days	6 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE DUP1	E160-H	22-Aug-2020	----	----	----		28-Aug-2020	7 days	6 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE DUP2	E160-H	22-Aug-2020	----	----	----		28-Aug-2020	7 days	6 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE JM6	E160-H	23-Aug-2020	----	----	----		31-Aug-2020	7 days	8 days	* EHT	
<b>Physical Tests : Turbidity by Nephelometry</b>											
HDPE DUP3	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	7 days	* EHTR	
<b>Physical Tests : Turbidity by Nephelometry</b>											
HDPE DUP4	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	7 days	* EHTR	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE JM14	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	7 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE JM24	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	7 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE JM3	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	7 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE JM6	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	7 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE SCH1	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	7 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE TRAVEL BLANK	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	7 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE BR3	E121	22-Aug-2020	----	----	----		31-Aug-2020	3 days	8 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE BR4	E121	22-Aug-2020	----	----	----		31-Aug-2020	3 days	8 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE DUP1	E121	22-Aug-2020	----	----	----		31-Aug-2020	3 days	8 days	* EHTR





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE DUP2	E121	22-Aug-2020	----	----	----		31-Aug-2020	3 days	8 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE DUP5	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	8 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE FIELD BLANK	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	8 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE JM10-2018	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	8 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE JM11	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	8 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE JM12	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	8 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE JM13	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	8 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE JM2	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	8 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE JM2 SEEPAGE	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	8 days	* EHTR



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : Turbidity by Nephelometry</b>											
HDPE JM4	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	8 days	*	EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>											
HDPE JM5	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	8 days	*	EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>											
HDPE SK1	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	8 days	*	EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>											
HDPE TMF1	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	8 days	*	EHTR
<b>Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS</b>											
Amber glass/Teflon lined cap (sodium bisulfate) DUP4	E641A	23-Aug-2020	02-Sep-2020	14 days	10 days	✓	02-Sep-2020	40 days	0 days	✓	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS</b>											
Amber glass/Teflon lined cap (sodium bisulfate) JM2	E641A	23-Aug-2020	02-Sep-2020	14 days	10 days	✓	02-Sep-2020	40 days	0 days	✓	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS</b>											
Amber glass/Teflon lined cap (sodium bisulfate) JM3	E641A	23-Aug-2020	02-Sep-2020	14 days	10 days	✓	02-Sep-2020	40 days	0 days	✓	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS</b>											
Amber glass/Teflon lined cap (sodium bisulfate) JM4	E641A	23-Aug-2020	02-Sep-2020	14 days	10 days	✓	02-Sep-2020	40 days	0 days	✓	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS</b>											
Amber glass/Teflon lined cap (sodium bisulfate) JM5	E641A	23-Aug-2020	02-Sep-2020	14 days	10 days	✓	02-Sep-2020	40 days	0 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS</b>										
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> TMF1	E641A	23-Aug-2020	02-Sep-2020	14 days	10 days	✓	02-Sep-2020	40 days	0 days	✓
<b>Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS</b>										
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> JM10-2018	E641A	23-Aug-2020	02-Sep-2020	14 days	9 days	✓	02-Sep-2020	40 days	0 days	✓
<b>Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS</b>										
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> JM6	E641A	23-Aug-2020	02-Sep-2020	14 days	9 days	✓	02-Sep-2020	40 days	0 days	✓
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> DUP3	E420.Cr-L	23-Aug-2020	----	----	----		04-Sep-2020	180 days	12 days	✓
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> DUP4	E420.Cr-L	23-Aug-2020	----	----	----		04-Sep-2020	180 days	12 days	✓
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> JM12	E420.Cr-L	23-Aug-2020	----	----	----		04-Sep-2020	180 days	12 days	✓
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> JM13	E420.Cr-L	23-Aug-2020	----	----	----		04-Sep-2020	180 days	12 days	✓
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> JM3	E420.Cr-L	23-Aug-2020	----	----	----		04-Sep-2020	180 days	12 days	✓
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> SCH1	E420.Cr-L	23-Aug-2020	----	----	----		04-Sep-2020	180 days	12 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> BR3	E420.Cr-L	22-Aug-2020	----	----	----		04-Sep-2020	180 days	13 days	✔
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> BR4	E420.Cr-L	22-Aug-2020	----	----	----		04-Sep-2020	180 days	13 days	✔
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> DUP1	E420.Cr-L	22-Aug-2020	----	----	----		04-Sep-2020	180 days	13 days	✔
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> DUP2	E420.Cr-L	22-Aug-2020	----	----	----		04-Sep-2020	180 days	13 days	✔
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> DUP5	E420.Cr-L	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✔
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> FIELD BLANK	E420.Cr-L	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✔
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> JM10-2018	E420.Cr-L	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✔
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> JM11	E420.Cr-L	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✔
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> JM14	E420.Cr-L	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> JM2	E420.Cr-L	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✔
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> JM2 SEEPAGE	E420.Cr-L	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✔
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> JM24	E420.Cr-L	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✔
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> JM4	E420.Cr-L	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✔
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> JM5	E420.Cr-L	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✔
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> JM6	E420.Cr-L	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✔
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> SK1	E420.Cr-L	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✔
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> TMF1	E420.Cr-L	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✔
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> TRAVEL BLANK	E420.Cr-L	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✔



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
<b>Glass vial total (hydrochloric acid)</b> DUP3	E508	23-Aug-2020	----	----	----		02-Sep-2020	28 days	10 days	✓	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
<b>Glass vial total (hydrochloric acid)</b> DUP4	E508	23-Aug-2020	----	----	----		02-Sep-2020	28 days	10 days	✓	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
<b>Glass vial total (hydrochloric acid)</b> JM2	E508	23-Aug-2020	----	----	----		02-Sep-2020	28 days	10 days	✓	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
<b>Glass vial total (hydrochloric acid)</b> JM2 SEEPAGE	E508	23-Aug-2020	----	----	----		02-Sep-2020	28 days	10 days	✓	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
<b>Glass vial total (hydrochloric acid)</b> JM3	E508	23-Aug-2020	----	----	----		02-Sep-2020	28 days	10 days	✓	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
<b>Glass vial total (hydrochloric acid)</b> JM4	E508	23-Aug-2020	----	----	----		02-Sep-2020	28 days	10 days	✓	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
<b>Glass vial total (hydrochloric acid)</b> JM5	E508	23-Aug-2020	----	----	----		03-Sep-2020	28 days	10 days	✓	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
<b>Glass vial total (hydrochloric acid)</b> SCH1	E508	23-Aug-2020	----	----	----		02-Sep-2020	28 days	10 days	✓	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
<b>Glass vial total (hydrochloric acid)</b> SK1	E508	23-Aug-2020	----	----	----		02-Sep-2020	28 days	10 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> TMF1	E508	23-Aug-2020	----	----	----		02-Sep-2020	28 days	10 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> JM12	E508	23-Aug-2020	----	----	----		31-Aug-2020	28 days	8 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> JM13	E508	23-Aug-2020	----	----	----		31-Aug-2020	28 days	8 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> BR3	E508	22-Aug-2020	----	----	----		31-Aug-2020	28 days	9 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> BR4	E508	22-Aug-2020	----	----	----		31-Aug-2020	28 days	9 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> DUP1	E508	22-Aug-2020	----	----	----		31-Aug-2020	28 days	9 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> DUP2	E508	22-Aug-2020	----	----	----		31-Aug-2020	28 days	9 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> DUP5	E508	23-Aug-2020	----	----	----		02-Sep-2020	28 days	9 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> FIELD BLANK	E508	23-Aug-2020	----	----	----		02-Sep-2020	28 days	9 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
<b>Glass vial total (hydrochloric acid)</b> JM10-2018	E508	23-Aug-2020	----	----	----		02-Sep-2020	28 days	9 days	✓	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
<b>Glass vial total (hydrochloric acid)</b> JM11	E508	23-Aug-2020	----	----	----		02-Sep-2020	28 days	9 days	✓	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
<b>Glass vial total (hydrochloric acid)</b> JM14	E508	23-Aug-2020	----	----	----		02-Sep-2020	28 days	9 days	✓	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
<b>Glass vial total (hydrochloric acid)</b> JM24	E508	23-Aug-2020	----	----	----		02-Sep-2020	28 days	9 days	✓	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
<b>Glass vial total (hydrochloric acid)</b> JM6	E508	23-Aug-2020	----	----	----		02-Sep-2020	28 days	9 days	✓	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
<b>Glass vial total (hydrochloric acid)</b> TRAVEL BLANK	E508	23-Aug-2020	----	----	----		02-Sep-2020	28 days	9 days	✓	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE total (nitric acid)</b> DUP3	E420	23-Aug-2020	----	----	----		04-Sep-2020	180 days	12 days	✓	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE total (nitric acid)</b> DUP4	E420	23-Aug-2020	----	----	----		04-Sep-2020	180 days	12 days	✓	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE total (nitric acid)</b> JM12	E420	23-Aug-2020	----	----	----		04-Sep-2020	180 days	12 days	✓	





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE total (nitric acid)</b> JM13	E420	23-Aug-2020	----	----	----		04-Sep-2020	180 days	12 days	✓	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE total (nitric acid)</b> JM3	E420	23-Aug-2020	----	----	----		04-Sep-2020	180 days	12 days	✓	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE total (nitric acid)</b> SCH1	E420	23-Aug-2020	----	----	----		04-Sep-2020	180 days	12 days	✓	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE total (nitric acid)</b> BR3	E420	22-Aug-2020	----	----	----		04-Sep-2020	180 days	13 days	✓	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE total (nitric acid)</b> BR4	E420	22-Aug-2020	----	----	----		04-Sep-2020	180 days	13 days	✓	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE total (nitric acid)</b> DUP1	E420	22-Aug-2020	----	----	----		04-Sep-2020	180 days	13 days	✓	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE total (nitric acid)</b> DUP2	E420	22-Aug-2020	----	----	----		04-Sep-2020	180 days	13 days	✓	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE total (nitric acid)</b> DUP5	E420	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✓	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE total (nitric acid)</b> FIELD BLANK	E420	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> JM10-2018	E420	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✔
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> JM11	E420	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✔
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> JM14	E420	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✔
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> JM2	E420	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✔
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> JM2 SEEPAGE	E420	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✔
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> JM24	E420	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✔
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> JM4	E420	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✔
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> JM5	E420	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✔
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> JM6	E420	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE total (nitric acid)</b> SK1	E420	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✔	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE total (nitric acid)</b> TMF1	E420	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✔	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE total (nitric acid)</b> TRAVEL BLANK	E420	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✔	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> JM10-2018	E611A	23-Aug-2020	02-Sep-2020	14 days	10 days	✔	03-Sep-2020	3 days	0 days	✔	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> JM6	E611A	23-Aug-2020	01-Sep-2020	14 days	8 days	✔	01-Sep-2020	5 days	0 days	✔	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> DUP4	E611A	23-Aug-2020	01-Sep-2020	14 days	9 days	✔	01-Sep-2020	4 days	0 days	✔	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> JM2	E611A	23-Aug-2020	01-Sep-2020	14 days	9 days	✔	01-Sep-2020	4 days	0 days	✔	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> JM3	E611A	23-Aug-2020	01-Sep-2020	14 days	9 days	✔	01-Sep-2020	4 days	0 days	✔	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> JM4	E611A	23-Aug-2020	01-Sep-2020	14 days	9 days	✔	01-Sep-2020	4 days	0 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> JM5	E611A	23-Aug-2020	01-Sep-2020	14 days	9 days	✔	01-Sep-2020	4 days	0 days	✔
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> TMF1	E611A	23-Aug-2020	01-Sep-2020	14 days	9 days	✔	01-Sep-2020	4 days	0 days	✔

**Legend & Qualifier Definitions**

- EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended
- EHTR: Exceeded ALS recommended hold time prior to sample receipt.
- EHT: Exceeded ALS recommended hold time prior to analysis.
- Rec. HT: ALS recommended hold time (see units).



## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Acidity by Titration	E283	78794	2	39	5.1	5.0	✓
Acidity by Titration (Peroxide Treated)	E284A	80003	1	1	100.0	5.0	✓
Alkalinity Species by Titration	E290	78792	2	39	5.1	5.0	✓
Ammonia by Fluorescence	E298	78790	2	40	5.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	78797	3	55	5.4	5.0	✓
BTEX by Headspace GC-MS	E611A	79732	2	38	5.2	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	81008	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	78795	3	56	5.3	5.0	✓
Colour (True) by Spectrometer	E329	78801	2	35	5.7	5.0	✓
Conductivity in Water	E100	78793	2	35	5.7	5.0	✓
Cyanate by Ion Selective Electrode	E343	82829	1	6	16.6	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	79797	2	32	6.2	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	80464	2	40	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	79798	2	39	5.1	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	81965	2	39	5.1	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	78802	3	49	6.1	5.0	✓
Fluoride in Water by IC	E235.F	78796	3	55	5.4	5.0	✓
Free Cyanide by CFA	E339	81532	2	25	8.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	78798	3	55	5.4	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	78799	3	55	5.4	5.0	✓
pH by Meter	E108	78791	2	39	5.1	5.0	✓
Sulfate in Water by IC	E235.SO4	78800	3	55	5.4	5.0	✓
TDS by Gravimetry	E162	78767	2	39	5.1	5.0	✓
Thiocyanate by Colourimetry	E344	81890	1	20	5.0	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	79475	2	24	8.3	5.0	✓
Total Cyanide by CFA	E333	81533	2	39	5.1	5.0	✓
Total Inorganic Carbon by Combustion (Low Level)	E354-L	80229	1	3	33.3	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	78786	2	40	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	79426	5	100	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	79474	2	28	7.1	5.0	✓
Total Nitrogen by Colourimetry	E366	78788	2	40	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	78787	2	40	5.0	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	78789	2	40	5.0	5.0	✓
TSS by Gravimetry	E160-H	78781	3	57	5.2	5.0	✓
Turbidity by Nephelometry	E121	79259	2	40	5.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	79731	2	35	5.7	5.0	✓
WAD Cyanide by CFA	E336	81531	2	35	5.7	5.0	✓



Matrix: **Water**

Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Laboratory Control Samples (LCS)</b>							
Acidity by Titration	E283	78794	2	39	5.1	5.0	✓
Acidity by Titration (Peroxide Treated)	E284A	80003	1	1	100.0	5.0	✓
Alkalinity Species by Titration	E290	78792	2	39	5.1	5.0	✓
Ammonia by Fluorescence	E298	78790	2	40	5.0	5.0	✓
BC PHC - EPH by GC-FID	E601A	80222	1	20	5.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	78797	3	55	5.4	5.0	✓
BTEX by Headspace GC-MS	E611A	79732	2	38	5.2	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	81008	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	78795	3	56	5.3	5.0	✓
Colour (True) by Spectrometer	E329	78801	2	35	5.7	5.0	✓
Conductivity in Water	E100	78793	2	35	5.7	5.0	✓
Cyanate by Ion Selective Electrode	E343	82829	1	6	16.6	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	79797	2	32	6.2	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	80464	2	40	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	79798	2	39	5.1	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	81965	2	39	5.1	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	78802	3	49	6.1	5.0	✓
Fluoride in Water by IC	E235.F	78796	3	55	5.4	5.0	✓
Free Cyanide by CFA	E339	81532	2	25	8.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	78798	3	55	5.4	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	78799	3	55	5.4	5.0	✓
PAHs by LVI GC-MS	E641A	80223	1	20	5.0	5.0	✓
pH by Meter	E108	78791	2	39	5.1	5.0	✓
Sulfate in Water by IC	E235.SO4	78800	3	55	5.4	5.0	✓
TDS by Gravimetry	E162	78767	2	39	5.1	5.0	✓
Thiocyanate by Colourimetry	E344	81890	1	20	5.0	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	79475	2	24	8.3	5.0	✓
Total Cyanide by CFA	E333	81533	2	39	5.1	5.0	✓
Total Inorganic Carbon by Combustion (Low Level)	E354-L	80229	1	3	33.3	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	78786	2	40	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	79426	5	100	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	79474	2	28	7.1	5.0	✓
Total Nitrogen by Colourimetry	E366	78788	2	40	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	78787	2	40	5.0	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	78789	2	40	5.0	5.0	✓
TSS by Gravimetry	E160-H	78781	3	57	5.2	5.0	✓
Turbidity by Nephelometry	E121	79259	2	40	5.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	79731	2	35	5.7	5.0	✓
WAD Cyanide by CFA	E336	81531	2	35	5.7	5.0	✓
<b>Method Blanks (MB)</b>							
Acidity by Titration	E283	78794	2	39	5.1	5.0	✓



Matrix: **Water**

Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Method Blanks (MB) - Continued</b>							
Acidity by Titration (Peroxide Treated)	E284A	80003	1	1	100.0	5.0	✓
Alkalinity Species by Titration	E290	78792	2	39	5.1	5.0	✓
Ammonia by Fluorescence	E298	78790	2	40	5.0	5.0	✓
BC PHC - EPH by GC-FID	E601A	80222	1	20	5.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	78797	3	55	5.4	5.0	✓
BTEX by Headspace GC-MS	E611A	79732	2	38	5.2	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	81008	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	78795	3	56	5.3	5.0	✓
Colour (True) by Spectrometer	E329	78801	2	35	5.7	5.0	✓
Conductivity in Water	E100	78793	2	35	5.7	5.0	✓
Cyanate by Ion Selective Electrode	E343	82829	1	6	16.6	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	79797	2	32	6.2	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	80464	2	40	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	79798	2	39	5.1	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	81965	2	39	5.1	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	78802	3	49	6.1	5.0	✓
Fluoride in Water by IC	E235.F	78796	3	55	5.4	5.0	✓
Free Cyanide by CFA	E339	81532	2	25	8.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	78798	3	55	5.4	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	78799	3	55	5.4	5.0	✓
PAHs by LVI GC-MS	E641A	80223	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	78800	3	55	5.4	5.0	✓
TDS by Gravimetry	E162	78767	2	39	5.1	5.0	✓
Thiocyanate by Colourimetry	E344	81890	1	20	5.0	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	79475	2	24	8.3	5.0	✓
Total Cyanide by CFA	E333	81533	2	39	5.1	5.0	✓
Total Inorganic Carbon by Combustion (Low Level)	E354-L	80229	1	3	33.3	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	78786	2	40	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	79426	5	100	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	79474	2	28	7.1	5.0	✓
Total Nitrogen by Colourimetry	E366	78788	2	40	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	78787	2	40	5.0	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	78789	2	40	5.0	5.0	✓
TSS by Gravimetry	E160-H	78781	3	57	5.2	5.0	✓
Turbidity by Nephelometry	E121	79259	2	40	5.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	79731	2	35	5.7	5.0	✓
WAD Cyanide by CFA	E336	81531	2	35	5.7	5.0	✓
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	78790	2	40	5.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	78797	3	55	5.4	5.0	✓
BTEX by Headspace GC-MS	E611A	79732	2	38	5.2	5.0	✓



Matrix: **Water**

Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<i>Analytical Methods</i>							
<b>Matrix Spikes (MS) - Continued</b>							
Chemical Oxygen Demand by Colourimetry	E559	81008	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	78795	3	56	5.3	5.0	✓
Cyanate by Ion Selective Electrode	E343	82829	1	6	16.6	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	79797	2	32	6.2	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	80464	2	40	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	79798	2	39	5.1	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	81965	2	39	5.1	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	78802	3	49	6.1	5.0	✓
Fluoride in Water by IC	E235.F	78796	3	55	5.4	5.0	✓
Free Cyanide by CFA	E339	81532	2	25	8.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	78798	3	55	5.4	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	78799	3	55	5.4	5.0	✓
Sulfate in Water by IC	E235.SO4	78800	3	55	5.4	5.0	✓
Thiocyanate by Colourimetry	E344	81890	1	20	5.0	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	79475	2	24	8.3	5.0	✓
Total Cyanide by CFA	E333	81533	2	39	5.1	5.0	✓
Total Inorganic Carbon by Combustion (Low Level)	E354-L	80229	1	3	33.3	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	78786	2	40	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	79426	5	100	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	79474	2	28	7.1	5.0	✓
Total Nitrogen by Colourimetry	E366	78788	2	40	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	78787	2	40	5.0	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	78789	2	40	5.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	79731	2	35	5.7	5.0	✓
WAD Cyanide by CFA	E336	81531	2	35	5.7	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 Vancouver - Environmental	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TSS by Gravimetry	E160-H Vancouver - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
TDS by Gravimetry	E162 Vancouver - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Bromide in Water by IC (Low Level)	E235.Br-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Sulfate in Water by IC	E235.SO4  Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Acidity by Titration	E283  Vancouver - Environmental	Water	APHA 2310 B (mod)	Acidity is determined by potentiometric titration to a specified endpoint.
Acidity by Titration (Peroxide Treated)	E284A  Vancouver - Environmental	Water	APHA 2310 B (mod)	Acidity is determined by potentiometric titration with preliminary hot peroxide treatment to a specified endpoint.
Alkalinity Species by Titration	E290  Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298  Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318  Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Total Kjeldahl Nitrogen is determined using block digestion followed by flow-injection analysis with fluorescence detection.
Colour (True) by Spectrometer	E329  Vancouver - Environmental	Water	APHA 2120 C (mod)	Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment.
Total Cyanide by CFA	E333  Vancouver - Environmental	Water	ISO 14403 (mod)	Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.
WAD Cyanide by CFA	E336  Vancouver - Environmental	Water	APHA 4500-CN I (mod)	Weak Acid Dissociable (WAD) cyanide is determined by in-line sample distillation with final determination by colourimetric analysis.
Free Cyanide by CFA	E339  Vancouver - Environmental	Water	ASTM D7237 (mod)	Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.
Cyanate by Ion Selective Electrode	E343  Waterloo - Environmental	Water	APHA 4500-CN L (mod)	This analysis is carried out using procedures adapted from APHA method 4500-CN "Cyanide". Cyanate is determined by the Cyanate hydrolysis method using an ammonia selective electrode



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thiocyanate by Colourimetry	E344  Vancouver - Environmental	Water	APHA 4500-CN M (mod)	Thiocyanate is determined by the ferric nitrate colourimetric method. Water samples containing high levels of hexavalent chromium, cyanide (together with sulfide), reducing agents, or hydrocarbons may cause negative or positive interferences with this method.
Total Inorganic Carbon by Combustion (Low Level)	E354-L  Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Inorganic Carbon is determined by the high temperature combustion method with measurement by an infrared detector, where the sample is acidified in a reaction chamber to convert all inorganic carbons (carbonates) to carbon dioxide for analysis.
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L  Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO <sub>2</sub> . NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L  Vancouver - Environmental	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO <sub>2</sub> . NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Nitrogen by Colourimetry	E366  Vancouver - Environmental	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U  Vancouver - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U  Vancouver - Environmental	Water	APHA 4500-P E (mod)	Dissolved Orthophosphate is determined colourimetrically on a water sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.
Total Metals in Water by CRC ICPMS	E420  Vancouver - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L  Vancouver - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals in Water by CRC ICPMS	E421  Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L  Vancouver - Environmental	Water	APHA 3030 B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS
Total Mercury in Water by CVAAS	E508  Vancouver - Environmental	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
Dissolved Mercury in Water by CVAAS	E509  Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
Chemical Oxygen Demand by Colourimetry	E559  Vancouver - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
VH and F1 by Headspace GC-FID	E581.VH+F1  Vancouver - Environmental	Water	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
BC PHC - EPH by GC-FID	E601A  Vancouver - Environmental	Water	BC MOE Lab Manual	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.
BTEX by Headspace GC-MS	E611A  Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by LVI GC-MS	E641A  Vancouver - Environmental	Water	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by large volume injection (LVI) GC-MS.
Dissolved Hardness (Calculated)	EC100  Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> ), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Hardness (Calculated) from Total Ca/Mg	EC100A  Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> ), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
VPH: VH-BTEX-Styrene	EC580A  Vancouver - Environmental	Water	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VPHw = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.
LEPH and HEPH: EPH-PAH	EC600A  Vancouver - Environmental	Water	BC MOE Lab Manual (LEPH and HEPH) (mod)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Acenaphthene, Acridine, Anthracene, Fluorene, Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(a)pyrene, Fluoranthene, and Pyrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Digestion for TKN in water	EP318  Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Samples are digested using block digestion with Copper Sulfate Digestion Reagent.
Digestion for Total Nitrogen in water	EP366  Vancouver - Environmental	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
Digestion for Total Phosphorus in water	EP372  Vancouver - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421  Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO <sub>3</sub> .
Dissolved Mercury Water Filtration	EP509  Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
VOCs Preparation for Headspace Analysis	EP581  Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601  Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

## QUALITY CONTROL REPORT

**Work Order** : **VA20B3842**

**Page** : 1 of 41

**Client** : ERM Consultants Canada Ltd.  
**Contact** : Jill Zyla  
**Address** : # 400 - 106 Front Street East  
 Toronto ON Canada M5A 1E1  
**Telephone** : 604 689 9460  
**Project** : 0539378-0012 (WQ ISKUT)  
**PO** : ----  
**C-O-C number** : 17-841428, 17-841426  
**Sampler** : ----  
**Site** : ----  
**Quote number** : Q74326  
**No. of samples received** : 24  
**No. of samples analysed** : 24

**Laboratory** : Vancouver - Environmental  
**Account Manager** : Amber Springer  
**Address** : 8081 Lougheed Highway  
 Burnaby, British Columbia Canada V5A 1W9  
**Telephone** : +1 604 253 4188  
**Date Samples Received** : 28-Aug-2020 10:10  
**Date Analysis Commenced** : 28-Aug-2020  
**Issue Date** : 10-Sep-2020 14:18

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
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Work Order : VA20B3842  
Client : ERM Consultants Canada Ltd.  
Project : 0539378-0012 (WQ ISKUT)

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## **General Comments**

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

# = Indicates a QC result that did not meet the ALS DQO.





### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 78767)</b>											
VA20B3842-001	BR4	solids, total dissolved [TDS]	----	E162	13	mg/L	103	107	4	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 78768)</b>											
VA20B3842-021	JM24	solids, total dissolved [TDS]	----	E162	13	mg/L	47	48	1	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 78781)</b>											
VA20B3842-001	BR4	solids, total suspended [TSS]	----	E160-H	5.0	mg/L	183	210	13.7%	20%	----
<b>Physical Tests (QC Lot: 78782)</b>											
VA20B3842-021	JM24	solids, total suspended [TSS]	----	E160-H	5.0	mg/L	40.2	40.5	0.3	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 78791)</b>											
VA20B3842-003	DUP1	pH	----	E108	0.10	pH units	7.39	7.40	0.135%	4%	----
<b>Physical Tests (QC Lot: 78792)</b>											
VA20B3842-003	DUP1	alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	30.2	30.5	0.988%	20%	----
		alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	30.2	30.5	0.988%	20%	----
<b>Physical Tests (QC Lot: 78793)</b>											
VA20B3842-003	DUP1	conductivity	----	E100	2.0	µS/cm	103	103	0.00%	10%	----
<b>Physical Tests (QC Lot: 78794)</b>											
VA20B3842-002	BR3	acidity (as CaCO3)	----	E283	2.0	mg/L	<2.0	<2.0	0	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 78801)</b>											
VA20B3842-001	BR4	colour, true	----	E329	5.0	CU	<5.0	<5.0	0	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 78808)</b>											
VA20B3842-023	FIELD BLANK	conductivity	----	E100	2.0	µS/cm	<2.0	<2.0	0	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 78809)</b>											
VA20B3842-023	FIELD BLANK	pH	----	E108	0.10	pH units	5.46	5.41	0.920%	4%	----
<b>Physical Tests (QC Lot: 78810)</b>											
VA20B3842-023	FIELD BLANK	alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 78811)</b>											
VA20B3842-022	DUP5	acidity (as CaCO3)	----	E283	2.0	mg/L	2.1	2.0	0.08	Diff <2x LOR	----

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 Work Order : VA20B3842  
 Client : ERM Consultants Canada Ltd.  
 Project : 0539378-0012 (WQ ISKUT)



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 78818)</b>											
VA20B3842-021	JM24	colour, true	----	E329	5.0	CU	<5.0	<5.0	0	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 79259)</b>											
KS2001568-001	Anonymous	turbidity	----	E121	0.10	NTU	0.11	<0.10	0.01	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 79416)</b>											
VA20B3842-011	JM4	turbidity	----	E121	0.10	NTU	10.2	10.7	4.77%	15%	----
<b>Physical Tests (QC Lot: 79531)</b>											
VA20B3754-009	Anonymous	solids, total suspended [TSS]	----	E160-H	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 80003)</b>											
VA20B3842-017	JM10-2018	acidity, hot peroxide treated (as CaCO3)	----	E284A	25	mg/L	-48	-47	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78786)</b>											
VA20B3842-001	BR4	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	<0.050	0.068	0.018	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78788)</b>											
VA20B3842-001	BR4	nitrogen, total	7727-37-9	E366	0.030	mg/L	0.119	0.119	0.0002	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78789)</b>											
VA20B3842-001	BR4	phosphorus, total	7723-14-0	E372-U	0.0200	mg/L	0.216	0.212	2.13%	20%	----
<b>Anions and Nutrients (QC Lot: 78790)</b>											
VA20B3842-001	BR4	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0154	0.0154	0.00007	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78795)</b>											
VA20B3842-001	BR4	chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78796)</b>											
VA20B3842-001	BR4	fluoride	16984-48-8	E235.F	0.020	mg/L	0.041	0.041	0.0004	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78797)</b>											
VA20B3842-001	BR4	bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78798)</b>											
VA20B3842-001	BR4	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0834	0.0872	4.50%	20%	----
<b>Anions and Nutrients (QC Lot: 78799)</b>											
VA20B3842-001	BR4	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78800)</b>											
VA20B3842-001	BR4	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	30.5	30.6	0.390%	20%	----
<b>Anions and Nutrients (QC Lot: 78802)</b>											
VA20B3842-001	BR4	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0015	0.0017	0.0001	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78803)</b>											
VA20B3842-021	JM24	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78805)</b>											
VA20B3842-021	JM24	nitrogen, total	7727-37-9	E366	0.030	mg/L	<0.030	<0.030	0	Diff <2x LOR	----

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 Work Order : VA20B3842  
 Client : ERM Consultants Canada Ltd.  
 Project : 0539378-0012 (WQ ISKUT)



Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Anions and Nutrients (QC Lot: 78806)</b>											
VA20B3842-021	JM24	phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0412	0.0375	9.44%	20%	----
<b>Anions and Nutrients (QC Lot: 78807)</b>											
VA20B3842-021	JM24	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0051	0.0063	0.0012	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78812)</b>											
VA20B3842-021	JM24	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	4.52	4.52	0.00476%	20%	----
<b>Anions and Nutrients (QC Lot: 78813)</b>											
VA20B3842-021	JM24	nitrate (as N)	14797-55-8	E235 NO3-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78814)</b>											
VA20B3842-021	JM24	nitrite (as N)	14797-65-0	E235 NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78815)</b>											
VA20B3842-021	JM24	fluoride	16984-48-8	E235 F	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78816)</b>											
VA20B3842-021	JM24	chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78817)</b>											
VA20B3842-021	JM24	bromide	24959-67-9	E235 Br-L	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78819)</b>											
VA20B3842-021	JM24	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 80313)</b>											
VA20B3842-019	JM6	chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 80315)</b>											
VA20B3842-019	JM6	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	4.83	4.82	0.122%	20%	----
<b>Anions and Nutrients (QC Lot: 80316)</b>											
VA20B3842-019	JM6	nitrate (as N)	14797-55-8	E235 NO3-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 80317)</b>											
VA20B3842-019	JM6	nitrite (as N)	14797-65-0	E235 NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 80318)</b>											
VA20B3842-019	JM6	fluoride	16984-48-8	E235 F	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 80319)</b>											
VA20B3842-019	JM6	bromide	24959-67-9	E235 Br-L	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 82504)</b>											
KS2001653-001	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0100	mg/L	0.0661	0.0654	0.0008	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 82829)</b>											
WT2000114-010	Anonymous	cyanate	88402-73-7	E343	0.20	mg/L	800	780	2.47%	20%	----
<b>Cyanides (QC Lot: 81531)</b>											
VA20B3842-001	BR4	cyanide, weak acid dissociable	----	E336	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----



Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Cyanides (QC Lot: 81532)</b>											
VA20B3842-001	BR4	cyanide, free	----	E339	0 0050	mg/L	<0 0050	<0.0050	0	Diff <2x LOR	----
<b>Cyanides (QC Lot: 81533)</b>											
VA20B3842-001	BR4	cyanide, strong acid dissociable (total)	----	E333	0 0050	mg/L	<0 0050	<0.0050	0	Diff <2x LOR	----
<b>Cyanides (QC Lot: 81559)</b>											
VA20B3842-020	JM14	cyanide, strong acid dissociable (total)	----	E333	0 0050	mg/L	<0 0050	<0.0050	0	Diff <2x LOR	----
<b>Cyanides (QC Lot: 81560)</b>											
VA20B3842-020	JM14	cyanide, weak acid dissociable	----	E336	0 0050	mg/L	<0 0050	<0.0050	0	Diff <2x LOR	----
<b>Cyanides (QC Lot: 81561)</b>											
VA20B3842-020	JM14	cyanide, free	----	E339	0 0050	mg/L	<0 0050	<0.0050	0	Diff <2x LOR	----
<b>Cyanides (QC Lot: 81890)</b>											
VA20B3842-017	JM10-2018	thiocyanate	302-04-5	E344	0.50	mg/L	<0.50	<0 50	0	Diff <2x LOR	----
<b>Organic / Inorganic Carbon (QC Lot: 78787)</b>											
VA20B3842-001	BR4	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	0.58	0 68	0.11	Diff <2x LOR	----
<b>Organic / Inorganic Carbon (QC Lot: 78804)</b>											
VA20B3842-021	JM24	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	<0.50	<0 50	0	Diff <2x LOR	----
<b>Organic / Inorganic Carbon (QC Lot: 80229)</b>											
VA20B3842-017	JM10-2018	carbon, total inorganic [TIC]	----	E354-L	0.50	mg/L	13 2	13.3	0.798%	20%	----
<b>Organic / Inorganic Carbon (QC Lot: 81965)</b>											
VA20B3842-001	BR4	carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	2.35	2 36	0.009	Diff <2x LOR	----
<b>Organic / Inorganic Carbon (QC Lot: 82552)</b>											
VA20B3842-021	JM24	carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	1.57	1.44	0.13	Diff <2x LOR	----
<b>Total Metals (QC Lot: 79426)</b>											
VA20B3824-001	Anonymous	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Total Metals (QC Lot: 79427)</b>											
VA20B3842-002	BR3	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Total Metals (QC Lot: 79474)</b>											
VA20B3842-011	JM4	aluminum, total	7429-90-5	E420	0 0030	mg/L	0.631	0.618	2.13%	20%	----
		antimony, total	7440-36-0	E420	0.00010	mg/L	0.00027	0.00026	0.00001	Diff <2x LOR	----
		arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00025	0.00027	0.00002	Diff <2x LOR	----
		barium, total	7440-39-3	E420	0.00010	mg/L	0 0305	0.0316	3.54%	20%	----
		beryllium, total	7440-41-7	E420	0.000020	mg/L	0.000058	0 000058	0.0000006	Diff <2x LOR	----
		bismuth, total	7440-69-9	E420	0.000050	mg/L	0.000069	0 000065	0 000004	Diff <2x LOR	----
		boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.00120	0.00118	2.29%	20%	----



Sub-Matrix: **Water**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Total Metals (QC Lot: 79474) - continued</b>											
VA20B3842-011	JM4	calcium, total	7440-70-2	E420	0.050	mg/L	31.3	31.6	1.10%	20%	----
		cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00462	0.00457	0.916%	20%	----
		copper, total	7440-50-8	E420	0.00050	mg/L	0.400	0.393	1.86%	20%	----
		iron, total	7439-89-6	E420	0.010	mg/L	2.40	2.40	0.0350%	20%	----
		lead, total	7439-92-1	E420	0.000050	mg/L	0.00502	0.00490	2.39%	20%	----
		lithium, total	7439-93-2	E420	0.0010	mg/L	0.0016	0.0015	0.00003	Diff <2x LOR	----
		magnesium, total	7439-95-4	E420	0.100	mg/L	3.94	3.94	0.0848%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	0.570	0.565	0.908%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000194	0.000199	0.000004	Diff <2x LOR	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	0.00086	0.00087	0.00001	Diff <2x LOR	----
		phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, total	7440-09-7	E420	0.100	mg/L	1.61	1.62	0.531%	20%	----
		selenium, total	7782-49-2	E420	0.000050	mg/L	0.000153	0.000172	0.000019	Diff <2x LOR	----
		silicon, total	7440-21-3	E420	0.10	mg/L	2.76	2.61	5.38%	20%	----
		silver, total	7440-22-4	E420	0.000010	mg/L	0.000089	0.000088	0.0000004	Diff <2x LOR	----
		sodium, total	7440-23-5	E420	0.050	mg/L	0.763	0.760	0.378%	20%	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	0.200	0.198	1.03%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	29.4	28.5	3.26%	20%	----
		thallium, total	7440-28-0	E420	0.000010	mg/L	0.000020	0.000019	0.0000008	Diff <2x LOR	----
		tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		titanium, total	7440-32-6	E420	0.00030	mg/L	0.00436	0.00445	1.86%	20%	----
		uranium, total	7440-61-1	E420	0.000010	mg/L	0.000257	0.000246	4.66%	20%	----
		vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, total	7440-66-6	E420	0.0030	mg/L	0.164	0.161	2.06%	20%	----
		zirconium, total	7440-67-7	E420	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
<b>Total Metals (QC Lot: 79475)</b>											
VA20B3842-011	JM4	chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	0.00019	0.00020	0.000005	Diff <2x LOR	----
<b>Total Metals (QC Lot: 79989)</b>											
VA20B3842-001	BR4	chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	0.00740	0.00745	0.689%	20%	----
<b>Total Metals (QC Lot: 79990)</b>											
VA20B3842-001	BR4	aluminum, total	7429-90-5	E420	0.0030	mg/L	4.98	4.88	2.00%	20%	----
		antimony, total	7440-36-0	E420	0.00010	mg/L	0.00025	0.00025	0.000002	Diff <2x LOR	----
		arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00259	0.00253	2.48%	20%	----
		barium, total	7440-39-3	E420	0.00010	mg/L	0.112	0.109	2.28%	20%	----
		beryllium, total	7440-41-7	E420	0.000020	mg/L	0.000100	0.000070	0.000030	Diff <2x LOR	----



Sub-Matrix: **Water**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Total Metals (QC Lot: 79990) - continued</b>											
VA20B3842-001	BR4	bismuth, total	7440-69-9	E420	0.000050	mg/L	0.000075	0.000072	0.000003	Diff <2x LOR	----
		boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.000320	0.000284	11.7%	20%	----
		calcium, total	7440-70-2	E420	0.050	mg/L	26.1	26.1	0.0132%	20%	----
		cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00272	0.00268	1.37%	20%	----
		copper, total	7440-50-8	E420	0.00050	mg/L	0.0205	0.0204	0.640%	20%	----
		iron, total	7439-89-6	E420	0.010	mg/L	6.20	6.22	0.240%	20%	----
		lead, total	7439-92-1	E420	0.000050	mg/L	0.00686	0.00669	2.52%	20%	----
		lithium, total	7439-93-2	E420	0.0010	mg/L	0.0032	0.0032	0.00006	Diff <2x LOR	----
		magnesium, total	7439-95-4	E420	0.100	mg/L	4.97	4.92	1.01%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	0.255	0.253	0.996%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00118	0.00116	1.90%	20%	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	0.00521	0.00501	3.92%	20%	----
		phosphorus, total	7723-14-0	E420	0.050	mg/L	0.246	0.247	0.0009	Diff <2x LOR	----
		potassium, total	7440-09-7	E420	0.100	mg/L	3.64	3.62	0.576%	20%	----
		selenium, total	7782-49-2	E420	0.000050	mg/L	0.000352	0.000378	0.000026	Diff <2x LOR	----
		silicon, total	7440-21-3	E420	0.10	mg/L	8.84	8.63	2.38%	20%	----
		silver, total	7440-22-4	E420	0.000010	mg/L	0.000113	0.000108	4.46%	20%	----
		sodium, total	7440-23-5	E420	0.050	mg/L	0.977	0.963	1.47%	20%	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	0.162	0.162	0.220%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	11.3	10.7	4.90%	20%	----
		thallium, total	7440-28-0	E420	0.000010	mg/L	0.000134	0.000138	2.52%	20%	----
		tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		titanium, total	7440-32-6	E420	0.00030	mg/L	0.308	0.306	0.963%	20%	----
		uranium, total	7440-61-1	E420	0.000010	mg/L	0.000178	0.000174	1.95%	20%	----
		vanadium, total	7440-62-2	E420	0.00050	mg/L	0.0192	0.0191	0.255%	20%	----
		zinc, total	7440-66-6	E420	0.0030	mg/L	0.0418	0.0394	5.96%	20%	----
		zirconium, total	7440-67-7	E420	0.00030	mg/L	0.00063	<0.00030	0.00033	Diff <2x LOR	----
<b>Total Metals (QC Lot: 80431)</b>											
KS2001412-001	Anonymous	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Total Metals (QC Lot: 80432)</b>											
VA20B3842-014	TMF1	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	0.0000066	0.0000016	Diff <2x LOR	----
<b>Total Metals (QC Lot: 81045)</b>											
VA20B3842-015	JM5	mercury total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 79797)</b>											



Sub-Matrix: **Water** *Laboratory Duplicate (DUP) Report*

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 79797) - continued</b>											
VA20B3842-001	BR4	chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 79798)</b>											
VA20B3842-001	BR4	aluminum, dissolved	7429-90-5	E421	0.0030	mg/L	0.0472	0.0443	6.38%	20%	----
		antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00011	0.00011	0.000001	Diff <2x LOR	----
		arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00025	0.00023	0.00002	Diff <2x LOR	----
		barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0288	0.0277	3.64%	20%	----
		beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		cadmium, dissolved	7440-43-9	E421	0.000050	mg/L	0.0000575	0.0000586	1.91%	20%	----
		calcium, dissolved	7440-70-2	E421	0.050	mg/L	24.7	24.0	2.70%	20%	----
		cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00017	0.00017	0.000003	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00046	0.00046	0.000006	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E421	0.010	mg/L	0.014	0.014	0.0003	Diff <2x LOR	----
		lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	0.100	mg/L	2.42	2.44	0.924%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0347	0.0352	1.53%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000969	0.000995	2.65%	20%	----
		nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00053	<0.00050	0.00003	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	0.100	mg/L	1.88	1.88	0.329%	20%	----
		selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000343	0.000249	0.000094	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	0.050	mg/L	1.15	1.20	4.80%	20%	----
		silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		sodium, dissolved	7440-23-5	E421	0.050	mg/L	0.584	0.581	0.597%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.132	0.133	0.804%	20%	----
		sulfur, dissolved	7704-34-9	E421	0.50	mg/L	10.1	10.0	0.472%	20%	----
		thallium, dissolved	7440-28-0	E421	0.000010	mg/L	0.000011	0.000013	0.000001	Diff <2x LOR	----
		tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		titanium, dissolved	7440-32-6	E421	0.00030	mg/L	0.00064	0.00062	0.00002	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000082	0.000081	0.000002	Diff <2x LOR	----
		vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0017	0.0017	0.00007	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----

**Dissolved Metals (QC Lot: 79799)**



Sub-Matrix: **Water** *Laboratory Duplicate (DUP) Report*

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 79799) - continued</b>											
VA20B3842-021	JM24	aluminum, dissolved	7429-90-5	E421	0.0030	mg/L	0.0444	0.0438	1.27%	20%	----
		antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00012	0.00012	0.000005	Diff <2x LOR	----
		barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0279	0.0285	2.18%	20%	----
		beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.000118	0.000121	2.60%	20%	----
		calcium, dissolved	7440-70-2	E421	0.050	mg/L	10.1	9.74	3.96%	20%	----
		cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00046	0.00045	0.000008	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E421	0.010	mg/L	0.031	0.030	0.001	Diff <2x LOR	----
		lead, dissolved	7439-92-1	E421	0.000050	mg/L	0.000227	0.000219	0.000008	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	0.100	mg/L	0.687	0.673	0.0146	Diff <2x LOR	----
		manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0204	0.0199	2.64%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000159	0.000153	0.000007	Diff <2x LOR	----
		nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	0.100	mg/L	0.629	0.611	0.019	Diff <2x LOR	----
		selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000064	0.000056	0.000008	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	0.050	mg/L	0.824	0.837	1.50%	20%	----
		silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		sodium, dissolved	7440-23-5	E421	0.050	mg/L	0.383	0.374	0.009	Diff <2x LOR	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0640	0.0641	0.0818%	20%	----
		sulfur, dissolved	7704-34-9	E421	0.50	mg/L	1.32	1.16	0.16	Diff <2x LOR	----
		thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		titanium, dissolved	7440-32-6	E421	0.00030	mg/L	0.00139	0.00137	0.00002	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000084	0.000079	0.000004	Diff <2x LOR	----
		vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0042	0.0040	0.0002	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----

<b>Dissolved Metals (QC Lot: 79800)</b>											
VA20B3842-021	JM24	chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----

<b>Dissolved Metals (QC Lot: 80464)</b>											
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Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 80464) - continued</b>											
VA20B3842-001	BR4	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 80465)</b>											
VA20B3842-021	JM24	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Aggregate Organics (QC Lot: 81008)</b>											
VA20B3842-017	JM10-2018	chemical oxygen demand [COD]	----	E559	20	mg/L	<20	<20	0	Diff <2x LOR	----
<b>Volatile Organic Compounds (QC Lot: 79732)</b>											
VA20B3842-009	JM3	benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
<b>Volatile Organic Compounds (QC Lot: 80458)</b>											
VA20B3842-017	JM10-2018	benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
<b>Hydrocarbons (QC Lot: 79731)</b>											
VA20B3842-009	JM3	VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.00%	30%	----
<b>Hydrocarbons (QC Lot: 80457)</b>											
VA20B3842-017	JM10-2018	VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.00%	30%	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

### Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 78767)</b>						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
<b>Physical Tests (QCLot: 78768)</b>						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
<b>Physical Tests (QCLot: 78781)</b>						
solids, total suspended [TSS]	----	E160-H	3	mg/L	<3.0	----
<b>Physical Tests (QCLot: 78782)</b>						
solids, total suspended [TSS]	----	E160-H	3	mg/L	<3.0	----
<b>Physical Tests (QCLot: 78792)</b>						
alkalinity, bicarbonate (as CaCO <sub>3</sub> )	----	E290	1	mg/L	<1.0	----
alkalinity, carbonate (as CaCO <sub>3</sub> )	----	E290	1	mg/L	<1.0	----
alkalinity, hydroxide (as CaCO <sub>3</sub> )	----	E290	1	mg/L	<1.0	----
alkalinity, total (as CaCO <sub>3</sub> )	----	E290	1	mg/L	<1.0	----
<b>Physical Tests (QCLot: 78793)</b>						
conductivity	----	E100	1	µS/cm	<1.0	----
<b>Physical Tests (QCLot: 78794)</b>						
acidity (as CaCO <sub>3</sub> )	----	E283	2	mg/L	2.1	----
<b>Physical Tests (QCLot: 78801)</b>						
colour, true	----	E329	5	CU	<5.0	----
<b>Physical Tests (QCLot: 78808)</b>						
conductivity	----	E100	1	µS/cm	<1.0	----
<b>Physical Tests (QCLot: 78810)</b>						
alkalinity, bicarbonate (as CaCO <sub>3</sub> )	----	E290	1	mg/L	<1.0	----
alkalinity, carbonate (as CaCO <sub>3</sub> )	----	E290	1	mg/L	<1.0	----
alkalinity, hydroxide (as CaCO <sub>3</sub> )	----	E290	1	mg/L	<1.0	----
alkalinity, total (as CaCO <sub>3</sub> )	----	E290	1	mg/L	<1.0	----
<b>Physical Tests (QCLot: 78811)</b>						
acidity (as CaCO <sub>3</sub> )	----	E283	2	mg/L	<2.0	----
<b>Physical Tests (QCLot: 78818)</b>						
colour, true	----	E329	5	CU	<5.0	----
<b>Physical Tests (QCLot: 79259)</b>						
turbidity	----	E121	0.1	NTU	<0.10	----
<b>Physical Tests (QCLot: 79416)</b>						
turbidity	----	E121	0.1	NTU	<0.10	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 79531)</b>						
solids, total suspended [TSS]	---	E160-H	3	mg/L	<3.0	---
<b>Physical Tests (QCLot: 80003)</b>						
acidity, hot peroxide treated (as CaCO3)	---	E284A	25	mg/L	<25	---
<b>Anions and Nutrients (QCLot: 78786)</b>						
Kjeldahl nitrogen, total [TKN]	---	E318	0.05	mg/L	<0.050	---
<b>Anions and Nutrients (QCLot: 78788)</b>						
nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	---
<b>Anions and Nutrients (QCLot: 78789)</b>						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	---
<b>Anions and Nutrients (QCLot: 78790)</b>						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
<b>Anions and Nutrients (QCLot: 78795)</b>						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
<b>Anions and Nutrients (QCLot: 78796)</b>						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
<b>Anions and Nutrients (QCLot: 78797)</b>						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	---
<b>Anions and Nutrients (QCLot: 78798)</b>						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	---
<b>Anions and Nutrients (QCLot: 78799)</b>						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	---
<b>Anions and Nutrients (QCLot: 78800)</b>						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
<b>Anions and Nutrients (QCLot: 78802)</b>						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	---
<b>Anions and Nutrients (QCLot: 78803)</b>						
Kjeldahl nitrogen, total [TKN]	---	E318	0.05	mg/L	<0.050	---
<b>Anions and Nutrients (QCLot: 78805)</b>						
nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	---
<b>Anions and Nutrients (QCLot: 78806)</b>						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	---
<b>Anions and Nutrients (QCLot: 78807)</b>						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
<b>Anions and Nutrients (QCLot: 78812)</b>						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
<b>Anions and Nutrients (QCLot: 78813)</b>						



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Anions and Nutrients (QCLot: 78813) - continued</b>						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 78814)</b>						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 78815)</b>						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
<b>Anions and Nutrients (QCLot: 78816)</b>						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
<b>Anions and Nutrients (QCLot: 78817)</b>						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
<b>Anions and Nutrients (QCLot: 78819)</b>						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 80313)</b>						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
<b>Anions and Nutrients (QCLot: 80315)</b>						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
<b>Anions and Nutrients (QCLot: 80316)</b>						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 80317)</b>						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 80318)</b>						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
<b>Anions and Nutrients (QCLot: 80319)</b>						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
<b>Anions and Nutrients (QCLot: 82504)</b>						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 82829)</b>						
cyanate	88402-73-7	E343	0.2	mg/L	<0.20	----
<b>Cyanides (QCLot: 81531)</b>						
cyanide, weak acid dissociable	----	E336	0.002	mg/L	<0.0020	----
<b>Cyanides (QCLot: 81532)</b>						
cyanide, free	----	E339	0.002	mg/L	<0.0020	----
<b>Cyanides (QCLot: 81533)</b>						
cyanide, strong acid dissociable (total)	----	E333	0.002	mg/L	<0.0020	----
<b>Cyanides (QCLot: 81559)</b>						
cyanide, strong acid dissociable (total)	----	E333	0.002	mg/L	<0.0020	----
<b>Cyanides (QCLot: 81560)</b>						



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Cyanides (QCLot: 81560) - continued</b>						
cyanide, weak acid dissociable	---	E336	0.002	mg/L	<0.0020	---
<b>Cyanides (QCLot: 81561)</b>						
cyanide, free	---	E339	0.002	mg/L	<0.0020	---
<b>Cyanides (QCLot: 81890)</b>						
thiocyanate	302-04-5	E344	0.5	mg/L	<0.50	---
<b>Organic / Inorganic Carbon (QCLot: 78787)</b>						
carbon, total organic [TOC]	---	E355-L	0.5	mg/L	<0.50	---
<b>Organic / Inorganic Carbon (QCLot: 78804)</b>						
carbon, total organic [TOC]	---	E355-L	0.5	mg/L	<0.50	---
<b>Organic / Inorganic Carbon (QCLot: 81965)</b>						
carbon, dissolved organic [DOC]	---	E358-L	0.5	mg/L	<0.50	---
<b>Organic / Inorganic Carbon (QCLot: 82552)</b>						
carbon, dissolved organic [DOC]	---	E358-L	0.5	mg/L	<0.50	---
<b>Total Metals (QCLot: 79426)</b>						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	---
<b>Total Metals (QCLot: 79427)</b>						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	---
<b>Total Metals (QCLot: 79474)</b>						
aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	---
antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	---
arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	---
barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	---
beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	---
bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	---
boron, total	7440-42-8	E420	0.01	mg/L	<0.010	---
cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	---
calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	---
cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	---
copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	---
iron, total	7439-89-6	E420	0.01	mg/L	<0.010	---
lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	---
lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	---
magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	---
manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	---
molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	---
nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	---



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Total Metals (QCLot: 79474) - continued</b>						
phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
<b>Total Metals (QCLot: 79475)</b>						
chromium, total	7440-47-3	E420.Cr-L	0.0001	mg/L	<0.00010	----
<b>Total Metals (QCLot: 79989)</b>						
chromium, total	7440-47-3	E420.Cr-L	0.0001	mg/L	<0.00010	----
<b>Total Metals (QCLot: 79990)</b>						
aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Total Metals (QCLot: 79990) - continued</b>						
molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
<b>Total Metals (QCLot: 80431)</b>						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
<b>Total Metals (QCLot: 80432)</b>						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
<b>Total Metals (QCLot: 81045)</b>						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
<b>Dissolved Metals (QCLot: 79797)</b>						
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	<0.00010	----
<b>Dissolved Metals (QCLot: 79798)</b>						
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 79798) - continued</b>						
copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
<b>Dissolved Metals (QCLot: 79799)</b>						
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----





Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 79799) - continued</b>						
lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	---
lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	---
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	---
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	---
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	---
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	---
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	---
potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	---
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	---
silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	---
silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	---
sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	---
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	---
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	---
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	---
tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	---
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	---
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	---
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	---
zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	---
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	---
<b>Dissolved Metals (QCLot: 79800)</b>						
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	<0.00010	---
<b>Dissolved Metals (QCLot: 80464)</b>						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	---
<b>Dissolved Metals (QCLot: 80465)</b>						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	---
<b>Aggregate Organics (QCLot: 81008)</b>						
chemical oxygen demand [COD]	---	E559	20	mg/L	<20	---
<b>Volatile Organic Compounds (QCLot: 79732)</b>						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	---
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	---
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	---
styrene	100-42-5	E611A	0.5	µg/L	<0.50	---
toluene	108-88-3	E611A	0.5	µg/L	<0.50	---
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	<0.50	---



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Volatile Organic Compounds (QCLot: 79732) - continued</b>						
xylene, o-	95-47-6	E611A	0.5	µg/L	<0.50	---
<b>Volatile Organic Compounds (QCLot: 80458)</b>						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	---
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	---
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	---
styrene	100-42-5	E611A	0.5	µg/L	<0.50	---
toluene	108-88-3	E611A	0.5	µg/L	<0.50	---
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	<0.50	---
xylene, o-	95-47-6	E611A	0.5	µg/L	<0.50	---
<b>Hydrocarbons (QCLot: 79731)</b>						
VHw (C6-C10)	---	E581.VH+F1	100	µg/L	<100	---
<b>Hydrocarbons (QCLot: 80222)</b>						
EPH (C10-C19)	---	E601A	250	µg/L	<250	---
EPH (C19-C32)	---	E601A	250	µg/L	<250	---
<b>Hydrocarbons (QCLot: 80457)</b>						
VHw (C6-C10)	---	E581.VH+F1	100	µg/L	<100	---
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 80223)</b>						
acenaphthene	83-32-9	E641A	0.01	µg/L	<0.010	---
acenaphthylene	208-96-8	E641A	0.01	µg/L	<0.010	---
acridine	260-94-6	E641A	0.01	µg/L	<0.010	---
anthracene	120-12-7	E641A	0.01	µg/L	<0.010	---
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	<0.010	---
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	---
benzo(b+j)fluoranthene	---	E641A	0.01	µg/L	<0.010	---
benzo(b+j+k)fluoranthene	---	E641A	0.015	µg/L	<0.015	---
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	<0.010	---
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	<0.010	---
chrysene	218-01-9	E641A	0.01	µg/L	<0.010	---
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	<0.0050	---
fluoranthene	206-44-0	E641A	0.01	µg/L	<0.010	---
fluorene	86-73-7	E641A	0.01	µg/L	<0.010	---
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	<0.010	---
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	<0.010	---
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	<0.010	---
naphthalene	91-20-3	E641A	0.05	µg/L	<0.050	---
phenanthrene	85-01-8	E641A	0.02	µg/L	<0.020	---

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Work Order : VA20B3842  
Client : ERM Consultants Canada Ltd.  
Project : 0539378-0012 (WQ ISKUT)



Sub-Matrix: **Water**

<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Result</i>	<i>Qualifier</i>
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 80223) - continued</b>						
pyrene	129-00-0	E641A	0.01	µg/L	<0.010	---
quinoline	6027-02-7	E641A	0.05	µg/L	<0.050	---



## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Physical Tests (QCLot: 78767)</b>									
solids, total dissolved [TDS]	---	E162	10	mg/L	1000 mg/L	102	85.0	115	---
<b>Physical Tests (QCLot: 78768)</b>									
solids, total dissolved [TDS]	---	E162	10	mg/L	1000 mg/L	102	85.0	115	---
<b>Physical Tests (QCLot: 78781)</b>									
solids, total suspended [TSS]	---	E160-H	3	mg/L	150 mg/L	97.8	85.0	115	---
<b>Physical Tests (QCLot: 78782)</b>									
solids, total suspended [TSS]	---	E160-H	3	mg/L	150 mg/L	99.5	85.0	115	---
<b>Physical Tests (QCLot: 78791)</b>									
pH	---	E108	---	pH units	7 pH units	100	98.0	102	---
<b>Physical Tests (QCLot: 78792)</b>									
alkalinity, total (as CaCO <sub>3</sub> )	---	E290	1	mg/L	500 mg/L	107	85.0	115	---
<b>Physical Tests (QCLot: 78793)</b>									
conductivity	---	E100	1	µS/cm	146.9 µS/cm	103	90.0	110	---
<b>Physical Tests (QCLot: 78794)</b>									
acidity (as CaCO <sub>3</sub> )	---	E283	2	mg/L	50 mg/L	104	85.0	115	---
<b>Physical Tests (QCLot: 78801)</b>									
colour, true	---	E329	5	CU	100 CU	97.1	85.0	115	---
<b>Physical Tests (QCLot: 78808)</b>									
conductivity	---	E100	1	µS/cm	146.9 µS/cm	101	90.0	110	---
<b>Physical Tests (QCLot: 78809)</b>									
pH	---	E108	---	pH units	7 pH units	100	98.0	102	---
<b>Physical Tests (QCLot: 78810)</b>									
alkalinity, total (as CaCO <sub>3</sub> )	---	E290	1	mg/L	500 mg/L	100	85.0	115	---
<b>Physical Tests (QCLot: 78811)</b>									
acidity (as CaCO <sub>3</sub> )	---	E283	2	mg/L	50 mg/L	97.8	85.0	115	---
<b>Physical Tests (QCLot: 78818)</b>									
colour, true	---	E329	5	CU	100 CU	97.9	85.0	115	---
<b>Physical Tests (QCLot: 79259)</b>									
turbidity	---	E121	0.1	NTU	200 NTU	97.5	85.0	115	---
<b>Physical Tests (QCLot: 79416)</b>									
turbidity	---	E121	0.1	NTU	200 NTU	103	85.0	115	---
<b>Physical Tests (QCLot: 79531)</b>									
solids, total suspended [TSS]	---	E160-H	3	mg/L	150 mg/L	98.7	85.0	115	---



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Physical Tests (QCLot: 80003)</b>									
acidity, hot peroxide treated (as CaCO3)	----	E284A	25	mg/L	2500 mg/L	96.6	85.0	115	----
<b>Anions and Nutrients (QCLot: 78786)</b>									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	105	75.0	125	----
<b>Anions and Nutrients (QCLot: 78788)</b>									
nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	98.9	75.0	125	----
<b>Anions and Nutrients (QCLot: 78789)</b>									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	91.6	80.0	120	----
<b>Anions and Nutrients (QCLot: 78790)</b>									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.12 mg/L	100	85.0	115	----
<b>Anions and Nutrients (QCLot: 78795)</b>									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	95.9	90.0	110	----
<b>Anions and Nutrients (QCLot: 78796)</b>									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	94.4	90.0	110	----
<b>Anions and Nutrients (QCLot: 78797)</b>									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	86.7	85.0	115	----
<b>Anions and Nutrients (QCLot: 78798)</b>									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	96.8	90.0	110	----
<b>Anions and Nutrients (QCLot: 78799)</b>									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	95.5	90.0	110	----
<b>Anions and Nutrients (QCLot: 78800)</b>									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	97.5	90.0	110	----
<b>Anions and Nutrients (QCLot: 78802)</b>									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	101	80.0	120	----
<b>Anions and Nutrients (QCLot: 78803)</b>									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	96.8	75.0	125	----
<b>Anions and Nutrients (QCLot: 78805)</b>									
nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	101	75.0	125	----
<b>Anions and Nutrients (QCLot: 78806)</b>									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	95.8	80.0	120	----
<b>Anions and Nutrients (QCLot: 78807)</b>									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.12 mg/L	96.3	85.0	115	----
<b>Anions and Nutrients (QCLot: 78812)</b>									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	97.6	90.0	110	----
<b>Anions and Nutrients (QCLot: 78813)</b>									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	96.8	90.0	110	----
<b>Anions and Nutrients (QCLot: 78814)</b>									



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 78814) - continued</b>									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	95.7	90.0	110	----
<b>Anions and Nutrients (QCLot: 78815)</b>									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	94.6	90.0	110	----
<b>Anions and Nutrients (QCLot: 78816)</b>									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	96.0	90.0	110	----
<b>Anions and Nutrients (QCLot: 78817)</b>									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	88.8	85.0	115	----
<b>Anions and Nutrients (QCLot: 78819)</b>									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	99.6	80.0	120	----
<b>Anions and Nutrients (QCLot: 80313)</b>									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	103	90.0	110	----
<b>Anions and Nutrients (QCLot: 80315)</b>									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	105	90.0	110	----
<b>Anions and Nutrients (QCLot: 80316)</b>									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	103	90.0	110	----
<b>Anions and Nutrients (QCLot: 80317)</b>									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	100	90.0	110	----
<b>Anions and Nutrients (QCLot: 80318)</b>									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	101	90.0	110	----
<b>Anions and Nutrients (QCLot: 80319)</b>									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	97.1	85.0	115	----
<b>Anions and Nutrients (QCLot: 82504)</b>									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	98.7	80.0	120	----
<b>Anions and Nutrients (QCLot: 82829)</b>									
cyanate	88402-73-7	E343	0.2	mg/L	1 mg/L	90.2	85.0	115	----
<b>Cyanides (QCLot: 81531)</b>									
cyanide, weak acid dissociable	----	E336	0.002	mg/L	0.125 mg/L	100	80.0	120	----
<b>Cyanides (QCLot: 81532)</b>									
cyanide, free	----	E339	0.002	mg/L	0.125 mg/L	94.9	80.0	120	----
<b>Cyanides (QCLot: 81533)</b>									
cyanide, strong acid dissociable (total)	----	E333	0.002	mg/L	0.25 mg/L	94.6	80.0	120	----
<b>Cyanides (QCLot: 81559)</b>									
cyanide, strong acid dissociable (total)	----	E333	0.002	mg/L	0.25 mg/L	93.9	80.0	120	----
<b>Cyanides (QCLot: 81560)</b>									
cyanide, weak acid dissociable	----	E336	0.002	mg/L	0.125 mg/L	95.4	80.0	120	----
<b>Cyanides (QCLot: 81561)</b>									



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Cyanides (QCLot: 81561) - continued</b>									
cyanide, free	----	E339	0.002	mg/L	0.125 mg/L	94.1	80.0	120	----
<b>Cyanides (QCLot: 81890)</b>									
thiocyanate	302-04-5	E344	0.5	mg/L	10 mg/L	94.7	85.0	115	----
<b>Organic / Inorganic Carbon (QCLot: 78787)</b>									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	99.7	80.0	120	----
<b>Organic / Inorganic Carbon (QCLot: 78804)</b>									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	95.4	80.0	120	----
<b>Organic / Inorganic Carbon (QCLot: 81965)</b>									
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	102	80.0	120	----
<b>Organic / Inorganic Carbon (QCLot: 82552)</b>									
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	97.6	80.0	120	----
<b>Total Metals (QCLot: 79426)</b>									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	97.4	80.0	120	----
<b>Total Metals (QCLot: 79427)</b>									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	101	80.0	120	----
<b>Total Metals (QCLot: 79474)</b>									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	99.8	80.0	120	----
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	104	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	98.7	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	105	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	100	80.0	120	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	102	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	100	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	101	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	104	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	99.7	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	99.6	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	100	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	99.7	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	102	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	100	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	99.1	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	100	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	99.6	80.0	120	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	91.3	80.0	120	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Total Metals (QCLot: 79474) - continued</b>									
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	98.8	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	99.1	80.0	120	----
silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	99.7	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	102	80.0	120	----
sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	104	80.0	120	----
strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	103	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	92.7	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	99.4	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	100	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	93.9	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	97.1	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	98.5	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	103	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	96.6	80.0	120	----
<b>Total Metals (QCLot: 79475)</b>									
chromium, total	7440-47-3	E420.Cr-L	0.0001	mg/L	0.25 mg/L	96.9	80.0	120	----
<b>Total Metals (QCLot: 79989)</b>									
chromium, total	7440-47-3	E420.Cr-L	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
<b>Total Metals (QCLot: 79990)</b>									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	104	80.0	120	----
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	106	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	102	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	103	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	104	80.0	120	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	112	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	100	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	103	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	101	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	101	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	101	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	98.0	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	108	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	101	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	107	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	98.5	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	99.7	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	98.9	80.0	120	----





Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Total Metals (QCLot: 79990) - continued</b>									
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	102	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	102	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	101	80.0	120	----
silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	104	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	105	80.0	120	----
sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	106	80.0	120	----
strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	104	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	102	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	108	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	102	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	98.4	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	106	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	105	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	103	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	98.2	80.0	120	----
<b>Total Metals (QCLot: 80431)</b>									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	92.6	80.0	120	----
<b>Total Metals (QCLot: 80432)</b>									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	91.7	80.0	120	----
<b>Total Metals (QCLot: 81045)</b>									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	93.6	80.0	120	----
<b>Dissolved Metals (QCLot: 79797)</b>									
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	0.25 mg/L	98.3	80.0	120	----
<b>Dissolved Metals (QCLot: 79798)</b>									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	94.1	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	97.2	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	95.7	80.0	120	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	98.1	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	101	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	96.5	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	97.0	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	104	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	97.6	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	94.9	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	94.6	80.0	120	----



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 79798) - continued</b>									
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	100	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	94.4	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	97.6	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	98.0	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	96.5	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	97.2	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	104	70.0	130	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	97.2	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	102	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	95.8	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	98.6	80.0	120	----
sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	99.3	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	99.8	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	99.6	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	100	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	94.0	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	91.4	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	93.7	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	97.0	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	94.4	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	89.9	80.0	120	----
<b>Dissolved Metals (QCLot: 79799)</b>									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	95.5	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	98.9	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	96.4	80.0	120	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	100	80.0	120	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	100	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	99.1	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	99.0	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	98.2	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	105	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	96.8	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	95.5	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	92.6	80.0	120	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	99.2	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	97.5	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	99.7	80.0	120	----



Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 79799) - continued</b>									
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	100	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	97.0	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	96.4	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	116	70.0	130	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	98.8	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	102	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	99.4	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	98.2	80.0	120	----
sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	99.9	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	97.1	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	89.5	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	98.7	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	93.6	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	93.4	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	93.2	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	98.8	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	95.8	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	90.3	80.0	120	----
<b>Dissolved Metals (QCLot: 79800)</b>									
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	0.25 mg/L	97.3	80.0	120	----
<b>Dissolved Metals (QCLot: 80464)</b>									
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	101	80.0	120	----
<b>Dissolved Metals (QCLot: 80465)</b>									
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	96.6	80.0	120	----
<b>Aggregate Organics (QCLot: 81008)</b>									
chemical oxygen demand [COD]	----	E559	20	mg/L	750 mg/L	101	85.0	115	----
<b>Volatile Organic Compounds (QCLot: 79732)</b>									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	98.2	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	91.3	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	113	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	91.4	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	97.3	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	200 µg/L	108	70.0	130	----
xylene, o-	95-47-6	E611A	0.5	µg/L	100 µg/L	94.4	70.0	130	----
<b>Volatile Organic Compounds (QCLot: 80458)</b>									



Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 80458) - continued</b>									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	92.7	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	85.1	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	108	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	85.0	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	89.9	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	200 µg/L	90.8	70.0	130	----
xylene, o-	95-47-6	E611A	0.5	µg/L	100 µg/L	88.9	70.0	130	----
<b>Hydrocarbons (QCLot: 79731)</b>									
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	93.1	70.0	130	----
<b>Hydrocarbons (QCLot: 80222)</b>									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	120	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	114	70.0	130	----
<b>Hydrocarbons (QCLot: 80457)</b>									
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	92.1	70.0	130	----
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 80223)</b>									
acenaphthene	83-32-9	E641A	0.01	µg/L	0.5 µg/L	109	60.0	130	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5 µg/L	110	60.0	130	----
acridine	260-94-6	E641A	0.01	µg/L	0.5 µg/L	100.0	60.0	130	----
anthracene	120-12-7	E641A	0.01	µg/L	0.5 µg/L	110	60.0	130	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5 µg/L	106	60.0	130	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5 µg/L	114	60.0	130	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	0.5 µg/L	110	60.0	130	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	1 µg/L	115	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5 µg/L	116	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5 µg/L	119	60.0	130	----
chrysene	218-01-9	E641A	0.01	µg/L	0.5 µg/L	113	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	0.5 µg/L	119	60.0	130	----
fluoranthene	206-44-0	E641A	0.01	µg/L	0.5 µg/L	111	60.0	130	----
fluorene	86-73-7	E641A	0.01	µg/L	0.5 µg/L	101	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5 µg/L	116	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5 µg/L	107	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	0.5 µg/L	101	60.0	130	----
naphthalene	91-20-3	E641A	0.05	µg/L	0.5 µg/L	102	50.0	130	----
phenanthrene	85-01-8	E641A	0.02	µg/L	0.5 µg/L	106	60.0	130	----
pyrene	129-00-0	E641A	0.01	µg/L	0.5 µg/L	115	60.0	130	----

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 Work Order : VA20B3842  
 Client : ERM Consultants Canada Ltd.  
 Project : 0539378-0012 (WQ ISKUT)



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 80223) - continued</b>									
quinoline	6027-02-7	E641A	0.05	µg/L	0.5 µg/L	119	60.0	130	----



### Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	Target		MS	Low	
<b>Anions and Nutrients (QCLot: 78786)</b>										
VA20B3842-002	BR3	Kjeldahl nitrogen, total [TKN]	----	E318	2.59 mg/L	2.5 mg/L	104	70.0	130	----
<b>Anions and Nutrients (QCLot: 78788)</b>										
VA20B3842-002	BR3	nitrogen, total	7727-37-9	E366	0.374 mg/L	0.4 mg/L	93.4	70.0	130	----
<b>Anions and Nutrients (QCLot: 78789)</b>										
VA20B3842-002	BR3	phosphorus, total	7723-14-0	E372-U	ND mg/L	0.05 mg/L	ND	70.0	130	----
<b>Anions and Nutrients (QCLot: 78790)</b>										
VA20B3842-002	BR3	ammonia, total (as N)	7664-41-7	E298	0.201 mg/L	0.2 mg/L	100	75.0	125	----
<b>Anions and Nutrients (QCLot: 78795)</b>										
VA20B3842-002	BR3	chloride	16887-00-6	E235.Cl	103 mg/L	100 mg/L	103	75.0	125	----
<b>Anions and Nutrients (QCLot: 78796)</b>										
VA20B3842-002	BR3	fluoride	16984-48-8	E235.F	1.02 mg/L	1 mg/L	102	75.0	125	----
<b>Anions and Nutrients (QCLot: 78797)</b>										
VA20B3842-002	BR3	bromide	24959-67-9	E235.Br-L	0.474 mg/L	0.5 mg/L	94.8	75.0	125	----
<b>Anions and Nutrients (QCLot: 78798)</b>										
VA20B3842-002	BR3	nitrate (as N)	14797-55-8	E235.NO3-L	2.59 mg/L	2.5 mg/L	104	75.0	125	----
<b>Anions and Nutrients (QCLot: 78799)</b>										
VA20B3842-002	BR3	nitrite (as N)	14797-65-0	E235.NO2-L	0.510 mg/L	0.5 mg/L	102	75.0	125	----
<b>Anions and Nutrients (QCLot: 78800)</b>										
VA20B3842-002	BR3	sulfate (as SO4)	14808-79-8	E235.SO4	103 mg/L	100 mg/L	103	75.0	125	----
<b>Anions and Nutrients (QCLot: 78802)</b>										
VA20B3842-002	BR3	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0317 mg/L	0.03 mg/L	106	70.0	130	----
<b>Anions and Nutrients (QCLot: 78803)</b>										
VA20B3842-022	DUP5	Kjeldahl nitrogen, total [TKN]	----	E318	2.51 mg/L	2.5 mg/L	100	70.0	130	----
<b>Anions and Nutrients (QCLot: 78805)</b>										
VA20B3842-022	DUP5	nitrogen, total	7727-37-9	E366	0.396 mg/L	0.4 mg/L	98.9	70.0	130	----
<b>Anions and Nutrients (QCLot: 78806)</b>										
VA20B3842-022	DUP5	phosphorus, total	7723-14-0	E372-U	0.0485 mg/L	0.05 mg/L	97.0	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 78807)</b>										
VA20B3842-022	DUP5	ammonia, total (as N)	7664-41-7	E298	0.210 mg/L	0.2 mg/L	105	75 0	125	----
<b>Anions and Nutrients (QCLot: 78812)</b>										
VA20B3842-022	DUP5	sulfate (as SO4)	14808-79-8	E235.SO4	102 mg/L	100 mg/L	102	75 0	125	----
<b>Anions and Nutrients (QCLot: 78813)</b>										
VA20B3842-022	DUP5	nitrate (as N)	14797-55-8	E235 NO3-L	2.56 mg/L	2.5 mg/L	102	75 0	125	----
<b>Anions and Nutrients (QCLot: 78814)</b>										
VA20B3842-022	DUP5	nitrite (as N)	14797-65-0	E235 NO2-L	0.506 mg/L	0.5 mg/L	101	75 0	125	----
<b>Anions and Nutrients (QCLot: 78815)</b>										
VA20B3842-022	DUP5	fluoride	16984-48-8	E235 F	1.01 mg/L	1 mg/L	101	75 0	125	----
<b>Anions and Nutrients (QCLot: 78816)</b>										
VA20B3842-022	DUP5	chloride	16887-00-6	E235.Cl	102 mg/L	100 mg/L	102	75 0	125	----
<b>Anions and Nutrients (QCLot: 78817)</b>										
VA20B3842-022	DUP5	bromide	24959-67-9	E235 Br-L	0.525 mg/L	0.5 mg/L	105	75 0	125	----
<b>Anions and Nutrients (QCLot: 78819)</b>										
VA20B3842-022	DUP5	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0 0350 mg/L	0.03 mg/L	117	70 0	130	----
<b>Anions and Nutrients (QCLot: 80313)</b>										
WR2000790-001	Anonymous	chloride	16887-00-6	E235.Cl	4520 mg/L	5000 mg/L	90.5	75 0	125	----
<b>Anions and Nutrients (QCLot: 80315)</b>										
WR2000790-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	ND mg/L	5000 mg/L	ND	75 0	125	----
<b>Anions and Nutrients (QCLot: 80316)</b>										
WR2000790-001	Anonymous	nitrate (as N)	14797-55-8	E235 NO3-L	112 mg/L	125 mg/L	90.1	75 0	125	----
<b>Anions and Nutrients (QCLot: 80317)</b>										
WR2000790-001	Anonymous	nitrite (as N)	14797-65-0	E235 NO2-L	22.2 mg/L	25 mg/L	88.6	75 0	125	----
<b>Anions and Nutrients (QCLot: 80318)</b>										
WR2000790-001	Anonymous	fluoride	16984-48-8	E235 F	46.9 mg/L	50 mg/L	93.7	75 0	125	----
<b>Anions and Nutrients (QCLot: 80319)</b>										
WR2000790-001	Anonymous	bromide	24959-67-9	E235 Br-L	20.6 mg/L	25 mg/L	82.5	75 0	125	----
<b>Anions and Nutrients (QCLot: 82504)</b>										
KS2001653-002	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	ND mg/L	0.03 mg/L	ND	70 0	130	----
<b>Anions and Nutrients (QCLot: 82829)</b>										
WT2000114-010	Anonymous	cyanate	88402-73-7	E343	ND mg/L	2 mg/L	ND	70 0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Cyanides (QCLot: 81531)</b>										
VA20B3842-002	BR3	cyanide, weak acid dissociable	----	E336	0.127 mg/L	0.125 mg/L	102	75.0	125	----
<b>Cyanides (QCLot: 81532)</b>										
VA20B3842-002	BR3	cyanide, free	----	E339	0.124 mg/L	0.125 mg/L	99.6	75.0	125	----
<b>Cyanides (QCLot: 81533)</b>										
VA20B3842-002	BR3	cyanide, strong acid dissociable (total)	----	E333	0.250 mg/L	0.25 mg/L	100	75.0	125	----
<b>Cyanides (QCLot: 81559)</b>										
VA20B3842-021	JM24	cyanide, strong acid dissociable (total)	----	E333	0.248 mg/L	0.25 mg/L	99.2	75.0	125	----
<b>Cyanides (QCLot: 81560)</b>										
VA20B3842-021	JM24	cyanide, weak acid dissociable	----	E336	0.129 mg/L	0.125 mg/L	103	75.0	125	----
<b>Cyanides (QCLot: 81561)</b>										
VA20B3842-021	JM24	cyanide, free	----	E339	0.125 mg/L	0.125 mg/L	100	75.0	125	----
<b>Cyanides (QCLot: 81890)</b>										
VA20B3935-003	Anonymous	thiocyanate	302-04-5	E344	9.46 mg/L	10 mg/L	94.6	75.0	125	----
<b>Organic / Inorganic Carbon (QCLot: 78787)</b>										
VA20B3842-002	BR3	carbon, total organic [TOC]	----	E355-L	4.97 mg/L	5 mg/L	99.4	70.0	130	----
<b>Organic / Inorganic Carbon (QCLot: 78804)</b>										
VA20B3842-022	DUP5	carbon, total organic [TOC]	----	E355-L	4.90 mg/L	5 mg/L	98.0	70.0	130	----
<b>Organic / Inorganic Carbon (QCLot: 80229)</b>										
VA20B4087-001	Anonymous	carbon, total inorganic [TIC]	----	E354-L	ND mg/L	10 mg/L	ND	70.0	130	----
<b>Organic / Inorganic Carbon (QCLot: 81965)</b>										
VA20B3842-002	BR3	carbon, dissolved organic [DOC]	----	E358-L	5.18 mg/L	5 mg/L	104	70.0	130	----
<b>Organic / Inorganic Carbon (QCLot: 82552)</b>										
VA20B3842-022	DUP5	carbon, dissolved organic [DOC]	----	E358-L	5.04 mg/L	5 mg/L	101	70.0	130	----
<b>Total Metals (QCLot: 79426)</b>										
VA20B3824-002	Anonymous	mercury, total	7439-97-6	E508	0.000122 mg/L	0.0001 mg/L	122	70.0	130	----
<b>Total Metals (QCLot: 79427)</b>										
VA20B3842-003	DUP1	mercury, total	7439-97-6	E508	0.000102 mg/L	0.0001 mg/L	102	70.0	130	----
<b>Total Metals (QCLot: 79474)</b>										
VA20B3842-012	JM2 SEEPAGE	aluminum, total	7429-90-5	E420	ND mg/L	0.2 mg/L	ND	70.0	130	----
		antimony, total	7440-36-0	E420	0.0200 mg/L	0.02 mg/L	100	70.0	130	----
		arsenic, total	7440-38-2	E420	0.0200 mg/L	0.02 mg/L	100	70.0	130	----
		barium, total	7440-39-3	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----





Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Total Metals (QCLot: 79474) - continued</b>										
VA20B3842-012	JM2 SEEPAGE	beryllium, total	7440-41-7	E420	0.0395 mg/L	0.04 mg/L	98.9	70.0	130	----
		bismuth, total	7440-69-9	E420	0.0100 mg/L	0.01 mg/L	100	70.0	130	----
		boron, total	7440-42-8	E420	0.098 mg/L	0.1 mg/L	97.8	70.0	130	----
		cadmium, total	7440-43-9	E420	ND mg/L	0.004 mg/L	ND	70.0	130	----
		calcium, total	7440-70-2	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		cobalt, total	7440-48-4	E420	0.0194 mg/L	0.02 mg/L	97.1	70.0	130	----
		copper, total	7440-50-8	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		iron, total	7439-89-6	E420	1.94 mg/L	2 mg/L	97.3	70.0	130	----
		lead, total	7439-92-1	E420	0.0201 mg/L	0.02 mg/L	100	70.0	130	----
		lithium, total	7439-93-2	E420	0.0960 mg/L	0.1 mg/L	96.0	70.0	130	----
		magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, total	7439-96-5	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		molybdenum, total	7439-98-7	E420	0.0200 mg/L	0.02 mg/L	100	70.0	130	----
		nickel, total	7440-02-0	E420	0.0401 mg/L	0.04 mg/L	100	70.0	130	----
		phosphorus, total	7723-14-0	E420	9.79 mg/L	10 mg/L	97.9	70.0	130	----
		potassium, total	7440-09-7	E420	4.55 mg/L	4 mg/L	114	70.0	130	----
		selenium, total	7782-49-2	E420	0.0438 mg/L	0.04 mg/L	109	70.0	130	----
		silicon, total	7440-21-3	E420	9.30 mg/L	10 mg/L	93.0	70.0	130	----
		silver, total	7440-22-4	E420	0.00390 mg/L	0.004 mg/L	97.5	70.0	130	----
		sodium, total	7440-23-5	E420	2.10 mg/L	2 mg/L	105	70.0	130	----
		strontium, total	7440-24-6	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		sulfur, total	7704-34-9	E420	ND mg/L	20 mg/L	ND	70.0	130	----
		thallium, total	7440-28-0	E420	0.00399 mg/L	0.004 mg/L	99.7	70.0	130	----
		tin, total	7440-31-5	E420	0.0196 mg/L	0.02 mg/L	98.1	70.0	130	----
		titanium, total	7440-32-6	E420	0.0393 mg/L	0.04 mg/L	98.3	70.0	130	----
		uranium, total	7440-61-1	E420	0.00424 mg/L	0.004 mg/L	106	70.0	130	----
		vanadium, total	7440-62-2	E420	0.103 mg/L	0.1 mg/L	103	70.0	130	----
		zinc, total	7440-66-6	E420	ND mg/L	0.4 mg/L	ND	70.0	130	----
		zirconium, total	7440-67-7	E420	0.0427 mg/L	0.04 mg/L	107	70.0	130	----
<b>Total Metals (QCLot: 79475)</b>										
VA20B3842-012	JM2 SEEPAGE	chromium, total	7440-47-3	E420.Cr-L	0.0392 mg/L	0.04 mg/L	98.0	70.0	130	----
<b>Total Metals (QCLot: 79989)</b>										
VA20B3842-002	BR3	chromium, total	7440-47-3	E420.Cr-L	0.0406 mg/L	0.04 mg/L	102	70.0	130	----
<b>Total Metals (QCLot: 79990)</b>										
VA20B3842-002	BR3	aluminum, total	7429-90-5	E420	ND mg/L	0.2 mg/L	ND	70.0	130	----
		antimony total	7440-36-0	E420	0.0210 mg/L	0.02 mg/L	105	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Lab rat ry sample ID	Client sample ID	Analyte	CAS Number	Method	C n entrati n	Target	MS	L w	High	Qualifier
<b>Total Metals (QCLot: 79990) - continued</b>										
VA20B3842-002	BR3	arsenic, total	7440-38-2	E420	0.0198 mg/L	0.02 mg/L	98.8	70.0	130	----
		barium, total	7440-39-3	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		beryllium, total	7440-41-7	E420	0.0400 mg/L	0.04 mg/L	100.0	70.0	130	----
		bismuth, total	7440-69-9	E420	0.0103 mg/L	0.01 mg/L	103	70.0	130	----
		boron, total	7440-42-8	E420	0.101 mg/L	0.1 mg/L	101	70.0	130	----
		cadmium, total	7440-43-9	E420	0.00409 mg/L	0.004 mg/L	102	70.0	130	----
		calcium, total	7440-70-2	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		cobalt, total	7440-48-4	E420	0.0196 mg/L	0.02 mg/L	98.0	70.0	130	----
		copper, total	7440-50-8	E420	0.0198 mg/L	0.02 mg/L	98.8	70.0	130	----
		iron, total	7439-89-6	E420	ND mg/L	2 mg/L	ND	70.0	130	----
		lead, total	7439-92-1	E420	0.0201 mg/L	0.02 mg/L	100	70.0	130	----
		lithium, total	7439-93-2	E420	0.0980 mg/L	0.1 mg/L	98.0	70.0	130	----
		magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, total	7439-96-5	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		molybdenum, total	7439-98-7	E420	0.0200 mg/L	0.02 mg/L	100.0	70.0	130	----
		nickel, total	7440-02-0	E420	0.0392 mg/L	0.04 mg/L	98.1	70.0	130	----
		phosphorus, total	7723-14-0	E420	9.78 mg/L	10 mg/L	97.8	70.0	130	----
		potassium, total	7440-09-7	E420	4.22 mg/L	4 mg/L	106	70.0	130	----
		selenium, total	7782-49-2	E420	0.0407 mg/L	0.04 mg/L	102	70.0	130	----
		silicon, total	7440-21-3	E420	9.22 mg/L	10 mg/L	92.2	70.0	130	----
		silver, total	7440-22-4	E420	0.00421 mg/L	0.004 mg/L	105	70.0	130	----
		sodium, total	7440-23-5	E420	1.99 mg/L	2 mg/L	99.7	70.0	130	----
		strontium, total	7440-24-6	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		sulfur, total	7704-34-9	E420	19.8 mg/L	20 mg/L	99.1	70.0	130	----
		thallium, total	7440-28-0	E420	0.00411 mg/L	0.004 mg/L	103	70.0	130	----
		tin, total	7440-31-5	E420	0.0206 mg/L	0.02 mg/L	103	70.0	130	----
		titanium, total	7440-32-6	E420	ND mg/L	0.04 mg/L	ND	70.0	130	----
		uranium, total	7440-61-1	E420	0.00418 mg/L	0.004 mg/L	104	70.0	130	----
		vanadium, total	7440-62-2	E420	0.105 mg/L	0.1 mg/L	105	70.0	130	----
		zinc, total	7440-66-6	E420	0.404 mg/L	0.4 mg/L	101	70.0	130	----
		zirconium, total	7440-67-7	E420	0.0413 mg/L	0.04 mg/L	103	70.0	130	----
<b>Total Metals (QCLot: 80431)</b>										
KS2001412-002	Anonymous	mercury, total	7439-97-6	E508	0.0000880 mg/L	0.0001 mg/L	88.0	70.0	130	----
<b>Total Metals (QCLot: 80432)</b>										
VA20B3842-016	SK1	mercury, total	7439-97-6	E508	0.0000874 mg/L	0.0001 mg/L	87.4	70.0	130	----
<b>Total Metals (QCLot: 81045)</b>										



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Lab rat ry sample ID	Client sample ID	Analyte	CAS Number	Method	C n entrati n	Target	MS	L w	High	Qualifier
<b>Total Metals (QCLot: 81045) - continued</b>										
VA20B3986-001	Anonymous	mercury, total	7439-97-6	E508	0.0000916 mg/L	0 0001 mg/L	91.6	70 0	130	----
<b>Dissolved Metals (QCLot: 79797)</b>										
VA20B3842-002	BR3	chromium, dissolved	7440-47-3	E421.Cr-L	0 0382 mg/L	0.04 mg/L	95.6	70 0	130	----
<b>Dissolved Metals (QCLot: 79798)</b>										
VA20B3842-002	BR3	aluminum, dissolved	7429-90-5	E421	0.189 mg/L	0.2 mg/L	94.4	70 0	130	----
		antimony, dissolved	7440-36-0	E421	0 0193 mg/L	0.02 mg/L	96.4	70 0	130	----
		arsenic, dissolved	7440-38-2	E421	0 0192 mg/L	0.02 mg/L	95.9	70 0	130	----
		barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70 0	130	----
		beryllium, dissolved	7440-41-7	E421	0 0402 mg/L	0.04 mg/L	100	70 0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00942 mg/L	0.01 mg/L	94.2	70 0	130	----
		boron, dissolved	7440-42-8	E421	0.102 mg/L	0.1 mg/L	102	70 0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00393 mg/L	0.004 mg/L	98.3	70 0	130	----
		calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70 0	130	----
		cobalt, dissolved	7440-48-4	E421	0 0194 mg/L	0.02 mg/L	97.1	70 0	130	----
		copper, dissolved	7440-50-8	E421	0 0191 mg/L	0.02 mg/L	95.5	70 0	130	----
		iron, dissolved	7439-89-6	E421	1.91 mg/L	2 mg/L	95.4	70 0	130	----
		lead, dissolved	7439-92-1	E421	0 0200 mg/L	0.02 mg/L	100 0	70 0	130	----
		lithium, dissolved	7439-93-2	E421	0 0997 mg/L	0.1 mg/L	99.7	70 0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70 0	130	----
		manganese, dissolved	7439-96-5	E421	ND mg/L	0.02 mg/L	ND	70 0	130	----
		molybdenum, dissolved	7439-98-7	E421	0 0195 mg/L	0.02 mg/L	97.5	70 0	130	----
		nickel, dissolved	7440-02-0	E421	0 0386 mg/L	0.04 mg/L	96.5	70 0	130	----
		phosphorus, dissolved	7723-14-0	E421	10.3 mg/L	10 mg/L	103	70 0	130	----
		potassium, dissolved	7440-09-7	E421	3.79 mg/L	4 mg/L	94.8	70 0	130	----
		selenium, dissolved	7782-49-2	E421	0 0406 mg/L	0.04 mg/L	101	70 0	130	----
		silicon, dissolved	7440-21-3	E421	9.43 mg/L	10 mg/L	94.3	70 0	130	----
		silver, dissolved	7440-22-4	E421	0.00395 mg/L	0.004 mg/L	98.7	70 0	130	----
		sodium, dissolved	7440-23-5	E421	2.03 mg/L	2 mg/L	101	70 0	130	----
		strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70 0	130	----
		sulfur, dissolved	7704-34-9	E421	21.3 mg/L	20 mg/L	106	70 0	130	----
		thallium, dissolved	7440-28-0	E421	0.00363 mg/L	0.004 mg/L	90.7	70 0	130	----
		tin, dissolved	7440-31-5	E421	0 0189 mg/L	0.02 mg/L	94.4	70 0	130	----
		titanium, dissolved	7440-32-6	E421	0 0382 mg/L	0.04 mg/L	95.6	70 0	130	----
		uranium, dissolved	7440-61-1	E421	0.00369 mg/L	0.004 mg/L	92.2	70 0	130	----
		vanadium, dissolved	7440-62-2	E421	0 0972 mg/L	0.1 mg/L	97.2	70 0	130	----
		zinc, dissolved	7440-66-6	E421	0.390 mg/L	0.4 mg/L	97.6	70 0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 79798) - continued</b>										
VA20B3842-002	BR3	zirconium, dissolved	7440-67-7	E421	0.0390 mg/L	0.04 mg/L	97.6	70.0	130	----
<b>Dissolved Metals (QCLot: 79799)</b>										
VA20B3842-022	DUP5	aluminum, dissolved	7429-90-5	E421	0.191 mg/L	0.2 mg/L	95.7	70.0	130	----
		antimony, dissolved	7440-36-0	E421	0.0190 mg/L	0.02 mg/L	95.3	70.0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0194 mg/L	0.02 mg/L	96.9	70.0	130	----
		barium, dissolved	7440-39-3	E421	0.0180 mg/L	0.02 mg/L	90.2	70.0	130	----
		beryllium, dissolved	7440-41-7	E421	0.0413 mg/L	0.04 mg/L	103	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00948 mg/L	0.01 mg/L	94.8	70.0	130	----
		boron, dissolved	7440-42-8	E421	0.103 mg/L	0.1 mg/L	103	70.0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00392 mg/L	0.004 mg/L	98.1	70.0	130	----
		calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		cobalt, dissolved	7440-48-4	E421	0.0194 mg/L	0.02 mg/L	96.8	70.0	130	----
		copper, dissolved	7440-50-8	E421	0.0191 mg/L	0.02 mg/L	95.7	70.0	130	----
		iron, dissolved	7439-89-6	E421	1.87 mg/L	2 mg/L	93.6	70.0	130	----
		lead, dissolved	7439-92-1	E421	0.0199 mg/L	0.02 mg/L	99.6	70.0	130	----
		lithium, dissolved	7439-93-2	E421	0.103 mg/L	0.1 mg/L	103	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, dissolved	7439-96-5	E421	0.0203 mg/L	0.02 mg/L	102	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	0.0197 mg/L	0.02 mg/L	98.6	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0383 mg/L	0.04 mg/L	95.9	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	10.8 mg/L	10 mg/L	108	70.0	130	----
		potassium, dissolved	7440-09-7	E421	3.85 mg/L	4 mg/L	96.4	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0413 mg/L	0.04 mg/L	103	70.0	130	----
		silicon, dissolved	7440-21-3	E421	8.88 mg/L	10 mg/L	88.8	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00385 mg/L	0.004 mg/L	96.2	70.0	130	----
		sodium, dissolved	7440-23-5	E421	2.16 mg/L	2 mg/L	108	70.0	130	----
		strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		sulfur, dissolved	7704-34-9	E421	19.8 mg/L	20 mg/L	99.2	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00359 mg/L	0.004 mg/L	89.8	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0190 mg/L	0.02 mg/L	94.9	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0384 mg/L	0.04 mg/L	95.9	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.00365 mg/L	0.004 mg/L	91.3	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.0981 mg/L	0.1 mg/L	98.1	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.384 mg/L	0.4 mg/L	95.9	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0389 mg/L	0.04 mg/L	97.2	70.0	130	----
<b>Dissolved Metals (QCLot: 79800)</b>										



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Lab rat ry sample ID	Client sample ID	Analyte	CAS Number	Method	C n entrati n	Target	MS	L w	High	Qualifier
<b>Dissolved Metals (QCLot: 79800) - continued</b>										
VA20B3842-022	DUP5	chromium, dissolved	7440-47-3	E421.Cr-L	0.0390 mg/L	0.04 mg/L	97.5	70.0	130	----
<b>Dissolved Metals (QCLot: 80464)</b>										
VA20B3842-002	BR3	mercury, dissolved	7439-97-6	E509	0.000103 mg/L	0.0001 mg/L	103	70.0	130	----
<b>Dissolved Metals (QCLot: 80465)</b>										
VA20B3842-022	DUP5	mercury, dissolved	7439-97-6	E509	0.0000963 mg/L	0.0001 mg/L	96.3	70.0	130	----
<b>Aggregate Organics (QCLot: 81008)</b>										
VA20B4087-001	Anonymous	chemical oxygen demand [COD]	----	E559	480 mg/L	500 mg/L	95.9	75.0	125	----
<b>Volatile Organic Compounds (QCLot: 79732)</b>										
VA20B3842-011	JM4	benzene	71-43-2	E611A	93.2 µg/L	100 µg/L	93.2	60.0	140	----
		ethylbenzene	100-41-4	E611A	87.3 µg/L	100 µg/L	87.3	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	110 µg/L	100 µg/L	110	60.0	140	----
		styrene	100-42-5	E611A	89.2 µg/L	100 µg/L	89.2	60.0	140	----
		toluene	108-88-3	E611A	91.9 µg/L	100 µg/L	91.9	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	207 µg/L	200 µg/L	103	60.0	140	----
		xylene, o-	95-47-6	E611A	90.6 µg/L	100 µg/L	90.6	60.0	140	----
<b>Volatile Organic Compounds (QCLot: 80458)</b>										
VA20B3846-006	Anonymous	benzene	71-43-2	E611A	101 µg/L	100 µg/L	101	60.0	140	----
		ethylbenzene	100-41-4	E611A	92.7 µg/L	100 µg/L	92.7	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	113 µg/L	100 µg/L	113	60.0	140	----
		styrene	100-42-5	E611A	94.3 µg/L	100 µg/L	94.3	60.0	140	----
		toluene	108-88-3	E611A	95.8 µg/L	100 µg/L	95.8	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	200 µg/L	200 µg/L	99.8	60.0	140	----
		xylene, o-	95-47-6	E611A	96.4 µg/L	100 µg/L	96.4	60.0	140	----
<b>Hydrocarbons (QCLot: 79731)</b>										
VA20B3842-010	DUP4	VHw (C6-C10)	----	E581.VH+F1	5670 µg/L	6310 µg/L	89.9	60.0	140	----
<b>Hydrocarbons (QCLot: 80457)</b>										
VA20B3846-002	Anonymous	VHw (C6-C10)	----	E581.VH+F1	6180 µg/L	6310 µg/L	98.0	60.0	140	----



**Reference Material (RM) Report**

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix: **Water**

					<i>Reference Material (RM) Report</i>				
<i>Laboratory sample ID</i>	<i>Reference Material ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>RM Target</i>	<i>Recovery (%)</i>	<i>Recovery Limits (%)</i>		<i>Qualifier</i>
					<i>Concentration</i>	<i>RM</i>	<i>Low</i>	<i>High</i>	
<b>Organic / Inorganic Carbon (QCLot: 80229)</b>									
QC-80229-002	RM	carbon, total inorganic [TIC]	----	E354-L	8 mg/L	97.9	80.0	120	----



Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

Affix ALS barcode label here (lab use only)

COC Number: 17 - 841428

Page of

<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>		<b>Select Service Level Below - Contact your AM to confirm all E&amp;P TATs (surcharges may apply)</b>			
Company: <b>ERM Consultant Canada</b>		Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input checked="" type="checkbox"/> EDD (DIGITAL)		Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply			
Contact: <b>Jill Zyla</b>		Quality Control (QC) Report with Report <input type="checkbox"/> YES <input type="checkbox"/> NO		PRIORITY (Business Days): 4 day [P4-20%] <input type="checkbox"/> 3 day [P3-25%] <input type="checkbox"/> 2 day [P2-50%] <input type="checkbox"/>			
Phone: <b>260-877-7838</b>		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked		EMERGENCY: 1 Business day [E - 100%] Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)]			
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX		Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm			
Street: <b>3790 Alfred Ave</b>		Email 1 or Fax: <b>Jill.Zyla@erm.com</b>		For tests that can not be performed according to the service level selected, you will be contacted.			
City/Province: <b>Smitners BC</b>		Email 2: <b>Wade.Brunham@erm.com</b>		<b>Analysis Request</b> Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below			
Postal Code: <b>V6J 2N0</b>		Email 3: <b>Katy.Olin@erm.com</b>					
Invoice To: Same as Report To <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		<b>Invoice Distribution</b>		<b>NUMBER OF CONTACTS</b> As per 974326 net			
Copy of Invoice with Report <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX				<b>SAMPLES ON HOLD</b> SUSPECTED HAZARD (see Special Instructions)	
Company: <b>Seabridge Gold</b>		Email 1 or Fax: <b>Elizabeth@seabridgegold.com</b>					
Contact: <b>Elizabeth Miller</b>		Email 2: <b>KSM admin@seabridgegold.com</b>					
Project Information		Oil and Gas Required Fields (client use)					
ALS Account # / Quote #: <b>@ 74326</b>		AFE/Cost Center: PO#					
Job #: <b>0539378-0012 (WQISKM)</b>		Laboratory Code: Routing Code:					
PO/AFE:		Requisitioner:					
LSD:		Location:					
ALS Lab Work Order # (lab use only): <b>3842</b>		ALS Contact:					
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type			
1	BR4	22-Aug-20	14:34	Water	1		
2	BR3	"	14:53	"	2		
3	Dup 1	"	9:50	"	3		
4	Dup 2	"	"	"	4		
5	JM13	23-Aug-20	9:00	"	5		
6	JM12	}	9:32	}	6		
7	SCH 1		9:59		7		
8	Dup 3		"		8		
9	JM3		10:14		9		
10	Dup 4		"		10		
11	JM4	"	10:47	"	11		
12	JM 2 seepage	"	11:17	"	12		

Environmental Division  
Vancouver  
Work Order Reference  
**VA20B3842**

Telephone: +1 604 253 4188

Drinking Water (DW) Samples<sup>1</sup> (client use)

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Are samples taken from a Regulated DW System?  
 YES  NO

Are samples for human consumption/ use?  
 YES  NO

Please email EDD to Jill.Zyla@erm.com  
Quote =  
All dissolved bottles have been filtered

**SAMPLE CONDITION AS RECEIVED (lab use only)**

Frozen  SIF Observations Yes  No   
Ice Packs  Ice Cubes  Custody seal intact Yes  No   
Cooling Initiated

INITIAL COOLER TEMPERATURES °C: S1 5.3 6.5 5.5  
FINAL COOLER TEMPERATURES °C: 8°C (Avg 8.1)

<b>SHIPMENT RELEASE (client use)</b>		<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>				<b>FINAL SHIPMENT RECEPTION (lab use only)</b>				
Released by: <b>Talart Bukri</b>	Date: <b>Aug-24-2020</b>	Time:	Received by: <b>JZ</b>	Date:	Time:	Received by: <b>AJ, JK</b>	Date: <b>28 Aug</b>	Time: <b>10:10 AM</b>		

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Report To		Report Format / Distribution			Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)		
Company: <b>ERM Consultants Canada</b>		Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input checked="" type="checkbox"/> EDD (DIGITAL)	Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply			Priority (Business Days): 4 day [P4-20%] <input type="checkbox"/> 3 day [P3-25%] <input type="checkbox"/> 2 day [P2-50%] <input type="checkbox"/>	
Contact: <b>Jill Zyla</b>		Quality Control (QC) Report with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	EMERGENCY: 1 Business day [E - 100%] <input type="checkbox"/> Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] <input type="checkbox"/>			Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm	
Phone: <b>250-877-7838</b>		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked	For tests that can not be performed according to the service level selected, you will be contacted.				
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX	Analysis Request				<p style="writing-mode: vertical-rl; transform: rotate(180deg);">NUMBER OF CONTAINERS</p> <p style="writing-mode: vertical-rl; transform: rotate(180deg);">746 per 074326</p> <p style="writing-mode: vertical-rl; transform: rotate(180deg);">SAMPLES ON HOLD</p> <p style="writing-mode: vertical-rl; transform: rotate(180deg);">SUSPECTED HAZARD (see Special Instructions)</p>
Street: <b>3790 Alford Ave</b>		Email 1 or Fax: <b>Jill.Zyla@erm.com</b>	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below				
City/Province: <b>Sonituer, BC</b>		Email 2: <b>Wade.Bornham@erm.com</b>					
Postal Code: <b>V0J 2N0</b>		Email 3: <b>Katay.Gin@erm.com</b>					
Invoice To: Same as Report To <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX					
Copy of Invoice with Report <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX					
Company: <b>Sea Bridge Gold</b>		Email 1 or Fax: <b>Elizabeth@seabridgegold.com</b>					
Contact: <b>Elizabeth Miller</b>		Email 2: <b>ksm.admin@seabridgegold.com</b>					
Project Information		Oil and Gas Required Fields (client use)					
ALS Account # / Quote #: <b>Q 74326</b>		AFE/Cost Center: _____ PO#: _____					
Job #: <b>0539378-0012 (WO 15K1)</b>		Minor Code: _____ Routing Code: _____					
PO / AFE: _____		Requisitioner: _____					
LSD: _____		Location: _____					
ALS Lab Work Order # (lab use only): _____		ALS Contact: _____					
Sampler: _____							
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	CONTAINER		
13	JM 2	23-Aug-20	11:35	Water	12		
14	TMF 1	}	12:08		12		
15	JMS		12:25		12		
16	SKI		12:48		8		
17	JM 10		13:23		15		
18	JM 11		14:11		8		
19	JM 6		14:32		12		
20	JM 14		15:02		8		
21	JM 24		15:26		8		
22	DUPS		13:23		12		
23	Field Blank (JM10-2018)		13:23		12		
24	Travel Blank			12			
Drinking Water (DW) Samples <sup>1</sup> (client use)		Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)		SAMPLE CONDITION AS RECEIVED (lab use only)			
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO				Frozen <input checked="" type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/> Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/> Cooling Initiated <input type="checkbox"/>			
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO				INITIAL COOLER TEMPERATURES °C: 5.3 5.8 5.4 7.8 FINAL COOLER TEMPERATURES °C: 8°C (CAN 90114)			
SHIPPING RELEASE (client use)		INITIAL SHIPMENT RECEPTION (lab use only)		FINAL SHIPMENT RECEPTION (lab use only)			
Released by: <b>Talent Baden</b>	Date: <b>Aug 24 2020</b>	Time: _____	Received by: _____	Date: _____	Time: _____	Received by: <b>H. J. ...</b>	
				Date: <b>28 Aug</b>	Time: <b>10:10 AM</b>		

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JUNE 2016 FRONT

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.





## CERTIFICATE OF ANALYSIS

**Work Order** : **VA20B3846**  
**Client** : **ERM Consultants Canada Ltd.**  
**Contact** : Jill Zyla  
**Address** : 3790 Alfred Ave  
Smithers BC Canada V0J 2N0  
**Telephone** : (250) 877-7838  
**Project** : 0539378-0012  
**PO** : ----  
**C-O-C number** : 17-841425, 17-841424  
**Sampler** : ----  
**Site** : ----  
**Quote number** : Q74326  
**No. of samples received** : 16  
**No. of samples analysed** : 16

**Page** : 1 of 23  
**Laboratory** : Vancouver - Environmental  
**Account Manager** : Amber Springer  
**Address** : 8081 Lougheed Highway  
Burnaby BC Canada V5A 1W9  
**Telephone** : +1 604 253 4188  
**Date Samples Received** : 28-Aug-2020 10:10  
**Date Analysis Commenced** : 28-Aug-2020  
**Issue Date** : 09-Sep-2020 12:43

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Brieanna Allen	Department Manager - Organics	Organics, Burnaby, British Columbia
Bruna Botti	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Cristina Alexandre	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
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Kevin Duarte	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics - Water Quality, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Richard Chong		Metals, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Shaneel Dayal	Analyst	Metals, Burnaby, British Columbia





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
-	No Unit
µg/L	micrograms per litre
µS/cm	Microsiemens per centimetre
CU	colour units
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in reports identified as "**Preliminary Report**" are considered authorized for use.

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DTMF	Dissolved concentration exceeds total for field-filtered metals sample. Metallic contaminants may have been introduced to dissolved sample during field filtration.
RRV	Reported result verified by repeat analysis.



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					FIELD BLANK	JM7	SCH2	SK2	JM10
Client sampling date / time					23-Aug-2020 12:08	24-Aug-2020 10:07	24-Aug-2020 10:26	24-Aug-2020 11:15	24-Aug-2020 11:57
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-001	VA20B3846-002	VA20B3846-003	VA20B3846-004	VA20B3846-005
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
acidity (as CaCO3)	----	E283	2.0	mg/L	2.0	<2.0	<2.0	<2.0	<2.0
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	38.7	38.9	21.4	36.4
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	<1.0	38.7	38.9	21.4	36.4
colour, true	----	E329	5.0	CU	<5.0	<5.0	<5.0	<5.0	<5.0
conductivity	----	E100	2.0	µS/cm	<2.0	115	115	42.7	98.0
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	<0.60	52.7	51.5	19.6	44.5
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	<0.60	56.0	55.7	20.6	48.2
pH	----	E108	0.10	pH units	5.31	7.48	7.59	7.27	7.55
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	63	63	27	49
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	<3.0	8.1	6.9	<3.0	16.7
turbidity	----	E121	0.10	NTU	<0.10	1.53	1.64	<0.10	9.66
<b>Anions and Nutrients</b>									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0201 <sup>RRV</sup>	0.0081	0.0065	<0.0050	<0.0050
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50
fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	<0.020	<0.020	<0.020	<0.020
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	0.0180	0.0165	<0.0050	0.0066
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	0.0029	0.0028	<0.0010	<0.0010
nitrogen, total	7727-37-9	E366	0.030	mg/L	<0.030	0.061	0.091	<0.030	<0.030
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	<0.0020	0.0042	0.0086	<0.0020	0.0174
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	<0.30	19.1	18.5	2.40	13.0
<b>Cyanides</b>									
cyanide, free	----	E339	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cyanide, strong acid dissociable (total)	----	E333	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cyanide, weak acid dissociable	----	E336	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
<b>Organic / Inorganic Carbon</b>									



## Analytical Results

Sub-Matrix: Water					Client sample ID	FIELD BLANK	JM7	SCH2	SK2	JM10
(Matrix: Water)										
Client sampling date / time					23-Aug-2020 12:08	24-Aug-2020 10:07	24-Aug-2020 10:26	24-Aug-2020 11:15	24-Aug-2020 11:57	
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-001	VA20B3846-002	VA20B3846-003	VA20B3846-004	VA20B3846-005	
					Result	Result	Result	Result	Result	
<b>Organic / Inorganic Carbon</b>										
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	<0.50	0.88	0.97 <sup>RRV</sup>	0.85	<0.50	
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	<0.50	<0.50	<0.50 <sup>RRV</sup>	<0.50	<0.50	
<b>Total Metals</b>										
aluminum, total	7429-90-5	E420	0.0030	mg/L	<0.0030	0.132	0.176	0.0040	0.339	
antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
arsenic, total	7440-38-2	E420	0.00010	mg/L	<0.00010	0.00014	0.00020	0.00020	0.00032	
barium, total	7440-39-3	E420	0.00010	mg/L	<0.00010	0.0305	0.0315	0.00384	0.0456	
beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	
cadmium, total	7440-43-9	E420	0.0000050	mg/L	<0.0000050	0.000137	0.000129	0.0000155	0.0000686	
calcium, total	7440-70-2	E420	0.050	mg/L	<0.050	19.6	19.6	6.87	17.2	
chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	0.00028	0.00030	<0.00010	0.00022	
copper, total	7440-50-8	E420	0.00050	mg/L	<0.00050	0.0270	0.0278	<0.00050	0.00090	
iron, total	7439-89-6	E420	0.010	mg/L	<0.010	0.199	0.281	<0.010	0.377	
lead, total	7439-92-1	E420	0.000050	mg/L	0.000060 <sup>RRV</sup>	0.00116	0.00156	<0.000050	0.00405	
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
magnesium, total	7439-95-4	E420	0.100	mg/L	<0.100	1.70	1.66	0.850	1.29	
manganese, total	7439-96-5	E420	0.00010	mg/L	<0.00010	0.0714	0.0767	0.00063	0.0444	
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	<0.000050	0.000315	0.000336	0.000070	0.000475	
nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
potassium, total	7440-09-7	E420	0.100	mg/L	<0.100	1.24	1.23	0.335	1.30	
selenium, total	7782-49-2	E420	0.000050	mg/L	<0.000050	0.000099	0.000101	0.000053	0.000093	
silicon, total	7440-21-3	E420	0.10	mg/L	<0.10	1.36	1.44	1.42	1.43	
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
sodium, total	7440-23-5	E420	0.050	mg/L	<0.050	0.615	0.613	0.449	0.660	
strontium, total	7440-24-6	E420	0.00020	mg/L	<0.00020	0.135	0.136	0.0388	0.116	
sulfur, total	7704-34-9	E420	0.50	mg/L	<0.50	6.81	6.38	0.74	4.60	



## Analytical Results

Sub-Matrix: Water					Client sample ID	FIELD BLANK	JM7	SCH2	SK2	JM10
(Matrix: Water)										
Client sampling date / time					23-Aug-2020 12:08	24-Aug-2020 10:07	24-Aug-2020 10:26	24-Aug-2020 11:15	24-Aug-2020 11:57	
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-001	VA20B3846-002	VA20B3846-003	VA20B3846-004	VA20B3846-005	
					Result	Result	Result	Result	Result	
<b>Total Metals</b>										
thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000012
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
titanium, total	7440-32-6	E420	0.00030	mg/L	<0.00030	0.00563	0.00940	<0.00030	<0.00030	0.0194
uranium, total	7440-61-1	E420	0.000010	mg/L	<0.000010	0.000146	0.000144	<0.000010	<0.000010	0.000189
vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00094
zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	0.0126	0.0129	0.0034	0.0034	0.0083
zirconium, total	7440-67-7	E420	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
<b>Dissolved Metals</b>										
aluminum, dissolved	7429-90-5	E421	0.0030	mg/L	<0.0030	0.0251	0.0274	<0.0030	<0.0030	0.0186
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	0.00015	0.00015	0.00019
barium, dissolved	7440-39-3	E421	0.00010	mg/L	<0.00010	0.0254	0.0273	0.00362	0.00362	0.0336
beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	0.000104	0.000106	0.0000135	0.0000135	0.0000182
calcium, dissolved	7440-70-2	E421	0.050	mg/L	<0.050	18.6	18.1	6.54	6.54	16.1
chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	0.00019	0.00018	<0.00010	<0.00010	<0.00010
copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	0.00983	0.00992	<0.00020	<0.00020	<0.00020
iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	0.012	0.015	<0.010	<0.010	0.010
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	0.000052	0.000053	<0.000050	<0.000050	0.000147
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
magnesium, dissolved	7439-95-4	E421	0.100	mg/L	<0.100	1.51	1.55	0.807	0.807	1.04
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	<0.00010	0.0542	0.0528	0.00016	0.00016	0.00385
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	<0.000050	0.000290	0.000295	0.000055	0.000055	0.000462
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
potassium, dissolved	7440-09-7	E421	0.100	mg/L	<0.100	1.06	1.08	0.323	0.323	0.994
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	0.000072	0.000122	0.000050	0.000050	0.000121



## Analytical Results

Sub-Matrix: Water					Client sample ID	FIELD BLANK	JM7	SCH2	SK2	JM10
(Matrix: Water)										
Client sampling date / time					23-Aug-2020 12:08	24-Aug-2020 10:07	24-Aug-2020 10:26	24-Aug-2020 11:15	24-Aug-2020 11:57	
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-001	VA20B3846-002	VA20B3846-003	VA20B3846-004	VA20B3846-005	
					Result	Result	Result	Result	Result	
<b>Dissolved Metals</b>										
silicon, dissolved	7440-21-3	E421	0.050	mg/L	<0.050	1.21	1.22	1.38	0.872	
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
sodium, dissolved	7440-23-5	E421	0.050	mg/L	<0.050	0.561	0.578	0.429	0.598	
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	<0.00020	0.123	0.122	0.0374	0.119	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	<0.50	6.04	6.09	0.80	4.19	
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	0.00053	
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	<0.000010	0.000113	0.000113	<0.000010	0.000175	
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	0.0084	0.0087	0.0018	0.0015	
zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	
dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	Field	Field	
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	Field	Field	
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>										
benzene	71-43-2	E611A	0.50	µg/L	----	<0.50	----	----	----	
ethylbenzene	100-41-4	E611A	0.50	µg/L	----	<0.50	----	----	----	
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	----	<0.50	----	----	----	
styrene	100-42-5	E611A	0.50	µg/L	----	<0.50	----	----	----	
toluene	108-88-3	E611A	0.50	µg/L	----	<0.50	----	----	----	
xylene, m+p-	179601-23-1	E611A	0.50	µg/L	----	<0.50	----	----	----	
xylene, o-	95-47-6	E611A	0.50	µg/L	----	<0.50	----	----	----	
xylenes, total	1330-20-7	E611A	0.75	µg/L	----	<0.75	----	----	----	
<b>Volatile Organic Compounds Surrogates</b>										
bromofluorobenzene, 4-	460-00-4	E611A	0.50	%	----	97.2	----	----	----	
difluorobenzene, 1,4-	540-36-3	E611A	0.50	%	----	117	----	----	----	
<b>Hydrocarbons</b>										
EPH (C10-C19)	----	E601A	250	µg/L	----	<250	----	----	----	
EPH (C19-C32)	----	E601A	250	µg/L	----	<250	----	----	----	
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	----	<100	----	----	----	
HEPHw	----	EC600A	250	µg/L	----	<250	----	----	----	



## Analytical Results

Sub-Matrix: Water					Client sample ID	FIELD BLANK	JM7	SCH2	SK2	JM10
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Analyte	CAS Number	Method	LOR	Unit	VA20B3846-001	VA20B3846-002	VA20B3846-003	VA20B3846-004	VA20B3846-005	
					Result	Result	Result	Result	Result	
<b>Hydrocarbons</b>										
LEPHw	----	EC600A	250	µg/L	----	<250	----	----	----	
VPHw	----	EC580A	100	µg/L	----	<100	----	----	----	
<b>Hydrocarbons Surrogates</b>										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%	----	104	----	----	----	
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	----	105	----	----	----	
<b>Polycyclic Aromatic Hydrocarbons</b>										
acenaphthene	83-32-9	E641A	0.010	µg/L	----	<0.010	----	----	----	
acenaphthylene	208-96-8	E641A	0.010	µg/L	----	<0.010	----	----	----	
acridine	260-94-6	E641A	0.010	µg/L	----	<0.010	----	----	----	
anthracene	120-12-7	E641A	0.010	µg/L	----	<0.010	----	----	----	
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	----	<0.010	----	----	----	
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	----	<0.0050	----	----	----	
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	----	<0.010	----	----	----	
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	----	<0.015	----	----	----	
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	----	<0.010	----	----	----	
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	----	<0.010	----	----	----	
chrysene	218-01-9	E641A	0.010	µg/L	----	<0.010	----	----	----	
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	----	<0.0050	----	----	----	
fluoranthene	206-44-0	E641A	0.010	µg/L	----	<0.010	----	----	----	
fluorene	86-73-7	E641A	0.010	µg/L	----	<0.010	----	----	----	
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	----	<0.010	----	----	----	
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	----	<0.010	----	----	----	
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	----	<0.010	----	----	----	
naphthalene	91-20-3	E641A	0.050	µg/L	----	<0.050	----	----	----	
phenanthrene	85-01-8	E641A	0.020	µg/L	----	<0.020	----	----	----	
pyrene	129-00-0	E641A	0.010	µg/L	----	<0.010	----	----	----	
quinoline	6027-02-7	E641A	0.050	µg/L	----	<0.050	----	----	----	
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>										
acridine-d9	34749-75-2	E641A	0.010	%	----	93.7	----	----	----	
chrysene-d12	1719-03-5	E641A	0.010	%	----	98.9	----	----	----	
naphthalene-d8	1146-65-2	E641A	0.010	%	----	111	----	----	----	





## Analytical Results

Sub-Matrix: **Water**

(Matrix: **Water**)

					Client sample ID	FIELD BLANK	JM7	SCH2	SK2	JM10
					Client sampling date / time	23-Aug-2020 12:08	24-Aug-2020 10:07	24-Aug-2020 10:26	24-Aug-2020 11:15	24-Aug-2020 11:57
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-001	VA20B3846-002	VA20B3846-003	VA20B3846-004	VA20B3846-005	
					Result	Result	Result	Result	Result	
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>										
phenanthrene-d10	1517-22-2	E641A	0.010	%	----	112	----	----	----	

Please refer to the General Comments section for an explanation of any qualifiers detected.



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					JM1	JM1-ALT	JM1-SEEPAGE	JM26	SHCR-4
Client sampling date / time					24-Aug-2020 12:17	24-Aug-2020 12:28	24-Aug-2020 12:49	24-Aug-2020 13:27	24-Aug-2020 13:54
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-006	VA20B3846-007	VA20B3846-008	VA20B3846-009	VA20B3846-010
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
acidity (as CaCO3)	----	E283	2.0	mg/L	<2.0	2.3	<2.0	<2.0	<2.0
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	36.4	55.4	73.6	27.9	32.4
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	36.4	55.4	73.6	27.9	32.4
colour, true	----	E329	5.0	CU	<5.0	<5.0	<5.0	<5.0	<5.0
conductivity	----	E100	2.0	µS/cm	88.1	259	220	64.7	64.9
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	40.5	129	110	29.5	31.1
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	43.3	133	115	33.5	33.0
pH	----	E108	0.10	pH units	7.56	7.47	7.68	7.44	7.51
solids, total dissolved [TDS]	----	E162	10	mg/L	46	161	130	36	37
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	<3.0	13.3	<3.0	38.9	<3.0
turbidity	----	E121	0.10	NTU	<0.10	6.83	<0.10	26.1	<0.10
<b>Anions and Nutrients</b>									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0.0211	<0.0050	<0.0050
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50
fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	0.041	<0.020	<0.020	<0.020
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	<0.050	<0.050	<0.050	0.067	<0.050
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0050	0.0207	<0.0050	<0.0050
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
nitrogen, total	7727-37-9	E366	0.030	mg/L	<0.030	<0.030	0.053	<0.030	<0.030
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0028	<0.0010	0.0020	0.0011	<0.0010
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0024	0.0222	0.0020	0.0418	<0.0020
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	9.18	75.2	40.9	5.42	1.60
<b>Cyanides</b>									
cyanide, free	----	E339	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cyanide, strong acid dissociable (total)	----	E333	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cyanide, weak acid dissociable	----	E336	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
<b>Organic / Inorganic Carbon</b>									
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	0.78	0.95	0.98 <sup>RRV</sup>	0.96 <sup>RRV</sup>	0.94 <sup>RRV</sup>



## Analytical Results

Sub-Matrix: Water					Client sample ID	JM1	JM1-ALT	JM1-SEEPAGE	JM26	SHCR-4
(Matrix: Water)										
Client sampling date / time					24-Aug-2020 12:17	24-Aug-2020 12:28	24-Aug-2020 12:49	24-Aug-2020 13:27	24-Aug-2020 13:54	
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-006	VA20B3846-007	VA20B3846-008	VA20B3846-009	VA20B3846-010	
					Result	Result	Result	Result	Result	
<b>Organic / Inorganic Carbon</b>										
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	<0.50	<0.50	<0.50 <sup>RRV</sup>	<0.50 <sup>RRV</sup>	<0.50 <sup>RRV</sup>	<0.50 <sup>RRV</sup>
<b>Total Metals</b>										
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0226	0.379	<0.0030	0.919	0.0035	
antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	0.00013	0.00013	<0.00010	<0.00010	
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00012	0.00214	<0.00010	0.00025	0.00020	
barium, total	7440-39-3	E420	0.00010	mg/L	0.0226	0.0237	0.0418	0.0662	0.0109	
beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	0.000020	<0.000020	0.000020	<0.000020	
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000566	0.00466	0.0000319	0.000294	<0.0000050	
calcium, total	7440-70-2	E420	0.050	mg/L	15.3	43.9	40.0	11.5	12.5	
chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	0.00022	<0.00010	<0.00010	<0.00010	<0.00010	
cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	0.00313	<0.00010	0.00048	<0.00010	
copper, total	7440-50-8	E420	0.00050	mg/L	0.00200	0.301	<0.00050	0.00332	<0.00050	
iron, total	7439-89-6	E420	0.010	mg/L	<0.010	4.89	<0.010	0.879	<0.010	
lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	0.00246	<0.000050	0.00462	<0.000050	
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	0.0015	<0.0010	0.0010	<0.0010	
magnesium, total	7439-95-4	E420	0.100	mg/L	1.23	5.67	3.60	1.14	0.410	
manganese, total	7439-96-5	E420	0.00010	mg/L	0.00352	0.470	0.00022	0.0929	<0.00010	
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000357	0.000243	0.000358	0.000210	0.000207	
nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	0.00097	<0.00050	<0.00050	<0.00050	
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	0.058	<0.050	0.070	<0.050	
potassium, total	7440-09-7	E420	0.100	mg/L	1.04	1.49	2.53	1.19	0.580	
selenium, total	7782-49-2	E420	0.000050	mg/L	0.000072	0.000374	0.000268	0.000090	0.000149	
silicon, total	7440-21-3	E420	0.10	mg/L	1.29	1.80	1.41	2.14	1.02	
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	0.000024	<0.000010	0.000013	<0.000010	
sodium, total	7440-23-5	E420	0.050	mg/L	0.489	0.482	0.708	0.435	0.302	
strontium, total	7440-24-6	E420	0.00020	mg/L	0.133	0.234	0.184	0.0771	0.0327	
sulfur, total	7704-34-9	E420	0.50	mg/L	3.12	27.0	14.9	1.65	<0.50	
thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	0.000011	<0.000010	0.000028	<0.000010	



## Analytical Results

Sub-Matrix: Water					Client sample ID	JM1	JM1-ALT	JM1-SEEPAGE	JM26	SHCR-4
(Matrix: Water)										
Client sampling date / time					24-Aug-2020 12:17	24-Aug-2020 12:28	24-Aug-2020 12:49	24-Aug-2020 13:27	24-Aug-2020 13:54	
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-006	VA20B3846-007	VA20B3846-008	VA20B3846-009	VA20B3846-010	
					Result	Result	Result	Result	Result	
<b>Total Metals</b>										
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
titanium, total	7440-32-6	E420	0.00030	mg/L	0.00035	0.00208	<0.00030	0.0419	<0.00030	<0.00030
uranium, total	7440-61-1	E420	0.000010	mg/L	0.000030	0.000246	0.000081	0.000155	<0.000010	<0.000010
vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	0.00170	<0.00050	<0.00050
zinc, total	7440-66-6	E420	0.0030	mg/L	0.0034	0.790	<0.0030	0.0456	<0.0030	<0.0030
zirconium, total	7440-67-7	E420	0.00030	mg/L	<0.00030	<0.00030	<0.00030	0.00050	<0.00030	<0.00030
<b>Dissolved Metals</b>										
aluminum, dissolved	7429-90-5	E421	0.0030	mg/L	0.0108	0.0175	<0.0030	0.0397	<0.0030	<0.0030
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	0.00011	<0.00010	<0.00010	<0.00010
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00019	0.00019
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0214	0.0212	0.0376	0.0322	0.0105	0.0105
beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000549	0.00337	0.0000233	0.000132	<0.0000050	<0.0000050
calcium, dissolved	7440-70-2	E421	0.050	mg/L	14.3	42.4	38.8	10.6	11.8	11.8
chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	0.00274	<0.00010	<0.00010	<0.00010	<0.00010
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00136	0.0232	<0.00020	0.00021	<0.00020	<0.00020
iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	0.041	<0.010	0.020	<0.010	<0.010
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	0.000158	<0.000050	<0.000050
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	0.0013	<0.0010	<0.0010	<0.0010	<0.0010
magnesium, dissolved	7439-95-4	E421	0.100	mg/L	1.15	5.65	3.30	0.737	0.381	0.381
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00300	0.433	<0.00010	0.0224	<0.00010	<0.00010
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000338	0.000157	0.000339	0.000208	0.000166	0.000166
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
potassium, dissolved	7440-09-7	E421	0.100	mg/L	0.936	1.38	2.20	0.620	0.539	0.539
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000070	0.000283	0.000214	0.000060	0.000136	0.000136
silicon, dissolved	7440-21-3	E421	0.050	mg/L	1.27	1.64	1.34	0.626	1.01	1.01



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					JM1	JM1-ALT	JM1-SEEPAGE	JM26	SHCR-4
Client sampling date / time					24-Aug-2020 12:17	24-Aug-2020 12:28	24-Aug-2020 12:49	24-Aug-2020 13:27	24-Aug-2020 13:54
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-006	VA20B3846-007	VA20B3846-008	VA20B3846-009	VA20B3846-010
					Result	Result	Result	Result	Result
<b>Dissolved Metals</b>									
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
sodium, dissolved	7440-23-5	E421	0.050	mg/L	0.467	0.472	0.651	0.362	0.280
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.122	0.219	0.169	0.0758	0.0300
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	3.16	25.5	13.2	1.80	0.61
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	<0.00030	0.00096	<0.00030
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000024	0.000088	0.000082	0.000118	<0.000010
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0032	0.548	<0.0010	0.0040	<0.0010
zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	Field	Field
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	Field	Field
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>									
benzene	71-43-2	E611A	0.50	µg/L	<0.50	----	----	----	----
ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	----	----	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	----	----	----	----
styrene	100-42-5	E611A	0.50	µg/L	<0.50	----	----	----	----
toluene	108-88-3	E611A	0.50	µg/L	<0.50	----	----	----	----
xylene, m+p-	179601-23-1	E611A	0.50	µg/L	<0.50	----	----	----	----
xylene, o-	95-47-6	E611A	0.50	µg/L	<0.50	----	----	----	----
xylenes, total	1330-20-7	E611A	0.75	µg/L	<0.75	----	----	----	----
<b>Volatile Organic Compounds Surrogates</b>									
bromofluorobenzene, 4-	460-00-4	E611A	0.50	%	93.1	----	----	----	----
difluorobenzene, 1,4-	540-36-3	E611A	0.50	%	97.6	----	----	----	----
<b>Hydrocarbons</b>									
EPH (C10-C19)	----	E601A	250	µg/L	<250	----	----	----	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	----	----	----	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----	----	----	----
HEPHw	----	EC600A	250	µg/L	<250	----	----	----	----
LEPHw	----	EC600A	250	µg/L	<250	----	----	----	----



## Analytical Results

Sub-Matrix: Water					Client sample ID	JM1	JM1-ALT	JM1-SEEPAGE	JM26	SHCR-4
(Matrix: Water)					Client sampling date / time	24-Aug-2020 12:17	24-Aug-2020 12:28	24-Aug-2020 12:49	24-Aug-2020 13:27	24-Aug-2020 13:54
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-006	VA20B3846-007	VA20B3846-008	VA20B3846-009	VA20B3846-010	
					Result	Result	Result	Result	Result	
<b>Hydrocarbons</b>										
VPHw	----	EC580A	100	µg/L	<100	----	----	----	----	----
<b>Hydrocarbons Surrogates</b>										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%	96.3	----	----	----	----	----
dichlorotoluene, 3,4-	97-75-0	E581 VH+F1	1.0	%	91.9	----	----	----	----	----
<b>Polycyclic Aromatic Hydrocarbons</b>										
acenaphthene	83-32-9	E641A	0.010	µg/L	<0.010	----	----	----	----	----
acenaphthylene	208-96-8	E641A	0.010	µg/L	<0.010	----	----	----	----	----
acridine	260-94-6	E641A	0.010	µg/L	<0.010	----	----	----	----	----
anthracene	120-12-7	E641A	0.010	µg/L	<0.010	----	----	----	----	----
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	<0.010	----	----	----	----	----
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	<0.0050	----	----	----	----	----
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	<0.010	----	----	----	----	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	----	----	----	----	----
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	<0.010	----	----	----	----	----
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	<0.010	----	----	----	----	----
chrysene	218-01-9	E641A	0.010	µg/L	<0.010	----	----	----	----	----
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	<0.0050	----	----	----	----	----
fluoranthene	206-44-0	E641A	0.010	µg/L	<0.010	----	----	----	----	----
fluorene	86-73-7	E641A	0.010	µg/L	<0.010	----	----	----	----	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	<0.010	----	----	----	----	----
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	<0.010	----	----	----	----	----
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	<0.010	----	----	----	----	----
naphthalene	91-20-3	E641A	0.050	µg/L	<0.050	----	----	----	----	----
phenanthrene	85-01-8	E641A	0.020	µg/L	<0.020	----	----	----	----	----
pyrene	129-00-0	E641A	0.010	µg/L	<0.010	----	----	----	----	----
quinoline	6027-02-7	E641A	0.050	µg/L	<0.050	----	----	----	----	----
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>										
acridine-d9	34749-75-2	E641A	0.010	%	88.7	----	----	----	----	----
chrysene-d12	1719-03-5	E641A	0.010	%	97.1	----	----	----	----	----
naphthalene-d8	1146-65-2	E641A	0.010	%	95.9	----	----	----	----	----
phenanthrene-d10	1517-22-2	E641A	0.010	%	102	----	----	----	----	----



Please refer to the General Comments section for an explanation of any qualifiers detected.

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## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					SHCR-2	SHCR-3	SHC5	SHCR-1	SK4
Client sampling date / time					24-Aug-2020 14:08	24-Aug-2020 14:21	24-Aug-2020 14:38	24-Aug-2020 14:49	24-Aug-2020 16:23
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-011	VA20B3846-012	VA20B3846-013	VA20B3846-014	VA20B3846-015
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
acidity (as CaCO3)	----	E283	2.0	mg/L	<2.0	<2.0	<2.0	<2.0	<2.0
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	51.6	32.1	51.9	34.6	34.5
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	51.6	32.1	51.9	34.6	34.5
colour, true	----	E329	5.0	CU	<5.0	<5.0	<5.0	<5.0	<5.0
conductivity	----	E100	2.0	µS/cm	104	88.5	118	86.5	97.7
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	49.1	38.9	57.0	39.4	42.9
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	51.9	43.4	60.0	41.9	46.4
pH	----	E108	0.10	pH units	7.79	7.50	7.70	7.54	7.47
solids, total dissolved [TDS]	----	E162	10	mg/L	55	54	60	46	61
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	<3.0	33.3	<3.0	<3.0	<3.0
turbidity	----	E121	0.10	NTU	0.16	17.3	0.15	0.13	<0.10
<b>Anions and Nutrients</b>									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0080	<0.0050	0.0065	0.0063	<0.0050
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50
fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	<0.020	<0.020	<0.020	0.023
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.053	<0.050	<0.050	<0.050	0.053
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	0.0180	<0.0050	<0.0050	0.0389
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
nitrogen, total	7727-37-9	E366	0.030	mg/L	<0.030	<0.030	<0.030	<0.030	0.076
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0012	0.0014	<0.0010	0.0034	<0.0010
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	<0.0020	0.0281	<0.0020	0.0034	<0.0020
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	2.91	13.5	9.32	9.56	14.1
<b>Cyanides</b>									
cyanide, free	----	E339	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cyanide, strong acid dissociable (total)	----	E333	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cyanide, weak acid dissociable	----	E336	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
<b>Organic / Inorganic Carbon</b>									
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	<0.50	0.94	0.58	<0.50	0.81





## Analytical Results

Sub-Matrix: Water					Client sample ID	SHCR-2	SHCR-3	SHC5	SHCR-1	SK4
(Matrix: Water)										
Client sampling date / time					24-Aug-2020 14:08	24-Aug-2020 14:21	24-Aug-2020 14:38	24-Aug-2020 14:49	24-Aug-2020 16:23	
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-011	VA20B3846-012	VA20B3846-013	VA20B3846-014	VA20B3846-015	
					Result	Result	Result	Result	Result	
<b>Organic / Inorganic Carbon</b>										
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.65
<b>Total Metals</b>										
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0173	0.631	0.0190	0.0038	0.0131	
antimony, total	7440-36-0	E420	0.00010	mg/L	0.00020	<0.00010	<0.00010	<0.00010	<0.00010	
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00021	0.00044	0.00031	0.00019	0.00049	
barium, total	7440-39-3	E420	0.00010	mg/L	0.0281	0.0505	0.0334	0.0178	0.0126	
beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000056	0.000111	0.0000101	0.0000127	0.0000396	
calcium, total	7440-70-2	E420	0.050	mg/L	20.0	15.2	21.4	14.1	15.4	
chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	0.00040	<0.00010	<0.00010	<0.00010	
copper, total	7440-50-8	E420	0.00050	mg/L	<0.00050	0.00131	<0.00050	<0.00050	0.00053	
iron, total	7439-89-6	E420	0.010	mg/L	0.034	0.742	0.035	<0.010	0.035	
lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	0.00678	<0.000050	<0.000050	<0.000050	
lithium, total	7439-93-2	E420	0.0010	mg/L	0.0016	<0.0010	<0.0010	<0.0010	<0.0010	
magnesium, total	7439-95-4	E420	0.100	mg/L	0.485	1.32	1.61	1.64	1.94	
manganese, total	7439-96-5	E420	0.00010	mg/L	0.00076	0.0752	0.00126	0.00013	0.00676	
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000287	0.000480	0.000683	0.000556	0.000475	
nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
potassium, total	7440-09-7	E420	0.100	mg/L	2.03	1.30	1.43	0.833	1.50	
selenium, total	7782-49-2	E420	0.000050	mg/L	0.000080	0.000081	0.000204	0.000069	0.000140	
silicon, total	7440-21-3	E420	0.10	mg/L	0.97	1.84	0.79	1.41	1.70	
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	0.000014	<0.000010	<0.000010	<0.000010	
sodium, total	7440-23-5	E420	0.050	mg/L	0.394	0.686	0.428	0.611	0.699	
strontium, total	7440-24-6	E420	0.00020	mg/L	0.0741	0.115	0.129	0.179	0.109	
sulfur, total	7704-34-9	E420	0.50	mg/L	0.80	4.93	3.22	3.17	5.10	
thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	0.000023	<0.000010	<0.000010	<0.000010	



## Analytical Results

Sub-Matrix: Water					Client sample ID	SHCR-2	SHCR-3	SHC5	SHCR-1	SK4
(Matrix: Water)										
Client sampling date / time					24-Aug-2020 14:08	24-Aug-2020 14:21	24-Aug-2020 14:38	24-Aug-2020 14:49	24-Aug-2020 16:23	
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-011	VA20B3846-012	VA20B3846-013	VA20B3846-014	VA20B3846-015	
					Result	Result	Result	Result	Result	
<b>Total Metals</b>										
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
titanium, total	7440-32-6	E420	0.00030	mg/L	0.00050	0.0360	0.00089	<0.00030	0.00067	
uranium, total	7440-61-1	E420	0.000010	mg/L	0.000120	0.000226	0.000081	0.000060	0.000028	
vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	0.00155	<0.00050	<0.00050	<0.00050	
zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	0.0149	<0.0030	<0.0030	0.0038	
zirconium, total	7440-67-7	E420	0.00030	mg/L	<0.00030	0.00046	<0.00030	<0.00030	<0.00030	
<b>Dissolved Metals</b>										
aluminum, dissolved	7429-90-5	E421	0.0030	mg/L	0.0085	0.0204	0.0088	<0.0030	<0.0030	
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00018	<0.00010	<0.00010	<0.00010	<0.00010	
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00016	0.00019	0.00024	0.00013	0.00037	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0258	0.0273	0.0326	0.0157	0.0107	
beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	0.0000181	0.0000055	0.0000071	0.0000268	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	18.9	14.0	20.3	13.4	14.3	
chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	0.00115	<0.00020	<0.00020	0.00041	
iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	0.012	<0.010	<0.010	<0.010	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	0.000214	0.000226 <sup>DTMF</sup>	<0.000050	<0.000050	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0014	<0.0010	<0.0010	<0.0010	<0.0010	
magnesium, dissolved	7439-95-4	E421	0.100	mg/L	0.448	0.956	1.54	1.47	1.75	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00014	0.00500	0.00067	0.00012	0.00260	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000259	0.000440	0.000607	0.000531	0.000421	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
potassium, dissolved	7440-09-7	E421	0.100	mg/L	1.82	0.838	1.34	0.733	1.30	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	0.000052	0.000165	0.000058	0.000100	
silicon, dissolved	7440-21-3	E421	0.050	mg/L	0.973	0.868	0.798	1.44	1.66	



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					SHCR-2	SHCR-3	SHC5	SHCR-1	SK4
Client sampling date / time					24-Aug-2020 14:08	24-Aug-2020 14:21	24-Aug-2020 14:38	24-Aug-2020 14:49	24-Aug-2020 16:23
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-011	VA20B3846-012	VA20B3846-013	VA20B3846-014	VA20B3846-015
					Result	Result	Result	Result	Result
<b>Dissolved Metals</b>									
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
sodium, dissolved	7440-23-5	E421	0.050	mg/L	0.371	0.574	0.399	0.561	0.719
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0704	0.110	0.127	0.178	0.103
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	0.98	4.14	3.09	3.20	4.44
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	0.000014	<0.000010	<0.000010	<0.000010
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	0.00062	<0.00030	<0.00030	<0.00030
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000117	0.000191	0.000072	0.000062	0.000026
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	0.0012	<0.0010	<0.0010	0.0028
zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	Field	Field
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	Field	Field

Please refer to the General Comments section for an explanation of any qualifiers detected.



## Analytical Results

Sub-Matrix: Water					Client sample ID	SK3	----	----	----	----
(Matrix: Water)					Client sampling date / time	24-Aug-2020 16:52	---	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-016	-----	-----	-----	-----	
					Result	---	---	---	---	
<b>Physical Tests</b>										
acidity (as CaCO3)	---	E283	2.0	mg/L	<2.0	---	---	---	---	
alkalinity, bicarbonate (as CaCO3)	---	E290	1.0	mg/L	23.5	---	---	---	---	
alkalinity, carbonate (as CaCO3)	---	E290	1.0	mg/L	<1.0	---	---	---	---	
alkalinity, hydroxide (as CaCO3)	---	E290	1.0	mg/L	<1.0	---	---	---	---	
alkalinity, total (as CaCO3)	---	E290	1.0	mg/L	23.5	---	---	---	---	
colour, true	---	E329	5.0	CU	<5.0	---	---	---	---	
conductivity	---	E100	2.0	µS/cm	54.7	---	---	---	---	
hardness (as CaCO3), dissolved	---	EC100	0.60	mg/L	24.4	---	---	---	---	
hardness (as CaCO3), from total Ca/Mg	---	EC100A	0.60	mg/L	26.2	---	---	---	---	
pH	---	E108	0.10	pH units	7.37	---	---	---	---	
solids, total dissolved [TDS]	---	E162	10	mg/L	34	---	---	---	---	
solids, total suspended [TSS]	---	E160-H	3.0	mg/L	<3.0	---	---	---	---	
turbidity	---	E121	0.10	NTU	<0.10	---	---	---	---	
<b>Anions and Nutrients</b>										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	---	---	---	---	
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	---	---	---	---	
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	---	---	---	---	
fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	---	---	---	---	
Kjeldahl nitrogen, total [TKN]	---	E318	0.050	mg/L	<0.050	---	---	---	---	
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0329	---	---	---	---	
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	---	---	---	---	
nitrogen, total	7727-37-9	E366	0.030	mg/L	0.059	---	---	---	---	
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	---	---	---	---	
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	<0.0020	---	---	---	---	
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	4.56	---	---	---	---	
<b>Cyanides</b>										
cyanide, free	---	E339	0.0050	mg/L	<0.0050	---	---	---	---	
cyanide, strong acid dissociable (total)	---	E333	0.0050	mg/L	<0.0050	---	---	---	---	
cyanide, weak acid dissociable	---	E336	0.0050	mg/L	<0.0050	---	---	---	---	
<b>Organic / Inorganic Carbon</b>										
carbon, dissolved organic [DOC]	---	E358-L	0.50	mg/L	1.23	---	---	---	---	



## Analytical Results

Sub-Matrix: Water					Client sample ID	SK3	----	----	----	----
(Matrix: Water)					Client sampling date / time	24-Aug-2020 16:52	---	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-016	-----	-----	-----	-----	
					Result	---	---	---	---	
<b>Organic / Inorganic Carbon</b>										
carbon, total organic [TOC]	---	E355-L	0.50	mg/L	0.53	---	---	---	---	
<b>Total Metals</b>										
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0161	---	---	---	---	
antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	---	---	---	---	
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00034	---	---	---	---	
barium, total	7440-39-3	E420	0.00010	mg/L	0.00722	---	---	---	---	
beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	---	---	---	---	
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	---	---	---	---	
boron, total	7440-42-8	E420	0.010	mg/L	<0.010	---	---	---	---	
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000403	---	---	---	---	
calcium, total	7440-70-2	E420	0.050	mg/L	8.56	---	---	---	---	
chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	<0.00010	---	---	---	---	
cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	---	---	---	---	
copper, total	7440-50-8	E420	0.00050	mg/L	0.00056	---	---	---	---	
iron, total	7439-89-6	E420	0.010	mg/L	0.027	---	---	---	---	
lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	---	---	---	---	
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	---	---	---	---	
magnesium, total	7439-95-4	E420	0.100	mg/L	1.17	---	---	---	---	
manganese, total	7439-96-5	E420	0.00010	mg/L	0.00123	---	---	---	---	
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	---	---	---	---	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000100	---	---	---	---	
nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	---	---	---	---	
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	---	---	---	---	
potassium, total	7440-09-7	E420	0.100	mg/L	0.605	---	---	---	---	
selenium, total	7782-49-2	E420	0.000050	mg/L	0.000054	---	---	---	---	
silicon, total	7440-21-3	E420	0.10	mg/L	1.52	---	---	---	---	
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	---	---	---	---	
sodium, total	7440-23-5	E420	0.050	mg/L	0.492	---	---	---	---	
strontium, total	7440-24-6	E420	0.00020	mg/L	0.0483	---	---	---	---	
sulfur, total	7704-34-9	E420	0.50	mg/L	1.52	---	---	---	---	
thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	---	---	---	---	



## Analytical Results

Sub-Matrix: Water					Client sample ID	SK3	----	----	----	----
(Matrix: Water)					Client sampling date / time	24-Aug-2020 16:52	---	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-016	-----	-----	-----	-----	
					Result	---	---	---	---	
<b>Total Metals</b>										
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	----	----	----	----	
titanium, total	7440-32-6	E420	0.00030	mg/L	0.00085	----	----	----	----	
uranium, total	7440-61-1	E420	0.000010	mg/L	<0.000010	----	----	----	----	
vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	----	----	----	----	
zinc, total	7440-66-6	E420	0.0030	mg/L	0.0037	----	----	----	----	
zirconium, total	7440-67-7	E420	0.00030	mg/L	<0.00030	----	----	----	----	
<b>Dissolved Metals</b>										
aluminum, dissolved	7429-90-5	E421	0.0030	mg/L	0.0032	----	----	----	----	
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	----	----	----	----	
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00033	----	----	----	----	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.00662	----	----	----	----	
beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	----	----	----	----	
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	----	----	----	----	
boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	----	----	----	----	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000317	----	----	----	----	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	8.06	----	----	----	----	
chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	<0.00010	----	----	----	----	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	----	----	----	----	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00039	----	----	----	----	
iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	----	----	----	----	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	----	----	----	----	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	----	----	----	----	
magnesium, dissolved	7439-95-4	E421	0.100	mg/L	1.05	----	----	----	----	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00016	----	----	----	----	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	----	----	----	----	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000078	----	----	----	----	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	----	----	----	----	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	----	----	----	----	
potassium, dissolved	7440-09-7	E421	0.100	mg/L	0.552	----	----	----	----	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000073	----	----	----	----	
silicon, dissolved	7440-21-3	E421	0.050	mg/L	1.49	----	----	----	----	



**Analytical Results**

Sub-Matrix: <b>Water</b>					Client sample ID	SK3	---	---	---	---
(Matrix: <b>Water</b> )					Client sampling date / time	24-Aug-2020 16:52	---	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-016	-----	-----	-----	-----	-----
					Result	---	---	---	---	---
<b>Dissolved Metals</b>										
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	---	---	---	---	---
sodium, dissolved	7440-23-5	E421	0.050	mg/L	0.496	---	---	---	---	---
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0497	---	---	---	---	---
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	1.52	---	---	---	---	---
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	---	---	---	---	---
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	---	---	---	---	---
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	---	---	---	---	---
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	<0.000010	---	---	---	---	---
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	---	---	---	---	---
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0037	---	---	---	---	---
zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	---	---	---	---	---
dissolved mercury filtration location	---	EP509	-	-	Field	---	---	---	---	---
dissolved metals filtration location	---	EP421	-	-	Field	---	---	---	---	---

Please refer to the General Comments section for an explanation of any qualifiers detected.

## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>VA20B3846</b>	Page	: 1 of 66
Client	: <b>ERM Consultants Canada Ltd.</b>	Laboratory	: Vancouver - Environmental
Contact	: Jill Zyla	Account Manager	: Amber Springer
Address	: 3790 Alfred Ave Smithers BC Canada V0J 2N0	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: 604 689 9460	Telephone	: +1 604 253 4188
Project	: 0539378-0012	Date Samples Received	: 28-Aug-2020 10:10
PO	: ----	Issue Date	: 09-Sep-2020 12:43
C-O-C number	: 17-841425, 17-841424		
Sampler	: ----		
Site	: ----		
Quote number	: Q74326		
No. of samples received	: 16		
No. of samples analysed	: 16		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

- Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.  
**CAS Number:** Chemical Abstracts Services number is a unique identifier assigned to discrete substances.  
**DQO:** Data Quality Objective.  
**LOR:** Limit of Reporting (detection limit).  
**RPD:** Relative Percent Difference.

## Summary of Outliers

### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.

### **Outliers : Analysis Holding Time Compliance (Breaches)**

- Analysis Holding Time Outliers exist - please see following pages for full details.

### **Outliers : Frequency of Quality Control Samples**

- No Quality Control Sample Frequency Outliers occur.



RIGHT SOLUTIONS | RIGHT PARTNER



## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> SK3	E298	24-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> SK4	E298	24-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> JM1	E298	24-Aug-2020	----	----	----		01-Sep-2020	28 days	8 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> JM10	E298	24-Aug-2020	----	----	----		01-Sep-2020	28 days	8 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> JM1-ALT	E298	24-Aug-2020	----	----	----		01-Sep-2020	28 days	8 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> JM1-SEEPAGE	E298	24-Aug-2020	----	----	----		01-Sep-2020	28 days	8 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> JM26	E298	24-Aug-2020	----	----	----		01-Sep-2020	28 days	8 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> JM7	E298	24-Aug-2020	----	----	----		01-Sep-2020	28 days	8 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> SCH2	E298	24-Aug-2020	----	----	----		01-Sep-2020	28 days	8 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> SHC5	E298	24-Aug-2020	----	----	----		01-Sep-2020	28 days	8 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> SHCR-1	E298	24-Aug-2020	----	----	----		01-Sep-2020	28 days	8 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> SHCR-2	E298	24-Aug-2020	----	----	----		01-Sep-2020	28 days	8 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> SHCR-3	E298	24-Aug-2020	----	----	----		01-Sep-2020	28 days	8 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> SHCR-4	E298	24-Aug-2020	----	----	----		01-Sep-2020	28 days	8 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> SK2	E298	24-Aug-2020	----	----	----		01-Sep-2020	28 days	8 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> FIELD BLANK	E298	23-Aug-2020	----	----	----		01-Sep-2020	28 days	9 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE JM1	E235.Br-L	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE JM10	E235.Br-L	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE JM1-ALT	E235.Br-L	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE JM1-SEEPAGE	E235.Br-L	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE JM26	E235.Br-L	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE JM7	E235.Br-L	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE SCH2	E235.Br-L	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE SHC5	E235.Br-L	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE SHCR-1	E235.Br-L	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE SHCR-2	E235.Br-L	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE SHCR-3	E235.Br-L	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE SHCR-4	E235.Br-L	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE SK2	E235.Br-L	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE SK3	E235.Br-L	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE SK4	E235.Br-L	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE FIELD BLANK	E235.Br-L	23-Aug-2020	----	----	----		28-Aug-2020	28 days	5 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE JM1	E235.Cl	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE JM10	E235.Cl	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE JM1-ALT	E235.Cl	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE JM1-SEEPAGE	E235.Cl	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE JM26	E235.Cl	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE JM7	E235.Cl	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE SCH2	E235.Cl	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE SHC5	E235.Cl	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE SHCR-1	E235.Cl	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE SHCR-2	E235.Cl	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE SHCR-3	E235.Cl	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE SHCR-4	E235.CI	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE SK2	E235.CI	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE SK3	E235.CI	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE SK4	E235.CI	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE FIELD BLANK	E235.CI	23-Aug-2020	----	----	----		28-Aug-2020	28 days	5 days	✓
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>										
HDPE JM1	E378-U	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>										
HDPE JM10	E378-U	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>										
HDPE JM1-ALT	E378-U	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>										
HDPE JM1-SEEPAGE	E378-U	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE JM26	E378-U	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE JM7	E378-U	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE SCH2	E378-U	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE SHC5	E378-U	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE SHCR-1	E378-U	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE SHCR-2	E378-U	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE SHCR-3	E378-U	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE SHCR-4	E378-U	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE SK2	E378-U	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	*	EHTR





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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE SK3	E378-U	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE SK4	E378-U	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE FIELD BLANK	E378-U	23-Aug-2020	----	----	----		28-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE JM1	E235.F	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE JM10	E235.F	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE JM1-ALT	E235.F	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE JM1-SEEPAGE	E235.F	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE JM26	E235.F	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE JM7	E235.F	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE SCH2	E235.F	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE SHC5	E235.F	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE SHCR-1	E235.F	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE SHCR-2	E235.F	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE SHCR-3	E235.F	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE SHCR-4	E235.F	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE SK2	E235.F	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE SK3	E235.F	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE SK4	E235.F	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE FIELD BLANK	E235.F	23-Aug-2020	----	----	----		28-Aug-2020	28 days	5 days	✓
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE JM1	E235.NO3-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE JM10	E235.NO3-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE JM1-ALT	E235.NO3-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE JM1-SEEPAGE	E235.NO3-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE JM26	E235.NO3-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE JM7	E235.NO3-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE SCH2	E235.NO3-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE SHC5	E235.NO3-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation			Analysis				
			Preparation Date	Holding Times Rec Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE SHCR-1	E235.NO3-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE SHCR-2	E235.NO3-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE SHCR-3	E235.NO3-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE SHCR-4	E235.NO3-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE SK2	E235.NO3-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE SK3	E235.NO3-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE SK4	E235.NO3-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE FIELD BLANK	E235.NO3-L	23-Aug-2020	----	----	----		28-Aug-2020	3 days	5 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE JM1	E235.NO2-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE JM10	E235.NO2-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE JM1-ALT	E235.NO2-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE JM1-SEEPAGE	E235.NO2-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE JM26	E235.NO2-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE JM7	E235.NO2-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE SCH2	E235.NO2-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE SHC5	E235.NO2-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE SHCR-1	E235.NO2-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE SHCR-2	E235.NO2-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE SHCR-3	E235.NO2-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE SHCR-4	E235.NO2-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE SK2	E235.NO2-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE SK3	E235.NO2-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE SK4	E235.NO2-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE FIELD BLANK	E235.NO2-L	23-Aug-2020	----	----	----		28-Aug-2020	3 days	5 days	* EHTR
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE JM1	E235.SO4	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE JM10	E235.SO4	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE JM1-ALT	E235.SO4	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
<b>HDPE</b> JM1-SEEPAGE	E235.S04	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
<b>HDPE</b> JM26	E235.S04	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
<b>HDPE</b> JM7	E235.S04	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
<b>HDPE</b> SCH2	E235.S04	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
<b>HDPE</b> SHC5	E235.S04	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
<b>HDPE</b> SHCR-1	E235.S04	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
<b>HDPE</b> SHCR-2	E235.S04	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
<b>HDPE</b> SHCR-3	E235.S04	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
<b>HDPE</b> SHCR-4	E235.S04	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE SK2	E235.SO4	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE SK3	E235.SO4	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE SK4	E235.SO4	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE FIELD BLANK	E235.SO4	23-Aug-2020	----	----	----		28-Aug-2020	28 days	5 days	✓
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>										
Amber glass total (sulfuric acid) JM1	E318	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	31-Aug-2020	23 days	2 days	✓
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>										
Amber glass total (sulfuric acid) JM10	E318	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	31-Aug-2020	23 days	2 days	✓
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>										
Amber glass total (sulfuric acid) JM1-ALT	E318	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	31-Aug-2020	23 days	2 days	✓
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>										
Amber glass total (sulfuric acid) JM1-SEEPAGE	E318	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	31-Aug-2020	23 days	2 days	✓
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>										
Amber glass total (sulfuric acid) JM26	E318	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	31-Aug-2020	23 days	2 days	✓





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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM7	E318	24-Aug-2020	29-Aug-2020	28 days	4 days	✔	31-Aug-2020	23 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SCH2	E318	24-Aug-2020	29-Aug-2020	28 days	4 days	✔	31-Aug-2020	23 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SHC5	E318	24-Aug-2020	29-Aug-2020	28 days	4 days	✔	31-Aug-2020	23 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SHCR-1	E318	24-Aug-2020	29-Aug-2020	28 days	4 days	✔	31-Aug-2020	23 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SHCR-2	E318	24-Aug-2020	29-Aug-2020	28 days	4 days	✔	31-Aug-2020	23 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SHCR-3	E318	24-Aug-2020	29-Aug-2020	28 days	4 days	✔	31-Aug-2020	23 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SHCR-4	E318	24-Aug-2020	29-Aug-2020	28 days	4 days	✔	31-Aug-2020	23 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SK2	E318	24-Aug-2020	29-Aug-2020	28 days	4 days	✔	31-Aug-2020	23 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SK3	E318	24-Aug-2020	29-Aug-2020	28 days	4 days	✔	31-Aug-2020	23 days	2 days	✔	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SK4	E318	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	31-Aug-2020	23 days	2 days	✓	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> FIELD BLANK	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	31-Aug-2020	22 days	2 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> JM1	E366	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	01-Sep-2020	23 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> JM10	E366	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	01-Sep-2020	23 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> JM1-ALT	E366	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	01-Sep-2020	23 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> JM1-SEEPAGE	E366	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	01-Sep-2020	23 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> JM26	E366	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	01-Sep-2020	23 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> JM7	E366	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	01-Sep-2020	23 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> SCH2	E366	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	01-Sep-2020	23 days	3 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> SHC5	E366	24-Aug-2020	29-Aug-2020	28 days	4 days	✔	01-Sep-2020	23 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> SHCR-1	E366	24-Aug-2020	29-Aug-2020	28 days	4 days	✔	01-Sep-2020	23 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> SHCR-2	E366	24-Aug-2020	29-Aug-2020	28 days	4 days	✔	01-Sep-2020	23 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> SHCR-3	E366	24-Aug-2020	29-Aug-2020	28 days	4 days	✔	01-Sep-2020	23 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> SHCR-4	E366	24-Aug-2020	29-Aug-2020	28 days	4 days	✔	01-Sep-2020	23 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> SK2	E366	24-Aug-2020	29-Aug-2020	28 days	4 days	✔	01-Sep-2020	23 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> SK3	E366	24-Aug-2020	29-Aug-2020	28 days	4 days	✔	01-Sep-2020	23 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> SK4	E366	24-Aug-2020	29-Aug-2020	28 days	4 days	✔	01-Sep-2020	23 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> FIELD BLANK	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✔	01-Sep-2020	22 days	3 days	✔	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> JM1	E372-U	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	29-Aug-2020	23 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> JM10	E372-U	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	29-Aug-2020	23 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> JM1-ALT	E372-U	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	29-Aug-2020	23 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> JM1-SEEPAGE	E372-U	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	29-Aug-2020	23 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> JM26	E372-U	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	29-Aug-2020	23 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> JM7	E372-U	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	29-Aug-2020	23 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> SCH2	E372-U	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	29-Aug-2020	23 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> SHC5	E372-U	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	29-Aug-2020	23 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> SHCR-1	E372-U	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	29-Aug-2020	23 days	0 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> SHCR-2	E372-U	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	29-Aug-2020	23 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> SHCR-3	E372-U	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	29-Aug-2020	23 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> SHCR-4	E372-U	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	29-Aug-2020	23 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> SK2	E372-U	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	29-Aug-2020	23 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> SK3	E372-U	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	29-Aug-2020	23 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> SK4	E372-U	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	29-Aug-2020	23 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> FIELD BLANK	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	
<b>Cyanides : Free Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM26	E339	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✓	
<b>Cyanides : Free Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SHC5	E339	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Cyanides : Free Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SHCR-1	E339	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✓	
<b>Cyanides : Free Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SHCR-2	E339	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✓	
<b>Cyanides : Free Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SHCR-3	E339	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✓	
<b>Cyanides : Free Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SHCR-4	E339	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✓	
<b>Cyanides : Free Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SK3	E339	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✓	
<b>Cyanides : Free Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SK4	E339	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✓	
<b>Cyanides : Free Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM1	E339	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✓	
<b>Cyanides : Free Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM10	E339	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✓	
<b>Cyanides : Free Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM1-ALT	E339	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Cyanides : Free Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM1-SEEPAGE	E339	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✓	
<b>Cyanides : Free Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM7	E339	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✓	
<b>Cyanides : Free Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SCH2	E339	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✓	
<b>Cyanides : Free Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SK2	E339	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✓	
<b>Cyanides : Free Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> FIELD BLANK	E339	23-Aug-2020	----	----	----		31-Aug-2020	14 days	8 days	✓	
<b>Cyanides : Total Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM26	E333	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✓	
<b>Cyanides : Total Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SHC5	E333	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✓	
<b>Cyanides : Total Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SHCR-1	E333	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✓	
<b>Cyanides : Total Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SHCR-2	E333	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SHCR-3	E333	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✓
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SHCR-4	E333	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✓
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SK3	E333	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✓
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SK4	E333	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✓
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM1	E333	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✓
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM10	E333	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✓
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM1-ALT	E333	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✓
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM1-SEEPAGE	E333	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✓
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM7	E333	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Cyanides : Total Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) SCH2	E333	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✔
<b>Cyanides : Total Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) SK2	E333	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✔
<b>Cyanides : Total Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) FIELD BLANK	E333	23-Aug-2020	----	----	----		31-Aug-2020	14 days	8 days	✔
<b>Cyanides : WAD Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) JM26	E336	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✔
<b>Cyanides : WAD Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) SHC5	E336	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✔
<b>Cyanides : WAD Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) SHCR-1	E336	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✔
<b>Cyanides : WAD Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) SHCR-2	E336	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✔
<b>Cyanides : WAD Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) SHCR-3	E336	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✔
<b>Cyanides : WAD Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) SHCR-4	E336	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✔



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Cyanides : WAD Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) SK3	E336	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) SK4	E336	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) JM1	E336	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) JM10	E336	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) JM1-ALT	E336	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) JM1-SEEPAGE	E336	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) JM7	E336	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) SCH2	E336	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) SK2	E336	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> FIELD BLANK	E336	23-Aug-2020	----	----	----		31-Aug-2020	14 days	8 days	✓
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> JM1	E421.Cr-L	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> JM1-ALT	E421.Cr-L	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> JM1-SEEPAGE	E421.Cr-L	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> JM26	E421.Cr-L	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> SHC5	E421.Cr-L	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> SHCR-1	E421.Cr-L	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> SHCR-2	E421.Cr-L	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> SHCR-3	E421.Cr-L	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> SHCR-4	E421.Cr-L	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> SK3	E421.Cr-L	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> SK4	E421.Cr-L	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> FIELD BLANK	E421.Cr-L	23-Aug-2020	29-Aug-2020	180 days	5 days	✓	30-Aug-2020	174 days	0 days	✓	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> JM10	E421.Cr-L	24-Aug-2020	29-Aug-2020	180 days	5 days	✓	30-Aug-2020	174 days	0 days	✓	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> JM7	E421.Cr-L	24-Aug-2020	29-Aug-2020	180 days	5 days	✓	30-Aug-2020	174 days	0 days	✓	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> SCH2	E421.Cr-L	24-Aug-2020	29-Aug-2020	180 days	5 days	✓	30-Aug-2020	174 days	0 days	✓	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> SK2	E421.Cr-L	24-Aug-2020	29-Aug-2020	180 days	5 days	✓	30-Aug-2020	174 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> JM1	E509	24-Aug-2020	01-Sep-2020	28 days	7 days	✓	01-Sep-2020	20 days	0 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> JM10	E509	24-Aug-2020	01-Sep-2020	28 days	7 days	✓	01-Sep-2020	20 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> JM1-ALT	E509	24-Aug-2020	01-Sep-2020	28 days	7 days	✓	01-Sep-2020	20 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> JM1-SEEPAGE	E509	24-Aug-2020	01-Sep-2020	28 days	7 days	✓	01-Sep-2020	20 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> JM26	E509	24-Aug-2020	01-Sep-2020	28 days	7 days	✓	01-Sep-2020	20 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> JM7	E509	24-Aug-2020	01-Sep-2020	28 days	7 days	✓	01-Sep-2020	20 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> SCH2	E509	24-Aug-2020	01-Sep-2020	28 days	7 days	✓	01-Sep-2020	20 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> SHC5	E509	24-Aug-2020	01-Sep-2020	28 days	7 days	✓	01-Sep-2020	20 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> SHCR-1	E509	24-Aug-2020	01-Sep-2020	28 days	7 days	✓	01-Sep-2020	20 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> SHCR-2	E509	24-Aug-2020	01-Sep-2020	28 days	7 days	✓	01-Sep-2020	20 days	0 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> SHCR-3	E509	24-Aug-2020	01-Sep-2020	28 days	7 days	✓	01-Sep-2020	20 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> SHCR-4	E509	24-Aug-2020	01-Sep-2020	28 days	7 days	✓	01-Sep-2020	20 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> SK2	E509	24-Aug-2020	01-Sep-2020	28 days	7 days	✓	01-Sep-2020	20 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> SK3	E509	24-Aug-2020	01-Sep-2020	28 days	7 days	✓	01-Sep-2020	20 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> SK4	E509	24-Aug-2020	01-Sep-2020	28 days	7 days	✓	01-Sep-2020	20 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> FIELD BLANK	E509	23-Aug-2020	01-Sep-2020	28 days	8 days	✓	01-Sep-2020	19 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> JM1	E421	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> JM1-ALT	E421	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> JM1-SEEPAGE	E421	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> JM26	E421	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> SHC5	E421	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> SHCR-1	E421	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> SHCR-2	E421	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> SHCR-3	E421	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> SHCR-4	E421	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> SK3	E421	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> SK4	E421	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> FIELD BLANK	E421	23-Aug-2020	29-Aug-2020	180 days	5 days	✓	30-Aug-2020	174 days	0 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> JM10	E421	24-Aug-2020	29-Aug-2020	180 days	5 days	✓	30-Aug-2020	174 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> JM7	E421	24-Aug-2020	29-Aug-2020	180 days	5 days	✓	30-Aug-2020	174 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> SCH2	E421	24-Aug-2020	29-Aug-2020	180 days	5 days	✓	30-Aug-2020	174 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> SK2	E421	24-Aug-2020	29-Aug-2020	180 days	5 days	✓	30-Aug-2020	174 days	0 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> JM1	E601A	24-Aug-2020	02-Sep-2020	14 days	9 days	✓	03-Sep-2020	40 days	0 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> JM7	E601A	24-Aug-2020	02-Sep-2020	14 days	9 days	✓	03-Sep-2020	40 days	0 days	✓	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
<b>Glass vial (sodium bisulfate)</b> JM1	E581.VH+F1	24-Aug-2020	02-Sep-2020	14 days	9 days	✓	03-Sep-2020	4 days	0 days	✓	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
<b>Glass vial (sodium bisulfate)</b> JM7	E581.VH+F1	24-Aug-2020	02-Sep-2020	14 days	9 days	✓	03-Sep-2020	4 days	0 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> JM1	E358-L	24-Aug-2020	----	----	----		31-Aug-2020	28 days	6 days	✓	





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> JM10	E358-L	24-Aug-2020	----	----	----		31-Aug-2020	28 days	6 days	✔	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> JM1-ALT	E358-L	24-Aug-2020	----	----	----		31-Aug-2020	28 days	6 days	✔	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> JM1-SEEPAGE	E358-L	24-Aug-2020	----	----	----		31-Aug-2020	28 days	6 days	✔	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> JM26	E358-L	24-Aug-2020	----	----	----		31-Aug-2020	28 days	6 days	✔	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> SHC5	E358-L	24-Aug-2020	----	----	----		31-Aug-2020	28 days	6 days	✔	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> SHCR-1	E358-L	24-Aug-2020	----	----	----		31-Aug-2020	28 days	6 days	✔	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> SHCR-2	E358-L	24-Aug-2020	----	----	----		31-Aug-2020	28 days	6 days	✔	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> SHCR-3	E358-L	24-Aug-2020	----	----	----		31-Aug-2020	28 days	6 days	✔	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> SHCR-4	E358-L	24-Aug-2020	----	----	----		31-Aug-2020	28 days	6 days	✔	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> SK3	E358-L	24-Aug-2020	----	----	----		31-Aug-2020	28 days	6 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> SK4	E358-L	24-Aug-2020	----	----	----		31-Aug-2020	28 days	6 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> FIELD BLANK	E358-L	23-Aug-2020	----	----	----		31-Aug-2020	28 days	7 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> JM7	E358-L	24-Aug-2020	----	----	----		31-Aug-2020	28 days	7 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> SCH2	E358-L	24-Aug-2020	----	----	----		31-Aug-2020	28 days	7 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> SK2	E358-L	24-Aug-2020	----	----	----		31-Aug-2020	28 days	7 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM1	E355-L	24-Aug-2020	----	----	----		29-Aug-2020	28 days	4 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM10	E355-L	24-Aug-2020	----	----	----		29-Aug-2020	28 days	4 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM1-ALT	E355-L	24-Aug-2020	----	----	----		29-Aug-2020	28 days	4 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM1-SEEPAGE	E355-L	24-Aug-2020	----	----	----		29-Aug-2020	28 days	4 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM26	E355-L	24-Aug-2020	----	----	----		29-Aug-2020	28 days	4 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM7	E355-L	24-Aug-2020	----	----	----		29-Aug-2020	28 days	4 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SCH2	E355-L	24-Aug-2020	----	----	----		29-Aug-2020	28 days	4 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SHC5	E355-L	24-Aug-2020	----	----	----		29-Aug-2020	28 days	4 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SHCR-1	E355-L	24-Aug-2020	----	----	----		29-Aug-2020	28 days	4 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SHCR-2	E355-L	24-Aug-2020	----	----	----		29-Aug-2020	28 days	4 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SHCR-3	E355-L	24-Aug-2020	----	----	----		29-Aug-2020	28 days	4 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SHCR-4	E355-L	24-Aug-2020	----	----	----		29-Aug-2020	28 days	4 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>										
<b>Amber glass total (sulfuric acid)</b> SK2	E355-L	24-Aug-2020	----	----	----		29-Aug-2020	28 days	4 days	✓
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>										
<b>Amber glass total (sulfuric acid)</b> SK3	E355-L	24-Aug-2020	----	----	----		29-Aug-2020	28 days	4 days	✓
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>										
<b>Amber glass total (sulfuric acid)</b> SK4	E355-L	24-Aug-2020	----	----	----		29-Aug-2020	28 days	4 days	✓
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>										
<b>Amber glass total (sulfuric acid)</b> FIELD BLANK	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓
<b>Physical Tests : Acidity by Titration</b>										
<b>HDPE</b> JM1	E283	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Acidity by Titration</b>										
<b>HDPE</b> JM10	E283	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Acidity by Titration</b>										
<b>HDPE</b> JM1-ALT	E283	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Acidity by Titration</b>										
<b>HDPE</b> JM1-SEEPAGE	E283	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Acidity by Titration</b>										
<b>HDPE</b> JM26	E283	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : Acidity by Titration</b>											
HDPE JM7	E283	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✔	
<b>Physical Tests : Acidity by Titration</b>											
HDPE SCH2	E283	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✔	
<b>Physical Tests : Acidity by Titration</b>											
HDPE SHC5	E283	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✔	
<b>Physical Tests : Acidity by Titration</b>											
HDPE SHCR-1	E283	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✔	
<b>Physical Tests : Acidity by Titration</b>											
HDPE SHCR-2	E283	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✔	
<b>Physical Tests : Acidity by Titration</b>											
HDPE SHCR-3	E283	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✔	
<b>Physical Tests : Acidity by Titration</b>											
HDPE SHCR-4	E283	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✔	
<b>Physical Tests : Acidity by Titration</b>											
HDPE SK2	E283	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✔	
<b>Physical Tests : Acidity by Titration</b>											
HDPE SK3	E283	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✔	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Acidity by Titration</b>										
HDPE SK4	E283	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Acidity by Titration</b>										
HDPE FIELD BLANK	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE SK3	E290	24-Aug-2020	----	----	----		28-Aug-2020	14 days	3 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE JM1	E290	24-Aug-2020	----	----	----		28-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE JM10	E290	24-Aug-2020	----	----	----		28-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE JM1-ALT	E290	24-Aug-2020	----	----	----		28-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE JM1-SEEPAGE	E290	24-Aug-2020	----	----	----		28-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE JM26	E290	24-Aug-2020	----	----	----		28-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE JM7	E290	24-Aug-2020	----	----	----		28-Aug-2020	14 days	4 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE SCH2	E290	24-Aug-2020	----	----	----		28-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE SHC5	E290	24-Aug-2020	----	----	----		28-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE SHCR-1	E290	24-Aug-2020	----	----	----		28-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE SHCR-2	E290	24-Aug-2020	----	----	----		28-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE SHCR-3	E290	24-Aug-2020	----	----	----		28-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE SHCR-4	E290	24-Aug-2020	----	----	----		28-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE SK2	E290	24-Aug-2020	----	----	----		28-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE SK4	E290	24-Aug-2020	----	----	----		28-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE FIELD BLANK	E290	23-Aug-2020	----	----	----		28-Aug-2020	14 days	5 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE JM1	E329	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE JM10	E329	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE JM1-ALT	E329	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE JM1-SEEPAGE	E329	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE JM26	E329	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE JM7	E329	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE SCH2	E329	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE SHC5	E329	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE SHCR-1	E329	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
Rec	Actual	Rec		Actual						
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE SHCR-2	E329	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE SHCR-3	E329	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE SHCR-4	E329	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE SK2	E329	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE SK3	E329	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE SK4	E329	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE FIELD BLANK	E329	23-Aug-2020	----	----	----		28-Aug-2020	3 days	5 days	* EHTR
<b>Physical Tests : Conductivity in Water</b>										
HDPE SK3	E100	24-Aug-2020	----	----	----		28-Aug-2020	28 days	3 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE JM1	E100	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Conductivity in Water</b>										
HDPE JM10	E100	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE JM1-ALT	E100	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE JM1-SEEPAGE	E100	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE JM26	E100	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE JM7	E100	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE SCH2	E100	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE SHC5	E100	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE SHCR-1	E100	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE SHCR-2	E100	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Conductivity in Water</b>										
HDPE SHCR-3	E100	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE SHCR-4	E100	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE SK2	E100	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE SK4	E100	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE FIELD BLANK	E100	23-Aug-2020	----	----	----		28-Aug-2020	28 days	5 days	✓
<b>Physical Tests : pH by Meter</b>										
HDPE JM1	E108	24-Aug-2020	----	----	----		28-Aug-2020	0.25 hrs	100 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE JM10	E108	24-Aug-2020	----	----	----		28-Aug-2020	0.25 hrs	100 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE JM1-ALT	E108	24-Aug-2020	----	----	----		28-Aug-2020	0.25 hrs	100 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE SK2	E108	24-Aug-2020	----	----	----		28-Aug-2020	0.25 hrs	101 hrs	* EHTR-FM



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : pH by Meter</b>										
HDPE JM7	E108	24-Aug-2020	----	----	----		28-Aug-2020	0.25 hrs	102 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE SCH2	E108	24-Aug-2020	----	----	----		28-Aug-2020	0.25 hrs	102 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE FIELD BLANK	E108	23-Aug-2020	----	----	----		28-Aug-2020	0.25 hrs	124 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE SK3	E108	24-Aug-2020	----	----	----		28-Aug-2020	0.25 hrs	95 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE SK4	E108	24-Aug-2020	----	----	----		28-Aug-2020	0.25 hrs	96 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE SHCR-1	E108	24-Aug-2020	----	----	----		28-Aug-2020	0.25 hrs	97 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE SHC5	E108	24-Aug-2020	----	----	----		28-Aug-2020	0.25 hrs	98 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE SHCR-2	E108	24-Aug-2020	----	----	----		28-Aug-2020	0.25 hrs	98 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE SHCR-3	E108	24-Aug-2020	----	----	----		28-Aug-2020	0.25 hrs	98 hrs	* EHTR-FM



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : pH by Meter</b>											
HDPE SHCR-4	E108	24-Aug-2020	----	----	----		28-Aug-2020	0.25 hrs	98 hrs	*	EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE JM1-SEEPAGE	E108	24-Aug-2020	----	----	----		28-Aug-2020	0.25 hrs	99 hrs	*	EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE JM26	E108	24-Aug-2020	----	----	----		28-Aug-2020	0.25 hrs	99 hrs	*	EHTR-FM
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE SK3	E162	24-Aug-2020	----	----	----		28-Aug-2020	7 days	3 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE SK4	E162	24-Aug-2020	----	----	----		28-Aug-2020	7 days	3 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE JM1	E162	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE JM10	E162	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE JM1-ALT	E162	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE JM1-SEEPAGE	E162	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE JM26	E162	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE JM7	E162	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE SCH2	E162	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE SHC5	E162	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE SHCR-1	E162	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE SHCR-2	E162	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE SHCR-3	E162	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE SHCR-4	E162	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE SK2	E162	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE FIELD BLANK	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✔
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE SK3	E160-H	24-Aug-2020	----	----	----		28-Aug-2020	7 days	3 days	✔
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE SK4	E160-H	24-Aug-2020	----	----	----		28-Aug-2020	7 days	3 days	✔
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE JM1	E160-H	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✔
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE JM10	E160-H	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✔
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE JM1-ALT	E160-H	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✔
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE JM1-SEEPAGE	E160-H	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✔
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE JM26	E160-H	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✔
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE JM7	E160-H	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✔



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE SCH2	E160-H	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE SHC5	E160-H	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE SHCR-1	E160-H	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE SHCR-2	E160-H	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE SHCR-3	E160-H	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE SHCR-4	E160-H	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE SK2	E160-H	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE FIELD BLANK	E160-H	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓	
<b>Physical Tests : Turbidity by Nephelometry</b>											
HDPE SHC5	E121	24-Aug-2020	----	----	----		28-Aug-2020	3 days	3 days	✓	





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE SHCR-1	E121	24-Aug-2020	----	----	----		28-Aug-2020	3 days	3 days	✓
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE SHCR-3	E121	24-Aug-2020	----	----	----		28-Aug-2020	3 days	3 days	✓
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE SK3	E121	24-Aug-2020	----	----	----		28-Aug-2020	3 days	3 days	✓
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE SK4	E121	24-Aug-2020	----	----	----		28-Aug-2020	3 days	3 days	✓
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE JM1	E121	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE JM10	E121	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE JM1-ALT	E121	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE JM1-SEEPAGE	E121	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE JM26	E121	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE JM7	E121	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE SCH2	E121	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE SHCR-2	E121	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE SHCR-4	E121	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE SK2	E121	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE FIELD BLANK	E121	23-Aug-2020	----	----	----		28-Aug-2020	3 days	5 days	* EHTR
<b>Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS</b>										
Amber glass/Teflon lined cap (sodium bisulfate) JM1	E641A	24-Aug-2020	02-Sep-2020	14 days	9 days	✓	02-Sep-2020	40 days	0 days	✓
<b>Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS</b>										
Amber glass/Teflon lined cap (sodium bisulfate) JM7	E641A	24-Aug-2020	02-Sep-2020	14 days	9 days	✓	02-Sep-2020	40 days	0 days	✓
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
HDPE total (nitric acid) SHC5	E420.Cr-L	24-Aug-2020	----	----	----		29-Aug-2020	180 days	4 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> SHCR-1	E420.Cr-L	24-Aug-2020	----	----	----		29-Aug-2020	180 days	4 days	✔
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> SHCR-2	E420.Cr-L	24-Aug-2020	----	----	----		29-Aug-2020	180 days	4 days	✔
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> SHCR-3	E420.Cr-L	24-Aug-2020	----	----	----		29-Aug-2020	180 days	4 days	✔
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> SK3	E420.Cr-L	24-Aug-2020	----	----	----		29-Aug-2020	180 days	4 days	✔
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> SK4	E420.Cr-L	24-Aug-2020	----	----	----		29-Aug-2020	180 days	4 days	✔
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> JM1	E420.Cr-L	24-Aug-2020	----	----	----		29-Aug-2020	180 days	5 days	✔
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> JM10	E420.Cr-L	24-Aug-2020	----	----	----		29-Aug-2020	180 days	5 days	✔
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> JM1-ALT	E420.Cr-L	24-Aug-2020	----	----	----		29-Aug-2020	180 days	5 days	✔
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> JM1-SEEPAGE	E420.Cr-L	24-Aug-2020	----	----	----		29-Aug-2020	180 days	5 days	✔



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> JM26	E420.Cr-L	24-Aug-2020	----	----	----		29-Aug-2020	180 days	5 days	✓
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> JM7	E420.Cr-L	24-Aug-2020	----	----	----		29-Aug-2020	180 days	5 days	✓
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> SCH2	E420.Cr-L	24-Aug-2020	----	----	----		29-Aug-2020	180 days	5 days	✓
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> SHCR-4	E420.Cr-L	24-Aug-2020	----	----	----		29-Aug-2020	180 days	5 days	✓
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> SK2	E420.Cr-L	24-Aug-2020	----	----	----		29-Aug-2020	180 days	5 days	✓
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> FIELD BLANK	E420.Cr-L	23-Aug-2020	----	----	----		29-Aug-2020	180 days	6 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> SK3	E508	24-Aug-2020	----	----	----		31-Aug-2020	28 days	6 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> SK4	E508	24-Aug-2020	----	----	----		31-Aug-2020	28 days	6 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> JM1	E508	24-Aug-2020	----	----	----		31-Aug-2020	28 days	7 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
<b>Glass vial total (hydrochloric acid)</b> JM10	E508	24-Aug-2020	----	----	----		31-Aug-2020	28 days	7 days	✔	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
<b>Glass vial total (hydrochloric acid)</b> JM1-ALT	E508	24-Aug-2020	----	----	----		31-Aug-2020	28 days	7 days	✔	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
<b>Glass vial total (hydrochloric acid)</b> JM1-SEEPAGE	E508	24-Aug-2020	----	----	----		31-Aug-2020	28 days	7 days	✔	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
<b>Glass vial total (hydrochloric acid)</b> JM26	E508	24-Aug-2020	----	----	----		31-Aug-2020	28 days	7 days	✔	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
<b>Glass vial total (hydrochloric acid)</b> JM7	E508	24-Aug-2020	----	----	----		31-Aug-2020	28 days	7 days	✔	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
<b>Glass vial total (hydrochloric acid)</b> SCH2	E508	24-Aug-2020	----	----	----		31-Aug-2020	28 days	7 days	✔	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
<b>Glass vial total (hydrochloric acid)</b> SHC5	E508	24-Aug-2020	----	----	----		31-Aug-2020	28 days	7 days	✔	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
<b>Glass vial total (hydrochloric acid)</b> SHCR-1	E508	24-Aug-2020	----	----	----		31-Aug-2020	28 days	7 days	✔	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
<b>Glass vial total (hydrochloric acid)</b> SHCR-2	E508	24-Aug-2020	----	----	----		31-Aug-2020	28 days	7 days	✔	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> SHCR-3	E508	24-Aug-2020	----	----	----		31-Aug-2020	28 days	7 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> SHCR-4	E508	24-Aug-2020	----	----	----		31-Aug-2020	28 days	7 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> SK2	E508	24-Aug-2020	----	----	----		31-Aug-2020	28 days	7 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> FIELD BLANK	E508	23-Aug-2020	----	----	----		31-Aug-2020	28 days	8 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPCS</b>										
<b>HDPE total (nitric acid)</b> SHC5	E420	24-Aug-2020	----	----	----		29-Aug-2020	180 days	4 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPCS</b>										
<b>HDPE total (nitric acid)</b> SHCR-1	E420	24-Aug-2020	----	----	----		29-Aug-2020	180 days	4 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPCS</b>										
<b>HDPE total (nitric acid)</b> SHCR-2	E420	24-Aug-2020	----	----	----		29-Aug-2020	180 days	4 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPCS</b>										
<b>HDPE total (nitric acid)</b> SHCR-3	E420	24-Aug-2020	----	----	----		29-Aug-2020	180 days	4 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPCS</b>										
<b>HDPE total (nitric acid)</b> SK3	E420	24-Aug-2020	----	----	----		29-Aug-2020	180 days	4 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
HDPE total (nitric acid) SK4	E420	24-Aug-2020	----	----	----		29-Aug-2020	180 days	4 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
HDPE total (nitric acid) JM1	E420	24-Aug-2020	----	----	----		29-Aug-2020	180 days	5 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
HDPE total (nitric acid) JM10	E420	24-Aug-2020	----	----	----		29-Aug-2020	180 days	5 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
HDPE total (nitric acid) JM1-ALT	E420	24-Aug-2020	----	----	----		29-Aug-2020	180 days	5 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
HDPE total (nitric acid) JM1-SEEPAGE	E420	24-Aug-2020	----	----	----		29-Aug-2020	180 days	5 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
HDPE total (nitric acid) JM26	E420	24-Aug-2020	----	----	----		29-Aug-2020	180 days	5 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
HDPE total (nitric acid) JM7	E420	24-Aug-2020	----	----	----		29-Aug-2020	180 days	5 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
HDPE total (nitric acid) SCH2	E420	24-Aug-2020	----	----	----		29-Aug-2020	180 days	5 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
HDPE total (nitric acid) SHCR-4	E420	24-Aug-2020	----	----	----		29-Aug-2020	180 days	5 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> SK2	E420	24-Aug-2020	----	----	----		29-Aug-2020	180 days	5 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> FIELD BLANK	E420	23-Aug-2020	----	----	----		29-Aug-2020	180 days	6 days	✓
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> JM1	E611A	24-Aug-2020	02-Sep-2020	14 days	9 days	✓	03-Sep-2020	4 days	0 days	✓
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> JM7	E611A	24-Aug-2020	02-Sep-2020	14 days	9 days	✓	03-Sep-2020	4 days	2 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHTR: Exceeded ALS recommended hold time prior to sample receipt.

Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Acidity by Titration	E283	78556	1	16	6.2	5.0	✓
Alkalinity Species by Titration	E290	78554	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	78807	1	20	5.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	78559	1	16	6.2	5.0	✓
BTEX by Headspace GC-MS	E611A	80458	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	78557	1	16	6.2	5.0	✓
Colour (True) by Spectrometer	E329	78563	1	16	6.2	5.0	✓
Conductivity in Water	E100	78555	1	16	6.2	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	78985	1	16	6.2	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	79608	1	16	6.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	78986	1	16	6.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	79212	1	16	6.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	78564	1	16	6.2	5.0	✓
Fluoride in Water by IC	E235.F	78558	1	16	6.2	5.0	✓
Free Cyanide by CFA	E339	79376	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	78560	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	78561	1	16	6.2	5.0	✓
pH by Meter	E108	78553	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	78562	1	16	6.2	5.0	✓
TDS by Gravimetry	E162	78592	1	16	6.2	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	78887	1	16	6.2	5.0	✓
Total Cyanide by CFA	E333	79377	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	78803	1	20	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	79427	2	40	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	78886	2	17	11.7	5.0	✓
Total Nitrogen by Colourimetry	E366	78805	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	78804	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	78806	1	20	5.0	5.0	✓
TSS by Gravimetry	E160-H	78591	1	16	6.2	5.0	✓
Turbidity by Nephelometry	E121	78566	1	16	6.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	80457	1	18	5.5	5.0	✓
WAD Cyanide by CFA	E336	79375	1	20	5.0	5.0	✓
<b>Laboratory Control Samples (LCS)</b>							
Acidity by Titration	E283	78556	1	16	6.2	5.0	✓
Alkalinity Species by Titration	E290	78554	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	78807	1	20	5.0	5.0	✓
BC PHC - EPH by GC-FID	E601A	80222	1	20	5.0	5.0	✓



Matrix: **Water**

Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<b>Analytical Methods</b>							
<b>Laboratory Control Samples (LCS) - Continued</b>							
Bromide in Water by IC (Low Level)	E235.Br-L	78559	1	16	6.2	5.0	✓
BTEX by Headspace GC-MS	E611A	80458	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	78557	1	16	6.2	5.0	✓
Colour (True) by Spectrometer	E329	78563	1	16	6.2	5.0	✓
Conductivity in Water	E100	78555	1	16	6.2	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	78985	1	16	6.2	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	79608	1	16	6.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	78986	1	16	6.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	79212	1	16	6.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	78564	1	16	6.2	5.0	✓
Fluoride in Water by IC	E235.F	78558	1	16	6.2	5.0	✓
Free Cyanide by CFA	E339	79376	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	78560	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	78561	1	16	6.2	5.0	✓
PAHs by LVI GC-MS	E641A	80223	1	20	5.0	5.0	✓
pH by Meter	E108	78553	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	78562	1	16	6.2	5.0	✓
TDS by Gravimetry	E162	78592	1	16	6.2	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	78887	1	16	6.2	5.0	✓
Total Cyanide by CFA	E333	79377	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	78803	1	20	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	79427	2	40	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	78886	1	17	5.8	5.0	✓
Total Nitrogen by Colourimetry	E366	78805	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	78804	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	78806	1	20	5.0	5.0	✓
TSS by Gravimetry	E160-H	78591	1	16	6.2	5.0	✓
Turbidity by Nephelometry	E121	78566	1	16	6.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	80457	1	18	5.5	5.0	✓
WAD Cyanide by CFA	E336	79375	1	20	5.0	5.0	✓
<b>Method Blanks (MB)</b>							
Acidity by Titration	E283	78556	1	16	6.2	5.0	✓
Alkalinity Species by Titration	E290	78554	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	78807	1	20	5.0	5.0	✓
BC PHC - EPH by GC-FID	E601A	80222	1	20	5.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	78559	1	16	6.2	5.0	✓
BTEX by Headspace GC-MS	E611A	80458	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	78557	1	16	6.2	5.0	✓
Colour (True) by Spectrometer	E329	78563	1	16	6.2	5.0	✓
Conductivity in Water	E100	78555	1	16	6.2	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	78985	1	16	6.2	5.0	✓



Matrix: **Water**

Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<b>Analytical Methods</b>							
<b>Method Blanks (MB) - Continued</b>							
Dissolved Mercury in Water by CVAAS	E509	79608	1	16	6.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	78986	1	16	6.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	79212	1	16	6.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	78564	1	16	6.2	5.0	✓
Fluoride in Water by IC	E235.F	78558	1	16	6.2	5.0	✓
Free Cyanide by CFA	E339	79376	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	78560	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	78561	1	16	6.2	5.0	✓
PAHs by LVI GC-MS	E641A	80223	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	78562	1	16	6.2	5.0	✓
TDS by Gravimetry	E162	78592	1	16	6.2	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	78887	1	16	6.2	5.0	✓
Total Cyanide by CFA	E333	79377	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	78803	1	20	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	79427	2	40	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	78886	1	17	5.8	5.0	✓
Total Nitrogen by Colourimetry	E366	78805	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	78804	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	78806	1	20	5.0	5.0	✓
TSS by Gravimetry	E160-H	78591	1	16	6.2	5.0	✓
Turbidity by Nephelometry	E121	78566	1	16	6.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	80457	1	18	5.5	5.0	✓
WAD Cyanide by CFA	E336	79375	1	20	5.0	5.0	✓
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	78807	1	20	5.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	78559	1	16	6.2	5.0	✓
BTEX by Headspace GC-MS	E611A	80458	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	78557	1	16	6.2	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	78985	1	16	6.2	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	79608	1	16	6.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	78986	1	16	6.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	79212	1	16	6.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	78564	1	16	6.2	5.0	✓
Fluoride in Water by IC	E235.F	78558	1	16	6.2	5.0	✓
Free Cyanide by CFA	E339	79376	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	78560	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	78561	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	78562	1	16	6.2	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	78887	1	16	6.2	5.0	✓
Total Cyanide by CFA	E333	79377	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	78803	1	20	5.0	5.0	✓



Matrix: **Water** Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<i>Analytical Methods</i>							
<b>Matrix Spikes (MS) - Continued</b>							
Total Mercury in Water by CVAAS	E508	79427	2	40	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	78886	1	17	5.8	5.0	✓
Total Nitrogen by Colourimetry	E366	78805	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	78804	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	78806	1	20	5.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	80457	1	18	5.5	5.0	✓
WAD Cyanide by CFA	E336	79375	1	20	5.0	5.0	✓



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 Vancouver - Environmental	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TSS by Gravimetry	E160-H Vancouver - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
TDS by Gravimetry	E162 Vancouver - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Bromide in Water by IC (Low Level)	E235.Br-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Sulfate in Water by IC	E235.S04  Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Acidity by Titration	E283  Vancouver - Environmental	Water	APHA 2310 B (mod)	Acidity is determined by potentiometric titration to a specified endpoint.
Alkalinity Species by Titration	E290  Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298  Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318  Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Total Kjeldahl Nitrogen is determined using block digestion followed by flow-injection analysis with fluorescence detection.
Colour (True) by Spectrometer	E329  Vancouver - Environmental	Water	APHA 2120 C (mod)	Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment.
Total Cyanide by CFA	E333  Vancouver - Environmental	Water	ISO 14403 (mod)	Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.
WAD Cyanide by CFA	E336  Vancouver - Environmental	Water	APHA 4500-CN I (mod)	Weak Acid Dissociable (WAD) cyanide is determined by in-line sample distillation with final determination by colourimetric analysis.
Free Cyanide by CFA	E339  Vancouver - Environmental	Water	ASTM D7237 (mod)	Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L  Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO <sub>2</sub> . NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Organic Carbon by Combustion (Low Level)	E358-L  Vancouver - Environmental	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO <sub>2</sub> . NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Nitrogen by Colourimetry	E366  Vancouver - Environmental	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U  Vancouver - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U  Vancouver - Environmental	Water	APHA 4500-P E (mod)	Dissolved Orthophosphate is determined colourimetrically on a water sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.
Total Metals in Water by CRC ICPMS	E420  Vancouver - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L  Vancouver - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS.
Dissolved Metals in Water by CRC ICPMS	E421  Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L  Vancouver - Environmental	Water	APHA 3030 B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS
Total Mercury in Water by CVAAS	E508  Vancouver - Environmental	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
Dissolved Mercury in Water by CVAAS	E509  Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
VH and F1 by Headspace GC-FID	E581.VH+F1  Vancouver - Environmental	Water	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
BC PHC - EPH by GC-FID	E601A  Vancouver - Environmental	Water	BC MOE Lab Manual	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.
BTEX by Headspace GC-MS	E611A  Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by LVI GC-MS	E641A  Vancouver - Environmental	Water	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by large volume injection (LVI) GC-MS.
Dissolved Hardness (Calculated)	EC100  Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> ), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Hardness (Calculated) from Total Ca/Mg	EC100A  Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> ), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
VPH: VH-BTEX-Styrene	EC580A  Vancouver - Environmental	Water	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VPHw = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.
LEPH and HEPH: EPH-PAH	EC600A  Vancouver - Environmental	Water	BC MOE Lab Manual (LEPH and HEPH) (mod)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Acenaphthene, Acridine, Anthracene, Fluorene, Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(a)pyrene, Fluoranthene, and Pyrene.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Digestion for TKN in water	EP318  Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Samples are digested using block digestion with Copper Sulfate Digestion Reagent.
Digestion for Total Nitrogen in water	EP366  Vancouver - Environmental	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.





<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Digestion for Total Phosphorus in water	EP372  Vancouver - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421  Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO <sub>3</sub> .
Dissolved Mercury Water Filtration	EP509  Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
VOCs Preparation for Headspace Analysis	EP581  Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601  Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

## QUALITY CONTROL REPORT

**Work Order** : **VA20B3846**

**Page** : 1 of 21

**Client** : ERM Consultants Canada Ltd.  
**Contact** : Jill Zyla  
**Address** : # 400 - 106 Front Street East  
 Toronto ON Canada M5A 1E1  
**Telephone** : 604 689 9460  
**Project** : 0539378-0012  
**PO** : ----  
**C-O-C number** : 17-841425, 17-841424  
**Sampler** : ----  
**Site** : ----  
**Quote number** : Q74326  
**No. of samples received** : 16  
**No. of samples analysed** : 16

**Laboratory** : Vancouver - Environmental  
**Account Manager** : Amber Springer  
**Address** : 8081 Lougheed Highway  
 Burnaby, British Columbia Canada V5A 1W9  
**Telephone** : +1 604 253 4188  
**Date Samples Received** : 28-Aug-2020 10:10  
**Date Analysis Commenced** : 28-Aug-2020  
**Issue Date** : 09-Sep-2020 12:43

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

### *Signatories*

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Brianna Allen	Department Manager Organics	Organics, Burnaby, British Columbia
Bruna Botti	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Caitlin Macey	Team Leader Inorganics	Inorganics Water Quality, Burnaby, British Columbia
Cristina Alexandre	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Jashan Kaur	Lab Assistant	Metals, Burnaby, British Columbia
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Kim Jensen	Department Manager Metals	Metals, Burnaby, British Columbia
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Richard Chong		Metals, Burnaby, British Columbia
Robin Weeks	Team Leader Metals	Metals, Burnaby, British Columbia
Shaneel Dayal	Analyst	Metals, Burnaby, British Columbia

Page : 2 of 21  
Work Order : VA20B3846  
Client : ERM Consultants Canada Ltd.  
Project : 0539378-0012

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## **General Comments**

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

# = Indicates a QC result that did not meet the ALS DQO.



### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 78553)</b>											
VA20B3846-001	FIELD BLANK	pH	----	E108	0.10	pH units	5.31	5.34	0.563%	4%	----
<b>Physical Tests (QC Lot: 78554)</b>											
VA20B3846-001	FIELD BLANK	alkalinity, bicarbonate (as CaCO <sub>3</sub> )	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, carbonate (as CaCO <sub>3</sub> )	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, hydroxide (as CaCO <sub>3</sub> )	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, total (as CaCO <sub>3</sub> )	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 78555)</b>											
VA20B3846-001	FIELD BLANK	conductivity	----	E100	2.0	µS/cm	<2.0	<2.0	0	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 78556)</b>											
VA20B3846-002	JM7	acidity (as CaCO <sub>3</sub> )	----	E283	2.0	mg/L	<2.0	<2.0	0	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 78563)</b>											
VA20B3846-001	FIELD BLANK	colour, true	----	E329	5.0	CU	<5.0	<5.0	0	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 78566)</b>											
VA20B3846-001	FIELD BLANK	turbidity	----	E121	0.10	NTU	<0.10	<0.10	0	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 78591)</b>											
VA20B3846-002	JM7	solids, total suspended [TSS]	----	E160-H	3.0	mg/L	8.1	9.7	1.6	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 78592)</b>											
VA20B3846-002	JM7	solids, total dissolved [TDS]	----	E162	13	mg/L	63	55	8	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78557)</b>											
VA20B3846-001	FIELD BLANK	chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78558)</b>											
VA20B3846-001	FIELD BLANK	fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78559)</b>											
VA20B3846-001	FIELD BLANK	bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78560)</b>											
VA20B3846-001	FIELD BLANK	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78561)</b>											
VA20B3846-001	FIELD BLANK	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78562)</b>											
VA20B3846-001	FIELD BLANK	sulfate (as SO <sub>4</sub> )	14808-79-8	E235.SO4	0.30	mg/L	<0.30	<0.30	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78564)</b>											



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Anions and Nutrients (QC Lot: 78564) - continued</b>											
VA20B3846-001	FIELD BLANK	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0 0010	mg/L	<0 0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78803)</b>											
VA20B3842-021	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78805)</b>											
VA20B3842-021	Anonymous	nitrogen, total	7727-37-9	E366	0.030	mg/L	<0.030	<0.030	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78806)</b>											
VA20B3842-021	Anonymous	phosphorus, total	7723-14-0	E372-U	0 0020	mg/L	0 0412	0.0375	9.44%	20%	----
<b>Anions and Nutrients (QC Lot: 78807)</b>											
VA20B3842-021	Anonymous	ammonia total (as N)	7664-41-7	E298	0 0050	mg/L	0 0051	0.0063	0.0012	Diff <2x LOR	----
<b>Cyanides (QC Lot: 79375)</b>											
VA20B3846-001	FIELD BLANK	cyanide, weak acid dissociable	----	E336	0 0050	mg/L	<0 0050	<0.0050	0	Diff <2x LOR	----
<b>Cyanides (QC Lot: 79376)</b>											
VA20B3846-001	FIELD BLANK	cyanide, free	----	E339	0 0050	mg/L	<0 0050	<0.0050	0	Diff <2x LOR	----
<b>Cyanides (QC Lot: 79377)</b>											
VA20B3846-001	FIELD BLANK	cyanide, strong acid dissociable (total)	----	E333	0 0050	mg/L	<0 0050	<0.0050	0	Diff <2x LOR	----
<b>Organic / Inorganic Carbon (QC Lot 78804)</b>											
VA20B3842-021	Anonymous	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	<0.50	<0 50	0	Diff <2x LOR	----
<b>Organic / Inorganic Carbon (QC Lot: 79212)</b>											
VA20B3846-001	FIELD BLANK	carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	<0.50	<0 50	0	Diff <2x LOR	----
<b>Total Metals (QC Lot: 78886)</b>											
VA20B3846-007	JM1-ALT	titanium, total	7440-32-6	E420	0.00030	mg/L	0.00208	0.00242	0.00034	Diff <2x LOR	----
		vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
VA20B3846-007	JM1-ALT	aluminum, total	7429-90-5	E420	0 0030	mg/L	0.379	0.390	2.90%	20%	----
		antimony, total	7440-36-0	E420	0.00010	mg/L	0.00013	0.00012	0 000008	Diff <2x LOR	----
		arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00214	0.00236	9.87%	20%	----
		barium, total	7440-39-3	E420	0.00010	mg/L	0 0237	0.0239	0.534%	20%	----
		beryllium, total	7440-41-7	E420	0.000020	mg/L	0.000020	<0 000020	0.0000002	Diff <2x LOR	----
		bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0 000050	0	Diff <2x LOR	----
		boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.00466	0.00463	0.544%	20%	----
		calcium, total	7440-70-2	E420	0.050	mg/L	43 9	42.4	3.49%	20%	----
		cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00313	0.00313	0.0522%	20%	----
		copper, total	7440-50-8	E420	0.00050	mg/L	0.301	0.302	0.415%	20%	----
		iron, total	7439-89-6	E420	0.010	mg/L	4.89	4 68	4.46%	20%	----
		lead, total	7439-92-1	E420	0.000050	mg/L	0.00246	0.00250	1.71%	20%	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Total Metals (QC Lot: 78886) - continued</b>											
VA20B3846-007	JM1-ALT	lithium, total	7439-93-2	E420	0.0010	mg/L	0.0015	0.0016	0.00006	Diff <2x LOR	----
		magnesium, total	7439-95-4	E420	0.100	mg/L	5.67	5.75	1.46%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	0.470	0.471	0.184%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000243	0.000226	0.000017	Diff <2x LOR	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	0.00097	0.00058	0.00039	Diff <2x LOR	----
		phosphorus, total	7723-14-0	E420	0.050	mg/L	0.058	<0.050	0.008	Diff <2x LOR	----
		potassium, total	7440-09-7	E420	0.100	mg/L	1.49	1.52	1.50%	20%	----
		selenium, total	7782-49-2	E420	0.000050	mg/L	0.000374	0.000321	0.000052	Diff <2x LOR	----
		silicon, total	7440-21-3	E420	0.10	mg/L	1.80	1.82	1.04%	20%	----
		silver, total	7440-22-4	E420	0.000010	mg/L	0.000024	0.000023	0.0000004	Diff <2x LOR	----
		sodium, total	7440-23-5	E420	0.050	mg/L	0.482	0.493	0.011	Diff <2x LOR	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	0.234	0.227	2.94%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	27.0	27.2	0.425%	20%	----
		thallium, total	7440-28-0	E420	0.000010	mg/L	0.000011	0.000012	0.0000006	Diff <2x LOR	----
		tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		uranium, total	7440-61-1	E420	0.000010	mg/L	0.000246	0.000266	8.07%	20%	----
		zinc, total	7440-66-6	E420	0.0030	mg/L	0.790	0.721	9.06%	20%	----
		zirconium, total	7440-67-7	E420	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
<b>Total Metals (QC Lot: 78887)</b>											
VA20B3846-007	JM1-ALT	chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	<0.00010	0.00010	0.000003	Diff <2x LOR	----
<b>Total Metals (QC Lot: 79427)</b>											
VA20B3842-002	Anonymous	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Total Metals (QC Lot: 79428)</b>											
VA20B3846-016	SK3	mercury total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 78985)</b>											
VA20B3846-003	SCH2	chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 78986)</b>											
VA20B3846-003	SCH2	aluminum, dissolved	7429-90-5	E421	0.0030	mg/L	0.0274	0.0276	0.0002	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0273	0.0278	1.66%	20%	----
		beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		boron dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.000106	0.000100	5.89%	20%	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 78986) - continued</b>											
VA20B3846-003	SCH2	calcium, dissolved	7440-70-2	E421	0.050	mg/L	18.1	18.6	2.61%	20%	----
		cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00018	0.00018	0.000002	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00992	0.0101	2.00%	20%	----
		iron, dissolved	7439 89 6	E421	0.010	mg/L	0.015	0.016	0.0004	Diff <2x LOR	----
		lead, dissolved	7439-92-1	E421	0.000050	mg/L	0.000053	0.000057	0.000003	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	0.100	mg/L	1.55	1.59	2.42%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0528	0.0537	1.69%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000295	0.000292	0.000002	Diff <2x LOR	----
		nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	0.100	mg/L	1.08	1.11	2.63%	20%	----
		selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000122	0.000129	0.000008	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	0.050	mg/L	1.22	1.23	0.787%	20%	----
		silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		sodium, dissolved	7440-23-5	E421	0.050	mg/L	0.578	0.597	3.27%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.122	0.130	6.22%	20%	----
		sulfur, dissolved	7704-34-9	E421	0.50	mg/L	6.09	6.24	2.35%	20%	----
		thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000113	0.000115	2.18%	20%	----
		vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0087	0.0080	0.0007	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 79608)</b>											
VA20B3846-001	FIELD BLANK	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Volatile Organic Compounds (QC Lot: 80458)</b>											
VA20B3842-017	Anonymous	benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, m+p-	179601 23 1	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----

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 Work Order : VA20B3846  
 Client : ERM Consultants Canada Ltd.  
 Project : 0539378-0012



Sub-Matrix: <b>Water</b>					<i>Laboratory Duplicate (DUP) Report</i>						
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Original Result</i>	<i>Duplicate Result</i>	<i>RPD(%) or Difference</i>	<i>Duplicate Limits</i>	<i>Qualifier</i>
<b>Hydrocarbons (QC Lot: 80457)</b>											
VA20B3842-017	Anonymous	VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.00%	30%	----





## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

### Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 78554)</b>						
alkalinity, bicarbonate (as CaCO <sub>3</sub> )	----	E290	1	mg/L	<1.0	----
alkalinity, carbonate (as CaCO <sub>3</sub> )	----	E290	1	mg/L	<1.0	----
alkalinity, hydroxide (as CaCO <sub>3</sub> )	----	E290	1	mg/L	<1.0	----
alkalinity, total (as CaCO <sub>3</sub> )	----	E290	1	mg/L	<1.0	----
<b>Physical Tests (QCLot: 78555)</b>						
conductivity	----	E100	1	µS/cm	<1.0	----
<b>Physical Tests (QCLot: 78556)</b>						
acidity (as CaCO <sub>3</sub> )	----	E283	2	mg/L	<2.0	----
<b>Physical Tests (QCLot: 78563)</b>						
colour, true	----	E329	5	CU	<5.0	----
<b>Physical Tests (QCLot: 78566)</b>						
turbidity	----	E121	0.1	NTU	<0.10	----
<b>Physical Tests (QCLot: 78591)</b>						
solids, total suspended [TSS]	----	E160-H	3	mg/L	<3.0	----
<b>Physical Tests (QCLot: 78592)</b>						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
<b>Anions and Nutrients (QCLot: 78557)</b>						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
<b>Anions and Nutrients (QCLot: 78558)</b>						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
<b>Anions and Nutrients (QCLot: 78559)</b>						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
<b>Anions and Nutrients (QCLot: 78560)</b>						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 78561)</b>						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 78562)</b>						
sulfate (as SO <sub>4</sub> )	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
<b>Anions and Nutrients (QCLot: 78564)</b>						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 78803)</b>						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
<b>Anions and Nutrients (QCLot: 78805)</b>						



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Anions and Nutrients (QCLot: 78805) - continued</b>						
nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
<b>Anions and Nutrients (QCLot: 78806)</b>						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
<b>Anions and Nutrients (QCLot: 78807)</b>						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
<b>Cyanides (QCLot: 79375)</b>						
cyanide, weak acid dissociable	----	E336	0.002	mg/L	<0.0020	----
<b>Cyanides (QCLot: 79376)</b>						
cyanide, free	----	E339	0.002	mg/L	<0.0020	----
<b>Cyanides (QCLot: 79377)</b>						
cyanide, strong acid dissociable (total)	----	E333	0.002	mg/L	<0.0020	----
<b>Organic / Inorganic Carbon (QCLot: 78804)</b>						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
<b>Organic / Inorganic Carbon (QCLot: 79212)</b>						
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
<b>Total Metals (QCLot: 78886)</b>						
aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Total Metals (QCLot: 78886) - continued</b>						
selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
<b>Total Metals (QCLot: 78887)</b>						
chromium, total	7440-47-3	E420.Cr-L	0.0001	mg/L	<0.00010	----
<b>Total Metals (QCLot: 79427)</b>						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
<b>Total Metals (QCLot: 79428)</b>						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
<b>Dissolved Metals (QCLot: 78985)</b>						
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	<0.00010	----
<b>Dissolved Metals (QCLot: 78986)</b>						
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 78986) - continued</b>						
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
<b>Dissolved Metals (QCLot: 79608)</b>						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
<b>Volatile Organic Compounds (QCLot: 80458)</b>						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	----
styrene	100-42-5	E611A	0.5	µg/L	<0.50	----
toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	<0.50	----
xylene, o-	95-47-6	E611A	0.5	µg/L	<0.50	----
<b>Hydrocarbons (QCLot: 80222)</b>						
EPH (C10-C19)	----	E601A	250	µg/L	<250	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	----
<b>Hydrocarbons (QCLot: 80457)</b>						
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 80223)</b>						
acenaphthene	83-32-9	E641A	0.01	µg/L	<0.010	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 80223) - continued</b>						
acenaphthylene	208-96-8	E641A	0.01	µg/L	<0.010	---
acridine	260-94-6	E641A	0.01	µg/L	<0.010	---
anthracene	120-12-7	E641A	0.01	µg/L	<0.010	---
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	<0.010	---
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	---
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	<0.010	---
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	---
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	<0.010	---
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	<0.010	---
chrysene	218-01-9	E641A	0.01	µg/L	<0.010	---
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	<0.0050	---
fluoranthene	206-44-0	E641A	0.01	µg/L	<0.010	---
fluorene	86-73-7	E641A	0.01	µg/L	<0.010	---
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	<0.010	---
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	<0.010	---
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	<0.010	---
naphthalene	91-20-3	E641A	0.05	µg/L	<0.050	---
phenanthrene	85-01-8	E641A	0.02	µg/L	<0.020	---
pyrene	129-00-0	E641A	0.01	µg/L	<0.010	---
quinoline	6027-02-7	E641A	0.05	µg/L	<0.050	---



## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Physical Tests (QCLot: 78553)</b>									
pH	---	E108	---	pH units	7 pH units	100	98.0	102	---
<b>Physical Tests (QCLot: 78554)</b>									
alkalinity, total (as CaCO <sub>3</sub> )	---	E290	1	mg/L	500 mg/L	102	85.0	115	---
<b>Physical Tests (QCLot: 78555)</b>									
conductivity	---	E100	1	µS/cm	146.9 µS/cm	101	90.0	110	---
<b>Physical Tests (QCLot: 78556)</b>									
acidity (as CaCO <sub>3</sub> )	---	E283	2	mg/L	50 mg/L	103	85.0	115	---
<b>Physical Tests (QCLot: 78563)</b>									
colour, true	---	E329	5	CU	100 CU	95.1	85.0	115	---
<b>Physical Tests (QCLot: 78566)</b>									
turbidity	---	E121	0.1	NTU	200 NTU	100	85.0	115	---
<b>Physical Tests (QCLot: 78591)</b>									
solids, total suspended [TSS]	---	E160-H	3	mg/L	150 mg/L	96.2	85.0	115	---
<b>Physical Tests (QCLot: 78592)</b>									
solids, total dissolved [TDS]	---	E162	10	mg/L	1000 mg/L	102	85.0	115	---
<b>Anions and Nutrients (QCLot: 78557)</b>									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	100	90.0	110	---
<b>Anions and Nutrients (QCLot: 78558)</b>									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	99.6	90.0	110	---
<b>Anions and Nutrients (QCLot: 78559)</b>									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	104	85.0	115	---
<b>Anions and Nutrients (QCLot: 78560)</b>									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	101	90.0	110	---
<b>Anions and Nutrients (QCLot: 78561)</b>									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	98.7	90.0	110	---
<b>Anions and Nutrients (QCLot: 78562)</b>									
sulfate (as SO <sub>4</sub> )	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	101	90.0	110	---
<b>Anions and Nutrients (QCLot: 78564)</b>									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	97.6	80.0	120	---
<b>Anions and Nutrients (QCLot: 78803)</b>									
Kjeldahl nitrogen, total [TKN]	---	E318	0.05	mg/L	4 mg/L	96.8	75.0	125	---
<b>Anions and Nutrients (QCLot: 78805)</b>									



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Anions and Nutrients (QCLot: 78805) - continued</b>									
nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	101	75.0	125	----
<b>Anions and Nutrients (QCLot: 78806)</b>									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	95.8	80.0	120	----
<b>Anions and Nutrients (QCLot: 78807)</b>									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.12 mg/L	96.3	85.0	115	----
<b>Cyanides (QCLot: 79375)</b>									
cyanide, weak acid dissociable	----	E336	0.002	mg/L	0.125 mg/L	97.0	80.0	120	----
<b>Cyanides (QCLot: 79376)</b>									
cyanide, free	----	E339	0.002	mg/L	0.125 mg/L	93.8	80.0	120	----
<b>Cyanides (QCLot: 79377)</b>									
cyanide, strong acid dissociable (total)	----	E333	0.002	mg/L	0.25 mg/L	93.0	80.0	120	----
<b>Organic / Inorganic Carbon (QCLot: 78804)</b>									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	95.4	80.0	120	----
<b>Organic / Inorganic Carbon (QCLot: 79212)</b>									
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	110	80.0	120	----
<b>Total Metals (QCLot: 78886)</b>									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	108	80.0	120	----
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	106	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	104	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	102	80.0	120	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	110	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	99.9	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	104	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	104	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	104	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	104	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	102	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	102	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	106	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	102	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	101	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	103	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	105	80.0	120	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Total Metals (QCLot: 78886) - continued</b>									
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	117	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	107	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	107	80.0	120	----
silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	101	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	102	80.0	120	----
sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	105	80.0	120	----
strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	104	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	100	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	104	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	102	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	98.3	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	102	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	106	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	98.5	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	101	80.0	120	----
<b>Total Metals (QCLot: 78887)</b>									
chromium, total	7440-47-3	E420.Cr-L	0.0001	mg/L	0.25 mg/L	104	80.0	120	----
<b>Total Metals (QCLot: 79427)</b>									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	101	80.0	120	----
<b>Total Metals (QCLot: 79428)</b>									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	94.9	80.0	120	----
<b>Dissolved Metals (QCLot: 78985)</b>									
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	0.25 mg/L	106	80.0	120	----
<b>Dissolved Metals (QCLot: 78986)</b>									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	106	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	100	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	102	80.0	120	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	110	80.0	120	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	105	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	110	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	107	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	106	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	108	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	104	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	101	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	103	80.0	120	----





Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 78986) - continued</b>									
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	104	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	106	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	107	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	104	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	105	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	104	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	110	70.0	130	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	104	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	105	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	109	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	102	80.0	120	----
sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	114	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	107	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	106	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	104	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	102	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	99.2	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	108	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	107	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	106	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	109	80.0	120	----
<b>Dissolved Metals (QCLot: 79608)</b>									
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	92.6	80.0	120	----
<b>Volatile Organic Compounds (QCLot: 80458)</b>									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	92.7	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	85.1	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	108	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	85.0	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	89.9	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	200 µg/L	90.8	70.0	130	----
xylene, o-	95-47-6	E611A	0.5	µg/L	100 µg/L	88.9	70.0	130	----
<b>Hydrocarbons (QCLot: 80222)</b>									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	120	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	114	70.0	130	----
<b>Hydrocarbons (QCLot: 80457)</b>									



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Hydrocarbons (QCLot: 80457) - continued</b>									
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	92.1	70.0	130	----
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 80223)</b>									
acenaphthene	83-32-9	E641A	0.01	µg/L	0.5 µg/L	109	60.0	130	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5 µg/L	110	60.0	130	----
acridine	260-94-6	E641A	0.01	µg/L	0.5 µg/L	100.0	60.0	130	----
anthracene	120-12-7	E641A	0.01	µg/L	0.5 µg/L	110	60.0	130	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5 µg/L	106	60.0	130	----
benzo(a)pyrene	50-32-8	E641A	0 005	µg/L	0.5 µg/L	114	60.0	130	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	0.5 µg/L	110	60.0	130	----
benzo(b+j+k)fluoranthene	----	E641A	0 015	µg/L	1 µg/L	115	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5 µg/L	116	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5 µg/L	119	60.0	130	----
chrysene	218-01-9	E641A	0.01	µg/L	0.5 µg/L	113	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A	0 005	µg/L	0.5 µg/L	119	60.0	130	----
fluoranthene	206-44-0	E641A	0.01	µg/L	0.5 µg/L	111	60.0	130	----
fluorene	86-73-7	E641A	0.01	µg/L	0.5 µg/L	101	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5 µg/L	116	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5 µg/L	107	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	0.5 µg/L	101	60.0	130	----
naphthalene	91-20-3	E641A	0.05	µg/L	0.5 µg/L	102	50.0	130	----
phenanthrene	85-01-8	E641A	0.02	µg/L	0.5 µg/L	106	60.0	130	----
pyrene	129-00-0	E641A	0.01	µg/L	0.5 µg/L	115	60.0	130	----
quinoline	6027-02-7	E641A	0.05	µg/L	0.5 µg/L	119	60.0	130	----



## Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level  $\geq 1 \times$  spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 78557)</b>										
VA20B3846-002	JM7	chloride	16887-00-6	E235.Cl	101 mg/L	100 mg/L	101	75.0	125	----
<b>Anions and Nutrients (QCLot: 78558)</b>										
VA20B3846-002	JM7	fluoride	16984-48-8	E235.F	1.00 mg/L	1 mg/L	100	75.0	125	----
<b>Anions and Nutrients (QCLot: 78559)</b>										
VA20B3846-002	JM7	bromide	24959-67-9	E235.Br-L	0.510 mg/L	0.5 mg/L	102	75.0	125	----
<b>Anions and Nutrients (QCLot: 78560)</b>										
VA20B3846-002	JM7	nitrate (as N)	14797-55-8	E235.NO3-L	2.53 mg/L	2.5 mg/L	101	75.0	125	----
<b>Anions and Nutrients (QCLot: 78561)</b>										
VA20B3846-002	JM7	nitrite (as N)	14797-65-0	E235.NO2-L	0.496 mg/L	0.5 mg/L	99.2	75.0	125	----
<b>Anions and Nutrients (QCLot: 78562)</b>										
VA20B3846-002	JM7	sulfate (as SO4)	14808-79-8	E235.SO4	100 mg/L	100 mg/L	100	75.0	125	----
<b>Anions and Nutrients (QCLot: 78564)</b>										
VA20B3846-002	JM7	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0305 mg/L	0.03 mg/L	102	70.0	130	----
<b>Anions and Nutrients (QCLot: 78803)</b>										
VA20B3842-022	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	2.51 mg/L	2.5 mg/L	100	70.0	130	----
<b>Anions and Nutrients (QCLot: 78805)</b>										
VA20B3842-022	Anonymous	nitrogen, total	7727-37-9	E366	0.396 mg/L	0.4 mg/L	98.9	70.0	130	----
<b>Anions and Nutrients (QCLot: 78806)</b>										
VA20B3842-022	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0485 mg/L	0.05 mg/L	97.0	70.0	130	----
<b>Anions and Nutrients (QCLot: 78807)</b>										
VA20B3842-022	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.210 mg/L	0.2 mg/L	105	75.0	125	----
<b>Cyanides (QCLot: 79375)</b>										
VA20B3846-002	JM7	cyanide, weak acid dissociable	----	E336	0.129 mg/L	0.125 mg/L	103	75.0	125	----
<b>Cyanides (QCLot: 79376)</b>										
VA20B3846-002	JM7	cyanide, free	----	E339	0.126 mg/L	0.125 mg/L	101	75.0	125	----
<b>Cyanides (QCLot: 79377)</b>										
VA20B3846-002	JM7	cyanide, strong acid dissociable (total)	----	E333	0.270 mg/L	0.25 mg/L	108	75.0	125	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Lab rat ry sample ID	Client sample ID	Analyte	CAS Number	Method	C n entrati n	Target	MS	L w	High	Qualifier
<b>Organic / Inorganic Carbon (QCLot: 78804)</b>										
VA20B3842-022	Anonymous	carbon, total organic [TOC]	----	E355-L	4.90 mg/L	5 mg/L	98.0	70 0	130	----
<b>Organic / Inorganic Carbon (QCLot: 79212)</b>										
VA20B3846-002	JM7	carbon, dissolved organic [DOC]	----	E358-L	5.01 mg/L	5 mg/L	100	70 0	130	----
<b>Total Metals (QCLot: 78886)</b>										
VA20B3846-002	JM7	aluminum, total	7429-90-5	E420	0.217 mg/L	0.2 mg/L	109	70 0	130	----
		antimony, total	7440-36-0	E420	0.0205 mg/L	0.02 mg/L	102	70 0	130	----
		arsenic, total	7440-38-2	E420	0.0209 mg/L	0.02 mg/L	105	70 0	130	----
		barium, total	7440-39-3	E420	ND mg/L	0.02 mg/L	ND	70 0	130	----
		beryllium, total	7440-41-7	E420	0.0394 mg/L	0.04 mg/L	98.4	70 0	130	----
		bismuth, total	7440-69-9	E420	0.0102 mg/L	0.01 mg/L	102	70 0	130	----
		boron, total	7440-42-8	E420	0.099 mg/L	0.1 mg/L	99.3	70 0	130	----
		cadmium, total	7440-43-9	E420	0.00420 mg/L	0.004 mg/L	105	70 0	130	----
		calcium, total	7440-70-2	E420	ND mg/L	4 mg/L	ND	70 0	130	----
		cobalt, total	7440-48-4	E420	0.0214 mg/L	0.02 mg/L	107	70 0	130	----
		copper, total	7440-50-8	E420	ND mg/L	0.02 mg/L	ND	70 0	130	----
		iron, total	7439-89-6	E420	2.14 mg/L	2 mg/L	107	70 0	130	----
		lead, total	7439-92-1	E420	0.0195 mg/L	0.02 mg/L	97.7	70 0	130	----
		lithium, total	7439-93-2	E420	0.110 mg/L	0.1 mg/L	110	70 0	130	----
		magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70 0	130	----
		manganese, total	7439-96-5	E420	ND mg/L	0.02 mg/L	ND	70 0	130	----
		molybdenum, total	7439-98-7	E420	0.0204 mg/L	0.02 mg/L	102	70 0	130	----
		nickel, total	7440-02-0	E420	0.0426 mg/L	0.04 mg/L	106	70 0	130	----
		phosphorus, total	7723-14-0	E420	11.5 mg/L	10 mg/L	115	70 0	130	----
		potassium, total	7440-09-7	E420	4.27 mg/L	4 mg/L	107	70 0	130	----
		selenium, total	7782-49-2	E420	0.0422 mg/L	0.04 mg/L	106	70 0	130	----
		silicon, total	7440-21-3	E420	9.25 mg/L	10 mg/L	92.5	70 0	130	----
		silver, total	7440-22-4	E420	0.00408 mg/L	0.004 mg/L	102	70 0	130	----
		sodium, total	7440-23-5	E420	2.12 mg/L	2 mg/L	106	70 0	130	----
		strontium, total	7440-24-6	E420	ND mg/L	0.02 mg/L	ND	70 0	130	----
		sulfur, total	7704-34-9	E420	21.2 mg/L	20 mg/L	106	70 0	130	----
		thallium, total	7440-28-0	E420	0.00397 mg/L	0.004 mg/L	99.2	70 0	130	----
		tin, total	7440-31-5	E420	0.0200 mg/L	0.02 mg/L	100	70 0	130	----
		titanium, total	7440-32-6	E420	0.0417 mg/L	0.04 mg/L	104	70 0	130	----
		uranium, total	7440-61-1	E420	0.00391 mg/L	0.004 mg/L	97.7	70 0	130	----
		vanadium, total	7440-62-2	E420	0.101 mg/L	0.1 mg/L	101	70 0	130	----
		zinc, total	7440-66-6	E420	0.399 mg/L	0.4 mg/L	99.8	70 0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Lab rat ry sample ID	Client sample ID	Analyte	CAS Number	Method	C n entrati n	Target	MS	L w	High	Qualifier
<b>Total Metals (QCLot: 78886) - continued</b>										
VA20B3846-002	JM7	zirconium, total	7440-67-7	E420	0.0418 mg/L	0.04 mg/L	105	70.0	130	----
<b>Total Metals (QCLot: 78887)</b>										
VA20B3846-002	JM7	chromium, total	7440-47-3	E420.Cr-L	0.0419 mg/L	0.04 mg/L	105	70.0	130	----
<b>Total Metals (QCLot: 79427)</b>										
VA20B3842-003	Anonymous	mercury, total	7439-97-6	E508	0.000102 mg/L	0.0001 mg/L	102	70.0	130	----
<b>Total Metals (QCLot: 79428)</b>										
VA20B3848-001	Anonymous	mercury, total	7439-97-6	E508	0.0000979 mg/L	0.0001 mg/L	97.9	70.0	130	----
<b>Dissolved Metals (QCLot: 78985)</b>										
VA20B3846-002	JM7	chromium, dissolved	7440-47-3	E421.Cr-L	0.0372 mg/L	0.04 mg/L	93.0	70.0	130	----
<b>Dissolved Metals (QCLot: 78986)</b>										
VA20B3846-002	JM7	aluminum, dissolved	7429-90-5	E421	0.190 mg/L	0.2 mg/L	95.0	70.0	130	----
		antimony, dissolved	7440-36-0	E421	0.0199 mg/L	0.02 mg/L	99.4	70.0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0185 mg/L	0.02 mg/L	92.5	70.0	130	----
		barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		beryllium, dissolved	7440-41-7	E421	0.0396 mg/L	0.04 mg/L	99.1	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00950 mg/L	0.01 mg/L	95.0	70.0	130	----
		boron, dissolved	7440-42-8	E421	0.098 mg/L	0.1 mg/L	98.3	70.0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00391 mg/L	0.004 mg/L	97.7	70.0	130	----
		calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		cobalt, dissolved	7440-48-4	E421	0.0189 mg/L	0.02 mg/L	94.7	70.0	130	----
		copper, dissolved	7440-50-8	E421	0.0188 mg/L	0.02 mg/L	93.8	70.0	130	----
		iron, dissolved	7439-89-6	E421	1.89 mg/L	2 mg/L	94.6	70.0	130	----
		lead, dissolved	7439-92-1	E421	0.0191 mg/L	0.02 mg/L	95.6	70.0	130	----
		lithium, dissolved	7439-93-2	E421	0.104 mg/L	0.1 mg/L	104	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, dissolved	7439-96-5	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	0.0195 mg/L	0.02 mg/L	97.6	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0379 mg/L	0.04 mg/L	94.7	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	10.0 mg/L	10 mg/L	100	70.0	130	----
		potassium, dissolved	7440-09-7	E421	3.75 mg/L	4 mg/L	93.7	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0407 mg/L	0.04 mg/L	102	70.0	130	----
		silicon, dissolved	7440-21-3	E421	9.27 mg/L	10 mg/L	92.7	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00392 mg/L	0.004 mg/L	97.9	70.0	130	----
		sodium, dissolved	7440-23-5	E421	2.11 mg/L	2 mg/L	106	70.0	130	----
		strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 78986) - continued</b>										
VA20B3846-002	JM7	sulfur, dissolved	7704-34-9	E421	19.8 mg/L	20 mg/L	98.8	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00382 mg/L	0.004 mg/L	95.4	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0196 mg/L	0.02 mg/L	97.8	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0373 mg/L	0.04 mg/L	93.2	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.00391 mg/L	0.004 mg/L	97.8	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.0979 mg/L	0.1 mg/L	97.9	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.395 mg/L	0.4 mg/L	98.8	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0423 mg/L	0.04 mg/L	106	70.0	130	----
<b>Dissolved Metals (QCLot: 79608)</b>										
VA20B3846-002	JM7	mercury, dissolved	7439-97-6	E509	0.0000904 mg/L	0.0001 mg/L	90.4	70.0	130	----
<b>Volatile Organic Compounds (QCLot: 80458)</b>										
VA20B3846-006	JM1	benzene	71-43-2	E611A	101 µg/L	100 µg/L	101	60.0	140	----
		ethylbenzene	100-41-4	E611A	92.7 µg/L	100 µg/L	92.7	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	113 µg/L	100 µg/L	113	60.0	140	----
		styrene	100-42-5	E611A	94.3 µg/L	100 µg/L	94.3	60.0	140	----
		toluene	108-88-3	E611A	95.8 µg/L	100 µg/L	95.8	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	200 µg/L	200 µg/L	99.8	60.0	140	----
		xylene, o-	95-47-6	E611A	96.4 µg/L	100 µg/L	96.4	60.0	140	----
<b>Hydrocarbons (QCLot: 80457)</b>										
VA20B3846-002	JM7	VHw (C6-C10)	----	E581.VH+F1	6180 µg/L	6310 µg/L	98.0	60.0	140	----



Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 17 - 841425

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<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>			<b>Select Service Level Below - Contact your AM to confirm all E&amp;P TATs (surcharges may apply)</b>											
Company: <b>ERM consultants Canada</b>		Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input checked="" type="checkbox"/> EDD (DIGITAL)			Regular [R] <input type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply											
Contact: <b>Jill Zyla</b>		Quality Control (QC) Report with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO			Priority (Business Days) 4 day [P4-20%] <input checked="" type="checkbox"/> 3 day [P3-25%] <input type="checkbox"/> 2 day [P2-50%] <input type="checkbox"/>			EMERGENCY 1 Business day [E - 100%] <input type="checkbox"/> Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] <input type="checkbox"/>								
Phone: <b>250-877-78-38</b>		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked														
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL   MAIL <input type="checkbox"/> FAX			Date and Time Required for all E&P TATs:			dd-mmm-yy hh:mm								
Street: <b>3790 Alfred Ave</b>		Email 1 or Fax: <b>Jill.Zyla@erm.com</b>			For tests that can not be performed according to the service level selected, you will be contacted.											
City/Province: <b>Somerset, BC</b>		Email 2: <b>Wade.Brunham@erm.com</b>			<b>Analysis Request</b>											
Postal Code: <b>V0S1N0</b>		Email 3: <b>Katay.Ain@erm.com</b>														
Invoice To: Same as Report To <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		<b>Invoice Distribution</b>			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below.											
Copy of Invoice with Report <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX														
Company: <b>Seabridge Gold</b>		Email 1 or Fax: <b>Elizabeth@seabridgegold.com</b>			<b>NUMBER OF CONTAINERS</b> As per 874326 12 12 12 12 12 12 12 12 12 12 12 12											
Contact: <b>Elizabeth Miller</b>		Email: <b>ERM admin @ seabridge.com</b>														
<b>Project Information</b>		<b>Oil and Gas Required Fields (client use)</b>														
ALS Account # / Quote #: <b>Q74326</b>		AFE/Cost Center: PO#														
Job #: <b>0539378-0012</b>		Major/Minor Code: Routing Code:														
PO / AFE:		Requisitioner:														
LSD:		Location:														
ALS Lab Work Order # (lab use only): <b>3846</b>		ALS Contact: Sampler:														
ALS Sample # (lab use only)		Sample Identification and/or Coordinates (This description will appear on the report)									Date (dd-mmm-yy)		Time (hh:mm)		Sample Type	
1		Field Blank									23-Aug-20		12:08		Water	
2		JM 7			24-Aug-20		10:07									
3		SCH2					10:26									
4		SK2					11:15									
5		JM 10					11:57									
6		JM 1					12:17									
7		JM1-A1T					12:28									
8		JM1-Seepage					12:49									
9		JM 26					13:27									
10		SHCR-4					13:54									
11		SHCR-2					14:08									
12		SHCR-3					14:21									
Drinking Water (DW) Samples (client use)				Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)												
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO				<b>All dissolved were pre-filtered</b>												
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO																
<b>SHIPMENT RELEASE (client use)</b>				<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>				<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>								
Released by: <b>Talbert Baker</b>		Date: <b>Aug-24-2020</b>		Time: <b>7:20</b>		Received by: <b>Talbert Baker</b>		Date: <b>Aug-24-2020</b>		Time: <b>10:10 AM</b>		Frozen <input type="checkbox"/>		SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>		
Ice Packs <input checked="" type="checkbox"/>		Ice Cubes <input type="checkbox"/>		Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>		Cooling Initiated <input type="checkbox"/>		INITIAL COOLER TEMPERATURES °C		FINAL COOLER TEMPERATURES °C		Telephone: + 1 604 253 4188				
7.1		2.7		5.2		4.6		8°C (Aug 21/16)								

SAMPLES ON HOLD  
SUSPECTED HAZARD (see Special Instructions)

Environmental Division  
Vancouver  
Work Order Reference:  
**VA20B3846**

Telephone: + 1 604 253 4188

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.



Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here  
(lab use only)

COC Number: 17 - 841424

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<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>			<b>Select Service Level Below - Contact your AM to confirm all E&amp;P TATs (surcharges may apply)</b>																																																															
Company: <b>ERM consultants Canada</b>		Select Report Format: <input type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input checked="" type="checkbox"/> EDD (DIGITAL)			Regular [R] <input type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply																																																															
Contact: <b>Jill Zyla</b>		Quality Control (QC) Report with Report <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			PRIORITY (Business Days)	4 day [P4-20%] <input checked="" type="checkbox"/>		EMERGENCY	1 Business day [E - 100%] <input type="checkbox"/>																																																											
Phone: <b>250-877-7838</b>		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked				3 day [P3-25%] <input type="checkbox"/>			Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] <input type="checkbox"/>																																																											
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX				2 day [P2-50%] <input type="checkbox"/>																																																														
Street: <b>3720 Alfred Ave</b>		Email 1 or Fax: <b>Jill.Zyla@erm.com</b>			Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm																																																															
City/Province: <b>Ymirters, BC</b>		Email 2: <b>Wade.Brunham@erm.com</b>			For tests that can not be performed according to the service level selected, you will be contacted.																																																															
Postal Code: <b>V05 2V0</b>		Email 3: <b>Kathy.Gin@erm.com</b>			<b>Analysis Request</b>																																																															
Invoice To: Same as Report To <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		Invoice Distribution			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (FP) below																																																															
Copy of Invoice with Report <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			<b>NUMBER OF CONTAINERS</b> <b>As per 74320</b>							<b>SAMPLES ON HOLD</b>																																																								
Company: <b>Scabridge Cold</b>		Email 1 or Fax: <b>Elizabeth@scabridgegold.com</b>																	<b>SUSPECTED HAZARD (see Special Instructions)</b>																																																	
Contact: <b>Elizabeth Miller</b>		Email 2: <b>KSM admin@scabridgegold.com</b>																								<b>SUSPECTED HAZARD (see Special Instructions)</b>																																										
Project Information		Oil and Gas Required Fields (client use)																															<b>SUSPECTED HAZARD (see Special Instructions)</b>																																			
ALS Account # / Quote #: <b>Q 74320</b>		AFE/Cost Center:	PO#																																					<b>SUSPECTED HAZARD (see Special Instructions)</b>																												
Job #: <b>0539378</b>		Major/Minor Code:	Routing Code:																																												<b>SUSPECTED HAZARD (see Special Instructions)</b>																					
PO / AFE:		Requisitioner:																																																				<b>SUSPECTED HAZARD (see Special Instructions)</b>														
LSD:		Location:																																																											<b>SUSPECTED HAZARD (see Special Instructions)</b>							
ALS Lab Work Order # (lab use only):		ALS Contact:		Sampler:																																																																<b>SUSPECTED HAZARD (see Special Instructions)</b>
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)		Date (dd-mmm-yy)	Time (hh:mm)																																																																
13	S H C 5		24-Aug-20	14:38	Water							<b>SUSPECTED HAZARD (see Special Instructions)</b>																																																								
14	S H C R-1		}	14:49	}														<b>SUSPECTED HAZARD (see Special Instructions)</b>																																																	
15	S K 4		}	18:23	}																					<b>SUSPECTED HAZARD (see Special Instructions)</b>																																										
16	S K 3		}	18:52	}																												<b>SUSPECTED HAZARD (see Special Instructions)</b>																																			
Drinking Water (DW) Samples <sup>1</sup> (client use)		Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)			SAMPLE CONDITION AS RECEIVED (lab use only)																																																															
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO		<b>All dissolved were pre-filled</b>			Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>																																																															
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO					Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>																																																															
					Cooling Initiated <input type="checkbox"/>																																																															
					INITIAL COOLER TEMPERATURES °C																																																															
					FINAL COOLER TEMPERATURES °C <b>8C (Aug 07 18)</b>																																																															
SHIPMENT RELEASE (client use)		INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)																																																															
Released by: <b>Talout Baker</b>	Date: <b>Aug-24-2020</b>	Time:	Received by: <b>JB</b>	Date:	Time:	Received by: <b>JG</b>	Date: <b>25 Aug</b>	Time: <b>10:10 AM</b>																																																												

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JUNE 2018 FROM

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.



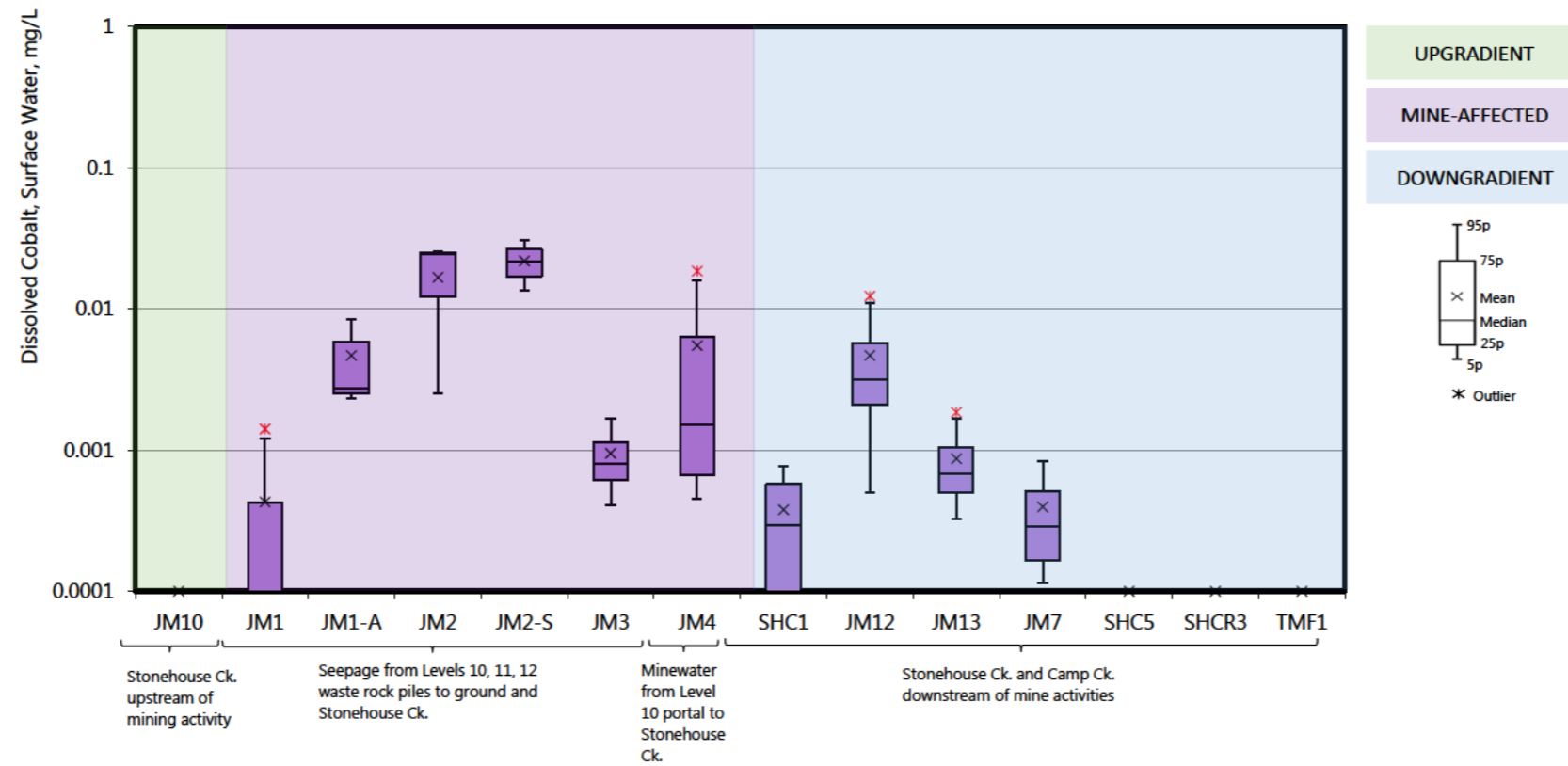


**wood.**

**Appendix E**  
**Box Plot Data Surface Water Monitoring**

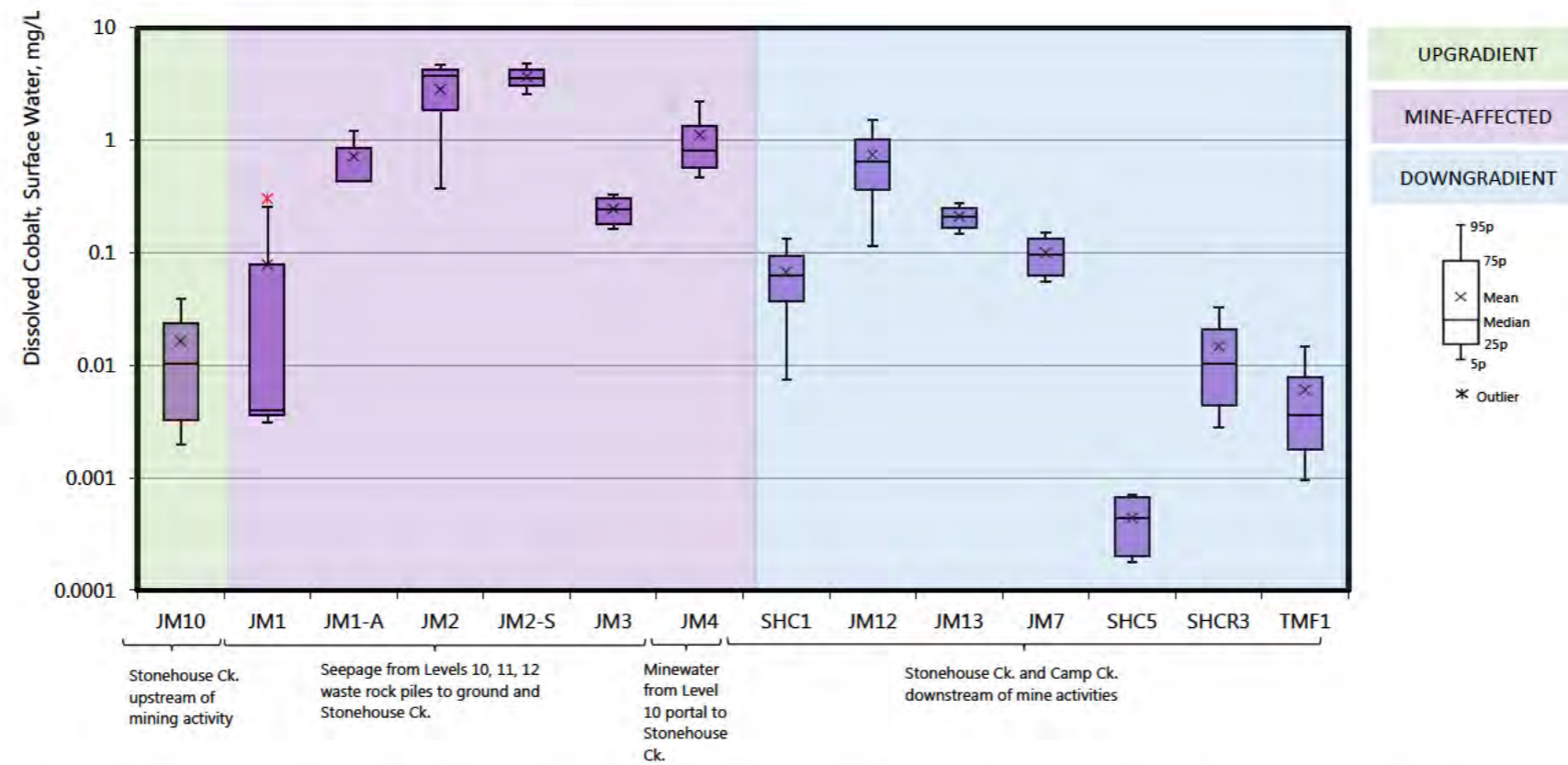


# Box Plot - Cobalt in Surface Water



Monitoring Well	JM10	JM1	JM1-A	JM2	JM2-S	JM3	JM4	SHC1	JM12	JM13	JM7	SHC5	SHCR3	TMF1
Min	0.000	0.000	0.002	0.000	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Q <sub>1</sub>	0.000	0.000	0.003	0.012	0.017	0.001	0.001	0.000	0.002	0.001	0.000	0.000	0.000	0.000
Median	0.000	0.000	0.003	0.024	0.022	0.001	0.002	0.000	0.003	0.001	0.000	0.000	0.000	0.000
Q <sub>3</sub>	0.000	0.000	0.006	0.025	0.026	0.001	0.006	0.001	0.006	0.001	0.001	0.000	0.000	0.000
Max	0.000	0.001	0.009	0.026	0.031	0.002	0.019	0.001	0.012	0.002	0.001	0.000	0.000	0.000
IQR	0.000	0.000	0.003	0.013	0.009	0.001	0.006	0.000	0.004	0.001	0.000	0.000	0.000	0.000
Upper Outliers	0.000	1.000	0.000	0.000	0.000	0.000	1.000	0.000	1.000	1.000	0.000	0.000	0.000	0.000
Lower Outliers	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
<b>For the Box (IQR and Median)</b>														
Q <sub>2</sub> -Q <sub>1</sub>	0	0	0.00022	0.0121	0.0044	0.000185	0.000862	0.000195	0.0	0.00017	0.000118	0	0	0
Q <sub>3</sub> -Q <sub>2</sub>	0	0.000328	0.00313	0.0007	0.00495	0.000333	0.004824	0.000278	0.002585	0.000365	0.000228	0	0	0
<b>For the Whiskers</b>														
Q <sub>3</sub> +1.5*IQR	0.0001	0.000919	0.010895	0.0442	0.040475	0.001909	0.014879	0.001281	0.01122	0.001843	0.00103	0.0001	0.0001	0.0001
Q <sub>1</sub> -1.5*IQR	0.0001	-0.00039	-0.00251	-0.007	0.003075	-0.00016	-0.00787	-0.00061	-0.00338	-0.0003	-0.00035	0.0001	0.0001	0.0001
5P	0.0001	0.001214	0.008374	0.02556	0.03041	0.001691	0.01607	0.000771	0.010989	0.001688	0.000831	0.0001	0.0001	0.0001
95P	0.0001	0.0001	0.002344	0.00252	0.01358	0.000411	0.000453	0.0001	0.000499	0.000325	0.000114	0.0001	0.0001	0.0001
W <sub>upper</sub> -Q <sub>3</sub>	0	0.000786	0.002504	0.00056	0.00396	0.000558	0.00972	0.000198	0.005244	0.000648	0.000318	0	0	0
Q <sub>1</sub> -W <sub>lower</sub>	0	0	0.000176	0.00968	0.00352	0.000204	0.000211	0	0.001596	0.00018	0.000054	0	0	0
Mean	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Data Table</b>														
	0.0001	0.00141	0.009	0.0257	0.0314	0.0009	0.0004	0.0001	0.0001	0.00058	0.00038	0.0001	0.0001	0.0001
	0.0001	0.0001	0.0023	0.0243	0.0215	0.00036	0.0185	0.00082	0.0123	0.00028	0.0001	0.0001	0.0001	0.0001
	0.0001	0.0001				0.00183	0.0023	0.00049	0.00276	0.00185	0.00091	0.0001	0.0001	0.0001
	0.0001	0.0001	0.00274	0.0001	0.0127	0.0007	0.000752	0.0001	0.00356	0.00077	0.00019	0.0001	0.0001	0.0001

# Box Plot - Manganese in Surface Water



Monitoring Well	JM10	JM1	JM1-A	JM2	JM2-S	JM3	JM4	SHC1	JM12	JM13	JM7	SHC5	SHCR3	TMF1
Min	0.002	0.003	0.430	0.005	2.480	0.160	0.438	0.000	0.053	0.141	0.054	0.000	0.002	0.001
Q <sub>1</sub>	0.003	0.004	0.432	1.858	3.020	0.180	0.572	0.037	0.366	0.167	0.062	0.000	0.004	0.002
Median	0.010	0.004	0.433	3.710	3.560	0.242	0.808	0.063	0.639	0.208	0.095	0.000	0.010	0.004
Q <sub>3</sub>	0.023	0.079	0.862	4.235	4.255	0.308	1.350	0.094	1.016	0.250	0.133	0.001	0.021	0.008
Max	0.043	0.302	1.290	4.760	4.950	0.337	2.400	0.144	1.640	0.281	0.155	0.001	0.036	0.016
IQR	0.020	0.075	0.430	2.377	1.235	0.128	0.779	0.057	0.650	0.084	0.071	0.000	0.016	0.006
Upper Outliers	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Lower Outliers	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

For the Box (IQR and Median)														
Q <sub>2</sub> -Q <sub>1</sub>	0.00708	0.00047	0.0015	1.85244	0.54	0.0625	0.2365	0.02617	0.3	0.041	0.03328	0.00024	0.00609	0.00182
Q <sub>3</sub> -Q <sub>2</sub>	0.01303	0.07471	0.4285	0.525	0.695	0.06575	0.542	0.03065	0.377	0.04275	0.0379	0.00024	0.01038	0.00425

For the Whiskers														
Q <sub>3</sub> +1.5*IQR	0.05355	0.19151	1.5065	7.80116	6.1075	0.50013	2.51775	0.17898	1.99138	0.37588	0.24001	0.0014	0.04552	0.01698
Q <sub>1</sub> -1.5*IQR	-0.02685	-0.1092	-0.2135	-1.7086	1.1675	-0.01288	-0.59625	-0.0483	-0.60963	0.04088	-0.04469	-0.00052	-0.02034	-0.00732
5P	0.039	0.25735	1.2043	4.655	4.811	0.33115	2.19	0.13395	1.5152	0.27485	0.15065	0.0007	0.03265	0.01453
95P	0.00198	0.00311	0.4303	0.37561	2.588	0.1639	0.4647	0.00748	0.11555	0.1461	0.05578	0.00018	0.00282	0.00096
W <sub>upper</sub> -Q <sub>3</sub>	0.0156	0.17861	0.3428	0.42	0.556	0.0234	0.84	0.0402	0.4992	0.0246	0.0174	2.4E-05	0.01182	0.00667
Q <sub>1</sub> -W <sub>lower</sub>	0.00132	0.00045	0.0012	1.48195	0.432	0.0156	0.1068	0.02945	0.2502	0.0204	0.0063	2.4E-05	0.00154	0.00083
Mean	0.0	0.1	0.7	2.8	3.7	0.2	1.1	0.1	0.7	0.2	0.1	0.0	0.0	0.0

Data Table														
	0.0429	0.302	1.29	4.76	4.95	0.337	0.438	0.0492	0.053	0.24	0.126	0.00017	0.00244	0.00509
	0.0169	0.00432	0.43	3.71	3.56	0.186	2.4	0.144	1.64	0.175	0.0647	0.00021	0.0356	0.00075
	0.00165	0.00375				0.298	0.616	0.077	0.808	0.281	0.155	0.00071	0.0159	0.0162
	0.00385	0.003	0.433	0.00512	2.48	0.16	1	0.00012	0.47	0.141	0.0542	0.00067	0.005	0.00214

APPENDIX E      2020 ISKUT PROJECT STANDPIPE PIEZOMETER  
GROUNDWATER MONITORING SUMMARY

**Appendix E: 2020 Iskut Project Standpipe Piezometer Groundwater Monitoring Summary**

Well ID	Easting <sup>A</sup> (m)	Northing <sup>A</sup> (m)	Water Level (m btoc)	Date	Notes
P88-01-1	372497	6278243	0	24-Aug-20	
P88-01-2	372497	6278243	0	24-Aug-20	
P88-01-alt1	372498	6278248	0.2	29-Aug-20	
P88-02-1	372659	6278136	0.146	24-Aug-20	
P88-02-2	372659	6278136	0.582	24-Aug-20	
P88-03	372870	6278308	1.442	24-Aug-20	
P88-04	372871	6278534	0	29-Aug-20	
P89-01	372710	6278244	n/a	29-Aug-20	Well was not located.
P89-02	372702	6278248	0	24-Aug-20	PVC filled with silt.
P89-03	372626	6278203	n/a	24-Aug-20	PVC damaged, water level reading could not be taken.
P89-06	372720	6278226	1.426	24-Aug-20	

**Notes:**

<sup>A</sup> UTM Zone 9V, NAD83

btoc: below top of casing

APPENDIX F      JOHNNY MOUNTAIN MINE EMA PERMIT PR-7927  
SURFACE WATER AND GROUNDWATER DATA AND QAQC







Appendix F-1: Groundwater and Surface Water Quality Results for Permit PR-7927, 2017-2020

Well ID	Units	MW17-22A							MW17-22B						JM10-2018		
Date Sampled		28-Jul-17	22-Oct-17	9-Jul-18	11-Sep-18	17-Jul-19	24-Aug-19	28-Aug-20	23-Jul-17	9-Jul-18	10-Sep-18	17-Jul-19	23-Aug-19	28-Aug-20	25-Oct-18	23-Aug-19	23-Aug-20
Time Sampled		10:30	12:00	0:00	8:20	10:50	10:00	16:30	13:57	0:00	18:20	11:45	16:30	16:30	10:40	16:00	13:23
ALS Sample ID		L1966936-2	L2014860-3	L2127140-1	L2162703-1	L2312976-1	L2335589-1	VA20B4087-001	L1966041-7	L2127140-2	L2162703-2	L2312976-2	L2335589-2	VA20B4087-002	L2188477-42	L2335590-1	VA20B3842-017
Matrix		Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
<b>Aggregate Organics (Water)</b>																	
COD	mg/L	27	-	-	-	<20	<20	<20	<20	-	-	<20	<20	<20	-	<20	
<b>Volatile Organic Compounds (Water)</b>																	
Benzene	mg/L	0.00546	0.00257	0.00107	0.00062	<0.00050	<0.00050	<0.00020	<0.0005	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050
Ethylbenzene	mg/L	0.16	0.0925	0.0439	0.0275	0.00674	0.00243	<0.00020	0.00074	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050
Toluene	mg/L	0.178	0.0984	0.0317	0.00918	0.00191	<0.00045	<0.40	0.00099	<0.00045	<0.00045	<0.00045	<0.00045	<0.00040	-	<0.00045	<0.00045
Xylenes	mg/L	1.02	0.654	0.316	0.186	0.00851	0.00369	<0.75	0.00352	<0.00075	<0.00075	<0.00075	<0.00075	<0.00075	-	<0.00075	<0.75
<b>Hydrocarbons (Water)</b>																	
EPH10-19	mg/L	0.87	0.57	0.37	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	-	<0.25	<0.25
EPH19-32	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	-	<0.25	<0.25
LEPH	mg/L	0.79	0.52	0.34	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	-	<0.25	<0.25
HEPH	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	-	<0.25	<0.25
<b>Polycyclic Aromatic Hydrocarbons (Water)</b>																	
Acenaphthene	mg/L	<0.00005	<0.00005	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.00005	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010
Acenaphthylene	mg/L	<0.00005	<0.00005	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.00005	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010
Acridine	mg/L	<0.00005	<0.00005	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.00005	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010
Anthracene	mg/L	<0.00005	<0.00005	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.00005	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010
Benz(a)anthracene	mg/L	<0.00005	<0.00005	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.00005	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010
Benzo(a)pyrene	mg/L	<0.000005	<0.000005	<0.000005	<0.000005	<0.0000050	<0.0000050	<0.0000050	<0.000005	<0.000005	<0.000005	<0.0000050	<0.0000050	<0.0000050	-	<0.0000050	<0.0000050
Benzo(b&j)fluoranthene	mg/L	<0.00005	<0.00005	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.00005	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010
Benzo(b+j+k)fluoranthene	mg/L	-	-	<0.000015	<0.000015	<0.000015	<0.000015	<0.000015	-	<0.000015	<0.000015	<0.000015	<0.000015	<0.000015	-	<0.000015	<0.000015
Benzo(g,h,i)perylene	mg/L	<0.00005	<0.00005	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.00005	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010
Benzo(k)fluoranthene	mg/L	<0.00005	<0.00005	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.00005	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010
Chrysene	mg/L	<0.00005	<0.00005	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.00005	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010
Dibenz(a,h)anthracene	mg/L	<0.000005	<0.000005	<0.000005	<0.000005	<0.0000050	<0.0000050	<0.0000050	<0.000005	<0.000005	<0.000005	<0.0000050	<0.0000050	<0.0000050	-	<0.0000050	<0.0000050
Fluoranthene	mg/L	<0.00005	<0.00005	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.00005	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010
Fluorene	mg/L	<0.00005	<0.00005	<0.00002	<0.0000301	<0.000010	<0.000020	<0.000010	<0.00005	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010
Indeno(1,2,3-c,d)pyrene	mg/L	<0.00005	<0.00005	<0.00001	<0.00001	<0.000010	<0.000010	<0.000011	<0.00005	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010
1-Methylnaphthalene	mg/L	-	-	0.00511	0.00236	0.00163	0.00423	0.0029	-	<0.00005	<0.00005	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.000050
2-Methylnaphthalene	mg/L	-	-	0.00891	0.00414	0.00318	0.00708	0.00363	-	<0.00005	<0.00005	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.000050
Naphthalene	mg/L	0.0829	0.0439	0.0207	0.0092	0.00317	0.00749	0.00427	0.00187	<0.00005	<0.00005	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.000050
Phenanthrene	mg/L	<0.00005	<0.00005	<0.00002	<0.00002	<0.000020	<0.000020	<0.000020	<0.00005	<0.00002	<0.00002	<0.000020	<0.000020	<0.000020	-	<0.000020	<0.000020
Pyrene	mg/L	<0.00005	<0.00005	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.00005	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010
Quinoline	mg/L	<0.004	<0.00005	<0.090	<0.050	<0.000050	<0.0020	<0.00550	<0.040	<0.00005	<0.00005	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.000050

**Appendix F-2: Surface Water Quality Duplicate Relative Percent Difference, 2020**

Sample Location:	Unit	Detection Limit	JM10-2018			
Date:			23-Aug-20			
ALS Sample ID:			VA20B3887-001	VA20B3842-017	5*DL	RPD (%)
RPDs above 20%						3.0
RPDs above 50%						0.0
Total calculated RPDs						33.0
<b>Physical Tests</b>						
Conductivity	uS/cm	2	142	143	10	0.7
Hardness (as CaCO <sub>3</sub> )	mg/L	0.5	67	68.8	3	2.7
pH	pH	0.1	7.87	7.49	0.5	4.9
Total Dissolved Solids	mg/L	20	82	80	100	2.5
Turbidity	NTU	0.1	1.44	1.31	0.5	9.5
<b>Anions and Nutrients</b>						
Acidity-Hot Peroxide Treated (as CaCO <sub>3</sub> )	mg/L	25	2	<2.0	125	-
Alkalinity, Bicarbonate (as CaCO <sub>3</sub> )	mg/L	1	54	56	5	3.0
Alkalinity, Carbonate (as CaCO <sub>3</sub> )	mg/L	1	<1.0	<1.0	5	-
Alkalinity, Hydroxide (as CaCO <sub>3</sub> )	mg/L	1	<1.0	<1.0	5	-
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	1	54	55.5	5	-
Ammonia, Total (as N)	mg/L	0.005	0.0097	<0.0050	0.025	-
Bromide (Br)	mg/L	0.05	<0.050	<0.050	0.25	-
Chloride (Cl)	mg/L	0.5	<0.50	<0.50	2.5	-
Fluoride (F)	mg/L	0.02	0.022	0.02	0.1	-
Nitrate (as N)	mg/L	0.005	<0.0050	<0.0050	0.025	-
Nitrite (as N)	mg/L	0.001	<0.0010	<0.0010	0.005	-
Sulfate (SO <sub>4</sub> )	mg/L	0.3	15.6	15	1.5	1.3
<b>Cyanides</b>						
Cyanide, Weak Acid Diss	mg/L	0.005	<0.0050	<0.0050	0.03	-
Cyanide, Total	mg/L	0.005	<0.0051	<0.0050	0.03	-
Cyanate	mg/L	0.2	<0.0052	<0.20	1	-
Thiocyanate (SCN)	mg/L	0.5		<0.50	2.5	-
Cyanide, Free	mg/L	0.005	<0.0050	<0.0050	0.03	-
<b>Organic / Inorganic Carbon</b>						
Total Inorganic Carbon	mg/L	1	-	13.2	5	-
Total Organic Carbon	mg/L	0.5	1.02	1.3	3	-
<b>Total Metals</b>						
Aluminum (Al)-Total	mg/L	0.003	0.056	0.057	0.015	1.8
Antimony (Sb)-Total	mg/L	0.0001	<0.00010	<0.00010	0.0005	-
Arsenic (As)-Total	mg/L	0.0001	0.00036	0.00037	0.0005	2.7
Barium (Ba)-Total	mg/L	0.0001	0.0169	0.0168	0.0005	0.6
Beryllium (Be)-Total	mg/L	0.0001	<0.000020	<0.000020	0.0005	-
Bismuth (Bi)-Total	mg/L	0.00005	<0.000050	<0.000050	0.00025	-
Boron (B)-Total	mg/L	0.01	<0.010	<0.010	0.05	-
Cadmium (Cd)-Total	mg/L	0.000005	0.0000232	0.0000258	0.000025	-
Calcium (Ca)-Total	mg/L	0.05	22.8	22.7	0.25	0.4
Chromium (Cr)-Total	mg/L	0.0001	<0.00010	<0.00010	0.0005	-
Cobalt (Co)-Total	mg/L	0.0001	<0.00010	<0.00010	0.0005	-
Copper (Cu)-Total	mg/L	0.0005	0.00075	0.00084	0.0025	-
Iron (Fe)-Total	mg/L	0.03	0.069	0.083	0.15	18.4
Lead (Pb)-Total	mg/L	0.00005	0.000153	0.000206	0.00025	-
Lithium (Li)-Total	mg/L	0.001	<0.0010	<0.0010	0.005	-
Magnesium (Mg)-Total	mg/L	0.005	2.24	2.3	0.025	2.6
Manganese (Mn)-Total	mg/L	0.0001	0.015	0.0165	0.0005	-
Mercury (Hg)-Total	mg/L	0.000005	<0.0000050	<0.0000050	0.000025	-
Molybdenum (Mo)-Total	mg/L	0.00005	0.000299	0.000293	0.00025	2.0

**Notes:**

RPD = relative percent difference.

RPD values were calculated where the parameter was reported above 5 times the DL.

**Appendix F-2: Surface Water Quality Duplicate Relative Percent Difference, 2020**

Sample Location: Date: ALS Sample ID:	Unit	Detection Limit	JM10-2018			
			23-Aug-20			
			VA20B3887-001	VA20B3842-017	5*DL	RPD (%)
Nickel (Ni)-Total	mg/L	0.0005	<0.00050	<0.00050	0.0025	-
Phosphorus (P)-Total	mg/L	0.3	<0.050	<0.050	1.5	-
Potassium (K)-Total	mg/L	0.05	1.1	1.11	0.025	-
Selenium (Se)-Total	mg/L	0.00005	0.000054	0.000075	0.000025	-
Silicon (Si)-Total	mg/L	0.1	1.1	1.11	0.5	0.9
Silver (Ag)-Total	mg/L	0.00001	<0.000010	<0.000010	0.00005	-
Sodium (Na)-Total	mg/L	2	0.3	0.3	10	3.6
Strontium (Sr)-Total	mg/L	0.0002	0.099	0.097	0.001	1.4
Sulfur (S)-Total	mg/L	0.5	5.17	5.44	2.5	-
Thallium (Tl)-Total	mg/L	0.00001	<0.000010	<0.000010	0.00005	-
Tin (Sn)-Total	mg/L	0.0001	<0.00010	<0.00010	0.0005	-
Titanium (Ti)-Total	mg/L	0.01	0.00163	0.00212	0.05	-
Uranium (U)-Total	mg/L	0.00001	0.000054	0.00005	0.00005	0.0
Vanadium (V)-Total	mg/L	0.0005	<0.00050	<0.00050	0.0025	-
Zinc (Zn)-Total	mg/L	0.003	<0.0030	<0.0030	0.015	-
<b>Dissolved Metals</b>						
Aluminum (Al)-Dissolved	mg/L	0.003	0.0125	0.0145	0.015	14.8
Antimony (Sb)-Dissolved	mg/L	0.0001	<0.00010	<0.00010	0.0005	-
Arsenic (As)-Dissolved	mg/L	0.0001	0.0002	0.0003	0.0005	18.9
Barium (Ba)-Dissolved	mg/L	0.0001	0.0164	0.0163	0.0005	0.6
Beryllium (Be)-Dissolved	mg/L	0.0001	<0.000020	<0.000020	0.0005	-
Bismuth (Bi)-Dissolved	mg/L	0.00005	<0.000050	<0.000050	0.00025	-
Boron (B)-Dissolved	mg/L	0.01	<0.010	<0.010	0.05	-
Cadmium (Cd)-Dissolved	mg/L	0.000005	0.000022	0.0000205	0.00003	-
Calcium (Ca)-Dissolved	mg/L	0.05	23.2	23.8	0.25	-
Chromium (Cr)-Dissolved	mg/L	0.0001	<0.00010	<0.00010	0.0005	-
Cobalt (Co)-Dissolved	mg/L	0.0001	<0.00010	<0.00010	0.0005	-
Copper (Cu)-Dissolved	mg/L	0.0005	0.00049	0.0006	0.0025	20.2
Iron (Fe)-Dissolved	mg/L	0.03	0.011	0.015	0.15	30.8
Lead (Pb)-Dissolved	mg/L	0.00005	<0.000050	0	0.025	-
Lithium (Li)-Dissolved	mg/L	0.001	<0.0010	<0.0010	0.005	-
Magnesium (Mg)-Dissolved	mg/L	0.005	2.2	2.25	0.025	2.2
Manganese (Mn)-Dissolved	mg/L	0.0001	0.0118	0.0121	0.0005	2.5
Mercury (Hg)-Dissolved	mg/L	0.000005	<0.0000050	<0.0000050	0.00003	-
Molybdenum (Mo)-Dissolved	mg/L	0.00005	0.000281	0.000265	0.00025	5.9
Nickel (Ni)-Dissolved	mg/L	0.0005	<0.00050	<0.00050	0.0025	-
Phosphorus (P)-Dissolved	mg/L	0.3	<0.050	<0.050	1.5	-
Potassium (K)-Dissolved	mg/L	0.05	1.11	1.12	0.25	0.9
Selenium (Se)-Dissolved	mg/L	0.00005	<0.000050	0.000053	0.00025	-
Silicon (Si)-Dissolved	mg/L	0.05	0.928	0.958	0.025	3.2
Silver (Ag)-Dissolved	mg/L	0.00001	<0.000010	<0.000010	0.00005	-
Sodium (Na)-Dissolved	mg/L	2	0.3	0.3	10	7.7
Strontium (Sr)-Dissolved	mg/L	0.0002	0.0965	0.0906	0.001	6.3
Sulfur (S)-Dissolved	mg/L	0.5	4.86	5.18	2.5	6.4
Thallium (Tl)-Dissolved	mg/L	0.00001	<0.000010	<0.000010	0.00005	-
Tin (Sn)-Dissolved	mg/L	0.0001	<0.00010	<0.00010	0.001	-
Titanium (Ti)-Dissolved	mg/L	0.01	<0.00030	0	0.05	-
Uranium (U)-Dissolved	mg/L	0.00001	0.000051	0.000046	0.00005	10.3
Vanadium (V)-Dissolved	mg/L	0.0005	<0.00050	<0.00050	0.0025	-
Zinc (Zn)-Dissolved	mg/L	0.001	0.0013	0.0016	0.005	20.7

**Notes:**

RPD = relative percent difference.

RPD values were calculated where the parameter was reported above 5 times the DL.

### Appendix F-3: Field and Travel Blanks, 2020

Site	Units	Field Blank	Travel Blank
Date		2020-08-23	2020-08-23
Time		13:23	0:00
ALS Sample ID		VA20B3842-023	VA20B3842-024
<b>Physical Tests</b>			
conductivity	µS/cm	<2.0	<2.0
acidity (as CaCO <sub>3</sub> )	mg/L	<2.0	<2.0
alkalinity, total (as CaCO <sub>3</sub> )	mg/L	<1.0	<1.0
colour, true	CU	<5.0	<5.0
hardness (as CaCO <sub>3</sub> ), dissolved	mg/L	<0.60	-
hardness (as CaCO <sub>3</sub> ), from total Ca/Mg	mg/L	<0.60	<0.60
pH	pH units	5.46	5.66
solids, total dissolved [TDS]	mg/L	<10	<10
solids, total suspended [TSS]	mg/L	<3.0	<3.0
turbidity	NTU	<0.10	<0.10
alkalinity, hydroxide (as CaCO <sub>3</sub> )	mg/L	<1.0	<1.0
alkalinity, carbonate (as CaCO <sub>3</sub> )	mg/L	<1.0	<1.0
alkalinity, bicarbonate (as CaCO <sub>3</sub> )	mg/L	<1.0	<1.0
<b>Anions and Nutrients</b>			
Kjeldahl nitrogen, total [TKN]	mg/L	<0.050	<0.050
ammonia, total (as N)	mg/L	<0.0050	<0.0050
bromide	mg/L	<0.050	<0.050
chloride	mg/L	<0.50	<0.50
fluoride	mg/L	<0.020	<0.020
nitrate (as N)	mg/L	<0.0050	<0.0050
nitrite (as N)	mg/L	<0.0010	<0.0010
nitrogen, total	mg/L	<0.030	<0.030
phosphate, ortho-, dissolved (as P)	mg/L	<0.0010	<0.0010
phosphorus, total	mg/L	<0.0020	<0.0020
sulfate (as SO <sub>4</sub> )	mg/L	<0.30	<0.30
<b>Cyanides</b>			
cyanide, free	mg/L	<0.0050	<0.0050
cyanide, strong acid dissociable (total)	mg/L	<0.0050	<0.0050
cyanide, weak acid dissociable	mg/L	<0.0050	<0.0050
<b>Organic / Inorganic Carbon</b>			
carbon, dissolved organic [DOC]	mg/L	<0.50	-
carbon, total organic [TOC]	mg/L	<0.50	<0.50
<b>Total Metals</b>			
aluminum, total	mg/L	<0.0030	<0.0030
antimony, total	mg/L	<0.00010	<0.00010
arsenic, total	mg/L	<0.00010	<0.00010
barium, total	mg/L	<0.00010	<0.00010
beryllium, total	mg/L	<0.000020	<0.000020
bismuth, total	mg/L	<0.000050	<0.000050
boron, total	mg/L	<0.010	<0.010
cadmium, total	mg/L	<0.0000050	<0.0000050
calcium, total	mg/L	<0.050	<0.050
chromium, total	mg/L	<0.00010	<0.00010
cobalt, total	mg/L	<0.00010	<0.00010
copper, total	mg/L	<0.00050	<0.00050
iron, total	mg/L	<0.010	<0.010
lead, total	mg/L	<0.000050	<0.000050
lithium, total	mg/L	<0.0010	<0.0010
magnesium, total	mg/L	<0.100	<0.100
manganese, total	mg/L	<0.00010	<0.00010
mercury, total	mg/L	<0.0000050	<0.0000050
molybdenum, total	mg/L	<0.000050	<0.000050

**Appendix F-3: Field and Travel Blanks, 2020**

Site	Units	Field Blank	Travel Blank
Date		2020-08-23	2020-08-23
Time		13:23	0:00
ALS Sample ID		VA20B3842-023	VA20B3842-024
nickel, total	mg/L	<0.00050	<0.00050
phosphorus, total	mg/L	<0.050	<0.050
potassium, total	mg/L	<0.100	<0.100
selenium, total	mg/L	<0.000050	<0.000050
silicon, total	mg/L	<0.10	<0.10
silver, total	mg/L	<0.000010	<0.000010
sodium, total	mg/L	<0.050	<0.050
strontium, total	mg/L	<0.00020	<0.00020
sulfur, total	mg/L	<0.50	<0.50
thallium, total	mg/L	<0.000010	<0.000010
tin, total	mg/L	<0.00010	<0.00010
titanium, total	mg/L	<0.00030	<0.00030
uranium, total	mg/L	<0.000010	<0.000010
vanadium, total	mg/L	<0.00050	<0.00050
zinc, total	mg/L	<0.0030	<0.0030
zirconium, total	mg/L	<0.00030	<0.00030
<b>Dissolved Metals</b>			
aluminum, dissolved	mg/L	<0.0030	-
antimony, dissolved	mg/L	<0.00010	-
arsenic, dissolved	mg/L	<0.00010	-
barium, dissolved	mg/L	<0.00010	-
beryllium, dissolved	mg/L	<0.000020	-
bismuth, dissolved	mg/L	<0.000050	-
boron, dissolved	mg/L	<0.010	-
cadmium, dissolved	mg/L	<0.0000050	-
calcium, dissolved	mg/L	<0.050	-
chromium, dissolved	mg/L	<0.00010	-
cobalt, dissolved	mg/L	<0.00010	-
copper, dissolved	mg/L	<0.00020	-
iron, dissolved	mg/L	<0.010	-
lead, dissolved	mg/L	<0.000050	-
lithium, dissolved	mg/L	<0.0010	-
magnesium, dissolved	mg/L	<0.100	-
manganese, dissolved	mg/L	<0.00010	-
mercury, dissolved	mg/L	<0.0000050	-
molybdenum, dissolved	mg/L	<0.000050	-
nickel, dissolved	mg/L	<0.00050	-
phosphorus, dissolved	mg/L	<0.050	-
potassium, dissolved	mg/L	<0.100	-
selenium, dissolved	mg/L	<0.000050	-
silicon, dissolved	mg/L	<0.050	-
silver, dissolved	mg/L	<0.000010	-
sodium, dissolved	mg/L	<0.050	-
strontium, dissolved	mg/L	<0.00020	-
sulfur, dissolved	mg/L	<0.50	-
thallium, dissolved	mg/L	<0.000010	-
tin, dissolved	mg/L	<0.00010	-
titanium, dissolved	mg/L	<0.00030	-
uranium, dissolved	mg/L	<0.000010	-
vanadium, dissolved	mg/L	<0.00050	-
zinc, dissolved	mg/L	<0.0010	-
zirconium, dissolved	mg/L	<0.00030	-

## APPENDIX G PERMIT PR-7927 ANNUAL STATUS REPORT



# Annual Status Form

AUTHORIZATION NUMBER: 7927

AUTHORIZATION TYPE: Refuse, Permit

LEGAL AUTHORIZATION HOLDER NAME: SnipGold Corp.

AUTHORIZED PERSON NAME: Jessy Chaplin

AUTHORIZED PERSON SIGNATURE: 

SIGNATURE DATE: March 31, 2021

*I understand that it is an offense to mislead a government official, and I declare that all of the information presented is accurate and true. I have been given the authority by the authorization holder to sign this form.*

CONDITION NUMBER	CONDITION DESCRIPTION	COMPLIANT? (Yes/No/ND)	ACTION TAKEN
1.1.1	The maximum authorized volume of solid waste that can be discharged is 38,000 m <sup>3</sup>	Yes	The landfill was not active in 2020.
1.1.2	The authorized discharge period is continuous between the years 2018 to 2022 snow free seasons.	Yes	N/A
1.1.3	The Authorized Works are the Main Landfill.	Yes	N/A
1.1.4	The permittee must not discharge under this authorization unless the Authorized Works are complete and fully operational.	Yes	N/A
1.1.5	The location of the facilities from which the discharge is authorized to originate is the non-operating Johnny Mountain Mine. The point of discharge is the Main Landfill located at latitude 56° 04' 28" and longitude 131° 37' 57".	Yes	N/A
1.2.1	The maximum authorized rate of discharge is indeterminate.	Yes	N/A
1.2.2	The characteristics of the emissions must be typical of those originating from the regulated open burning of wood waste, cardboard, paper and paper products.	Yes	No open burning took place on site in 2020
1.2.3	The location of the facilities from which the discharge is authorized to originate and the point where the discharge is authorized to occur is the same as specified in subsection 1.2.5 above.	Yes	N/A
2.1	Authorization for the discharge of emissions from a properly designed auxiliary fired refuse incinerator that serves a remote industrial camp with a design capacity of less than 100 persons is through the Waste Discharge Regulation pursuant to the Environmental Management Act.	Yes	There is no incinerator or camp at Johnny Mountain Mine.
2.2	The permittee must not open burn waste which is unacceptable to the director. Unacceptable materials include nuisance causing combustibles such as painted and treated wood, rubber, plastics, tars, asphalt shingles, roofing material, insulation, etc. Acceptable materials include unpainted, untreated demolition and construction wood wastes, broken lumber and pallets, slabs, log ends and branches, brush and miscellaneous, non-recyclable cardboard and paper products.	Yes	SnipGold separates waste for landfill and authorized waste for burning. No waste was placed in the Main Landfill in 2020 and no open burning occurred in 2020.
2.3	The permittee must incorporate the residue of combustion from a burn into the landfill authorized in subsection 1.1 or a landfill authorized by the director once such residue has cooled to ambient temperature.	Yes	No open burning occurred on site in 2020.

Authorized Person Initial: 

Date: March 31, 2021

CONDITION NUMBER	CONDITION DESCRIPTION	COMPLIANT? (Yes/No/ND)	ACTION TAKEN
2.5.1	The permittee must regularly inspect the Authorized Works and maintain them in good working order. If components of the Authorized Works have a manufacturer's recommended maintenance schedule, then those components must, at a minimum, be maintained in accordance with that schedule. The permittee must maintain a record of inspections and maintenance of the Authorized Works, and make the record available to an officer upon request.	Yes	As no construction occurred on site in 2020, Wood completed the erosion and sediment control measures inspection at the Main Landfill in 2020. No additional inspections of Authorized Works were conducted in 2020. The landfill was not active in 2020.
2.5.2	In the event of an emergency or other condition which prevents normal operation of the Authorized Works or leads to an unauthorized discharge, the permittee must take remedial action immediately to restore the normal operation of the Authorized Works and to prevent any unauthorized discharges. The permittee must immediately report the emergency or other condition and the remedial action that has and will be taken to the EnvironmentalCompliance@gov.bc.ca email address or as otherwise instructed by the director.	Yes	N/A
2.6	The permittee must cause a Qualified Professional to a. Certify all facilities and information, including works, plans, assessments, investigations, surveys, programs, and reports related to the design, and b. Seal all as-built drawings.	Yes	Wood have been contracted by SnipGold Corp. as the Qualified Professional for the Main Landfill Upgrades. Wood have completed the Post Construction Report - 2019 Main Landfill Upgrades report (Wood 2020), in which they document the inspections, reports and programs completed in relation to the landfill. Construction Inspections are provided in Appendix B and Construction Record Drawings are provided within Appendix A of the report. The Record Drawings incorporated findings from AllNorth's post-construction survey completed in September 2019.
2.7	The permittee must compact all refuse and confine such compacted refuse to the smallest practical area and volume at the operating face of the landfill. The permittee must apply a minimum 0.15 metre of cover material that is to the satisfaction of the director, on all exposed solid waste at least once per month while in use. The director may vary the frequency of covering when freezing conditions adversely affect normal operation or when sufficient quantities of soil material are incorporated with the waste.	Yes	The landfill was not active in 2020. Following their Main Landfill inspection, Wood recommended covering exposed materials in 2021.
2.8	The permittee must use the best practical means available to prevent the scatter of litter at the site. The permittee must clean up any litter scattered at a minimum of twice per year.	Yes	As no reclamation activities occurred on site in 2020, thus no litter was generated. Due to cleanup efforts by SnipGold from 2016-2020, most scattered litter has been removed. Additionally, SnipGold staff visited the site on October 7, 2020 and during the site visit collected and removed scattered litter (pers. Comm. Jessy Chaplin, 2020).
2.9	The permittee must apply final cover to all areas of the site that have reached final landfill elevations as soon as practical thereafter. Final cover requirements must be in accordance with the approved 2018 Johnny Mountain Mine TAR Chapter 3.2 Facility Design, Operation, and Closure Plan.	Yes	Final cover has not yet been applied as the landfill has not reached final capacity or elevation yet.
2.10	The director may require the permittee to construct or modify works, or follow specific operating instructions, if the director is of the opinion that there is a possibility of a nuisance or hazard being caused by bears or other animals that are attracted to the site.	Yes	No wildlife incidents were recorded in 2020.
2.11	The permittee must not deposit or store waste at the site at less than 1.22 metres above the highest groundwater level at the site.	Yes	Fill from Borrow Area 3 was placed in the Main Landfill to provide site grading to keep water from contacting the buried waste, including providing a minimum 1.22 m (4 feet) separation from groundwater (Post Construction Report - 2019 Main Landfill Upgrades report (Wood 2020)). No material was added to the Landfill in 2020.

Authorized Person Initial: 

Date: Mar 31, 2021



CONDITION NUMBER	CONDITION DESCRIPTION	COMPLIANT? (Yes/No/ND)	ACTION TAKEN
2.12	The permittee must comply with all applicable provisions of the Hazardous Waste Regulation of the Environmental Management Act when handling and disposing any hazardous waste generated during the mine reclamation. Hazardous waste as defined by the regulation is not authorized for discharge to the Main Landfill. Where conflict exists between this permit and the Hazardous Waste Regulation, the latter must take precedence.	Yes	No suspected hazardous/hazardous waste was identified in 2020.
2.13	Following the excavation of Burial Sites #1 and #2, the permittee must complete confirmatory soil sampling and analysis from the walls and floors of the excavations to confirm removal of all waste material. The confirmatory testing must be completed in a manner consistent with the Technical Guidance 1 on Contaminated Sites, "Site Characterization and Confirmation Testing". Results and interpretations of the confirmatory soil testing must be submitted as part of the annual report required by Section 3.	Yes	Disposal (Burial) Sites #1, #2 and undocumented Disposal Site #3 were fully excavated in 2018. Confirmatory Soil sampling was conducted and reported on in the 2018 Iskut Project/JMM Annual Reclamation Report. Northwest Response completed both the excavation and relocation of the waste and the confirmatory sampling.
2.14	At the start of the reclamation activities the permittee must develop, implement and then maintain erosion prevention and sediment control measures. Each snow-free season, until the end of the authorization provided in section 1.1, a Qualified Professional must assess whether those controls are being undertaken and are effective. That assessment, including recommended updates to the control measures, must be submitted as part of the annual report required by section 3.	Yes	In 2019 a QP from Wood assessed the Main Landfill sediment erosion controls and found them to be effective (Post Construction Report - 2019 Main Landfill Upgrades report (Wood 2020))
2.15	The permittee must annually monitor groundwater and surface water downslope from the Main Landfill for a period of five years, starting in summer 2018. Monitoring sites include MW17-22A, MW17-22B and Sky Creek 1.0. Results and interpretations of the water monitoring program specified above must be submitted as part of the annual report required by section 3.	Yes	Ground and surface water was monitored at MW17-22A, MW17-22B and Sky Creek 1.0 (JM10-2018) during the 2020 season. Results are presented in the JMM Annual Report for 2020: Environmental Management Act Permit PR-7927.
3	The permittee must, on or before each March 31 that occurs during the term of this Authorization, submit such data, operating and discharge periods for the preceding calendar year to the director, by email at EnvAuthorisationsReporting@gov.bc.ca or as otherwise instructed by the director, in a form that is tabulated, graphically represented and interpreted to the satisfaction of the director.	Yes	N/A
4.1	The permittee must immediately notify the director or designate by email at EnvironmentalCompliance@gov.bc.ca, or as otherwise instructed by the director of any non-compliance with the requirements of this Authorization by the permittee and take remedial action to remedy any effects of such non-compliance. The permittee must provide the director with written confirmation of all such non-compliance events, including available test results within 24 hours of the original notification by email at EnvironmentalCompliance@gov.bc.ca, or as otherwise instructed by the director.	Yes	No non-compliances related to Permit PR-7927 occurred in 2020.

Authorized Person Initial: \_\_\_\_\_

Date: Mar 31, 2021

CONDITION NUMBER	CONDITION DESCRIPTION	COMPLIANT? (Yes/No/ND)	ACTION TAKEN
4.2	If the permittee fails to comply with any of the requirements of this Authorization, the permittee must, within 30 days of such non-compliance, submit to the director a written report that is satisfactory to the director and includes, but is not necessarily limited to, the following: a. All relevant test results obtained by the permittee related to the non-compliance, b. An explanation of the most probable cause(s) of the non-compliance, and c. A description of remedial action planned and/or taken by the permittee to prevent similar non-compliance(s) in the future. The permittee must submit all non-compliance reporting required to be submitted under this section by email at EnvironmentalCompliance@gov.bc.ca or as otherwise instructed by the director.	Yes	No non-compliances related to Permit PR-7927 occurred in 2020.
5	The permittee must immediately report all spills to the environment (as defined in the Spill Reporting Regulation) in accordance with the Spill Reporting Regulation, which among other things, requires notification to Emergency Management BC at 1-800-663-3456.	Yes	No reportable spills were recorded on site in 2020

Authorized Person Initial: \_\_\_\_\_



Date: \_\_\_\_\_

Mar 31, 2021

APPENDIX H      2008 ENV OFFICIAL WARNING LETTER ISSUED TO  
SKYLINE GOLD CORPORATION



The Best Place on Earth

June 11, 2008

File: PR-7927

**REGISTERED MAIL**

JIM SMULDERS  
PRESIDENT  
SKYLINE GOLD CORPORATION  
SUITE 212 - 10451 SHELLBRIDGE WAY  
RICHMOND BC V6X 2W8

**OFFICIAL WARNING – UNAUTHORIZED BURNING AND BURIAL OF WASTE**

During a meeting of the Northwest Mine Development Review Committee on March 27, 2008, Skyline Gold Corporation disclosed information regarding reclamation activities that were undertaken at the Johnny Mountain Mine in 2007. Buildings were reported to have been burned and demolition materials and scrap metals were reported to have been buried on site.

Authorization under the *Environmental Management Act* is required for scheduled activities as defined in the Waste Discharge Regulation. Burning of Waste is a Schedule 1 activity, and an Industrial Non-hazardous Waste Landfills is a schedule 2 activity. No authorization for the above reclamation activities was obtained in 2007.

You are warned that you are in non-compliance with Section 6(3) of the *Environmental Management Act*, which states: "A person must not introduce or cause or allow to be introduced into the environment, waste produced by a prescribed activity or operation" without authorization from a permit, approval, order or through compliance with a regulation.

In order to determine if pollution may occur from the buried demolition debris from the Johnny Mountain Mine under Mine Reclamation Permit M-178, legally described as District Lots 7031 and 7032, Cassiar District, owned and/or operated by SKYLINE GOLD CORPORATION, of Suite 212, 10451 SHELLBRIDGE WAY, RICHMOND, BRITISH COLUMBIA, the ministry requires Skyline Gold Corporation undertake the following:

1. Obtain a qualified professional to complete a site investigation and oversee any remedial actions required to bring the site in compliance with the *Environmental Management Act* and its associated legislation. Forward the name of the selected qualified professional to the Manager, Environmental Protection Division, Ministry of Environment (MOE), Skeena Region, by June 30, 2008.

2. The site investigation must include the following:
- i. Provide a detailed summary of all activities undertaken in 2007 related to reclamation of the Johnny Mountain Mine site – including: the locations, estimated volumes and descriptions of all materials burned, description of all waste materials and approximate volumes of materials buried on site, and a description of any materials removed from site as well as the location(s) the materials were moved to.
  - ii. Itemize all hazardous wastes as defined in the Hazardous Waste Regulation that were on site as of October 13, 1999, and detail the disposal of the items, including: copies of all relevant records that confirm the fate of the hazardous materials. Any hazardous wastes remaining on site or buried on site must be identified and a plan prepared detailing proper disposal for the wastes.
  - iii. Carry out field investigations, which includes test pitting and trenching, to confirm the following:
    - location of all buried waste/disposal sites;
    - the materials buried;
    - an estimated volume of waste buried at each location;
    - the depth of the bottom of the trench;
    - depth of cover over the buried materials; and
    - to characterize the site conditions around the disposal sites including:
      - a. a description of the overburden and underlying bedrock;
      - b. depth to the seasonal high water table;
      - c. approximate direction of groundwater flow; and
      - d. distances to nearby surface water bodies from the disposal areas.
  - iv. Provide detailed maps showing all locations of buried materials on site, and indicating approximate volumes of waste at each location. Maps must show contours, water courses, and outlines of the disposal locations.
  - v. Assess the suitability of the disposal areas in comparison with “British Columbia Landfill Criteria for Municipal Solid Waste”. Detail any sites not meeting the criteria and identify suitable alternative sites for disposal.
  - vi. Submit the above information in a site investigation report to the Manager, Environmental Protection Division, MOE, Skeena Region, by August 15, 2008.
3. Relocation of unsuitably buried materials identified in the site investigation report will be required. The material must be reburied at locations approved by the Ministry of Environment and the Ministry of Mines, Energy and Petroleum Resources. Burial of the

relocated materials shall be in a manner approved in writing by the Ministry of Environment.

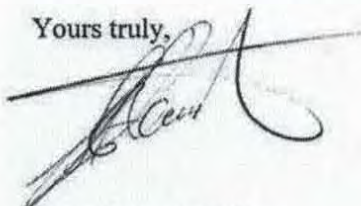
4. Any hazardous wastes found buried, or remaining on site, must be properly disposed of in an authorized facility. Copies of the manifests shall be submitted to the Manager, Environmental Protection Division, MOE, Skeena Region, following delivery of the wastes to the disposal facility. Removal of any remaining hazardous wastes shall be completed by September 15, 2008.

Failure to comply with the requirements of this letter will lead to escalating enforcement and may result in legal action.

It is your responsibility to ensure that all activities are carried out with due regard for the rights of third parties, and comply with other applicable legislation, such as the *Mines Act* and the *Heritage Conservation Act*, that may be in force.

If you have any questions, please call me at 250-847-7416.

Yours truly,



Craig Stewart, P. Geo.  
For Director, *Environmental Management Act*  
Environmental Protection – Skeena Region  
Ministry of Environment

cc: Jill Pardoe, Ministry of Mines, Energy and Petroleum Resources

## APPENDIX I      COMMUNICATION WITH B. VROOM (2021)

**From:** Carey deHoog <[Carey@seabridgegold.com](mailto:Carey@seabridgegold.com)>  
**Sent:** March 4, 2021 4:13 PM  
**To:** Jessy Chaplin <[jessy@seabridgegold.com](mailto:jessy@seabridgegold.com)>  
**Cc:** Elizabeth Miller <[elizabeth@seabridgegold.com](mailto:elizabeth@seabridgegold.com)>; Lionel Sequeira <[lionel@seabridgegold.com](mailto:lionel@seabridgegold.com)>  
**Subject:** FW: PR 7927 (Johnny Mountain) - can you help or point me in the right direction?

Hi Jessy,

I'm not sure where to go with this one now. This response is a bit frustrating..... Bryan called this afternoon (Mark forwarded the request to him). When we spoke he mentioned the 2020 non-compliance and I thought I was pretty clear in asking him not to confuse the two issues and that I was looking for a response on the 2008 warning letter.

Bryan wasn't familiar with the past issues or annual reports but did read the 2008 letter. I don't think he looked at the report from Northwest Response even though I requested he do so. I am wondering if following up with "J Green" (from 2019 ARR reference) is a better approach. Getting passed on to different people in their Ministry is certainly not helping! It seems no one wants to take the time to acknowledge the work Seabridge has done!

We can talk more about this at tomorrow's meeting.

~Carey

**From:** Vroom, Bryan ENV:EX <[Bryan.Vroom@gov.bc.ca](mailto:Bryan.Vroom@gov.bc.ca)>  
**Sent:** March 4, 2021 3:08 PM  
**To:** Carey deHoog <[Carey@seabridgegold.com](mailto:Carey@seabridgegold.com)>  
**Cc:** Love, Mark P ENV:EX <[Mark.Love@gov.bc.ca](mailto:Mark.Love@gov.bc.ca)>  
**Subject:** FW: PR 7927 (Johnny Mountain) - can you help or point me in the right direction?

Hi Carey,

Thanks for returning my call earlier. As discussed there was a data review inspection completed last spring where it was determined that an unauthorised discharge occurred with burning of waste fuel. I have attached the 2020 inspection records for your convenience along with an inspection record from 2015. I have also included the final Administrative Penalty determination letter from July 2020 that arose from the unauthorised burning of waste fuel.

You have asked that the Ministry 'sign off' that the actions stated in a June 11, 2008 warning letter related to unauthorised burial of waste and related contamination are complete. The activities to remove buried waste and related contamination are described in the 2019 annual report that was submitted in 2020. I cannot 'sign off' on the remediation activities. What I can say is that the ministry does not anticipate further inspections on the matters referred to in the 2008 warning letter at this time, but there is no limitation on our ability to do so. You are reminded that it is the responsibility of the waste discharger to comply with the *Environmental Management Act* (EMA) and its regulations, including the Contaminated Sites Regulation.

Best regards.



Bryan Vroom, M.Sc., P.Ag.  
Section Head, Heavy Industry  
Compliance Team : Regional Operations Branch : Environmental Protection Division  
Ministry of Environment and Climate Change Strategy

2080A Labieux Road, Nanaimo, BC V9T 6J9  
[bryan.vroom@gov.bc.ca](mailto:bryan.vroom@gov.bc.ca)  
250 739 8215

To report an act of pollution call the RAPP line at 1-877-952-7277 or #7277 on the TELUS Mobility Network. If the situation is not an emergency, report the incident [online](#) or contact the nearest [Conservation Officer Service district office](#).

More information about Environmental Compliance and how it is assessed can be found [here](#).

 [@ComplianceBC](#)

**From:** Carey deHoog <[Carey@seabridgegold.com](mailto:Carey@seabridgegold.com)>  
**Sent:** March 3, 2021 11:28 AM  
**To:** Love, Mark P ENV:EX <[Mark.Love@gov.bc.ca](mailto:Mark.Love@gov.bc.ca)>  
**Cc:** Jessy Chaplin <[jessy@seabridgegold.com](mailto:jessy@seabridgegold.com)>; Elizabeth Miller <[elizabeth@seabridgegold.com](mailto:elizabeth@seabridgegold.com)>; Lionel Sequeira <[lionel@seabridgegold.com](mailto:lionel@seabridgegold.com)>  
**Subject:** RE: PR 7927 (Johnny Mountain) - can you help or point me in the right direction?

[EXTERNAL] This email came from an external source. Only open attachments or links that you are expecting from a known sender.

Hi Mark,

Thanks for returning my call. As discussed, please see attached letter from 2008 where the original order was issued. In reading it again, it seems to be an official warning but the content of the letter does indicate an action by SnipGold. It was originally issued by Craig Stewart (not Jim, my mistake).

Thanks again for following up with your compliance team. It would be great to have a response from MOE stating that the clean up work is to the satisfaction of the Ministry for this year's annual report.

~Carey

**From:** Carey deHoog  
**Sent:** March 2, 2021 7:48 AM  
**To:** 'mark.love@gov.bc.ca' <[mark.love@gov.bc.ca](mailto:mark.love@gov.bc.ca)>  
**Subject:** PR 7927 (Johnny Mountain) - can you help or point me in the right direction?

Good morning Mark!

It's been such a long time since I've seen you! I am now working for Seabridge Gold – made the jump to industry early this year.

I wonder if you would be able to point me in the right direction? I am looking to find a response from MOE on the 2018 cleanup work that was done by SnipGold following unauthorized burial of waste in burial sites 1 & 2 (form 2008) at the Johnny Mountain site.

The response we received in early 2020 indicated a desktop inspection would likely take place last year (2020) as no onsite inspections were being done during the pandemic. This response came from J. Green and mentioned 'the Officer conducting the inspection' would be in touch.

Are you able to tell me who that would be so I can follow up with them? We are looking to close off this piece for the 2020 Annual Report.

Thanks!

Carey deHoog  
Permitting Specialist

**SEABRIDGE GOLD**

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APPENDIX G      JOHNNY MOUNTAIN 2020 TAILINGS STORAGE FACILITY AND  
PORTAL HYDROLOGIC MONITORING SUMMARY (RTEC 2021C)



## Johnny Mountain Mine

### 2020 Tailings Storage Facility and Portal Hydrologic Monitoring Report

March 2021

Project No.: 0539378-0008

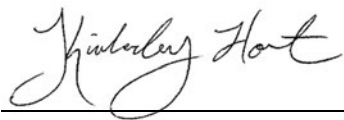


**Signature Page**

March 2021

# Johnny Mountain Mine

## 2020 Tailings Storage Facility and Portal Hydrologic Monitoring Report



---

Kimberley Hort, EIT  
Hydrology Consultant



---

Wade Brunham, M.Sc., R.P.Bio  
Partner

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## EXECUTIVE SUMMARY

The Johnny Mountain Mine is a closed underground gold mine located in the Coast Mountain Range of British Columbia, approximately 100 km northwest of Stewart, BC. The site is situated on a sub-alpine plateau surrounded by steep valleys, and is located near the confluence of the Craig and Iskut rivers. The northwest face of Johnny Mountain is covered by an alpine glacier.

Snip Gold Corporation (SnipGold), a subsidiary of Seabridge Gold Inc., acquired the property on June 21, 2016. Hydrometric stations were established for the open-water season at two locations receiving discharge or seepage from the tailing storage facility (TSF) in 2016. In 2017, these two stations were re-established in the same location, and seasonal hydrometric monitoring was extended to the three portal locations on site. For 2018, seasonal hydrometric monitoring continued at the locations monitored in 2017. In 2019, all stations were re-established and monitoring of the level 10 portal was consolidated into one location due to the completion of reclamation work on the portal. In 2020, the stations were re-established and the current status of monitoring discharge from the portals is a single hydrometric location at each of the level 10, level 11, and level 12 portals.

The objective of the 2020 program was to continue monitoring the water discharging/seeping from the Johnny Mountain TSF (two locations) and three portal discharge locations (level 10, level 11, and level 12 portals). Both automated and manual monitoring methods were used. Automated hydrometric monitoring stations were installed at the two TSF locations and at the level 10 portal. The level 11 and level 12 portal locations are not amenable to installing hydrometric stations due to minimal discharge volumes, and discharge at these locations was measured using manual measurements. Stage-discharge rating measurements were completed at each station and rating curves were developed. The rating curves were applied to the stage data and hydrographs for the monitoring period generated for the three stations.

This report presents the results from the 2020 hydrometric monitoring of the TSF and portal stations. Section 2 presents the methodology used for the fieldwork and the analyses, Section 3 presents the results and a short summary. Raw data are included as appendices to this report.

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## ACRONYMS AND ABBREVIATIONS

7-day low flow	The minimum 7-day-average flow that occurs over a specific period, such as a month, season or year
Baseflow	The groundwater component of flow discharge that is attributed to soil moisture and groundwater drainage into a channel
BC	British Columbia
ERM	ERM Consultants Canada Ltd.
Freshet	Streamflow response to snowmelt and spring rains
Hydrograph	A graphical plot of water discharge versus time
ISO	International Organization for Standardization
kg	Kilogram
km	Kilometre
km <sup>2</sup>	Square Kilometre
m	Metre
MAD	Mean annual discharge
MASL	Meters above sea level
mm	Millimeter
m/s	Meters per second, a unit of velocity
m <sup>3</sup> /s	Meters cubed per second, a unit of discharge
NAD83	North American Datum 1983, geodetic reference system
Q	Discharge
QA/QC	Quality assurance/ quality control
RISC	Resources Information Standards Committee

RTEC	Rescan Tahltan Environmental Consultants. A partnership between the Tahltan Nation Development Corporation and Rescan Environmental Services Ltd. (now ERM)
Runoff	Runoff is a measure of the hydrological response of a watershed. It is often presented as a depth, in mm, over a n entire watershed allowing direct comparison with precipitation totals
R <sup>2</sup>	Root mean square
Seabridge	Seabridge Gold Inc.
SnipGold	SnipGold Corporation, a subsidiary of Seabridge Gold Inc. acquired the Iskut Project on June 21, 2016
Stage	Elevation of water surface above a datum
Stage-Discharge Curve (Rating Curve)	A curve derived from concurrently measured water level (stage) and flow (discharge) data; often referred to as a rating curve for a hydrometric station
TSF	Tailings Storage Facility
UTM	Universal Transverse Mercator coordinate system, uses NAD 83 reference system
Watershed	The geographical area drained by a river and its tributaries; an area characterized by all runoff being conveyed to the same outlet.
WSC	Water Survey of Canada

## 1. INTRODUCTION

The Johnny Mountain Mine is a closed underground gold mine located in the Coast Mountain Range of British Columbia, approximately 100 km northwest of Stewart, BC (Figure 1-1). The site is situated on a sub-alpine plateau surrounded by steep valleys, and is located near the confluence of the Craig and Iskut rivers. The northwest face of Johnny Mountain is covered by an alpine glacier.

Snip Gold Corporation (SnipGold), a subsidiary of Seabridge Gold Inc., acquired the property on June 21, 2016. In July 2016, RTEC conducted a site visit along with SnipGold in order to determine potential hydrological monitoring locations around the Tailings Storage Facility (TSF). Two hydrometric monitoring stations were established later in the summer of 2016 in order to monitor the passive surface water overflow of the TSF (northeast side) and low volume seepage from the southwest side of the TSF. The stations were removed prior to the streams freezing.

In 2017, the two TSF hydrometric stations were re-installed, two new stations were established to monitor discharge from the level 10 portal, and discharge measurements were collected at level 11, and level 12 portals.

For 2018, hydrometric monitoring was continued at the 2017 locations.

For 2019, hydrometric monitoring was continued at the 2018 locations, with the exception of a single consolidated station at the level 10 portal due to the completion of reclamation activities. During the late summer of 2018, the secondary level 10 portal was decommissioned, resulting in a single discharge from the reclaimed portal.

For 2020, hydrometric monitoring was continued at the 2019 locations.

This report presents the results from the 2020 hydrometric monitoring of the TSF and portal stations. Section 2 presents the methodology used for the fieldwork and the analyses, Section 3 presents the results and a short summary. Raw data are included as appendices to this report.

**Figure 1-1  
Project Location**



## 2. METHODS

### 2.1 General Overview

The 2020 program focussed on water originating from the TSF and three portals (level 10, level 11, and level 12), which are located on the plateau at approximately 1,100 masl, and on the slope of Johnny Mountain immediately above the plateau (Figure 2.1-1).

Water from the TSF flows into two drainage systems:

#### 1. Northeast:

On the northeast side water is passively discharged from the TSF via an overflow spillway and monitored at hydrometric station JTN-H1. The overflow water from the TSF is directed to Johnny Creek, which enters Bronson Creek before draining into the Iskut River.

#### 2. Southwest:

On the southwest side, small volumes of water are collected into a drainage ditch and monitored at hydrometric station JTS-H1. This small water volume reflects rain, snowmelt, and seepage from the TSF. Seepage water on the southwest side of the TSF and the discharge from the three portals drain into upper Stonehouse Creek, which drains into the Craig River. The Craig River flows into the Iskut River approximately 10 km downstream of where Bronson Creek enters the Iskut River.

The Iskut River flows west, joining the Stikine River which discharges into the Pacific Ocean near Wrangell, Alaska, approximately 80 km west of the Johnny Mountain site.

### 2.2 Overview of 2020 Field Program

The 2020 field program was carried out between June and October 2020, with the overall objective of re-establishing and maintaining the two TSF and three portal hydrometric monitoring locations. The 2020 field program included:

- re-installing continuous hydrometric stations;
- collecting stage-discharge measurements;
- maintaining station instrumentation; and
- downloading data.

The first site visit was conducted in mid-June (Photo 2.2-1). This site visit included re-installation of two hydrometric stations: one station for the TSF discharge/seepage location (JTS-H1), and one station for the level 10 portal location (P10-A). Due to the depth of snow present at the time of the June site visit and inclement weather hindering safe access to the plateau, hydrometric station JTN-H1 could not be re-installed at that time and was re-installed in July. The level 11 and level 12 portal locations are not amenable to installing hydrometric stations due to minimal discharge volumes each year. Discharges at these locations are measured using manual measurements rather than automated measurements (hydrometric stations). Figure 2.1-1 shows the locations of the monitoring stations and Table 2.2-1 provides station details.

There were five site visits in total in 2020, the dates of each site visit is presented in Table 2.2-1.



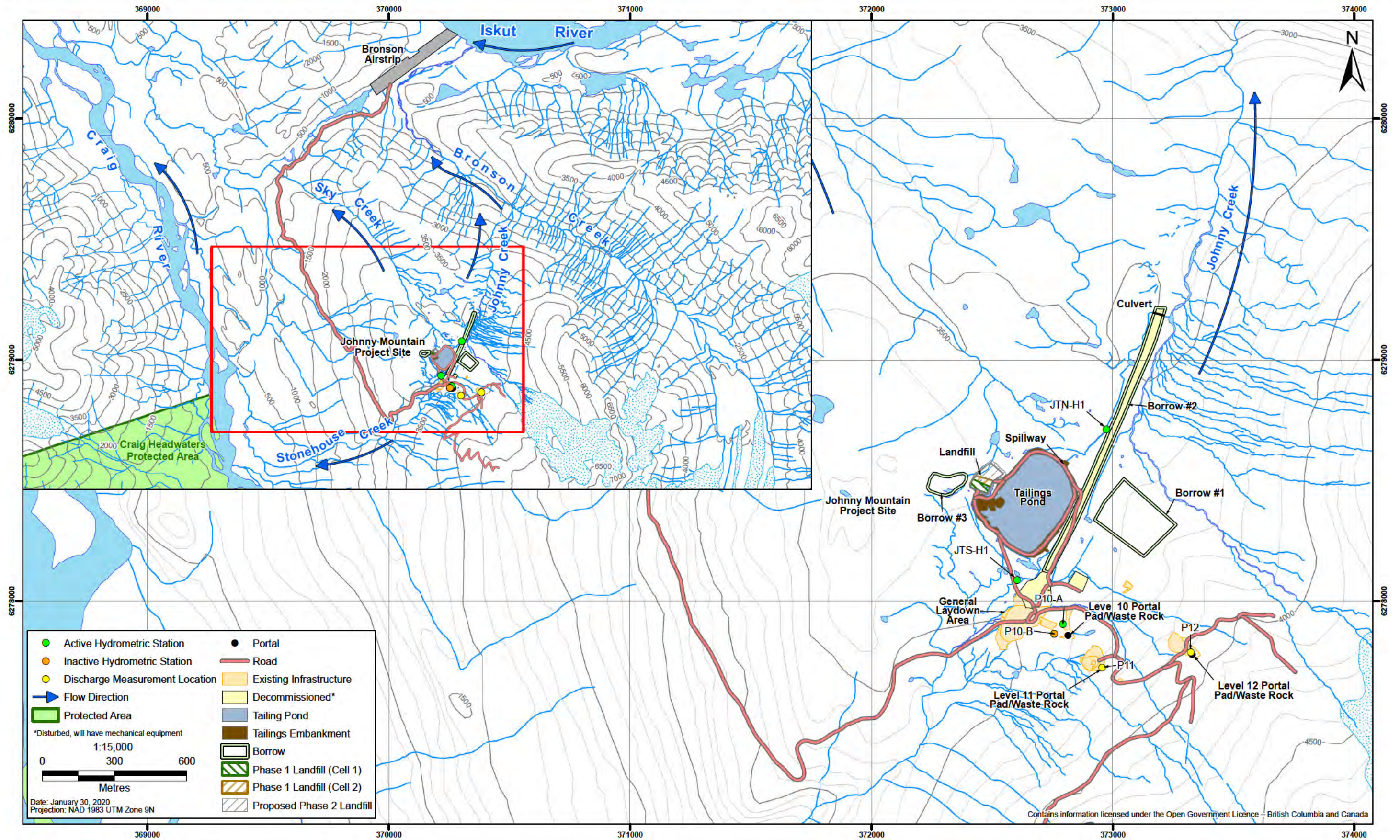
Photo 2.2-1: Snow conditions near the TSF in June. June 14, 2020.

Table 2.2-1: 2020 Tailings Storage Facility and Portal Hydrometric Monitoring Stations

Station	Location	Easting	Northing	Period of Operation
JTS-H1	Downstream of seepage. Small stream ~100 m southwest of the TSF. Discharges into Stonehouse Creek.	372,609	6,278,081	Sep 24 - Oct 24 (2016) Apr 28 - Jun 22 (2017) Jun 9 - Oct 21 (2018) Jun 27 - Oct 31 (2019) Jun 14 - Oct 17 (2020)
JTN-H1	Downstream of passive spillway. Small stream ~230 m northeast of the TSF. Discharges into Johnny Creek.	372,973	6,278,720	Sep 24 - Oct 24 (2016) Jul 8 - Oct 24 (2017) Jun 10 - Oct 21 (2018) Jun 27 - Oct 31 (2019) Jul 9 - Sep 24 (2020)
P10-A	Level 10 portal discharge around the northeast side of the old mill building. Relocated in 2019 due to reclamation work to ~40 m downstream of portal discharge culvert.	372,802	6,277,921	Jun 9 - Oct 24 (2017) Jun 9 - Aug 29 (2018) Jun 27 - Oct 31 (2019) Jun 14 - Oct 17 (2020)
P10-B	Level 10 portal discharge around the southwest side of the old mill building. Station is deactivated as of August 2018 reclamation work.	372,758	6,277,865	Jun 9 - Oct 24 (2017) Jun 9 - Aug 28 (2018)
P11	Level 11 portal discharge upslope of the old mill building.	372,955	6,277,725	31-Aug-20 25-Sep-20 17-Oct-20
P12	Level 12 portal discharge upslope of the old mill building.	373,324	6,277,787	14-Jul-20 31-Aug-20 24-Sep-20 17-Oct-20

Note:  
UTM NAD 83, Zone 9V

Figure 2.1-1  
Hydrometric Monitoring Stations



## 2.3 Hydrometric Station Setup

Stations JTS-H1 and JTN-H1 consisted of PS98i® 0-5 PSI vented pressure transducers (accuracies of  $\pm 0.25\%$  FSO) paired with GDL® data loggers (Instrumentation Northwest Inc.). The portal monitoring station P10-A consisted of a DI601 10 m Micro-Diver® pressure transducer (accuracies of  $\pm 1.0$  cmH<sub>2</sub>O with a 0.2 cmH<sub>2</sub>O resolution) with internal data logger paired with another DI601 10 m Micro-Diver acting as a barologger (Schlumberger Water Services). The instruments were set to record water level at ten minute intervals. A station information sheet for each monitoring location is presented in Appendix A.

### 2.3.1 Hydrometric Station JTS-H1 (Tailings Storage Seepage)

Hydrometric monitoring station JTS-H1 was re-established in the pool approximately 100 m southwest of the TSF where a series of seepage collection ditches converge into a single channel (Photo 2.3-1). The pressure transducer and cabling were inserted into a flexible aluminum conduit with one end of the conduit secured in an aluminum pipe. The aluminum pipe was then placed into the water and secured to a large boulder using threaded anchor rods and quick-setting epoxy. The data logger was housed in a steel waterproof enclosure that was secured to the boulder above the high water mark. The water elevation at the station is controlled by a small cobble outflow channel at the southwest end of the gauging pool (i.e., a section control).



Photo 2.3-1: Hydrometric monitoring station JTS-H1 (tailings storage seepage). August 20, 2019.

### 2.3.2 Hydrometric Station JTN-H1 (Tailings Storage Spillway)

Hydrometric monitoring station JTN-H1 was re-installed in the channel that originates in the spillway on the northeast side of the TSF. The station is located approximately 230 m northeast of the TSF where a series of seepage collection ditches converge into a single channel with the main spillway channel (Photo 2.3-2). The pressure transducer and cabling were inserted into a flexible aluminum conduit with one end of the conduit secured in an aluminum pipe. The aluminum pipe was installed at



a shallow angle, parallel to the ground surface, extending into the channel and secured to rebar pounded into the bank and bed. The data logger was housed in a steel waterproof enclosure that was secured on the channel bank above the high water mark. The water elevation at the station is controlled by the channel slope and bed material along the gauging reach (i.e., a channel control).



Photo 2.3-2: Hydrometric monitoring station JTN-H1 (TSF spillway). July 24, 2019.

### 2.3.3 Hydrometric Station P10-A (Level 10 Portal A)

Hydrometric monitoring station P10-A was re-installed in the channel that originates in the level 10 portal and flows northeast around the former mill building. The station is located in a pool 40 m downstream of the level 10 portal culvert outflow (Photo 2.3-3). Water level in the pool is controlled by the height of the pool's outflow. The pressure transducer was fixed to a piece of stationary rebar that was driven into the stream bed at the inflow of the pool. The barologger was fixed to a piece of stationary rebar that was driven into the ground beside the pool.

### 2.3.4 Monitoring Location P11 (Level 11 Portal)

A culvert was positioned during the 2017 reclamation work to capture the water discharging from the level 11 portal (Photo 2.3-4). The site was assessed for monitoring in 2017 and it was determined that establishing a continuous monitoring station was not feasible due to the minimal flow from the portal. In 2017 through 2020, manual volumetric discharge measurements were obtained at the site. In September 2020, the culvert was manually dug out and cleared during a site visit to collect manual volumetric discharge measurements.



*Photo 2.3-3: Hydrometric monitoring station P10-A (Level 10 Portal A), looking upstream, August 29, 2019.*



*Photo 2.3-4: Hydrometric monitoring location P11 (Level 11 Portal; discharge measurements only).  
September 25, 2020.*

### 2.3.5 Monitoring Location P12 (Level 12 Portal)

Similar to the reclamation work at P11, a culvert was positioned to capture the water discharging from the level 12 portal (Photo 2.3-5). The site was assessed for monitoring in 2017 and it was determined that establishing a continuous monitoring station was not feasible due to the minimal flow from the portal. In 2017 through 2020, manual volumetric discharge measurements were obtained at the site.



*Photo 2.3-5: Hydrometric monitoring location P12 (Level 12 Portal; discharge measurements only).  
September 24, 2020.*

## 2.4 Hydrometric Station Surveys

Pressure transducers can be subject to electronic drift and sensor fouling, presenting challenges for developing rating curves without a fixed elevation control. To establish and maintain a consistent elevation, all stage (i.e., the height of the water surface) data are referenced to an arbitrary (gauge) datum. The water surface is surveyed to this datum during station visits, allowing the continuous data to be post-processed and corrected to gauge height, as well as for fouling and sensor drifts to be removed.

The gauge datum is a critical concept in hydrometric monitoring. It is established using a series of benchmarks, which are physical installations, typically occurring within a network at each monitoring station. Concrete expansion bolts, secured into bedrock and/or large stable boulders near the monitoring station, are frequently used as benchmarks. Continuity of the gauge datum is assured through correct installation of benchmarks and completion of station surveys.

Assigning benchmark elevations, and thus the gauge datum, can be done in a variety of ways, but continuity throughout data collection is critical. Three bench marks were installed at each station (Table 2.4-1) above the maximum expected water level. One bench mark at each station was assigned to be the primary reference point, and given an arbitrary local elevation of 100.000 m. All bench marks and recorded water levels were referenced to the gauge datum, 100.000 m below the primary bench mark.

Table 2.4-1: Hydrometric Monitoring Station Benchmarks

Station	Benchmark	Elevation <sup>1</sup>	Benchmark Information
JTS-H1	BM 1	100.000	Concrete expansion bolt in bedrock outcrop ~25 m north (upstream) of station.
	BM 2	100.240	Concrete expansion bolt in bedrock outcrop ~25 m north (upstream) of station. ~5 m east of BM 1.
	BM 3	99.603	Concrete expansion bolt in boulder that data logger is secured on.
JTN-H1	BM 1	100.000	Concrete expansion bolt in bedrock outcrop ~80 m north (downstream) of station.
	BM 2	100.063	Concrete expansion bolt in bedrock outcrop ~80 m north (downstream) of station. ~5 m east of BM 2.
	BM 3	100.011	Concrete expansion bolt in bedrock outcrop ~80 m north (downstream) of station. ~5 m east of BM 3.
P10-A	BM 1	100.000	Concrete expansion bolt in bedrock outcrop ~15 m upstream of pressure transducer.
	BM 2	99.221	Concrete expansion bolt in bedrock outcrop ~1 m upstream of pressure transducer.
	BM 3	99.101	Concrete expansion bolt in bedrock outcrop beside pressure transducer on south shore of the TSF.

Note:

<sup>1</sup> Elevation is height (m) relative to the gauge datum, 100.000 m below the reference point (BM 1).

## 2.5 Discharge Measurements

Manual flow measurements were performed during the five site visits in 2020 to obtain a range of measured discharges under different flow conditions. Manual flow measurements were carried out at each site using one of two methods, depending on flow conditions:

- A hand-held current velocity meter: used to complete velocity-area measurements in the channels with sufficient flows.
- A volumetric method: used to measure discharge in channels where flows are too minimal for the velocity-area method.

### 2.5.1 Velocity-Area Measurements

The location of the measurement section was determined based on channel geometry and flow conditions at the time of measurement. Generally, the stream was measured along a straight reach near the monitoring station where the bed and flow conditions were relatively uniform. Areas with highly turbulent flow and/or immovable rocks were avoided where feasible. Current velocities were measured using a Hach FH950™ handheld electromagnetic current meter (velocity measurement accuracies of  $\pm 2\%$  of reading  $\pm 0.015$  m/s through the range 0 to 3.04 m/s). A fixed sampling interval of 40 seconds was selected for each velocity measurement, during which an average velocity was determined.

Measurements of velocity, depth, and distance across the channel were obtained (Photo 2.5-1) to determine the total stream discharge during each station visit. A minimum of 20 measurements are typically taken across the width of a channel, with the aim of having each vertical or observation interval accounting for less than 10% of the total discharge (RISC 2018). Where channels were too

narrow to obtain 20 vertical observations, technicians used a 5 cm spacing interval to obtain as many measurements as possible. This method assumes that the velocity measured at each vertical represents the mean velocity in that segment. During the velocity measurements, the water velocities were measured at 60% of the water depth, from water surface. The measurement at 60% of the water depth is generally accepted as representing the mean velocity of the vertical water column (Herschy 2009). In all cases, field methods adhered to the *Manual of British Columbia Hydrometric Standards* (RISC 2018) and Water Survey of Canada (WSC) operating procedures (Terzi 1981).



*Photo 2.5-1: Velocity-area discharge downstream of the JTN-H1 (TSF) monitoring station using a handheld velocity meter. June 27, 2019.*

### **2.5.2 Volumetric Measurement**

Volumetric measurements were conducted at two sites (P11 and P12) where flows were too minimal to submerge the current velocity meter and accurately measure discharge using the velocity-area method. Volumetric measurements were conducted at the outlets of the elevated culverts that discharge out of the portals (Photo 2.5-2). To determine discharge during each site visit, five consecutive measurements were conducted with the average being taken as the total discharge. Measurements were conducted using a collection receptacle, a stopwatch to measure the time and a graduated cylinder to determine the volume of water collected in the receptacle. Field methods adhered to the standard of having a difference between measurements within 5% when feasible (RISC 2018). In some instances, during and following extended periods of rainfall, groundwater discharges continuously increased during field measurement sampling and field measurements exceeded the standard of a 5% difference.



*Photo 2.5-2: Volumetric discharge measurement using a collection receptacle, a stopwatch to measure the time and a graduated cylinder to determine the volume of water collected in the receptacle. July 24, 2019.*

## 2.6 Rating Curve Development

Empirical relationships between measured stage and discharge (i.e., rating curves) were developed to provide a continuous record of the discharge at the monitoring sites (ISO 2010). Once the rating curve is established for a monitoring site, continuous stage data (i.e., stage data recorded at 10-minute intervals) can be converted into a continuous discharge data and presented as a discharge hydrograph. The quality of the discharge hydrograph depends on the quality of the rating curve. The quality of the rating curve depends on the following factors:

- amount of data;
- accuracy of data;
- distribution of the data points used to generate the curve; and
- hydraulic characteristics of the monitoring location.

Although a rating curve can potentially be developed with as few as two points, it is recommended to have a minimum of six (RISC 2018) or fifteen (ISO 2010) discharge measurements, well distributed through the range of flows, to properly develop a rating curve.

A minimum of five discharge measurements per year is recommended to meet “Grade A” standards for discharge data based on the *Manual of British Columbia Hydrometric Standards* (RISC 2018). Each additional stage-discharge measurement at varying flow conditions increases the range and robustness of the rating curve.

High discharge information often requires extrapolation beyond the range of the empirical field data used to generate the rating curve. Therefore, it is important to take measurements at high discharges to better define the upper end of the rating curve. The rating curve can also change from low flow periods to high flow periods due to seasonal influences, such as vegetation (Herschly 2009), or because of different channel geometries or hydraulic controls at low and high flow conditions. Rating curves are hydraulic functions expressed as an equation of the form:

$$Q = C (h - a)^b \quad (1)$$

where  $Q$  is the discharge ( $\text{m}^3/\text{s}$ ),  $C$  and  $b$  are dimensionless coefficients,  $h$  is the stage (water level; m), and  $a$  is the stage at zero flow (datum correction; m).

In accordance with industry standards, the practical development of the rating curves was completed using Aquarius™ Time Series Hydrologic Software (Aquatics Informatics Inc.). The software uses standard methods outlined by the United States Geological Survey and the International Organization for Standardization (Kennedy 1984, ISO 2010). The Aquarius™ interface allows the user to draw the rating curve in a logarithmic plot. Equation (1) is logarithmically transformed to equation (2), which is in the form of the equation of a straight line:

$$\text{Log } Q = \text{log } C + b \text{ log } (h - a) \quad (2)$$

The hydrometric technician can then determine characteristics that are evident in logarithmic plots and relate these to the type of control, the stream cross section, cross-section shape changes, and shifting control patterns (Sauer 2002). Root Mean Square (RMS) error, used by the Aquarius™ software as an overall measure of error of the stage-discharge relationship, is provided as an indicator of uncertainty. RMS error is a statistical parameter that describes how well the values predicted by the stage-discharge relationship fit or represent the observed data.

Rating curve uncertainty is critical in interpreting discharge records, and much of the uncertainty is associated with the extrapolation of the rating curve beyond field measurements. Guidelines suggest that 1.5 times (ISO 2010) or 2 times (Rantz et al. 1982) of the greatest manually measured discharge is the recommended limit of reliable extrapolation. All discharges obtained from curves extrapolated above the limit recommended by Rantz et al. 1982, are noted as having higher uncertainty in the daily discharge tables provided in Appendix B of this report.

## 2.7 Discharge Hydrographs

The measured discharge hydrographs were generated and presented as 10-minute and mean daily discharge. For the operational period, discharge was calculated at the 10-minute intervals by applying the developed rating curve equations to the recorded stage data; data from the data logger was first compensated to changes in barometric pressure using the data from the barologger. The 10-minute-interval discharge data were averaged over a 24-hour period to calculate mean daily discharge. The measured discharge hydrographs, presented as mean daily discharge, were then generated.

## 2.8 Quality Assurance and Quality Control

The hydrotechnical standards and methods employed during the program were consistent with standards published by the British Columbia Ministry of Environment and Climate Change Strategy (RISC 2018). These standards complement the national standards developed by the Environment Canada's Water Survey of Canada (WSC 1999).

RISC (2018) outlines three criteria for both water level data and discharge data that are used to assess and grade (i.e., A, B, C, E [estimated], and U [unknown]) the overall quality of hydrometric data:

- o instrumentation;
- o field procedures; and
- o data calculation and assessment.

The list provided below details the methods that were used in the study, with the aim to achieve high quality data based on the standards in each of the three criteria.

### 2.8.1 Instrumentation

Most instrumentation used and calibration/verification procedures comply with the highest quality data collection outlined in the RISC manual (i.e., Grade A). High accuracy recording data loggers and pressure transducers were used when possible for recording and determining of continuous water level at the hydrometric stations. Pressure transducers meeting RISC Grade C were used where flow conditions were more conducive to a smaller set ups than standpipes, due to low depth and unstable channel banks.

### 2.8.2 Field Procedures

The field procedures are designed to follow the highest standards outlined by RISC (Grade A). These include the use of a minimum of three benchmarks at each station, more than two level checks per year, 20 or more verticals (each accounting for <10% of the total discharge) in manual stream flow measurements, and five or more manual flow measurements per year.

Due to the narrow channel width at the some gauging locations, the number of vertical observations and percentage of flow in each panel of the flow measurements resulted in grade C data for this criterion.

### 2.8.3 Data Calculation and Assessment

Data calculations meet the high/mid-range of standards. Results are compared to other stations and years, and are reviewed for anomalies and deficiencies (Grade A). Discharge rating accuracy varies across the hydrometric monitoring network (between Grade A and B). Due to the unstable nature of the channels, rating curves often shift and rating points that are <15% (Grade B) from established curves are considered valid, although many of the points are with 5% (Grade A). Limited data collected to date does not meet the minimum recommended number of points used to develop some of the rating curves. Standards suggest that a minimum six (RISC 2018) to 15 (ISO 2010) field measurements are required to develop a robust single-segment rating curve. Rating curves having two and three segments are recommended to have a minimum of 14 and 22 field measurements, respectively, to develop robust rating curves (RISC 2018).

Additionally, RISC (2018) states: “hydrometric data should be graded as E (i.e., Estimated) when stations are operated using RISC standards (i.e., water level or discharge data could be Grade A/RS, A, B, or C) but data were estimated due to instrument anomalies, shift correction, missing data, or rating curve extrapolation beyond maximum or minimum measured discharge levels.” Some of the data collected for the Project as described above falls in this category and thus should be considered Grade E for discrete periods at each station (e.g. for discharge calculated from rating curves extrapolated beyond measured values).



### 3. RESULTS

The following sections present the results from the manual discharge measurements, rating curves, and discharge hydrographs for the 2020 stations. Station information sheets are provided in Appendix A, daily discharge measurements are provided in Appendix B, rating curves are presented in Appendix C, historical discharge tables are presented in Appendix D and complete historical hydrologic indices tables are presented in Appendix E.

#### 3.1 Discharge Measurements

Table 3.1-1 presents a summary of the discharge measurements that were made in 2020. Twenty manual discharge measurements were conducted between June and October 2020.

Table 3.1-1: Summary of 2020 Discharge Measurements

Station	Date	Stage (m)	Discharge (m <sup>3</sup> /s)	Difference from Curve <sup>1</sup> (%)	Method	Instrument <sup>2</sup>
JTS-H1	14-Jun-20	99.031	0.067	-8.53	Velocity-Area	Hach FH950
	15-Jun-20	99.043	N/A <sup>3</sup>	N/A <sup>3</sup>	Velocity-Area	Hach FH950
	14-Jul-20	98.983	0.041	14.70	Velocity-Area	Hach FH950
	1-Sep-20	98.964	0.027	8.77	Velocity-Area	Hach FH950
	24-Sep-20	98.937	0.015	11.80	Velocity-Area	Hach FH950
	17-Oct-20	98.294	0.009	-3.32	Velocity-Area	Hach FH950
JTN-H1	9-Jul-20	99.576	0.013	-4.00	Velocity-Area	Hach FH950
	31-Aug-20	99.600	0.014	-0.12	Velocity-Area	Hach FH950
	24-Sep-20	99.539	0.003	-0.27	Velocity-Area	Hach FH950
	17-Oct-20	N/A <sup>5</sup>	0.003	N/A <sup>5</sup>	Velocity-Area	Hach FH950
P10-A	14-Jun-20	98.982	0.014	-4.40	Velocity-Area	Hach FH950
	14-Jul-20	98.974	0.018	41.9	Velocity-Area	Hach FH950
	24-Sep-20	98.951	0.007	-7.17	Velocity-Area	Hach FH950
	17-Oct-20	98.951	0.008	5.30	Velocity-Area	Hach FH950
P11	14-Jun-20	N/A <sup>3</sup>	N/A <sup>3</sup>	N/A <sup>3</sup>	N/A <sup>3</sup>	N/A <sup>3</sup>
	14-Jul-20	N/A <sup>4</sup>	N/A <sup>4</sup>	N/A <sup>4</sup>	N/A <sup>4</sup>	N/A <sup>4</sup>
	31-Aug-20	N/A <sup>3</sup>	8.28 x 10 <sup>-5</sup>	N/A <sup>5</sup>	Volumetric	Graduated Cylinder/Stopwatch
	25-Sep-20	N/A <sup>3</sup>	5.19 x 10 <sup>-5</sup>	N/A <sup>5</sup>	Volumetric	Graduated Cylinder/Stopwatch
	17-Oct-20	N/A <sup>3</sup>	4.52 x 10 <sup>-5</sup>	N/A <sup>5</sup>	Volumetric	Graduated Cylinder/Stopwatch
P12	14-Jun-20	N/A <sup>3</sup>	N/A <sup>3</sup>	N/A <sup>3</sup>	N/A <sup>3</sup>	N/A <sup>3</sup>
	14-Jul-20	N/A <sup>3</sup>	1.65 x 10 <sup>-3</sup>	N/A <sup>5</sup>	Volumetric	Graduated Cylinder/Stopwatch
	31-Aug-20	N/A <sup>3</sup>	8.39 x 10 <sup>-4</sup>	N/A <sup>5</sup>	Volumetric	Graduated Cylinder/Stopwatch

Station	Date	Stage (m)	Discharge (m <sup>3</sup> /s)	Difference from Curve <sup>1</sup> (%)	Method	Instrument <sup>2</sup>
P12 (cont'd)	24-Sep-20	N/A <sup>3</sup>	6.16 x 10 <sup>-4</sup>	N/A <sup>5</sup>	Volumetric	Graduated Cylinder/Stopwatch
	17-Oct-20	N/A <sup>3</sup>	4.52 x 10 <sup>-4</sup>	N/A <sup>5</sup>	Volumetric	Graduated Cylinder/Stopwatch

Notes:

<sup>1</sup> Difference from curve indicates how far the rating point (discharge measurement) was above or below the established rating curve.

<sup>2</sup> <http://www.hach.com/fh950-portable-velocity-meter-with-20-cable/product?id=10379735623>.

<sup>3</sup> N/A Stage measurement not conducted due to snowpack/ice affecting measurement, benchmarks removed or discharge measurement location only.

<sup>4</sup> Discharge measurements not taken due to localized settling that covered the outflow of the discharge culvert.

<sup>5</sup> Rating curve not developed or point not included due to no/or unreliable stage measurement.

### 3.2 Stage-Discharge Rating Curves

The relationships between stage and discharge were established for the three monitoring stations with available data. The 2020 stage-discharge measurements were compared to the existing rating curves to determine if the relationships were still valid. Where geomorphic changes to the channel occurred and rating points did not plot along the existing rating curve, a new curve was developed. Between six and thirteen rating points from the 2016 through 2020 monitoring programs were used to develop each curve. The rating equations are summarized in Table 3.2-1 and 2020 rating curves along with previous 2016 through 2019 curves are presented in Appendix C. Included in the tables are the number of stage-discharge field measurements used to construct the rating equations, the Root Mean Square Error and the years of measurements included in the rating equation.

Table 3.2-1: Stage-Discharge Rating Equations

Station	Rating Equation <sup>1</sup>	Number of Rating Points Used in Curve Development	RMS Error (Shift RMS)	Rating Period
JTS-H1	$Q = 4.015(h - 98.848)^{2.354}$	13	10.9	2016 - 2020
JTN-H1	$Q = 1.698(h - 99.494)^{1.947}$	13	7.1 (0.2)	2016 - 2020
P10-A	$Q = 1.339(h - 98.877)^{2.006}$	6	9.1	2019-2020

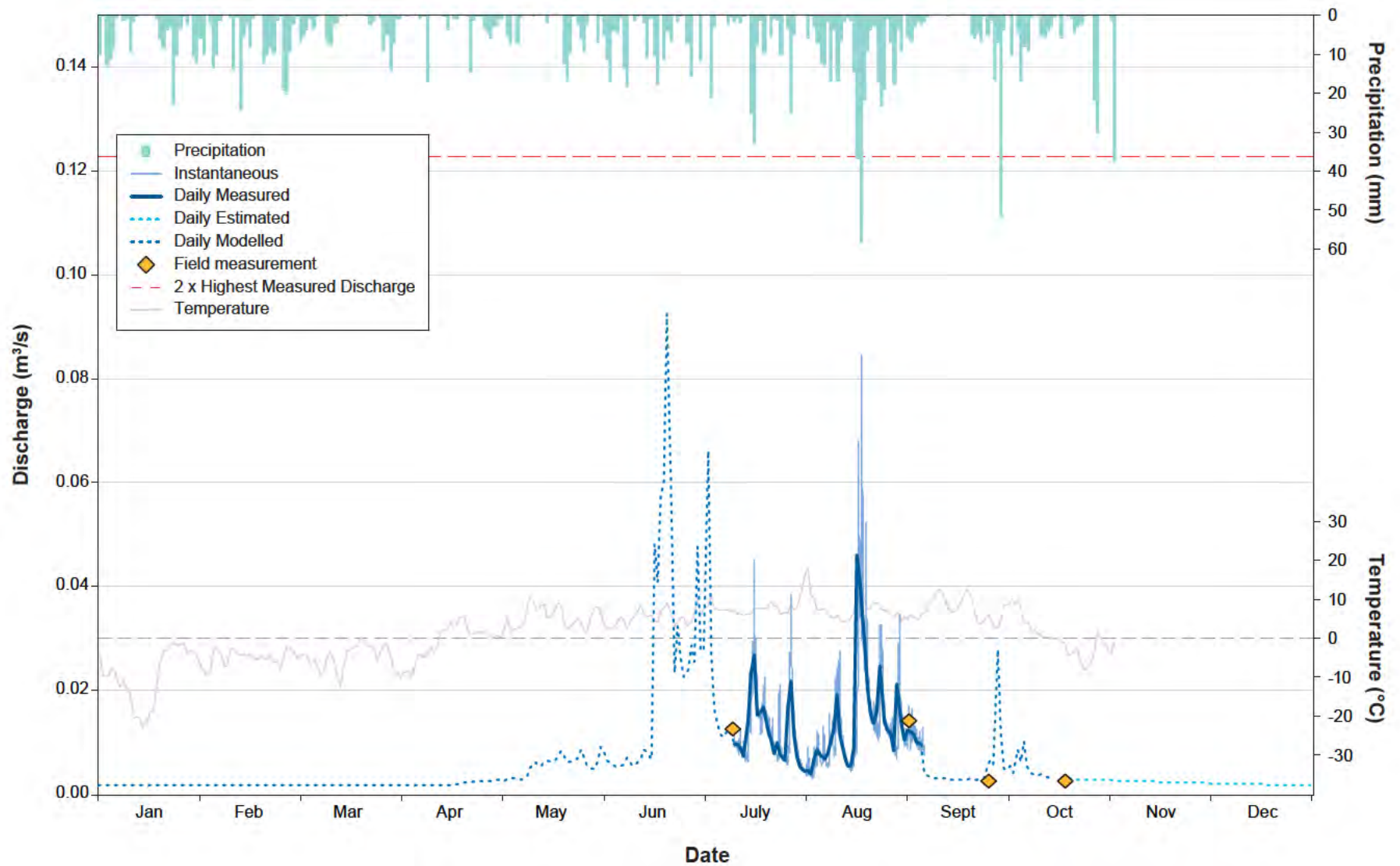
Notes:

<sup>1</sup> Equation  $Q = C(h - a)^b$  :  $Q$  is the discharge (m<sup>3</sup>/s),  $C$  and  $b$  are dimensionless coefficients,  $h$  is the stage (m), and  $a$  is the stage at zero flow (m).

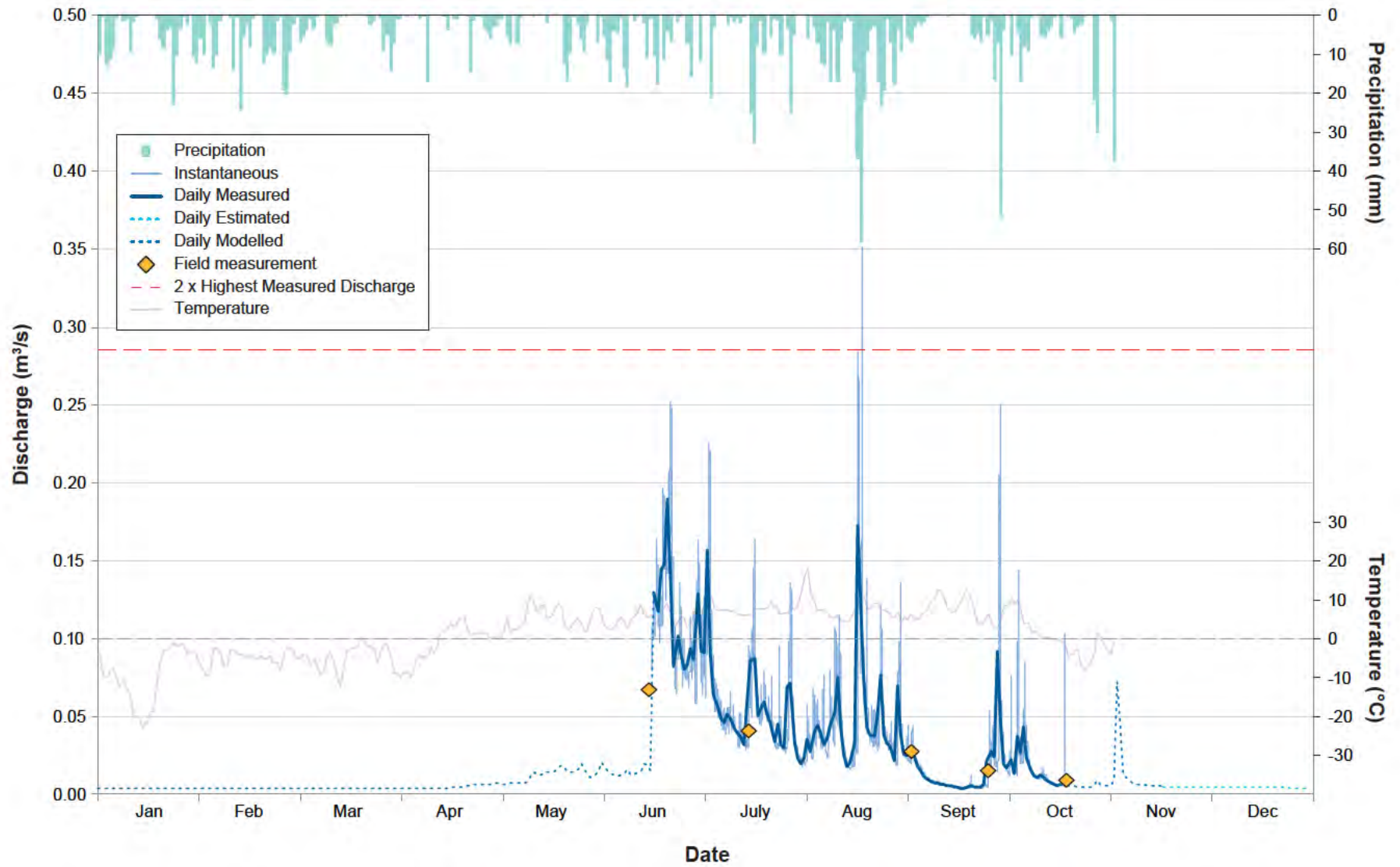
### 3.3 Discharge Hydrographs

Daily discharge hydrographs were generated for the operational periods using the corrected stage records and rating curves for each station. Discharge hydrographs are presented in Figures 3.3-1 through 3.3-3, and include daily precipitation and temperature data collected at the Johnny Mountain meteorological station (UTM 371,942 E; 6,278,283 N; Zone 9V; NAD 83). The daily discharge tables for the hydrographs are presented in Appendix B and historical discharge tables are presented in Appendix D.

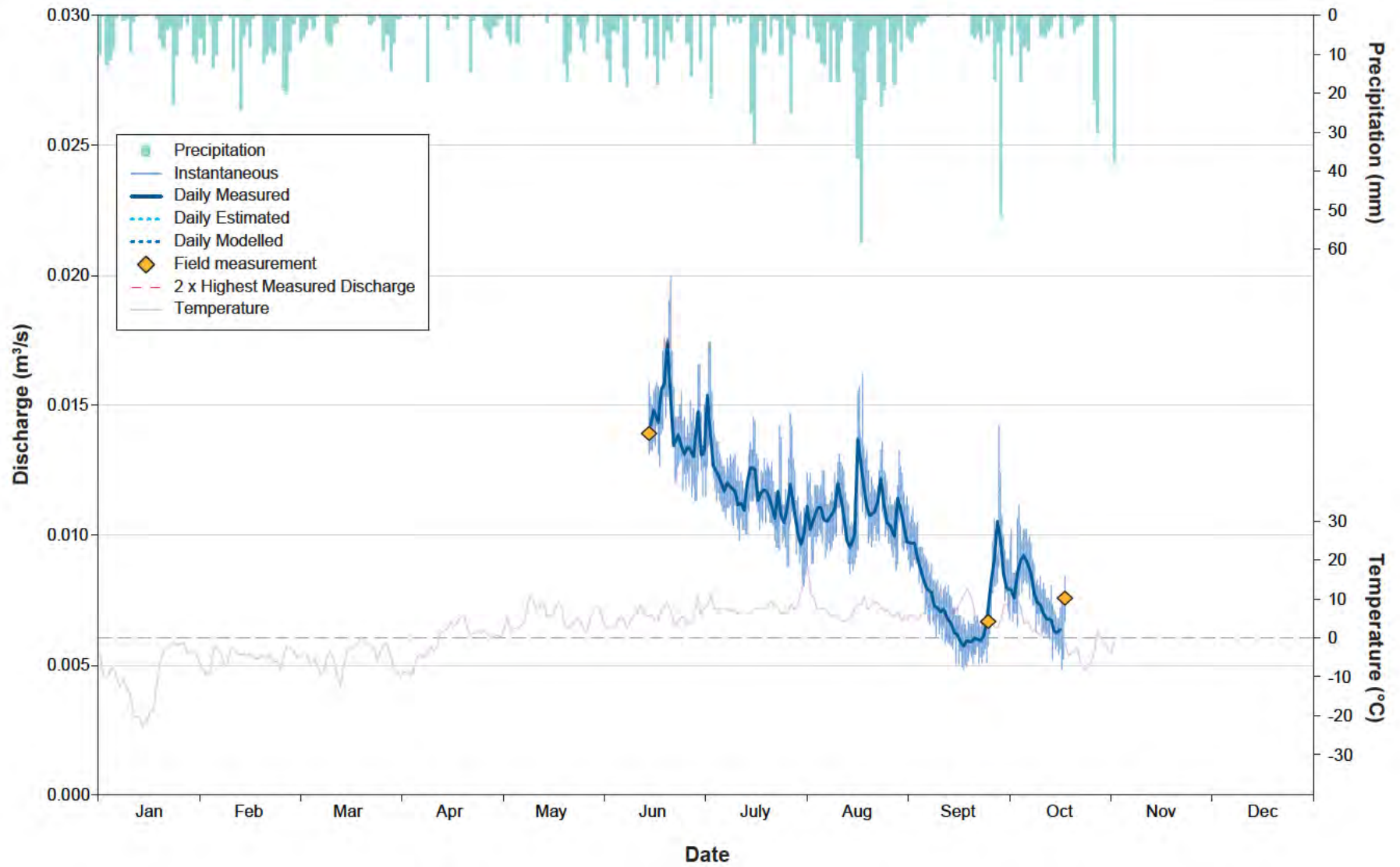
Local meteorological data is used to illustrate the relationship between stream flows and the weather, a detailed analysis of the meteorological data is provided in a separate memorandum (RTEC 2020b).



**Figure 3.3-1: 2020 Discharge Hydrograph for Station JTS-H1**



**Figure 3.3-2: 2020 Discharge Hydrograph for Station JTN-H1**



**Figure 3.3-3: 2020 Discharge Hydrograph for Station P10-A**

Annual hydrographs for the two automated hydrometric stations monitoring the TSF show a nival (snowmelt dominated) streamflow regime. The hydrographs are characterized by elevated streamflow during the spring freshet, when snow is melting, followed by a general decline in flow rate through the summer with periods of high flow resulting from precipitation events. Substantial peak events occurred in August as well as in the early fall, while a relatively warm and dry period in September saw a major decrease in stream flows (RTEC 2020b).

The groundwater discharge hydrograph for P10-A illustrates a general steady decline throughout the period of operation with less acute and significant reactions to precipitation events, when compared to JTS-H1 and JTN-H1. In comparison to the other stations, P10-A has a more prolonged response, with streamflows declining over the course a few days after a major precipitation event.

### 3.3.1 Discharge Estimates

Gaps in the flow data caused by station deactivation, malfunctioning pressure transducers, water levels dropping below the sensor elevation, or unreliable data caused by snow and ice buildup, were filled with modelled or estimated data using one, or a combination, of several methods. Regression models (Maidment 1992) were used to fill data gaps during the open water season (April - November). Logarithmic decay curves (Hersch 2009) were used during winter low flow periods to interpolate between discrete manual measurements made while hydrometric stations were not active. Concurrent periods of record from each station were used to determine the regression equation which was then applied to the data from the reference station to model daily discharge for the station with the missing data (Table 3.3-1).

Table 3.3-1: 2020 Regression Analysis Summary for Hydrograph Estimation

Hydrometric Station (Reference Station)	Concurrent Period <sup>a</sup>	Regression Equation	R <sup>2</sup>	Estimated Periods
JTS-H1 (WSC 08CG001)	July 10 - Sep 4	$Y = 0.0036e^{0.0019X}$	0.69	Jan 1 - Jun 15, Oct 17 - Nov 16
JTN-H1 (WSC08CG001)	July 10 - Aug 15	$Y = 8 \cdot 10^{-9} \cdot X^2 - 6 \cdot 10^{-7} X + 0.0016$	0.63	Jan 1 - Jun 15
JTN-H1 (JTS-H1)	July 11 - Aug 27	$Y = 2.015X^2 + 0.091X + 0.0024$	0.92	Jun 16 - Jul 9, Sep 5 - Oct 17

Note:

<sup>a</sup> Concurrent period represent the complete date range used in the analysis. In some cases there were data gaps (estimated periods) within the concurrent period used.

Daily discharge values were estimated for the missing periods of data at JTN-H1 and JTS-H1 in 2020. When discharge estimates were required, data was modelled by means of regression (correlation) analysis. Station JTN-H1 was paired with nearby station JTS-H1 for those periods of the year when station JTS-H1 was active but JTN-H1 was not. Stations were paired with the Water Survey of Canada (WSC) station 08CG001 for correlation during periods when both stations were not operational.

### 3.4 Hydrologic Indices

#### 3.4.1 Mean Annual Discharge

Mean annual discharge (MAD) for 2020 is presented in Table 3.4-1. In 2020, MAD ranged from 0.007 m<sup>3</sup>/s at JTN-H1 to 0.020 m<sup>3</sup>/s at JTS-H1. As a complete annual data set for station P10-A is not available, nor can it be accurately modelled based on other local stations, no MAD is presented and the observed daily averages are used for comparison between the stations instead. Observed daily average discharges for the periods of operation of the three stations range from 0.010 m<sup>3</sup>/s at P10-A to 0.045 m<sup>3</sup>/s at JTS-H1.

Table 3.4-1: 2020 Mean Annual Discharge

Station	MAD (m <sup>3</sup> /s)	Observed Average (m <sup>3</sup> /s)
JTS-H1	0.020	0.045
JTN-H1	0.007	0.013
P10-A <sup>1</sup>	N/A	0.010

<sup>1</sup> A complete annual data series is not available for P10-A, value is based on the station's period of operation from June 14<sup>th</sup> through October 17<sup>th</sup>, 2020.

#### 3.4.2 Annual Peak Flows

Annual daily peak flows are presented in Table 3.4-2. High flows were driven largely by snowmelt and heavy precipitation over the Project area in what was a wetter than average year (RTEC 2020b). In 2020, annual daily peak flows were the result of snowmelt in late June and ranged from 0.017 m<sup>3</sup>/s at P10-A to 0.190 m<sup>3</sup>/s at JTS-H1. Both JTN-H1 and JTS-H1 experienced peak flows well above historical maximums, a result of the wetter than average year.

Table 3.4-2: 2020 and Historic Daily Peak Flow

Station Name	Daily Peak Flow (m <sup>3</sup> /s)				
	Observed 2016 to 2019 <sup>1</sup>			2020	Date
	Min	Mean	Max		
JTS-H1	0.004	0.050	0.155	0.190	20-Jun-20
JTN-H1	0.003	0.023	0.047	0.092	20-Jun-20
P10-A	0.006	0.012	0.018	0.017 <sup>2</sup>	20-Jun-20

<sup>1</sup> Complete annual data series are not available for historic data, values are based on the stations period of operation during the open water season.

<sup>2</sup> A complete annual data series is not available for P10-A, values are based on the station's period of operation from June 14<sup>th</sup> through October 17<sup>th</sup>, 2020.

#### 3.4.3 7-Day Low Flow

Summer low-flows (June to September) and annual low flows were calculated using the minimum 7-day-average of daily flows. The 7-day summer and annual low flows are presented in Table 3.4-3 with summer lows being compared to historic low flows during the open water season in Table 3.4-4. The summer low flows at each station occurred in late September and ranged from 0.003 m<sup>3</sup>/s at JTN-H1 to 0.006 m<sup>3</sup>/s at P10-A. In contrast to observed daily flow averages and peak flows, P10-A has the highest low flows rather than JTS-H1. This reversal is consistent with historic trends and is likely a result of P10-A monitoring

groundwater discharge, which is less responsive to snowmelt and precipitation but maintains more stable flows throughout the year. Subsequently, while flows at JTN-H1 and JTS-H1 decreased significantly in September due to reduced precipitation inputs and warmer weather, groundwater flows decreased to a minimal degree during that same period. Annual low flows occurred in early April when precipitation is stored in the snowpack and streamflows are dependent on available groundwater. The April low flows were determined based on the modelling of data using regression analysis in correlation with the WSC station 08CG001 on the Iskut River (Environment Canada 2020). Annual daily low flows ranged from 0.002 m<sup>3</sup>/s at JTN-H1 to 0.004 m<sup>3</sup>/s at JTS-H1. Annual daily low flows are not available for P10-A in 2020 as the station was not operational for the entirety of the year and as a groundwater discharge monitoring location, is not suitable for modelling off of nearby stream data.

Table 3.4-3: 2020 7-Day Low Flows

Station	7-Day Summer Low Flow (m <sup>3</sup> /s)	Date	7-Day Annual Low Flow (m <sup>3</sup> /s)	Date
JTS-H1	0.005	21-Sep-20	0.004	8-Apr-20
JTN-H1	0.003	21-Sep-20	0.002	8-Apr-20
P10-A <sup>1</sup>	0.006	17-Sep-20	N/A	N/A

<sup>1</sup> A complete annual data series is not available for P10-A, values are based on the station's period of operation from June 14<sup>th</sup> through October 17<sup>th</sup>, 2020.

Table 3.4-4: 2020 and Observed Historic Low Flow Comparison

Station Name	Daily Low Flow (m <sup>3</sup> /s)			7-Day Summer Low Flow (m <sup>3</sup> /s)	Date
	Observed 2016 to 2019 <sup>1</sup>				
	Min	Mean	Max		
JTS-H1	0.001	0.002	0.004	0.005	21-Sep-20
JTN-H1	0.001	0.002	0.003	0.003	21-Sep-20
P10-A	0.003	0.004	0.005	0.006	17-Sep-20

<sup>1</sup> Complete annual data series are not available for historic data, values are based on the stations period of operation during the open water season and are not averaged over a 7-day period.

### 3.5 Summary

The surface water hydrology monitoring program was initiated in 2016 (RTEC 2016) and continued through 2017 (RTEC 2017), 2018 (RTEC 2019), 2019 (RTEC 2020) and 2020. In 2020, the hydrologic response generally exhibited was that of snow-melt dominated flow regimes. Relative to historic data, the 2020 results indicate that the project area experienced a cooler than average summer with above average precipitation (RTEC 2020b). The prominence and correlation of the precipitation with daily stream flow data varied between TSF monitoring stations and the groundwater discharge location, with TSF stations showing a greater response to precipitation events.

Mean annual discharges were 0.020 m<sup>3</sup>/s at JTS-H1 and 0.007 m<sup>3</sup>/s at JTN-H1, while P10-A had an observed mean discharge of 0.010 m<sup>3</sup>/s during its operational period. All stations experienced higher than average peak flows, with TSF monitoring stations experiencing discharges significantly higher than previous historical maximums. Likewise, summer low flows were near or greater than historical maximums, occurring in late September during a warm dry period



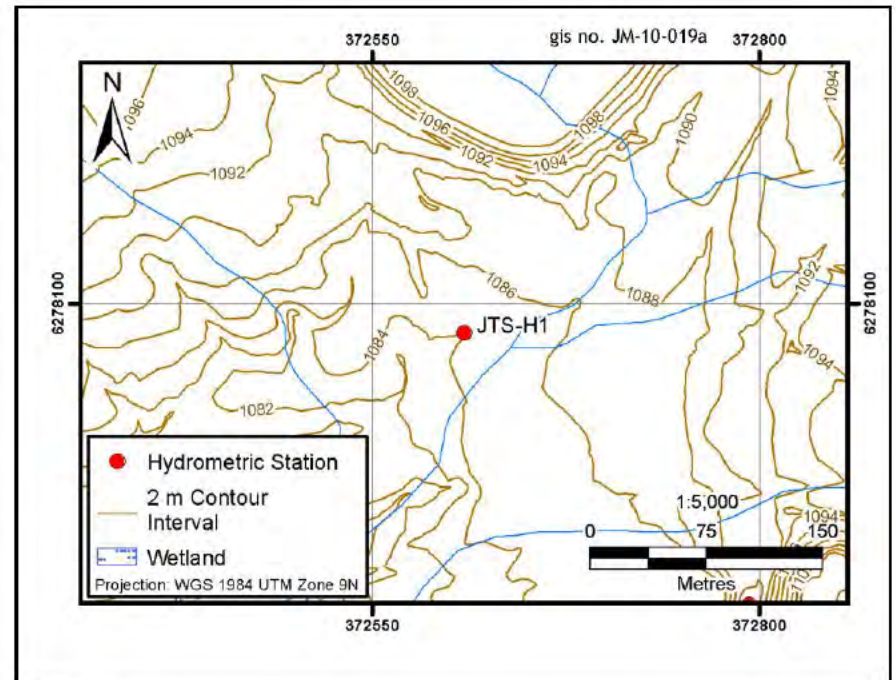
## 4. REFERENCES

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## APPENDIX A      STATION INFORMATION SHEETS

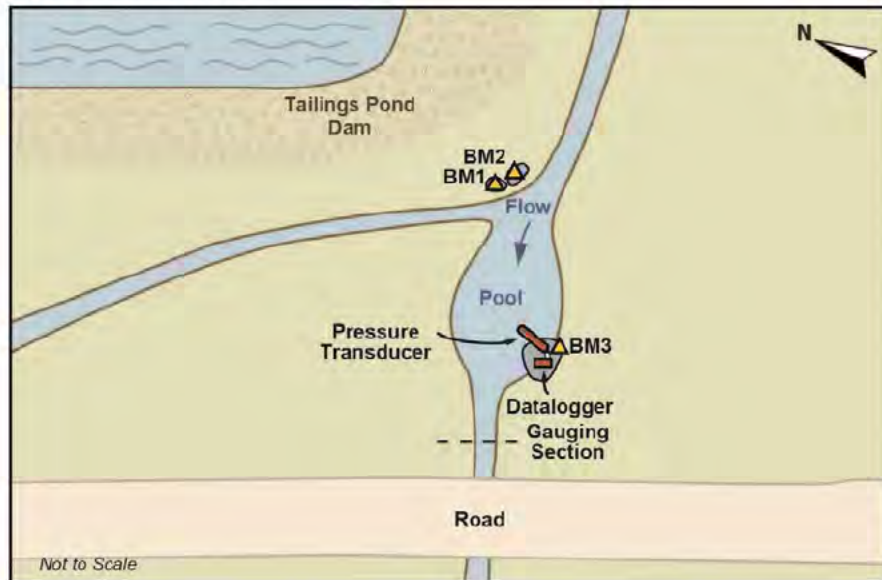
## Appendix A.1: Station Information Sheet for Hydrometric Station JTS-H1

Site ID:	JTS-H1	Drainage Area (km <sup>2</sup> ):	0	
Site Location:	Tailings Pond Seepage Collection			
UTM:	NAD 83, Zone 9 V	E 372,609	N 6,278,081	
<b>Benchmarks</b>	<b>Elevation</b>	<b>Description</b>		
BM 1	100.000	Bolt in bedrock ~25 m north (upstream) of station		
BM 2	100.240	Bolt in bedrock ~25 m north (upstream) of station		
BM 3	99.603	Bolt in bedrock used to secure data logger box		
Transducer:	PS98i	Data Logger:	GDL	
Operating Period: 2016-2020				
2016	Sep 24 - Oct 24			
2017	Apr 28 - Jun 22			
2018	Jun 9 - Oct 21			
2019	Jun 27 - Oct 31			
2020	Jun 14 - Oct 17			
General Comments:				
<ul style="list-style-type: none"> <li>Station located in pool ~100 m southwest of the tailing pond where a series of collection ditches converge into a single channel.</li> <li>Discharge measurements are taken at the outflow of the pool.</li> </ul>				



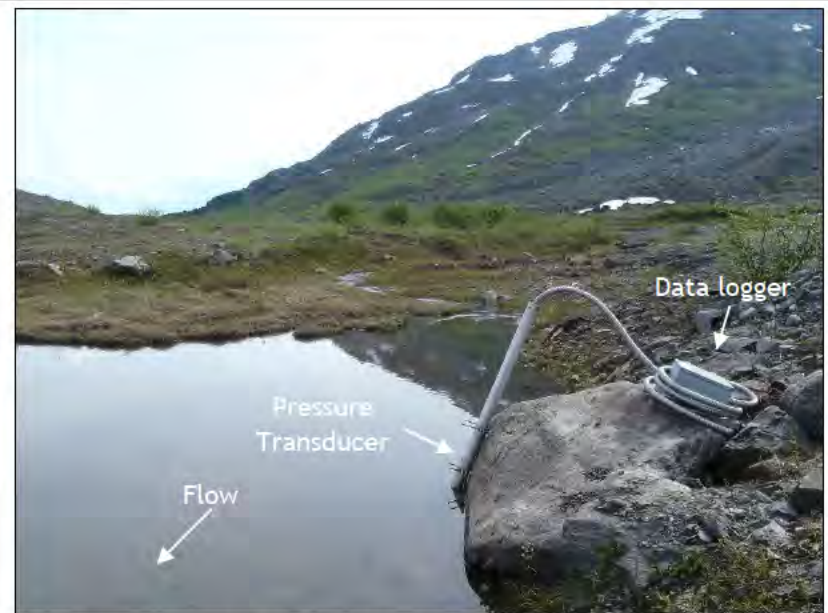
### General Site Information

Figure 1. Sketch of JTS-H1



Plan View of Site

### Site Map

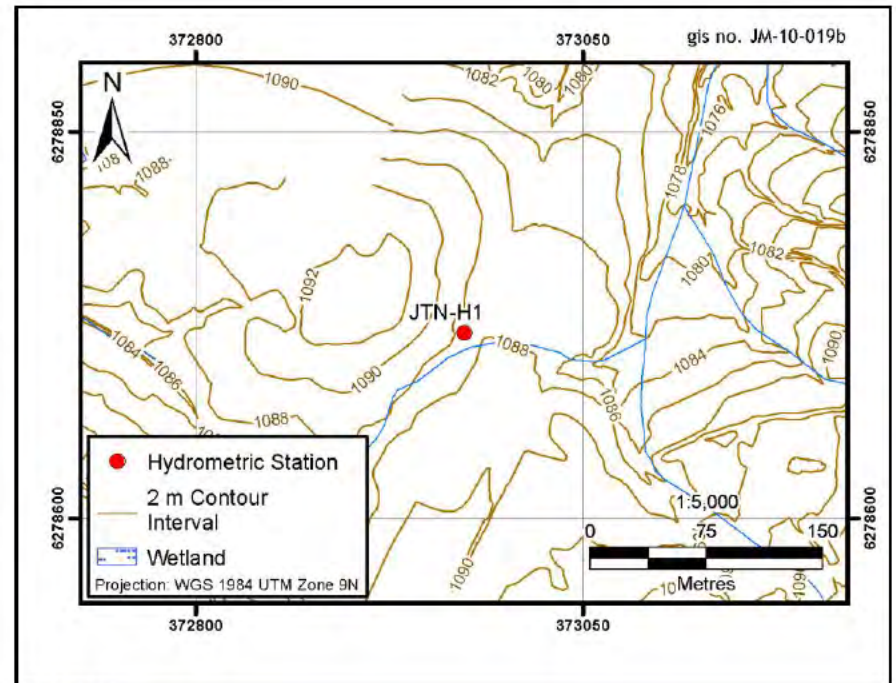


Station JTS-H1. View is looking upstream (Northeast).

Site Photo

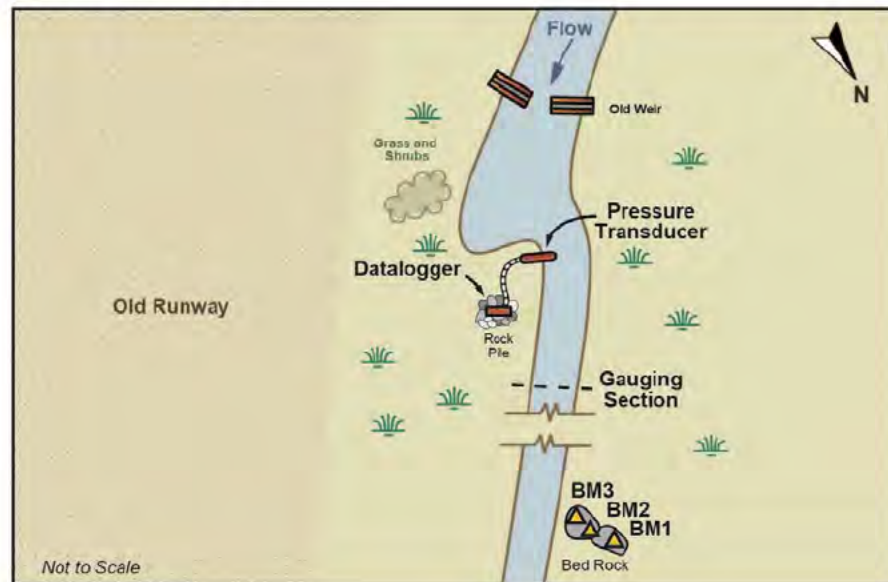
## Appendix A.2: Station Information Sheet for Hydrometric Station JTN-H1

Site ID:	JTN-H1	Drainage Area (km <sup>2</sup> ):	0
Site Location:	Tailings Pond Spillway		
UTM:	NAD 83, Zone 9 V	E 372,973	N 6,278,720
<b>Benchmarks</b>	<b>Elevation</b>	<b>Description</b>	
BM 1	100.000	Bolt in bedrock ~80 m north (downstream) of station	
BM 2	100.063	Bolt in bedrock ~80 m north (downstream) of station	
BM 3	100.011	Bolt in bedrock ~80 m north (downstream) of station	
Transducer:	PS98i	Data Logger:	GDL
Operating Period: 2016-2020			
2016	Sep 24 - Oct 24		
2017	Jul 8 - Oct 24		
2018	Jun 10 - Oct 21		
2019	Jun 27 - Oct 31		
2020	Jul 9 - Sep 24		
General Comments:			
<ul style="list-style-type: none"> <li>Located approximately 230 m northeast of the tailings pond within the main spillway channel.</li> </ul>			



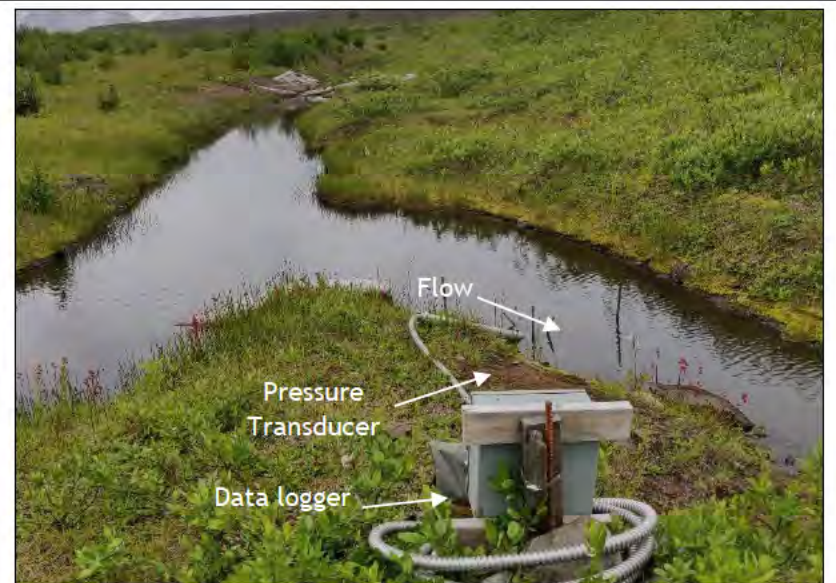
### General Site Information

Figure 2. Sketch of JTN-H1



Plan View of Site

### Site Map



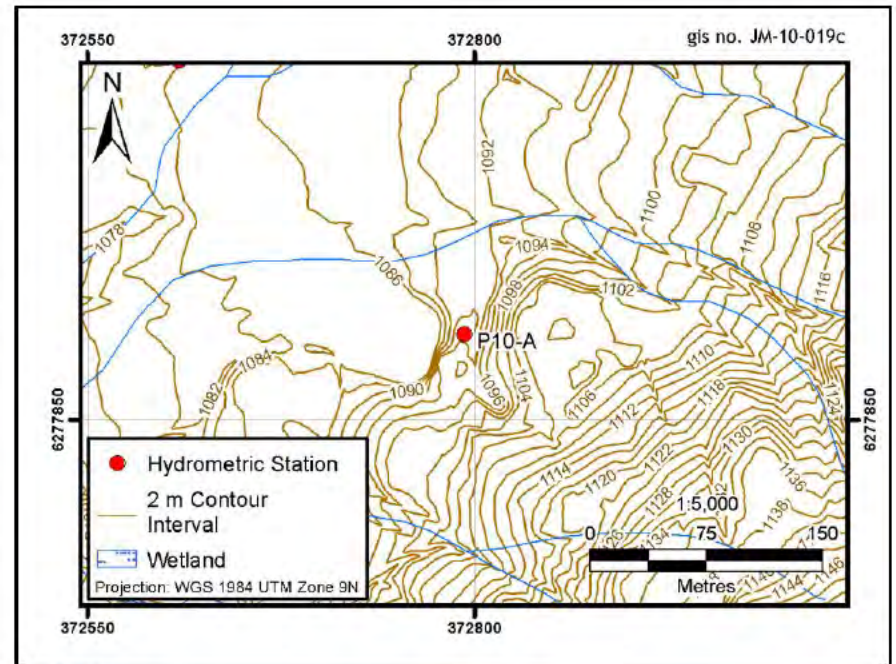
Station JTN-H1. View is looking upstream (Southwest).

Site Photo

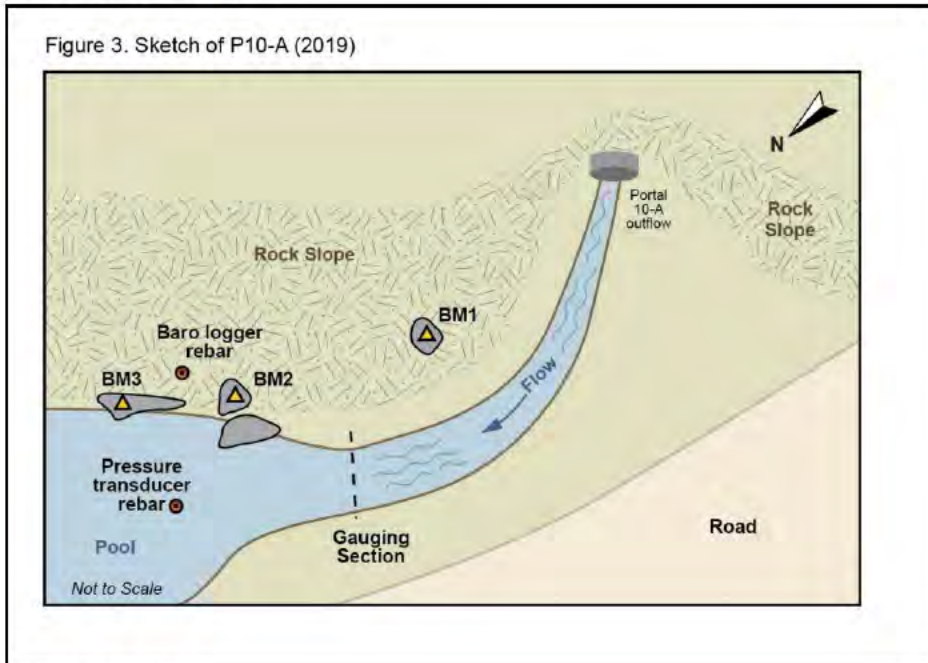
### Appendix A.3: Station Information Sheet for Hydrometric Station P10-A

Site ID:	P10-A	Drainage Area (km <sup>2</sup> ):	N/A
Site Location:	Level 10 Portal Outflow		
UTM:	NAD 83, Zone 9 V	E 372,802	N 6,277,921
<b>Benchmarks</b>	<b>Elevation</b>	<b>Description</b>	
BM 1	100.000	Bolt in Bedrock ~15 m upstream of station	
BM 2	99.221	Bolt in bedrock ~1 m upstream of station	
BM 3	99.101	Bolt in bedrock beside station on south bank	
Transducer:	Micro-Diver	Baro Logger:	Micro-Diver
Operating Period: 2016-20120			
2017	Jun 9 - Oct 24		
2018	Jun 9 - Aug 29		
2019	Jun 27 - Oct 31		
2020	Jun 14 - Oct 17		
General Comments:			
<ul style="list-style-type: none"> <li>Station was relocated in 2019 due to remediation work in 2018. Station is located approximately 40 m downstream of level 10 portal discharge culvert.</li> <li>Station is used to monitor groundwater outflow from the portal.</li> </ul>			

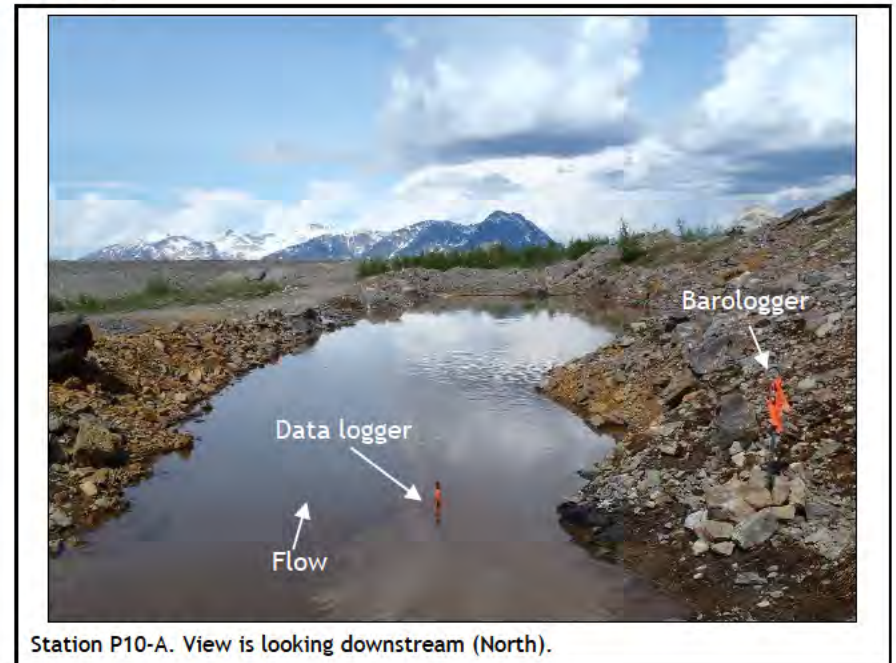
#### General Site Information



#### Site Map



#### Plan View of Site



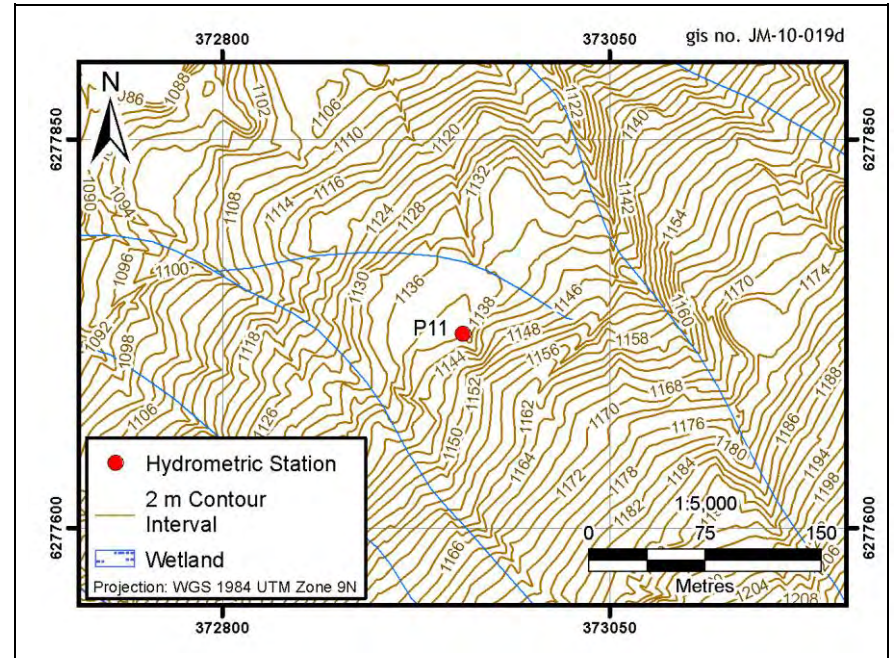
Station P10-A. View is looking downstream (North).

#### Site Photo

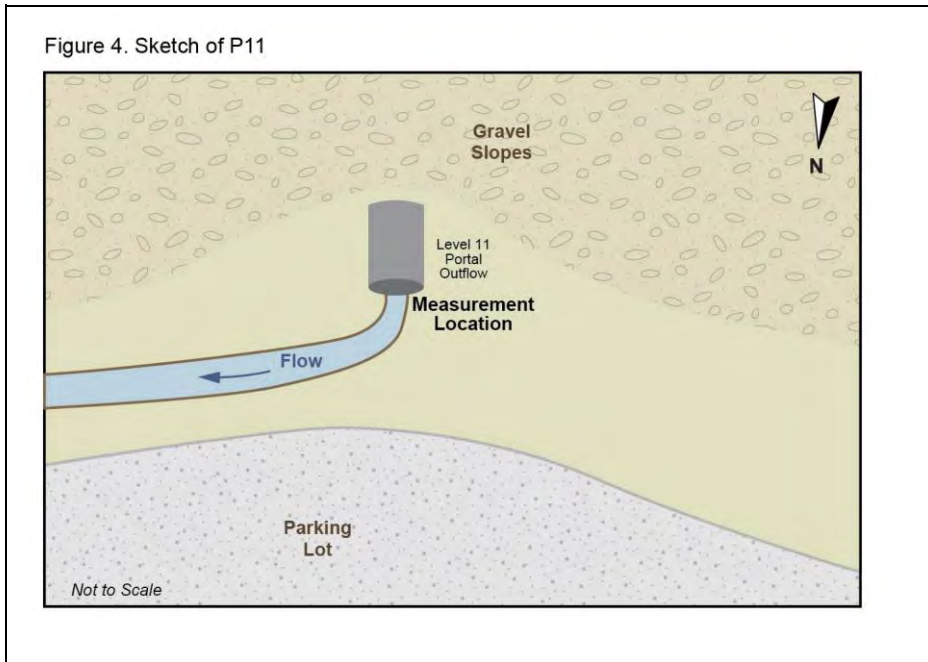
Appendix A.4: Station Information Sheet for Hydrometric Station P11

Site ID:	P11	Drainage Area (km <sup>2</sup> ):	N/A
Site Location:	Level 11 Portal Outflow		
UTM:	NAD 83, Zone 9 V	E 372,955	N 6,277,725
Benchmarks	Elevation	Description	
BM 1	N/A	N/A	
BM 2	N/A	N/A	
BM 3	N/A	N/A	
Transducer:	N/A	Data Logger:	N/A
Operating Period: 2017-2020			
2017-2020	Manual discharge measurements only		
General Comments:			
<ul style="list-style-type: none"> <li>Level 11 portal discharge can be accessed by the roads above the old mill building.</li> <li>No benchmarks or station is installed, volumetric discharge measurements are used to monitor the groundwater outflow from the portal.</li> </ul>			

General Site Information



Site Map



Plan View of Site



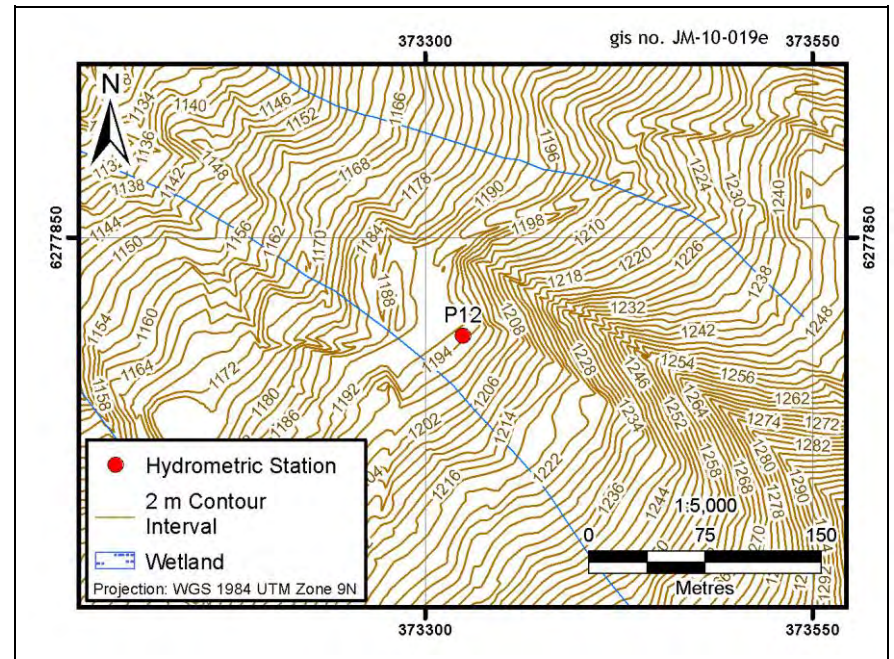
Station P11. View is looking at outflow culvert (South).

Site Photo

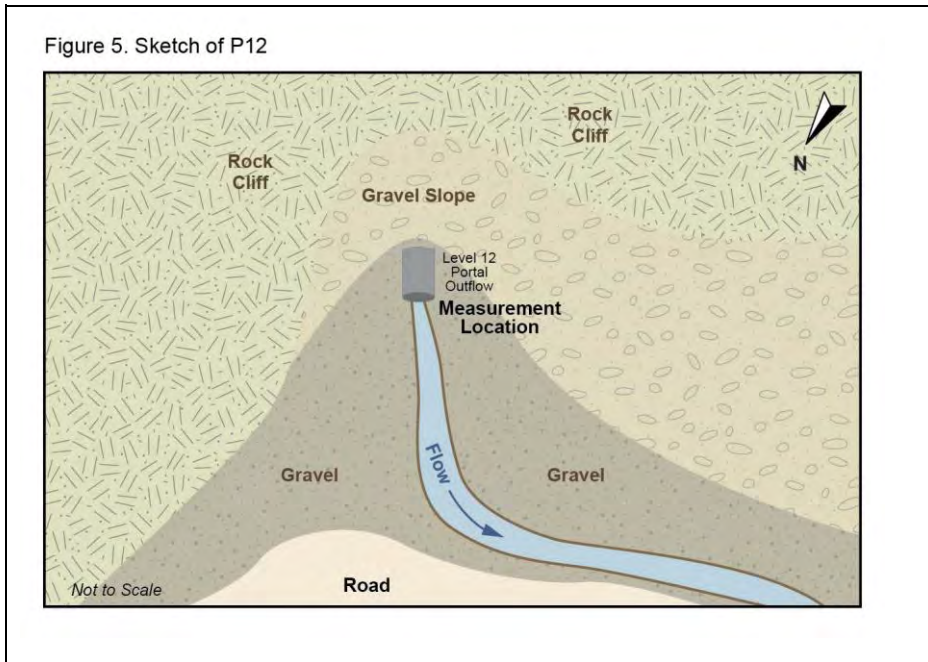
Appendix A.5: Station Information Sheet for Hydrometric Station P12

Site ID:	P12	Drainage Area (km <sup>2</sup> ):	N/A
Site Location:	Level 12 Portal Outflow		
UTM:	NAD 83, Zone 9 V	E 373,324	N 6,277,787
Benchmarks	Elevation	Description	
BM 1	N/A	N/A	
BM 2	N/A	N/A	
BM 3	N/A	N/A	
Transducer:	N/A	Data Logger:	N/A
Operating Period: 2017-2020			
2017-2020	Manual discharge measurements only		
General Comments:			
<ul style="list-style-type: none"> <li>Level 12 portal discharge can be accessed by the roads above the old mill building.</li> <li>No benchmarks or station is installed, volumetric discharge measurements are used to monitor the groundwater outflow from the portal.</li> </ul>			

General Site Information



Site Map



Plan View of Site



Station P12. View is looking at the culvert outflow (East).

Site Photo

## APPENDIX B      DAILY DISCHARGE TABLES



Appendix B-a: Summary of Daily Discharge [Q, m<sup>3</sup>/s] at Hydrometric Station JTS-H1, 2020

Drainage Area = N/A km<sup>2</sup>

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.007</i>	<i>0.021</i>	0.092	0.023	0.025	0.017	<i>0.006</i>	<i>0.005</i>
2	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.007</i>	<i>0.018</i>	0.091	0.035	0.028	0.022	<i>0.009</i>	<i>0.005</i>
3	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.007</i>	<i>0.015</i>	0.157	0.028	0.024	0.014	<i>0.073</i>	<i>0.005</i>
4	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.008</i>	<i>0.013</i>	0.090	0.041	0.018	0.038	<i>0.045</i>	<i>0.005</i>
5	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.008</i>	<i>0.012</i>	0.063	0.044	0.015	0.027	<i>0.013</i>	<i>0.005</i>
6	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.008</i>	<i>0.012</i>	0.056	0.040	0.012	0.043	<i>0.010</i>	<i>0.005</i>
7	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.007</i>	<i>0.012</i>	0.048	0.032	0.010	0.023	<i>0.008</i>	<i>0.005</i>
8	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.007</i>	<i>0.013</i>	0.046	0.035	0.009	0.015	<i>0.007</i>	<i>0.005</i>
9	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.008</i>	<i>0.016</i>	0.052	0.045	0.008	0.012	<i>0.006</i>	<i>0.005</i>
10	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.009</i>	<i>0.013</i>	0.049	0.053	0.007	0.011	<i>0.006</i>	<i>0.005</i>
11	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.012</i>	<i>0.012</i>	0.042	0.075	0.007	0.012	<i>0.006</i>	<i>0.005</i>
12	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.015</i>	<i>0.014</i>	0.039	0.042	0.006	0.011	<i>0.006</i>	<i>0.005</i>
13	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.013</i>	<i>0.015</i>	0.037	0.025	0.006	0.009	<i>0.006</i>	<i>0.005</i>
14	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.012</i>	<i>0.020</i>	0.032	0.018	0.005	0.007	<i>0.006</i>	<i>0.005</i>
15	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.014</i>	<i>0.019</i>	0.060	0.020	0.005	0.006	<i>0.006</i>	<i>0.005</i>
16	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.015</i>	<i>0.016</i>	0.086	0.033	0.005	0.006	<i>0.005</i>	<i>0.005</i>
17	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.015</i>	0.130	0.087	0.173	0.004	0.006	<i>0.005</i>	<i>0.005</i>
18	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.005</i>	<i>0.015</i>	0.117	0.050	0.120	0.004	<i>0.006</i>	<i>0.005</i>	<i>0.005</i>
19	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.005</i>	<i>0.017</i>	0.145	0.056	0.073	0.004	<i>0.005</i>	<i>0.005</i>	<i>0.005</i>
20	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.005</i>	<i>0.019</i>	0.148	0.060	0.043	0.006	<i>0.005</i>	<i>0.005</i>	<i>0.004</i>
21	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.006</i>	<i>0.017</i>	0.190	0.052	0.039	0.004	<i>0.005</i>	<i>0.005</i>	<i>0.004</i>
22	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.006</i>	<i>0.015</i>	0.140	0.046	0.037	0.004	<i>0.005</i>	<i>0.005</i>	<i>0.004</i>
23	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.006</i>	<i>0.014</i>	0.082	0.034	0.052	0.005	<i>0.005</i>	<i>0.005</i>	<i>0.004</i>
24	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.006</i>	<i>0.015</i>	0.102	0.045	0.077	0.006	<i>0.005</i>	<i>0.005</i>	<i>0.004</i>
25	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.006</i>	<i>0.016</i>	0.089	0.032	0.038	0.021	<i>0.005</i>	<i>0.005</i>	<i>0.004</i>
26	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.006</i>	<i>0.020</i>	0.080	0.030	0.033	0.028	<i>0.005</i>	<i>0.005</i>	<i>0.004</i>
27	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.006</i>	<i>0.016</i>	0.083	0.069	0.032	0.024	<i>0.006</i>	<i>0.005</i>	<i>0.004</i>
28	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.006</i>	<i>0.012</i>	0.094	0.072	0.022	0.092	<i>0.009</i>	<i>0.005</i>	<i>0.004</i>
29	<i>0.004</i>		<i>0.004</i>	<i>0.006</i>	<i>0.011</i>	0.087	0.033	0.070	0.048	<i>0.007</i>	<i>0.005</i>	<i>0.004</i>
30	<i>0.004</i>		<i>0.004</i>	<i>0.007</i>	<i>0.011</i>	0.129	0.024	0.038	0.020	<i>0.006</i>	<i>0.005</i>	<i>0.004</i>
31	<i>0.004</i>		<i>0.004</i>		<i>0.015</i>		0.020	0.026		<i>0.006</i>		<i>0.004</i>
Mean	0.004	0.004	0.004	0.005	0.012	0.062	0.056	0.047	0.015	0.012	0.010	0.005
Max	0.004	0.004	0.004	0.007	0.020	0.190	0.157	0.173	0.092	0.043	0.073	0.005
Min	0.004	0.004	0.004	0.004	0.007	0.012	0.020	0.018	0.004	0.005	0.005	0.004

Note: Estimated and modelled values are italicized

Values in red denote high uncertainty based on extrapolation of the rating curve beyond 2 times the greatest measured discharge.

**Appendix B-b: Summary of Daily Discharge [Q, m<sup>3</sup>/s] at Hydrometric Station JTN-H1 , 2020**

Drainage Area = N/A km<sup>2</sup>

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.002	0.002	0.002	0.002	0.003	0.009	0.028	0.004	0.012	0.005	0.003	0.002
2	0.002	0.002	0.002	0.002	0.003	0.008	0.028	0.005	0.012	0.005	0.003	0.002
3	0.002	0.002	0.002	0.002	0.003	0.007	0.066	0.004	0.012	0.004	0.003	0.002
4	0.002	0.002	0.002	0.002	0.003	0.006	0.027	0.007	0.010	0.009	0.003	0.002
5	0.002	0.002	0.002	0.002	0.003	0.005	0.016	0.009	0.010	0.006	0.003	0.002
6	0.002	0.002	0.002	0.002	0.003	0.005	0.014	0.008	0.004	0.010	0.003	0.002
7	0.002	0.002	0.002	0.002	0.003	0.005	0.012	0.007	0.004	0.006	0.003	0.002
8	0.002	0.002	0.002	0.002	0.003	0.006	0.011	0.008	0.003	0.004	0.003	0.002
9	0.002	0.002	0.002	0.002	0.003	0.007	0.013	0.010	0.003	0.004	0.003	0.002
10	0.002	0.002	0.002	0.002	0.004	0.006	0.012	0.013	0.003	0.004	0.003	0.002
11	0.002	0.002	0.002	0.002	0.005	0.005	0.010	0.019	0.003	0.004	0.003	0.002
12	0.002	0.002	0.002	0.002	0.006	0.006	0.010	0.011	0.003	0.004	0.002	0.002
13	0.002	0.002	0.002	0.002	0.006	0.007	0.009	0.007	0.003	0.003	0.002	0.002
14	0.002	0.002	0.002	0.002	0.005	0.009	0.007	0.005	0.003	0.003	0.002	0.002
15	0.002	0.002	0.002	0.002	0.006	0.008	0.014	0.005	0.003	0.003	0.002	0.002
16	0.002	0.002	0.002	0.002	0.007	0.007	0.024	0.009	0.003	0.003	0.002	0.002
17	0.002	0.002	0.002	0.002	0.006	0.048	0.027	0.046	0.003	0.003	0.002	0.002
18	0.002	0.002	0.002	0.002	0.006	0.041	0.015	0.041	0.003	0.003	0.002	0.002
19	0.002	0.002	0.002	0.002	0.007	0.058	0.016	0.029	0.003	0.003	0.002	0.002
20	0.002	0.002	0.002	0.002	0.008	0.060	0.017	0.020	0.003	0.003	0.002	0.002
21	0.002	0.002	0.002	0.002	0.007	0.092	0.012	0.015	0.003	0.003	0.002	0.002
22	0.002	0.002	0.002	0.002	0.006	0.055	0.011	0.014	0.003	0.003	0.002	0.002
23	0.002	0.002	0.002	0.002	0.006	0.024	0.008	0.016	0.003	0.003	0.002	0.002
24	0.002	0.002	0.002	0.002	0.006	0.032	0.010	0.025	0.003	0.003	0.002	0.002
25	0.002	0.002	0.002	0.002	0.007	0.026	0.008	0.014	0.005	0.003	0.002	0.002
26	0.002	0.002	0.002	0.002	0.009	0.023	0.006	0.012	0.006	0.003	0.002	0.002
27	0.002	0.002	0.002	0.002	0.007	0.024	0.017	0.012	0.006	0.003	0.002	0.002
28	0.002	0.002	0.002	0.002	0.005	0.029	0.022	0.008	0.028	0.003	0.002	0.002
29	0.002	0.002	0.002	0.003	0.005	0.026	0.011	0.021	0.011	0.003	0.002	0.002
30	0.002		0.002	0.003	0.005	0.048	0.007	0.014	0.005	0.003	0.002	0.002
31	0.002		0.002		0.006		0.005	0.010		0.003		0.002
<b>Mean</b>	0.002	0.002	0.002	0.002	0.005	0.023	0.016	0.014	0.006	0.004	0.002	0.002
<b>Max</b>	0.002	0.002	0.002	0.003	0.009	0.092	0.066	0.046	0.028	0.010	0.003	0.002
<b>Min</b>	0.002	0.002	0.002	0.002	0.003	0.005	0.005	0.004	0.003	0.003	0.002	0.002

Note: Estimated and modelled values are italicized

Values in red denote high uncertainty based on extrapolation of the rating curve beyond 2 times the greatest measured discharge.

Appendix B-c: Summary of Daily Discharge [Q, m<sup>3</sup>/s] at Hydrometric Station P10-A, 2020

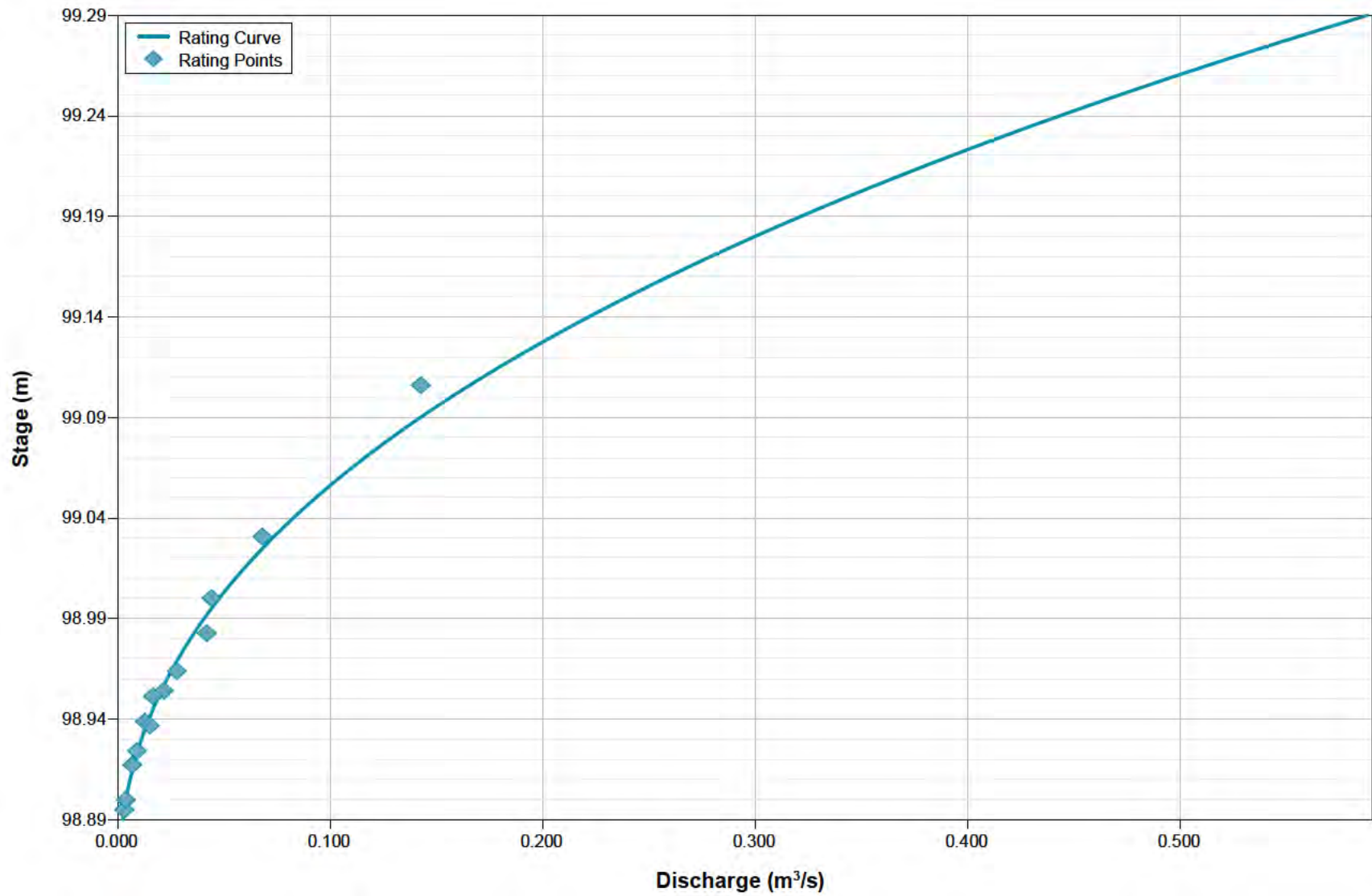
Drainage Area = N/A km<sup>2</sup>

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	-	-	-	-	-	-	0.013	0.010	0.010	0.008	-	-
2	-	-	-	-	-	-	0.013	0.011	0.010	0.008	-	-
3	-	-	-	-	-	-	0.015	0.010	0.010	0.008	-	-
4	-	-	-	-	-	-	0.014	0.011	0.009	0.009	-	-
5	-	-	-	-	-	-	0.013	0.011	0.009	0.009	-	-
6	-	-	-	-	-	-	0.012	0.011	0.008	0.009	-	-
7	-	-	-	-	-	-	0.012	0.011	0.008	0.009	-	-
8	-	-	-	-	-	-	0.012	0.011	0.008	0.009	-	-
9	-	-	-	-	-	-	0.012	0.011	0.007	0.008	-	-
10	-	-	-	-	-	-	0.012	0.011	0.007	0.007	-	-
11	-	-	-	-	-	-	0.012	0.012	0.007	0.007	-	-
12	-	-	-	-	-	-	0.011	0.011	0.007	0.007	-	-
13	-	-	-	-	-	-	0.011	0.011	0.007	0.007	-	-
14	-	-	-	-	-	-	0.011	0.010	0.007	0.007	-	-
15	-	-	-	-	-	-	0.012	0.010	0.006	0.006	-	-
16	-	-	-	-	-	0.014	0.013	0.010	0.006	0.006	-	-
17	-	-	-	-	-	0.015	0.013	0.014	0.006	0.006	-	-
18	-	-	-	-	-	0.014	0.011	0.013	0.006	-	-	-
19	-	-	-	-	-	0.016	0.012	0.012	0.006	-	-	-
20	-	-	-	-	-	0.016	0.012	0.011	0.006	-	-	-
21	-	-	-	-	-	0.017	0.012	0.011	0.006	-	-	-
22	-	-	-	-	-	0.015	0.011	0.011	0.006	-	-	-
23	-	-	-	-	-	0.013	0.011	0.011	0.006	-	-	-
24	-	-	-	-	-	0.014	0.012	0.012	0.006	-	-	-
25	-	-	-	-	-	0.013	0.011	0.011	0.007	-	-	-
26	-	-	-	-	-	0.013	0.010	0.010	0.008	-	-	-
27	-	-	-	-	-	0.013	0.011	0.010	0.009	-	-	-
28	-	-	-	-	-	0.013	0.012	0.010	0.011	-	-	-
29	-	-	-	-	-	0.013	0.011	0.011	0.010	-	-	-
30	-	-	-	-	-	0.015	0.010	0.011	0.009	-	-	-
31	-	-	-	-	-	-	0.010	0.010	-	-	-	-
Mean	-	-	-	-	-	0.014	0.012	0.011	0.008	0.008	-	-
Max	0.000	0.000	0.000	0.000	0.000	0.017	0.015	0.014	0.011	0.009	0.000	0.000
Min	0.000	0.000	0.000	0.000	0.000	0.013	0.010	0.010	0.006	0.006	0.000	0.000

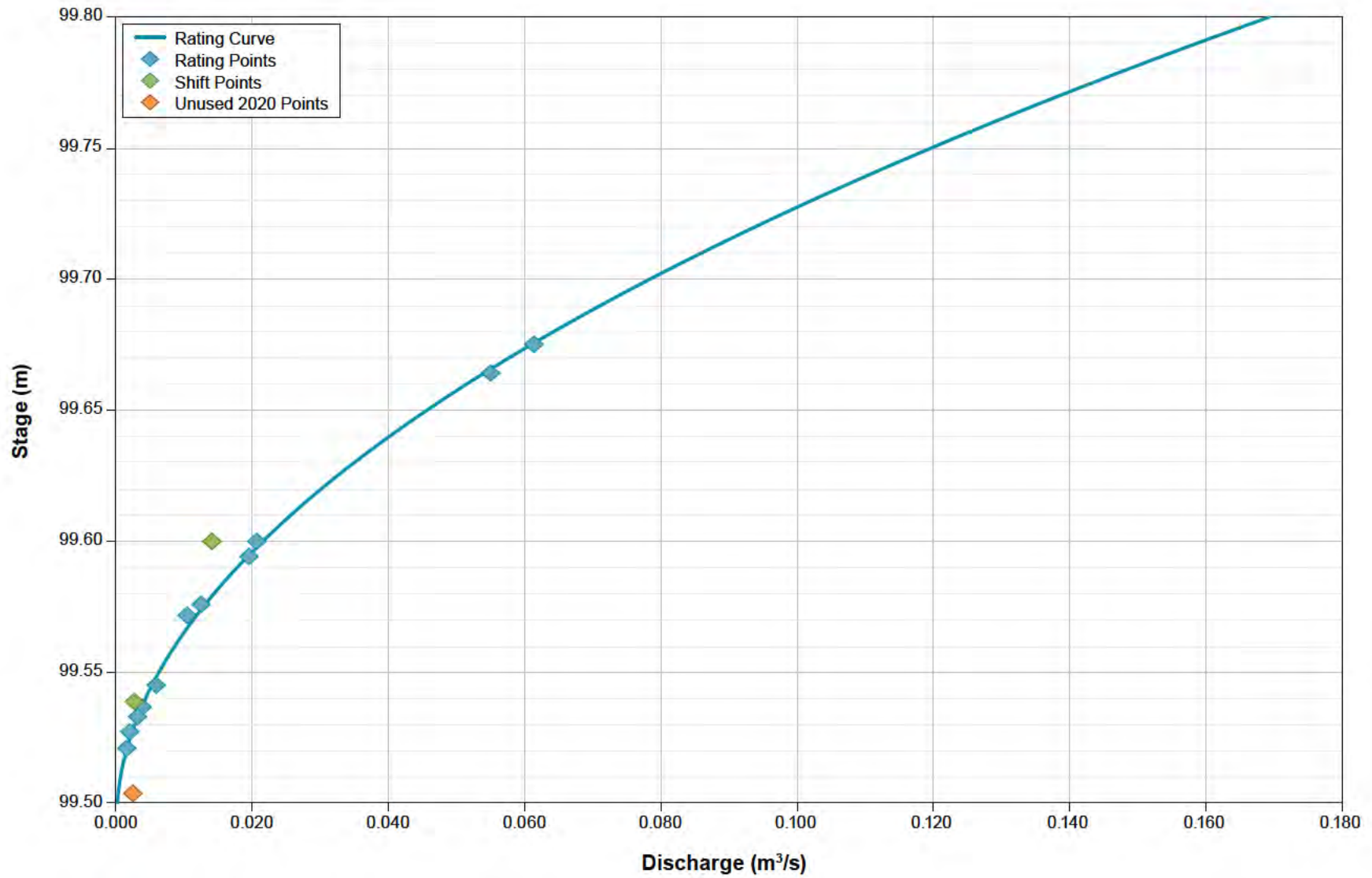
Note: Estimated and modelled values are italicized

Values in red denote high uncertainty based on extrapolation of the rating curve beyond 2 times the greatest measured discharge.

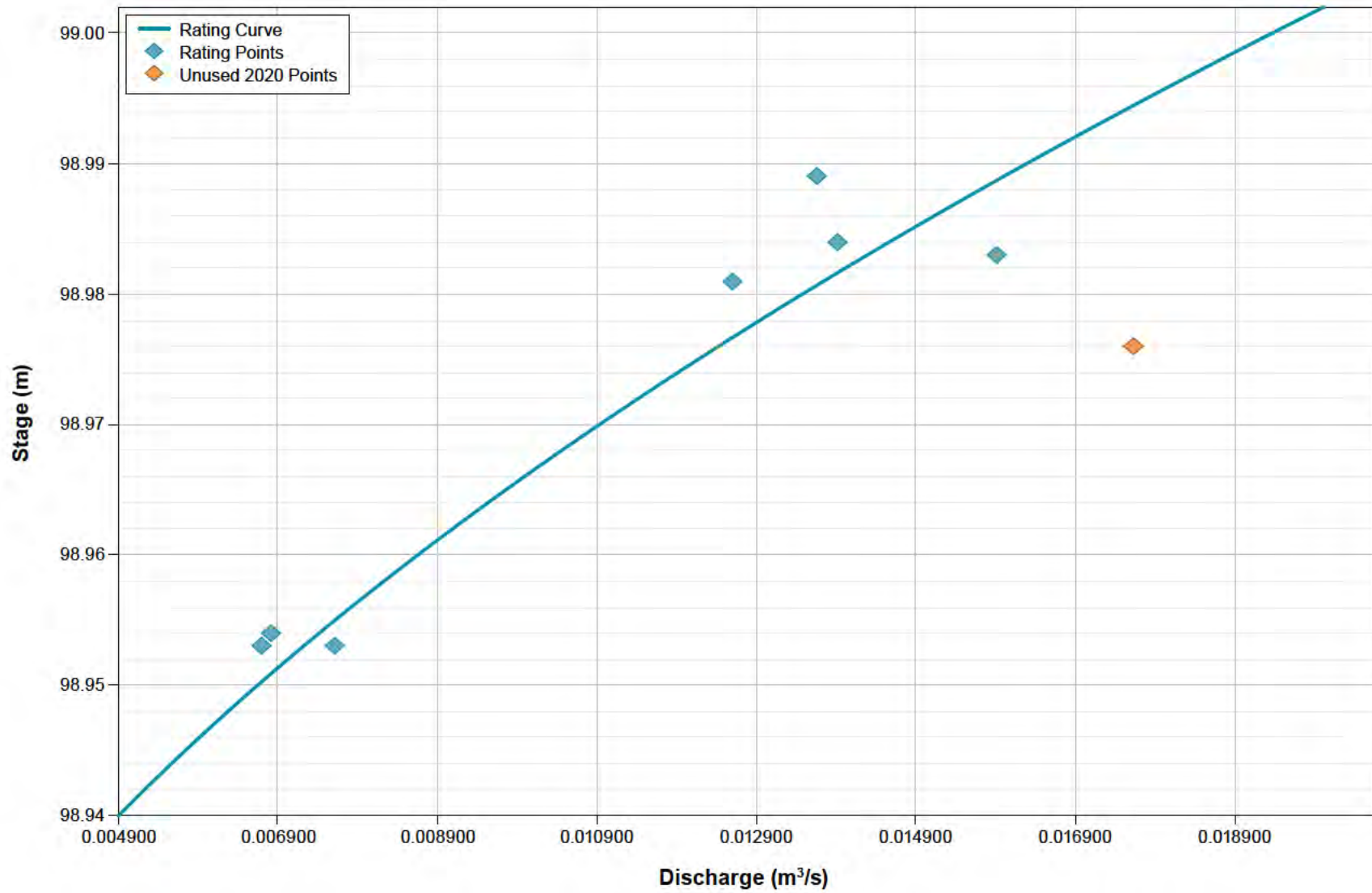
## APPENDIX C      RATING CURVES



**Figure C-a: Rating Curve for JTS-H1, 2020**



**Figure C-b: Rating Curve for JTN-H1, 2020**



**Figure C-c: Rating Curve for P10-A, 2020**

## APPENDIX D      HISTORIC DAILY DISCHARGE TABLES



Appendix D: Summary of Daily Discharge [Q, m<sup>3</sup>/s] at Hydrometric Station JTS-H1, 2016

Drainage Area = 0 km<sup>2</sup>

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	-	-	-	-	-	-	-	-	-	0.002	-	-
2	-	-	-	-	-	-	-	-	-	0.002	-	-
3	-	-	-	-	-	-	-	-	-	0.002	-	-
4	-	-	-	-	-	-	-	-	-	0.002	-	-
5	-	-	-	-	-	-	-	-	-	0.002	-	-
6	-	-	-	-	-	-	-	-	-	0.002	-	-
7	-	-	-	-	-	-	-	-	-	0.001	-	-
8	-	-	-	-	-	-	-	-	-	0.001	-	-
9	-	-	-	-	-	-	-	-	-	0.002	-	-
10	-	-	-	-	-	-	-	-	-	0.001	-	-
11	-	-	-	-	-	-	-	-	-	0.001	-	-
12	-	-	-	-	-	-	-	-	-	0.001	-	-
13	-	-	-	-	-	-	-	-	-	0.001	-	-
14	-	-	-	-	-	-	-	-	-	0.002	-	-
15	-	-	-	-	-	-	-	-	-	0.002	-	-
16	-	-	-	-	-	-	-	-	-	0.001	-	-
17	-	-	-	-	-	-	-	-	-	0.002	-	-
18	-	-	-	-	-	-	-	-	-	0.002	-	-
19	-	-	-	-	-	-	-	-	-	0.004	-	-
20	-	-	-	-	-	-	-	-	-	0.003	-	-
21	-	-	-	-	-	-	-	-	-	0.003	-	-
22	-	-	-	-	-	-	-	-	-	0.002	-	-
23	-	-	-	-	-	-	-	-	-	0.002	-	-
24	-	-	-	-	-	-	-	-	-	0.002	-	-
25	-	-	-	-	-	-	-	-	<i>0.013</i>	-	-	-
26	-	-	-	-	-	-	-	-	<i>0.013</i>	-	-	-
27	-	-	-	-	-	-	-	-	0.004	-	-	-
28	-	-	-	-	-	-	-	-	0.003	-	-	-
29	-	-	-	-	-	-	-	-	0.002	-	-	-
30	-	-	-	-	-	-	-	-	0.002	-	-	-
31	-	-	-	-	-	-	-	-	-	-	-	-
Mean	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.006	0.002	N/A	N/A
Max	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.013	0.004	N/A	N/A
Min	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.002	0.001	N/A	N/A
Total	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.037	0.044	N/A	N/A

Note: Estimated and modelled values are italicized

Values in red denote high uncertainty based on extrapolation of the rating curve beyond 2 times the greatest measured discharge.

Appendix D: Summary of Daily Discharge [Q, m<sup>3</sup>/s] at Hydrometric Station JTS-H1, 2017

Drainage Area = 0 km<sup>2</sup>

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	-	-	-	-	-	-	<i>0.008</i>	<i>0.004</i>	<i>0.009</i>	<i>0.005</i>	-	-
2	-	-	-	-	-	-	<i>0.009</i>	<i>0.004</i>	<i>0.006</i>	<i>0.004</i>	-	-
3	-	-	-	-	-	-	<i>0.016</i>	<i>0.004</i>	<i>0.005</i>	<i>0.004</i>	-	-
4	-	-	-	-	-	-	<i>0.011</i>	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	-	-
5	-	-	-	-	-	-	<i>0.008</i>	<i>0.004</i>	<i>0.004</i>	<i>0.011</i>	-	-
6	-	-	-	-	-	-	<i>0.005</i>	<i>0.004</i>	<i>0.005</i>	<i>0.006</i>	-	-
7	-	-	-	-	-	-	<i>0.006</i>	<i>0.004</i>	<i>0.004</i>	<i>0.007</i>	-	-
8	-	-	-	-	-	<i>0.021</i>	<i>0.015</i>	<i>0.003</i>	<i>0.013</i>	<i>0.007</i>	-	-
9	-	-	-	-	-	<i>0.021</i>	<i>0.009</i>	<i>0.003</i>	<i>0.017</i>	<i>0.005</i>	-	-
10	-	-	-	-	-	<i>0.024</i>	<i>0.008</i>	<i>0.003</i>	<i>0.012</i>	<i>0.004</i>	-	-
11	-	-	-	-	-	<i>0.009</i>	<i>0.007</i>	<i>0.003</i>	<i>0.007</i>	<i>0.004</i>	-	-
12	-	-	-	-	-	<i>0.010</i>	<i>0.005</i>	<i>0.004</i>	<i>0.005</i>	<i>0.004</i>	-	-
13	-	-	-	-	-	<i>0.007</i>	<i>0.005</i>	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	-	-
14	-	-	-	-	-	<i>0.008</i>	<i>0.004</i>	<i>0.005</i>	<i>0.004</i>	<i>0.021</i>	-	-
15	-	-	-	-	-	<i>0.006</i>	<i>0.004</i>	<i>0.007</i>	<i>0.004</i>	<i>0.014</i>	-	-
16	-	-	-	-	-	<i>0.006</i>	<i>0.004</i>	<i>0.015</i>	<i>0.004</i>	<i>0.010</i>	-	-
17	-	-	-	-	-	<i>0.006</i>	<i>0.004</i>	<i>0.019</i>	<i>0.004</i>	<i>0.008</i>	-	-
18	-	-	-	-	-	<i>0.002</i>	<i>0.004</i>	<i>0.012</i>	<i>0.005</i>	<i>0.007</i>	-	-
19	-	-	-	-	-	<i>0.001</i>	<i>0.004</i>	<i>0.010</i>	<i>0.004</i>	<i>0.007</i>	-	-
20	-	-	-	-	-	<i>0.006</i>	<i>0.004</i>	<i>0.023</i>	<i>0.004</i>	<i>0.007</i>	-	-
21	-	-	-	-	-	<i>0.012</i>	<i>0.004</i>	<i>0.034</i>	<i>0.004</i>	<i>0.007</i>	-	-
22	-	-	-	-	-	<i>0.005</i>	<i>0.004</i>	<i>0.023</i>	<i>0.008</i>	<i>0.013</i>	-	-
23	-	-	-	-	-	<i>0.003</i>	<i>0.004</i>	<i>0.012</i>	<i>0.010</i>	-	-	-
24	-	-	-	-	-	<i>0.003</i>	<i>0.004</i>	<i>0.010</i>	<i>0.007</i>	-	-	-
25	-	-	-	-	-	<i>0.007</i>	<i>0.005</i>	<i>0.017</i>	<i>0.025</i>	-	-	-
26	-	-	-	-	-	<i>0.011</i>	<i>0.006</i>	<i>0.010</i>	<i>0.021</i>	-	-	-
27	-	-	-	-	-	<i>0.009</i>	<i>0.005</i>	<i>0.006</i>	<i>0.028</i>	-	-	-
28	-	-	-	-	-	<i>0.007</i>	<i>0.005</i>	<i>0.005</i>	<i>0.029</i>	-	-	-
29	-	-	-	-	-	<i>0.005</i>	<i>0.005</i>	<i>0.011</i>	<i>0.015</i>	-	-	-
30	-	-	-	-	-	<i>0.008</i>	<i>0.004</i>	<i>0.013</i>	<i>0.008</i>	-	-	-
31	-	-	-	-	-	-	<i>0.004</i>	<i>0.020</i>	-	-	-	-
Mean	N/A	N/A	N/A	N/A	N/A	0.009	0.006	0.010	0.009	0.008	N/A	N/A
Max	N/A	N/A	N/A	N/A	N/A	0.024	0.016	0.034	0.029	0.021	N/A	N/A
Min	N/A	N/A	N/A	N/A	N/A	0.001	0.004	0.003	0.004	0.004	N/A	N/A
Total	N/A	N/A	N/A	N/A	N/A	0.196	0.189	0.298	0.279	0.166	N/A	N/A

Note: Estimated and modelled values are italicized

Values in red denote high uncertainty based on extrapolation of the rating curve beyond 2 times the greatest measured discharge.

Appendix D: Summary of Daily Discharge [Q, l/s] at Hydrometric Station JTS-H1, 2018

Drainage Area = 0 km<sup>2</sup>

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	-	-	-	-	-	-	25.80	3.77	12.91	3.54	-	-
2	-	-	-	-	-	-	17.24	4.15	40.43	17.89	-	-
3	-	-	-	-	-	-	16.17	4.64	15.59	3.45	-	-
4	-	-	-	-	-	-	14.55	4.03	10.32	3.38	-	-
5	-	-	-	-	-	-	12.98	3.66	8.12	4.04	-	-
6	-	-	-	-	-	-	12.63	3.36	6.73	4.13	-	-
7	-	-	-	-	-	-	10.56	3.34	8.38	4.99	-	-
8	-	-	-	-	-	-	8.93	3.59	7.47	7.00	-	-
9	-	-	-	-	-	-	8.56	18.49	7.41	5.72	-	-
10	-	-	-	-	-	<i>56.44</i>	8.46	7.91	6.50	4.34	-	-
11	-	-	-	-	-	52.33	11.97	4.50	5.44	59.94	-	-
12	-	-	-	-	-	63.48	14.61	4.07	4.83	27.66	-	-
13	-	-	-	-	-	60.36	9.73	3.97	4.62	13.43	-	-
14	-	-	-	-	-	<b>98.19</b>	8.21	5.87	4.66	9.96	-	-
15	-	-	-	-	-	63.72	11.12	3.90	4.32	7.50	-	-
16	-	-	-	-	-	65.46	26.56	3.60	4.19	6.36	-	-
17	-	-	-	-	-	87.17	43.75	6.12	4.00	17.05	-	-
18	-	-	-	-	-	67.01	27.90	4.16	3.89	10.68	-	-
19	-	-	-	-	-	59.09	16.09	3.47	3.82	46.16	-	-
20	-	-	-	-	-	58.27	11.13	3.18	3.66	48.72	-	-
21	-	-	-	-	-	53.42	8.90	2.97	3.56	-	-	-
22	-	-	-	-	-	41.44	7.42	4.50	3.48	-	-	-
23	-	-	-	-	-	27.66	6.70	3.47	8.27	-	-	-
24	-	-	-	-	-	22.50	5.92	3.76	4.41	-	-	-
25	-	-	-	-	-	19.45	5.23	4.60	7.12	-	-	-
26	-	-	-	-	-	17.36	4.71	4.05	13.32	-	-	-
27	-	-	-	-	-	15.38	4.40	3.41	7.45	-	-	-
28	-	-	-	-	-	13.15	4.09	28.30	5.75	-	-	-
29	-	-	-	-	-	23.93	3.89	15.14	4.53	-	-	-
30	-	-	-	-	-	39.03	4.15	8.82	9.89	-	-	-
31	-	-	-	-	-	-	3.83	14.95	-	-	-	-
Mean	N/A	N/A	N/A	N/A	N/A	47.85	12.14	6.25	7.84	15.30	N/A	N/A
Max	N/A	N/A	N/A	N/A	N/A	98.19	43.75	28.30	40.43	59.94	N/A	N/A
Min	N/A	N/A	N/A	N/A	N/A	13.15	3.83	2.97	3.48	3.38	N/A	N/A
Total	N/A	N/A	N/A	N/A	N/A	1004.85	376.21	193.72	235.07	305.95	N/A	N/A

Note: Estimated and modelled values are italicized.

Values in red denote high uncertainty based on extrapolation of the rating curve beyond 2 times the greatest measured discharge.

Appendix D: Summary of Daily Discharge [Q, L/s] at Hydrometric Station JTS-H1, 2019

Drainage Area = 0 km<sup>2</sup>

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	-	-	-	-	-	-	11.76	22.60	10.11	10.46	-	-
2	-	-	-	-	-	-	10.85	12.07	8.50	10.52	-	-
3	-	-	-	-	-	-	9.59	9.41	7.71	12.73	-	-
4	-	-	-	-	-	-	9.23	7.66	16.04	9.84	-	-
5	-	-	-	-	-	-	7.44	6.65	15.35	18.90	-	-
6	-	-	-	-	-	-	6.44	5.90	9.36	13.56	-	-
7	-	-	-	-	-	-	5.89	5.45	8.23	82.75	-	-
8	-	-	-	-	-	-	5.48	5.11	7.35	47.10	-	-
9	-	-	-	-	-	-	5.27	4.89	6.43	154.69	-	-
10	-	-	-	-	-	-	19.47	4.46	5.93	13.26	-	-
11	-	-	-	-	-	-	14.38	4.74	5.77	11.48	-	-
12	-	-	-	-	-	-	12.71	5.56	5.66	13.88	-	-
13	-	-	-	-	-	-	12.35	5.30	7.55	12.00	-	-
14	-	-	-	-	-	-	8.49	4.57	21.37	10.80	-	-
15	-	-	-	-	-	-	7.95	4.26	13.16	8.68	-	-
16	-	-	-	-	-	-	7.12	4.43	11.47	11.59	-	-
17	-	-	-	-	-	-	7.93	4.20	8.90	15.49	-	-
18	-	-	-	-	-	-	9.68	48.02	7.38	13.94	-	-
19	-	-	-	-	-	-	11.13	79.08	7.14	11.95	-	-
20	-	-	-	-	-	-	10.65	28.54	17.22	9.59	-	-
21	-	-	-	-	-	-	18.25	148.34	19.49	8.57	-	-
22	-	-	-	-	-	-	13.66	119.31	102.46	7.80	-	-
23	-	-	-	-	-	-	10.08	40.34	82.83	8.02	-	-
24	-	-	-	-	-	-	7.84	81.40	45.46	7.82	-	-
25	-	-	-	-	-	-	7.05	65.61	108.02	10.97	-	-
26	-	-	-	-	-	-	6.80	39.82	90.98	8.32	-	-
27	-	-	-	-	-	-	9.10	39.68	43.10	7.22	-	-
28	-	-	-	-	-	-	14.16	39.46	21.11	7.10	-	-
29	-	-	-	-	-	14.89	20.38	22.57	14.81	7.26	-	-
30	-	-	-	-	-	12.94	13.53	15.53	12.09	6.21	-	-
31	-	-	-	-	-	-	10.57	12.20	-	6.45	-	-
Mean	N/A	N/A	N/A	N/A	N/A	13.914	10.492	28.940	24.700	18.676	N/A	N/A
Max	N/A	N/A	N/A	N/A	N/A	14.891	20.378	148.336	108.018	154.695	N/A	N/A
Min	N/A	N/A	N/A	N/A	N/A	12.937	5.274	4.198	5.663	6.212	N/A	N/A

*Note: Estimated and modelled values are italicized discharge.*

Appendix D: Summary of Daily Discharge [Q, m<sup>3</sup>/s] at Hydrometric Station JTN-H1, 2016

Drainage Area = 0 km<sup>2</sup>

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	-	-	-	-	-	-	-	-	-	0.005	-	-
2	-	-	-	-	-	-	-	-	-	0.004	-	-
3	-	-	-	-	-	-	-	-	-	0.004	-	-
4	-	-	-	-	-	-	-	-	-	0.004	-	-
5	-	-	-	-	-	-	-	-	-	0.003	-	-
6	-	-	-	-	-	-	-	-	-	0.003	-	-
7	-	-	-	-	-	-	-	-	-	0.003	-	-
8	-	-	-	-	-	-	-	-	-	0.003	-	-
9	-	-	-	-	-	-	-	-	-	0.003	-	-
10	-	-	-	-	-	-	-	-	-	0.003	-	-
11	-	-	-	-	-	-	-	-	-	0.002	-	-
12	-	-	-	-	-	-	-	-	-	0.002	-	-
13	-	-	-	-	-	-	-	-	-	0.003	-	-
14	-	-	-	-	-	-	-	-	-	0.003	-	-
15	-	-	-	-	-	-	-	-	-	0.003	-	-
16	-	-	-	-	-	-	-	-	-	0.003	-	-
17	-	-	-	-	-	-	-	-	-	0.003	-	-
18	-	-	-	-	-	-	-	-	-	0.003	-	-
19	-	-	-	-	-	-	-	-	-	0.004	-	-
20	-	-	-	-	-	-	-	-	-	0.004	-	-
21	-	-	-	-	-	-	-	-	-	0.005	-	-
22	-	-	-	-	-	-	-	-	-	0.005	-	-
23	-	-	-	-	-	-	-	-	-	0.006	-	-
24	-	-	-	-	-	-	-	-	-	0.004	-	-
25	-	-	-	-	-	-	-	-	<i>0.018</i>	-	-	-
26	-	-	-	-	-	-	-	-	<b>0.032</b>	-	-	-
27	-	-	-	-	-	-	-	-	0.019	-	-	-
28	-	-	-	-	-	-	-	-	0.011	-	-	-
29	-	-	-	-	-	-	-	-	0.008	-	-	-
30	-	-	-	-	-	-	-	-	0.007	-	-	-
31	-	-	-	-	-	-	-	-	-	-	-	-
Mean	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.016	0.004	N/A	N/A
Max	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.032	0.006	N/A	N/A
Min	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.007	0.002	N/A	N/A
Total	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.095	0.085	N/A	N/A

Note: Estimated and modelled values are italicized

Values in red denote high uncertainty based on extrapolation of the rating curve beyond 2 times the greatest measured discharge.

Appendix D: Summary of Daily Discharge [Q, l/s] at Hydrometric Station JTN-H1, 2017

Drainage Area = N/A km<sup>2</sup>

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	-	-	-	-	-	-	-	3.540	10.642	5.494	-	-
2	-	-	-	-	-	-	-	3.428	6.343	4.084	-	-
3	-	-	-	-	-	-	-	3.320	4.553	3.781	-	-
4	-	-	-	-	-	-	-	3.231	3.851	3.994	-	-
5	-	-	-	-	-	-	-	3.158	3.739	13.786	-	-
6	-	-	-	-	-	-	-	3.127	5.080	7.084	-	-
7	-	-	-	-	-	-	-	3.093	3.950	7.447	-	-
8	-	-	-	-	-	-	<i>18.419</i>	3.049	15.357	7.781	-	-
9	-	-	-	-	-	-	10.818	3.010	21.099	5.245	-	-
10	-	-	-	-	-	-	8.745	2.989	14.280	4.020	-	-
11	-	-	-	-	-	-	7.136	3.034	7.799	3.797	-	-
12	-	-	-	-	-	-	5.759	3.180	5.174	3.714	-	-
13	-	-	-	-	-	-	4.751	3.545	3.995	3.973	-	-
14	-	-	-	-	-	-	4.204	4.703	3.772	27.018	-	-
15	-	-	-	-	-	-	4.299	8.071	3.627	16.914	-	-
16	-	-	-	-	-	-	3.835	18.693	3.705	12.110	-	-
17	-	-	-	-	-	-	3.620	23.884	4.129	9.427	-	-
18	-	-	-	-	-	-	3.480	15.043	4.920	8.313	-	-
19	-	-	-	-	-	-	3.364	11.662	3.821	8.330	-	-
20	-	-	-	-	-	-	3.293	29.562	3.644	7.762	-	-
21	-	-	-	-	-	-	3.886	<b>43.486</b>	4.134	7.758	-	-
22	-	-	-	-	-	-	3.492	28.939	8.819	15.444	-	-
23	-	-	-	-	-	-	3.339	14.455	12.361	-	-	-
24	-	-	-	-	-	-	3.298	11.554	7.461	-	-	-
25	-	-	-	-	-	-	4.994	20.922	32.446	-	-	-
26	-	-	-	-	-	-	6.464	11.225	27.011	-	-	-
27	-	-	-	-	-	-	4.959	6.701	35.904	-	-	-
28	-	-	-	-	-	-	5.517	4.477	36.983	-	-	-
29	-	-	-	-	-	-	5.157	12.794	18.549	-	-	-
30	-	-	-	-	-	-	4.021	16.019	9.109	-	-	-
31	-	-	-	-	-	-	3.695	25.668	-	-	-	-
Mean	N/A	N/A	N/A	N/A	N/A	N/A	5.439	11.276	10.875	8.513	N/A	N/A
Max	N/A	N/A	N/A	N/A	N/A	0.000	18.419	43.486	36.983	27.018	N/A	N/A
Min	N/A	N/A	N/A	N/A	N/A	0.000	3.293	2.989	3.627	3.714	N/A	N/A
Total	N/A	N/A	N/A	N/A	N/A	0.000	130.545	349.562	326.259	187.276	N/A	N/A

Note: Estimated and modelled values are italicized

Values in red denote high uncertainty based on extrapolation of the rating curve beyond 2 times the greatest measured discharge.

Appendix D: Summary of Daily Discharge [Q, l/s] at Hydrometric Station JTN-H1, 2018

Drainage Area = 0 km<sup>2</sup>

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	-	-	-	-	-	-	7.12	1.19	3.18	2.00	-	-
2	-	-	-	-	-	-	4.63	1.33	9.50	2.25	-	-
3	-	-	-	-	-	-	3.38	1.62	3.15	1.95	-	-
4	-	-	-	-	-	-	2.54	1.37	2.64	1.94	-	-
5	-	-	-	-	-	-	2.10	1.23	2.42	2.18	-	-
6	-	-	-	-	-	-	1.91	1.08	2.31	2.24	-	-
7	-	-	-	-	-	-	1.62	1.10	2.70	2.29	-	-
8	-	-	-	-	-	-	1.41	1.22	2.56	2.89	-	-
9	-	-	-	-	-	-	1.35	4.54	2.55	2.30	-	-
10	-	-	-	-	-	-	1.55	2.55	2.26	2.03	-	-
11	-	-	-	-	-	<i>16.38</i>	2.26	1.69	2.07	15.50	-	-
12	-	-	-	-	-	17.04	2.46	1.58	1.95	6.42	-	-
13	-	-	-	-	-	16.27	1.89	1.52	1.86	3.34	-	-
14	-	-	-	-	-	27.19	1.78	2.10	1.94	2.78	-	-
15	-	-	-	-	-	19.34	2.34	1.63	1.81	2.49	-	-
16	-	-	-	-	-	17.69	6.02	1.54	1.68	2.28	-	-
17	-	-	-	-	-	20.47	10.55	2.09	1.65	5.20	-	-
18	-	-	-	-	-	15.61	6.54	1.80	1.64	3.42	-	-
19	-	-	-	-	-	13.29	4.55	1.64	1.57	13.16	-	-
20	-	-	-	-	-	11.85	3.45	1.54	1.54	19.25	-	-
21	-	-	-	-	-	12.12	2.76	1.41	1.48	-	-	-
22	-	-	-	-	-	8.66	2.36	1.95	1.37	-	-	-
23	-	-	-	-	-	6.27	2.05	1.61	2.60	-	-	-
24	-	-	-	-	-	4.74	1.86	1.64	1.84	-	-	-
25	-	-	-	-	-	4.10	1.70	1.85	2.36	-	-	-
26	-	-	-	-	-	3.76	1.55	1.81	4.37	-	-	-
27	-	-	-	-	-	2.95	1.48	1.56	2.59	-	-	-
28	-	-	-	-	-	2.45	1.39	6.33	2.23	-	-	-
29	-	-	-	-	-	4.30	1.32	2.94	2.10	-	-	-
30	-	-	-	-	-	9.78	1.28	2.27	2.03	-	-	-
31	-	-	-	-	-	-	1.20	3.40	-	-	-	-
Mean	N/A	N/A	N/A	N/A	N/A	11.71	2.85	1.97	2.46	4.79	N/A	N/A
Max	N/A	N/A	N/A	N/A	N/A	27.19	10.55	6.33	9.50	19.25	N/A	N/A
Min	N/A	N/A	N/A	N/A	N/A	2.45	1.20	1.08	1.37	1.94	N/A	N/A
Total	N/A	N/A	N/A	N/A	N/A	234.25	88.40	61.14	73.95	95.89	N/A	N/A

Note: Estimated and modelled values are italicized.

Values in red denote high uncertainty based on extrapolation of the rating curve beyond 2 times the greatest measured discharge.

Appendix D: Summary of Daily Discharge [Q, L/s] at Hydrometric Station JTN-H1, 2019

Drainage Area = 0 km<sup>2</sup>

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	-	-	-	-	-	-	2.11	7.76	5.13	5.79	-	-
2	-	-	-	-	-	-	1.94	4.86	4.31	5.34	-	-
3	-	-	-	-	-	-	1.74	3.97	4.09	6.68	-	-
4	-	-	-	-	-	-	1.76	3.53	7.52	5.53	-	-
5	-	-	-	-	-	-	1.70	3.22	7.95	9.73	-	-
6	-	-	-	-	-	-	1.51	2.98	5.73	8.37	-	-
7	-	-	-	-	-	-	1.45	2.81	4.91	31.70	-	-
8	-	-	-	-	-	-	1.40	2.63	3.95	23.42	-	-
9	-	-	-	-	-	-	1.38	2.54	3.38	12.75	-	-
10	-	-	-	-	-	-	4.00	2.33	2.99	8.55	-	-
11	-	-	-	-	-	-	3.20	2.33	2.74	6.89	-	-
12	-	-	-	-	-	-	2.95	2.67	2.54	9.95	-	-
13	-	-	-	-	-	-	2.78	2.47	3.32	10.67	-	-
14	-	-	-	-	-	-	2.21	2.16	8.34	11.58	-	-
15	-	-	-	-	-	-	2.26	2.02	6.18	9.21	-	-
16	-	-	-	-	-	-	2.16	2.05	5.43	35.05	-	-
17	-	-	-	-	-	-	2.36	2.00	4.35	25.80	-	-
18	-	-	-	-	-	-	2.67	13.72	3.55	19.40	-	-
19	-	-	-	-	-	-	3.15	24.00	3.37	16.56	-	-
20	-	-	-	-	-	-	3.15	13.34	8.38	12.47	-	-
21	-	-	-	-	-	-	4.56	47.15	10.29	9.49	-	-
22	-	-	-	-	-	-	3.37	45.83	38.00	7.62	-	-
23	-	-	-	-	-	-	2.66	24.97	37.37	9.83	-	-
24	-	-	-	-	-	-	2.55	35.47	26.72	9.45	-	-
25	-	-	-	-	-	-	2.56	33.09	44.74	13.94	-	-
26	-	-	-	-	-	-	2.59	23.95	42.61	11.61	-	-
27	-	-	-	-	-	-	3.14	21.11	27.44	8.49	-	-
28	-	-	-	-	-	-	5.68	21.37	16.12	6.78	-	-
29	-	-	-	-	-	2.76	7.16	13.16	10.21	5.71	-	-
30	-	-	-	-	-	2.36	4.68	8.72	7.24	4.88	-	-
31	-	-	-	-	-	-	3.86	6.42	-	7.13	-	-
Mean	N/A	N/A	N/A	N/A	N/A	2.563	2.860	12.407	11.964	11.947	N/A	N/A
Max	N/A	N/A	N/A	N/A	N/A	2.762	7.162	47.152	44.741	35.048	N/A	N/A
Min	N/A	N/A	N/A	N/A	N/A	2.364	1.376	2.004	2.541	4.879	N/A	N/A

*Note: Estimated and modelled values are italicized discharge.*



Appendix D: Summary of Daily Discharge [Q, l/s] at Hydrometric Station P10-A, 2017

Drainage Area = N/A km<sup>2</sup>

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	-	-	-	-	-	-	9.587	6.026	9.377	9.409	-	-
2	-	-	-	-	-	-	9.025	5.716	9.054	8.638	-	-
3	-	-	-	-	-	-	8.690	5.658	8.337	8.108	-	-
4	-	-	-	-	-	-	8.144	5.573	8.133	8.067	-	-
5	-	-	-	-	-	-	8.000	5.368	7.903	9.830	-	-
6	-	-	-	-	-	-	8.566	5.137	7.529	9.836	-	-
7	-	-	-	-	-	-	8.585	5.016	7.360	9.466	-	-
8	-	-	-	-	-	-	10.057	5.347	8.276	9.529	-	-
9	-	-	-	-	-	<i>9.108</i>	8.620	5.728	9.643	9.074	-	-
10	-	-	-	-	-	8.684	8.207	5.688	9.265	8.359	-	-
11	-	-	-	-	-	8.734	8.115	5.449	8.928	8.054	-	-
12	-	-	-	-	-	8.705	7.669	5.359	8.352	8.345	-	-
13	-	-	-	-	-	8.531	7.153	5.245	8.389	7.131	-	-
14	-	-	-	-	-	8.890	7.030	5.269	8.005	9.787	-	-
15	-	-	-	-	-	8.945	7.017	6.337	7.541	9.910	-	-
16	-	-	-	-	-	8.453	6.857	7.421	7.243	9.885	-	-
17	-	-	-	-	-	8.439	6.786	9.210	7.218	9.564	-	-
18	-	-	-	-	-	9.015	6.893	8.368	7.575	8.650	-	-
19	-	-	-	-	-	10.133	6.742	8.215	7.256	8.654	-	-
20	-	-	-	-	-	9.183	6.333	9.255	7.019	8.391	-	-
21	-	-	-	-	-	8.935	6.508	10.711	6.771	7.450	-	-
22	-	-	-	-	-	9.247	6.136	10.211	6.997	7.199	-	-
23	-	-	-	-	-	9.769	5.660	8.780	8.563	-	-	-
24	-	-	-	-	-	10.433	5.643	8.166	8.263	-	-	-
25	-	-	-	-	-	9.971	5.903	8.864	9.665	-	-	-
26	-	-	-	-	-	9.038	6.036	8.845	10.779	-	-	-
27	-	-	-	-	-	8.669	6.232	8.138	11.103	-	-	-
28	-	-	-	-	-	9.261	6.242	8.342	11.631	-	-	-
29	-	-	-	-	-	9.128	6.214	8.699	11.130	-	-	-
30	-	-	-	-	-	8.766	6.213	9.299	10.164	-	-	-
31	-	-	-	-	-	-	6.014	10.152	-	-	-	-
Mean	N/A	N/A	N/A	N/A	N/A	9.093	7.254	7.277	8.582	8.788	N/A	N/A
Max	N/A	N/A	N/A	N/A	N/A	10.433	10.057	10.711	11.631	9.910	N/A	N/A
Min	N/A	N/A	N/A	N/A	N/A	8.439	5.643	5.016	6.771	7.131	N/A	N/A
Total	N/A	N/A	N/A	N/A	N/A	200.037	224.879	225.589	257.467	193.337	N/A	N/A

*Note: Estimated and modelled values are italicized*

*Values in red denote high uncertainty based on extrapolation of the rating curve beyond 2 times the greatest measured discharge.*

Appendix D: Summary of Daily Discharge [Q, l/s] at Hydrometric Station P10-A, 2018

Drainage Area = N/A km<sup>2</sup>

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	-	-	-	-	-	-	10.38	6.02	<i>4.12</i>	-	-	-
2	-	-	-	-	-	-	10.24	5.51	<i>4.46</i>	-	-	-
3	-	-	-	-	-	-	9.83	5.21	<i>4.82</i>	-	-	-
4	-	-	-	-	-	-	9.83	5.06	<i>5.22</i>	-	-	-
5	-	-	-	-	-	-	9.29	4.93	<i>5.65</i>	-	-	-
6	-	-	-	-	-	-	8.72	4.62	<i>6.12</i>	-	-	-
7	-	-	-	-	-	-	8.30	4.71	<i>6.62</i>	-	-	-
8	-	-	-	-	-	-	8.00	5.22	-	-	-	-
9	-	-	-	-	-	-	7.61	5.08	-	-	-	-
10	-	-	-	-	-	<i>10.52</i>	7.43	4.79	-	-	-	-
11	-	-	-	-	-	10.85	7.30	4.75	-	-	-	-
12	-	-	-	-	-	11.20	7.46	4.44	-	-	-	-
13	-	-	-	-	-	12.18	7.33	4.05	-	-	-	-
14	-	-	-	-	-	10.92	7.41	3.03	-	-	-	-
15	-	-	-	-	-	11.74	8.05	2.91	-	-	-	-
16	-	-	-	-	-	13.59	9.60	2.89	-	-	-	-
17	-	-	-	-	-	13.68	9.70	2.86	-	-	-	-
18	-	-	-	-	-	14.37	9.37	2.90	-	-	-	-
19	-	-	-	-	-	15.30	8.71	3.08	-	-	-	-
20	-	-	-	-	-	14.50	8.85	3.36	-	-	-	-
21	-	-	-	-	-	13.24	8.20	3.43	-	-	-	-
22	-	-	-	-	-	12.07	7.66	3.37	-	-	-	-
23	-	-	-	-	-	11.62	7.70	3.12	-	-	-	-
24	-	-	-	-	-	10.66	7.04	3.04	-	-	-	-
25	-	-	-	-	-	10.33	6.91	2.87	-	-	-	-
26	-	-	-	-	-	9.99	7.16	2.77	-	-	-	-
27	-	-	-	-	-	9.70	6.71	2.77	-	-	-	-
28	-	-	-	-	-	9.90	6.49	<i>3.00</i>	-	-	-	-
29	-	-	-	-	-	11.32	6.91	<i>3.25</i>	-	-	-	-
30	-	-	-	-	-	11.02	6.85	<i>3.51</i>	-	-	-	-
31	-	-	-	-	-	-	6.72	<i>3.80</i>	-	-	-	-
Mean	N/A	N/A	N/A	N/A	N/A	11.84	8.12	3.88	5.29	N/A	N/A	N/A
Max	N/A	N/A	N/A	N/A	N/A	15.30	10.38	6.02	6.62	N/A	N/A	N/A
Min	N/A	N/A	N/A	N/A	N/A	9.70	6.49	2.77	4.12	N/A	N/A	N/A
Total	N/A	N/A	N/A	N/A	N/A	248.68	251.73	120.34	37.00	N/A	N/A	N/A

Note: Estimated and modelled values are italicized.

Values in red denote high uncertainty based on extrapolation of the rating curve beyond 2 times the greatest measured discharge.

Appendix D: Summary of Daily Discharge [Q, L/s] at Hydrometric Station P10-A, 2019

Drainage Area = N/A km<sup>2</sup>

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	-	-	-	-	-	-	17.24	10.03	6.89	7.06	-	-
2	-	-	-	-	-	-	16.92	9.71	6.59	6.98	-	-
3	-	-	-	-	-	-	16.25	9.54	6.52	6.95	-	-
4	-	-	-	-	-	-	16.66	9.45	6.50	6.70	-	-
5	-	-	-	-	-	-	14.95	9.07	6.64	7.22	-	-
6	-	-	-	-	-	-	15.06	9.13	6.51	7.30	-	-
7	-	-	-	-	-	-	14.79	9.00	6.27	9.67	-	-
8	-	-	-	-	-	-	14.48	9.08	6.03	11.22	-	-
9	-	-	-	-	-	-	14.50	9.07	5.98	9.65	-	-
10	-	-	-	-	-	-	<i>13.44</i>	8.61	6.04	7.85	-	-
11	-	-	-	-	-	-	12.45	8.59	5.92	6.76	-	-
12	-	-	-	-	-	-	<i>17.99</i>	8.52	5.91	6.83	-	-
13	-	-	-	-	-	-	11.55	8.33	5.87	6.80	-	-
14	-	-	-	-	-	-	10.55	8.21	6.28	6.97	-	-
15	-	-	-	-	-	-	9.85	8.43	6.37	7.05	-	-
16	-	-	-	-	-	-	9.47	8.74	6.31	6.39	-	-
17	-	-	-	-	-	-	9.96	8.66	6.30	6.05	-	-
18	-	-	-	-	-	-	10.13	10.32	6.04	5.88	-	-
19	-	-	-	-	-	-	10.10	12.26	5.97	5.91	-	-
20	-	-	-	-	-	-	9.90	8.64	6.31	5.89	-	-
21	-	-	-	-	-	-	10.23	13.80	6.73	5.72	-	-
22	-	-	-	-	-	-	10.90	12.82	10.91	6.07	-	-
23	-	-	-	-	-	-	10.37	9.34	12.14	5.57	-	-
24	-	-	-	-	-	-	10.20	10.13	10.13	5.25	-	-
25	-	-	-	-	-	-	9.82	10.65	12.62	5.29	-	-
26	-	-	-	-	-	-	9.25	8.83	12.47	5.17	-	-
27	-	-	-	-	-	-	9.56	8.79	10.47	5.79	-	-
28	-	-	-	-	-	-	9.48	9.02	8.96	5.66	-	-
29	-	-	-	-	-	17.63	9.92	8.57	8.13	5.60	-	-
30	-	-	-	-	-	17.53	10.00	7.74	7.69	4.81	-	-
31	-	-	-	-	-	-	9.83	7.15	-	4.73	-	-
Mean	N/A	N/A	N/A	N/A	N/A	17.58	11.93	9.36	7.52	6.61	N/A	N/A
Max	N/A	N/A	N/A	N/A	N/A	17.63	17.24	13.80	12.62	11.22	N/A	N/A
Min	N/A	N/A	N/A	N/A	N/A	17.53	9.25	7.15	5.87	4.73	N/A	N/A

*Note: Estimated and modelled values are italicized*

*Values in red denote high uncertainty based on extrapolation of the rating curve beyond 2 times the greatest measured discharge.*

Appendix D: Summary of Daily Discharge [Q, l/s] at Hydrometric Station P10-B, 2017

Drainage Area = N/A km<sup>2</sup>

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	-	-	-	-	-	-	0.68	0.55	-	-	-	-
2	-	-	-	-	-	-	0.64	0.51	-	-	-	-
3	-	-	-	-	-	-	0.69	0.54	-	-	-	-
4	-	-	-	-	-	-	0.64	0.66	-	-	-	-
5	-	-	-	-	-	-	0.58	0.70	-	-	-	-
6	-	-	-	-	-	-	0.53	0.62	-	-	-	-
7	-	-	-	-	-	-	0.52	0.70	-	-	-	-
8	-	-	-	-	-	-	0.53	0.80	-	-	-	-
9	-	-	-	-	-	<i>0.84</i>	0.59	0.68	-	-	-	-
10	-	-	-	-	-	0.85	0.56	0.65	-	-	-	-
11	-	-	-	-	-	0.81	0.63	0.69	-	-	-	-
12	-	-	-	-	-	0.85	0.65	0.66	-	-	-	-
13	-	-	-	-	-	1.18	0.67	0.71	-	-	-	-
14	-	-	-	-	-	0.98	0.68	0.72	-	-	-	-
15	-	-	-	-	-	0.99	0.70	0.72	-	-	-	-
16	-	-	-	-	-	1.14	0.71	0.74	-	-	-	-
17	-	-	-	-	-	1.04	0.62	0.71	-	-	-	-
18	-	-	-	-	-	1.06	0.56	0.71	-	-	-	-
19	-	-	-	-	-	1.00	0.55	0.69	-	-	-	-
20	-	-	-	-	-	0.88	0.57	0.69	-	-	-	-
21	-	-	-	-	-	0.76	0.57	0.73	-	-	-	-
22	-	-	-	-	-	0.69	0.55	0.71	-	-	-	-
23	-	-	-	-	-	0.71	0.58	0.62	-	-	-	-
24	-	-	-	-	-	0.65	0.53	0.59	-	-	-	-
25	-	-	-	-	-	0.67	0.57	0.55	-	-	-	-
26	-	-	-	-	-	0.65	0.60	0.57	-	-	-	-
27	-	-	-	-	-	0.65	0.55	0.56	-	-	-	-
28	-	-	-	-	-	0.67	0.61	-	-	-	-	-
29	-	-	-	-	-	0.75	0.68	-	-	-	-	-
30	-	-	-	-	-	0.74	0.65	-	-	-	-	-
31	-	-	-	-	-	-	0.61	-	-	-	-	-
Mean	N/A	N/A	N/A	N/A	N/A	0.84	0.61	0.66	N/A	N/A	N/A	N/A
Max	N/A	N/A	N/A	N/A	N/A	1.18	0.71	0.80	N/A	N/A	N/A	N/A
Min	N/A	N/A	N/A	N/A	N/A	0.65	0.52	0.51	N/A	N/A	N/A	N/A
Total	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Notes: Estimated and modelled values are italicized.

Values in red denote high uncertainty based on extrapolation of the rating curve beyond 2 times the greatest measured discharge.

Appendix D: Summary of Daily Discharge [Q, l/s] at Hydrometric Station P10-B, 2017

Drainage Area = N/A km<sup>2</sup>

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	-	-	-	-	-	-	0.842	0.668	0.600	0.592	-	-
2	-	-	-	-	-	-	0.744	0.634	0.610	0.558	-	-
3	-	-	-	-	-	-	0.662	0.663	0.643	0.550	-	-
4	-	-	-	-	-	-	0.669	0.624	0.632	0.570	-	-
5	-	-	-	-	-	-	0.821	0.643	0.635	0.667	-	-
6	-	-	-	-	-	-	0.851	0.610	0.655	0.572	-	-
7	-	-	-	-	-	-	0.765	0.659	0.592	0.548	-	-
8	-	-	-	-	-	-	1.000	0.683	0.673	0.545	-	-
9	-	-	-	-	-	<i>1.047</i>	0.747	0.662	0.691	0.487	-	-
10	-	-	-	-	-	1.036	0.693	0.676	0.636	0.452	-	-
11	-	-	-	-	-	1.011	0.693	0.625	0.638	0.422	-	-
12	-	-	-	-	-	0.966	0.675	0.640	0.636	0.552	-	-
13	-	-	-	-	-	0.902	0.619	0.646	0.608	0.439	-	-
14	-	-	-	-	-	0.930	0.612	0.634	0.572	0.584	-	-
15	-	-	-	-	-	0.959	0.618	0.671	0.589	0.453	-	-
16	-	-	-	-	-	0.844	0.616	0.740	0.602	0.496	-	-
17	-	-	-	-	-	0.842	0.602	0.722	0.566	0.450	-	-
18	-	-	-	-	-	0.930	0.681	0.636	0.560	0.406	-	-
19	-	-	-	-	-	1.071	0.718	0.629	0.526	0.489	-	-
20	-	-	-	-	-	0.919	0.710	0.738	0.551	0.500	-	-
21	-	-	-	-	-	0.828	0.698	0.849	0.554	0.438	-	-
22	-	-	-	-	-	0.874	0.678	0.717	0.560	0.441	-	-
23	-	-	-	-	-	0.884	0.652	0.667	0.595	-	-	-
24	-	-	-	-	-	0.927	0.621	0.628	0.541	-	-	-
25	-	-	-	-	-	0.857	0.644	0.732	0.662	-	-	-
26	-	-	-	-	-	0.762	0.658	0.669	0.591	-	-	-
27	-	-	-	-	-	0.742	0.654	0.602	0.668	-	-	-
28	-	-	-	-	-	0.800	0.663	0.662	0.697	-	-	-
29	-	-	-	-	-	0.717	0.645	0.726	0.625	-	-	-
30	-	-	-	-	-	0.737	0.651	0.658	0.549	-	-	-
31	-	-	-	-	-	-	0.649	0.731	-	-	-	-
Mean	N/A	N/A	N/A	N/A	N/A	0.890	0.695	0.672	0.609	0.510	N/A	N/A
Max	N/A	N/A	N/A	N/A	N/A	1.071	1.000	0.849	0.697	0.667	N/A	N/A
Min	N/A	N/A	N/A	N/A	N/A	0.717	0.602	0.602	0.526	0.406	N/A	N/A
Total	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	18.257	11.210	N/A	N/A

Notes: Estimated and modelled values are italicized.

Values in red denote high uncertainty based on extrapolation of the rating curve beyond 2 times the greatest measured discharge.

**Appendix D: Summary of Daily Discharge [Q, l/s] at Hydrometric Station P11, 2017-2018**

Drainage Area =		N/A	km <sup>2</sup>
2017	6-Oct-17	0.16	
2018	10-Jun-18	0.41	
	11-Jul-18	0.10	
	11-Aug-18	0.07	
	7-Sep-18	0.07	
	21-Oct-18	0.10	
2019	27-Jun-19	0.148	
	24-Jul-19	0.027	
	19-Aug-19	0.058	

**Appendix D: Summary of Daily Discharge [Q, l/s] at Hydrometric Station P12, 2017-2018**

Drainage Area =		N/A	km <sup>2</sup>
2017	6-Oct-17	0.87	
2018	10-Jun-18	1.46	
	11-Jul-18	1.11	
	11-Aug-18	0.34	
	7-Sep-18	0.56	
	21-Oct-18	0.73	
2019	27-Jun-19	0.90	
	24-Jul-19	0.48	
	19-Aug-19	0.76	
	25-Sep-19	2.28	
	31-Oct-19	0.37	

## APPENDIX E      HISTORIC HYDROLOGIC INDICES



Appendix E: Historic Hydrologic Indices - Monthly Historic Peak Flow Data

JTN-H1												
Monthly Peak Flows (L/s)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2016	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	32.47	6.20	N/A	N/A
2017	N/A	N/A	N/A	N/A	N/A	N/A	18.42	43.49	36.98	27.02	N/A	N/A
2018	N/A	N/A	N/A	N/A	N/A	27.19	10.55	6.33	9.50	19.25	N/A	N/A
2019	N/A	N/A	N/A	N/A	N/A	2.76	7.16	47.15	44.74	35.05	N/A	N/A
<b>Average 2016-2019</b>	-	-	-	-	-	<b>14.98</b>	<b>12.04</b>	<b>32.32</b>	<b>30.91</b>	<b>21.88</b>	-	-

JTS-H1												
Monthly Peak Flows (L/s)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2016	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	13.32	4.01	N/A	N/A
2017	N/A	N/A	N/A	N/A	N/A	<i>23.86</i>	<i>15.67</i>	<i>33.63</i>	<i>28.78</i>	<i>21.35</i>	N/A	N/A
2018	N/A	N/A	N/A	N/A	N/A	98.19	43.75	28.30	40.43	59.94	N/A	N/A
2019	N/A	N/A	N/A	N/A	N/A	14.89	20.38	148.34	108.02	154.69	N/A	N/A
<b>Average 2016-2019</b>	-	-	-	-	-	<b>45.65</b>	<b>26.60</b>	<b>70.09</b>	<b>47.64</b>	<b>60.00</b>	-	-

P10-A												
Monthly Peak Flows (L/s)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017	N/A	N/A	N/A	N/A	N/A	10.43	10.06	10.71	11.63	9.91	N/A	N/A
2018	N/A	N/A	N/A	N/A	N/A	15.30	10.38	6.02	6.62	N/A	N/A	N/A
2019	N/A	N/A	N/A	N/A	N/A	17.63	17.24	13.80	12.62	11.22	N/A	N/A
<b>Average 2017-2019</b>	-	-	-	-	-	<b>14.46</b>	<b>12.56</b>	<b>10.18</b>	<b>10.29</b>	<b>10.56</b>	-	-

P10-B												
Monthly Peak Flows (L/s)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017	N/A	N/A	N/A	N/A	N/A	1.07	1.00	0.85	0.70	0.67	N/A	N/A
2018	N/A	N/A	N/A	N/A	N/A	1.18	0.71	0.80	N/A	N/A	N/A	N/A
<b>Average 2017-2018</b>	-	-	-	-	-	<b>1.12</b>	<b>0.85</b>	<b>0.82</b>	<b>0.70</b>	<b>0.67</b>	-	-

P10 Total												
Monthly Peak Flows (L/s)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017	N/A	N/A	N/A	N/A	N/A	11.50	11.06	11.56	12.33	10.58	N/A	N/A
2018	N/A	N/A	N/A	N/A	N/A	16.48	11.08	6.82	N/A	N/A	N/A	N/A
<b>Average 2017-2018</b>	-	-	-	-	-	<b>13.99</b>	<b>11.07</b>	<b>9.19</b>	<b>12.33</b>	<b>10.58</b>	-	-

1. Values based on modelled data are denoted in red

2. Values based on partial monthly data are italicized

3. Station P10 represents the sum of the flows out of Portal 10, incorporating both P10-A and P10-B sites

Appendix E: Historic Hydrologic Indices - Monthly Historic Low Flow Data

JTN-H1													Monthly Low Flows (L/s)	
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
2016	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6.87	2.35	N/A	N/A		
2017	N/A	N/A	N/A	N/A	N/A	N/A	3.29	2.99	3.63	3.71	N/A	N/A		
2018	N/A	N/A	N/A	N/A	N/A	2.45	1.20	1.08	1.37	1.94	N/A	N/A		
2019	N/A	N/A	N/A	N/A	N/A	2.36	1.38	2.00	2.54	4.88	N/A	N/A		
<b>Average 2016-2019</b>	-	-	-	-	-	<b>2.41</b>	<b>1.96</b>	<b>2.02</b>	<b>3.60</b>	<b>3.22</b>	-	-		

JTS-H1													Monthly Low Flows (L/s)	
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
2016	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.92	1.06	N/A	N/A		
2017	N/A	N/A	N/A	N/A	N/A	1.22	3.66	3.43	3.90	3.97	N/A	N/A		
2018	N/A	N/A	N/A	N/A	N/A	13.15	3.83	2.97	3.48	3.38	N/A	N/A		
2019	N/A	N/A	N/A	N/A	N/A	12.94	5.27	4.20	5.66	6.21	N/A	N/A		
<b>Average 2016-2019</b>	-	-	-	-	-	<b>9.11</b>	<b>4.25</b>	<b>3.53</b>	<b>3.74</b>	<b>3.66</b>	-	-		

P10-A													Monthly Low Flows (L/s)	
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
2017	N/A	N/A	N/A	N/A	N/A	8.44	5.64	5.02	6.77	7.13	N/A	N/A		
2018	N/A	N/A	N/A	N/A	N/A	9.70	6.49	2.77	4.12	N/A	N/A	N/A		
2019	N/A	N/A	N/A	N/A	N/A	17.53	9.25	7.15	5.87	4.73	N/A	N/A		
<b>Average 2017-2019</b>	-	-	-	-	-	<b>11.89</b>	<b>7.13</b>	<b>4.98</b>	<b>5.58</b>	<b>5.93</b>	-	-		

P10-B													Monthly Low Flows (L/s)	
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
2017	N/A	N/A	N/A	N/A	N/A	0.72	0.60	0.60	0.53	0.41	N/A	N/A		
2018	N/A	N/A	N/A	N/A	N/A	0.65	0.52	0.51	N/A	N/A	N/A	N/A		
<b>Average 2017-2018</b>	-	-	-	-	-	<b>0.68</b>	<b>0.56</b>	<b>0.55</b>	<b>0.53</b>	<b>0.41</b>	-	-		

P10 Total													Monthly Low Flows (L/s)	
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
2017	N/A	N/A	N/A	N/A	N/A	9.16	6.24	5.62	7.30	7.54	N/A	N/A		
2018	N/A	N/A	N/A	N/A	N/A	10.35	7.01	3.28	N/A	N/A	N/A	N/A		
<b>Average 2017-2018</b>	-	-	-	-	-	<b>9.75</b>	<b>6.63</b>	<b>4.45</b>	<b>7.30</b>	<b>7.54</b>	-	-		

1. Values based on modelled data are denoted in red

2. Values based on partial monthly data are italicized

3. Station P10 represents the sum of the flows out of Portal 10, incorporating both P10-A and P10-B sites

Appendix E: Historic Hydrologic Indices - Historic Mean Monthly Discharge Data

JTN-H1													
Mean Monthly Discharge (L/s)													
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
2016	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	15.97	3.53	N/A	N/A	
2017	N/A	N/A	N/A	N/A	N/A	N/A	5.44	11.28	10.88	8.51	N/A	N/A	
2018	N/A	N/A	N/A	N/A	N/A	11.71	2.85	1.97	2.46	4.79	N/A	N/A	
2019	N/A	N/A	N/A	N/A	N/A	2.56	2.86	12.41	11.96	11.95	N/A	N/A	
<b>Average 2016-2019</b>	-	-	-	-	-	<b>7.14</b>	<b>3.72</b>	<b>8.55</b>	<b>10.30</b>	<b>7.20</b>	-	-	

JTS-H1													
Mean Monthly Discharge (L/s)													
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
2016	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6.19	1.84	N/A	N/A	
2017	N/A	N/A	N/A	N/A	N/A	8.53	6.09	9.61	9.31	7.55	N/A	N/A	
2018	N/A	N/A	N/A	N/A	N/A	47.85	12.14	6.25	7.84	15.30	N/A	N/A	
2019	N/A	N/A	N/A	N/A	N/A	13.97	10.49	28.94	24.70	18.68	N/A	N/A	
<b>Average 2016-2019</b>	-	-	-	-	-	<b>23.43</b>	<b>9.57</b>	<b>14.93</b>	<b>12.01</b>	<b>10.84</b>	-	-	

P10-A													
Mean Monthly Discharge (L/s)													
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
2017	N/A	N/A	N/A	N/A	N/A	9.09	7.25	7.28	8.58	8.79	N/A	N/A	
2018	N/A	N/A	N/A	N/A	N/A	11.84	8.12	3.88	5.29	N/A	N/A	N/A	
2019	N/A	N/A	N/A	N/A	N/A	17.58	11.93	9.36	7.52	6.61	N/A	N/A	
<b>Average 2017-2019</b>	-	-	-	-	-	<b>12.84</b>	<b>9.10</b>	<b>6.84</b>	<b>7.13</b>	<b>7.70</b>	-	-	

P10-B													
Mean Monthly Discharge (L/s)													
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
2017	N/A	N/A	N/A	N/A	N/A	0.89	0.70	0.67	0.61	0.51	N/A	N/A	
2018	N/A	N/A	N/A	N/A	N/A	0.84	0.61	0.66	N/A	N/A	N/A	N/A	
<b>Average 2017-2018</b>	-	-	-	-	-	<b>0.87</b>	<b>0.65</b>	<b>0.67</b>	<b>0.61</b>	<b>0.51</b>	-	-	

P10 Total													
Mean Monthly Discharge (L/s)													
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
2017	N/A	N/A	N/A	N/A	N/A	9.98	7.95	7.95	9.19	9.30	N/A	N/A	
2018	N/A	N/A	N/A	N/A	N/A	12.69	8.73	4.54	N/A	N/A	N/A	N/A	
<b>Average 2017-2018</b>	-	-	-	-	-	<b>11.33</b>	<b>8.34</b>	<b>6.24</b>	<b>9.19</b>	<b>9.30</b>	-	-	

1. Values based on modelled data are denoted in red

2. Values based on partial monthly data are italicized

3. Station P10 represents the sum of the flows out of Portal 10, incorporating both P10-A and P10-B sites

APPENDIX H            JOHNNY MOUNTAIN MINE - TAILINGS STORAGE FACILITY 2020  
DAM SAFETY INSPECTION (KCB 2021)



**Klohn Crippen Berger**

# **SnipGold Corporation**

**Johnny Mountain Mine - Tailings Storage Facility**

*2020 Dam Safety Inspection*



Platinum  
member

M10088A07.730



January 2021

January 13, 2021

SnipGold Corporation  
1235 Main Street  
P.O. Box 2536  
Smithers, British Columbia  
VOJ 2N0

**Elizabeth Miller, M.Sc., R.P.Bio.**  
**Program Manager/Environmental Supervisor**

Dear Ms. Miller:

**Johnny Mountain Mine - Tailings Storage Facility**  
**2020 Dam Safety Inspection**

We are pleased to submit our 2020 Dam Safety Inspection (DSI) report for the Johnny Mountain Mine (JMM) Tailings Storage Facility (TSF).

Yours truly,

**KLOHN CRIPPEN BERGER LTD.**



David Willms, P.Eng.  
Project Manager

DW/NS:jc

# SnipGold Corporation

## Johnny Mountain Mine - Tailings Storage Facility

### *2020 Dam Safety Inspection*

## CLARIFICATIONS

This report is an instrument of service of Klohn Crippen Berger (KCB). The report has been prepared for the exclusive use of SnipGold and the applicable regulatory authorities for the specific application to the Johnny Mountain TSF, and it may not be relied upon by any other party without KCB's written consent.

KCB has prepared this report in a manner consistent with the level of care, skill and diligence ordinarily provided by members of the same profession for projects of a similar nature at the time and place the services were rendered. KCB makes no warranty, express or implied.

Use of or reliance upon this instrument of service by the Client is subject to the following conditions:

1. The report is to be read in full, with sections or parts of the report relied upon in the context of the whole report.
2. The Executive Summary is a selection of key elements of the report. It does not include details needed for the proper application of the findings and recommendations in the report.
3. The observations, findings and conclusions in this report are based on observed factual data and conditions that existed at the time of the work and should not be relied upon to precisely represent conditions at any other time.
4. The report is based on information provided to KCB by the Client or by other parties on behalf of the client (Client-supplied information). KCB has not verified the correctness or accuracy of such information and makes no representations regarding its correctness or accuracy. KCB shall not be responsible to the Client for the consequences of any error or omission contained in Client-supplied information.
5. KCB should be consulted regarding the interpretation or application of the findings and recommendations in the report.



## EXECUTIVE SUMMARY

### Summary of Facility Description

The TSF area (Figure 2) is approximately 11.5 ha, with a 10 ha pond and compacted glacial till dykes on three sides and a shorter dyke tying into high ground on the north side. The dykes were constructed in 1988 initially to El. 1076.0 m old datum (OD)<sup>1</sup> and raised to a final minimum level of El. 1079 m OD in 1989 (with some crest levels up to El. 1080.2 m OD). The compacted till dykes were built on natural ground that formed an impoundment around a mountain lake or “tarn”. Figure 3 shows the site topography and bathymetry from 2017 surveys, and Figure 4 shows five cross sections showing the 2017 downstream embankment slope. A review of the design and 'as-built' cross-sections from field construction reports indicated that the dams are between 3 m and 9.9 m high (verified by 2017 LIDAR survey), with a nominal 5 m crest width (ranges from 4.7 m to 11 m). Slopes are nominally 2.5H:1V downstream and 1.5H:1V upstream but downstream slopes are locally as steep as 1.9H:1V. The stability of this slope has been reviewed by the EoR and is considered safe based on the planned closure activities and current surveillance program.

In this report and inspection summaries, the four arms are described as Northwest Dam, Northeast Dam, Southeast Dam and Southwest Dam as shown on Figure 2.

### Summary of Key Hazards

The key hazards and potential risks are summarized in Section 8.4. The following failure modes were considered, have been determined to be low risk, and are appropriately managed by SnipGold’s operating practices.

1. *Dam foundation failure leading to a dam failure and release of tailings, under seismic loading leading to undrained strength failure.*
2. *Dam embankment failure leading to a release of tailings under static stability or seismic loading.*
3. *Failure of the blanket underdrain system raising the phreatic surface in the dam.*
4. *Piping of fines through the granular underdrain could lead to dam failure.*
5. *Failure of the spillway leading to dam overtopping or breach.*
6. *Failure of upstream diversions, causing additional storm runoff into the TSF.*
7. *Internal erosion of dam fill initiated by animal burrowing in the dam.*

### Consequence Classification

The current consequence classification is Significant under the *Canadian Dam Association Dam Safety Guidelines* (CDA 2013) and the CDA Technical Bulletin for Mining Dams (CDA 2014). Dam consequence classifications can be Low, Significant, High, Very High and Extreme. This classification was confirmed by a dam breach study conducted in 2018 (KCB 2018c).

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<sup>1</sup> Old Datum = OD.

New Datum = ND = old datum + 18.6 m.

## Summary of Significant Changes (Construction, Development Downstream etc.)

There were no significant changes to the TSF in 2020.

### Significant Changes in Instrumentation or Visual Monitoring Records

The weirs installed in 2015 appear to be functioning; however, the location of the weirs could be optimized to better intercept seepage at key locations. The weir locations will be reviewed as part of the final closure plan.

The general piezometric and flow levels are consistent with historic values or historic estimates. Three out of ten vibrating wire piezometers appear to be tracking pond level with up to 1.5 m annual fluctuation, five out of ten also appear to fluctuate seasonally but at 0.5 m to less than 1 m annual fluctuation, and two of the ten ceased functioning in 2019 or 2020 since the last dam safety inspection. The reason for the malfunction is unknown as the two piezometers (DH17-04A and DH17-05A) did not show any unusual readings before malfunctioning. The cause of the instrument failure should be reviewed with the instrument and datalogger supplier (RST Technical). As well, the metal riser for DH17-02 was found to have snapped off at the base likely due to high wind stress and should be replaced.

SnipGold carried out periodic inspections and read the piezometers that were installed in 2017.

### Significant Changes to Stability and / or Surface Water Control

There were no significant changes to stability or surface water control.

Minor tension cracks have developed on the upstream slope of the dam as a result of wave action and freeze-thaw effects against the upstream face, particularly in areas repaired in 2017. These are a maintenance issue and not currently a dam safety concern and will be addressed as part of closure work.

Downstream slopes have minor rilling, minor slumping, and minor local erosion but are generally in satisfactory condition. These shallow defects do not represent conditions that could rapidly impact the overall stability of the dam, provided that they are monitored and addressed over time. Without periodic maintenance, these shallow defects could regress and endanger the dam crest. These are currently a maintenance issue and not currently a dam safety concern and will be addressed as part of closure work.

### Summary of Review of OMS Manual

In 2018, a new Operations, Maintenance and Surveillance (OMS) manual was prepared for the TSF including maintenance and surveillance requirements (KCB 2018d). The next update to the OMS Manual should add Quantitative Performance Objectives for the vibrating wire piezometers to routine surveillance. Recommended alert levels for vibrating wire piezometers are included in this DSI.

### **Summary of Review of ERP**

The OMS Manual contains an Emergency Response Plan (ERP) for emergencies at the TSF and includes the site wide ERP for emergencies at the camp and for the exploration team. This ERP was last updated in 2018.

### **Scheduled Date for Next Dam Safety Review**

The next Dam Safety Review (DSR) is scheduled for 2021.

### **Summary of 2020 Recommendations**

Four recommendations and one MEM (now Ministry of Energy, Mines and Low Carbon Innovation - MEMLCI) order from previous years have not been closed out, and are to be closed out during closure construction. Section 10 includes updates of past recommendations. The MEMLCI order was addressed by a letter request to the MEMLCI for an exemption for an Independent Tailings Review Board (ITRB); KCB issued a letter to support this exemption. This letter is included in Appendix IV.

Three additional recommendations were made as part of this DSI: to investigate the cause of the malfunction of DH17-04A, and -05A (or their dataloggers), to repair the metal riser for DH17-02, and to remove two defunct culverts as part of closure activities. This last recommendations should be done as part of the overall closure activities and regrading work at the site. None of the circumstances contributing to the outstanding recommendations represent an immediate risk to the facility. All remaining recommendations are considered Priority 4, which is the lowest priority, or items that are considered housekeeping, or best practices. In KCB's opinion, the facility was functioning safely and as intended at the time of our inspection.

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- Appendix II Instrumentation Data
- Appendix III Tailings Storage Facility Inspection Form
- Appendix IV KCB Letter in Support of ITRB Exemption

## 1 INTRODUCTION

This report presents our 2020 Dam Safety Inspection (DSI) carried out by Klohn Crippen Berger Ltd. (KCB) for the closed Johnny Mountain Tailings Storage Facility (TSF) owned by SnipGold Corporation – a Subsidiary of Seabridge Gold Inc. (SnipGold). This DSI has been prepared to meet the requirements of Section 10.5.3 of the Health, Safety and Reclamation Code for Mines in British Columbia - revised July 2017, (HSRC 2017) which includes the HSRC Guidance Document (HSRC 2016).

The TSF is located at the former Johnny Mountain Mine. The site is located approximately 100 km northwest of Stewart, BC (56°37'45''N and 131°04'20''W) at about elevation 1100 m above sea level, between the Craig and Iskut Rivers on an alpine plateau on the northwest flank of Johnny Mountain (see Figure 1<sup>2</sup> and Figure 1.1). The site is accessed by helicopter from McLymont Staging Area or Bell II and is connected to SnipGold's nearby Iskut Camp by a 4x4 road.

Mr. Neil K. Hemrajani Singh, P.Eng. of KCB is the Engineer of Record (EoR) for reporting to the Ministry of Energy, Mines and Low Carbon Innovation, British Columbia (MEMLCI). Mr. Singh of KCB and Ms. Elizabeth Miller of SnipGold conducted the 2020 site inspection with other representatives of SnipGold.

This DSI includes document review, interviews with site personnel, a site walkover inspection, review of site instrumentation data, and review of 2020 works.

A Dam Safety Review was conducted in 2016 and included discussion and summary of previous construction and site operations history (KCB 2017b). This 2020 DSI report focuses on the 2020 site conditions and contains a subset of information for historical context, from the DSR and previous DSIs.

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<sup>2</sup> Figures 1, 2, 3, 4 and 5 are at the end of the document.

Figure 1.1 Johnny Mountain TSF Location Plan





## 2 BACKGROUND INFORMATION

### 2.1 Organization and Responsibilities

The mine is in Closure – Active Care as defined in by CDA (2013). There are ongoing plans and investigations to clean up the site. SnipGold’s site management team and key roles are as follows.

#### Chairman and Chief Executive Officer – Rudi Fronk

- Mr. Fronk has overall responsibility for the mine and TSF.

#### Mine Manager and Exploration Manager – Marcus Adam

- Although the mine is not operating, in practical terms Mr. Adam is the “Mine Manager” as defined for this closed facility under Section 21 of the Mines Act having responsibility for the mine as delegated by Mr. Fronk.
- Mr. Adam manages the site exploration program, and acts as site manager, which includes responsibility for the currently inactive tailings facility.

#### Environmental Coordinator and TSF Qualified Person – Elizabeth Miller, R.P.Bio., Vice President Environment and Social Responsibility (Seabridge Gold)

- TSF Qualified Person, as required by the HSRC, Section 10.4.2 with responsibility for developing and implementing the tailings and water management plans for the TSF, coordination of design, construction and overall management of the TSF, and succession plans for the EoR.

#### Site Environmental Manager and Alternate TSF Qualified Person – Kevin Hidber

- Field based alternate TSF Qualified Person.

#### Engineer of Record – Neil K. Hemrajani Singh, P. Eng.

- Has been EoR since October 1, 2016.
- Responsibilities include carrying out Dam Safety Inspections and preparing the reports for submission to regulators.

#### Alternate EoR - David Willms, P. Eng.

- Alternate EoR in the event that Mr. Singh is unavailable or incapacitated.

### 2.2 Regulatory

#### 2.2.1 Regulations

*Health, Safety and Reclamation Code for Mines in British Columbia (Ministry of Energy and Mines, Revised June 2017)*, Section 10 of the code regulates the reclamation and closure of tailings impoundments in British Columbia.

Section 4.2 of the *Health, Safety and Reclamation Code Guidance Document* (MEM 2016) provides a list of items that as a minimum should be provided in a dam safety inspection report.

*British Columbia Environmental Management Act (October 2003)*: This act provides regulations under which prescribed industries including the mining industry, may release waste to the environment.

*British Columbia Water Sustainability Act (February 2016)*: This act regulates licensing, diversion and use of water resources and replaces much of the previous BC Water Act.

### 2.2.2 Guidelines

*Canadian Dam Association Dam Safety Guidelines* (CDA 2013) cover principles that are applicable for all dams and should be understood and followed by dam owners, managers, operators and other interested parties. Additional specific guidelines and clarification for mining dams is given in *Technical Bulletin Application of Dam Safety Guidelines to Mining Dams* (CDA 2014). This Technical Bulletin includes the consideration of the various operating and closure stages of a tailings dam.

### 2.2.3 Permits

The following permits govern the operation and management of the former Johnny Mountain Mine:

1. Permit PR-7927 - Water Management Act, issued by the BC Ministry of Environment, Lands and Parks, July 14, 1999, amended June 2008, amended August 2, 2011, amended 23, 2011, amended February 22, 2018, amended May 31, 2018. The last amendment is under the Environmental Management Act (EMA) by the Ministry of Environment and Climate Change Strategy (MECCS).
2. Permit PE-8415 – Environmental Management Act, issued by the BC Ministry of Environment, and Climate Change Strategy, June 6, 1990, amended May 11, 2000, amended June 10, 2019.
3. M-178 – Mines Act R.S.B.C. 1996 c. 293, amended permit Approving Work System and Reclamation Program, October 13, 1999, amended July 7, 2004.

### 2.2.4 Water Quality Monitoring Requirements

Water quality monitoring requirements are outlined in the June 2019 amendment to Permit PE-8415. The results are reported annually in the PE-8415 Annual Report, which is reported separately by SnipGold.

### 2.2.5 Regulatory Inspections

MEMLCI conducts periodic geotechnical inspections of the site to determine if the site is in compliance with the Code and permit conditions. The most recent inspection was conducted by Dr. Paul Hughes, Geotechnical Inspector on July 13, 2017.

A Senior Geotechnical Inspector, Mr. Eamon Mauer, P.Eng. reviewed the Standard Operating Procedure (SOP) in May 2020 and provided comments, but not under a formal inspection.

## 2.3 Site Datum

The original design drawings and construction records used a local datum, and were presented in Imperial units. Work through the 2000s used the same Old Datum<sup>3</sup> but with maps and data in metric. The site survey including LiDAR conducted in 2017, has used a new datum, which is approximately “Old Datum” + 18.6 m. Unless otherwise stated, this new datum (ND) has been used for this report.

For consistency, we have converted all information to metric.

---

<sup>3</sup> In this report, values are presented as Old Datum (OD) if they were based on the original construction survey. New datum (ND) is used for recent survey and current elevations.

## 3 TAILINGS STORAGE FACILITY DESCRIPTION

### 3.1 Description

The TSF is located north of the 10-level portal on the west side of the former Johnny Mountain airstrip and comprises a wet cover tailings storage facility (TSF) with a closure spillway, seepage collection ditches and seepage ponds. The TSF area (Figure 2) is approximately 11.5 ha, with a 10-ha pond and compacted till dykes on three sides and a shorter dyke tying into high ground on the north side. The dykes were constructed in 1988 initially to El. 1076 m OD and raised to a final minimum level of El. 1079 m OD in 1989 with some crest levels up to El. 1080.2 m OD. The compacted till dykes were built on natural ground that formed an impoundment around a mountain lake or “tarn”.

Figure 3.1 provides a plan of the original layout. Figure 3.2 provides a typical design cross section from 1987, and Figure 3.3 shows an as-built cross section from 1989. Figure 3.4 shows a more current cross-section based on 2017 LiDAR and 2017 drilling results. Figure 3<sup>4</sup> shows the site topography and bathymetry from 2017 surveys, and Figure 4 shows five cross sections showing the downstream embankment slope based on 2017 LiDAR survey. A review of the design and 'as-built' cross-sections from field construction reports indicates that the dams are between 3 m and 9.9 m high (verified by 2017 LIDAR survey), with a nominal 5 m crest width (ranges from 4.7 m to 11 m). Slopes are nominally 2.5H:1V downstream and 1.5H:1V upstream but downstream slopes are locally as steep as 1.9H:1V.

The dams comprising the TSF were classified as Significant consequence dams as part of the 2016 DSR (KCB 2017b) under the CDA Dam Safety Guidelines (CDA 2013) and the CDA Technical Bulletin for Mining Dams (CDA 2014). Dam consequence classifications can be Low, Significant, High, Very High and Extreme. This classification was confirmed by a dam breach study conducted in 2018 (KCB 2018c). There have been no changes since 2018 that would substantively change the consequence classification.

For the purpose of this report and inspection summaries, the four dams are described as Northwest Dam, Northeast Dam, Southeast Dam and Southwest Dam as shown on Figure 2.

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<sup>4</sup> Figures 1, 2, 3, 4 and 5 are at the end of the document.

Figure 3.1 Former Johnny Mountain Mine (Greenwood 2016)

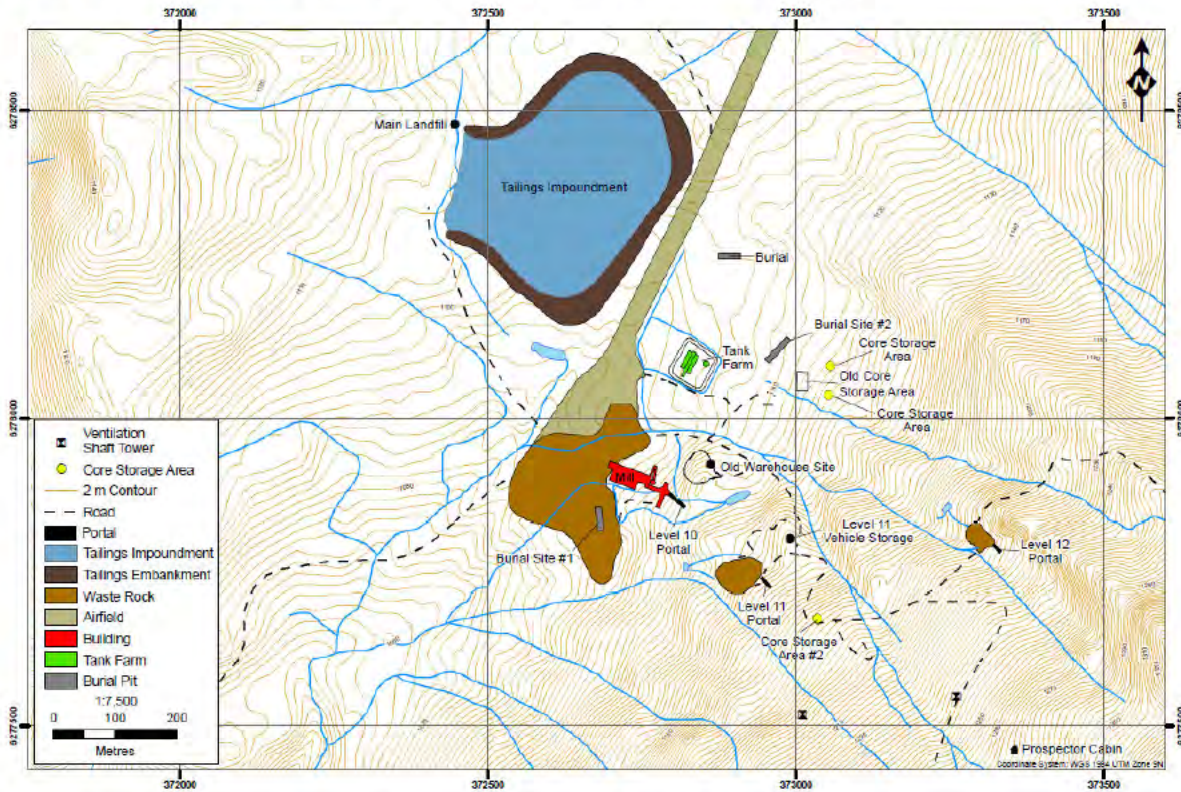


Figure 3.2 Typical Design Cross Section (Dick 1987)

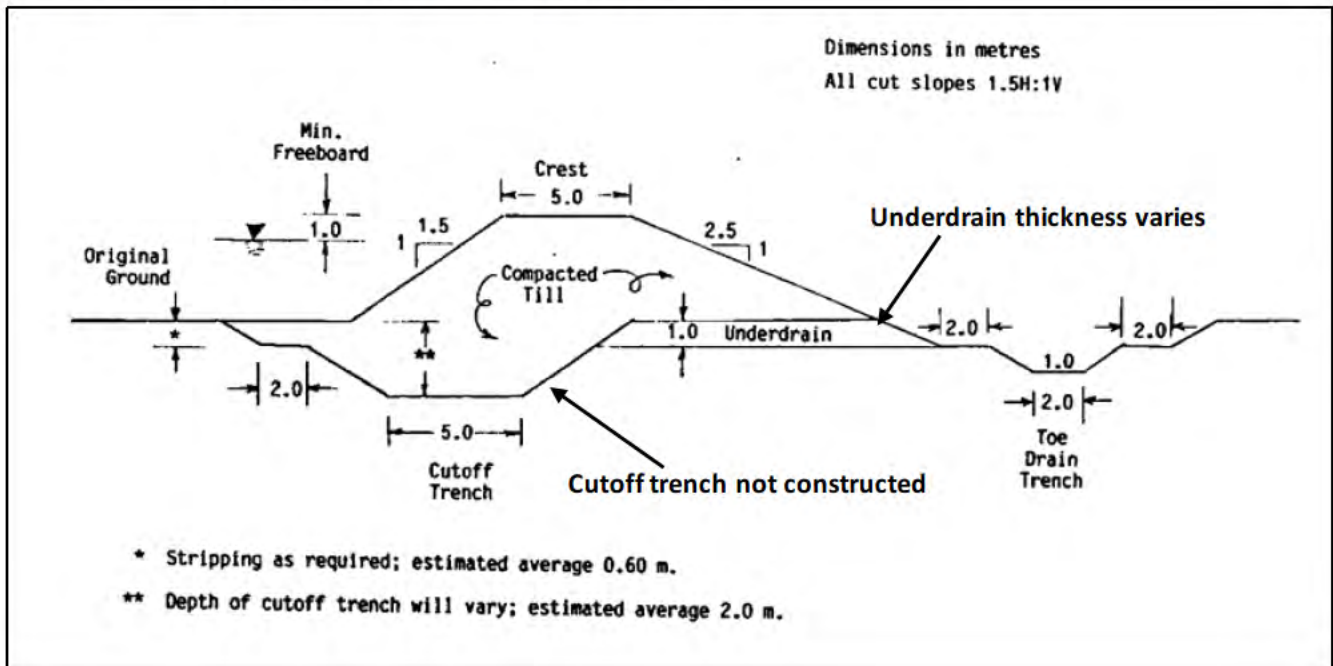


Figure 3.3 Typical As-Built Dam Cross Sections (Old Datum) (Dick 1989)

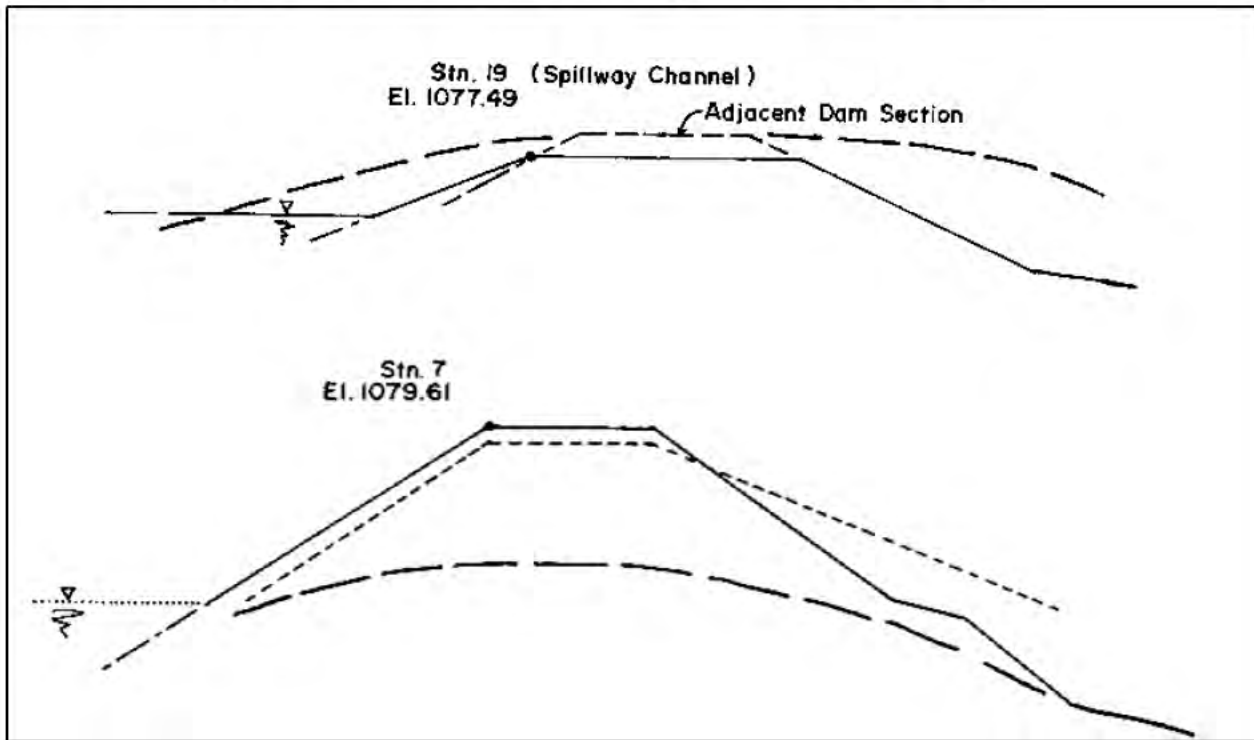
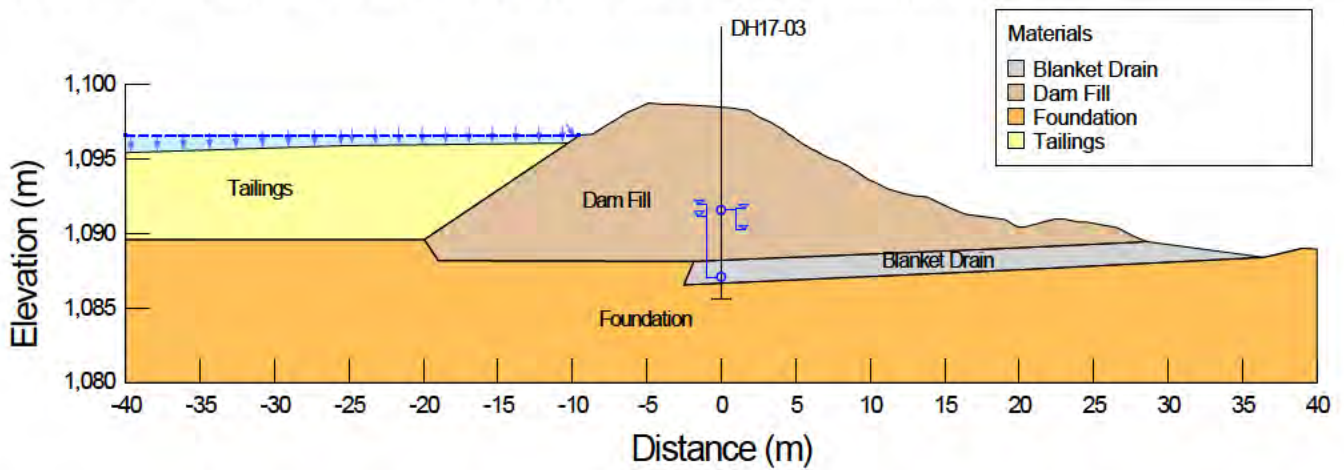


Figure 3.4 Southeast Dam at DH17-03, As-built, 2017 Condition (New Datum)



Note: Piezometer levels shown are the typical range of water levels.

## 3.2 TSF History

### Operations

Johnny Mountain Mine was operated from November 1988 until September 1990 and from September to December 1993 by Skyline Gold Corporation (later SnipGold).

### TSF Design and Construction

The TSF was designed and constructed under the direction of R.C. Dick, P.Eng., Geotechnical Consultant (Dick 1987a) with compacted till embankments built on dense basal till overlying bedrock. The dams were built to a maximum of El. 1080.2 m (old datum, Dick 1999).

Tailings were first deposited along the southwest dyke and later from the southwest corner with beach development pushing the decant pond to the east towards the spillway. Sluicing operations were conducted in 1990 to lower the tailings beach against the embankments. The tailings are currently flooded by approximately 0.5 m to 5 m depth of water. Islands of tailings observed in previous years have been regraded by SnipGold, such that the tailings now are underwater. A bathymetric survey conducted in 2017 (RTEC 2017d) indicates pockets in the tailings surface of 2 m to 4 m depth, and 5 m to 6 m depth in the northeast, closest to the spillway. The pond contains an estimated 124,000 m<sup>3</sup> of tailings (198,000 tonnes) (Closure Plan, Skyline 1999). Tailings density has been estimated to range from 1.45 t/m<sup>3</sup> to 1.77 t/m<sup>3</sup> and, averaging 1.6 t/m<sup>3</sup>. The estimated remaining storage capacity when last used (December 1993) based on the original design capacity was 70,000 m<sup>3</sup> (Skyline 1999). The estimates for storage available within the TSF have been updated based on 2017 bathymetric survey, and these have been used in the closure planning design for storage of PAG waste rock. The 2018 Closure Design report provides an estimate of 135,000 m<sup>3</sup> capacity with a 0.5 m water cover, or approximately 88,000 m<sup>3</sup> with 1 m water cover (KCB 2018a), after relocation of tailings above the specified cover depth to deeper parts.

The dykes were constructed in three stages, with Stage 1 to approximately El. 1074.4 m OD, Stage 2 to El. 1079.0 m OD, and Stage 3 to nominally El. 1080.2 m OD, between September 1987 and November 1988, including a winter construction season. Although the original design included a compacted till cut-off trench, the foundation preparation exposed firm till or bedrock and hence no cut-off was built.

A blanket drain was built downstream of the embankment centreline of nominally 700 mm thickness, of 8-inch minus granular fill, except for the SW corner where the drain thickness was increased to 2 m to cross an old creek bed. A small slump was noted on the east dyke in 1992 and this was repaired by constructing a 4.5 m wide downstream berm between the airstrip and the spillway. At the Northeast Dam, a section was overbuilt by 1 m in height and 5 m width extending 100 m east from the abutment to allow construction access by loaded scrapers. This overbuilt section is not compacted to design requirements but is outside the dam design section. A small slough was noted on the overbuilt (access ramp) section of the Northeast Dam in 2020.

## Spillway

A temporary spillway was built in the Northeast Dam to El. 1073.5 m OD in February 1988, replaced by a permanent spillway in November 1988 following a design by Dames & Moore which included a geotextile and coarse mine waste rock liner. The channel was formed by excavation in the till down to El. 1077.8 m OD across the dam crest, and a riprap cover of 0.45 m placed overtop the crest channel, then down the downstream slope to form a spillway chute. The chute was widened and side walls (riprap over glacial till) along the chute were enlarged in 1993. Figure 5<sup>5</sup> shows the current spillway configuration.

## 3.3 Climate

### 3.3.1 Climate

The 2017 TSF Closure Design report (KCB 2018a) includes an updated review of climate at the site, with a statistical correlation of data from the Stewart A climate station to the site data, including new data from the Johnny Mountain climate station installed in 2016.

The site is located between El. 1075 m (at the TSF) and 1225 m (at the Level 12 Portal) above sea level in the transition zone between the coastal and interior climatic zones. The site is subject to significant precipitation year-round and very heavy snowfall during the winter months. The Stewart A station is perhaps not a direct correlation due to lower elevation and proximity to the coast; however, it represents one of the better available historic data sets in the region.

Average annual precipitation, as well as wet and dry year annual precipitation values, were based on the monthly precipitation record at Stewart, and are shown in Table 3.1. The monthly distribution of rain and snow shown in Table 3.2, is based on Johnny Mountain data.

**Table 3.1 Johnny Mountain TSF Annual Precipitation for Average, Wet and Dry Years (KCB 2018a)**

Return Period	Annual Precipitation (mm)
1:200 Dry Year	1,213
1:100 Dry Year	1,308
1:50 Dry Year	1,411
1:20 Dry Year	1,559
1:10 Dry Year	1,687
1911-2015 Mean	2,089
1:10 Wet Year	2,492
1:20 Wet Year	2,619
1:50 Wet Year	2,768
1:100 Wet Year	2,870
1:200 Wet Year	2,966

*Based on correlation to Stewart precipitation record*

<sup>5</sup> Figures 1, 2, 3, 4 and 5 are at the end of the document.



**Table 3.2 Monthly Precipitation Distribution (KCB 2018a)**

	Month												Annual
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Precipitation	12%	8%	8%	3%	4%	3%	4%	6%	11%	12%	11%	18%	100%
<i>Rainfall</i>	0%	1%	0%	0%	2%	3%	4%	6%	10%	6%	0%	1%	34%
<i>Snowfall</i>	12%	7%	7%	3%	2%	0%	0%	0%	1%	7%	11%	17%	66%

Evaporation data from nearby stations, Juneau Airport, Alaska and Topley Landing, BC, were adjusted for elevation and latitude to derive a lake evaporation estimate for the Project site. The data from these two sites was comparable to 4 years of evaporation data from the nearby Teigan Lake (KSM station, similar elevation to Johnny Mountain at approximately El. 1085 m). The resulting average annual evaporation at Johnny Mountain TSF is therefore estimated as 258 mm.

A Mine Environment Neutral Drainage (MEND 2004) program report on Metal Leaching / Acid Rock Drainage (ML/ARD) reports the site receives 2.0 m to 2.6 m of precipitation per year and estimated sublimation and evaporation is 250 mm per year but they also report up to 30 m of snowfall may occur annually. The high snowfall measurement may have been influenced by local snow drifting, as the water equivalent of 30 m snowfall is more than the typical maximum annual precipitation of 2.6 m. Most of the precipitation arrives as snow, and melts in May and June, with traces remaining on site until July.

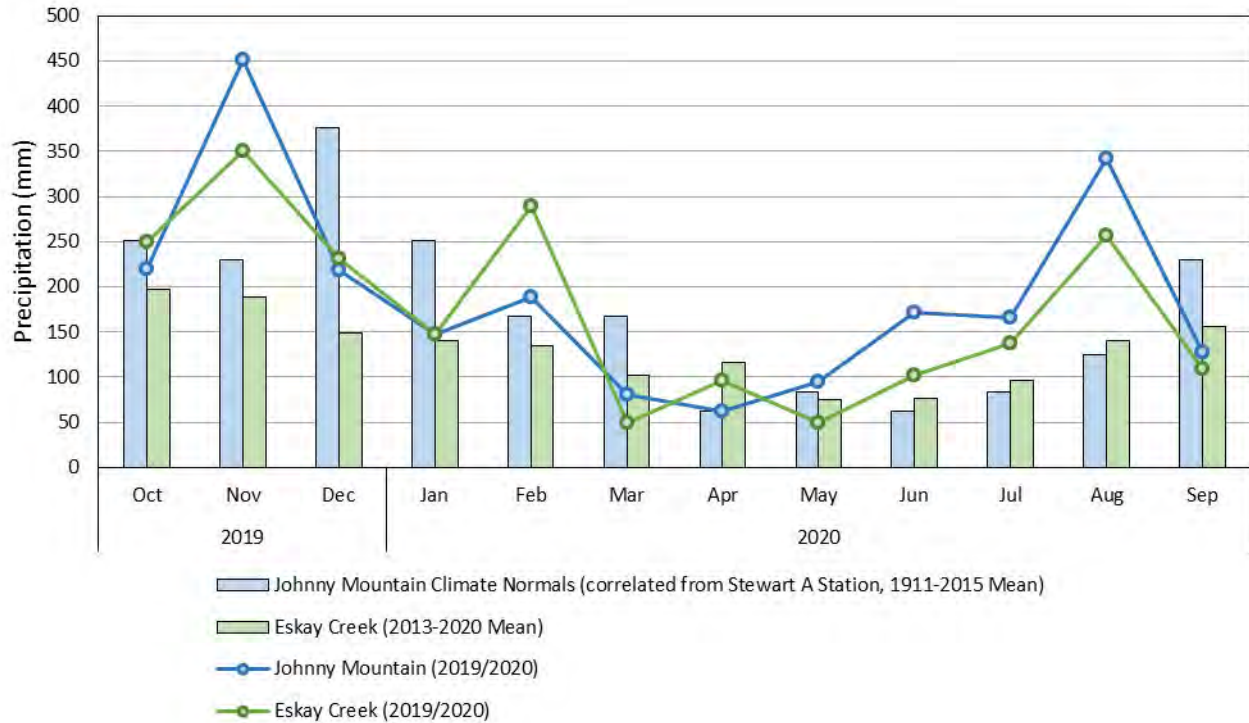
### 2020 Weather Data

Site weather data from October 2019 to October 2020 is shown in Figure 3.5 and Figure 3.6. The year, overall, was warmer and wetter than average.

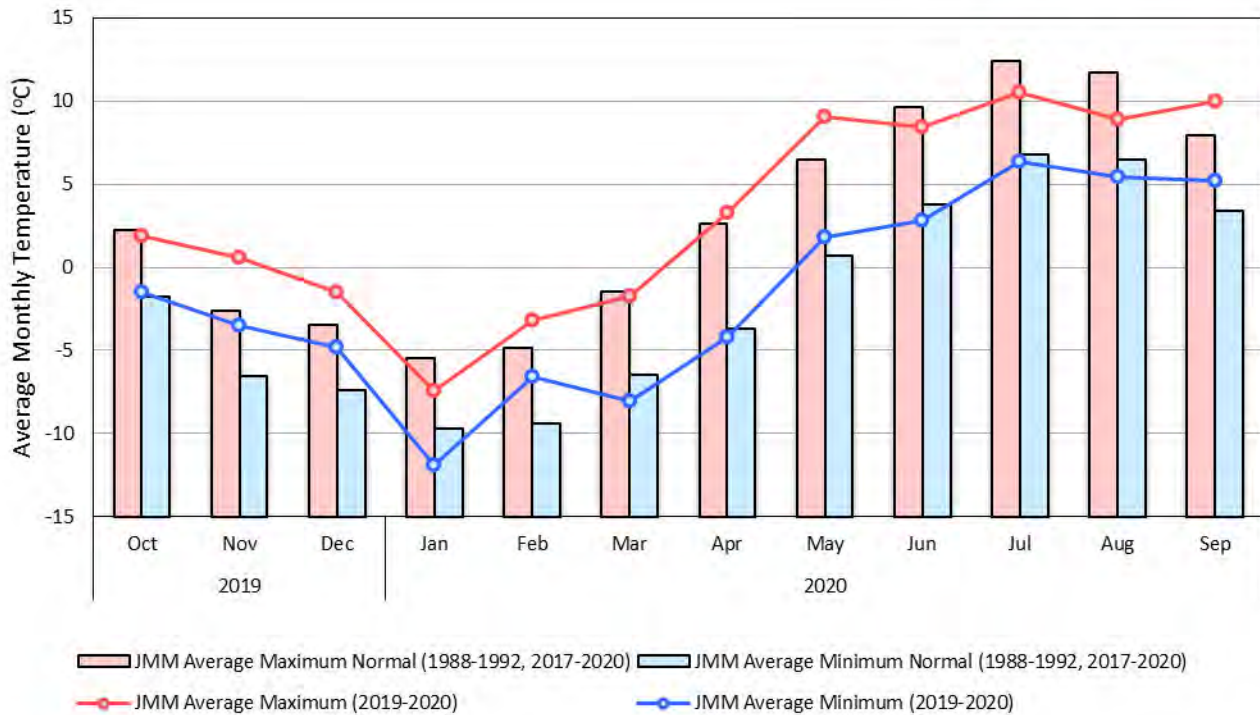
In lieu of a sufficiently long dataset to make comparisons to previous years, precipitation data at a nearby weather station at Eskay Creek (NHC 2018) is also shown on Figure 3.5 for comparison. In the review period, November, February, June, July, and August had more precipitation than the average, March was drier than average, and the remaining months were similar to the average. Total precipitation recorded at Eskay Creek was 2070 mm, which is higher than the 2013 to 2020 mean of 1572 mm. The site precipitation data generally agrees with the Eskay Creek station for months where data is available from both stations.

The 2019/2020 mean monthly minimum and maximum temperatures were lower than average in January and higher than average in November, December, February, May, and September.

**Figure 3.5 2019/2020 Precipitation Data**



**Figure 3.6 2019/2020 Temperature Data**



## 4 2019 SITE ACTIVITIES

### 4.1 Construction

No construction activities took place in 2020 due to COVID-19 restrictions on camp capacity.

### 4.2 Site Inspections

Mr. Kevin Hidber of SnipGold conducted site inspections on June 17, 2020 and August 1, 2020. Ms. Elizabeth Miller of SnipGold also completed an inspection form during the DSI site visit on August 20, 2020. Site inspection checklists are included in Appendix III. The site was still snow covered but partially exposed in June, but clear for both of the August site visits.

Observations include minor sloughing and erosion in some areas on the downstream face, some minor tension cracks from wave and freeze/thaw action on the upstream crest, some local seepage and wet areas near the dam toe, and a slump or slough of about 3 m width, 2 m length, 0.5 m depth on the outer edge of the Northeast ramp. Spillway flow was negligible in June but flow was noted in August with a maximum depth of 80 mm over the spillway inlet invert in August.

The Engineer of Record, Mr. Neil K. Hemrajani Singh, P.Eng. conducted the 2019 Dam Safety Inspection site visit. Mr. Singh visited the site on August 20, 2020 accompanied by the SnipGold TSF Qualified Person, Ms. Elizabeth Miller; and SnipGold representatives, Ms. Jessy Chaplin, and Mr. Lionel Sequeira. The site visit letter is included in Appendix I. The site visit letter summarizes the trip, interviews, photographs, and findings. Photos referenced in this DSI are in Appendix I of the site visit letter unless otherwise noted.

The following points are noted:

- The crest is in good condition (Photos I-6, I-7, I-12, I-14, I-17, and I-23). There is minor localized rutting and undulations, with minor evidence of ponding at low spots.
- The upstream slope is in good condition (Photos I-6, I-9 I-15, I-16, I-20, and I-22). There are minor tension cracks along some areas of the upstream crest where repairs were completed in 2017. This is likely due to wave erosion and freeze-thaw action against the steep upstream slopes. This cracking is similar to previous years, not an immediate concern and will be addressed as part of closure work.
- Downstream slopes have minor rilling, minor slumping, and local minor erosion but are generally in good condition (Photos I-3, I-4, I-8, I-10, I-13, I-14, I-18, I-21, I-24, and I-25). Vegetation coverage is sparse, with few small shrubs growing on the downstream slope.
- Previous areas of marmot burrowing on the downstream face of the Southwest Dam near DH17-04 were examined. There was no new evidence of marmot activity on the dam. Marmots were seen on the nearby landfill to the north.
- Seepage was observed on the northwest and northeast dam slopes, and at the toe of all the dams (Photos I-5, I-8, I-19, I-25, I-26, I-27, and I-29). The seepage is well contained in drainage ditches or seepage collection ponds at the dam toes. Four v-notch weirs are used to monitor flows, but will need to be relocated for better efficacy (Photos I-37, I-38, I-39 and I-40).

- There was no construction activity at the TSF in 2020. Plans for waste rock disposal in the TSF have been deferred to 2021. The spillway is in good condition (Photos I-11, I-28, I-33, and I-34). The pond level was measured as 0.335 m on the staff gauge. Maximum flow depth at the spillway invert was 80 mm at the time of inspection (August 20, 2020) giving an estimated pond level of 1096.77 m.
- No reclamation activities at the landfill at the northwest corner of the TSF have been undertaken since the last DSI, in 2019 (Photos I-30, and I-31). The engineered landfill contains metal and construction debris and is separated from the TSF pond by an access road. There was subsidence of the fill cover over the uneven landfill materials leading to sinkholes and openings on the landfill surface. These localized differential settlement points are to be expected due to the very uneven surface and openings in the construction debris.
- There is a culvert through the access road between the landfill and the TSF; however, this culvert is above the low point on the road and thus has no effect. The culvert is not needed, but there is also no benefit to removing it at this time – it can be removed when final closure activities are conducted.
- A second 450 mm diameter corrugated metal pipe (CMP) is located in the Southwest Dam (Photo I-25). It was presumably used for either a tailings delivery pipeline or to allow a power line conduit to cross the dam crest during operations. It is currently unused. The invert is at approximately 1.0 m below the Southwest Dam crest, or about 0.9 m above the spillway invert (El. 1096.7 m). The culvert should be removed during closure activities but is not a dam safety issue.
- In 2019, a 1.1 m deep void with a diameter up to about 0.2 m was discovered around the steel pipe protecting the PVC standpipe for piezometer P89-01, located at the downstream edge of the dam crest. The void was backfilled in 2019 with locally derived glacial till fill. The void is believed to be the result of an improperly backfilled drill hole and not indicative of internal erosion. The standpipe was inspected in 2020 and no new soil movement or soil loss was observed (Photo I-35).
- Five pairs (10 total) of vibrating wire piezometers with data loggers were installed in 2017. Piezometer data was downloaded during the 2020 DSI site inspection; data plots are in Appendix II.
  - ◆ Two locations (DH17-02 and DH17-05) which had previously shown spurious high readings had been repaired with bentonite surface collars in 2019. This repair has appeared to remove the spiking readings (presumably correlated to rainfall events). Instead, now, these two piezometers appear to fluctuate according to (presumably) pond level.
  - ◆ Two piezometers have ceased functioning since our August 2019 site visit - DH17-04A in September 2019, and DH17-05A in June 2020. The reason for this failure is not known. Neither had shown unusual readings before failing.
  - ◆ The steel bar riser which supported the dataloggers for DH17-02A and DH17-02B has snapped at the base likely due to high winds (Photo I-36).

- Two standpipe piezometers, P89-01 and P89-06 were read by dip-metre, showing piezometric levels consistent with past readings.

### 4.3 Instrumentation Review

#### 4.3.1 TSF Pond Water Level

The pond level is passively maintained via the spillway and is not regularly monitored. Two water level staff gauges have been installed in the pond, one at the northwest corner near the landfill, and one at the spillway. Both showed a measurement of 0.335 m – this coincided with a measured water depth of 80 mm at the spillway invert (El. 1096.69 m). The pond level has historically been within 0.1 m of the spillway invert, so the readings were consistent with past observations.

#### 4.3.2 Piezometer Readings

##### Vibrating Wire Piezometers

Data from dataloggers monitoring the five pairs (10 total) of Vibrating Wire Piezometers (VWPs) was reviewed. Hourly readings are plotted on Figures II-1 to II-6 in Appendix II, from July 2017 to August 2020. The VWP readings have not been corrected for fluctuations in barometric pressure.

- Three instruments (DH17-02A, DH17-02B and DH17-05B) show readings that correlate with precipitation and pond level. It appears that local low spots on the crest resulted in water ponding at the base of the piezometer installations. In 2018, the fill around the base of these piezometers was regraded and fine-grained material was placed at the base to create a mound around the instruments. This proved ineffective, so in 2019 a bentonite collar was constructed by digging down 0.3 m within 0.8 m of the instrument, placing a layer of bentonite chips, and backfilling this excavation. The bentonite collars have smoothed out the irregularities in the readings from precipitation or water ponding in the drillhole, and now fluctuations seem to more likely follow the pond level. These three piezometers show an annual fluctuation range of about 1.5 m since September, 2019.
- Five of the remaining seven piezometers show seasonal fluctuations ranging from 0.5 m to 1.0 m since September 2019.
- Two of the piezometers, DH17-04A and DH17-05A stopped functioning since September 2019, and June 2020 respectively. It is not clear what caused the malfunction. There were no unusual readings prior to the malfunction. A review of potential issues with the vibrating wire piezometers or dataloggers should be conducted with the supplier, RST Technical.
- Piezometer levels are lowest in the spring just before thaw (March and April), with a slight rise after spring snowmelt and during rainy periods.
- Instrument temperatures for the piezometers have remained above 0°C (see Figure II-7), thus frost penetration at the dam has not reached the depth of the instruments.

Piezometer levels from September 2017 (after readings stabilized following initial installation) to August 2020 are summarized in Table 4.1.

Interim alert levels were set in 2018 at 1.0 m above the maximum recorded level for the seven VWP's that are not responding to precipitation. If any of these levels are exceeded, the cause should be investigated. These levels should be reassessed in future DSIs as long-term trends become more apparent.

**Table 4.1 Vibrating Wire Piezometer Levels**

Instrument	Instrument Tip Elevation (m)	Maximum Recorded Level (m)	Alert Level (m)	Alert Exceedance Level (m)	Alert Exceedance Date
DH17-01A	1086.8	1091.32	1092.3	none	N/A
DH17-01B	1090.5	1091.21	1092.2	none	N/A
DH17-02A	1088.2	1095.49	1096.5	none	N/A
DH17-02B	1093.2	1097.58	1098.5	none	N/A
DH17-03A	1087.0	1092.09	1093.1	none	N/A
DH17-03B	1091.5	1092.30	1093.1	none	N/A
DH17-04A	1086.7	1094.18	1095.2	none	N/A
DH17-04B	1093.2	1093.93	1094.9	none	N/A
DH17-05A	1088.7	1094.49	1095.5	none	N/A
DH17-05B	1093.7	1096.18	1097.2	none	N/A

### Standpipe Piezometers

Two of eight standpipe piezometers near the dam crest and toe were read during the 2020 DSI site visit. Data is presented in Appendix II, Figure II-8 and summarized in Table 4.2. The reading at P89-06 was the highest recorded, exceeding the previous reading by 0.2 m but this value is still over 1.35 m below ground and is not a dam safety concern.

**Table 4.2 Standpipe Piezometers**

Instrument	Instrument Screen Elevation (m)	Maximum Recorded Water Level (Note 1) (m)	Maximum Water Level Date	2019 DSI Site Visit Water Level (m)	2020 DSI Site Visit Water Level (m)
P88-01 P1	1080.5 – 1083.6	1095.50	2008-08-28	1095.20	Not read
P88-01 P2	1086.3 – 1088.1	1095.50	2008-08-28	1095.10	Not read
P88-02 P1	1074.7 – 1077.8	1086.99	2008-08-28	1085.87	Not read
P88-02 P2	1081.8 – 1083.6	1087.03	2011-09-24	1086.36	Not read
P88-03 P1	1081.8 – 1083.6	1094.70	2008-08-28	1092.99	Not read
P88-04 P1	1079.0 – 1080.8	1089.18	2006-09-11	1088.10	Not read
P89-01	1087.8 – 1091.2	1091.86	2006-09-11	1090.90	1091.05
P89-06	1088.0 – 1089.6	1090.25	2020-08-20	1090.04	1090.25

Note:

1. Maximum water levels since 2006 reported. Readings for some instruments from before 2006 are substantially different, suggesting they may have been measured from a different datum.

## Flow Monitoring

### *90° V-Notch Weirs*

There are four 90° V-notch weirs constructed from lumber (with water-resistant paint), located at historic weir locations W3, W4, W6 and W11a (photograph in Appendix I). Several of the weir pools have filled with sediment. In August 2020, the readings were:

- W3: 0.02 m = 0.09 L/s (5 L/min);
- W4: <0.01 m = <0.01 L/s (<0.6L/min);
- W6: not flowing; and
- W11a: <0.015 m = 0.04 L/s (2.5 L/min).

These flows are slightly higher than flows recorded during the 2018 and 2019 DSI inspections, and can be attributed to the rainy weather in the days leading up to the 2020 DSI.

The weir locations should be reviewed when closure work is complete. We do not recommend further work or maintenance on the weirs until the final closure drainage configuration is established.

Measurements from the historic (temporary) weirs range from 0.2 L/min to 24 L/min, with highest flows occurring in 2011.

## 5 HYDROTECHNICAL ASSESSMENT

### 5.1 Water Management

There have been no substantial changes to TSF water management in 2020. The pond continues to be maintained with a water cover over the tailings and surplus water passively decanted through a permanent spillway on the Northeast Dam. The spillway channel directs flow to an old polishing pond east of the dam and onward down Johnny Creek and Bronson Creek to Iskut River.

A bathymetric survey conducted in 2017 indicates that when the pond is at the spillway invert, the maximum pond depth is about 6 m, and the average depth is about 2 m. The pond volume below the spillway invert is about 186,000 m<sup>3</sup>. The survey also indicates a volume of about 98,000 m<sup>3</sup> between the spillway invert at El. 1096.7 m and the dam crest at El. 1097.6 m.

#### Spillway

The spillway is about 4.5 m wide with an invert about 1 m (El. 1096.6 m ND) below the minimum dam crest level (El. 1097.6 m ND), and is armoured with rockfill, riprap, and geofabric. The spillway chute gradient is about 23% (see Figure 5). It has performed well with little to no maintenance required since construction. The spillway capacity was assessed as part of the 2017 DSI (KCB 2017a) and exceeds design requirements. The spillway was in good condition with maximum flow depth of about 80 mm as observed in August 2020.

#### Seepage Ponds and Ditches

There are seepage collection ditches and ponds at the toe of the dam. The ditches collect seepage from the dam and are functioning well. The ponds are located at the southwest corner of the TSF and at the old polishing pond location east of the spillway and flow either north to Johnny Creek or south to Stonehouse Creek. The ditches were observed with up to 60 mm depth of flow locally during the site inspections in August, 2020.

Rescan Tahltan Environmental Consultants (RTEC) installed two hydrometric monitoring stations in September 2016. Station STS-H1 is located 100 m southwest of the TSF, on a small stream that drains from the south side of the TSF to Stonehouse Creek. Station JTN-H1 is located about 100 m northeast of the TSF, at the outlet of the polishing pond on a small channel that leads to Johnny Creek.

An interception ditch diverts upslope drainage around the west side of the impoundment.

#### Polishing Pond and Saddle Berm

The old polishing pond area below the spillway is partially contained by a Saddle “Dam” (identified as such in the original design, Dick, 1989) that contains the Polishing Pond and directs flow eastward toward Johnny Creek. The Saddle “Dam” also prevents spillway flow from entering Sky Creek. The Saddle “Dam” does not qualify as a dam according to the typical definition provided by the CDA (2013), i.e., at least 2.5 m high from crest to toe and 30,000 m<sup>3</sup> reservoir capacity, and is not classified as such. It is currently indistinguishable from the surrounding natural terrain. When observed in



August 2020, the polishing pond and channel to Johnny Creek were performing well. We have renamed this feature as the Saddle Berm, as it does not meet the definition of a dam.

## 5.2 Water Balance

There have been no substantial changes to the water balance in 2020. The TSF closure design (KCB 2018a) includes an update to the TSF water balance which specifically looked at average and drought conditions. The drought condition was considered for confirming minimum required water cover over the tailings. In a 200-year dry year, the water level in the TSF pond level can be expected to drop up to about 0.2 m below the spillway invert. A summary of the TSF water balance for an average year is provided in Table 5.1.

**Table 5.1 TSF Water Balance Summary – Average Year**

Flow	Input Rate	Total Volume (m <sup>3</sup> )
<b>Inflows</b>		
Rainfall	708 mm/yr	71,000
Snowmelt	1382 mm/yr	138,000
<b>Outflows</b>		
Evaporation	258 mm/yr	26,000
Seepage	9.3 m <sup>3</sup> /day	3,000
Spillway Discharge		180,000

A flood routing study (KCB 2018a) using an Inflow Design Flood of 393 mm of precipitation over 24 hours indicated a peak spillway discharge rate of 630 L/s with a peak water elevation of El. 1096.87 m at the spillway crest (0.27 m flow depth).

## 6 GEOTECHNICAL ASSESSMENT

There were no substantial changes to the geotechnical stability of the TSF in 2020. Dam stability relies on a robust closure spillway combined with a stable design section on a good foundation. Stability was last assessed in 2017 using results of the 2017 drilling and lab investigation, LiDAR survey and bathymetry survey, along with the new vibrating wire piezometers to provide additional information on embankment zonation, material properties, slope geometry, tailings geometry, and piezometric levels in the embankment.

The primary findings of the 2017 assessment were that in some areas, the downstream slope does not meet HSRC (2017) factor of safety requirements for shallow slip surfaces for static and seismic loading, and therefore flattening the downstream slope to 2.5H:1V should be completed to improve stability of the surficial material. This lower factor of safety was evident in 2020, when a small slump (about 3 m<sup>3</sup> total volume) occurred on the outer slope of the Northeast Dam access ramp. The outer slope of this ramp is not considered part of the dam fill and is steeper than 2H:1V. The slump occurred in this steep ramp side-slope but does not comprise a dam safety risk, rather it is an indicator of the potential behaviour of the material at slopes steeper than 2.5H:1V

Factor of safety requirements for deep slip surfaces are met in the current configuration, even if the blanket drain ceases to function. Additional details of the stability analyses are given in the TSF Closure Design report (KCB 2018a).

Surveillance and maintenance items related to the dam stability include:

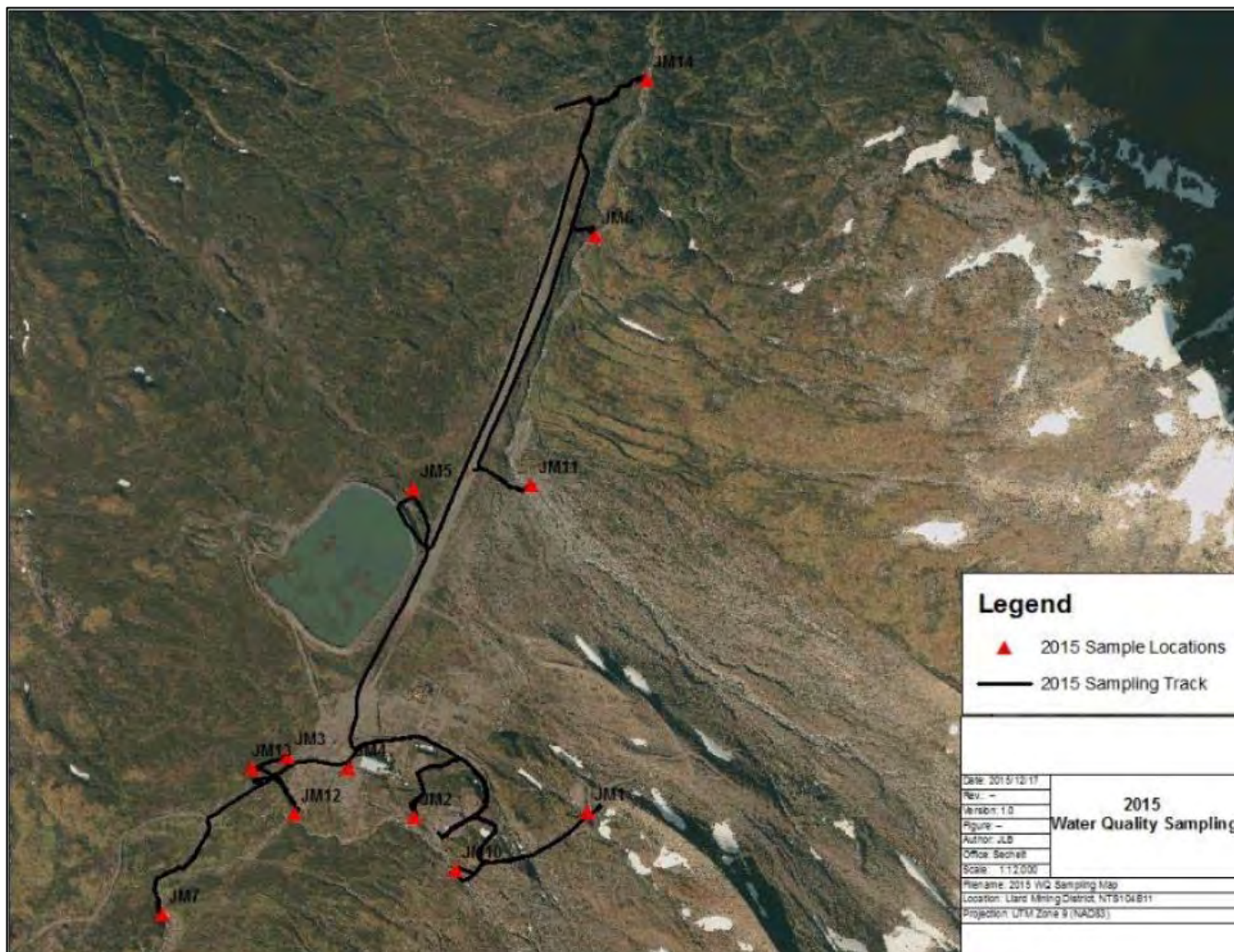
1. Monitoring the piezometric surface within the dam embankment (vibrating wire piezometers and standpipe piezometers).
2. Monitoring seepage rates and potential migration of fines in seepage at four weirs at the dam toe.
3. Inspections of the dam and spillway up to three times a year during the field season, from approximately June to October, including an annual inspection by the Engineer of Record.
4. Slope and crest maintenance during the field season from June to October, as required.
5. Monitoring the TSF year-round via internet camera.

## 7 HYDROGEOLOGY AND GEOCHEMICAL ASSESSMENT

### 7.1 Water Quality and Geochemistry

Water quality monitoring at Johnny Mountain began in 1986 and has been ongoing at Johnny Creek and Stonehouse Creek. Water quality monitoring of discharge from the TSF began in 1989. The program is outlined in the May 2000 amendment to Waste Management Act Permit PE-8415, and a water quality monitoring program was then initiated in 2001 including additional sampling stations and monitored parameters. The 2020 results are provided in the 2020 PE-8415 Annual report provided to MECCS, which is also included in the SnipGold 2020 Annual Reclamation Report (requirement of Johnny Mountain Mine Mines Act Permit M-178). The tailings pond outflow, measured at station JM5 (Figure 7.1) since 2006, has met the Permit PE-8415 conditions for dissolved copper (limit 0.05 mg/L) and dissolved zinc (limit 0.2 mg/L).

**Figure 7.1 Water Quality Sampling locations (Greenwood 2016)**



## 8 DAM SAFETY MANAGEMENT

### 8.1 Review of Operation, Maintenance and Surveillance Manual

A “Closure Management Manual” (SnipGold 2015) combined with the SnipGold Standard Operating Procedure for all employees and the site Emergency Response Plan (SnipGold 2017) provide the basis for the site operation, maintenance and surveillance. A new Operation, Maintenance and Surveillance manual for the TSF was prepared in early 2018 (KCB, 2018d) and includes maintenance and surveillance requirements as well as updates the ERP.

There are no active operations at the TSF. Plans are being prepared for relocation of potentially acid-generating rock from various points on the site into the TSF. The scope of this work and the implementation are documented in a 2020 Project Execution Plan (PEP) prepared by SnipGold (2020).

Key elements for surveillance and maintenance currently in place are:

- Regular inspections of the site and TSF when staff are at the Iskut Camp, and the site is accessible. The site weather station is internet connected and has been operating since October 2016. In the past, regular observation of the TSF was possible by internet connected camera; however, as of March 2019 the internet connection is inoperable. Station data (including photographs) is downloaded by ERM when they conduct site visits for water quality testing.
- Annual dam safety inspections of the TSF by the EoR. This includes visual observations of the dam condition, with photographs at regular photo stations, observations of the spillway condition, monitoring instrumentation and an annual report.
- A DSR at least every five years as per the revised HSRC (MEM 2017).
- Surveillance includes annual readings of the weir levels, annual readings of standpipe piezometers, and hourly (datalogger) readings of the vibrating wire piezometers (checked annually).
- The pond freeboard is checked annually at the spillway. The spillway invert is 1.0 m below the lowest point on the dam crest.
- Maintenance includes regrading of the main access road to the TSF, and, when required grading or clearing out of water collection ditches at the toe of the dams.
- Maintenance records are kept in the SnipGold Smithers office.
- All site staff are required to report of any noted spill, instability or unusual condition.

We recommend the following changes for the next OMS Manual update, which should be completed when closure construction works are complete:

- Add Quantitative Performance Objectives for the vibrating wire piezometers. These levels should be set 1 m above the maximum recorded level (See Section 4.3.2).

- The OMS should include the updated TSF inspection form (provided in the 2019 DSI, KCB, 2020).

## 8.2 Review of Emergency Response and Preparedness Plan

There is an Emergency Response Plan (ERP) for emergencies at the camp and for the exploration team. We understand this is updated annually before the field season with current phone numbers and contact information and included in the OMS along with emergency procedures and notifications in the event of a TSF incident and dam breach inundation maps.

The ERP includes informing the Mine Manager immediately, who will coordinate response to the emergency, including notifying others for immediate response and notifying others in the chain of responsibility.

The ERP includes communication protocols, contacts and current phone numbers, and emergency response procedures related to: medical, fire, aviation, rescue, overdue crew, wildlife and hydrocarbon spills, tailings spills, tailings high inflow events, and TSF embankment instability.

## 8.3 Public Safety Management

The site is remote and not easily accessible to the public. Access is limited to helicopter, or vehicle from Iskut Camp which is accessible by small plane (using Bronson Creek Airstrip). The airstrip at Johnny Mountain has been dug up. The public safety risk posed by the TSF is considered to be low.

## 8.4 Risk Assessment

The HSRC requires a risk assessment that reviews, characterizes, and where appropriate, mitigates risks of operating the TSF. Risks are to be documented and managed to a level appropriate to the structure's consequence classification. Risk assessments are required for all TSFs, but for those TSFs with a classification of "High" or above, a formal independent risk assessment is to be conducted. As the current consequence classification is "Significant", an independent risk assessment is not required.

A risk assessment was completed as part of the 2017 DSI to identify all critical risks associated with the TSF, assess impacts associated with those risks, to inform design alternatives, develop design objectives and to determine monitoring objectives. Risks are potential outcomes based on a combination of potential hazard and probability of occurrence. There have been no significant changes in 2020, that would change the 2017 risk assessment.

Potential risks and KCB's view of each, from the 2017 risk assessment, are summarized below. In KCB's opinion, the risks on site are appropriately managed, and will be further reduced by the proposed closure works.

1. **Failure Mode:** *Dam foundation failure leading to a dam failure and release of tailings, under seismic loading leading to undrained strength failure.*  
To manage this risk, the dam should meet design criteria for global stability based on potential slip surfaces through the foundation. This failure mode was presented and reviewed in the

TSF Closure Design report (KCB 2018a). The dam meets global stability requirements, and the foundation is safe. The risk of a seismically induced, static or undrained strength failure of the foundation is low due to the foundation being comprised of dense till over bedrock.

2. **Failure Mode:** *Dam embankment stability failure leading to a release of tailings under static stability or seismic loading.*

To manage this risk, the dam should meet design stability criteria for both upstream and downstream slopes. The dam generally meets stability criteria for deep-seated slip surfaces and the risk of a seismically induced, peak or undrained strength failure of the embankment is low due to downstream embankment construction over dense till or bedrock. However, the assessment (KCB 2018a) indicated the potential for local, minor surficial slumps on the downstream face, and that some minor surficial slumps may have occurred during the last 30 years. The small slump on the northeast access ramp in 2020 is typical of these types of slumps. Slumps have been repaired on the upstream face in 2017. The downstream minor surficial slumps are not global stability risks; however, they could regress over time causing narrowing of the dam crest and potentially a dam failure if left unattended or unrepaired for an extended period. The dam is under regular surveillance which appropriately manages this potential risk, and there are plans for flattening the slopes for long-term closure.

3. **Failure Mode:** *Failure of the blanket underdrain system raising the phreatic surface in the dam.*

The phreatic surface is to be maintained below acceptable levels for embankment stability. The dam was designed with a granular underdrain to lower the phreatic surface in the embankment slope. To manage this risk, the stability of the dam was checked assuming a non-functioning underdrain. Surface slumps or excess dam fill have covered much of the toe of the dam and so seepage paths from the drain are at least partially blocked. Seepage analysis and measurements at the new piezometers indicates that the drain is functioning and keeping the piezometric surface in the embankment at acceptable levels below the dam crest. Furthermore, updated analysis of the dam stability showed that after closure works are implemented, including flattening the downstream slope to 2.5H:1V, the embankment will continue to meet stability design criteria even with a fully blocked blanket drain.

4. **Failure Mode:** *Piping of fines through the granular underdrain could lead to dam failure.*

To manage this risk, the drain material should be properly designed to be filter compatible with the dam embankment fill. The Dam Safety Review report (KCB 2017b) included a review of filter compatibility which indicated some potential for gap-graded dam fills and gap-graded blanket drain fill, which could, under a significant gradient, lead to potential loss of fines through the drain or potential internal instability within the drain. Drilling in 2017 indicated that there has likely been fines migration into the blanket under-drain over time resulting in the drain, in some locations, being indistinguishable from the till. Nevertheless, the volume of seepage is low, and there has been no recent evidence of dam settlement, fines in the seepage or other indicators of piping of fines. The void discovered around P89-01 during the 2019 DSI site visit is believed to be the result of an improperly backfilled drill hole and not associated with internal erosion. Ongoing monitoring of seepage for fines is now part of the

annual inspections. The drain is to be extended under the new planned downstream 2.5H:1V slope. The drain extension will be designed to act as an inverted filter to impede any potential transport of fines.

5. **Failure Mode:** *Failure of the spillway leading to dam overtopping or breach.*  
To manage this risk, the spillway should be adequately sized and designed. The spillway capacity to carry the required Inflow Design Flood for a dam failure consequence classification of Significant (1/3 between the 975-year flood and the PMF), has been reviewed and confirmed. The closure design includes recommendations for some upgrades to armouring of the spillway to improve erosion resistance under design flows (KCB 2018a).
6. **Failure Mode:** *Failure of upstream diversions, causing additional storm runoff into the TSF.*  
To manage this risk, the spillway capacity should be adequately sized to include inflows if diversions are breached. The landfill and area upstream is effectively part of the TSF catchment. A new water balance, conducted in 2017 now includes this area in the catchment in terms of inflows to the TSF. Spillway capacity has been checked and is adequate to pass-through the design storm.
7. **Failure Mode:** *Internal erosion of dam fill initiated by animal burrowing in the dam.*  
Marmots have previously burrowed up to 1.2 m deep holes into the downstream face of the dam, which have been backfilled. If left unattended, deeper burrows could initiate internal erosion of the dam fill, particularly if they reach the phreatic surface and create a new seepage path. This risk is managed by making periodic inspections over the summer and backfilling burrows as they are discovered. Since the original backfilling of burrows in 2017, annual burrowing activity has been limited to shallow (less than 0.2 m) holes, which have been backfilled during routine inspections.

These potential risks have been summarized in the OMS Manual (KCB 2018d) issued in March 2018. The OMS Manual includes instrumentation, surveillance and maintenance requirements to manage these risks.

## 8.5 Site Historic Incidents

The facility has performed well and is stable.

There are no significant site historic incidents regarding dam stability or operations other than a small slump on the Northeast Dam in 1994, repaired by constructing a buttress.

Two marmot holes were found in the Southwest embankment in 2017 and backfilled with local glacial till. Marmots dug out one of these holes by July 2018, at which time the hole was again backfilled. A new marmot hole was found in the Southwest Dam during the 2018 DSI and backfilled with some redigging noted in 2019. There was no evidence of marmots re-digging previously backfilled holes during the 2020 DSI. These should continue to be monitored for further activity as part of the normal inspections. A larger marmot den is located beyond the toe of the Southwest Dam. Marmots also inhabit the landfill to the north of the TSF.

Based on a LiDAR survey conducted in 2017 and the inspections in 2018, there have been localized surficial slumps around the downstream slope, causing local over-steepened slopes ranging from

1.9H:1V to 2.5H:1V. As previously discussed, these do not represent a risk to the global stability but if left unaddressed for an extended time, could eventually lead to a regressive failure. A slough of about 3 m<sup>3</sup> was noted on the northeast ramp in 2020 – but with no direct impact on the dam fill.

Mitigations include ongoing site surveillance requirements in the OMS Manual (KCB 2018d) and slope flattening as part of the planned closure design (KCB 2018a).



## 9 CLOSURE AND RECLAMATION

An updated closure design for the TSF was prepared in 2017, which supplements the 1999 Closure Plan (Skyline 1999). This TSF Closure Design report (KCB 2018a) provides design recommendations to upgrade the dam, place PAG waste rock in the TSF and update the long-term monitoring plan.

The design also includes minor upgrades to the spillway, with additional armouring, along with upgrades to the seepage collection ditches at the toe of the TSF. A scope for the design of the closure works is currently being considered by SnipGold. Some of this work was planned for 2020, but was postponed due to difficulties around mobilizing during the COVID-19 pandemic.

The TSF is currently considered in Active Closure, but the intent is to transition to Passive Closure (KCB 2018a). Active Closure involves the on-going operation, inspection, monitoring and maintenance of the TSF and supporting infrastructure. Passive Closure involves no further changes or actions for the TSF to operate safely. Aside from required maintenance identified during DSIs or DSRs, dams in passive closure should be stable with low maintenance (CDA 2014).

## 10 SUMMARY OF FINDINGS AND RECOMMENDATIONS

In KCB's opinion, the facility was functioning safely and as intended at the time of our inspection.

Recommendations and orders from previous inspections that have not been closed out and from the current 2020 DSI are summarized in Table 10.1. Previously closed recommendations (prior to 2020) are not listed. Recommendations have been prioritized using the suggested scheme from the HSRC Guidance Document (HSRC 2016), provided in Table 10.2.

In response to Order 2017-01 (listed in Table 10.2) SnipGold requested an exemption to the requirement for an Independent Tailings Review Board (ITRB) but are awaiting response for further action. KCB issued a letter to supports this ITRB exemption; a copy of this letter is included in Appendix IV.

**Table 10.1 Recommendations Summary**

Number	Item	Action Item	Priority	Timeline	Status
<b>2017 MEM (Now MEMLCI) Orders</b>					
MEM 2017-01		Order #1 - Establish an ITRB	-		SnipGold has requested an exemption (KCB letter dated March 29, 2018 see Appendix IV). Pending MEMLCI Response.
<b>2017 DSI</b>					
2017-DSI-01	Ditch and Water Management	An overall ditch cleanup and drainage/ water management plan is to be implemented as part of the closure plan.	4	2022-03-31	Will be addressed as part of final closure of facility.
2017-DSI-02	Dam Upgrades	Since the objective is to eventually move the facility into Passive Closure, we recommend upgrades to the dam (per KCB 2018a TSF closure design) to address these surficial stability issues which will reduce long-term risk. This includes flattening of the downstream slope, minor spillway upgrades and maintaining filter compatibility of underdrains.	4	2022-03-31	Will be addressed as part of final closure of facility.
SFI-2017-06	Weirs	When a final ditch and drainage plan is prepared, relocate the weirs to optimal measuring points to more accurately measure seepage.	4	2022-03-31	Will be addressed as part of final closure of facility.
<b>2018 DSI</b>					
2018-DSI-02	Quantitative Performance Objectives	Update the OMS Manual (and field inspection form) with alert levels for the vibrating wire piezometers. These levels should be set 1 m above the maximum recorded level (See Section 4.3.2).	4	2019	Updated inspection form was included in the 2019 DSI report. Alert levels are updated in this report and should be added to next OMS Manual update.
<b>2020 DSI</b>					
2020-DSI-01	DH17-04A, and -05A Piezometer or datalogger	Review, with RST Technical potential issues that caused the malfunction of the two piezometers or their dataloggers.	4	2021	New.

Number	Item	Action Item	Priority	Timeline	Status
	Repair or abandon.				
2020-DSI-02	DH17-02 Metal Riser repair	Repair or replace the metal riser which snapped near ground surface for DH17-02 vibrating wire dataloggers.	4	2021	New
2020-DSI-03	Two Defunct Culverts	Two old metal culverts, one in the access road next to the landfill and one in the Southwest Dam should be removed as part of final closure operations. Both are well above the spillway inlet invert and neither represent a dam safety concern but should be removed during final closure activities.	4	2022	New. Will be addressed as part of final closure of facility

**Table 10.2 Priority Ranking Scheme (MEM 2016)**

Priority	Description
1	A high probability or actual dam safety issues considered immediately dangerous to life, health or the environment, or a significant risk of regulatory enforcement.
2	If not corrected, could likely result in dam safety issues leading to injury, environmental impact or significant regulatory enforcement; or, a repetitive deficiency that demonstrates a systematic breakdown of procedures.
3	Single occurrences of deficiencies or non-conformances that alone would not be expected to result in dam safety issues.
4	Best Management Practice – further improvements are necessary to meet industry best practices or reduce potential risks.

## 11 CLOSING

Thank you for the opportunity to work on this project. Should you have any questions, please contact the undersigned.

**KLOHN CRIPPEN BERGER LTD.**



David Willms, P.Eng.  
Senior Geotechnical Engineer, Associate



Neil K. Hemrajani Singh, P.Eng.  
Senior Geological/Geotechnical Engineer, Principal

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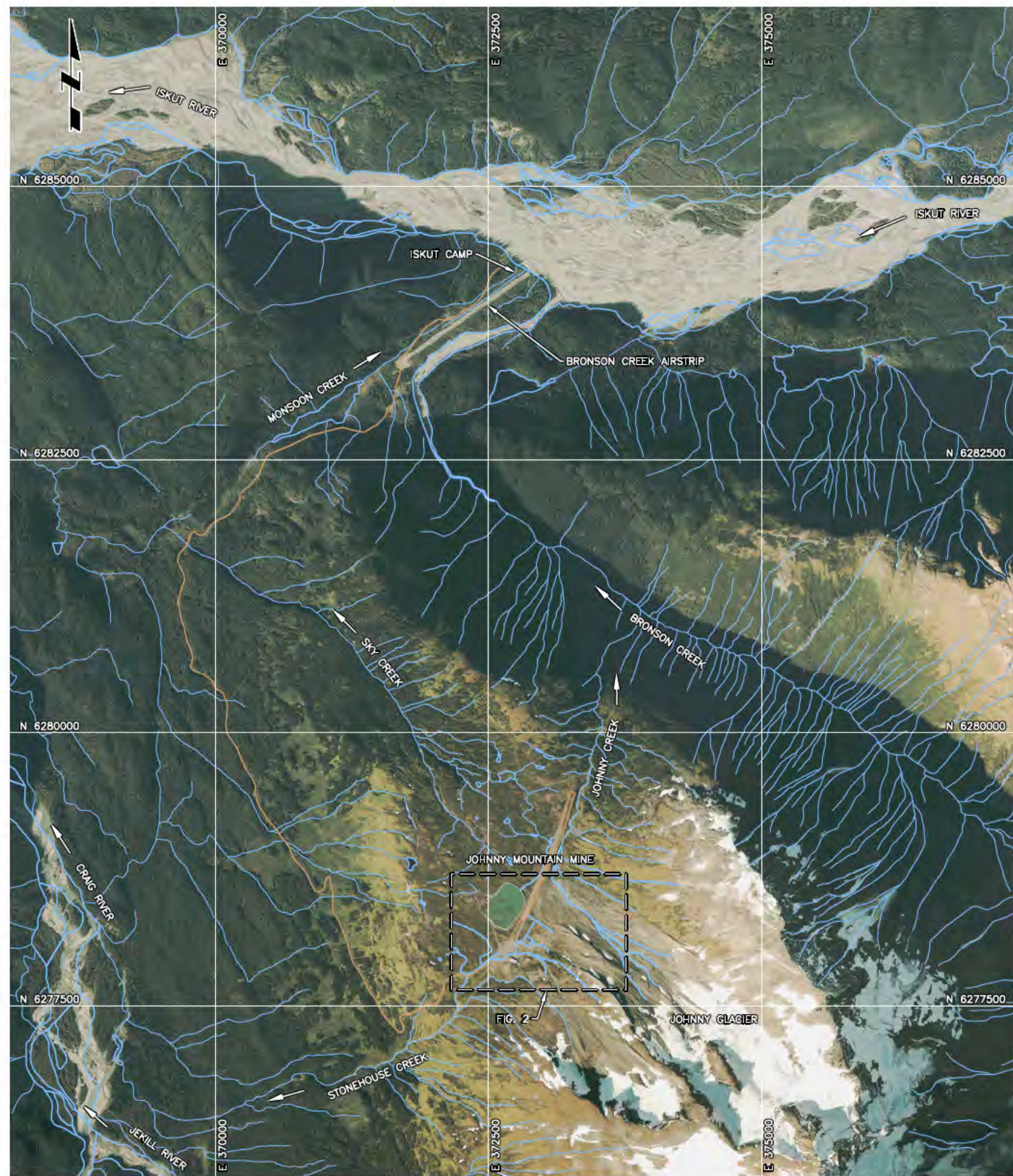
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## FIGURES

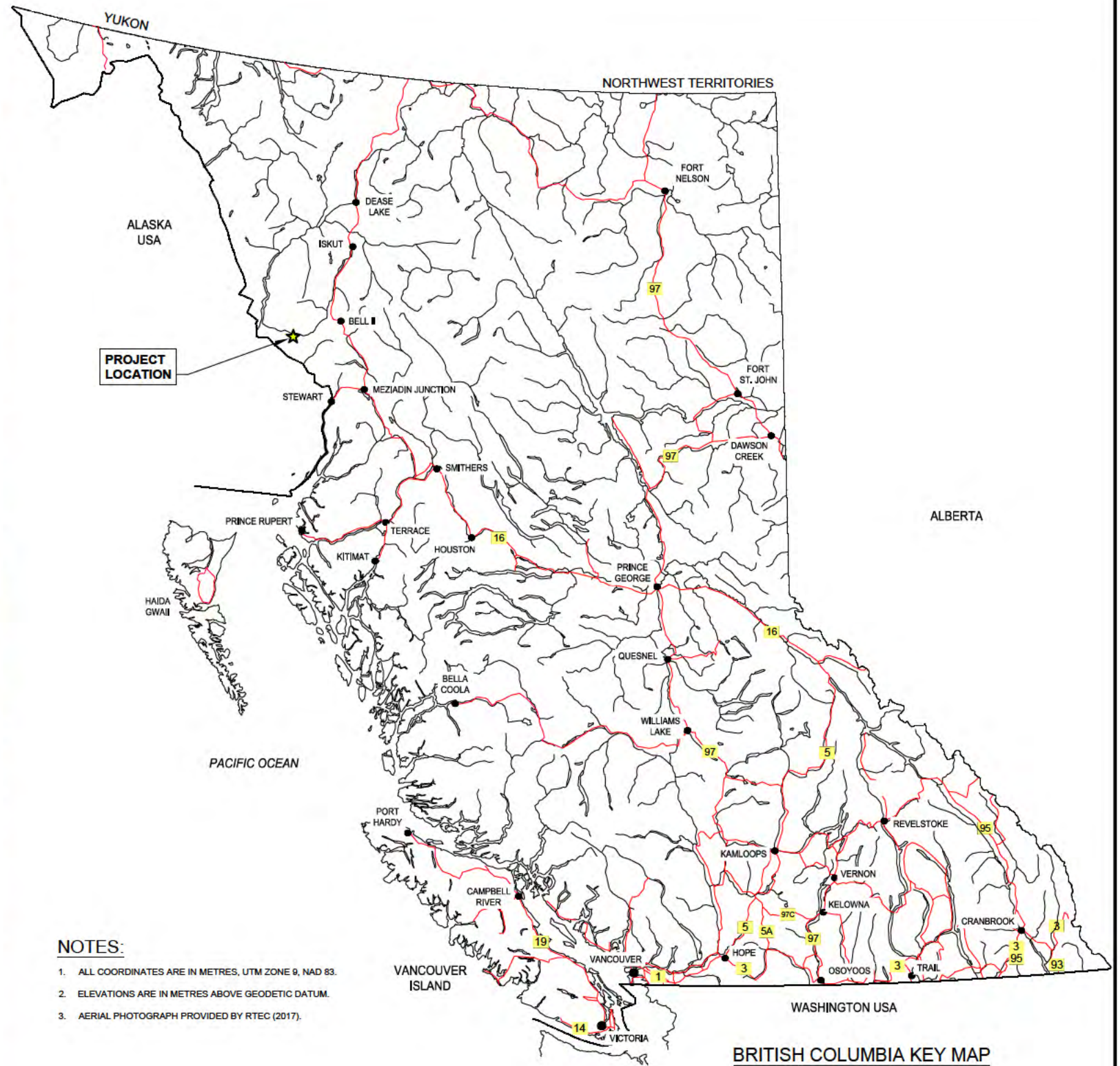
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Figure 1	Project Area
Figure 2	Site Plan
Figure 3	Tailings Storage Facility – Plan
Figure 4	Tailings Storage Facility – Sections
Figure 5	Tailings Storage Facility – Spillway

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LOCATION PLAN



NOTES:

1. ALL COORDINATES ARE IN METRES, UTM ZONE 9, NAD 83.
2. ELEVATIONS ARE IN METRES ABOVE GEODETIC DATUM.
3. AERIAL PHOTOGRAPH PROVIDED BY RTEC (2017).

NOT FOR CONSTRUCTION

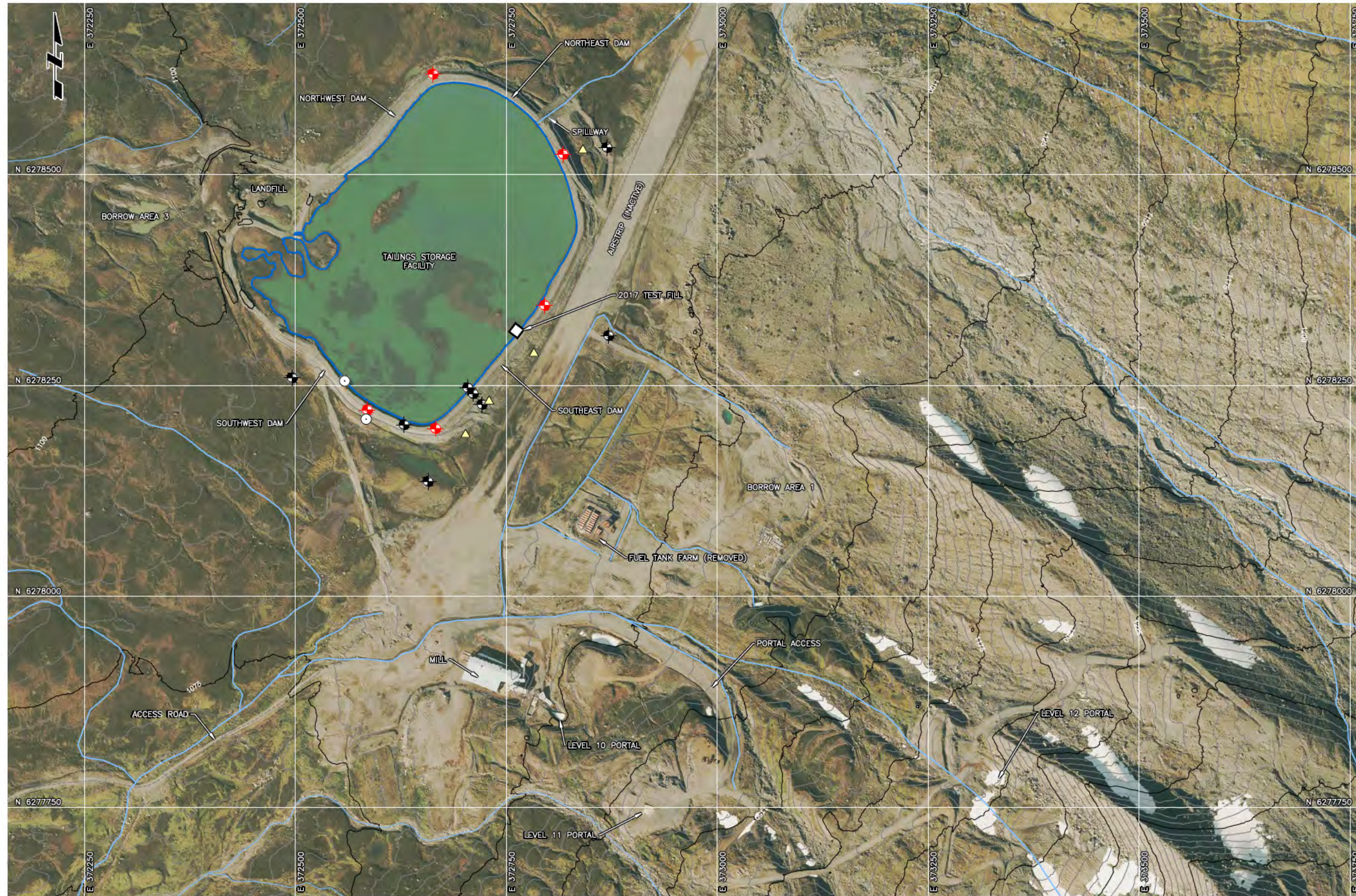


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		TITLE <b>PROJECT AREA</b>
SCALE AS SHOWN	PROJECT No. M10088A07	FIG. No. 1





KCB/FGD/L



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**LEGEND**

-  2017 SONIC DRILL HOLE WITH VIBRATING WIRE PIEZOMETER
-  DRILL HOLE WITH STANDPIPE PIEZOMETER
-  WEIR
-  POINT OF INTEREST

**NOTES:**

1. ALL COORDINATES ARE IN METRES, UTM ZONE 9, NAD 83.
2. ELEVATIONS ARE IN METRES ABOVE GEODETIC DATUM.
3. AERIAL PHOTOGRAPH PROVIDED BY RTEC (2017).
4. LIDAR DATA PROVIDED BY SNIPGOLD, SEPTEMBER 2017.


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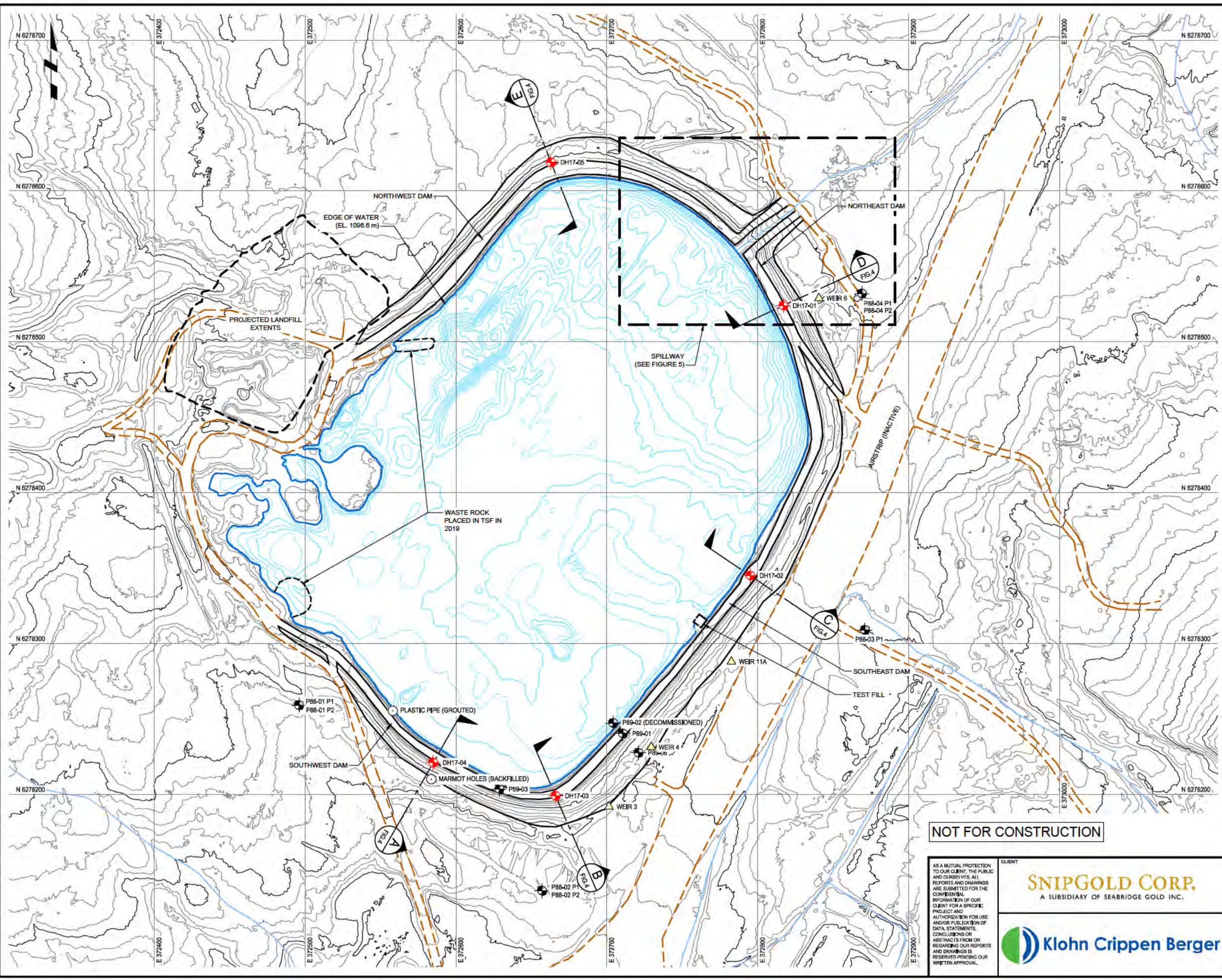
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 A SUBSIDIARY OF SEABRIDGE GOLD INC.

 **Klohn Crippen Berger**

PROJECT JOHNNY MOUNTAIN MINE - TAILINGS STORAGE FACILITY 2020 DAM SAFETY INSPECTION		
TITLE  SITE PLAN		
SCALE AS SHOWN	PROJECT No. M10088A07	FIG. No. 2

10/20/20

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**LEGEND**

- 1002.5 TAILINGS BATHYMETRY
- 2017 SONIC DRILL HOLE WITH VIBRATING WIRE PIEZOMETER
- DRILL HOLE WITH STANDPIPE PIEZOMETER
- ▲ WEIR
- POINT OF INTEREST

**NOTES:**

1. BATHYMETRY PROVIDED BY RTEC (2017).
2. TAILINGS SURFACE, LANDFILL AND AIRSTRIP TOPOGRAPHY NOT UPDATED TO SHOW CHANGES SINCE 2017.

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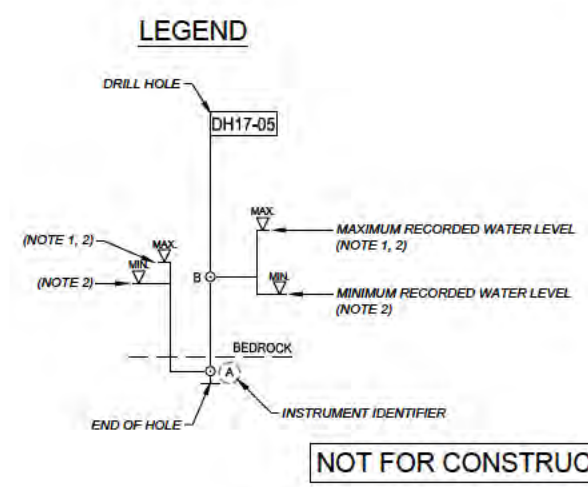
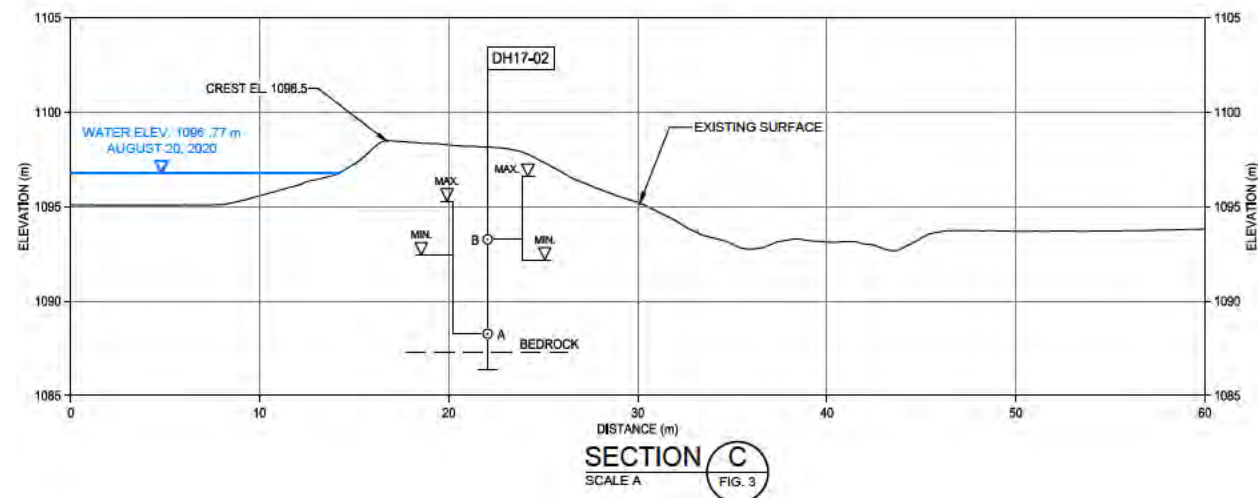
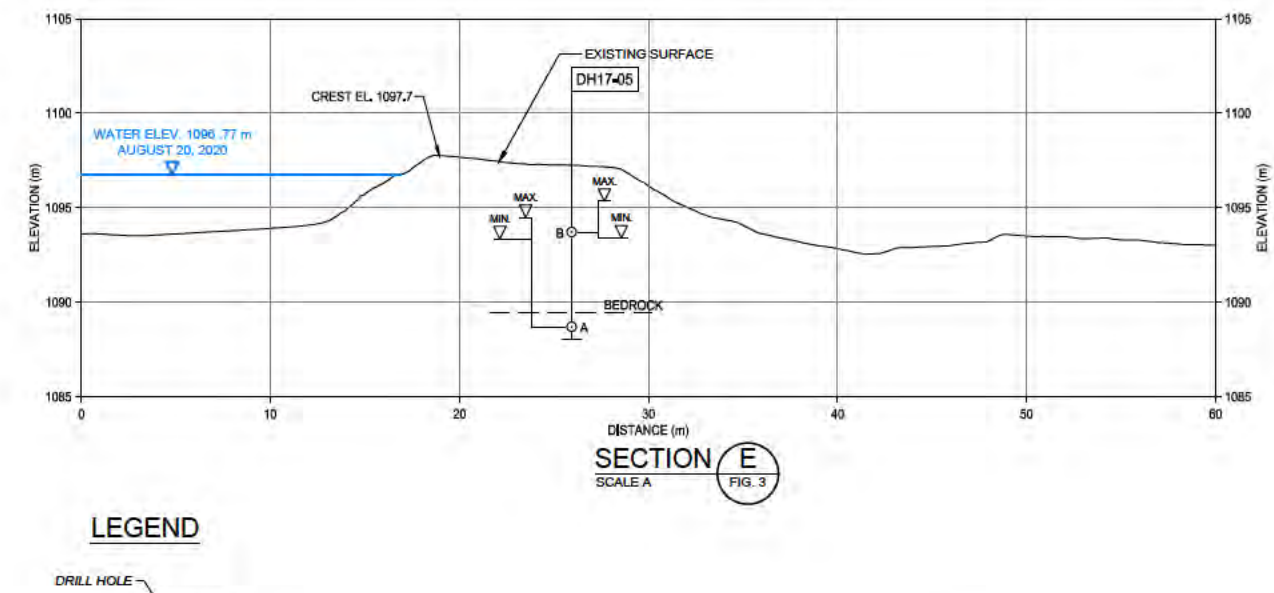
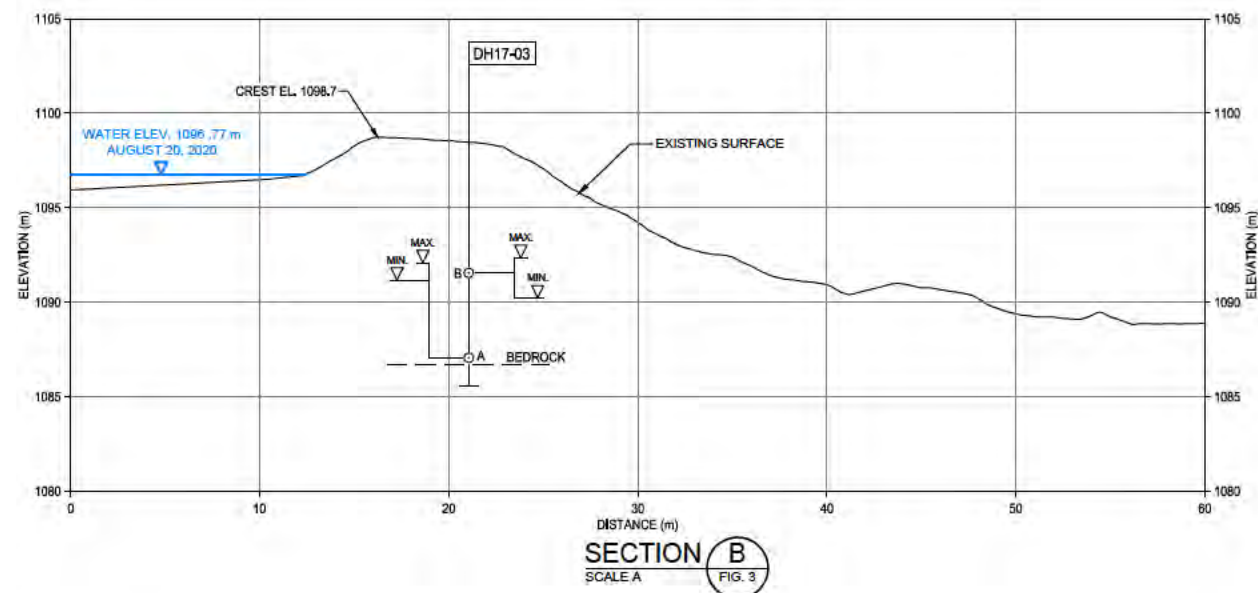
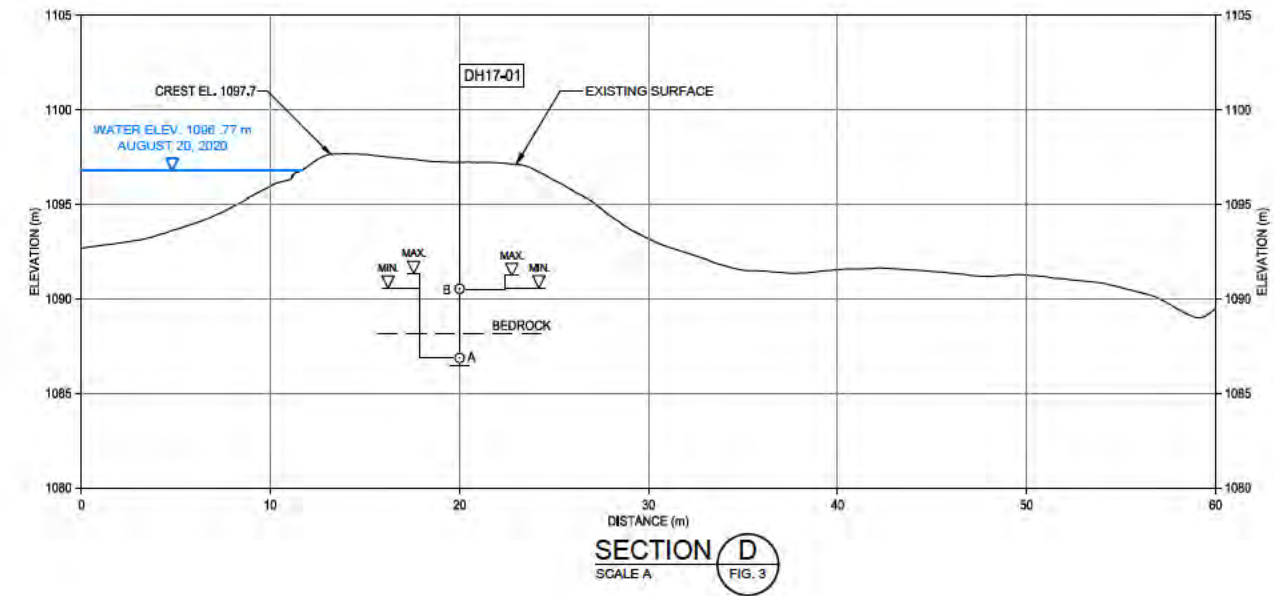
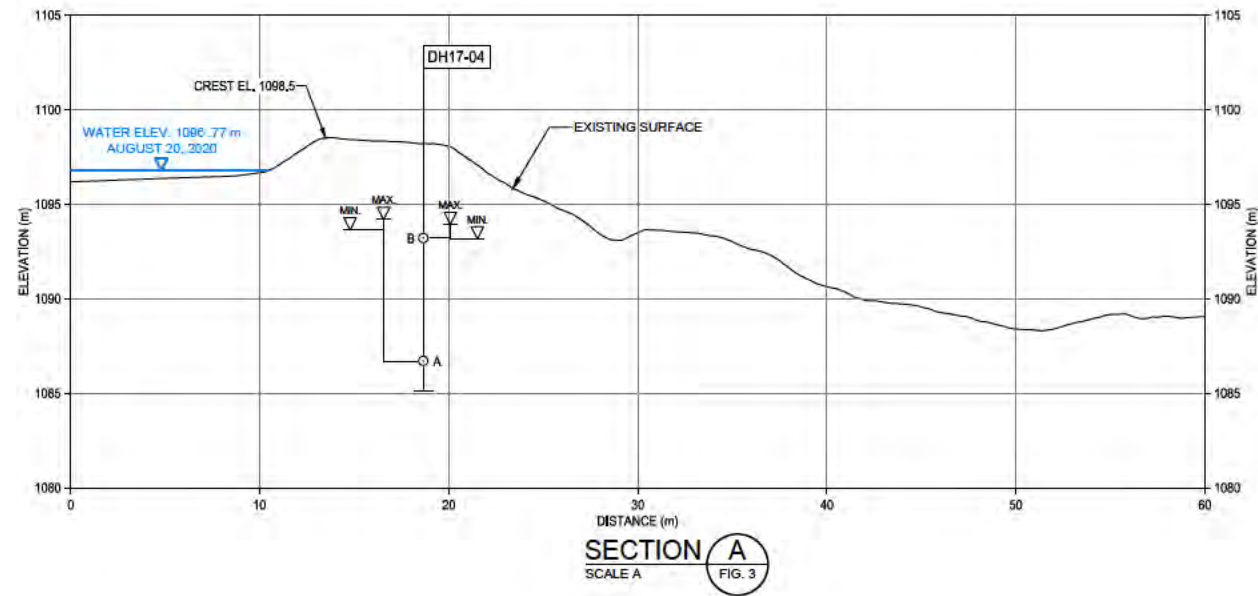
CLIENT

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**Klohn Crippen Berger**

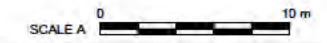
PROJECT	JOHNNY MOUNTAIN MINE - TAILINGS STORAGE FACILITY 2020 DAM SAFETY INSPECTION	
TITLE	TAILINGS STORAGE FACILITY PLAN	
SCALE	PROJECT No.	FIG. No.
AS SHOWN	M10088A07	3

NCB/FG-DL



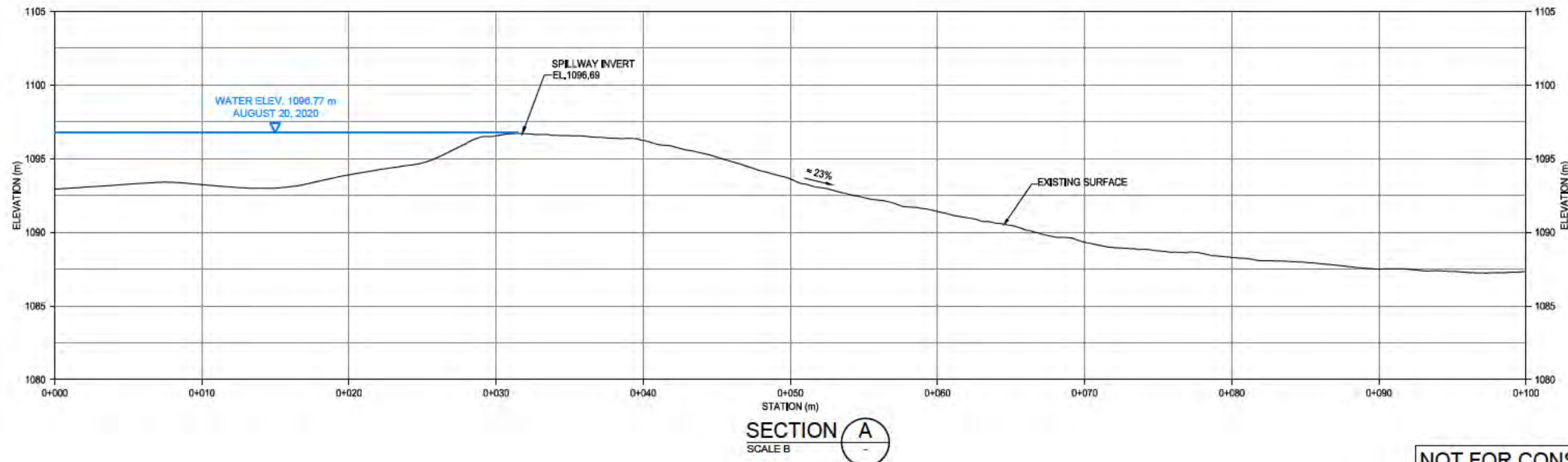
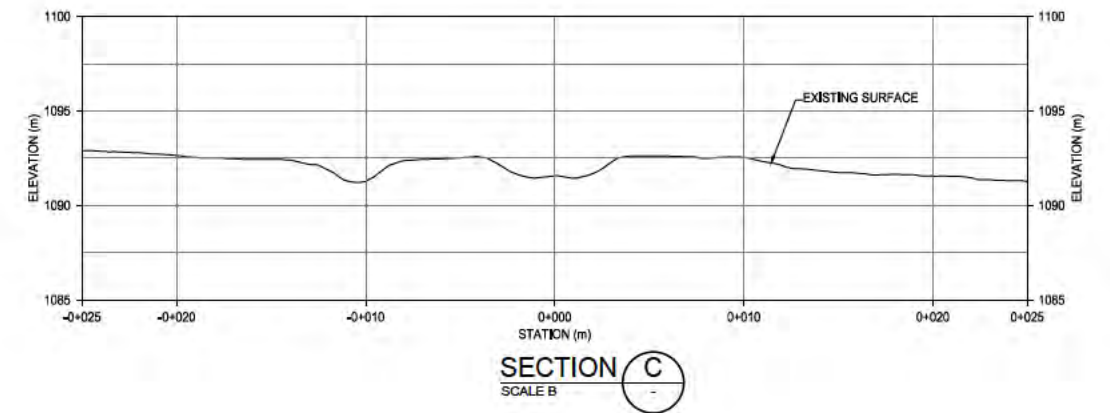
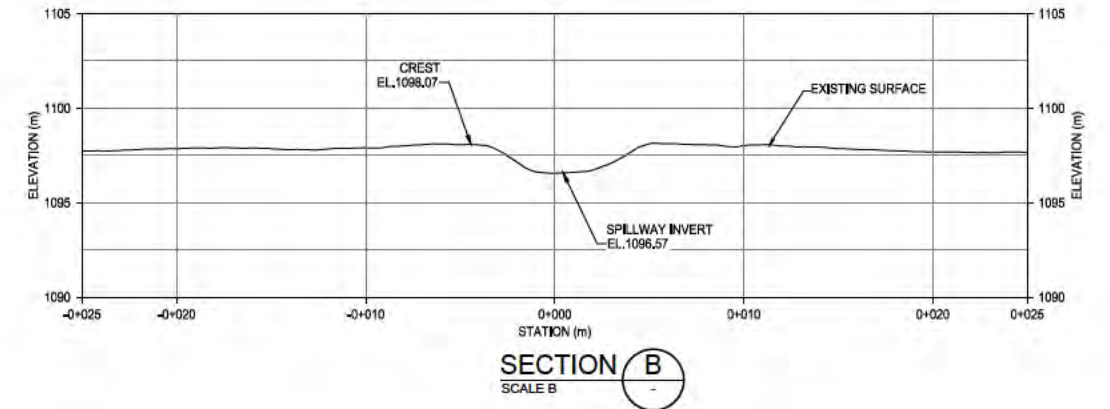
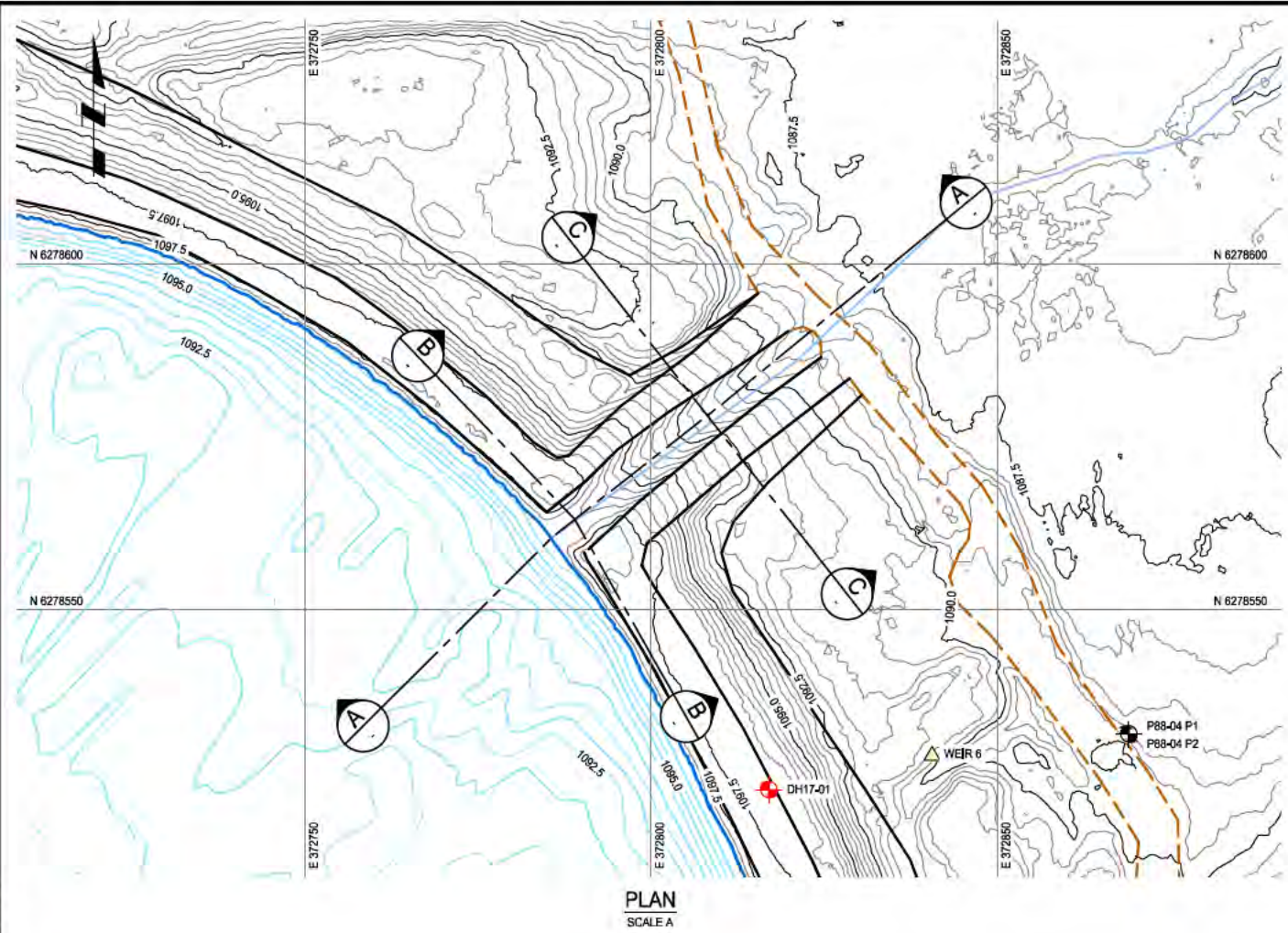
- NOTES:**
- SPURIOUS READINGS CORRESPONDING TO RAINFALL INFILTRATION IN DH17-02A, DH17-02B AND DH17-05B NOT SHOWN. FLUCTUATIONS APPEAR TO FOLLOW POND LEVEL SINCE REPAIRS IN 2019 AND THESE VALUES ARE INCLUDED.
  - MAXIMUM AND MINIMUM RECORDED WATER LEVELS SINCE SEPTEMBER 2017 SHOWN.

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		TITLE <b>TAILINGS STORAGE FACILITY SECTIONS</b>
SCALE AS SHOWN	PROJECT No. M10088A07	FIG. No. 4

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**NOTES:**

- 1. BATHYMETRY PROVIDED BY RTEC (2017).

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		TITLE <b>TAILINGS STORAGE FACILITY SPILLWAY</b>
SCALE AS SHOWN	PROJECT No. M10088A07	FIG. No. 5

NOBFG-DL

# APPENDIX I

## 2020 DSI Site Visit Report

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2020 DSI Site Visit – Johnny Mountain TSF

September 15, 2020

SnipGold Corporation  
A subsidiary of Seabridge Gold Inc.  
1235 Main Street  
P.O. Box 2536  
Smithers, BC  
VOJ 2N0

**Ms. Elizabeth Miller, M.Sc., R.P.Bio.**  
**Vice President Environment and Social Responsibility (ESR)**

Dear Ms. Miller:

**Iskut Project – Johnny Mountain Mine**  
**2020 DSI Site Visit – Johnny Mountain TSF**

## **1 INTRODUCTION**

SnipGold Corporation (SnipGold), a subsidiary of Seabridge Gold Inc. has engaged Klohn Crippen Berger Ltd. (KCB) for engineering services related to the Iskut Project – Johnny Mountain Mine (JMM) Tailings Storage Facility (TSF).

This letter documents the site visit on August 20, 2020 conducted by Mr. Neil Singh, P.Eng., of KCB, who was accompanied by SnipGold representatives: Ms. Elizabeth Miller, R.P.Bio., Jessy Chaplin, and Lionel Sequeira. The site visit is required as part of the annual Dam Safety Inspection (DSI). This letter will be appended to the 2020 DSI Report (to be issued separately), which will contain additional discussion on site observations and dam safety.

### **1.1 Logistics**

A brief summary of Mr. Singh's travel and site visit are included below:

#### **August 19, 2020**

- Travel from Vancouver to Terrace and stay overnight in Terrace.

#### **August 20, 2020**

- Helicopter flight from Terrace to Johnny Mountain TSF site, via Bell II and McClymont Landing, arriving at about 11 am. Followed Covid safety guidelines in helicopter including masks, and plastic barriers between passengers.

- Conduct dam safety inspection at Johnny Mountain TSF with Ms. Miller. Finish about 15:00:
  - ◆ Helicopter remained on site, so radio check-ins were not required.
  - ◆ Although outdoors, continued to wear masks when less than 2 metres from others.
  - ◆ Walk dam crest, toe and slopes; observe spillway, drainage ditches, and adjacent landfill; monitor piezometers and weirs.
  - ◆ No direct interactions with other site personnel at Bronson Camp to maintain Covid distancing.
- Return to Terrace via helicopter, after site visit to McClymont landing for refueling, and to the KSM camp to pick up water samples (by others).
- Weather is variable, with some rain, some clear and sunny periods.

### August 21, 2020

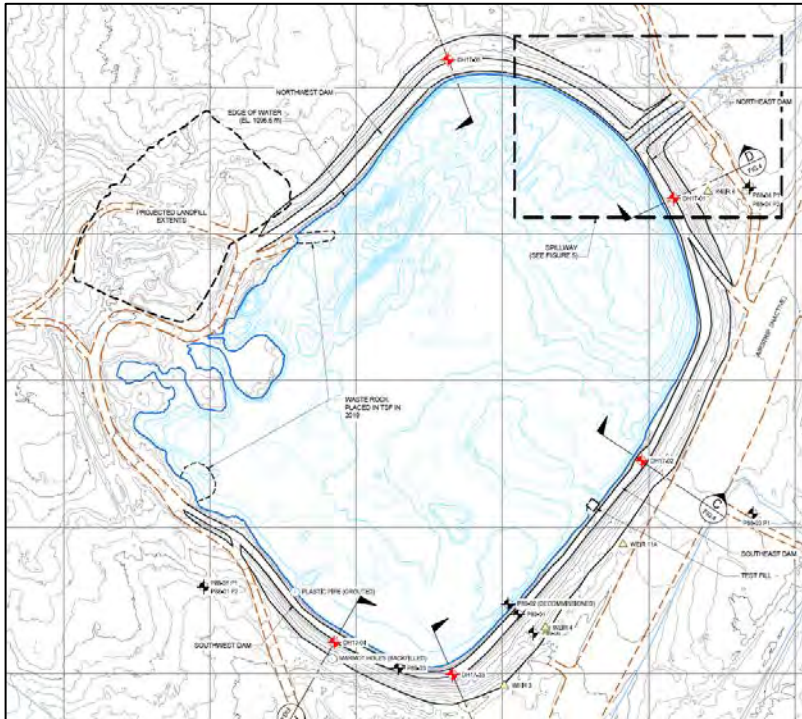
- Return to Vancouver by commercial flight.

## 2 SITE INSPECTION

### 2.1 General Observations

The site inspection checklist will be included in the Dam Safety Inspection report. Selected photographs are included with this letter in Attachment I; some 2018 and 2019 photos are also presented to provide comparison between this year and previous. Figure 1 shows the general arrangement of the TSF.

Figure 1 TSF General Arrangement



This section provides a summary of observations for the dams:

- The crest is in good condition. There is minor localized rutting and undulations, with minor evidence of ponding at low spots.
- The upstream slope is in good condition. There are minor tension cracks along some areas of the upstream crest where repairs were completed in 2017. This is due to wave erosion against the steep upstream slopes. This cracking is similar to previous years and not an immediate concern.
- Downstream slopes have minor rilling, minor slumping, and local minor erosion but are generally in good condition. Vegetation coverage is sparse, with a few small shrubs growing on the downstream slope.
- We examined areas where there had been previous minor evidence of marmot burrowing on the downstream face of the Southwest Dam near DH17-04. No new activity was observed. Marmots were observed in the landfill to the northwest but not on or near the dam.
- Seepage (damp areas) was observed on dam slopes notably on the northwest and northeast dams, and was present locally at the dam toes. The seepage is contained in the drainage ditches.
- There was no noted activity or construction in the TSF surface or dam slopes. SnipGold confirms no construction or waste rock relocation was conducted in 2020.



- The spillway is in good condition. The pond level was measured at 0.335 m on the staff gauge at both the spillway and near the landfill and up to 80 mm deep in the spillway inlet. Flow in the spillway was estimated to be on the order of 5 L/s.
- No work occurred at the landfill at the northwest corner of the TSF since the last site visit. The landfill contains metal and construction debris and is capped with till. Subsidence of the fill cover was noted, leading to sinkholes and openings on the landfill surface. The landfill is separated from the TSF pond by an access road. There is a culvert that ostensibly drains from the landfill to the TSF but it is higher than the low point of the road, and any drainage can just flow directly from the landfill to the TSF. The culvert is not needed but we see no benefit to removing it at this time – it can be removed when final closure activities are completed.
- Last year (2019) a 1.1 m deep void with a diameter up to about 0.2 m was discovered around the steel pipe protecting the PVC standpipe for piezometer P89-01, located at the downstream edge of the dam crest. The backfill and repairs to this piezometer appear to be intact, and no new soil movement or soil loss was observed.
- Four weirs were observed to have minimal measurable flow. Weir W3 has been damaged likely by a bear. No repair is recommended at this time. The v-notch remains intact. The weirs will be relocated as part of closure activities.
- Five pairs of vibrating wire piezometers (10 total) with data loggers were installed in 2017, location as shown on Figure 1. Data was downloaded during the inspection and is shown on Figure 2 attached:
  - ◆ Two locations (DH17-02B and DH17-05B) historically showed spurious fluctuations, that seemed to correlate with rainfall events. Bentonite collars added to DH17-02 and DH17-05 in 2019 appear to have somewhat reduced the fluctuations, indicating they were likely caused by surface infiltration during precipitation events.
  - ◆ Two piezometers have ceased functioning since our last site visit (DH17-04A since September 2019, and DH17-05A since June 2020). These two piezometers, which are not readable, had not shown any spurious readings before failing.
  - ◆ The steel bar riser upon which dataloggers DH17-02A and DH17-02B were mounted has snapped at the base, likely due to high winds.
- Two standpipe piezometers, P89-01 and P89-06 were read by dip-metre (at the Southeast Dam crest and toe respectively). They showed piezometric levels consistent with past readings (within 0.15m).
- A 450 mm diameter corrugated metal pipe (CMP culvert) is located in the Southwest Dam. It was presumably used for either a tailings pipeline or to allow a power line conduit to cross the dam crest during operations, but is currently unused. The invert is at approximately 1.0 m from the dam crest, which is estimated to be El. 1098.6 m. Thus, the culvert invert is about El. 1097.6 m or about 0.9 m above the spillway invert (El. 1096.7 m). The culvert should be removed as part of closure plans but is not a dam safety issue.

- A small slough – about 2m by 3 m by 0.5 m was noted on the northeast dam access ramp, south of the spillway. It is a small surficial slump and does not affect the dam directly. This is not a dam safety issue but should be monitored and repaired if it increases as it could impinge on the access road.

### **3 SUMMARY**

The dam appeared to be in good condition at the time of inspection. No significant dam safety concerns were identified. The minor cracking on the upstream slopes and the minor rilling erosion and slumping on the downstream slopes are not immediate dam safety concerns and are expected to be addressed by the pending closure works.

We will follow-up with RST Instruments to assess the problems with the two non-readable piezometers and a replacement steel riser for DH17-02.

## 4 CLOSING

This report is an instrument of service of Klohn Crippen Berger Ltd. The report has been prepared for the exclusive use of SnipGold Corporation for the specific application to the Johnny Mountain Mine. The report's contents may not be relied upon by any other party without the express written permission of Klohn Crippen Berger. In this report, Klohn Crippen Berger has endeavoured to comply with generally-accepted professional practice common to the local area. Klohn Crippen Berger makes no warranty, express or implied.

Use of or reliance upon this instrument of service by the Client is subject to the following conditions:

1. The report is to be read in full, with sections or parts of the report relied upon in the context of the whole report.
2. The observations, findings and conclusions in this report are based on observed factual data and conditions that existed at the time of the work and should not be relied upon to precisely represent conditions at any other time.
3. The report is based on information provided to KCB by the Client or by other parties on behalf of the client (Client-supplied information). KCB has not verified the correctness or accuracy of such information and makes no representations regarding its correctness or accuracy. KCB shall not be responsible to the Client for the consequences of any error or omission contained in Client-supplied information.
4. KCB should be consulted regarding the interpretation or application of the findings and recommendations in the report.

Yours truly,

**KLOHN CRIPPEN BERGER LTD.**

  
Neil Singh, P.Eng.  
Senior Principal Consultant

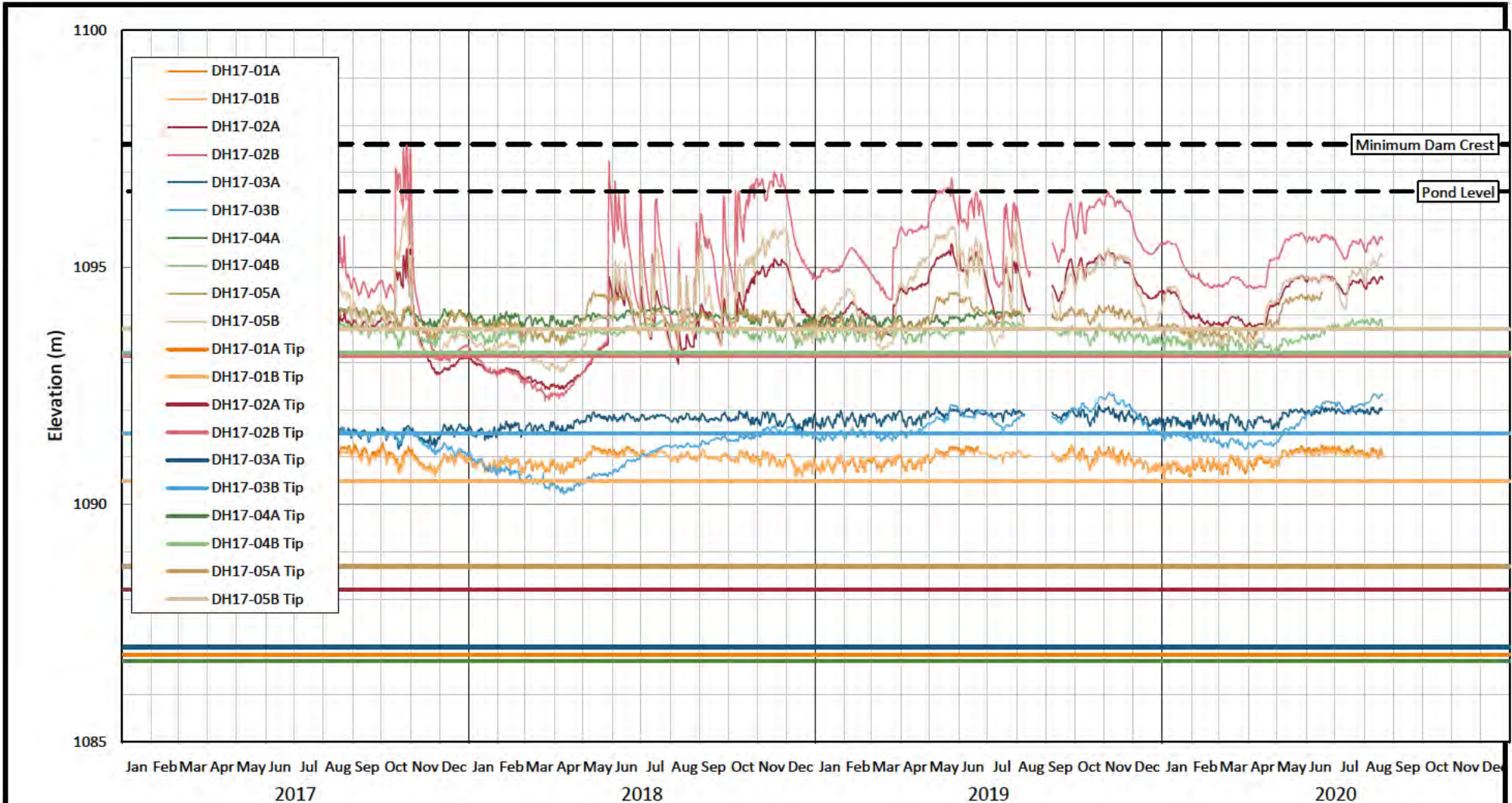
NS/DH: jc

### Attachments:

Figure 2 – Tailings Dam Piezometers – Vibrating Wire Piezometers  
Attachment I – Selected Site Visit Photographs

## FIGURE

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Notes:  
 1. Piezometer data has not been corrected for barometric pressure fluctuations.

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		<p>TITLE</p> <p>TAILINGS DAM PIEZOMETERS</p>	
		<p>PROJECT No.</p> <p>M10088A07</p>	<p>FIG No.</p> <p>2</p>

# ATTACHMENT I

## Selected Site Visit Photographs

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## Attachment I Selected Site Visit Photographs

Standard inspection photo locations are shown in Figure I-1. Other photo locations are shown in Figure I-2.

**Figure I-1 Tailings Storage Facility Configuration**



Figure I-2 Other Photo Locations





### Northwest Dam Photographs

Photo I-1 Northwest Dam Abutment by Landfill (NW-1)



**Photo I-2 Test Ramp onto TSF Surface from Northwest Dam (G-12)**

2020



Photo I-3 Northwest Dam Downstream Face (NW-2)



**Photo I-4 Northwest Dam Rill Erosion on Downstream Face (G-13)**



**Photo I-5 Northwest Dam Seepage collection at toe (G-14)**



**Photo I-6 Northwest Dam Upstream Face and Crest (NW-3)**



**Photo I-7 Northwest Dam Crest (NW-4)**



**Northeast Dam Photographs**

**Photo I-8 Northeast Dam Ditch and Toe Line (G-1)**



Photo I-9 Northeast Dam Looking East (NE-1)





**Photo I-10 Northeast Dam Downstream Slope Approaching Spillway (NE-3)**



Photo I-11 Northeast Dam Spillway Looking East (NE-4)



Photo I-12 Northeast Dam Crest by DH17-01 (G-2)



**Southeast Dam Photographs**

**Photo I-13 Southeast Dam Downstream Slope and Ditch Line (SE-1)**



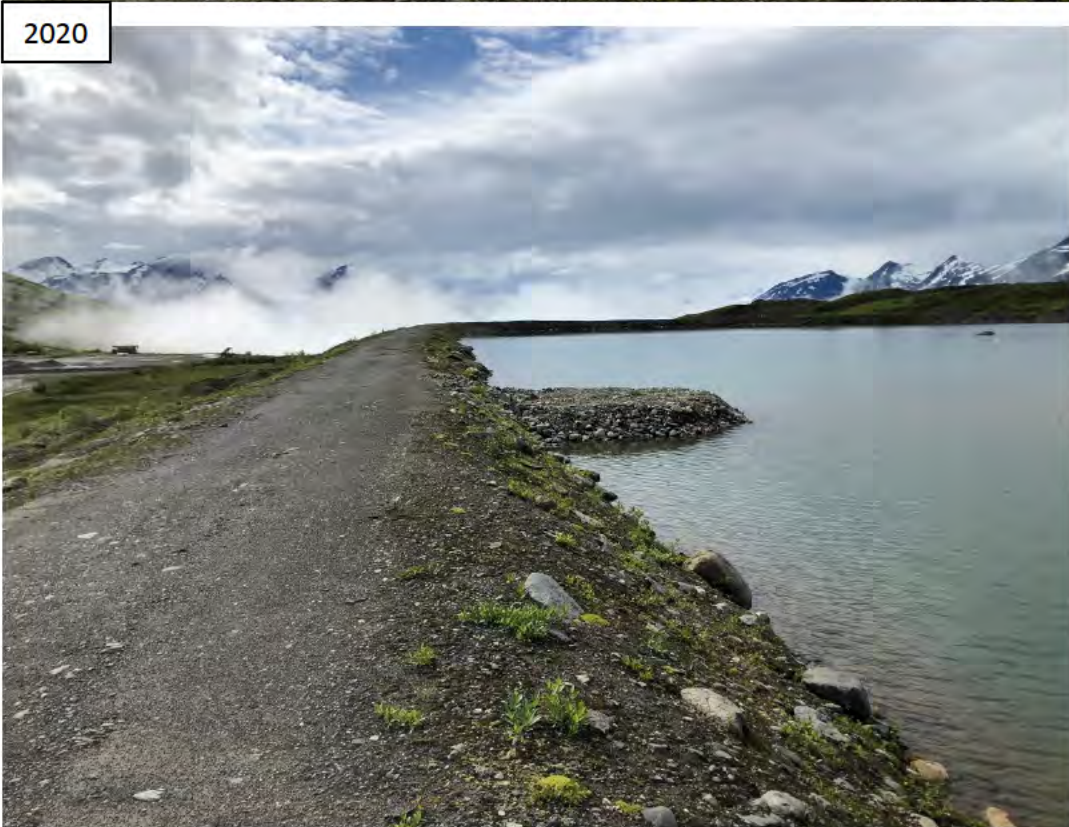
**Photo I-14 Southeast Dam Downstream Slope and Crest (SE-2)**



Photo I-15 Southeast Dam Upstream Slope (SE-3)



**Photo I-16 Southeast Dam Looking South at Test Fill (SE-4)**

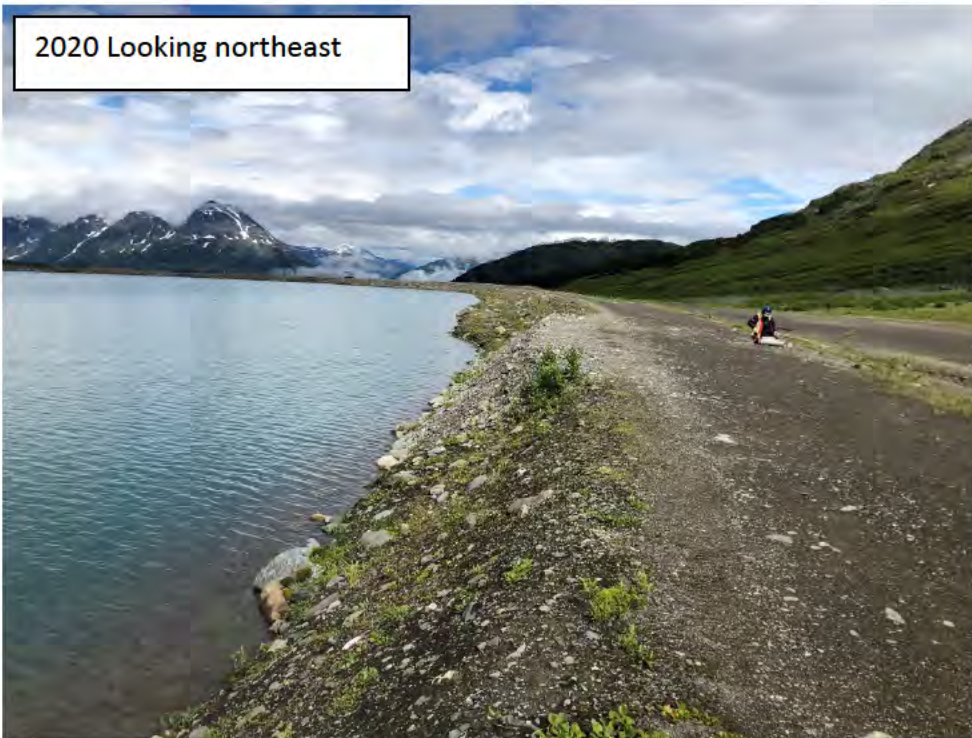


**Photo I-17 Southeast Dam Crest (SE-5)**

2019, looking southwest



2020 Looking northeast





**Photo I-18 Southeast Dam Downstream Slope and Ditch (SE-6)**



**Photo I-19 Southeast Dam Downstream Slope and Ditch (G-3)**



**Photo I-20 Southeast Dam Upstream Slope Looking South (G-4)**



**Photo I-21 South Corner Rill Erosion (G-5)**



**Southwest Dam Photographs**

**Photo I-22 Southwest Dam Upstream Slope (SW-1)**



Photo I-23 Southwest Dam Crest Looking East (SW-2)



**Photo I-24 Southwest Dam Downstream Slope and Toe (SW-3)**

2019, Looking northwest



2020, Looking northwest



Photo I-25 Southwest Dam Downstream Slope and Access Road at Toe (SW-4)





**Photo I-26 Seepage Collection Pond at Southeast Corner (G-6)**



**General Photographs**

**Photo I-27 TSF Looking Northwest (G-7)**



**Photo I-28 Northeast Dam with Spillway (S-3)**



**Photo I-29 Northeast Dam and Northwest Dam (G-9)**



Photo I-30 Landfill at Northwest / Southwest corner (G-10)



Photo I-31 Southwest Dam (G-11)



Photo I-32    **Avalanche Paths and Johnny Glacier (G-8)**



### Spillway and Channels

Photo I-33 Spillway Inlet (S-1)



**Photo I-34 Spillway Channel Outlet (S-2)**



**Piezometers**

**Photo I-35 Standpipe Piezo 89-01 (P-1)**



**Photo I-36 Vibrating Wire Piezometer P17-02A and -02B (P-2)**





**Photo I-37 Weir 6 by Northeast Dam (W-1)**



**Photo I-38 Weir 4 by Southeast Dam (W-2)**



**Photo I-39 Weir 3 by Southeast Dam (W-3)**



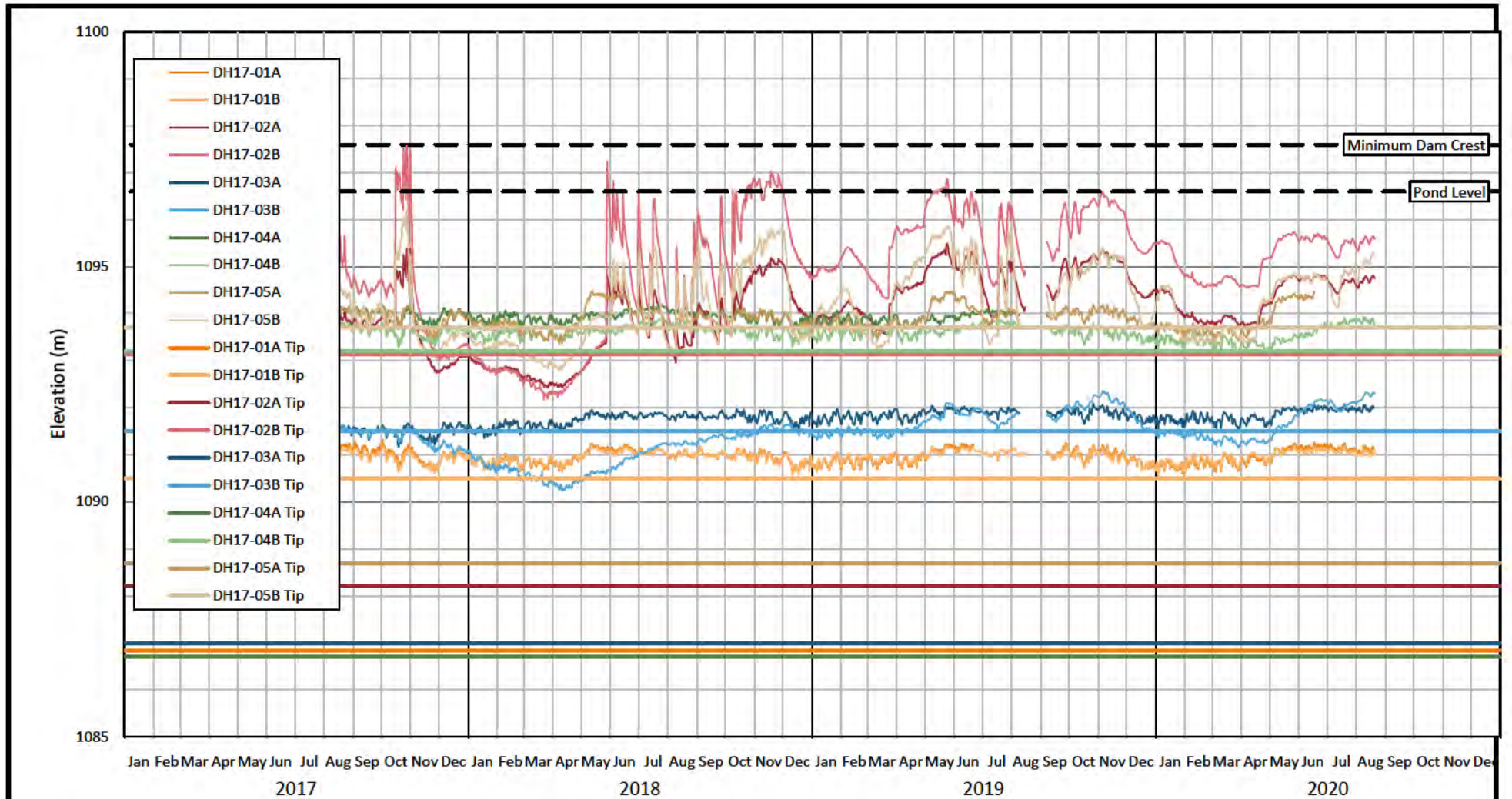
**Photo I-40 Weir 11a by Southeast Dam (W-4)**



## **APPENDIX II**

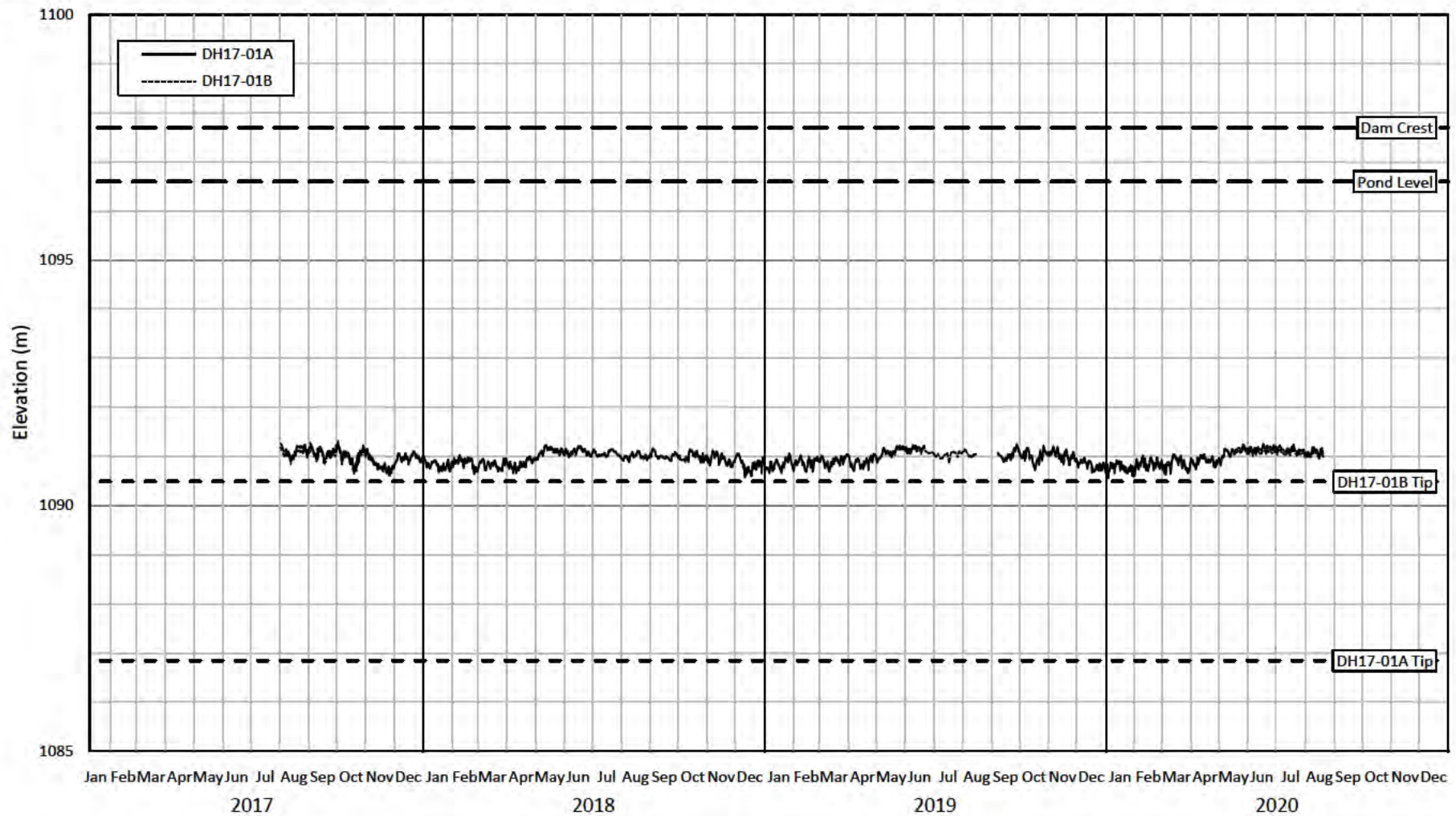
### **Instrumentation Data**

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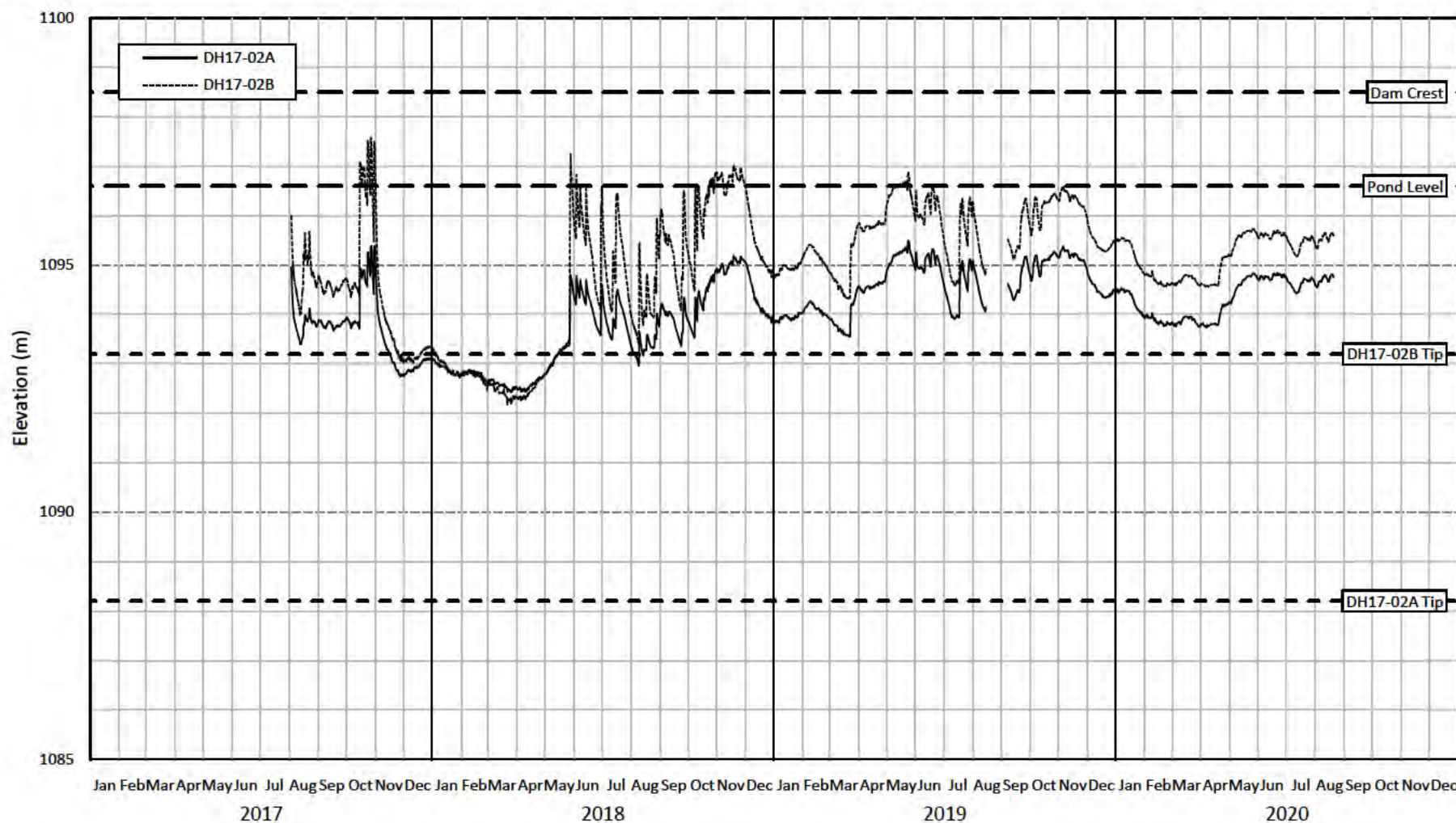
Notes:  
 1. Piezometer data has not been corrected for barometric pressure fluctuations.

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		TITLE TAILINGS DAM PIEZOMETERS	
		PROJECT NO. M10088A07	FIG No. II-1



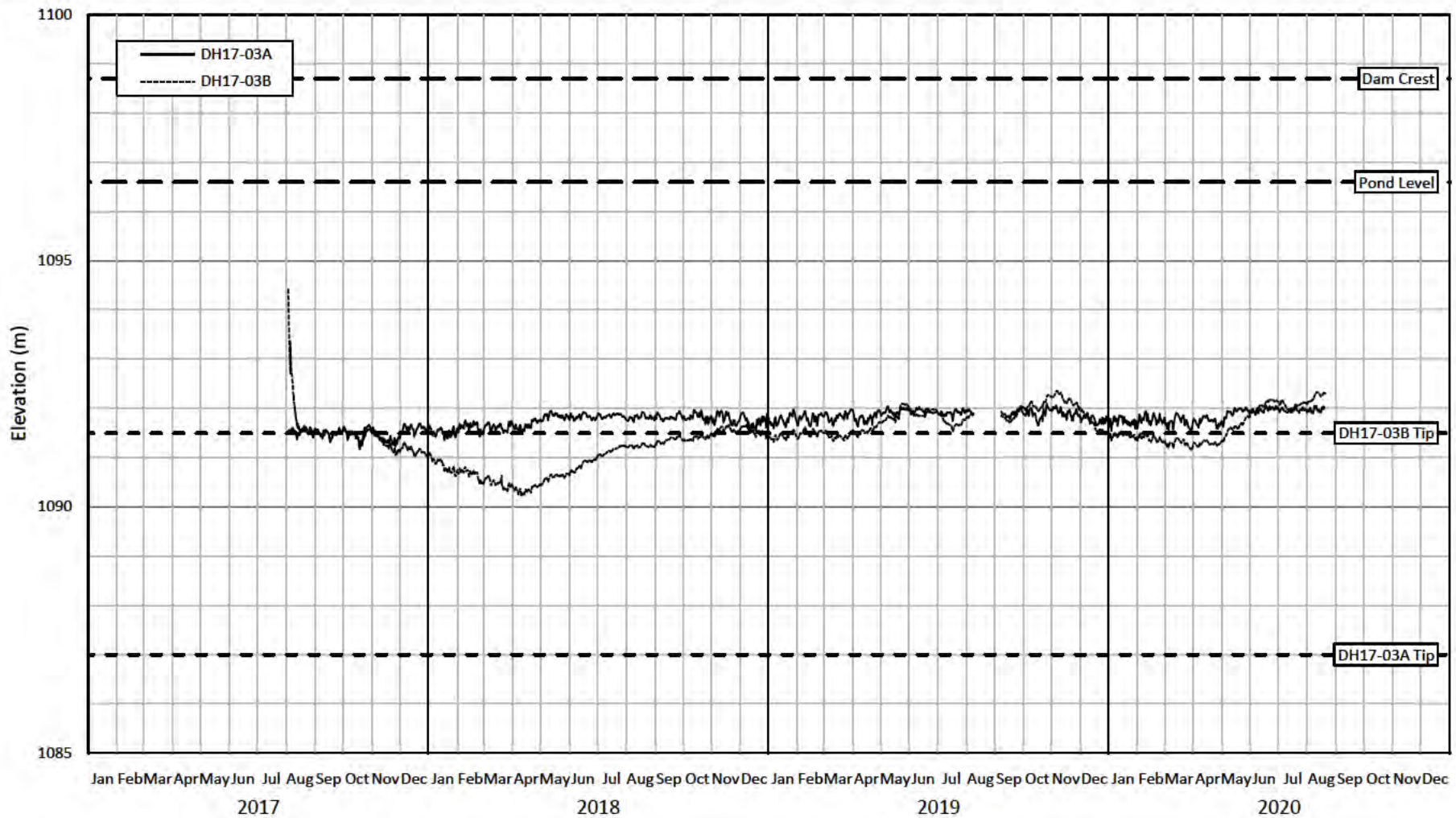
Notes:  
 1. Piezometer data has not been corrected for barometric pressure fluctuations.

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		<p>TITLE</p> <p>TAILINGS DAM PIEZOMETERS          DH17-01</p>	
		<p>PROJECT No.</p> <p>M10088A07</p>	<p>FIG No.</p> <p>II-2</p>



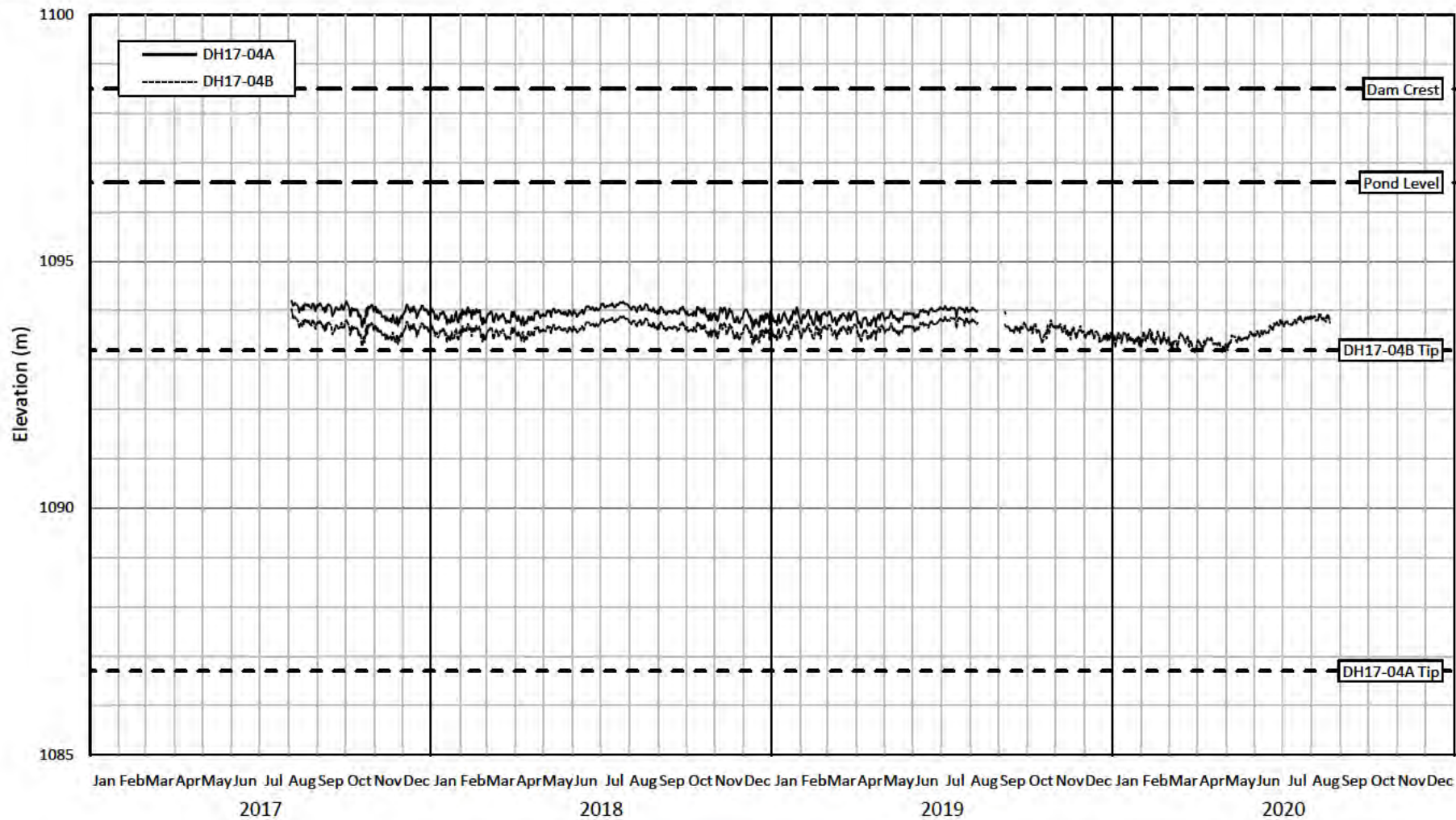
Notes:  
 1. Piezometer data has not been corrected for barometric pressure fluctuations.

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		<p>TITLE</p> <p>TAILINGS DAM PIEZOMETERS          DH17-02</p>	
		<p>PROJECT No.</p> <p>M10088A07</p>	<p>FIG No.</p> <p>II-3</p>



Notes:  
 1. Piezometer data has not been corrected for barometric pressure fluctuations.

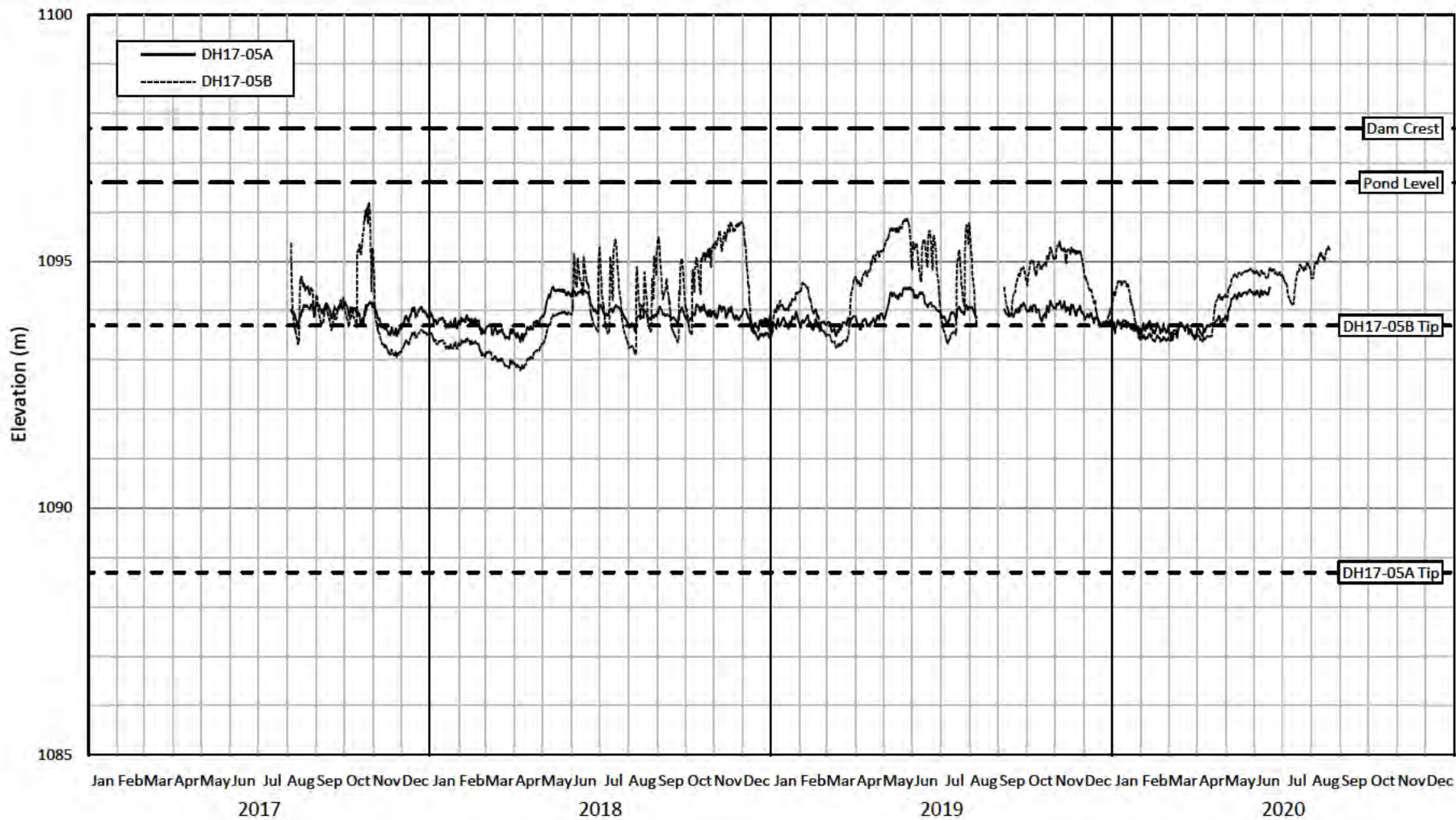
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		<p>TITLE</p> <p>TAILINGS DAM PIEZOMETERS          DH17-03</p>	
		<p>PROJECT No.</p> <p>M10088A07</p>	<p>FIG No.</p> <p>II-4</p>



Notes:  
 1. Piezometer data has not been corrected for barometric pressure fluctuations.

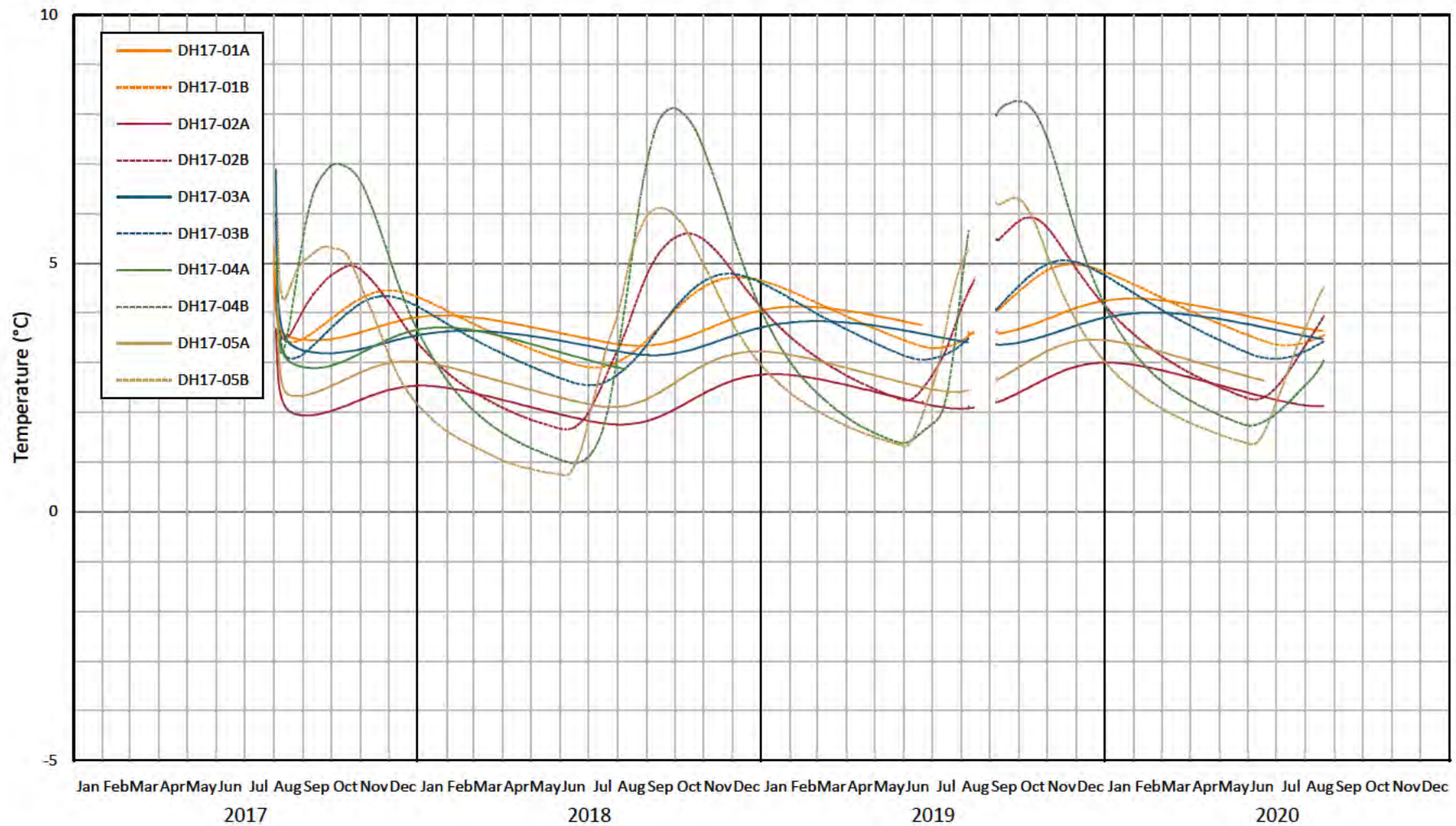
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		<p>TITLE</p> <p>TAILINGS DAM PIEZOMETERS          DH17-04</p>	
		<p>PROJECT No.</p> <p>M10088A07</p>	<p>FIG No.</p> <p>II-5</p>



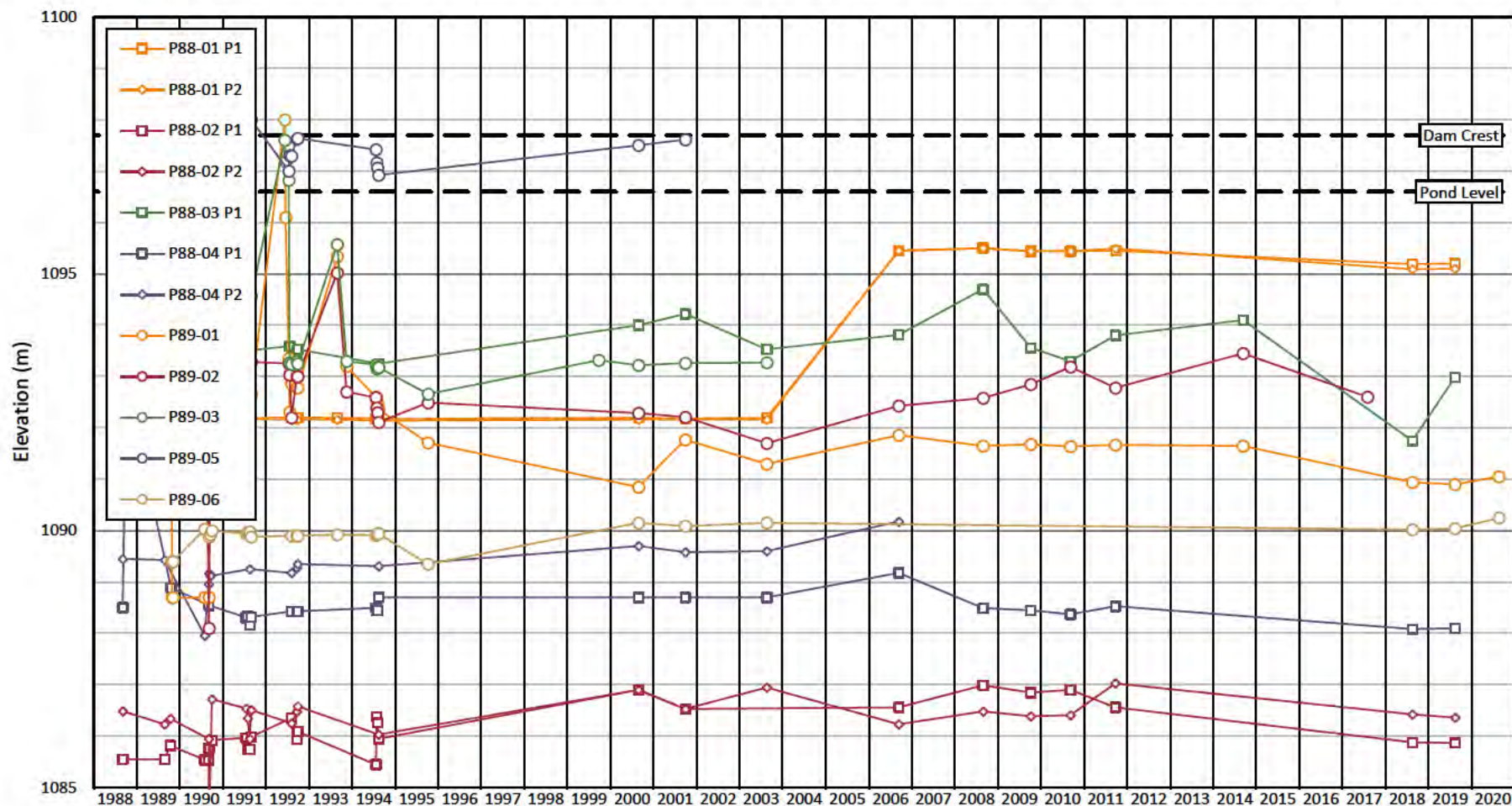


Notes:  
 1. Piezometer data has not been corrected for barometric pressure fluctuations.

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		<p>TITLE</p> <p>TAILINGS DAM PIEZOMETERS          DH17-05</p>	
		<p>PROJECT No.</p> <p>M10088A07</p>	<p>FIG No.</p> <p>II-6</p>



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		<p>TITLE</p> <p>TAILINGS DAM PIEZOMETER TEMPERATURES</p>	
		<p>PROJECT No.</p> <p>M10088A07</p>	<p>FIG No.</p> <p>II-7</p>



Notes:  
 1. Piezometer records before 2016 taken from reports by others. Some of these readings are substantially different from present readings and may have been measured from a different datum.

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	<p>TITLE</p> <p>TAILINGS DAM PIEZOMETERS          STANDPIPE PIEZOMETERS</p>		
	<p>PROJECT No.</p> <p>M10088A07</p>		<p>FIG No.</p> <p>II-8</p>

## **APPENDIX III**

### **2020 Inspection Checklists**

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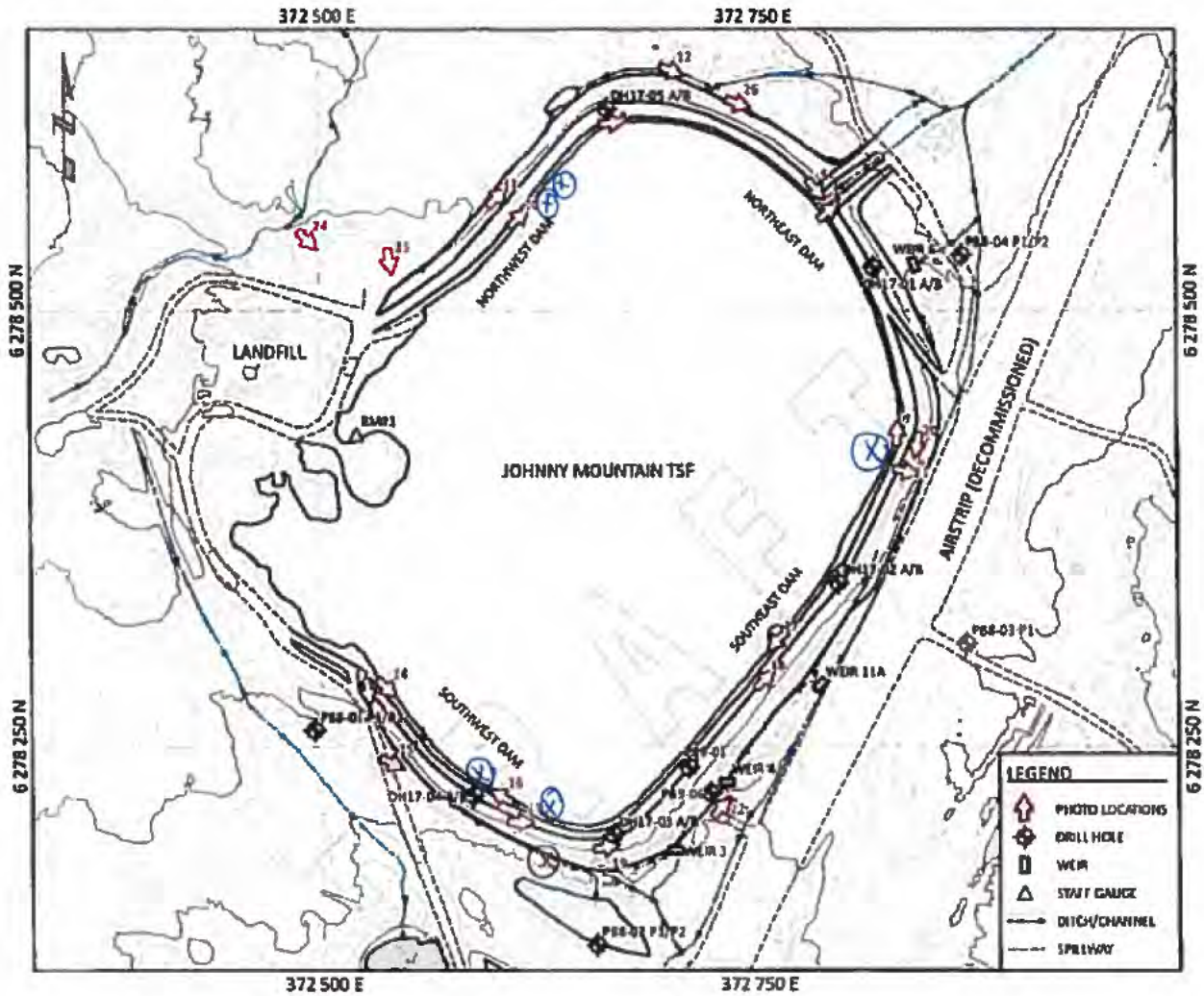
Date (yyyy-mm-dd)	2020-06-17		
Recorded By	Elizabeth Miller + Kevin Hieber		
<b>Inspection Log</b>			
	Yes	No	Comments
<b>Scope of Inspection</b>			North side of TSF
Walk the Upstream Crest	✓		
Walk the Downstream Crest		✓	Snow covered, only small portion of d.s. crest visible
Walk the Toe		✓	Heavy snow covered.
Read Instruments/Weirs		X	Heavy snow covered
Download VWP Dataloggers and Send Data to the EoR	✓		Completed - June 18, 2020 - sent to EoR.
<b>Tailings Storage Facility Pond</b>			
Are there exposed tailings in the pond?	✓		Small areas - islands visible in pictures
Is the pond frozen?	✓		Outer edges near spillway starting to melt.
Is the pond level at the spillway invert?	✓		Small flow from TSF
<b>Tailings Dam - Northwest Dam</b>			
<b>Upstream Slope</b>			
Is there evidence of erosion, sloughing, sliding, cracking, settlement or sinkholes?	✓		minor settlement/sloughing near photostation #11
<b>Dam Crest</b>			
Is there evidence of erosion, cracking, settlement, sinkholes or ponding water?	✓		minor settlement/sloughing near photostation #1C
<b>Downstream Slope and Toe</b>			
Is there evidence of erosion, sloughing, sliding, cracking, settlement or sinkholes?	—		Not visible - snow covered
Are there unusual wet areas, increases in seepage or boils at dam toe?	—		"
Is there turbid seepage from the dam toe?	—		"
<b>Toe Collection Ditch</b>			
Are the collection ditches obstructed by debris, vegetation or other materials?	—		Not visible

4A - Did not climb local  
0.34 m Benchmark water gauge

Date (yyyy-mm-dd)		2020-06-18	
Recorded By		Elizabeth Miller + Kevin Tidler	
Inspection Log			
	Yes	No	Comments
<b>Tailings Dam – Northeast Dam</b>			
<i>Upstream Slope</i>			
Is there evidence of erosion, sloughing, sliding, cracking, settlement or sinkholes?		X	
<i>Dam Crest</i>			
Is there evidence of erosion, cracking, settlement, sinkholes or ponding water?		X	
<i>Downstream Slope and Toe</i>			
Is there evidence of erosion, sloughing, sliding, cracking, settlement or sinkholes?	---		Snow covered
Are there unusual wet areas, increases in seepage or boils at dam toe?	---		"
Is there turbid seepage from the dam toe?	---		"
<i>Toe Collection Ditch</i>			
Are the collection ditches obstructed by debris, vegetation or other materials?	---		"
<i>Spillway</i>			
Is the spillway obstructed by debris, vegetation or other materials?		✓	
Is there evidence of erosion, sloughing, sliding, cracking or settlement in or around the spillway?		✓	
Is there flow in the spillway? What is the flow depth?	✓		0.34 m Bm #1
<b>Tailings Dam – Southeast Dam</b>			
<i>Upstream Slope</i>			
Is there evidence of erosion, sloughing, sliding, cracking, settlement or sinkholes?	✓		Minor sloughing near photo station 7
<i>Dam Crest</i>			
Is there evidence of erosion, cracking, settlement, sinkholes or ponding water?		X	
<i>Downstream Slope and Toe</i>			
Is there evidence of erosion, sloughing, sliding, cracking, settlement or sinkholes?	---		Snow covered
Are there unusual wet areas, increases in seepage or boils at dam toe?	---		"
Is there turbid seepage from the dam toe?	---		"
<i>Toe Collection Ditch</i>			
Are the collection ditches obstructed by debris, vegetation or other materials?	---		"

Date (yyyy-mm-dd)	2020-06-17		
Recorded By	Elizabeth Miller + Kevin Hidber		
<b>Inspection Log</b>			
	Yes	No	Comments
<b>Tailings Dam – Southwest Dam</b>			
<i>Upstream Slope</i>			
Is there evidence of erosion, sloughing, sliding, cracking, settlement or sinkholes?	✓		minor - near photostation 16
<i>Dam Crest</i>			
Is there evidence of erosion, cracking, settlement, sinkholes or ponding water?		x	
<i>Downstream Slope and Toe</i>			
Is there evidence of erosion, sloughing, sliding, cracking, settlement or sinkholes?	+		
Are there unusual wet areas, increases in seepage or boils at dam toe?	+		
Is there turbid seepage from the dam toe?	+		
<i>Toe Collection Ditch</i>			
Are the collection ditches obstructed by debris, vegetation or other materials?	+		
<i>Seepage Collection Ponds</i>			
Is there evidence of erosion, sloughing, sliding, cracking or settlement around the seepage collection ponds?	+		
<b>Instrumentation Readings &amp; Comments</b>			
Pond Level at Staff Gauge BM#1 (m)	0.34m.		
Freeboard to Dam Crest (m)			
P88-01 (m below top of casing)	—		
P88-06 (m below top of casing)	—		
Weir 3 (cm)	Snow covered		
Weir 4 (cm)	"		
Weir 6 (cm)	"		
Weir 11A (cm)	"		

Figure 1 Johnny Mountain Mine Tailings Storage Facility 2016 DSI Photo Locations



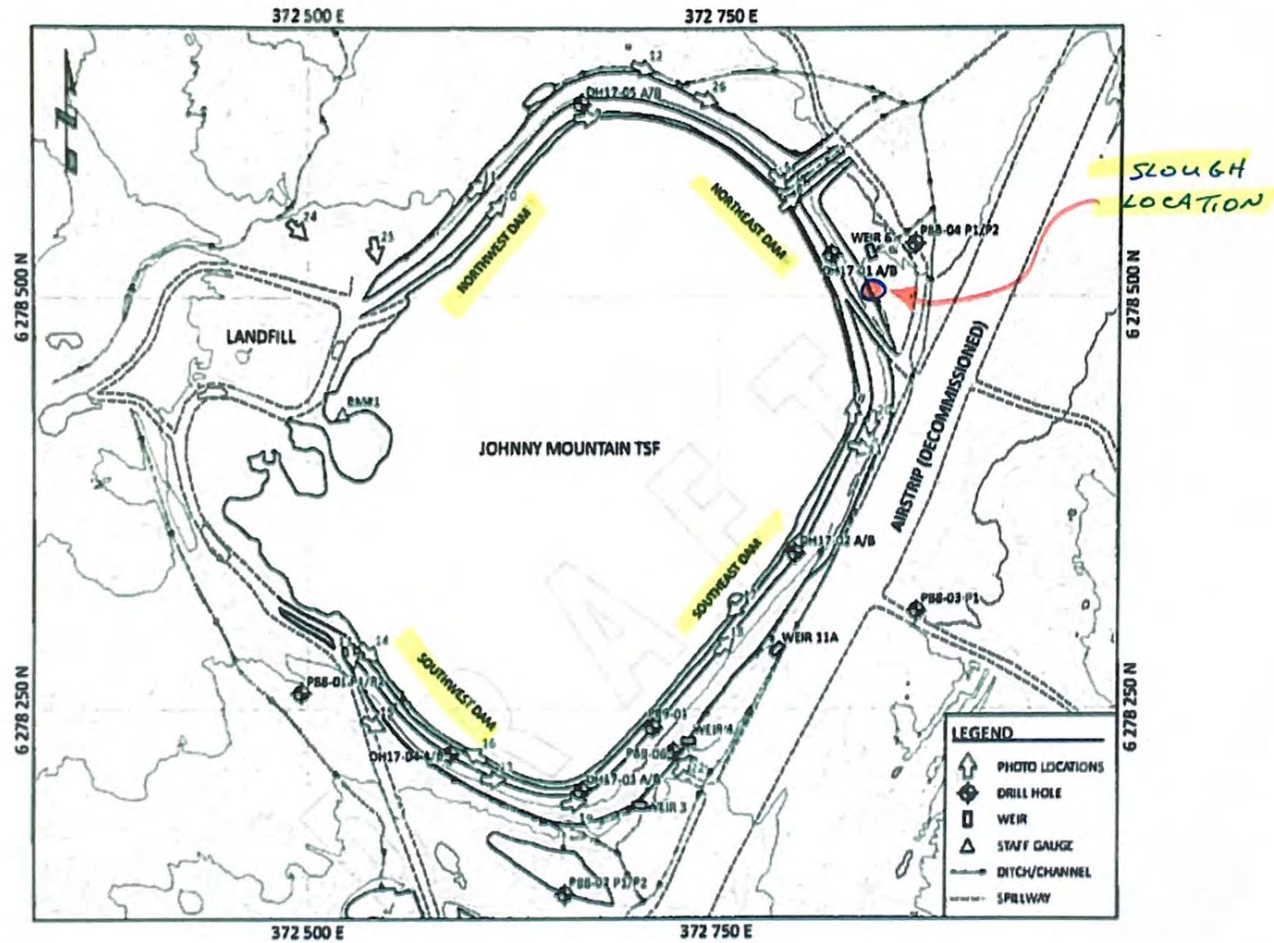


Date (yyyy-mm-dd)	2020-08-01		
Recorded By	KEVIN HIDBER		
<b>Inspection Log</b>			
<b>NORTHWEST DAM</b>	Yes	No	Comments
<b>Scope of Inspection</b>			
Walk the Upstream Crest	✓		MINOR TENSION CRACKS - NO CHANGE
Walk the Downstream Crest	✓		MINOR EROSION FROM WATER RUNOFF
Walk the Toe	✓		NO CHANGE SINCE LAST INSPECTION
Read Instruments/Weirs	✓		
Download VWP Dataloggers and Send Data to the EoR		✓	NO DATA DOWNLOADED
<b>Tailings Storage Facility Pond</b>			
Are there exposed tailings in the pond?	✓		SMALL ISLANDS OF ROCK REMAIN
Is the pond frozen?		✓	
Is the pond level at the spillway invert?	✓		SMALL FLOW AT SPILLWAY
<b>Tailings Dam - Northwest Dam</b>			
<b>Upstream Slope</b>			
Is there evidence of erosion, sloughing, sliding, cracking, settlement or sinkholes?	✓		MINOR EROSION DUE TO WAVE ACTION
<b>Dam Crest</b>			
Is there evidence of erosion, cracking, settlement, sinkholes or ponding water?	✓		MINOR TENSION CRACKS NO CHANGE FROM LAST SEASON
<b>Downstream Slope and Toe</b>			
Is there evidence of erosion, sloughing, sliding, cracking, settlement or sinkholes?	✓		MINOR EROSION FROM RUNOFF NO CHANGE FROM LAST SEASON
Are there unusual wet areas, increases in seepage or boils at dam toe?		✓	
Is there turbid seepage from the dam toe?		✓	
<b>Toe Collection Ditch</b>			
Are the collection ditches obstructed by debris, vegetation or other materials?		✓	DITCHES ARE CLEAN

Date (yyyy-mm-dd)	2020-08-01		
Recorded By	KEVIN HEDBER		
<b>Inspection Log</b>			
	Yes	No	Comments
<b>Tailings Dam – Northeast Dam</b>			
<i>Upstream Slope</i>			
Is there evidence of erosion, sloughing, sliding, cracking, settlement or sinkholes?	✓		MINOR STRESS CRACKS EVIDENT EVIDENCE OF WAVE ACTION
<i>Dam Crest</i>			
Is there evidence of erosion, cracking, settlement, sinkholes or ponding water?	✓		MINOR STRESS CRACKS NO CHANGE FROM LAST REPORT
<i>Downstream Slope and Toe</i>			
Is there evidence of erosion, sloughing, sliding, cracking, settlement or sinkholes?	✓		SLoughING ONI LOCATION NEAR WEIR # 6
Are there unusual wet areas, increases in seepage or boils at dam toe?		✓	
Is there turbid seepage from the dam toe?		✓	
<i>Toe Collection Ditch</i>			
Are the collection ditches obstructed by debris, vegetation or other materials?	✓		SOME VEGETATION EVIDENT
<i>Spillway</i>			
Is the spillway obstructed by debris, vegetation or other materials?		✓	
Is there evidence of erosion, sloughing, sliding, cracking or settlement in or around the spillway?		✓	
Is there flow in the spillway? What is the flow depth?	✓		SMALL FLOW FROM TSF WATER GAUGE READS: 0.31m
<b>Tailings Dam – Southeast Dam</b>			
<i>Upstream Slope</i>			
Is there evidence of erosion, sloughing, sliding, cracking, settlement or sinkholes?	✓		MINOR STRESS CRACKS EVIDENCE OF WAVE ACTION
<i>Dam Crest</i>			
Is there evidence of erosion, cracking, settlement, sinkholes or ponding water?	✓		MINOR STRESS CRACKS
<i>Downstream Slope and Toe</i>			
Is there evidence of erosion, sloughing, sliding, cracking, settlement or sinkholes?	✓		MINOR EROSION DUE TO WATER RUNOFF
Are there unusual wet areas, increases in seepage or boils at dam toe?		✓	
Is there turbid seepage from the dam toe?		✓	
<i>Toe Collection Ditch</i>			
Are the collection ditches obstructed by debris, vegetation or other materials?	✓		MINOR VEGETATION / GRASS GROWTH

Date (yyyy-mm-dd)	2020 - 08 - 01		
Recorded By	KEVIN HEDBER		
<b>Inspection Log</b>			
	Yes	No	Comments
<b>Tailings Dam – Southwest Dam</b>			
<b>Upstream Slope</b>			
Is there evidence of erosion, sloughing, sliding, cracking, settlement or sinkholes?	✓		MINOR STRESS CRACKS / TENSION CRACKS. WASIE ACTION EVIDENT
<b>Dam Crest</b>			
Is there evidence of erosion, cracking, settlement, sinkholes or ponding water?	✓		MINOR EROSION DUE TO WATER RUNOFF
<b>Downstream Slope and Toe</b>			
Is there evidence of erosion, sloughing, sliding, cracking, settlement or sinkholes?	✓		MINOR TENSION CRACKS MINOR EROSION DUE TO RUNOFF
Are there unusual wet areas, increases in seepage or boils at dam toe?		✓	
Is there turbid seepage from the dam toe?		✓	
<b>Toe Collection Ditch</b>			
Are the collection ditches obstructed by debris, vegetation or other materials?	✓		MINOR GRASS / VEGETATION
<b>Seepage Collection Ponds</b>			
Is there evidence of erosion, sloughing, sliding, cracking or settlement around the seepage collection ponds?		✓	
<b>Instrumentation Readings &amp; Comments</b>			
Pond Level at Staff Gauge BM#1 (m)	0.31 m		
Freeboard to Dam Crest (m)	APPROX 1.35 m		
P88-01 (m below top of casing)	N/A		
P88-06 (m below top of casing)	N/A		
Weir 3 (cm)	6 mm OF FLOW		
Weir 4 (cm)	8 mm OF FLOW		
Weir 6 (cm)	DRY		
Weir 11A (cm)	12 mm OF FLOW		

Figure 1 Johnny Mountain Mine Tailings Storage Facility 2016 DSI Photo Locations



Date (yyyy-mm-dd)	2020-08-20		
Recorded By	Elizabeth Miller + Neil Singh		
Inspection Log			
	Yes	No	Comments
<b>Scope of Inspection</b>			
Walk the Upstream Crest	✓		
Walk the Downstream Crest	✓		
Walk the Toe	✓		
Read Instruments/Weirs	✓		
Download VWP Dataloggers and Send Data to the EoR	✓		
<b>Tailings Storage Facility Pond</b>			
Are there exposed tailings in the pond?	✓		minor, small islands
Is the pond frozen?		X	
Is the pond level at the spillway invert?	✓		
<b>Tailings Dam - Northwest Dam</b>			
<b>Upstream Slope</b>			
Is there evidence of erosion, sloughing, sliding, cracking, settlement or sinkholes?	✓		minor raveling - unchanged from previous year
<b>Dam Crest</b>			
Is there evidence of erosion, cracking, settlement, sinkholes or ponding water?	✓		minor undulation, minor ponding, unchanged
<b>Downstream Slope and Toe</b>			
Is there evidence of erosion, sloughing, sliding, cracking, settlement or sinkholes?	✓		minor raveling, no debris or significant sloughing - unchanged
Are there unusual wet areas, increases in seepage or boils at dam toe?		✓	
Is there turbid seepage from the dam toe?		✓	Ditch is in good condition
<b>Toe Collection Ditch</b>			
Are the collection ditches obstructed by debris, vegetation or other materials?		✓	Some vegetation

0.34m - staff gauge near landfill

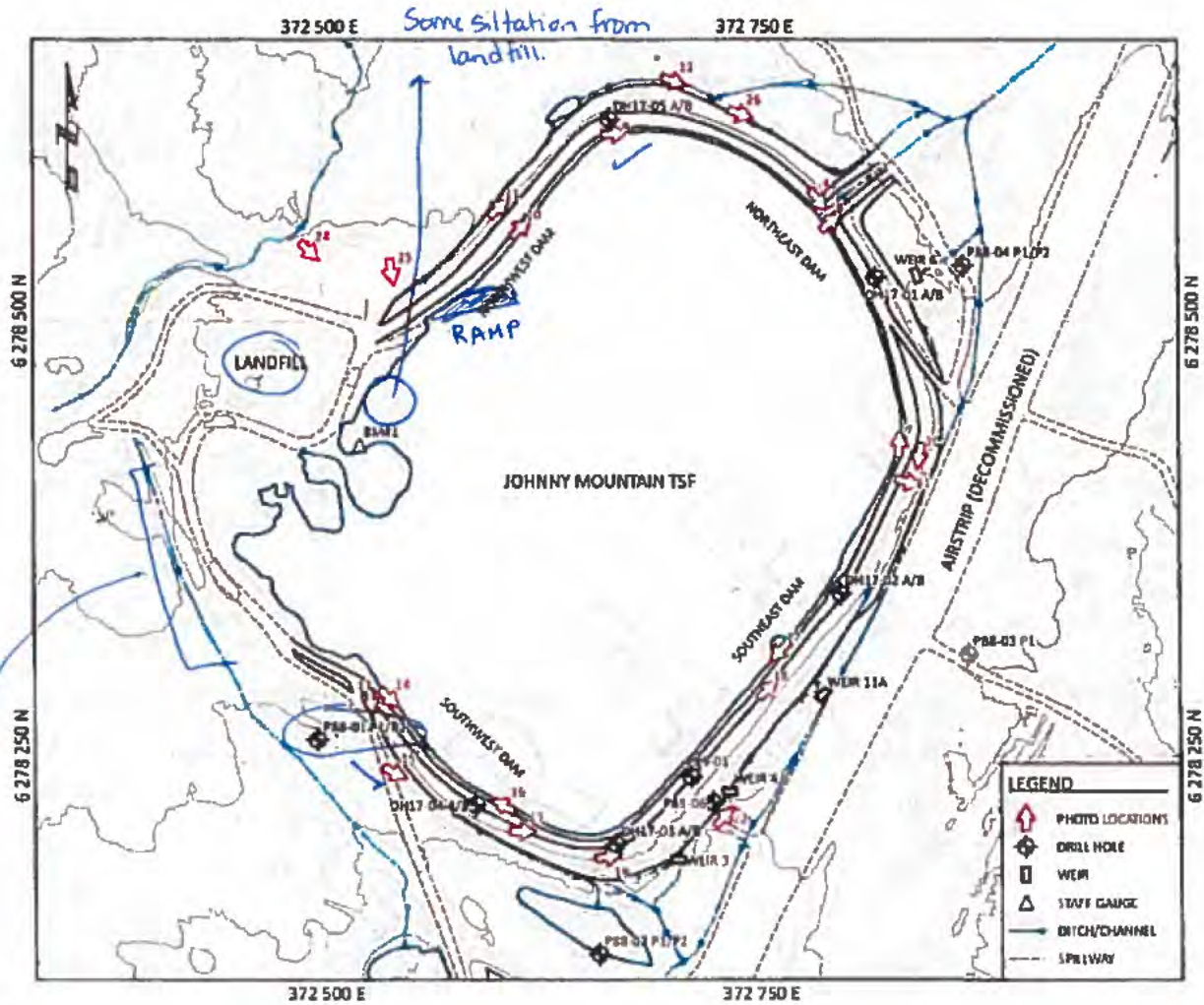
89-01 → red GW casing

Date (yyyy-mm-dd)			
Recorded By			
Inspection Log			
	Yes	No	Comments
<b>Tailings Dam – Northeast Dam</b>			
<i>Upstream Slope</i>			
Is there evidence of erosion, sloughing, sliding, cracking, settlement or sinkholes?	✓		Minor, unchanged
<i>Dam Crest</i>			
Is there evidence of erosion, cracking, settlement, sinkholes or ponding water?	✓		minor irregularity, minor ponding, no change
<i>Downstream Slope and Toe</i>			
Is there evidence of erosion, sloughing, sliding, cracking, settlement or sinkholes?	✓		Sloughing 3m wide x 2m long x 0.5m deep near NE ramp
Are there unusual wet areas, increases in seepage or boils at dam toe?	✓		More seepage than seen before, not an issue. NE Ramp 3m wide x 2m long x 0.5m deep
Is there turbid seepage from the dam toe?		✓	But there is seepage
<i>Toe Collection Ditch</i>			
Are the collection ditches obstructed by debris, vegetation or other materials?	✓		Flowing, up to 3" depth of flow, ditching performing well. Some partial blocks near slough.
<i>Spillway</i>			
Is the spillway obstructed by debris, vegetation or other materials?		✓	minor vegetation, not obstructing
Is there evidence of erosion, sloughing, sliding, cracking or settlement in or around the spillway?		✓	
Is there flow in the spillway? What is the flow depth?	✓		~ 0.34m
<b>Tailings Dam – Southeast Dam</b>			
<i>Upstream Slope</i>			
Is there evidence of erosion, sloughing, sliding, cracking, settlement or sinkholes?	✓		3 minor tension cracks, not a dam safety issue. But visit next year.
<i>Dam Crest</i>			
Is there evidence of erosion, cracking, settlement, sinkholes or ponding water?	✓		minor.
<i>Downstream Slope and Toe</i>			
Is there evidence of erosion, sloughing, sliding, cracking, settlement or sinkholes?	✓		
Are there unusual wet areas, increases in seepage or boils at dam toe?		✓	
Is there turbid seepage from the dam toe?		✓	
<i>Toe Collection Ditch</i>			
Are the collection ditches obstructed by debris, vegetation or other materials?	✓		Some vegetation

Area of repair from last year - looks to be in good shape

Date (yyyy-mm-dd)			
Recorded By			
Inspection Log			
	Yes	No	Comments
<b>Tailings Dam – Southwest Dam</b>			
<b>Upstream Slope</b>			
Is there evidence of erosion, sloughing, sliding, cracking, settlement or sinkholes?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	> Looks good, some localized ponding, no evidence of erosion
<b>Dam Crest</b>			
Is there evidence of erosion, cracking, settlement, sinkholes or ponding water?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Good condition
<b>Downstream Slope and Toe</b>			
Is there evidence of erosion, sloughing, sliding, cracking, settlement or sinkholes?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Minor rilling near - no change from last year.
Are there unusual wet areas, increases in seepage or boils at dam toe?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Seepage seems a little higher, but no issues observed
Is there turbid seepage from the dam toe?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<b>Toe Collection Ditch</b>			
Are the collection ditches obstructed by debris, vegetation or other materials?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Small amount vegetation
<b>Seepage Collection Ponds</b>			
Is there evidence of erosion, sloughing, sliding, cracking or settlement around the seepage collection ponds?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<b>Instrumentation Readings &amp; Comments</b>			
Pond Level at Staff Gauge BM#1 (m)	0.34m		
Freeboard to Dam Crest (m)			
P88-01 (m below top of casing)			
P88-06 (m below top of casing)			
Weir 3 (cm)			
Weir 4 (cm)			
Weir 6 (cm)			
Weir 11A (cm)			

Figure 1 Johnny Mountain Mine Tailings Storage Facility 2016 DSI Photo Locations



- No sign of erosion, good condition. Ditch from landfill good, minor sedimentation. Some standing water.
- No access on landfill, sinkholes evident.
- Ramp - surface seems fine, some oxidation occurring
- Staff gauge at spillway @ .34



## **APPENDIX IV**

### **Exemption form ITRB Requirement**

---

March 29, 2018

SnipGold Corporation  
1235 Main Street, P.O. Box 2536  
Smithers, British Columbia  
VOJ 2N0

**Elizabeth Miller**  
**Environmental Coordinator**

Dear Ms. Miller:

**Johnny Mountain Mine Tailings Storage Facility  
Exemption from ITRB Requirement**

This letter provides my endorsement of the SnipGold request to the BC Ministry of Energy, Mines and Petroleum Resources for an exemption of having an Independent Tailings Review Board (ITRB). I am the current Engineer of Record for the Johnny Mountain Mine Tailings Storage Facility which is in active care and maintenance. I conducted the 2017 Dam Safety Inspection at site, the 2016 Dam Safety Review, prepared the 2018 Operation, Maintenance and Surveillance Manual and conducted a dam breach assessment for the TSF in 2018. My reasons follow:

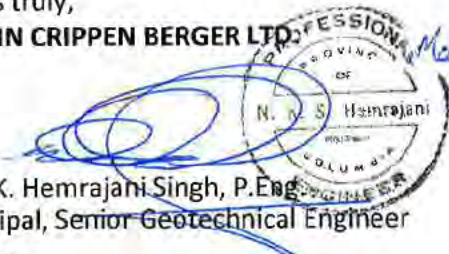
1. The site is closed and has been for many years.
2. Current closure plans, to be implemented over the coming years, will further buttress the already stable dam, will reduce the volume of water in the facility and will provide a natural erosion protection over most of the tailings surface.
3. The TSF has a Closure spillway that is in good condition, with sufficient capacity to pass the Inflow Design Flood (IDF) which functions passively and maintains the pond level below the design freeboard level.
4. New instrumentation including piezometers and weirs have been installed. Site staff are also able to monitor the TSF from a remote camera.
5. Following implementation of the closure plan, we anticipate that the TSF, which is currently classified as a Significant consequence facility, will fall into a Low consequence classification.

For these reasons we endorse the SnipGold request for an exemption of the establishment of an ITRB.

This report is an instrument of service of Klohn Crippen Berger Ltd. The report has been prepared for the exclusive use of SnipGold Corporation for the specific application to the Johnny Mountain Tailings Storage Facility. The report's contents may not be relied upon by any other party without the express written permission of Klohn Crippen Berger. In this report, Klohn Crippen Berger has endeavoured to comply with generally-accepted professional practice common to the local area. Klohn Crippen Berger makes no warranty, express or implied.

Yours truly,

**KLOHN CRIPPEN BERGER LTD.**



March 29, 2018.

Neil K. Hemrajani Singh, P. Eng.  
Principal, Senior Geotechnical Engineer

NKS: jcp

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M10088A03.730

APPENDIX I            JOHNNY MOUNTAIN DRAINAGE MANAGEMENT AND MONITORING  
PLAN (RTEC 2021B)



## Johnny Mountain Mine

### Drainage Management and Monitoring Plan

March 2021

Project No.: 0539378-0016



March 2021

# Johnny Mountain Mine

## Drainage Management and Monitoring Plan

Name of Property: Johnny Mountain Mine Project

Company Name: SnipGold Corp.

*Prepared for:*

SnipGold Corp.

1235 Main Street  
P.O. Box 2536  
Smithers, BC  
Canada V0J 2N0

*Prepared by:*

RTEC

1111 West Hastings Street, 15th Floor  
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## GLOSSARY AND ABBREVIATIONS

ABA	Acid-base accounting
AP	Acid potential
BC	British Columbia
CMM	Closure Management Manual
DL	Detection limit
EC	Electrical conductivity
EMLI	British Columbia Ministry of Energy, Mines and Low Carbon Innovation
ENV	British Columbia Ministry of Environment and Climate Change Strategy
JMM	Johnny Mountain Mine
kg	Kilogram
m	Metre
MEND	Mine Environment Neutral Drainage program
ML/ARD	Metal leaching/acid rock drainage
NPR	Net potential ratio
nPAG	Non-potentially acid-generating
PAG	Potentially acid-generating
Plan (the)	Drainage Management and Monitoring Plan
PM	Project Manager/Site Manager
QA/QC	Quality assurance/quality control
RMS	Root mean square
RTEC	RTEC, a joint venture company between ERM Consultants Canada Ltd. (ERM) and the Tahltan Nation Development Corporation (TNDC)
SnipGold	SnipGold Corporation, a subsidiary of Seabridge Gold Inc.
t	Tonne
TARP	Trigger Action Response Plan
TSF	Tailings Storage Facility
WSC	Water Survey of Canada



## 1. INTRODUCTION

The Johnny Mountain Mine (JMM) is a former underground gold mine located in the Coast Mountain Range, approximately 100 km northwest of Stewart, British Columbia (BC; Figure 1-1). Mine operations ceased in 1993 and reclamation activities have occurred sporadically from 1999 to 2016. Seabridge Gold Inc. (Seabridge) acquired SnipGold Corp. (SnipGold) and its properties in 2016.

Since the acquisition, SnipGold has undertaken environmental monitoring and reclamation activities. The underground workings and portals have been reclaimed and closed as described in previous Annual Reclamation Reports.

Surface water quality monitoring is conducted in accordance with *Environmental Management Act* Permit PE-8415, *Environmental Management Act* Permit PR 7927 and *Mines Act* Permit M-178. Monitoring objectives are to detect changes to water quality at compliance points identified in the applicable permits.

There are three primary drainages (Johnny, Stonehouse and Sky creeks) flowing through the mine site and there are fish barriers on these creeks which prevent fish to the mine site.

### 1.1 Purpose

The Drainage Management Plan (DMP) addresses the following conditions in **JMM's** *Mines Act* Permit M-178:

*Condition 3: Drainage Monitoring: The Permittee shall implement a program to monitor and track changes to drainage chemistry from disturbed areas and waste materials. The program shall be capable of detecting significant metal leaching and provide early warning about the onset of ARD or increases in contaminant loadings. This program must specify the frequency, sampling type, location, parameters to be analysed, detection limits and QA/QC procedures and triggers for implementing additional mitigation works, and shall be submitted with the 2004 annual Reclamation Report due March 31, 2005, for approval by the Chief Inspector.*

*Condition 4(b): Drainage Management and Collection: The Permittee shall install weirs or other suitable flow measuring equipment at all water quality monitoring locations so that flows can be monitored when water quality monitoring is conducted.*

*Condition 5: Contingency Plans: Pursuant to condition 4 above, the Permittee must develop contingency plans demonstrating how contaminant loadings will be reduced, and receiving environment reclamation objectives will be achieved, should the underground and/or tailings mitigation strategies fail to protect against the onset of ML/ARD. Contingency Plans shall be described in the updated Closure Plan due March 31, 2005.*

### 1.2 Environmental Setting

The JMM site is situated on a sub alpine plateau at approximately 1,100 m elevation and the terrain falls off steeply around the plateau. Above the plateau, glaciers on Johnny Mountain feed streams that run through and around the mine site.

Above the decommissioned airstrip, much of the site is located on morainal till deposits exposed by a receding glacier. The deglaciated areas typically have limited soil, and where soil is present, it is

derived from glacial till and colluvium. Naturally occurring mineralization and gossan exist across the site and upgradient of mine discharges. The site is surrounded by treed, steep valleys.

The climate at the site is typical of an alpine tundra site located near the Pacific Coast. Winters include heavy snowfall and cold temperatures, and rain is common during the rest of the year.

Three main streams originate and drain from the plateau: Johnny Creek (drains to the north-northeast, and enters Bronson Creek); Stonehouse Creek (drains to the southwest and enters the Craig River); and Sky Creek (drains to the northwest and enters the Craig River). Below the plateau, Bronson Creek drains to the Iskut River. Stonehouse Creek and Sky Creek drain into the Craig River, then into the Iskut River, which eventually drains into the Stikine River, which flows west to the Pacific Ocean.

### 1.3 Reclamation

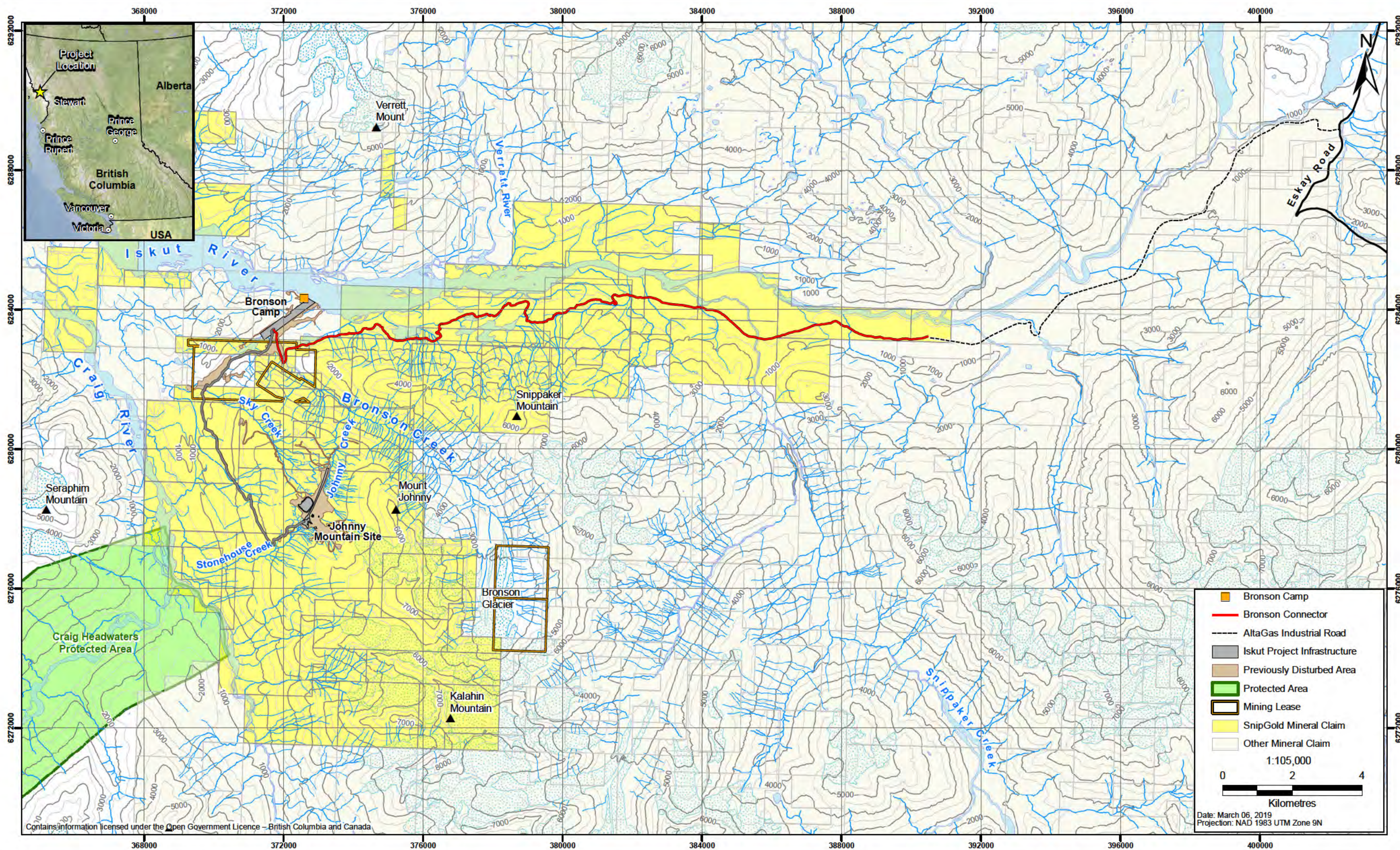
Reclamation that has been completed at the JMM by SnipGold since its 2016 acquisition are detailed in the JMM 2019 *Mines Act* Permit M-178 Annual Reclamation Report (RTEC 2019). These activities include relocation of material to the main landfill, deconstruction of the mill building, in situ remediation of contaminated soils, trial placement of potentially acid generating material (PAG) excavated from the decommissioned airstrip as well as other opportunistic activities. Future reclamation activities include: decommissioning of remaining site infrastructure; removal of waste materials from the surface of the site and subsequent re-vegetation of target areas; excavation and treatment with hydrated lime and removal of the waste rock pads to the tailing storage facility (as per Permit M-178); and continuation of in-situ remediation of hydrocarbon contaminated soils (RTEC 2019).

Since the SnipGold acquisition, Seabridge has conducted additional geochemical characterization studies as follows:

- In July 2017, as part of an evaluation of potential closure scenarios for the tailings impoundment, ABA analysis and elemental abundance methods were conducted on 27 tailings samples collected from within the tailings pond. The majority of samples (n=22) were classified as PAG or acid-generating, which confirmed the pre-mining assessment that the tailings material should continue to be submerged to manage ML/ARD (RTEC 2017).
- In 2017, an overview assessment of PAG rock was conducted to inform reclamation activities. This assessment included a visual inspection of ML/ARD indicators (e.g., signs of visible limonite staining) and the collection of 29 waste rock samples for geochemical analyses from the portal pad areas and the decommissioned airstrip. A subset of 15 samples were analyzed using ABA and elemental abundance methods, and three composite samples were assessed for mineralogical content and static leach testing (RTEC 2018). The assessment found that the majority of the waste rock samples were classified as PAG or acid-generating (n=10), or had an uncertain potential for acid generation (n=4).

Pursuant to Permit M-178, relocation of waste rock to the TSF from the airstrip and portal pads will occur over time.

Figure 1-1  
Johnny Mountain Mine: Regional Location and Land Tenures



## 2. DRAINAGE MONITORING PROGRAM

### 2.1 Geochemical Characterization

Waste materials with the potential to generate metal leaching / acid rock drainage (ML / ARD) include tailings and waste rock, and exposed rock faces in the underground workings. Prior to mining, tailings were identified as having the highest ML/ARD potential and consequently the mine plan provided for the placement of tailings in a flooded impoundment to limit sulphide oxidation (Price and Yeager 2004). Prior to mining, waste rock was assessed as having little to no ML/ARD potential based on an ARD assessment consisting of five waste rock samples (Price and Yeager 2004). During mining, ARD potential was assessed by visual observations of sulphide mineralization (Price and Yeager 2004).

After mine operations commenced, ML/ARD potential analyses carried out in the 1990s and early 2000s found that most of the waste rock was either PAG or the potential for acid generation was uncertain, based on the following:

- In 1990, acid-base accounting (ABA) analysis was conducted on 57 samples collected from the waste dumps at the portal areas, the Magazine Road and the airstrip. The analysis concluded that ARD potential is likely from approximately 50% of the waste rock and uncertain for 35% of the waste rock (Price and Yeager 2004).
- Kinetic testing of waste rock during the 1990s, including humidity cell tests and the construction of three waste rock field tests, found potential for ML (Price and Yeager 2004).
- Field test pad leachate monitoring from 1995 to 1997 demonstrated potential for ML. These field test pads were subsequently discontinued and there is no evidence of the test pads at the site.
- A general assessment of ARD prediction methods in 1994, including analysis of various size fractions from the waste dumps and ABA analysis, found waste dump material is PAG (Price and Yeager 2004); and
- In 2003, ABA analysis was conducted on <2 cm grab samples collected from the Magazine Road and the airstrip. This analysis concluded that the south end of the airstrip was either PAG or had uncertain ARD potential, and the north end of the airstrip had a lower sulphide-sulphur content and was not PAG (Price and Yeager 2004).

### 2.2 Water Quality Monitoring

The drainage water quality monitoring program is designed to monitor and track changes to drainage chemistry from disturbed areas and waste materials, including the portal areas and the TSF.

#### 2.2.1 *Field Monitoring*

Current monitoring locations are shown in Figure 2.2-1. Table 2.2-1 describes the monitoring locations and identifies the sample type and sampling frequency. Table 2.2-2 identifies the monitored parameters and their detection limits based on Permit PE-8415. Drainage water quality monitoring procedures consider Clark (2013), and follow the procedures outlined in the *Johnny Mountain Mine: Closure Water Monitoring Program* (RTEC 2020; Appendix B of the Closure Management Manual).

Table 2.2-1: Drainage Water Quality Monitoring Locations, Sample Type and Sampling Frequency

Station	Easting	Northing	Location Description	Sample Type	Sampling Frequency <sup>2</sup>
JM1 <sup>1</sup>	373272	6277784	12-Level Waste Rock Seepage, mine water source	Water	Annually
JM2 <sup>1</sup>	372834	6277774	11-Level Waste Rock Seepage, mine water source	Water	Annually
JM3 <sup>1</sup>	372514	6277926	10-Level Waste Rock Seepage, mine water source	Water	Annually
JM4 <sup>1</sup>	372668	6277897	Mine water discharge at 10 (represents mine water from all levels), mine water source	Water	Annually
JM5 <sup>1</sup>	372832	6278600	Tailings pond discharge, mine water source	Water	Annually
JM6 <sup>1</sup>	373292	6279242	Johnny Creek at end of Johnny Flats	Water	Annually
JM7 <sup>1</sup>	372204	6277520	Stonehouse Creek	Water	Annually
TMF1	372784	6278567	At spillway of tailings pond, upstream of JM5	Water	Annually for parameters as per Table 2.2-2; daily for pH and electrical conductivity (EC) during disposal of waste rock in the tailings pond
JM10	372995	6277584	Stonehouse Creek upstream of mining activity; upstream reference for JM1, JM2, JM3, and JM4	Water	Annually
JM11	373084	6278642	Johnny Creek upstream of mine influence; upstream reference location for JM5 and JM6	Water	Annually
JM12	372534	6277780	Downstream of JM4, upstream of Stonehouse Creek	Water	Annually
JM13	372407	6277840	Downstream of JM3, Stonehouse Creek on northwest side of Magazine Road	Water	Annually
SHC1	372644	6277719	Stonehouse Creek, downstream of Level 11 Waste Rock Storage (JM2) and Level 10 Waste Rock Storage (JM3)	Water	Annually
SHC3	369910	6276458	Stonehouse Creek, below cascade downstream of mine influence; downstream of JM7 (far field monitoring location)	Water	Annually
SK3	369804	6281776	Downstream of cascades on Sky Creek	Water	Annually
BR1	377467	6278580	Reference site upstream of Johnny Creek confluence in Bronson Creek	Water	Annually
BR3	372075	628246	Bronson Creek downstream of Johnny Creek confluence (upstream of the Bronson Airstrip)	Water	Annually

Notes:

UTM Zone 9V

<sup>1</sup> Monitoring of these sites is required by Permit PE-8415

<sup>2</sup> In some years, SnipGold monitors more frequently (e.g., monthly, June to October) when flow is present.

Figure 2.2-1  
 Drainage Monitoring Locations, Johnny Mountain Mine

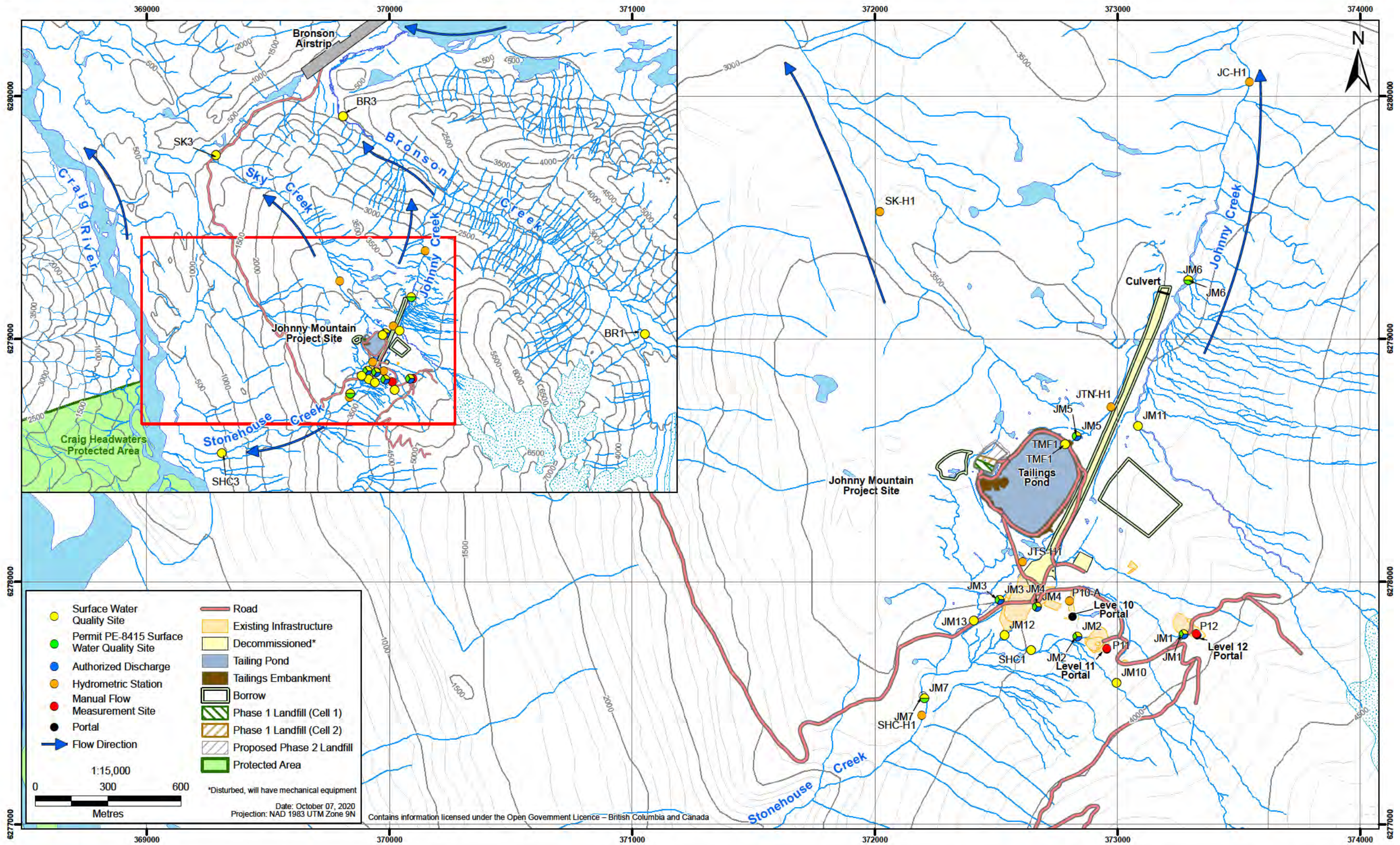


Table 2.2-2: Drainage Water Quality Monitoring Parameters and Detection Limits

Parameter	Detection Limit <sup>3</sup>	Parameter	Detection Limit <sup>3</sup>
In-Situ Field Parameters		Organic Carbon	
Temperature	±0.1°C	Total Organic Carbon	0.5
pH <sup>1</sup>	±0.01 pH units	Dissolved Organic Carbon	0.5
Specific Conductivity	±2 µS/cm	Total <sup>1</sup> and Dissolved Metals	
Conductivity	±2 µS/cm	Aluminum (Al)	0.001
Physical Parameters		Antimony (Sb)	0.0001
Colour, True	5 CU	Arsenic (As)	0.0002
Conductivity (EC)	2 µS/cm	Barium (Ba)	0.0001
Hardness (as CaCO <sub>3</sub> ) <sup>1</sup>	1	Beryllium (Be)	0.0001
pH	0.1 pH units	Bismuth (Bi)	0.0005
Total Suspended Solids	2	Boron (B)	0.01
Total Dissolved Solids	10	Cadmium (Cd)	0.00001
Turbidity	0.1 NTU	Calcium (Ca)	0.05
Anions		Chromium (Cr)	0.0005
Acidity (as CaCO <sub>3</sub> )	2	Cobalt (Co)	0.0001
Alkalinity, Bicarbonate (as CaCO <sub>3</sub> )	1	Copper (Cu) <sup>1</sup>	0.0002
Alkalinity, Carbonate (as CaCO <sub>3</sub> )	1	Iron (Fe) <sup>1</sup>	0.01
Alkalinity, Hydroxide (as CaCO <sub>3</sub> )	1	Lead (Pb)	0.0001
Alkalinity, Total (as CaCO <sub>3</sub> )	1	Lithium (Li)	0.001
Alkalinity, Carbonate (as CaCO <sub>3</sub> )	1	Magnesium (Mg)	0.1
Bromide (Br)	0.05	Manganese (Mn)	0.0002
Chloride (Cl)	0.5	Mercury (Hg)	0.00001
Fluoride (F)	0.02	Molybdenum (Mo)	0.0001
Sulphate (SO <sub>4</sub> ) <sup>1</sup>	0.5	Nickel (Ni)	0.0005
Nutrients		Potassium (K)	0.1
Total Nitrogen	0.05	Selenium (Se)	0.0003
Total Kjeldahl Nitrogen	0.05	Silicon (Si)	0.05
Ammonia, Total (as N)	0.02	Silver (Ag)	0.00001
Nitrate (as N)	0.005	Sodium (Na)	0.1
Nitrite (as N)	0.005	Strontium (Sr)	0.0002
Dissolved Orthophosphate (as P)	0.005	Thallium (Tl)	0.00001
Total Phosphate (as P)	0.005	Tin (Sn)	0.0002
Cyanide		Titanium (Ti)	0.01
Cyanide, Weak Acid Dissociable	0.001	Uranium (U)	0.00001
Cyanide, Total	0.001	Vanadium (V)	0.001
		Zinc (Zn) <sup>1</sup>	0.001

Notes:

<sup>1</sup> Parameter is required by Permit PE-8415.

<sup>2</sup> Precision objectives for in-situ field measurements.

<sup>3</sup> Units are mg/L unless otherwise noted.

### 2.2.2 *Quality Assurance / Quality Control*

Drainage water quality monitoring includes field duplicates and blanks for quality assurance/quality control (QA/QC) purposes. Duplicate samples enable the identification of field sampling error and environmental variance. Blanks are used to detect contamination in samples due to storage and transportation.

Duplicate samples involve collecting two samples at the same location and same time, by the same person, using the same equipment, and same procedures. In accordance with Permit PE-8415, the duplicate sampling location is site JM8. A minimum of one duplicate sample is collected per sampling event.

One set of field and travel blanks is included with each sample set that is submitted to the laboratory. Travel blanks are pre-filled with distilled/deionized water by the laboratory, remain with the sample bottles during sampling and transportation, and are not be opened at any time. Field blanks consist of distilled/deionized water and are prepared in the field using the same methods as regular samples (e.g., addition of preservatives). In accordance with Permit PE-8415, the field blank is identified as site JM9.

### 2.2.3 *Water Quality Data Evaluation*

#### 2.2.3.1 *Data Management*

Water quality data is **uploaded and stored in SnipGold's environmental, health and safety database**. Water quality data is reviewed for anomalous readings and any discrepancies are addressed at the time of writing the annual drainage monitoring report.

#### 2.2.3.2 *Data Analysis: Screening for Water Quality Criteria*

Water quality results are compared to the Permit PE-8415 limit for JM5 and trigger limits (see Section 6). While data for other water quality parameters is collected (Table 2.2-2), data analysis focuses on the parameters identified in Permit PE-8415. For data analysis, measurements below the realized detection limit (DL) are replaced with half the realized DL. Duplicate samples are averaged for the analysis.

For pH, hardness, and dissolved organic carbon (DOC) dependent guidelines, the sample specific pH, hardness, and DOC values are used to set the guideline limit.

Water quality data evaluation considers technical guidance including ENV (2016b).

## 2.3 *Flow Monitoring*

The passive discharge of water from the TSF and the portals is monitored to estimate flows at water quality monitoring locations as required by Condition 4(b) of Permit M-178.

### 2.3.1 *Field Monitoring*

Drainage flows are monitored continuously at hydrometric stations installed during the open water season (June to October) and manual flow measurements (Figure 2.2-1) are taken when water quality is sampled.

Table 2.3-1 identifies the locations of flow monitoring stations, equivalent or closest water quality monitoring stations, and flow measurement methods.



Table 2.3-1: Drainage Flow Monitoring Locations and Methods

Hydrometric Station	Location	Easting	Northing	Flow Measurement Method	Equivalent Water Quality Station(s)
JTS-H1	Downstream of seepage. Small stream ~100 m southwest of the tailing pond. Discharges into Stonehouse Creek.	372609	6278081	Continuous flow measurements via installed hydrometric station during open water season (June to October)	-
JTN-H1	Downstream of passive spillway. Small stream ~230 m northeast of the tailings pond. Discharges into Johnny Creek.	372973	6278720	Continuous flow measurements via installed hydrometric station during open water season (June to October)	JM5, TMF1
P10-A	Level 10 portal discharge around the northeast side of the old mill building. Relocated in 2019 due to reclamation work to ~40 m downstream of portal discharge culvert.	372802	6277921	Continuous flow measurements via installed hydrometric station during open water season (June to October)	JM3, JM4
P11	Level 11 portal discharge upslope of the old mill building.	372955	6277725	Manual flow measurements	JM2
P12	Level 12 portal discharge upslope of the old mill building.	373324	6277787	Manual flow measurements	JM1
JC-H1	Johnny Creek ~800 m past the north end of the airstrip. Discharges into Bronson Creek.	373544	6280059	Continuous flow measurements via installed hydrometric station during open water season (June to October)	JM6, JM11, JM14
SHC-H1	Stonehouse Creek ~600 m downstream of the old mill building. Discharges into the Craig River.	372193	6277448	Continuous flow measurements via installed hydrometric station during open water season (June to October)	JM7, JM10, JM12, JM13, SHC1, SHC3
SK-H1	Sky Creek ~1.2 km northwest side of the tailings pond. Discharges into the Craig River.	372021	6279525	Continuous flow measurements via installed hydrometric station during open water season (June to October)	-

Note:

UTM NAD 83, Zone 9V

### 2.3.2 Quality Assurance / Quality Control

The hydrotechnical standards and methods are consistent with Resources Information Standards Committee (RISC;2018), which complement Water Survey of Canada (WSC 1999) standards. The Resources Information Standards Committee (2018) identifies three criteria for water level data and discharge data to assess and grade (i.e., A, B, C, E [estimated], and U [unknown]) the overall quality of hydrometric data as follows:

- o Instrumentation;
- o Field procedures; and

- o Data calculation and assessment.

#### 2.3.2.1 *Instrumentation*

Flow monitoring instrumentation and calibration/verification procedures meet the “Grade A” data collection standard as defined in RISC (2018). High accuracy recording data loggers and pressure transducers record and measure continuous water levels at hydrometric stations JTS-H1, JTN-H1, JC-H1, SHC-H1, and SK-H1. Pressure transducers are used at station P10-A and meet the “Grade C” data collection standard as defined by RISC (2018) due to low depth and unstable channel banks.

#### 2.3.2.2 *Field Procedures*

The field procedures are designed to follow Grade A in RISC 2018. These procedures include a minimum of three benchmarks at each station, more than two level checks per year, 20 or more vertical checks (each accounting for <10% of the total discharge) in manual stream flow measurements, and five or more manual flow measurements per year.

At gauging locations where channel widths are narrow, the number of vertical observations and percentage of flow in each panel of flow measurements will follow Grade C procedures.

#### 2.3.3 *Flows at Water Quality Monitoring Locations*

As per Condition 4(b) on Permit M-178, drainage flows are monitored at each water quality monitoring location. Water quality and corresponding hydrometric stations are described in Table 2.2-1.

### 3. TRIGGER ACTION RESPONSE PLAN

As stated in Conditions 3 and 5 of Permit M-178, the Trigger Action Response Plan (TARP) is “designed to detect significant metal leaching, provide early warning about the onset of ARD or increases in contaminant loadings, and specify triggers for implementing additional mitigation works.” The TARP provides contingencies in the event that existing mitigation strategies, including subaqueous disposal of PAG waste rock and tailings in the TSF, are not effective in controlling the effects of ARD and/or significant ML onset to the downstream aquatic environment.

#### 3.1 Triggers

Triggers include numerical threshold levels below either permitted discharge limits and/or receiving environment reclamation objectives that trigger specific responses in order to:

- Identify a change in the quality of the drainage;
- Avoid non-compliance with permitted discharge limits; and/or
- Avoid exceedance of receiving environment reclamation objectives.

These threshold levels are referred to as ‘Level 1 Triggers’ and ‘Level 2 Triggers’:

- Level 1 Triggers: An “alert” level. If a Level 1 Trigger is exceeded, this will result in further investigation to determine why there is a change in the drainage quality. These investigations may indicate that the observed trend is temporary or caused by a known activity, may indicate the need to identify potential effects to the downstream environment, or may indicate the need to implement readily available contingencies and initiate forward planning for more complex contingency implementation.
- Level 2 Triggers: An “action” level, at which point contingencies will be implemented to prevent a non-compliance event and decrease contaminant loadings to the receiving environment.

Trigger criteria are defined based on three categories: A, B, and C, where:

- “A” triggers are based on permit limits as defined in Permit PE-8415;
- “B” triggers are based on observed water quality at the site; and
- “C” triggers are based on receiving environment reclamation objectives to be determined per sampling event.

Specific trigger criteria are defined as follows:

- Level 1 triggers:
  - A. 80% of the applicable permit limit at JM5.
  - B. 80<sup>th</sup> percentile of the water quality observed between 2009 and 2018 (20<sup>th</sup> percentile for pH), except:
    - a. If the 80<sup>th</sup> percentile is below the detection limit, the detection limit is applied.
  - C. 80% of the receiving environment reclamation objective (defined as the higher of the short-term BC WQG-AL or an upstream reference site above mine infrastructure), to be determined upon review of results. For parameters without a relevant BC WQG-AL (i.e., dissolved zinc) or for sampling events that did not include an upstream reference site, “B” is applied.

- o Level 2 triggers:
  - A. 95% of the applicable permit limit at JM5.
  - B. 95<sup>th</sup> percentile of the water quality as observed between 2009 and 2018 (5<sup>th</sup> percentile for pH):
    - a. If the 95<sup>th</sup> percentile is below the detection limit, then five times the detection limit is applied; and
    - b. If the calculated Level 2 criterion is less than the BC WQG-AL, then the BC WQG-AL is applied.
  - C. 95% of the receiving environment reclamation objective (defined as the higher of the short-term BC WQG-AL or an upstream reference site above mine infrastructure), to be determined upon review of results. For parameters without a relevant BC WQG-AL (i.e., dissolved zinc) or for sampling events that did not include an upstream reference site, “B” is applied.

Trigger criteria have been defined for three sites monitored under Permit PE-8415: JM5, JM6, and JM7. JM5 was selected as representing tailings pond discharge. JM6 and JM7 were selected as representing cumulative influences of mining-related materials leaving the JMM plateau to the northeast via Johnny Creek (JM6) and to the southwest via Stonehouse Creek (JM7), prior to the water reaching sensitive fish bearing aquatic habitat topographically down gradient of the site. Trigger criteria are provided for these locations in Table 3.1-1 and 3.1-2 for the parameters monitored under Permit PE-8415. Hardness was excluded as there are no WQG-AL for hardness. **Note that specific values for “C” triggers are not provided as these values would be determined after reviewing sampling results.**

Table 3.1-1: Level 1 Triggers

Station	Parameter				
	pH	Sulphate	Dissolved Copper	Dissolved Iron	Dissolved Zinc
JM5	C	B= 19	A = 0.040	B= 0.030	A = 0.16
JM6	C	C	C	C	C
JM7	C	C	C	C	C

Notes:

Units: mg/L, except pH

Table 3.1-2: Level 2 Triggers

Station	Parameter				
	pH	Sulphate	Dissolved Copper	Dissolved Iron	Dissolved Zinc
JM5	C	B = 128	A = 0.045	B = 0.35	A = 0.19
JM6	C	C	C	C	C
JM7	C	C	C	C	C

Notes:

Units: mg/L, except pH

## 3.2 Action Response Plan

If a Level 1 or Level 2 Trigger is exceeded, the Project Manager or Site Manager will be immediately notified. The Project Manager or Site Manager will then initiate appropriate actions for each trigger level.

### 3.2.1 Level 1 Action Response Plan

When a Level 1 trigger exceedance is identified, the following location-specific management actions will be initiated and/or implemented (a simplified version is presented in Figure 3.2-1).

#### 1. Step 1: Investigation

Initiate an investigation into the cause of the exceedance immediately and:

- A. If the cause is known or a change of state (i.e., onset of ARD or land mass movement nearby) is evident:
  - a. If the effect can be reversed in the short-term with a known action, complete the action OR proceed to Step 2;
  - b. If the effect cannot be reversed in the short term, proceed to Step 2.
- B. If the cause is not known, proceed to Step 2.

#### 2. Step 2: Confirmatory Sampling and Analysis

Collect two additional confirmatory samples over the following two months. The sampling will include the location with the trigger exceedance as well as an upstream reference and the next downstream location.

- A. If the results indicate concentrations below the Level 1 trigger, no further action is required.
- B. If a Level 1 trigger exceedance is identified in either of the confirmatory samples, proceed to Step 3.

#### 3. Step 3: Trend Analysis

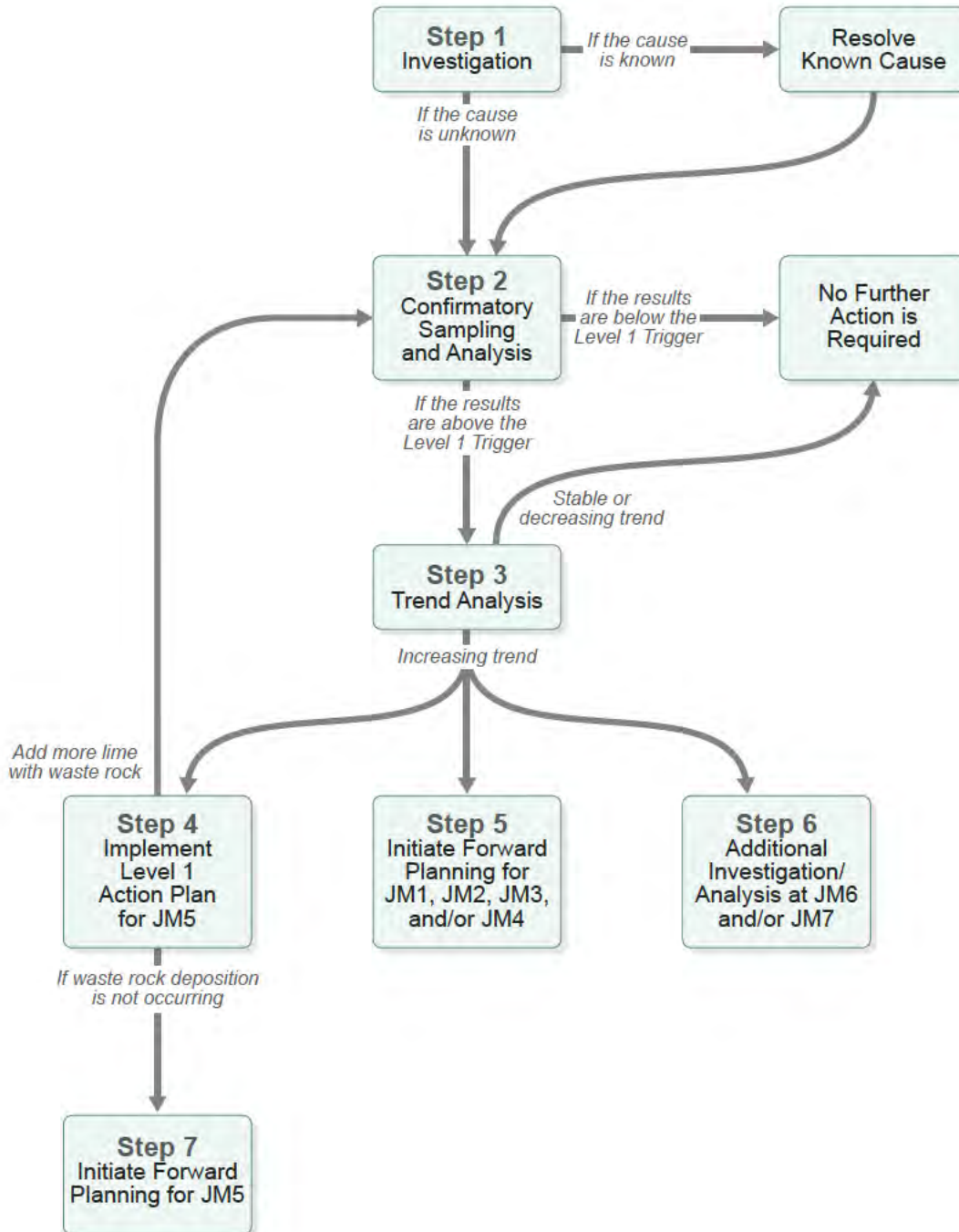
A trend analysis will be completed over the past five monitoring events:

- A. If the results indicate a stable or generally decreasing trend, consider the trigger exceedance an outlier, and no further action is required.
- B. If the results indicate an increasing trend:
  - a. If the Level 1 trigger exceedance is at JM5, proceed to Step 4.
  - b. If the Level 1 trigger exceedance is at ONLY JM6 or JM7, proceed to Step 5.

#### 4. Step 4: Implement Level 1 Action at JM5

- A. If deposition of waste rock is occurring, increase the quantity of lime being added with the waste rock. Repeat Step 2.
- B. If deposition of waste rock is not occurring, proceed to Step 6.

**Figure 3.2-1**  
**Simplified Level 1 Action Response Plan**



5. Step 5: Additional Investigation and Analysis Required for JM6 and/or JM7

Additional investigation and/or analysis is required to understand the cause of a Level 1 trigger exceedance at a receiving environment location if a Level 1 trigger exceedance is not registered at an upstream authorized discharge. This investigation and/or analysis may include, but not be limited to:

- Monitoring of additional non-mine influenced tributaries to identify potential causes for increased variability; or
- Consideration of development of science-based environmental benchmarks; or
- Re-evaluation of the Level 1 triggers.

6. Step 6: Initiate Forward Planning for Mitigating the Effect of Discharge from JM5

Forward planning will be initiated that would allow for future implementation of contingencies, which may include, but not be limited to:

- Temporarily or permanently increasing the water cover depth on the TSF; or
- Temporarily ceasing passive discharge from the TSF until water quality improves; or
- Identifying other suitable storage locations for waste rock; or
- Conducting an ecological risk assessment; or
- Other contingencies as identified based on an understanding of the cause.

3.2.2 *Level 2 Action Response Plan*

When a Level 2 trigger exceedance is identified, the following management actions will be initiated and/or implemented:

1. Initiate Steps 1 through 4 of the Level 1 Action Response Plan, as appropriate:
  - a. If concentrations remain above Level 2 triggers, proceed to Step 2.
2. Implement the appropriate contingencies identified in Steps 5 and 6 of the Level 1 Action Response Plan.

## 4. ROLES AND RESPONSIBILITIES

The SnipGold designated qualified supervisor (i.e., Project/Site Manager) will assign tasks and duties to applicable site personnel (Table 4-1). Communication of this information and sign-off by individuals will be documented and tracked. All personnel, including contractors or firms hired to complete works, share responsibility for protecting the environment.

The general approach to environmental compliance with regard to ML/ARD will be for site personnel to observe, record, and report potential concerns, and SnipGold will avoid, control, and mitigate any environmental non-compliance. Personnel will contact their supervisor immediately upon becoming aware of an incident or concern, to facilitate timely reporting of occurrences.

**Table 4-1: Roles and Responsibilities**

Role	Name	Responsibilities
Environmental Manager	Jessy Chaplin	<ul style="list-style-type: none"> <li>Responsible for overall environmental management.</li> </ul>
Project Manager/ Site Manager (PM)	To be determined (TBD)	<ul style="list-style-type: none"> <li>Responsible for overall site activities.</li> <li>Reporting to the Environmental Manager.</li> <li>Overseeing compliance with permits by regularly checking to ensure that activities are aligned with permit requirements.</li> <li>Authorizing Stop Work authority to site personnel (e.g., contractor(s)) as described in permits.</li> <li>Notifying regulatory agencies or authorizing notification of environmental non-compliance or environmental incidences.</li> <li>Reviewing site environmental monitoring report(s), including incidents, daily/weekly, and final reports.</li> <li>Providing site staff, including contractors, with the appropriate equipment and sufficient supplies.</li> <li>Reducing the potential for incidents on site by regularly monitoring the implementation of mitigation measures listed in permits.</li> <li>Directing the implementing corrective measures, when non-compliances are identified or incidents occur.</li> <li>Confirming that site staff, including contractors, are properly trained for their jobs.</li> <li>Providing notification on changes or updates to monitoring plans.</li> <li>Signing off on annual reporting.</li> </ul>
Environmental Technician (or designated contractor)*	TBD	<ul style="list-style-type: none"> <li>Reporting to the PM on permit compliance and the status of corrective measures.</li> <li>Communicating the requirements of this Plan to the PM, and onsite workers, including contractors.</li> <li>Completing environmental orientation with the site workers.</li> <li>Reviewing monitoring data as it becomes available.</li> <li>Executing the TARP.</li> <li>Providing corrective action advice to the site staff and the PM, where appropriate.</li> <li>Having the authority to issue a Stop Work Order where activities are impacting, or may impact, water/sediment quality and/or fish/fish habitat or otherwise result in non-compliance with this Plan.</li> <li>Maintaining records of monitoring, site visits and non-compliances and environmental incidents.</li> </ul>

*\* If an Environmental Technician (ET) or contractor is not designated, the responsibilities of the ET will fall on the Project Manager, or designate.*



## 5. REPORTING, DOCUMENTATION, AND RECORDS

### 5.1 Reporting

Drainage monitoring results will be provided in the Annual Reclamation Report submitted by March 31 of each year as required by Permit M-178 and will include the following information:

1. An assessment of the compliance of the previous year's drainage monitoring based on the DMP.
2. An assessment of drainage chemistry, including any detected influence of significant ML, early warnings about the onset of ARD, or increases in contaminant loadings.
3. An evaluation of monitoring data against the applicable triggers for implementing additional mitigation works.

### 5.2 Recordkeeping

Drainage monitoring results will be entered in a format and program that will allow for comparison between years. Sample locations, sampling dates and conditions, and analytical results will be retained for collected samples. A log of field notes from visual inspections and inspection photographs will also be retained. Monitoring data will be stored and will be available for review during site inspections by ENV or EMPR.

## 6. REFERENCES

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APPENDIX J            2020 SUPPLEMENTARY ENVIRONMENTAL SITE INVESTIGATION  
REPORT (WOOD 2021A)

# 2020 Supplementary Site Investigation Report

Johnny Mountain Mine Reclamation Project  
British Columbia

Rev. 3  
Project # VE52655D

Prepared for:

**SNIPGOLD CORPORATION**

4 March 2021



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4 March 2021

Elizabeth Miller, M.Sc., R.P.Bio.  
Vice President Environment and Social Responsibility  
SnipGold Corporation  
1235 Main St., PO Box 2536  
Smithers, BC  
V0J 2N0

Dear Elizabeth,

Wood Environment & Infrastructure Solutions, a Division of Wood Canada Ltd. (Wood), is pleased to submit the 2020 Site Investigation Report in support of the Johnny Mountain Mine Reclamation Plan.

Should you have any questions, please contact Mario Bianchin at (604) 295-1634 or Jeremiah Gladu (604) 295-6144.

Respectfully submitted,

**Wood Environment & Infrastructure Solutions**  
**a Division of Wood Canada Limited**

**Jeremiah Gladu, P.Ag., CSAP**  
Senior Associate Environmental Scientist

**Mario Bianchin, Ph.D., P.Geo.**  
Principal Hydrogeologist  
Group Manager, Environmental Engineering &  
Contaminants



# 2020 Supplementary Site Investigation Report

Johnny Mountain Mine Reclamation Project  
British Columbia

Rev. 3

Project # VE52655D

## Prepared for:

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1235 Main St., PO Box 2536, Smithers, BC V0J 2N0

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**4 March 2021**

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## Executive Summary

Wood Environment & Infrastructure Solutions (Wood) was retained by SnipGold Corporation (SnipGold) to complete a Supplementary Site Investigation (SSI) at the Johnny Mountain Mine (JMM) Site to support and inform the mine reclamation efforts currently in progress. The objective of the 2020 SSI was to determine current concentrations of petroleum hydrocarbons in the in-situ treatment areas; to complete further evaluation of concentrations of metals in groundwater in upstream, midstream and downstream locations and groundwater sampling required to support annual compliance monitoring requirements for Permit PR-7927. Also conducted was the sampling of surface water samples to acquire data to support an Ecological Risk Assessment (ERA) completed under separate scope and cover.

The in-field portion of the 2020 SSI was conducted in August 2020. The objectives of the 2020 SSI, built on the results of the 2019 SSI, included specific tasks to support ongoing Site reclamation work, including:

- Continuing an environmental site investigation of specific areas of environmental concern (AECs) and areas of potential environmental concern (APECs) to assess hydrocarbon impacts in groundwater within the following APECs/AECs:
  - AEC 1: Mill/10 Level Portal;
  - AEC 2: Tank Farm and Fuel Lines and AEC 3 – Fuel Pump Shed;
  - AEC 5: Main Landfill; and
  - APEC 7: Tailings Storage Facility (TSF).
- Evaluation of petroleum hydrocarbon levels in material located in the Treatment Areas 1 and 2;
- Continuing evaluation of background concentration of metals in groundwater by completing additional groundwater monitoring and sampling activities;
- Collection of surface water samples at strategic locations to support the ERA; and
- Collection of groundwater quality data at the Main Landfill, required to support annual compliance reporting requirements for Permit PR-7927.

The following conclusions were made during this assessment as they relate to the objectives and scope of work defined within this report.

### Physical Remediation – Shallow Soil Hydrocarbon Contamination

In 2020, Wood completed a year-end sampling of Treatment Area 1 and Treatment Area 2 to determine the effectiveness of the remediation program. Based on the results of the 2020 soil sampling and the data collected during the 2017 Site Investigation (2017 SI), 2018 SSI and 2019 SSI, concentrations of light extractable petroleum hydrocarbons (LEPH) have decreased significantly as shown in the following tables.

**Treatment Area 1 – 95<sup>th</sup> Percentile Over Time**

Sampling Event	95 <sup>th</sup> Percentile (mg/kg)	Average Concentration (mg/kg)
2017 In-Situ (LEPH)	3748	3138
2018 (Year End) LEPH	3582	1857
2019 (Mid-Year) LEPH	2005	1217
2019 (Year End) LEPH	1394	738
2020 (Year End) LEPH	1164	710

**Treatment Area 2 – 95<sup>th</sup> Percentile 2019 Year End Sampling**

Sampling Event	95 <sup>th</sup> Percentile (mg/kg)	Average Concentration (mg/kg)
2017 In-Situ (LEPH)	3748	3138
2019 (Year End) LEPH	2772	1619
2020 (Year End) LEPH	1292	813

**Groundwater Sampling Program - Hydrocarbons**

Groundwater impacted by petroleum hydrocarbons was identified at AEC 1 and AEC 2. Light non-aqueous phase liquid (LNAPL) was identified at monitoring well MW17-17B. Soil impacted by petroleum hydrocarbons has also been identified at those AECs during previous assessments. Contamination identified within those AECs have impacted groundwater quality.

Concentrations observed in 2020 for polycyclic aromatic hydrocarbons (PAHs) downstream of the Tailings Impoundment (MW17-20A) were lower than the previous groundwater sampling events completed in July and October 2017. The groundwater quality in that area has improved since 2017. Natural attenuation seems to be present and concentrations are decreasing with time.

Concentrations observed in 2020 for benzene, toluene, ethylbenzene and xylenes (BTEX) and PAHs at the Main Landfill (APEC 9) (MW17-22A) were lower than the previous groundwater sampling events completed in July and October 2017. The groundwater quality in that area has improved since 2017. Natural attenuation is likely occurring, and concentrations are decreasing with time.

**Background Groundwater Assessment**

The 2017 to 2020 field investigations identified elevated concentrations of dissolved metals: antimony, cobalt, manganese, cadmium, copper, lithium, iron, uranium and arsenic in groundwater. An assessment of background concentrations of dissolved metals has indicated that antimony, arsenic, uranium, iron, lithium, cobalt and manganese are elevated compared to background concentrations and could be attributed to historical mining activities. Wood observed that the concentrations of dissolved metals are generally decreasing over time. When compared to the BC Contaminated Sites Regulation (CSR), many of the dissolved metals concentrations that are elevated are still less than BC Contaminated Site Regulation (CSR) aquatic life (AWF) water use standards. Additionally, many of the observed exceedances were not reproduced during groundwater well resampling events. When taking the CSR into consideration manganese appears to be the remaining dissolved metal that would require further assessment.



Elevated dissolved concentrations of manganese appear to be associated with the AEC 1 – Mill Building and 10 Level Portal; however, elevated manganese was also identified at APEC 10 – Burial Site # 1, APEC 12 – Burial Site # 2 and at AEC 2 – Tank Farm and Fuel Line area. The location where elevated manganese is identified were all in disturbed areas and the highest concentrations were found around the AEC 1 – Mill Building and 10 Level Portal.

**Surface Water Sampling**

Surface water sample SW20-02, located at AEC 1 (Mill – 10 Level Portal), contained a detectable concentration of methylnaphthalene. It has not been determined if the detectable concentration can be related to former activities at AEC 1 or were introduced during laboratory testing. Traces of contaminants are commonly introduced during laboratory testing; however, the concentrations are not considered significant by the laboratory if they are less than a pre-determined limit. Wood recommends to re-sample this location during the next field season for analysis of methylnaphthalene to confirm the detection in surface water.

**Summary of APECs and AECs**

Based on the result of the 2020 SSI, the following APECs/AECs are recommended to be carried forward for additional assessment and/or remediation work.

**Summary of APECs and AECs**

Initial APEC	Description	2019 Classification	Contaminant Type	Potential contaminants of concern (PCOCs) <sup>1</sup>	Contaminants of Concern (COCs) <sup>2</sup>
APEC 1	Mill / 10 Level Portal	AEC 1	Diesel fuel and lubricants	Groundwater: cobalt, manganese	Soil: heavy extractable petroleum hydrocarbons (HEPH)  Groundwater: manganese, acenaphthene, methylnaphthalene, LEPH <sub>w</sub> , extractable petroleum hydrocarbons (EPH <sub>w10-19</sub> )
APEC 2 / APEC 14	Tank Farm Area / Fuel Lines	AEC 2	Diesel fuel, aviation fuels and possibly gasoline, waste rock	Groundwater: manganese	Soil: volatile petroleum hydrocarbons (VPHs), LEPH <sub>s</sub>  Groundwater: Groundwater: manganese, LNAPL, methylnaphthalene and LEPH <sub>w</sub>
APEC 4	Fuel Pump Shed	AEC 3	Diesel fuel and Avgas	-	Soil: LEPH
APEC 5	Mechanical Shop / 11 Level Portal	AEC 4	Fuels, lubricants, and waste rock storage	-	Soil: toluene, xylenes, VPHs, LEPH and HEPH



Initial APEC	Description	2019 Classification	Contaminant Type	Potential contaminants of concern (PCOCs) <sup>1</sup>	Contaminants of Concern (COCs) <sup>2</sup>
APEC 9	Main Landfill	AEC 5	Inferred to be diesel fuel	-	Groundwater: BTEX, LEPHW, methylnaphthalene, naphthalene and metals
APEC 10	Burial Site 1 (Fmr. Chalet)	APEC 10	Waste rock	Groundwater: manganese	Groundwater: manganese
APEC 11	Airstrip	AEC 6	Waste rock	Groundwater: metals	-
APEC 12	Burial Site #2	APEC 12	Contents of burial site, waste rock	Groundwater: manganese	Groundwater: manganese
APEC 13	Warehouse East Area	AEC 7	Stored / used fuel and lubricants	Groundwater: BTEX, LEPHW, naphthalene and metals	Soil: LEPH, HEPH

**Notes:**

- <sup>1</sup> Elevated metal concentrations in soil are expected across the surface of a mine site. Elevated metals in soil may need to be addressed through determining background concentrations or through a risk assessment.
- <sup>2</sup> Note, potentially acid generating (PAG) material is identified in other locations within the mine site; however, those areas have been identified by SnipGold and are scheduled for removal to the tailing storage facility (TSF). This has been included as an APEC due to potential for metals leaching.



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### List of Acronyms and Abbreviations

AEC	Areas of Environmental Concern
APEC	Area of Potential Environmental Concern
ARR	Annual Reclamation Report
AW	Aquatic Life Water Use
BC	British Columbia
BTEX	Benzene, Toluene, Ethylbenzene and Xylenes
CALA	Canadian Association for Laboratory Accreditation
CFU	Colony Forming Units
COCs	Contaminants of Concern
COD	Chemical Oxygen Demand

CSR	BC Contaminated Site Regulation
EC	Electrical Conductivity
ENV	BC Ministry of Environment and Climate Change Strategy
EPH	Extractable Petroleum Hydrocarbons
ERA	Ecological Risk Assessment
HEPH	Heavy Extractable Petroleum Hydrocarbons
HUB	Hydrocarbon Utilizing Bacteria
JMM	Johnny Mountain Mine
Kg	Kilogram
L	Litre
LEPH	Light Extractable Petroleum Hydrocarbons
LNAPL	Light Non-Aqueous Phase Liquid
masl	Metres Above Sea Level
mbgl	Metre Below Ground Level
MDL	Method Detection Limit
mg	Milligram
µg	Microgram
PAH	Polycyclic Aromatic Hydrocarbons
PAG	Potentially Acid Generating
PCOCs	Potential Contaminants of Concern
POL	Practical Quantitation Limit
PVC	Polyvinyl Chloride
QA	Quality Assurance
QC	Quality Control
SI	Site Investigation
SSI	Supplementary Site Investigation
TDS	Total Dissolved Solids
TGD	Technical Guidance Document
TIC	Total Inorganic Carbon
TOC	Total Organic Carbon
TOP	Top of Pipe
TSF	Tailing Storage Facility
USCS	Unified Soil Classification System
VH	Volatile Hydrocarbons
VPH	Volatile Petroleum Hydrocarbons
WAD	Weak Acid Dissociable
WL <sub>R</sub>	Reverted Wildlands



## 1.0 Introduction

Wood Environment & Infrastructure Solutions (Wood) was retained by SnipGold Corporation (SnipGold) to complete a Supplementary Site Investigation (SSI) at the Johnny Mountain Mine (JMM) Site to provide supplemental information to support and inform the mine reclamation efforts currently in progress. Site investigation work has been ongoing since 2017 and the following reports were issued: 1) 2017 Site Investigation (2017 SI) report, 2) 2018 Supplementary Site Investigation (SSI) report, and 3) 2019 SSI report. The objective of the 2020 SSI was to 1) determine existing concentrations of petroleum hydrocarbons in the in-situ treatment areas; 2) further evaluate concentrations of metals in groundwater in upstream, midstream and downstream locations, 3) groundwater sampling required to support annual compliance monitoring requirements for Permit PR-7927, and 4) conduct the sampling of surface water samples to acquire data to support an Ecological Risk Assessment (ERA) completed under separate scope and cover.

The in-field portion of the 2020 SSI was conducted in August 2020. The results of the 2017 through 2020 field investigation, laboratory analyses, and data evaluation are provided in this report.

### 1.1 Site Background

A brief discussion of the history of the JMM Site, the Site reclamation activities conducted to date, and the results of previously conducted environmental investigations are provided in the following sections.

#### 1.1.1 Site History

The Johnny Mountain Mine was an underground mine that saw development from 1986 to 1988 with mining/milling beginning in 1988. Mine production included producing gold, silver, and copper concentrate. The mine location is shown on Figure 1 and a Site Plan is shown on Figure 2 (see Appendices). Mining operations were relatively short-lived and occurred from November 1988 to August 1990 and from September to November 1993 when operations were stopped. Mining facilities included three adits (numbered 10, 11, and 12), five vent shafts, a mill building, a tailings facility, an air strip (at the Mine Site), a fuel tank farm, several ancillary buildings, waste rock piles, a 10-km road from the Bronson Camp to the mine, a septic bed, and a few other minor components. The milling process comprised conventional grinding and gravity separation, which initially included a cyanide leach process. Due to inefficiencies, the cyanide leach process ceased during active mining operation.

The Johnny Mountain Mine was owned and operated by International Skyline Gold Corporation (Skyline). During a share roll-back in May 2012, Skyline changed its name to SnipGold Corporation. SnipGold was subsequently acquired by Seabridge Gold in 2016 and currently operates as a subsidiary of Seabridge Gold. SnipGold currently maintains exploration activities on its mineral claims in the area of the Site focusing on the Quartz Rise area.

#### 1.1.2 Pre-2016 Reclamation Activities

Following mine closure, limited reclamation activities began in 1995. A formal Reclamation Plan was prepared in 1999 (Woznow and Yeager, 1999) and approved by the BC Ministry of Energy and Mines in October 15, 1999. Following a period between 2002 through 2008 during which minimal reclamation work was completed, the Site reclamation was progressed in 2009 following a list of prioritized tasks. The history of JMM reclamation during these years can be reviewed in the 2015 annual reclamation report (ARR) (Greenwood 2015).

### 1.1.3 Reclamation Activities Since 2016

Following acquisition of SnipGold and the Johnny Mountain Mine in 2016, SnipGold continued with mine reclamation activities. During their inaugural reclamation season in 2016, SnipGold reviewed the reclamation activities which had been completed to date and developed a five-year Johnny Mountain Mine Project Execution Plan (PEP) that meets the requirements of the approved Closure and Reclamation Plan. The 2016 reclamation activities were focused on the clean-up of the Bronson airstrip area and the engineering evaluation of the road connecting Bronson airstrip with the JMM Site as part of preparation for future reclamation activities, the long-term stability of the tailings dam was examined and a dam safety review (DSR) was conducted in August 2016. A detailed account of Site Reclamation activities up to and including the 2016 field season is provided in the 2016 Annual Reclamation Report (RTEC, 2017).

In the summer of 2017, SnipGold continued reclamation activities at the JMM Site, undertaking the following main activities:

- Investigation of the Site to determine the presence/absence of environmental contamination in areas of environmental concern;
- Mill building clean-up, inspection of and improvements to the TSF;
- Completion of a borrow source investigation program; and
- Demolition of the Tank Farm.

In 2017 Wood completed a Site Investigation (2017 SI) which included the identification and investigation of fourteen (14) areas of potential environmental concern (APECs 1-14) relating to historic mining operations (Amec Foster Wheeler, 2018). The locations of APECs and areas of environmental concern (AECs) are presented on Figures 3 and 4 (see Appendices) and the sampling locations are presented on Figures 5 to 12 (see Appendices). The results of the 2017 SI indicated that there was contamination present related to former operations within six (6) APECs. These APECs were carried forward as areas of environmental concern (AECs). Table 1 below lists the APECs assessed during the 2017 SI.

The 2017 SI results indicated that further investigation work was required at four (4) of the APECs to confirm the presence/absence of contamination.

A follow-up Supplemental Site Investigation SSI was completed in 2018 (2018 SSI) by Wood. At the conclusion of the 2018 SSI there remained six (6) AECs at which contamination was identified as present related to former operations and four (4) APECs where additional assessment work was recommended. Table 1 below lists the APECs assessed during 2018 SSI.

Additionally, in 2018 SnipGold continued reclamation activities at the JMM Site, undertaking the following main activities (by area):

- Construction of Phase 1 (Cell 1) of the Main Landfill;
- Burial Site 1 (APEC 10);
  - Excavation of waste material and placement in Main Landfill. The remediation work was conducted by Northwest Response (Northwest Response, 2018b);
- Burial Site 2 (APEC 12);
  - Excavation of waste material and placement in Main Landfill. The remediation work was conducted by Northwest Response (Northwest Response, 2018b);
- Mill Building (AEC 1);



- Removal of landfillable demolition debris from inside the building and placement in the main landfill;
- Removal of concentrate from within the mill building and placement below water within the tailings impoundment;
- Removed 4000 kg of hazardous material offsite to a certified landfill;
- Initiate demolition of infrastructure at the 10-Level Portal;
- Tank Farm and Fuel Lines (AEC 2);
  - Initiate in-situ remediation of hydrocarbon contaminated soil. The remediation work was conducted by Northwest Response (Northwest Response, 2018a);
  - Removal of demolished tanks and placement in the Main Landfill;
- JMM Airstrip (AEC 6);
  - Mapping of potentially acid generating (PAG) materials that was historically added to the airstrip as surfacing material

In 2019 Wood completed a Supplemental Site Investigation (2019 SSI). The 2019 SSI was completed to further delineate contamination identified by the 2017 Site Investigations (SI) and 2018 SSI conducted by Wood and to conduct further presence/absence investigation in potentially contaminated areas. Also conducted was the investigation into the potential presence of PAG within the airstrip and sampling to determine the efficacy of the 2019 hydrocarbon remediation work.

The objectives of the 2019 SSI included specific tasks to support ongoing Site reclamation work, including:

- Continuing an environmental site investigation of specific areas of AECs and APECs to delineate previously identified hydrocarbon impacts or to assess areas with potential hydrocarbon impacts within the following APECs/AECs:
  - APEC 12 – Burial Site 2;
  - APEC 13 – Warehouse East;
  - APEC 8 – 12 Level Portal;
  - AEC 1 – Mill /10 Level Portal;
  - AEC 2 – Tank Farm and Fuel Lines and AEC 3 – Fuel Pump Shed;
  - AEC 4 – Mechanical Shop / 11-Level Portal;
- Continuing in-situ hydrocarbon remediation of contaminated soil in the area adjacent to the Tank Farm and Fuelling Facilities;
- Evaluation of petroleum hydrocarbon levels in material to be placed in the TSF;
- Continuing evaluation of background concentration of metals in groundwater by completing Site wide additional groundwater monitoring and sampling activities;
- Delineation of PAG material along the Airstrip; and
- Collection of groundwater quality data required to support annual compliance reporting requirements for Permit PR-7927.

The sampling locations of 2019 SSI are presented on Figures 5 to 12 (see Appendices).

Table 1 below lists the APECs assessed during the 2019 SSI and the final classification of the APEC. APECs 2 and 14 were combined into one AEC as they represented a single contaminant plume. The following four APECs were removed from the list :

- APEC 3 and APEC 6 were removed as the 2018 SSI that determined that no further investigation was required; and
- APEC 8 was removed as the 2019 SSI that determined that no further investigation was required.

**Table 1: Summary of APECs and AECs 2017 to 2019**

#	Description	Investigated in 2017	2017 Classification	Investigated in 2018	Investigated in 2019	2019 Classification
APEC 1	Mill / 10 Level Portal	Yes	AEC 1	Yes	Yes	AEC 1
APEC 2 / APEC 14	Tank Farm Area / Fuel Lines <sup>1</sup>	Yes	AEC 2	Yes	Yes	AEC 2
APEC 3	Main Warehouses	Yes	<b>Removed</b>			
APEC 4	Fuel Pump Shed	Yes	AEC 3	No	No	AEC 3
APEC 5	Mechanical Shop / 11 Level Portal	Yes	AEC 4	Yes	Yes	AEC 4
APEC 6	Septic Field	Yes	<b>Removed</b>			
APEC 7	Tailings Impoundment	Yes	APEC 7	Yes	No	APEC 7
APEC 8	12 Level Portal	No	<b>Removed</b>			
APEC 9	Main Landfill	Yes	AEC 5	Yes	No	AEC 5
APEC 10	Burial Site 1 (Former Chalet)	Yes	APEC 10	Yes	No	APEC 10
APEC 11	Airstrip	Yes	AEC 6	Yes	No	AEC 6
APEC 12	Burial Site 2	Yes	APEC 12	No	Yes	APEC 12
APEC 13	Warehouse East Area	Yes	APEC 13	No	Yes	AEC 7

In 2020 Wood prepared a draft ERA for the JMM Site. The draft ERA was prepared to quantitatively assess the potential risks to ecological receptors associated with exposure to potential contaminants of concern (PCOC) in various media (e.g., soil, groundwater). This information will be used to identify risk-based closure criteria for elevated dissolved metals in groundwater and elevated petroleum hydrocarbons in soil and groundwater. The draft ERA was also prepared to identify AECs where SnipGold should focus their reclamation efforts based on potential risk identified to ecological receptors.



## 2.0 Objectives

At the conclusion of the 2019 SSI an APEC/AEC list and their associated PCOC/COCs was prepared. This list formed the basis of the 2020 objectives. The 2019 APEC/AEC list is presented in Table 2.

**Table 2: Summary of APECs/AECs and Associated PCOCs/COCs After 2019**

2019 Classification	Contaminant Type)	PCOCs <sup>1</sup>	COCs <sup>2</sup>	Summary of 2019 Recommendations
AEC 1 – Mill / 10 Level Portal	Diesel fuel and lubricants	Groundwater: cobalt, manganese	Soil: Heavy extractable petroleum hydrocarbons (HEPH)  Groundwater: Light extractable petroleum hydrocarbons (LEPH <sub>w</sub> ), Extractable petroleum hydrocarbons (EPH <sub>w10-19</sub> )	Groundwater sampling  HC remediation of soil
AEC 2 – Tank Farm and Fuel Lines	Diesel fuel, aviation fuels and possibly gasoline, waste rock	Groundwater: manganese	Soil: VPH <sub>s</sub> , LEPH <sub>s</sub>  Groundwater: LEPH <sub>w</sub>	Groundwater sampling  HC remediation of soil
AEC 3 – Fuel Pump Shed	Diesel fuel and Avgas	-	Soil: LEPH	HC remediation of soil
AEC 4 – Mechanical Shop / 11 Level Portal	Fuels, lubricants, and waste rock storage	-	Soil: toluene, xylenes, VPH <sub>s</sub> , LEPH and HEPH	HC remediation of soil
AEC 5 – Main Landfill	Inferred to be diesel fuel	-	Groundwater: benzene, toluene, ethylbenzene and xylenes (BTEX,) LEPH <sub>w</sub> , methylnaphthalene, naphthalene and metals	Groundwater sampling
APEC 10 - Burial Site #1 (Fmr. Chalet)	Waste rock	Groundwater: manganese	-	Groundwater sampling

2019 Classification	Contaminant Type)	PCOCs <sup>1</sup>	COCs <sup>2</sup>	Summary of 2019 Recommendations
AEC 6 – JMM Airstrip	Waste rock	Groundwater: metals	-	Groundwater sampling
APEC 12 - Burial Site #2	Contents of burial site, waste rock	Groundwater: manganese	-	Groundwater sampling
AEC 7 – Warehouse Area East	Stored / used fuel and lubricants	Groundwater: BTEX, LEPH <sub>w</sub> , naphthalene and metals	Soil: LEPH, HEPH	Groundwater sampling Additional soil sampling
APEC 7 - Tailings Impoundment	Tailing Storage Facility (TSF)	Groundwater: metals	-	Groundwater sampling

**Notes:**

APEC = area of potential environmental concern

AEC = area of environmental concern

BTEX = benzene, toluene, ethylbenzene and xylene

COCs = contaminants of concern

HEPH = heavy extractable petroleum hydrocarbons

LEPH<sub>s</sub> = light extractable petroleum hydrocarbons in soil

LEPH<sub>w</sub> = light extractable petroleum hydrocarbons in water

VPH<sub>s</sub> = volatile petroleum hydrocarbons in soil

EPH<sub>w10-19</sub> = extractable petroleum hydrocarbons in water (C10 – C19)

<sup>1</sup> Elevated metal concentrations in soil are expected across the surface of a mine site. Elevated metals in soil may need to be addressed through determining background concentrations or through a risk assessment.

<sup>2</sup> Note that PAG material is identified in other locations within the mine site; however, those areas have been identified by SnipGold and are scheduled for removal to the TSF. This has been included as an APEC due to potential for metals leaching.

In 2020, to limit exposure from outbreak of the Covid-19 virus, heavy equipment was not available at the Site. The scope was modified as test pitting with an excavator could not be completed. Additionally, excavation of hydrocarbon contaminated soil for further soil remediation or mechanical aeration of treatment areas could not be completed in 2020. The modified 2020 objectives to support ongoing Site reclamation work included:

- Continue an environmental site investigation of specific AECs and APECs to assess hydrocarbon impacts in groundwater within the following APECs/AECs were prioritized:
  - AEC 1: Mill/10 Level Portal;
  - AEC 2: Tank Farm and Fuel Lines and AEC 3 – Fuel Pump Shed;
  - AEC 5: Main Landfill; and
  - Tailings storage facility (TSF).
- Evaluation of petroleum hydrocarbon levels in material located in the Treatment Areas 1 and 2 by hand digging test pits into the material;



- Continuing evaluation of background concentration of metals in groundwater by completing additional groundwater monitoring and sampling activities;
- Collection of surface water samples at strategic locations to support the ERA; and
- Collection of groundwater quality data at the Main Landfill, required to support annual compliance reporting requirements for Permit PR-7927.

### 3.0 Scope of Work

The scope of work for the 2020 SSI was outlined in the proposal document titled “*Jonny Mountain Mine Reclamation Plan 2020 Scope of Work: Remediation of Hydrocarbons in Soil, Environmental Investigation, and Landfill Design and Construction Services*”, dated January 25, 2020 (Rev1). The scope of work was subsequently modified as heavy equipment was not available for the 2020 field season. The modified scope of work included the following tasks:

#### 3.1 In-Situ Hydrocarbon Remediation

SnipGold has undertaken the physical remediation of hydrocarbons in soil within AEC 2 – Tank Farm and Fuel Line area. Remediation of petroleum hydrocarbon soil contamination in the area of the Fuel Tank Farm and Fuel Lines (AEC 2) was commenced by NorthWest Response during the 2018 and 2019 field season. As a result of the remediation program, there is a stockpile of soil excavated in 2018 that contains approximately 3,000 m<sup>3</sup> of soil, hereafter referred to as Treatment Area 1 (see Figure 7). Treatment Area 1 is located in the Fuel Line area portion of AEC 2 (see Figure 7). In 2019 an additional 6,000 m<sup>3</sup> of soil was excavated in 2019 from AEC 2 and placed into a stockpile, hereafter referred to as Treatment Area 2. Treatment Area 2 is located in the former Tank Farm portion of AEC 2.

Wood’s 2020 scope of work included the completion of year-end sampling of Treatment Area 1 and Treatment Area 2. The treated soil was evaluated for petroleum hydrocarbon constituents, nutrients, moisture content, pH and hydrocarbon utilizing bacteria (HUB). The assessment of the efficacy of the remediation program was also included within the 2020 scope of work.

#### 3.2 Groundwater Sampling Program - Hydrocarbons

The 2017 to 2019 field investigations identified elevated concentrations of dissolved hydrocarbons in groundwater wells MW17-04B, MW17-13, MW17-20A, MW17-22A and MW17-23A. To assess current concentrations and the fate of dissolved hydrocarbons in groundwater over time, the following wells were proposed to be sampled for benzene, toluene, ethylbenzene and xylenes (BTEX), light and heavy extractable petroleum hydrocarbons (LEPH<sub>w</sub>/HEPH<sub>w</sub>) and polycyclic aromatic hydrocarbons in water (PAH<sub>w</sub>) and some selected wells on volatile hydrocarbons (VH<sub>w</sub>) and volatile petroleum hydrocarbons (VPH<sub>w</sub>):

- AEC 1 – Mill /10 Level Portal: MW17-04A, MW17-04B, MW17-06A, MW17-06B, MW17-07A, MW17-07B
- AEC 2 – Tank Farm and Fuel Lines: MW17-12A, MW17-12B, MW17-13, MW17-17A, MW17-17B
- AEC 5 - Main Landfill: MW17-22A, MW17-22B.
- APEC 7 -TSF: MW17-20A, MW17-20B and MW17-23A.

The rationale for the completion of groundwater sampling on these wells is presented in Table 3 in Section 4.4. The location of those wells is presented on Figures 5 through 12 appended to this report.

### 3.3 Background Groundwater Assessment

The Site investigation work completed by Wood during the 2017 to 2019 field seasons identified elevated concentrations of dissolved metals: cobalt, manganese, cadmium, copper and arsenic in groundwater. Wood completed a background groundwater assessment using available data supplemented with additional groundwater sampling completed in 2019. By using the information obtained during the 2017 to 2020 field sampling programs, Wood completed the following:

- Updated the 2019 dataset to demonstrate background groundwater quality. Background concentrations can be used for a direct comparison to groundwater quality data from within APECs and AECs;
- Complete a trend analysis of specific water quality parameters to assess if dissolved metals concentrations vary significantly over time in a manner indicative of the presence of a contaminant source; and
- Complete graphical analyses of the expanded groundwater quality dataset to identify groundwater geochemical anomalies along inferred groundwater flow paths. A statistical evaluation of outliers was completed using various outlier tests.

The rationale for the completion of groundwater sampling for background dissolved metals is presented in Table 3 in Section 4.4.

### 3.4 2020 Landfill Compliance Sampling

Permit PR-7927 authorizes the discharge of waste to the Main Landfill and includes conditions requiring annual groundwater monitoring for a period of five years starting in the summer of 2018. The permit requires annual groundwater sampling be conducted at groundwater monitoring wells MW17-22A and MW17-22B during summer months. Part of the 2020 scope of work for Wood was to ensure that groundwater samples were collected from MW17-22A and MW17-22B in compliance with permit PR-7927.

### 3.5 2020 Surface Water Sampling

The ERA being prepared by Wood in 2019 recommended collection of surface water samples at strategic locations across the Site, particularly upstream to establish background concentrations and to determine concentrations at select compliance points. To assess current concentrations in surface water, the following locations were sampled:

- Camp Creek (South of AEC 2: Tank Farm and Fuel Lines) (SW20-01);
- Unnamed stream located at AEC 1: Mill -10 Level Portal (East of the mill building) (SW20-02); and
- Stonehouse Creek (South of 12 Level Portal) (SW20-03).

## 4.0 2020 Investigation Methodology

The methodologies used to conduct the individual tasks as part of the overall 2020 scope of work are discussed in the following sections and include detailed discussions of:

- In-situ hydrocarbon stockpile sampling in remediation areas;
- Soil field screening;
- Surface water Sampling;
- Groundwater monitoring wells sampling; and

- Quality assurance and quality control.

#### 4.1 In-Situ Hydrocarbon Remediation Area Sampling

SnipGold has undertaken the physical remediation of hydrocarbons in soil within AEC 2 – Tank Farm and Fuel Line area. Remediation of petroleum hydrocarbon soil contamination in the area of the Fuel Tank Farm and Fuel Lines (AEC 2) was commenced by NorthWest Response during the 2018 and 2019 field season. As a result of the remediation program, there is a stockpile of soil excavated in 2018 that contains approximately 3,000 m<sup>3</sup> of soil, hereafter referred to as Treatment Area 1. Treatment Area 1 is located in the Fuel Line area portion of AEC 2. There is also an additional 6,000 m<sup>3</sup> of soil that was excavated in 2019 from AEC 2 and placed into a stockpile, hereafter referred to as Treatment Area 2. Treatment Area 2 is located in the former Tank Farm portion of AEC 2. Within these treatment areas, a total of 9,000 m<sup>3</sup> of soil was treated during the 2018 and 2019 reclamation season. The approximate locations of the treatment areas are presented on Figure 7 (see Appendices).

On August 29 2020, Wood completed six hand dug test pits (TP20-1-1 to TP20-1-6) until a depth of 1 metre below ground level (mbgl) within Treatment Area 1 and twelve test pits (TP20-2-1 to TP20-2-12) until a depth of 1 mbgl within Treatment Area 2 to assess hydrocarbon concentrations in soil. One sample was collected from each test pit, and two duplicate soil samples were obtained from each treatment area.

#### 4.2 Soil Sampling

A new pair of nitrile gloves was worn for the collection of each of the soil samples. Each soil sample was split with a portion of the sample placed into laboratory supplied containers for laboratory analysis, and the remaining sample was placed into a plastic bag for field screening. The laboratory-supplied containers were specific to the analysis requested. This included the use of methanol vials for containing samples submitted for analysis on volatile organic compound (VOC) parameters.

All soil samples collected for VOCs were field-screened for sample headspace vapours using the ambient temperature headspace technique and an RKI Eagle 2PID in methane elimination mode. The RKI Eagle 2 was calibrated at the start of each workday using hexane. Additionally, each soil sample was visually examined for indicators of potential contamination (e.g., staining, discoloration and debris inclusions) and to classify the soil type in accordance with the Unified Soil Classification System (USCS) based on applicable ASTM International standards (2011). Although not part of the screening procedure, olfactory indicators of contamination were recorded among the field observations.

Each sample jar and vial to be submitted for laboratory analysis was labelled with a unique sample number, registered on a chain of custody form, and stored in a cooler with ice packs before transport to the laboratory. Sufficient ice packs were placed within the coolers to maintain (as close as possible) a temperature of 4°C for the period of transport. Samples were couriered to ALS in Burnaby, BC.

#### 4.3 Soil Field Screening

Soil field screening was completed on site by Wood field staff. Each soil sample was visually examined and physically classified in accordance with the modified Unified Soil Classification System (USCS). The grab samples were also examined for indicators of hydrocarbon contamination (e.g. black staining and hydrocarbon odour).

#### 4.4 Groundwater Monitoring and Sampling

The location of the monitoring wells is presented on Figures 5 to 12 (see Appendices). Groundwater samples were submitted for laboratory analysis of dissolved metals, ions and nutrients, and some samples on BTEX<sub>w</sub>, LEPH<sub>w</sub>/HEPH<sub>w</sub>, PAH<sub>w</sub>, VHW and VPH<sub>w</sub>. The rationale for the completion of groundwater sampling on these wells is presented in the table below.

**Table 3: Rationale for Groundwater Sampling**

Monitoring Well ID	Sampling Period	Area	Rationale for Analysis
MW17-04A	August 23, 2020	AEC 1: Mill / 10 Level Portal	Determine the current concentrations of hydrocarbons in groundwater in the Mill Building Area.
MW17-04B	August 23, 2020	AEC 1: Mill / 10 Level Portal Midstream	Confirm repeatability of dissolved manganese observed in 2019 in groundwater in the Mill Building Area  Confirm the current concentrations of hydrocarbons in groundwater in the Mill Building Area.
MW17-05B	August 23, 2020	AEC 1: Mill / 10 Level Portal Midstream	Confirm repeatability of dissolved cobalt and manganese observed in 2019 in groundwater in the Mill Building Area
MW17-06A	August 23, 2020	AEC 1: Mill / 10 Level Portal	Determine the current concentrations of hydrocarbons in groundwater in the Mill Building Area.
MW17-06B	August 23, 2020	AEC 1: Mill / 10 Level Portal Midstream	Confirm repeatability of dissolved manganese observed in 2019 in groundwater in the Mill Building Area.  Determine the current concentrations of hydrocarbons in groundwater in the Mill Building Area.
MW17-07A	August 23, 2020	AEC 1: Mill / 10 Level Portal	Determine the current concentrations of hydrocarbons in groundwater in the Mill Building Area.
MW17-07B	August 23, 2020	AEC 1: Mill / 10 Level Portal	Determine the current concentrations of hydrocarbons in groundwater in the Mill Building Area.
MW17-09A	August 28, 2020	APEC 10: Burial Site 1 Midstream	Confirm repeatability of dissolved lithium and uranium observed in 2019 in this area.
MW17-09B	August 28, 2020	APEC 10: Burial Site 1 Midstream	Confirm repeatability of dissolved cobalt, and manganese observed in 2019 in this area.
MW17-11A	August 24, 2020	Stonehouse Creek Drainage Downstream	Confirm the current concentrations of dissolved metals in that area.





Monitoring Well ID	Sampling Period	Area	Rationale for Analysis
MW17-11B	August 24, 2020	Stonehouse Creek Downstream	Confirm the current concentrations of dissolved metals in that area.
MW17-12A	August 24, 2020	AEC 2: Fuel Lines	Determine the current concentrations of hydrocarbons in groundwater in the Fuel Lines area.
MW17-12B	August 24, 2020	AEC 2: Fuel Lines	Determine the current concentrations of hydrocarbons in groundwater in the Fuel Lines area.
MW17-14A	August 25, 2020	Midstream	Confirm the current concentrations of dissolved metals in that area.
MW17-17A	August 24, 2020	AEC 2: Tank Farm and Fuel Lines	Determine the current concentrations of hydrocarbons in groundwater in the Tank Farm and Fuel Lines area.
MW17-17B *	August 24, 2020	AEC 2: Tank Farm and Fuel Lines	Determine the current concentrations of hydrocarbons in groundwater in the Tank Farm and Fuel Lines area.
MW17-20A	August 25, 2020	TSF	Determine the current concentrations of hydrocarbons in groundwater in the TSF area.
MW17-20B	August 25, 2020	TSF	Determine the current concentrations of hydrocarbons in groundwater in the TSF area.
MW17-21A	August 25, 2020	Sky Creek Drainage Upstream	Confirm the current concentrations of dissolved metals in that area.
MW17-21B	August 25, 2020	Sky Creek Drainage Upstream	Confirm the current concentrations of dissolved metals in that area.
MW17-22A	August 28, 2020	AEC 5 : Main Landfill Landfill Downstream	Landfill compliance monitoring. Confirm the current concentrations of dissolved metals in that area.
MW17-22B	August 28, 2020	AEC 5 : Main Landfill Landfill Downstream	Landfill compliance monitoring. Confirm the current concentrations of dissolved metals in that area.
MW17-23A	August 28, 2020	TSF	Determine the current concentrations of dissolved hydrocarbons in groundwater in this area.
MW17-24A	August 24, 2020	Sky Creek Drainage Downstream	Confirm the current concentrations of dissolved metals in that area.
MW17-24B	August 24, 2020	Sky Creek Drainage Downstream	Confirm the current concentrations of dissolved metals in that area.



Monitoring Well ID	Sampling Period	Area	Rationale for Analysis
MW17-25A	August 24, 2020	TSF	Confirm the current concentrations of dissolved metals in that area.
MW17-26A	August 25, 2020	Johnny Creek Drainage Upstream	Confirm the current concentrations of dissolved metals in that area.
MW17-26B	August 24, 2020	Johnny Creek Drainage Upstream	Confirm the current concentrations of dissolved metals in that area.
MW17-27A	August 28, 2020	AEC 6: Airstrip Upstream	Confirm the current concentrations of dissolved metals in that area.
MW17-27B **	August 28, 2020	AEC 6: Airstrip Upstream	Confirm the current concentrations of dissolved cobalt observed in 2019 in that area.

\* Monitoring well MW17-17B was not sampled as a LNAPL was detected in that well.

\*\* Monitoring well MW17-27B was not sampled as the field technician was not able to purge that well (due to the presence of sand and sediments in the well).

On August 23, 24, 25 and 28 2020, Wood collected groundwater samples from the monitoring wells listed in Table 3 (except for wells MW17-17B and MW17-27B).

Monitoring wells MW17-22A and MW17-22B, located downgradient from the landfill, were sampled to satisfy the requirements for permit PR-7927, which authorizes the discharge of waste to the Main Landfill. The location of monitoring wells MW17-22A and MW17-22B are presented on Figure 12 (see Appendices). Groundwater samples collected from monitoring wells MW17-22A and MW17-22B were submitted for analysis of BTEX, EPHw<sub>10-19</sub>, PAHs, ion and nutrients (alkalinity, bicarbonate, carbonate, chloride, fluoride, hydroxide, nitrate, nitrite, ammonia, total potassium, total sodium, sulphate), total and dissolved metals, chemical oxygen demand (COD), cyanide, cyanate and thiocyanate, total inorganic carbon (TIC), total organic carbon (TOC), total dissolved solids (TDS), electrical conductivity (EC), hardness.

All groundwater sampling was conducted using a low-flow sampling technique as defined in ASTM Standard D4448-01 (ASTM, 2013) and consistent with the BC Ministry of Environment and Climate Change Strategy (ENV) water monitoring guidance for mines (BC MOE 2016) for groundwater wells less than 10 m in depth. For groundwater wells greater than 10 m in depth, Waterra tubing was used to purge the well. Before purging each well, the depth to water was recorded. The depth measurements were consistently recorded from the mark on top of the polyvinyl chloride (PVC) standpipe.

During purging at each monitoring well, a YSI Professional Plus multi-meter was used to measure physicochemical parameters of the purge water to determine when the measured parameters stabilized between readings. At the point at which the monitored physicochemical parameters had stabilized, the groundwater passing through the flow through cell was considered to be representative of formation water, and sample collection was commenced. The following parameter stabilization targets (parameter stabilization) were used during purging:

- pH ±0.1 units;
- temperature ±0.2 °C;
- electrical conductivity (EC) ±3%;



- oxidation/reduction potential (ORP)  $\pm 10$  mV; and
- dissolved oxygen (DO)  $\pm 10\%$ .

A groundwater sample was deemed representative of formation water if groundwater purging targets were met.

Each sample was collected in laboratory supplied containers by field personnel wearing nitrile gloves. Each sample was preserved with allocated preservatives supplied by the laboratory. Each sample container was labelled with a unique sample number, registered on a chain of custody form, and stored in a cooler with ice packs before transport to the laboratory. Sufficient ice packs were packed within the coolers to maintain (as close as possible) a temperature of 4°C for the period of transport. Samples were couriered to ALS in Burnaby, BC.

Blind duplicate samples were collected by filling the primary and duplicate sample containers simultaneously. The duplicate samples were labelled such that their duplicate pairs could not be identified by the sample name alone.

#### 4.5 Quality Assurance / Quality Control

The Quality Assurance / Quality Control (QA/QC) plan addresses analysis and the sample quality from collection to reporting. The methodology is detailed in the British Columbia Environmental Laboratory Manual, 2015 Edition (BC MOE, 2015b).

The QA program consisted of the following components:

- Each sample was collected using the same methodology;
- Sample containers were labelled with the sampling date, the project number, and the individual sample number;
- Sampler used new nitrile disposable gloves during the collection of each sample;
- Samples were stored and delivered to the laboratory in chilled insulated coolers where they arrived at the proper temperature;
- Samples were shipped under chain of custody protocols from Johnny Mountain Mine to ALS Laboratory in Terrace by Wood field staff. Samples were then transferred from ALS Laboratory Terrace to ALS Laboratory in Burnaby;
- Samples were analyzed by a laboratory accredited by the Canadian Association for Laboratory Accreditation (CALA);
- A review was conducted of data tables with original analytical records; and
- The analytical laboratory confirms that their quality assurance conforms to the British Columbia Environmental Laboratory Manual, 2015 Edition.

The QA program included procedures implemented in the field and laboratory to demonstrate the generated data were reliable.

As part of the QC program, a blind duplicate was analyzed for all parameters to verify sampling and analytical reproducibility. The respective relative percent differences (RPD) were calculated. Duplicate sample results were compared to primary sample results to flag any variations with laboratory experimental procedures. RPD is the difference in concentration between the primary and duplicate results divided by the average concentration of the primary and duplicate results. RPDs are only applied when the measured concentrations are at least five times the Method Detection Limit (MDL), which is

commonly referred to as the Practical Quantitation Limit (PQL). Error is known to increase within five times the MDL, and RPDs are generally not considered to be valid measures of sample variability at these low concentrations. The RPD calculations and concentrations are summarized in Tables 2 to 7 and 9 to 14 (in Appendices). The RPD levels used for evaluation of data quality were those identified in the British Columbia Field Sampling Manual (BC MOE, 2013).

## 5.0 Investigation Results

The results of the individual tests, laboratory analyses, and data evaluations are discussed in the following sections. The results as they pertain to the specific objectives of the 2020 SSI are discussed under Section 6.0, and the conclusions on an individual APEC/AEC basis are discussed under Section 7.0.

### 5.1 Soil Field Screening Observations

Soil samples collected during the investigation were field screened for indicators of potential contamination including visual evidence of staining and presence of free petroleum hydrocarbon product. Indirect observations of odour were also recorded where noted. A description of the soil types and USCS classification was recorded.

The soil type encountered during hand dug test pits within Treatment Areas 1 and 2 was consistent with that observed during the 2017, 2018 and 2019 works and included a variable clay/silt/sand/gravel fill.

Hydrocarbon odour was observed during test pitting for sample SP20-02-02 in Treatment Area 2. No odour was observed for all the other samples at Treatment Areas 1 and 2.

### 5.2 Groundwater Monitoring

During the 2017 SI, monitoring wells were drilled in nested pairs such that the well designated as A had a screen set within competent bedrock while the well designated as B had screen either within the weathered shallow bedrock or straddling the bedrock-aternary sediment interface. Generally, nested well pairs were completed within 3 m of each other and were never completed within the same borehole.

One groundwater level monitoring event was performed during August 2020. The depth to groundwater at 30 monitoring wells was recorded using a calibrated electric sounder and was measured from a surveyed reference point at the top of each PVC standpipe ("top of pipe" - TOP). Results of groundwater level surveys are summarized in Table 1 (see Appendices).

Depths to groundwater ranged from artesian conditions at MW17-11A (>1,047.4 masl) to 15.80 m below TOP (1,049.68 masl) at MW17-27A.

### 5.3 Soil Analytical Results – Petroleum Hydrocarbons

The results of the soil laboratory analysis are discussed in the following sections. The results of laboratory analyses are provided in Tables 2 through 8 (see Appendices). The analytical laboratory certificates are included in Appendix B for reference.

It should be noted that for the purpose of this investigation, the soil analytical results for EPH<sub>10-19</sub> are considered equivalent to LEPH and the soil analytical results for EPH<sub>19-32</sub> are considered equivalent to HEPH. LEPH and HEPH are calculated by subtracting PAHs from the EPH<sub>10-19</sub> and EPH<sub>19-32</sub> result, respectively. By calculating the LEPH and HEPH concentrations this way the EPH<sub>10-19</sub> and EPH<sub>19-32</sub> concentrations will always be greater than or equal to the LEPH/HEPH concentrations. This fact allows the use of the EPH<sub>10-19</sub>/EPH<sub>19-32</sub> concentrations for screening for elevated LEPH/HEPH.

### 5.3.1 Treatment Area 1 Year End Sampling –August 29, 2020

#### Petroleum Hydrocarbons

In total, six (6) soil samples (SP20-01-01 to SP20-01-06) and one blind duplicate soil sample (SP20-01-56) were collected from Treatment Area 1 and submitted to ALS for analyses of BTEX, LEPH/HEPHs, VOCs and PAHs. A synopsis of the analytical results is as follows:

- Soil sample SP20-01-05 contained an elevated concentration of LEPH of 1,330 mg/kg;

Soil samples SP20-01-01 and SP20-01-04 contained detectable concentrations of LEPH and HEPH that are less than five times the MDL and are not considered a significant result.

#### Soil Amendments

Three (3) soil samples (SP20-01-01, SP20-01-03 and SP20-01-05) out of six (6) soil samples collected during the 2020 year end sampling of Treatment Area 1 were submitted to ALS for analysis soil moisture, available nitrogen as nitrate and phosphorus as phosphate, HUB and TOC. A synopsis of the analytical results is as follows:

- The soil moisture measured in soil samples collected from Treatment Area 1 ranged between 9.95% and 15%. The ideal moisture content for coarse grained soils encountered at the Site is between 12% and 30% <sup>1</sup>;
- The TOC measured in soil samples collected from Treatment Area 1 ranged between 0.32% and 1.34%;
- The available nitrogen as nitrate concentrations measured in soil samples collected from Treatment Area 1 were below the detection limit of 1 mg/kg.
- The available phosphorus as phosphate concentrations measured in soil samples collected from Treatment Area 1 ranged from <2.0 mg/kg to 4.7 mg/kg.
- The HUB count measured in soil samples from Treatment Area 1 ranged between 20,500 colony forming units per gram (CFU/g) and 56,000 CFU/g. A concentration of less than 3,000 CFU/g is an indicator of stress being placed on the microbial population <sup>2</sup>.

### 5.3.2 Treatment Area 2 Year End Sampling – August 29, 2020

#### Petroleum Hydrocarbons

In total, twelve (12) soil samples (SP20-02-01 to SP20-02-12) and one blind duplicate soil sample (SP20-02-62) were collected from Treatment Area 2 and submitted to ALS for analyses of BTEX and LEPH/HEPHs. A synopsis of the analytical results is as follows:

- Soil sample SP20-02-03 contained an elevated concentration of LEPH of 1,200 mg/kg;
- Soil sample SP20-02-05 contained an elevated concentration of LEPH of 1,050 mg/kg;
- Soil sample SP20-02-06 contained an elevated concentration of LEPH of 1,660 mg/kg;
- Soil sample SP20-02-10 contained an elevated concentration of LEPH of 1,040 mg/kg;

<sup>1</sup> Hydrocarbon Remediation Plan for Johnny Mountain Mine, British Columbia, April 2019, Wood.

<sup>2</sup> US EPA document 510-B-17-003.

Soil samples SP20-02-02, SP20-02-04, SP20-02-07, SP20-02-08 and SP20-02-11 contained detectable concentrations of LEPH and HEPH that are less than five times the MDL and are not considered significant results.

### Soil Amendments

Six (6) soil samples (SP20-02-02, SP20-02-04, SP20-02-06, SP20-02-08, SP20-02-10 and SP20-02-12) out of twelve (12) soil samples collected during the 2020 year end sampling of Treatment Area 2 were submitted to ALS for analysis soil moisture, available nitrogen as nitrate and phosphorus as phosphate, HUB and TOC. A synopsis of the analytical results is as follows:

- The soil moisture measured in samples collected from Treatment Area 2 ranged between 9.63% and 17.2%. Overall, this is within the optimal moisture content range of 12% and 30%;
- The TOC measured in soil samples collected from Treatment Area 1 ranged from 0.19% to 0.50%;
- The available nitrogen as nitrate concentrations measured in soil samples collected from Treatment Area 2 range from <1 mg/kg (three out of six samples) to 15.8 mg/kg.
- The available phosphorus as phosphate concentrations measured in soil samples collected from Treatment Area 2 ranged from <2.0 mg/kg (three out of six samples) to 5 mg/kg.
- The HUB count measured in soil samples from Treatment Area 1 ranged from 6,600 CFU/g to 1,000,000 CFU/g. A concentration of less than 3,000 CFU/g is an indicator of stress being placed on the microbial population <sup>3</sup>.

## 5.4 Groundwater Analytical Results

The results of the groundwater laboratory analysis are discussed in the following sections. The results of laboratory analyses are provided in Tables 9 through 14 and 15B through 15I (see Appendices). The analytical laboratory certificates are included in Appendix B for reference.

For discussion purpose only, when a parameter is considered elevated it exceeded 5 times the laboratory method detection limit (MDL).

### 5.4.1 Petroleum Hydrocarbons Results

Groundwater samples collected from monitoring wells MW17-04A, MW17-04B, MW17-06A, MW17-06B, MW17-07A, MW17-07B, MW17-12A, MW17-12B, MW17-13, MW17-17A, MW17-22A, MW17-22B, MW17-20A, MW17-20B and MW17-23A were submitted for analysis of BTEX, PAHs and LEPH/LEPHs.

Groundwater sample MW17-17A was also submitted for analysis on VPHs and samples MW17-22A and MW17-22B were also submitted for analysis VOCs. No sample was collected from monitoring well MW17-17B as a LNAPL was detected.

A synopsis of the analytical results is as follows:

- Groundwater sample MW17-4B, located within APEC 1 (Mill and 10 Level Portal), contained elevated concentrations of methylnaphthalene and LEPH<sub>w</sub>.
- Groundwater sample MW17-6B, located within APEC 1 (Mill and 10 Level Portal), contained elevated concentrations of acenaphthene and methylnaphthalene;

<sup>3</sup> US EPA document 510-B-17-003.

- Groundwater sample MW17-12A, located within APEC 14 (Fuel Lines), contained an elevated concentration of  $LEPH_w$ .
- Groundwater sample MW17-17A, located within APEC 14 (Fuel Lines), contained an elevated concentration of methylnaphthalene.
- Groundwater sample MW17-20A, located downstream of the Tailings Impoundment, contained elevated concentrations of methylnaphthalene and naphthalene.
- Groundwater samples collected from monitoring well MW17-22A, located at the Main Landfill, contained elevated concentrations of ethylbenzene, methylnaphthalene and naphthalene.
- A light non-aqueous phase liquid (LNAPL) (measurement of 1 cm) was measured with a Heron interface probe within monitoring well MW17-17B located within APEC 14 (Fuel Lines). The presence of LNAPL was also verified visually with a bailer.

### 5.4.2 Dissolved Metals Results

During August 2020, Wood collected groundwater samples from monitoring wells MW17-04B, MW17-05B, MW17-06B, MW17-09A, MW17-09B, MW17-11A, MW17-11B, MW17-21A, MW17-21B, MW17-14A, MW17-24A, MW17-24B, MW17-22A, MW17-22B, MW17-25A, MW17-26A, MW17-26B and MW17-27A. Groundwater samples were submitted for laboratory analysis of dissolved metals. A synopsis of the analytical results is as follows:

- Groundwater sample MW17-5B, located within APEC 1 (Mill and 10 Level Portal), contained elevated concentrations of cobalt (1.94  $\mu\text{g/L}$ ) and manganese (5,700  $\mu\text{g/L}$ );
- Groundwater sample MW17-9A, located within APEC 10 (Burial Site 1), contained an elevated concentration of iron (1,970  $\mu\text{g/L}$ ), lithium (8.5  $\mu\text{g/L}$ ) and manganese (1,760  $\mu\text{g/L}$ );
- Groundwater sample MW17-9B, located within APEC 10 (Burial Site 1), contained elevated concentrations of cobalt (2.96  $\mu\text{g/L}$ ) and manganese (3,320  $\mu\text{g/L}$ );
- Groundwater sample MW17-14A, located within APEC 12 (Burial Site 2), contained an elevated concentration of iron (3,800  $\mu\text{g/L}$ ).
- Groundwater sample MW17-27A, located within APEC 11 (Airstrip), contained elevated concentrations of cobalt (1.44  $\mu\text{g/L}$ );
- Groundwater sample MW17-24A, located downstream Sky Creek Drainage, contained an elevated concentration of Lithium (8.4  $\mu\text{g/L}$ ).
- Groundwater sample MW17-21A, located downstream Sky Creek Drainage, contained an elevated concentration of Lithium (8.5  $\mu\text{g/L}$ ).

All remaining groundwater samples analyzed for dissolved metals reported concentrations that are below the detection limits, less than five times the MDL and/or marginal and not considered significant.

### 5.4.3 Alkalinity, Ions and Nutrients

During August 2020, Wood collected groundwater samples from monitoring wells MW17-04B, MW17-05B, MW17-06B, MW17-09A, MW17-09B, MW17-11A, MW17-11B, MW17-21A, MW17-21B, MW17-14A, MW17-24A, MW17-24B, MW17-22A, MW17-22B, MW17-25A, MW17-26A, MW17-26B and MW17-27A. Groundwater samples were submitted for laboratory analysis of alkalinity, ions and nutrients. All groundwater samples analyzed for alkalinity, ions and nutrients reported concentrations that are consistent with former sampling events, are below the detection limits, less than five times the MDL and/or marginal and not considered significant.

## 5.5 Surface Water Analytical Results

The results of the surface water laboratory analysis are discussed in the following sections. The results of laboratory analyses are provided in Tables 16A through 16D (see Appendices). The analytical laboratory certificates are included in Appendix D for reference.

### 5.5.1 Petroleum Hydrocarbons, PAHs and VOCs Results

Surface water samples SW20-02 and SW20-03 collected from respectively an unnamed stream (AEC 1: Mill – 10 Level Portal) and Stonehouse Creek (South of 12 Level Portal) were submitted for analysis of BTEXw, PAHw, LEPHw/LEPHw and VOCw.

A synopsis of the analytical results is as follows:

- Surface water sample SW20-02 located at AEC 1 (Mill – 10 Level Portal) contained a detectable concentration of methyl-naphthalene, however, the reported results are less than five times the method detection limit (MDL).

All remaining groundwater samples analyzed for BTEXw, PAHw, LEPHw/LEPHw and VOCw reported concentrations that are below the detection limits.

### 5.5.2 Dissolved Metals Results

Surface water samples SW20-01 collected from Camp Creek (South of AEC 2: Tank Farm and Fuel Lines) was submitted for analysis of total cadmium, iron, and magnesium, and SW20-02 collected from an unnamed stream (AEC 1: Mill – 10 Level Portal) was submitted for analysis of total manganese.

## 5.6 Quality Assurance and Quality Control Results

To ensure quality of data, a field duplicate was taken to measure possible field sampling error or local environmental variance. Duplicate samples are taken at a frequency of 1 out of 10 for groundwater and soil samples. Relative percent differences values are calculated for each duplicate that has a concentration at or greater than five times the reported detection limit (RDL). A summary of RPDs for duplicate samples collected is provided in Tables 2 to 14 (see Appendices).

The BC Field Sampling Manual identifies RPD values >20% as an indication that a possible problem exists, and >50% indicates that a definite problem exists, most likely either through contamination or lack of sample representativeness (BC MOE, 2013). During the 2017 to 2020 investigations, a total of ten soil duplicate samples and nine groundwater duplicate samples were analysed for concentrations of hydrocarbons, metals, PAHs, VOCs and major ions.

The RPD values for total of 773 groundwater parameters were calculated. Out of 743 groundwater RPDs, a total of 10 metal parameters had a calculated RPD value greater than 50% and one (1) pH parameter had a calculated RPD value greater than 20%. The remaining groundwater RPDs were either below the



target RPD of 20% or not calculable due to concentrations reported as less than detection limits. The RPD values for total of 587 soil parameters were calculated. Out of 587 soil RPDs, a total of six metal parameters had a calculated RPD value greater than 20% and four (4) metal parameters had a calculated RPD value greater than 50%. One (1) EPH<sub>10-19</sub> parameter had a calculated RPD value greater than 50%. The remaining soil RPDs were either below the target RPD of 20% or not calculable due to concentrations that are less than detection limits. Out of 773 duplicate groundwater parameters, less than 1.5% exceeded the target RPD and out of 587 duplicate soil parameters, less than 2% exceeded the target RPD. Some errors in sampling are anticipated during a large site investigation and this can be further compounded by the heterogeneity of concentrations in soil; however, overall the field QA/QC project has met Wood's data quality objectives.

To ensure data quality, a total of about 1,200 lab control parameters (Method Blank, Matrix Spike, Laboratory Control Sample, Certified Reference Material, Internal Reference Material and Calibration Verification Standard) were analyzed by the laboratory ALS for a variety of analytical parameters. The laboratory QA/QC testing indicated the results are within the ALS data quality objectives, and therefore the analytical testing is considered reliable. A full list of laboratories' COAs is included in Appendix B.

Based on the field and laboratory procedures used, QA/QC results and data validation, it is concluded that the data generated for the Site meet accuracy and precision targets and are reliable in characterizing Site environmental conditions.

## 6.0 Discussion

The investigation results as they pertain to the specific objectives of the 2020 SSI are discussed separately in the following sections. The conclusions on an individual APEC/AEC basis are discussed under Section 7.

### 6.1 In-Situ Hydrocarbon Remediation

Based on the results of the Year End sampling from Treatment Area 1 (fuel line area) and Treatment Area 2 (tank farm), Wood prepared the following box plots to show the concentrations of petroleum hydrocarbons in treated material over time. Chart 1 and Chart 2 below show the initial concentrations of LEPH and HEPH from AEC 2 plotted into a box plot. The initial concentrations are based on the in-situ sampling of hydrocarbons completed by Wood during the 2017 SI. The initial concentrations are then compared to box plots generated by measured concentrations of post-excavation interim samples. The data used to generate the box plots are included as Appendix C. For comparison purposes only, the box plot data are compared to the BC CSR (BC Regulation 375/96, last amended January 24, 2019, BC Reg. 13/2019) reverted Wildlands (WL<sub>R</sub>) standards of 1,000 mg/kg for LEPH and HEPH.

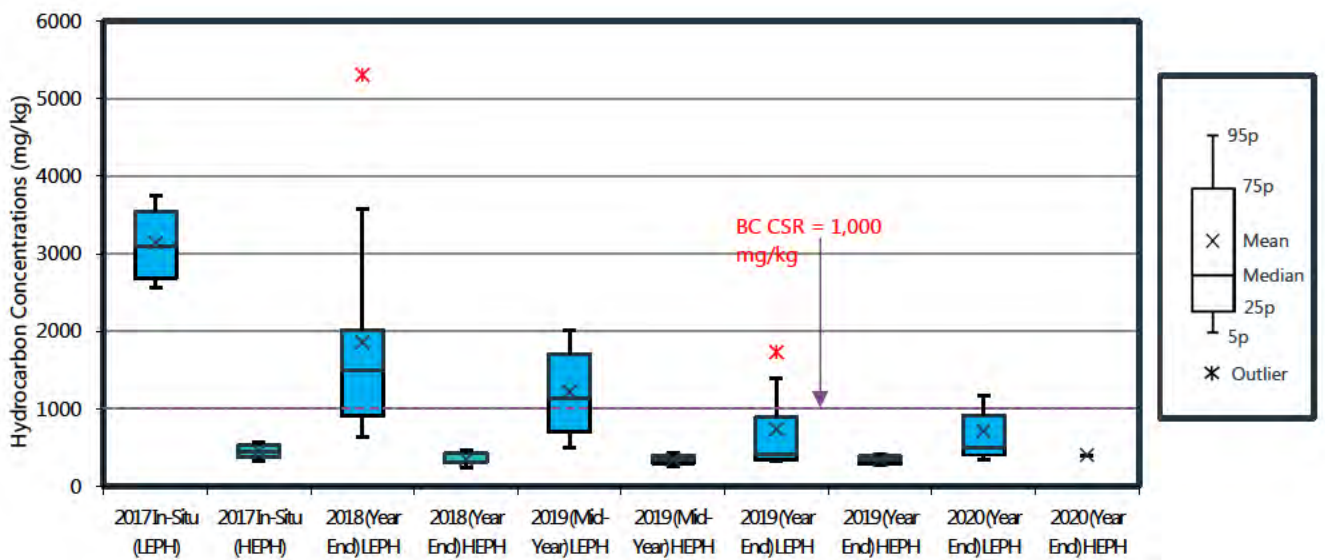
#### Treatment Area 1

The 2020-year end sampling event completed in August 2020 for Treatment Area 1 indicates that the 95<sup>th</sup> percentile of the LEPH concentration is greater than the CSR standard of 1,000 mg/kg. This is due to one soil sample (SP20-01-05) which contained a LEPH concentration of 1,330 mg/kg. All remaining samples analyzed for LEPH from Treatment Area 1 contained concentrations of LEPH that were less than 1,000 mg/kg.

All soil samples collected during the August 2020 sampling event for Treatment Area 1 contained concentrations of HEPH of less than 1,000 mg/kg, and the majority was below the method detection limit. Table 4 below shows the 95<sup>th</sup> percentile for the 2020 sampling event completed on Treatment Area 1.

**Table 4: Treatment Area 1 – 95<sup>th</sup> Percentile for LEPH by Sampling Event**

Sampling Event	95 <sup>th</sup> Percentile (mg/kg)	Average Concentration (mg/kg)
2017 In-Situ (LEPH)	3748	3138
2018 (Year End) LEPH	3582	1857
2019 (Mid-Year) LEPH	2005	1217
2019 (Year End) LEPH	1394	738
2020 (Year End) LEPH	1164	710



**Chart 1: Treatment Area 1 – Petroleum Hydrocarbon Concentrations**

**Treatment Area 2**

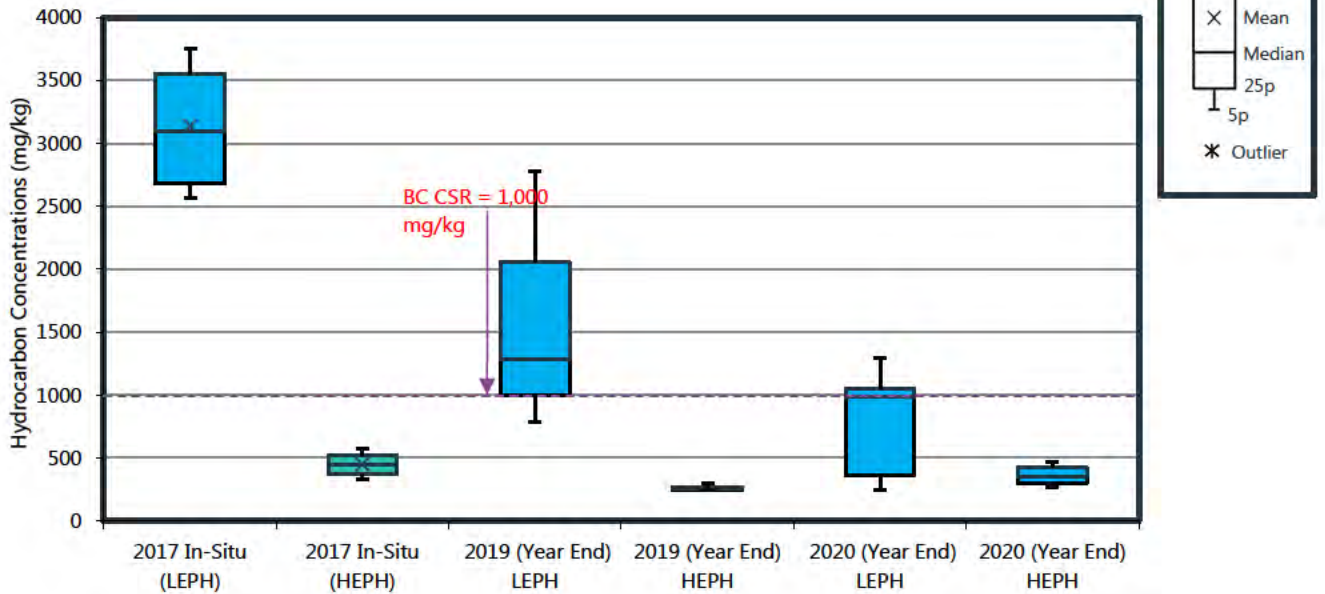
The 2020-year end sampling event completed in August 2020 for Treatment Area 2 indicates that the 95<sup>th</sup> percentile of the LEPH concentration is greater than the CSR standard of 1,000 mg/kg. This is due to four out of twelve soil samples (SP20-02-03, SP20-02-05, SP20-02-06 and SP20-02-10) which contained LEPH concentrations greater than 1,000 mg/kg (ranging from 1,040 to 1,660 mg/kg). The remaining soil samples analyzed for LEPH from Treatment Area 2 contained concentrations of LEPH that were less than 1,000 mg/kg, and four of those were below laboratory detection limits.

All soil samples collected during the August 2020 sampling event for Treatment Area 2 contained concentrations of HEPH of less than 1,000 mg/kg. Table 5 below shows the 95<sup>th</sup> percentile for the year end sampling event of Treatment Area 2.



**Table 5: Treatment Area 2 – 95<sup>th</sup> Percentile for LEPH by Sampling Event**

Sampling Event	95 <sup>th</sup> Percentile (mg/kg)	Average Concentration (mg/kg)
2017 In-Situ (LEPH)	3748	3138
2019 (Year End) LEPH	2772	1619
2020 (Year End) LEPH	1292	813



**Chart 2: Treatment Area 2 – Petroleum Hydrocarbon Concentrations**

The 95<sup>th</sup> percentile is not used to determine if the soil can be considered remediated; instead it is used to estimate the concentration of hydrocarbons in the entire stockpile based on limited soil sampling data. Based on the data in Table 5, we can infer that concentrations of LEPH have significantly decreased and 95% of the soil should contain LEPH concentrations less than 1,164 mg/kg and 1,292 mg/kg for Treatment Areas 1 and 2, respectively. The decrease of LEPHs concentrations is especially observed for Treatment Area 2 where 95<sup>th</sup> percentile concentrations in 2020 are almost 50% of those observed in 2019. The box plot is a good indicator of when confirmation of remediation sampling should be completed on treated soil.

## 6.2 Petroleum Hydrocarbons Groundwater Investigation

As mentioned before, for discussion purpose only, a parameter is considered elevated when it exceeded 5 times the laboratory MDL.

The Site investigation work completed by Wood during 2020 field season identified elevated concentrations of petroleum hydrocarbons in groundwater. Groundwater wells with elevated concentrations of petroleum hydrocarbons are shown in Figures 13 to 18 (see Appendices) and in Table 6 below.

**Table 6: Summary of Impacted Monitoring Wells with Petroleum Hydrocarbons**

APEC / AEC #	Monitoring Well	COCs*
AEC 1: Mill / 10 Level Portal	MW17-04B	methylnaphthalene,
AEC 2: Tank Farm / Fuel Lines	MW17-17A	methylnaphthalene
	MW17-17B	LNAPL measured in well
Downstream of the Tailings Impoundment	MW17-20A	methylnaphthalene and naphthalene
APEC 9: Main Landfill	MW17-22A	BTEX, methylnaphthalene and naphthalene

\* COCs considered in Table 6 are elevated concentrations identified with results more than five times the method detection limit (MDL)

Groundwater impacted by petroleum hydrocarbons was identified at AEC 1 and AEC 2. LNAPL was identified at monitoring well MW17-17B. Soil impacted by petroleum hydrocarbons was also identified within these AECs during previous assessments. Soil contamination identified within those AECs have impacted groundwater quality.

Elevated concentrations of methylnaphthalene and naphthalene were observed downstream of the Tailings Impoundment (MW17-20A) in the 2020 sampling event; however, they were lower than the previous groundwater sampling events completed in July and October 2017. The groundwater quality in that area seems to have improved since 2017. Natural attenuation is likely occurring and concentrations of PHCs appear to be decreasing with time.

Elevated concentrations of ethylbenzene, methylnaphthalene and naphthalene were observed downstream of the Main Landfill (APEC 9) (MW17-22A); however, they were lower or within the same range than the previous groundwater sampling events completed in July and October 2017, July and September 2018 and July 2019. The groundwater quality in that area seems to have improved since 2017. Natural attenuation is likely occurring and concentrations of PHCs appear to be decreasing with time.

### 6.3 Background Metals Groundwater Investigation

The Site investigation work completed by Wood during the 2017 to 2020 field seasons identified elevated concentrations of dissolved metals: aluminum, antimony, cobalt, manganese, iron, lithium, uranium and arsenic in groundwater. Groundwater wells with elevated concentrations of metals are shown in Figures 13 to 18 (see Appendices).

In 2020, Wood completed additional groundwater sampling to supplement the existing dataset. The 2020 sampling focused on groundwater wells that are considered representative of background conditions (Upstream). Wood also sampled groundwater wells located within areas where mining activity occurred (Midstream) and where PAG material was placed, in ore processing areas and in concentrate storage areas. Additionally, Wood sampled groundwater wells that are considered to be located downgradient of historical mining activity (Downstream). The following Table 7 summarizes the groundwater wells sampled during the period of 2017 and 2020 and their classification in regards to an upstream, downstream and midstream location. The geology that the well screen has been installed in is also included in Table 7.



**Table 7: Summary of Well Location and Geology at Well Screen**

<b>APEC / AEC #</b>	<b>Monitoring Well</b>	<b>Location</b>	<b>Geology at Well Screen</b>
AEC 1: Mill / 10 Level Portal	MW17-01A	Midstream	Bedrock
AEC 1: Mill / 10 Level Portal	MW17-01B	Midstream	Overburden
AEC 1: Mill / 10 Level Portal	MW17-02A	Midstream	Bedrock
AEC 1: Mill / 10 Level Portal	MW17-02B	Midstream	Bedrock
AEC 1: Mill / 10 Level Portal	MW17-03	Midstream	Bedrock
AEC 1: Mill / 10 Level Portal	MW17-04A	Midstream	Bedrock
AEC 1: Mill / 10 Level Portal	MW17-04B	Midstream	Overburden
AEC 1: Mill / 10 Level Portal	MW17-05A	Midstream	Bedrock
AEC 1: Mill / 10 Level Portal	MW17-05B	Midstream	Bedrock
AEC 1: Mill / 10 Level Portal	MW17-06A	Midstream	Bedrock
AEC 1: Mill / 10 Level Portal	MW17-06B	Midstream	Bedrock
AEC 1: Mill / 10 Level Portal	MW17-07A	Midstream	Bedrock
AEC 1: Mill / 10 Level Portal	MW17-07B	Midstream	Bedrock
AEC 1: Mill / 10 Level Portal	MW17-08A	Midstream	Bedrock
AEC 1: Mill / 10 Level Portal	MW17-08B	Midstream	Overburden
APEC 10: Burial Site 1	MW17-09A	Midstream	Bedrock
APEC 10: Burial Site 1	MW17-09B	Midstream	Overburden
APEC 6: Septic Field	MW17-10A	Midstream	Bedrock
APEC 6: Septic Field	MW17-10B	Midstream	Overburden
Stonehouse Creek	MW17-11A	Downstream	Bedrock
Stonehouse Creek	MW17-11B	Downstream	Bedrock
AEC 2: Tank Farm / Fuel Lines	MW17-12A	Midstream	Overburden
AEC 2: Tank Farm / Fuel Lines	MW17-12B	Midstream	Overburden
AEC 2: Tank Farm / Fuel Lines	MW17-13	Midstream	Overburden
APEC 12: Burial Site 2	MW17-14A	Midstream	Overburden
APEC 12: Burial Site 2	MW17-14B	Midstream	Overburden
Burial Site 2 Upstream	MW17-15A	Upstream	Overburden
Burial Site 2 Upstream	MW17-15B	Upstream	Overburden
AEC 2: Tank Farm / Fuel Lines	MW17-16	Midstream	Overburden



APEC / AEC #	Monitoring Well	Location	Geology at Well Screen
AEC 2: Tank Farm / Fuel Lines	MW17-17A	Midstream	Overburden
AEC 2: Tank Farm / Fuel Lines	MW17-17B	Midstream	Overburden
TSF	MW17-18A	Downstream Tailings	Bedrock
TSF	MW17-18B	Downstream Tailings	Overburden
TSF	MW17-19A	Upstream	Overburden
TSF	MW17-19B	Upstream	Overburden
TSF	MW17-20A	Downstream Tailings	Bedrock
TSF	MW17-20B	Downstream Tailings	Overburden
Sky Creek Drainage	MW17-21A	Upstream	Overburden
Sky Creek Drainage	MW17-21B	Upstream	Overburden
AEC 5: Main Landfill	MW17-22A	Downstream Tailings	Bedrock
AEC 5: Main Landfill	MW17-22B	Downstream Tailings	Overburden
TSF	MW17-23A	Downstream Tailings	Bedrock
TSF	MW17-23B	Downstream Tailings	Overburden
Sky Creek Drainage	MW17-24A	Downstream Tailings	Bedrock
Sky Creek Drainage	MW17-24B	Downstream Tailings	Overburden
Tailings Impoundment	MW17-25A	Downstream Tailings	Bedrock
Tailings Impoundment	MW17-25B	Downstream Tailings	Overburden
Johnny Creek Drainage	MW17-26A	Upstream	Overburden
Johnny Creek Drainage	MW17-26B	Upstream	Overburden
AEC 6: Airstrip	MW17-27A	Midstream	Bedrock
AEC 6: Airstrip	MW17-27B	Midstream	Bedrock
Stonehouse Creek	MW17-28	Downstream	Overburden

Using the upstream, midstream and downstream classification in Table 7 and the concentrations at each sample location presented in the attached Table 12, Wood prepared boxplots for each sampling location for select metals. The box plots and the data used to generate the box plots are presented as Appendix C. Box plots are generally evaluated against each other by determining if the boxes overlap with each other or if the median value overlaps with the box generated by the plots. The background concentrations were considered using the upstream monitoring wells concentrations. An increase in dissolved metals concentrations between background locations and midstream locations could indicate the groundwater has been impacted by mining activities.



The following sections discuss metal parameter and evaluate if the observed exceedances can be attributed to background or should be carried forward as a COC for groundwater. For discussion purposes, results were also compared to the Contaminated Sites Regulation (CSR) (BC Regulation 375/96, last amended January 24, 2019, BC Reg. 13/2019) Freshwater Aquatic Life use (AW<sub>F</sub>) standards. Wood notes that the CSR standards are not applicable to the core area of a permitted mine and this comparison has been used as a screening tool to focus on parameters that may require additional investigation.

### 6.3.1 Antimony

The box plots for antimony and the data used to generate the box plots are presented as Appendix C. The plots generated from the upstream areas show that the data obtained is within the background box plot range. The box plots generated for the midstream areas show that the data obtained from sampling locations MW17-01, MW17-02, MW17-08, MW17-12, and MW17-25 are outside of the background box plot range. The box plots generated for the downstream areas show that the data obtained from sampling locations MW17-27 are outside of the background box plot range.

Concentrations of antimony from sample location MW17-01, MW17-02, MW17-08, MW17-12, MW17-25 and MW17-27 are less than BC CSR AW<sub>F</sub> standard of 90 µg/L.

Additionally, groundwater wells MW17-27A and MW17-25A were resampled on August 25 and 28, 2020 and reported results of 0.98 µg/L and 1.18 µg/L, respectively. Monitoring well MW17-27B was not resampled in 2020. Groundwater well MW17-08A has not been sampled since July 24, 2017. Groundwater sample from monitoring well MW17-08A contained antimony concentrations of 6.37 µg/L, well below the CSR AW<sub>F</sub> standard of 90 µg/L.

### 6.3.2 Arsenic

The box plots for arsenic and the data used to generate the box plots are presented as Appendix C. The box plots generated for the midstream areas show that the data obtained from sampling location MW17-12 are outside of the background box plot range. The box plots generated for the downstream areas show that the data obtained from sampling locations MW17-24, MW17-27 and MW17-28 are outside of the background box plot range.

Concentrations of arsenic from sample location MW17-12, MW17-24, MW17-27A and MW17-28 are less than BC CSR AW<sub>F</sub> standard of 50 µg/L.

Monitoring well MW17-27A contained an arsenic concentration of 32.1 µg/L during the July 24, 2017 sampling event. Groundwater well MW17-27A was resampled on July 16, 2019 and August 28, 2020 and reported results were respectively 2.4 µg/L and 2.94 µg/L.

### 6.3.3 Uranium

The box plots for uranium and the data used to generate the box plots are presented as Appendix C. The box plots generated for the midstream areas show that the data obtained from sampling locations MW17-1, MW17-2, MW17-3, MW17-10 and MW17-12 are outside of the background box plot range. The box plots generated for the downstream areas show that the data obtained from sampling locations, MW17-11 and MW17-28 are outside of the background box plot range.

Concentrations of uranium from sample locations MW17-1, MW17-2, MW17-3, MW17-10, MW17-12, MW17-11 and MW17-28 are less than BC CSR AW<sub>F</sub> standard of 85 µg/L. Monitoring well MW17-09A

contained a uranium concentration of 39.1 µg/L. Groundwater well MW17-09A was previously sampled for uranium on July 28, 2017, July 2, 2018 and November 18 2018 and July 16, 2019 and the results were 11.7 µg/L, 0.079 µg/L, 1.95 µg/L and 12.8 µg/L, respectively. Monitoring well MW17-09A was resampled on August 20, 2020 and the reported result is 5.94 µg/L.

### 6.3.4 Iron

The box plots for iron and the data used to generate the box plots are presented as Appendix C. The box plots generated for the midstream areas show that the data obtained from sampling locations MW17-4, MW17-5, MW17-9, MW17-13 and MW17-14 are outside of the background box plot range. The box plots generated for the downstream areas are within the background box plot range.

No BC CSR AW<sub>F</sub> standard apply for iron. Groundwater well MW17-05B was resampled for iron on July 17, 2019 and September 5, 2019 and the results were 533 µg/L and 846 µg/L, respectively. Monitoring well MW17-05B was resampled on August 23, 2020 and the reported result is 390 µg/L.

### 6.3.5 Lithium

The box plots for lithium and the data used to generate the box plots are presented as Appendix C. The box plots generated for the midstream areas are within the background box plot range. The box plots generated for the upstream areas are within the background box plot range. No BC CSR AW<sub>F</sub> standard apply for lithium.

However, monitoring wells MW17-09A and MW17-24A located midstream contained a lithium concentration of 8.5 µg/L and 8.4 µg/L, respectively. Monitoring well MW17-21A located upstream contained a lithium concentration of 8.5 µg/L during the August 2020 sampling event. Monitoring well MW17-09A contained a lithium concentration of 9.1 µg/L during the July 24, 2017 sampling event. Groundwater well MW17-09A was previously sampled for lithium on July 28, 2017, July 2, 2018, November 18, 2018 and July 17, 2019 and the results were <50 µg/L, <1.0 µg/L, 7.5 µg/L and 7.3 µg/L, respectively. Groundwater well MW17-24A was previously sampled for lithium on July 23, 2017, July 15, 2019 and September 4, 2019 and the results were <50 µg/L, 7.6 µg/L and 7.2 µg/L, respectively.

### 6.3.6 Cobalt

The box plots for cobalt in groundwater and the data used to generate the box plots are presented as Appendix C. Wood was provided with laboratory reports containing metals analysis of surface water samples collected across the mine site by Environmental Resources Management (ERM). Using the surface water data, Wood generated similar box plots showing the cobalt concentrations in surface water at various sampling points. The box plots and the data used to generate the surface water box plots are presented as Appendix C.

The box plots generated for the midstream areas show that the data obtained from sampling locations MW17-05, MW17-06 and MW17-09 are outside of the upstream box plot range. The box plots generated for the downstream areas show that the data obtained from sampling location MW17-27 is outside of the upstream box plot range.

Based on the surface water data, it is likely that surface water migrating through mine impacted areas is either the source or a contributor to the elevated cobalt concentrations in groundwater. Table 8 below shows the sampling events where elevated cobalt was identified.

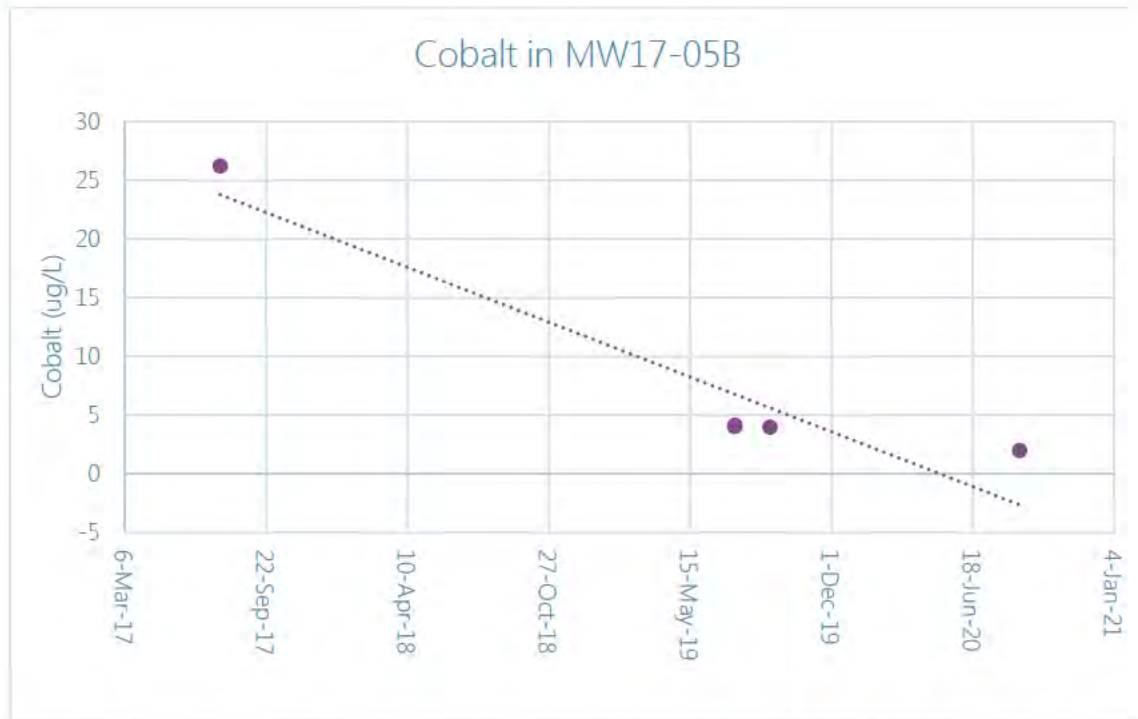


**Table 8: Summary of Elevated Cobalt**

APEC	Monitoring Well	Sample Date	Location	Geology	Cobalt (µg/L)
AEC 1: Mill / 10 Level Portal	MW17-05B	19-Jul-17	Midstream	Bedrock	26.2
AEC 1: Mill / 10 Level Portal	MW17-05B	17-Jul-19	Midstream	Bedrock	3.99
AEC 1: Mill / 10 Level Portal	MW17-05B (DUP)	17-Jul-19	Midstream	Bedrock	4.1
AEC 1: Mill / 10 Level Portal	MW17-05B	5-Sep-19	Midstream	Bedrock	3.94
AEC 1: Mill / 10 Level Portal	MW17-05B	23-Aug-20	Midstream	Bedrock	1.94
AEC 1: Mill / 10 Level Portal	MW17-06B	19-Jul-17	Midstream	Bedrock	1.64
APEC 10: Burial Site 1	MW17-09A	2-Jul-18	Midstream	Bedrock	14.6
APEC 10: Burial Site 1	MW17-09B	24-Jul-17	Midstream	Overburden	8.04
APEC 10: Burial Site 1	MW17-09B	2-Jul-18	Midstream	Overburden	8.38
APEC 10: Burial Site 1	MW17-09B	18-Nov-18	Midstream	Overburden	15.8
APEC 10: Burial Site 1	MW17-09B	17-Jul-19	Midstream	Overburden	13.8
APEC 10: Burial Site 1	MW17-09B	23-Aug-20	Midstream	Overburden	2.96
AEC 6: Airstrip	MW17-27A	28-Aug-20	Downstream	Overburden	1.44
AEC 6: Airstrip	MW17-27B	24-Jul-17	Downstream	Bedrock	1.9
AEC 6: Airstrip	MW17-27B	16-Jul-19	Downstream	Bedrock	1.27

Cobalt concentrations were all less than BC CSR AW<sub>F</sub> standard of 40 µg/L. However, a groundwater sample collected from monitoring well MW17-05B contained a cobalt concentration of 26.2 µg/L. Groundwater well MW17-05B was subsequently resampled for cobalt on July 17, 2019, September 5, 2019 and August 23, 2020, and the results were 3.99 µg/L, 3.94 µg/L, and 1.94 µg/L respectively. A blind duplicate groundwater sample was submitted for laboratory analysis on July 19, 2017 that contained a concentration of cobalt of 4.1 µg/L. The measured concentrations of cobalt in monitoring well MW17-05B are plotted on Chart 3 along with a linear trend line. The general trend appears to be that cobalt concentrations are decreasing over time in monitoring well MW17-05B.





**Chart 3: Cobalt Concentrations in MW17-05B (AEC 1: Mill / 10 Level Portal)**

As the subsequent analysis of groundwater from monitoring well MW17-05B indicates that the cobalt is not elevated, it is confirmed that cobalt will not be carried forward as a COC.

### 6.3.7 Manganese

The box plots for manganese in groundwater and the data used to generate the box plots are presented as Appendix C. Wood was provided with laboratory reports containing metals analysis of surface water samples collected across the mine site by RTEC. Using the surface water data, Wood generated similar box plots showing the manganese concentrations in surface water at various sampling points.

The box plots generated for the midstream areas show that the data obtained from sampling locations MW17-02, MW17-03, MW17-04, MW17-05, MW17-06, MW17-09, MW17-10 and MW17-13 are outside of the background box plot range. The box plots generated for the downstream areas show that the data obtained from sampling location MW17-11 is outside of the background box plot range. No BC CSR AWF standard apply for manganese.

Based on a review of box plots, it appears that there is elevated manganese in groundwater. Surface water migrating through mine impacted areas is a potential contributor to the elevated manganese concentrations in groundwater. Another potential source of elevated manganese concentrations at the Site may be related to elevated concentrations of hydrocarbons in some monitoring wells. Natural attenuation of hydrocarbons depletes dissolved oxygen in groundwater resulting in the reductive dissolution of manganese from soil. The resulting increase in manganese in groundwater is generally considered a short-term phenomenon as it is expected to precipitate out when aerobic conditions return after the hydrocarbon plume has sufficiently attenuated.

Elevated concentrations of manganese were observed at the groundwater wells MW17-04, MW17-06, MW17-09 and MW17-13 that were impacted with hydrocarbons or PAHs.



Chart 4 shows the concentration of manganese in monitoring wells MW17-04B, MW17-05B, MW17-06B, MW17-9A, MW17-9B, MW17-13 and MW17-14A.

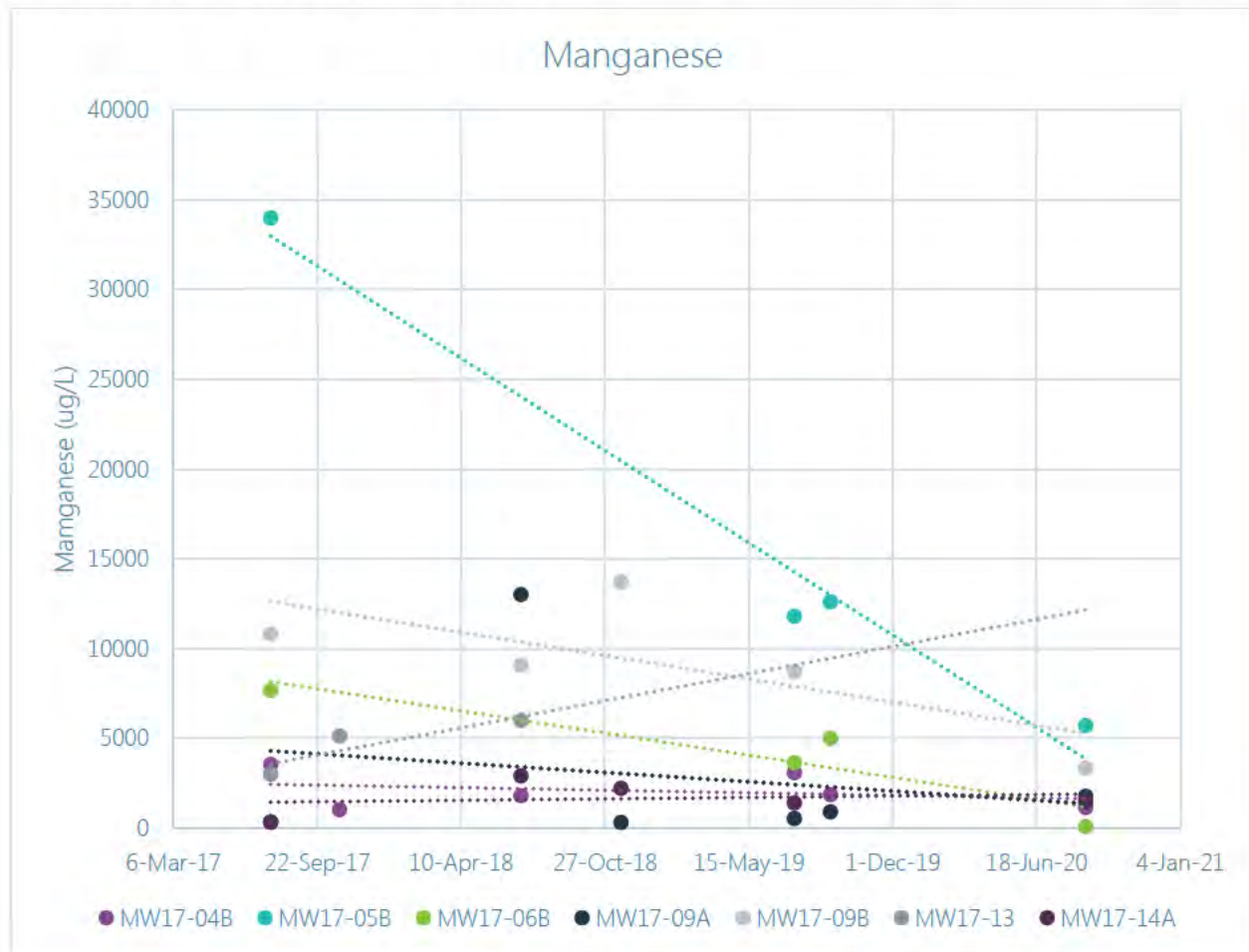


Chart 4: Manganese Concentrations in Groundwater

### 6.3.8 Landfill Compliance Groundwater Monitoring

Permit PR-7927 authorizing the discharge of waste to the Main Landfill includes provisions for annual groundwater monitoring for a period of five years starting in the summer of 2018. The permit requires annual groundwater sampling be conducted at MW17-22A and MW17-22B during summer months. Groundwater quality monitoring parameters include:

- **Field Parameters:** specific electrical conductivity, temperature, ORP, and pH; and
- **Analytical Parameters:** BTEX, EPH, PAH, dissolved metals, pH, alkalinity, bicarbonate, carbonate, chloride, electrical conductivity (EC), fluoride, hardness, hydroxide, total iron, total magnesium, total manganese, nitrate, nitrite, ammonia, total potassium, total sodium, sulphate, TDS, TIC, TOC, COD and turbidity, acidity (hot peroxide titration) and cyanides (weak acid dissociable (WAD), free, total, cyanate and thiocyanate).

Light-end petroleum hydrocarbon (BTEX) concentrations were detectable in the groundwater samples from the deep well (MW17-22A) in 2018 and 2019; however, elevated concentrations of toluene and xylenes were not identified in the 2020 sampling event, as it was during the previous groundwater sampling event. Concentrations of ethylbenzene were observed but were more than three times lower

than the one observed in 2019. Concentrations of BTEX were not detected in the groundwater samples from the shallow well (MW17-22B). Concentrations of heavier end hydrocarbons (VH<sub>w</sub>, LEPH<sub>w</sub>) were not detected in groundwater samples collected from the shallow well (MW17-22B) or in the deep well (MW17-22A) in 2020, confirming the results of 2019. Concentrations of naphthalene in groundwater from MW17-22A were elevated in 2020; and measured concentrations were slightly higher than the 2019 sampling events. However, the concentrations were still lower than those observed in 2017 and 2018. No PAHs were detected in the shallow well (MW17-22B). Concentrations of ethylbenzene, xylenes and naphthalene in groundwater at the deep well (MW17-22A) demonstrate a steady declining trend over time which is likely attributed to the natural attenuation of a finite and localized source.

Concentrations of dissolved metals in the groundwater samples from MW17-22A and MW17-22B were reported at low levels for all sampling events in 2017, 2018, 2019 and 2020. The measured dissolved metals concentrations from the 2020 sampling are consistent with concentrations observed during the previous Site Investigation.

Total metals in groundwater samples were analysed in 2019 and 2020. The results indicated that the groundwater sample collected from the shallow groundwater well MW17-22B contained an elevated concentration of total cobalt in 2019. In 2020, cobalt concentration was lower than the MDL. Total metals were detected at concentrations generally higher compared to 2019 results for MW17-22A, and at concentrations generally lower compared to 2019 results for MW17-22B. It should be noted that analysis of dissolved metals in groundwater well MW17-22B in 2017, 2018, 2019 and 2020 did not identify elevated concentrations of metals.

All cyanide species were reported at low concentrations in groundwater samples collected from both MW17-22A and MW17-22B during the 2017, 2018, 2019 and 2020 sampling events.

## 6.4 Surface Water Investigation

Surface water sample SW20-02 located at AEC 1 (Mill – 10 Level Portal) contained a detectable concentration of methylnaphthalene.

## 7.0 Conclusions

The following conclusions were made during this assessment as they relate to the objectives and scope of work defined in Sections 2.0 and 3.0.

### 7.1 Physical Remediation – Soil Hydrocarbon Contamination

In 2020, Wood completed a year-end sampling of Treatment Area 1 and Treatment Area 2 to determine the effectiveness of the remediation program. Based on the results of the 2020 soil sampling and the data collected during the 2017 SI, 2018 SSI and 2019 SSI, concentrations of LEPH have decreased significantly as shown in the following tables.

**Treatment Area 1 – 95<sup>th</sup> Percentile Over Time**

Sampling Event	95 <sup>th</sup> Percentile (mg/kg)	Average Concentration (mg/kg)
2017 In-Situ (LEPH)	3748	3138
2018 (Year End) LEPH	3582	1857
2019 (Mid-Year) LEPH	2005	1217
2019 (Year End) LEPH	1394	738
2020 (Year End) LEPH	1164	710

**Treatment Area 2 – 95<sup>th</sup> Percentile 2019 Year End Sampling**

Sampling Event	95 <sup>th</sup> Percentile (mg/kg)	Average Concentration (mg/kg)
2017 In-Situ (LEPH)	3748	3138
2019 (Year End) LEPH	2772	1619
2020 (Year End) LEPH	1292	813

### 7.2 Groundwater Sampling Program - Hydrocarbons

Groundwater impacted by petroleum hydrocarbons was identified at AEC 1 and AEC 2. LNAPL was identified at monitoring well MW17-17B. Soil impacted by petroleum hydrocarbons has also been identified at those AECs during previous assessments. Contamination identified within those AECs have impacted groundwater quality.

Concentrations observed in 2020 for PAHs downstream of the TSF (MW17-20A) were lower than the previous groundwater sampling events completed in July and October 2017. The groundwater quality in that area has improved since 2017. Natural attenuation is present and concentrations are decreasing with time.

Concentrations observed in 2020 for BTEX and PAHs at the Main Landfill (APEC 9) (MW17-22A) were lower than the previous groundwater sampling events completed in July and October 2017. The groundwater quality in that area has improved since 2017. Natural attenuation is present and concentrations are decreasing with time.

### 7.3 Background Groundwater Assessment

The 2017 to 2020 field investigations identified elevated concentrations of dissolved metals: antimony, cobalt, manganese, cadmium, copper, lithium, iron, uranium and arsenic in groundwater. An assessment of background concentrations of dissolved metals has indicated that antimony, arsenic, uranium, iron, lithium, cobalt and manganese are elevated compared to background concentrations and could be attributed to historical mining activities. Wood observed that the concentrations of dissolved metals are generally decreasing over time. When compared to the CSR, many of the dissolved metals concentrations that are elevated are still less than CSR AW<sub>F</sub>. Based on observed concentrations compared to background, manganese appears to be the remaining dissolved metals that would require further assessment.

Elevated dissolved concentrations of manganese appear to be associated with the AEC 1 – Mill Building and 10 Level Portal; however, elevated manganese was also identified at APEC 10 – Burial Site # 1, APEC 12 – Burial Site # 2 and at AEC 2 – Tank Farm and Fuel Line area. The location where elevated manganese is identified were all in disturbed areas and the highest concentrations were found around the AEC 1 – Mill Building and 10 Level Portal.

### 7.4 Surface Water Sampling

Surface water sample SW20-02, located at AEC 1 (Mill – 10 Level Portal), contained a detectable concentration of methylnaphthalene. It has not been determined if the detectable concentration can be related to former activities at AEC 1 or were introduced during laboratory testing. Traces of contaminants are commonly introduced during laboratory testing; however, the concentrations are not considered significant by the lab if they are less than a pre-determined limit. Wood recommends to re-sample this location during the next field season for analysis of methylnaphthalene to confirm the detection in surface water.

### 7.5 Summary of APECs and AECs

Based on the results of the 2020 SSI, the following APECs/AECs in the table below are recommended to be carried forward for additional assessment and/or remediation work.

Summary of AECs and Associated PCOCs and COCs

Initial APEC	Description	2019 Classification	Contaminant Type	Potential contaminants of concern (PCOCs) <sup>1</sup>	Contaminants of Concern (COCs) <sup>2</sup>
APEC 1	Mill / 10 Level Portal	AEC 1	Diesel fuel and lubricants	Groundwater: cobalt, manganese	Soil: heavy extractable petroleum hydrocarbons (HEPH)  Groundwater: manganese, acenaphthene, methylnaphthalene, LEPH <sub>w</sub> , extractable petroleum hydrocarbons (EPH <sub>w10-19</sub> )
APEC 2 / APEC 14	Tank Farm Area / Fuel Lines	AEC 2	Diesel fuel, aviation fuels and possibly	Groundwater: manganese	Soil: volatile petroleum hydrocarbons (VPH <sub>s</sub> ), LEPH <sub>s</sub>  Groundwater: Groundwater: manganese, LNAPL,



Initial APEC	Description	2019 Classification	Contaminant Type	Potential contaminants of concern (PCOCs) <sup>1</sup>	Contaminants of Concern (COCs) <sup>2</sup>
			gasoline, waste rock		methylnaphthalene and LEPH <sub>w</sub>
APEC 4	Fuel Pump Shed	AEC 3	Diesel fuel and Avgas		Soil: LEPH
APEC 5	Mechanical Shop / 11 Level Portal	AEC 4	Fuels, lubricants, and waste rock storage		Soil: toluene, xylenes, VPHs, LEPH and HEPH
APEC 9	Main Landfill	AEC 5	Inferred to be diesel fuel	-	Groundwater: BTEX, LEPHW, methylnaphthalene, naphthalene and metals
APEC 10	Burial Site 1 (Fmr. Chalet)	APEC 10	Waste rock	Groundwater: manganese	Groundwater: manganese
APEC 11	Airstrip	AEC 6	Waste rock	Groundwater: metals	-
APEC 12	Burial Site #2	APEC 12	Contents of burial site, waste rock	Groundwater: manganese	Groundwater: manganese
APEC 13	Warehouse East Area	AEC 7	Stored / used fuel and lubricants	Groundwater: BTEX, LEPH <sub>w</sub> , naphthalene and metals	Soil: LEPH, HEPH

**Notes:**

- <sup>1</sup> Elevated metal concentrations in soil are expected across the surface of a mine site. Elevated metals in soil may need to be addressed through determining background concentrations or through a risk assessment.
- <sup>2</sup> Note, PAG material is identified in other locations within the mine site; however, those areas have been identified by SnipGold and are scheduled for removal to the TSF. This has been included as an APEC due to potential for metals leaching.



## 8.0 Closure

This report was prepared exclusively for SnipGold Corporation by Wood Environment & Infrastructure Solutions (Wood). The information, conclusions and estimates contained in this report are based exclusively on: i) information available at the time of preparation, ii) the accuracy and completeness of data supplied by the Client or by third parties as instructed by the Client, and iii) the assumptions, conditions and qualifications/limitations set forth in this report.

The field work completed in this program was completed in general accordance with industry standards with limits imposed by existing infrastructure and site conditions. Interpretations and conclusions made within this report were based upon the field work and discussions with SnipGold Corporation staff.

This report has been prepared in accordance with generally accepted practices in the environmental industry. No other warranty, expressed or implied, is made.

Respectfully submitted,

**Wood Environment & Infrastructure Solutions**  
a Division of Wood Canada Limited

**Prepared by:**



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Associate Environmental Scientist

**Approved by:**



**Mario Bianchin, Ph.D., P.Geo.**  
Principal Hydrogeologist  
Group Manager,  
Environmental Engineering and Contaminants



## 9.0 References

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- Woznow D.P. and D.A. Yeager. 1999. Closure Plan for The Johnny Mountain Gold Mine, Reclamation Permit No. M-178. International Skyline Gold Corporation.



**wood.**

**Figures**



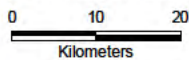


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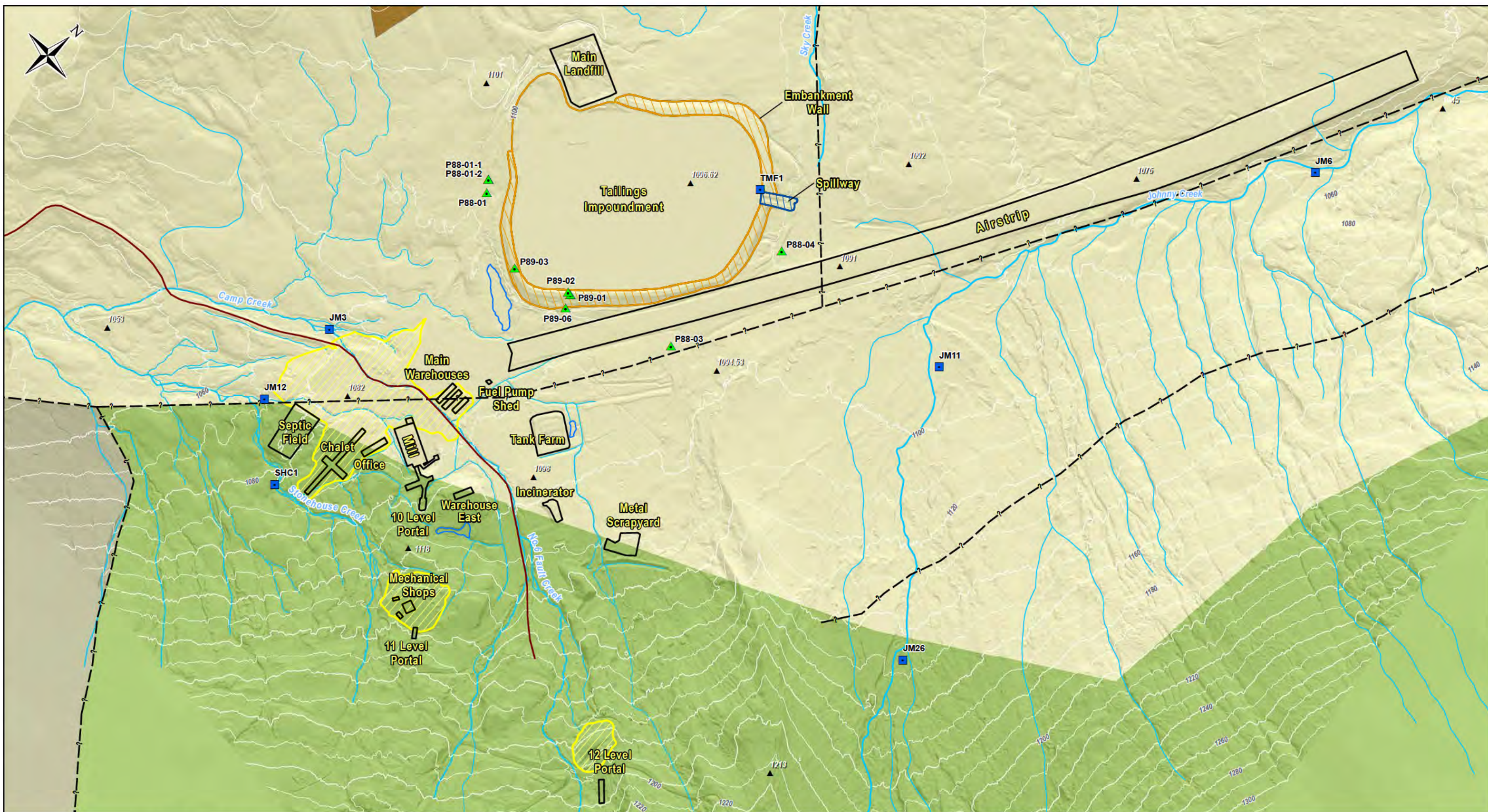
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- ⬡ Mine
- ⬢ Camp
- Laydown area
- ▲ Mountain
- Highway
- Access roads
- Watercourse
- Lake
- Protected area

References:  
 DataBC Data Distribution Service  
 Open Government License  
 (<http://www.data.gov.bc.ca/>)



CLIENT <b>SNIPGOLD CORPORATION</b>			
PROJECT <b>Johnny Mountain Mine Reclamation Project Supplementary Site Investigation Report</b>			
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COORDINATE SYSTEM NAD 1983 UTM Zone 9N	JOB No VE52655D	ANALYST PK	QA/QC AD





- Existing Piezometers
- Surface Water Station
- Spot height (m)
- Access road
- Watercourse
- LiDAR contour (10m)
- Historic Services and Facilities
- Pond
- Tailings Impoundment
- Embankment Wall
- Spillway
- Waste Rock Storage
- Estimated Fault Line

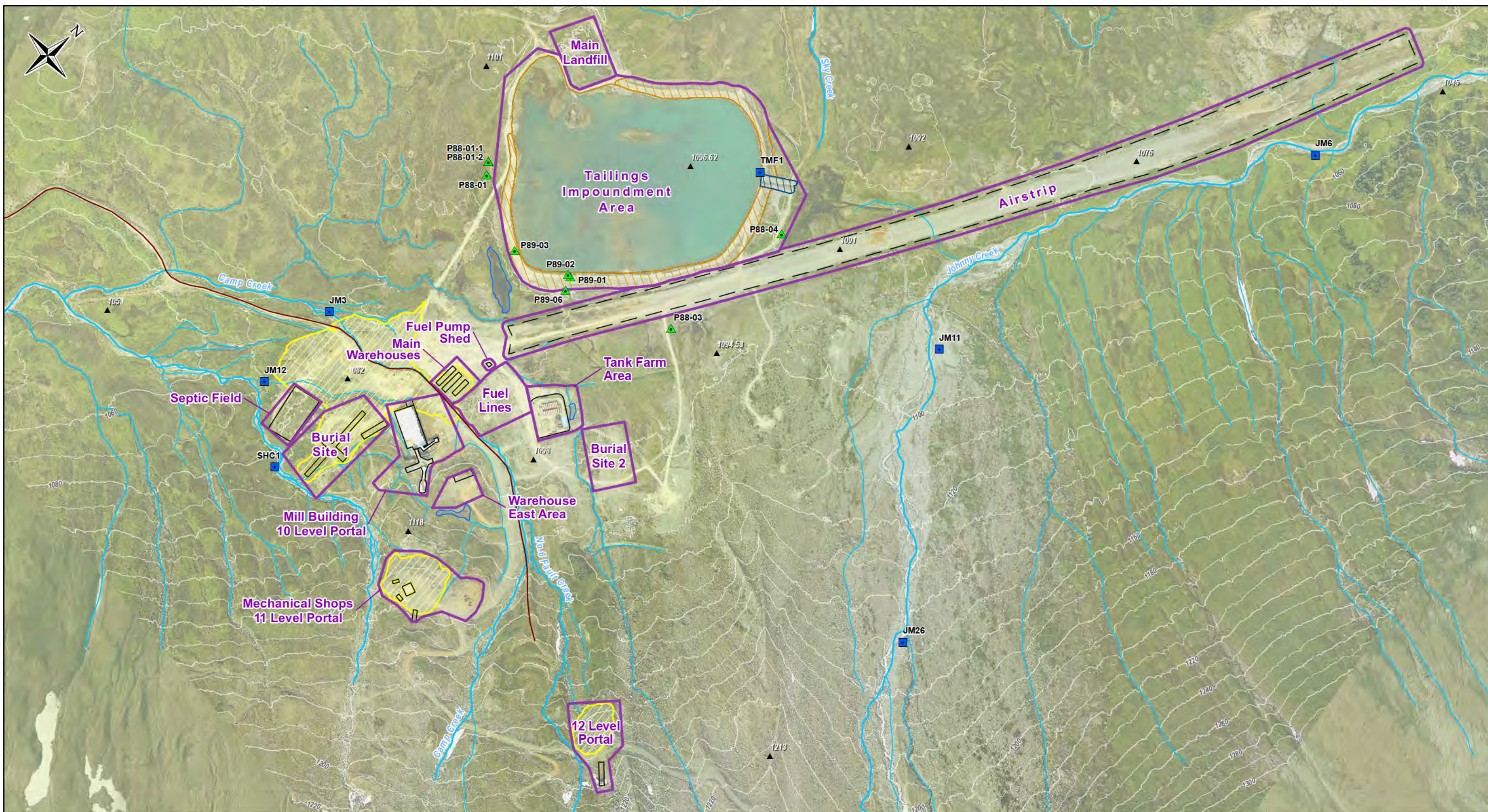
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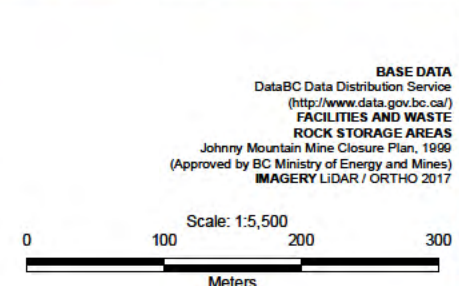


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- Legend**
- ▲ Spot height (m)
  - Access road
  - Watercourse
  - LiDAR contour (10m)
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  - Airstrip
  - ▭ Pond
  - ▭ Tailings Impoundment
  - ▨ Embankment Wall
  - ▨ Spillway
  - ▨ Waste Rock Storage
  - ▲ Existing Piezometers
  - Surface Water Station
  - ▭ Areas of Potential Environmental Concern (APECs)



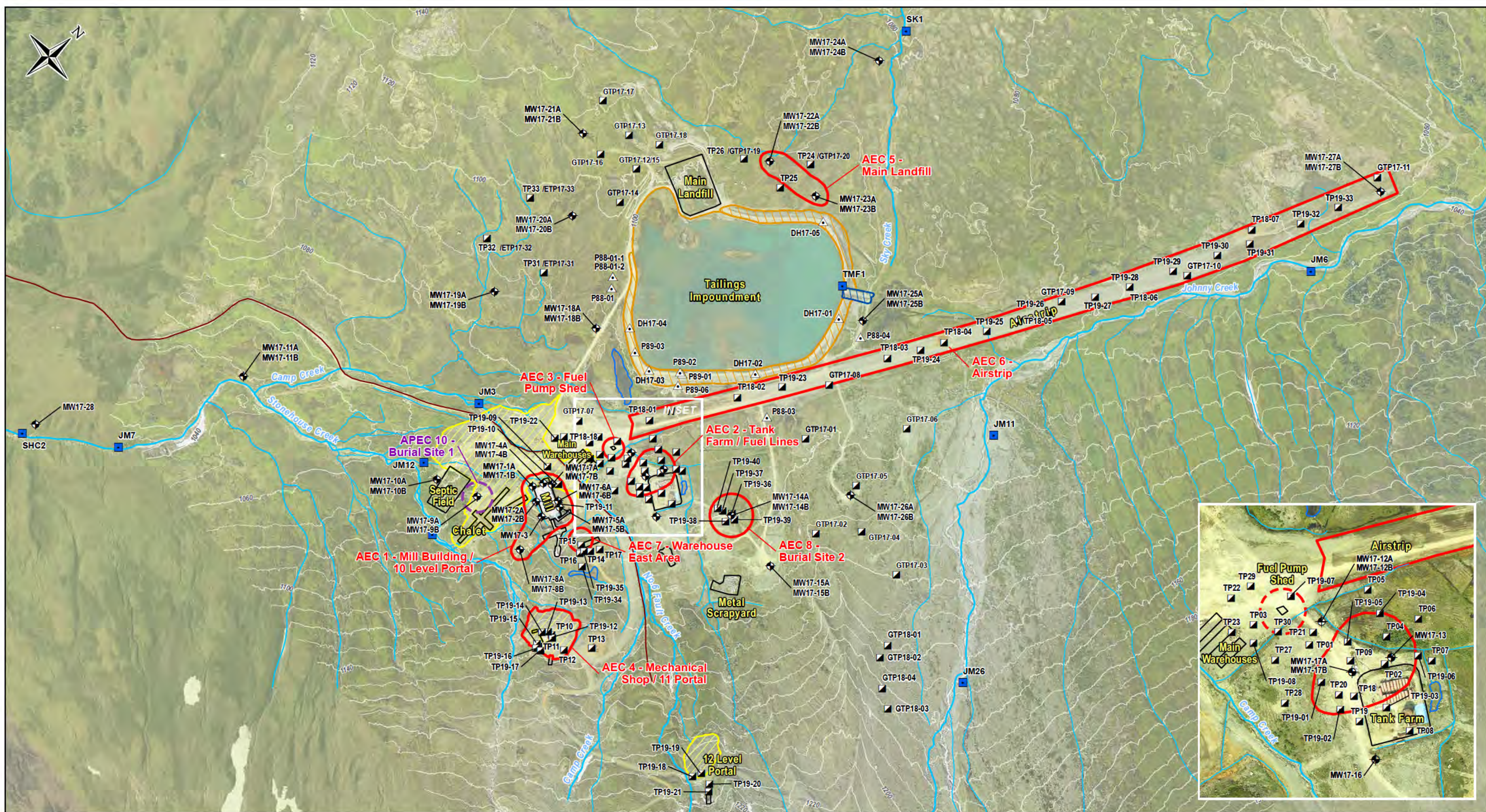
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**SNIPGOLD CORPORATION**

TITLE:  
**Site Plan and APECs**

PROJECT: <b>Johnny Mountain Mine Reclamation Project</b>			
DATE: December, 2020	ANALYST: PK	QA/QC: AD	<b>Figure 3</b>
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JOB No: VE52655D			
COORDINATE SYSTEM: NAD 1983 UTM Zone 9N			

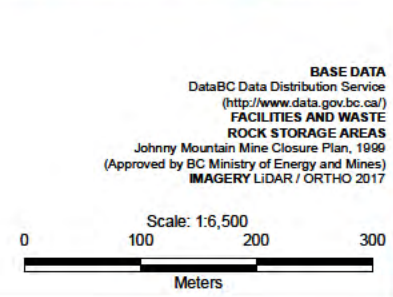


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- Legend**
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  - Watercourse
  - LiDAR contour (10m)
  - Historic Services and Facilities
  - Pond
  - Tailings Impoundment
  - Embankment Wall
  - Spillway
  - Waste Rock Storage
  - Monitoring Well
  - Test Pit
  - ▲ Piezometer
  - Surface Water Station
  - AEC
  - Undelineated extent (APEC)
- For nested wells A suffix designate Deep, B suffix designate Shallow



CLIENT:  
**SNIPGOLD CORPORATION**

TITLE:  
**Areas of Potential Environmental Concern and Areas of Environment Concern**

PROJECT:  
**Johnny Mountain Mine Reclamation Project**

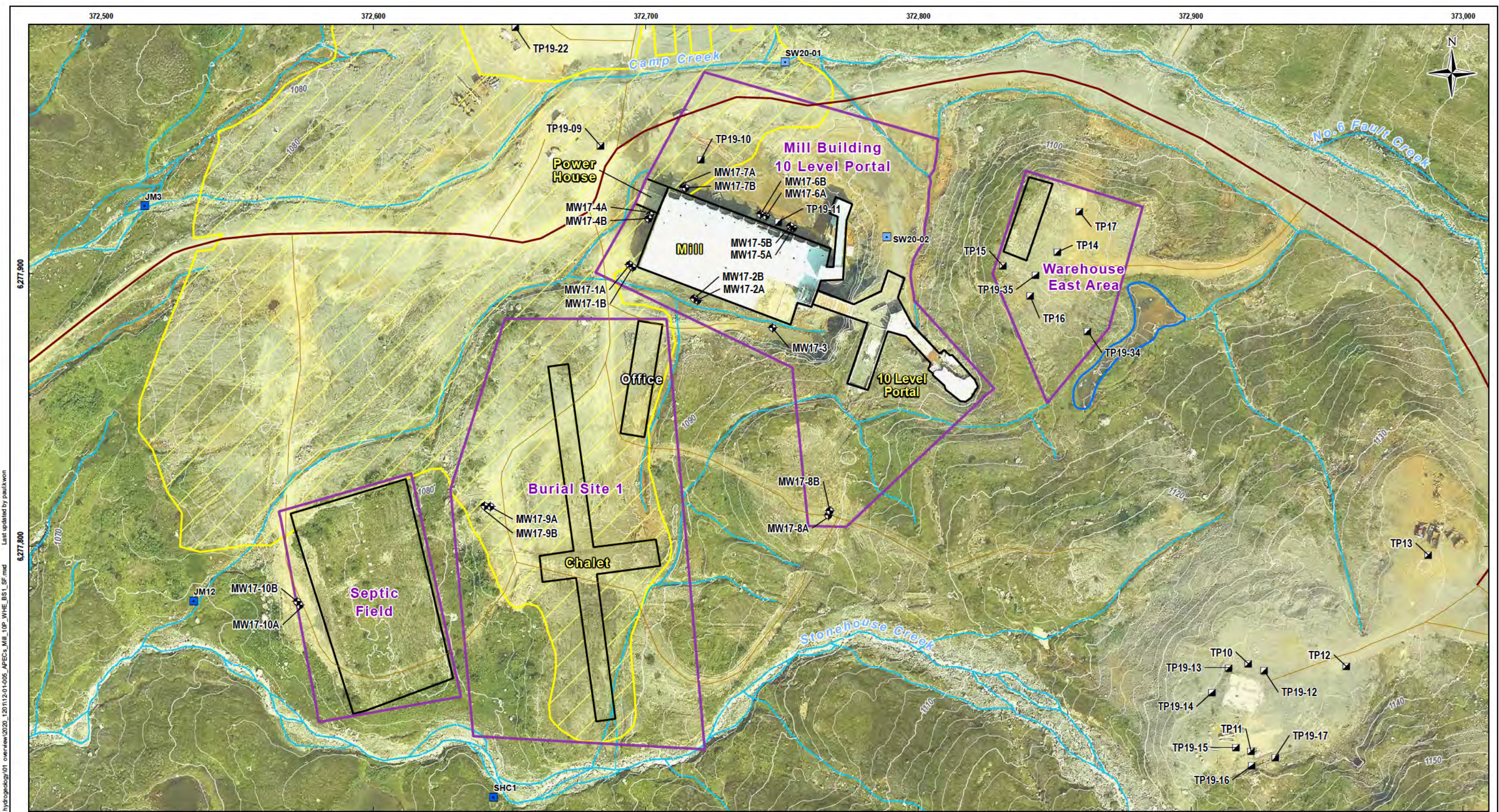
DATE: December, 2020 ANALYST: PK QA/QC: AD **Figure 4**

GIS FILE:  
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JOB No:  
VE52655D

COORDINATE SYSTEM:  
NAD 1983 UTM Zone 9N

**wood.**



**Legend**

- Access road
- Mine road
- Watercourse
- LiDAR contour (2m)
- Historic Services and Facilities
- Pond
- Waste Rock Storage
- Areas of Potential Environmental Concern (APECs)
- ⊕ Monitoring Well
- ⊠ Test Pit
- ⊠ Surface Water Station
- ⊠ Surface Water Sample

BASE DATA  
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(http://www.data.gov.bc.ca/)  
FACILITIES AND WASTE  
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(Approved by BC Ministry of Energy and Mines)  
IMAGERY LIDAR / ORTHO 2017

Scale: 1:1,300

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CLIENT:  
**SNIPGOLD CORPORATION**

TITLE:  
**Sample Location Plan:  
Mill Building / Warehouse  
Area East**

PROJECT:  
**Johnny Mountain  
Mine Reclamation Project**

DATE: December, 2020    ANALYST: PK    QA/QC: AD    **Figure 5**

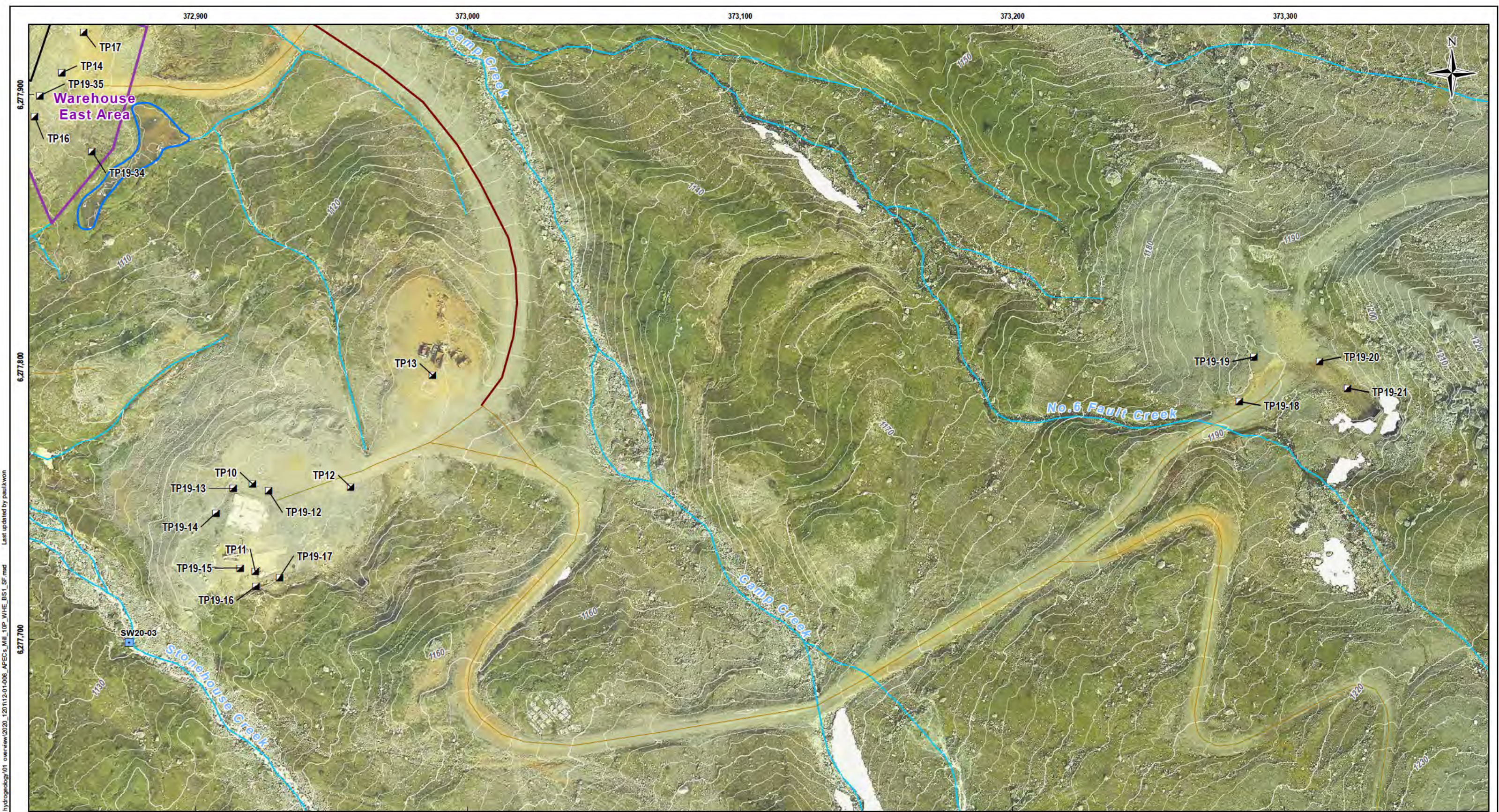
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JOB No:  
VE52655D

COORDINATE SYSTEM:  
NAD 1983 UTM Zone 9N

**wood.**

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 Last updated by paulkwon

- Legend**
- Access road
  - Mine road
  - Watercourse
  - LiDAR contour (2m)
  - Historic Services and Facilities
  - Pond
  - Waste Rock Storage
  - Areas of Potential Environmental Concern (APECs)
  - ◆ Monitoring Well
  - Test Pit
  - Surface Water Sample

BASE DATA  
 DataBC Data Distribution Service  
 (<http://www.data.gov.bc.ca/>)  
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 (Approved by BC Ministry of Energy and Mines)  
**IMAGERY LIDAR / ORTHO 2017**

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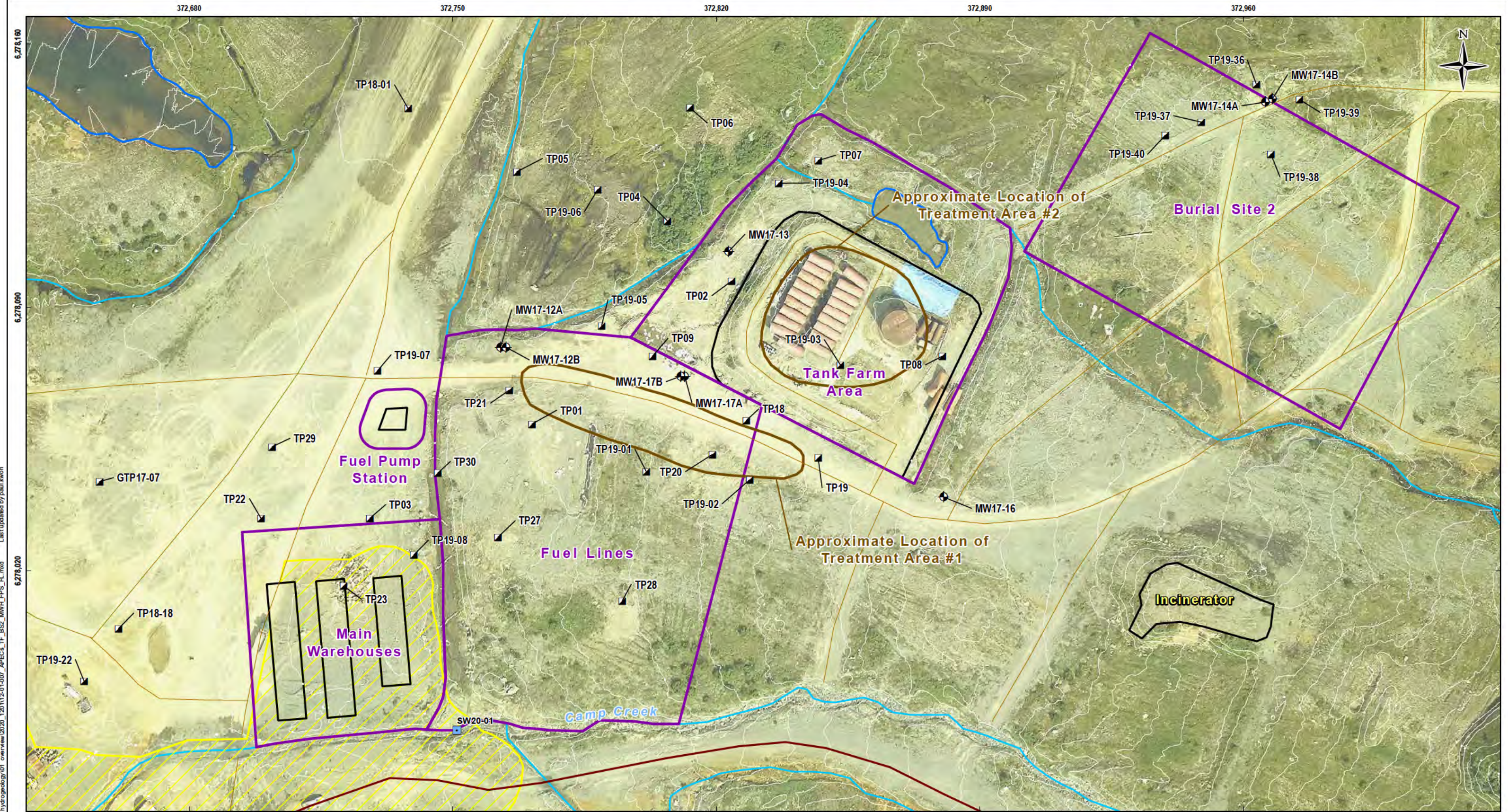
CLIENT:  
**SNIPGOLD CORPORATION**

TITLE:  
**Sample Location Plan:  
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PROJECT:  
**Johnny Mountain  
Mine Reclamation Project**

DATE: December, 2020	ANALYST: PK	QA/QC: AD	<b>Figure 6</b>
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JOB No: VE52655D			<b>wood.</b>
COORDINATE SYSTEM: NAD 1983 UTM Zone 9N			





- Legend**
- Access road
  - Mine road
  - Watercourse
  - LiDAR contour (1m)
  - Historic Services and Facilities
  - Pond
  - Waste Rock Storage
  - Areas of Potential Environmental Concern (APECs)
  - Approximate Treatment Area
  - ⊕ Monitoring Well
  - ⊠ Test Pit
  - ⊠ Surface Water Sample

BASE DATA  
DataBC Data Distribution Service  
(http://www.data.gov.bc.ca/)  
**FACILITIES AND WASTE  
ROCK STORAGE AREAS**  
Johnny Mountain Mine Closure Plan, 1999  
(Approved by BC Ministry of Energy and Mines)  
IMAGERY LIDAR / ORTHO 2017

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CLIENT:  
**SNIPGOLD CORPORATION**

TITLE:  
**Sample Location Plan:  
Tank Farm and Fuel Line  
Area / Pump Island Station**

PROJECT: <b>Johnny Mountain Mine Reclamation Project</b>			
DATE: December, 2020	ANALYST: PK	QA/QC: AD	<b>Figure 7</b>
GIS FILE: 12-01-007_APECs_TF_BS2_MWH_FPS_FL.mxd			
JOB No: VE52655D			
COORDINATE SYSTEM: NAD 1983 UTM Zone 9N			



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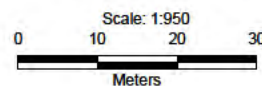
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**Legend**

-  Access road
-  Mine road
-  Watercourse
-  LiDAR contour (1m)
-  Historic Services and Facilities
-  Pond
-  Waste Rock Storage
-  Areas of Potential Environmental Concern (APECs)
-  Monitoring Well
-  Test Pit

BASE DATA  
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(http://www.data.gov.bc.ca/)  
FACILITIES AND WASTE  
ROCK STORAGE AREAS  
Johnny Mountain Mine Closure Plan, 1999  
(Approved by BC Ministry of Energy and Mines)  
IMAGERY LIDAR / ORTHO 2017



CLIENT:

**SNIPGOLD CORPORATION**

TITLE:

**Sample Location Plan:  
Burial Site 2 Downstream**

PROJECT:

**Johnny Mountain  
Mine Reclamation Project**

DATE:  
December, 2020

ANALYST:  
PK

QA/QC:  
AD

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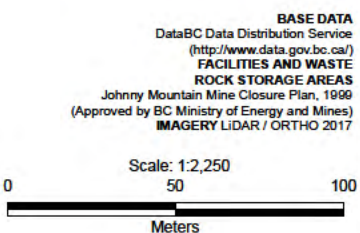
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 Last updated by paul.kwon

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  - Watercourse
  - LiDAR contour (2m)
  - Interceptor Ditch / Toe Drainage
  - ▭ Tailings Impoundment
  - ▨ Embankment Wall
  - ▩ Spillway
  - ▭ Pond
  - ▭ Areas of Potential Environmental Concern (APECs)
  - ⊕ Monitoring Well
  - ⊠ Test Pit
  - ▲ Piezometer
  - Surface Water Station



CLIENT:  
**SNIPGOLD CORPORATION**

TITLE:  
**Sample Location Plan:  
 Main Landfill / Tailings  
 Impoundment Area 1**

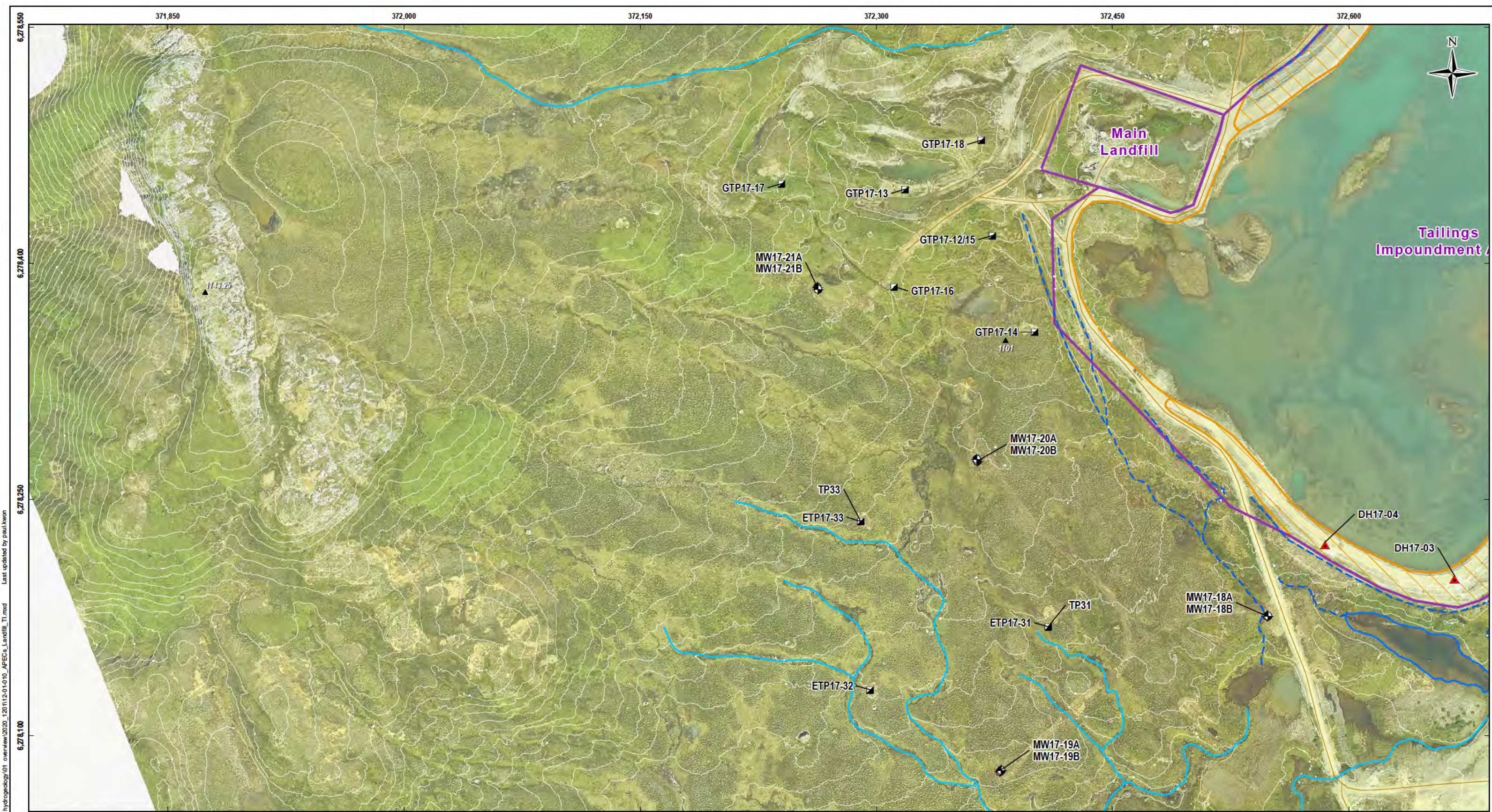
PROJECT:  
**Johnny Mountain  
 Mine Reclamation Project**

DATE: December, 2020    ANALYST: PK    QA/QC: AD    **Figure 9**

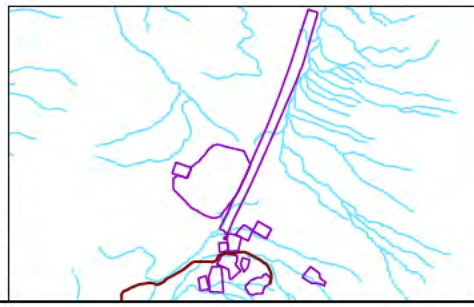
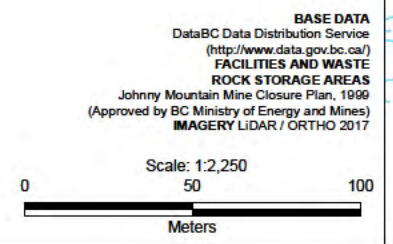
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 VE52655D

COORDINATE SYSTEM:  
 NAD 1983 UTM Zone 9N



- Legend**
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  - Mine road
  - Watercourse
  - LiDAR contour (2m)
  - Interceptor Ditch / Toe Drainage
  - ▭ Tailings Impoundment
  - ▨ Embankment Wall
  - ▩ Spillway
  - ▭ Pond
  - ▭ Areas of Potential Environmental Concern (APECs)
  - ⊕ Monitoring Well
  - ▣ Test Pit
  - ▲ Piezometer

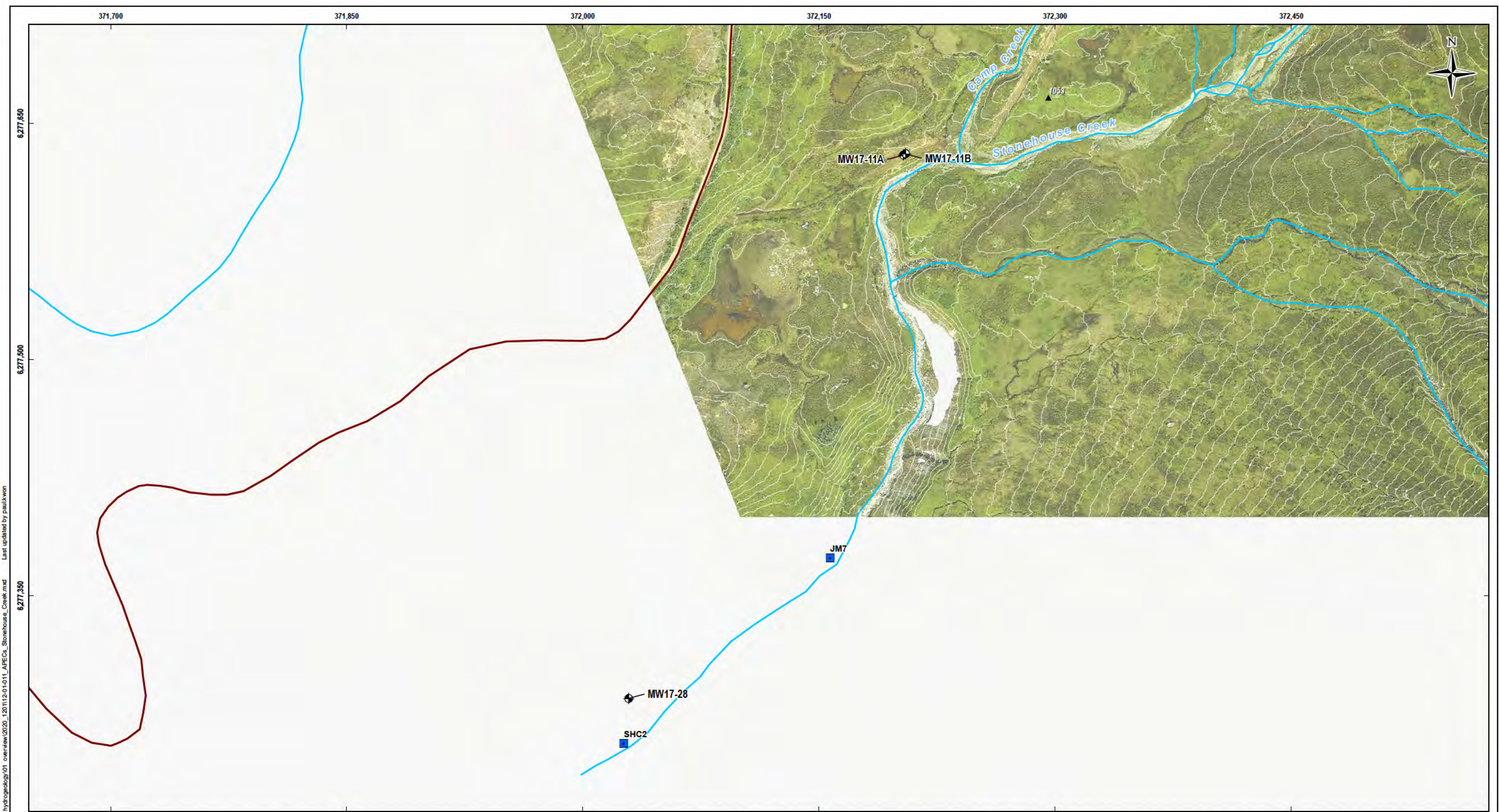


CLIENT:  
**SNIPGOLD CORPORATION**

TITLE:  
**Sample Location Plan:  
Main Landfill / Tailings  
Impoundment Area 2**

PROJECT: <b>Johnny Mountain Mine Reclamation Project</b>		DATE: December, 2020		ANALYST: PK	QA/QC: AD	<b>Figure 10</b>
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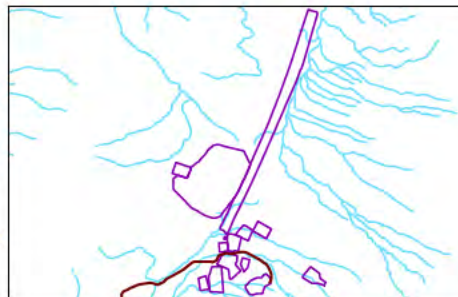
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- Legend**
- ▲ Spot height (m)
  - Access road
  - Mine road
  - Watercourse
  - LiDAR contour (2m)
  - ⊕ Monitoring Well
  - Surface Water Station

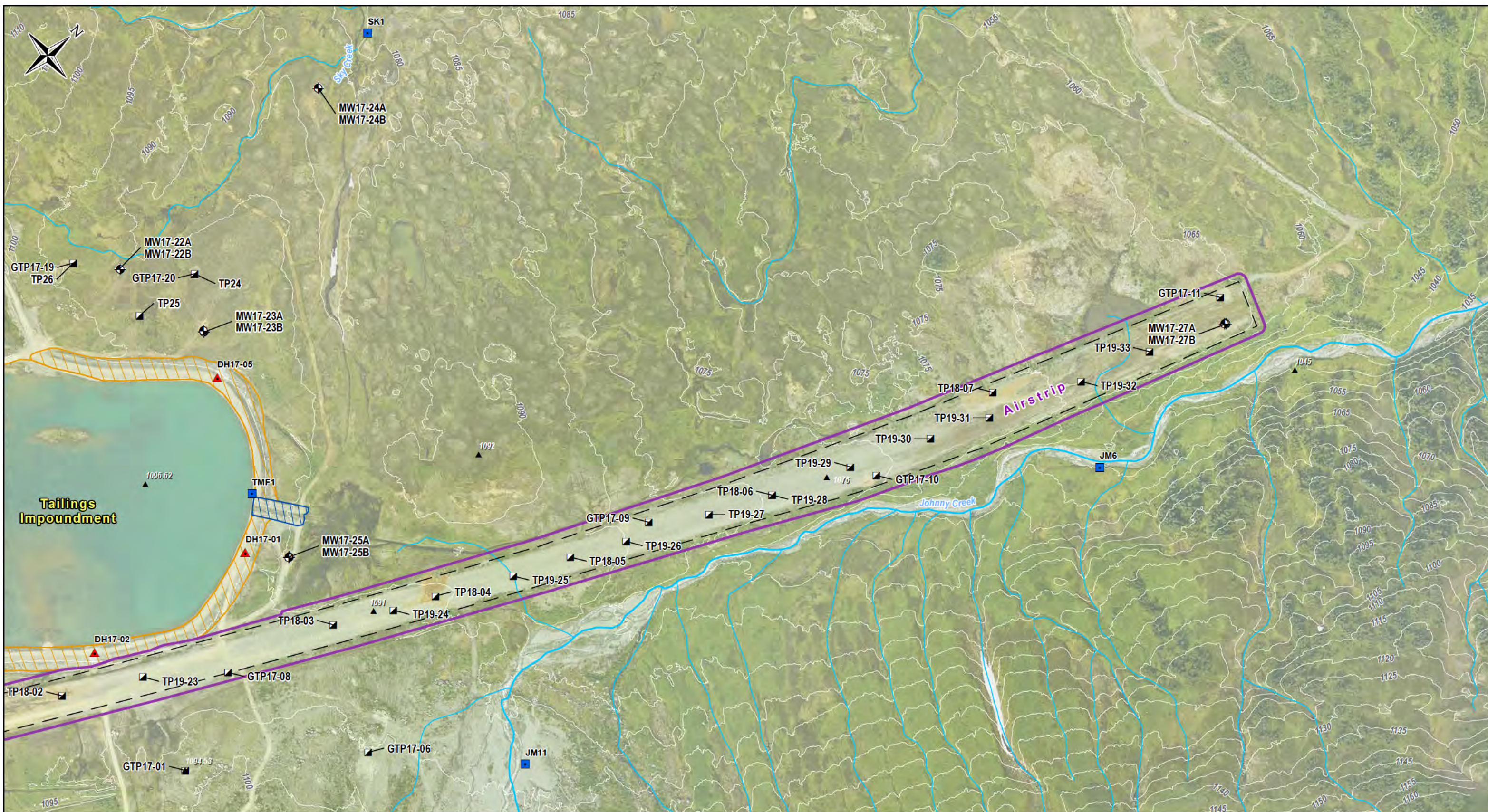
BASE DATA  
DataBC Data Distribution Service  
(<http://www.data.gov.bc.ca/>)  
FACILITIES AND WASTE  
ROCK STORAGE AREAS  
Johnny Mountain Mine Closure Plan, 1999  
(Approved by BC Ministry of Energy and Mines)  
IMAGERY LIDAR / ORTHO 2017

Scale: 1:2,250

0 50 100  
Meters

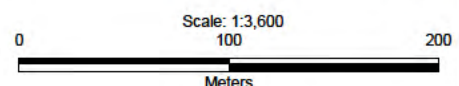


CLIENT: <b>SNIPGOLD CORPORATION</b>	PROJECT: <b>Johnny Mountain Mine Reclamation Project</b>		
TITLE: <b>Sample Location Plan: Stonehouse Creek</b>	DATE: December, 2020	ANALYST: PK	QA/QC: AD
	GIS FILE: 12-01-011_APECs_Stonehouse_Creek.mxd		<b>Figure 11</b>
	JOB No: VE52655D		<b>wood.</b>
	COORDINATE SYSTEM: NAD 1983 UTM Zone 9N		



- Legend**
- ▲ Spot height (m)
  - Access road
  - Watercourse
  - LiDAR contour (5m)
  - Airstrip
  - Pond
  - Tailings Impoundment
  - Embankment Wall
  - Spillway
  - ⊕ Monitoring Well
  - ⊠ Test Pit
  - ▲ Piezometer
  - Surface Water Station
  - ▭ Areas of Potential Environmental Concern (APECs)

BASE DATA  
DataBC Data Distribution Service  
(http://www.data.gov.bc.ca/)  
FACILITIES AND WASTE  
ROCK STORAGE AREAS  
Johnny Mountain Mine Closure Plan, 1999  
(Approved by BC Ministry of Energy and Mines)  
IMAGERY LIDAR / ORTHO 2017

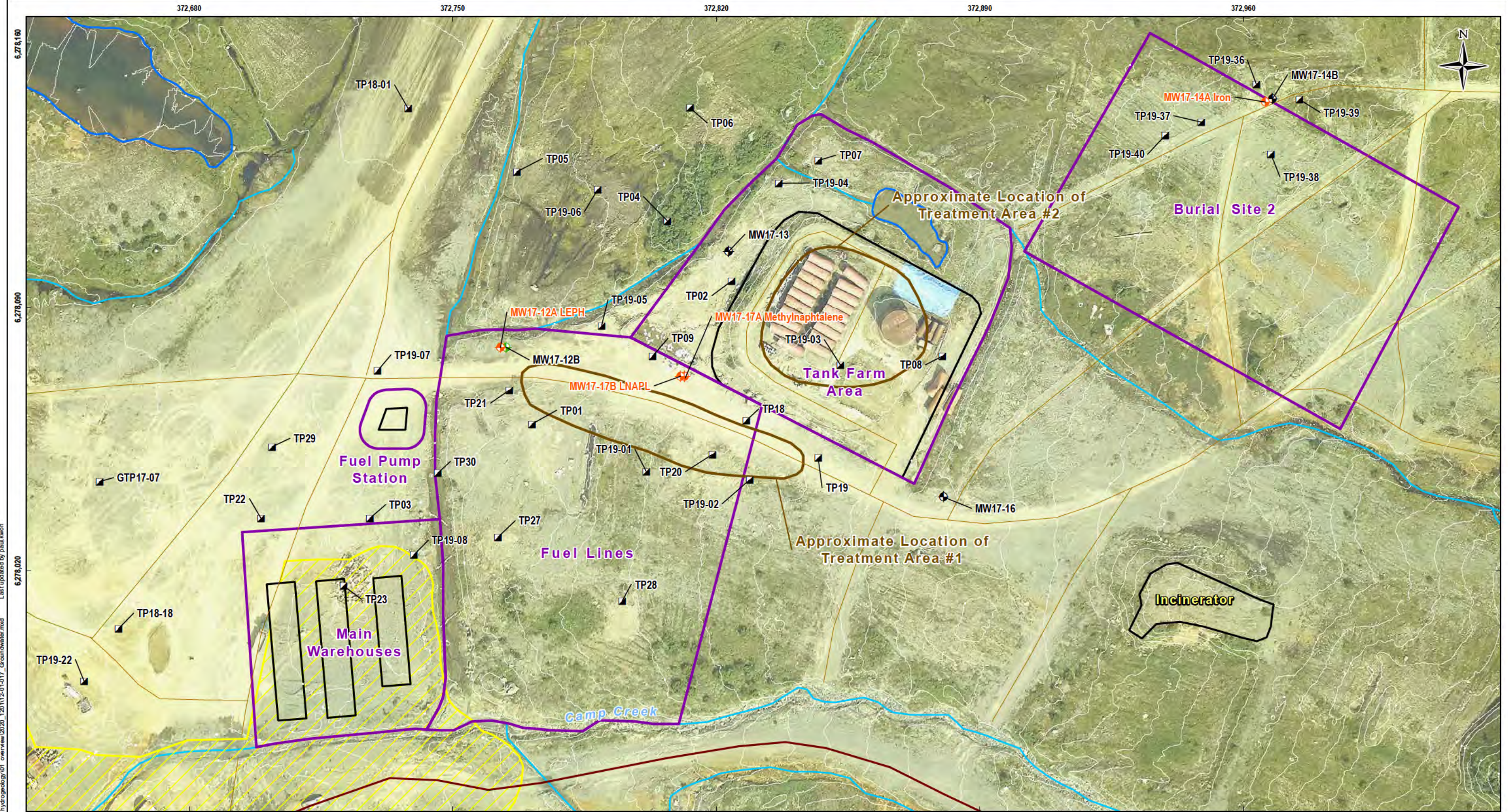


CLIENT:  
**SNIPGOLD CORPORATION**

TITLE:  
**Sample Location Plan:  
Airstrip**

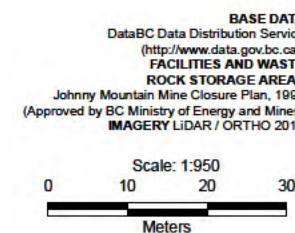
PROJECT: <b>Johnny Mountain Mine Reclamation Project</b>			
DATE: December, 2020	ANALYST: PK	QA/QC: AD	<b>Figure 12</b>
GIS FILE: 12-01-012_APECs_Airstrip_v2.mxd			
JOB No: VE52655D			
COORDINATE SYSTEM: NAD 1983 UTM Zone 9N			

Y:\GIS\Projects\MM\MM0649\_Johnny Mt\Mapping\12\_hydrology\01\_overview\2020\_120112-01-012\_APECs\_Airstrip\_v2.mxd Last updated by paul.kwon



Y:\GIS\Projects\MM\MM0649\_Johnny Mt\Mining\12\_hydrology\01\_overview\020\_120112-01-017\_Groundwater.mxd  
 Last updated by paul.kwon  
 6278,020  
 6278,160

- Legend**
- Access road
  - Mine road
  - Watercourse
  - LiDAR contour (1m)
  - Historic Services and Facilities
  - Pond
  - Waste Rock Storage
  - Areas of Potential Environmental Concern (APECs)
  - Approximate Treatment Area
  - Monitoring Well
  - Test Pit
  - Elevated Metals or Hydrocarbons in Groundwater
  - Elevated Metals or Hydrocarbons not Identified



CLIENT: <b>SNIPGOLD CORPORATION</b>	PROJECT: <b>Johnny Mountain Mine Reclamation Project</b>	
TITLE: <b>Elevated Metals and Petroleum Hydrocarbons in Groundwater - Tank Farm Area / Burial Site 2 / Main Warehouses / Fuel Pump Station / Fuel Lines</b>	DATE: December, 2020 ANALYST: PK QA/QC: AD	<b>Figure 13</b>
GIS FILE: 12-01-017_Groundwater.mxd		
JOB No: VE52655D COORDINATE SYSTEM: NAD 1983 UTM Zone 9N		



Y:\GIS\Projects\MM\MM0649 Johnny Mt\Mapping\12 hydrogeology\01 overview\020\_120\112-01-18\_Groundwater.mxd  
 Last updated by paul.kwon

**Legend**

- ▲ Spot height (m)
- Access road
- Mine road
- Watercourse
- LiDAR contour (2m)
- Interceptor Ditch / Toe Drainage
- ▭ Tailings Impoundment
- ▨ Embankment Wall
- ▩ Spillway
- ▭ Pond
- ▭ Areas of Potential Environmental Concern (APECs)
- ⊕ Monitoring Well
- ⊠ Test Pit
- ▲ Piezometer
- ⬮ Elevated Metals or Hydrocarbons in Groundwater
- ⬮ Elevated Metals or Hydrocarbons not Identified
- Surface Water Station

BASE DATA  
 DataBC Data Distribution Service  
 (http://www.data.gov.bc.ca/)  
**FACILITIES AND WASTE  
 ROCK STORAGE AREAS**  
 Johnny Mountain Mine Closure Plan, 1999  
 (Approved by BC Ministry of Energy and Mines)  
**IMAGERY LIDAR / ORTHO 2017**

Scale: 1:2,250

0 50 100  
Meters

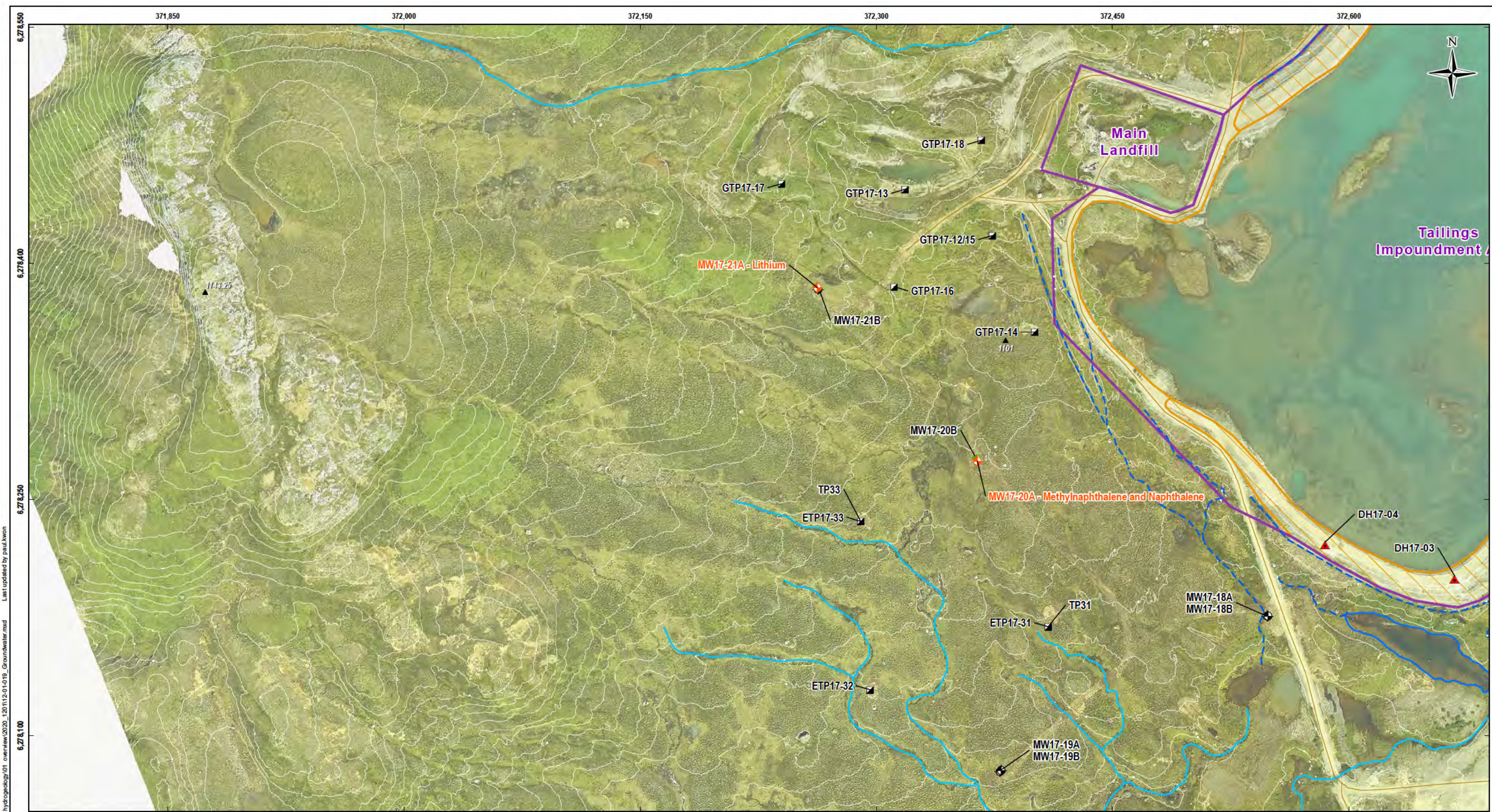


CLIENT:  
**SNIPGOLD CORPORATION**

TITLE:  
**Elevated Metals and Petroleum Hydrocarbons in Groundwater - Main Landfill / Tailings Impoundment Area**

PROJECT: <b>Johnny Mountain Mine Reclamation Project</b>			
DATE: December, 2020	ANALYST: PK	QA/QC: AD	<b>Figure 14</b>
GIS FILE: 12-01-018_Groundwater.mxd			<b>wood.</b>
JOB No: VE52655D			
COORDINATE SYSTEM: NAD 1983 UTM Zone 9N			





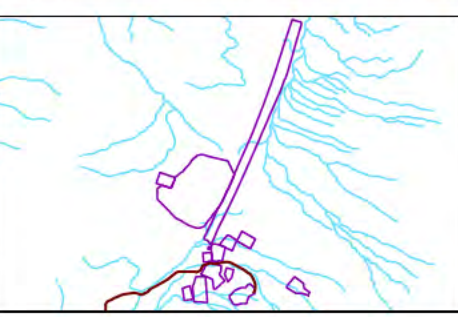
**Legend**

▲ Spot height (m)	--- Interceptor Ditch / Toe Drainage	⊕ Monitoring Well
— Access road	▭ Tailings Impoundment	▣ Test Pit
— Mine road	▨ Embankment Wall	▲ Piezometer
— Watercourse	▩ Spillway	◆ Elevated Metals or Hydrocarbons in Groundwater
— LiDAR contour (2m)	▭ Pond	◆ Elevated Metals or Hydrocarbons not Identified
	▭ Areas of Potential Environmental Concern (APECs)	

BASE DATA  
DataBC Data Distribution Service  
(http://www.data.gov.bc.ca/)  
FACILITIES AND WASTE  
ROCK STORAGE AREAS  
Johnny Mountain Mine Closure Plan, 1999  
(Approved by BC Ministry of Energy and Mines)  
IMAGERY LIDAR / ORTHO 2017

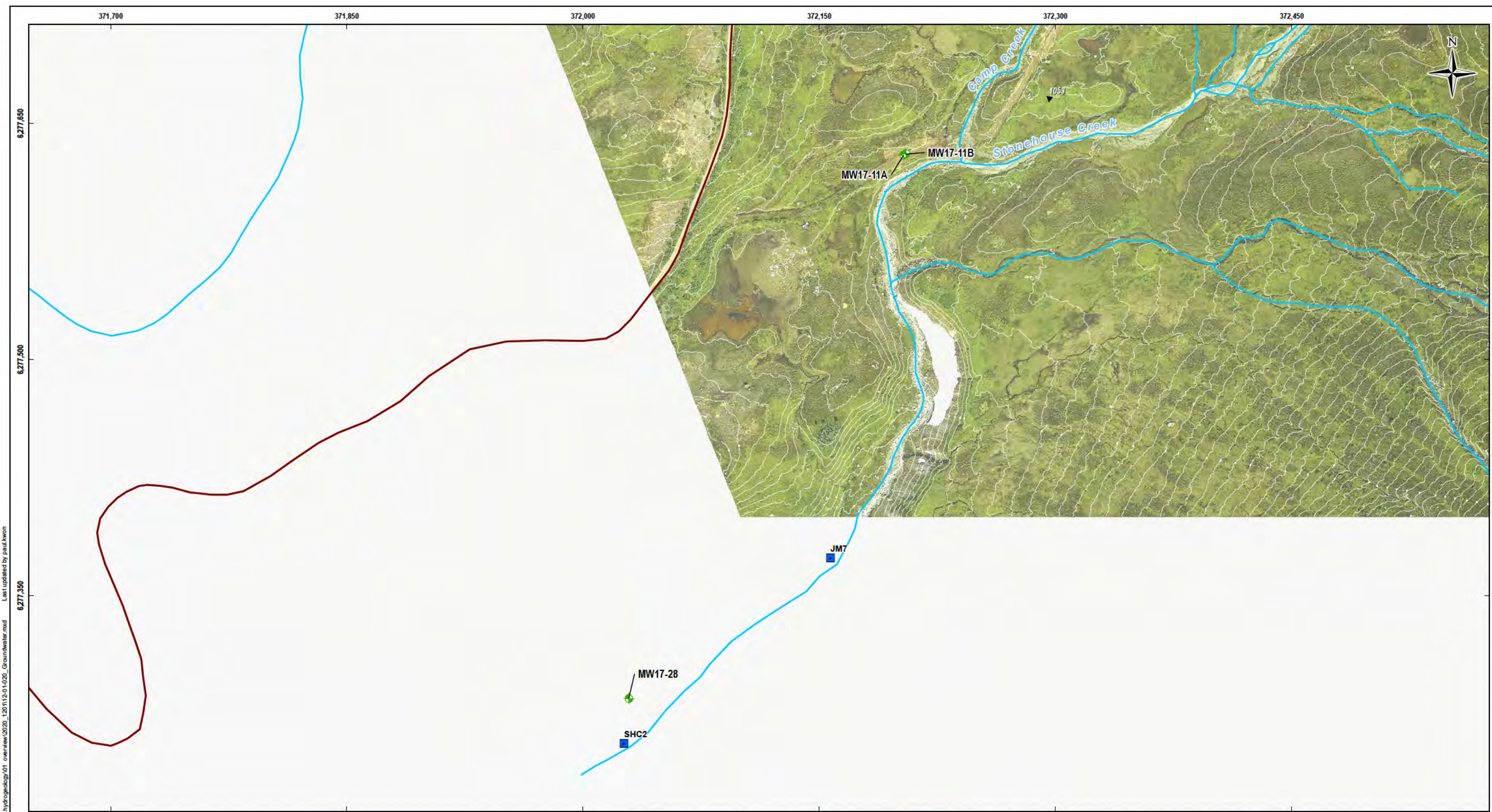
Scale: 1:2,250

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Meters



CLIENT: <b>SNIPGOLD CORPORATION</b>	PROJECT: <b>Johnny Mountain Mine Reclamation Project</b>		
TITLE: <b>Elevated Metals and Petroleum Hydrocarbons in Groundwater - Main Landfill / Tailings Impoundment Area</b>	DATE: December, 2020	ANALYST: PK	QA/QC: AD
	GIS FILE: 12-01-019_Groundwater.mxd		<b>Figure 15</b>
	JOB No: VE52655D		<b>wood.</b>
	COORDINATE SYSTEM: NAD 1983 UTM Zone 9N		

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- Legend**
- ▲ Spot height (m)
  - Elevated Metals or Hydrocarbons not Identified
  - Access road
  - Surface Water Station
  - Mine road
  - Watercourse
  - LiDAR contour (2m)

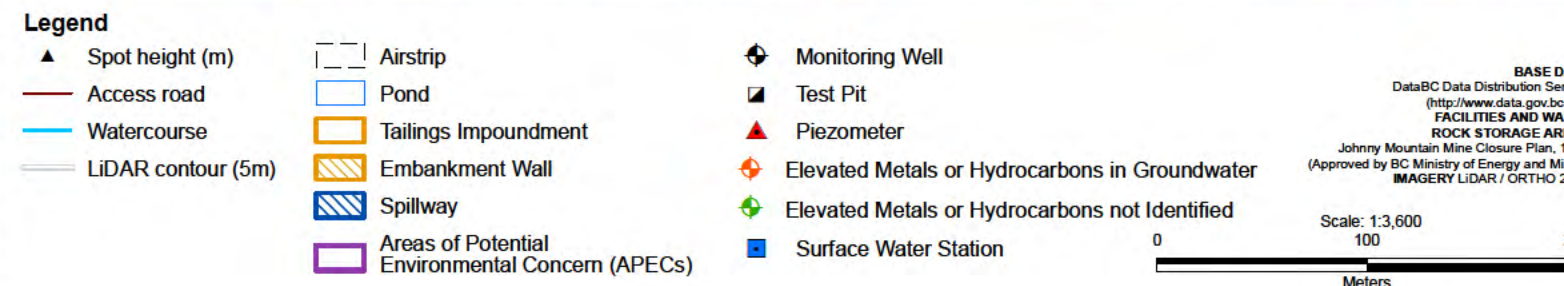
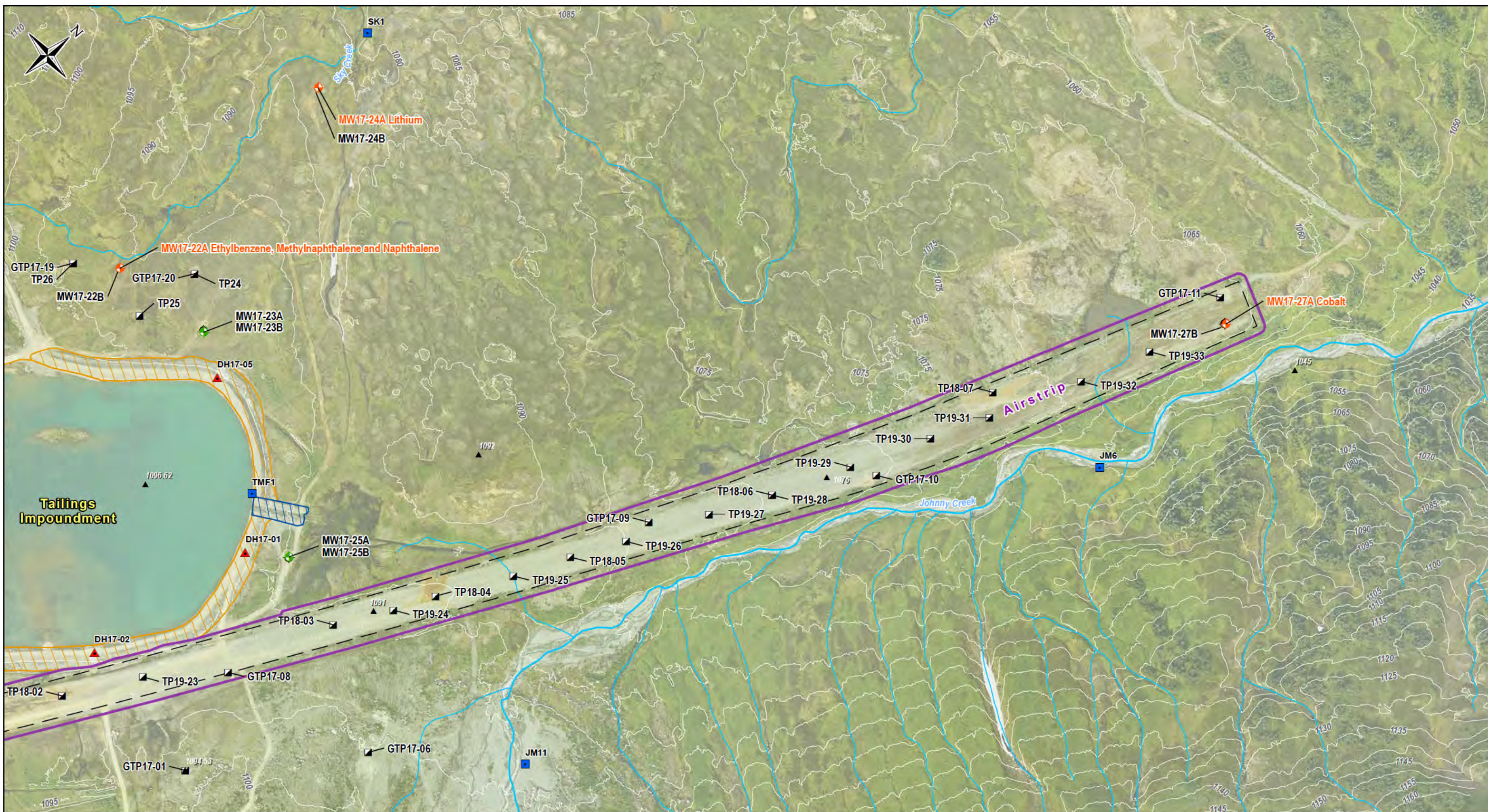
BASE DATA  
DataBC Data Distribution Service  
(http://www.data.gov.bc.ca/)  
FACILITIES AND WASTE  
ROCK STORAGE AREAS  
Johnny Mountain Mine Closure Plan, 1999  
(Approved by BC Ministry of Energy and Mines)  
IMAGERY LIDAR / ORTHO 2017

Scale: 1:2,250

0 50 100  
Meters

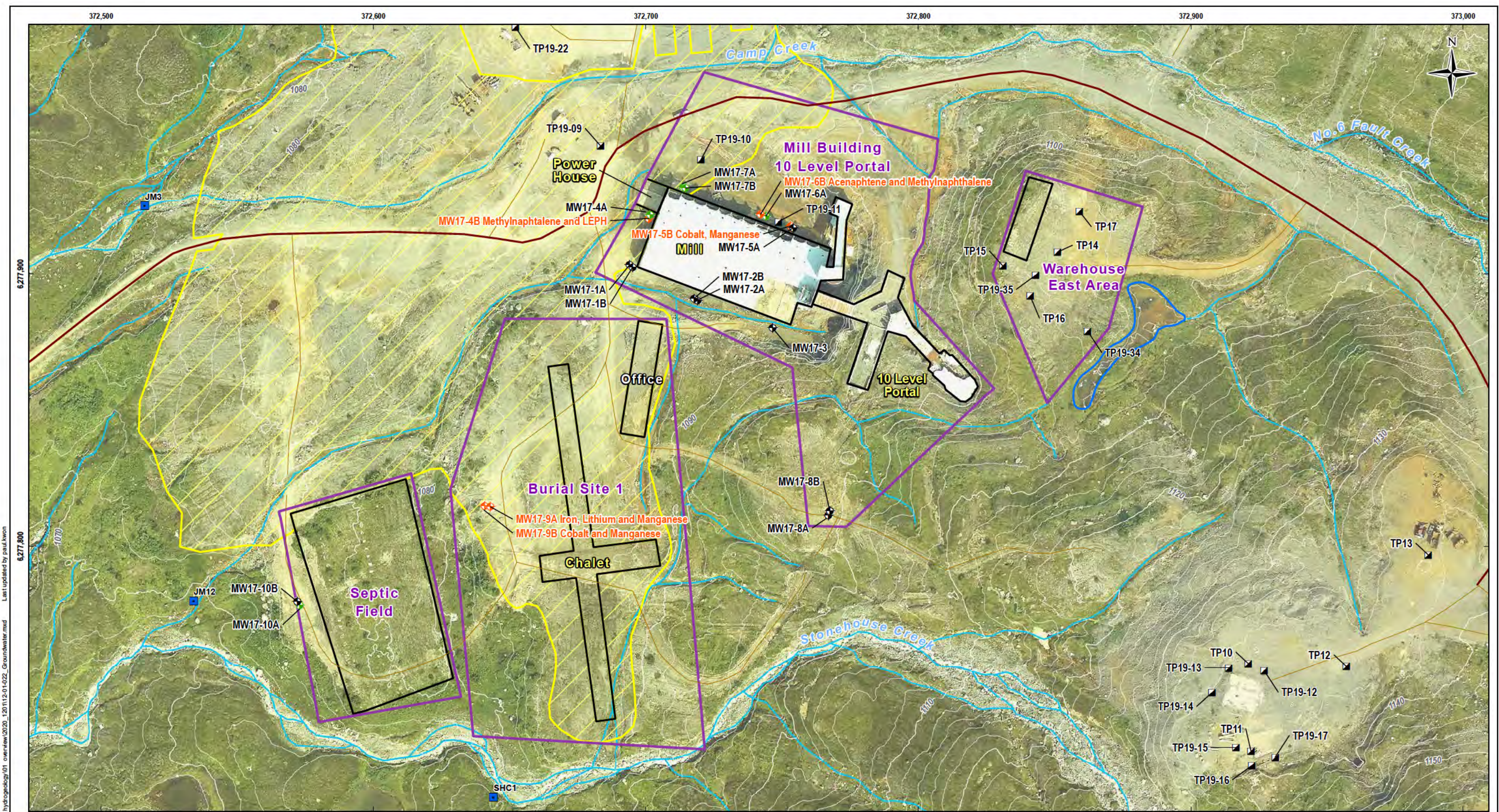


<p>CLIENT: <b>SNIPGOLD CORPORATION</b></p> <p>TITLE: <b>Elevated Metals or Petroleum Hydrocarbons in Groundwater - Stonehouse Creek</b></p>	<p>PROJECT: <b>Johnny Mountain Mine Reclamation Project</b></p> <table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <tr> <td>DATE: December, 2020</td> <td>ANALYST: PK</td> <td>QA/QC: AD</td> <td rowspan="2" style="text-align: center; vertical-align: middle;"><b>Figure 16</b></td> </tr> <tr> <td colspan="3">GIS FILE: 12-01-020_Groundwater.mxd</td> </tr> <tr> <td colspan="3">JOB No: VE52655D</td> <td rowspan="2" style="text-align: center; vertical-align: middle;"><b>wood.</b></td> </tr> <tr> <td colspan="3">COORDINATE SYSTEM: NAD 1983 UTM Zone 9N</td> </tr> </table>	DATE: December, 2020	ANALYST: PK	QA/QC: AD	<b>Figure 16</b>	GIS FILE: 12-01-020_Groundwater.mxd			JOB No: VE52655D			<b>wood.</b>	COORDINATE SYSTEM: NAD 1983 UTM Zone 9N		
DATE: December, 2020	ANALYST: PK	QA/QC: AD	<b>Figure 16</b>												
GIS FILE: 12-01-020_Groundwater.mxd															
JOB No: VE52655D			<b>wood.</b>												
COORDINATE SYSTEM: NAD 1983 UTM Zone 9N															



CLIENT: <b>SNIPGOLD CORPORATION</b>	PROJECT: <b>Johnny Mountain          Mine Reclamation Project</b>		
TITLE: <b>Elevated Metals and Petroleum          Hydrocarbons in Groundwater -          Airstrip</b>	DATE: December, 2020	ANALYST: PK	QA/QC: AD
<b>Figure 17</b>			
GIS FILE: 12-01-021_Groundwater.mxd			
JOB No: VE52655D			
COORDINATE SYSTEM: NAD 1983 UTM Zone 9N			

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 Last updated by paul.kwon



- Legend**
- Access road
  - Mine road
  - Watercourse
  - LiDAR contour (2m)
  - Historic Services and Facilities
  - Pond
  - Waste Rock Storage
  - Areas of Potential Environmental Concern (APECs)
  - ⊕ Monitoring Well
  - ⊠ Test Pit
  - ⊕ Elevated Metals or Hydrocarbons in Groundwater
  - ⊕ Elevated Metals or Hydrocarbons not Identified
  - ⊠ Surface Water Station

- ⊕ MW17-4B Methylnaphthalene and LEPH
- ⊕ MW17-5B Cobalt, Manganese
- ⊕ MW17-9A Iron, Lithium and Manganese
- ⊕ MW17-9B Cobalt and Manganese

BASE DATA  
DataBC Data Distribution Service  
(http://www.data.gov.bc.ca/)  
FACILITIES AND WASTE  
ROCK STORAGE AREAS  
Johnny Mountain Mine Closure Plan, 1999  
(Approved by BC Ministry of Energy and Mines)  
IMAGERY LIDAR / ORTHO 2017

Scale: 1:1,300

0 25 50  
Meters



CLIENT:  
**SNIPGOLD CORPORATION**

TITLE:  
**Elevated Metals and Petroleum Hydrocarbons in Groundwater - Mill Building / 10 Level Portal / Warehouse East Area / Burial Site 1 / Septic Field**

PROJECT: <b>Johnny Mountain Mine Reclamation Project</b>			
DATE: December, 2020	ANALYST: PK	QA/QC: AD	<b>Figure 18</b>
GIS FILE: 12-01-022_Groundwater.mxd			
JOB No: VE52655D			
COORDINATE SYSTEM: NAD 1983 UTM Zone 9N			



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**wood.**

**Tables**



Table 1: Groundwater Monitoring Data

Well ID	Elevation top of PVC pipe (m)	Ground Elevation (m)	Stick up length (m)	WL Elevation (m)	Date Monitored	Depth to Water (mbtop)	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (uS/cm)	ORP (mV)	Well Headspace (%LEL)	Well Headspace (ppm)
MW17-01A	1083.79	1082.94	0.85	1,080.69	17-Jul-17	3.097	-	-	-	-	-	-	-
MW17-01A	1083.79	1082.94	0.85	1,081.34	19-Jul-17	2.444	7.8	6.62	4.61	455	41.3	-	-
MW17-01A	1083.79	1082.94	0.85	1,081.95	28-Jul-17	1.831	-	-	-	-	-	-	-
MW17-01A	1083.79	1082.94	0.85	1,082.20	7-Sep-19	1.581	-	-	-	-	-	1	0
MW17-01B	1083.70	1082.89	0.81	1,082.47	17-Jul-17	1.231	-	-	-	-	-	-	-
MW17-01B	1083.70	1082.89	0.81	1,082.40	19-Jul-17	1.293	7.49	8.95	4.4	285	111.1	-	-
MW17-01B	1083.70	1082.89	0.81	1,082.53	28-Jul-17	1.166	-	-	-	-	-	-	-
MW17-01B	1083.70	1082.89	0.81	1,082.52	7-Sep-19	1.174	-	-	-	-	-	0	1
MW17-02A	1083.46	1082.72	0.74	1,082.85	17-Jul-17	0.615	-	-	-	-	-	-	-
MW17-02A	1083.46	1082.72	0.74	1,082.84	19-Jul-17	0.622	7.95	6.62	0.7	209	76.3	-	-
MW17-02A	1083.46	1082.72	0.74	1,082.86	28-Jul-17	0.604	-	-	-	-	-	-	-
MW17-02A	1083.46	1082.72	0.74	1,082.88	9-Jul-19	0.583	-	-	-	-	-	1	0
MW17-02B	1083.67	1082.69	0.98	1,082.74	17-Jul-17	0.926	-	-	-	-	-	-	-
MW17-02B	1083.67	1082.69	0.98	1,082.74	19-Jul-17	0.931	7.74	9.2	6.34	487	97.8	-	-
MW17-02B	1083.67	1082.69	0.98	1,082.82	28-Jul-17	0.849	-	-	-	-	-	-	-
MW17-02B	1083.67	1082.69	0.98	1,082.79	9-Jul-19	0.876	-	-	-	-	-	1	0
MW17-03	1083.98	1083.18	0.80	1,082.94	17-Jul-17	1.042	-	-	-	-	-	-	-
MW17-03	1083.98	1083.18	0.80	1,082.94	19-Jul-17	1.04	7.54	8.14	0.26	329	-7	-	-
MW17-03	1083.98	1083.18	0.80	1,082.95	28-Jul-17	1.038	-	-	-	-	-	-	-
MW17-03	1083.98	1083.18	0.80	1,082.84	9-Jul-19	1.148	-	-	-	-	-	0	0
MW17-04A	1083.78	1082.90	0.88	1,082.73	17-Jul-17	1.046	-	-	-	-	-	-	-
MW17-04A	1083.78	1082.90	0.88	1,082.69	19-Jul-17	1.092	7.95	5.85	5.02	287	93.6	-	-
MW17-04A	1083.78	1082.90	0.88	1,082.72	28-Jul-17	1.064	-	-	-	-	-	-	-
MW17-04A	1083.78	1082.90	0.88	1,082.75	2-Jul-18	1.034	10.44	3.1	0.3	147.1	-133.7	-	-
MW17-04A	1083.78	1082.90	0.88	1,082.89	5-Sep-19	0.89	7.75	5.19	2.82	152	0	-	-
MW17-04A	1083.78	1082.90	0.88	1,082.86	7-Sep-19	0.92	-	-	-	-	-	0	0
MW17-04A	1083.78	1082.90	0.88	1,082.32	23-Aug-20	1.46	7.99	5.4	1.12	180.2	-207	-	-
MW17-04B	1083.81	1083.00	0.81	1,082.74	17-Jul-17	1.070	-	-	-	-	-	-	-
MW17-04B	1083.81	1083.00	0.81	1,082.72	19-Jul-17	1.093	7.1	8.62	0.51	366	-66.9	-	-
MW17-04B	1083.81	1083.00	0.81	1,082.78	28-Jul-17	1.028	-	-	-	-	-	-	-
MW17-04B	1083.81	1083.00	0.81	1,082.82	24-Oct-17	0.99	-	-	-	-	-	-	-
MW17-04B	1083.81	1083.00	0.81	1,082.73	2-Jul-18	1.085	9.21	5.1	0.36	288	-64.6	-	-
MW17-04B	1083.81	1083.00	0.81	1,082.77	17-Jul-19	1.044	6.92	9.25	2.28	781	-56.2	-	-
MW17-04B	1083.81	1083.00	0.81	1,082.71	5-Sep-19	1.1	6.92	8.36	0.37	450	-	-	-
MW17-04B	1083.81	1083.00	0.81	1,082.66	7-Sep-19	1.152	-	-	-	-	-	1	0
MW17-04B	1083.81	1083.00	0.81	1,082.29	23-Aug-20	1.52	6.93	8.2	0.54	317.1	-34.9	-	-
MW17-05A	1083.96	1083.23	0.72	1,083.84	17-Jul-17	0.120	-	-	-	-	-	-	-
MW17-05A	1083.96	1083.23	0.72	1,083.78	19-Jul-17	0.173	7.28	4.81	1.06	456	98.6	-	-
MW17-05A	1083.96	1083.23	0.72	1,083.84	28-Jul-17	0.121	-	-	-	-	-	-	-
MW17-05A	1083.96	1083.23	0.72	1,083.81	7-Sep-19	0.15	-	-	-	-	-	0	1



**Table 1: Groundwater Monitoring Data**

Well ID	Elevation top of PVC pipe (m)	Ground Elevation (m)	Stick up length (m)	WL Elevation (m)	Date Monitored	Depth to Water (mbtop)	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (uS/cm)	ORP (mV)	Well Headspace (%LEL)	Well Headspace (ppm)
MW17-05B	1084.06	1083.25	0.81	1,083.04	17-Jul-17	1.016	-	-	-	-	-	-	-
MW17-05B	1084.06	1083.25	0.81	1,083.04	19-Jul-17	1.014	6.6	6.49	2.17	1307	21.2	-	-
MW17-05B	1084.06	1083.25	0.81	1,083.03	28-Jul-17	1.029	-	-	-	-	-	-	-
MW17-05B	1084.06	1083.25	0.81	1,082.87	17-Jul-19	1.189	7.03	9.49	0.41	785	-16.4	-	-
MW17-05B	1084.06	1083.25	0.81	1,082.92	5-Sep-19	1.14	7.21	7.56	0.52	610	0	-	-
MW17-05B	1084.06	1083.25	0.81	1,082.87	7-Sep-19	1.19	-	-	-	-	-	0	0
MW17-05B	1084.06	1083.25	0.81	1,082.56	23-Aug-20	1.5	6.96	7.4	1.15	441.8	7.7	-	-
MW17-06A	1083.92	1083.12	0.80	1,080.85	17-Jul-17	3.073	-	-	-	-	-	-	-
MW17-06A	1083.92	1083.12	0.80	1,083.05	19-Jul-17	0.867	8.14	5.33	3.69	497	41.4	-	-
MW17-06A	1083.92	1083.12	0.80	1,083.69	28-Jul-17	0.233	-	-	-	-	-	-	-
MW17-06A	1083.92	1083.12	0.80	1,083.72	7-Sep-19	0.2	-	-	-	-	-	0	0
MW17-06A	1083.92	1083.12	0.80	1,083.47	23-Aug-20	0.45	7.73	4.5	4.37	176.6	1.9	-	-
MW17-06B	1083.92	1083.11	0.81	1,083.03	17-Jul-17	0.891	-	-	-	-	-	-	-
MW17-06B	1083.92	1083.11	0.81	1,083.03	19-Jul-17	0.892	7.28	6.15	0.94	1,189	91.7	-	-
MW17-06B	1083.92	1083.11	0.81	1,083.02	28-Jul-17	0.902	-	-	-	-	-	-	-
MW17-06B	1083.92	1083.11	0.81	1,082.94	17-Jul-19	0.974	7.42	7.84	0.37	845	-8.6	-	-
MW17-06B	1083.92	1083.11	0.81	1,082.92	5-Sep-19	1	7.55	7.08	1.05	578	0	-	-
MW17-06B	1083.92	1083.11	0.81	1,082.91	7-Sep-19	1.01	-	-	-	-	-	0	0
MW17-06B	1083.92	1083.11	0.81	1,082.82	23-Aug-20	1.1	11.01	6.9	1.46	320.5	-23.6	-	-
MW17-07A	1083.77	1083.04	0.74	1,083.24	17-Jul-17	0.531	-	-	-	-	-	-	-
MW17-07A	1083.77	1083.04	0.74	1,083.38	19-Jul-17	0.39	7.91	5.27	0.43	267	65.9	-	-
MW17-07A	1083.77	1083.04	0.74	1,083.41	28-Jul-17	0.368	-	-	-	-	-	-	-
MW17-07A	1083.77	1083.04	0.74	1,083.44	4-Sep-19	0.33	8.07	3.69	0.43	160	0	-	-
MW17-07A	1083.77	1083.04	0.74	1,083.31	7-Sep-19	0.46	-	-	-	-	-	0	0
MW17-07A	1083.77	1083.04	0.74	1,083.25	23-Aug-20	0.52	7.71	4.7	0.85	191.5	-49.1	-	-
MW17-07B	1083.80	1082.96	0.84	1,082.82	17-Jul-17	0.976	-	-	-	-	-	-	-
MW17-07B	1083.80	1082.96	0.84	1,082.81	19-Jul-17	0.985	7.03	5.66	1.08	545	92.2	-	-
MW17-07B	1083.80	1082.96	0.84	1,082.86	28-Jul-17	0.940	-	-	-	-	-	-	-
MW17-07B	1083.80	1082.96	0.84	1,082.79	5-Sep-19	1.01	7.11	6.41	1.16	394	0	-	-
MW17-07B	1083.80	1082.96	0.84	1,082.80	7-Sep-19	1	-	-	-	-	-	0	0
MW17-07B	1083.80	1082.96	0.84	1,082.22	23-Aug-20	1.58	6.84	5.4	1.36	453.9	82	-	-
MW17-08A	1098.83	1098.13	0.70	1,070.05	17-Jul-17	28.777	-	-	-	-	-	-	-
MW17-08A	1098.83	1098.13	0.70	1,073.75	24-Jul-17	25.081	8.3	5.21	15.22	207	42	-	-
MW17-08A	1098.83	1098.13	0.70	1,070.94	28-Jul-17	27.883	-	-	-	-	-	-	-
MW17-08A	1098.83	1098.13	0.70	1,091.82	2-Jul-18	7.011	7.84	7.1	0.44	515	-99.5	-	-
MW17-08A	1098.83	1098.13	0.70	1,090.96	9-Jul-19	7.869	-	-	-	-	-	0	0
MW17-08A	1098.83	1098.13	0.70	1,090.91	18-Jul-19	7.914	-	-	-	-	-	-	-
MW17-08B	1098.83	1098.12	0.71	1,096.77	17-Jul-17	2.062	-	-	-	-	-	-	-
MW17-08B	1098.83	1098.12	0.71	1,096.54	24-Jul-17	2.286	6.56	4.92	8.52	345	110.2	-	-
MW17-08B	1098.83	1098.12	0.71	1,096.68	28-Jul-17	2.149	-	-	-	-	-	-	-



Table 1: Groundwater Monitoring Data

Well ID	Elevation top of PVC pipe (m)	Ground Elevation (m)	Stick up length (m)	WL Elevation (m)	Date Monitored	Depth to Water (mbtop)	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (uS/cm)	ORP (mV)	Well Headspace (%LEL)	Well Headspace (ppm)
MW17-08B	1098.83	1098.12	0.71	1,096.10	9-Jul-19	2.728	-	-	-	-	-	1	0
MW17-09A	1084.58	1083.76	0.81	1,065.08	17-Jul-17	19.491	-	-	-	-	-	-	-
MW17-09A	1084.58	1083.76	0.81	1,071.94	24-Jul-17	12.631	7.68	4.69	10.27	755	116.1	-	-
MW17-09A	1084.58	1083.76	0.81	1,071.94	28-Jul-17	12.631	-	-	-	-	-	-	-
MW17-09A	1084.58	1083.76	0.81	1,075.08	9-Jul-19	9.492	-	-	-	-	-	1	0
MW17-09A	1084.58	1083.76	0.81	1,075.16	15-Jul-19	9.412	7.48	5.85	5.97	461	-66	-	-
MW17-09A	1084.58	1083.76	0.81	1,065.98	6-Sep-19	18.6	7.58	5.06	6	344	-21.4	-	-
MW17-09A	1084.58	1083.76	0.81	1,077.42	29-Aug-20	7.156	7.21	4	7.44	123	-5.2	-	-
MW17-09B	1084.38	1083.68	0.70	1,080.29	17-Jul-17	4.092	-	-	-	-	-	-	-
MW17-09B	1084.38	1083.68	0.70	1,080.26	24-Jul-17	4.119	6.63	6.76	1.21	473	120	-	-
MW17-09B	1084.38	1083.68	0.70	1,080.32	28-Jul-17	4.056	-	-	-	-	-	-	-
MW17-09B	1084.38	1083.68	0.70	1,080.24	2-Jul-18	4.142	6.93	3.8	0.61	250.8	-29.8	-	-
MW17-09B	1084.38	1083.68	0.70	1,080.10	9-Jul-19	4.275	-	-	-	-	-	0	0
MW17-09B	1084.38	1083.68	0.70	1,080.20	17-Jul-19	4.174	6.46	5.07	1.09	457	50.1	-	-
MW17-09B	1084.38	1083.68	0.70	1,080.54	28-Aug-20	3.836	6.37	4.6	1.7	175.6	58.7	-	-
MW17-10A	1076.47	1075.62	0.85	1,072.56	17-Jul-17	3.911	-	-	-	-	-	-	-
MW17-10A	1076.47	1075.62	0.85	1,072.52	24-Jul-17	3.953	-	-	-	-	-	-	-
MW17-10A	1076.47	1075.62	0.85	1,072.53	28-Jul-17	3.944	-	-	-	-	-	-	-
MW17-10A	1076.47	1075.62	0.85	1,072.38	10-Jul-19	4.087	-	-	-	-	-	-	-
MW17-10A	1076.47	1075.62	0.85	1,071.83	15-Jul-19	4.64	7.79	6.91	2.46	376	-115.5	-	-
MW17-10A	1076.47	1075.62	0.85	1,072.58	4-Sep-19	3.89	7.88	5.53	1.22	237	0	-	-
MW17-10B	1076.34	1075.61	0.73	1,072.27	17-Jul-17	4.070	-	-	-	-	-	-	-
MW17-10B	1076.34	1075.61	0.73	1,072.16	24-Jul-17	4.175	6.27	4.77	1.99	349	103.6	-	-
MW17-10B	1076.34	1075.61	0.73	1,072.26	28-Jul-17	4.081	-	-	-	-	-	-	-
MW17-10B	1076.34	1075.61	0.73	1,071.90	10-Jul-19	4.435	-	-	-	-	-	1	0
MW17-11A*	1047.41	1047.35	0.06	1,053.44	17-Jul-17	-6.030	-	-	-	-	-	-	-
MW17-11A*	1047.41	1047.35	0.06	-	24-Jul-17	artesian	7.45	4.96	0.2	251	47.1	-	-
MW17-11A*	1047.41	1047.35	0.06	1,053.44	28-Jul-17	-6.030	-	-	-	-	-	-	-
MW17-11A*	1047.41	1047.35	0.06	-	10-Jul-19	artesian	-	-	-	-	-	1	0
MW17-11A*	1047.41	1047.35	0.06	-	15-Jul-19	artesian	7.83	3.26	0.1	240	-28.3	-	-
MW17-11A*	1047.41	1047.35	0.06	-	4-Sep-19	artesian	7.82	3.8	0.37	142	0	-	-
MW17-11A*	1047.41	1047.35	0.06	-	24-Aug-20	artesian	7.55	3.4	0.3	181	-33	-	-
MW17-11B	1048.09	1047.24	0.85	1,048.11	17-Jul-17	-0.022	-	-	-	-	-	-	-
MW17-11B	1048.09	1047.24	0.85	1,047.53	24-Jul-17	0.559	8	9.2	2.62	256	-105.4	-	-
MW17-11B	1048.09	1047.24	0.85	1,047.93	28-Jul-17	0.160	-	-	-	-	-	-	-
MW17-11B	1048.09	1047.24	0.85	1,047.84	10-Jul-19	0.25	-	-	-	-	-	0	0
MW17-11B	1048.09	1047.24	0.85	1,047.89	15-Jul-19	0.2	8.06	5.44	2.02	194	-54.5	-	-
MW17-11B	1048.09	1047.24	0.85	-	4-Sep-19	-	8.02	7.52	0.93	140	0	-	-
MW17-11B	1048.09	1047.24	0.85	-	24-Aug-20	0.07	7.89	5.3	1.1	159.5	-147	-	-
MW17-12A	1087.82	1087.02	0.80	1,087.04	17-Jul-17	0.777	-	-	-	-	-	-	-





**Table 1: Groundwater Monitoring Data**

Well ID	Elevation top of PVC pipe (m)	Ground Elevation (m)	Stick up length (m)	WL Elevation (m)	Date Monitored	Depth to Water (mbtop)	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (uS/cm)	ORP (mV)	Well Headspace (%LEL)	Well Headspace (ppm)
MW17-12A	1087.82	1087.02	0.80	1,087.03	24-Jul-17	0.791	8.73	6.32	0.28	302	-250.7	-	-
MW17-12A	1087.82	1087.02	0.80	1,087.05	28-Jul-17	0.764	-	-	-	-	-	-	-
MW17-12A	1087.82	1087.02	0.80	1,086.82	7-Sep-19	1	-	-	-	-	-	1	2
MW17-12A	1087.82	1087.02	0.80	1,086.66	24-Aug-20	1.16	7.9	4.3	0.23	158.1	-147	-	-
MW17-12B	1087.80	1087.04	0.76	1,086.93	17-Jul-17	0.875	-	-	-	-	-	-	-
MW17-12B	1087.80	1087.04	0.76	1,086.91	20-Jul-17	0.892	7.87	7.69	5.22	276	82.9	-	-
MW17-12B	1087.80	1087.04	0.76	1,087.08	28-Jul-17	0.719	-	-	-	-	-	-	-
MW17-12B	1087.80	1087.04	0.76	1,086.53	7-Sep-19	1.27	-	-	-	-	-	1	0
MW17-12B	1087.80	1087.04	0.76	1,086.99	24-Aug-20	0.815	7.09	6.2	1	291.8	43.3	-	-
MW17-13	1091.94	1091.07	0.88	1,090.41	17-Jul-17	1.532	-	-	-	-	-	-	-
MW17-13	1091.94	1091.07	0.88	1,090.40	24-Jul-17	1.541	7.09	5.75	5.61	27.5	21.7	-	-
MW17-13	1091.94	1091.07	0.88	1,090.50	28-Jul-17	1.441	-	-	-	-	-	-	-
MW17-13	1091.94	1091.07	0.88	1,090.45	24-Oct-17	1.49	-	-	-	-	-	-	-
MW17-13	1091.94	1091.07	0.88	1,090.11	2-Jul-18	1.832	8.54	3.8	3.06	179.4	-49	-	-
MW17-13	1091.94	1091.07	0.88	1,090.04	18-Jul-19	1.904	7.51	5.88	6.9	313	53	-	-
MW17-13	1091.94	1091.07	0.88	1,090.04	7-Sep-19	1.9	-	-	-	-	-	1	3
MW17-14A	1099.53	1098.59	0.94	1,095.38	17-Jul-17	4.149	-	-	-	-	-	-	-
MW17-14A	1099.53	1098.59	0.94	1,095.20	24-Jul-17	4.331	8.02	8.42	0.44	264	-184.9	-	-
MW17-14A	1099.53	1098.59	0.94	1,095.18	28-Jul-17	4.351	-	-	-	-	-	-	-
MW17-14A	1099.53	1098.59	0.94	1,095.66	2-Jul-18	3.875	8.76	5.6	0.25	184.4	-217.7	-	-
MW17-14A	1099.53	1098.59	0.94	1,094.91	16-Jul-19	4.626	8.11	7.86	4.32	356	-192.8	-	-
MW17-14A	1099.53	1098.59	0.94	1,094.90	7-Sep-19	4.63	-	-	-	-	-	0	0
MW17-14A	1099.53	1098.59	0.94	1,095.79	25-Aug-20	3.742	7.56	5.5	0.21	235.7	-218	-	-
MW17-14B	1099.43	1098.54	0.89	1,096.35	17-Jul-17	3.083	-	-	-	-	-	-	-
MW17-14B	1099.43	1098.54	0.89	1,096.05	24-Jul-17	3.38	7.43	6.59	9.01	192	108.1	-	-
MW17-14B	1099.43	1098.54	0.89	1,096.20	28-Jul-17	3.232	-	-	-	-	-	-	-
MW17-14B	1099.43	1098.54	0.89	1,097.01	2-Jul-18	2.421	12.64	3.4	9.95	108.6	8.3	-	-
MW17-14B	1099.43	1098.54	0.89	1,096.37	5-Sep-19	3.06	7.75	9.7	10.68	120	0	-	-
MW17-14B	1099.43	1098.54	0.89	-	7-Sep-19	Dry	-	-	-	-	-	1	0
MW17-15A	1104.78	1103.93	0.85	1,102.22	17-Jul-17	2.558	-	-	-	-	-	-	-
MW17-15A	1104.78	1103.93	0.85	1,102.01	24-Jul-17	2.763	7.63	6.16	9.62	177	13.9	-	-
MW17-15A	1104.78	1103.93	0.85	1,101.62	28-Jul-17	3.161	-	-	-	-	-	-	-
MW17-15A	1104.78	1103.93	0.85	1,100.53	7-Sep-19	4.25	-	-	-	-	-	0	0
MW17-15B	1104.87	1104.01	0.86	1,102.27	17-Jul-17	2.593	-	-	-	-	-	-	-
MW17-15B	1104.87	1104.01	0.86	1,102.07	24-Jul-17	2.794	8.04	7.94	9.54	147	68.6	-	-
MW17-15B	1104.87	1104.01	0.86	1,101.67	28-Jul-17	3.198	-	-	-	-	-	-	-
MW17-15B	1104.87	1104.01	0.86	1,101.64	7-Sep-19	3.23	-	-	-	-	-	1	0
MW17-16	1096.10	1095.23	0.87	1,093.37	17-Jul-17	2.732	-	-	-	-	-	-	-
MW17-16	1096.10	1095.23	0.87	1,093.08	24-Jul-17	3.017	7.46	6.89	9.38	170	79.2	-	-
MW17-16	1096.10	1095.23	0.87	1,093.39	28-Jul-17	2.711	-	-	-	-	-	-	-

**Table 1: Groundwater Monitoring Data**

Well ID	Elevation top of PVC pipe (m)	Ground Elevation (m)	Stick up length (m)	WL Elevation (m)	Date Monitored	Depth to Water (mbtop)	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (uS/cm)	ORP (mV)	Well Headspace (%LEL)	Well Headspace (ppm)
MW17-16	1096.10	1095.23	0.87	1,091.60	18-Jul-19	4.499	7.78	6.67	8.27	227	70.5	-	-
MW17-16	1096.10	1095.23	0.87	1,091.55	7-Sep-19	4.55	-	-	-	-	-	1	0
MW17-17A	1091.47	1090.63	0.84	1,089.44	17-Jul-17	2.033	-	-	-	-	-	-	-
MW17-17A	1091.47	1090.63	0.84	1,089.41	24-Jul-17	2.059	8.9	6.08	4.64	37.9	39.9	-	-
MW17-17A	1091.47	1090.63	0.84	1,089.57	28-Jul-17	1.898	-	-	-	-	-	-	-
MW17-17A	1091.47	1090.63	0.84	1,088.89	2-Jul-18	2.58	8.5	3.4	2.1	139.2	-42.7	-	-
MW17-17A	1091.47	1090.63	0.84	1,088.20	7-Sep-19	3.27	-	-	-	-	-	1	3
MW17-17A	1091.47	1090.63	0.84	1,087.75	24-Aug-20	3.716	-	-	-	-	-	-	-
MW17-17B	1090.85	1090.00	0.85	1,088.97	17-Jul-17	1.877	-	-	-	-	-	-	-
MW17-17B	1090.85	1090.00	0.85	1,088.93	24-Jul-17	1.922	7.55	5.62	6.9	194	76.3	-	-
MW17-17B	1090.85	1090.00	0.85	1,089.08	28-Jul-17	1.766	-	-	-	-	-	-	-
MW17-17B	1090.85	1090.00	0.85	1,088.72	1-Jul-18	2.134	8.78	2.7	5.96	115.8	23.2	-	-
MW17-17B	1090.85	1090.00	0.85	1,087.46	7-Sep-19	3.39	-	-	-	-	-	4	311
MW17-17B	1090.85	1090.00	0.85	1,087.20	24-Aug-20	3.649	6.72	6.9	1.91	322.3	-40.5	-	-
MW17-18A	1088.47	1087.66	0.81	1,086.26	17-Jul-17	2.211	-	-	-	-	-	-	-
MW17-18A	1088.47	1087.66	0.81	1,086.29	24-Jul-17	2.176	7.31	8.22	2.3	462	-88.2	-	-
MW17-18A	1088.47	1087.66	0.81	1,086.35	28-Jul-17	2.117	-	-	-	-	-	-	-
MW17-18A	1088.47	1087.66	0.81	1,086.13	7-Sep-19	2.34	-	-	-	-	-	1	0
MW17-18B	1088.41	1087.62	0.79	1,086.65	17-Jul-17	1.756	-	-	-	-	-	-	-
MW17-18B	1088.41	1087.62	0.79	1,086.61	24-Jul-17	1.802	6.74	6.58	5.98	151	98.7	-	-
MW17-18B	1088.41	1087.62	0.79	1,086.75	28-Jul-17	1.654	-	-	-	-	-	-	-
MW17-18B	1088.41	1087.62	0.79	-	7-Sep-19	Dry	-	-	-	-	-	1	0
MW17-19A	1085.62	1084.84	0.78	1,084.70	17-Jul-17	0.922	-	-	-	-	-	-	-
MW17-19A	1085.62	1084.84	0.78	1,081.64	23-Jul-17	3.984	7.85	4.06	6.38	587	562	-	-
MW17-19A	1085.62	1084.84	0.78	1,084.71	28-Jul-17	0.916	-	-	-	-	-	-	-
MW17-19A	1085.62	1084.84	0.78	1,084.31	10-Jul-19	1.318	-	-	-	-	-	1	0
MW17-19B	1085.50	1084.82	0.68	1,084.63	17-Jul-17	0.877	-	-	-	-	-	-	-
MW17-19B	1085.50	1084.82	0.68	1,084.62	23-Jul-17	0.885	8.09	5.15	0.79	153	68.7	-	-
MW17-19B	1085.50	1084.82	0.68	1,084.76	28-Jul-17	0.745	-	-	-	-	-	-	-
MW17-19B	1085.50	1084.82	0.68	1,083.43	10-Jul-19	2.075	-	-	-	-	-	1	0
MW17-20A	1096.74	1095.95	0.79	1,094.84	17-Jul-17	1.904	-	-	-	-	-	-	-
MW17-20A	1096.74	1095.95	0.79	1,094.76	23-Jul-17	1.98	7.81	5.57	3.28	273	28.8	-	-
MW17-20A	1096.74	1095.95	0.79	1,094.83	28-Jul-17	1.917	-	-	-	-	-	-	-
MW17-20A	1096.74	1095.95	0.79	1,094.89	21-Oct-17	1.85	-	-	-	-	-	-	-
MW17-20A	1096.74	1095.95	0.79	1,094.48	10-Jul-19	2.262	-	-	-	-	-	0	3
MW17-20A	1096.74	1095.95	0.79	1,094.64	18-Jul-19	2.099	7.92	6.23	1.21	276	-82.1	-	-
MW17-20A	1096.74	1095.95	0.79	1,093.96	25-Aug-20	2.78	6.68	5	4.24	104.9	-122.7	-	-
MW17-20B	1096.74	1095.93	0.81	1,095.43	17-Jul-17	1.307	-	-	-	-	-	-	-
MW17-20B	1096.74	1095.93	0.81	1,095.40	23-Jul-17	1.339	6.73	5.54	9.37	78	121.8	-	-
MW17-20B	1096.74	1095.93	0.81	1,095.60	28-Jul-17	1.138	-	-	-	-	-	-	-

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Well ID	Elevation top of PVC pipe (m)	Ground Elevation (m)	Stick up length (m)	WL Elevation (m)	Date Monitored	Depth to Water (mbtop)	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (uS/cm)	ORP (mV)	Well Headspace (%LEL)	Well Headspace (ppm)
MW17-20B	1096.74	1095.93	0.81	1,095.40	21-Oct-17	1.335	-	-	-	-	-	-	-
MW17-20B	1096.74	1095.93	0.81	1,094.97	10-Jul-19	1.765	-	-	-	-	-	0	2
MW17-20B	1096.74	1095.93	0.81	1,095.34	18-Jul-19	1.404	6.7	7.33	7.29	57	79	-	-
MW17-20B	1096.74	1095.93	0.81	1,095.84	25-Aug-20	0.9	6.38	6.7	9.24	27.3	46.6	-	-
MW17-21A	1105.50	1104.79	0.71	1,103.75	17-Jul-17	1.751	-	-	-	-	-	-	-
MW17-21A	1105.50	1104.79	0.71	1,103.78	23-Jul-17	1.722	7.83	4.79	1.96	284	18.6	-	-
MW17-21A	1105.50	1104.79	0.71	1,103.80	28-Jul-17	1.699	-	-	-	-	-	-	-
MW17-21A	1105.50	1104.79	0.71	1,103.66	10-Jul-19	1.844	-	-	-	-	-	0	1
MW17-21A	1105.50	1104.79	0.71	1,103.64	18-Jul-19	1.862	8.14	5.96	0.34	270	-17.8	-	-
MW17-21A	1105.50	1104.79	0.71	1,104.10	4-Sep-19	1.4	8.05	5.49	0.32	173	0	-	-
MW17-21A	1105.50	1104.79	0.71	1,104.29	25-Aug-20	1.21	7.96	3.9	0.38	194.3	-119.9	-	-
MW17-21B	1105.46	1104.71	0.75	1,104.47	17-Jul-17	0.996	-	-	-	-	-	-	-
MW17-21B	1105.46	1104.71	0.75	1,104.48	23-Jul-17	0.985	6.49	6.29	5.91	265	141.2	-	-
MW17-21B	1105.46	1104.71	0.75	1,104.55	28-Jul-17	0.911	-	-	-	-	-	-	-
MW17-21B	1105.46	1104.71	0.75	1,104.27	10-Jul-19	1.192	-	-	-	-	-	0	0
MW17-21B	1105.46	1104.71	0.75	1,104.36	25-Aug-20	1.1	6.12	6.4	6.52	46.6	73	0	0
MW17-22A	1090.67	1089.90	0.77	1,089.56	17-Jul-17	1.113	-	-	-	-	-	-	-
MW17-22A	1090.67	1089.90	0.77	1,084.85	23-Jul-17	5.823	7.89	5.08	4.13	0.21	129.9	-	-
MW17-22A	1090.67	1089.90	0.77	1,083.23	28-Jul-17	7.444	-	-	-	-	-	-	-
MW17-22A	1090.67	1089.90	0.77	1,089.64	22-Oct-17	1.035	-	-	-	-	-	-	-
MW17-22A	1090.67	1089.90	0.77	1,089.58	9-Jul-18	1.092	8.09	5.6	0.81	198.6	-55.3	-	-
MW17-22A	1090.67	1089.90	0.77	1,089.51	10-Sep-18	1.161	7.63	6	7.06	320.8	-77	-	-
MW17-22A	1090.67	1089.90	0.77	1,089.42	17-Jul-19	1.249	7.57	6.95	2.38	345	-25.2	-	-
MW17-22A	1090.67	1089.90	0.77	1,087.89	4-Sep-19	2.78	7.78	4.65	0.56	206	0	-	-
MW17-22A	1090.67	1089.90	0.77	1,089.31	7-Sep-19	1.36	-	-	-	-	-	1	0
MW17-22A	1090.67	1089.90	0.77	1,089.77	28-Aug-20	0.905	7.42	4.5	4.18	238.7	-40	-	-
MW17-22B	1090.78	1089.96	0.82	1,089.17	17-Jul-17	1.605	-	-	-	-	-	-	-
MW17-22B	1090.78	1089.96	0.82	1,089.18	23-Jul-17	1.6	5.71	4.49	9.27	63	196.1	-	-
MW17-22B	1090.78	1089.96	0.82	1,089.25	28-Jul-17	1.526	-	-	-	-	-	-	-
MW17-22B	1090.78	1089.96	0.82	1,089.01	9-Jul-18	1.764	6.95	4.6	7.93	42.3	22.4	-	-
MW17-22B	1090.78	1089.96	0.82	1,089.10	10-Sep-18	1.68	6.37	7.5	6.74	77	39	-	-
MW17-22B	1090.78	1089.96	0.82	1,089.09	17-Jul-19	1.682	6.75	6.32	8.72	70	46.6	-	-
MW17-22B	1090.78	1089.96	0.82	1,088.94	4-Sep-19	1.84	6.31	7.82	9.96	42	20.3	-	-
MW17-22B	1090.78	1089.96	0.82	-	7-Sep-19	Dry	-	-	-	-	-	-	-
MW17-22B	1090.78	1089.96	0.82	1,089.40	28-Aug-20	1.375	6.39	5.7	8.06	30.3	109.7	-	-
MW17-23A	1092.82	1092.03	0.79	1,090.82	17-Jul-17	2.005	-	-	-	-	-	-	-
MW17-23A	1092.82	1092.03	0.79	1,090.72	23-Jul-17	2.101	8.73	5.74	1.71	257	31.7	-	-
MW17-23A	1092.82	1092.03	0.79	1,090.82	28-Jul-17	2.002	-	-	-	-	-	-	-
MW17-23A	1092.82	1092.03	0.79	1,090.80	22-Oct-17	2.02	-	-	-	-	-	-	-
MW17-23A	1092.82	1092.03	0.79	1,090.40	10-Jul-19	2.426	-	-	-	-	-	0	0



**Table 1: Groundwater Monitoring Data**

Well ID	Elevation top of PVC pipe (m)	Ground Elevation (m)	Stick up length (m)	WL Elevation (m)	Date Monitored	Depth to Water (mbtop)	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (uS/cm)	ORP (mV)	Well Headspace (%LEL)	Well Headspace (ppm)
MW17-23A	1092.82	1092.03	0.79	1,090.51	16-Jul-19	2.308	8.05	5.37	7.74	229	-57.7	-	-
MW17-23A	1092.82	1092.03	0.79	1,090.94	28-Aug-20	1.885	7.79	3.9	1.55	144.8	-46.5	-	-
MW17-23B	1092.85	1092.04	0.81	1,090.60	17-Jul-17	2.256	-	-	-	-	-	-	-
MW17-23B	1092.85	1092.04	0.81	1,090.39	23-Jul-17	2.459	7.58	5.71	9.65	152	32.6	-	-
MW17-23B	1092.85	1092.04	0.81	1,090.62	28-Jul-17	2.230	-	-	-	-	-	-	-
MW17-23B	1092.85	1092.04	0.81	1,089.87	10-Jul-19	2.984	-	-	-	-	-	1	0
MW17-24A	1082.01	1081.18	0.83	1,078.71	17-Jul-17	3.303	-	-	-	-	-	-	-
MW17-24A	1082.01	1081.18	0.83	1,078.70	23-Jul-17	3.307	7.61	5.28	1.02	322	116.9	-	-
MW17-24A	1082.01	1081.18	0.83	1,078.74	28-Jul-17	3.267	-	-	-	-	-	-	-
MW17-24A	1082.01	1081.18	0.83	1,078.67	10-Jul-19	3.342	-	-	-	-	-	1	0
MW17-24A	1082.01	1081.18	0.83	1,078.66	15-Jul-19	3.348	7.72	5.211	0.33	308	-87.6	-	-
MW17-24A	1082.01	1081.18	0.83	1,078.78	4-Sep-19	3.23	7.46	4.01	9.96	173	0	-	-
MW17-24A	1082.01	1081.18	0.83	1,078.91	24-Aug-20	3.1	7.4	3.5	0.44	228	-60.3	-	-
MW17-24B	1082.07	1081.24	0.83	1,078.93	17-Jul-17	3.146	-	-	-	-	-	-	-
MW17-24B	1082.07	1081.24	0.83	1,078.89	23-Jul-17	3.184	8.18	5.21	10.07	69	53.6	-	-
MW17-24B	1082.07	1081.24	0.83	1,078.94	28-Jul-17	3.129	-	-	-	-	-	-	-
MW17-24B	1082.07	1081.24	0.83	1,078.77	10-Jul-19	3.304	-	-	-	-	-	1	0
MW17-24B	1082.07	1081.24	0.83	1,078.80	18-Jul-19	3.275	7.11	3.95	10.3	38	24	-	-
MW17-24B	1082.07	1081.24	0.83	1,078.92	4-Sep-19	3.15	6.68	5.22	12.76	22	12.12	-	-
MW17-24B	1082.07	1081.24	0.83	1,079.18	24-Aug-20	2.895	6.48	4.7	11.49	18.5	100.5	-	-
MW17-25A	1088.44	1087.56	0.88	1,086.24	17-Jul-17	2.205	-	-	-	-	-	-	-
MW17-25A	1088.44	1087.56	0.88	1,086.08	23-Jul-17	2.364	7.92	5.92	4.32	348	54.7	-	-
MW17-25A	1088.44	1087.56	0.88	1,086.17	28-Jul-17	2.275	-	-	-	-	-	-	-
MW17-25A	1088.44	1087.56	0.88	1,085.93	7-Sep-19	2.51	-	-	-	-	-	1	0
MW17-25A	1088.44	1087.56	0.88	1,086.30	25-Aug-20	2.141	7.48	4.7	3.5	258.9	1.7	-	-
MW17-25B	1088.38	1087.50	0.88	1,086.18	17-Jul-17	2.202	-	-	-	-	-	-	-
MW17-25B	1088.38	1087.50	0.88	1,085.94	23-Jul-17	2.439	7.92	6.66	6	137	108.3	-	-
MW17-25B	1088.38	1087.50	0.88	1,086.09	28-Jul-17	2.292	-	-	-	-	-	-	-
MW17-25B	1088.38	1087.50	0.88	-	7-Sep-19	Dry	-	-	-	-	-	1	0
MW17-26A	1105.43	1104.51	0.92	1,098.68	17-Jul-17	6.752	-	-	-	-	-	-	-
MW17-26A	1105.43	1104.51	0.92	1,096.73	23-Jul-17	8.694	7.32	5.62	9.38	260	119.2	-	-
MW17-26A	1105.43	1104.51	0.92	1,096.44	28-Jul-17	8.992	-	-	-	-	-	-	-
MW17-26A	1105.43	1104.51	0.92	1,095.32	15-Jul-19	10.105	7.85	5.11	8.45	285	24.5	-	-
MW17-26A	1105.43	1104.51	0.92	1,096.59	5-Sep-19	8.84	8.01	4.07	8.4	179	0	-	-
MW17-26A	1105.43	1104.51	0.92	1,098.06	25-Aug-20	7.365	7.61	4.4	8.18	190.5	76.3	-	-
MW17-26B	1105.70	1104.80	0.90	1,100.56	17-Jul-17	5.138	-	-	-	-	-	-	-
MW17-26B	1105.70	1104.80	0.90	1,101.23	24-Jul-17	4.469	7.88	8.35	9.3	302	82.2	-	-
MW17-26B	1105.70	1104.80	0.90	1,101.49	28-Jul-17	4.213	-	-	-	-	-	-	-
MW17-26B	1105.70	1104.80	0.90	1,099.76	18-Jul-19	5.942	7.71	6.19	5.83	297	42.8	-	-
MW17-26B	1105.70	1104.80	0.90	1,100.75	5-Sep-19	4.95	8.1	6.02	6.93	196	5	-	-



**Table 1: Groundwater Monitoring Data**

Well ID	Elevation top of PVC pipe (m)	Ground Elevation (m)	Stick up length (m)	WL Elevation (m)	Date Monitored	Depth to Water (mbtop)	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (uS/cm)	ORP (mV)	Well Headspace (%LEL)	Well Headspace (ppm)
MW17-26B	1105.70	1104.80	0.90	1,102.35	25-Aug-20	3.352	7.59	5.6	6.44	200.5	74.1	-	-
MW17-27A	1065.48	1064.67	0.81	1,049.00	17-Jul-17	16.488	-	-	-	-	-	-	-
MW17-27A	1065.48	1064.67	0.81	1,048.64	24-Jul-17	16.842	7.92	4.45	1	383	40	-	-
MW17-27A	1065.48	1064.67	0.81	1,048.69	28-Jul-17	16.792	-	-	-	-	-	-	-
MW17-27A	1065.48	1064.67	0.81	1,048.40	16-Jul-19	17.088	7.85	5.62	2.23	288	-78.8	-	-
MW17-27A	1065.48	1064.67	0.81	1,048.46	7-Sep-19	17.02	-	-	-	-	-	1	0
MW17-27A	1065.48	1064.67	0.81	1,049.68	28-Aug-20	15.805	7.33	4.1	4.1	270.2	-24	-	-
MW17-27B	1065.35	1064.53	0.82	1,048.82	17-Jul-17	16.527	-	-	-	-	-	-	-
MW17-27B	1065.35	1064.53	0.82	1,048.07	24-Jul-17	17.275	8.1	4.11	0.2	383	-55.1	-	-
MW17-27B	1065.35	1064.53	0.82	1,048.10	28-Jul-17	17.251	-	-	-	-	-	-	-
MW17-27B	1065.35	1064.53	0.82	1,047.71	16-Jul-19	17.639	7.57	6.3	4.5	429	-	-	-
MW17-27B	1065.35	1064.53	0.82	1,047.93	7-Sep-19	17.42	-	-	-	-	-	1	1
MW17-27B	1065.35	1064.53	0.82	-	28-Aug-20	No purge or water sampling possible (mix of sand and water)							
MW17-28	1007.90	1007.18	0.72	1,003.55	23-Jul-17	4.342	8.07	6.04	7.46	346	156.5	-	-
MW17-28	1007.90	1007.18	0.72	1,003.55	28-Jul-17	4.342	-	-	-	-	-	-	-
MW17-28	1007.90	1007.18	0.72	1,003.59	7-Sep-19	4.31	8.47	6.98	16.68	155	65.9	-	-

**Notes:**

LEL = Lower explosive limit

ppm = parts per million

mbtop = meters below top of pipe



**Table 2: PETROLEUM HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

			AEC 2 : Fuel Lines										
			MW17-12A		MW17-17A				TP1 3	TP09		TP18	
			MW17-12A 2-4	MW17-12A 8-10	MW17-17A 6-8	MW17-17A 16-18	MW17-17A 18-20	MW17-17A 30-35	TP1 3-4	TP-09 6-8	TP-09 8-10	TP-18 6-8	TP-18 8-10
			0.6-1.2	2.4-3.0	1.8-2.4	4.9-5.5	5.5-6.1	9.1-10.7	0.9-1.2	1.8-2.4	2.4-3.0	1.8-2.4	2.4-3.0
			20-Jun-17	20-Jun-17	06-Jul-17	06-Jul-17	06-Jul-17	06-Jul-17	21-Jun-17	25-Jun-17	25-Jun-17	26-Jun-17	26-Jun-17
			L1948071-2	L1948071-5	L1957720-25	L1957720-31	L1957720-32	L1957720-36	L1948071-26	L1951378-63	L1951378-64	L1951378-96	L1951378-97
Parameters	Units	MDL											
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	0.00	5.00	45.00	10.00	30.00	5.00	0.00	5.00	10.00	nm	nm
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no	no
<b>Petroleum Hydrocarbons (PHCs)</b>													
Benzene	µg/g	0.0050	na	na	na	na	na	na	na	na	na	na	na
Ethylbenzene	µg/g	0.015	na	na	na	na	na	na	na	na	na	na	na
Toluene	µg/g	0.050	na	na	na	na	na	na	na	na	na	na	na
ortho-Xylene	µg/g	0.050	na	na	na	na	na	na	na	na	na	na	na
meta- & para-Xylene	µg/g	0.050	na	na	na	na	na	na	na	na	na	na	na
Xylenes, Total	µg/g	0.075	na	na	na	na	na	na	na	na	na	na	na
Volatile Hydrocarbons (VH <sub>6-10</sub> )	µg/g	100	<100	<100	<100	<100	na	<100	<100	260	330	620	960
VPH <sub>5</sub> <sup>1</sup>	µg/g	100	<100	<100	<100	<100	na	<100	<100	250	330	620	960
Styrene	µg/g	0.050	na	na	na	na	na	na	na	na	na	na	na
Methyl tert-butyl ether [MTBE]	µg/g	0.20	na	na	na	na	na	na	na	na	na	na	na
EPH <sub>10-19</sub>	µg/g	200	<200	<200	2300	na	<200	<200	<200	4660	2480	7620	11100
EPH <sub>19-32</sub>	µg/g	200	<200	<200	410	na	<200	<200	<200	270	<200	950	1390
LEPH <sub>5</sub>	µg/g	200	<200	<200	2300	na	<200	<200	<200	4650	2470	7600	11000
HEPH <sub>5</sub>	µg/g	200	<200	<200	410	na	<200	<200	<200	270	<200	950	1390
<b>Taxonomy (Soil)</b>													
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	na	na	na	na	na	na	na	na	na	na	na
<b>Organic / Inorganic Carbon (Soil)</b>													
Total Organic Carbon	%	0.0500	na	na	na	na	na	na	na	na	na	na	na

**Notes:**

- MDL = Method Detection Limit
- EPH<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPH<sub>5</sub> = light extractable petroleum hydrocarbons in soil
- HEPH<sub>5</sub> = heavy extractable petroleum hydrocarbons in soil
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- VPHS = volatile petroleum hydrocarbons in soil
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**Table 2: PETROLEUM HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

			AEC 2 : Fuel Lines										
APEC/Issue													
Sample Station			TP20		TP21	TP27		TP28			TP19-01	TP19-02	TP19-05
Sample ID			TP-20 4-6	TP-20 8-10	TP-21 6-8	TP27 2-4	TP27 6-8	TP28 2-4	TP28 6-8	TP28 DUP A	TP19-01-04	TP19-02-04	TP19-05-01
Sample Depth (mbg)			1.2-1.8	2.4-3.0	1.8-2.4	0.6-1.2	1.8-2.4	0.6-1.2	1.8-2.4	1.8-2.4	4.0	3.5	0.5
Sample Date			26-Jun-17	26-Jun-17	26-Jun-17	21-Jul-17	21-Jul-17	21-Jul-17	21-Jul-17	21-Jul-17	10-Jul-19	10-Jul-19	10-Jul-19
Lab ID #			L1951378-105	L1951378-107	L1951378-111	L1965813-2	L1965813-4	L1965813-6	L1965813-8	L1965813-9	L2313880-4	L2313880-10	L2313880-26
Parameters	Units	MDL											
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm	175.00	290.00	190.00
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no	no
<b>Petroleum Hydrocarbons (PHCs)</b>													
Benzene	µg/g	0.0050	na	na	na	na	na	na	na	na	<0.0050	<0.0050	<0.0050
Ethylbenzene	µg/g	0.015	na	na	na	na	na	na	na	na	<0.015	<0.015	<0.015
Toluene	µg/g	0.050	na	na	na	na	na	na	na	na	<0.050	<0.050	<0.050
ortho-Xylene	µg/g	0.050	na	na	na	na	na	na	na	na	<0.050	<0.050	<0.050
meta- & para-Xylene	µg/g	0.050	na	na	na	na	na	na	na	na	<0.050	<0.050	<0.050
Xylenes, Total	µg/g	0.075	na	na	na	na	na	na	na	na	<0.075	<0.075	<0.075
Volatile Hydrocarbons (VH <sub>6-10</sub> )	µg/g	100	<100	220	<100	<100	<100	<100	<100	<100	<100	<100	<100
VPH <sub>5</sub> <sup>1</sup>	µg/g	100	<100	220	<100	<100	<100	<100	<100	<100	<100	<100	<100
Styrene	µg/g	0.050	na	na	na	na	na	na	na	na	<0.050	<0.050	<0.050
Methyl tert-butyl ether [MTBE]	µg/g	0.20	na	na	na	na	na	na	na	na	<0.20	<0.20	<0.20
EPH <sub>10-19</sub>	µg/g	200	900	590	<200	<200	<200	<200	<200	<200	<200	<200	<200
EPH <sub>19-32</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
LEPH <sub>5</sub>	µg/g	200	900	590	<200	<200	<200	<200	<200	<200	na	na	na
HEPH <sub>5</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	<200	<200	na	na	na
<b>Taxonomy (Soil)</b>													
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	na	na	na	na	na	na	na	na	na	na	na
<b>Organic / Inorganic Carbon (Soil)</b>													
Total Organic Carbon	%	0.0500	na	na	na	na	na	na	na	na	na	na	na

**Notes:**

- MDL = Method Detection Limit
- EPH<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPH<sub>5</sub> = light extractable petroleum hydrocarbons in soil
- HEPH<sub>5</sub> = heavy extractable petroleum hydrocarbons in soil
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- VPHS = volatile petroleum hydrocarbons in soil
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**Table 2: PETROLEUM HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

			APEC/Issue	AEC 2 : Fuel Lines		AEC 1 : Mill / 10 Level Portal								
			Sample Station	TP19-05	MW17-1A	MW17-3		MW17-2B	MW17-4B		MW17-5B	MW17-6A	MW17-7A	
			Sample ID	TP19-05-03	MW17-1A 7-9	MW17-3 0-2	MW17-3 2-4	MW17-2B 2-4	MW17-4B 3-4	MW17-4B 4-7	MW17-5B 2-3	MW17-6A 0-1	MW17-7A 0-1	MW17-7A 2-3.5
			Sample Depth (mbg)	2.4	2.1-2.7	0.0-0.6	0.6-1.2	0.6-1.2	0.9-1.2	1.2-2.1	0.6-0.9	0.0-0.3	0.0-0.3	0.6-1.1
			Sample Date	10-Jul-19	10-Jun-17	11-Jun-17	11-Jun-17	11-Jun-17	12-Jun-17	12-Jun-17	13-Jun-17	13-Jun-17	14-Jun-17	14-Jun-17
			Lab ID #	L2313880-28	L1942125-5	L1942125-15	L1942125-16	L1942125-29	L1942125-48	L1942125-49	L1945466-2	L1945466-6	L1945466-22	L1945466-23
Parameters	Units	MDL												
<b>Field Screening</b>														
Sample Headspace Vapour Concentration	ppmv	5.00	100.00	0.00	45.00	0.00	0.00	0.00	5.00	0.00	0.00	5.00	35.00	0.00
Observable Staining	-	-	no	no	no	no	no	no	no	yes	no	no	no	no
<b>Petroleum Hydrocarbons (PHCs)</b>														
Benzene	µg/g	0.0050	<0.0050	na	na	na	na	na	na	na	na	na	na	na
Ethylbenzene	µg/g	0.015	<0.015	na	na	na	na	na	na	na	na	na	na	na
Toluene	µg/g	0.050	<0.050	na	na	na	na	na	na	na	na	na	na	na
ortho-Xylene	µg/g	0.050	<0.050	na	na	na	na	na	na	na	na	na	na	na
meta- & para-Xylene	µg/g	0.050	<0.050	na	na	na	na	na	na	na	na	na	na	na
Xylenes, Total	µg/g	0.075	<0.075	na	na	na	na	na	na	na	na	na	na	na
Volatile Hydrocarbons (VH <sub>6-10</sub> )	µg/g	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
VPH <sub>5</sub> <sup>1</sup>	µg/g	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Styrene	µg/g	0.050	<0.050	na	na	na	na	na	na	na	na	na	na	na
Methyl tert-butyl ether [MTBE]	µg/g	0.20	<0.20	na	na	na	na	na	na	na	na	na	na	na
EPH <sub>10-19</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	470	490	<200	210	260	<200
EPH <sub>19-32</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	250	<200	<200	400	2030	<200
LEPH <sub>5</sub>	µg/g	200	na	<200	<200	<200	<200	<200	470	490	<200	210	260	<200
HEPH <sub>5</sub>	µg/g	200	na	<200	<200	<200	<200	<200	250	<200	<200	400	2030	<200
<b>Taxonomy (Soil)</b>														
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	na	na	na	na	na	na	na	na	na	na	na	na
<b>Organic / Inorganic Carbon (Soil)</b>														
Total Organic Carbon	%	0.0500	na	na	na	na	na	na	na	na	na	na	na	na

**Notes:**

- MDL = Method Detection Limit
- EPH<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPH<sub>5</sub> = light extractable petroleum hydrocarbons in soil
- HEPH<sub>5</sub> = heavy extractable petroleum hydrocarbons in soil
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- VPHS = volatile petroleum hydrocarbons in soil
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit



**Table 2: PETROLEUM HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue			AEC 1 : Mill / 10 Level Portal				AEC 2 : Tank Farm Area						
Sample Station	MW17-7B	MW17-8A	TP19-10	TP19-11	MW17-13			MW17-16 2-4		TP2			
Sample ID	MW17-7B 0-1	MW17-8A 3-4	TP19-10-01	TP19-11-01	MW17-13 2-3	MW17-13 6-8	MW17-13 10-12	MW17-16 2-4	MW17-16 2-4 DUP	TP2 3-4	TP2 6-9		
Sample Depth (mbg)	0.0-0.3	0.9-1.2	0.8	0.5	0.6-0.9	1.8-2.4	3.0-3.6	0.6-1.2	0.6-1.2	0.9-1.2	1.8-2.7		
Sample Date	14-Jun-17	15-Jun-17	11-Jul-19	11-Jul-19	22-Jun-17	22-Jun-17	22-Jun-17	05-Jul-17	05-Jul-17	21-Jun-17	21-Jun-17		
Lab ID #	L1945466-35	L1945466-42	L2313896-17	L2313896-19	L1948071-51	L1948071-53	L1948071-55	L1957720-16	L1957720-17	L1948071-32	L1948071-33		
Parameters	Units	MDL											
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	30.00	0.00	0.00	0.00	80.00	10.00	0.00	35.00	35.00	0.00	140.00
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no	yes
<b>Petroleum Hydrocarbons (PHCs)</b>													
Benzene	µg/g	0.0050	na	na	<0.0050	<0.0050	na	na	na	na	na	na	na
Ethylbenzene	µg/g	0.015	na	na	<0.015	<0.015	na	na	na	na	na	na	na
Toluene	µg/g	0.050	na	na	<0.050	<0.050	na	na	na	na	na	na	na
ortho-Xylene	µg/g	0.050	na	na	<0.050	<0.050	na	na	na	na	na	na	na
meta- & para-Xylene	µg/g	0.050	na	na	<0.050	<0.050	na	na	na	na	na	na	na
Xylenes, Total	µg/g	0.075	na	na	<0.075	<0.075	na	na	na	na	na	na	na
Volatile Hydrocarbons (VH <sub>6-10</sub> )	µg/g	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	360	420
VPH <sub>5</sub> <sup>1</sup>	µg/g	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	360	420
Styrene	µg/g	0.050	na	na	<0.050	<0.050	na	na	na	na	na	na	na
Methyl tert-butyl ether [MTBE]	µg/g	0.20	na	na	<0.20	<0.20	na	na	na	na	na	na	na
EPH <sub>10-19</sub>	µg/g	200	<200	<200	<200	<200	2750	870	<200	<200	<200	3440	3880
EPH <sub>19-32</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	<200	<200	<200	600	300
LEPH <sub>5</sub>	µg/g	200	<200	<200	na	na	2750	870	<200	<200	<200	3440	3880
HEPH <sub>5</sub>	µg/g	200	<200	<200	na	na	<200	<200	<200	<200	<200	600	300
<b>Taxonomy (Soil)</b>													
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	na	na	na	na	na	na	na	na	na	na	na
<b>Organic / Inorganic Carbon (Soil)</b>													
Total Organic Carbon	%	0.0500	na	na	na	na	na	na	na	na	na	na	na

**Notes:**

- MDL = Method Detection Limit
- EPH<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPH<sub>5</sub> = light extractable petroleum hydrocarbons in soil
- HEPH<sub>5</sub> = heavy extractable petroleum hydrocarbons in soil
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- VPHS = volatile petroleum hydrocarbons in soil
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
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**Table 2: PETROLEUM HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue			AEC 2 : Tank Farm Area										
			TP04		TP05		TP06	TP06	TP07		TP08		TP19-06
Sample Station													
Sample ID			TP-04 2-3	TP-04 6-8	TP-05 4-6	TP-05 8-10	TP-06 4-6	TP-06 8-10	TP-07 2-3	TP-07 6-8	TP-08 4-6	TP-08 8-10	TP-19 6-8
Sample Depth (mbg)			0.6-0.9	1.8-2.4	1.2-1.8	2.4-3.0	1.2-1.8	2.4-3.0	0.6-0.9	1.8-2.4	1.2-1.8	2.4-3.0	1.8-2.4
Sample Date			24-Jun-17	24-Jun-17	25-Jun-17	25-Jun-17	25-Jun-17	25-Jun-17	25-Jun-17	25-Jun-17	25-Jun-17	25-Jun-17	26-Jun-17
Lab ID #			L1951378-38	L1951378-40	L1951378-43	L1951378-45	L1951378-48	L1951378-50	L1951378-52	L1951378-54	L1951378-57	L1951378-59	L1951378-101
Parameters	Units	MDL											
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	160.00	0.00	nm	nm	nm	nm	nm	nm	nm	nm	nm
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no	no
<b>Petroleum Hydrocarbons (PHCs)</b>													
Benzene	µg/g	0.0050	na	na	na	na	na	na	na	na	na	na	na
Ethylbenzene	µg/g	0.015	na	na	na	na	na	na	na	na	na	na	na
Toluene	µg/g	0.050	na	na	na	na	na	na	na	na	na	na	na
ortho-Xylene	µg/g	0.050	na	na	na	na	na	na	na	na	na	na	na
meta- & para-Xylene	µg/g	0.050	na	na	na	na	na	na	na	na	na	na	na
Xylenes, Total	µg/g	0.075	na	na	na	na	na	na	na	na	na	na	na
Volatile Hydrocarbons (VH <sub>6-10</sub> )	µg/g	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
VPH <sub>5</sub> <sup>1</sup>	µg/g	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Styrene	µg/g	0.050	na	na	na	na	na	na	na	na	na	na	na
Methyl tert-butyl ether [MTBE]	µg/g	0.20	na	na	na	na	na	na	na	na	na	na	na
EPH <sub>10-19</sub>	µg/g	200	2480	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
EPH <sub>19-32</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
LEPH <sub>5</sub>	µg/g	200	2480	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
HEPH <sub>5</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
<b>Taxonomy (Soil)</b>													
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	na	na	na	na	na	na	na	na	na	na	na
<b>Organic / Inorganic Carbon (Soil)</b>													
Total Organic Carbon	%	0.0500	na	na	na	na	na	na	na	na	na	na	na

**Notes:**

- MDL = Method Detection Limit
- EPH<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPH<sub>5</sub> = light extractable petroleum hydrocarbons in soil
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- mbg = metres below grade
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- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- VPHS = volatile petroleum hydrocarbons in soil
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**Table 2: PETROLEUM HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

			AEC 2 : Tank Farm Area									AEC 3 : Fuel Pump Shed	
APEC/Issue			TP19-03				TP19-04		TP19-06			TP29	TP30
Sample Station			TP19-03-02	TP19-03-03	TP19-03-04	TP19-03-07	TP19-04-01	TP19-04-03	TP19-06-02	TP19-06-03	TP19-06-04	TP29 2-4	TP30 2-4
Sample ID													
Sample Depth (mbg)			1.8	1.8	2.7	4.4	0.5	2.6	1.7	2.4	2.4	0.6-1.2	0.6-1.2
Sample Date			10-Jul-19	10-Jul-19	10-Jul-19	10-Jul-19	10-Jul-19	10-Jul-19	11-Jul-19	11-Jul-19	11-Jul-19	21-Jul-17	21-Jul-17
Lab ID #			L2313880-15	L2313880-16	L2313880-17	L2313880-20	L2313880-21	L2313880-23	L2313896-2	L2313896-3	L2313896-4	L1965813-11	L1965813-16
Parameters	Units	MDL											
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	105.00	105.00	1150.00	200.00	280.00	105.00	80.00	60.00	60.00	nm	nm
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no	yes
<b>Petroleum Hydrocarbons (PHCs)</b>													
Benzene	µg/g	0.0050	<0.0050	<0.0050	na	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	na	na
Ethylbenzene	µg/g	0.015	0.437	0.271	na	0.042	<0.015	<0.015	<0.015	<0.015	<0.015	na	na
Toluene	µg/g	0.050	<0.050	<0.050	na	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	na	na
ortho-Xylene	µg/g	0.050	0.251	0.29	na	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	na	na
meta- & para-Xylene	µg/g	0.050	0.461	0.524	na	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	na	na
Xylenes, Total	µg/g	0.075	0.712	0.814	na	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	na	na
Volatile Hydrocarbons (VH <sub>6-10</sub> )	µg/g	100	260	250	na	<100	<100	<100	<100	<100	<100	<100	190
VPH <sub>5</sub> <sup>1</sup>	µg/g	100	260	250	na	<100	<100	<100	<100	<100	<100	<100	190
Styrene	µg/g	0.050	<0.050	<0.050	na	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	na	na
Methyl tert-butyl ether [MTBE]	µg/g	0.20	<0.20	<0.20	na	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	na	na
EPH <sub>10-19</sub>	µg/g	200	1450	1790	4300	<200	<200	<200	<200	<200	<200	<200	4950
EPH <sub>19-32</sub>	µg/g	200	<200	<200	340	<200	<200	<200	<200	<200	<200	<200	<200
LEPH <sub>5</sub>	µg/g	200	na	na	na	na	na	na	na	na	na	<200	4950
HEPH <sub>5</sub>	µg/g	200	na	na	na	na	na	na	na	na	na	<200	<200
<b>Taxonomy (Soil)</b>													
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	na	na	na	na	na	na	na	na	na	na	na
<b>Organic / Inorganic Carbon (Soil)</b>													
Total Organic Carbon	%	0.0500	na	na	na	na	na	na	na	na	na	na	na

**Notes:**

- MDL = Method Detection Limit
- EPH<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPH<sub>5</sub> = light extractable petroleum hydrocarbons in soil
- HEPH<sub>5</sub> = heavy extractable petroleum hydrocarbons in soil
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- VPHS = volatile petroleum hydrocarbons in soil
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**Table 2: PETROLEUM HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VES2655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue			AEC 3 : Fuel Pump Shed			APEC 6 : Septic Field				APEC 10 : Burial Site 1		AEC 4 : Mechanical Shop 11 Level Portal	
Sample Station			TP19-07	TP19-08		MW17-10A				MW17-9B		TP10	TP11
Sample ID			TP19-07-02	TP19-08-01	TP19-08-02	MW17-10A 2-4	MW17-10A 12-14	MW17-10A 16-18	MW17-10A 18-20	MW17-9B 3-4	MW17-9B 6-10	TP-10 8-10	TP-11 4-6
Sample Depth (mbg)			1.7	0.5	2.3	0.6-1.2	3.6-4.3	4.9-5.5	5.5-6.1	0.9-1.2	1.8-3.0	2.4-3.0	1.2-1.8
Sample Date			11-Jul-19	11-Jul-19	11-Jul-19	17-Jun-17	17-Jun-17	17-Jun-17	17-Jun-17	16-Jun-17	16-Jun-17	26-Jun-17	26-Jun-17
Lab ID #			L2313896-6	L2313896-9	L2313896-10	L1946419-28	L1946419-33	L1946419-35	L1946419-36	L1946419-2	L1946419-4	L1951378-69	L1951378-72
Parameters	Units	MDL											
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	40.00	95.00	60.00	20.00	15.00	55.00	0.00	35.00	0.00	10.00	5.00
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no	no
<b>Petroleum Hydrocarbons (PHCs)</b>													
Benzene	µg/g	0.0050	<0.0050	<0.0050	<0.0050	na	na	na	na	na	na	na	na
Ethylbenzene	µg/g	0.015	<0.015	<0.015	<0.015	na	na	na	na	na	na	na	na
Toluene	µg/g	0.050	<0.050	<0.050	<0.050	na	na	na	na	na	na	na	na
ortho-Xylene	µg/g	0.050	<0.050	<0.050	<0.050	na	na	na	na	na	na	na	na
meta- & para-Xylene	µg/g	0.050	<0.050	<0.050	<0.050	na	na	na	na	na	na	na	na
Xylenes, Total	µg/g	0.075	<0.075	<0.075	<0.075	na	na	na	na	na	na	na	na
Volatile Hydrocarbons (VH <sub>6-10</sub> )	µg/g	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	1220
VPH <sub>5</sub> <sup>1</sup>	µg/g	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	1210
Styrene	µg/g	0.050	<0.050	<0.050	<0.050	na	na	na	na	na	na	na	na
Methyl tert-butyl ether [MTBE]	µg/g	0.20	<0.20	<0.20	<0.20	na	na	na	na	na	na	na	na
EPH <sub>10-19</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	10500
EPH <sub>19-32</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	<200	<200	380	700	2630
LEPH <sub>5</sub>	µg/g	200	na	na	na	<200	<200	<200	<200	<200	<200	<200	10500
HEPH <sub>5</sub>	µg/g	200	na	na	na	<200	<200	<200	<200	<200	380	700	2630
<b>Taxonomy (Soil)</b>													
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	na	na	na	na	na	na	na	na	na	na	na
<b>Organic / Inorganic Carbon (Soil)</b>													
Total Organic Carbon	%	0.0500	na	na	na	na	na	na	na	na	na	na	na

**Notes:**

- MDL = Method Detection Limit
- EPH<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPH<sub>5</sub> = light extractable petroleum hydrocarbons in soil
- HEPH<sub>5</sub> = heavy extractable petroleum hydrocarbons in soil
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- VPHS = volatile petroleum hydrocarbons in soil
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**Table 2: PETROLEUM HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

			AEC 4 : Mechanical Shop 11 Level Portal										
APEC/Issue			TP11	TP12	TP13	TP19-12		TP19-13		TP19-14		TP19-15	TP19-16
Sample Station			TP11	TP12	TP13	TP19-12-03	TP19-12-04	TP19-13-02	TP19-13-03	TP19-14-01	TP19-14-02	TP19-15-02	TP19-16-01
Sample ID			TP-11 8-10	TP-12 4-6	TP-13 6-8	TP19-12-03	TP19-12-04	TP19-13-02	TP19-13-03	TP19-14-01	TP19-14-02	TP19-15-02	TP19-16-01
Sample Depth (mbg)			2.4-3.0	1.2-1.8	1.8-2.4	2.9	2.9	2.9	3.7	0.7	2.4	2.4	0.5
Sample Date			26-Jun-17	26-Jun-17	26-Jun-17	11-Jul-19	11-Jul-19	11-Jul-19	11-Jul-19	12-Jul-19	12-Jul-19	12-Jul-19	12-Jul-19
Lab ID #			L1951378-74	L1951378-77	L1951378-81	L2313896-22	L2313896-23	L2313896-27	L2313896-28	L2313895-1	L2313895-2	L2313895-5	L2313895-8
Parameters	Units	MDL											
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	5.00	0.00	15.00	0.00	0.00	0.00	0.00	20.00	95.00	20.00	25.00
Observable Staining	-	-	no	no	no	no	no	no	no	no	Yes	no	no
<b>Petroleum Hydrocarbons (PHCs)</b>													
Benzene	µg/g	0.0050	na	na	na	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Ethylbenzene	µg/g	0.015	na	na	na	<0.015	<0.015	<0.015	<0.015	<0.015	0.409	<0.015	<0.015
Toluene	µg/g	0.050	na	na	na	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
ortho-Xylene	µg/g	0.050	na	na	na	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
meta- & para-Xylene	µg/g	0.050	na	na	na	<0.050	<0.050	<0.050	<0.050	<0.050	0.643	<0.050	<0.050
Xylenes, Total	µg/g	0.075	na	na	na	<0.075	<0.075	<0.075	<0.075	<0.075	0.643	<0.075	<0.075
Volatile Hydrocarbons (VH <sub>6-10</sub> )	µg/g	100	940	<100	<100	<100	<100	<100	<100	<100	480	<100	<100
VPH <sub>5</sub> <sup>1</sup>	µg/g	100	930	<100	<100	<100	<100	<100	<100	<100	480	<100	<100
Styrene	µg/g	0.050	na	na	na	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Methyl tert-butyl ether [MTBE]	µg/g	0.20	na	na	na	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
EPH <sub>10-19</sub>	µg/g	200	8600	<200	<200	<200	<200	<200	<200	3520	2950	<200	<200
EPH <sub>19-32</sub>	µg/g	200	1330	<200	<200	220	250	<200	830	1450	310	<200	390
LEPH <sub>5</sub>	µg/g	200	8600	<200	<200	na	na	na	na	na	na	na	na
HEPH <sub>5</sub>	µg/g	200	1330	<200	<200	na	na	na	na	na	na	na	na
<b>Taxonomy (Soil)</b>													
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	na	na	na	na	na	na	na	na	na	na	na
<b>Organic / Inorganic Carbon (Soil)</b>													
Total Organic Carbon	%	0.0500	na	na	na	na	na	na	na	na	na	na	na

**Notes:**

- MDL = Method Detection Limit
- EPH<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPH<sub>5</sub> = light extractable petroleum hydrocarbons in soil
- HEPH<sub>5</sub> = heavy extractable petroleum hydrocarbons in soil
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- VPHS = volatile petroleum hydrocarbons in soil
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**Table 2: PETROLEUM HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue			AEC 4 : Mechanical Shop 11 Level Portal					APEC 8: Level 12 Portal					
Sample Station			TP19-16		TP19-17			TP19-18		TP19-19		TP19-20	TP19-21
Sample ID			TP19-16-02	TP19-16-03	TP19-17-01	TP19-17-02	TP19-17-03	TP19-18-01	TP19-18-02	TP19-19-01	TP19-19-02	TP19-20-01	TP19-21-01
Sample Depth (mbg)			2.9	3.3	0.5	2.7	3.9	0.9	1.9	1.0	2.6	0.4	0.2
Sample Date			12-Jul-19	12-Jul-19	12-Jul-19	12-Jul-19	12-Jul-19	12-Jul-19	12-Jul-19	12-Jul-19	12-Jul-19	12-Jul-19	12-Jul-19
Lab ID #			L2313895-9	L2313895-10	L2313895-13	L2313895-14	L2313895-15	L2313895-16	L2313895-17	L2313895-18	L2313895-19	L2313895-22	L2313895-23
Parameters	Units	MDL											
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	25.00	15.00	45.00	20.00	0.00	10.00	15.00	25.00	25.00	25.00	30.00
Observable Staining	-	-	Yes	Yes	Yes	Yes	no	no	no	no	no	no	no
<b>Petroleum Hydrocarbons (PHCs)</b>													
Benzene	µg/g	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Ethylbenzene	µg/g	0.015	<0.015	0.158	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
Toluene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
ortho-Xylene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
meta- & para-Xylene	µg/g	0.050	<0.050	0.075	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Xylenes, Total	µg/g	0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075
Volatile Hydrocarbons (VH <sub>6-10</sub> )	µg/g	100	<100	200	<100	<100	<100	<100	<100	<100	<100	<100	<100
VPH <sub>5</sub> <sup>1</sup>	µg/g	100	<100	200	<100	<100	<100	<100	<100	<100	<100	<100	<100
Styrene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Methyl tert-butyl ether [MTBE]	µg/g	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
EPH <sub>10-19</sub>	µg/g	200	<200	5230	2140	<200	<200	<200	<200	<200	<200	<200	<200
EPH <sub>19-32</sub>	µg/g	200	<200	1250	1600	<200	<200	<200	<200	<200	<200	<200	670
LEPH <sub>5</sub>	µg/g	200	na	na	na	na	na	na	na	na	na	na	na
HEPH <sub>5</sub>	µg/g	200	na	na	na	na	na	na	na	na	na	na	na
<b>Taxonomy (Soil)</b>													
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	na	na	na	na	na	na	na	na	na	na	na
<b>Organic / Inorganic Carbon (Soil)</b>													
Total Organic Carbon	%	0.0500	na	na	na	na	na	na	na	na	na	na	na

**Notes:**

- MDL = Method Detection Limit
- EPH<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPH<sub>5</sub> = light extractable petroleum hydrocarbons in soil
- HEPH<sub>5</sub> = heavy extractable petroleum hydrocarbons in soil
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- VPHS = volatile petroleum hydrocarbons in soil
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**Table 2: PETROLEUM HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue			Main Warehouses					AEC 7: Warehouse East Area					
Sample Station			TP3		TP22		TP23	TP14	TP15	TP16	TP17	TP19-34	
Sample ID			TP3 4-6	TP3 6-9	TP22 4-6	TP22 6-8	TP23 6-8	TP-14 2-3	TP-15 2-3	TP-16 4-6	TP-17 4-6	TP19-34-03	TP19-34-04
Sample Depth (mbg)			1.2-1.8	1.8-2.7	1.2-1.8	1.8-2.4	1.8-2.4	0.6-0.9	0.6-0.9	1.2-1.8	1.2-1.8	1.8	3.5
Sample Date			21-Jun-17	21-Jun-17	04-Jul-17	04-Jul-17	04-Jul-17	26-Jun-17	26-Jun-17	26-Jun-17	26-Jun-17	14-Jul-19	14-Jul-19
Lab ID #			L1948071-37	L1948071-38	L1957720-3	L1957720-4	L1957720-8	L1951378-83	L1951378-86	L1951378-89	L1951378-92	L2313897-3	L2313897-4
Parameters	Units	MDL											
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	85.00	100.00	nm	nm	nm	nm	nm	15.00	25.00	100.00	5.00
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no	no
<b>Petroleum Hydrocarbons (PHCs)</b>													
Benzene	µg/g	0.0050	na	na	na	na	na	na	na	na	na	0.031	<0.0050
Ethylbenzene	µg/g	0.015	na	na	na	na	na	na	na	na	na	0.309	<0.015
Toluene	µg/g	0.050	na	na	na	na	na	na	na	na	na	<0.050	<0.050
ortho-Xylene	µg/g	0.050	na	na	na	na	na	na	na	na	na	0.079	<0.050
meta- & para-Xylene	µg/g	0.050	na	na	na	na	na	na	na	na	na	0.245	<0.050
Xylenes, Total	µg/g	0.075	na	na	na	na	na	na	na	na	na	0.324	<0.075
Volatile Hydrocarbons (VH <sub>6-10</sub> )	µg/g	100	170	<100	<100	na	<100	<100	<100	<100	<100	<100	<100
VPH <sub>5</sub> <sup>1</sup>	µg/g	100	170	<100	<100	na	<100	<100	<100	<100	<100	<100	<100
Styrene	µg/g	0.050	na	na	na	na	na	na	na	na	na	<0.050	<0.050
Methyl tert-butyl ether [MTBE]	µg/g	0.20	na	na	na	na	na	na	na	na	na	<0.20	<0.20
EPH <sub>10-19</sub>	µg/g	200	3090	1150	na	<200	<200	<200	<200	<200	<200	<200	<200
EPH <sub>19-32</sub>	µg/g	200	450	<200	na	<200	570	<200	3110	<200	<200	<200	<200
LEPH <sub>5</sub>	µg/g	200	3090	1150	na	<200	<200	<200	<200	<200	<200	na	na
HEPH <sub>5</sub>	µg/g	200	450	<200	na	<200	570	<200	3110	<200	<200	na	na
<b>Taxonomy (Soil)</b>													
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	na	na	na	na	na	na	na	na	na	na	na
<b>Organic / Inorganic Carbon (Soil)</b>													
Total Organic Carbon	%	0.0500	na	na	na	na	na	na	na	na	na	na	na

**Notes:**

- MDL = Method Detection Limit
- EPH<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPH<sub>5</sub> = light extractable petroleum hydrocarbons in soil
- HEPH<sub>5</sub> = heavy extractable petroleum hydrocarbons in soil
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- VPHS = volatile petroleum hydrocarbons in soil
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
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**Table 2: PETROLEUM HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue			AEC 7 : Warehouse East Area						APEC 12: Burial Site 2				
Sample Station			TP19-35		EX19-01				MW17-14A 18-20		MW17-14B	TP19-36	
Sample ID			TP19-35-01	TP19-35-02	EX19-01-01	EX19-01-02	EX19-01-03	EX19-01-04	MW17-14A 4-6	MW17-14A 18-20	MW17-14B 6-8	TP19-36-02	TP19-36-04
Sample Depth (mbg)			0.5	1.5	2.5	2.0	1.8	3.5	1.2-1.8	5.5-6.1	1.8-2.4	1.5	3.5
Sample Date			14-Jul-19	14-Jul-19	14-Jul-19	14-Jul-19	14-Jul-19	14-Jul-19	22-Jun-17	22-Jun-17	23-Jun-17	14-Jul-19	14-Jul-19
Lab ID #			L2313897-5	L2313897-6	L2313899-1	L2313899-2	L2313899-3	L2313899-4	L1948071-63	L1948071-69	L1951378-14	L2313897-10	L2313897-12
Parameters	Units	MDL											
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	0.00	0.00	nm	nm	nm	nm	20.00	0.00	20.00	0.00	0.00
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no	no
<b>Petroleum Hydrocarbons (PHCs)</b>													
Benzene	µg/g	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	na	na	na	<0.0050	<0.0050
Ethylbenzene	µg/g	0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	na	na	na	<0.015	<0.015
Toluene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	na	na	na	<0.050	<0.050
ortho-Xylene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	na	na	na	<0.050	<0.050
meta- & para-Xylene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	na	na	na	<0.050	<0.050
Xylenes, Total	µg/g	0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	na	na	na	<0.075	<0.075
Volatile Hydrocarbons (VH <sub>6-10</sub> )	µg/g	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
VPH <sub>5</sub> <sup>1</sup>	µg/g	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Styrene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	na	na	na	<0.050	<0.050
Methyl tert-butyl ether [MTBE]	µg/g	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	na	na	na	<0.20	<0.20
EPH <sub>10-19</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
EPH <sub>19-32</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	<200	<200	1010	<200	<200
LEPH <sub>5</sub>	µg/g	200	na	na	na	na	na	na	<200	<200	<200	na	na
HEPH <sub>5</sub>	µg/g	200	na	na	na	na	na	na	<200	<200	1010	na	na
<b>Taxonomy (Soil)</b>													
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	na	na	na	na	na	na	na	na	na	na	na
<b>Organic / Inorganic Carbon (Soil)</b>													
Total Organic Carbon	%	0.0500	na	na	na	na	na	na	na	na	na	na	na

**Notes:**

- MDL = Method Detection Limit
- EPH<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPH<sub>5</sub> = light extractable petroleum hydrocarbons in soil
- HEPH<sub>5</sub> = heavy extractable petroleum hydrocarbons in soil
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- VPHS = volatile petroleum hydrocarbons in soil
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit



**Table 2: PETROLEUM HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue			APEC 12 : Burial Site 2										Burial Site 2 Upstream
Sample Station	TP19-36	TP19-37	TP19-38			TP19-39			TP19-40			MW17-15B	
Sample ID	TP19-36-05	TP19-37-02	TP19-38-01	TP19-38-03	TP19-38-04	TP19-39-01	TP19-39-02	TP19-39-03	TP19-40-01	TP19-40-02	MW17-15B 4-6		
Sample Depth (mbg)	3.5	1.6	0.6	2.6	3.4	0.7	1.5	3.3	1.8	3.2			
Sample Date	14-Jul-19	14-Jul-19	14-Jul-19	14-Jul-19	14-Jul-19	14-Jul-19	14-Jul-19	14-Jul-19	14-Jul-19	14-Jul-19	23-Jun-17		
Lab ID #	L2313897-13	L2313897-16	L2313897-17	L2313897-19	L2313897-20	L2313897-21	L2313897-22	L2313897-23	L2313897-24	L2313897-25	L1951378-23		
Parameters	Units	MDL											
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	0.00	10.00	0.00	20.00	25.00	25.00	25.00	25.00	40.00	35.00	0.00
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no	no
<b>Petroleum Hydrocarbons (PHCs)</b>													
Benzene	µg/g	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	na
Ethylbenzene	µg/g	0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	na
Toluene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	na
ortho-Xylene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	na
meta- & para-Xylene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	na
Xylenes, Total	µg/g	0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	na
Volatile Hydrocarbons (VH <sub>6-10</sub> )	µg/g	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
VPH <sub>5</sub> <sup>1</sup>	µg/g	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Styrene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	na
Methyl tert-butyl ether [MTBE]	µg/g	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	na
EPH <sub>10-19</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
EPH <sub>19-32</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	680
LEPH <sub>5</sub>	µg/g	200	na	na	na	na	na	na	na	na	na	na	<200
HEPH <sub>5</sub>	µg/g	200	na	na	na	na	na	na	na	na	na	na	680
<b>Taxonomy (Soil)</b>													
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	na	na	na	na	na	na	na	na	na	na	na
<b>Organic / Inorganic Carbon (Soil)</b>													
Total Organic Carbon	%	0.0500	na	na	na	na	na	na	na	na	na	na	na

**Notes:**

- MDL = Method Detection Limit
- EPH<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPH<sub>5</sub> = light extractable petroleum hydrocarbons in soil
- HEPH<sub>5</sub> = heavy extractable petroleum hydrocarbons in soil
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- VPHS = volatile petroleum hydrocarbons in soil
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**Table 2: PETROLEUM HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

			APEC 7 : Tailings Impoundment Area									AEC 5 : Main Landfill		
APEC/Issue														
Sample Station			MW17-18A	MW17-19A			MW17-20B	MW17-23A		MW17-25A	TP32 2-4	TP33	MW17-22A	
Sample ID			MW17-18A 10-12	MW17-19A 6-8	MW17-19A 6-8 DUPA	MW17-20B 2-4	MW17-23A 4-6	MW17-23A 4-6 DUPA	MW17-25A 10-12	TP32 2-4	TP33 2-4	MW17-22A 6-8	MW17-22A 6-8 DUPA	
Sample Depth (mbg)			3.0-3.6	1.8-2.4	1.8-2.4	0.6-1.2	1.2-1.8	1.2-1.8	3.0-3.6	0.6-1.2	0.6-1.2	1.8-2.4	1.8-2.4	
Sample Date			07-Jul-17	08-Jul-17	08-Jul-17	10-Jul-17	12-Jul-17	12-Jul-17	13-Jul-17	22-Jul-17	22-Jul-17	10-Jul-17	10-Jul-17	
Lab ID #			L1957720-44	L1957720-63	L1957720-64	L1957720-89	L1959270-26	L1959270-27	L1959270-66	L1965813-23	L1965813-27	L1957720-112	L1957720-113	
Parameters	Units	MDL												
<b>Field Screening</b>														
Sample Headspace Vapour Concentration	ppmv	5.00	65.00	0.00	0.00	nm	5.00	5.00	5.00	nm	nm	30.00	30.00	
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no	no	
<b>Petroleum Hydrocarbons (PHCs)</b>														
Benzene	µg/g	0.0050	na	na	na	na	na	na	na	na	na	na	na	
Ethylbenzene	µg/g	0.015	na	na	na	na	na	na	na	na	na	na	na	
Toluene	µg/g	0.050	na	na	na	na	na	na	na	na	na	na	na	
ortho-Xylene	µg/g	0.050	na	na	na	na	na	na	na	na	na	na	na	
meta- & para-Xylene	µg/g	0.050	na	na	na	na	na	na	na	na	na	na	na	
Xylenes, Total	µg/g	0.075	na	na	na	na	na	na	na	na	na	na	na	
Volatile Hydrocarbons (VH <sub>6-10</sub> )	µg/g	100	<100	<100	<100	<100	<100	<100	<100	<100	na	<100	<100	
VPH <sub>5</sub> <sup>1</sup>	µg/g	100	<100	<100	<100	<100	<100	<100	<100	<100	na	<100	<100	
Styrene	µg/g	0.050	na	na	na	na	na	na	na	na	na	na	na	
Methyl tert-butyl ether [MTBE]	µg/g	0.20	na	na	na	na	na	na	na	na	na	na	na	
EPH <sub>10-19</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	
EPH <sub>19-32</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	<200	<200	<200	210	<200	
LEPH <sub>5</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	
HEPH <sub>5</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	<200	<200	<200	210	<200	
<b>Taxonomy (Soil)</b>														
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	na	na	na	na	na	na	na	na	na	na	na	
<b>Organic / Inorganic Carbon (Soil)</b>														
Total Organic Carbon	%	0.0500	na	na	na	na	na	na	na	na	na	na	na	

**Notes:**

- MDL = Method Detection Limit
- EPH<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPH<sub>5</sub> = light extractable petroleum hydrocarbons in soil
- HEPH<sub>5</sub> = heavy extractable petroleum hydrocarbons in soil
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- VPHS = volatile petroleum hydrocarbons in soil
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**Table 2: PETROLEUM HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue			AEC 5 : Main Landfill			Stonehouse Creek Drainage Downstream			Sky Creek Drainage Downstream		Sky Creek Drainage Upstream		Soil Treatment Area - 1
Sample Station			TP24	TP25		MW17-11A			MW17-24A		MW17-21A		LF1
Sample ID			TP24 2-4	TP25 4-6	TP26 4-6	MW17-11A 2-3	MW17-11A 6-8	MW17-11A 12-14	MW17-24A 6-8	MW17-24A 6-8 DIPA	MW17-21A 6-8	MW17-21A 8-10	LF1
Sample Depth (mbg)			0.6-1.2	1.2-1.8	1.2-1.8	0.6-0.9	1.8-2.4	3.6-4.3	1.8-2.4	1.8-2.4	1.8-2.4	2.4-3.0	0.1 (sfc)
Sample Date			12-Jul-17	11-Jul-17	11-Jul-17	19-Jun-17	19-Jun-17	19-Jun-17	13-Jul-17	13-Jul-17	10-Jul-17	10-Jul-17	11-Sep-18
Lab ID #			L1959270-20	L1959270-13	L1959270-17	L1946419-52	L1946419-55	L1946419-58	L1959270-43	L1959270-44	L1957720-95	L1957720-96	L2162701-1
Parameters	Units	MDL											
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	70.00	5.00	5.00	10.00	10.00	0.00	10.00	nm
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no	no
<b>Petroleum Hydrocarbons (PHCs)</b>													
Benzene	µg/g	0.0050	na	na	na	na	na	na	na	na	na	na	na
Ethylbenzene	µg/g	0.015	na	na	na	na	na	na	na	na	na	na	na
Toluene	µg/g	0.050	na	na	na	na	na	na	na	na	na	na	na
ortho-Xylene	µg/g	0.050	na	na	na	na	na	na	na	na	na	na	na
meta- & para-Xylene	µg/g	0.050	na	na	na	na	na	na	na	na	na	na	na
Xylenes, Total	µg/g	0.075	na	na	na	na	na	na	na	na	na	na	na
Volatile Hydrocarbons (VH <sub>6-10</sub> )	µg/g	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	na	na
VPH <sub>5</sub> <sup>1</sup>	µg/g	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	na	na
Styrene	µg/g	0.050	na	na	na	na	na	na	na	na	na	na	na
Methyl tert-butyl ether [MTBE]	µg/g	0.20	na	na	na	na	na	na	na	na	na	na	na
EPH <sub>10-19</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	<200	<200	na	<200	370
EPH <sub>19-32</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	<200	<200	na	340	<200
LEPH <sub>5</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	<200	<200	na	<200	370
HEPH <sub>5</sub>	µg/g	200	<200	<200	<200	<200	<200	<200	<200	<200	na	340	<200
<b>Taxonomy (Soil)</b>													
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	na	na	na	na	na	na	na	na	na	na	2100000
<b>Organic / Inorganic Carbon (Soil)</b>													
Total Organic Carbon	%	0.0500	na	na	na	na	na	na	na	na	na	na	na

**Notes:**

- MDL = Method Detection Limit
- EPH<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPH<sub>5</sub> = light extractable petroleum hydrocarbons in soil
- HEPH<sub>5</sub> = heavy extractable petroleum hydrocarbons in soil
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- VPHS = volatile petroleum hydrocarbons in soil
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**Table 2: PETROLEUM HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

			Soil Treatment Area - 1											
APEC/Issue														
Sample Station			LF2	LF3	LF4	LF5	LF6	LF7	TP19-41	TP19-42	TP19-43	TP19-44	TP19-45	TP19-46
Sample ID			LF2	LF3	LF4	LF5	LF6	LF7	TP19-41-01	TP19-42-01	TP19-43-01	TP19-44-01	TP19-45-01	TP19-46-01
Sample Depth (mbg)			0.1 (sfc)	0.1 (sfc)	0.1 (sfc)	0.1 (sfc)	0.1 (sfc)	0.1 (sfc)	-	-	-	-	-	-
Sample Date			11-Sep-18	11-Sep-18	11-Sep-18	11-Sep-18	11-Sep-18	11-Sep-18	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19
Lab ID #			L2162701-2	L2162701-3	L2162701-4	L2162701-5	L2162701-6	L2162701-7	L2312978-1	L2312978-2	L2312978-3	L2312978-4	L2312978-5	L2312978-6
Parameters	Units	MDL												
<b>Field Screening</b>														
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no	no	no
<b>Petroleum Hydrocarbons (PHCs)</b>														
Benzene	µg/g	0.0050	na	na	na	na	na	na	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Ethylbenzene	µg/g	0.015	na	na	na	na	na	na	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
Toluene	µg/g	0.050	na	na	na	na	na	na	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
ortho-Xylene	µg/g	0.050	na	na	na	na	na	na	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
meta- & para-Xylene	µg/g	0.050	na	na	na	na	na	na	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Xylenes, Total	µg/g	0.075	na	na	na	na	na	na	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075
Volatile Hydrocarbons (VH <sub>6-10</sub> )	µg/g	100	na	na	na	na	na	na	<100	<100	<100	<100	<100	<100
VPH <sub>5</sub> <sup>1</sup>	µg/g	100	na	na	na	na	na	na	<100	<100	<100	<100	<100	<100
Styrene	µg/g	0.050	na	na	na	na	na	na	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Methyl tert-butyl ether [MTBE]	µg/g	0.20	na	na	na	na	na	na	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
EPH <sub>10-19</sub>	µg/g	200	980	1600	2430	1490	820	5310	1780	1450	830	350	660	2230
EPH <sub>19-32</sub>	µg/g	200	200	310	430	300	<200	490	380	320	230	<200	<200	440
LEPH <sub>5</sub>	µg/g	200	980	1600	2430	1490	820	5310	na	na	na	na	na	na
HEPH <sub>5</sub>	µg/g	200	200	310	430	300	<200	490	na	na	na	na	na	na
<b>Taxonomy (Soil)</b>														
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	1490000	915000	1430000	480000	2400000	215000	na	na	na	na	na	na
<b>Organic / Inorganic Carbon (Soil)</b>														
Total Organic Carbon	%	0.0500	na	na	na	na	na	na	na	na	na	na	na	na

**Notes:**

- MDL = Method Detection Limit
- EPH<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPH<sub>5</sub> = light extractable petroleum hydrocarbons in soil
- HEPH<sub>5</sub> = heavy extractable petroleum hydrocarbons in soil
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- VPHS = volatile petroleum hydrocarbons in soil
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
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**Table 2: PETROLEUM HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

Parameters	Units	MDL	Soil Treatment Area - 1							Soil Treatment Area - 1								
			APEC/Issue		Soil Treatment Area - 1							Soil Treatment Area - 1						
			Sample Station	TP19-41	TP19-42	TP19-43	TP19-44	TP19-45	TP19-46		SP20-01-01	SP20-01-02	SP20-01-03	SP20-01-04	SP20-01-05	SP20-01-06		
			Sample ID	TP19-41	TP19-42	TP19-43	TP19-44	TP19-45	TP19-46	TP19-46A	SP20-01-01	SP20-01-02	SP20-01-03	SP20-01-04	SP20-01-05	SP20-01-06	DUP SP20-01-06 (SP20-01-56)	
			Sample Depth (mbg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sample Date	6-Sep-19	06-Sep-19	06-Sep-19	06-Sep-19	06-Sep-19	06-Sep-19	06-Sep-19	06-Sep-19	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020			
Lab ID #	L2345252-1	L2345252-2	L2345252-3	L2345252-4	L2345252-5	L2345252-6	L2345252-7	VA20B4299-001	VA20B4299-002	VA20B4299-003	VA20B4299-004	VA20B4299-005	VA20B4299-006	VA20B4299-007				
<b>Field Screening</b>																		
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no	no	no	no	no		
<b>Petroleum Hydrocarbons (PHCs)</b>																		
Benzene	µg/g	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050		
Ethylbenzene	µg/g	0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015		
Toluene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050		
ortho-Xylene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050		
meta- & para-Xylene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050		
Xylenes, Total	µg/g	0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075		
Volatile Hydrocarbons (VH <sub>6-10</sub> )	µg/g	100	<100	<100	<100	<100	<100	<100	<100	na	na	na	na	na	na	na		
VPH <sub>5</sub> <sup>1</sup>	µg/g	100	<100	<100	<100	<100	<100	<100	<100	na	na	na	na	na	na	na		
Styrene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050		
Methyl tert-butyl ether [MTBE]	µg/g	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050		
EPH <sub>10-19</sub>	µg/g	200	<200	320	<200	1730	890	340	410	300	<200	<200	500	1330	<200	<200		
EPH <sub>19-32</sub>	µg/g	200	<200	<200	<200	430	250	<200	<200	<200	<200	<200	<200	440	<200	<200		
LEPH <sub>5</sub>	µg/g	200	na	na	na	na	na	na	na	300	<200	<200	500	1330	<200	<200		
HEPH <sub>5</sub>	µg/g	200	na	na	na	na	na	na	na	<200	<200	<200	<200	440	<200	<200		
<b>Taxonomy (Soil)</b>																		
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	na	50000	na	260000	na	340000	na	27000	20500	na	na	56000	na	na		
<b>Organic / Inorganic Carbon (Soil)</b>																		
Total Organic Carbon	%	0.0500	na	0.151	na	0.295	na	0.216	na	1.34	na	0.324	na	0.477	na	na		

- Notes:**
- MDL = Method Detection Limit
  - EPH<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
  - EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
  - LEPH<sub>5</sub> = light extractable petroleum hydrocarbons in soil
  - HEPH<sub>5</sub> = heavy extractable petroleum hydrocarbons in soil
  - mbg = metres below grade
  - na = not analyzed
  - nm = not measured
  - no = none observed
  - ns = no applicable standard
  - ppmv = parts per million by volume
  - VPHS = volatile petroleum hydrocarbons in soil
  - µg/g = micrograms per gram (parts per million)
  - < = concentration is less than reported method detection limit
  - = no applicable units / method detection limit

**Table 2: PETROLEUM HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

		APEC/Issue	Soil Treatment Area - 2				Soil Treatment Area - 2		
		Sample Station	TP19-47	TP19-48	TP19-49	TP19-50	TP19-51	TP19-52	
		Sample ID	TP19-47	TP19-48	TP19-49	TP19-50	TP19-51	TP19-52	TP19-52A
		Sample Depth (mbg)	-	-	-	-	-	-	-
		Sample Date	7-Sep-19	07-Sep-19	07-Sep-19	07-Sep-19	07-Sep-19	07-Sep-19	07-Sep-19
		Lab ID #	L2345249-1	L2345249-2	L2345249-3	L2345249-4	L2345249-5	L2345249-6	L2345249-7
Parameters	Units	MDL							
<b>Field Screening</b>									
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm
Observable Staining	-	-	no	no	no	no	no	no	no
<b>Petroleum Hydrocarbons (PHCs)</b>									
Benzene	µg/g	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Ethylbenzene	µg/g	0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
Toluene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
ortho-Xylene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
meta- & para-Xylene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Xylenes, Total	µg/g	0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075
Volatile Hydrocarbons (VH <sub>6-10</sub> )	µg/g	100	<100	<100	<100	<100	<100	<100	<100
VPH <sub>5</sub> <sup>1</sup>	µg/g	100	<100	<100	<100	<100	<100	<100	<100
Styrene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Methyl tert-butyl ether [MTBE]	µg/g	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
EPH <sub>10-19</sub>	µg/g	200	3420	530	950	1040	1770	2340	1280
EPH <sub>19-32</sub>	µg/g	200	320	<200	250	240	270	240	<200
LEPH <sub>5</sub>	µg/g	200	na	na	na	na	na	na	na
HEPH <sub>5</sub>	µg/g	200	na	na	na	na	na	na	na
<b>Taxonomy (Soil)</b>									
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	13100000	na	4400000	na	27600000	na	na
<b>Organic / Inorganic Carbon (Soil)</b>									
Total Organic Carbon	%	0.0500	0.317	na	0.265	na	0.268	na	na

**Notes:**

- MDL = Method Detection Limit
- EPH<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPH<sub>5</sub> = light extractable petroleum hydrocarbons in soil
- HEPH<sub>5</sub> = heavy extractable petroleum hydrocarbons in soil
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- VPHS = volatile petroleum hydrocarbons in soil
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**Table 2: PETROLEUM HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue			Soil Treatment Area - 2												
Sample Station			SP20-02-01	SP20-02-02	SP20-02-03	SP20-02-04	SP20-02-05	SP20-02-06	SP20-02-07	SP20-02-08	SP20-02-09	SP20-02-10	SP20-02-11	SP20-02-12	
Sample ID			SP20-02-01	SP20-02-02	SP20-02-03	SP20-02-04	SP20-02-05	SP20-02-06	SP20-02-07	SP20-02-08	SP20-02-09	SP20-02-10	SP20-02-11	SP20-02-12	DUP SP20-02-12 (SP20-02-62)
Sample Depth (mbg)			-	-	-	-	-	-	-	-	-	-	-	-	-
Sample Date			29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020
Lab ID #			VA20B4301-001	VA20B4301-002	VA20B4301-003	VA20B4301-004	VA20B4301-005	VA20B4301-006	VA20B4301-007	VA20B4301-008	VA20B4301-009	VA20B4301-010	VA20B4301-011	VA20B4301-012	VA20B4301-013
Parameters	Units	MDL													
<b>Field Screening</b>															
Sample Headspace Vapour Concentration	ppmv	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Observable Staining	-	-	no	HC odeour	no	no	no	no	no	no	no	no	no	no	no
<b>Petroleum Hydrocarbons (PHCs)</b>															
Benzene	µg/g	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Ethylbenzene	µg/g	0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
Toluene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
ortho-Xylene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
meta- & para-Xylene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Xylenes, Total	µg/g	0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075
Volatile Hydrocarbons (VH <sub>6-10</sub> )	µg/g	100	na	na	na	na	na	na	na	na	na	na	na	na	na
VPH <sub>5</sub> <sup>1</sup>	µg/g	100	na	na	na	na	na	na	na	na	na	na	na	na	na
Styrene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Methyl tert-butyl ether [MTBE]	µg/g	0.20	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
EPH <sub>10-19</sub>	µg/g	200	<200	990	1200	560	1050	1660	360	250	<200	1040	210	<200	<200
EPH <sub>19-32</sub>	µg/g	200	<200	350	250	<200	<200	500	<200	<200	<200	<200	<200	<200	<200
LEPH <sub>5</sub>	µg/g	200	<200	990	1200	560	1050	1660	360	250	<200	1040	210	<200	<200
HEPH <sub>5</sub>	µg/g	200	<200	350	250	<200	<200	500	<200	<200	<200	<200	<200	<200	<200
<b>Taxonomy (Soil)</b>															
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	na	56000	na	1000000	na	34000	na	64000	na	99500	na	6600	na
<b>Organic / Inorganic Carbon (Soil)</b>															
Total Organic Carbon	%	0.0500	na	0.498	na	0.387	na	0.377	na	0.220	na	0.479	na	0.186	na

**Notes:**

- MDL = Method Detection Limit
- EPH<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPH<sub>5</sub> = light extractable petroleum hydrocarbons in soil
- HEPH<sub>5</sub> = heavy extractable petroleum hydrocarbons in soil
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- VPHS = volatile petroleum hydrocarbons in soil
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**Table 2: PETROLEUM HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

			QA/QC									
			APEC/Issue									
			Sample Station									
			Sample ID									
			Sample Depth (mbg)									
			Sample Date									
			Lab ID #									
Parameters	Units	MDL	Allowable RPD <sup>3</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)
<b>Field Screening</b>												
Sample Headspace Vapour Concentration	ppmv	5.00	-	-	-	-	-	-	-	-	-	-
Observable Staining	-	-	-	-	-	-	-	-	-	-	-	-
<b>Petroleum Hydrocarbons (PHCs)</b>												
Benzene	µg/g	0.0050	20	-	-	-	-	-	-	-	-	-
Ethylbenzene	µg/g	0.015	20	-	-	-	-	-	-	-	-	-
Toluene	µg/g	0.050	20	-	-	-	-	-	-	-	-	-
ortho-Xylene	µg/g	0.050	20	-	-	-	-	-	-	-	-	-
meta- & para-Xylene	µg/g	0.050	20	-	-	-	-	-	-	-	-	-
Xylenes, Total	µg/g	0.075	20	-	-	-	-	-	-	-	-	-
Volatile Hydrocarbons (VH <sub>6-10</sub> )	µg/g	100	20	-	-	-	-	-	-	-	-	-
VPH <sub>5</sub> <sup>1</sup>	µg/g	100	20	-	-	-	-	-	-	-	-	-
Styrene	µg/g	0.050	20	-	-	-	-	-	-	-	-	-
Methyl tert-butyl ether (MTBE)	µg/g	0.20	20	-	-	-	-	-	-	-	-	-
EPH <sub>10-19</sub>	µg/g	200	20	-	-	-	-	-	-	58.56	-	-
EPH <sub>19-32</sub>	µg/g	200	20	-	-	-	-	-	-	-	-	-
LEPH <sub>5</sub>	µg/g	200	20	-	-	-	-	-	-	-	-	-
HEPH <sub>5</sub>	µg/g	200	20	-	-	-	-	-	-	-	-	-
<b>Taxonomy (Soil)</b>												
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000										
<b>Organic / Inorganic Carbon (Soil)</b>												
Total Organic Carbon	%	0.0500										

**Notes:**

- MDL = Method Detection Limit
- EPH<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPH<sub>5</sub> = light extractable petroleum hydrocarbons in soil
- HEPH<sub>5</sub> = heavy extractable petroleum hydrocarbons in soil
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- VPHS = volatile petroleum hydrocarbons in soil
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**QA/QC**

- nc = not calculated
- RPD = Representative percent difference
- 1** = calculated RPD exceeds allowable RPD



**Table 3: POLYCYCLIC AROMATIC HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue			AEC 1 : Mill / 10 Level Portal										
Sample Station	MW17-1A	MW17-3		MW17-2B	MW17-4B		MW17-5B	MW17-6A	MW17-7A		MW17-7B		
Sample ID	MW17-1A 7-9	MW17-3 0-2	MW17-3 2-4	MW17-2B 2-4	MW17-4B 3-4	MW17-4B 4-7	MW17-5B 2-3	MW17-6A 0-1	MW17-7A 0-1	MW17-7A 2-3.5	MW17-7B 0-1		
Sample Depth (mbg)	2.1-2.7	0.0-0.6	0.6-1.2	0.6-1.2	0.9-1.2	1.2-2.1	0.6-0.9	0.0-0.3	0.0-0.3	0.6-1.1	0.0-0.3		
Sample Collection Date	10-Jun-17	11-Jun-17	11-Jun-17	11-Jun-17	12-Jun-17	12-Jun-17	13-Jun-17	13-Jun-17	14-Jun-17	14-Jun-17	14-Jun-17		
Lab ID #	L1942125-5	L1942125-15	L1942125-16	L1942125-29	L1942125-48	L1942125-49	L1945466-2	L1945466-6	L1945466-22	L1945466-23	L1945466-35		
Parameters	Units	MDL											
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	0.00	45.00	0.00	0.00	5.00	0.00	0.00	5.00	35.00	0.00	30.00
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no	no
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>													
Acenaphthene	µg/g	0.0050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.20	<0.050	<0.050	<0.050	<0.050	<0.050
Acenaphthylene	µg/g	0.0050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Anthracene	µg/g	0.0040	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benz(a)anthracene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(a)pyrene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(b+j)fluoranthenes <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(g,h,i)perylene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(k)fluoranthene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chrysene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dibenz(a,h)anthracene <sup>1</sup>	µg/g	0.0050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluoranthene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluorene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.20	<0.050	<0.050	<0.050	<0.050	<0.050
Indeno(1,2,3-cd)pyrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Methylnaphthalene, 2-	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	0.409	<0.050	0.186	<0.050	<0.050	<0.050
Naphthalene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.060	<0.050	<0.050	<0.050	<0.050	<0.050
Phenanthrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	0.384	<0.050	0.108	<0.050	<0.050	<0.050
Pyrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	0.057	<0.050	<0.050	<0.050	<0.050	<0.050

**Notes:**

- MDL = Method Detection Limit
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- PAH = polyaromatic hydrocarbon
- ppmv = parts per million by volume
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**Table 3: POLYCYCLIC AROMATIC HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue		AEC 1 : Mill / 10 Level Portal	APEC 10 : Burial Site 1		APEC 6 : Septic Field				AEC 2 : Fuel Lines				
Sample Station		MW17-8A	MW17-9B		MW17-10A				MW17-12A		MW17-17A		
Sample ID		MW17-8A 3-4	MW17-9B 3-4	MW17-9B 6-10	MW17-10A 2-4	MW17-10A 12-14	MW17-10A 16-18	MW17-10A 18-20	MW17-12A 2-4	MW17-12A 8-10	MW17-17A 6-8	MW17-17A 18-20	
Sample Depth (mbg)		0.9-1.2	0.9-1.2	1.8-3.0	0.6-1.2	3.6-4.3	4.8-5.5	5.5-6.1	0.6-1.2	2.4-3.0	1.8-2.4	5.5-6.1	
Sample Collection Date		15-Jun-17	16-Jun-17	16-Jun-17	17-Jun-17	17-Jun-17	17-Jun-17	17-Jun-17	20-Jun-17	20-Jun-17	06-Jul-17	06-Jul-17	
Lab ID #		L1945466-42	L1946419-2	L1946419-4	L1946419-28	L1946419-33	L1946419-35	L1946419-36	L1948071-2	L1948071-5	L1957720-25	L1957720-32	
Parameters	Units	MDL											
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	0.00	35.00	0.00	20.00	15.00	55.00	0.00	0.00	5.00	45.00	30.00
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no	no
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>													
Acenaphthene	µg/g	0.0050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.50	<0.050
Acenaphthylene	µg/g	0.0050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.20	<0.050
Anthracene	µg/g	0.0040	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.20	<0.050
Benzo(a)anthracene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(a)pyrene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(b+j)fluoranthenes <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(g,h,i)perylene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(k)fluoranthene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chrysene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dibenz(a,h)anthracene <sup>1</sup>	µg/g	0.0050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluoranthene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluorene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.665	<0.050
Indeno(1,2,3-cd)pyrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Methylnaphthalene, 2-	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	8.73	<0.050
Naphthalene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	1.96	<0.050
Phenanthrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	1.02	<0.050
Pyrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.092	<0.050

**Notes:**

- MDL = Method Detection Limit
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- PAH = polyaromatic hydrocarbon
- ppmv = parts per million by volume
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**Table 3: POLYCYCLIC AROMATIC HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue			AEC 2 : Fuel Lines									
Sample Station	MW17-17A	TP1 3-4	TP09		TP18		TP20		TP21	TP27		
Sample ID	MW17-17A 30-35	TP1 3-4	TP-09 6-8	TP-09 8-10	TP-18 6-8	TP-18 8-10	TP-20 4-6	TP-20 8-10	TP-21 6-8	TP27 2-4	TP27 6-8	
Sample Depth (mbg)	9.1-10.1	0.9-1.2	1.8-2.4	2.4-3.0	1.8-2.4	2.4-3.0	1.2-1.8	2.4-3.0	1.8-2.4	0.6-1.2	1.8-2.4	
Sample Collection Date	06-Jul-17	21-Jun-17	25-Jun-17	25-Jun-17	26-Jun-17	26-Jun-17	26-Jun-17	26-Jun-17	26-Jun-17	21-Jul-17	21-Jul-17	
Lab ID #	L1957720-36	L1948071-26	L1951378-63	L1951378-64	L1951378-96	L1951378-97	L1951378-105	L1951378-107	L1951378-111	L1965813-2	L1965813-4	
Parameters	Units	MDL										
<b>Field Screening</b>												
Sample Headspace Vapour Concentration	ppmv	5.00	5.00	0.00	nm	nm	nm	nm	nm	nm	nm	nm
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>												
Acenaphthene	µg/g	0.0050	<0.050	<0.050	<0.80	<0.50	<2.0	<3.0	<0.050	<0.20	<0.050	<0.050
Acenaphthylene	µg/g	0.0050	<0.050	<0.050	<0.30	<0.20	<0.40	<0.60	<0.050	<0.050	<0.050	<0.050
Anthracene	µg/g	0.0040	<0.050	<0.050	<0.30	<0.090	<0.40	<0.50	<0.050	<0.050	<0.050	<0.050
Benzo(a)anthracene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	0.099	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(a)pyrene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(b+j)fluoranthenes <sup>1</sup>	µg/g	0.010	<0.050	<0.050	0.084	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(g,h,i)perylene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(k)fluoranthene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chrysene	µg/g	0.010	<0.050	<0.050	0.11	<0.050	<0.050	<0.080	<0.050	<0.050	<0.050	<0.050
Dibenz(a,h)anthracene <sup>1</sup>	µg/g	0.0050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluoranthene	µg/g	0.010	<0.050	<0.050	0.491	<0.050	<0.090	<0.20	<0.050	<0.050	<0.050	<0.050
Fluorene	µg/g	0.010	<0.050	<0.050	1.06	0.539	2.05	3.01	<0.050	0.188	<0.050	<0.050
Indeno(1,2,3-cd)pyrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Methylnaphthalene, 2-	µg/g	0.010	<0.050	<0.050	27.1	12.8	33.7	61.1	<0.050	2.48	<0.050	<0.050
Naphthalene	µg/g	0.010	<0.050	<0.050	7.98	4.24	10.1	18.8	<0.050	<0.70	<0.050	<0.050
Phenanthrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	2.18	0.936	4.58	6.98	<0.050	0.318	<0.050	<0.050
Pyrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	0.448	0.077	0.424	0.626	<0.050	<0.050	<0.050	<0.050

**Notes:**

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- ns = no applicable standard
- PAH = polyaromatic hydrocarbon
- ppmv = parts per million by volume
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
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**Table 3: POLYCYCLIC AROMATIC HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue			AEC 2 : Fuel Lines			AEC 2 : Tank Farm Area							
Sample Station			TP28			MW17-13			MW17-16		TP02		TP04
Sample ID			TP28 2-4	TP28 6-8	TP28 6-8 DUP A	MW17-13 2-3	MW17-13 6-8	MW17-13 10-12	MW17-16 2-4	MW17-16 2-4 DUP	TP2 3-4	TP2 6-9	TP-04 2-3
Sample Depth (mbg)			0.6-1.2	1.8-2.4	1.8-2.4	0.6-0.9	1.8-2.4	3.0-3.6	0.6-1.2	0.6-1.2	0.9-1.2	1.8-2.7	0.6-0.9
Sample Collection Date			21-Jul-17	21-Jul-17	21-Jul-17	22-Jun-17	22-Jun-17	22-Jun-17	05-Jul-17	05-Jul-17	21-Jun-17	21-Jun-17	24-Jun-17
Lab ID #			L1965813-6	L1965813-8	L1965813-9	L1948071-51	L1948071-53	L1948071-55	L1957720-16	L1957720-17	L1948071-32	L1948071-33	L1951378-38
Parameters	Units	MDL											
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	80.00	10.00	0.00	35.00	35.00	130.00	140.00	160.00
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	yes	no
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>													
Acenaphthene	µg/g	0.0050	<0.050	<0.050	<0.050	<0.30	<0.050	<0.050	<0.050	<0.050	<0.10	<0.50	<0.050
Acenaphthylene	µg/g	0.0050	<0.050	<0.050	<0.050	<0.080	<0.050	<0.050	<0.050	<0.050	<0.050	<0.20	<0.050
Anthracene	µg/g	0.0040	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.060	<0.20	<0.050
Benz(a)anthracene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(a)pyrene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(b+j)fluoranthenes <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(g,h,i)perylene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(k)fluoranthene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chrysene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dibenz(a,h)anthracene <sup>1</sup>	µg/g	0.0050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluoranthene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluorene	µg/g	0.010	<0.050	<0.050	<0.050	0.296	<0.050	<0.050	<0.050	<0.050	<0.20	0.531	<0.050
Indeno(1,2,3-cd)pyrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Methylnaphthalene, 2-	µg/g	0.010	<0.050	<0.050	<0.050	4.32	0.185	<0.050	<0.050	<0.050	0.252	6.08	<0.050
Naphthalene	µg/g	0.010	<0.050	<0.050	<0.050	<2.0	<0.050	<0.050	<0.050	<0.050	<0.20	<2.0	<0.050
Phenanthrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	0.471	<0.050	<0.050	<0.050	<0.050	0.124	0.895	<0.050
Pyrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	0.064	<0.050	<0.050	<0.050	<0.050	0.114	0.104	<0.050

**Notes:**

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- ppmv = parts per million by volume
- µg/g = micrograms per gram (parts per million)
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**Table 3: POLYCYCLIC AROMATIC HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue			AEC 2 : Tank Farm Area									
Sample Station	TP04	TP05		TP06		TP07		TP08		TP19		
Sample ID	TP-04 6-8	TP-05 4-6	TP-05 8-10	TP-06 4-6	TP-06 8-10	TP-07 2-3	TP-07 6-8	TP-08 4-6	TP-08 8-10	TP-19 6-8	TP29 2-4	
Sample Depth (mbg)	1.8-2.4	1.2-1.8	2.4-3.0	1.2-1.8	2.4-3.0	0.6-0.9	1.8-2.4	1.2-1.8	2.4-3.0	1.8-2.4	0.6-1.2	
Sample Collection Date	24-Jun-17	25-Jun-17	25-Jun-17	25-Jun-17	25-Jun-17	25-Jun-17	25-Jun-17	25-Jun-17	25-Jun-17	26-Jun-17	21-Jul-17	
Lab ID #	L1951378-40	L1951378-43	L1951378-45	L1951378-48	L1951378-50	L1951378-52	L1951378-54	L1951378-57	L1951378-59	L1951378-101	L1965813-11	
Parameters	Units	MDL										
<b>Field Screening</b>												
Sample Headspace Vapour Concentration	ppmv	5.00	0.00	nm	nm	nm	nm	nm	nm	nm	nm	
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>												
Acenaphthene	µg/g	0.0050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
Acenaphthylene	µg/g	0.0050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
Anthracene	µg/g	0.0040	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
Benz(a)anthracene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
Benzo(a)pyrene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
Benzo(b+j)fluoranthenes <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
Benzo(g,h,i)perylene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
Benzo(k)fluoranthene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
Chrysene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
Dibenz(a,h)anthracene <sup>1</sup>	µg/g	0.0050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
Fluoranthene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
Fluorene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
Indeno(1,2,3-cd)pyrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
Methylnaphthalene, 2-	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
Naphthalene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
Phenanthrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
Pyrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	

**Notes:**

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- mbg = metres below grade
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- nm = not measured
- no = none observed
- ns = no applicable standard
- PAH = polyaromatic hydrocarbon
- ppmv = parts per million by volume
- µg/g = micrograms per gram (parts per million)
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**Table 3: POLYCYCLIC AROMATIC HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

Parameters	Units	MDL	APEC/Issue	APEC 3 : Main Warehouses				APEC 12 : Burial Site 2			Burial Site 2 Upstream	AEC 4 : Mechanical Shop 11 Level Portal	
			AEC 2 : Tank Farm Area	TP03	TP22	TP23	MW17-14A	MW17-14B	MW17-15B	TP10	TP11		
Sample Station			TP30										
Sample ID			TP30 2-4	TP3 4-6	TP3 6-9	TP22 6-8	TP23 6-8	MW17-14A 4-6	MW17-14A 18-20	MW17-14B 6-8	MW17-15B 4-6	TP-10 8-10	TP-11 4-6
Sample Depth (mbg)			0.6-1.2	1.2-1.8	1.8-2.7	1.8-2.4	1.8-2.4	1.2-1.8	5.5-6.1	1.8-2.4	1.2-1.8	2.4-3.0	1.2-1.8
Sample Collection Date			21-Jul-17	21-Jun-17	21-Jun-17	04-Jul-17	04-Jul-17	22-Jun-17	22-Jun-17	23-Jun-17	23-Jun-17	26-Jun-17	26-Jun-17
Lab ID #			L1965813-16	L1948071-37	L1948071-38	L1957720-4	L1957720-8	L1948071-63	L1948071-69	L1951378-14	L1951378-23	L1951378-69	L1951378-72
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	nm	0.00	85.00	nm	nm	20.00	0.00	20.00	0.00	10.00	5.00
Observable Staining	-	-	yes	no	no	no	no	no	no	no	no	no	no
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>													
Acenaphthene	µg/g	0.0050	<0.70	<0.80	<0.30	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<3.0
Acenaphthylene	µg/g	0.0050	<0.20	<0.30	<0.070	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.70
Anthracene	µg/g	0.0040	<0.080	<0.40	<0.20	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.40
Benz(a)anthracene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(a)pyrene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(b+j)fluoranthenes <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(g,h,i)perylene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(k)fluoranthene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chrysene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dibenz(a,h)anthracene <sup>1</sup>	µg/g	0.0050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluoranthene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.070
Fluorene	µg/g	0.010	0.705	1.1	0.316	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	2.58
Indeno(1,2,3-cd)pyrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Methylnaphthalene, 2-	µg/g	0.010	4.98	11	2.72	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.086	62.6
Naphthalene	µg/g	0.010	<1.0	<3.0	<0.30	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	14.3
Phenanthrene <sup>1</sup>	µg/g	0.010	0.926	2.68	0.925	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	4.71
Pyrene <sup>1</sup>	µg/g	0.010	0.071	0.257	0.109	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.294

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**Table 3: POLYCYCLIC AROMATIC HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

Parameters	Units	MDL	AEC 4 : Mechanical Shop 11 Level Portal			AEC 7 : Warehouse East Area				APEC 7 : Tailings Impoundment Area								
			Sample Station	Sample ID	Sample Depth (mbg)	Sample Collection Date	Lab ID #	TP11	TP12	TP13	TP14	TP15	TP16	TP17	MW17-18A	MW17-19A	MW17-20B	
Sample Headspace Vapour Concentration	ppmv	5.00	TP11	TP-11 8-10	2.4-3.0	26-Jun-17	L1951378-74	5.00	0.00	15.00	nm	nm	0.00	0.00	65.00	0.00	0.00	nm
Observable Staining	-	-	TP12	TP-12 4-6	1.2-1.8	26-Jun-17	L1951378-77	no	no	no	no	no	no	no	no	no	no	no
Polycyclic Aromatic Hydrocarbons (PAHs)			TP13	TP-13 6-8	1.8-2.4	26-Jun-17	L1951378-81											
Acenaphthene	µg/g	0.0050	TP14	TP-14 2-3	0.6-0.9	26-Jun-17	L1951378-83	<2.0	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Acenaphthylene	µg/g	0.0050	TP15	TP-15 2-3	0.6-0.9	26-Jun-17	L1951378-86	<0.60	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Anthracene	µg/g	0.0040	TP16	TP-16 4-6	1.2-1.8	26-Jun-17	L1951378-89	<0.50	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benz(a)anthracene <sup>1</sup>	µg/g	0.010	TP17	TP-17 4-6	1.2-1.8	26-Jun-17	L1951378-92	<0.050	<0.050	<0.050	<0.050	0.089	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(a)pyrene	µg/g	0.010	MW17-18A	MW17-18A 10-12	3.0-3.6	07-Jul-17	L1957720-44	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(b+j)fluoranthenes <sup>1</sup>	µg/g	0.010	MW17-19A	MW17-19A 6-8	1.8-2.4	08-Jul-17	L1957720-63	<0.050	<0.050	<0.050	<0.050	0.106	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(g,h,i)perylene	µg/g	0.010	MW17-19A	MW17-19A 6-8 DUPA	1.8-2.4	08-Jul-17	L1957720-64	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(k)fluoranthene <sup>1</sup>	µg/g	0.010	MW17-20B	MW17-20B 2-4	0.6-1.2	10-Jul-17	L1957720-89	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chrysene	µg/g	0.010						<0.070	<0.050	<0.050	<0.050	<0.20	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dibenz(a,h)anthracene <sup>1</sup>	µg/g	0.0050						<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluoranthene	µg/g	0.010						0.266	<0.050	<0.050	<0.050	0.079	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluorene	µg/g	0.010						2.38	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Indeno(1,2,3-cd)pyrene <sup>1</sup>	µg/g	0.010						<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Methylnaphthalene, 2-	µg/g	0.010						47.7	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Naphthalene	µg/g	0.010						<4.0	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Phenanthrene <sup>1</sup>	µg/g	0.010						4.95	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Pyrene <sup>1</sup>	µg/g	0.010						0.438	<0.050	<0.050	<0.050	0.292	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050

- Notes:**
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  - PAH = polyaromatic hydrocarbon
  - ppmv = parts per million by volume
  - µg/g = micrograms per gram (parts per million)
  - < = concentration is less than reported method detection limit
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**Table 3: POLYCYCLIC AROMATIC HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

Parameters	Units	MDL	APEC 7 : Tailings Impoundment Area					AEC 5 : Main Landfill					Stonehouse Creek Drainage Downstream
			Sample Station	Sample ID	Sample Depth (mbg)	Sample Collection Date	Lab ID #	MW17-23A	MW17-25A	TP32	TP33	MW17-22A	TP24
			MW17-23A 4-6	MW17-23A 4-6 DUPA	MW17-25A 10-12	TP32 2-4	TP33 2-4	MW17-22A 6-8	MW17-22A 6-8 DUPA	TP24 2-4	TP25 4-6	TP26 4-6	MW17-11A 2-3
			1.2-1.8	1.2-1.8	3.0-3.6	0.6-1.2	0.6-1.2	1.8-2.4	1.8-2.4	0.6-1.2	1.2-1.8	1.2-1.8	0.6-0.9
			12-Jul-17	12-Jul-17	13-Jul-17	22-Jul-17	22-Jul-17	10-Jul-17	10-Jul-17	12-Jul-17	11-Jul-17	11-Jul-17	19-Jun-17
			L1959270-26	L1959270-27	L1959270-66	L1965813-23	L1965813-27	L1957720-112	L1957720-113	L1959270-20	L1959270-13	L1959270-17	L1946419-52
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	5.00	5.00	5.00	nm	nm	30.00	30.00	nm	nm	nm	5.00
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no	no
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>													
Acenaphthene	µg/g	0.0050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Acenaphthylene	µg/g	0.0050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Anthracene	µg/g	0.0040	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benz(a)anthracene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(a)pyrene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(b+j)fluoranthenes <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(g,h,i)perylene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(k)fluoranthene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chrysene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dibenz(a,h)anthracene <sup>1</sup>	µg/g	0.0050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluoranthene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluorene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Indeno(1,2,3-cd)pyrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Methylnaphthalene, 2-	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Naphthalene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Phenanthrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Pyrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050

- Notes:**
- MDL = Method Detection Limit
  - mbg = metres below grade
  - na = not analyzed
  - nm = not measured
  - no = none observed
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  - PAH = polyaromatic hydrocarbon
  - ppmv = parts per million by volume
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  - < = concentration is less than reported method detection limit
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**Table 3: POLYCYCLIC AROMATIC HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

Parameters	Units	MDL	Stonehouse Creek Drainage Downstream		Sky Creek Drainage Downstream		Sky Creek Drainage Upstream	Soil Treatment Area - 1						
			MW17-11A	MW17-11A 12-14	MW17-24A	MW17-24A 6-8 DUPA	MW17-21A	LF1	LF2	LF3	LF4	LF5	LF6	LF7
Sample Station			MW17-11A 6-8	MW17-11A 12-14	MW17-24A 6-8	MW17-24A 6-8 DUPA	MW17-21A 8-10	LF1	LF2	LF3	LF4	LF5	LF6	LF7
Sample ID														
Sample Depth (mbg)			1.8-2.4	3.6-4.3	1.8-2.4	1.8-2.4	2.4-3.0	0.1 (sfc)	0.1 (sfc)	0.1 (sfc)	0.1 (sfc)	0.1 (sfc)	0.1 (sfc)	0.1 (sfc)
Sample Collection Date			19-Jun-17	19-Jun-17	13-Jul-17	13-Jul-17	10-Jul-17	11-Sep-18	11-Sep-18	11-Sep-18	11-Sep-18	11-Sep-18	11-Sep-18	11-Sep-18
Lab ID #			L1946419-55	L1946419-58	L1959270-43	L1959270-44	L1957720-96	L2162701-1	L2162701-2	L2162701-3	L2162701-4	L2162701-5	L2162701-6	L2162701-7
Field Screening														
Sample Headspace Vapour Concentration	ppmv	5.00	70.00	5.00	10.00	10.00	10.00	nm	nm	nm	nm	nm	nm	nm
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no	no	no
Polycyclic Aromatic Hydrocarbons (PAHs)														
Acenaphthene	µg/g	0.0050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0050	<0.050	<0.20	<0.50	<0.20	<0.020	<2.0
Acenaphthylene	µg/g	0.0050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0060	<0.020	<0.030	<0.20	<0.030	<0.0090	<0.40
Anthracene	µg/g	0.0040	<0.050	<0.050	<0.050	<0.050	<0.050	<0.020	<0.020	<0.040	<0.080	<0.060	<0.020	<0.20
Benz(a)anthracene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.010	<0.010	<0.010	<0.020	<0.010	<0.010	<0.010
Benzo(a)pyrene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.010	<0.010	<0.010	0.014	<0.010	<0.010	<0.010
Benzo(b+j)fluoranthenes <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.010	<0.010	<0.010	0.018	<0.010	0.013	<0.010
Benzo(g,h,i)perylene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.010	<0.010	<0.010	0.021	<0.010	<0.010	<0.010
Benzo(k)fluoranthene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Chrysene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.010	<0.020	<0.020	<0.040	<0.020	<0.020	<0.030
Dibenz(a,h)anthracene <sup>1</sup>	µg/g	0.0050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluoranthene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.010	<0.010	<0.020	<0.030	<0.020	<0.010	<0.040
Fluorene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.010	0.043	0.119	0.425	0.138	<0.020	1.48
Indeno(1,2,3-cd)pyrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.010	<0.010	<0.010	0.018	<0.010	<0.010	<0.010
Methylnaphthalene, 2-	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.010	<0.020	<0.040	0.671	<0.080	<0.010	22.7
Naphthalene	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.010	<0.040	<0.20	<0.60	<0.10	<0.030	<6.01
Phenanthrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	<0.010	<0.020	0.126	0.651	0.167	<0.010	2.2
Pyrene <sup>1</sup>	µg/g	0.010	<0.050	<0.050	<0.050	<0.050	<0.050	0.019	0.052	0.072	0.122	0.076	0.04	0.221

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  - ppmv = parts per million by volume
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**Table 3: POLYCYCLIC AROMATIC HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

Parameters	Units	MDL	Soil Treatment Area - 1						
			APEC/Issue	Sample Station	Sample ID	Sample Depth (mbg)	Sample Collection Date	Lab ID #	
<b>Field Screening</b>									
Sample Headspace Vapour Concentration	ppmv	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Observable Staining	-	-	no	no	no	no	no	no	no
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>									
Acenaphthene	µg/g	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0200	<0.0050	<0.0050
Acenaphthylene	µg/g	0.0050	<0.0070	<0.0050	<0.0050	<0.0060	<0.0200	<0.0050	<0.0050
Anthracene	µg/g	0.0040	<0.0040	<0.0040	<0.0040	<0.0050	<0.0200	<0.0040	<0.0040
Benzo(a)anthracene <sup>1</sup>	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(a)pyrene	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b+j)fluoranthenes <sup>1</sup>	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(g,h,i)perylene	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(k)fluoranthene <sup>1</sup>	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Chrysene	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Dibenz(a,h)anthracene <sup>1</sup>	µg/g	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluoranthene	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Fluorene	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Indeno(1,2,3-cd)pyrene <sup>1</sup>	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Methylnaphthalene, 2-	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Naphthalene	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Phenanthrene <sup>1</sup>	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.020	<0.010	<0.010
Pyrene <sup>1</sup>	µg/g	0.010	<0.010	<0.010	<0.010	0.017	0.090	<0.010	<0.010

**Notes:**

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- ns = no applicable standard
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- ppmv = parts per million by volume
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**Table 3: POLYCYCLIC AROMATIC HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue		Soil Treatment Area - 2													
Sample Station	SP20-02-01	SP20-02-02	SP20-02-03	SP20-02-04	SP20-02-05	SP20-02-06	SP20-02-07	SP20-02-08	SP20-02-09	SP20-02-10	SP20-02-11	SP20-02-12			
Sample ID	SP20-02-01	SP20-02-02	SP20-02-03	SP20-02-04	SP20-02-05	SP20-02-06	SP20-02-07	SP20-02-08	SP20-02-09	SP20-02-10	SP20-02-11	SP20-02-12	DUP SP20-02-12 (SP20-02-62)		
Sample Depth (mbg)	-	-	-	-	-	-	-	-	-	-	-	-	-		
Sample Collection Date	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020		
Lab ID #	VA20B4301-001	VA20B4301-002	VA20B4301-003	VA20B4301-004	VA20B4301-005	VA20B4301-006	VA20B4301-007	VA20B4301-008	VA20B4301-009	VA20B4301-010	VA20B4301-011	VA20B4301-012	VA20B4301-013		
Parameters	Units	MDL													
<b>Field Screening</b>															
Sample Headspace Vapour Concentration	ppmv	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Observable Staining	-	-	no	HC odour	no	no	no	no	no	no	no	no	no	no	
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>															
Acenaphthene	µg/g	0.0050	<0.0050	<0.0060	<0.0060	<0.0050	<0.0070	<0.0060	<0.0060	<0.0050	<0.0050	<0.0090	<0.0050	<0.0050	
Acenaphthylene	µg/g	0.0050	<0.0050	<0.0300	<0.0200	<0.0200	<0.0200	<0.0200	<0.0080	<0.0060	<0.0050	<0.0200	<0.0060	<0.0050	
Anthracene	µg/g	0.0040	<0.0040	<0.0090	<0.0080	<0.0040	<0.0050	<0.0200	<0.0040	<0.0040	<0.0040	<0.0050	<0.0040	<0.0040	
Benz(a)anthracene <sup>1</sup>	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Benzo(a)pyrene	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Benzo(b+j)fluoranthenes <sup>1</sup>	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Benzo(g,h,i)perylene	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Benzo(k)fluoranthene <sup>1</sup>	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Chrysene	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.020	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Dibenz(a,h)anthracene <sup>1</sup>	µg/g	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
Fluoranthene	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Fluorene	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Indeno(1,2,3-cd)pyrene <sup>1</sup>	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Methylnaphthalene, 2-	µg/g	0.010	<0.010	<0.020	<0.010	<0.010	<0.020	<0.020	0.011	<0.010	0.042	<0.030	<0.010	<0.010	
Naphthalene	µg/g	0.010	<0.010	<0.010	<0.020	<0.010	<0.030	<0.010	<0.010	<0.010	0.012	<0.010	<0.010	<0.010	
Phenanthrene <sup>1</sup>	µg/g	0.010	<0.010	<0.030	<0.030	<0.020	<0.010	<0.030	<0.020	<0.010	<0.010	<0.040	<0.010	<0.010	
Pyrene <sup>1</sup>	µg/g	0.010	<0.010	<0.020	0.052	<0.010	0.014	0.100	0.011	<0.010	<0.010	0.021	<0.010	<0.010	

- Notes:**
- MDL = Method Detection Limit
  - mbg = metres below grade
  - na = not analyzed
  - nm = not measured
  - no = none observed
  - ns = no applicable standard
  - PAH = polyaromatic hydrocarbon
  - ppmv = parts per million by volume
  - µg/g = micrograms per gram (parts per million)
  - < = concentration is less than reported method detection limit
  - = no applicable units / method detection limit

**Table 3: POLYCYCLIC AROMATIC HYDROCARBONS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue			QA/QC							
Sample Station										
Sample ID		TP28 6-8 DUP A	MW17-16 2-4 DUP	MW17-19A 6-8 DUPA	MW17-23A 4-6 DUPA	MW17-22A 6-8 DUPA	MW17-24A 6-8 DUPA	SP20-01-56	SP20-02-12	
Sample Depth (mbg)		1.8-2.4	0.6-1.2	1.8-2.4	1.2-1.8	1.8-2.4	1.8-2.4	-	-	
Sample Collection Date		21-Jul-17	05-Jul-17	08-Jul-17	12-Jul-17	10-Jul-17	13-Jul-17	29-Aug-2020	29-Aug-2020	
Lab ID #		L1965813-9	L1957720-17	L1957720-64	L1959270-27	L1957720-113	L1959270-44	VA20B4299-007	VA20B4301-013	
Parameters	Units	MDL	Allowable RPD <sup>3</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	
<b>Field Screening</b>										
Sample Headspace Vapour Concentration	ppmv	5.00	-	-	-	-	-	-	-	-
Observable Staining	-	-	-	-	-	-	-	-	-	-
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>										
Acenaphthene	µg/g	0.0050	20	-	-	-	-	-	-	-
Acenaphthylene	µg/g	0.0050	20	-	-	-	-	-	-	-
Anthracene	µg/g	0.0040	20	-	-	-	-	-	-	-
Benz(a)anthracene <sup>1</sup>	µg/g	0.010	20	-	-	-	-	-	-	-
Benzo(a)pyrene	µg/g	0.010	20	-	-	-	-	-	-	-
Benzo(b+j)fluoranthenes <sup>1</sup>	µg/g	0.010	20	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	µg/g	0.010	20	-	-	-	-	-	-	-
Benzo(k)fluoranthene <sup>1</sup>	µg/g	0.010	20	-	-	-	-	-	-	-
Chrysene	µg/g	0.010	20	-	-	-	-	-	-	-
Dibenz(a,h)anthracene <sup>1</sup>	µg/g	0.0050	20	-	-	-	-	-	-	-
Fluoranthene	µg/g	0.010	20	-	-	-	-	-	-	-
Fluorene	µg/g	0.010	20	-	-	-	-	-	-	-
Indeno(1,2,3-cd)pyrene <sup>1</sup>	µg/g	0.010	20	-	-	-	-	-	-	-
Methylnaphthalene, 2-	µg/g	0.010	20	-	-	-	-	-	-	-
Naphthalene	µg/g	0.010	20	-	-	-	-	-	-	-
Phenanthrene <sup>1</sup>	µg/g	0.010	20	-	-	-	-	-	-	-
Pyrene <sup>1</sup>	µg/g	0.010	20	-	-	-	-	-	-	-

**Notes:**

- MDL = Method Detection Limit
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- PAH = polyaromatic hydrocarbon
- ppmv = parts per million by volume
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**QA/QC**

3 = allowable RPDs as identified in BC Environmental Laboratory Manual (February 2016), Section A, Table 2

1 = calculated RPD exceeds allowable RPD

**Table 4: METALS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

Parameters	APEC/Issue		AEC 1 : Mill / 10 Level Portal								APEC 10 : Burial Site 1		APEC 6 : Septic Field	AEC 2 : Fuel Lines		
	Sample Station		MW17-1B-3-4	MW17-3	MW17-2B	MW17-4A	MW17-5A	MW17-5B	MW17-6B	MW17-7A	MW17-8A	MW17-9A		MW17-10A	MW17-12A	
	Sample ID		MW17-1B-3-4	MW17-3 0-2	MW17-2B 2-4	MW17-4A 3-4	MW17-5A 2-3	MW17-5B 2-3	MW17-6B 0-1	MW17-7A 0-1	MW17-8A 3-4	MW17-9A 0-1	MW17-9A 5-7	MW17-10A 2-4	MW17-12A 2-4	MW17-12A 8-10
	Sample Depth (mbg)		0.9-1.2	0.0-0.6	0.6-1.2	0.9-1.2	0.6-0.9	0.6-0.9	0.0-0.3	0.0-0.3	0.9-1.2	0.0-0.3	1.5-2.1	0.6-1.2	0.6-1.2	2.4-3.0
	Sample Collection Date		11-Jun-17	11-Jun-17	11-Jun-17	11-Jun-17	12-Jun-17	13-Jun-17	13-Jun-17	14-Jun-17	15-Jun-17	17-Jun-17	17-Jun-17	17-Jun-17	20-Jun-17	20-Jun-17
	Lab ID #		L1942125-13	L1942125-15	L1942125-29	L1942125-32	L1942125-52	L1945466-2	L1945466-18	L1945466-22	L1945466-42	L1946419-14	L1946419-16	L1946419-28	L1948071-2	L1948071-5
Units	MDL															
<b>Field Screening</b>																
Sample Headspace Vapour Concentration	ppmv	5.00	nm	45.00	0.00	0.00	0.00	0.00	nm	35.00	0.00	50.00	5.00	20.00	0.00	5.00
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no	no	no	no	no
<b>Physiochemical Parameters</b>																
Moisture	%	0.25	11.9	5.97	10.6	12.8	na	11.8	22.8	14.6	36.4	na	na	11.1	7.88	13.8
pH	unitless	0.10	7.46	8.28	9.00	7.91	8.33	10.20	8.40	8.39	5.58	7.80	7.57	7.56	8.32	8.30
<b>Metals (General)</b>																
Aluminum	µg/g	50	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Antimony <sup>1</sup>	µg/g	0.10	1.07	1.16	0.52	1.23	1.63	1.74	11.1	7.73	0.71	1.13	1.17	0.86	0.83	0.95
Arsenic	µg/g	0.10	8.49	6.25	1.99	11.8	20.6	9.07	28.2	54.6	11.8	11.9	16.1	9.79	5.17	7.44
Barium	µg/g	0.50	487	130	1430	171	98.1	280	112	104	54.8	254	104	297	193	182
Beryllium	µg/g	0.10	0.54	<0.20	0.23	0.53	0.22	0.29	0.19	0.22	1.44	0.66	0.54	0.38	0.19	0.23
Bismuth	µg/g	0.20	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Boron	µg/g	5.0	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Cadmium	µg/g	0.020	0.76	0.76	0.19	1.01	2.09	7.40	13.40	10.80	0.23	1.91	0.46	1.17	4.42	4.15
Calcium	µg/g	50	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Chromium (Total)	µg/g	0.50	5.36	3.23	3.61	14.2	4.24	6.22	126	13.9	11.7	6.91	7.43	9.22	2.26	5.03
Cobalt	µg/g	0.10	17.6	7.47	19.7	11.3	14.9	11.9	16.7	25.8	4.32	8.92	9.09	9.06	9.28	9.15
Copper	µg/g	0.50	177.00	421.00	156.00	95.70	896.00	137.00	7940.00	3710.00	21.60	63.50	62.40	84.90	85.20	56.10
Iron	µg/g	50	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Lead	µg/g	0.50	25.10	25.00	5.99	33.80	42.10	178.00	868.00	299.00	20.20	84.50	43.00	31.10	30.30	50.00
Lithium	µg/g	2.0	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Magnesium	µg/g	20	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Manganese	µg/g	1.0	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Mercury	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.148	0.086	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Molybdenum	µg/g	0.10	1.13	1.31	1.91	1.75	2.03	1.41	49.7	4.22	6.68	2.29	1.74	2.09	0.81	0.81
Nickel	µg/g	0.50	5.85	2.79	4.80	8.57	3.41	7.27	24.50	8.00	3.90	4.69	6.21	7.62	2.49	4.46
Phosphorus	µg/g	50	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Potassium	µg/g	100	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Selenium	µg/g	0.20	0.96	1.03	<0.20	0.3	3.86	0.28	9.98	9.96	0.67	0.33	0.32	0.38	<0.20	<0.20
Silver <sup>1</sup>	µg/g	0.10	0.79	0.98	1.44	0.43	4.37	1.14	55.7	14.6	0.53	0.35	0.28	0.35	0.31	0.3
Sodium	µg/g	50	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Strontium	µg/g	0.50	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Sulfur, elemental	µg/g	1000	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Thallium <sup>1</sup>	µg/g	0.050	0.386	0.366	0.462	0.405	0.27	0.38	0.325	0.33	0.204	0.361	0.331	0.321	0.479	0.376
Tin	µg/g	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	6.2	2.5	5.2	<2.0	<2.0	<2.0	<2.0	<2.0
Titanium	µg/g	1.0	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Tungsten	µg/g	0.50	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Uranium	µg/g	0.050	0.389	0.71	0.211	0.5	0.726	0.488	0.701	0.662	1.91	0.842	1.05	0.635	0.637	0.443
Vanadium	µg/g	0.2	86.1	23.1	125	44.9	23.4	53.4	29	28	25.9	38.8	33.7	48.9	40.7	45.2
Zinc	µg/g	2.0	176.00	141.00	120.00	328.00	283.00	941.00	1560.00	1400.00	98.70	323.00	148.00	193.00	489.00	441.00
Zirconium	µg/g	1.0	na	na	na	na	na	na	na	na	na	na	na	na	na	na

**Notes:**

- MDL = Method Detection Limit
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- µg/g = micrograms per gram (equivalent to mg/kg and parts per million (ppm))
- < = concentration is less than reported method detection limit
- > = reported greater than value due to instrumentation and method limitation. Instrument saturated due to silver over a certain level
- = no applicable units / method detection limit

**Table 4: METALS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue		AEC 2 : Fuel Lines					AEC 2 : Tank Farm Area					APEC 4 : Fuel Pump Shed		APEC 3 : Main Warehouses		
Sample Station		MW17-17A		TP01	TP27	MW17-13	MW17-16		TP02	TP04	TP05	TP90	TP30	TP03	TP22	
Sample ID		MW17-17A 6-8	MW17-17A 18-20	TP1 3-4	TP27 2-4	MW17-13 10-12	MW17-16 2-4	MW17-16 2-4 DUP	TP2 3-4	TP-04 2-3	TP-05 4-6	TP29 2-4	TP30 2-4	TP3 4-6	TP22 6-8	
Sample Depth (mbg)		1.8-2.4	5.5-6.1	0.9-1.2	0.6-1.2	3.0-3.6	0.6-1.2	0.6-1.2	0.9-1.2	0.6-0.9	1.2-1.8	0.6-1.2	0.6-1.2	1.2-1.8	1.8-2.4	
Sample Collection Date		06-Jul-17	06-Jul-17	21-Jun-17	21-Jul-17	22-Jun-17	05-Jul-17	05-Jul-17	21-Jun-17	24-Jun-17	25-Jun-17	21-Jul-17	21-Jul-17	21-Jun-17	04-Jul-17	
Lab ID #		L1957720-25	L1957720-32	L1948071-26	L1965813-2	L1948071-55	L1957720-16	L1957720-17	L1948071-32	L1951378-38	L1951378-43	L1965813-11	L1965813-16	L1948071-37	L1957720-4	
Parameters	Units	MDL														
<b>Field Screening</b>																
Sample Headspace Vapour Concentration	ppmv	5.00	25.00	30.00	0.00	nm	0.00	35.00	35.00	130.00	160.00	nm	nm	nm	85.00	nm
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no	yes	no	no	
<b>Physiochemical Parameters</b>																
Moisture	%	0.25	7.39	7.2	9.11	9.37	16.7	5.47	5.38	12.3	27	42.2	8.93	13	12	8.23
pH	unitless	0.10	8.33	8.15	8.20	7.52	7.71	8.25	8.25	7.21	7.89	7.34	7.93	7.80	7.86	8.55
<b>Metals (General)</b>																
Aluminum	µg/g	50	na	na	na	14800	na	na	na	na	na	na	11900	14400	na	na
Antimony <sup>1</sup>	µg/g	0.10	1.12	1.57	0.95	1.16	1.14	0.82	<0.10	0.97	0.85	1.56	0.9	1.16	0.91	0.85
Arsenic	µg/g	0.10	6.8	28.3	5.45	9.45	8.73	4.64	0.24	5.68	5.61	36.9	6	7.95	10.1	9.34
Barium	µg/g	0.50	247	481	266	262	268	231	9.49	210	160	247	233	210	278	172
Beryllium	µg/g	0.10	0.25	0.70	0.23	0.37	0.16	0.22	<0.10	0.21	0.20	2.32	0.27	0.25	0.18	0.23
Bismuth	µg/g	0.20	na	na	na	0.78	na	na	na	na	na	na	0.33	0.58	na	na
Boron	µg/g	5.0	na	na	na	<5.0	na	na	na	na	na	na	<5.0	<5.0	na	na
Cadmium	µg/g	0.020	4.97	12.40	3.99	3.84	5.11	2.56	0.15	3.92	2.63	3.67	4.60	6.65	2.41	1.96
Calcium	µg/g	50	na	na	na	4660	na	na	na	na	na	na	5120	4530	na	na
Chromium (Total)	µg/g	0.50	9.03	27.9	1.97	5.8	3.91	2.98	<0.50	3.02	1.5	32.5	2.22	2.53	6.56	8.66
Cobalt	µg/g	0.10	11.8	25.1	9.39	12	11.7	9.03	0.41	9.15	8.48	10.5	10.1	13.6	9.26	9.21
Copper	µg/g	0.50	57.30	151.00	46.50	111.00	70.30	36.30	1.93	49.90	48.10	62.10	54.40	113.00	45.30	39.90
Iron	µg/g	50	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Lead	µg/g	0.50	41.80	70.60	42.30	54.00	75.80	31.00	1.43	48.60	30.80	39.30	50.40	69.10	41.60	30.10
Lithium	µg/g	2.0	na	na	na	15.9	na	na	na	na	na	na	13.9	14.3	na	na
Magnesium	µg/g	20	na	na	na	10200	na	na	na	na	na	na	8650	10400	na	na
Manganese	µg/g	1.0	na	na	na	1830	na	na	na	na	na	na	1650	1780	na	na
Mercury	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Molybdenum	µg/g	0.10	0.95	3.37	0.31	1.15	1.12	0.76	<0.10	0.41	0.5	8.22	0.52	0.35	0.38	0.34
Nickel	µg/g	0.50	6.67	33.50	2.49	4.57	4.18	4.05	<0.50	3.04	2.20	19.20	2.78	3.39	6.92	8.20
Phosphorus	µg/g	50	na	na	na	1050	na	na	na	na	na	na	1010	1260	na	na
Potassium	µg/g	100	na	na	na	6910	na	na	na	na	na	na	6360	7300	na	na
Selenium	µg/g	0.20	<0.20	0.52	<0.20	0.25	<0.20	<0.20	<0.20	<0.20	0.34	3.6	<0.20	<0.20	<0.20	<0.20
Silver <sup>1</sup>	µg/g	0.10	0.48	1.02	0.27	0.48	0.39	0.19	<0.10	0.28	0.28	0.68	0.25	0.46	0.44	0.32
Sodium	µg/g	50	na	na	na	152	na	na	na	na	na	na	121	84	na	na
Strontium	µg/g	0.50	na	na	na	33.4	na	na	na	na	na	na	32.8	25.8	na	na
Sulfur, elemental	µg/g	1000	na	na	na	<1000	na	na	na	na	na	na	<1000	1700	na	na
Thallium <sup>1</sup>	µg/g	0.050	0.459	0.822	0.464	0.494	0.457	0.403	<0.050	0.422	0.387	0.235	0.44	0.471	0.297	0.259
Tin	µg/g	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Titanium	µg/g	1.0	na	na	na	1190	na	na	na	na	na	na	1030	1190	na	na
Tungsten	µg/g	0.50	na	na	na	<0.50	na	na	na	na	na	na	<0.50	<0.50	na	na
Uranium	µg/g	0.050	0.493	0.678	0.442	0.61	0.434	0.405	<0.050	0.483	0.426	3.12	0.557	0.634	0.416	0.312
Vanadium	µg/g	0.2	59.4	145	44.5	58.8	55.3	40.3	1.89	43.7	43	60.2	49.8	70.7	48.7	49.7
Zinc	µg/g	2.0	687.00	1380.00	518.00	520.00	688.00	346.00	17.00	459.00	430.00	492.00	495.00	837.00	271.00	204.00
Zirconium	µg/g	1.0	na	na	na	6.4	na	na	na	na	na	na	3.9	3.4	na	na

- Notes:**
- MDL = Method Detection Limit
  - mbg = metres below grade
  - na = not analyzed
  - nm = not measured
  - no = none observed
  - ns = no applicable standard
  - µg/g = micrograms per gram (equivalent to mg/kg and parts per million (ppm)
  - < = concentration is less than reported method detection limit
  - > = reported greater than value due to instrumentation and method limita
  - = no applicable units / method detection limit

**Table 4: METALS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

			APEC 3 : Main Warehouses	APEC 12 : Burial Site 2		Burial Site 2 Upstream			AEC 4 : Mechanical Shop 11 Level Portal		AEC 7 : Warehouse East Area		APEC 7 : Tailings Impoundment Area			
Sample Station			TP23	MW17-14A		MW17-15A	MW17-15B		TP10	TP12	TP14	TP15	MW17-18A	MW17-19A		MW17-23A
Sample ID			TP23 6-8	MW17-14A 4-6	MW17-14A 18-20	MW17-15A 6-8	MW17-15B 4-6	MW17-15B 35-45	TP-10 8-10	TP-12 4-6	TP-14 2-3	TP-15 2-3	MW17-18A 10-12	MW17-19A 6-8	MW17-19A 6-8 DUPA	MW17-23A 4-6
Sample Depth (mbg)			1.8-2.4	1.2-1.8	5.5-6.1	1.8-2.4	1.2-1.8	10.7-13.7	2.4-3.0	1.2-1.8	0.6-0.9	0.6-0.9	3.0-3.6	1.8-2.4	1.8-2.4	1.2-1.8
Sample Collection Date			04-Jul-17	22-Jun-17	22-Jun-17	05-Jul-17	23-Jun-17	24-Jun-17	26-Jun-17	26-Jun-17	26-Jun-17	26-Jun-17	07-Jul-17	08-Jul-17	08-Jul-17	12-Jul-17
Lab ID #			L1957720-8	L1948071-63	L1948071-69	L1957720-13	L1951378-23	L1951378-34	L1951378-69	L1951378-77	L1951378-83	L1951378-86	L1957720-44	L1957720-63	L1957720-64	L1959270-26
Parameters	Units	MDL														
<b>Field Screening</b>																
Sample Headspace Vapour Concentration	ppmv	5.00	nm	20.00	0.00	nm	0.00	0.00	5.00	0.00	nm	nm	65.00	0.00	0.00	5.00
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no	no	no	no	no
<b>Physiochemical Parameters</b>																
Moisture	%	0.25	11.8	6.55	17.7		15.4	na	10.2	6.58	11.1	18.2	6.16	9.41	10.6	12.1
pH	unitless	0.10	7.40	8.07	8.25	8.64	8.87	8.79	8.02	7.97	4.98	6.88	8.10	7.87	8.13	6.56
<b>Metals (General)</b>																
Aluminum	µg/g	50	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Antimony <sup>1</sup>	µg/g	0.10	53.6	1.09	0.91	1.06	1.14	0.9	7.11	1.46	0.77	1.61	0.98	1.7	1.78	0.97
Arsenic	µg/g	0.10	14.6	11.5	9.98	8.18	5.78	5.95	17.6	17.4	6.52	8.93	19.4	28	20.2	43.2
Barium	µg/g	0.50	205	241	269	251	266	229	155	160	177	166	182	166	160	226
Beryllium	µg/g	0.10	0.34	0.20	0.57	0.20	0.27	0.24	0.27	0.19	0.89	0.74	0.37	0.42	0.39	0.63
Bismuth	µg/g	0.20	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Boron	µg/g	5.0	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Cadmium	µg/g	0.020	2.04	4.70	3.78	4.81	6.20	0.94	1.52	0.32	0.48	3.01	7.21	1.09	0.96	1.57
Calcium	µg/g	50	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Chromium (Total)	µg/g	0.50	8.29	5.78	6.88	3.15	2.32	3.59	17.9	1.5	2.97	9.06	11.4	28.1	25.1	20.4
Cobalt	µg/g	0.10	11.4	10.5	9.38	11.1	11.3	7.88	32.1	11.1	11	10.6	14.1	13.9	12.8	12.3
Copper	µg/g	0.50	137.00	138.00	67.60	58.80	53.70	24.90	734.00	291.00	57.10	96.50	84.70	59.00	41.30	55.90
Iron	µg/g	50	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Lead	µg/g	0.50	3160.00	47.70	44.50	60.00	48.50	27.30	64.80	22.60	23.60	39.80	51.90	31.70	34.60	40.30
Lithium	µg/g	2.0	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Magnesium	µg/g	20	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Manganese	µg/g	1.0	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Mercury	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.055	<0.050	<0.050	<0.050	<0.050
Molybdenum	µg/g	0.10	1.11	0.97	0.91	0.73	0.54	0.58	4.09	1.23	0.87	1.72	1.57	1.59	1.3	0.66
Nickel	µg/g	0.50	7.14	3.79	5.52	3.97	2.83	2.53	10.70	2.13	3.17	8.24	21.70	25.70	24.30	16.90
Phosphorus	µg/g	50	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Potassium	µg/g	100	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Selenium	µg/g	0.20	0.66	<0.20	<0.20	<0.20	<0.20	<0.20	1.76	1.41	0.26	0.9	0.36	0.71	0.6	<0.20
Silver <sup>1</sup>	µg/g	0.10	0.5	0.43	0.38	0.31	0.25	0.22	1.76	0.8	0.17	0.44	0.81	0.55	0.53	0.34
Sodium	µg/g	50	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Strontium	µg/g	0.50	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Sulfur, elemental	µg/g	1000	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Thallium <sup>1</sup>	µg/g	0.050	0.346	0.462	0.33	0.504	0.413	0.315	0.32	0.474	0.402	0.38	0.385	0.251	0.274	0.343
Tin	µg/g	2.0	2.4	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Titanium	µg/g	1.0	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Tungsten	µg/g	0.50	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Uranium	µg/g	0.050	0.518	0.464	0.749	0.415	0.636	0.608	0.808	0.605	0.562	0.674	0.321	0.568	0.609	0.511
Vanadium	µg/g	0.2	53.8	45.1	44.4	50.5	57.8	44.2	27.7	34	39.8	47.8	61.1	45.8	46.7	68.5
Zinc	µg/g	2.0	299.00	601.00	575.00	623.00	774.00	176.00	448.00	129.00	158.00	384.00	769.00	165.00	156.00	268.00
Zirconium	µg/g	1.0	na	na	na	na	na	na	na	na	na	na	na	na	na	na

**Notes:**  
 MDL = Method Detection Limit  
 mbg = metres below grade  
 na = not analyzed  
 nm = not measured  
 no = none observed  
 ns = no applicable standard  
 µg/g = micrograms per gram (equivalent to mg/kg and parts per million (ppm)  
 < = concentration is less than reported method detection limit  
 > = reported greater than value due to instrumentation and method limita  
 - = no applicable units / method detection limit

**Table 4: METALS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

Parameters	Units	MDL	APEC 7 : Tailings Impoundment Area					AEC 5 : Main Landfill					Stonehouse Creek Drainage Downstream	Stonehouse Creek Drainage Upstream	Sky Creek Background Downstream		Sky Creek Background Upstream		
			Sample Station	Sample ID	Sample Depth (mbg)	Sample Collection Date	Lab ID #	MW17-23A	MW17-25A	TP31	TP32	TP33	MW17-22A	TP24	TP25	TP26	MW17-11A	MW17-28A	MW17-24A
<b>Field Screening</b>																			
Sample Headspace Vapour Concentration	ppmv	5.00	5.00	5.00	nm	nm	nm	30.00	30.00	nm	nm	nm	5.00	25.00	10.00	10.00	10.00	10.00	
Observable Staining	-	-	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	
<b>Physiochemical Parameters</b>																			
Moisture	%	0.25	11.4	13.1	16.7	na	18.3	13.9	13.7	18.7	12.8	25.7	na	na	8.43	6.77	14.2		
pH	unitless	0.10	6.51	7.97	6.00	6.72	5.83	7.41	7.35	6.68	7.93	6.11	5.93	6.40	7.25	7.27	7.86		
<b>Metals (General)</b>																			
Aluminum	µg/g	50	na	na	15200	17400	16300	na	na	na	na	na	na	na	na	na	na		
Antimony <sup>1</sup>	µg/g	0.10	0.9	2.61	1.41	1.67	1.76	1.86	1.79	1.58	0.78	1.89	0.88	1	1.88	1.73	2.43		
Arsenic	µg/g	0.10	39.4	50.9	57.1	32.7	32.5	34.9	35.3	29.4	11.6	53.9	14.6	13	192	165	45.8		
Barium	µg/g	0.50	283	98	120	432	113	102	95.2	194	222	110	167	151	65	60	191		
Beryllium	µg/g	0.10	0.58	0.63	0.63	0.71	1.14	1.09	1.06	0.57	0.43	1.32	0.91	1.65	0.49	0.46	0.38		
Bismuth	µg/g	0.20	na	na	0.28	0.23	<0.20	na	na	na	na	na	na	na	na	na	na		
Boron	µg/g	5.0	na	na	<5.0	<5.0	<5.0	na	na	na	na	na	na	na	na	na	na		
Cadmium	µg/g	0.020	1.65	5.23	1.88	1.81	0.68	1.92	1.75	1.54	1.20	1.27	0.81	0.44	5.36	5.18	2.02		
Calcium	µg/g	50	na	na	2660	4430	2200	na	na	na	na	na	na	na	na	na	na		
Chromium (Total)	µg/g	0.50	22.9	17	13.4	35.4	15	24.4	23.6	22	13.6	31.4	15.1	14.9	16.1	15.7	46.7		
Cobalt	µg/g	0.10	13.4	23.1	13.7	15.5	14.4	20.8	19.9	16.9	10.9	14.2	10.9	7.39	13.2	12.1	13.7		
Copper	µg/g	0.50	69.40	151.00	70.10	54.90	64.90	113.00	108.00	66.30	44.70	69.50	133.00	34.00	71.00	62.90	64.30		
Iron	µg/g	50	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na		
Lead	µg/g	0.50	37.10	82.70	45.60	48.80	36.50	48.80	48.60	60.50	22.80	70.60	27.80	29.30	217.00	205.00	119.00		
Lithium	µg/g	2.0	na	na	12.6	17.1	15.3	na	na	na	na	na	na	na	na	na	na		
Magnesium	µg/g	20	na	na	8080	10300	7940	na	na	na	na	na	na	na	na	na	na		
Manganese	µg/g	1.0	na	na	1660	4650	19658	na	na	na	na	na	na	na	na	na	na		
Mercury	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050		
Molybdenum	µg/g	0.10	0.68	3.48	1.21	0.95	1.17	3.24	3.17	1.06	0.57	2.96	2.87	2.79	3.67	3.65	6.14		
Nickel	µg/g	0.50	18.60	35.20	19.30	30.80	22.10	40.70	37.50	26.70	11.20	36.80	11.10	10.90	33.20	34.80	32.20		
Phosphorus	µg/g	50	na	na	1490	1400	1250	na	na	na	na	na	na	na	na	na	na		
Potassium	µg/g	100	na	na	3050	4980	2780	na	na	na	na	na	na	na	na	na	na		
Selenium	µg/g	0.20	0.37	1.73	0.31	<0.20	0.27	0.58	0.56	<0.20	<0.20	0.52	0.32	0.35	<0.20	<0.20	0.68		
Silver <sup>1</sup>	µg/g	0.10	0.44	1.08	0.4	0.51	0.29	0.77	0.78	0.47	0.22	0.72	0.29	0.44	1.32	1.18	1.18		
Sodium	µg/g	50	na	na	120	146	109	na	na	na	na	na	na	na	na	na	na		
Strontium	µg/g	0.50	na	na	19.1	39.9	22.7	na	na	na	na	na	na	na	na	na	na		
Sulfur, elemental	µg/g	1000	na	na	<1000	<1000	<1000	na	na	na	na	na	na	na	na	na	na		
Thallium <sup>1</sup>	µg/g	0.050	0.343	0.321	0.364	0.338	0.332	0.316	0.302	0.341	0.316	0.387	0.36	0.282	0.165	0.143	0.261		
Tin	µg/g	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	3.4	<2.0	<2.0		
Titanium	µg/g	1.0	na	na	743	719	751	na	na	na	na	na	na	na	na	na	na		
Tungsten	µg/g	0.50	na	na	<0.50	<0.50	<0.50	na	na	na	na	na	na	na	na	na	na		
Uranium	µg/g	0.050	0.418	0.409	0.481	0.462	0.64	0.325	0.328	0.852	0.366	1.05	1.2	1.58	0.608	0.618	0.347		
Vanadium	µg/g	0.2	73	50.5	48.2	57.6	46.7	41.3	40	54.2	80.8	53.3	58.3	51.5	21	19.1	49.6		
Zinc	µg/g	2.0	287.00	562.00	335.00	265.00	236.00	237.00	223.00	283.00	169.00	310.00	169.00	194.00	877.00	751.00	281.00		
Zirconium	µg/g	1.0	na	na	8	11.1	3.8	na	na	na	na	na	na	na	na	na	na		

- Notes:**
- MDL = Method Detection Limit
  - mbg = metres below grade
  - na = not analyzed
  - nm = not measured
  - no = none observed
  - ns = no applicable standard
  - µg/g = micrograms per gram (equivalent to mg/kg and parts per million (ppm)
  - < = concentration is less than reported method detection limit
  - > = reported greater than value due to instrumentation and method limita
  - = no applicable units / method detection limit



**Table 4: METALS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue			QA/QC				
Sample Station							
Sample ID				MW17-16 2-4 DUP	MW17-19A 6-8 DUPA	MW17-23A DUPA	MW17-22A 6-8 DUPA
Sample Depth (mbg)				0.6-1.2	1.8-2.4	1.2-1.8	1.8-2.4
Sample Collection Date				05-Jul-17	08-Jul-17	12-Jul-17	10-Jul-17
Lab ID #				L1957720-17	L1957720-64	L1959270-27	L1957720-113
Parameters	Units	MDL	Allowable RPD <sup>3</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)
<b>Field Screening</b>							
Sample Headspace Vapour Concentration	ppmv	5.00					
Observable Staining	-	-	-	-			
<b>Physiochemical Parameters</b>							
Moisture	%	0.25	-	-			
pH	unitless	0.10	-	-			
<b>Metals (General)</b>							
Aluminum	µg/g	50	20	-	-	-	-
Antimony <sup>1</sup>	µg/g	0.10	20	-	4.60	7.49	3.84
Arsenic	µg/g	0.10	20	-	<b>32.37</b>	9.20	1.14
Barium	µg/g	0.50	20	<b>184.22</b>	3.68	<b>22.40</b>	6.90
Beryllium	µg/g	0.10	20	-	-	8.26	2.79
Bismuth	µg/g	0.20	20	-	-	-	-
Boron	µg/g	5.0	20	-	-	-	-
Cadmium	µg/g	0.020	20	<b>177.72</b>	13.20	4.97	9.26
Calcium	µg/g	50	20	-	-	-	-
Chromium (Total)	µg/g	0.50	20	-	11.28	11.55	3.33
Cobalt	µg/g	0.10	20	-	8.24	8.56	4.42
Copper	µg/g	0.50	20	-	<b>35.29</b>	<b>21.55</b>	4.52
Iron	µg/g	50	20	-	-	-	-
Lead	µg/g	0.50	20	-	8.75	8.27	0.41
Lithium	µg/g	2.0	20	-	-	-	-
Magnesium	µg/g	20	20	-	-	-	-
Manganese	µg/g	1.0	20	-	-	-	-
Mercury	µg/g	0.050	20	-	-	-	-
Molybdenum	µg/g	0.10	20	-	<b>20.07</b>	2.99	2.18
Nickel	µg/g	0.50	20	-	5.60	9.58	8.18
Phosphorus	µg/g	50	20	-	-	-	-
Potassium	µg/g	100	20	-	-	-	-
Selenium	µg/g	0.20	20	-	-	-	-
Silver <sup>1</sup>	µg/g	0.10	20	-	3.70	-	1.29
Sodium	µg/g	50	20	-	-	-	-
Strontium	µg/g	0.50	20	-	-	-	-
Sulfur, elemental	µg/g	1000	20	-	-	-	-
Thallium <sup>1</sup>	µg/g	0.050	20	-	8.76	0.00	4.53
Tin	µg/g	2.0	20	-	-	-	-
Titanium	µg/g	1.0	20	-	-	-	-
Tungsten	µg/g	0.50	20	-	-	-	-
Uranium	µg/g	0.050	20	-	6.97	<b>20.02</b>	0.92
Vanadium	µg/g	0.2	20	<b>182.08</b>	1.95	6.36	3.20
Zinc	µg/g	2.0	20	<b>181.27</b>	5.61	6.85	6.09
Zirconium	µg/g	1.0	20	-	-	-	-

**Notes:**

- MDL = Method Detection Limit
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- µg/g = micrograms per gram (equivalent to mg/kg and parts per million (ppm))
- < = concentration is less than reported method detection limit
- > = reported greater than value due to instrumentation and method limita
- = no applicable units / method detection limit

**QA/QC**

- 3 = allowable RPDs as identified in BC Environmental Laboratory Manual (February 2016), Section A, Table 2
- nc = not calculated
- RPD = Representative percent difference
- 1** = calculated RPD exceeds allowable RPD







**Table 5: VOCs**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue			AEC 2 : Tank Farm Area												
Sample Station	MW17-16		TP02		TP04		TP05		TP06		TP07		TP08		
Sample ID	MW17-16 2-4	MW17-16 2-4 DUP	TP2 3-4	TP2 6-9	TP-04 2-3	TP-04 6-8	TP-05 4-6	TP-05 8-10	TP-06 4-6	TP-06 8-10	TP-07 2-3	TP-07 6-8	TP-08 4-6		
Sample Depth (mbg)	0.6-1.2	0.6-1.2	0.9-1.2	1.8-2.7	0.6-0.9	1.8-2.4	1.2-1.8	2.4-3.0	1.2-1.8	2.4-3.0	0.6-0.9	1.8-2.4	1.2-1.8		
Sample Collection Date	05-Jul-17	05-Jul-17	21-Jun-17	21-Jun-17	24-Jun-17	24-Jun-17	25-Jun-17	25-Jun-17	25-Jun-17	25-Jun-17	25-Jun-17	25-Jun-17	25-Jun-17		
Lab ID #	L1957720-16	L1957720-17	L1948071-32	L1948071-33	L1951378-38	L1951378-40	L1951378-43	L1951378-45	L1951378-48	L1951378-50	L1951378-52	L1951378-54	L1951378-57		
Parameters	Units	MDL													
<b>Field Screening</b>															
Sample Headspace Vapour Concentration	ppmv	5	35.00	35.00	130.00	140.00	160.00	0.00	nm	nm	nm	nm	nm		
Noticable Odour	-	-	no	no	no	no	no	no	no	no	no	no	no		
Observable Staining	-	-	no	no	no	yes	no	no	no	no	no	no	no		
<b>Volatile Organic Compounds (VOCs)</b>															
Benzene	µg/g	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050		
Bromodichloromethane	µg/g	0.050	<0.050	<0.050	<0.060	<0.080	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050		
Bromoform	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050		
Carbon Tetrachloride	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050		
Chlorobenzene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050		
Dibromochloromethane [DBCM]	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050		
Chloroethane	µg/g	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10		
Chloroform	µg/g	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10		
Chloromethane	µg/g	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10		
Dichlorobenzene, 1,2-	µg/g	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050		
Dichlorobenzene, 1,3-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050		
Dichlorobenzene, 1,4-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050		
Dichloroethane, 1,1-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050		
Dichloroethane, 1,2-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050		
Dichloroethylene, 1,1-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050		
Dichloroethylene, 1,2- cis-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050		
Dichloroethylene, 1,2- trans-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050		
Dichloromethane	µg/g	0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30		
Dichloropropane, 1,2-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050		
cis-1,3-Dichloropropylene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050		
trans-1,3-Dichloropropylene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050		
Ethylbenzene	µg/g	0.015	<0.015	<0.015	<0.015	0.06	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015		
Methyl tert-butyl ether [MTBE]	µg/g	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20		
Styrene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050		
Tetrachloroethane, 1,1,1,2-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050		
Tetrachloroethane, 1,1,2,2-	µg/g	0.050	<0.70	<0.050	<0.20	<0.20	0.44	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050		
Tetrachloroethylene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050		
Toluene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050		
Trichloroethane, 1,1,1-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050		
Trichloroethane, 1,1,2-	µg/g	0.050	<0.30	<0.050	<2.3	<2.5	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050		
Trichloroethylene	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010		
Trichlorofluoromethane	µg/g	0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10		
Vinyl Chloride	µg/g	0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10		
ortho-Xylene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050		
meta- & para-Xylene	µg/g	0.050	<0.050	<0.050	<0.050	0.065	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050		
Xylenes, Total	µg/g	0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075		

**Notes:**

- MDL = Method Detection Limit
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/g = micrograms per gram (parts per million)
- VOC = volatile organic compound
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit



**Table 5: VOCs**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

Parameters	APEC/Issue		AEC 4 : Mechanical Shop 11 Level Portal				AEC 7: Warehouse East			
	Units	MDL	TP11		TP12	TP13	TP14	TP15	TP16	TP17
<b>Field Screening</b>										
Sample Headspace Vapour Concentration	ppmv	5	5.00	5.00	0.00	15.00	nm	nm	15.00	0.00
Noticable Odour	-	-	no	no	no	no	no	no	no	no
Observable Staining	-	-	no	no	no	no	no	no	no	no
<b>Volatile Organic Compounds (VOCs)</b>										
Benzene	µg/g	0.0050	<0.0050	0.0082	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromodichloromethane	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Bromoform	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Carbon Tetrachloride	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chlorobenzene	µg/g	0.050	<0.16	<0.20	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dibromochloromethane [DBCM]	µg/g	0.050	<1.6	<0.40	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloroethane	µg/g	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Chloroform	µg/g	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Chloromethane	µg/g	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Dichlorobenzene, 1,2-	µg/g	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichlorobenzene, 1,3-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichlorobenzene, 1,4-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichloroethane, 1,1-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichloroethane, 1,2-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichloroethylene, 1,1-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichloroethylene, 1,2-cis-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichloroethylene, 1,2-trans-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichloromethane	µg/g	0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Dichloropropane, 1,2-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
cis-1,3-Dichloropropylene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
trans-1,3-Dichloropropylene	µg/g	0.050	<0.33	<0.30	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Ethylbenzene	µg/g	0.015	2.4	0.372	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
Methyl tert-butyl ether [MTBE]	µg/g	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Styrene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Tetrachloroethane, 1,1,1,2-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Tetrachloroethane, 1,1,2,2-	µg/g	0.050	<4.1	<6.0	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Tetrachloroethylene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Toluene	µg/g	0.050	<0.050	0.627	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Trichloroethane, 1,1,1-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Trichloroethane, 1,1,2-	µg/g	0.050	<1.2	<0.70	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Trichloroethylene	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.04	<0.010	<0.010
Trichlorofluoromethane	µg/g	0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Vinyl Chloride	µg/g	0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
ortho-Xylene	µg/g	0.050	3.99	<0.060	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
meta- & para-Xylene	µg/g	0.050	4.06	0.868	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Xylenes, Total	µg/g	0.075	8.05	0.868	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075

**Notes:**

- MDL = Method Detection Limit
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/g = micrograms per gram (parts per million)
- VOC = volatile organic compound
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**Table 5: VOCs**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

Parameters		APEC/Issue		APEC 7 :Tailings Impoundment Area						
		Sample Station	MW17-18A	MW17-19A		MW17-20B	MW17-23A	MW17-23A	MW17-25A	TP32
Sample ID		MW17-18A 10-12	MW17-19A 6-8	MW17-19A 6-8 DUPA	MW17-20B 2-4	MW17-23A 4-6	MW17-23A 4-6 DUPA	MW17-25A 10-12	TP32 2-4	
Sample Depth (mbg)		3.0-3.6	1.8-2.4	1.8-2.4	0.6-1.2	1.2-1.8	1.2-1.8	3.0-3.6	0.6-1.2	
Sample Collection Date		07-Jul-17	08-Jul-17	08-Jul-17	10-Jul-17	12-Jul-17	12-Jul-17	13-Jul-17	22-Jul-17	
Lab ID #		L1957720-44	L1957720-63	L1957720-64	L1957720-89	L1959270-26	L1959270-27	L1959270-66	L1965813-23	
Units	MDL									
<b>Field Screening</b>										
Sample Headspace Vapour Concentration	ppmv	5	65.00	0.00	0.00	nm	5.00	5.00	5.00	nm
Noticable Odour	-	-	no	no	no	no	no	no	no	no
Observable Staining	-	-	no	no	no	no	no	no	no	no
<b>Volatile Organic Compounds (VOCs)</b>										
Benzene	µg/g	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromodichloromethane	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Bromoform	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Carbon Tetrachloride	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chlorobenzene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dibromochloromethane [DBCM]	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloroethane	µg/g	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Chloroform	µg/g	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Chloromethane	µg/g	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Dichlorobenzene, 1,2-	µg/g	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichlorobenzene, 1,3-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichlorobenzene, 1,4-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichloroethane, 1,1-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichloroethane, 1,2-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichloroethylene, 1,1-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichloroethylene, 1,2-cis-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichloroethylene, 1,2-trans-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dichloromethane	µg/g	0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Dichloropropane, 1,2-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
cis-1,3-Dichloropropylene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
trans-1,3-Dichloropropylene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Ethylbenzene	µg/g	0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
Methyl tert-butyl ether [MTBE]	µg/g	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Styrene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Tetrachloroethane, 1,1,1,2-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Tetrachloroethane, 1,1,2,2-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Tetrachloroethylene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Toluene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.055	<0.050
Trichloroethane, 1,1,1-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Trichloroethane, 1,1,2-	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Trichloroethylene	µg/g	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Trichlorofluoromethane	µg/g	0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Vinyl Chloride	µg/g	0.100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
ortho-Xylene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
meta- & para-Xylene	µg/g	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Xylenes, Total	µg/g	0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075

**Notes:**

- MDL = Method Detection Limit
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/g = micrograms per gram (parts per million)
- VOC = volatile organic compound
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit





**Table 5: VOCs**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

			QA/QC							
APEC/Issue										
Sample Station										
Parameters	Units	MDL	Allowable RPD <sup>3</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)
Sample ID			TP28 6-8 DUP A	MW17-16 2-4 DUP	MW17-19A 6-8 DUPA	MW17-23A 4-6 DUPA	MW17-22A 6-8 DUPA	MW17-24A 6-8 DUPA	DUP SP20-01-06	
Sample Depth (mbg)			1.8-2.4	0.6-1.2	1.8-2.4	1.2-1.8	1.8-2.4	1.8-2.4	-	
Sample Collection Date			21-Jul-17	05-Jul-17	08-Jul-17	12-Jul-17	10-Jul-17	13-Jul-17	29-Aug-2020	
Lab ID #			L1965813-9	L1957720-17	L1957720-64	L1959270-27	L1957720-113	L1959270-44	VA20B4299-007	
Field Screening										
Sample Headspace Vapour Concentration	ppmv	5	-	-	-	-	-	-	-	-
Noticable Odour	-	-	-	-	-	-	-	-	-	-
Observable Staining	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)										
Benzene	µg/g	0.0050	20	-	-	-	-	-	-	-
Bromodichloromethane	µg/g	0.050	20	-	-	-	-	-	-	-
Bromoform	µg/g	0.050	20	-	-	-	-	-	-	-
Carbon Tetrachloride	µg/g	0.050	20	-	-	-	-	-	-	-
Chlorobenzene	µg/g	0.050	20	-	-	-	-	-	-	-
Dibromochloromethane [DBCM]	µg/g	0.050	20	-	-	-	-	-	-	-
Chloroethane	µg/g	0.10	20	-	-	-	-	-	-	-
Chloroform	µg/g	0.10	20	-	-	-	-	-	-	-
Chloromethane	µg/g	0.10	20	-	-	-	-	-	-	-
Dichlorobenzene, 1,2-	µg/g	0.05	20	-	-	-	-	-	-	-
Dichlorobenzene, 1,3-	µg/g	0.050	20	-	-	-	-	-	-	-
Dichlorobenzene, 1,4-	µg/g	0.050	20	-	-	-	-	-	-	-
Dichloroethane, 1,1-	µg/g	0.050	20	-	-	-	-	-	-	-
Dichloroethane, 1,2-	µg/g	0.050	20	-	-	-	-	-	-	-
Dichloroethylene, 1,1-	µg/g	0.050	20	-	-	-	-	-	-	-
Dichloroethylene, 1,2-cis-	µg/g	0.050	20	-	-	-	-	-	-	-
Dichloroethylene, 1,2-trans-	µg/g	0.050	20	-	-	-	-	-	-	-
Dichloromethane	µg/g	0.30	20	-	-	-	-	-	-	-
Dichloropropane, 1,2-	µg/g	0.050	20	-	-	-	-	-	-	-
cis-1,3-Dichloropropylene	µg/g	0.050	20	-	-	-	-	-	-	-
trans-1,3-Dichloropropylene	µg/g	0.050	20	-	-	-	-	-	-	-
Ethylbenzene	µg/g	0.015	20	-	-	-	-	-	-	-
Methyl tert-butyl ether [MTBE]	µg/g	0.20	20	-	-	-	-	-	-	-
Styrene	µg/g	0.050	20	-	-	-	-	-	-	-
Tetrachloroethane, 1,1,1,2-	µg/g	0.050	20	-	-	-	-	-	-	-
Tetrachloroethane, 1,1,2,2-	µg/g	0.050	20	-	-	-	-	-	-	-
Tetrachloroethylene	µg/g	0.050	20	-	-	-	-	-	-	-
Toluene	µg/g	0.050	20	-	-	-	-	-	-	-
Trichloroethane, 1,1,1-	µg/g	0.050	20	-	-	-	-	-	-	-
Trichloroethane, 1,1,2-	µg/g	0.050	20	-	-	-	-	-	-	-
Trichloroethylene	µg/g	0.010	20	-	-	-	-	-	-	-
Trichlorofluoromethane	µg/g	0.100	20	-	-	-	-	-	-	-
Vinyl Chloride	µg/g	0.100	20	-	-	-	-	-	-	-
ortho-Xylene	µg/g	0.050	20	-	-	-	-	-	-	-
meta- & para-Xylene	µg/g	0.050	20	-	-	-	-	-	-	-
Xylenes, Total	µg/g	0.075	20	-	-	-	-	-	-	-

**Notes:**

- MDL = Method Detection Limit
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/g = micrograms per gram (parts per million)
- VOC = volatile organic compound
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**QA/QC**

- 3 = allowable RPDs as identified in BC Environmental Laboratory Manual (February 2016), Section A, Table 2
- nc = not calculated
- RPD = Representative percent difference
- 1** = calculated RPD exceeds allowable RPD

**Table 6: POLYCHLORINATED BIPHENYLS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

Parameters	Units	MDL	APEC/Issue		AEC 1 : Mill / 10 Level Portal	APEC 10 : Burial Site 1	APEC 3 : Main Warehouses	APEC 12 : Burial Site 2			
			Sample Station	Sample ID	Sample Depth (mbg)	Sample Collection Date	Lab ID #				
<b>Polychlorinated biphenyls</b>											
PCB-1016	µg/g	0.020	MW17-3	MW17-3 0-2	0.0-0.6	11-Jun-17	L1942125-15	MW17-7A MW17-7A 0-1 0.0-0.3 14-Jun-17 L1945466-22	MW17-9B MW17-9B 3-4 0.9-1.2 16-Jun-17 L1946419-2	TP03 TP3 4-6 1.2-1.8 21-Jun-17 L1948071-37	MW17-14A MW17-14A 4-6 1.2-1.8 22-Jun-17 L1948071-63
PCB-1221	µg/g	0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020			
PCB-1232	µg/g	0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020			
PCB-1242	µg/g	0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020			
PCB-1248	µg/g	0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020			
PCB-1254	µg/g	0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020			
PCB-1260	µg/g	0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020			
PCB-1262	µg/g	0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020			
PCB-1268	µg/g	0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020			
Polychlorinated Biphenyls, Total	µg/g	0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020			

**Notes:**

- MDL = Method Detection Limit
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- PCB = polychlorinated biphenyl
- ppmv = parts per million by volume
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**Table 7: CYANIDE AND GLYCOLS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue		AEC 1 : Mill / 10 Level Portal									AEC 2 : Fuel Lines	APEC 3 : Main Warehouses	APEC 12 : Burial Site 2	
Sample Station		MW17-1B	MW17-3	MW17-2B	MW17-4A	MW17-4B	MW17-5B	MW17-6B	MW17-7A	MW17-8A	TP01	TP03	MW17-14A	
Sample ID		MW17-1B-3-4	MW17-3 0-2	MW17-2B 2-4	MW17-4A 3-4	MW17-4B 1-2	MW17-5B 2-3	MW17-6B 0-1	MW17-7A 0-1	MW17-8A 3-4	TP1 3-4	TP3 4-6	MW17-14A 4-6	
Sample Depth (mbg)		0.9-1.2	0.0-0.6	0.6-1.2	0.9-1.2	0.3-0.6	0.6-0.9	0.0-0.3	0.0-0.3	0.9-1.2	0.0-1.2	1.2-1.8	1.2-1.8	
Sample Collection Date		11-Jun-17	11-Jun-17	11-Jun-17	11-Jun-17	12-Jun-17	13-Jun-17	13-Jun-17	14-Jun-17	15-Jun-17	21-Jun-17	21-Jun-17	22-Jun-17	
Lab ID #		L1942125-13	L1942125-15	L1942125-29	L1942125-32	L1942125-47	L1945466-2	L1945466-18	L1945466-22	L1945466-42	L1948071-26	L1948071-37	L1948071-63	
Parameters	Units	MDL												
Cyanide														
Cyanide, Total	µg/g	0.05	0.206	<0.050	0.051	5.25	3.48	<0.050	7.15	3.83	0.128	<0.050	<0.050	<0.050

**Notes:**

- MDL = Method Detection Limit
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**Table 7: CYANIDE AND GLYCOLS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue	Burial Site 2 Upstream	APEC 7 : Tailings Impoundment Area					AEC 5 : Main Landfill					Sky Creek Drainage Upstream
Sample Station	MW17-15B	MW17-23A	MW17-23A	MW17-25A	TP31	TP33	MW17-22A		TP24	TP25	TP26	MW17-21A
Sample ID	MW17-15B 4-6	MW17-23A 4-6	MW17-23A 4-6 DUPA	MW17-25A 10-12	TP31 2-4	TP33 2-4	MW17-22A 6-8	MW17-22A 6-8 DUPA	TP24 2-4	TP25 4-6	TP26 4-6	MW17-21A 8-10
Sample Depth (mbg)	1.2-1.8	1.2-1.8	1.2-1.8	3.0-3.6	0.6-1.2	0.6-1.2	1.8-2.4	1.8-2.4	0.6-1.2	1.2-1.8	1.2-1.8	2.4-3.0
Sample Collection Date	23-Jun-17	12-Jul-17	12-Jul-17	13-Jul-17	22-Jul-17	22-Jul-17	10-Jul-17	10-Jul-17	12-Jul-17	11-Jul-17	11-Jul-17	10-Jul-17
Lab ID #	L1951378-23	L1959270-26	L1959270-27	L1959270-66	L1965813-19	L1965813-27	L1957720-112	L1957720-113	L1959270-20	L1959270-13	L1959270-17	L1957720-96
Parameters	Units	MDL										
Cyanide												
Cyanide, Total	µg/g	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050

**Notes:**

- MDL = Method Detection Limit
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**Table 7: CYANIDE AND GLYCOLS**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue			QA/QC		
Sample Station					
Sample ID			MW17-23A 4-6 DUPA	MW17-22A 6-8 DUPA	
Sample Depth (mbg)			1.2-1.8	1.8-2.4	
Sample Collection Date			12-Jul-17	10-Jul-17	
Lab ID #			L1959270-27	L1957720-113	
Parameters	Units	MDL	Allowable RPD <sup>3</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)
<b>Cyanide</b>					
Cyanide, Total	µg/g	0.05	20	-	-

**Notes:**

- MDL = Method Detection Limit
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**QA/QC**

- 3 = allowable RPDs as identified in BC Environmental Laboratory Manual (February 2016), Section A, Table 2
- nc = not calculated
- RPD = Representative percent difference
- 1** = calculated RPD exceeds allowable RPD

**Table 8: Soil Amendments**

Johnny Mountain Mine Reclamation Project

SnipGold Corporation

VE52655D

Johnny Mountain Mine

Nov - 20

APEC/Issue			Soil Treatment Area - 1 (Sept 2018)							Soil Treatment Area - 1 (July 2019)	
Sample Station			LF1	LF2	LF3	LF4	LF5	LF6	LF7	TP19-41	TP19-42
Sample ID			LF1	LF2	LF3	LF4	LF5	LF6	LF7	TP19-41-01	TP19-42-01
Sample Depth (mbg)			0.1 (sfc)	0.1 (sfc)	0.1 (sfc)	0.1 (sfc)	0.1 (sfc)	0.1 (sfc)	0.1 (sfc)	-	-
Sample Collection Date			11-Sep-18	11-Sep-18	11-Sep-18	11-Sep-18	11-Sep-18	11-Sep-18	11-Sep-18	17-Jul-19	17-Jul-19
Lab ID #			L2162701-1	L2162701-2	L2162701-3	L2162701-4	L2162701-5	L2162701-6	L2162701-7	L2312978-1	L2312978-2
Parameters	Units	MDL									
<b>Physiochemical Parameters</b>											
Moisture	%	0.25	10.90	12.70	13.60	12.20	11.00	12.10	13.90	14.30	14.20
pH	unitless	0.10	7.66	7.52	7.53	7.57	7.51	7.48	7.90	na	na
<b>Plant Available Nutrients</b>											
Available Nitrate-N	µg/g	1.00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	na	na
Available Phosphate-P	µg/g	2.00	2.8	3.4	3.1	3.1	3.1	3	<2.0	na	na
Available Potassium	µg/g	20.0	71	87	77	82	84	66	103	na	na
Available Sulfate-S	µg/g	4.00	na	na	na	na	na	na	na	na	na
<b>Anions and Nutrients (Leachable)</b>											
Ammonia (as N)	µg/g	0.50	na	na	na	na	na	na	na	na	na
Total Nitrogen	µg/g	0.02	na	na	na	na	na	na	na	<0.020	<0.020
Total Dissolved Phosphate	µg/g	5.00	na	na	na	na	na	na	na	na	na
<b>Taxonomy (Soil)</b>											
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	na	50000	na	260000	na	340000	na	151000	72500
<b>Organic / Inorganic Carbon (Soil)</b>											
Total Organic Carbon	%	0.0500	0.24	0.4	0.49	0.42	0.35	0.33	0.36	0.404	0.286

**Notes:**

- MDL = Method Detection Limit
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit
- CFU/g = Colony forming unit per gram

**Table 8: Soil Amendments**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue			Soil Treatment Area - 1 (July 2019)				Soil Treatment Area - 1 (Sept 2019)		
Sample Station			TP19-43	TP19-44	TP19-45	TP19-46	TP19-42	TP19-44	TP19-46
Sample ID			TP19-43-01	TP19-44-01	TP19-45-01	TP19-46-01	TP19-42	TP19-44	TP19-46
Sample Depth (mbg)			-	-	-	-	-	-	-
Sample Collection Date			17-Jul-19	17-Jul-19	17-Jul-19	17-Jul-19	06-Sep-19	06-Sep-19	06-Sep-19
Lab ID #			L2312978-3	L2312978-4	L2312978-5	L2312978-6	L2345252-2	L2345252-4	L2345252-6
Parameters	Units	MDL							
<b>Physiochemical Parameters</b>									
Moisture	%	0.25	13.80	12.90	12.90	13.50	9.69	9.33	11.80
pH	unitless	0.10	na	na	na	na	na	na	na
<b>Plant Available Nutrients</b>									
Available Nitrate-N	µg/g	1.00	na	na	na	na	<1.0	<1.0	<1.0
Available Phosphate-P	µg/g	2.00	na	na	na	na	8.4	<2.0	2.2
Available Potassium	µg/g	20.0	na	na	na	na	45	64	50
Available Sulfate-S	µg/g	4.00	na	na	na	na	23.1	16.6	17.4
<b>Anions and Nutrients (Leachable)</b>									
Ammonia (as N)	µg/g	0.50	na	na	na	na	<5.0	<5.0	<5.0
Total Nitrogen	µg/g	0.02	<0.020	<0.020	<0.020	<0.020	na	na	na
Total Dissolved Phosphate	µg/g	5.00	na	na	na	na	7.8	5.6	4.2
<b>Taxonomy (Soil)</b>									
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	167000	580000	295000	159000	50000	260000	340000
<b>Organic / Inorganic Carbon (Soil)</b>									
Total Organic Carbon	%	0.0500	0.263	0.219	0.268	0.354	0.151	0.295	0.216

**Notes:**

- MDL = Method Detection Limit
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit
- CFU/g = Colony forming unit per gram



**Table 8: Soil Amendments**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue			Soil Treatment Area - 1 (August 2020)						Soil Treatment Area - 2 (Sept 2019)			
Sample Station	SP20-01-01	SP20-01-02	SP20-01-03	SP20-01-04	SP20-01-05	SP20-01-06		TP19-47	TP19-49	TP19-51		
Sample ID	SP20-01-01	SP20-01-02	SP20-01-03	SP20-01-04	SP20-01-05	SP20-01-06	DUP SP20-01-06 (SP20-01-56)	TP19-47	TP19-49	TP19-51		
Sample Depth (mbg)	-	-	-	-	-	-	-	-	-	-		
Sample Collection Date	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	7-Sep-19	07-Sep-19	07-Sep-19		
Lab ID #	VA20B4299-001	VA20B4299-002	VA20B4299-003	VA20B4299-004	VA20B4299-005	VA20B4299-006	VA20B4299-007	L2345249-1	L2345249-3	L2345249-5		
Parameters	Units	MDL										
<b>Physiochemical Parameters</b>												
Moisture	%	0.25	11.0	9.95	12.8	11.4	11.3	14.9	15.0	13.40	12.00	11.50
pH	unitless	0.10	na	na	na	na	na	na	na	na	ns	ns
<b>Plant Available Nutrients</b>												
Available Nitrate-N	µg/g	1.00	<1.0	na	<1.0	na	<1.0	na	na	<1.0	<1.0	<1.0
Available Phosphate-P	µg/g	2.00	2.6	na	4.7	na	<2.0	na	na	3.1	2.2	<2.0
Available Potassium	µg/g	20.0	67	na	63	na	70	na	na	57	76	89
Available Sulfate-S	µg/g	4.00	7.2	na	3.6	na	7.6	na	na	29.1	30.7	26.2
<b>Anions and Nutrients (Leachable)</b>												
Ammonia (as N)	µg/g	0.50	na	na	na	na	na	na	na	<5.0	528	8830
Total Nitrogen	µg/g	0.02	na	na	na	na	na	na	na	na	na	na
Total Dissolved Phosphate	µg/g	5.00	na	na	na	na	na	na	na	10.4	20.3	12
<b>Taxonomy (Soil)</b>												
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	27000	20500	na	na	56000	na	na	13100000	4400000	27600000
<b>Organic / Inorganic Carbon (Soil)</b>												
Total Organic Carbon	%	0.0500	1.34	na	0.324	na	0.477	na	na	0.317	0.265	0.268

**Notes:**

- MDL = Method Detection Limit
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit
- CFU/g = Colony forming unit per gram

**Table 8: Soil Amendments**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov - 20

APEC/Issue			Soil Treatment Area - 2 (August 2020)												
Sample Station	SP20-02-01	SP20-02-02	SP20-02-03	SP20-02-04	SP20-02-05	SP20-02-06	SP20-02-07	SP20-02-08	SP20-02-09	SP20-02-10	SP20-02-11	SP20-02-12			
Sample ID	SP20-02-01	SP20-02-02	SP20-02-03	SP20-02-04	SP20-02-05	SP20-02-06	SP20-02-07	SP20-02-08	SP20-02-09	SP20-02-10	SP20-02-11	SP20-02-12	DUP SP20-02-12 (SP20-02-62)		
Sample Depth (mbg)	-	-	-	-	-	-	-	-	-	-	-	-	-		
Sample Collection Date	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020		
Lab ID #	VA20B4301-001	VA20B4301-002	VA20B4301-003	VA20B4301-004	VA20B4301-005	VA20B4301-006	VA20B4301-007	VA20B4301-008	VA20B4301-009	VA20B4301-010	VA20B4301-011	VA20B4301-012	VA20B4301-013		
Parameters	Units	MDL													
<b>Physiochemical Parameters</b>															
Moisture	%	0.25	12.3	15.1	12.6	12.9	17.2	13.9	10.5	11.0	9.63	14.1	10.4	12.6	10.8
pH	unitless	0.10	na	na	na	na	na	na	na	na	na	na	na	na	na
<b>Plant Available Nutrients</b>															
Available Nitrate-N	µg/g	1.00	na	<1.0	na	15.8	na	<1.0	na	5.0	na	4.2	na	<1.0	na
Available Phosphate-P	µg/g	2.00	na	<2.0	na	4.2	na	<2.0	na	5.0	na	3.1	na	<2.0	na
Available Potassium	µg/g	20.0	na	82	na	84	na	96	na	96	na	78	na	82	na
Available Sulfate-S	µg/g	4.00	na	11.0	na	20.6	na	8.7	na	9.5	na	9.0	na	17.8	na
<b>Anions and Nutrients (Leachable)</b>															
Ammonia (as N)	µg/g	0.50	na	na	na	na	na	na	na	na	na	na	na	na	na
Total Nitrogen	µg/g	0.02	na	na	na	na	na	na	na	na	na	na	na	na	na
Total Dissolved Phosphate	µg/g	5.00	na	na	na	na	na	na	na	na	na	na	na	na	na
<b>Taxonomy (Soil)</b>															
Hydrocarbon Utilizing Bacteria (HUB)	CFU/g	5.0000	na	56000	na	1000000	na	34000	na	64000	na	99500	na	6600	na
<b>Organic / Inorganic Carbon (Soil)</b>															
Total Organic Carbon	%	0.0500	na	0.498	na	0.387	na	0.377	na	0.220	na	0.479	na	0.186	na

**Notes:**

- MDL = Method Detection Limit
- mbg = metres below grade
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit
- CFU/g = Colony forming unit per gram

**Table 9: Groundwater Analytical Results – PHCs**

Johnny Mountain Mine Reclamation Project

SnipGold Corporation

VE52655D

Johnny Mountain Mine

Nov-20

APEC/AEC/Issue			APEC 1 / AEC 1 : Mill / 10 Level Portal										
Sample Station			MW17-1		MW17-2		MW17-3	MW17-4					
Sample ID			MW17-1A	MW17-1B	MW17-2A	MW17-2B	MW17-3	MW17-4A	BH17-04A	MW17-4B	MW17-4B DUP A	MW17-4B	MW17-4B "DUP 1"
Sample Collection Date			19-Jul-17	19-Jul-17	19-Jul-17	19-Jul-17	19-Jul-17	19-Jul-17	23-Aug-2020	19-Jul-17	19-Jul-17	22-Oct-17	23-Oct-17
Lab ID #			L1962977-1	L1962977-2	L1962977-3	L1962977-4	L1962977-5	L1962977-6	VA20B3890-001	L1962977-7	L1962977-8	L2014860-1	L2014860-4
Sample Analysis Date													
Parameters	Units	MDL											
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Noticable Odour	-	-	no	no	no	no	no	no	no	no	no	no	no
Conductivity	µs/cm	2	455	285	209	487	329	387	180.2	366	366	404	408
<b>Petroleum Hydrocarbons (PHCs)</b>													
Benzene	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	na
Ethylbenzene	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	na
Toluene	µg/L	0.45	<0.45	<0.45	0.86	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	na
ortho-Xylene	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	na
meta- & para-Xylene	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	na
Xylenes (Total)	µg/L	0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	na
VHw6-10	µg/L	100	<100	<100	<100	<100	<100	<100	na	<100	<100	na	na
VPHw	µg/L	100	<100	<100	<100	<100	<100	<100	na	<100	<100	na	na
Methyl-tert-butyl ether [MTBE]	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	na
Styrene	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	na
EPHw10-19	µg/L	250	<250	<250	<250	<250	<250	<250	<250	1870	2060	1560	1530
EPH19-32	µg/L	250	<250	<250	<250	<250	<250	<250	<250	330	330	300	<250
LEPHw	µg/L	250	<250	<250	<250	<250	<250	<250	<250	1870	2060	1560	1530
HEPH	µg/L	250	<250	<250	<250	<250	<250	<250	<250	330	330	300	<250

**Notes:**

- MDL = Method detection limit
- EPHw<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPHw = light extractable petroleum hydrocarbons in water
- HEPH = heavy extractable petroleum hydrocarbons
- VPHw = volatile petroleum hydrocarbons in water
- VHw(6-10) = volatile hydrocarbons in water
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit

**Table 9: Groundwater Analytical Results – PHCs**

Johnny Mountain Mine Reclamation Project

SnipGold Corporation

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Johnny Mountain Mine

Nov-20

APEC/AEC/Issue			APEC 1 / AEC 1: Mill / 10 Level Portal														
			Sample Station			MW17-4		MW17-5		MW17-6				MW17-7			
Sample ID			MW17-4B	MW17-4B	BH17-04B	MW17-5A	MW17-5B	MW17-6A	BH17-06A	MW17-6B	BH17-06B	MW17-7A	BH17-07A	MW17-7B	BH17-07B	MW17-8A	MW17-8B
Sample Collection Date			02-Jul-18	17-Jul-19	23-Aug-2020	19-Jul-17	19-Jul-17	19-Jul-17	23-Aug-2020	19-Jul-17	23-Aug-2020	19-Jul-17	23-Aug-2020	19-Jul-17	23-Aug-2020	24-Jul-17	24-Jul-17
Lab ID #			L2123781-7	L2317077-3	VA20B3890-002	L1962977-9	L1962977-10	L1962977-11	VA20B3890-004	L1962977-12	VA20B3890-005	L1962977-13	VA20B3890-006	L1962977-14	VA20B3890-007	L1966041-16	L1966041-17
Sample Analysis Date																	
Parameters	Units	MDL															
<b>Field Screening</b>																	
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Noticable Odour	-	-	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no
Conductivity	µs/cm	2	288	781	317.1	456	1307	497	176.6	1189	320.5	267	191.5	545	453.9	207	345
<b>Petroleum Hydrocarbons (PHCs)</b>																	
Benzene	µg/L	0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Ethylbenzene	µg/L	0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Toluene	µg/L	0.45	na	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45
ortho-Xylene	µg/L	0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
meta- & para-Xylene	µg/L	0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Xylenes (Total)	µg/L	0.75	na	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75
VHw6-10	µg/L	100	<100	<100	na	<100	<100	<100	na	<100	na	<100	na	<100	na	<100	<100
VPHw	µg/L	100	<100	<100	na	<100	<100	<100	na	<100	na	<100	na	<100	na	<100	<100
Methyl-tert-butyl ether [MTBE]	µg/L	0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Styrene	µg/L	0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
EPHw10-19	µg/L	250	1730	1030	600	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250
EPH19-32	µg/L	250	420	270	300	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	1210	<250
LEPHw	µg/L	250	1730	1030	600	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250
HEPH	µg/L	250	420	270	300	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	1210	<250

**Notes:**

- MDL = Method detection limit
- EPHw<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPHw = light extractable petroleum hydrocarbons in water
- HEPH = heavy extractable petroleum hydrocarbons
- VPHw = volatile petroleum hydrocarbons in water
- VHw(6-10) = volatile hydrocarbons in water
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit

**Table 9: Groundwater Analytical Results – PHCs**

Johnny Mountain Mine Reclamation Project

SnipGold Corporation

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Johnny Mountain Mine

Nov-20

APEC/AEC/Issue			APEC 1: Mill / 10 Level Portal				APEC 10: Burial Site 1				APEC9 / AEC 5: Main Landfill				
Sample Station			MW17-8				MW17-9				MW17-22				
Sample ID			MW17-8B DUP C				MW17-9A	MW17-9A	MW17-9B	MW17-9BFD	MW17-9B	MW17-22A	MW17-22A	MW17-22A	MW17-22A
Sample Collection Date			24-Jul-17				28-Jul-17	2-Jul-18	24-Jul-17	2-Jul-18	2-Jul-18	28-Jul-17	22-Oct-17	9-Jul-18	11-Sep-18
Lab ID #			L1966041-18				L1966936-1	L2123781-6	L1966041-19	L2123781-10	L2123781-5	L1966936-2	L2014860-3	L2127140-1	L2162703-1
Sample Analysis Date															
Parameters	Units	MDL													
<b>Field Screening</b>															
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	
Noticable Odour	-	-	no	no	no	no	no	no	no	no	no	no	no	no	
Conductivity	µs/cm	2	345	755	515	473	250.8	250.8	210	322	198.6	320.8			
<b>Petroleum Hydrocarbons (PHCs)</b>															
Benzene	µg/L	0.50	<0.50	<0.50	na	<0.50	na	na	na	na	na	na	na	na	
Ethylbenzene	µg/L	0.50	<0.50	<0.50	na	<0.50	na	na	na	na	na	na	na	na	
Toluene	µg/L	0.45	<0.45	<0.45	na	<0.45	na	na	na	na	na	na	na	na	
ortho-Xylene	µg/L	0.50	<0.50	<0.50	na	<0.50	na	na	na	na	na	na	na	na	
meta- & para-Xylene	µg/L	0.50	<0.50	<0.50	na	<0.50	na	na	na	na	na	na	na	na	
Xylenes (Total)	µg/L	0.75	<0.75	<0.75	na	<0.75	na	na	na	na	na	na	na	na	
VHw6-10	µg/L	100	<100	300	<100	<100	<100	<100	<100	2260	na	730	360		
VPHw	µg/L	100	<100	300	<100	<100	<100	<100	<100	900	na	330	130		
Methyl-tert-butyl ether [MTBE]	µg/L	0.50	<0.50	<0.50	na	<0.50	na	na	na	na	na	na	na	na	
Styrene	µg/L	0.50	<0.50	<0.50	na	<0.50	na	na	na	na	na	na	na	na	
EPHw10-19	µg/L	250	<250	<250	<250	<250	<250	<250	<250	870	570	370	<250		
EPH19-32	µg/L	250	<250	520	<250	<250	<250	<250	<250	<250	<250	<250	<250		
LEPHw	µg/L	250	<250	<250	<250	<250	<250	<250	<250	790	520	340	<250		
HEPH	µg/L	250	<250	520	<250	<250	<250	<250	<250	<250	<250	<250	<250		

**Notes:**

- MDL = Method detection limit
- EPHw<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPHw = light extractable petroleum hydrocarbons in water
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- VPHw = volatile petroleum hydrocarbons in water
- VHw(6-10) = volatile hydrocarbons in water
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit

**Table 9: Groundwater Analytical Results – PHCs**

Johnny Mountain Mine Reclamation Project

SnipGold Corporation

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Johnny Mountain Mine

Nov-20

APEC/AEC/Issue			AEC 5: Main Landfill					APEC 6: Septic Field		APEC 2 / AEC 2: Tank Farm Area		
Sample Station			MW17-22					MW17-10		MW17-13		
Sample ID			MW17-22A	MW17-22B	MW17-22B DUP A	MW17-22B	MW17-22B	MW17-22B	MW17-10A	MW17-10B	MW17-13	MW17-13
Sample Collection Date			17-Jul-19	23-Jul-17	23-Jul-17	9-Jul-18	10-Sep-18	17-Jul-19	24-Jul-17	24-Jul-17	20-Jul-17	24-Oct-17
Lab ID #			L2312976-1	L1966041-7	L1966041-8	L2127140-2	L2162703-2	L2312976-2	L1966041-20	L1966041-21	L1962977-17	L2014860-2
Sample Analysis Date												
Parameters	Units	MDL										
<b>Field Screening</b>												
Sample Headspace Vapour Concentration	ppmv	5.00	na	nm	nm	nm	nm	na	nm	nm	nm	nm
Noticable Odour	-	-	na	no	no	no	no	na	no	no	no	no
Conductivity	µs/cm	2	na	63	63	42.3	77	na	362	349	275	303
<b>Petroleum Hydrocarbons (PHCs)</b>												
Benzene	µg/L	0.50	<0.50	na	na	na	na	<0.50	<0.50	<0.50	<0.50	<0.5
Ethylbenzene	µg/L	0.50	6.74	na	na	na	na	<0.50	<0.50	<0.50	0.76	1.84
Toluene	µg/L	0.45	1.91	na	na	na	na	<0.45	0.52	<0.45	<0.45	<0.45
ortho-Xylene	µg/L	0.50	<0.50	na	na	na	na	<0.50	<0.50	<0.50	<0.50	2.21
meta- & para-Xylene	µg/L	0.50	8.51	na	na	na	na	<0.50	<0.50	<0.50	<0.50	3.44
Xylenes (Total)	µg/L	0.75	8.51	na	na	na	na	<0.75	<0.75	<0.75	<0.75	5.64
VHw6-10	µg/L	100	na	<100	<100	<100	<100		<100	<100	<100	na
VPHw	µg/L	100	na	<100	<100	<100	<100		<100	<100	<100	na
Methyl-tert-butyl ether [MTBE]	µg/L	0.50	<0.50	na	na	na	na	<0.50	<0.50	<0.50	<0.50	<0.5
Styrene	µg/L	0.50	<0.50	na	na	na	na	<0.50	<0.50	<0.50	<0.50	<0.5
EPHw10-19	µg/L	250	<250	<250	<250	<250	<250	<250	<250	<250	420	370
EPH19-32	µg/L	250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250
LEPHw	µg/L	250	<250	<250	<250	<250	<250	<250	<250	<250	400	350
HEPH	µg/L	250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250

**Notes:**

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- EPHw<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
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- VPHw = volatile petroleum hydrocarbons in water
- VHw(6-10) = volatile hydrocarbons in water
- na = not analyzed
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- no = none observed
- ns = no applicable standard
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**Table 9: Groundwater Analytical Results – PHCs**

Johnny Mountain Mine Reclamation Project

SnipGold Corporation

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Johnny Mountain Mine

Nov-20

APEC/AEC/Issue			APEC 2 / AEC 2: Tank Farm Area		APEC 12: Burial Site 2				APEC 14 /AEC 2: Fuel Lines									
Sample Station			MW17-13	MW17-16	MW17-14				MW17-12				MW17-17				MW17-17	
Sample ID			MW17-13	MW17-16	MW17-14A	MW17-14A	MW17-14B	MW17-14B	MW17-12A	MW17-12A	MW17-12B	MW17-12B	MW17-12B-DUP (MW17-62B)	MW17-17A	MW17-17A	MW17-17B	MW17-17B	MW17-17B
Sample Collection Date			2-Jul-18	20-Jul-17	24-Jul-17	1-Jul-18	24-Jul-17	1-Jul-18	20-Jul-17	24-Aug-20	20-Jul-17	24-Aug-20	24-Aug-20	20-Jul-17	24-Aug-20	20-Jul-17	1-Jul-18	24-Aug-20
Lab ID #			L2123781-9	L1962977-20	L1966041-24	L2123781-3	L1966041-25	L2123781-4	L1962977-15	VA20B3891-001	L1962977-16	VA20B3891-002	VA20B3891-009	L1962977-21	VA20B3891-003	L1962977-22	L2123781-2	-
Sample Analysis Date																		
Parameters	Units	MDL																
<b>Field Screening</b>																		
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Noticable Odour	-	-	no	no	no	no	no	no	no	rotten egg	no	no	no	no	no	no	no	no
Conductivity	µs/cm	2	179.4	170	264	184.4	192	108.6	302	158.1	276	291.8	291.8	379	nm	194	115.8	-
<b>Petroleum Hydrocarbons (PHCs)</b>																		
Benzene	µg/L	0.50	na	<0.50	<0.50	na	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	na
Ethylbenzene	µg/L	0.50	na	<0.50	<0.50	na	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	na
Toluene	µg/L	0.45	na	<0.45	<0.45	na	<0.45	na	<0.45	<0.50	<0.45	<0.50	<0.50	0.59	<0.50	<0.45	na	na
ortho-Xylene	µg/L	0.50	na	<0.50	<0.50	na	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	na
meta- & para-Xylene	µg/L	0.50	na	<0.50	<0.50	na	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	na
Xylenes (Total)	µg/L	0.75	na	<0.75	<0.75	na	<0.75	na	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	na	na
VHw6-10	µg/L	100	120	<100	<100	<100	<100	<100	<100	na	<100	na	na	<100	<100	<100	<100	na
VPHw	µg/L	100	110	<100	<100	<100	<100	<100	<100	na	<100	na	na	<100	<100	<100	<100	na
Methyl-tert-butyl ether [MTBE]	µg/L	0.50	na	<0.50	<0.50	na	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	na
Styrene	µg/L	0.50	na	<0.50	<0.50	na	<0.50	na	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	na	na
EPHw10-19	µg/L	250	800	<250	<250	<250	<250	<250	<250	530	<250	<250	<250	<250	<250	<250	<250	na
EPH19-32	µg/L	250	<250	<250	<250	260	<250	<250	<250	280	<250	<250	<250	<250	<250	<250	<250	na
LEPHw	µg/L	250	760	<250	<250	<250	<250	<250	<250	530	<250	<250	<250	<250	<250	<250	<250	na
HEPH	µg/L	250	<250	<250	<250	260	<250	<250	<250	280	<250	<250	<250	<250	<250	<250	<250	na

**Notes:**

- MDL = Method detection limit
- EPHw<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPHw = light extractable petroleum hydrocarbons in water
- HEPH = heavy extractable petroleum hydrocarbons
- VPHw = volatile petroleum hydrocarbons in water
- VHw(6-10) = volatile hydrocarbons in water
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit

**Table 9: Groundwater Analytical Results – PHCs**

Johnny Mountain Mine Reclamation Project

SnipGold Corporation

VE52655D

Johnny Mountain Mine

Nov-20

APEC/AEC/Issue			Tailings Impoundment Downstream										
			Sample Station					Sample Station					
Sample ID			MW17-20A	MW17-20A	MW17-20A	MW17-20B	MW17-20B	MW17-20B	MW17-23A	MW17-23A	MW17-23B	MW17-23A	MW17-23A
Sample Collection Date			23-Jul-17	21-Oct-17	25-Aug-2020	23-Jul-17	21-Oct-17	25-Aug-2020	23-Jul-17	22-Oct-17	23-Jul-17	16-Jul-19	28-Aug-2020
Lab ID #			L1966041-3	L2014861-1	VA20B3887-005	L1966041-4	L2014861-2	VA20B3887-006	L1966041-12	L2014861-3	L1966041-13	L2313901-4	VA20B4083-003
Sample Analysis Date													
Parameters	Units	MDL											
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Noticable Odour	-	-	no	no	no	no	no	no	no	no	no	no	no
Conductivity	µs/cm	2	273	78	104.9	278	58	27.3	257	213	157	229	144.8
<b>Petroleum Hydrocarbons (PHCs)</b>													
Benzene	µg/L	0.50	17.1	3.41	<0.50	2.6	<0.5	na	<0.50	<0.5	<0.50	<0.50	<0.50
Ethylbenzene	µg/L	0.50	64.4	23.2	<0.50	65.5	1.8	na	<0.50	<0.5	<0.50	<0.50	<0.50
Toluene	µg/L	0.45	263	25.2	<0.50	112	2.51	na	21.3	7.34	<0.45	<0.45	<0.50
ortho-Xylene	µg/L	0.50	128	41.7	<0.50	123	3.3	na	<0.50	<0.5	<0.50	<0.50	<0.50
meta- & para-Xylene	µg/L	0.50	304	93.7	<0.50	310	7.86	na	<0.50	<0.5	<0.50	<0.50	<0.50
Xylenes (Total)	µg/L	0.75	433	135	<0.75	433	11.2	na	<0.75	<0.75	<0.75	<0.75	<0.75
VHw6-10	µg/L	100	1080	na	na	1180	na	na	<100	na	<100	<100	na
VPHw	µg/L	100	300	na	na	560	na	na	<100	na	<100	<100	na
Methyl-tert-butyl ether [MTBE]	µg/L	0.50	<0.50	<0.5	<0.50	<0.50	<0.5	na	<0.50	<0.5	<0.50	<0.50	<0.50
Styrene	µg/L	0.50	<0.50	<0.5	<0.50	<0.50	<0.5	na	<0.50	<0.5	<0.50	<0.50	<0.50
EPHw10-19	µg/L	250	280	270	<250	430	<250	<250	<250	<250	<250	<250	<250
EPH19-32	µg/L	250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250
LEPHw	µg/L	250	270	270	<250	400	<250	<250	<250	<250	<250	<250	<250
HEPH	µg/L	250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250

**Notes:**

- MDL = Method detection limit
- EPHw<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPHw = light extractable petroleum hydrocarbons in water
- HEPH = heavy extractable petroleum hydrocarbons
- VPHw = volatile petroleum hydrocarbons in water
- VHw(6-10) = volatile hydrocarbons in water
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit



**Table 9: Groundwater Analytical Results – PHCs**

Johnny Mountain Mine Reclamation Project

SnipGold Corporation

VE52655D

Johnny Mountain Mine

Nov-20

APEC/AEC/Issue		Sky Creek Drainage Upstream	Sky Creek Drainage Upstream	APEC 9 / AEC 5 : Main Landfill								QA/QC				
Sample Station		MW17-21	MW17-21	MW17-22								FIELD BLANK				
Sample ID		MW17-21A	MW17-21B	MW17-22A	MW17-22A	MW17-22A DUP 1	MW17-22A	MW17-22B	MW17-22B DUP A	MW17-22B	MW17-22B	FIELD BLANK	-	MW17-4B "DUP 1"	MW17-22B DUP A	MW17-12B-DUP (MW17-62B)
Sample Collection Date		23-Jul-17	23-Jul-17	28-Jul-17	22-Oct-17	22-Oct-17	28-Aug-2020	23-Jul-17	23-Jul-17	28-Aug-2020	24-Oct-17	-	23-Oct-17	23-Jul-17	24-Aug-20	
Lab ID #		L1966041-5	L1966041-6	L1966936-2	L2014860-3	L2014860-4	VA20B4087-001	L1966041-7	L1966041-8	VA20B4087-002	L2014860-5	-	L2014860-4	L1966041-8	VA20B3891-009	
Sample Analysis Date												-				
Parameters	Units	MDL											Allowable RPD <sup>1</sup> (%)	Calculated RPD <sup>2</sup> (%)	Calculated RPD <sup>2</sup> (%)	Calculated RPD <sup>2</sup> (%)
<b>Field Screening</b>																
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	-	-	-	-
Noticable Odour	-	-	no	no	no	no	no	no	no	no	no	no	-	-	-	-
Conductivity	µs/cm	2	284	235	353	210	210	238.7	63	63	30.3	na	-	-	-	-
<b>Petroleum Hydrocarbons (PHCs)</b>																
Benzene	µg/L	0.50	<0.50	<0.50	5.46	2.57	<0.5	<0.5	<0.50	<0.50	<0.5	<0.5	20	-	-	-
Ethylbenzene	µg/L	0.50	1.11	<0.50	160	92.5	<0.5	2.14	0.74	0.51	<0.5	<0.5	20	-	-	-
Toluene	µg/L	0.45	2.75	<0.45	178	98.4	<0.45	<0.45	0.99	0.69	<0.45	<0.45	20	-	-	-
ortho-Xylene	µg/L	0.50	2.43	<0.50	363	238	<0.5	0.65	1.35	0.93	<0.50	<0.5	20	-	-	-
meta- & para-Xylene	µg/L	0.50	5.39	<0.50	655	417	<0.5	<0.50	2.17	1.45	<0.50	<0.5	20	-	-	-
Xylenes (Total)	µg/L	0.75	7.82	<0.75	1020	654	<0.75	<0.75	3.52	2.39	<0.75	<0.75	20	-	-	-
VHw6-10	µg/L	100	<100	<100	2260	na	na	na	<100	<100	na	na	20	-	-	-
VPHw	µg/L	100	<100	<100	900	na	na	na	<100	<100	na	na	20	-	-	-
Methyl-tert-butyl ether [MTBE]	µg/L	0.50	<0.50	<0.50	<0.50	<0.5	<0.5	<0.50	<0.50	<0.50	<0.50	<0.5	20	-	-	-
Styrene	µg/L	0.50	<0.50	<0.50	<0.50	<0.5	<0.5	<0.5	<0.50	<0.50	<0.5	<0.5	20	-	-	-
EPHw10-19	µg/L	250	<250	<250	870	570	1530	<250	<250	<250	<250	<250	20	1.94	-	-
EPH19-32	µg/L	250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	20	-	-	-
LEPHw	µg/L	250	<250	<250	790	520	1530	<250	<250	<250	<250	<250	20	1.94	-	-
HEPH	µg/L	250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	20	-	-	-

**Notes:**

- MDL = Method detection limit
- EPHw<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPHw = light extractable petroleum hydrocarbons in water
- HEPH = heavy extractable petroleum hydrocarbons
- VPHw = volatile petroleum hydrocarbons in water
- VHw(6-10) = volatile hydrocarbons in water
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit

**QA/QC**

1. Allowable RPDs as identified in BC Environmental Laboratory Manual (February 2016), Section A, Table 2
2. RPDs calculated only where both values are greater than 5 times the method detection limit

-	= not calculated
RPD	= Representative percent difference
1	= calculated RPD exceeds allowable RPD



**Table 10: Groundwater Analytical Results – PAHs**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

Parameters	APEC/Issue		APEC 1: Mill / 10 Level Portal												
	Sample Station		MW17-1		MW17-2		MW17-3			MW17-4					
	Sample ID		MW17-1A	MW17-1B	MW17-2A	MW17-2B	MW17-3	MW17-4A	MW17-4A	BH17-04A	MW17-4B	MW17-4B DUP A	MW17-4B	MW17-4B "DUP 1"	
	Sample Collection Date		19-Jul-17	19-Jul-17	19-Jul-17	19-Jul-17	19-Jul-17	19-Jul-17	02-Jul-18	23-Aug-2020	19-Jul-17	19-Jul-17	23-Oct-17	23-Oct-17	
	Units	MDL	Lab ID #	L1962977-1	L1962977-2	L1962977-3	L1962977-4	L1962977-5	L1962977-6	L2123781-8	VA20B3890-001	L1962977-7	L1962977-8	L2014860-1	L2014860-4
<b>Field Screening</b>															
Sample Headspace Vapour Concentration	ppmv	5.00		nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Noticable Odour	-	-		no	no	no	no	no	no	no	no	no	no	no	no
Conductivity	µs/cm	1		455	285	209	487	329	287	147.1	180.2	366	366	408	408
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>															
Acenaphthene	µg/L	0.01		<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.010	<0.010	<0.20	<0.20	<0.05	<0.05
Acenaphthylene	µg/L	0.01		<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.010	<0.010	<0.20	<0.20	<0.05	<0.05
Acridine	µg/L	0.01		<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.010	<0.010	<0.30	<0.10	<0.05	<0.05
Anthracene	µg/L	0.01		<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.010	<0.010	<0.10	<0.05	<0.05	<0.05
Benz(a)anthracene	µg/L	0.01		<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/L	0.005		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.005	<0.0050	<0.0050	<0.005	<0.005	<0.005	<0.005
Benzo(b+j)fluoranthenes	µg/L	0.01		<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05
Benzo(b+j+k)fluoranthene	µg/L	0.015		na	na	na	na	na	na	<0.015	<0.015	na	na	na	na
Benzo(g,h,i)perylene	µg/L	0.01		<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/L	0.01		<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05
Chrysene	µg/L	0.01		<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	µg/L	0.005		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.005	<0.0050	<0.0050	<0.005	<0.005	<0.005	<0.005
Fluoranthene	µg/L	0.01		<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05
Fluorene	µg/L	0.01		<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.010	0.014	<0.20	<0.06	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	µg/L	0.01		<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05
Methylnaphthalene, 1-	µg/L	0.01		na	na	na	na	na	na	<0.050	0.036	na	na	na	na
Methylnaphthalene, 2-	µg/L	0.01		na	na	na	na	na	na	<0.050	0.04	na	na	na	na
Naphthalene	µg/L	0.05		<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.050	<0.050	<0.40	<0.40	<0.05	<0.05
Phenanthrene	µg/L	0.02		<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.020	<0.020	<0.20	<0.05	<0.05	<0.05
Pyrene	µg/L	0.01		<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.010	<0.010	<0.10	<0.20	0.062	0.057
Quinoline	µg/L	0.05		<0.050	<0.050	<0.050	<0.050	<0.050	<0.05	<0.050	<0.050	<3.00	<3.00	<0.05	<0.05

**Notes:**

- MDL = Method detection limit
- nm = not measured
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit



**Table 10: Groundwater Analytical Results – PAHs**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

APEC/Issue			APEC 1: Mill / 10 Level Portal																
			MW17-4			MW17-5		MW17-6				MW17-7				MW17-8			
Sample Station	Sample ID	Sample Collection Date	Lab ID #	MW17-4B	MW17-4B	BH17-04B	MW17-5A	MW17-5B	MW17-6A	BH17-06A	MW17-6B	BH17-06B	MW17-7A	BH17-07A	MW17-7B	BH17-07B	MW17-8A	MW17-8B	MW17-8B "DUP C"
Parameters	Units	MDL																	
<b>Field Screening</b>																			
Sample Headspace Vapour Concentration	ppmv	5.00		nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Noticable Odour	-	-		no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no
Conductivity	µs/cm	1		288	781	317.1	456	1307	497	176.6	1189	320.5	267	191.5	545	453.9	207	345	345
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>																			
Acenaphthene	µg/L	0.01		<0.20	<0.30	<0.040	<0.05	<0.05	<0.05	<0.010	<0.05	0.061	<0.05	<0.010	<0.05	<0.010	<0.05	<0.05	<0.05
Acenaphthylene	µg/L	0.01		<0.20	<0.20	<0.030	<0.05	<0.05	<0.05	<0.010	<0.05	<0.010	<0.05	<0.010	<0.05	<0.010	<0.05	<0.05	<0.05
Acridine	µg/L	0.01		<0.20	<0.20	<0.080	<0.05	<0.05	<0.05	<0.040	<0.05	<0.013	<0.05	<0.010	<0.05	<0.010	<0.05	<0.05	<0.05
Anthracene	µg/L	0.01		<0.080	<0.040	<0.020	<0.05	<0.05	<0.05	<0.010	<0.05	<0.010	<0.05	<0.010	<0.05	<0.010	<0.05	<0.05	<0.05
Benz(a)anthracene	µg/L	0.01		<0.080	<0.010	<0.010	<0.05	<0.05	<0.05	<0.010	<0.05	<0.010	<0.05	<0.010	<0.05	<0.010	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/L	0.005		<0.0050	<0.0050	<0.0050	<0.005	<0.005	<0.005	<0.0050	<0.005	<0.0050	<0.005	<0.0050	<0.005	<0.0050	<0.005	<0.005	<0.005
Benzo(b+j)fluoranthenes	µg/L	0.01		<0.010	<0.010	<0.010	<0.05	<0.05	<0.05	<0.010	<0.05	<0.010	<0.05	<0.010	<0.05	<0.010	<0.05	<0.05	<0.05
Benzo(b+j+k)fluoranthene	µg/L	0.015		<0.015	<0.015	<0.015	na	na	na	<0.015	na	<0.015	na	<0.015	na	<0.015	na	na	na
Benzo(g,h,i)perylene	µg/L	0.01		<0.010	<0.010	<0.010	<0.05	<0.05	<0.05	<0.010	<0.05	<0.010	<0.05	<0.010	<0.05	<0.010	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/L	0.01		<0.010	<0.010	<0.010	<0.05	<0.05	<0.05	<0.010	<0.05	<0.010	<0.05	<0.010	<0.05	<0.010	<0.05	<0.05	<0.05
Chrysene	µg/L	0.01		<0.080	<0.010	<0.010	<0.05	<0.05	<0.05	<0.010	<0.05	<0.010	<0.05	<0.010	<0.05	<0.010	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	µg/L	0.005		<0.0090	<0.0050	<0.0050	<0.005	<0.005	<0.005	<0.0050	<0.005	<0.0050	<0.005	<0.0050	<0.005	<0.0050	<0.005	<0.005	<0.005
Fluoranthene	µg/L	0.01		<0.080	<0.020	<0.010	<0.05	<0.05	<0.05	<0.010	<0.05	<0.010	<0.05	<0.010	<0.05	<0.010	<0.05	<0.05	<0.05
Fluorene	µg/L	0.01		<0.20	0.207	0.024	<0.05	<0.05	<0.05	<0.010	<0.05	0.046	<0.05	0.01	<0.05	<0.010	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	µg/L	0.01		<0.020	<0.010	<0.010	<0.05	<0.05	<0.05	<0.010	<0.05	<0.010	<0.05	<0.010	<0.05	<0.010	<0.05	<0.05	<0.05
Methylnaphthalene, 1-	µg/L	0.01		<2.0	2.68	0.205	na	na	na	<0.010	na	0.084	na	<0.010	na	<0.010	na	na	na
Methylnaphthalene, 2-	µg/L	0.01		<0.80	2.99	0.217	na	na	na	<0.010	na	0.056	na	<0.010	na	<0.010	na	na	na
Naphthalene	µg/L	0.05		<0.50	<0.50	<0.050	<0.05	<0.05	<0.05	<0.050	<0.05	<0.050	<0.05	<0.050	<0.05	<0.050	0.093	<0.05	<0.05
Phenanthrene	µg/L	0.02		<0.16	0.23	0.024	<0.05	<0.05	<0.05	<0.020	<0.05	<0.020	<0.05	<0.020	<0.05	<0.020	<0.05	<0.05	<0.05
Pyrene	µg/L	0.01		<0.080	0.058	0.034	<0.05	<0.05	<0.05	<0.010	<0.05	<0.010	<0.05	<0.010	<0.05	<0.010	<0.05	<0.05	<0.05
Quinoline	µg/L	0.05		<0.40	<3.0	<0.600	<0.05	<0.05	<0.05	<0.050	<0.05	<0.050	<0.05	<0.050	<0.05	<0.050	<0.05	<0.05	<0.05

**Notes:**

- MDL = Method detection limit
- nm = not measured
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit

**Table 10: Groundwater Analytical Results – PAHs**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

			AEC 5: Main Landfill									
			MW17-22									
			MW17-22A	MW17-22A	MW17-22A	MW17-22A	MW17-22A	MW17-22B	MW17-22B DUP A	MW17-22B	MW17-22B	MW17-22B
			28-Jul-17	22-Oct-17	9-Jul-18	11-Sep-18	17-Jul-19	23-Jul-17	23-Jul-17	9-Jul-18	10-Sep-18	17-Jul-19
			L1966936-2	L2014860-3	L2127140-1	L2162703-1	L2312976-1	L1966041-7	L1966041-8	L2127140-2	L2162703-2	L2312976-2
Parameters	Units	MDL										
<b>Field Screening</b>												
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	na	nm	nm	nm	nm	na
Noticable Odour	-	-	no	no	no	no	na	no	no	no	no	na
Conductivity	µs/cm	1	210	322	198.6	320.8	na	63	63	42.3	77	na
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>												
Acenaphthene	µg/L	0.01	<0.05	<0.05	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010
Acenaphthylene	µg/L	0.01	<0.05	<0.05	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010
Acridine	µg/L	0.01	<0.05	<0.05	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010
Anthracene	µg/L	0.01	<0.05	<0.05	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010
Benz(a)anthracene	µg/L	0.01	<0.05	<0.05	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010
Benzo(a)pyrene	µg/L	0.005	<0.005	<0.005	<0.0050	<0.0050	<0.0050	<0.005	<0.005	<0.0050	<0.0050	<0.0050
Benzo(b+j)fluoranthenes	µg/L	0.01	<0.05	<0.05	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010
Benzo(b+j+k)fluoranthene	µg/L	0.015	na	na	<0.015	<0.015	<0.015	na	na	<0.015	<0.015	<0.015
Benzo(g,h,i)perylene	µg/L	0.01	<0.05	<0.05	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010
Benzo(k)fluoranthene	µg/L	0.01	<0.05	<0.05	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010
Chrysene	µg/L	0.01	<0.05	<0.05	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010
Dibenz(a,h)anthracene	µg/L	0.005	<0.005	<0.005	<0.0050	<0.0050	<0.0050	<0.005	<0.005	<0.0050	<0.0050	<0.0050
Fluoranthene	µg/L	0.01	<0.05	<0.05	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010
Fluorene	µg/L	0.01	<0.05	<0.05	<0.020	<0.030	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010
Indeno(1,2,3-c,d)pyrene	µg/L	0.01	<0.05	<0.05	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010
Methylnaphthalene, 1-	µg/L	0.01	na	na	5.11	2.36	1.63	na	na	<0.050	<0.050	<0.050
Methylnaphthalene, 2-	µg/L	0.01	na	na	8.91	4.14	3.18	na	na	<0.050	<0.050	<0.050
Naphthalene	µg/L	0.05	82.9	43.9	20.7	9.2	3.17	1.87	1.93	<0.050	<0.050	<0.050
Phenanthrene	µg/L	0.02	<0.05	<0.05	<0.020	<0.020	<0.020	<0.05	<0.05	<0.020	<0.020	<0.020
Pyrene	µg/L	0.01	<0.05	<0.05	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010
Quinoline	µg/L	0.05	<4.0	<0.05	<0.90	<0.502	<0.60	<0.40	<0.40	<0.050	<0.050	<0.050

**Notes:**

- MDL = Method detection limit
- nm = not measured
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit

**Table 10: Groundwater Analytical Results – PAHs**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

Parameters	APEC/Issue		AEC 2: Tank Farm / Fuel Lines													
	Sample Station	AEC 2: Tank Farm / Fuel Lines	MW17-13				MW17-16	MW17-12				MW17-17				
	Sample ID	MW17-13	MW17-13	MW17-13	MW17-16	MW17-12A	MW17-12A	MW17-12B	MW17-12B	MW17-12B-DUP (MW17-62B)	MW17-17A	MW17-17A	MW17-17A	MW17-17B	MW17-17B	
	Sample Collection Date	20-Jul-17	24-Oct-17	2-Jul-18	20-Jul-17	20-Jul-17	24-Aug-20	20-Jul-17	24-Aug-20	24-Aug-20	20-Jul-17	1-Jul-18	24-Aug-20	20-Jul-17	1-Jul-18	
	Lab ID #	L1962977-17	L2014860-2	L2123781-9	L1962977-20	L1962977-15	VA20B3891-001	L1962977-16	VA20B3891-002	VA20B3891-009	L1962977-21	L2123781-1	VA20B3891-003	L1962977-22	L2123781-2	
Units	MDL															
<b>Field Screening</b>																
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Noticable Odour	-	-	no	no	no	no	no	rotten egg	no	no	no	no	no	no	no	no
Conductivity	µs/cm	1	275	305	179.4	170	302	158.1	276	291.8	291.8	379	139.2	139.2	194	115.8
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>																
Acenaphthene	µg/L	0.01	0.531	0.43	0.872	<0.05	<0.05	<0.010	<0.05	0.011	<0.010	<0.05	<0.010	<0.012	<0.05	<0.010
Acenaphthylene	µg/L	0.01	<0.20	<0.05	<0.30	<0.05	<0.05	0.011	<0.05	<0.010	<0.010	<0.05	<0.010	<0.010	<0.05	<0.010
Acridine	µg/L	0.01	<0.05	<0.05	<0.080	<0.05	<0.05	0.025	<0.05	<0.010	<0.010	<0.05	<0.010	<0.017	<0.05	<0.010
Anthracene	µg/L	0.01	<0.05	<0.05	<0.080	<0.05	<0.05	<0.010	<0.05	<0.010	<0.010	<0.05	<0.010	<0.010	<0.05	<0.010
Benz(a)anthracene	µg/L	0.01	<0.05	<0.05	<0.080	<0.05	<0.05	<0.010	<0.05	<0.010	<0.010	<0.05	<0.010	<0.010	<0.05	<0.010
Benzo(a)pyrene	µg/L	0.005	<0.005	<0.005	<0.0050	<0.005	<0.005	<0.0050	<0.005	<0.0050	<0.0050	<0.005	<0.0050	<0.0050	<0.005	<0.0050
Benzo(b+j)fluoranthenes	µg/L	0.01	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.05	<0.010	<0.010	<0.05	<0.010	<0.010	<0.05	<0.010
Benzo(b+j+k)fluoranthene	µg/L	0.015	na	na	<0.015	na	na	<0.015	na	<0.015	<0.015	na	<0.015	<0.015	na	<0.015
Benzo(g,h,i)perylene	µg/L	0.01	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.05	<0.010	<0.010	<0.05	<0.010	<0.010	<0.05	<0.010
Benzo(k)fluoranthene	µg/L	0.01	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.05	<0.010	<0.010	<0.05	<0.010	<0.010	<0.05	<0.010
Chrysene	µg/L	0.01	<0.05	<0.05	<0.080	<0.05	<0.05	<0.010	<0.05	<0.010	<0.010	<0.05	<0.010	<0.010	<0.05	<0.010
Dibenz(a,h)anthracene	µg/L	0.005	<0.005	<0.005	<0.0050	<0.005	<0.005	<0.0050	<0.005	<0.0050	<0.0050	<0.005	<0.0050	<0.0050	<0.005	<0.0050
Fluoranthene	µg/L	0.01	<0.05	<0.05	<0.080	<0.05	<0.05	<0.010	<0.05	<0.010	<0.010	<0.05	<0.010	<0.010	<0.05	<0.010
Fluorene	µg/L	0.01	0.572	0.451	1.02	<0.05	<0.05	<0.010	<0.05	<0.010	<0.010	<0.05	<0.010	0.014	<0.05	<0.010
Indeno(1,2,3-c,d)pyrene	µg/L	0.01	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.05	<0.010	<0.010	<0.05	<0.010	<0.010	<0.05	<0.010
Methylnaphthalene, 1-	µg/L	0.01	na	na	28.4	na	na	0.024	na	0.026	<0.010	na	<0.050	0.116	na	<0.050
Methylnaphthalene, 2-	µg/L	0.01	na	na	15.7	na	na	0.04	na	<0.010	<0.010	na	<0.050	0.124	na	<0.050
Naphthalene	µg/L	0.05	19.6	14.9	35.1	<0.05	0.055	<0.050	<0.05	<0.050	<0.050	<0.10	<0.050	<0.050	<0.05	<0.050
Phenanthrene	µg/L	0.02	0.311	0.258	0.54	<0.05	<0.05	<0.020	<0.05	<0.020	<0.020	<0.05	<0.020	<0.020	<0.05	<0.020
Pyrene	µg/L	0.01	<0.05	<0.05	<0.080	<0.05	<0.05	0.035	<0.05	<0.010	<0.010	<0.05	<0.010	<0.010	<0.05	<0.010
Quinoline	µg/L	0.05	<1.0	<0.05	<2.0	<0.05	<0.05	<0.050	<0.05	<0.050	<0.050	<0.05	<0.050	<0.050	<0.05	<0.050

**Notes:**

- MDL = Method detection limit
- nm = not measured
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit

**Table 10: Groundwater Analytical Results – PAHs**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

Parameters	APEC/Issue		Tailings Impoundment Downstream			Tailings Impoundment Downstream							APEC 6: Septic Field		APEC 10: Burial Site 1				
	Sample Station	MDL	MW17-20			MW17-20			MW17-23				MW17-10		MW17-9				
	Sample ID	MDL	MW17-20A	MW17-20A	MW17-20A	MW17-20B	MW17-20B	MW17-20B	MW17-23A	MW17-23A	MW17-23A	MW17-23A	MW17-23B	MW17-10A	MW17-10B	MW17-9A	MW17-9A	MW17-9B	
	Sample Collection Date	MDL	23-Jul-17	21-Oct-17	25-Aug-2020	23-Jul-17	21-Oct-17	25-Aug-2020	23-Jul-17	22-Oct-17	16-Jul-19	28-Aug-2020	23-Jul-17	24-Jul-17	24-Jul-17	28-Jul-17	2-Jul-18	24-Jul-17	
Units	MDL	Lab ID #	L1966041-3	L2014861-1	VA20B3887-005	L1966041-4	L2014861-2	VA20B3887-006	L1966041-12	L2014861-3	L2313901-4	VA20B4083-003	L1966041-13	L1966041-20	L1966041-21	L1966936-1	L2123781-6	L1966041-19	
<b>Field Screening</b>																			
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	
Noticable Odour	-	-	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	
Conductivity	µs/cm	1	273	278	104.9	78	58.2	27.3	257	213	229	144.8	157	362	349	755	515	473	
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>																			
Acenaphthene	µg/L	0.01	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.010	0.215	
Acenaphthylene	µg/L	0.01	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.010	<0.05	
Acridine	µg/L	0.01	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.010	<0.05	
Anthracene	µg/L	0.01	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.010	<0.05	
Benz(a)anthracene	µg/L	0.01	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.010	<0.05	
Benzo(a)pyrene	µg/L	0.005	<0.005	<0.005	<0.0050	<0.005	<0.005	<0.0050	<0.005	<0.005	<0.0050	<0.0050	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.005	
Benzo(b+j)fluoranthenes	µg/L	0.01	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.010	<0.05	
Benzo(b+j+k)fluoranthene	µg/L	0.015	na	na	<0.015	na	na	<0.015	na	na	<0.015	<0.015	na	na	na	na	<0.015	na	
Benzo(g,h,i)perylene	µg/L	0.01	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.010	<0.05	
Benzo(k)fluoranthene	µg/L	0.01	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.010	<0.05	
Chrysene	µg/L	0.01	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.010	<0.05	
Dibenz(a,h)anthracene	µg/L	0.005	<0.005	<0.005	<0.0050	<0.005	<0.005	<0.0050	<0.005	<0.005	<0.0050	<0.0050	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.005	
Fluoranthene	µg/L	0.01	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.010	<0.05	
Fluorene	µg/L	0.01	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	0.052	<0.010	0.259
Indeno(1,2,3-c,d)pyrene	µg/L	0.01	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.010	<0.05	
Methylnaphthalene, 1-	µg/L	0.01	na	na	0.112	na	na	<0.010	na	na	<0.050	<0.010	na	na	na	na	<0.050	na	
Methylnaphthalene, 2-	µg/L	0.01	na	na	0.182	na	na	<0.010	na	na	<0.050	<0.010	na	na	na	na	<0.050	na	
Naphthalene	µg/L	0.05	17	6.65	0.165	24.4	0.734	<0.050	<0.05	<0.05	<0.050	<0.050	<0.05	<0.05	<0.05	<0.20	<0.050	<0.30	
Phenanthrene	µg/L	0.02	<0.05	<0.05	<0.020	<0.05	<0.05	<0.020	<0.05	<0.05	<0.020	<0.020	<0.05	<0.05	<0.05	<0.05	<0.020	<0.05	
Pyrene	µg/L	0.01	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.05	<0.05	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.010	<0.05	
Quinoline	µg/L	0.05	<0.20	<0.05	<0.050	<0.40	<0.05	<0.050	<0.05	<0.05	<0.050	<0.050	<0.05	<0.05	<0.05	<0.10	<0.050	<0.40	

**Notes:**

- MDL = Method detection limit
- nm = not measured
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit

**Table 10: Groundwater Analytical Results – PAHs**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

Parameters	APEC/Issue		APEC 9: Main Landfill		APEC 10: Burial Site 1		APEC 12: Burial Site 2			
	Sample Station		MW17-22		MW17-9		MW17-14			
	Sample ID		MW17-22A	MW17-22B	MW17-9B	MW17-9BFD	MW17-14A	MW17-14A	MW17-14B	MW17-14B
	Sample Collection Date		28-Aug-2020	28-Aug-2020	2-Jul-18	2-Jul-18	24-Jul-17	1-Jul-18	24-Jul-17	1-Jul-18
	Lab ID #		VA20B4087-001	VA20B4087-002	L2123781-5	L2123781-10	L1966041-24	L2123781-3	L1966041-25	L2123781-4
	Units	MDL								
<b>Field Screening</b>										
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm
Noticable Odour	-	-	no	no	no	no	no	no	no	no
Conductivity	µs/cm	1	238.7	30.3	250.8	250.8	264	184.4	192	108.6
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>										
Acenaphthene	µg/L	0.01	<0.010	<0.010	0.113	0.093	<0.05	<0.010	<0.05	<0.010
Acenaphthylene	µg/L	0.01	<0.010	<0.010	<0.020	<0.020	<0.05	<0.010	<0.05	<0.010
Acridine	µg/L	0.01	<0.010	<0.010	<0.020	<0.010	<0.05	<0.010	<0.05	<0.010
Anthracene	µg/L	0.01	<0.010	<0.010	<0.040	<0.040	<0.05	<0.010	<0.05	<0.010
Benz(a)anthracene	µg/L	0.01	<0.010	<0.010	<0.010	<0.010	<0.05	<0.010	<0.05	<0.010
Benzo(a)pyrene	µg/L	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.005	<0.0050	<0.005	<0.0050
Benzo(b+j)fluoranthenes	µg/L	0.01	<0.010	<0.010	<0.010	<0.010	<0.05	<0.010	<0.05	<0.010
Benzo(b+j+k)fluoranthene	µg/L	0.015	<0.015	<0.015	<0.015	<0.015	na	<0.015	na	<0.015
Benzo(g,h,i)perylene	µg/L	0.01	<0.010	<0.010	<0.010	<0.010	<0.05	<0.010	<0.05	<0.010
Benzo(k)fluoranthene	µg/L	0.01	<0.010	<0.010	<0.010	<0.010	<0.05	<0.010	<0.05	<0.010
Chrysene	µg/L	0.01	<0.010	<0.010	<0.010	<0.010	<0.05	<0.010	<0.05	<0.010
Dibenz(a,h)anthracene	µg/L	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.005	<0.0050	<0.005	<0.0050
Fluoranthene	µg/L	0.01	<0.010	<0.010	<0.010	<0.010	<0.05	<0.010	<0.05	<0.010
Fluorene	µg/L	0.01	<0.010	<0.010	0.257	0.238	<0.05	<0.010	<0.05	<0.010
Indeno(1,2,3-c,d)pyrene	µg/L	0.01	<0.010	<0.010	<0.010	<0.010	<0.05	<0.010	<0.05	<0.010
Methylnaphthalene, 1-	µg/L	0.01	2.9	<0.010	<0.050	<0.050	na	<0.050	na	<0.050
Methylnaphthalene, 2-	µg/L	0.01	3.63	<0.010	<0.050	<0.050	na	<0.050	na	<0.050
Naphthalene	µg/L	0.05	4.27	<0.050	<0.070	<0.070	<0.05	<0.050	<0.05	<0.050
Phenanthrene	µg/L	0.02	<0.020	<0.020	0.028	0.024	<0.05	<0.020	<0.05	<0.020
Pyrene	µg/L	0.01	<0.010	<0.010	0.015	0.014	<0.05	<0.010	<0.05	<0.010
Quinoline	µg/L	0.05	<5.50	<0.050	<0.40	<0.40	<0.05	<0.050	<0.05	<0.050

**Notes:**

- MDL = Method detection limit
- nm = not measured
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit



**Table 10: Groundwater Analytical Results – PAHs**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

APEC/Issue			QA/QC						
Sample Station									
Parameters	Units	MDL	Allowable	Calculated RPD <sup>2</sup>	Calculated RPD <sup>2</sup> (%)	Calculated RPD <sup>2</sup>	Calculated RPD <sup>2</sup>	Calculated RPD <sup>2</sup>	Calculated RPD <sup>2</sup>
<b>Field Screening</b>									
Sample Headspace Vapour Concentration	ppmv	5.00	-	-	-	-	-	-	-
Noticable Odour	-	-	-	-	-	-	-	-	-
Conductivity	µs/cm	1	-	-	-	-	-	-	-
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>									
Acenaphthene	µg/L	0.01	20	-	-	-	-	19.42	-
Acenaphthylene	µg/L	0.01	20	-	-	-	-	-	-
Acridine	µg/L	0.01	20	-	-	-	-	-	-
Anthracene	µg/L	0.01	20	-	-	-	-	-	-
Benz(a)anthracene	µg/L	0.01	20	-	-	-	-	-	-
Benzo(a)pyrene	µg/L	0.005	20	-	-	-	-	-	-
Benzo(b+j)fluoranthenes	µg/L	0.01	20	-	-	-	-	-	-
Benzo(b+j+k)fluoranthene	µg/L	0.015	20	-	-	-	-	-	-
Benzo(g,h,i)perylene	µg/L	0.01	20	-	-	-	-	-	-
Benzo(k)fluoranthene	µg/L	0.01	20	-	-	-	-	-	-
Chrysene	µg/L	0.01	20	-	-	-	-	-	-
Dibenz(a,h)anthracene	µg/L	0.005	20	-	-	-	-	-	-
Fluoranthene	µg/L	0.01	20	-	-	-	-	-	-
Fluorene	µg/L	0.01	20	-	-	-	-	7.68	-
Indeno(1,2,3-c,d)pyrene	µg/L	0.01	20	-	-	-	-	-	-
Methylnaphthalene, 1-	µg/L	0.01	20	-	-	-	-	-	-
Methylnaphthalene, 2-	µg/L	0.01	20	-	-	-	-	-	-
Naphthalene	µg/L	0.05	20	-	-	-	3.16	-	-
Phenanthrene	µg/L	0.02	20	-	-	-	-	-	-
Pyrene	µg/L	0.01	20	-	8.40	-	-	-	-
Quinoline	µg/L	0.05	20	-	-	-	-	-	-

**Notes:**

- MDL = Method detection limit
- nm = not measured
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit

**QA/QC**

1. Allowable RPDs as identified in BC Environmental Laboratory Manual (February 2016), Section A, Table 2
2. RPDs calculated only where both values are greater than 5 times the method detection limit
  - = not calculated
  - RPD = Representative percent difference
  - 1 = calculated RPD exceeds allowable RPD





**Table 11: Groundwater Analytical Results – VOCs**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

APEC/Issue			AEC 1: Mill / 10 Level Portal										
			Sample Station		MW17-1		MW17-2		MW17-3	MW17-4			MW17-4B
Sample ID			MW17-1A	MW17-1B	MW17-2A	MW17-2B	MW17-3	MW17-4A	MW17-4A	MW17-4B	MW17-4B DUP A	MW17-4B	MW17-4B
Sample Collection Date			19-Jul-17	19-Jul-17	19-Jul-17	19-Jul-17	19-Jul-17	19-Jul-17	2-Jul-18	19-Jul-17	19-Jul-17	22-Oct-17	02-Jul-18
Lab ID #			L1962977-1	L1962977-2	L1962977-3	L1962977-4	L1962977-5	L1962977-6	L2123781-8	L1962977-7	L1962977-8	L2014860-1	L2123781-7
Parameters	Units	MDL											
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Noticable Odour	-	-	no	no	no	no	no	no	no	no	no	no	no
Conductivity	µs/cm	1	455	285	209	487	329	387	147.1	366	366	404	288
<b>Volatile Organic Compounds (VOCs)</b>													
Bromodichloromethane [BDCM]	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromoform	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Carbon tetrachloride	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chlorobenzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dibromochloromethane [DBCM]	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroethane	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroform	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloromethane	µg/L	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Dichlorobenzene, 1,2-	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dichlorobenzene, 1,3-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dichlorobenzene, 1,4-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dichloroethane, 1,1-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dichloroethane, 1,2-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dichloroethene, 1,1-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dichloroethylene, 1,2-cis-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dichloroethylene, 1,2-trans-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dichloromethane	µg/L	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Dichloropropane, 1,2-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,3-Dichloropropylene	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,3-Dichloropropylene	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
dichloropropene, 1,3- (cis + trans)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethane, 1,1,1,2-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethane, 1,1,2,2-	µg/L	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Tetrachloroethylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethane, 1,1,1-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethane, 1,1,2-	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Trichloroethylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichlorofluoromethane	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl Chloride	µg/L	0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40

**Notes:**

- MDL = Method detection limit
- no = none observed
- nm = not measured
- ns = no applicable standard
- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit

**Table 11: Groundwater Analytical Results – VOCs**

Johnny Mountain Mine Reclamation Project  
 Johnny Mountain Mine  
 VE52655D  
 Nov-20

APEC/Issue			AEC 1: Mill / 10 Level Portal									APEC 10: Burial Site 1	
Sample Station			MW17-5		MW17-6		MW17-7		MW17-8			MW17-9	
Sample ID			MW17-5A	MW17-5B	MW17-6A	MW17-6B	MW17-7A	MW17-7B	MW17-8A	MW17-8B	MW17-8B DUP C	MW17-9A	MW17-9A
Sample Collection Date			19-Jul-17	19-Jul-17	19-Jul-17	19-Jul-17	19-Jul-17	19-Jul-17	24-Jul-17	24-Jul-17	24-Jul-17	28-Jul-17	02-Jul-18
Lab ID #			L1962977-9	L1962977-10	L1962977-11	L1962977-12	L1962977-13	L1962977-14	L1966041-16	L1966041-17	L1966041-18	L1966936-1	L2123781-6
Parameters	Units	MDL											
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Noticable Odour	-	-	no	no	no	no	no	no	no	no	no	no	no
Conductivity	µs/cm	1	456	1307	497	1189	267	545	207	345	345	755	515
<b>Volatile Organic Compounds (VOCs)</b>													
Bromodichloromethane [BDCM]	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromoform	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Carbon tetrachloride	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chlorobenzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dibromochloromethane [DBCM]	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroethane	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroform	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloromethane	µg/L	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Dichlorobenzene, 1,2-	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dichlorobenzene, 1,3-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dichlorobenzene, 1,4-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dichloroethane, 1,1-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dichloroethane, 1,2-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dichloroethene, 1,1-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dichloroethylene, 1,2-cis-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dichloroethylene, 1,2-trans-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dichloromethane	µg/L	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Dichloropropane, 1,2-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,3-Dichloropropylene	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,3-Dichloropropylene	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
dichloropropene, 1,3- (cis + trans)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethane, 1,1,1,2-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethane, 1,1,2,2-	µg/L	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Tetrachloroethylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethane, 1,1,1-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethane, 1,1,2-	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Trichloroethylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichlorofluoromethane	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl Chloride	µg/L	0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40

**Notes:**

- MDL = Method detection limit
- no = none observed
- nm = not measured
- ns = no applicable standard
- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit

**Table 11: Groundwater Analytical Results – VOCs**

Johnny Mountain Mine Reclamation Project  
 Johnny Mountain Mine  
 VE52655D  
 Nov-20

Parameters	APEC/Issue		APEC 10: Burial Site 1			APEC 6: Septic Field		AEC 2: Tank Farm / Fuel Lines					
	Sample Station		MW17-9			MW17-10		MW17-13		MW17-16	MW17-12		MW17-17
	Sample ID		MW17-9B	MW17-9B	MW17-9BFD	MW17-10A	MW17-10B	MW17-13	MW17-13	MW17-16	MW17-12A	MW17-12B	MW17-17A
	Sample Collection Date		24-Jul-17	02-Jul-18	02-Jul-18	24-Jul-17	24-Jul-17	20-Jul-17	24-Oct-17	20-Jul-17	20-Jul-17	20-Jul-17	20-Jul-17
	Lab ID #		L1966041-19	L2123781-5	L2123781-10	L1966041-20	L1966041-21	L1962977-17	L2014860-2	L1962977-20	L1962977-15	L1962977-16	L1962977-21
Units	MDL												
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	
Noticable Odour	-	-	no	no	no	no	no	no	no	no	no	no	
Conductivity	µs/cm	1	473	250.8	250.8	362	349	275	303	170	302	276	
<b>Volatile Organic Compounds (VOCs)</b>													
Bromodichloromethane [BDCM]	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Bromoform	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Carbon tetrachloride	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
Chlorobenzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Dibromochloromethane [DBCM]	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Chloroethane	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Chloroform	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Chloromethane	µg/L	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	
Dichlorobenzene, 1,2-	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
Dichlorobenzene, 1,3-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Dichlorobenzene, 1,4-	µg/L	1.0	2	1.7	1.6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Dichloroethane, 1,1-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Dichloroethane, 1,2-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Dichloroethene, 1,1-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Dichloroethylene, 1,2-cis-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Dichloroethylene, 1,2-trans-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Dichloromethane	µg/L	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	
Dichloropropane, 1,2-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
cis-1,3-Dichloropropylene	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
trans-1,3-Dichloropropylene	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
dichloropropene, 1,3- (cis + trans)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Tetrachloroethane, 1,1,1,2-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Tetrachloroethane, 1,1,2,2-	µg/L	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	
Tetrachloroethylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Trichloroethane, 1,1,1-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Trichloroethane, 1,1,2-	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
Trichloroethylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Trichlorofluoromethane	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Vinyl Chloride	µg/L	0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	

**Notes:**

- MDL = Method detection limit
- no = none observed
- nm = not measured
- ns = no applicable standard
- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit

**Table 11: Groundwater Analytical Results – VOCs**

Johnny Mountain Mine Reclamation Project  
 Johnny Mountain Mine  
 VE52655D  
 Nov-20

APEC/Issue			AEC 2: Tank Farm / Fuel Lines			APEC 12: Burial Site 2				Tailings Impoundment Downstream			
Sample Station			MW17-17			MW17-14				MW17-20			
Sample ID			MW17-17A	MW17-17B	MW17-17B	MW17-14A	MW17-14A	MW17-14B	MW17-14B	MW17-20A	MW17-20B	MW17-20A	MW17-20B
Sample Collection Date			1-Jul-18	20-Jul-17	1-Jul-18	20-Jul-17	01-Jul-18	20-Jul-17	01-Jul-18	21-Oct-17	21-Oct-17	23-Jul-17	23-Jul-17
Lab ID #			L2123781-1	L1962977-22	L2123781-2	L1966041-24	L2123781-3	L1966041-25	L2123781-4	L1966041-3	L1966041-4	L2014861-1	L2014861-2
Parameters	Units	MDL											
<b>Field Screening</b>													
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Noticable Odour	-	-	no	no	no	no	no	no	no	no	no	no	no
Conductivity	µs/cm	1	139.2	194	115.8	264	184.4	192	108.6	273	78	278	58
<b>Volatile Organic Compounds (VOCs)</b>													
Bromodichloromethane [BDCM]	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1
Bromoform	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1
Carbon tetrachloride	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.5	0.5
Chlorobenzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1
Dibromochloromethane [DBCM]	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1
Chloroethane	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1
Chloroform	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1
Chloromethane	µg/L	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5	<5
Dichlorobenzene, 1,2-	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.5	0.5
Dichlorobenzene, 1,3-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1
Dichlorobenzene, 1,4-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1
Dichloroethane, 1,1-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1
Dichloroethane, 1,2-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1
Dichloroethene, 1,1-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1
Dichloroethylene, 1,2-cis-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1
Dichloroethylene, 1,2-trans-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1
Dichloromethane	µg/L	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5	<5
Dichloropropane, 1,2-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1
cis-1,3-Dichloropropylene	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	<0.5
trans-1,3-Dichloropropylene	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.5	<0.5
dichloropropene, 1,3- (cis + trans)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1
Tetrachloroethane, 1,1,1,2-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1
Tetrachloroethane, 1,1,2,2-	µg/L	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2	<0.2
Tetrachloroethylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1
Trichloroethane, 1,1,1-	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1	1
Trichloroethane, 1,1,2-	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	<0.5
Trichloroethylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1
Trichlorofluoromethane	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1
Vinyl Chloride	µg/L	0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.4	<0.4

**Notes:**

- MDL = Method detection limit
- no = none observed
- nm = not measured
- ns = no applicable standard
- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit



**Table 11: Groundwater Analytical Results – VOCs**

Johnny Mountain Mine Reclamation Project  
 Johnny Mountain Mine  
 VE52655D  
 Nov-20

APEC/Issue			QA/QC					
Sample Station								
Sample ID			-	MW17-4B DUP A	MW17-8B DUP C	MW17-9BFD	MW17-22A DUP 1	MW17-22B DUP A
Sample Collection Date			-	19-Jul-17	24-Jul-17	02-Jul-18	23-Jul-17	23-Jul-17
Lab ID #			-	L1962977-8	L1966041-18	L2123781-10	L2014860-4	L1966041-8
Parameters	Units	MDL	Allowable RPD <sup>1</sup> (%)	Calculated RPD <sup>2</sup> (%)	Calculated RPD <sup>2</sup> (%)	Calculated RPD <sup>2</sup> (%)	Calculated RPD <sup>2</sup> (%)	Calculated
<b>Field Screening</b>								
Sample Headspace Vapour Concentration	ppmv	5.00	-					
Noticable Odour	-	-	-					
Conductivity	µs/cm	1	-					
<b>Volatile Organic Compounds (VOCs)</b>								
Bromodichloromethane [BDCM]	µg/L	1.0	20	-	-	-	-	#REF!
Bromoform	µg/L	1.0	20	-	-	-	-	#REF!
Carbon tetrachloride	µg/L	0.50	20	-	-	-	-	#REF!
Chlorobenzene	µg/L	1.0	20	-	-	-	-	#REF!
Dibromochloromethane [DBCM]	µg/L	1.0	20	-	-	-	-	#REF!
Chloroethane	µg/L	1.0	20	-	-	-	-	#REF!
Chloroform	µg/L	1.0	20	-	-	-	-	#REF!
Chloromethane	µg/L	5.0	20	-	-	-	-	#REF!
Dichlorobenzene, 1,2-	µg/L	0.50	20	-	-	-	-	#REF!
Dichlorobenzene, 1,3-	µg/L	1.0	20	-	-	-	-	#REF!
Dichlorobenzene, 1,4-	µg/L	1.0	20	-	-	-	-	#REF!
Dichloroethane, 1,1-	µg/L	1.0	20	-	-	-	-	#REF!
Dichloroethane, 1,2-	µg/L	1.0	20	-	-	-	-	#REF!
Dichloroethene, 1,1-	µg/L	1.0	20	-	-	-	-	#REF!
Dichloroethylene, 1,2-cis-	µg/L	1.0	20	-	-	-	-	#REF!
Dichloroethylene, 1,2-trans-	µg/L	1.0	20	-	-	-	-	#REF!
Dichloromethane	µg/L	5.0	20	-	-	-	-	#REF!
Dichloropropane, 1,2-	µg/L	1.0	20	-	-	-	-	#REF!
cis-1,3-Dichloropropylene	µg/L	0.50	20	-	-	-	-	#REF!
trans-1,3-Dichloropropylene	µg/L	0.50	20	-	-	-	-	#REF!
dichloropropene, 1,3- (cis + trans)	µg/L	1.0	20	-	-	-	-	#REF!
Tetrachloroethane, 1,1,1,2-	µg/L	1.0	20	-	-	-	-	#REF!
Tetrachloroethane, 1,1,2,2-	µg/L	0.20	20	-	-	-	-	#REF!
Tetrachloroethylene	µg/L	1.0	20	-	-	-	-	#REF!
Trichloroethane, 1,1,1-	µg/L	1.0	20	-	-	-	-	#REF!
Trichloroethane, 1,1,2-	µg/L	0.50	20	-	-	-	-	#REF!
Trichloroethylene	µg/L	1.0	20	-	-	-	-	#REF!
Trichlorofluoromethane	µg/L	1.0	20	-	-	-	-	#REF!
Vinyl Chloride	µg/L	0.40	20	-	-	-	-	#REF!

**Notes:**

- MDL = Method detection limit
- no = none observed
- nm = not measured
- ns = no applicable standard
- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit

**QA/QC**

1. Allowable RPDs as identified in BC Environmental Laboratory Manual (February 2016), Section A, Table 2
  2. RPDs calculated only where both values are greater than 5 times the method detection limit
- = not calculated
  - RPD = Representative percent difference
  - 1 = calculated RPD exceeds allowable RPD















**Table 12: Groundwater Analytical Results – Dissolved Metals**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

Parameters	APEC/Issue		Stonehouse Creek Upstream	Sky Creek Drainage Downstream									
	Sample Station		MW17-28	MW17-24					MW17-21				
	Sample ID		MW17-28	MW17-24A	MW17-24A "DUP B"	MW17-24A	MW17-24B	MW17-24B	MW17-21A	MW17-21A	MW17-21A	MW17-21B	MW17-21B
	Sample Collection Date		29-Jul-17	23-Jul-17	23-Jul-17	24-Aug-20	23-Jul-17	24-Aug-20	23-Jul-17	Sept 5 2019	25-Aug-2020	23-Jul-17	25-Aug-2020
Lab ID #		L1966936-3	L1966041-9	L1966041-10	A20B3891-00	L1966041-11	A20B3891-00	L1966041-5	L2345256-3	A20B3887-00	L1966041-6	A20B3887-00	
Units	MDL												
<b>Field Screening</b>													
pH	unitless	0.1	8.07	7.61	4.61	7.4	8.18	6.48	7.83	8.05	7.96	6.49	6.12
Conductivity	µs/cm	1	346	322	322	228	69	18.5	284	173	194.3	235	46.6
<b>Physiochemical Parameters</b>													
pH	unitless	0.1	8.07	7.61	7.61	7.79	8.18	6.41	7.83	8.21	8.11	6.49	7.14
Conductivity	µs/cm	1	345	311	313	313	249	26.3	280	282	256	185	109
Hardness (as CaCO <sub>3</sub> )	mg/L	500	59700	143000	144000	133	31400	10.9	111000	104	97.1	91400	32.6
<b>Metals (General)</b>													
Aluminum	µg/L	1.0	56	<10	<10	1.2	11	<1.0	<10	3.6	2.5	<10	2.6
Antimony	µg/L	0.10	3.07	4.17	4.1	0.24	<0.5	<0.10	1.01	0.18	0.14	<0.5	<0.10
Arsenic	µg/L	0.10	<1	3.1	3.2	3.51	1.4	0.4	<1	0.71	0.6	<1	<0.10
Barium	µg/L	0.10	31	34	34	42.5	<20	4.34	32	28.5	28.3	25	14.8
Beryllium	µg/L	0.10	<5	<5	<5	<0.100	<5	<0.100	<5	< 0.1	<0.100	<5	<0.100
Bismuth	µg/L	0.050	na	na	na	<0.050	na	<0.050	na	< 0.05	<0.050	na	<0.050
Boron	µg/L	10	<100	<100	<100	<10	<100	<10	<100	< 10	16	<100	<10
Cadmium	µg/L	0.0050	<0.05	<0.05	<0.05	<0.0050	<0.05	0.12	<0.05	< 0.01	<0.0100	0.212	0.0779
Calcium	mg/L	50	19.6	42.2	42.6	37.6	11	3.5	27	23.6	23	31.7	11.1
Cesium	µg/L	0.010	na	na	na	0.016	na	<0.010	na	< 0.01	<0.010	na	<0.010
Chromium (Total) <sup>1</sup>	µg/L	0.10	<0.5	<0.5	<0.5	<0.10	<0.5	<0.10	<0.5	< 0.1	<0.10	<0.5	<0.10
Cobalt	µg/L	0.10	<0.5	<0.5	<0.5	<0.10	<0.5	<0.10	<0.5	< 0.1	<0.10	0.66	<0.10
Copper	µg/L	0.20	<1	<1	<1	<0.20	<1	0.27	<1	1.17	0.68	<1	0.21
Iron <sup>2</sup>	µg/L	10	<30	<30	<30	61	<30	<10	<30	13	11	<30	<10
Lead	µg/L	0.050	<1	<1	<1	<0.050	<1	<0.050	<1	< 0.05	0.119	<1	<0.050
Lithium	µg/L	1.0	<50	<50	<50	8.4	<50	<1.0	<50	9.6	8.5	<50	<1.0
Magnesium	µg/L	5.0	2600	9120	9150	9490	980	520	10600	11000	9620	3000	1190
Manganese <sup>2</sup>	µg/L	0.10	58	58	59	93.6	<10	0.5	80	146	117	439	44.3
Mercury	µg/L	0.0050	<0.2	<0.2	<0.2	<0.0050	<0.2	<0.0050	<0.2	< 0.005	<0.0050	<0.2	<0.0050
Molybdenum <sup>3</sup>	µg/L	0.050	22.8	5.2	5.1	3.03	1.4	0.069	9.8	9.66	9.34	<1	0.168
Nickel	µg/L	0.50	<5	<5	<5	<0.50	<5	<0.50	<5	< 0.5	<0.50	<5	<0.50
Phosphorus	µg/L	50	na	na	na	<50	na	<50	na	< 50	<50	na	<50
Potassium	µg/L	50	15800	3500	3500	2610	<2000	181	4100	3200	3040	<2000	601
Rubidium	µg/L	0.20	na	na	na	3.41	na	0.35	na	0.42	0.4	na	0.68
Selenium	µg/L	0.050	1.3	<1	<1	<0.050	<1	0.285	<1	0.299	<0.050	<1	0.195
Silicon	µg/L	50	na	na	na	7460	na	1930	na	3620	3140	na	3800
Silver	µg/L	0.010	<0.05	<0.05	<0.05	<0.010	<0.05	<0.010	<0.05	< 0.01	<0.010	<0.05	<0.010
Sodium	mg/L	50	42.2	18.8	18.9	12.2	<2	0.492	17.2	16.1	15.6	5.4	1.3
Strontium	µg/L	0.20	na	na	na	511	na	20.9	na	494	459	na	56.1
Sulfur	mg/L	0.5	na	na	na	8.49	na	<0.5	na	17.1	15.7	na	1.42
Tellurium	µg/L	0.20	na	na	na	<0.20	na	<0.20	na	< 0.2	<0.20	na	<0.20
Thallium	µg/L	0.010	<0.2	<0.2	<0.2	<0.010	<0.2	<0.010	<0.2	< 0.01	<0.010	<0.2	<0.010
Thorium	µg/L	0.10	na	na	na	<0.10	na	<0.10	na	< 0.1	<0.10	na	<0.10
Tin	µg/L	0.10	na	na	na	<0.10	na	<0.10	na	< 0.1	0.15	na	<0.10
Titanium	µg/L	0.30	<50	<50	<50	<0.30	<50	<0.30	<50	< 0.3	<0.30	<50	<0.30
Tungsten	µg/L	0.10	na	na	na	<0.10	na	<0.10	na	< 0.1	<0.10	na	<0.10
Uranium	µg/L	0.010	0.75	0.78	0.79	0.06	<0.2	<0.010	0.52	0.423	0.398	<0.2	0.014
Vanadium	µg/L	0.50	<30	<30	<30	<0.50	<30	<0.50	<30	< 0.5	<0.50	<30	<0.50
Zinc	µg/L	1.0	<5	<5	<5	<1.0	<5	7	<5	2.80	3.6	<5	2.5
Zirconium	µg/L	0.060	na	na	na	<0.20	na	<0.20	na	< 0.2	<0.20	na	<0.20

**Notes:**

- MDL = Method detection limit
- na = not analyzed
- ns = no applicable standard
- mg/L = milligram per litre
- µg/L = micrograms per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit

**Table 12: Groundwater Analytical Results – Dissolved Metals**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

Parameters	APEC/Issue		QA/QC									
	Sample Station											
	Sample ID		-	MW17-4B DUP A	MW17-4B "DUP 1"	MW17-55B	MW17-7C DUP of MW17-7B	MW17-8B "DUP C"	MW17-9BFD	MW17-18B DUP D	MW17-22B DUP A	DUP MW17-25A (MW17-75A )
	Sample Collection Date		-	19-Jul-17	23-Oct-17	17-Jul-19	5-Sep-19	24-Jul-17	2-Jul-18	24-Jul-17	23-Jul-17	25-Aug-2020
	Lab ID #		-	L1962977-8	L2014860-4	L2317077-7	L2345260-3	L1966041-18	L2123781-10	L1966041-28	L1966041-8	VA20B3887-009
Units	MDL	Allowable RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)
<b>Field Screening</b>												
pH	unitless	0.1	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Conductivity	µs/cm	1	-	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Physiochemical Parameters</b>												
pH	unitless	0.1	-	0.00	0.00	1.89	11.63	0.00	0.00	0.00	32.06	0.37
Conductivity	µs/cm	1	-	1.07	1.07	0.93	2.91	0.61	1.19	0.66	2.25	0.86
Hardness (as CaCO3)	mg/L	500	-	-	-	-	-	-	-	-	-	-
<b>Metals (General)</b>												
Aluminum	µg/L	1.0	20	0.00	0.00	-	-	0.00	-	0.00	0.00	-
Antimony	µg/L	0.10	20	-	-	-	-	-	-	-	-	0.85
Arsenic	µg/L	0.10	20	0.00	0.00	6.62	-	0.00	-	0.00	0.00	3.92
Barium	µg/L	0.10	20	0.43	0.43	2.97	58.74	2.30	1.17	0.00	0.00	3.57
Beryllium	µg/L	0.10	20	0.00	0.00	-	-	0.00	-	0.00	0.00	-
Bismuth	µg/L	0.050	20	-	-	-	-	-	-	-	-	-
Boron	µg/L	10	20	0.00	0.00	-	-	0.00	0.55	0.00	0.00	-
Cadmium	µg/L	0.0050	20	0.00	0.00	3.41	57.91	7.26	3.74	5.83	0.00	2.68
Calcium	mg/L	50	20	-	-	-	-	-	-	-	-	-
Cesium	µg/L	0.010	20	-	-	-	-	-	-	-	-	-
Chromium (Total) <sup>1</sup>	µg/L	0.10	20	-	-	-	-	-	-	-	-	-
Cobalt	µg/L	0.10	20	7.77	7.77	2.72	-	-	2.29	-	-	-
Copper	µg/L	0.20	20	-	-	-	-	-	-	-	-	-
Iron <sup>2</sup>	µg/L	10	20	0.32	0.32	15.73	-	-	1.28	-	-	-
Lead	µg/L	0.050	20	0.00	0.00	-	-	0.00	-	0.00	0.00	-
Lithium	µg/L	1.0	20	0.00	0.00	-	-	0.00	-	0.00	0.00	-
Magnesium	µg/L	5.0	20	0.30	0.30	3.98	58.62	1.88	1.81	0.81	1.36	2.56
Manganese <sup>2</sup>	µg/L	0.10	20	1.40	1.40	7.02	63.23	0.00	1.89	1.80	0.00	3.66
Mercury	µg/L	0.0050	20	0.00	0.00	-	-	0.00	-	0.00	0.00	-
Molybdenum <sup>3</sup>	µg/L	0.050	20	0.00	0.00	6.06	-	0.00	3.40	0.00	0.00	4.24
Nickel	µg/L	0.50	20	0.00	0.00	-	-	0.00	1.03	0.00	0.00	-
Phosphorus	µg/L	50	20	-	-	-	-	-	-	-	-	-
Potassium	µg/L	50	20	2.25	2.25	8.94	59.04	9.52	2.18	4.65	0.00	5.97
Rubidium	µg/L	0.20	20	-	-	5.00	54.13	-	1.93	-	-	2.06
Selenium	µg/L	0.050	20	0.00	0.00	-	-	0.00	-	0.00	0.00	-
Silicon	µg/L	50	20	-	-	1.03	55.29	-	0.78	-	-	3.58
Silver	µg/L	0.010	20	-	-	-	-	-	-	-	-	-
Sodium	mg/L	50	20	-	-	-	-	-	-	-	-	-
Strontium	µg/L	0.20	20	-	-	2.82	51.45	-	0.00	-	-	0.41
Sulfur	mg/L	0.5	20	-	-	0.41	62.55	-	0.71	-	-	2.11
Tellurium	µg/L	0.20	20	-	-	-	-	-	-	-	-	-
Thallium	µg/L	0.010	20	0.00	0.00	-	-	0.00	-	0.00	0.00	-
Thorium	µg/L	0.10	20	-	-	-	-	-	-	-	-	-
Tin	µg/L	0.10	20	-	-	-	-	-	-	-	-	-
Titanium	µg/L	0.30	20	0.00	0.00	-	-	0.00	-	0.00	0.00	-
Tungsten	µg/L	0.10	20	-	-	-	-	-	-	-	-	-
Uranium	µg/L	0.010	20	5.26	5.26	12.59	-	0.00	0.00	0.00	0.00	2.13
Vanadium	µg/L	0.50	20	0.00	0.00	-	-	0.00	-	0.00	0.00	-
Zinc	µg/L	1.0	20	-	-	4.48	-	60.76	4.40	-	-	-
Zirconium	µg/L	0.060	20	-	-	0.00	-	-	-	-	-	-

**Notes:**

- MDL = Method detection limit
- na = not analyzed
- ns = no applicable standard
- mg/L = milligram per litre
- µg/L = micrograms per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit

**QA/QC**

- = not calculated
- RPD = Representative percent difference
- 1 = calculated RPD exceeds allowable RPD



**Table 13: Groundwater Analytical Results – Anions and Nutrients**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

APEC/Issue			APEC 1: Mill / 10 Level Portal																			
			Sample Station		MW17-1		MW17-2		MW17-3	MW17-4						MW17-5						
Sample ID			MW17-1A	MW17-1B	MW17-2A	MW17-2B	MW17-3	MW17-4A	MW17-4A	MW17-4A	MW17-4B	MW17-4B DUP A	MW17-4B	MW17-4B "DUP1"	MW17-4B	MW17-4B	MW17-4B	BH17-04B	MW17-5A	MW17-5B	MW17-5B	
Sample Collection Date			19-Jul-17	19-Jul-17	19-Jul-17	19-Jul-17	19-Jul-17	19-Jul-17	2-Jul-18	5-Sep-19	19-Jul-17	19-Jul-17	23-Oct-17	23-Oct-17	2-Jul-18	17-Jul-19	05-Sep-19	23-Aug-2020	19-Jul-17	19-Jul-17	17-Jul-19	
Lab ID #			L1962977-1	L1962977-2	L1962977-3	L1962977-4	L1962977-5	L1962977-6	L2123781-8	L2345256-2	L1962977-7	L1962977-8	L2014860-1	L2014860-4	L2123781-7	L2317077-3	L2345256-1	A20B3890-00	L1962977-9	L1962977-10	L2317077-1	
Parameters	Units	MDL																				
<b>Field Screening</b>																						
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	
Conductivity	µs/cm	1	455	285	209	487	329	287	147.1	152	366	366	408	408	288	781	450	317.1	456	1307	785	
<b>Physiochemical Parameters</b>																						
pH	ns	0.10	8.04	7.76	8.07	8.12	8.11	7.95	8.18	8.06	7.10	7.10	7.94	7.91	8.06	8.20	7.72	7.49	7.78	6.60	8.02	
Conductivity	µs/cm	1.0	469.00	255.00	215.00	500.00	338.00	276.00	251.00	249.00	377.00	373.00	404.00	399.00	457.00	760.00	661.00	438	477.00	1340.00	750.00	
Hardness (CaCO3)	mg/L	0.50	165	113	97	258	172	130	117	112	197	198	133	184	225	394	333	204	203	760	365	
TSS	µg/L	3000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
TDS	µg/L	13000	n/a	n/a	n/a	n/a	n/a	na	174000.00	n/a	na	na	264000.00	252000.00	319000.00	n/a	n/a	250000.00	n/a	n/a	n/a	
<b>Alkalinity Anions &amp; Nutrients</b>																						
Acidity (as CaCO3)	µg/L	1000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3900	n/a	n/a	n/a	
Alkalinity, Bicarbonate (as CaCO3)	µg/L	1000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	248000	n/a	112000	n/a	n/a	130000	
Alkalinity, Carbonate (as CaCO3)	µg/L	1000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	<1000	n/a	<1000	n/a	n/a	<1000	
Alkalinity, Hydroxide (as CaCO3)	µg/L	1000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	<1000	n/a	<1000	n/a	n/a	<1000	
Alkalinity, Total (as CaCO3)	µg/L	1000	74200	35600	60800	108000	95800	75400	83600	113000	196000	197000	172000	165000	194000	248000	293000	112000	73600	170000	130000	
Bromide	µg/L	50	74	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	n/a	<50	<250	<250	
Chloride	mg/L	0.50	7.98	n/a	0.88	0.73	n/a	1.31	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.5	<0.50	1.35	<0.5	<2.50	
Fluoride	µg/L	20.00	245	32	108	172	82	91	105	132	34	33	49	46	35	53	68	74	125	<100	110	
Nitrate as N	mg/L	0.0050	0.0273	0.134	na	0.0129	na	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0226	<0.0050	0.0267	0.01	<0.005	<0.005	<0.025	
Nitrite as N	µg/L	1.0	8.8	<1.0	<1.0	4.3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	5.1	<1.0	3.6	1.2	<1	<5	<5.0	
Sulfate	mg/L	0.30	137	82.4	42.2	148	75.5	59.5	45.8	24.3	4.11	4.03	42.1	41.1	60.7	165	119	114	154	625	280	

**Notes:**

- MDL = Method detection limit
- nm = not measured
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- mg/L = milligram per litre
- µs/cm = microsiemens per centimeter
- na = not analyzed



**Table 13: Groundwater Analytical Results – Anions and Nutrients**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

			APEC 1: Mill / 10 Level Portal														APEC 10: Burial Site 1						
APEC/Issue			MW17-5			MW17-6			MW17-7			MW17-8			MW17-9								
Sample Station			MW17-55B	MW17-5B	BH17-05B	MW17-6A	MW17-6B	MW17-6B	MW17-6B	BH17-06B	MW17-7A	MW17-7A	MW17-7B	MW17-8A	MW17-8B	MW17-8B "DUP C"	MW17-9A	MW17-9A	MW17-9A	MW17-9A	MW17-9A	MW17-9A	MW17-9B
Sample ID																							
Sample Collection Date			17-Jul-19	05-Sep-19	23-Aug-2020	19-Jul-17	19-Jul-17	17-Jul-19	05-Sep-19	23-Aug-2020	19-Jul-17	5-Sep-19	19-Jul-17	24-Jul-17	24-Jul-17	24-Jul-17	28-Jul-17	02-Jul-18	18-Nov-18	17-Jul-19	06-Sep-19	28-Aug-20	24-Jul-17
Lab ID #			L2317077-7	L2345256-6	A20B3890-00	L1962977-11	L1962977-12	L2317077-2	L2345256-11	A20B3890-00	L1962977-13	L2345260-4	L1962977-14	L1966041-16	L1966041-17	L1966041-18	L1966936-1	L2123781-6	L2200711-2	L2317077-5	L2345260-2	A20B4496-00	L1966041-19
Parameters	Units	MDL																					
<b>Field Screening</b>																							
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Conductivity	µs/cm	1	785	610	441.8	497	1189	845	578	320.5	267	160	545	207	345	345	755	515	383	461	344	123	473
<b>Physiochemical Parameters</b>																							
pH	ns	0.10	7.87	8.09	7.52	8.11	7.28	8.21	8.17	8.62	7.91	8.13	7.03	8.30	6.56	6.56	7.68	7.60	8.25	8.50	8.41	8.03	6.36
Conductivity	µs/cm	1.0	757.00	895.00	746	532.00	1230.00	825.00	863.00	292	275.00	264.00	562.00	313.00	329.00	327.00	754.00	442.00	351.00	590.00	533.00	386.00	469.00
Hardness (CaCO3)	mg/L	0.50	357	441	283	236	717	436	441	163	137	122	303	112	174	175	87	197	51	117	200	160	225
TSS	µg/L	3000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
TDS	µg/L	13000	n/a	n/a	500000.00	n/a	n/a	n/a	n/a	215000.00	n/a	n/a	n/a	n/a	n/a	n/a	na	316000.00	232000.00	n/a	n/a	269000.00	na
<b>Alkalinity Anions &amp; Nutrients</b>																							
Acidity (as CaCO3)	µg/L	1000	n/a	n/a	5100	n/a	n/a	n/a	n/a	<2000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3300	n/a
Alkalinity, Bicarbonate (as CaCO3)	µg/L	1000	129000	n/a	121000	n/a	n/a	111000	n/a	22600	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	260000	n/a	167000	n/a
Alkalinity, Carbonate (as CaCO3)	µg/L	1000	<1000	n/a	<1000	n/a	n/a	<1000	n/a	5600	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	8800	n/a	<1000	n/a
Alkalinity, Hydroxide (as CaCO3)	µg/L	1000	<1000	n/a	<1000	n/a	n/a	<1000	n/a	<1000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	<1000	n/a	<1000	n/a
Alkalinity, Total (as CaCO3)	µg/L	1000	129000	142000	121000	71100	158000	111000	114000	22600	78200	88100	122000	139000	37200	37000	336000	105000	137000	269000	225000	167000	93800
Bromide	µg/L	50	<50	<250	n/a	<50	<250	<250	<250	n/a	<50	<50	<50	<50	<50	<50	400	<50	150	155	<50	<50	<50
Chloride	mg/L	0.50	0.54	<2.50	<2.50	1.02	<0.5	<2.50	<2.50	<0.50	<0.5	<0.50	<0.5	3.39	<0.5	<0.5	15.3	<0.50	6.95	12.6	2.99	1.89	0.82
Fluoride	µg/L	20.00	108	<100	126	131	<100	<100	110	82	62	65	33	288	26	25	320	35	146	537	253	178	38
Nitrate as N	mg/L	0.0050	<0.0050	<0.025	<0.0250	<0.005	<0.005	<0.025	<0.025	0.0056	<0.005	<0.005	<0.005	<0.005	0.1	0.0986	<0.0250	0.007	0.0221	7.2	<0.005	0.0086	<0.0050
Nitrite as N	µg/L	1.0	<1.0	<5.0	<5	<1	<5	167	6.3	3.8	<1	<1.0	<1	<1	<1	<1	<5.0	2	2	4.5	<1.0	1.1	<1.0
Sulfate	mg/L	0.30	272	361	278	184	580	347	363	104	58	56.4	167	82.4	128	128	170	125	42.4	48.2	69.5	49.3	146

**Notes:**

- MDL = Method detection limit
- nm = not measured
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- mg/L = milligram per litre
- µs/cm = microsiemens per centimeter
- na = not analyzed



**Table 13: Groundwater Analytical Results – Anions and Nutrients**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

Parameters	Units	MDL	APEC 10: Burial Site 1					APEC 6: Septic Field			Stonehouse Creek Drainage Downstream						APEC 12: Burial Site 2									
			MW17-9					MW17-10			MW17-11						MW17-14									
			Sample Station	Sample ID	Sample Collection Date	Lab ID #																				
Field Screening																										
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm		
Conductivity	µs/cm	1	250.8	250.8	579	457	175.6	362	349	376	240	147	181	194	206	159.5	155	264	184.4	343	356	235.7	192	108.6		
Physiochemical Parameters																										
pH	ns	0.10	7.63	7.63	7.08	7.86	7.11	7.73	6.27	7.75	7.97	8.29	7.62	8.22	8.21	7.67	8.17	8.02	8.30	8.07	8.29	7.81	7.43	8.21		
Conductivity	µs/cm	1.0	418.00	423.00	533.00	487.00	388	355.00	336.00	377.00	239.00	247.00	250.00	205.00	206.00	223.00	219.00	259.00	337.00	338.00	355.00	339	190.00	182.00		
Hardness (CaCO3)	mg/L	0.50	196	195	250	220	187	172	175	159	102	104	103	92	88	95	74	102	121	125	115	117	107	98		
TSS	µg/L	3000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a		
TDS	µg/L	13000	281000.00	281000.00	391000.00	n/a	274000.00	n/a	n/a	n/a	n/a	n/a	146000.00	n/a	n/a	138000.00	n/a	na	254000.00	225000.00	n/a	350000.00	na	114000.00		
Alkalinity Anions & Nutrients																										
Acidity (as CaCO3)	µg/L	1000	n/a	n/a	n/a	n/a	5000	n/a	n/a	n/a	n/a	n/a	<2000	n/a	n/a	<2000	n/a	n/a	n/a	n/a	n/a	2600	n/a	n/a		
Alkalinity, Bicarbonate (as CaCO3)	µg/L	1000	n/a	n/a	n/a	87600	69800	n/a	n/a	na	na	n/a	111000	93300	n/a	100000	n/a	n/a	n/a	n/a	na	146000	n/a	n/a		
Alkalinity, Carbonate (as CaCO3)	µg/L	1000	n/a	n/a	n/a	<1000	<1000	n/a	n/a	na	na	n/a	<1000	<1000	n/a	<1000	n/a	n/a	n/a	n/a	na	<1000	n/a	n/a		
Alkalinity, Hydroxide (as CaCO3)	µg/L	1000	n/a	n/a	n/a	<1000	<1000	n/a	n/a	na	na	n/a	<1000	<1000	n/a	<1000	n/a	n/a	n/a	na	<1000	n/a	n/a			
Alkalinity, Total (as CaCO3)	µg/L	1000	90900	90400	83700	87600	69800	111000	43400	130000	108000	112000	111000	93300	91000	100000	95600	88000	171000	150000	183000	146000	87600	86100		
Bromide	µg/L	50	<50	<50	<50	<50	n/a	<50	<50	<50	<50	<50	n/a	<50	<50	n/a	<50	<50	91	<50	<50	<50	<50	<50		
Chloride	mg/L	0.50	<0.50	<0.50	0.91	0.63	<0.50	2.14	<0.5	2.4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3.19	6.68	3.22	5.56	3.92	<0.50	<0.50		
Fluoride	µg/L	20.00	29	31	31	47	43	184	<20	189	322	329	332	178	160	161	345	249	438	301	527	284	<20	<20		
Nitrate as N	mg/L	0.0050	<0.0050	<0.0050	0.0071	0.102	0.0196	<0.005	0.221	<0.0050	0.0098	<0.005	<5.0	<0.0050	<0.005	<5.0	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	0.0142	0.0153	0.0131		
Nitrite as N	µg/L	1.0	1.2	1.3	1.2	4.9	1.6	<1	<1	<1.0	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.00	<1.0	<1.0	<1.0	<1.0	1.2	<1.0	<1.0		
Sulfate	mg/L	0.30	123	124	201	154	123	73.7	121	68	19.5	22.4	22.3	11.1	15.3	16.2	22.5	39.7	3	14.8	1.21	11.2	12	12.4		

**Notes:**

- MDL = Method detection limit
- nm = not measured
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- mg/L = milligram per litre
- µs/cm = microsiemens per centimeter
- na = not analyzed



**Table 13: Groundwater Analytical Results – Anions and Nutrients**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

Parameters	Units	APEC/Issue		Sky Creek Drainage Downstream						Johnny Creek Drainage Upstream						AEC 2: Tank Farm / Fuel Lines										
		APEC 12: Burial Site 2		MW17-24						MW17-26						MW17-13			MW17-16	MW17-12		MW17-17				
		Sample Station		MW17-14		MW17-24						MW17-26						MW17-13			MW17-16	MW17-12		MW17-17		
		Sample ID		MW17-14B	MW17-14B	MW17-24A	MW17-24A	MW17-24A	MW17-24B	MW17-24B	MW17-26A	MW17-26A	MW17-26A	MW17-26B	MW17-26B	MW17-13	MW17-13	MW17-13	MW17-16	MW17-12A	MW17-12B	MW17-17A	MW17-17A	MW17-17B	MW17-17B	
		Sample Collection Date		25-Nov-18	5-Sep-19	15-Jul-19	04-Sep-19	24-Aug-20	04-Sep-19	24-Aug-20	15-Jul-19	05-Sep-19	25-Aug-2020	05-Sep-19	25-Aug-2020	20-Jul-17	24-Oct-17	2-Jul-18	20-Jul-17	20-Jul-17	20-Jul-17	20-Jul-17	1-Jul-18	20-Jul-17	1-Jul-18	
Lab ID #		L2203208-1	L2345260-8	L2313900-3	L2345256-4	A20B3891-00	L2345256-9	A20B3891-00	L2313900-4	L2345260-6	A20B3887-00	L2345260-7	A20B3887-00	L1962977-17	L2014860-2	L2123781-9	L1962977-20	L1962977-15	L1962977-16	L1962977-21	L2123781-1	L1962977-22	L2123781-2			
MDL																										
<b>Field Screening</b>																										
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm			
Conductivity	µs/cm	1	177	120	308	175	228	22	18.5	285	179	190.5	196	200.5	275	305	179.4	170	302	276	379	139.2	194	115.8		
<b>Physiochemical Parameters</b>																										
pH	ns	0.10	8.07	8.12	8.09	8.32	7.79	7.42	6.41	8.07	8.23	8.1	8.29	8.08	7.09	8.14	8.22	7.46	8.73	7.69	8.90	8.23	7.55	8.17		
Conductivity	µs/cm	1.0	184.00	165.00	305.00	292.00	313	34.20	26.3	279.00	288.00	255	305.00	274	281.00	303.00	292.00	176.00	322.00	279.00	387.00	238.00	201.00	199.00		
Hardness (CaCO3)	mg/L	0.50	95	75	128	122	133	15	10.9	133	148	130	129	134	148	133	145	95	34	146	39	97	106	102		
TSS	µg/L	3000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a		
TDS	µg/L	13000	105000.00	n/a	n/a	n/a	172000.00	n/a	18000.00	n/a	n/a	192000.00	n/a	224000.00	na	200000.00	198000.00	n/a	n/a	n/a	na	177000.00	na	120000.00		
<b>Alkalinity Anions &amp; Nutrients</b>																										
Acidity (as CaCO3)	µg/L	1000	n/a	n/a	n/a	n/a	<2000	n/a	2700	n/a	n/a	<2000	n/a	<2000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a		
Alkalinity, Bicarbonate (as CaCO3)	µg/L	1000	n/a	n/a	na	n/a	176000	n/a	12200	na	n/a	111000	n/a	115000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a		
Alkalinity, Carbonate (as CaCO3)	µg/L	1000	n/a	n/a	na	n/a	<1000	n/a	<1000	na	n/a	<1000	n/a	<1000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a		
Alkalinity, Hydroxide (as CaCO3)	µg/L	1000	n/a	n/a	na	n/a	<1000	n/a	<1000	na	n/a	<1000	n/a	<1000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a		
Alkalinity, Total (as CaCO3)	µg/L	1000	74800	71100	146000	151000	176000	15200	12200	118000	121000	111000	124000	115000	112000	128000	128000	81200	112000	96500	108000	81800	81900	86000		
Bromide	µg/L	50	<50	<50	<50	<50	n/a	<50	n/a	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	64	<50	<50	<50		
Chloride	mg/L	0.50	<0.50	<0.5	<0.50	<0.5	<0.50	<0.50	<0.50	<0.50	<0.5	<0.50	<0.5	<0.50	<0.50	<0.50	<0.50	<0.5	3.4	<0.5	6.74	134	<0.50	<0.50		
Fluoride	µg/L	20.00	<20	25	459	462	466	30	27	<20	<20	<20	<20	26	<20	<20	<20	<20	572	<20	430	69	<20	<20		
Nitrate as N	mg/L	0.0050	0.0624	0.0097	<0.0050	<0.005	<0.0050	<0.005	0.0066	0.05	<0.0428	0.0239	<0.0137	0.0187	<0.0050	<0.0050	<0.0050	0.0087	<0.005	0.0108	<0.005	<5.0	0.0194	0.017		
Nitrite as N	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1	<1.0	<1	<1.0	<1.0	1.2	<1.0	1.2	<1.0	<1.0	<1.0	<1	<1	<1	<1.0	<1.0	<1.0	<1.0		
Sulfate	mg/L	0.30	15.9	14.8	21.5	23.8	24.4	1.67	1.11	33.1	37.6	24.3	42.5	31.8	34.9	32.7	33.3	10.5	56	48.1	75.3	39	19.8	19.3		

**Notes:**

- MDL = Method detection limit
- nm = not measured
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- mg/L = milligram per litre
- µs/cm = microsiemens per centimeter
- na = not analyzed



**Table 13: Groundwater Analytical Results – Anions and Nutrients**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

Parameters			APEC/Issue		Tailings Impoundment Downstream															AEC 5: Main Landfill				
			Sample Station		MW17-18			MW17-19		MW17-20			MW17-23			MW17-25				MW17-22				
			Sample ID		MW17-18A	MW17-18B	MW17-18B DUP D	MW17-19A	MW17-19B	MW17-20A	MW17-20A	MW17-20B	MW17-20B	MW17-23A	MW17-23A	MW17-23B	MW17-25A	MW17-25A	DUP MW17- 25A (MW17- 25A)	MW17-25B	MW17-22A	MW17-22A	MW17-22A	MW17-22A
			Sample Collection Date		24-Jul-17	24-Jul-17	24-Jul-17	23-Jul-17	23-Jul-17	23-Jul-17	21-Oct-17	23-Jul-17	21-Oct-17	23-Jul-17	22-Oct-17	23-Jul-17	23-Jul-17	25-Aug-2020	25-Aug-2020	23-Jul-17	28-Jul-17	22-Oct-17	9-Jul-18	11-Sep-18
Lab ID #			L1966041-26	L1966041-27	L1966041-28	L1966041-1	L1966041-2	L1966041-3	L2014861-1	L1966041-4	L2014861-2	L1966041-12	L2014861-3	L1966041-13	L1966041-14	A20B3887-00	A20B3887-00	L1966041-15	L1966936-2	L2014860-3	L2127140-1	L2162703-1		
Units	MDL																							
<b>Field Screening</b>																								
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	
Conductivity	µs/cm	1	462	151	151	587	153	273	278	78	58.2	257	213	157	348	258.9	258.9	137	210	322	198.6	320.8		
<b>Physiochemical Parameters</b>																								
pH	ns	0.10	7.91	6.74	6.74	7.85	8.09	7.81	7.95	6.73	7.33	8.73	8.11	7.58	7.92	8.05	8.08	7.02	7.89	8.30	8.23	8.20		
Conductivity	µs/cm	1.0	449.00	151.00	150.00	570.00	133.00	272.00	278.00	66.70	58.20	340.00	213.00	148.00	342.00	352	349	130.00	343.00	353.00	367.00	357.00		
Hardness (CaCO3)	mg/L	0.50	147	72	73	180	60	111	101	31	23	37	71	64	147	151	151	64	132	114	146	131		
TSS	µg/L	3000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a		
TDS	µg/L	13000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	261000.00	256000.00	n/a	na	220000.00	233000.00	211000.00		
<b>Alkalinity Anions &amp; Nutrients</b>																								
Acidity (as CaCO3)	µg/L	1000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	<2000	<2000	n/a	n/a	n/a	n/a	n/a		
Alkalinity, Bicarbonate (as CaCO3)	µg/L	1000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	156000	156000	n/a	n/a	n/a	n/a	n/a		
Alkalinity, Carbonate (as CaCO3)	µg/L	1000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	<1000	<1000	n/a	n/a	n/a	n/a	n/a		
Alkalinity, Hydroxide (as CaCO3)	µg/L	1000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	<1000	<1000	n/a	n/a	n/a	n/a	n/a		
Alkalinity, Total (as CaCO3)	µg/L	1000	134000	51800	51600	97600	56400	88900	109000	29400	26500	138000	79800	69500	141000	156000	156000	51200	113000	122000	181000	165000		
Bromide	µg/L	50	110	<50	<50	140	<50	<100	<50	<50	<50	<100	67	<50	<50	<50	<50	<50	<50	<50	<50	<50		
Chloride	mg/L	0.50	5.63	<0.5	<0.5	10.6	<0.5	5.65	5.1	<0.5	<0.5	3.15	1.64	<0.5	1.55	<0.50	<0.5	<0.5	3.66	2.3	0.8	<0.50		
Fluoride	µg/L	20.00	514	26	28	442	142	360	326	51	58	228	118	79	306	343	354	23	477	548	463	478		
Nitrate as N	mg/L	0.0050	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0135	0.0354	0.0104	0.0135	0.0098	<0.005	<0.005	<0.005.0	<0.0050		
Nitrite as N	µg/L	1.0	<1	<1	<1	1.5	<1	<1	<1	<1	<1	<1	<1	2	1.4	1.2	1.7	<1	<1.0	<1.0	<1.0	<1.0		
Sulfate	mg/L	0.30	93.5	23.7	23.1	180	12.3	44.5	45.4	5.4	5.1	35.1	26.7	7.16	44.9	39.5	39.6	15.4	60.5	54.3	16.3	27.1		

**Notes:**

- MDL = Method detection limit
- nm = not measured
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- mg/L = milligram per litre
- µs/cm = microsiemens per centimeter
- na = not analyzed

**Table 13: Groundwater Analytical Results – Anions and Nutrients**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

			APEC/Issue	AEC 5: Main Landfill										APEC 11: Airstrip					Additional Borrow Investigation			
			Sample Station	MW17-22										MW17-27					MW17-21A			
			Sample ID	MW17-22A	MW17-22A	MW17-22A	MW17-22B	MW17-22B DUP A	MW17-22B	MW17-22B	MW17-22B	MW17-22B	MW17-22C DUP of	MW17-22B	MW17-27A	MW17-27A	MW17-27A	MW17-27B	MW17-27B	MW17-21A	MW17-21A	MW17-21B
			Sample Collection Date	17-Jul-19	04-Sep-19	28-Aug-2020	23-Jul-17	23-Jul-17	9-Jul-18	10-Sep-18	17-Jul-19	4-Sep-19	04-Sep-19	28-Aug-2020	24-Jul-17	16-Jul-19	28-Aug-2020	24-Jul-17	16-Jul-19	Sept 5 2019	25-Aug-2020	25-Aug-2020
			Lab ID #	L2312976-1	L2345256-5	A20B4087-00	L1966041-7	L1966041-8	L2127140-2	L2162703-2	L2312976-2	L2345256-7	L2345256-8	VA20B4087-002	L1966041-29	L2313901-3	A20B4083-00	L1966041-30	L2313901-2	L2345256-3	A20B3887-00	VA20B3887-008
Parameters	Units	MDL																				
<b>Field Screening</b>																						
Sample Headspace Vapour Concentration	ppmv	5.00																				
Conductivity	µs/cm	1			238.7	63	63	42.3	77	nm	nm	42	30.3	383	288	270.2	383	429	173	194.3	46.6	
<b>Physiochemical Parameters</b>																						
pH	ns	0.10	n/a	n/a	8.06	5.71	5.71	7.20	7.16	n/a	n/a	7.42	6.86	7.92	8.26	7.88	8.10	8.13	8.21	8.11	7.14	
Conductivity	µs/cm	1.0	n/a	n/a	350	58.50	57.20	71.70	78.80	n/a	n/a	58.20	44.9	382.00	290.00	386	435.00	491.00	282.00	256	109	
Hardness (CaCO3)	mg/L	0.50	n/a	n/a	147	29	32	35	35	n/a	n/a	27	24	191	125	204	195	217	1040	97.1	32.6	
TSS	µg/L	3000	n/a	<3000	<3000	n/a	n/a	n/a	n/a	n/a	<3000	n/a	<3000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
TDS	µg/L	13000	n/a	n/a	213000.00	na	na	46000.00	49000.00	n/a		n/a	30000.00	n/a	n/a	255000.00	n/a	n/a	n/a	180000.00	88000.00	
<b>Alkalinity Anions &amp; Nutrients</b>																						
Acidity (as CaCO3)	µg/L	1000	n/a	<1000	<2000	n/a	n/a	n/a	n/a	n/a	1800	n/a	3400	n/a	n/a	2200	n/a	n/a	n/a	<2000	4500	
Alkalinity, Bicarbonate (as CaCO3)	µg/L	1000	142000	n/a	136000	n/a	n/a	n/a	n/a	30100	n/a	n/a	18800	n/a	na	134000	n/a	na	n/a	87600	48600	
Alkalinity, Carbonate (as CaCO3)	µg/L	1000	3800	n/a	<1000	n/a	n/a	n/a	n/a	<1000	n/a	n/a	<1000	n/a	na	<1000	n/a	na	n/a	<1000	<1000	
Alkalinity, Hydroxide (as CaCO3)	µg/L	1000	<1000	n/a	<1000	n/a	n/a	n/a	n/a	<1000	n/a	n/a	<1000	n/a	na	n/a	na	na	n/a	<1000	<1000	
Alkalinity, Total (as CaCO3)	µg/L	1000	146000	n/a	136000	28100	27700	33900	37100	30100	n/a	27900	18800	137000	109000	134000	625000	199000	93900	87600	48600	
Bromide	µg/L	50	<50	n/a	nm	<50	<50	<50	<50	<50	n/a	<50	nm	<50	<50	n/a	<50	<50	<50	<50	<50	
Chloride	mg/L	0.50	<0.50	n/a	<500	<0.50	<0.50	3.91	<0.50	<0.50	n/a	<0.50	<500	0.82	<0.50	<0.50	<0.5	<0.50	<0.50	<0.50	<0.50	
Fluoride	µg/L	20.00	553	n/a	584	21	21	629	<20	21	n/a	25	<20	89	66	52	162	68	652	571	432	
Nitrate as N	mg/L	0.0050	<5.0	n/a	<0.005	<0.005	<0.005	4.71	<0.0050	5.4	n/a	0.0329	0.0342	<0.005	0.0142	<0.0050	<0.005	<0.0050	<0.005	0.0244	0.0126	
Nitrite as N	µg/L	1.0	<1.0	n/a	<1	<1.0	<1.0	7.8	<1.0	1.9	n/a	<1.0	<1	<1	<1.0	<1	<1	<1.0	<1.0	<1	1.3	
Sulfate	mg/L	0.30	38	n/a	44	3.02	2.96	741	3.39	3.1	n/a	2.92	1.93	78.6	46.7	67.4	86.4	99.1	50.2	41.5	31.8	

**Notes:**

- MDL = Method detection limit
- nm = not measured
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- mg/L = milligram per litre
- µs/cm = microsiemens per centimeter
- na = not analyzed



**Table 13: Groundwater Analytical Results – Anions and Nutrients**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

APEC/Issue			QA/QC								
Sample Station											
Sample ID			-	MW17-4B DUP A	MW17-4B "DUP1"	MW17-55B	MW17-8B "DUP C"	MW17-9BFD	MW17-18B DUP D	MW17-22B DUP A	MW17-12B-DUP (MW17-62B)
Sample Collection Date			-	19-Jul-17	23-Oct-17	17-Jul-19	24-Jul-17	2-Jul-18	24-Jul-17	23-Jul-17	22-Oct-17
Lab ID #			-	L1962977-8	L2014860-4	L2317077-7	L1966041-18	L2123781-10	L1966041-28	L1966041-8	L2014860-3
Parameters	Units	MDL	Allowable RPD <sup>3</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)
<b>Field Screening</b>											
Sample Headspace Vapour Concentration	ppmv	5.00	-	-	-	-	-	-	-	-	-
Conductivity	µs/cm	1	-	-	-	-	-	-	-	-	-
<b>Physiochemical Parameters</b>											
pH	ns	0.10	-	0.00	0.38	-	0.00	0.00	0.00	0.00	0.37
Conductivity	µs/cm	1.0	-	1.07	1.25	-	0.61	1.19	0.66	2.25	0.86
Hardness (CaCO <sub>3</sub> )	mg/L	0.50	-	0.51	32.18	-	0.57	0.51	0.69	0.00	0.00
TSS	µg/L	3000	-	-	-	-	-	-	-	-	-
TDS	µg/L	13000	-	-	4.65	-	-	0.00	-	-	1.93
<b>Alkalinity Anions &amp; Nutrients</b>											
Acidity (as CaCO <sub>3</sub> )	µg/L	1000	20	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate (as CaCO <sub>3</sub> )	µg/L	1000	20	-	-	0.77	-	-	-	-	0.00
Alkalinity, Carbonate (as CaCO <sub>3</sub> )	µg/L	1000	20	-	-	-	-	-	-	-	-
Alkalinity, Hydroxide (as CaCO <sub>3</sub> )	µg/L	1000	20	-	-	-	-	-	-	-	-
Alkalinity, Total (as CaCO <sub>3</sub> )	µg/L	1000	20	0.51	4.15	0.77	0.54	0.55	0.39	1.43	0.00
Bromide	µg/L	50	20	-	-	-	-	-	-	-	-
Chloride	mg/L	0.50	20	-	-	-	-	-	-	-	-
Fluoride	µg/L	20.00	20	-	-	1.83	-	-	-	-	3.16
Nitrate as N	mg/L	0.0050	20	-	-	-	1.41	-	-	-	-
Nitrite as N	µg/L	1.0	20	-	-	-	-	-	-	-	-
Sulfate	mg/L	0.30	20	1.97	2.40	2.90	0.00	0.81	2.56	2.01	0.25

**Notes:**

- MDL = Method detection limit
- nm = not measured
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- mg/L = milligram per litre
- µs/cm = microsiemens per centimeter
- na = not analyzed

**QA/QC**

3. Allowable RPDs as identified in BC Environmental Laboratory Manual (February 2016), Section A, Table 2

4. RPDs calculated only where both values are greater than 5 times the method detection limit

- = not calculated
- RPD = Representative percent difference
- 1 = calculated RPD exceeds allowable RPD



**Table 14: Groundwater Analytical Results – Cyanide and Glycol**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

Parameters	Units	MDL	AEC 1: Mill / 10 Level Portal														AEC 5: Main Landfill				
			MW17-1		MW17-2		MW17-3	MW17-4			MW17-5		MW17-7	MW17-8		MW17-22					
Sample Station	Sample ID	Sample Collection Date	Lab ID #	MW17-1A	MW17-1B	MW17-2A	MW17-2B	MW17-3	MW17-4A	MW17-4B	MW17-4B "DUP 1"	MW17-4B	MW17-5A	MW17-5B	MW17-7A	MW17-8A	MW17-8B	MW17-8B "DUP C"	MW17-22A	MW17-22A	MW17-22A
Field Screening																					
Sample Headspace Vapour Concentration	ppmv	5.00		nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Conductivity	µs/cm	1		455	285	209	487	329	147.1	408	408	288	456	1307	267	207	345	345	210	322	198.6
Cyanide and Glycols																					
Cyanide, Total	µg/L	5.0		23.3	25.5	<5.0	5.2	<5.0	<5.0	11.1	11.7	11.2	<5	<5	<5	<5	<5	<5	<5.0	<1.0	<5.0

**Notes:**

- MDL = Method detection limit
- na = not analyzed
- nm = not measured
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- mg/L = milligram per litre
- µs/cm = microsiemens per centimeter
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**Table 14: Groundwater Analytical Results – Cyanide and Glycol**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

Parameters	APEC/Issue		AEC 5: Main Landfill							AEC 2: Tank Farm / Fuel Lines				Tailings Impoundment Downstream								
	Sample Station		MW17-22							MW17-13		MW17-17		MW17-18			MW17-19		MW17-20			
	Sample ID		MW17-22A	MW17-22A	MW17-22A	MW17-22B	MW17-22B DUP A	MW17-22B	MW17-22B	MW17-22B	MW17-22B	MW17-13	MW17-13	MW17-17A	MW17-17B	MW17-18A	MW17-18B	MW17-18B DUP D	MW17-19A	MW17-19B	MW17-20A	MW17-20A
	Sample Collection Date	Lab ID #	11-Sep-18	17-Jul-19	28-Aug-2020	23-Jul-17	23-Jul-17	9-Jul-18	10-Sep-18	17-Jul-19	28-Aug-2020	24-Oct-17	2-Jul-18	1-Jul-18	1-Jul-18	24-Jul-17	24-Jul-17	24-Jul-17	23-Jul-17	23-Jul-17	23-Jul-17	21-Oct-17
Units	MDL																					
Sample Headspace Vapour Concentration	ppmv	5.00	nm		nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Conductivity	µs/cm	1	320.8		238.7	63	63	42.3	77		30.3	305	179.4	139.2	115.8	462	151	151	587	153	273	278
Cyanide, Total	µg/L	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<1.0	<5.0	<5.0	<5.0	<5.0	<5	<5	<5	<5	<5	<1

**Notes:**

- MDL = Method detection limit
- na = not analyzed
- nm = not measured
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- mg/L = milligram per litre
- µs/cm = microsiemens per centimeter
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

**Table 14: Groundwater Analytical Results – Cyanide and Glycol**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

Parameters	APEC/Issue		Tailings Impoundment Downstream						APEC 10 : Burial Site 1						APEC 12: Burial Site 2				AEC 8: Burial Site 2			
	Sample Station		MW17-20		MW17-23		MW17-25		MW17-9						MW17-14				MW17-14			
	Sample ID		MW17-20B	MW17-20B	MW17-23A	MW17-23A	MW17-23B	MW17-25A	MW17-25B	MW17-9A	MW17-9A	MW17-9A	MW17-9B	MW17-9B	MW17-9B	MW17-9B	MW17-14A	MW17-14A	MW17-14A	MW17-14B	MW17-14B	MW17-14B
	Sample Collection Date		23-Jul-17	21-Oct-17	23-Jul-17	22-Oct-17	23-Jul-17	23-Jul-17	23-Jul-17	28-Jul-17	2-Jul-18	18-Nov-18	24-Jul-17	2-Jul-18	2-Jul-18	18-Nov-18	24-Jul-17	1-Jul-18	25-Nov-18	24-Jul-17	1-Jul-18	25-Nov-18
	Lab ID #		L1966041-4	L2014861-2	L1966041-12	L2014861-3	L1966041-13	L1966041-14	L1966041-15	L1966936-1	L2123781-6	L2200711-2	L1966041-19	L2123781-5	L2123781-10	L2200711-3	L1966041-24	L2123781-3	L2203208-2	L1966041-25	L2123781-4	L2203208-1
	Units	MDL																				
<b>Field Screening</b>																						
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm
Conductivity	µs/cm	1	78	58.2	257	213	157	348	137	755	515	383	473	250.8	250.8	579	264	184.4	343	192	108.6	177
<b>Cyanide and Glycols</b>																						
Cyanide, Total	µg/L	5.0	<5	<1	<5	<1	<5	<5	<5	<5.0	<5.0	<1.0	<5.0	<5.0	<5.0	<1.0	<5.0	<5.0	<1.0	<5.0	<5.0	<1.0

**Notes:**

- MDL = Method detection limit
- na = not analyzed
- nm = not measured
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- mg/L = milligram per litre
- µs/cm = microsiemens per centimeter
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit



**Table 14: Groundwater Analytical Results – Cyanide and Glycol**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

APEC/Issue			QA/QC					
Sample Station								
Sample ID			-	MW17-4B "DUP 1"	MW17-8B "DUP C"	MW17-22B DUP A	MW17-18B DUP D	MW17-9BFD
Sample Collection Date			-	23-Oct-17	24-Jul-17	23-Jul-17	24-Jul-17	02-Jul-18
Lab ID #			-	L2014860-4	L1966041-18	L1966041-8	L1966041-28	L2123781-10
Parameters	Units	MDL	Allowable RPD <sup>3</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)	Calculated RPD <sup>4</sup> (%)
<b>Field Screening</b>								
Sample Headspace Vapour Concentration	ppmv	5.00	-	-	-	-	-	-
Conductivity	µs/cm	1	-	-	-	-	-	-
<b>Cyanide and Glycols</b>								
Cyanide, Total	µg/L	5.0	20	-	-	-	-	-

**Notes:**

- MDL = Method detection limit
- na = not analyzed
- nm = not measured
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- mg/L = milligram per litre
- µs/cm = microsiemens per centimeter
- µg/g = micrograms per gram (parts per million)
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit

3. Allowable RPDs as identified in BC Environmental Laboratory Manual (February 2016), Section A, Table 2

4. RPDs calculated only where both values are greater than 5 times the method detection limit

- = not calculated

RPD = Representative percent difference

1 = calculated RPD exceeds allowable RPD



**Table 15A: Landfill Monitoring Field Parameters**

Johnny Mountain Mine Reclamation Project	<b>Location</b>	<b>Main Landfill</b>													
Snip Gold Corporation	<b>Sample Station</b>	MW17-22													
Johnny Mountain Mine	<b>Sample ID</b>	MW17-22A							MW17-22B						
VE52655D	<b>Sample Collection Date</b>	28-Jul-17	22-Oct-17	9-Jul-18	11-Sep-18	17-Jul-19	4-Sep-19	28-Aug-20	23-Jul-17	23-Jul-17	9-Jul-18	10-Sep-18	17-Jul-19	4-Sep-19	28-Aug-20
<b>Parameters</b>	<b>Units</b>														
<b>Field Screening</b>															
pH	unitless	7.89	7.47	8.09	7.57	7.57	7.78	7.42	5.71	5.71	6.95	6.39	6.75	6.31	6.39
Redox Potential	mV	129.9	184	-55.3	-77	-25.2	0	-40	196.1	196.1	22.4	39	46.6	2.3	109.7
Temperature	°C	nm	nm	nm	nm	6.95	4.65	4.5	nm	nm	nm	nm	6.52	7.82	5.7
Conductivity	µs/cm	210	322	198.6	320.8	34.5	60	238.7	63	63	42.3	77	70	42.0	30.3

**Notes:**

- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- mV = millivolts
- µs/cm = microsiemens per centimeter



**Table 15B: Landfill Monitoring – PHCs**

Johnny Mountain Mine Reclamation Project  
 Snip Gold Corporation  
 Johnny Mountain Mine  
 VE52655D

Parameters	Units	Method Detection Limit	Main Landfill											
			Sample Station											
			MW17-22A						MW17-22B					
			Sample Collection Date	28-Jul-17	22-Oct-17	9-Jul-18	11-Sep-18	17-Jul-19	28-Aug-20	23-Jul-17	23-Jul-17	9-Jul-18	10-Sep-18	17-Jul-19
<b>Petroleum Hydrocarbons (PHCs)</b>														
VHw	µg/L	100	2260	na	730	360	nm	nm	<100	<100	<100	<100	nm	nm
VPH	µg/L	100	900	na	330	130	nm	nm	<100	<100	<100	<100	nm	nm
EPHw10-19	µg/L	250	870	570	370	<250	<250	<250	<250	<250	<250	<250	<250	<250
EPH19-32	µg/L	250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250
LEPHw	µg/L	250	790	520	340	<250	<250	<250	<250	<250	<250	<250	<250	<250
HEPH	µg/L	250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250

**Notes:**

- VPH = volatile petroleum hydrocarbons excluding BTEX.
- VH<sub>(6-10)</sub> = volatile hydrocarbons including BTEX.
- EPHw<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPHw = light extractable petroleum hydrocarbons in water
- HEPH = heavy extractable petroleum hydrocarbons
- na = not analyzed
- nm = not measured
- ppmv = parts per million by volume
- < = concentration is less than reported method detection limit
- nm = not measured

**Table 15C: Landfill Monitoring – PAHs**

Johnny Mountain Mine Reclamation Project  
 Snip Gold Corporation  
 Johnny Mountain Mine  
 VE52655D

Parameters	Units	Method Detection Limit	Location		Main Landfill									
			Sample Station		MW17-22									
			Sample ID		MW17-22A					MW17-22B				
			Sample Collection Date		28-Jul-17	22-Oct-17	9-Jul-18	11-Sep-18	17-Jul-19	28-Aug-2020	23-Jul-17	23-Jul-17	9-Jul-18	10-Sep-18
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>														
Acenaphthene	µg/L	0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010
Acenaphthylene	µg/L	0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010
Acridine	µg/L	0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010
Anthracene	µg/L	0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010
Benz(a)anthracene	µg/L	0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010
Benzo(a)pyrene	µg/L	0.0050	<0.005	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.005	<0.005	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(b+j)fluoranthenes	µg/L	0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010
Benzo(b+j+k)fluoranthene	µg/L	0.0150	na	na	<0.015	<0.015	<0.015	<0.015	na	na	<0.015	<0.015	<0.015	<0.015
Benzo(g,h,i)perylene	µg/L	0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010
Benzo(k)fluoranthene	µg/L	0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010
Chrysene	µg/L	0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010
Dibenz(a,h)anthracene	µg/L	0.0050	<0.005	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.005	<0.005	<0.0050	<0.0050	<0.0050	<0.0050
Fluoranthene	µg/L	0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010
Fluorene	µg/L	0.010	<0.05	<0.05	<0.020	<0.030	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010
Indeno(1,2,3-c,d)pyrene	µg/L	0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010
Methylnaphthalene, 1-	µg/L	0.050	na	na	5.11	2.36	1.63	2.9	na	na	<0.050	<0.050	<0.050	<0.010
Methylnaphthalene, 2-	µg/L	0.050	na	na	8.91	4.14	3.18	3.63	na	na	<0.050	<0.050	<0.050	<0.010
Naphthalene	µg/L	0.050	82.9	43.9	20.7	9.2	3.17	4.27	1.87	1.93	<0.050	<0.050	<0.050	<0.050
Phenanthrene	µg/L	0.020	<0.05	<0.05	<0.020	<0.020	<0.020	<0.020	<0.05	<0.05	<0.020	<0.020	<0.020	<0.020
Pyrene	µg/L	0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010
Quinoline	µg/L	0.050	<4.0	<0.05	<0.90	<0.502	<0.60	<5.50	<0.40	<0.40	<0.050	<0.050	<0.050	<0.050

**Notes:**

ppmv = parts per million by volume

µg/L = microgram per litre

< = concentration is less than reported method detection limit



**Table 15D: Landfill Monitoring – VOCs**

Johnny Mountain Mine Reclamation Project Snip Gold Corporation Johnny Mountain Mine VE52655D			APEC/Issue		Main Landfill					
			Sample Station		MW17-22					
			Sample ID		MW17-22A			MW17-22B		
			Sample Collection Date		9-Jul-18	17-Jul-19	28-Aug-2020	09-Jul-18	17-Jul-19	28-Aug-2020
Parameters	Units	Method Detection Limit								
<b>Volatile Organic Compounds (VOCs)</b>										
Benzene	ug/L	0.5	1.07	<0.50	<0.50	<0.50	<0.50	<0.50		
Bromodichloromethane	ug/L	1.0	nm	<1.0	<0.50	nm	<1.0	<0.50		
Bromoform	ug/L	1.0	nm	<1.0	<0.50	nm	<1.0	<0.50		
Carbon Tetrachloride	ug/L	0.5	nm	<0.50	<0.50	nm	<0.50	<0.50		
Chlorobenzene	ug/L	1.0	nm	<1.0	<0.50	nm	<1.0	<0.50		
Dibromochloromethane	ug/L	1.0	nm	<1.0	<0.50	nm	<1.0	<0.50		
Chloroethane	ug/L	1.0	nm	<1.0	<0.50	nm	<1.0	<0.50		
Chloroform	ug/L	1.0	nm	<1.0	<0.50	nm	<1.0	<0.50		
Chloromethane	ug/L	5.0	nm	<5.0	<5.0	nm	<5.0	<5.0		
1,2-Dichlorobenzene	ug/L	0.5	nm	<0.50	<0.50	nm	<0.50	<0.50		
1,3-Dichlorobenzene	ug/L	1.0	nm	<1.0	<0.50	nm	<1.0	<0.50		
1,4-Dichlorobenzene	ug/L	1.0	nm	<1.0	<0.50	nm	<1.0	<0.50		
1,1-Dichloroethane	ug/L	1.0	nm	<1.0	<0.50	nm	<1.0	<0.50		
1,2-Dichloroethane	ug/L	1.0	nm	<1.0	<0.50	nm	<1.0	<0.50		
1,1-Dichloroethylene	ug/L	1.0	nm	<1.0	<0.50	nm	<1.0	<0.50		
cis-1,2-Dichloroethylene	ug/L	1.00	nm	<1.0	<0.50	nm	<1.0	<0.50		
trans-1,2-Dichloroethylene	ug/L	1.0	nm	<1.0	<0.50	nm	<1.0	<0.50		
Dichloromethane	ug/L	5.0	nm	<5.0	<0.50	nm	<5.0	<0.50		
1,2-Dichloropropane	ug/L	1.0	nm	<1.0	<0.50	nm	<1.0	<0.50		
cis-1,3-Dichloropropylene	ug/L	0.5	nm	<0.50	<0.50	nm	<0.50	<0.50		
trans-1,3-Dichloropropylene	ug/L	0.5	nm	<0.50	<0.50	nm	<0.50	<0.50		
1,3-Dichloropropene (cis & trans)	ug/L	1.00	nm	<1.0	<0.75	nm	<1.0	<0.75		
Ethylbenzene	ug/L	0.5	43.9	6.74	2.14	<0.50	<0.50	<0.50		
Methyl t-butyl ether (MTBE)	ug/L	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50		
Styrene	ug/L	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50		
1,1,1,2-Tetrachloroethane	ug/L	1.0	nm	<1.0	<0.50	nm	<1.0	<0.50		
1,1,2,2-Tetrachloroethane	ug/L	0.2	nm	<1.0	<0.20	nm	<0.20	<0.20		
Tetrachloroethylene	ug/L	1.0	nm	<1.0	<0.50	nm	<1.0	<0.50		
Toluene	ug/L	0.5	31.7	1.91	<0.40	<0.45	<0.45	<0.40		
1,1,1-Trichloroethane	ug/L	1.0	nm	<1.0	<0.50	nm	<1.0	<0.50		
1,1,2-Trichloroethane	ug/L	0.5	nm	<0.50	<0.50	nm	<0.50	<0.50		
Trichloroethylene	ug/L	1.00	nm	<1.0	<0.50	nm	<1.0	<0.50		
Trichlorofluoromethane	ug/L	1.00	nm	<1.0	<0.50	nm	<1.0	<0.50		
Vinyl Chloride	ug/L	0.4	nm	<0.40	<0.40	nm	<0.40	<0.40		
ortho-Xylene	ug/L	0.5	nm	<0.50	0.65	nm	<0.50	<0.50		
meta- & para-Xylene	ug/L	0.50	nm	8.51	<0.50	nm	<0.50	<0.50		
Xylenes	ug/L	0.8	nm	8.51	<0.75	nm	<0.75	<0.75		

**Notes:**

- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit
- nm = not measured

**Table 15E: Landfill Monitoring – Dissolved Metals**

Johnny Mountain Mine Reclamation Project  
 Snip Gold Corporation  
 Johnny Mountain Mine  
 VE52655D

Parameters	Units	Method Detection Limit	Main Landfill											
			Sample Station											
			Sample ID											
			Sample Collection Date											
			MW17-22A						MW17-22B					
			28-Jul-17	22-Oct-17	9-Jul-18	11-Sep-18	17-Jul-19	28-Aug-2020	23-Jul-17	23-Jul-17	9-Jul-18	10-Sep-18	17-Jul-19	28-Aug-2020
<b>Metals (General)</b>														
Aluminum	µg/L	1.0	15	10.5	4.8	14.8	384	5.6	<10	<10	1.8	<1.0	1.9	1.7
Antimony	µg/L	0.10	3.67	1.35	<0.10	0.33	0.6	0.25	<0.5	<0.5	<0.10	<0.10	<0.10	<0.10
Arsenic	µg/L	0.10	1	1.33	3.33	2.36	3.02	1.56	<1	<1	<0.10	<0.10	<0.10	<0.10
Barium	µg/L	0.10	23	21.7	37.3	38.3	42.8	39.3	<20	<20	9.14	10.5	9.31	8.13
Beryllium	µg/L	0.10	<5	<0.1	<0.10	<0.10	<0.10	<0.100	<5	<5	<0.10	<0.10	<0.10	<0.100
Bismuth	µg/L	0.050	na	<0.050	<0.050	<0.050	<0.050	<0.050	na	na	<0.050	<0.050	<0.050	<0.050
Boron	µg/L	10	<100	24	27	28	21	14	<100	<100	<10	<10	<10	<10
Cadmium	µg/L	0.0050	<0.05	<0.005	<0.0050	0.01	0.08	0.0388	<0.05	<0.05	0.07	0.07	0.07	0.0537
Calcium	mg/L	50	42.2	35.5	42.9	38.5	43900	44800	10.3	10.3	11.2	12.3	9950	8540
Cesium	µg/L	0.010	na	na	<0.010	<0.010	0.025	<0.010	na	na	<0.010	<0.010	<0.010	<0.010
Chromium (Total) <sup>1</sup>	µg/L	0.10	<0.5	<0.1	<0.10	<0.10	0.37	<0.10	<0.5	<0.5	<0.10	<0.10	<0.10	<0.10
Cobalt	µg/L	0.10	<0.5	0.11	<0.10	<0.10	0.49	<0.10	<0.5	<0.5	<0.10	<0.10	<0.10	<0.10
Copper	µg/L	0.20	<1	0.90	<0.20	1.29	1.64	3.67	<1	<1	<0.20	<0.20	0.22	<0.20
Iron <sup>2</sup>	µg/L	10	<30	<30	366	193	978	32	<30	<30	<10	<10	<10	<10
Lead	µg/L	0.050	<1	<0.05	<0.050	0.14	0.82	0.192	<1	<1	<0.050	<0.050	<0.050	<0.050
Lithium	µg/L	1.0	<50	5.8	5.5	5.3	5.5	5.1	<50	<50	<1.0	<1.0	<1.0	<1.0
Magnesium	µg/L	5.0	6460	6220	9320	8540	9140	8590	740	730	1030	1020	835	755
Manganese	µg/L	0.10	33	147	448	452	303	183	32	32	4.8	3.24	2.05	0.99
Mercury	µg/L	0.0050	<0.2	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.2	<0.2	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum	µg/L	0.050	3.2	3.2	2.79	2.24	2.59	2.6	<1	<1	0.085	0.074	0.078	0.069
Nickel	µg/L	0.50	<5	0.57	<0.50	0.54	1.11	0.89	<5	<5	<0.50	<0.50	<0.50	<0.50
Phosphorus	µg/L	50	na	<300	<50	90	300	<50	na	na	<50	<50	<50	<50
Potassium	µg/L	50	6000	5190	4870	5050	4080	4000	<2000	<2000	401	476	444	443
Rubidium	µg/L	0.20	na	na	0.6	0.74	1.36	0.91	na	na	0.53	0.72	0.68	0.78
Selenium	µg/L	0.050	<1	0.185	1.93	0.392	0.178	0.065	<1	<1	0.069	0.11	0.101	<0.050
Silicon	µg/L	50	na	3640	5520	5060	6240	5720	na	na	2070	2380	2370	1900
Silver	µg/L	0.010	<0.05	<0.01	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010
Sodium	mg/L	50	19.1	19.1	17.8	16.8	16600	15600	<2	<2	0.65	0.806	3980	696
Strontium	µg/L	0.20	na	235	325	311	341	396	na	na	41.9	51.1	45.5	33.1
Sulfur	mg/L	500	na	na	8.66	9.01	11300	16400	na	na	0.82	1.14	1220	<500
Tellurium	µg/L	0.20	na	na	<0.20	<0.20	<0.20	<0.20	na	na	<0.20	<0.20	<0.20	<0.20
Thallium	µg/L	0.010	<0.2	<0.01	<0.010	<0.010	0.047	<0.010	<0.2	<0.2	<0.010	<0.010	<0.010	<0.010
Thorium	µg/L	0.10	na	na	<0.10	<0.10	<0.10	<0.10	na	na	<0.10	<0.10	<0.10	<0.10
Tin	µg/L	0.10	na	0.43	0.12	0.2	0.25	0.38	na	na	<0.10	<0.10	<0.10	<0.10
Titanium	µg/L	0.30	<50	<10	<0.30	<0.30	<11	<0.30	<50	<50	<0.30	<0.30	<0.30	<0.30
Tungsten	µg/L	0.10	na	na	<0.10	<0.10	<0.10	<0.10	na	na	<0.10	<0.10	<0.10	<0.10
Uranium	µg/L	0.010	1.09	1.13	0.675	0.51	0.723	0.624	<0.2	<0.2	<0.010	<0.010	<0.010	0.018
Vanadium	µg/L	0.50	<30	<0.5	<0.50	<0.50	0.96	<0.50	<30	<30	<0.50	<0.50	<0.50	<0.50
Zinc	µg/L	1.0	<5	<3	1.80	4.30	4.80	4.6	<5	<5	2.30	1.40	1.80	1.1
Zirconium	µg/L	0.200	na	na	<0.060	0.08	<0.20	<0.20	na	na	<0.060	<0.060	<0.20	<0.20

**Notes:**

- na = not analyzed
- mg/L = milligram per litre
- µg/L = micrograms per litre
- < = concentration is less than reported method detection limit



**Table 15F: Landfill Monitoring – Total Metals**

Parameters	Units	Method Detection Limit	Location		Main Landfill	
			Sample Station		MW17-22	
			Sample ID		MW17-22A	MW17-22B
			Sample Collection Date		17-Jul-19	28-Aug-2020
					17-Jul-19	28-Aug-2020
<b>Metals (General)</b>						
Aluminum	µg/L	15.0	33	244	1110	9.6
Antimony	µg/L	0.50	0.91	0.5	<0.50	<0.10
Arsenic	µg/L	0.50	2.64	3.24	2.67	<0.10
Barium	µg/L	0.50	27.4	43.6	22.6	6.79
Beryllium	µg/L	0.50	<0.50	<0.100	<0.50	<0.100
Bismuth	µg/L	0.250	<0.25	<0.050	<0.25	<0.050
Boron	µg/L	50	<50	13	<50	<10
Cadmium	µg/L	0.0250	0.04	0.165	0.24	0.0532
Calcium	mg/L	250	40300	41000	10500	7150
Cesium	µg/L	0.050	<0.050	0.023	0.12	<0.010
Chromium (Total) <sup>1</sup>	µg/L	0.50	<0.50	1.07	1.78	<0.10
Cobalt	µg/L	0.50	<0.50	0.3	1.55	<0.10
Copper	µg/L	2.50	<2.5	2.78	9.10	<0.50
Iron <sup>2</sup>	µg/L	50	132	840	2680	20
Lead	µg/L	0.250	0.35	1.07	2.51	<0.050
Lithium	µg/L	5.0	<5.0	5.4	<5.0	<1.0
Magnesium	µg/L	25.0	8140	8670	1380	576
Manganese	µg/L	0.50	115	337	113	1.9
Mercury	µg/L	0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum	µg/L	0.250	2.49	2.54	0.26	0.064
Nickel	µg/L	2.50	<2.5	1.73	<2.5	<0.50
Phosphorus	µg/L	250	410	85	<250	<50
Potassium	µg/L	250	3680	4170	740	421
Rubidium	µg/L	1.00	<1.0	1.32	2.2	0.67
Selenium	µg/L	0.250	<0.25	0.144	<0.25	<0.050
Silicon	µg/L	500	5530	6030	3750	2100
Silver	µg/L	0.050	<0.050	0.015	0.109	<0.010
Sodium	mg/L	250	17200	15200	810	647
Strontium	µg/L	1.00	323	372	45.2	29.9
Sulfur	mg/L	2500	13400	16600	<2500	600
Tellurium	µg/L	1.00	<1.0	<0.20	<1.0	<0.20
Thallium	µg/L	0.050	<0.050	0.012	<0.050	<0.010
Thorium	µg/L	0.50	<0.50	<0.10	<0.50	<0.10
Tin	µg/L	0.50	1.19	1.71	<0.50	<0.10
Titanium	µg/L	1.50	<1.5	9.34	63.6	0.31
Tungsten	µg/L	0.50	<0.50	<0.10	<0.50	<0.10
Uranium	µg/L	0.050	0.561	0.652	0.063	<0.010
Vanadium	µg/L	2.50	<2.5	0.64	3.6	<0.50
Zinc	µg/L	15.0	<15	10.6	<15	<3.0
Zirconium	µg/L	1.000	<1.0	0.37	<1.0	<0.20

**Notes:**

- na = not analyzed
- mg/L = milligram per litre
- µg/L = micrograms per litre
- < = concentration is less than reported method detection limit

**Table 15G: Landfill Monitoring – Anions and Nutrients**

Parameters		Units Method Detection Limit		Main Landfill															
				MW17-22															
				MW17-22A								MW17-22B							
				Sample Collection Date	28-Jul-17	22-Oct-17	9-Jul-18	11-Sep-18	17-Jul-19	4-Sep-19	28-Aug-2020	23-Jul-17	23-Jul-17	9-Jul-18	10-Sep-18	17-Jul-19	4-Sep-19	28-Aug-2020	
<b>Physiochemical Parameters</b>																			
pH	pH	0.10	7.89	8.30	8.23	8.20	8.27	nm	8.06	5.71	5.71	7.20	7.16	7.60	nm	6.86			
Conductivity	uS/cm	2.0	343.00	353.00	367.00	357.00	336.00	nm	350	58.50	57.20	71.70	78.80	60.70	nm	44.9			
Hardness (CaCO3)	ug/L	500.00	132000	114000	146000	131000	147000	nm	147000	28800	28800	32200	34900	28300	nm	24400			
Total Suspended Solids	ug/L	3000	nm	220000.00	233000.00	211000.00	nm	<3000	<3000	na	na	46000.00	49000.00	58100	<3000	<3000			
Total Dissolved Solids	ug/L	13000	nm	nm	nm	nm	229000	nm	213000.00	nm	nm	nm	nm	50000	nm	30000.00			
Turbidity	NTU	0.10	nm	3.49	16.20	3.58	3.31	nm	3.26	na	na	7.38	2.72	23.70	nm	0.17			
<b>Alkalinity Anions &amp; Nutrients</b>																			
Acidity (as CaCO3)	ug/L	1000	nm	nm	nm	nm	nm	<1000	<2000	nm	nm	nm	nm	<25000	1800	3400			
Alkalinity, Total (as CaCO3)	ug/L	1000	113000	122000	181000	165000	146000	nm	136000	28100	27700	33900	37100	30100	nm	18800			
Ammonia, Total (as N)	ug/L	5	nm	nm	nm	nm	<5.0	nm	16.9	nm	nm	nm	nm	<5.0	nm	<5			
Bromide	ug/L	50	<50	<50	<50	<50	<50	nm	nm	<50	<50	<50	<50	<50	nm	nm			
Chloride	ug/L	500.00	3.66	2.3	0.8	<0.50	<0.50	nm	<500	<0.50	<0.50	3.91	<0.50	<0.50	nm	<500			
Fluoride	ug/L	20.00	477	548	463	478	553	nm	584	21	21	629	<20	21	nm	<20			
Nitrate as N	ug/L	5.0000	<0.005	<0.005	<0.005.0	<0.0050	<5.0	nm	<5	<0.005	<0.005	4.71	<0.0050	5.4	nm	34.2			
Nitrite as N	ug/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	nm	<1	<1.0	<1.0	7.8	<1.0	1.9	nm	<1			
Total Kjeldahl Nitrogen	ug/L	50.0	nm	nm	nm	nm	77	nm	202	nm	nm	nm	nm	<50	nm	<50			
Total Nitrogen	ug/L	30	nm	nm	nm	nm	73	nm	196	nm	nm	nm	nm	58	nm	<30			
Phosphorus (P)-Total	ug/L	2	nm	nm	nm	nm	392	nm	67.6	nm	nm	nm	nm	14.3	nm	3.5			
Sulfate	mg/L	0.3	60.5	54.3	16.3	27.1	38	nm	44	3.02	2.96	741	3.39	3.1	nm	1.93			

- Notes:**
- nm = not measured
  - ug/L = microgram per litre
  - mg/L = milligram per litre
  - us/cm = microsiemens per centimeter



**Table 15H: Landfill Monitoring – Cyanide and Total Phenols**

Johnny Mountain Mine Reclamation Project  
 Snip Gold Corporation  
 Johnny Mountain Mine  
 VE52655D

		Location		Main Landfill											
		Sample Station		MW17-22											
		Sample ID		MW17-22A						MW17-22B					
		Sample Collection Date		28-Jul-17	22-Oct-17	9-Jul-18	11-Sep-18	17-Jul-19	28-Aug-2020	23-Jul-17	23-Jul-17	9-Jul-18	10-Sep-18	17-Jul-19	28-Aug-2020
Parameters		Units	Method Detection Limit												
<b>Cyanide</b>															
Cyanide, Total		ug/L	5.0	<5.0	<1.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	
Cyanide, Weak Acid Diss		ug/L	5	<5.0	<1.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	
Cyanate		ug/L	200.0	<200	na	<200	<200	<200	<200	<200	<200	<200	<200	<200	
Thiocyanate (SCN)		ug/L	100.0	<500	na	<500	<500	<500	<500	<500	<500	<500	580	<500	
Cyanide, Free		ug/L	5	<5.0	na	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	
<b>Phenols</b>															
Total Phenolic Compunds		ug/L	1.0	nm	nm	nm	nm	<1.0	<1.0	nm	nm	nm	nm	<1.0	

**Notes:**

- µg/L = microgram per litre
- mg/L = milligram per litre
- < = concentration is less than reported method detection limit
- = no applicable units / method detection limit
- nm = not measured

**Table 15I: Landfill Monitoring – Carbon and COD**

Johnny Mountain Mine Reclamation Project			<b>Location</b>		<b>Main Landfill</b>											
Snip Gold Corporation			<b>Sample Station</b>		MW17-22											
Johnny Mountain Mine			<b>Sample ID</b>		MW17-22A					MW17-22B						
VE52655D			<b>Sample Collection Date</b>		28-Jul-17	22-Oct-17	9-Jul-18	11-Sep-18	17-Jul-19	28-Aug-2020	23-Jul-17	23-Jul-17	9-Jul-18	10-Sep-18	17-Jul-19	28-Aug-2020
<b>Parameters</b>	<b>Units</b>	<b>Method Detection Limit</b>														
<b>Carbon</b>																
Total Inorganic Carbon	µg/L	500	28800	nm	nm	nm	33200	33300	7860	8220	nm	nm	8830	7040		
Total Organic Carbon	µg/L	500	3800	nm	nm	nm	2920	2460	640	540	nm	nm	680	520		
<b>COD</b>																
Chemical Oxygen Demand	µg/L	20000	27000	nm	nm	nm	<20000	<20000	<20,000	<20,000	nm	nm	<20000	<20000		

**Notes:**

- na = not analyzed
- nm = not measured
- µg/L = microgram per litre
- < = concentration is less than reported method detection limit



**Table 16A: Surface Water Analytical Results – PHCs**

Johnny Mountain Mine Reclamation Project  
 SnipGold Corporation  
 VE52655D  
 Johnny Mountain Mine  
 Nov-20

	APEC/Issue		Surface Water Sampling		
	Sample Station		SW20-01	SW20-02	SW20-03
	Sample ID		SW20-01	SW20-02	SW20-03
	Sample Collection Date		29-Aug-2020	29-Aug-2020	29-Aug-2020
	Lab ID #		VA20B4178-001	VA20B4178-002	VA20B4178-003
	Sample Analysis Date				
Parameters	Units	MDL			
<b>Field Screening</b>					
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm
Noticable Odour	-	-	nm	nm	nm
Conductivity	µs/cm	2	nm	nm	nm
<b>Petroleum Hydrocarbons (PHCs)</b>					
Benzene	µg/L	0.50	na	<0.50	<0.50
Ethylbenzene	µg/L	0.50	na	<0.50	<0.50
Toluene	µg/L	0.45	na	<0.40	<0.40
ortho-Xylene	µg/L	0.50	na	<0.50	<0.50
meta- & para-Xylene	µg/L	0.50	na	<0.50	<0.50
Xylenes (Total)	µg/L	0.75	na	<0.75	<0.75
VHw6-10	µg/L	100	na	na	na
VPHw	µg/L	100	na	na	na
Methyl-tert-butyl ether [MTBE]	µg/L	0.50	na	<0.50	<0.50
Styrene	µg/L	0.50	na	<0.50	<0.50
EPHw10-19	µg/L	250	na	<250	<250
EPH19-32	µg/L	250	na	<250	<250
LEPHw	µg/L	250	na	<250	<250
HEPH	µg/L	250	na	<250	<250

**Notes:**

- MDL = Method detection limit
- EPHw<sub>10-19</sub> = extractable petroleum hydrocarbons (carbon chains c10 through c19)
- EPH<sub>19-32</sub> = extractable petroleum hydrocarbons (carbon chains c19 through c32)
- LEPHw = light extractable petroleum hydrocarbons in water
- HEPH = heavy extractable petroleum hydrocarbons
- VPHw = volatile petroleum hydrocarbons in water
- VHw(6-10) = volatile hydrocarbons in water
- na = not analyzed
- nm = not measured
- no = none observed
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit

**Table 16B: Surface Water Analytical Results – PAHs**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

Parameters	APEC/Issue		Surface Water Sampling		
	Sample Station		SW20-01	SW20-02	SW20-03
	Sample ID		SW20-01	SW20-02	SW20-03
	Sample Collection Date		29-Aug-2020	29-Aug-2020	29-Aug-2020
	Lab ID #		VA20B4178-001	VA20B4178-002	VA20B4178-003
	Units	MDL			
<b>Field Screening</b>					
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm
Noticable Odour	-	-	nm	nm	nm
Conductivity	µs/cm	1	nm	nm	nm
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>					
Acenaphthene	µg/L	0.010	na	<0.010	<0.010
Acenaphthylene	µg/L	0.010	na	<0.010	<0.010
Acridine	µg/L	0.010	na	<0.010	<0.010
Anthracene	µg/L	0.010	na	<0.010	<0.010
Benz(a)anthracene	µg/L	0.010	na	<0.010	<0.010
Benzo(a)pyrene	µg/L	0.0050	na	<0.0050	<0.0050
Benzo(b+j)fluoranthenes	µg/L	0.010	na	<0.010	<0.010
Benzo(b+j+k)fluoranthene	µg/L	0.0150	na	<0.015	<0.015
Benzo(g,h,i)perylene	µg/L	0.010	na	<0.010	<0.010
Benzo(k)fluoranthene	µg/L	0.010	na	<0.010	<0.010
Chrysene	µg/L	0.010	na	<0.010	<0.010
Dibenz(a,h)anthracene	µg/L	0.0050	na	<0.0050	<0.0050
Fluoranthene	µg/L	0.010	na	<0.010	<0.010
Fluorene	µg/L	0.010	na	<0.010	<0.010
Indeno(1,2,3-c,d)pyrene	µg/L	0.010	na	<0.010	<0.010
Methylnaphthalene, 1-	µg/L	0.010	na	0.024	<0.010
Methylnaphthalene, 2-	µg/L	0.010	na	0.018	<0.010
Naphthalene	µg/L	0.050	na	<0.050	<0.050
Phenanthrene	µg/L	0.020	na	<0.020	<0.020
Pyrene	µg/L	0.010	na	<0.010	<0.010
Quinoline	µg/L	0.050	na	<0.050	<0.050

**Notes:**

- MDL = Method detection limit
- nm = not measured
- ns = no applicable standard
- ppmv = parts per million by volume
- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit

**Table 16C: Surface Water Analytical Results – Total Metals**

Johnny Mountain Mine Reclamation Project

Johnny Mountain Mine

VE52655D

Nov-20

	APEC/Issue		Surface Water Sampling		
	Sample Station		SW20-01	SW20-02	SW20-03
	Sample ID		SW20-01	SW20-02	SW20-03
	Sample Collection Date		29-Aug-2020	29-Aug-2020	29-Aug-2020
	Lab ID #		VA20B4178-001	VA20B4178-002	VA20B4178-003
Parameters	Units	MDL			
<b>Field Screening</b>					
pH	unitless	0.1	nm	nm	nm
Conductivity	µs/cm	1	nm	nm	nm
<b>Physiochemical Parameters</b>					
pH	unitless	0.1	na	na	na
Conductivity	µs/cm	1	na	na	na
Hardness (as CaCO <sub>3</sub> )	mg/L	500	na	na	na
<b>Metals (General)</b>					
Cadmium	µg/L	0.0050	0.316	na	na
Iron <sup>2</sup>	µg/L	10	349	na	na
Magnesium	µg/L	5.0	4230	na	na
Manganese <sup>2</sup>	µg/L	0.10	na	192	na

**Notes:**

- MDL = Method detection limit
- na = not analyzed
- ns = no applicable standard
- mg/L = milligram per litre
- µg/L = micrograms per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit

**Table 16D: Surface Water Analytical Results – VOCs**

Johnny Mountain Mine Reclamation Project  
 Johnny Mountain Mine  
 VE52655D  
 Nov-20

			APEC/Issue			Surface Water Sampling		
			Sample Station			SW20-01	SW20-02	SW20-03
			Sample ID			SW20-01	SW20-02	SW20-03
			Sample Collection Date			29-Aug-2020	29-Aug-2020	29-Aug-2020
			Lab ID #			VA20B4178-001	VA20B4178-002	VA20B4178-003
Parameters	Units	MDL						
<b>Field Screening</b>								
Sample Headspace Vapour Concentration	ppmv	5.00	nm	nm	nm			
Noticable Odour	-	-	nm	nm	nm			
Conductivity	µs/cm	1	nm	nm	nm			
<b>Volatile Organic Compounds (VOCs)</b>								
Bromodichloromethane [BDCM]	µg/L	1.0	na	<0.50	<0.50			
Bromoform	µg/L	1.0	na	<0.50	<0.50			
Carbon tetrachloride	µg/L	0.50	na	<0.50	<0.50			
Chlorobenzene	µg/L	1.0	na	<0.50	<0.50			
Dibromochloromethane [DBCM]	µg/L	1.0	na	<0.50	<0.50			
Chloroethane	µg/L	1.0	na	<0.50	<0.50			
Chloroform	µg/L	1.0	na	<0.50	<0.50			
Chloromethane	µg/L	5.0	na	<0.50	<0.50			
Dichlorobenzene, 1,2-	µg/L	0.50	na	<0.50	<0.50			
Dichlorobenzene, 1,3-	µg/L	1.0	na	<0.50	<0.50			
Dichlorobenzene, 1,4-	µg/L	1.0	na	<0.50	<0.50			
Dichloroethane, 1,1-	µg/L	1.0	na	<0.50	<0.50			
Dichloroethane, 1,2-	µg/L	1.0	na	<0.50	<0.50			
Dichloroethene, 1,1-	µg/L	1.0	na	<0.50	<0.50			
Dichloroethylene, 1,2-cis-	µg/L	1.0	na	<0.50	<0.50			
Dichloroethylene, 1,2-trans-	µg/L	1.0	na	<0.50	<0.50			
Dichloromethane	µg/L	5.0	na	<0.50	<0.50			
Dichloropropane, 1,2-	µg/L	1.0	na	<0.50	<0.50			
cis-1,3-Dichloropropylene	µg/L	0.50	na	<0.50	<0.50			
trans-1,3-Dichloropropylene	µg/L	0.50	na	<0.50	<0.50			
dichloropropene, 1,3- (cis + trans)	µg/L	1.0	na	<0.75	<0.75			
Tetrachloroethane, 1,1,1,2-	µg/L	1.0	na	<0.50	<0.50			
Tetrachloroethane, 1,1,2,2-	µg/L	0.20	na	<0.20	<0.20			
Tetrachloroethylene	µg/L	1.0	na	<0.50	<0.50			
Trichloroethane, 1,1,1-	µg/L	1.0	na	<0.50	<0.50			
Trichloroethane, 1,1,2-	µg/L	0.50	na	<0.50	<0.50			
Trichloroethylene	µg/L	1.0	na	<0.50	<0.50			
Trichlorofluoromethane	µg/L	1.0	na	<0.50	<0.50			
Vinyl Chloride	µg/L	0.40	na	<0.40	<0.40			

**Notes:**

- MDL = Method detection limit
- no = none observed
- nm = not measured
- ns = no applicable standard
- µg/L = microgram per litre
- µs/cm = microsiemens per centimeter
- < = concentration is less than reported method detection limit



**wood.**

**Appendix A  
Site Photograph Log**



Photo 1: Setup for groundwater sampling using a hydrolift pump.  
August, 2020


	<p>Wood Environment &amp; Infrastructure Solutions, a Division of Wood Canada Limited #600 – 4445 Lougheed Highway Burnaby, BC V5C 0E4 Canada</p>	<p>PROJECT:</p> <p>2020 Supplemental Site Investigation</p>			
	<p>CLIENT:</p> <p><b>SNIPGOLD CORPORATION</b></p>	<p>DATE:</p> <p>04 March 2021</p>	<p>JOB No.:</p> <p>VE52655D</p>	<p>PAGE:</p> <p>1</p>	<p>REV.:</p> <p>0</p>





Photo 2: LNAPL identified at MW17-17B , using a bailer.


	Wood Environment & Infrastructure Solutions, a Division of Wood Canada Limited #600 – 4445 Lougheed Highway Burnaby, BC V5C 0E4 Canada		PROJECT:  2020 Supplemental Site Investigation	
	CLIENT: <b>SNIPGOLD CORPORATION</b>	DATE: 04 March 2021	JOB No.: VE52655D	PAGE: 2



Photo 3: View of creek sampled for surface water (sample SW20-01).


	Wood Environment & Infrastructure Solutions, a Division of Wood Canada Limited #600 – 4445 Lougheed Highway Burnaby, BC V5C 0E4 Canada		PROJECT:  2020 Supplemental Site Investigation	
	CLIENT: <b>SNIPGOLD CORPORATION</b>	DATE: 04 March 2021	JOB No.: VE52655D	PAGE: 3



Photo 4: View of stream sampled for surface water (sample SW20-02).



	Wood Environment & Infrastructure Solutions, a Division of Wood Canada Limited #600 – 4445 Lougheed Highway Burnaby, BC V5C 0E4 Canada		PROJECT:  2020 Supplemental Site Investigation	
	CLIENT: <b>SNIPGOLD CORPORATION</b>	DATE: 04 March 2021	JOB No.: VE52655D	PAGE: 4



Photo 5: View of creek sampled for surface water (sample SW20-03).

	<p>Wood Environment &amp; Infrastructure Solutions, a Division of Wood Canada Limited #600 – 4445 Lougheed Highway Burnaby, BC V5C 0E4 Canada</p>	<p>PROJECT:  2020 Supplemental Site Investigation</p>			
	<p>CLIENT: <b>SNIPGOLD CORPORATION</b></p>	<p>DATE: 04 March 2021</p>	<p>JOB No.: VE52655D</p>	<p>PAGE: 5</p>	<p>REV.: 0</p>



**wood.**

**Appendix B**  
**Certificate of Analysis**



**CERTIFICATE OF ANALYSIS**

**Work Order** : **VA20B4299**  
**Client** : **Seabridge Gold Inc.**  
**Contact** : Elizabeth Miller  
**Address** : 1235 Main Street P.O. Box 2536  
Smithers BC Canada V0J 2N0  
**Telephone** : 416 367 9292  
**Project** : VE52655D  
**PO** :  
**C-O-C number** : ----  
**Sampler** : Ardy M  
**Site** : ----  
**Quote number** : VA20-SEAB100-0003 - Wood/Seabridge Gold  
**No. of samples received** : 10  
**No. of samples analysed** : 7

**Page** : 1 of 9  
**Laboratory** : Vancouver - Environmental  
**Account Manager** : Selam Worku  
**Address** : 8081 Lougheed Highway  
Burnaby BC Canada V5A 1W9  
**Telephone** : +1 604 253 4188  
**Date Samples Received** : 02-Sep-2020 10:45  
**Date Analysis Commenced** : 04-Sep-2020  
**Issue Date** : 28-Sep-2020 14:20

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

**Signatories**

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Brianna Allen	Department Manager - Organics	Organics, Burnaby, British Columbia
Dwayne Bennett	Technical Specialist	Inorganics, Saskatoon, Saskatchewan
Hedy Lai	Team Leader - Inorganics	Inorganics, Saskatoon, Saskatchewan
Jeremy Paterson	Analyst	Microbiology, Winnipeg, Manitoba
Melissa Shaw	Team Leader - Inorganics	Inorganics, Saskatoon, Saskatchewan
Xihua Yao	Laboratory Analyst	Inorganics, Saskatoon, Saskatchewan



## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

Unit	Description
%	percent
CFU/g	Colony Forming Units per gram
mg/kg	milligrams per kilogram

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in reports identified as "**Preliminary Report**" are considered authorized for use.

## Workorder Comments

**Sample "SP20-01-14": client labelled one jar and one plastic bag sample as "SP20-1-4", labelled the sample as "SP20-01-14" according to the identification of the bag.**

Additional parameters were requestd via email for samples SP20-01-01, SP20-01-03, SP20-01-05 and SP20-01-05.

## Sample Comments

Sample	Client Id	Comment
VA20B4299-001	SP20-01-01	Sample(s)-007: Soil jar was submitted as VOC sample container. VOC results may be biased low, and do not meet federal (CCME) or provincial requirements (for BC, AB-Tier1, MB, ON, SK).

## Qualifiers

Qualifier	Description
DLCI	Detection Limit Raised: Chromatographic interference due to co-elution.



## Analytical Results

Sub-Matrix: Soil					Client sample ID				
(Matrix: Soil/Solid)					SP20-01-01	SP20-01-02	SP20-01-03	SP20-01-04	SP20-01-05
Client sampling date / time					29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020 12:00	29-Aug-2020 12:00
Analyte	CAS Number	Method	LOR	Unit	VA20B4299-001	VA20B4299-002	VA20B4299-003	VA20B4299-004	VA20B4299-005
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
moisture	----	E144	0.25	%	11.0	9.95	12.8	11.4	11.3
<b>Organic / Inorganic Carbon</b>									
carbon, total [TC]	----	E351	0.050	%	1.45	----	0.397	----	0.611
carbon, inorganic [IC]	----	E354	0.050	%	0.108	----	0.073	----	0.134
carbon, inorganic [IC], (as CaCO3 equivalent)	----	E354	0.40	%	0.90	----	0.61	----	1.11
carbon, total organic [TOC]	----	EC356	0.050	%	1.34	----	0.324	----	0.477
organic matter	----	EC356	0.10	%	2.31	----	0.56	----	0.82
<b>Plant Available Nutrients</b>									
phosphate, available (as P)	14265-44-2	E384	2.0	mg/kg	2.6	----	4.7	----	<2.0
potassium, available	7440-09-7	E390	20	mg/kg	67	----	63	----	70
sulfate, available (as S)	14808-79-8	E497.SO4	3.0	mg/kg	7.2	----	3.6	----	7.6
nitrate + nitrite, available (as N)	----	E269.N+N	1.0	mg/kg	<1.0	----	<1.0	----	<1.0
<b>Taxonomy</b>									
hydrocarbon utilizing bacteria [HUB]	----	E924.AR	5	CFU/g	27000	20500	----	----	56000
<b>Volatile Organic Compounds</b>									
chlorobenzene	108-90-7	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
chloromethane	74-87-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichlorobenzene, 1,2-	95-50-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichlorobenzene, 1,3-	541-73-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichlorobenzene, 1,4-	106-46-7	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloropropane, 1,2-	78-87-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
dichloropropylene, cis+trans-1,3-	542-75-6	E611C	0.075	mg/kg	<0.075	<0.075	<0.075	<0.075	<0.075
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.250 <sup>DLCI</sup>
trichloroethane, 1,1,2-	79-00-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
trichlorofluoromethane	75-69-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>									
benzene	71-43-2	E611C	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	<0.015	<0.015	<0.015	<0.015





## Analytical Results

Sub-Matrix: Soil					Client sample ID	SP20-01-01	SP20-01-02	SP20-01-03	SP20-01-04	SP20-01-05
(Matrix: Soil/Solid)										
Client sampling date / time					29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020
								12:00		12:00
Analyte	CAS Number	Method	LOR	Unit	VA20B4299-001	VA20B4299-002	VA20B4299-003	VA20B4299-004	VA20B4299-005	
					Result	Result	Result	Result	Result	
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>										
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
styrene	100-42-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
toluene	108-88-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
xylene, m+p-	179601-23-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
xylene, o-	95-47-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
xylenes, total	1330-20-7	E611C	0.075	mg/kg	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075
<b>Volatile Organic Compounds [Drycleaning]</b>										
carbon tetrachloride	56-23-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
chloroethane	75-00-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethane, 1,1-	75-34-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethane, 1,2-	107-06-2	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethylene, 1,1-	75-35-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethylene, cis-1,2-	156-59-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
dichloroethylene, trans-1,2-	156-60-5	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
dichloromethane	75-09-2	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
tetrachloroethylene	127-18-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
trichloroethane, 1,1,1-	71-55-6	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
trichloroethylene	79-01-6	E611C	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
vinyl chloride	75-01-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
<b>Volatile Organic Compounds Surrogates</b>										
bromofluorobenzene, 4-	460-00-4	E611C	0.050	%	94.5	90.3	97.5	88.4	102	
difluorobenzene, 1,4-	540-36-3	E611C	0.050	%	101	108	106	105	104	
<b>Hydrocarbons</b>										
EPH (C10-C19)	----	E601A	200	mg/kg	300	<200	<200	500	1330	
EPH (C19-C32)	----	E601A	200	mg/kg	<200	<200	<200	<200	440	
HEPHs	----	EC600A	200	mg/kg	<200	<200	<200	<200	440	
LEPHs	----	EC600A	200	mg/kg	300	<200	<200	500	1330	
<b>Hydrocarbons Surrogates</b>										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	5.0	%	87.5	85.8	95.4	86.0	91.8	
<b>Polycyclic Aromatic Hydrocarbons</b>										



## Analytical Results

Sub-Matrix: Soil					Client sample ID				
(Matrix: Soil/Solid)					SP20-01-01	SP20-01-02	SP20-01-03	SP20-01-04	SP20-01-05
Client sampling date / time					29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020 12:00	29-Aug-2020 12:00
Analyte	CAS Number	Method	LOR	Unit	VA20B4299-001	VA20B4299-002	VA20B4299-003	VA20B4299-004	VA20B4299-005
					Result	Result	Result	Result	Result
<b>Polycyclic Aromatic Hydrocarbons</b>									
acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0200 <sup>DLCI</sup>
acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	<0.0070 <sup>DLCI</sup>	<0.0050	<0.0050	<0.0060 <sup>DLCI</sup>	<0.0200 <sup>DLCI</sup>
acridine	260-94-6	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.050 <sup>DLCI</sup>	<0.200 <sup>DLCI</sup>
anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.0040	<0.0040	<0.0040	<0.0050 <sup>DLCI</sup>	<0.0200 <sup>DLCI</sup>
benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(b+j)fluoranthene	----	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(b+j+k)fluoranthene	----	E641A-L	0.015	mg/kg	<0.015	<0.015	<0.015	<0.015	<0.015
benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
chrysene	218-01-9	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
fluoranthene	206-44-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
fluorene	86-73-7	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
naphthalene	91-20-3	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
phenanthrene	85-01-8	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.020 <sup>DLCI</sup>
pyrene	129-00-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	0.017	0.090
quinoline	6027-02-7	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
B(a)P total potency equivalents [B(a)P TPE]	----	E641A-L	0.020	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010
IACR (CCME)	----	E641A-L	0.15	mg/kg	<0.11	<0.11	<0.11	<0.11	<0.11
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>									
acridine-d9	34749-75-2	E641A-L	0.010	%	96.7	88.1	106	98.9	99.1
chrysene-d12	1719-03-5	E641A-L	0.010	%	103	98.7	116	105	112
naphthalene-d8	1146-65-2	E641A-L	0.010	%	90.2	88.8	103	95.8	95.6
phenanthrene-d10	1517-22-2	E641A-L	0.010	%	96.7	91.4	108	102	105
<b>Volatile Organic Compounds [THMs]</b>									
bromodichloromethane	75-27-4	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
bromoform	75-25-2	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050



## Analytical Results

Sub-Matrix: Soil					Client sample ID	SP20-01-01	SP20-01-02	SP20-01-03	SP20-01-04	SP20-01-05
(Matrix: Soil/Solid)					Client sampling date / time	29-Aug-2020	29-Aug-2020	29-Aug-2020	29-Aug-2020 12:00	29-Aug-2020 12:00
Analyte	CAS Number	Method	LOR	Unit	VA20B4299-001	VA20B4299-002	VA20B4299-003	VA20B4299-004	VA20B4299-005	
					Result	Result	Result	Result	Result	
<b>Volatile Organic Compounds [THMs]</b>										
chloroform	67-66-3	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
dibromochloromethane	124-48-1	E611C	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050

Please refer to the General Comments section for an explanation of any qualifiers detected.



## Analytical Results

Sub-Matrix: Soil					Client sample ID				
(Matrix: Soil/Solid)					SP20-01-06	SP20-01-56	----	----	----
Client sampling date / time					29-Aug-2020 12:00	29-Aug-2020 12:00	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20B4299-006	VA20B4299-007	-----	-----	-----
					Result	Result	---	---	---
<b>Physical Tests</b>									
moisture	----	E144	0.25	%	14.9	15.0	----	----	----
<b>Volatile Organic Compounds</b>									
chlorobenzene	108-90-7	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
chloromethane	74-87-3	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
dichloropropane, 1,2-	78-87-5	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
dichloropropylene, cis+trans-1,3-	542-75-6	E611C	0.075	mg/kg	<0.075	<0.075	----	----	----
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
trichlorofluoromethane	75-69-4	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>									
benzene	71-43-2	E611C	0.0050	mg/kg	<0.0050	<0.0050	----	----	----
ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	<0.015	----	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
styrene	100-42-5	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
toluene	108-88-3	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
xylene, m+p-	179601-23-1	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
xylene, o-	95-47-6	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
xylenes, total	1330-20-7	E611C	0.075	mg/kg	<0.075	<0.075	----	----	----
<b>Volatile Organic Compounds [Drycleaning]</b>									
carbon tetrachloride	56-23-5	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
chloroethane	75-00-3	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
dichloroethane, 1,1-	75-34-3	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
dichloroethane, 1,2-	107-06-2	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
dichloroethylene, 1,1-	75-35-4	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
dichloroethylene, cis-1,2-	156-59-4	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----
dichloroethylene, trans-1,2-	156-60-5	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----



## Analytical Results

Sub-Matrix: Soil					Client sample ID	SP20-01-06	SP20-01-56	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time	29-Aug-2020 12:00	29-Aug-2020 12:00	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20B4299-006	VA20B4299-007	-----	-----	-----	
					Result	Result	---	---	---	
<b>Volatile Organic Compounds [Drycleaning]</b>										
dichloromethane	75-09-2	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----	
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----	
tetrachloroethylene	127-18-4	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----	
trichloroethane, 1,1,1-	71-55-6	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----	
trichloroethylene	79-01-6	E611C	0.010	mg/kg	<0.010	<0.010	----	----	----	
vinyl chloride	75-01-4	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----	
<b>Volatile Organic Compounds Surrogates</b>										
bromofluorobenzene, 4-	460-00-4	E611C	0.050	%	98.1	108	----	----	----	
difluorobenzene, 1,4-	540-36-3	E611C	0.050	%	97.1	103	----	----	----	
<b>Hydrocarbons</b>										
EPH (C10-C19)	----	E601A	200	mg/kg	<200	<200	----	----	----	
EPH (C19-C32)	----	E601A	200	mg/kg	<200	<200	----	----	----	
HEPHs	----	EC600A	200	mg/kg	<200	<200	----	----	----	
LEPHs	----	EC600A	200	mg/kg	<200	<200	----	----	----	
<b>Hydrocarbons Surrogates</b>										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	5.0	%	87.6	81.3	----	----	----	
<b>Polycyclic Aromatic Hydrocarbons</b>										
acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	----	----	----	
acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	----	----	----	
acridine	260-94-6	E641A-L	0.010	mg/kg	<0.010	<0.010	----	----	----	
anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.0040	<0.0040	----	----	----	
benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	<0.010	<0.010	----	----	----	
benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	<0.010	<0.010	----	----	----	
benzo(b+j)fluoranthene	----	E641A-L	0.010	mg/kg	<0.010	<0.010	----	----	----	
benzo(b+j+k)fluoranthene	----	E641A-L	0.015	mg/kg	<0.015	<0.015	----	----	----	
benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	<0.010	<0.010	----	----	----	
benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	<0.010	<0.010	----	----	----	
chrysene	218-01-9	E641A-L	0.010	mg/kg	<0.010	<0.010	----	----	----	
dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	----	----	----	
fluoranthene	206-44-0	E641A-L	0.010	mg/kg	<0.010	<0.010	----	----	----	
fluorene	86-73-7	E641A-L	0.010	mg/kg	<0.010	<0.010	----	----	----	



## Analytical Results

Sub-Matrix: Soil					Client sample ID	SP20-01-06	SP20-01-56	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time	29-Aug-2020 12:00	29-Aug-2020 12:00	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20B4299-006	VA20B4299-007	-----	-----	-----	
					Result	Result	---	---	---	
<b>Polycyclic Aromatic Hydrocarbons</b>										
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	<0.010	<0.010	----	----	----	
methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	<0.010	<0.010	----	----	----	
methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	<0.010	<0.010	----	----	----	
naphthalene	91-20-3	E641A-L	0.010	mg/kg	<0.010	<0.010	----	----	----	
phenanthrene	85-01-8	E641A-L	0.010	mg/kg	<0.010	<0.010	----	----	----	
pyrene	129-00-0	E641A-L	0.010	mg/kg	<0.010	<0.010	----	----	----	
quinoline	6027-02-7	E641A-L	0.010	mg/kg	<0.010	<0.010	----	----	----	
B(a)P total potency equivalents [B(a)P TPE]	----	E641A-L	0.020	mg/kg	<0.010	<0.010	----	----	----	
IACR (CCME)	----	E641A-L	0.15	mg/kg	<0.11	<0.11	----	----	----	
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>										
acridine-d9	34749-75-2	E641A-L	0.010	%	94.2	96.8	----	----	----	
chrysene-d12	1719-03-5	E641A-L	0.010	%	106	106	----	----	----	
naphthalene-d8	1146-65-2	E641A-L	0.010	%	96.6	97.4	----	----	----	
phenanthrene-d10	1517-22-2	E641A-L	0.010	%	101	100	----	----	----	
<b>Volatile Organic Compounds [THMs]</b>										
bromodichloromethane	75-27-4	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----	
bromoform	75-25-2	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----	
chloroform	67-66-3	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----	
dibromochloromethane	124-48-1	E611C	0.050	mg/kg	<0.050	<0.050	----	----	----	

Please refer to the General Comments section for an explanation of any qualifiers detected.

## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>VA20B4299</b>	Page	: 1 of 15
Client	: <b>Seabridge Gold Inc.</b>	Laboratory	: Vancouver - Environmental
Contact	: Elizabeth Miller	Account Manager	: Selam Worku
Address	: 1235 Main Street P.O. Box 2536 Smithers BC Canada V0J 2N0	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: 416 367 9292	Telephone	: +1 604 253 4188
Project	: VE52655D	Date Samples Received	: 02-Sep-2020 10:45
PO	:	Issue Date	: 28-Sep-2020 14:20
C-O-C number	: ----		
Sampler	: Ardy M		
Site	: ----		
Quote number	: VA20-SEAB100-0003 - Wood/Seabridge Gold		
No. of samples received	: 10		
No. of samples analysed	: 7		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

- Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.
- CAS Number:** Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
- DQO:** Data Quality Objective.
- LOR:** Limit of Reporting (detection limit).
- RPD:** Relative Percent Difference.

## Summary of Outliers

### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Matrix Spike outliers occur.
- Laboratory Control Sample (LCS) outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.

### **Outliers : Analysis Holding Time Compliance (Breaches)**

- Analysis Holding Time Outliers exist - please see following pages for full details.

### **Outliers : Frequency of Quality Control Samples**

- No Quality Control Sample Frequency Outliers occur.







**Outliers : Quality Control Samples**

*Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes*

Matrix: **Soil/Solid**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
<b>Laboratory Control Sample (LCS) Recoveries</b>								
Volatile Organic Compounds	QC-MRG3-8244500 2	----	chloromethane	74-87-3	E611C	46.6 % LCS-ND	60.0-140%	Recovery less than lower control limit

**Result Qualifiers**

Qualifier	Description
LCS-ND	Lab Control Sample recovery was slightly outside ALS DQO. Reported non-detect results for associated samples were unaffected.



## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: Soil/Solid

Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
Glass soil jar/Teflon lined cap SP20-01-04	E601A	29-Aug-2020	09-Sep-2020	14 days	10 days	✓	10-Sep-2020	40 days	1 days	✓
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
Glass soil jar/Teflon lined cap SP20-01-05	E601A	29-Aug-2020	09-Sep-2020	14 days	10 days	✓	10-Sep-2020	40 days	1 days	✓
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
Glass soil jar/Teflon lined cap SP20-01-06	E601A	29-Aug-2020	09-Sep-2020	14 days	10 days	✓	10-Sep-2020	40 days	1 days	✓
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
Glass soil jar/Teflon lined cap SP20-01-56	E601A	29-Aug-2020	09-Sep-2020	14 days	10 days	✓	10-Sep-2020	40 days	1 days	✓
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
Glass soil jar/Teflon lined cap SP20-01-01	E601A	29-Aug-2020	09-Sep-2020	14 days	11 days	✓	10-Sep-2020	40 days	1 days	✓
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
Glass soil jar/Teflon lined cap SP20-01-02	E601A	29-Aug-2020	09-Sep-2020	14 days	11 days	✓	10-Sep-2020	40 days	1 days	✓
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
Glass soil jar/Teflon lined cap SP20-01-03	E601A	29-Aug-2020	09-Sep-2020	14 days	11 days	✓	10-Sep-2020	40 days	1 days	✓



Matrix: Soil/Solid

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Organic / Inorganic Carbon : Total Carbon by Combustion</b>											
LDPE bag SP20-01-01	E351	29-Aug-2020	----	----	----		09-Sep-2020	0 days	0 days		✔
<b>Organic / Inorganic Carbon : Total Carbon by Combustion</b>											
LDPE bag SP20-01-03	E351	29-Aug-2020	----	----	----		09-Sep-2020	0 days	0 days		✔
<b>Organic / Inorganic Carbon : Total Carbon by Combustion</b>											
LDPE bag SP20-01-05	E351	29-Aug-2020	----	----	----		09-Sep-2020	0 days	0 days		✔
<b>Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve</b>											
LDPE bag SP20-01-01	E354	29-Aug-2020	----	----	----		08-Sep-2020	----	----		
<b>Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve</b>											
LDPE bag SP20-01-03	E354	29-Aug-2020	----	----	----		08-Sep-2020	----	----		
<b>Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve</b>											
LDPE bag SP20-01-05	E354	29-Aug-2020	----	----	----		08-Sep-2020	----	----		
<b>Physical Tests : Moisture Content by Gravimetry</b>											
Glass soil jar/Teflon lined cap SP20-01-01	E144	29-Aug-2020	----	----	----		08-Sep-2020	----	----		
<b>Physical Tests : Moisture Content by Gravimetry</b>											
Glass soil jar/Teflon lined cap SP20-01-02	E144	29-Aug-2020	----	----	----		08-Sep-2020	----	----		
<b>Physical Tests : Moisture Content by Gravimetry</b>											
Glass soil jar/Teflon lined cap SP20-01-03	E144	29-Aug-2020	----	----	----		08-Sep-2020	----	----		



Matrix: Soil/Solid

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : Moisture Content by Gravimetry</b>											
Glass soil jar/Teflon lined cap SP20-01-04	E144	29-Aug-2020	----	----	----		08-Sep-2020	----	----		
<b>Physical Tests : Moisture Content by Gravimetry</b>											
Glass soil jar/Teflon lined cap SP20-01-05	E144	29-Aug-2020	----	----	----		08-Sep-2020	----	----		
<b>Physical Tests : Moisture Content by Gravimetry</b>											
Glass soil jar/Teflon lined cap SP20-01-06	E144	29-Aug-2020	----	----	----		08-Sep-2020	----	----		
<b>Physical Tests : Moisture Content by Gravimetry</b>											
Glass soil jar/Teflon lined cap SP20-01-56	E144	29-Aug-2020	----	----	----		08-Sep-2020	----	----		
<b>Plant Available Nutrients : Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride)</b>											
LDPE bag SP20-01-01	E269.N+N	29-Aug-2020	11-Sep-2020	----	----		11-Sep-2020	0 days	0 days	✔	
<b>Plant Available Nutrients : Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride)</b>											
LDPE bag SP20-01-03	E269.N+N	29-Aug-2020	11-Sep-2020	----	----		11-Sep-2020	0 days	0 days	✔	
<b>Plant Available Nutrients : Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride)</b>											
LDPE bag SP20-01-05	E269.N+N	29-Aug-2020	11-Sep-2020	----	----		11-Sep-2020	0 days	0 days	✔	
<b>Plant Available Nutrients : Available Phosphorus by FIALab (Modified Kelowna)</b>											
LDPE bag SP20-01-05	E384	29-Aug-2020	17-Sep-2020	180 days	18 days	✔	17-Sep-2020	161 days	0 days	✔	
<b>Plant Available Nutrients : Available Phosphorus by FIALab (Modified Kelowna)</b>											
LDPE bag SP20-01-01	E384	29-Aug-2020	17-Sep-2020	180 days	19 days	✔	17-Sep-2020	160 days	0 days	✔	



Matrix: Soil/Solid

Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Plant Available Nutrients : Available Phosphorus by FIALab (Modified Kelowna)</b>											
LDPE bag SP20-01-03	E384	29-Aug-2020	17-Sep-2020	180 days	19 days	✓	17-Sep-2020	160 days	0 days	✓	
<b>Plant Available Nutrients : Available Potassium by flame photometry (Modified Kelowna)</b>											
LDPE bag SP20-01-05	E390	29-Aug-2020	17-Sep-2020	180 days	18 days	✓	17-Sep-2020	161 days	0 days	✓	
<b>Plant Available Nutrients : Available Potassium by flame photometry (Modified Kelowna)</b>											
LDPE bag SP20-01-01	E390	29-Aug-2020	17-Sep-2020	180 days	19 days	✓	17-Sep-2020	160 days	0 days	✓	
<b>Plant Available Nutrients : Available Potassium by flame photometry (Modified Kelowna)</b>											
LDPE bag SP20-01-03	E390	29-Aug-2020	17-Sep-2020	180 days	19 days	✓	17-Sep-2020	160 days	0 days	✓	
<b>Plant Available Nutrients : Available Sulfate by ICPOES (0.01M Calcium Chloride Ext.)</b>											
LDPE bag SP20-01-01	E497.SO4	29-Aug-2020	11-Sep-2020	----	----		11-Sep-2020	0 days	0 days	✓	
<b>Plant Available Nutrients : Available Sulfate by ICPOES (0.01M Calcium Chloride Ext.)</b>											
LDPE bag SP20-01-03	E497.SO4	29-Aug-2020	11-Sep-2020	----	----		11-Sep-2020	0 days	0 days	✓	
<b>Plant Available Nutrients : Available Sulfate by ICPOES (0.01M Calcium Chloride Ext.)</b>											
LDPE bag SP20-01-05	E497.SO4	29-Aug-2020	11-Sep-2020	----	----		11-Sep-2020	0 days	0 days	✓	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)</b>											
Glass soil jar/Teflon lined cap SP20-01-04	E641A-L	29-Aug-2020	09-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)</b>											
Glass soil jar/Teflon lined cap SP20-01-05	E641A-L	29-Aug-2020	09-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓	



Matrix: Soil/Solid

Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)</b>											
Glass soil jar/Teflon lined cap SP20-01-06	E641A-L	29-Aug-2020	09-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)</b>											
Glass soil jar/Teflon lined cap SP20-01-56	E641A-L	29-Aug-2020	09-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)</b>											
Glass soil jar/Teflon lined cap SP20-01-01	E641A-L	29-Aug-2020	09-Sep-2020	14 days	11 days	✓	09-Sep-2020	40 days	0 days	✓	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)</b>											
Glass soil jar/Teflon lined cap SP20-01-02	E641A-L	29-Aug-2020	09-Sep-2020	14 days	11 days	✓	09-Sep-2020	40 days	0 days	✓	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)</b>											
Glass soil jar/Teflon lined cap SP20-01-03	E641A-L	29-Aug-2020	09-Sep-2020	14 days	11 days	✓	09-Sep-2020	40 days	0 days	✓	
<b>Taxonomy : Hydrocarbon Utilizing Bacteria</b>											
Glass soil jar/Teflon lined cap SP20-01-05	E924.AR	29-Aug-2020	----	----	----		24-Sep-2020	48 hrs	627 hrs	* EHTR	
<b>Taxonomy : Hydrocarbon Utilizing Bacteria</b>											
Glass soil jar/Teflon lined cap SP20-01-01	E924.AR	29-Aug-2020	----	----	----		24-Sep-2020	48 hrs	639 hrs	* EHTR	
<b>Taxonomy : Hydrocarbon Utilizing Bacteria</b>											
Glass soil jar/Teflon lined cap SP20-01-02	E924.AR	29-Aug-2020	----	----	----		24-Sep-2020	48 hrs	639 hrs	* EHTR	
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>											
Glass soil methanol vial SP20-01-01	E611C	29-Aug-2020	04-Sep-2020	----	----		04-Sep-2020	----	----		



Matrix: Soil/Solid

Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>											
Glass soil methanol vial SP20-01-02	E611C	29-Aug-2020	04-Sep-2020	----	----		04-Sep-2020	----	----		
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>											
Glass soil methanol vial SP20-01-03	E611C	29-Aug-2020	04-Sep-2020	----	----		04-Sep-2020	----	----		
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>											
Glass soil methanol vial SP20-01-04	E611C	29-Aug-2020	04-Sep-2020	----	----		04-Sep-2020	----	----		
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>											
Glass soil methanol vial SP20-01-05	E611C	29-Aug-2020	04-Sep-2020	----	----		04-Sep-2020	----	----		
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>											
Glass soil methanol vial SP20-01-06	E611C	29-Aug-2020	04-Sep-2020	----	----		04-Sep-2020	----	----		
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>											
Glass soil methanol vial SP20-01-56	E611C	29-Aug-2020	06-Sep-2020	----	----		08-Sep-2020	----	----		
<b>Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS</b>											
Glass soil methanol vial SP20-01-04	E611C	29-Aug-2020	04-Sep-2020	40 days	5 days	✓	04-Sep-2020	34 days	0 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS</b>											
Glass soil methanol vial SP20-01-05	E611C	29-Aug-2020	04-Sep-2020	40 days	5 days	✓	04-Sep-2020	34 days	0 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS</b>											
Glass soil methanol vial SP20-01-06	E611C	29-Aug-2020	04-Sep-2020	40 days	5 days	✓	04-Sep-2020	34 days	0 days	✓	



Matrix: Soil/Solid

Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS</b>											
Glass soil methanol vial SP20-01-01	E611C	29-Aug-2020	04-Sep-2020	40 days	6 days	✓	04-Sep-2020	33 days	0 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS</b>											
Glass soil methanol vial SP20-01-02	E611C	29-Aug-2020	04-Sep-2020	40 days	6 days	✓	04-Sep-2020	33 days	0 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS</b>											
Glass soil methanol vial SP20-01-03	E611C	29-Aug-2020	04-Sep-2020	40 days	6 days	✓	04-Sep-2020	33 days	0 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS</b>											
Glass soil methanol vial SP20-01-56	E611C	29-Aug-2020	06-Sep-2020	40 days	7 days	✓	08-Sep-2020	32 days	1 days	✓	
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>											
Glass soil methanol vial SP20-01-01	E611C	29-Aug-2020	04-Sep-2020	----	----		04-Sep-2020	----	----		
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>											
Glass soil methanol vial SP20-01-02	E611C	29-Aug-2020	04-Sep-2020	----	----		04-Sep-2020	----	----		
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>											
Glass soil methanol vial SP20-01-03	E611C	29-Aug-2020	04-Sep-2020	----	----		04-Sep-2020	----	----		
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>											
Glass soil methanol vial SP20-01-04	E611C	29-Aug-2020	04-Sep-2020	----	----		04-Sep-2020	----	----		
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>											
Glass soil methanol vial SP20-01-05	E611C	29-Aug-2020	04-Sep-2020	----	----		04-Sep-2020	----	----		





Matrix: **Soil/Solid**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>										
Glass soil methanol vial SP20-01-06	E611C	29-Aug-2020	04-Sep-2020	----	----		04-Sep-2020	----	----	
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>										
Glass soil methanol vial SP20-01-56	E611C	29-Aug-2020	06-Sep-2020	----	----		08-Sep-2020	----	----	
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
Glass soil methanol vial SP20-01-01	E611C	29-Aug-2020	04-Sep-2020	----	----		04-Sep-2020	----	----	
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
Glass soil methanol vial SP20-01-02	E611C	29-Aug-2020	04-Sep-2020	----	----		04-Sep-2020	----	----	
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
Glass soil methanol vial SP20-01-03	E611C	29-Aug-2020	04-Sep-2020	----	----		04-Sep-2020	----	----	
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
Glass soil methanol vial SP20-01-04	E611C	29-Aug-2020	04-Sep-2020	----	----		04-Sep-2020	----	----	
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
Glass soil methanol vial SP20-01-05	E611C	29-Aug-2020	04-Sep-2020	----	----		04-Sep-2020	----	----	
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
Glass soil methanol vial SP20-01-06	E611C	29-Aug-2020	04-Sep-2020	----	----		04-Sep-2020	----	----	
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
Glass soil methanol vial SP20-01-56	E611C	29-Aug-2020	06-Sep-2020	----	----		08-Sep-2020	----	----	

**Legend & Qualifier Definitions**

EHTR: Exceeded ALS recommended hold time prior to sample receipt.

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Work Order : VA20B4299  
Client : Seabridge Gold Inc.  
Project : VE52655D

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Rec. HT: ALS recommended hold time (see units).

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## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Soil/Solid**

Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)	E269.N+N	84477	1	9	11.1	5.0	✓
Available Phosphorus by FIALab (Modified Kelowna)	E384	86217	1	9	11.1	5.0	✓
Available Potassium by flame photometry (Modified Kelowna)	E390	86218	1	9	11.1	5.0	✓
Available Sulfate by ICPOES (0.01M Calcium Chloride Ext.)	E497.SO4	84476	1	20	5.0	5.0	✓
BC PHC - EPH by GC-FID	E601A	82948	1	10	10.0	5.0	✓
Hydrocarbon Utilizing Bacteria	E924.AR	91388	1	9	11.1	5.0	✓
Moisture Content by Gravimetry	E144	82950	1	9	11.1	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	82949	1	10	10.0	5.0	✓
Total Carbon by Combustion	E351	83605	1	20	5.0	5.0	✓
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354	82926	1	10	10.0	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	81573	2	16	12.5	5.0	✓
<b>Laboratory Control Samples (LCS)</b>							
Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)	E269.N+N	84477	2	9	22.2	10.0	✓
Available Phosphorus by FIALab (Modified Kelowna)	E384	86217	2	9	22.2	10.0	✓
Available Potassium by flame photometry (Modified Kelowna)	E390	86218	2	9	22.2	10.0	✓
Available Sulfate by ICPOES (0.01M Calcium Chloride Ext.)	E497.SO4	84476	2	20	10.0	10.0	✓
BC PHC - EPH by GC-FID	E601A	82948	2	10	20.0	10.0	✓
Moisture Content by Gravimetry	E144	82950	1	9	11.1	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	82949	2	10	20.0	10.0	✓
Total Carbon by Combustion	E351	83605	2	20	10.0	10.0	✓
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354	82926	2	10	20.0	10.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	81573	2	16	12.5	5.0	✓
<b>Method Blanks (MB)</b>							
Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)	E269.N+N	84477	1	9	11.1	5.0	✓
Available Phosphorus by FIALab (Modified Kelowna)	E384	86217	1	9	11.1	5.0	✓
Available Potassium by flame photometry (Modified Kelowna)	E390	86218	1	9	11.1	5.0	✓
Available Sulfate by ICPOES (0.01M Calcium Chloride Ext.)	E497.SO4	84476	1	20	5.0	5.0	✓
BC PHC - EPH by GC-FID	E601A	82948	1	10	10.0	5.0	✓
Hydrocarbon Utilizing Bacteria	E924.AR	91388	1	9	11.1	5.0	✓
Moisture Content by Gravimetry	E144	82950	1	9	11.1	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	82949	1	10	10.0	5.0	✓
Total Carbon by Combustion	E351	83605	1	20	5.0	5.0	✓
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354	82926	1	10	10.0	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	81573	2	16	12.5	5.0	✓
<b>Matrix Spikes (MS)</b>							
VOCs (BC List) by Headspace GC-MS	E611C	81573	2	16	12.5	5.0	✓



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Moisture Content by Gravimetry	E144 Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)	E269.N+N Saskatoon - Environmental	Soil/Solid	Alberta Agriculture/APHA 4500-NO3 I (mod)	Plant available nitrate and nitrite are analyzed by colourimetry using a flow injection analyzer on a soil sample extract that has been extracted using 0.01M Calcium Chloride, then shaken well and filtered prior to analysis.
Total Carbon by Combustion	E351 Saskatoon - Environmental	Soil/Solid	CSSS (2008) 21.2 (mod)	Total Carbon is determined by the high temperature combustion method with measurement by an infrared detector.
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354 Saskatoon - Environmental	Soil/Solid	CSSS (2008) 20.2	Total Inorganic Carbon is determined by acetic acid pH standard curve, where a known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.
Available Phosphorus by FIALab (Modified Kelowna)	E384 Saskatoon - Environmental	Soil/Solid	Comm. Soil Sci. Plant Anal, 25 (5&6)	Plant available phosphorus is extracted from air dried soil using a fixed ratio Modified Kelowna extraction. Phosphorus is determined by colorimetry using a flow injection analyzer.
Available Potassium by flame photometry (Modified Kelowna)	E390 Saskatoon - Environmental	Soil/Solid	Comm. Soil Sci. Plant Anal, 25 (5&6)	Plant available potassium is extracted from soil using modified Kelowna solution. Potassium is determined by flame emission at 770 nm.
Available Sulfate by ICPOES (0.01M Calcium Chloride Ext.)	E497.SO4 Saskatoon - Environmental	Soil/Solid	Alberta Agriculture	Plant available sulfate is determined by ICPOES. Soil is extracted using a 0.01M calcium chloride solution. This extraction may also produce organic sulfur in the extracts when organic soils are analyzed.
BC PHC - EPH by GC-FID	E601A Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual (EPH in Solids by GC/FID) (mod)	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.
VOCs (BC List) by Headspace GC-MS	E611C Vancouver - Environmental	Soil/Solid	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L Vancouver - Environmental	Soil/Solid	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by GC-MS.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Hydrocarbon Utilizing Bacteria	E924.AR  Winnipeg - Environmental	Soil/Solid	Internal	Following extraction, serial dilutions are plated onto hydrocarbon-laden media and incubated at 20°C for 5 days. Observed colonies are enumerated.
Total Organic Carbon (Calculated) in soil	EC356  Saskatoon - Environmental	Soil/Solid	CSSS (2008) 21.2	Total Organic Carbon (TOC) is calculated by the difference between total carbon (TC) and total inorganic carbon (TIC).
LEPH and HEPH: EPH-PAH	EC600A  Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual (LEPH and HEPH) (mod)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(b+j+k)fluoranthene, Benzo(a)pyrene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, and Pyrene.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Fixed ratio 0.01M Calcium Chloride extraction for plant available nutrients	EP269  Saskatoon - Environmental	Soil/Solid	Alberta Agriculture	Plant available nutrients (N&S) extracted using 0.01M calcium chloride, then shaken well and filtered prior to analysis.
Modified Kelowna Extraction for soil	EP384  Saskatoon - Environmental	Soil/Solid	Comm. Soil Sci. Plant Anal, 25 (5&6)	Plant available phosphorus and potassium are extracted from the soil using fixed ratio Modified Kelowna solution.
VOCs Methanol Extraction for Headspace Analysis	EP581  Vancouver - Environmental	Soil/Solid	EPA 5035A (mod)	VOCs in samples are extracted with methanol. Extracts are then prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PHCs and PAHs Hexane-Acetone Tumbler Extraction	EP601  Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1 (mod)	Samples are subsampled and Petroleum Hydrocarbons (PHC) and PAHs are extracted with 1:1 hexane:acetone using a rotary extractor.
Dry and Grind	EPP442  Saskatoon - Environmental	Soil/Solid	Soil Sampling and Methods of Analysis, Carter 2008	After removal of any coarse fragments and reservation of wet subsamples a portion of homogenized sample is set in a tray and dried at less than 60 C until dry. The sample is then particle size reduced with an automated crusher or mortar and pestle, typically to <2 mm. Further size reduction may be needed for particular tests.

## QUALITY CONTROL REPORT

**Work Order** : **VA20B4299**

**Page** : 1 of 18

**Client** : Seabridge Gold Inc.  
**Contact** : Elizabeth Miller  
**Address** : 1235 Main Street P.O. Box 2536  
                   Smithers BC Canada V0J 2N0  
**Telephone** : 416 367 9292  
**Project** : VE52655D  
**PO** :  
**C-O-C number** : ----  
**Sampler** : Ardy M  
**Site** : ----  
**Quote number** : VA20-SEAB100-0003 - Wood/Seabridge Gold  
**No. of samples received** : 10  
**No. of samples analysed** : 7

**Laboratory** : Vancouver - Environmental  
**Account Manager** : Selam Worku  
**Address** : 8081 Lougheed Highway  
                   Burnaby, British Columbia Canada V5A 1W9  
**Telephone** : +1 604 253 4188  
**Date Samples Received** : 02-Sep-2020 10:45  
**Date Analysis Commenced** : 04-Sep-2020  
**Issue Date** : 28-Sep-2020 14:20

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

### *Signatories*

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Brianna Allen	Department Manager - Organics	Organics, Burnaby, British Columbia
Dwayne Bennett	Technical Specialist	Inorganics, Saskatoon, Saskatchewan
Hedy Lai	Team Leader - Inorganics	Inorganics, Saskatoon, Saskatchewan
Jeremy Paterson	Analyst	Microbiology, Winnipeg, Manitoba
Melissa Shaw	Team Leader - Inorganics	Inorganics, Saskatoon, Saskatchewan
Xihua Yao	Laboratory Analyst	Inorganics, Saskatoon, Saskatchewan

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Work Order : VA20B4299  
Client : Seabridge Gold Inc.  
Project : VE52655D

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## **General Comments**

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

# = Indicates a QC result that did not meet the ALS DQO.



### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: Soil/Solid

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 82950)</b>											
VA20B4299-001	SP20-01-01	moisture	----	E144	0.25	%	11.0	13.2	18.0%	20%	----
<b>Organic / Inorganic Carbon (QC Lot: 82926)</b>											
VA20B4276-008	Anonymous	carbon, inorganic [IC]	----	E354	0.050	%	5.45	5.47	0.305%	20%	----
<b>Organic / Inorganic Carbon (QC Lot: 83605)</b>											
VA20B4276-008	Anonymous	carbon, total [TC]	----	E351	0.050	%	13.0	13.2	1.04%	20%	----
<b>Plant Available Nutrients (QC Lot: 84476)</b>											
VA20B4097-038	Anonymous	sulfate, available (as S)	14808-79-8	E497.S04	3.0	mg/kg	242	234	3.45%	30%	----
<b>Plant Available Nutrients (QC Lot: 84477)</b>											
VA20B4299-001	SP20-01-01	nitrate + nitrite, available (as N)	----	E269 N+N	1.0	mg/kg	<1.0	<1.0	0	Diff <2x LOR	----
<b>Plant Available Nutrients (QC Lot: 86217)</b>											
VA20B4299-001	SP20-01-01	phosphate, available (as P)	14265-44-2	E384	2.0	mg/kg	2.6	2.6	0.004	Diff <2x LOR	----
<b>Plant Available Nutrients (QC Lot: 86218)</b>											
VA20B4299-001	SP20-01-01	potassium, available	7440-09-7	E390	20	mg/kg	67	66	1	Diff <2x LOR	----
<b>Taxonomy (QC Lot: 91388)</b>											
VA20B4301-002	Anonymous	hydrocarbon utilizing bacteria [HUB]	----	E924 AR	5000	CFU/g	56000	49000	13.3%	50%	----
<b>Volatile Organic Compounds (QC Lot: 81573)</b>											
KS2001615-001	Anonymous	benzene	71-43-2	E611C	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		bromodichloromethane	75-27-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		bromoform	75-25-2	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		carbon tetrachloride	56-23-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chlorobenzene	108-90-7	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chloroethane	75-00-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chloroform	67-66-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chloromethane	74-87-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dibromochloromethane	124-48-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichlorobenzene, 1,2-	95-50-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichlorobenzene, 1,3-	541-73-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichlorobenzene, 1,4-	106-46-7	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethane, 1,1-	75-34-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethane, 1,2-	107-06-2	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethylene, 1,1-	75-35-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----





Sub-Matrix: Soil/Solid					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Volatile Organic Compounds (QC Lot: 81573) - continued</b>											
KS2001615-001	Anonymous	dichloroethylene, cis-1,2-	156-59-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloromethane	75-09-2	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloropropane, 1,2-	78-87-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloropropylene, cis-1,3-	10061-01-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloropropylene, trans-1,3-	10061-02-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	<0.015	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		styrene	100-42-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tetrachloroethylene	127-18-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		toluene	108-88-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		trichloroethane, 1,1,1-	71-55-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		trichloroethane, 1,1,2-	79-00-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		trichloroethylene	79-01-6	E611C	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		trichlorofluoromethane	75-69-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		vinyl chloride	75-01-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
xylene, m+p-	179601-23-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----		
xylene, o-	95-47-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----		
<b>Volatile Organic Compounds (QC Lot: 82445)</b>											
VA20B3143-018	Anonymous	benzene	71-43-2	E611C	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		bromodichloromethane	75-27-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		bromoform	75-25-2	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		carbon tetrachloride	56-23-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chlorobenzene	108-90-7	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chloroethane	75-00-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chloroform	67-66-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		chloromethane	74-87-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dibromochloromethane	124-48-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichlorobenzene, 1,2-	95-50-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichlorobenzene, 1,3-	541-73-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichlorobenzene, 1,4-	106-46-7	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethane, 1,1-	75-34-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethane, 1,2-	107-06-2	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethylene, 1,1-	75-35-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----



Sub-Matrix: Soil/Solid

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Volatile Organic Compounds (QC Lot: 82445) - continued</b>											
VA20B3143-018	Anonymous	dichloroethylene, cis-1,2-	156-59-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloromethane	75-09-2	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloropropane, 1,2-	78-87-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloropropylene, cis-1,3-	10061-01-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		dichloropropylene, trans-1,3-	10061-02-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	<0.015	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		styrene	100-42-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tetrachloroethylene	127-18-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		toluene	108-88-3	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		trichloroethane, 1,1,1-	71-55-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		trichloroethane, 1,1,2-	79-00-5	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		trichloroethylene	79-01-6	E611C	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		trichlorofluoromethane	75-69-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		vinyl chloride	75-01-4	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611C	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
<b>Hydrocarbons (QC Lot: 82948)</b>											
VA20B4299-001	SP20-01-01	EPH (C10-C19)	----	E601A	200	mg/kg	300	340	30	Diff <2x LOR	----
		EPH (C19-C32)	----	E601A	200	mg/kg	<200	<200	0	Diff <2x LOR	----
<b>Polycyclic Aromatic Hydrocarbons (QC Lot: 82949)</b>											
VA20B4299-001	SP20-01-01	acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		acenaphthylene	208-96-8	E641A-L	0.0070	mg/kg	<0.0070	<0.0080	0.0010	Diff <2x LOR	----
		acridine	260-94-6	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.0040	<0.0040	0	Diff <2x LOR	----
		benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(b+j)fluoranthene	----	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		chrysene	218-01-9	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		fluoranthene	206-44-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----

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 Work Order : VA20B4299  
 Client : Seabridge Gold Inc.  
 Project : VE52655D



Sub-Matrix: **Soil/Solid**

*Laboratory Duplicate (DUP) Report*

<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Original Result</i>	<i>Duplicate Result</i>	<i>RPD(%) or Difference</i>	<i>Duplicate Limits</i>	<i>Qualifier</i>
<b>Polycyclic Aromatic Hydrocarbons (QC Lot: 82949) - continued</b>											
VA20B4299-001	SP20-01-01	fluorene	86-73-7	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		naphthalene	91-20-3	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		phenanthrene	85-01-8	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		pyrene	129-00-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		quinoline	6027-02-7	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

### Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 82950)</b>						
moisture	----	E144	0.25	%	<0.25	----
<b>Organic / Inorganic Carbon (QCLot: 82926)</b>						
carbon, inorganic [IC]	----	E354	0.05	%	<0.050	----
<b>Organic / Inorganic Carbon (QCLot: 83605)</b>						
carbon, total [TC]	----	E351	0.05	%	<0.050	----
<b>Plant Available Nutrients (QCLot: 84476)</b>						
sulfate, available (as S)	14808-79-8	E497.SO4	3	mg/kg	<3.0	----
<b>Plant Available Nutrients (QCLot: 84477)</b>						
nitrate + nitrite, available (as N)	----	E269.N+N	1	mg/kg	<1.0	----
<b>Plant Available Nutrients (QCLot: 86217)</b>						
phosphate, available (as P)	14265-44-2	E384	2	mg/kg	<2.0	----
<b>Plant Available Nutrients (QCLot: 86218)</b>						
potassium, available	7440-09-7	E390	20	mg/kg	<20	----
<b>Taxonomy (QCLot: 91388)</b>						
hydrocarbon utilizing bacteria [HUB]	----	E924.AR	5	CFU/g	<5	----
<b>Volatile Organic Compounds (QCLot: 81573)</b>						
benzene	71-43-2	E611C	0.005	mg/kg	<0.0050	----
bromodichloromethane	75-27-4	E611C	0.05	mg/kg	<0.050	----
bromoform	75-25-2	E611C	0.05	mg/kg	<0.050	----
carbon tetrachloride	56-23-5	E611C	0.05	mg/kg	<0.050	----
chlorobenzene	108-90-7	E611C	0.05	mg/kg	<0.050	----
chloroethane	75-00-3	E611C	0.05	mg/kg	<0.050	----
chloroform	67-66-3	E611C	0.05	mg/kg	<0.050	----
chloromethane	74-87-3	E611C	0.05	mg/kg	<0.050	----
dibromochloromethane	124-48-1	E611C	0.05	mg/kg	<0.050	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.05	mg/kg	<0.050	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.05	mg/kg	<0.050	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.05	mg/kg	<0.050	----
dichloroethane, 1,1-	75-34-3	E611C	0.05	mg/kg	<0.050	----
dichloroethane, 1,2-	107-06-2	E611C	0.05	mg/kg	<0.050	----
dichloroethylene, 1,1-	75-35-4	E611C	0.05	mg/kg	<0.050	----
dichloroethylene, cis-1,2-	156-59-4	E611C	0.05	mg/kg	<0.050	----
dichloroethylene, trans-1,2-	156-60-5	E611C	0.05	mg/kg	<0.050	----



Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Volatile Organic Compounds (QCLot: 81573) - continued</b>						
dichloromethane	75-09-2	E611C	0.05	mg/kg	<0.050	---
dichloropropane, 1,2-	78-87-5	E611C	0.05	mg/kg	<0.050	---
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.05	mg/kg	<0.050	---
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.05	mg/kg	<0.050	---
ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	---
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.05	mg/kg	<0.050	---
styrene	100-42-5	E611C	0.05	mg/kg	<0.050	---
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.05	mg/kg	<0.050	---
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.05	mg/kg	<0.050	---
tetrachloroethylene	127-18-4	E611C	0.05	mg/kg	<0.050	---
toluene	108-88-3	E611C	0.05	mg/kg	<0.050	---
trichloroethane, 1,1,1-	71-55-6	E611C	0.05	mg/kg	<0.050	---
trichloroethane, 1,1,2-	79-00-5	E611C	0.05	mg/kg	<0.050	---
trichloroethylene	79-01-6	E611C	0.01	mg/kg	<0.010	---
trichlorofluoromethane	75-69-4	E611C	0.05	mg/kg	<0.050	---
vinyl chloride	75-01-4	E611C	0.05	mg/kg	<0.050	---
xylene, m+p-	179601-23-1	E611C	0.05	mg/kg	<0.050	---
xylene, o-	95-47-6	E611C	0.05	mg/kg	<0.050	---
<b>Volatile Organic Compounds (QCLot: 82445)</b>						
benzene	71-43-2	E611C	0.005	mg/kg	<0.0050	---
bromodichloromethane	75-27-4	E611C	0.05	mg/kg	<0.050	---
bromoform	75-25-2	E611C	0.05	mg/kg	<0.050	---
carbon tetrachloride	56-23-5	E611C	0.05	mg/kg	<0.050	---
chlorobenzene	108-90-7	E611C	0.05	mg/kg	<0.050	---
chloroethane	75-00-3	E611C	0.05	mg/kg	<0.050	---
chloroform	67-66-3	E611C	0.05	mg/kg	<0.050	---
chloromethane	74-87-3	E611C	0.05	mg/kg	<0.050	---
dibromochloromethane	124-48-1	E611C	0.05	mg/kg	<0.050	---
dichlorobenzene, 1,2-	95-50-1	E611C	0.05	mg/kg	<0.050	---
dichlorobenzene, 1,3-	541-73-1	E611C	0.05	mg/kg	<0.050	---
dichlorobenzene, 1,4-	106-46-7	E611C	0.05	mg/kg	<0.050	---
dichloroethane, 1,1-	75-34-3	E611C	0.05	mg/kg	<0.050	---
dichloroethane, 1,2-	107-06-2	E611C	0.05	mg/kg	<0.050	---
dichloroethylene, 1,1-	75-35-4	E611C	0.05	mg/kg	<0.050	---
dichloroethylene, cis-1,2-	156-59-4	E611C	0.05	mg/kg	<0.050	---
dichloroethylene, trans-1,2-	156-60-5	E611C	0.05	mg/kg	<0.050	---



Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Volatile Organic Compounds (QCLot: 82445) - continued</b>						
dichloromethane	75-09-2	E611C	0.05	mg/kg	<0.050	---
dichloropropane, 1,2-	78-87-5	E611C	0.05	mg/kg	<0.050	---
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.05	mg/kg	<0.050	---
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.05	mg/kg	<0.050	---
ethylbenzene	100-41-4	E611C	0.015	mg/kg	<0.015	---
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.05	mg/kg	<0.050	---
styrene	100-42-5	E611C	0.05	mg/kg	<0.050	---
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.05	mg/kg	<0.050	---
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.05	mg/kg	<0.050	---
tetrachloroethylene	127-18-4	E611C	0.05	mg/kg	<0.050	---
toluene	108-88-3	E611C	0.05	mg/kg	<0.050	---
trichloroethane, 1,1,1-	71-55-6	E611C	0.05	mg/kg	<0.050	---
trichloroethane, 1,1,2-	79-00-5	E611C	0.05	mg/kg	<0.050	---
trichloroethylene	79-01-6	E611C	0.01	mg/kg	<0.010	---
trichlorofluoromethane	75-69-4	E611C	0.05	mg/kg	<0.050	---
vinyl chloride	75-01-4	E611C	0.05	mg/kg	<0.050	---
xylene, m+p-	179601-23-1	E611C	0.05	mg/kg	<0.050	---
xylene, o-	95-47-6	E611C	0.05	mg/kg	<0.050	---
<b>Hydrocarbons (QCLot: 82948)</b>						
EPH (C10-C19)	---	E601A	200	mg/kg	<200	---
EPH (C19-C32)	---	E601A	200	mg/kg	<200	---
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 82949)</b>						
acenaphthene	83-32-9	E641A-L	0.005	mg/kg	<0.0050	---
acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	<0.0050	---
acridine	260-94-6	E641A-L	0.01	mg/kg	<0.010	---
anthracene	120-12-7	E641A-L	0.004	mg/kg	<0.0040	---
benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	<0.010	---
					<0.010	---
benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	<0.010	---
benzo(b+j)fluoranthene	---	E641A-L	0.01	mg/kg	<0.010	---
benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	<0.010	---
					<0.010	---
benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	<0.010	---
					<0.010	---
chrysene	218-01-9	E641A-L	0.01	mg/kg	<0.010	---
dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	<0.0050	---



Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 82949) - continued</b>						
fluoranthene	206-44-0	E641A-L	0.01	mg/kg	<0.010	----
fluorene	86-73-7	E641A-L	0.01	mg/kg	<0.010	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	<0.010	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	<0.010	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	<0.010	----
naphthalene	91-20-3	E641A-L	0.01	mg/kg	<0.010	----
phenanthrene	85-01-8	E641A-L	0.01	mg/kg	<0.010	----
pyrene	129-00-0	E641A-L	0.01	mg/kg	<0.010	----
quinoline	6027-02-7	E641A-L	0.01	mg/kg	<0.010	----



## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Physical Tests (QCLot: 82950)</b>									
moisture	---	E144	0.25	%	50 %	99.8	90.0	110	---
<b>Organic / Inorganic Carbon (QCLot: 82926)</b>									
carbon, inorganic [IC]	---	E354	0.05	%	0.5 %	95.9	90.0	110	---
<b>Organic / Inorganic Carbon (QCLot: 83605)</b>									
carbon, total [TC]	---	E351	0.05	%	48 %	101	80.0	120	---
<b>Plant Available Nutrients (QCLot: 84476)</b>									
sulfate, available (as S)	14808-79-8	E497.SO4	3	mg/kg	200 mg/kg	104	70.0	130	---
<b>Plant Available Nutrients (QCLot: 84477)</b>									
nitrate + nitrite, available (as N)	---	E269.N+N	1	mg/kg	22 mg/kg	81.8	70.0	130	---
<b>Plant Available Nutrients (QCLot: 86217)</b>									
phosphate, available (as P)	14265-44-2	E384	2	mg/kg	12.5 mg/kg	96.6	80.0	120	---
<b>Plant Available Nutrients (QCLot: 86218)</b>									
potassium, available	7440-09-7	E390	20	mg/kg	125 mg/kg	94.8	70.0	130	---
<b>Volatile Organic Compounds (QCLot: 81573)</b>									
benzene	71-43-2	E611C	0.005	mg/kg	2.5 mg/kg	104	70.0	130	---
bromodichloromethane	75-27-4	E611C	0.05	mg/kg	2.5 mg/kg	104	70.0	130	---
bromoform	75-25-2	E611C	0.05	mg/kg	2.5 mg/kg	108	70.0	130	---
carbon tetrachloride	56-23-5	E611C	0.05	mg/kg	2.5 mg/kg	100	70.0	130	---
chlorobenzene	108-90-7	E611C	0.05	mg/kg	2.5 mg/kg	111	70.0	130	---
chloroethane	75-00-3	E611C	0.05	mg/kg	2.5 mg/kg	93.7	60.0	140	---
chloroform	67-66-3	E611C	0.05	mg/kg	2.5 mg/kg	103	70.0	130	---
chloromethane	74-87-3	E611C	0.05	mg/kg	2.5 mg/kg	82.7	60.0	140	---
dibromochloromethane	124-48-1	E611C	0.05	mg/kg	2.5 mg/kg	109	70.0	130	---
dichlorobenzene, 1,2-	95-50-1	E611C	0.05	mg/kg	2.5 mg/kg	111	70.0	130	---
dichlorobenzene, 1,3-	541-73-1	E611C	0.05	mg/kg	2.5 mg/kg	99.4	70.0	130	---
dichlorobenzene, 1,4-	106-46-7	E611C	0.05	mg/kg	2.5 mg/kg	113	70.0	130	---
dichloroethane, 1,1-	75-34-3	E611C	0.05	mg/kg	2.5 mg/kg	103	70.0	130	---
dichloroethane, 1,2-	107-06-2	E611C	0.05	mg/kg	2.5 mg/kg	107	70.0	130	---
dichloroethylene, 1,1-	75-35-4	E611C	0.05	mg/kg	2.5 mg/kg	98.2	70.0	130	---
dichloroethylene, cis-1,2-	156-59-4	E611C	0.05	mg/kg	2.5 mg/kg	106	70.0	130	---
dichloroethylene, trans-1,2-	156-60-5	E611C	0.05	mg/kg	2.5 mg/kg	105	70.0	130	---





Sub-Matrix: Soil/Solid

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 81573) - continued</b>									
dichloromethane	75-09-2	E611C	0.05	mg/kg	2.5 mg/kg	103	60.0	140	----
dichloropropane, 1,2-	78-87-5	E611C	0.05	mg/kg	2.5 mg/kg	101	70.0	130	----
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.05	mg/kg	2.5 mg/kg	87.1	70.0	130	----
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.05	mg/kg	2.5 mg/kg	78.4	70.0	130	----
ethylbenzene	100-41-4	E611C	0.015	mg/kg	2.5 mg/kg	102	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.05	mg/kg	2.5 mg/kg	105	70.0	130	----
styrene	100-42-5	E611C	0.05	mg/kg	2.5 mg/kg	99.1	70.0	130	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.05	mg/kg	2.5 mg/kg	104	70.0	130	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.05	mg/kg	2.5 mg/kg	114	70.0	130	----
tetrachloroethylene	127-18-4	E611C	0.05	mg/kg	2.5 mg/kg	109	70.0	130	----
toluene	108-88-3	E611C	0.05	mg/kg	2.5 mg/kg	105	70.0	130	----
trichloroethane, 1,1,1-	71-55-6	E611C	0.05	mg/kg	2.5 mg/kg	94.0	70.0	130	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.05	mg/kg	2.5 mg/kg	108	70.0	130	----
trichloroethylene	79-01-6	E611C	0.01	mg/kg	2.5 mg/kg	105	70.0	130	----
trichlorofluoromethane	75-69-4	E611C	0.05	mg/kg	2.5 mg/kg	100	60.0	140	----
vinyl chloride	75-01-4	E611C	0.05	mg/kg	2.5 mg/kg	85.3	60.0	140	----
xylene, m+p-	179601-23-1	E611C	0.05	mg/kg	5 mg/kg	110	70.0	130	----
xylene, o-	95-47-6	E611C	0.05	mg/kg	2.5 mg/kg	112	70.0	130	----
<b>Volatile Organic Compounds (QCLot: 82445)</b>									
benzene	71-43-2	E611C	0.005	mg/kg	2.5 mg/kg	91.1	70.0	130	----
bromodichloromethane	75-27-4	E611C	0.05	mg/kg	2.5 mg/kg	103	70.0	130	----
bromoform	75-25-2	E611C	0.05	mg/kg	2.5 mg/kg	113	70.0	130	----
carbon tetrachloride	56-23-5	E611C	0.05	mg/kg	2.5 mg/kg	92.0	70.0	130	----
chlorobenzene	108-90-7	E611C	0.05	mg/kg	2.5 mg/kg	96.3	70.0	130	----
chloroethane	75-00-3	E611C	0.05	mg/kg	2.5 mg/kg	61.4	60.0	140	----
chloroform	67-66-3	E611C	0.05	mg/kg	2.5 mg/kg	99.0	70.0	130	----
chloromethane	74-87-3	E611C	0.05	mg/kg	2.5 mg/kg	# 46.6	60.0	140	LCS-ND
dibromochloromethane	124-48-1	E611C	0.05	mg/kg	2.5 mg/kg	104	70.0	130	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.05	mg/kg	2.5 mg/kg	103	70.0	130	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.05	mg/kg	2.5 mg/kg	97.3	70.0	130	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.05	mg/kg	2.5 mg/kg	101	70.0	130	----
dichloroethane, 1,1-	75-34-3	E611C	0.05	mg/kg	2.5 mg/kg	82.1	70.0	130	----
dichloroethane, 1,2-	107-06-2	E611C	0.05	mg/kg	2.5 mg/kg	98.5	70.0	130	----
dichloroethylene, 1,1-	75-35-4	E611C	0.05	mg/kg	2.5 mg/kg	74.4	70.0	130	----
dichloroethylene, cis-1,2-	156-59-4	E611C	0.05	mg/kg	2.5 mg/kg	91.5	70.0	130	----
dichloroethylene, trans-1,2-	156-60-5	E611C	0.05	mg/kg	2.5 mg/kg	82.7	70.0	130	----
dichloromethane	75-09-2	E611C	0.05	mg/kg	2.5 mg/kg	89.1	60.0	140	----



Sub-Matrix: Soil/Solid

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 82445) - continued</b>									
dichloropropane, 1,2-	78-87-5	E611C	0.05	mg/kg	2.5 mg/kg	102	70.0	130	----
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.05	mg/kg	2.5 mg/kg	109	70.0	130	----
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.05	mg/kg	2.5 mg/kg	92.0	70.0	130	----
ethylbenzene	100-41-4	E611C	0.015	mg/kg	2.5 mg/kg	92.6	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.05	mg/kg	2.5 mg/kg	89.2	70.0	130	----
styrene	100-42-5	E611C	0.05	mg/kg	2.5 mg/kg	95.7	70.0	130	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.05	mg/kg	2.5 mg/kg	101	70.0	130	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.05	mg/kg	2.5 mg/kg	116	70.0	130	----
tetrachloroethylene	127-18-4	E611C	0.05	mg/kg	2.5 mg/kg	85.3	70.0	130	----
toluene	108-88-3	E611C	0.05	mg/kg	2.5 mg/kg	92.9	70.0	130	----
trichloroethane, 1,1,1-	71-55-6	E611C	0.05	mg/kg	2.5 mg/kg	92.2	70.0	130	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.05	mg/kg	2.5 mg/kg	100	70.0	130	----
trichloroethylene	79-01-6	E611C	0.01	mg/kg	2.5 mg/kg	92.6	70.0	130	----
trichlorofluoromethane	75-69-4	E611C	0.05	mg/kg	2.5 mg/kg	99.9	60.0	140	----
vinyl chloride	75-01-4	E611C	0.05	mg/kg	2.5 mg/kg	60.4	60.0	140	----
xylene, m+p-	179601-23-1	E611C	0.05	mg/kg	5 mg/kg	94.5	70.0	130	----
xylene, o-	95-47-6	E611C	0.05	mg/kg	2.5 mg/kg	94.4	70.0	130	----
<b>Hydrocarbons (QCLot: 82948)</b>									
EPH (C10-C19)	----	E601A	200	mg/kg	1134.37 mg/kg	107	70.0	130	----
EPH (C19-C32)	----	E601A	200	mg/kg	575.98 mg/kg	105	70.0	130	----
					10183 mg/kg	99.6	70.0	130	----
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 82949)</b>									
acenaphthene	83-32-9	E641A-L	0.005	mg/kg	0.5 mg/kg	101	60.0	130	----
acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	0.5 mg/kg	100	60.0	130	----
acridine	260-94-6	E641A-L	0.01	mg/kg	0.5 mg/kg	103	60.0	130	----
anthracene	120-12-7	E641A-L	0.004	mg/kg	0.5 mg/kg	105	60.0	130	----
benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	0.5 mg/kg	103	60.0	130	----
					0.545 mg/kg	97.9	60.0	130	----
benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	0.5 mg/kg	102	60.0	130	----
benzo(b+j)fluoranthene	----	E641A-L	0.01	mg/kg	0.5 mg/kg	104	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	0.5 mg/kg	102	60.0	130	----
					0.377 mg/kg	98.8	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	0.5 mg/kg	95.5	60.0	130	----
					0.34 mg/kg	99.9	60.0	130	----
chrysene	218-01-9	E641A-L	0.01	mg/kg	0.5 mg/kg	95.6	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	0.5 mg/kg	103	60.0	130	----



Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 82949) - continued</b>									
fluoranthene	206-44-0	E641A-L	0.01	mg/kg	0.5 mg/kg	101	60.0	130	----
fluorene	86-73-7	E641A-L	0.01	mg/kg	0.5 mg/kg	103	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	0.5 mg/kg	106	60.0	130	----
					0.445 mg/kg	99.2	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	0.5 mg/kg	95.9	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	0.5 mg/kg	94.8	60.0	130	----
					1.088 mg/kg	91.0	60.0	130	----
naphthalene	91-20-3	E641A-L	0.01	mg/kg	0.5 mg/kg	97.3	50.0	130	----
					1.03 mg/kg	97.0	50.0	130	----
phenanthrene	85-01-8	E641A-L	0.01	mg/kg	0.5 mg/kg	102	60.0	130	----
					1.13 mg/kg	97.3	60.0	130	----
pyrene	129-00-0	E641A-L	0.01	mg/kg	0.5 mg/kg	107	60.0	130	----
					1.325 mg/kg	96.8	60.0	130	----
quinoline	6027-02-7	E641A-L	0.01	mg/kg	0.5 mg/kg	101	60.0	130	----

**Qualifiers**

Qualifier	Description
LCS-ND	Lab Control Sample recovery was slightly outside ALS DQO. Reported non-detect results for associated samples were unaffected.



## Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level  $\geq 1 \times$  spike level.

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 81573)</b>										
KS2001615-001	Anonymous	benzene	71-43-2	E611C	2.68 mg/kg	3.125 mg/kg	116	60 0	140	----
		bromodichloromethane	75-27-4	E611C	2.80 mg/kg	3.125 mg/kg	121	60 0	140	----
		bromoform	75-25-2	E611C	2.82 mg/kg	3.125 mg/kg	122	60 0	140	----
		carbon tetrachloride	56-23-5	E611C	2.35 mg/kg	3.125 mg/kg	102	60 0	140	----
		chlorobenzene	108-90-7	E611C	2.71 mg/kg	3.125 mg/kg	117	60 0	140	----
		chloroethane	75-00-3	E611C	2.64 mg/kg	3.125 mg/kg	114	60 0	140	----
		chloroform	67-66-3	E611C	2.69 mg/kg	3.125 mg/kg	116	60 0	140	----
		chloromethane	74-87-3	E611C	2.85 mg/kg	3.125 mg/kg	123	60 0	140	----
		dibromochloromethane	124-48-1	E611C	2.76 mg/kg	3.125 mg/kg	120	60 0	140	----
		dichlorobenzene, 1,2-	95-50-1	E611C	2.60 mg/kg	3.125 mg/kg	112	60 0	140	----
		dichlorobenzene, 1,3-	541-73-1	E611C	2.50 mg/kg	3.125 mg/kg	108	60 0	140	----
		dichlorobenzene, 1,4-	106-46-7	E611C	2.63 mg/kg	3.125 mg/kg	114	60 0	140	----
		dichloroethane, 1,1-	75-34-3	E611C	2.78 mg/kg	3.125 mg/kg	120	60 0	140	----
		dichloroethane, 1,2-	107-06-2	E611C	2.97 mg/kg	3.125 mg/kg	128	60 0	140	----
		dichloroethylene, 1,1-	75-35-4	E611C	2.68 mg/kg	3.125 mg/kg	116	60 0	140	----
		dichloroethylene, cis-1,2-	156-59-4	E611C	2.79 mg/kg	3.125 mg/kg	121	60 0	140	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	2.76 mg/kg	3.125 mg/kg	120	60 0	140	----
		dichloromethane	75-09-2	E611C	2.91 mg/kg	3.125 mg/kg	126	60 0	140	----
		dichloropropane, 1,2-	78-87-5	E611C	2.93 mg/kg	3.125 mg/kg	126	60 0	140	----
		dichloropropylene, cis-1,3-	10061-01-5	E611C	2.70 mg/kg	3.125 mg/kg	116	60 0	140	----
		dichloropropylene, trans-1,3-	10061-02-6	E611C	3.12 mg/kg	3.125 mg/kg	135	60 0	140	----
		ethylbenzene	100-41-4	E611C	2.74 mg/kg	3.125 mg/kg	118	60 0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	2.37 mg/kg	3.125 mg/kg	102	60 0	140	----
		styrene	100-42-5	E611C	2.82 mg/kg	3.125 mg/kg	122	60 0	140	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	2.64 mg/kg	3.125 mg/kg	114	60 0	140	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611C	3.01 mg/kg	3.125 mg/kg	130	60 0	140	----
		tetrachloroethylene	127-18-4	E611C	2.51 mg/kg	3.125 mg/kg	108	60 0	140	----
		toluene	108-88-3	E611C	2.58 mg/kg	3.125 mg/kg	112	60 0	140	----
		trichloroethane, 1,1,1-	71-55-6	E611C	2.71 mg/kg	3.125 mg/kg	117	60 0	140	----
		trichloroethane, 1,1,2-	79-00-5	E611C	2.64 mg/kg	3.125 mg/kg	114	60 0	140	----
		trichloroethylene	79-01-6	E611C	2.56 mg/kg	3.125 mg/kg	111	60 0	140	----
		trichlorofluoromethane	75-69-4	E611C	2.52 mg/kg	3.125 mg/kg	109	60 0	140	----



Sub-Matrix: Soil/Solid

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 81573) - continued</b>										
KS2001615-001	Anonymous	vinyl chloride	75-01-4	E611C	2.69 mg/kg	3.125 mg/kg	116	60 0	140	----
		xylene, m+p-	179601-23-1	E611C	5.67 mg/kg	6.25 mg/kg	123	60 0	140	----
		xylene, o-	95-47-6	E611C	2.83 mg/kg	3.125 mg/kg	122	60 0	140	----
<b>Volatile Organic Compounds (QCLot: 82445)</b>										
VA20B3143-019	Anonymous	benzene	71-43-2	E611C	2.07 mg/kg	3.125 mg/kg	95.2	60 0	140	----
		bromodichloromethane	75-27-4	E611C	2.08 mg/kg	3.125 mg/kg	95.7	60 0	140	----
		bromoform	75-25-2	E611C	2.23 mg/kg	3.125 mg/kg	102	60 0	140	----
		carbon tetrachloride	56-23-5	E611C	2.11 mg/kg	3.125 mg/kg	97.0	60 0	140	----
		chlorobenzene	108-90-7	E611C	2.11 mg/kg	3.125 mg/kg	97.2	60 0	140	----
		chloroethane	75-00-3	E611C	2.03 mg/kg	3.125 mg/kg	93.2	60 0	140	----
		chloroform	67-66-3	E611C	2.13 mg/kg	3.125 mg/kg	97.8	60 0	140	----
		chloromethane	74-87-3	E611C	1.99 mg/kg	3.125 mg/kg	91.7	60 0	140	----
		dibromochloromethane	124-48-1	E611C	2.16 mg/kg	3.125 mg/kg	99.5	60 0	140	----
		dichlorobenzene, 1,2-	95-50-1	E611C	2.08 mg/kg	3.125 mg/kg	95.9	60 0	140	----
		dichlorobenzene, 1,3-	541-73-1	E611C	1.99 mg/kg	3.125 mg/kg	91.5	60 0	140	----
		dichlorobenzene, 1,4-	106-46-7	E611C	2.06 mg/kg	3.125 mg/kg	94.6	60 0	140	----
		dichloroethane, 1,1-	75-34-3	E611C	1.81 mg/kg	3.125 mg/kg	83.1	60 0	140	----
		dichloroethane, 1,2-	107-06-2	E611C	2.04 mg/kg	3.125 mg/kg	94.0	60 0	140	----
		dichloroethylene, 1,1-	75-35-4	E611C	2.08 mg/kg	3.125 mg/kg	95.4	60 0	140	----
		dichloroethylene, cis-1,2-	156-59-4	E611C	2.06 mg/kg	3.125 mg/kg	94.5	60 0	140	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	2.04 mg/kg	3.125 mg/kg	93.8	60 0	140	----
		dichloromethane	75-09-2	E611C	2.10 mg/kg	3.125 mg/kg	96.5	60 0	140	----
		dichloropropane, 1,2-	78-87-5	E611C	2.14 mg/kg	3.125 mg/kg	98.4	60 0	140	----
		dichloropropylene, cis-1,3-	10061-01-5	E611C	2.19 mg/kg	3.125 mg/kg	101	60 0	140	----
		dichloropropylene, trans-1,3-	10061-02-6	E611C	2.07 mg/kg	3.125 mg/kg	95.2	60 0	140	----
		ethylbenzene	100-41-4	E611C	2.12 mg/kg	3.125 mg/kg	97.6	60 0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	2.13 mg/kg	3.125 mg/kg	98.0	60 0	140	----
		styrene	100-42-5	E611C	2.12 mg/kg	3.125 mg/kg	97.7	60 0	140	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	2.17 mg/kg	3.125 mg/kg	99.7	60 0	140	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611C	2.23 mg/kg	3.125 mg/kg	102	60 0	140	----
		tetrachloroethylene	127-18-4	E611C	2.03 mg/kg	3.125 mg/kg	93.5	60 0	140	----
		toluene	108-88-3	E611C	2.19 mg/kg	3.125 mg/kg	101	60 0	140	----
		trichloroethane, 1,1,1-	71-55-6	E611C	2.12 mg/kg	3.125 mg/kg	97.3	60 0	140	----
		trichloroethane, 1,1,2-	79-00-5	E611C	2.11 mg/kg	3.125 mg/kg	96.9	60 0	140	----
trichloroethylene	79-01-6	E611C	2.04 mg/kg	3.125 mg/kg	93.8	60 0	140	----		
trichlorofluoromethane	75-69-4	E611C	2.90 mg/kg	3.125 mg/kg	134	60 0	140	----		

Page : 17 of 18  
 Work Order : VA20B4299  
 Client : Seabridge Gold Inc.  
 Project : VE52655D



Sub-Matrix: **Soil/Solid**

					<i>Matrix Spike (MS) Report</i>					
					<i>Spike</i>		<i>Recovery (%)</i>	<i>Recovery Limits (%)</i>		
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>Concentration</i>	<i>Target</i>	<i>MS</i>	<i>Low</i>	<i>High</i>	<i>Qualifier</i>
<b>Volatile Organic Compounds (QCLot: 82445) - continued</b>										
VA20B3143-019	Anonymous	vinyl chloride	75-01-4	E611C	1.95 mg/kg	3.125 mg/kg	89.7	60.0	140	----
		xylene, m+p-	179601-23-1	E611C	4.22 mg/kg	6.25 mg/kg	97.0	60.0	140	----
		xylene, o-	95-47-6	E611C	2.10 mg/kg	3.125 mg/kg	96.8	60.0	140	----



## Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be AL long term mean values (for empirical test methods)

Sub Matrix: Soil/Solid

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
							Low	High	
<b>Organic / Inorganic Carbon (QCLot: 82926)</b>									
QC-82926-003	RM	carbon, inorganic [IC]	----	E354	0.383 %	91.7	80.0	120	----
<b>Organic / Inorganic Carbon (QCLot: 83605)</b>									
QC-83605-003	RM	carbon, total [TC]	----	E351	1.4 %	103	80.0	120	----
<b>Plant Available Nutrients (QCLot: 84476)</b>									
QC-84476-003	RM	sulfate, available (as S)	14808-79-8	E497.SO4	497 mg/kg	105	70.0	130	----
<b>Plant Available Nutrients (QCLot: 84477)</b>									
QC-84477-003	RM	nitrate + nitrite, available (as N)	----	E269 N+N	16.8 mg/kg	76.7	70.0	130	----
<b>Plant Available Nutrients (QCLot: 86217)</b>									
QC-86217-003	RM	phosphate, available (as P)	14265-44-2	E384	10.47 mg/kg	100	80.0	120	----
<b>Plant Available Nutrients (QCLot: 86218)</b>									
QC-86218-003	RM	potassium, available	7440-09-7	E390	154 mg/kg	100.0	70.0	130	
<b>Hydrocarbons (QCLot: 82948)</b>									
QC-82948-003	Petroleum Hydrocarbon IRM	EPH (C10-C19)	----	E601A	7113 mg/kg	101	70.0	130	----
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 82949)</b>									
QC-82949-003	RM	acenaphthene	83-32-9	E641A-L	0.638 mg/kg	98.1	60.0	130	----
QC-82949-003	RM	acenaphthylene	208-96-8	E641A-L	0.2 mg/kg	93.6	60.0	130	----
QC-82949-003	RM	anthracene	120-12-7	E641A-L	0.32 mg/kg	97.4	60.0	130	----
QC-82949-003	RM	benzo(a)pyrene	50-32-8	E641A-L	0.135 mg/kg	99.1	60.0	130	----
QC-82949-003	RM	benzo(b+j)fluoranthene	----	E641A-L	0.793 mg/kg	99.5	60.0	130	----
QC-82949-003	RM	chrysene	218-01-9	E641A-L	0.666 mg/kg	93.8	60.0	130	----
QC-82949-003	RM	dibenz(a,h)anthracene	53-70-3	E641A-L	1.196 mg/kg	99.2	60.0	130	----
QC-82949-003	RM	fluoranthene	206-44-0	E641A-L	1.757 mg/kg	94.0	60.0	130	----
QC-82949-003	RM	fluorene	86-73-7	E641A-L	0.989 mg/kg	99.6	60.0	130	----
QC-82949-003	RM	methylnaphthalene, 1-	90-12-0	E641A-L	1.256 mg/kg	93.7	60.0	130	----



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# Chain of Custody (COC) / Analytical Request Form

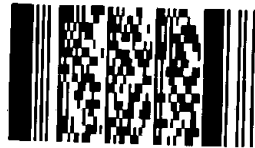
Canada Toll Free: 1 800 668 9878

### Affix ALS barcode label here

(lab use only)

COC Number: 17 -

Page 1 of 1

<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>			<b>Select Service Level Below - Contact your AM to confirm all E&amp;P TATs (surcharges may apply)</b>																																																		
Company: Wood		Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)			Regular [R] <input checked="" type="checkbox"/> Standard TAT If received by 3 pm - business days - no surcharges apply																																																		
Contact: Jeremiah Gladu		Quality Control (QC) Report with Report <input type="checkbox"/> YES <input type="checkbox"/> NO			PROPERTY (Business Days) 4 day [P4-20%] <input type="checkbox"/> 3 day [P3-25%] <input type="checkbox"/> 2 day [P2-50%] <input type="checkbox"/>		EMERGENCY 1 Business day [E - 100%] <input type="checkbox"/> Same Day, Weekend or Statutory holiday [E2 -200%] (Laboratory opening fees may apply) <input type="checkbox"/>																																																
Phone:		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked			Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm																																																		
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			For tests that can not be performed according to the service level selected, you will be contacted.																																																		
Street: 4445 Lougheed Hwy.		Email 1 or Fax jeremiah.gladu@woodplc.com			<b>Analysis Request</b> Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below																																																		
City/Province: Burnaby/BC		Email 2 a-mypour@																																																					
Postal Code: V5C 0E4		Email 3			<table border="1"> <tr> <td rowspan="10" style="writing-mode: vertical-rl; transform: rotate(180deg);">NUMBER OF CONTAINERS</td> <td rowspan="10" style="writing-mode: vertical-rl; transform: rotate(180deg);">BTEX/UOC</td> <td rowspan="10" style="writing-mode: vertical-rl; transform: rotate(180deg);">EPH/PAH</td> <td rowspan="10" style="writing-mode: vertical-rl; transform: rotate(180deg);">General chemistry *</td> <td rowspan="10" style="writing-mode: vertical-rl; transform: rotate(180deg);">DISSOLVED METALS</td> <td colspan="4"></td> <td rowspan="10" style="writing-mode: vertical-rl; transform: rotate(180deg);">SAMPLES ON HOLD</td> <td rowspan="10" style="writing-mode: vertical-rl; transform: rotate(180deg);">SUSPECTED HAZARD (see Special Instructions)</td> </tr> <tr><td colspan="4"></td></tr> <tr><td colspan="4"></td></tr> <tr><td colspan="4"></td></tr> <tr><td colspan="4"></td></tr> <tr><td colspan="4"></td></tr> <tr><td colspan="4"></td></tr> <tr><td colspan="4"></td></tr> <tr><td colspan="4"></td></tr> <tr><td colspan="4"></td></tr> </table>				NUMBER OF CONTAINERS	BTEX/UOC	EPH/PAH	General chemistry *	DISSOLVED METALS					SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)																																				
NUMBER OF CONTAINERS	BTEX/UOC	EPH/PAH	General chemistry *	DISSOLVED METALS																SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)																																		
<b>Invoice To</b> Same as Report To <input type="checkbox"/> YES <input type="checkbox"/> NO		<b>Invoice Distribution</b>			<div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>Environmental Division Vancouver</p> <p>Work Order Reference <b>VA20B4299</b></p>  <p>Telephone: + 1 604 263 4188</p> </div>																																																		
Copy of Invoice with Report <input type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX																																																					
Company:		Email 1 or Fax																																																					
Contact:		Email 2																																																					
<b>Project Information</b>		<b>Oil and Gas Required Fields (client use)</b>																																																					
ALS Account # / Quote #:		AFE/Cost Center:	PO#																																																				
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PO / AFE:		Requisitioner:																																																					
LSD:		Location:																																																					
ALS Lab Work Order # (lab use only): B 4299		ALS Contact: Selam Worku	Sampler: Ardy M.																																																				
<b>ALS Sample # (lab use only)</b>	<b>Sample Identification and/or Coordinates (This description will appear on the report)</b>			<b>Date (dd-mmm-yy)</b>	<b>Time (hh:mm)</b>	<b>Sample Type</b>																																																	
SP20-01-01				29-Aug-20	AM	Soil	✓	✓																																															
SP20-01-02					H		✓	✓																																															
SP20-01-03					H		✓	✓																																															
SP20-01-04					PM		✓	✓																																															
SP20-01-05					PM		✓	✓																																															
SP20-01-06 **					PM		✓	✓																																															
SP20-01-56 **					PM		✓	✓																																															
SP20-01-11					AM																																																		
SP20-01-14 **					H																																																		
SP20-01-15 **					H																																																		
<b>Drinking Water (DW) Samples<sup>1</sup> (client use)</b>		<b>Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)</b>			<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>																																																		
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO		*GENERAL WATER CHEMISTRY TO INCLUDE: pH, Alkalinity, bicarbonate, carbonate, chloride, conductivity, fluoride, hardness, hydroxide, nitrate, nitrite, ammonia, sulphate, turbidity, TDS, acidity.			Frozen <input type="checkbox"/> SIF Observations: Yes <input type="checkbox"/> No <input type="checkbox"/>																																																		
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO					Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>																																																		
					Cooling Initiated <input type="checkbox"/>																																																		
					INITIAL COOLER TEMPERATURES °C		FINAL COOLER TEMPERATURES °C																																																
					24		17°C (Avg)																																																
<b>SHIPMENT RELEASE (client use)</b>		<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>			<b>FINAL SHIPMENT RECEPTION (lab use only)</b>																																																		
Released by: Ardy Mansourpour	Date:	Time:	Received by: Chris Allison	Date: Aug 31/2020	Time: 1030	Received by: RSS	Date: 2 Sep 2020	Time: 17°C																																															

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

10/4/20





**CERTIFICATE OF ANALYSIS**

**Work Order** : **VA20B4301**  
**Client** : **Seabridge Gold Inc.**  
**Contact** : Elizabeth Miller  
**Address** : 1235 Main Street P.O. Box 2536  
Smithers BC Canada V0J 2N0  
**Telephone** : 416 367 9292  
**Project** : VE52655D  
**PO** :  
**C-O-C number** : ----  
**Sampler** : Ardy M  
**Site** : ----  
**Quote number** : VA20-SEAB100-0003 - Wood/Seabridge Gold  
**No. of samples received** : 13  
**No. of samples analysed** : 13

**Page** : 1 of 11  
**Laboratory** : Vancouver - Environmental  
**Account Manager** : Selam Worku  
**Address** : 8081 Lougheed Highway  
Burnaby BC Canada V5A 1W9  
**Telephone** : +1 604 253 4188  
**Date Samples Received** : 02-Sep-2020 10:45  
**Date Analysis Commenced** : 06-Sep-2020  
**Issue Date** : 28-Sep-2020 11:49

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

**Signatories**

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Brianna Allen	Department Manager - Organics	Organics, Burnaby, British Columbia
Dwayne Bennett	Technical Specialist	Inorganics, Saskatoon, Saskatchewan
Hedy Lai	Team Leader - Inorganics	Inorganics, Saskatoon, Saskatchewan
Jeremy Paterson	Analyst	Microbiology, Winnipeg, Manitoba
Melissa Shaw	Team Leader - Inorganics	Inorganics, Saskatoon, Saskatchewan
Xihua Yao	Laboratory Analyst	Inorganics, Saskatoon, Saskatchewan



## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
%	percent
CFU/g	Colony Forming Units per gram
mg/kg	milligrams per kilogram

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in reports identified as "**Preliminary Report**" are considered authorized for use.

## Workorder Comments

Additional parameters added via email for samples , SP20-02-02, SP20-02-04, SP20-02-06, SP20-02-08, SP20-02-10 and SP20-02-12.

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLCI	Detection Limit Raised: Chromatographic interference due to co-elution.
DLQ	Detection Limit raised due to co-eluting interference. GCMS qualifier ion ratio did not meet acceptance criteria.



## Analytical Results

Sub-Matrix: Soil					Client sample ID				
(Matrix: Soil/Solid)					SP20-02-01	SP20-02-02	SP20-02-03	SP20-02-04	SP20-02-05
Client sampling date / time					29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00
Analyte	CAS Number	Method	LOR	Unit	VA20B4301-001	VA20B4301-002	VA20B4301-003	VA20B4301-004	VA20B4301-005
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
moisture	----	E144	0.25	%	12.3	15.1	12.6	12.9	17.2
<b>Organic / Inorganic Carbon</b>									
carbon, total [TC]	----	E351	0.050	%	----	0.674	----	0.530	----
carbon, inorganic [IC]	----	E354	0.050	%	----	0.176	----	0.143	----
carbon, inorganic [IC], (as CaCO3 equivalent)	----	E354	0.40	%	----	1.47	----	1.19	----
carbon, total organic [TOC]	----	EC356	0.050	%	----	0.498	----	0.387	----
organic matter	----	EC356	0.10	%	----	0.86	----	0.67	----
<b>Plant Available Nutrients</b>									
phosphate, available (as P)	14265-44-2	E384	2.0	mg/kg	----	<2.0	----	4.2	----
potassium, available	7440-09-7	E390	20	mg/kg	----	82	----	84	----
sulfate, available (as S)	14808-79-8	E497.SO4	3.0	mg/kg	----	11.0	----	20.6	----
nitrate + nitrite, available (as N)	----	E269.N+N	1.0	mg/kg	----	<1.0	----	15.8	----
<b>Taxonomy</b>									
hydrocarbon utilizing bacteria [HUB]	----	E924.AR	5	CFU/g	----	56000	----	1000000	----
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>									
benzene	71-43-2	E611A	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
ethylbenzene	100-41-4	E611A	0.015	mg/kg	<0.015	<0.015	<0.015	<0.015	<0.015
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
styrene	100-42-5	E611A	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
toluene	108-88-3	E611A	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
xylene, m+p-	179601-23-1	E611A	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
xylene, o-	95-47-6	E611A	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
xylenes, total	1330-20-7	E611A	0.075	mg/kg	<0.075	<0.075	<0.075	<0.075	<0.075
BTEX, total	----	E611A	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
BTEX+Styrene, total	N/A	E611A	0.15	mg/kg	<0.15	<0.15	<0.15	<0.15	<0.15
<b>Volatile Organic Compounds Surrogates</b>									
bromofluorobenzene, 4-	460-00-4	E611A	0.050	%	85.8	86.4	97.2	102	97.6
difluorobenzene, 1,4-	540-36-3	E611A	0.050	%	109	101	110	116	115
<b>Hydrocarbons</b>									
EPH (C10-C19)	----	E601A	200	mg/kg	<200	990	1200	560	1050



## Analytical Results

Sub-Matrix: Soil					Client sample ID	SP20-02-01	SP20-02-02	SP20-02-03	SP20-02-04	SP20-02-05
(Matrix: Soil/Solid)										
Client sampling date / time						29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00
Analyte	CAS Number	Method	LOR	Unit	VA20B4301-001	VA20B4301-002	VA20B4301-003	VA20B4301-004	VA20B4301-005	
					Result	Result	Result	Result	Result	
<b>Hydrocarbons</b>										
EPH (C19-C32)	----	E601A	200	mg/kg	<200	350	250	<200	<200	
HEPHs	----	EC600A	200	mg/kg	<200	350	250	<200	<200	
LEPHs	----	EC600A	200	mg/kg	<200	990	1200	560	1050	
<b>Hydrocarbons Surrogates</b>										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	5.0	%	89.7	93.3	89.0	87.9	98.7	
<b>Polycyclic Aromatic Hydrocarbons</b>										
acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	<0.0050	<0.0060 <sup>DLCI</sup>	<0.0060 <sup>DLCI</sup>	<0.0050	<0.0070 <sup>DLCI</sup>	
acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	<0.0050	<0.0300 <sup>DLCI</sup>	<0.0200 <sup>DLCI</sup>	<0.0200 <sup>DLCI</sup>	<0.0200 <sup>DLCI</sup>	
acridine	260-94-6	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.090 <sup>DLCI</sup>	<0.010	<0.020 <sup>DLCI</sup>	
anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.0040	<0.0090 <sup>DLCI</sup>	<0.0080 <sup>DLCI</sup>	<0.0040	<0.0050 <sup>DLCI</sup>	
benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
benzo(b+j)fluoranthene	----	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
benzo(b+j+k)fluoranthene	----	E641A-L	0.015	mg/kg	<0.015	<0.015	<0.015	<0.015	<0.015	
benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
chrysene	218-01-9	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
fluoranthene	206-44-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
fluorene	86-73-7	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	<0.010	<0.020 <sup>DLCI</sup>	<0.030 <sup>DLCI</sup>	<0.010	<0.010	
methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	<0.010	<0.020 <sup>DLCI</sup>	<0.010	<0.010	<0.020 <sup>DLCI</sup>	
naphthalene	91-20-3	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.020 <sup>DLCI</sup>	<0.010	<0.030 <sup>DLCI</sup>	
phenanthrene	85-01-8	E641A-L	0.010	mg/kg	<0.010	<0.030 <sup>DLCI</sup>	<0.030 <sup>DLCI</sup>	<0.020 <sup>DLCI</sup>	<0.010	
pyrene	129-00-0	E641A-L	0.010	mg/kg	<0.010	<0.020 <sup>DLCI</sup>	0.052	<0.010	0.014	
quinoline	6027-02-7	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
B(a)P total potency equivalents [B(a)P TPE]	----	E641A-L	0.020	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
IACR (CCME)	----	E641A-L	0.15	mg/kg	<0.11	<0.11	<0.11	<0.11	<0.11	
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>										
acridine-d9	34749-75-2	E641A-L	0.010	%	107	107	96.0	102	108	



## Analytical Results

Sub-Matrix: Soil					Client sample ID				
(Matrix: Soil/Solid)					SP20-02-01	SP20-02-02	SP20-02-03	SP20-02-04	SP20-02-05
Client sampling date / time					29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00
Analyte	CAS Number	Method	LOR	Unit	VA20B4301-001	VA20B4301-002	VA20B4301-003	VA20B4301-004	VA20B4301-005
					Result	Result	Result	Result	Result
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>									
chrysene-d12	1719-03-5	E641A-L	0.010	%	118	119	105	113	117
naphthalene-d8	1146-65-2	E641A-L	0.010	%	105	106	92.7	99.5	106
phenanthrene-d10	1517-22-2	E641A-L	0.010	%	107	111	97.1	104	108

Please refer to the General Comments section for an explanation of any qualifiers detected.



## Analytical Results

Sub-Matrix: Soil					Client sample ID				
(Matrix: Soil/Solid)					SP20-02-06	SP20-02-07	SP20-02-08	SP20-02-09	SP20-02-10
Client sampling date / time					29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00
Analyte	CAS Number	Method	LOR	Unit	VA20B4301-006	VA20B4301-007	VA20B4301-008	VA20B4301-009	VA20B4301-010
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
moisture	----	E144	0.25	%	13.9	10.5	11.0	9.63	14.1
<b>Organic / Inorganic Carbon</b>									
carbon, total [TC]	----	E351	0.050	%	0.545	----	0.353	----	0.613
carbon, inorganic [IC]	----	E354	0.050	%	0.168	----	0.133	----	0.134
carbon, inorganic [IC], (as CaCO3 equivalent)	----	E354	0.40	%	1.40	----	1.10	----	1.11
carbon, total organic [TOC]	----	EC356	0.050	%	0.377	----	0.220	----	0.479
organic matter	----	EC356	0.10	%	0.65	----	0.38	----	0.82
<b>Plant Available Nutrients</b>									
phosphate, available (as P)	14265-44-2	E384	2.0	mg/kg	<2.0	----	5.0	----	3.1
potassium, available	7440-09-7	E390	20	mg/kg	96	----	96	----	78
sulfate, available (as S)	14808-79-8	E497.SO4	3.0	mg/kg	8.7	----	9.5	----	9.0
nitrate + nitrite, available (as N)	----	E269.N+N	1.0	mg/kg	<1.0	----	5.0	----	4.2
<b>Taxonomy</b>									
hydrocarbon utilizing bacteria [HUB]	----	E924.AR	5	CFU/g	34000	----	64000	----	99500
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>									
benzene	71-43-2	E611A	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
ethylbenzene	100-41-4	E611A	0.015	mg/kg	<0.015	<0.015	<0.015	<0.015	<0.015
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
styrene	100-42-5	E611A	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
toluene	108-88-3	E611A	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
xylene, m+p-	179601-23-1	E611A	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
xylene, o-	95-47-6	E611A	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
xylenes, total	1330-20-7	E611A	0.075	mg/kg	<0.075	<0.075	<0.075	<0.075	<0.075
BTEX, total	----	E611A	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
BTEX+Styrene, total	N/A	E611A	0.15	mg/kg	<0.15	<0.15	<0.15	<0.15	<0.15
<b>Volatile Organic Compounds Surrogates</b>									
bromofluorobenzene, 4-	460-00-4	E611A	0.050	%	93.9	90.4	96.7	90.2	90.6
difluorobenzene, 1,4-	540-36-3	E611A	0.050	%	107	103	113	103	103
<b>Hydrocarbons</b>									
EPH (C10-C19)	----	E601A	200	mg/kg	1660	360	250	<200	1040



## Analytical Results

Sub-Matrix: Soil					Client sample ID	SP20-02-06	SP20-02-07	SP20-02-08	SP20-02-09	SP20-02-10
(Matrix: Soil/Solid)					Client sampling date / time	29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00
Analyte	CAS Number	Method	LOR	Unit	VA20B4301-006	VA20B4301-007	VA20B4301-008	VA20B4301-009	VA20B4301-010	
					Result	Result	Result	Result	Result	
<b>Hydrocarbons</b>										
EPH (C19-C32)	----	E601A	200	mg/kg	500	<200	<200	<200	<200	
HEPHs	----	EC600A	200	mg/kg	500	<200	<200	<200	<200	
LEPHs	----	EC600A	200	mg/kg	1660	360	250	<200	1040	
<b>Hydrocarbons Surrogates</b>										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	5.0	%	93.8	97.0	93.1	88.0	92.6	
<b>Polycyclic Aromatic Hydrocarbons</b>										
acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	<0.0060 <sup>DLCI</sup>	<0.0060 <sup>DLCI</sup>	<0.0050	<0.0050	<0.0090 <sup>DLCI</sup>	
acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	<0.0200 <sup>DLCI</sup>	<0.0080 <sup>DLCI</sup>	<0.0060 <sup>DLCI</sup>	<0.0050	<0.0200 <sup>DLCI</sup>	
acridine	260-94-6	E641A-L	0.010	mg/kg	<0.300 <sup>DLCI</sup>	<0.010	<0.010	<0.010	<0.070 <sup>DLCI</sup>	
anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.0200 <sup>DLCI</sup>	<0.0040	<0.0040	<0.0040	<0.0050 <sup>DLCI</sup>	
benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
benzo(b+j)fluoranthene	----	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
benzo(b+j+k)fluoranthene	----	E641A-L	0.015	mg/kg	<0.015	<0.015	<0.015	<0.015	<0.015	
benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
chrysene	218-01-9	E641A-L	0.010	mg/kg	<0.020 <sup>DLCI</sup>	<0.010	<0.010	<0.010	<0.010	
dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
fluoranthene	206-44-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
fluorene	86-73-7	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	<0.020 <sup>DLCI</sup>	0.010	<0.010	0.025	<0.030 <sup>DLCI</sup>	
methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	<0.020 <sup>DLCI</sup>	0.011	<0.010	0.042	<0.030 <sup>DLCI</sup>	
naphthalene	91-20-3	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	0.012	<0.010	
phenanthrene	85-01-8	E641A-L	0.010	mg/kg	<0.030 <sup>DLCI</sup>	<0.020 <sup>DLCI</sup>	<0.010	<0.010	<0.040 <sup>DLCI</sup>	
pyrene	129-00-0	E641A-L	0.010	mg/kg	0.100	0.011	<0.010	<0.010	0.021	
quinoline	6027-02-7	E641A-L	0.010	mg/kg	<0.020 <sup>DLCI</sup>	<0.010	<0.010	<0.010	<0.020 <sup>DLCI</sup>	
B(a)P total potency equivalents [B(a)P TPE]	----	E641A-L	0.020	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	
IACR (CCME)	----	E641A-L	0.15	mg/kg	<0.11	<0.11	<0.11	<0.11	<0.11	
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>										
acridine-d9	34749-75-2	E641A-L	0.010	%	100	113	104	98.4	103	



## Analytical Results

Sub-Matrix: Soil					Client sample ID	SP20-02-06	SP20-02-07	SP20-02-08	SP20-02-09	SP20-02-10
(Matrix: Soil/Solid)										
Client sampling date / time					29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00	
Analyte	CAS Number	Method	LOR	Unit	VA20B4301-006	VA20B4301-007	VA20B4301-008	VA20B4301-009	VA20B4301-010	
					Result	Result	Result	Result	Result	
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>										
chrysene-d12	1719-03-5	E641A-L	0.010	%	115	125	110	107	117	
naphthalene-d8	1146-65-2	E641A-L	0.010	%	95.9	111	98.8	95.8	100	
phenanthrene-d10	1517-22-2	E641A-L	0.010	%	103	118	102	100	106	

Please refer to the General Comments section for an explanation of any qualifiers detected.





## Analytical Results

Sub-Matrix: Soil					Client sample ID	SP20-02-11	SP20-02-12	SP20-02-62	----	----
(Matrix: Soil/Solid)					Client sampling date / time	29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B4301-011	VA20B4301-012	VA20B4301-013	-----	-----	
					Result	Result	Result	---	---	
<b>Physical Tests</b>										
moisture	----	E144	0.25	%	10.4	12.6	10.8	----	----	
<b>Organic / Inorganic Carbon</b>										
carbon, total [TC]	----	E351	0.050	%	----	0.290	----	----	----	
carbon, inorganic [IC]	----	E354	0.050	%	----	0.104	----	----	----	
carbon, inorganic [IC], (as CaCO3 equivalent)	----	E354	0.40	%	----	0.86	----	----	----	
carbon, total organic [TOC]	----	EC356	0.050	%	----	0.186	----	----	----	
organic matter	----	EC356	0.10	%	----	0.32	----	----	----	
<b>Plant Available Nutrients</b>										
phosphate, available (as P)	14265-44-2	E384	2.0	mg/kg	----	<2.0	----	----	----	
potassium, available	7440-09-7	E390	20	mg/kg	----	82	----	----	----	
sulfate, available (as S)	14808-79-8	E497.SO4	3.0	mg/kg	----	17.8	----	----	----	
nitrate + nitrite, available (as N)	----	E269.N+N	1.0	mg/kg	----	<1.0	----	----	----	
<b>Taxonomy</b>										
hydrocarbon utilizing bacteria [HUB]	----	E924.AR	5	CFU/g	----	6600	----	----	----	
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>										
benzene	71-43-2	E611A	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	----	----	
ethylbenzene	100-41-4	E611A	0.015	mg/kg	<0.015	<0.015	<0.015	----	----	
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.050	mg/kg	<0.050	<0.050	<0.050	----	----	
styrene	100-42-5	E611A	0.050	mg/kg	<0.050	<0.050	<0.050	----	----	
toluene	108-88-3	E611A	0.050	mg/kg	<0.050	<0.050	<0.050	----	----	
xylene, m+p-	179601-23-1	E611A	0.050	mg/kg	<0.050	<0.050	<0.050	----	----	
xylene, o-	95-47-6	E611A	0.050	mg/kg	<0.050	<0.050	<0.050	----	----	
xylenes, total	1330-20-7	E611A	0.075	mg/kg	<0.075	<0.075	<0.075	----	----	
BTEX, total	----	E611A	0.10	mg/kg	<0.10	<0.10	<0.10	----	----	
BTEX+Styrene, total	N/A	E611A	0.15	mg/kg	<0.15	<0.15	<0.15	----	----	
<b>Volatile Organic Compounds Surrogates</b>										
bromofluorobenzene, 4-	460-00-4	E611A	0.050	%	97.7	88.1	96.8	----	----	
difluorobenzene, 1,4-	540-36-3	E611A	0.050	%	117	109	113	----	----	
<b>Hydrocarbons</b>										
EPH (C10-C19)	----	E601A	200	mg/kg	210	<200	<200	----	----	



## Analytical Results

Sub-Matrix: Soil					Client sample ID	SP20-02-11	SP20-02-12	SP20-02-62	----	----
(Matrix: Soil/Solid)										
Client sampling date / time					29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA20B4301-011	VA20B4301-012	VA20B4301-013	-----	-----	
					Result	Result	Result	---	---	
<b>Hydrocarbons</b>										
EPH (C19-C32)	----	E601A	200	mg/kg	<200	<200	<200	----	----	
HEPHs	----	EC600A	200	mg/kg	<200	<200	<200	----	----	
LEPHs	----	EC600A	200	mg/kg	210	<200	<200	----	----	
<b>Hydrocarbons Surrogates</b>										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	5.0	%	96.4	91.2	98.0	----	----	
<b>Polycyclic Aromatic Hydrocarbons</b>										
acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	----	----	
acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	<0.0060 <sup>DLCL</sup>	<0.0050	<0.0050	----	----	
acridine	260-94-6	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----	
anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.0040	<0.0040	<0.0040	----	----	
benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----	
benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----	
benzo(b+j)fluoranthene	----	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----	
benzo(b+j+k)fluoranthene	----	E641A-L	0.015	mg/kg	<0.015	<0.015	<0.015	----	----	
benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----	
benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----	
chrysene	218-01-9	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----	
dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	----	----	
fluoranthene	206-44-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----	
fluorene	86-73-7	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----	
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----	
methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----	
methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----	
naphthalene	91-20-3	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----	
phenanthrene	85-01-8	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----	
pyrene	129-00-0	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----	
quinoline	6027-02-7	E641A-L	0.010	mg/kg	<0.010	<0.010	<0.010	----	----	
B(a)P total potency equivalents [B(a)P TPE]	----	E641A-L	0.020	mg/kg	<0.010	<0.010	<0.010	----	----	
IACR (CCME)	----	E641A-L	0.15	mg/kg	<0.11	<0.11	<0.11	----	----	
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>										
acridine-d9	34749-75-2	E641A-L	0.010	%	104	106	106	----	----	



**Analytical Results**

Sub-Matrix: Soil					Client sample ID	SP20-02-11	SP20-02-12	SP20-02-62	----	----
(Matrix: Soil/Solid)					Client sampling date / time	29-Aug-2020 12:00	29-Aug-2020 12:00	29-Aug-2020 12:00	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B4301-011	VA20B4301-012	VA20B4301-013	-----	-----	
					Result	Result	Result	---	---	
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>										
chrysene-d12	1719-03-5	E641A-L	0.010	%	115	117	117	----	----	
naphthalene-d8	1146-65-2	E641A-L	0.010	%	101	103	105	----	----	
phenanthrene-d10	1517-22-2	E641A-L	0.010	%	106	108	109	----	----	

Please refer to the General Comments section for an explanation of any qualifiers detected.

## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>VA20B4301</b>	Page	: 1 of 16
Client	: <b>Seabridge Gold Inc.</b>	Laboratory	: Vancouver - Environmental
Contact	: Elizabeth Miller	Account Manager	: Selam Worku
Address	: 1235 Main Street P.O. Box 2536 Smithers BC Canada V0J 2N0	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: 416 367 9292	Telephone	: +1 604 253 4188
Project	: VE52655D	Date Samples Received	: 02-Sep-2020 10:45
PO	:	Issue Date	: 28-Sep-2020 11:49
C-O-C number	: ----		
Sampler	: Ardy M		
Site	: ----		
Quote number	: VA20-SEAB100-0003 - Wood/Seabridge Gold		
No. of samples received	: 13		
No. of samples analysed	: 13		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.  
**CAS Number:** Chemical Abstracts Services number is a unique identifier assigned to discrete substances.  
**DQO:** Data Quality Objective.  
**LOR:** Limit of Reporting (detection limit).  
**RPD:** Relative Percent Difference.

## Summary of Outliers

### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.

### **Outliers : Analysis Holding Time Compliance (Breaches)**

- Analysis Holding Time Outliers exist - please see following pages for full details.

### **Outliers : Frequency of Quality Control Samples**

- No Quality Control Sample Frequency Outliers occur.

RIGHT SOLUTIONS | RIGHT PARTNER



## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: Soil/Solid

Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
Glass soil jar/Teflon lined cap SP20-02-01	E601A	29-Aug-2020	08-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
Glass soil jar/Teflon lined cap SP20-02-02	E601A	29-Aug-2020	08-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
Glass soil jar/Teflon lined cap SP20-02-03	E601A	29-Aug-2020	08-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
Glass soil jar/Teflon lined cap SP20-02-04	E601A	29-Aug-2020	08-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
Glass soil jar/Teflon lined cap SP20-02-05	E601A	29-Aug-2020	08-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
Glass soil jar/Teflon lined cap SP20-02-06	E601A	29-Aug-2020	08-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
Glass soil jar/Teflon lined cap SP20-02-07	E601A	29-Aug-2020	08-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓



Matrix: Soil/Solid

Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Glass soil jar/Teflon lined cap</b> SP20-02-08	E601A	29-Aug-2020	08-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Glass soil jar/Teflon lined cap</b> SP20-02-09	E601A	29-Aug-2020	08-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Glass soil jar/Teflon lined cap</b> SP20-02-10	E601A	29-Aug-2020	08-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Glass soil jar/Teflon lined cap</b> SP20-02-11	E601A	29-Aug-2020	08-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Glass soil jar/Teflon lined cap</b> SP20-02-12	E601A	29-Aug-2020	08-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Glass soil jar/Teflon lined cap</b> SP20-02-62	E601A	29-Aug-2020	08-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓	
<b>Organic / Inorganic Carbon : Total Carbon by Combustion</b>											
<b>LDPE bag</b> SP20-02-02	E351	29-Aug-2020	----	----	----		09-Sep-2020	0 days	0 days	✓	
<b>Organic / Inorganic Carbon : Total Carbon by Combustion</b>											
<b>LDPE bag</b> SP20-02-04	E351	29-Aug-2020	----	----	----		09-Sep-2020	0 days	0 days	✓	
<b>Organic / Inorganic Carbon : Total Carbon by Combustion</b>											
<b>LDPE bag</b> SP20-02-06	E351	29-Aug-2020	----	----	----		09-Sep-2020	0 days	0 days	✓	



Matrix: Soil/Solid

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Organic / Inorganic Carbon : Total Carbon by Combustion</b>											
LDPE bag SP20-02-08	E351	29-Aug-2020	----	----	----		09-Sep-2020	0 days	0 days	✔	
<b>Organic / Inorganic Carbon : Total Carbon by Combustion</b>											
LDPE bag SP20-02-10	E351	29-Aug-2020	----	----	----		09-Sep-2020	0 days	0 days	✔	
<b>Organic / Inorganic Carbon : Total Carbon by Combustion</b>											
LDPE bag SP20-02-12	E351	29-Aug-2020	----	----	----		09-Sep-2020	0 days	0 days	✔	
<b>Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve</b>											
LDPE bag SP20-02-02	E354	29-Aug-2020	----	----	----		09-Sep-2020	----	----		
<b>Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve</b>											
LDPE bag SP20-02-04	E354	29-Aug-2020	----	----	----		09-Sep-2020	----	----		
<b>Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve</b>											
LDPE bag SP20-02-06	E354	29-Aug-2020	----	----	----		09-Sep-2020	----	----		
<b>Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve</b>											
LDPE bag SP20-02-08	E354	29-Aug-2020	----	----	----		09-Sep-2020	----	----		
<b>Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve</b>											
LDPE bag SP20-02-10	E354	29-Aug-2020	----	----	----		09-Sep-2020	----	----		
<b>Organic / Inorganic Carbon : Total Inorganic Carbon by Acetic Acid pH Standard Curve</b>											
LDPE bag SP20-02-12	E354	29-Aug-2020	----	----	----		09-Sep-2020	----	----		





Matrix: Soil/Solid

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap SP20-02-01	E144	29-Aug-2020	----	----	----		08-Sep-2020	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap SP20-02-02	E144	29-Aug-2020	----	----	----		08-Sep-2020	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap SP20-02-03	E144	29-Aug-2020	----	----	----		08-Sep-2020	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap SP20-02-04	E144	29-Aug-2020	----	----	----		08-Sep-2020	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap SP20-02-05	E144	29-Aug-2020	----	----	----		08-Sep-2020	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap SP20-02-06	E144	29-Aug-2020	----	----	----		08-Sep-2020	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap SP20-02-07	E144	29-Aug-2020	----	----	----		08-Sep-2020	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap SP20-02-08	E144	29-Aug-2020	----	----	----		08-Sep-2020	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap SP20-02-09	E144	29-Aug-2020	----	----	----		08-Sep-2020	----	----	



Matrix: Soil/Solid

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap SP20-02-10	E144	29-Aug-2020	----	----	----		08-Sep-2020	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap SP20-02-11	E144	29-Aug-2020	----	----	----		08-Sep-2020	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap SP20-02-12	E144	29-Aug-2020	----	----	----		08-Sep-2020	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
Glass soil jar/Teflon lined cap SP20-02-62	E144	29-Aug-2020	----	----	----		08-Sep-2020	----	----	
<b>Plant Available Nutrients : Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride)</b>										
LDPE bag SP20-02-02	E269.N+N	29-Aug-2020	11-Sep-2020	----	----		11-Sep-2020	0 days	0 days	✔
<b>Plant Available Nutrients : Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride)</b>										
LDPE bag SP20-02-04	E269.N+N	29-Aug-2020	11-Sep-2020	----	----		11-Sep-2020	0 days	0 days	✔
<b>Plant Available Nutrients : Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride)</b>										
LDPE bag SP20-02-06	E269.N+N	29-Aug-2020	11-Sep-2020	----	----		11-Sep-2020	0 days	0 days	✔
<b>Plant Available Nutrients : Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride)</b>										
LDPE bag SP20-02-08	E269.N+N	29-Aug-2020	11-Sep-2020	----	----		11-Sep-2020	0 days	0 days	✔



Matrix: Soil/Solid

Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Plant Available Nutrients : Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride)</b>											
LDPE bag SP20-02-10	E269.N+N	29-Aug-2020	11-Sep-2020	----	----		11-Sep-2020	0 days	0 days	✓	
<b>Plant Available Nutrients : Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride)</b>											
LDPE bag SP20-02-12	E269.N+N	29-Aug-2020	11-Sep-2020	----	----		11-Sep-2020	0 days	0 days	✓	
<b>Plant Available Nutrients : Available Phosphorus by FIALab (Modified Kelowna)</b>											
LDPE bag SP20-02-02	E384	29-Aug-2020	17-Sep-2020	180 days	18 days	✓	17-Sep-2020	161 days	0 days	✓	
<b>Plant Available Nutrients : Available Phosphorus by FIALab (Modified Kelowna)</b>											
LDPE bag SP20-02-04	E384	29-Aug-2020	17-Sep-2020	180 days	18 days	✓	17-Sep-2020	161 days	0 days	✓	
<b>Plant Available Nutrients : Available Phosphorus by FIALab (Modified Kelowna)</b>											
LDPE bag SP20-02-06	E384	29-Aug-2020	17-Sep-2020	180 days	18 days	✓	17-Sep-2020	161 days	0 days	✓	
<b>Plant Available Nutrients : Available Phosphorus by FIALab (Modified Kelowna)</b>											
LDPE bag SP20-02-08	E384	29-Aug-2020	17-Sep-2020	180 days	18 days	✓	17-Sep-2020	161 days	0 days	✓	
<b>Plant Available Nutrients : Available Phosphorus by FIALab (Modified Kelowna)</b>											
LDPE bag SP20-02-10	E384	29-Aug-2020	17-Sep-2020	180 days	18 days	✓	17-Sep-2020	161 days	0 days	✓	
<b>Plant Available Nutrients : Available Phosphorus by FIALab (Modified Kelowna)</b>											
LDPE bag SP20-02-12	E384	29-Aug-2020	17-Sep-2020	180 days	18 days	✓	17-Sep-2020	161 days	0 days	✓	
<b>Plant Available Nutrients : Available Potassium by flame photometry (Modified Kelowna)</b>											
LDPE bag SP20-02-02	E390	29-Aug-2020	17-Sep-2020	180 days	18 days	✓	17-Sep-2020	161 days	0 days	✓	



Matrix: Soil/Solid

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Plant Available Nutrients : Available Potassium by flame photometry (Modified Kelowna)</b>											
LDPE bag SP20-02-04	E390	29-Aug-2020	17-Sep-2020	180 days	18 days	✔	17-Sep-2020	161 days	0 days	✔	
<b>Plant Available Nutrients : Available Potassium by flame photometry (Modified Kelowna)</b>											
LDPE bag SP20-02-06	E390	29-Aug-2020	17-Sep-2020	180 days	18 days	✔	17-Sep-2020	161 days	0 days	✔	
<b>Plant Available Nutrients : Available Potassium by flame photometry (Modified Kelowna)</b>											
LDPE bag SP20-02-08	E390	29-Aug-2020	17-Sep-2020	180 days	18 days	✔	17-Sep-2020	161 days	0 days	✔	
<b>Plant Available Nutrients : Available Potassium by flame photometry (Modified Kelowna)</b>											
LDPE bag SP20-02-10	E390	29-Aug-2020	17-Sep-2020	180 days	18 days	✔	17-Sep-2020	161 days	0 days	✔	
<b>Plant Available Nutrients : Available Potassium by flame photometry (Modified Kelowna)</b>											
LDPE bag SP20-02-12	E390	29-Aug-2020	17-Sep-2020	180 days	18 days	✔	17-Sep-2020	161 days	0 days	✔	
<b>Plant Available Nutrients : Available Sulfate by ICPOES (0.01M Calcium Chloride Ext.)</b>											
LDPE bag SP20-02-02	E497.SO4	29-Aug-2020	11-Sep-2020	----	----		11-Sep-2020	0 days	0 days	✔	
<b>Plant Available Nutrients : Available Sulfate by ICPOES (0.01M Calcium Chloride Ext.)</b>											
LDPE bag SP20-02-04	E497.SO4	29-Aug-2020	11-Sep-2020	----	----		11-Sep-2020	0 days	0 days	✔	
<b>Plant Available Nutrients : Available Sulfate by ICPOES (0.01M Calcium Chloride Ext.)</b>											
LDPE bag SP20-02-06	E497.SO4	29-Aug-2020	11-Sep-2020	----	----		11-Sep-2020	0 days	0 days	✔	
<b>Plant Available Nutrients : Available Sulfate by ICPOES (0.01M Calcium Chloride Ext.)</b>											
LDPE bag SP20-02-08	E497.SO4	29-Aug-2020	11-Sep-2020	----	----		11-Sep-2020	0 days	0 days	✔	



Matrix: Soil/Solid

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Plant Available Nutrients : Available Sulfate by ICPOES (0.01M Calcium Chloride Ext.)</b>											
<b>LDPE bag</b> SP20-02-10	E497.SO4	29-Aug-2020	11-Sep-2020	----	----		11-Sep-2020	0 days	0 days	✔	
<b>Plant Available Nutrients : Available Sulfate by ICPOES (0.01M Calcium Chloride Ext.)</b>											
<b>LDPE bag</b> SP20-02-12	E497.SO4	29-Aug-2020	11-Sep-2020	----	----		11-Sep-2020	0 days	0 days	✔	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)</b>											
<b>Glass soil jar/Teflon lined cap</b> SP20-02-01	E641A-L	29-Aug-2020	08-Sep-2020	14 days	10 days	✔	09-Sep-2020	40 days	0 days	✔	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)</b>											
<b>Glass soil jar/Teflon lined cap</b> SP20-02-02	E641A-L	29-Aug-2020	08-Sep-2020	14 days	10 days	✔	09-Sep-2020	40 days	0 days	✔	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)</b>											
<b>Glass soil jar/Teflon lined cap</b> SP20-02-03	E641A-L	29-Aug-2020	08-Sep-2020	14 days	10 days	✔	09-Sep-2020	40 days	0 days	✔	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)</b>											
<b>Glass soil jar/Teflon lined cap</b> SP20-02-04	E641A-L	29-Aug-2020	08-Sep-2020	14 days	10 days	✔	09-Sep-2020	40 days	0 days	✔	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)</b>											
<b>Glass soil jar/Teflon lined cap</b> SP20-02-05	E641A-L	29-Aug-2020	08-Sep-2020	14 days	10 days	✔	09-Sep-2020	40 days	0 days	✔	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)</b>											
<b>Glass soil jar/Teflon lined cap</b> SP20-02-06	E641A-L	29-Aug-2020	08-Sep-2020	14 days	10 days	✔	09-Sep-2020	40 days	0 days	✔	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)</b>											
<b>Glass soil jar/Teflon lined cap</b> SP20-02-07	E641A-L	29-Aug-2020	08-Sep-2020	14 days	10 days	✔	09-Sep-2020	40 days	0 days	✔	



Matrix: Soil/Solid

Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)</b>											
Glass soil jar/Teflon lined cap SP20-02-08	E641A-L	29-Aug-2020	08-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)</b>											
Glass soil jar/Teflon lined cap SP20-02-09	E641A-L	29-Aug-2020	08-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)</b>											
Glass soil jar/Teflon lined cap SP20-02-10	E641A-L	29-Aug-2020	08-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)</b>											
Glass soil jar/Teflon lined cap SP20-02-11	E641A-L	29-Aug-2020	08-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)</b>											
Glass soil jar/Teflon lined cap SP20-02-12	E641A-L	29-Aug-2020	08-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)</b>											
Glass soil jar/Teflon lined cap SP20-02-62	E641A-L	29-Aug-2020	08-Sep-2020	14 days	10 days	✓	09-Sep-2020	40 days	0 days	✓	
<b>Taxonomy : Hydrocarbon Utilizing Bacteria</b>											
Glass soil jar/Teflon lined cap SP20-02-02	E924.AR	29-Aug-2020	----	----	----		24-Sep-2020	48 hrs	627 hrs	* EHTR	
<b>Taxonomy : Hydrocarbon Utilizing Bacteria</b>											
Glass soil jar/Teflon lined cap SP20-02-04	E924.AR	29-Aug-2020	----	----	----		24-Sep-2020	48 hrs	627 hrs	* EHTR	
<b>Taxonomy : Hydrocarbon Utilizing Bacteria</b>											
Glass soil jar/Teflon lined cap SP20-02-06	E924.AR	29-Aug-2020	----	----	----		24-Sep-2020	48 hrs	627 hrs	* EHTR	



Matrix: Soil/Solid

Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Taxonomy : Hydrocarbon Utilizing Bacteria</b>											
<b>Glass soil jar/Teflon lined cap</b> SP20-02-08	E924.AR	29-Aug-2020	----	----	----		24-Sep-2020	48 hrs	627 hrs	*	EHTR
<b>Taxonomy : Hydrocarbon Utilizing Bacteria</b>											
<b>Glass soil jar/Teflon lined cap</b> SP20-02-10	E924.AR	29-Aug-2020	----	----	----		24-Sep-2020	48 hrs	627 hrs	*	EHTR
<b>Taxonomy : Hydrocarbon Utilizing Bacteria</b>											
<b>Glass soil jar/Teflon lined cap</b> SP20-02-12	E924.AR	29-Aug-2020	----	----	----		24-Sep-2020	48 hrs	627 hrs	*	EHTR
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
<b>Glass soil methanol vial</b> SP20-02-01	E611A	29-Aug-2020	06-Sep-2020	40 days	8 days	✓	08-Sep-2020	31 days	1 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
<b>Glass soil methanol vial</b> SP20-02-02	E611A	29-Aug-2020	06-Sep-2020	40 days	8 days	✓	08-Sep-2020	31 days	1 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
<b>Glass soil methanol vial</b> SP20-02-03	E611A	29-Aug-2020	06-Sep-2020	40 days	8 days	✓	08-Sep-2020	31 days	1 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
<b>Glass soil methanol vial</b> SP20-02-04	E611A	29-Aug-2020	06-Sep-2020	40 days	8 days	✓	08-Sep-2020	31 days	1 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
<b>Glass soil methanol vial</b> SP20-02-05	E611A	29-Aug-2020	06-Sep-2020	40 days	8 days	✓	08-Sep-2020	31 days	1 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
<b>Glass soil methanol vial</b> SP20-02-06	E611A	29-Aug-2020	06-Sep-2020	40 days	8 days	✓	08-Sep-2020	31 days	1 days	✓	



Matrix: **Soil/Solid**

Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
Glass soil methanol vial SP20-02-07	E611A	29-Aug-2020	06-Sep-2020	40 days	8 days	✓	08-Sep-2020	31 days	1 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
Glass soil methanol vial SP20-02-08	E611A	29-Aug-2020	06-Sep-2020	40 days	8 days	✓	08-Sep-2020	31 days	1 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
Glass soil methanol vial SP20-02-09	E611A	29-Aug-2020	06-Sep-2020	40 days	8 days	✓	08-Sep-2020	31 days	1 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
Glass soil methanol vial SP20-02-10	E611A	29-Aug-2020	06-Sep-2020	40 days	8 days	✓	08-Sep-2020	31 days	1 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
Glass soil methanol vial SP20-02-11	E611A	29-Aug-2020	06-Sep-2020	40 days	8 days	✓	08-Sep-2020	31 days	1 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
Glass soil methanol vial SP20-02-12	E611A	29-Aug-2020	06-Sep-2020	40 days	8 days	✓	08-Sep-2020	31 days	1 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
Glass soil methanol vial SP20-02-62	E611A	29-Aug-2020	06-Sep-2020	40 days	8 days	✓	08-Sep-2020	31 days	1 days	✓	

**Legend & Qualifier Definitions**

EHTR: Exceeded ALS recommended hold time prior to sample receipt.  
 Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Soil/Solid**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)	E269.N+N	84477	1	9	11.1	5.0	✔
Available Phosphorus by FIALab (Modified Kelowna)	E384	86217	1	9	11.1	5.0	✔
Available Potassium by flame photometry (Modified Kelowna)	E390	86218	1	9	11.1	5.0	✔
Available Sulfate by ICPOES (0.01M Calcium Chloride Ext.)	E497.SO4	84476	1	20	5.0	5.0	✔
BC PHC - EPH by GC-FID	E601A	82900	1	13	7.6	5.0	✔
BTEX by Headspace GC-MS	E611A	82438	1	19	5.2	5.0	✔
Hydrocarbon Utilizing Bacteria	E924.AR	91388	1	9	11.1	5.0	✔
Moisture Content by Gravimetry	E144	82902	1	13	7.6	5.0	✔
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	82901	1	13	7.6	5.0	✔
Total Carbon by Combustion	E351	83605	1	20	5.0	5.0	✔
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354	83524	1	10	10.0	5.0	✔
<b>Laboratory Control Samples (LCS)</b>							
Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)	E269.N+N	84477	2	9	22.2	10.0	✔
Available Phosphorus by FIALab (Modified Kelowna)	E384	86217	2	9	22.2	10.0	✔
Available Potassium by flame photometry (Modified Kelowna)	E390	86218	2	9	22.2	10.0	✔
Available Sulfate by ICPOES (0.01M Calcium Chloride Ext.)	E497.SO4	84476	2	20	10.0	10.0	✔
BC PHC - EPH by GC-FID	E601A	82900	2	13	15.3	10.0	✔
BTEX by Headspace GC-MS	E611A	82438	1	19	5.2	5.0	✔
Moisture Content by Gravimetry	E144	82902	1	13	7.6	5.0	✔
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	82901	2	13	15.3	10.0	✔
Total Carbon by Combustion	E351	83605	2	20	10.0	10.0	✔
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354	83524	2	10	20.0	10.0	✔
<b>Method Blanks (MB)</b>							
Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)	E269.N+N	84477	1	9	11.1	5.0	✔
Available Phosphorus by FIALab (Modified Kelowna)	E384	86217	1	9	11.1	5.0	✔
Available Potassium by flame photometry (Modified Kelowna)	E390	86218	1	9	11.1	5.0	✔
Available Sulfate by ICPOES (0.01M Calcium Chloride Ext.)	E497.SO4	84476	1	20	5.0	5.0	✔
BC PHC - EPH by GC-FID	E601A	82900	1	13	7.6	5.0	✔
BTEX by Headspace GC-MS	E611A	82438	1	19	5.2	5.0	✔
Hydrocarbon Utilizing Bacteria	E924.AR	91388	1	9	11.1	5.0	✔
Moisture Content by Gravimetry	E144	82902	1	13	7.6	5.0	✔
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	82901	1	13	7.6	5.0	✔
Total Carbon by Combustion	E351	83605	1	20	5.0	5.0	✔
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354	83524	1	10	10.0	5.0	✔
<b>Matrix Spikes (MS)</b>							
BTEX by Headspace GC-MS	E611A	82438	1	19	5.2	5.0	✔



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Moisture Content by Gravimetry	E144 Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Available Nitrate and Nitrite by Colourimetry (0.01M Calcium Chloride Ext.)	E269.N+N Saskatoon - Environmental	Soil/Solid	Alberta Agriculture/APHA 4500-NO3 I (mod)	Plant available nitrate and nitrite are analyzed by colourimetry using a flow injection analyzer on a soil sample extract that has been extracted using 0.01M Calcium Chloride, then shaken well and filtered prior to analysis.
Total Carbon by Combustion	E351 Saskatoon - Environmental	Soil/Solid	CSSS (2008) 21.2 (mod)	Total Carbon is determined by the high temperature combustion method with measurement by an infrared detector.
Total Inorganic Carbon by Acetic Acid pH Standard Curve	E354 Saskatoon - Environmental	Soil/Solid	CSSS (2008) 20.2	Total Inorganic Carbon is determined by acetic acid pH standard curve, where a known quantity of acetic acid is consumed by reaction with carbonates in the soil. The pH of the resulting solution is measured and compared against a standard curve relating pH to weight of carbonate.
Available Phosphorus by FIALab (Modified Kelowna)	E384 Saskatoon - Environmental	Soil/Solid	Comm. Soil Sci. Plant Anal, 25 (5&6)	Plant available phosphorus is extracted from air dried soil using a fixed ratio Modified Kelowna extraction. Phosphorus is determined by colorimetry using a flow injection analyzer.
Available Potassium by flame photometry (Modified Kelowna)	E390 Saskatoon - Environmental	Soil/Solid	Comm. Soil Sci. Plant Anal, 25 (5&6)	Plant available potassium is extracted from soil using modified Kelowna solution. Potassium is determined by flame emission at 770 nm.
Available Sulfate by ICPOES (0.01M Calcium Chloride Ext.)	E497.SO4 Saskatoon - Environmental	Soil/Solid	Alberta Agriculture	Plant available sulfate is determined by ICPOES. Soil is extracted using a 0.01M calcium chloride solution. This extraction may also produce organic sulfur in the extracts when organic soils are analyzed.
BC PHC - EPH by GC-FID	E601A Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual (EPH in Solids by GC/FID) (mod)	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.
BTEX by Headspace GC-MS	E611A Vancouver - Environmental	Soil/Solid	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L Vancouver - Environmental	Soil/Solid	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by GC-MS.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Hydrocarbon Utilizing Bacteria	E924.AR  Winnipeg - Environmental	Soil/Solid	Internal	Following extraction, serial dilutions are plated onto hydrocarbon-laden media and incubated at 20°C for 5 days. Observed colonies are enumerated.
Total Organic Carbon (Calculated) in soil	EC356  Saskatoon - Environmental	Soil/Solid	CSSS (2008) 21.2	Total Organic Carbon (TOC) is calculated by the difference between total carbon (TC) and total inorganic carbon (TIC).
LEPH and HEPH: EPH-PAH	EC600A  Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual (LEPH and HEPH) (mod)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(b+j+k)fluoranthene, Benzo(a)pyrene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, and Pyrene.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Fixed ratio 0.01M Calcium Chloride extraction for plant available nutrients	EP269  Saskatoon - Environmental	Soil/Solid	Alberta Agriculture	Plant available nutrients (N&S) extracted using 0.01M calcium chloride, then shaken well and filtered prior to analysis.
Modified Kelowna Extraction for soil	EP384  Saskatoon - Environmental	Soil/Solid	Comm. Soil Sci. Plant Anal, 25 (5&6)	Plant available phosphorus and potassium are extracted from the soil using fixed ratio Modified Kelowna solution.
VOCs Methanol Extraction for Headspace Analysis	EP581  Vancouver - Environmental	Soil/Solid	EPA 5035A (mod)	VOCs in samples are extracted with methanol. Extracts are then prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PHCs and PAHs Hexane-Acetone Tumbler Extraction	EP601  Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1 (mod)	Samples are subsampled and Petroleum Hydrocarbons (PHC) and PAHs are extracted with 1:1 hexane:acetone using a rotary extractor.
Dry and Grind	EPP442  Saskatoon - Environmental	Soil/Solid	Soil Sampling and Methods of Analysis, Carter 2008	After removal of any coarse fragments and reservation of wet subsamples a portion of homogenized sample is set in a tray and dried at less than 60 C until dry. The sample is then particle size reduced with an automated crusher or mortar and pestle, typically to <2 mm. Further size reduction may be needed for particular tests.

## QUALITY CONTROL REPORT

**Work Order** : **VA20B4301**

**Page** : 1 of 10

**Client** : Seabridge Gold Inc.  
**Contact** : Elizabeth Miller  
**Address** : 1235 Main Street P.O. Box 2536  
 Smithers BC Canada V0J 2N0  
**Telephone** : 416 367 9292  
**Project** : VE52655D  
**PO** :  
**C-O-C number** : ----  
**Sampler** : Ardy M  
**Site** : ----  
**Quote number** : VA20-SEAB100-0003 - Wood/Seabridge Gold  
**No. of samples received** : 13  
**No. of samples analysed** : 13

**Laboratory** : Vancouver - Environmental  
**Account Manager** : Selam Worku  
**Address** : 8081 Lougheed Highway  
 Burnaby, British Columbia Canada V5A 1W9  
**Telephone** : +1 604 253 4188  
**Date Samples Received** : 02-Sep-2020 10:45  
**Date Analysis Commenced** : 06-Sep-2020  
**Issue Date** : 28-Sep-2020 11:49

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Brianna Allen	Department Manager - Organics	Organics, Burnaby, British Columbia
Dwayne Bennett	Technical Specialist	Inorganics, Saskatoon, Saskatchewan
Hedy Lai	Team Leader - Inorganics	Inorganics, Saskatoon, Saskatchewan
Jeremy Paterson	Analyst	Microbiology, Winnipeg, Manitoba
Melissa Shaw	Team Leader - Inorganics	Inorganics, Saskatoon, Saskatchewan
Xihua Yao	Laboratory Analyst	Inorganics, Saskatoon, Saskatchewan

Page : 2 of 10  
Work Order : VA20B4301  
Client : Seabridge Gold Inc.  
Project : VE52655D

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## **General Comments**

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

# = Indicates a QC result that did not meet the ALS DQO.



## Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: Soil/Solid

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 82902)</b>											
VA20B4301-001	SP20-02-01	moisture	----	E144	0.25	%	12.3	12.8	4.14%	20%	----
<b>Organic / Inorganic Carbon (QC Lot: 83524)</b>											
VA20B4301-002	SP20-02-02	carbon, inorganic [IC]	----	E354	0.050	%	0.176	0.180	0.003	Diff <2x LOR	----
<b>Organic / Inorganic Carbon (QC Lot: 83605)</b>											
VA20B4276-008	Anonymous	carbon, total [TC]	----	E351	0.050	%	13.0	13.2	1.04%	20%	----
<b>Plant Available Nutrients (QC Lot: 84476)</b>											
VA20B4097-038	Anonymous	sulfate, available (as S)	14808-79-8	E497.S04	3.0	mg/kg	242	234	3.45%	30%	----
<b>Plant Available Nutrients (QC Lot: 84477)</b>											
VA20B4299-001	Anonymous	nitrate + nitrite, available (as N)	----	E269 N+N	1.0	mg/kg	<1.0	<1.0	0	Diff <2x LOR	----
<b>Plant Available Nutrients (QC Lot: 86217)</b>											
VA20B4299-001	Anonymous	phosphate, available (as P)	14265-44-2	E384	2.0	mg/kg	2.6	2.6	0.004	Diff <2x LOR	----
<b>Plant Available Nutrients (QC Lot: 86218)</b>											
VA20B4299-001	Anonymous	potassium, available	7440-09-7	E390	20	mg/kg	67	66	1	Diff <2x LOR	----
<b>Taxonomy (QC Lot: 91388)</b>											
VA20B4301-002	SP20-02-02	hydrocarbon utilizing bacteria [HUB]	----	E924 AR	5000	CFU/g	56000	49000	13.3%	50%	----
<b>Volatile Organic Compounds (QC Lot: 82438)</b>											
VA20B4301-001	SP20-02-01	benzene	71-43-2	E611A	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.015	mg/kg	<0.015	<0.015	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
<b>Hydrocarbons (QC Lot: 82900)</b>											
VA20B4301-001	SP20-02-01	EPH (C10-C19)	----	E601A	200	mg/kg	<200	<200	0	Diff <2x LOR	----
		EPH (C19-C32)	----	E601A	200	mg/kg	<200	<200	0	Diff <2x LOR	----
<b>Polycyclic Aromatic Hydrocarbons (QC Lot: 82901)</b>											
VA20B4301-001	SP20-02-01	acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		acridine	260-94-6	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.0040	<0.0040	0	Diff <2x LOR	----



Sub-Matrix: **Soil/Solid**

*Laboratory Duplicate (DUP) Report*

<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Original Result</i>	<i>Duplicate Result</i>	<i>RPD(%) or Difference</i>	<i>Duplicate Limits</i>	<i>Qualifier</i>
<b>Polycyclic Aromatic Hydrocarbons (QC Lot: 82901) - continued</b>											
VA20B4301-001	SP20-02-01	benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(b+j)fluoranthene	----	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		chrysene	218-01-9	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		dibenz(a,h)anthracene	53-70-3	E641A-L	0 0050	mg/kg	<0 0050	<0.0050	0	Diff <2x LOR	----
		fluoranthene	206-44-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		fluorene	86-73-7	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		naphthalene	91-20-3	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		phenanthrene	85-01-8	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		pyrene	129-00-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		quinoline	6027-02-7	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 82902)</b>						
moisture	----	E144	0.25	%	<0.25	----
<b>Organic / Inorganic Carbon (QCLot: 83524)</b>						
carbon, inorganic [IC]	----	E354	0.05	%	<0.050	----
<b>Organic / Inorganic Carbon (QCLot: 83605)</b>						
carbon, total [TC]	----	E351	0.05	%	<0.050	----
<b>Plant Available Nutrients (QCLot: 84476)</b>						
sulfate, available (as S)	14808-79-8	E497.SO4	3	mg/kg	<3.0	----
<b>Plant Available Nutrients (QCLot: 84477)</b>						
nitrate + nitrite, available (as N)	----	E269.N+N	1	mg/kg	<1.0	----
<b>Plant Available Nutrients (QCLot: 86217)</b>						
phosphate, available (as P)	14265-44-2	E384	2	mg/kg	<2.0	----
<b>Plant Available Nutrients (QCLot: 86218)</b>						
potassium, available	7440-09-7	E390	20	mg/kg	<20	----
<b>Taxonomy (QCLot: 91388)</b>						
hydrocarbon utilizing bacteria [HUB]	----	E924.AR	5	CFU/g	<5	----
<b>Volatile Organic Compounds (QCLot: 82438)</b>						
benzene	71-43-2	E611A	0.005	mg/kg	<0.0050	----
ethylbenzene	100-41-4	E611A	0.015	mg/kg	<0.015	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.05	mg/kg	<0.050	----
styrene	100-42-5	E611A	0.05	mg/kg	<0.050	----
toluene	108-88-3	E611A	0.05	mg/kg	<0.050	----
xylene, m+p-	179601-23-1	E611A	0.05	mg/kg	<0.050	----
xylene, o-	95-47-6	E611A	0.05	mg/kg	<0.050	----
<b>Hydrocarbons (QCLot: 82900)</b>						
EPH (C10-C19)	----	E601A	200	mg/kg	<200	----
EPH (C19-C32)	----	E601A	200	mg/kg	<200	----
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 82901)</b>						
acenaphthene	83-32-9	E641A-L	0.005	mg/kg	<0.0050	----
acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	<0.0050	----
acridine	260-94-6	E641A-L	0.01	mg/kg	<0.010	----





Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 82901) - continued</b>						
anthracene	120-12-7	E641A-L	0.004	mg/kg	<0.0040	----
					<0.0040	----
benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	<0.010	----
benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
benzo(b+j)fluoranthene	----	E641A-L	0.01	mg/kg	<0.010	----
benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	<0.010	----
chrysene	218-01-9	E641A-L	0.01	mg/kg	<0.010	----
dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	<0.0050	----
fluoranthene	206-44-0	E641A-L	0.01	mg/kg	<0.010	----
fluorene	86-73-7	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	<0.010	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	<0.010	----
naphthalene	91-20-3	E641A-L	0.01	mg/kg	<0.010	----
phenanthrene	85-01-8	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
pyrene	129-00-0	E641A-L	0.01	mg/kg	<0.010	----
					<0.010	----
quinoline	6027-02-7	E641A-L	0.01	mg/kg	<0.010	----



## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Soil/Solid

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Physical Tests (QCLot: 82902)</b>									
moisture	---	E144	0.25	%	50 %	98.5	90.0	110	---
<b>Organic / Inorganic Carbon (QCLot: 83524)</b>									
carbon, inorganic [IC]	---	E354	0.05	%	0.5 %	96.0	90.0	110	---
<b>Organic / Inorganic Carbon (QCLot: 83605)</b>									
carbon, total [TC]	---	E351	0.05	%	48 %	101	80.0	120	---
<b>Plant Available Nutrients (QCLot: 84476)</b>									
sulfate, available (as S)	14808-79-8	E497.SO4	3	mg/kg	200 mg/kg	104	70.0	130	---
<b>Plant Available Nutrients (QCLot: 84477)</b>									
nitrate + nitrite, available (as N)	---	E269.N+N	1	mg/kg	22 mg/kg	81.8	70.0	130	---
<b>Plant Available Nutrients (QCLot: 86217)</b>									
phosphate, available (as P)	14265-44-2	E384	2	mg/kg	12.5 mg/kg	96.6	80.0	120	---
<b>Plant Available Nutrients (QCLot: 86218)</b>									
potassium, available	7440-09-7	E390	20	mg/kg	125 mg/kg	94.8	70.0	130	---
<b>Volatile Organic Compounds (QCLot: 82438)</b>									
benzene	71-43-2	E611A	0.005	mg/kg	2.5 mg/kg	89.7	70.0	130	---
ethylbenzene	100-41-4	E611A	0.015	mg/kg	2.5 mg/kg	93.4	70.0	130	---
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.05	mg/kg	2.5 mg/kg	96.9	70.0	130	---
styrene	100-42-5	E611A	0.05	mg/kg	2.5 mg/kg	95.8	70.0	130	---
toluene	108-88-3	E611A	0.05	mg/kg	2.5 mg/kg	102	70.0	130	---
xylene, m+p-	179601-23-1	E611A	0.05	mg/kg	5 mg/kg	103	70.0	130	---
xylene, o-	95-47-6	E611A	0.05	mg/kg	2.5 mg/kg	97.4	70.0	130	---
<b>Hydrocarbons (QCLot: 82900)</b>									
EPH (C10-C19)	---	E601A	200	mg/kg	1134.37 mg/kg	99.9	70.0	130	---
					7113 mg/kg	101	70.0	130	---
EPH (C19-C32)	---	E601A	200	mg/kg	575.98 mg/kg	96.3	70.0	130	---
					10183 mg/kg	98.3	70.0	130	---
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 82901)</b>									
acenaphthene	83-32-9	E641A-L	0.005	mg/kg	0.5 mg/kg	99.3	60.0	130	---
					0.638 mg/kg	97.7	60.0	130	---



Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 82901) - continued</b>									
acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	0.5 mg/kg	98.0	60.0	130	----
					0.2 mg/kg	96.8	60.0	130	----
acridine	260-94-6	E641A-L	0.01	mg/kg	0.5 mg/kg	98.7	60.0	130	----
anthracene	120-12-7	E641A-L	0.004	mg/kg	0.5 mg/kg	101	60.0	130	----
					0.32 mg/kg	99.3	60.0	130	----
benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	0.5 mg/kg	101	60.0	130	----
benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	0.5 mg/kg	104	60.0	130	----
					0.135 mg/kg	103	60.0	130	----
benzo(b+j)fluoranthene	----	E641A-L	0.01	mg/kg	0.5 mg/kg	106	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	0.5 mg/kg	99.4	60.0	130	----
					0.377 mg/kg	104	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	0.5 mg/kg	96.8	60.0	130	----
chrysene	218-01-9	E641A-L	0.01	mg/kg	0.5 mg/kg	90.0	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	0.5 mg/kg	101	60.0	130	----
fluoranthene	206-44-0	E641A-L	0.01	mg/kg	0.5 mg/kg	99.2	60.0	130	----
fluorene	86-73-7	E641A-L	0.01	mg/kg	0.5 mg/kg	100	60.0	130	----
					0.989 mg/kg	99.0	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	0.5 mg/kg	105	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	0.5 mg/kg	92.9	60.0	130	----
					1.256 mg/kg	94.3	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	0.5 mg/kg	91.9	60.0	130	----
naphthalene	91-20-3	E641A-L	0.01	mg/kg	0.5 mg/kg	92.2	50.0	130	----
phenanthrene	85-01-8	E641A-L	0.01	mg/kg	0.5 mg/kg	99.2	60.0	130	----
					1.13 mg/kg	97.6	60.0	130	----
pyrene	129-00-0	E641A-L	0.01	mg/kg	0.5 mg/kg	105	60.0	130	----
					1.325 mg/kg	100.0	60.0	130	----
quinoline	6027-02-7	E641A-L	0.01	mg/kg	0.5 mg/kg	92.1	60.0	130	----



### Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level  $\geq$  1x spike level.

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 82438)</b>										
VA20B4301-002	SP20-02-02	benzene	71-43-2	E611A	2.12 mg/kg	3.125 mg/kg	99.6	60 0	140	----
		ethylbenzene	100-41-4	E611A	2.00 mg/kg	3.125 mg/kg	94.3	60 0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	2.17 mg/kg	3.125 mg/kg	102	60 0	140	----
		styrene	100-42-5	E611A	1.98 mg/kg	3.125 mg/kg	93.4	60 0	140	----
		toluene	108-88-3	E611A	2.02 mg/kg	3.125 mg/kg	94.8	60 0	140	----
		xylene, m+p-	179601-23-1	E611A	4.32 mg/kg	6.25 mg/kg	102	60 0	140	----
		xylene, o-	95-47-6	E611A	2.06 mg/kg	3.125 mg/kg	96.8	60 0	140	----



## Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be AL long term mean values (for empirical test methods)

Sub Matrix: Soil/Solid

					Reference Material (RM) Report				
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
							Low	High	
<b>Organic / Inorganic Carbon (QCLot: 83524)</b>									
QC-83524-003	RM	carbon, inorganic [IC]	----	E354	0.383 %	91.9	80.0	120	----
<b>Organic / Inorganic Carbon (QCLot: 83605)</b>									
QC-83605-003	RM	carbon, total [TC]	----	E351	1.4 %	103	80.0	120	----
<b>Plant Available Nutrients (QCLot: 84476)</b>									
QC-84476-003	RM	sulfate, available (as S)	14808-79-8	E497.SO4	497 mg/kg	105	70.0	130	----
<b>Plant Available Nutrients (QCLot: 84477)</b>									
QC-84477-003	RM	nitrate + nitrite, available (as N)	----	E269 N+N	16.8 mg/kg	76.7	70.0	130	----
<b>Plant Available Nutrients (QCLot: 86217)</b>									
QC-86217-003	RM	phosphate, available (as P)	14265-44-2	E384	10.47 mg/kg	100	80.0	120	----
<b>Plant Available Nutrients (QCLot: 86218)</b>									
QC-86218-003	RM	potassium, available	7440-09-7	E390	154 mg/kg	100.0	70.0	130	
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 82901)</b>									
QC-82901-003	RM	benz(a)anthracene	56-55-3	E641A-L	0.545 mg/kg	101	60.0	130	----
QC-82901-003	RM	benzo(b+j)fluoranthene	----	E641A-L	0.793 mg/kg	102	60.0	130	----
QC-82901-003	RM	benzo(k)fluoranthene	207-08-9	E641A-L	0.34 mg/kg	108	60.0	130	----
QC-82901-003	RM	chrysene	218-01-9	E641A-L	0.666 mg/kg	99.9	60.0	130	----
QC-82901-003	RM	dibenz(a,h)anthracene	53-70-3	E641A-L	1.196 mg/kg	101	60.0	130	----
QC-82901-003	RM	fluoranthene	206-44-0	E641A-L	1.757 mg/kg	96.9	60.0	130	----
QC-82901-003	RM	indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.445 mg/kg	103	60.0	130	----
QC-82901-003	RM	methylnaphthalene, 2-	91-57-6	E641A-L	1.088 mg/kg	92.0	60.0	130	----
QC-82901-003	RM	naphthalene	91-20-3	E641A-L	1.03 mg/kg	98.1	50.0	130	----



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# Chain of Custody (COC) / Analytical Request Form

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Affix ALS barcode label here

(lab use only)

COC Number: 17 -

Page 1 of 2

<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>			<b>Select Service Level Below - Contact your AM to confirm all E&amp;P TATs (surcharges may apply)</b>										
Company:	Wood.	Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)			Regular [R] <input checked="" type="checkbox"/> Standard TAT If received by 3 pm - business days - no surcharges apply										
Contact:	Jeremiah Gladu	Quality Control (QC) Report with Report <input type="checkbox"/> YES <input type="checkbox"/> NO			PROPERTY (Business Days)	4 day [P4-20%] <input type="checkbox"/>		EMERGENCY	1 Business day [E - 100%] <input type="checkbox"/>						
Phone:		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked				3 day [P3-25%] <input type="checkbox"/>			Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] <input type="checkbox"/>						
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX				2 day [P2-60%] <input type="checkbox"/>									
Street:	4445 Lougheed Hwy.	Email 1 or Fax jeremiah.gladu@woodplc.com			Date and Time Required for all E&P TATs:		dd-mmm-yy hh:mm								
City/Province:	Burnaby/BC	Email 2			For tests that cannot be performed according to the service level selected, you will be contacted.										
Postal Code:	V5C 0E4	Email 3			<b>Analysis Request</b>										
<b>Invoice To</b>	Same as Report To <input type="checkbox"/> YES <input type="checkbox"/> NO	<b>Invoice Distribution</b>			<b>NUMBER OF CONTAINERS</b>	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below					<b>SAMPLES ON HOLD</b>	SUSPECTED HAZARD (see Special Instructions)			
	Copy of Invoice with Report <input type="checkbox"/> YES <input type="checkbox"/> NO	Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX													
Company:		Email 1 or Fax													
Contact:		Email 2													
<b>Project Information</b>		<b>Oil and Gas Required Fields (client use)</b>													
ALS Account # / Quote #:		APE/Cost Center:													
Job #:		Major/Minor Code:													
PO / AFE:		Routing Code:													
LSD:		Requisitioner:													
LSD:		Location:													
ALS Lab Work Order # (lab use only):		ALS Contact:		Sampler:											
B-4301 4301		Selam Worku		Ardy M.											
<b>ALS Sample # (lab use only)</b>	<b>Sample Identification and/or Coordinates (This description will appear on the report)</b>	<b>Date (dd-mmm-yy)</b>	<b>Time (hh:mm)</b>	<b>Sample Type</b>	BTEX	EPH/PAH	General chemistry *	DISSOLVED METALS							
	SP20-02-01	29-Aug-20	PM	Soil	✓	✓									
	SP20-02-02 * *				✓	✓									
	SP20-02-03 * *				✓	✓									
	SP20-02-04				✓	✓									
	SP20-02-05				✓	✓									
	SP20-02-06				✓	✓									
	SP20-02-07				✓	✓									
	SP20-02-08 * *				✓	✓									
	SP20-02-09				✓	✓									
	SP20-02-10				✓	✓									
	SP20-02-11				✓	✓									
	SP20-02-12				✓	✓									
<b>Drinking Water (DW) Samples<sup>1</sup> (client use)</b>		<b>Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)</b>			<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>										
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO		*GENERAL WATER CHEMISTRY TO INCLUDE: pH, Alkalinity, bicarbonate, carbonate, chloride, conductivity, fluoride, hardness, hydroxide, nitrate, nitrite, ammonia, sulphate, turbidity, TDS, acidity.			Frozen <input type="checkbox"/>		SIF Observations: Yes <input type="checkbox"/> No <input type="checkbox"/>								
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO					Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/>		Custody seal intact: Yes <input type="checkbox"/> No <input type="checkbox"/>		Cooling Initiated <input type="checkbox"/>						
					INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C						
									17 C (AV. 9/1)						
<b>SHIPMENT RELEASE (client use)</b>				<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>				<b>FINAL SHIPMENT RECEPTION (lab use only)</b>							
Released by: Ardy Mansourpour		Date:		Received by: Chris Allison		Date: Aug 31, 2020		Received by: RSS		Date: 2 Sep 2020		Time: 10:45			

Environmental Division  
Vancouver  
Work Order Reference  
**VA20B4301**

Telephone: +1 604 253 4188



www.alsglobal.com

# Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 688 9878

## Affix ALS barcode label here

(lab use only)

COC Number: 17 -

Page 2 of 2

<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>			<b>Select Service Level Below - Contact your AM to confirm all E&amp;P TATs (surcharges may apply)</b>										
Company:	Wood.	Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)			Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply										
Contact:	Jeremiah Gladu	Quality Control (QC) Report with Report <input type="checkbox"/> YES <input type="checkbox"/> NO			PRIORITY (Business Days)	4 day [P4-20%] <input type="checkbox"/>		EMERGENCY	1 Business day [E - 100%] <input type="checkbox"/>						
Phone:		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked				3 day [P3-25%] <input type="checkbox"/>			Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] <input type="checkbox"/>						
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX				2 day [P2-50%] <input type="checkbox"/>									
Street:	4445 Lougheed Hwy.	Email 1 or Fax jeremiah.glsdu@woodplc.com			Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm										
City/Province:	Burnaby/BC	Email 2			For tests that can not be performed according to the service level selected, you will be contacted.										
Postal Code:	V5C 0E4	Email 3			<b>Analysis Request</b>										
<b>Invoice To</b>	Same as Report To <input type="checkbox"/> YES <input type="checkbox"/> NO	<b>Invoice Distribution</b>			<b>NUMBER OF CONTAINERS</b>	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below					<b>SAMPLES ON HOLD</b>	SUSPECTED HAZARD (see Special Instructions)			
	Copy of Invoice with Report <input type="checkbox"/> YES <input type="checkbox"/> NO	Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX													
Company:		Email 1 or Fax													
Contact:		Email 2													
<b>Project Information</b>		<b>Oil and Gas Required Fields (client use)</b>													
ALS Account # / Quote #:		AFE/Cost Center:		PO#											
Job #:	VE52855D	Major/Minor Code:		Routing Code:											
PO / AFE:		Requisitioner:													
LSD:		Location:													
ALS Lab Work Order # (lab use only):		ALS Contact:	Selam Worku	Sampler:		Ardy M.									
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type		BTEX	EPH/PAH	General chemistry *	DISSOLVED METALS						
	SP20-02-62	29-Aug-20	PM	Soil		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>								
<b>Drinking Water (DW) Samples<sup>1</sup> (client use)</b>		<b>Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)</b>			<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>										
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO		*GENERAL WATER CHEMISTRY TO INCLUDE: pH, Alkalinity, bicarbonate, carbonate, chloride, conductivity, fluoride, hardness, hydroxide, nitrate, nitrite, ammonia, sulphate, turbidity, TDS, acidity.			Frozen: <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>										
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO					Ice Packs <input type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>										
					Cooling Initiated <input type="checkbox"/>										
<b>SHIPMENT RELEASE (client use)</b>		<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>			<b>FINAL SHIPMENT RECEPTION (lab use only)</b>										
Released by: Ardy Mansourpour	Date:	Time:	Received by:	Date:	Time:	Received by: RSS	Date: 2 Sept 2020	Time: 10:45							

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

For any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.



CERTIFICATE OF ANALYSIS

Work Order : VA20B3887
Amendment : 1
Client : Wood Canada Ltd.
Contact : Jeremiah Gladu
Address : 600 - 4445 Lougheed Hwy
Burnaby BC Canada V5C 0E4
Telephone : 604 294 3811
Project : VE52655D
PO : ---
C-O-C number : ---
Sampler : Ardy M.
Site : ---
Quote number : VA20-SEAB100-0003 - Wood/Seabridge Gold
No. of samples received : 9
No. of samples analysed : 9

Page : 1 of 10
Laboratory : Vancouver - Environmental
Account Manager : Selam Worku
Address : 8081 Lougheed Highway
Burnaby BC Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 28-Aug-2020 10:10
Date Analysis Commenced : 01-Sep-2020
Issue Date : 27-Oct-2020 09:43

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
Analytical Results
Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Table with 3 columns: Signatories, Position, Laboratory Department. Lists names like Annabelle Prasad, Bruna Botti, Caitlin Macey, Cristina Alexandre, Kevin Duarte, Lindsay Gung, Ophelia Chiu, Shaneel Dayal and their respective roles and departments.





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
-	No Unit
µg/L	micrograms per litre
µS/cm	Microsiemens per centimetre
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in reports identified as "Preliminary Report" are considered authorized for use.

## Workorder Comments

**Sample "BH17-20B": 2 40mL glass VOC vials received broken. BTEX analysis not possible.**

**All Samples: Labelling Issues. On CofC, Sample IDs start with "BH17" but on bottles Sample IDs start with "MW17". Samples labelled as per CofC.**

The units for trace metals have been updated to ug/L in this report.

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					MW17-25A	MW17-26A	MW17-26B	MW17-14A	MW17-20A
Client sampling date / time					25-Aug-2020 11:00	25-Aug-2020 12:00	25-Aug-2020 11:30	25-Aug-2020 13:10	25-Aug-2020 14:35
Analyte	CAS Number	Method	LOR	Unit	VA20B3887-001	VA20B3887-002	VA20B3887-003	VA20B3887-004	VA20B3887-005
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
acidity (as CaCO3)	----	E283	2.0	mg/L	<2.0	<2.0	<2.0	2.6	----
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	156	111	115	146	----
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	----
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	----
alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	----
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	156	111	115	146	----
conductivity	----	E100	2.0	µS/cm	352	255	274	339	----
pH	----	E108	0.10	pH units	8.05	8.10	8.08	7.81	----
solids, total dissolved [TDS]	----	E162	10	mg/L	261	192	224	350	----
turbidity	----	E121	0.10	NTU	726	155	441	2720	----
hardness (as CaCO3), dissolved	----	EC100	600	µg/L	151000	130000	134000	117000	----
<b>Anions and Nutrients</b>									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0229	<0.0050	0.0080	0.0346	----
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	----
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	<0.50	3.92	----
fluoride	16984-48-8	E235.F	0.020	mg/L	0.343	<0.020	0.026	0.284	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0104	0.0239	0.0187	0.0142	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0012	0.0012	0.0012	0.0012	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	39.5	24.3	31.8	11.2	----
<b>Dissolved Metals</b>									
aluminum, dissolved	7429-90-5	E421	1.0	µg/L	3.0	2.4	2.6	268	----
antimony, dissolved	7440-36-0	E421	0.10	µg/L	1.18	0.16	0.15	<0.10	----
arsenic, dissolved	7440-38-2	E421	0.10	µg/L	2.00	0.12	0.15	2.01	----
barium, dissolved	7440-39-3	E421	0.10	µg/L	33.0	58.1	36.8	349	----
beryllium, dissolved	7440-41-7	E421	0.100	µg/L	<0.100	<0.100	<0.100	<0.100	----
bismuth, dissolved	7440-69-9	E421	0.050	µg/L	<0.050	<0.050	<0.050	<0.050	----
boron, dissolved	7440-42-8	E421	10	µg/L	<10	<10	<10	29	----
cadmium, dissolved	7440-43-9	E421	0.0050	µg/L	0.0340	0.0186	0.0146	0.0687	----
calcium, dissolved	7440-70-2	E421	50	µg/L	47000	43600	42700	37000	----
cesium, dissolved	7440-46-2	E421	0.010	µg/L	0.011	<0.010	<0.010	0.052	----



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					MW17-25A	MW17-26A	MW17-26B	MW17-14A	MW17-20A
Client sampling date / time					25-Aug-2020 11:00	25-Aug-2020 12:00	25-Aug-2020 11:30	25-Aug-2020 13:10	25-Aug-2020 14:35
Analyte	CAS Number	Method	LOR	Unit	VA20B3887-001	VA20B3887-002	VA20B3887-003	VA20B3887-004	VA20B3887-005
					Result	Result	Result	Result	Result
<b>Dissolved Metals</b>									
chromium, dissolved	7440-47-3	E421.Cr-L	0.10	µg/L	<0.10	<0.10	<0.10	0.22	----
cobalt, dissolved	7440-48-4	E421	0.10	µg/L	0.12	<0.10	<0.10	0.81	----
copper, dissolved	7440-50-8	E421	0.20	µg/L	0.22	<0.20	<0.20	1.74	----
iron, dissolved	7439-89-6	E421	10	µg/L	30	<10	<10	3800	----
lead, dissolved	7439-92-1	E421	0.050	µg/L	<0.050	<0.050	<0.050	1.36	----
lithium, dissolved	7439-93-2	E421	1.0	µg/L	5.0	2.8	3.4	3.9	----
magnesium, dissolved	7439-95-4	E421	5.0	µg/L	8110	5210	6540	6030	----
manganese, dissolved	7439-96-5	E421	0.10	µg/L	134	<0.10	1.69	1450	----
mercury, dissolved	7439-97-6	E509	0.0050	µg/L	<0.0050	<0.0050	<0.0050	<0.0050	----
molybdenum, dissolved	7439-98-7	E421	0.050	µg/L	4.34	0.678	0.892	16.6	----
nickel, dissolved	7440-02-0	E421	0.50	µg/L	0.54	<0.50	<0.50	0.99	----
phosphorus, dissolved	7723-14-0	E421	50	µg/L	<50	<50	<50	<50	----
potassium, dissolved	7440-09-7	E421	50	µg/L	3900	3330	3960	3740	----
rubidium, dissolved	7440-17-7	E421	0.20	µg/L	1.92	0.87	1.30	1.00	----
selenium, dissolved	7782-49-2	E421	0.050	µg/L	0.051	0.220	0.385	<0.050	----
silicon, dissolved	7440-21-3	E421	50	µg/L	6860	2040	2160	3310	----
silver, dissolved	7440-22-4	E421	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----
sodium, dissolved	17341-25-2	E421	50	µg/L	17400	926	2490	28200	----
strontium, dissolved	7440-24-6	E421	0.20	µg/L	484	271	298	423	----
sulfur, dissolved	7704-34-9	E421	500	µg/L	14400	8400	11400	2460	----
tellurium, dissolved	13494-80-9	E421	0.20	µg/L	<0.20	<0.20	<0.20	<0.20	----
thallium, dissolved	7440-28-0	E421	0.010	µg/L	0.020	<0.010	<0.010	<0.010	----
thorium, dissolved	7440-29-1	E421	0.10	µg/L	<0.10	<0.10	<0.10	<0.10	----
tin, dissolved	7440-31-5	E421	0.10	µg/L	<0.10	<0.10	<0.10	<0.10	----
titanium, dissolved	7440-32-6	E421	0.30	µg/L	<0.30	<0.30	<0.30	17.8	----
tungsten, dissolved	7440-33-7	E421	0.10	µg/L	<0.10	<0.10	<0.10	<0.10	----
uranium, dissolved	7440-61-1	E421	0.010	µg/L	0.325	0.298	0.393	0.100	----
vanadium, dissolved	7440-62-2	E421	0.50	µg/L	<0.50	<0.50	<0.50	1.05	----
zinc, dissolved	7440-66-6	E421	1.0	µg/L	<1.0	1.1	<1.0	15.1	----
zirconium, dissolved	7440-67-7	E421	0.20	µg/L	<0.20	<0.20	<0.20	0.44	----
dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	Field	----



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					MW17-25A	MW17-26A	MW17-26B	MW17-14A	MW17-20A
Client sampling date / time					25-Aug-2020 11:00	25-Aug-2020 12:00	25-Aug-2020 11:30	25-Aug-2020 13:10	25-Aug-2020 14:35
Analyte	CAS Number	Method	LOR	Unit	VA20B3887-001	VA20B3887-002	VA20B3887-003	VA20B3887-004	VA20B3887-005
					Result	Result	Result	Result	Result
<b>Dissolved Metals</b>									
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	Field	----
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>									
benzene	71-43-2	E611A	0.50	µg/L	----	----	----	----	<0.50
ethylbenzene	100-41-4	E611A	0.50	µg/L	----	----	----	----	0.50
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	----	----	----	----	<0.50
styrene	100-42-5	E611A	0.50	µg/L	----	----	----	----	<0.50
toluene	108-88-3	E611A	0.50	µg/L	----	----	----	----	<0.50
xylene, m+p-	179601-23-1	E611A	0.50	µg/L	----	----	----	----	0.50
xylene, o-	95-47-6	E611A	0.50	µg/L	----	----	----	----	<0.50
xylenes, total	1330-20-7	E611A	0.75	µg/L	----	----	----	----	<0.75
BTEX, total	----	E611A	1.2	µg/L	----	----	----	----	<1.2
<b>Volatile Organic Compounds Surrogates</b>									
bromofluorobenzene, 4-	460-00-4	E611A	0.50	%	----	----	----	----	93.7
difluorobenzene, 1,4	540-36-3	E611A	0.50	%	----	----	----	----	108
<b>Hydrocarbons</b>									
EPH (C10-C19)	----	E601A	250	µg/L	----	----	----	----	<250
EPH (C19-C32)	----	E601A	250	µg/L	----	----	----	----	<250
HEPHw	----	EC600A	250	µg/L	----	----	----	----	<250
LEPHw	----	EC600A	250	µg/L	----	----	----	----	<250
<b>Hydrocarbons Surrogates</b>									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%	----	----	----	----	88.0
<b>Polycyclic Aromatic Hydrocarbons</b>									
acenaphthene	83-32-9	E641A	0.010	µg/L	----	----	----	----	<0.010
acenaphthylene	208-96-8	E641A	0.010	µg/L	----	----	----	----	<0.010
acridine	260-94-6	E641A	0.010	µg/L	----	----	----	----	<0.010
anthracene	120-12-7	E641A	0.010	µg/L	----	----	----	----	<0.010
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	----	----	----	----	<0.010
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	----	----	----	----	<0.0050
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	----	----	----	----	<0.010
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	----	----	----	----	<0.015
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	----	----	----	----	<0.010



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					MW17-25A	MW17-26A	MW17-26B	MW17-14A	MW17-20A
Client sampling date / time					25-Aug-2020 11:00	25-Aug-2020 12:00	25-Aug-2020 11:30	25-Aug-2020 13:10	25-Aug-2020 14:35
Analyte	CAS Number	Method	LOR	Unit	VA20B3887-001	VA20B3887-002	VA20B3887-003	VA20B3887-004	VA20B3887-005
					Result	Result	Result	Result	Result
<b>Polycyclic Aromatic Hydrocarbons</b>									
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	----	----	----	----	<0.010
chrysene	218-01-9	E641A	0.010	µg/L	----	----	----	----	<0.010
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	----	----	----	----	<0.0050
fluoranthene	206-44-0	E641A	0.010	µg/L	----	----	----	----	<0.010
fluorene	86-73-7	E641A	0.010	µg/L	----	----	----	----	<0.010
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	----	----	----	----	<0.010
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	----	----	----	----	0.112
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	----	----	----	----	0.182
naphthalene	91-20-3	E641A	0.050	µg/L	----	----	----	----	0.165
phenanthrene	85-01-8	E641A	0.020	µg/L	----	----	----	----	<0.020
pyrene	129-00-0	E641A	0.010	µg/L	----	----	----	----	<0.010
quinoline	6027-02-7	E641A	0.050	µg/L	----	----	----	----	<0.050
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>									
acridine-d9	34749-75-2	E641A	0.010	%	----	----	----	----	91.6
chrysene-d12	1719-03-5	E641A	0.010	%	----	----	----	----	102
naphthalene-d8	1146-65-2	E641A	0.010	%	----	----	----	----	98.0
phenanthrene-d10	1517-22-2	E641A	0.010	%	----	----	----	----	102

Please refer to the General Comments section for an explanation of any qualifiers detected.



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

					MW17-20B	MW17-21A	MW17-21B	MW17-75A	----
					25-Aug-2020 14:15	25-Aug-2020 16:00	25-Aug-2020 16:30	25-Aug-2020 11:00	----
Analyte	CAS Number	Method	LOR	Unit	VA20B3887-006	VA20B3887-007	VA20B3887-008	VA20B3887-009	-----
					Result	Result	Result	Result	---
<b>Physical Tests</b>									
acidity (as CaCO3)	----	E283	2.0	mg/L	----	<2.0	4.5	<2.0	----
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	----	87.6	48.6	156	----
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	----	<1.0	<1.0	<1.0	----
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	----	<1.0	<1.0	<1.0	----
alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L	----	<1.0	<1.0	<1.0	----
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	----	87.6	48.6	156	----
conductivity	----	E100	2.0	µS/cm	----	256	109	349	----
pH	----	E108	0.10	pH units	----	8.11	7.14	8.08	----
solids, total dissolved [TDS]	----	E162	10	mg/L	----	180	88	256	----
turbidity	----	E121	0.10	NTU	----	0.95	73.4	618	----
hardness (as CaCO3), dissolved	----	EC100	600	µg/L	----	97100	32600	151000	----
<b>Anions and Nutrients</b>									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	----	0.0273	0.0053	0.0244	----
bromide	24959-67-9	E235.Br-L	0.050	mg/L	----	<0.050	<0.050	<0.050	----
chloride	16887-00-6	E235.Cl	0.50	mg/L	----	<0.50	<0.50	<0.50	----
fluoride	16984-48-8	E235.F	0.020	mg/L	----	0.571	0.432	0.354	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	----	0.0244	0.0126	0.0135	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	----	<0.0010	0.0013	0.0017	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	----	41.5	31.8	39.6	----
<b>Dissolved Metals</b>									
aluminum, dissolved	7429-90-5	E421	1.0	µg/L	----	2.5	2.6	3.3	----
antimony, dissolved	7440-36-0	E421	0.10	µg/L	----	0.14	<0.10	1.17	----
arsenic, dissolved	7440-38-2	E421	0.10	µg/L	----	0.60	<0.10	2.08	----
barium, dissolved	7440-39-3	E421	0.10	µg/L	----	28.3	14.8	34.2	----
beryllium, dissolved	7440-41-7	E421	0.100	µg/L	----	<0.100	<0.100	<0.100	----
bismuth, dissolved	7440-69-9	E421	0.050	µg/L	----	<0.050	<0.050	<0.050	----
boron, dissolved	7440-42-8	E421	10	µg/L	----	16	<10	10	----
cadmium, dissolved	7440-43-9	E421	0.0050	µg/L	----	<0.0100 <sup>DLM</sup>	0.0779	0.0331	----
calcium, dissolved	7440-70-2	E421	50	µg/L	----	23000	11100	46800	----
cesium, dissolved	7440-46-2	E421	0.010	µg/L	----	<0.010	<0.010	0.010	----
chromium, dissolved	7440-47-3	E421.Cr-L	0.10	µg/L	----	<0.10	<0.10	<0.10	----



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					MW17-20B	MW17-21A	MW17-21B	MW17-75A	----
Client sampling date / time					25-Aug-2020 14:15	25-Aug-2020 16:00	25-Aug-2020 16:30	25-Aug-2020 11:00	----
Analyte	CAS Number	Method	LOR	Unit	VA20B3887-006	VA20B3887-007	VA20B3887-008	VA20B3887-009	-----
					Result	Result	Result	Result	---
<b>Dissolved Metals</b>									
cobalt, dissolved	7440-48-4	E421	0.10	µg/L	----	<0.10	<0.10	0.13	----
copper, dissolved	7440-50-8	E421	0.20	µg/L	----	0.68	0.21	0.25	----
iron, dissolved	7439-89-6	E421	10	µg/L	----	11	<10	32	----
lead, dissolved	7439-92-1	E421	0.050	µg/L	----	0.119	<0.050	<0.050	----
lithium, dissolved	7439-93-2	E421	1.0	µg/L	----	8.5	<1.0	5.0	----
magnesium, dissolved	7439-95-4	E421	5.0	µg/L	----	9620	1190	8320	----
manganese, dissolved	7439-96-5	E421	0.10	µg/L	----	117	44.3	139	----
mercury, dissolved	7439-97-6	E509	0.0050	µg/L	----	<0.0050	<0.0050	<0.0050	----
molybdenum, dissolved	7439-98-7	E421	0.050	µg/L	----	9.34	0.168	4.16	----
nickel, dissolved	7440-02-0	E421	0.50	µg/L	----	<0.50	<0.50	0.54	----
phosphorus, dissolved	7723-14-0	E421	50	µg/L	----	<50	<50	<50	----
potassium, dissolved	7440-09-7	E421	50	µg/L	----	3040	601	4140	----
rubidium, dissolved	7440-17-7	E421	0.20	µg/L	----	0.40	0.68	1.96	----
selenium, dissolved	7782-49-2	E421	0.050	µg/L	----	<0.050	0.195	<0.050	----
silicon, dissolved	7440-21-3	E421	50	µg/L	----	3140	3800	7110	----
silver, dissolved	7440-22-4	E421	0.010	µg/L	----	<0.010	<0.010	<0.010	----
sodium, dissolved	17341-25-2	E421	50	µg/L	----	15600	1300	17800	----
strontium, dissolved	7440-24-6	E421	0.20	µg/L	----	459	56.1	482	----
sulfur, dissolved	7704-34-9	E421	500	µg/L	----	15700	1420	14100	----
tellurium, dissolved	13494-80-9	E421	0.20	µg/L	----	<0.20	<0.20	<0.20	----
thallium, dissolved	7440-28-0	E421	0.010	µg/L	----	<0.010	<0.010	0.018	----
thorium, dissolved	7440-29-1	E421	0.10	µg/L	----	<0.10	<0.10	<0.10	----
tin, dissolved	7440-31-5	E421	0.10	µg/L	----	0.15	<0.10	<0.10	----
titanium, dissolved	7440-32-6	E421	0.30	µg/L	----	<0.30	<0.30	<0.30	----
tungsten, dissolved	7440-33-7	E421	0.10	µg/L	----	<0.10	<0.10	<0.10	----
uranium, dissolved	7440-61-1	E421	0.010	µg/L	----	0.398	0.014	0.332	----
vanadium, dissolved	7440-62-2	E421	0.50	µg/L	----	<0.50	<0.50	<0.50	----
zinc, dissolved	7440-66-6	E421	1.0	µg/L	----	3.6	2.5	<1.0	----
zirconium, dissolved	7440-67-7	E421	0.20	µg/L	----	<0.20	<0.20	<0.20	----
dissolved mercury filtration location	----	EP509	-	-	----	Field	Field	Field	----
dissolved metals filtration location	----	EP421	-	-	----	Field	Field	Field	----



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					MW17-20B	MW17-21A	MW17-21B	MW17-75A	----
Client sampling date / time					25-Aug-2020 14:15	25-Aug-2020 16:00	25-Aug-2020 16:30	25-Aug-2020 11:00	----
Analyte	CAS Number	Method	LOR	Unit	VA20B3887-006	VA20B3887-007	VA20B3887-008	VA20B3887-009	-----
					Result	Result	Result	Result	---
<b>Hydrocarbons</b>									
EPH (C10-C19)	----	E601A	250	µg/L	<250	----	----	----	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	----	----	----	----
HEPHw	----	EC600A	250	µg/L	<250	----	----	----	----
LEPHw	----	EC600A	250	µg/L	<250	----	----	----	----
<b>Hydrocarbons Surrogates</b>									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%	83.9				
<b>Polycyclic Aromatic Hydrocarbons</b>									
acenaphthene	83-32-9	E641A	0.010	µg/L	<0.010	----	----	----	----
acenaphthylene	208-96-8	E641A	0.010	µg/L	<0.010	----	----	----	----
acridine	260-94-6	E641A	0.010	µg/L	<0.010	----	----	----	----
anthracene	120-12-7	E641A	0.010	µg/L	<0.010	----	----	----	----
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	<0.010	----	----	----	----
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	<0.0050	----	----	----	----
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	<0.010	----	----	----	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	----	----	----	----
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	<0.010	----	----	----	----
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	<0.010	----	----	----	----
chrysene	218-01-9	E641A	0.010	µg/L	<0.010	----	----	----	----
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	<0.0050	----	----	----	----
fluoranthene	206-44-0	E641A	0.010	µg/L	<0.010	----	----	----	----
fluorene	86-73-7	E641A	0.010	µg/L	<0.010	----	----	----	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	<0.010	----	----	----	----
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	<0.010	----	----	----	----
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	<0.010	----	----	----	----
naphthalene	91-20-3	E641A	0.050	µg/L	<0.050	----	----	----	----
phenanthrene	85-01-8	E641A	0.020	µg/L	<0.020	----	----	----	----
pyrene	129-00-0	E641A	0.010	µg/L	<0.010	----	----	----	----
quinoline	6027-02-7	E641A	0.050	µg/L	<0.050	----	----	----	----
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>									
acridine-d9	34749-75-2	E641A	0.010	%	95.1	----	----	----	----
chrysene-d12	1719-03-5	E641A	0.010	%	111	----	----	----	----





## Analytical Results

Sub-Matrix: Groundwater					Client sample ID	MW17-20B	MW17-21A	MW17-21B	MW17-75A	----
(Matrix: Water)					Client sampling date / time	25-Aug-2020 14:15	25-Aug-2020 16:00	25-Aug-2020 16:30	25-Aug-2020 11:00	----
Analyte	CAS Number	Method	LOR	Unit	VA20B3887-006	VA20B3887-007	VA20B3887-008	VA20B3887-009	-----	----
Polycyclic Aromatic Hydrocarbons Surrogates					Result	Result	Result	Result	----	----
naphthalene-d8	1146-65-2	E641A	0.010	%	100	----	----	----	----	----
phenanthrene-d10	1517-22-2	E641A	0.010	%	108	----	----	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>VA20B3887</b>	Page	: 1 of 21
Amendment	: 1		
Client	: <b>Wood Canada Ltd.</b>	Laboratory	: Vancouver - Environmental
Contact	: Jeremiah Gladu	Account Manager	: Selam Worku
Address	: 600 - 4445 Lougheed Hwy Burnaby BC Canada V5C 0E4	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: VE52655D	Date Samples Received	: 28-Aug-2020 10:10
PO	: ----	Issue Date	: 27-Oct-2020 09:43
C-O-C number	: ----		
Sampler	: Ardy M.		
Site	: ----		
Quote number	: VA20-SEAB100-0003 - Wood/Seabridge Gold		
No. of samples received	: 9		
No. of samples analysed	: 9		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

## Summary of Outliers

### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.

### **Outliers : Analysis Holding Time Compliance (Breaches)**

- Analysis Holding Time Outliers exist - please see following pages for full details.

### **Outliers : Frequency of Quality Control Samples**

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> MW17-21A	E298	25-Aug-2020	----	----	----		03-Sep-2020	28 days	8 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> MW17-21B	E298	25-Aug-2020	----	----	----		03-Sep-2020	28 days	8 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> MW17-14A	E298	25-Aug-2020	----	----	----		03-Sep-2020	28 days	9 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> MW17-25A	E298	25-Aug-2020	----	----	----		03-Sep-2020	28 days	9 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> MW17-26A	E298	25-Aug-2020	----	----	----		03-Sep-2020	28 days	9 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> MW17-26B	E298	25-Aug-2020	----	----	----		03-Sep-2020	28 days	9 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> MW17-75A	E298	25-Aug-2020	----	----	----		03-Sep-2020	28 days	9 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE MW17-21A	E235.Br-L	25-Aug-2020	----	----	----		01-Sep-2020	28 days	6 days	✓
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE MW17-21B	E235.Br-L	25-Aug-2020	----	----	----		01-Sep-2020	28 days	6 days	✓
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE MW17-14A	E235.Br-L	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE MW17-25A	E235.Br-L	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE MW17-26A	E235.Br-L	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE MW17-26B	E235.Br-L	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE MW17-75A	E235.Br-L	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE MW17-21A	E235.Cl	25-Aug-2020	----	----	----		01-Sep-2020	28 days	6 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE MW17-21B	E235.Cl	25-Aug-2020	----	----	----		01-Sep-2020	28 days	6 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE MW17-14A	E235.Cl	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE MW17-25A	E235.Cl	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE MW17-26A	E235.Cl	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE MW17-26B	E235.Cl	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE MW17-75A	E235.Cl	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE MW17-21A	E235.F	25-Aug-2020	----	----	----		01-Sep-2020	28 days	6 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE MW17-21B	E235.F	25-Aug-2020	----	----	----		01-Sep-2020	28 days	6 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE MW17-14A	E235.F	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE MW17-25A	E235.F	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE MW17-26A	E235.F	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE MW17-26B	E235.F	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE MW17-75A	E235.F	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE MW17-21A	E235.NO3-L	25-Aug-2020	----	----	----		01-Sep-2020	3 days	6 days	* EHTL
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE MW17-21B	E235.NO3-L	25-Aug-2020	----	----	----		01-Sep-2020	3 days	6 days	* EHTL
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE MW17-14A	E235.NO3-L	25-Aug-2020	----	----	----		01-Sep-2020	3 days	7 days	* EHTL
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE MW17-25A	E235.NO3-L	25-Aug-2020	----	----	----		01-Sep-2020	3 days	7 days	* EHTL
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE MW17-26A	E235.NO3-L	25-Aug-2020	----	----	----		01-Sep-2020	3 days	7 days	* EHTL
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE MW17-26B	E235.NO3-L	25-Aug-2020	----	----	----		01-Sep-2020	3 days	7 days	* EHTL



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE MW17-75A	E235.NO3-L	25-Aug-2020	----	----	----		01-Sep-2020	3 days	7 days	* EHTL
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE MW17-21A	E235.NO2-L	25-Aug-2020	----	----	----		01-Sep-2020	3 days	6 days	* EHTL
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE MW17-21B	E235.NO2-L	25-Aug-2020	----	----	----		01-Sep-2020	3 days	6 days	* EHTL
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE MW17-14A	E235.NO2-L	25-Aug-2020	----	----	----		01-Sep-2020	3 days	7 days	* EHTL
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE MW17-25A	E235.NO2-L	25-Aug-2020	----	----	----		01-Sep-2020	3 days	7 days	* EHTL
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE MW17-26A	E235.NO2-L	25-Aug-2020	----	----	----		01-Sep-2020	3 days	7 days	* EHTL
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE MW17-26B	E235.NO2-L	25-Aug-2020	----	----	----		01-Sep-2020	3 days	7 days	* EHTL
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE MW17-75A	E235.NO2-L	25-Aug-2020	----	----	----		01-Sep-2020	3 days	7 days	* EHTL
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE MW17-21A	E235.SO4	25-Aug-2020	----	----	----		01-Sep-2020	28 days	6 days	✓





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
<b>HDPE</b> MW17-21B	E235.SO4	25-Aug-2020	----	----	----		01-Sep-2020	28 days	6 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
<b>HDPE</b> MW17-14A	E235.SO4	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
<b>HDPE</b> MW17-25A	E235.SO4	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
<b>HDPE</b> MW17-26A	E235.SO4	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
<b>HDPE</b> MW17-26B	E235.SO4	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
<b>HDPE</b> MW17-75A	E235.SO4	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> MW17-14A	E421.Cr-L	25-Aug-2020	01-Sep-2020	180 days	7 days	✓	02-Sep-2020	172 days	0 days	✓
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> MW17-21A	E421.Cr-L	25-Aug-2020	01-Sep-2020	180 days	7 days	✓	02-Sep-2020	172 days	0 days	✓
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> MW17-21B	E421.Cr-L	25-Aug-2020	01-Sep-2020	180 days	7 days	✓	02-Sep-2020	172 days	0 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> MW17-25A	E421.Cr-L	25-Aug-2020	01-Sep-2020	180 days	7 days	✔	02-Sep-2020	172 days	0 days	✔	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> MW17-26A	E421.Cr-L	25-Aug-2020	01-Sep-2020	180 days	7 days	✔	02-Sep-2020	172 days	0 days	✔	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> MW17-26B	E421.Cr-L	25-Aug-2020	01-Sep-2020	180 days	7 days	✔	02-Sep-2020	172 days	0 days	✔	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> MW17-75A	E421.Cr-L	25-Aug-2020	01-Sep-2020	180 days	7 days	✔	02-Sep-2020	172 days	0 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> MW17-14A	E509	25-Aug-2020	03-Sep-2020	28 days	8 days	✔	03-Sep-2020	19 days	0 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> MW17-21A	E509	25-Aug-2020	03-Sep-2020	28 days	8 days	✔	03-Sep-2020	19 days	0 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> MW17-21B	E509	25-Aug-2020	03-Sep-2020	28 days	8 days	✔	03-Sep-2020	19 days	0 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> MW17-25A	E509	25-Aug-2020	03-Sep-2020	28 days	8 days	✔	03-Sep-2020	19 days	0 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> MW17-26A	E509	25-Aug-2020	03-Sep-2020	28 days	8 days	✔	03-Sep-2020	19 days	0 days	✔	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> MW17-26B	E509	25-Aug-2020	03-Sep-2020	28 days	8 days	✓	03-Sep-2020	19 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> MW17-75A	E509	25-Aug-2020	03-Sep-2020	28 days	8 days	✓	03-Sep-2020	19 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> MW17-14A	E421	25-Aug-2020	01-Sep-2020	180 days	7 days	✓	02-Sep-2020	172 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> MW17-21A	E421	25-Aug-2020	01-Sep-2020	180 days	7 days	✓	02-Sep-2020	172 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> MW17-21B	E421	25-Aug-2020	01-Sep-2020	180 days	7 days	✓	02-Sep-2020	172 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> MW17-25A	E421	25-Aug-2020	01-Sep-2020	180 days	7 days	✓	02-Sep-2020	172 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> MW17-26A	E421	25-Aug-2020	01-Sep-2020	180 days	7 days	✓	02-Sep-2020	172 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> MW17-26B	E421	25-Aug-2020	01-Sep-2020	180 days	7 days	✓	02-Sep-2020	172 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> MW17-75A	E421	25-Aug-2020	01-Sep-2020	180 days	7 days	✓	02-Sep-2020	172 days	0 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> MW17-20A	E601A	25-Aug-2020	01-Sep-2020	14 days	7 days	✓	02-Sep-2020	40 days	0 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> MW17-20B	E601A	25-Aug-2020	01-Sep-2020	14 days	7 days	✓	02-Sep-2020	40 days	0 days	✓	
<b>Physical Tests : Acidity by Titration</b>											
<b>HDPE</b> MW17-14A	E283	25-Aug-2020	----	----	----		01-Sep-2020	14 days	7 days	✓	
<b>Physical Tests : Acidity by Titration</b>											
<b>HDPE</b> MW17-21A	E283	25-Aug-2020	----	----	----		01-Sep-2020	14 days	7 days	✓	
<b>Physical Tests : Acidity by Titration</b>											
<b>HDPE</b> MW17-21B	E283	25-Aug-2020	----	----	----		01-Sep-2020	14 days	7 days	✓	
<b>Physical Tests : Acidity by Titration</b>											
<b>HDPE</b> MW17-25A	E283	25-Aug-2020	----	----	----		01-Sep-2020	14 days	7 days	✓	
<b>Physical Tests : Acidity by Titration</b>											
<b>HDPE</b> MW17-26A	E283	25-Aug-2020	----	----	----		01-Sep-2020	14 days	7 days	✓	
<b>Physical Tests : Acidity by Titration</b>											
<b>HDPE</b> MW17-26B	E283	25-Aug-2020	----	----	----		01-Sep-2020	14 days	7 days	✓	
<b>Physical Tests : Acidity by Titration</b>											
<b>HDPE</b> MW17-75A	E283	25-Aug-2020	----	----	----		01-Sep-2020	14 days	7 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE MW17-14A	E290	25-Aug-2020	----	----	----		01-Sep-2020	14 days	7 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE MW17-21A	E290	25-Aug-2020	----	----	----		01-Sep-2020	14 days	7 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE MW17-21B	E290	25-Aug-2020	----	----	----		01-Sep-2020	14 days	7 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE MW17-25A	E290	25-Aug-2020	----	----	----		01-Sep-2020	14 days	7 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE MW17-26A	E290	25-Aug-2020	----	----	----		01-Sep-2020	14 days	7 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE MW17-26B	E290	25-Aug-2020	----	----	----		01-Sep-2020	14 days	7 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE MW17-75A	E290	25-Aug-2020	----	----	----		01-Sep-2020	14 days	7 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE MW17-14A	E100	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE MW17-21A	E100	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Conductivity in Water</b>										
HDPE MW17-21B	E100	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE MW17-25A	E100	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE MW17-26A	E100	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE MW17-26B	E100	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE MW17-75A	E100	25-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Physical Tests : pH by Meter</b>										
HDPE MW17-21B	E108	25-Aug-2020	----	----	----		01-Sep-2020	0.25 hrs	168 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE MW17-21A	E108	25-Aug-2020	----	----	----		01-Sep-2020	0.25 hrs	169 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE MW17-14A	E108	25-Aug-2020	----	----	----		01-Sep-2020	0.25 hrs	172 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE MW17-26A	E108	25-Aug-2020	----	----	----		01-Sep-2020	0.25 hrs	173 hrs	* EHTR-FM



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : pH by Meter</b>										
HDPE MW17-26B	E108	25-Aug-2020	----	----	----		01-Sep-2020	0.25 hrs	173 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE MW17-25A	E108	25-Aug-2020	----	----	----		01-Sep-2020	0.25 hrs	174 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE MW17-75A	E108	25-Aug-2020	----	----	----		01-Sep-2020	0.25 hrs	174 hrs	* EHTR-FM
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE MW17-14A	E162	25-Aug-2020	----	----	----		01-Sep-2020	7 days	6 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE MW17-21A	E162	25-Aug-2020	----	----	----		01-Sep-2020	7 days	6 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE MW17-21B	E162	25-Aug-2020	----	----	----		01-Sep-2020	7 days	6 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE MW17-25A	E162	25-Aug-2020	----	----	----		01-Sep-2020	7 days	7 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE MW17-26A	E162	25-Aug-2020	----	----	----		01-Sep-2020	7 days	7 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE MW17-26B	E162	25-Aug-2020	----	----	----		01-Sep-2020	7 days	7 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE MW17-75A	E162	25-Aug-2020	----	----	----		01-Sep-2020	7 days	7 days	✓
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE MW17-14A	E121	25-Aug-2020	----	----	----		01-Sep-2020	3 days	6 days	* EHTL
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE MW17-21A	E121	25-Aug-2020	----	----	----		01-Sep-2020	3 days	6 days	* EHTL
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE MW17-21B	E121	25-Aug-2020	----	----	----		01-Sep-2020	3 days	6 days	* EHTL
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE MW17-26A	E121	25-Aug-2020	----	----	----		01-Sep-2020	3 days	6 days	* EHTL
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE MW17-26B	E121	25-Aug-2020	----	----	----		01-Sep-2020	3 days	6 days	* EHTL
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE MW17-25A	E121	25-Aug-2020	----	----	----		01-Sep-2020	3 days	7 days	* EHTL
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE MW17-75A	E121	25-Aug-2020	----	----	----		01-Sep-2020	3 days	7 days	* EHTL
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>										
Amber glass/Teflon lined cap (sodium bisulfate) MW17-20A	E641A	25-Aug-2020	01-Sep-2020	14 days	7 days	✓	02-Sep-2020	40 days	0 days	✓





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>										
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> MW17-20B	E641A	25-Aug-2020	01-Sep-2020	14 days	7 days	✓	02-Sep-2020	40 days	0 days	✓
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> MW17-20A	E611A	25-Aug-2020	02-Sep-2020	14 days	8 days	✓	03-Sep-2020	5 days	0 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended  
 EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.  
 Rec. HT: ALS recommended hold time (see units).



## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Acidity by Titration	E283	79843	1	7	14.2	5.0	✔
Alkalinity Species by Titration	E290	79835	1	19	5.2	5.0	✔
Ammonia by Fluorescence	E298	80950	1	18	5.5	5.0	✔
Bromide in Water by IC (Low Level)	E235.Br-L	79839	1	18	5.5	5.0	✔
BTEX by Headspace GC-MS	E611A	80458	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	79837	1	18	5.5	5.0	✔
Conductivity in Water	E100	79836	1	19	5.2	5.0	✔
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	79884	1	14	7.1	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	80793	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	79885	1	17	5.8	5.0	✔
Fluoride in Water by IC	E235.F	79838	1	18	5.5	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	79840	1	18	5.5	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	79841	1	18	5.5	5.0	✔
pH by Meter	E108	79834	1	19	5.2	5.0	✔
Sulfate in Water by IC	E235.SO4	79842	1	18	5.5	5.0	✔
TDS by Gravimetry	E162	79768	1	20	5.0	5.0	✔
Turbidity by Nephelometry	E121	79729	1	20	5.0	5.0	✔
<b>Laboratory Control Samples (LCS)</b>							
Acidity by Titration	E283	79843	1	7	14.2	5.0	✔
Alkalinity Species by Titration	E290	79835	1	19	5.2	5.0	✔
Ammonia by Fluorescence	E298	80950	1	18	5.5	5.0	✔
BC PHC - EPH by GC-FID	E601A	79806	1	20	5.0	5.0	✔
Bromide in Water by IC (Low Level)	E235.Br-L	79839	1	18	5.5	5.0	✔
BTEX by Headspace GC-MS	E611A	80458	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	79837	1	18	5.5	5.0	✔
Conductivity in Water	E100	79836	1	19	5.2	5.0	✔
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	79884	1	14	7.1	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	80793	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	79885	1	17	5.8	5.0	✔
Fluoride in Water by IC	E235.F	79838	1	18	5.5	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	79840	1	18	5.5	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	79841	1	18	5.5	5.0	✔
PAHs by Hexane LVI GC-MS	E641A	79807	1	20	5.0	5.0	✔
pH by Meter	E108	79834	1	19	5.2	5.0	✔
Sulfate in Water by IC	E235.SO4	79842	1	18	5.5	5.0	✔
TDS by Gravimetry	E162	79768	1	20	5.0	5.0	✔
Turbidity by Nephelometry	E121	79729	1	20	5.0	5.0	✔



Matrix: **Water**

Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Method Blanks (MB)</b>							
Acidity by Titration	E283	79843	1	7	14.2	5.0	✓
Alkalinity Species by Titration	E290	79835	1	19	5.2	5.0	✓
Ammonia by Fluorescence	E298	80950	1	18	5.5	5.0	✓
BC PHC - EPH by GC-FID	E601A	79806	1	20	5.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	79839	1	18	5.5	5.0	✓
BTEX by Headspace GC-MS	E611A	80458	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	79837	1	18	5.5	5.0	✓
Conductivity in Water	E100	79836	1	19	5.2	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	79884	1	14	7.1	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	80793	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	79885	2	17	11.7	5.0	✓
Fluoride in Water by IC	E235.F	79838	1	18	5.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	79840	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	79841	1	18	5.5	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	79807	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	79842	1	18	5.5	5.0	✓
TDS by Gravimetry	E162	79768	1	20	5.0	5.0	✓
Turbidity by Nephelometry	E121	79729	1	20	5.0	5.0	✓
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	80950	1	18	5.5	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	79839	1	18	5.5	5.0	✓
BTEX by Headspace GC-MS	E611A	80458	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	79837	1	18	5.5	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	79884	1	14	7.1	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	80793	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	79885	1	17	5.8	5.0	✓
Fluoride in Water by IC	E235.F	79838	1	18	5.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	79840	1	18	5.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	79841	1	18	5.5	5.0	✓
Sulfate in Water by IC	E235.SO4	79842	1	18	5.5	5.0	✓



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 Vancouver - Environmental	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TDS by Gravimetry	E162 Vancouver - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Bromide in Water by IC (Low Level)	E235.Br-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Acidity by Titration	E283  Vancouver - Environmental	Water	APHA 2310 B (mod)	Acidity is determined by potentiometric titration to a specified endpoint.
Alkalinity Species by Titration	E290  Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298  Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
Dissolved Metals in Water by CRC ICPMS	E421  Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L  Vancouver - Environmental	Water	APHA 3030 B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS
Dissolved Mercury in Water by CVAAS	E509  Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
BC PHC - EPH by GC-FID	E601A  Vancouver - Environmental	Water	BC MOE Lab Manual	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.
BTEX by Headspace GC-MS	E611A  Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by Hexane LVI GC-MS	E641A  Vancouver - Environmental	Water	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by large volume injection (LVI) GC-MS.
Dissolved Hardness (Calculated)	EC100  Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> ), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
LEPH and HEPH: EPH-PAH	EC600A  Vancouver - Environmental	Water	BC MOE Lab Manual (LEPH and HEPH) (mod)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Acenaphthene, Acridine, Anthracene, Fluorene, Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(a)pyrene, Fluoranthene, and Pyrene.
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Dissolved Metals Water Filtration	EP421  Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO <sub>3</sub> .
Dissolved Mercury Water Filtration	EP509  Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
VOCs Preparation for Headspace Analysis	EP581  Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601  Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

## QUALITY CONTROL REPORT

**Work Order** : **VA20B3887**

**Page** : 1 of 15

**Amendment** : **1**

**Client** : Wood Canada Ltd.  
**Contact** : Jeremiah Gladu  
**Address** : 1235 Main Street P.O. Box 2536  
 Smithers BC Canada V0J 2N0

**Laboratory** : Vancouver - Environmental  
**Account Manager** : Selam Worku  
**Address** : 8081 Lougheed Highway  
 Burnaby, British Columbia Canada V5A 1W9

**Telephone** : ----  
**Project** : VE52655D  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : Ardy M.  
**Site** : ----  
**Quote number** : VA20-SEAB100-0003 - Wood/Seabridge Gold  
**No. of samples received** : 9  
**No. of samples analysed** : 9

**Telephone** : +1 604 253 4188  
**Date Samples Received** : 28-Aug-2020 10:10  
**Date Analysis Commenced** : 01-Sep-2020  
**Issue Date** : 27-Oct-2020 09:43

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Annabelle Prasad	Analyst	Metals, Burnaby, British Columbia
Bruna Botti	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Cristina Alexandre	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kevin Duarte	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics - Water Quality, Burnaby, British Columbia
Ophelia Chiu	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Shaneel Dayal	Analyst	Metals, Burnaby, British Columbia



## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

# = Indicates a QC result that did not meet the ALS DQO.





## Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 79729)</b>											
VA20B3887-001	MW17-25A	turbidity	----	E121	0.10	NTU	726	767	5.49%	15%	----
<b>Physical Tests (QC Lot: 79768)</b>											
VA20B3617-004	Anonymous	solids, total dissolved [TDS]	----	E162	20	mg/L	2650	2610	1.79%	20%	----
<b>Physical Tests (QC Lot: 79834)</b>											
VA20B3728-003	Anonymous	pH	----	E108	0.10	pH units	7.86	7.89	0.356%	4%	----
<b>Physical Tests (QC Lot: 79835)</b>											
VA20B3728-003	Anonymous	alkalinity, bicarbonate (as CaCO <sub>3</sub> )	----	E290	1.0	mg/L	61.3	61.1	0.327%	20%	----
		alkalinity, carbonate (as CaCO <sub>3</sub> )	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, hydroxide (as CaCO <sub>3</sub> )	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, phenolphthalein (as CaCO <sub>3</sub> )	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, total (as CaCO <sub>3</sub> )	----	E290	1.0	mg/L	61.3	61.1	0.327%	20%	----
<b>Physical Tests (QC Lot: 79836)</b>											
VA20B3728-003	Anonymous	conductivity	----	E100	2.0	µS/cm	118	119	0.0844%	10%	----
<b>Physical Tests (QC Lot: 79843)</b>											
VA20B3887-002	MW17-26A	acidity (as CaCO <sub>3</sub> )	----	E283	2.0	mg/L	<2.0	<2.0	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 79837)</b>											
VA20B3728-001	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	1.25	1.24	0.003	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 79838)</b>											
VA20B3728-001	Anonymous	fluoride	16984-48-8	E235.F	0.020	mg/L	0.090	0.088	0.002	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 79839)</b>											
VA20B3728-001	Anonymous	bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 79840)</b>											
VA20B3728-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 79841)</b>											
VA20B3728-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 79842)</b>											
VA20B3728-001	Anonymous	sulfate (as SO <sub>4</sub> )	14808-79-8	E235.SO4	0.30	mg/L	24.5	24.4	0.0399%	20%	----
<b>Anions and Nutrients (QC Lot: 80950)</b>											
VA20B3854-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0124	0.0120	0.0005	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 79884)</b>											
VA20B3887-001	MW17-25A	chromium, dissolved	7440-47-3	E421.Cr-L	0.100	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----



Sub-Matrix: **Water**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 79885)</b>											
VA20B3887-001	MW17-25A	aluminum, dissolved	7429-90-5	E421	1.00	mg/L	3.0 µg/L	0.0027	0.0003	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E421	0.100	mg/L	1.18 µg/L	0.00121	2.65%	20%	----
		arsenic, dissolved	7440-38-2	E421	0.100	mg/L	2.00 µg/L	0.00195	2.61%	20%	----
		barium, dissolved	7440-39-3	E421	0.100	mg/L	33 0 µg/L	0.0345	4.40%	20%	----
		beryllium, dissolved	7440-41-7	E421	0.100	mg/L	<0.100 µg/L	<0 000100	0	Diff <2x LOR	----
		bismuth, dissolved	7440-69-9	E421	0 0500	mg/L	<0.050 µg/L	<0 000050	0	Diff <2x LOR	----
		boron, dissolved	7440-42-8	E421	10 0	mg/L	<10 µg/L	<0.010	0	Diff <2x LOR	----
		cadmium, dissolved	7440-43-9	E421	0.00500	mg/L	0 0340 µg/L	0.0000304	0.0000036	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E421	50 0	mg/L	47000 µg/L	44.6	5.07%	20%	----
		cesium, dissolved	7440-46-2	E421	0 0100	mg/L	0.011 µg/L	0 000012	0 000001	Diff <2x LOR	----
		cobalt, dissolved	7440-48-4	E421	0.100	mg/L	0.12 µg/L	0.00011	0 000008	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.200	mg/L	0.22 µg/L	0.00020	0.00002	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E421	10 0	mg/L	30 µg/L	0.031	0.0002	Diff <2x LOR	----
		lead, dissolved	7439-92-1	E421	0 0500	mg/L	<0.050 µg/L	<0 000050	0	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E421	1.00	mg/L	5.0 µg/L	0.0050	0.00003	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	5.00	mg/L	8110 µg/L	8.12	0.0781%	20%	----
		manganese, dissolved	7439-96-5	E421	0.100	mg/L	134 µg/L	0.130	2.21%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0 0500	mg/L	4.34 µg/L	0.00441	1.69%	20%	----
		nickel, dissolved	7440-02-0	E421	0.500	mg/L	0.54 µg/L	<0.00050	0.00004	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E421	50 0	mg/L	<50 µg/L	<0.050	0	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	50 0	mg/L	3900 µg/L	3 89	0.103%	20%	----
		rubidium, dissolved	7440-17-7	E421	0.200	mg/L	1.92 µg/L	0.00183	0.00009	Diff <2x LOR	----
		selenium, dissolved	7782-49-2	E421	0 0500	mg/L	0.051 µg/L	<0 000050	0 000001	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	50 0	mg/L	6860 µg/L	6 82	0.641%	20%	----
		silver, dissolved	7440-22-4	E421	0 0100	mg/L	<0.010 µg/L	<0 000010	0	Diff <2x LOR	----
		sodium, dissolved	17341-25-2	E421	50 0	mg/L	17400 µg/L	17.2	1.11%	20%	----
		strontium, dissolved	7440-24-6	E421	0.200	mg/L	484 µg/L	0.510	5.24%	20%	----
		sulfur, dissolved	7704-34-9	E421	500	mg/L	14400 µg/L	14.0	2.06%	20%	----
		tellurium, dissolved	13494-80-9	E421	0.200	mg/L	<0.20 µg/L	<0.00020	0	Diff <2x LOR	----
		thallium, dissolved	7440-28-0	E421	0 0100	mg/L	0.020 µg/L	0 000020	0.00000003	Diff <2x LOR	----
		thorium, dissolved	7440-29-1	E421	0.100	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		tin, dissolved	7440-31-5	E421	0.100	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		titanium, dissolved	7440-32-6	E421	0.300	mg/L	<0.30 µg/L	<0.00030	0	Diff <2x LOR	----
		tungsten, dissolved	7440-33-7	E421	0.100	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E421	0 0100	mg/L	0.325 µg/L	0 000324	0.167%	20%	----
		vanadium, dissolved	7440-62-2	E421	0.500	mg/L	<0.50 µg/L	<0.00050	0	Diff <2x LOR	----



Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 79885) - continued</b>											
VA20B3887-001	MW17-25A	zinc, dissolved	7440-66-6	E421	1.00	mg/L	<1 0 µg/L	<0.0010	0	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.200	mg/L	<0.20 µg/L	<0.00020	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 80793)</b>											
VA20B3887-001	MW17-25A	mercury, dissolved	7439-97-6	E509	0.00500	mg/L	<0.0050 µg/L	<0.0000050	0	Diff <2x LOR	----
<b>Volatile Organic Compounds (QC Lot: 80458)</b>											
VA20B3842-017	Anonymous	benzene	71-43-2	E611A	0 0005	µg/L	<0 00050 mg/L	<0 50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0 0005	µg/L	<0 00050 mg/L	<0 50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0 0005	µg/L	<0 00050 mg/L	<0 50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0 0005	µg/L	<0 00050 mg/L	<0 50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0 0005	µg/L	<0 00050 mg/L	<0 50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0 0005	µg/L	<0 00050 mg/L	<0 50	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0 0005	µg/L	<0 00050 mg/L	<0 50	0	Diff <2x LOR	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 79729)</b>						
turbidity	----	E121	0.1	NTU	<0.10	----
<b>Physical Tests (QCLot: 79768)</b>						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
<b>Physical Tests (QCLot: 79835)</b>						
alkalinity, bicarbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, carbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, hydroxide (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
<b>Physical Tests (QCLot: 79836)</b>						
conductivity	----	E100	1	µS/cm	<1.0	----
<b>Physical Tests (QCLot: 79843)</b>						
acidity (as CaCO3)	----	E283	2	mg/L	2.1	----
<b>Anions and Nutrients (QCLot: 79837)</b>						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
<b>Anions and Nutrients (QCLot: 79838)</b>						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
<b>Anions and Nutrients (QCLot: 79839)</b>						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
<b>Anions and Nutrients (QCLot: 79840)</b>						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 79841)</b>						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 79842)</b>						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
<b>Anions and Nutrients (QCLot: 80950)</b>						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
<b>Dissolved Metals (QCLot: 79884)</b>						
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	<0.00010	----
<b>Dissolved Metals (QCLot: 79885)</b>						
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 79885) - continued</b>						
barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	---
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	---
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	---
boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	---
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	---
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	---
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	---
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	---
copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	---
iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	---
lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	---
lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	---
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	---
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	---
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	---
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	---
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	---
potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	---
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	---
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	---
silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	---
silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	---
sodium, dissolved	17341-25-2	E421	0.05	mg/L	<0.050	---
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	---
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	---
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	---
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	---
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	---
tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	---
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	---
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	---
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	---
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	---
zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	---
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	---
<b>Dissolved Metals (QCLot: 80793)</b>						



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 80793) - continued</b>						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	---
<b>Volatile Organic Compounds (QCLot: 80458)</b>						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	---
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	---
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	---
styrene	100-42-5	E611A	0.5	µg/L	<0.50	---
toluene	108-88-3	E611A	0.5	µg/L	<0.50	---
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	<0.50	---
xylene, o-	95-47-6	E611A	0.5	µg/L	<0.50	---
<b>Hydrocarbons (QCLot: 79806)</b>						
EPH (C10-C19)	---	E601A	250	µg/L	<250	---
EPH (C19-C32)	---	E601A	250	µg/L	<250	---
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 79807)</b>						
acenaphthene	83-32-9	E641A	0.01	µg/L	<0.010	---
acenaphthylene	208-96-8	E641A	0.01	µg/L	<0.010	---
acridine	260-94-6	E641A	0.01	µg/L	<0.010	---
anthracene	120-12-7	E641A	0.01	µg/L	<0.010	---
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	<0.010	---
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	---
benzo(b+j)fluoranthene	---	E641A	0.01	µg/L	<0.010	---
benzo(b+j+k)fluoranthene	---	E641A	0.015	µg/L	<0.015	---
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	<0.010	---
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	<0.010	---
chrysene	218-01-9	E641A	0.01	µg/L	<0.010	---
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	<0.0050	---
fluoranthene	206-44-0	E641A	0.01	µg/L	<0.010	---
fluorene	86-73-7	E641A	0.01	µg/L	<0.010	---
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	<0.010	---
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	<0.010	---
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	<0.010	---
naphthalene	91-20-3	E641A	0.05	µg/L	<0.050	---
phenanthrene	85-01-8	E641A	0.02	µg/L	<0.020	---
pyrene	129-00-0	E641A	0.01	µg/L	<0.010	---
quinoline	6027-02-7	E641A	0.05	µg/L	<0.050	---

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Work Order : VA20B3887 Amendment 1  
Client : Wood Canada Ltd.  
Project : VE52655D

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## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Physical Tests (QCLot: 79729)</b>									
turbidity	----	E121	0.1	NTU	200 NTU	100	85.0	115	----
<b>Physical Tests (QCLot: 79768)</b>									
solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	100	85.0	115	----
<b>Physical Tests (QCLot: 79834)</b>									
pH	----	E108	----	pH units	7 pH units	99.9	98.0	102	----
<b>Physical Tests (QCLot: 79835)</b>									
alkalinity, phenolphthalein (as CaCO <sub>3</sub> )	----	E290	1	mg/L	229 mg/L	96.4	75.0	125	----
alkalinity, total (as CaCO <sub>3</sub> )	----	E290	1	mg/L	500 mg/L	97.5	85.0	115	----
<b>Physical Tests (QCLot: 79836)</b>									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	103	90.0	110	----
<b>Physical Tests (QCLot: 79843)</b>									
acidity (as CaCO <sub>3</sub> )	----	E283	2	mg/L	50 mg/L	100	85.0	115	----
<b>Anions and Nutrients (QCLot: 79837)</b>									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	----
<b>Anions and Nutrients (QCLot: 79838)</b>									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	101	90.0	110	----
<b>Anions and Nutrients (QCLot: 79839)</b>									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	101	85.0	115	----
<b>Anions and Nutrients (QCLot: 79840)</b>									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	101	90.0	110	----
<b>Anions and Nutrients (QCLot: 79841)</b>									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.8	90.0	110	----
<b>Anions and Nutrients (QCLot: 79842)</b>									
sulfate (as SO <sub>4</sub> )	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 80950)</b>									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.12 mg/L	99.6	85.0	115	----
<b>Dissolved Metals (QCLot: 79884)</b>									
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	0.25 mg/L	101	80.0	120	----
<b>Dissolved Metals (QCLot: 79885)</b>									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	103	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	101	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	102	80.0	120	----





Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Dissolved Metals (QCLot: 79885) - continued</b>									
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	104	80.0	120	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	101	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	97.1	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	102	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	100	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	103	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	107	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	104	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	102	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	100	80.0	120	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	99.9	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	99.3	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	101	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	108	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	108	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	104	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	101	70.0	130	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	104	80.0	120	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	100	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	100	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	104	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	108	80.0	120	----
sodium, dissolved	17341-25-2	E421	0.05	mg/L	50 mg/L	106	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	112	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	91.2	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	94.7	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	100	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	95.5	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	99.4	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	102	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	103	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	100	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	104	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	104	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	110	80.0	120	----
<b>Dissolved Metals (QCLot: 80793)</b>									
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	93.3	80.0	120	----



Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 80458)</b>									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	92.7	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	85.1	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	108	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	85.0	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	89.9	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	200 µg/L	90.8	70.0	130	----
xylene, o-	95-47-6	E611A	0.5	µg/L	100 µg/L	88.9	70.0	130	----
<b>Hydrocarbons (QCLot: 79806)</b>									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	109	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	104	70.0	130	----
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 79807)</b>									
acenaphthene	83-32-9	E641A	0.01	µg/L	0.5 µg/L	107	60.0	130	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5 µg/L	108	60.0	130	----
acridine	260-94-6	E641A	0.01	µg/L	0.5 µg/L	93.0	60.0	130	----
anthracene	120-12-7	E641A	0.01	µg/L	0.5 µg/L	103	60.0	130	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5 µg/L	102	60.0	130	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5 µg/L	105	60.0	130	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	0.5 µg/L	105	60.0	130	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	1 µg/L	111	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5 µg/L	107	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5 µg/L	116	60.0	130	----
chrysene	218-01-9	E641A	0.01	µg/L	0.5 µg/L	111	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	0.5 µg/L	110	60.0	130	----
fluoranthene	206-44-0	E641A	0.01	µg/L	0.5 µg/L	105	60.0	130	----
fluorene	86-73-7	E641A	0.01	µg/L	0.5 µg/L	97.1	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5 µg/L	109	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5 µg/L	108	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	0.5 µg/L	103	60.0	130	----
naphthalene	91-20-3	E641A	0.05	µg/L	0.5 µg/L	101	50.0	130	----
phenanthrene	85-01-8	E641A	0.02	µg/L	0.5 µg/L	101	60.0	130	----
pyrene	129-00-0	E641A	0.01	µg/L	0.5 µg/L	109	60.0	130	----
quinoline	6027-02-7	E641A	0.05	µg/L	0.5 µg/L	111	60.0	130	----



## Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 79837)</b>										
VA20B3728-002	Anonymous	chloride	16887-00-6	E235.Cl	92.3 mg/L	100 mg/L	92.3	75 0	125	----
<b>Anions and Nutrients (QCLot: 79838)</b>										
VA20B3728-002	Anonymous	fluoride	16984-48-8	E235 F	0.905 mg/L	1 mg/L	90.5	75 0	125	----
<b>Anions and Nutrients (QCLot: 79839)</b>										
VA20B3728-002	Anonymous	bromide	24959-67-9	E235 Br-L	0.464 mg/L	0.5 mg/L	92.8	75 0	125	----
<b>Anions and Nutrients (QCLot: 79840)</b>										
VA20B3728-002	Anonymous	nitrate (as N)	14797-55-8	E235 NO3-L	2.31 mg/L	2.5 mg/L	92.4	75 0	125	----
<b>Anions and Nutrients (QCLot: 79841)</b>										
VA20B3728-002	Anonymous	nitrite (as N)	14797-65-0	E235 NO2-L	0.453 mg/L	0.5 mg/L	90.6	75 0	125	----
<b>Anions and Nutrients (QCLot: 79842)</b>										
VA20B3728-002	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	91.2 mg/L	100 mg/L	91.2	75 0	125	----
<b>Anions and Nutrients (QCLot: 80950)</b>										
VA20B3854-002	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.220 mg/L	0.2 mg/L	110	75 0	125	----
<b>Dissolved Metals (QCLot: 79884)</b>										
VA20B3887-002	MW17-26A	chromium, dissolved	7440-47-3	E421.Cr-L	0.0394 mg/L	0.04 mg/L	98.5	70 0	130	----
<b>Dissolved Metals (QCLot: 79885)</b>										
VA20B3887-002	MW17-26A	aluminum, dissolved	7429-90-5	E421	0.196 mg/L	0.2 mg/L	98.1	70 0	130	----
		antimony, dissolved	7440-36-0	E421	0.0201 mg/L	0.02 mg/L	101	70 0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0206 mg/L	0.02 mg/L	103	70 0	130	----
		barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70 0	130	----
		beryllium, dissolved	7440-41-7	E421	0.0404 mg/L	0.04 mg/L	101	70 0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00888 mg/L	0.01 mg/L	88.8	70 0	130	----
		boron, dissolved	7440-42-8	E421	0.096 mg/L	0.1 mg/L	96.0	70 0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00388 mg/L	0.004 mg/L	97.1	70 0	130	----
		calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70 0	130	----
		cesium, dissolved	7440-46-2	E421	0.00967 mg/L	0.01 mg/L	96.7	70 0	130	----
		cobalt, dissolved	7440-48-4	E421	0.0195 mg/L	0.02 mg/L	97.7	70 0	130	----
		copper, dissolved	7440-50-8	E421	0.0196 mg/L	0.02 mg/L	97.9	70 0	130	----
		iron, dissolved	7439-89-6	E421	1.93 mg/L	2 mg/L	96.7	70 0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 79885) - continued</b>										
VA20B3887-002	MW17-26A	lead, dissolved	7439-92-1	E421	0.0195 mg/L	0.02 mg/L	97.4	70.0	130	----
		lithium, dissolved	7439-93-2	E421	0.0984 mg/L	0.1 mg/L	98.4	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, dissolved	7439-96-5	E421	0.0201 mg/L	0.02 mg/L	100	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	0.0195 mg/L	0.02 mg/L	97.6	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0391 mg/L	0.04 mg/L	97.8	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	10.2 mg/L	10 mg/L	102	70.0	130	----
		potassium, dissolved	7440-09-7	E421	4.34 mg/L	4 mg/L	108	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.0186 mg/L	0.02 mg/L	93.1	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0412 mg/L	0.04 mg/L	103	70.0	130	----
		silicon, dissolved	7440-21-3	E421	8.88 mg/L	10 mg/L	88.8	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00389 mg/L	0.004 mg/L	97.3	70.0	130	----
		sodium, dissolved	17341-25-2	E421	2.18 mg/L	2 mg/L	109	70.0	130	----
		strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		sulfur, dissolved	7704-34-9	E421	19.1 mg/L	20 mg/L	95.6	70.0	130	----
		tellurium, dissolved	13494-80-9	E421	0.0385 mg/L	0.04 mg/L	96.3	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00387 mg/L	0.004 mg/L	96.7	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0209 mg/L	0.02 mg/L	104	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0192 mg/L	0.02 mg/L	96.3	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0395 mg/L	0.04 mg/L	98.8	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0201 mg/L	0.02 mg/L	100	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.00407 mg/L	0.004 mg/L	102	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.104 mg/L	0.1 mg/L	104	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.399 mg/L	0.4 mg/L	99.7	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0412 mg/L	0.04 mg/L	103	70.0	130	----
<b>Dissolved Metals (QCLot: 80793)</b>										
VA20B3887-002	MW17-26A	mercury, dissolved	7439-97-6	E509	0.0000940 mg/L	0.0001 mg/L	94.0	70.0	130	----
<b>Volatile Organic Compounds (QCLot: 80458)</b>										
VA20B3846-006	Anonymous	benzene	71-43-2	E611A	101 µg/L	100 µg/L	101	60.0	140	----
		ethylbenzene	100-41-4	E611A	92.7 µg/L	100 µg/L	92.7	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	113 µg/L	100 µg/L	113	60.0	140	----
		styrene	100-42-5	E611A	94.3 µg/L	100 µg/L	94.3	60.0	140	----
		toluene	108-88-3	E611A	95.8 µg/L	100 µg/L	95.8	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	200 µg/L	200 µg/L	99.8	60.0	140	----
		xylene, o-	95-47-6	E611A	96.4 µg/L	100 µg/L	96.4	60.0	140	----

Page : 15 of 15  
Work Order : VA20B3887 Amendment 1  
Client : Wood Canada Ltd.  
Project : VE52655D

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# Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here  
(lab use only)

COC Number: 17 -

Page 1 of 1

Report To		Report Format / Distribution			Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)							
Company:	Wood.	Select Report Format:	<input checked="" type="checkbox"/> PDF	<input checked="" type="checkbox"/> EXCEL	<input type="checkbox"/> EDD (DIGITAL)	Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply						
Contact:	Jeremiah Gladu	Quality Control (QC) Report with Report	<input type="checkbox"/> YES <input type="checkbox"/> NO			PRIORITY (Business Day)	4 day [P4-20%]	<input type="checkbox"/>	EMERGENCY	1 Business day [E - 100%]	<input type="checkbox"/>	
Phone:		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked			3 day [P3-25%]		<input type="checkbox"/>	Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)]		<input type="checkbox"/>		
Company address below will appear on the final report		Select Distribution:	<input checked="" type="checkbox"/> EMAIL	<input type="checkbox"/> MAIL	<input type="checkbox"/> FAX		2 day [P2-50%]	<input type="checkbox"/>				
Street:	4445 Lougheed Hwy.	Email 1 or Fax	jeremiah.gladu@woodplc.com			Date and Time Required for all E&P TATs:		dd-mmm-yy hh:mm				
City/Province:	Burnaby/BC	Email 2				For tests that can not be performed according to the service level selected, you will be contacted.						
Postal Code:	V5C 0E4	Email 3				Analysis Request						
Invoice To	Same as Report To <input type="checkbox"/> YES <input type="checkbox"/> NO	Invoice Distribution			NUMBER OF CONTAINERS	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below						
	Copy of invoice with Report <input type="checkbox"/> YES <input type="checkbox"/> NO	Select Invoice Distribution:	<input checked="" type="checkbox"/> EMAIL	<input type="checkbox"/> MAIL		<input type="checkbox"/> FAX	BTEX	EPH/PAH	General chemistry *	DISSOLVED METALS	SAMPLES ON HOLD	
Company:		Email 1 or Fax								SUSPECTED HAZARD (see Special Instructions)		
Contact:		Email 2										
Project Information		Oil and Gas Required Fields (client use)										
ALS Account # / Quote #:		AFE/Cost Center:	PO#									
Job #:	VE52655D	Major/Minor Code:	Routing Code:									
PO / AFE:		Requisitioner:										
LSD:		Location:										
ALS Lab Work Order # (lab use only):	3877	ALS Contact:	Selam Worku	Sampler:		Ardy M.						
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type								
1	BH17-25A	25 Aug-20	11:00	GW								
2	BH17-26A		12:00									
3	BH17-26B		11:30									
4	BH17-14A		13:10									
5	BH17-20A		14:35									
6	BH17-20B		14:15									
7	BH17-21A		16:00									
8	BH17-21B		16:30									
9	BH17-75A		11:00									
Terrace Shipping Coolers x 4												
Drinking Water (DW) Samples <sup>1</sup> (client use)		Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)			SAMPLE CONDITION AS RECEIVED (lab use only)							
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO					Frozen	<input type="checkbox"/>	SIF Observations	Yes <input type="checkbox"/> No <input type="checkbox"/>				
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO		*GENERAL WATER CHEMISTRY TO INCLUDE: pH, Alkalinity, bicarbonate, carbonate, chloride, conductivity, fluoride, hardness, hydroxide, nitrate, nitrite, ammonia, sulphate, turbidity, TDS, acidity			Ice Packs	<input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/>	Custody seal intact	Yes <input type="checkbox"/> No <input type="checkbox"/>				
					Cooling Initiated	<input type="checkbox"/>						
					INITIAL COOLER TEMPERATURES °C		FINAL COOLER TEMPERATURES °C					
					7.1	12.5	-2.3	4.1	5.2			
SHIPMENT RELEASE (client use)		INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)							
Released by:	Ardy Mansourpour	Date:	Aug 26, 2020	Time:		Received by:	cm	Date:	28 Aug, 2020	Time:	10:10am	

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

NOV 2016 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.



CERTIFICATE OF ANALYSIS

Work Order : VA20B3890
Amendment : 1
Client : Wood Canada Ltd.
Contact : Jeremiah Gladu
Address : 600 - 4445 Lougheed Hwy
Burnaby BC Canada V5C 0E4
Telephone : 604 294 3811
Project : VE52655D
PO : ---
C-O-C number : ---
Sampler : Ardy M.
Site : ---
Quote number : VA20-SEAB100-0003 - Wood/Seabridge Gold
No. of samples received : 7
No. of samples analysed : 7

Page : 1 of 8
Laboratory : Vancouver - Environmental
Account Manager : Selam Worku
Address : 8081 Lougheed Highway
Burnaby BC Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 28-Aug-2020 10:10
Date Analysis Commenced : 28-Aug-2020
Issue Date : 27-Oct-2020 16:09

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
Analytical Results
Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Table with 3 columns: Signatories, Position, Laboratory Department. Lists names like Brianna Allen, Bruna Botti, Caitlin Macey, etc., along with their roles and departments.



## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
-	No Unit
µg/L	micrograms per litre
µS/cm	Microsiemens per centimetre
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in reports identified as "Preliminary Report" are considered authorized for use.

## Workorder Comments

Samples "BH17-04B" & "BH17-07A" One VOC vials received broken in Transit.

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLCI	Detection Limit Raised: Chromatographic interference due to co-elution.
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
RRV	Reported result verified by repeat analysis.





## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					BH17-04A	BH17-04B	BH17-05B	BH17-06A	BH17-06B
Client sampling date / time					23-Aug-2020 16:30	23-Aug-2020 14:30	23-Aug-2020 10:00	23-Aug-2020 16:24	23-Aug-2020 11:00
Analyte	CAS Number	Method	LOR	Unit	VA20B3890-001	VA20B3890-002	VA20B3890-003	VA20B3890-004	VA20B3890-005
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
acidity (as CaCO3)	----	E283	2.0	mg/L	----	3.9	5.1	----	<2.0
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	----	112	121	----	22.6
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	----	<1.0	<1.0	----	11.2
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	----	<1.0	<1.0	----	<1.0
alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L	----	<1.0	<1.0	----	5.6
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	----	112	121	----	33.8
conductivity	----	E100	2.0	µS/cm	----	438	746	----	292
pH	----	E108	0.10	pH units	----	7.49	7.52	----	8.62
solids, total dissolved [TDS]	----	E162	10	mg/L	----	250	500	----	215
turbidity	----	E121	0.10	NTU	----	0.90	4.94	----	0.55
hardness (as CaCO3), dissolved	----	EC100	600	µg/L	----	204000	283000	----	163000
<b>Anions and Nutrients</b>									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	----	0.105	0.180	----	0.138
chloride	16887-00-6	E235.Cl	0.50	mg/L	----	<0.50	<2.50 <sup>DLDS</sup>	----	<0.50
fluoride	16984-48-8	E235.F	0.020	mg/L	----	0.074	0.126	----	0.082
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	----	0.0100	<0.0250 <sup>DLDS</sup>	----	0.0056
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	----	0.0012	<0.0050 <sup>DLDS</sup>	----	0.0038
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	----	114	278	----	104
<b>Dissolved Metals</b>									
aluminum, dissolved	7429-90-5	E421	1.0	µg/L	----	2.9	<1.0	----	203
antimony, dissolved	7440-36-0	E421	0.10	µg/L	----	0.17	<0.10	----	1.11
arsenic, dissolved	7440-38-2	E421	0.10	µg/L	----	0.74	0.86	----	4.23
barium, dissolved	7440-39-3	E421	0.10	µg/L	----	61.8	18.7	----	33.3
beryllium, dissolved	7440-41-7	E421	0.100	µg/L	----	<0.100	<0.100	----	<0.100
bismuth, dissolved	7440-69-9	E421	0.050	µg/L	----	<0.050	<0.050	----	<0.050
boron, dissolved	7440-42-8	E421	10	µg/L	----	44	21	----	57
cadmium, dissolved	7440-43-9	E421	0.0050	µg/L	----	0.0269	0.839	----	0.0093
calcium, dissolved	7440-70-2	E421	50	µg/L	----	74500	98300	----	63000
cesium, dissolved	7440-46-2	E421	0.010	µg/L	----	0.016	<0.010	----	<0.010
chromium, dissolved	7440-47-3	E421.Cr-L	0.10	µg/L	----	<0.10	<0.10	----	0.94



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					BH17-04A	BH17-04B	BH17-05B	BH17-06A	BH17-06B
Client sampling date / time					23-Aug-2020 16:30	23-Aug-2020 14:30	23-Aug-2020 10:00	23-Aug-2020 16:24	23-Aug-2020 11:00
Analyte	CAS Number	Method	LOR	Unit	VA20B3890-001	VA20B3890-002	VA20B3890-003	VA20B3890-004	VA20B3890-005
					Result	Result	Result	Result	Result
<b>Dissolved Metals</b>									
cobalt, dissolved	7440-48-4	E421	0.10	µg/L	----	0.41	1.94	----	0.17
copper, dissolved	7440-50-8	E421	0.20	µg/L	----	0.84	0.36	----	2.32
iron, dissolved	7439-89-6	E421	10	µg/L	----	374	390	----	118
lead, dissolved	7439-92-1	E421	0.050	µg/L	----	0.059	<0.050	----	0.237
lithium, dissolved	7439-93-2	E421	1.0	µg/L	----	1.9	3.3	----	3.7
magnesium, dissolved	7439-95-4	E421	5.0	µg/L	----	4370	9200	----	1440
manganese, dissolved	7439-96-5	E421	0.10	µg/L	----	1140	5700	----	71.3
mercury, dissolved	7439-97-6	E509	0.0050	µg/L	----	<0.0050	<0.0050	----	<0.0050
molybdenum, dissolved	7439-98-7	E421	0.050	µg/L	----	0.348	3.38	----	5.16
nickel, dissolved	7440-02-0	E421	0.50	µg/L	----	<0.50	0.68	----	<0.50
phosphorus, dissolved	7723-14-0	E421	50	µg/L	----	<50	<50	----	<50
potassium, dissolved	7440-09-7	E421	50	µg/L	----	4050	5430	----	5260
rubidium, dissolved	7440-17-7	E421	0.20	µg/L	----	5.22	3.86	----	2.62
selenium, dissolved	7782-49-2	E421	0.050	µg/L	----	0.073	0.067	----	1.92
silicon, dissolved	7440-21-3	E421	50	µg/L	----	3390	3990	----	4020
silver, dissolved	7440-22-4	E421	0.010	µg/L	----	<0.010	<0.010	----	<0.010
sodium, dissolved	17341-25-2	E421	50	µg/L	----	1150	7140	----	3780
strontium, dissolved	7440-24-6	E421	0.20	µg/L	----	357	432	----	278
sulfur, dissolved	7704-34-9	E421	500	µg/L	----	37300	71500	----	35000
tellurium, dissolved	13494-80-9	E421	0.20	µg/L	----	<0.20	<0.20	----	<0.20
thallium, dissolved	7440-28-0	E421	0.010	µg/L	----	<0.010	0.017	----	<0.010
thorium, dissolved	7440-29-1	E421	0.10	µg/L	----	<0.10	<0.10	----	<0.10
tin, dissolved	7440-31-5	E421	0.10	µg/L	----	<0.10	<0.10	----	<0.10
titanium, dissolved	7440-32-6	E421	0.30	µg/L	----	<0.30	<0.30	----	<0.30
tungsten, dissolved	7440-33-7	E421	0.10	µg/L	----	<0.10	<0.10	----	0.46
uranium, dissolved	7440-61-1	E421	0.010	µg/L	----	0.390	0.173	----	0.063
vanadium, dissolved	7440-62-2	E421	0.50	µg/L	----	<0.50	<0.50	----	5.64
zinc, dissolved	7440-66-6	E421	1.0	µg/L	----	5.8	30.1	----	1.1
zirconium, dissolved	7440-67-7	E421	0.20	µg/L	----	<0.20	<0.20	----	<0.20
dissolved mercury filtration location	----	EP509	-	-	----	Field	Field	----	Field
dissolved metals filtration location	----	EP421	-	-	----	Field	Field	----	Field



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					BH17-04A	BH17-04B	BH17-05B	BH17-06A	BH17-06B
Client sampling date / time					23-Aug-2020 16:30	23-Aug-2020 14:30	23-Aug-2020 10:00	23-Aug-2020 16:24	23-Aug-2020 11:00
Analyte	CAS Number	Method	LOR	Unit	VA20B3890-001	VA20B3890-002	VA20B3890-003	VA20B3890-004	VA20B3890-005
					Result	Result	Result	Result	Result
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>									
benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	----	<0.50	<0.50
ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	----	<0.50	<0.50
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	----	<0.50	<0.50
styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	----	<0.50	<0.50
toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	----	<0.50	<0.50
xylene, m+p-	179601-23-1	E611A	0.50	µg/L	<0.50	<0.50	----	<0.50	<0.50
xylene, o-	95-47-6	E611A	0.50	µg/L	<0.50	<0.50	----	<0.50	<0.50
xylenes, total	1330-20-7	E611A	0.75	µg/L	<0.75	<0.75	----	<0.75	<0.75
BTEX, total	----	E611A	1.2	µg/L	<1.2	<1.2	----	<1.2	<1.2
<b>Volatile Organic Compounds Surrogates</b>									
bromofluorobenzene, 4-	460-00-4	E611A	0.50	%	93.8	95.1	----	91.7	94.2
difluorobenzene, 1,4-	540-36-3	E611A	0.50	%	93.8	111	----	105	108
<b>Hydrocarbons</b>									
EPH (C10-C19)	----	E601A	250	µg/L	<250	600	----	<250	<250
EPH (C19-C32)	----	E601A	250	µg/L	<250	300	----	<250	<250
HEPHw	----	EC600A	250	µg/L	<250	300	----	<250	<250
LEPHw	----	EC600A	250	µg/L	<250	600	----	<250	<250
<b>Hydrocarbons Surrogates</b>									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%	89.4	92.6	----	69.9	90.9
<b>Polycyclic Aromatic Hydrocarbons</b>									
acenaphthene	83-32-9	E641A	0.010	µg/L	<0.010	<0.040 <sup>DLCI</sup>	----	<0.010	0.061
acenaphthylene	208-96-8	E641A	0.010	µg/L	<0.010	<0.030 <sup>DLCI</sup>	----	<0.010	<0.010
acridine	260-94-6	E641A	0.010	µg/L	<0.010	<0.080 <sup>DLCI</sup>	----	<0.040 <sup>DLCI</sup>	<0.013 <sup>DLCI</sup>
anthracene	120-12-7	E641A	0.010	µg/L	<0.010	<0.020 <sup>DLCI</sup>	----	<0.010	<0.010
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	<0.010	<0.010	----	<0.010	<0.010
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	<0.0050	<0.0050	----	<0.0050	<0.0050
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	<0.010	<0.010	----	<0.010	<0.010
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	<0.015	----	<0.015	<0.015
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	<0.010	<0.010	----	<0.010	<0.010
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	<0.010	<0.010	----	<0.010	<0.010
chrysene	218-01-9	E641A	0.010	µg/L	<0.010	<0.010	----	<0.010	<0.010



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					BH17-04A	BH17-04B	BH17-05B	BH17-06A	BH17-06B
Client sampling date / time					23-Aug-2020 16:30	23-Aug-2020 14:30	23-Aug-2020 10:00	23-Aug-2020 16:24	23-Aug-2020 11:00
Analyte	CAS Number	Method	LOR	Unit	VA20B3890-001	VA20B3890-002	VA20B3890-003	VA20B3890-004	VA20B3890-005
					Result	Result	Result	Result	Result
<b>Polycyclic Aromatic Hydrocarbons</b>									
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	<0.0050	<0.0050	----	<0.0050	<0.0050
fluoranthene	206-44-0	E641A	0.010	µg/L	<0.010	<0.010	----	<0.010	<0.010
fluorene	86-73-7	E641A	0.010	µg/L	0.014	0.024	----	<0.010	0.046
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	<0.010	<0.010	----	<0.010	<0.010
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	0.036	0.205	----	<0.010	0.084
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	0.040	0.217	----	<0.010	0.056
naphthalene	91-20-3	E641A	0.050	µg/L	<0.050	<0.050	----	<0.050	<0.050
phenanthrene	85-01-8	E641A	0.020	µg/L	<0.020	0.024	----	<0.020	<0.020
pyrene	129-00-0	E641A	0.010	µg/L	<0.010	0.034	----	<0.010	<0.010
quinoline	6027-02-7	E641A	0.050	µg/L	<0.050	<0.600 <sup>DLCI</sup>	----	<0.050	<0.050
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>									
acridine-d9	34749-75-2	E641A	0.010	%	91.7	86.9	----	7.09 <sup>RRV</sup>	98.5
chrysene-d12	1719-03-5	E641A	0.010	%	93.9	102	----	102	102
naphthalene-d8	1146-65-2	E641A	0.010	%	91.8	99.9	----	95.7	98.5
phenanthrene-d10	1517-22-2	E641A	0.010	%	96.6	92.7	----	108	104

Please refer to the General Comments section for an explanation of any qualifiers detected.



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					BH17-07A	BH17-07B	----	----	----
Client sampling date / time					23-Aug-2020 13:35	23-Aug-2020 13:00	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20B3890-006	VA20B3890-007	-----	-----	-----
					Result	Result	---	---	---
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>									
benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	----	----	----
ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	----	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	----	----	----
styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	----	----	----
toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	----	----	----
xylene, m+p-	179601-23-1	E611A	0.50	µg/L	<0.50	<0.50	----	----	----
xylene, o-	95-47-6	E611A	0.50	µg/L	<0.50	<0.50	----	----	----
xylenes, total	1330-20-7	E611A	0.75	µg/L	<0.75	<0.75	----	----	----
BTEX, total	----	E611A	1.2	µg/L	<1.2	<1.2	----	----	----
<b>Volatile Organic Compounds Surrogates</b>									
bromofluorobenzene, 4-	460-00-4	E611A	0.50	%	91.7	94.6	----	----	----
difluorobenzene, 1,4-	540-36-3	E611A	0.50	%	90.0	107	----	----	----
<b>Hydrocarbons</b>									
EPH (C10-C19)	----	E601A	250	µg/L	<250	<250	----	----	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	<250	----	----	----
HEPHw	----	EC600A	250	µg/L	<250	<250	----	----	----
LEPHw	----	EC600A	250	µg/L	<250	<250	----	----	----
<b>Hydrocarbons Surrogates</b>									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%	90.5	90.6	----	----	----
<b>Polycyclic Aromatic Hydrocarbons</b>									
acenaphthene	83-32-9	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
acenaphthylene	208-96-8	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
acridine	260-94-6	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
anthracene	120-12-7	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	<0.0050	<0.0050	----	----	----
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	<0.015	----	----	----
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
chrysene	218-01-9	E641A	0.010	µg/L	<0.010	<0.010	----	----	----



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					BH17-07A	BH17-07B	----	----	----
Client sampling date / time					23-Aug-2020 13:35	23-Aug-2020 13:00	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20B3890-006	VA20B3890-007	-----	-----	-----
					Result	Result	---	---	---
<b>Polycyclic Aromatic Hydrocarbons</b>									
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	<0.0050	<0.0050	----	----	----
fluoranthene	206-44-0	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
fluorene	86-73-7	E641A	0.010	µg/L	0.010	<0.010	----	----	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
naphthalene	91-20-3	E641A	0.050	µg/L	<0.050	<0.050	----	----	----
phenanthrene	85-01-8	E641A	0.020	µg/L	<0.020	<0.020	----	----	----
pyrene	129-00-0	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
quinoline	6027-02-7	E641A	0.050	µg/L	<0.050	<0.050	----	----	----
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>									
acridine-d9	34749-75-2	E641A	0.010	%	95.1	92.5	----	----	----
chrysene-d12	1719-03-5	E641A	0.010	%	94.5	104	----	----	----
naphthalene-d8	1146-65-2	E641A	0.010	%	95.6	96.0	----	----	----
phenanthrene-d10	1517-22-2	E641A	0.010	%	101	101	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>VA20B3890</b>	Page	: 1 of 16
Amendment	: 1		
Client	: <b>Wood Canada Ltd.</b>	Laboratory	: Vancouver - Environmental
Contact	: Jeremiah Gladu	Account Manager	: Selam Worku
Address	: 600 - 4445 Lougheed Hwy Burnaby BC Canada V5C 0E4	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: VE52655D	Date Samples Received	: 28-Aug-2020 10:10
PO	: ----	Issue Date	: 27-Oct-2020 16:09
C-O-C number	: ----		
Sampler	: Ardy M.		
Site	: ----		
Quote number	: VA20-SEAB100-0003 - Wood/Seabridge Gold		
No. of samples received	: 7		
No. of samples analysed	: 7		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

## Summary of Outliers

### Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- Test sample Surrogate recovery outliers exist for all regular sample matrices - please see following pages for full details.

### Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

### Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

### Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.





Page : 3 of 16  
Work Order : VA20B3890 Amendment 1  
Client : Wood Canada Ltd.  
Project : VE52655D



**Regular Sample Surrogates**

Sub-Matrix: **Groundwater**

Analyte Group	Laboratory sample ID	Client/Ref Sample D	Analyte	CAS Number	Result	Limits	Comment
<b>Samples Submitted</b>							
Polycyclic Aromatic Hydrocarbons Surrogates	VA20B3890-004	BH17-06A	acridine-d9	34749-75-2	7.09 %	60.0-130 %	Recovery less than lower data quality objective



## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> BH17-04B	E298	23-Aug-2020	----	----	----		04-Sep-2020	28 days	11 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> BH17-05B	E298	23-Aug-2020	----	----	----		04-Sep-2020	28 days	11 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> BH17-06B	E298	23-Aug-2020	----	----	----		04-Sep-2020	28 days	11 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> BH17-04B	E235.Cl	23-Aug-2020	----	----	----		30-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> BH17-06B	E235.Cl	23-Aug-2020	----	----	----		30-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> BH17-05B	E235.Cl	23-Aug-2020	----	----	----		30-Aug-2020	28 days	7 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
<b>HDPE</b> BH17-04B	E235.F	23-Aug-2020	----	----	----		30-Aug-2020	28 days	6 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE BH17-06B	E235.F	23-Aug-2020	----	----	----		30-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE BH17-05B	E235.F	23-Aug-2020	----	----	----		30-Aug-2020	28 days	7 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE BH17-04B	E235.NO3-L	23-Aug-2020	----	----	----		30-Aug-2020	3 days	6 days	* EHTR	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE BH17-06B	E235.NO3-L	23-Aug-2020	----	----	----		30-Aug-2020	3 days	6 days	* EHTR	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE BH17-05B	E235.NO3-L	23-Aug-2020	----	----	----		30-Aug-2020	3 days	7 days	* EHTR	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE BH17-04B	E235.NO2-L	23-Aug-2020	----	----	----		30-Aug-2020	3 days	6 days	* EHTR	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE BH17-06B	E235.NO2-L	23-Aug-2020	----	----	----		30-Aug-2020	3 days	6 days	* EHTR	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE BH17-05B	E235.NO2-L	23-Aug-2020	----	----	----		30-Aug-2020	3 days	7 days	* EHTR	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE BH17-04B	E235.SO4	23-Aug-2020	----	----	----		30-Aug-2020	28 days	6 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
<b>HDPE</b> BH17-06B	E235.SO4	23-Aug-2020	----	----	----		30-Aug-2020	28 days	6 days	✔
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
<b>HDPE</b> BH17-05B	E235.SO4	23-Aug-2020	----	----	----		30-Aug-2020	28 days	7 days	✔
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> BH17-04B	E421.Cr-L	23-Aug-2020	31-Aug-2020	180 days	8 days	✔	01-Sep-2020	171 days	1 days	✔
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> BH17-05B	E421.Cr-L	23-Aug-2020	31-Aug-2020	180 days	8 days	✔	01-Sep-2020	171 days	1 days	✔
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> BH17-06B	E421.Cr-L	23-Aug-2020	31-Aug-2020	180 days	8 days	✔	01-Sep-2020	171 days	1 days	✔
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
<b>Glass vial dissolved (hydrochloric acid)</b> BH17-05B	E509	23-Aug-2020	02-Sep-2020	28 days	10 days	✔	02-Sep-2020	17 days	0 days	✔
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
<b>Glass vial dissolved (hydrochloric acid)</b> BH17-06B	E509	23-Aug-2020	02-Sep-2020	28 days	10 days	✔	02-Sep-2020	17 days	0 days	✔
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
<b>Glass vial dissolved (hydrochloric acid)</b> BH17-04B	E509	23-Aug-2020	02-Sep-2020	28 days	9 days	✔	02-Sep-2020	18 days	0 days	✔
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> BH17-04B	E421	23-Aug-2020	31-Aug-2020	180 days	8 days	✔	01-Sep-2020	171 days	1 days	✔



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> BH17-05B	E421	23-Aug-2020	31-Aug-2020	180 days	8 days	✓	01-Sep-2020	171 days	1 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> BH17-06B	E421	23-Aug-2020	31-Aug-2020	180 days	8 days	✓	01-Sep-2020	171 days	1 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> BH17-04A	E601A	23-Aug-2020	01-Sep-2020	14 days	9 days	✓	02-Sep-2020	40 days	0 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> BH17-04B	E601A	23-Aug-2020	01-Sep-2020	14 days	9 days	✓	02-Sep-2020	40 days	0 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> BH17-06A	E601A	23-Aug-2020	01-Sep-2020	14 days	9 days	✓	02-Sep-2020	40 days	0 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> BH17-06B	E601A	23-Aug-2020	01-Sep-2020	14 days	9 days	✓	02-Sep-2020	40 days	0 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> BH17-07A	E601A	23-Aug-2020	01-Sep-2020	14 days	9 days	✓	02-Sep-2020	40 days	0 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> BH17-07B	E601A	23-Aug-2020	01-Sep-2020	14 days	9 days	✓	02-Sep-2020	40 days	0 days	✓	
<b>Physical Tests : Acidity by Titration</b>											
<b>HDPE</b> BH17-04B	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	6 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : Acidity by Titration</b>											
HDPE BH17-05B	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	6 days	✓	
<b>Physical Tests : Acidity by Titration</b>											
HDPE BH17-06B	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	6 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE BH17-04B	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE BH17-05B	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	6 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE BH17-06B	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	6 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
HDPE BH17-04B	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
HDPE BH17-05B	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
HDPE BH17-06B	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Physical Tests : pH by Meter</b>											
HDPE BH17-04B	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	140 hrs	* EHTR-FM	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval
<b>Physical Tests : pH by Meter</b>										
HDPE BH17-06B	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	144 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE BH17-05B	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	145 hrs	* EHTR-FM
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE BH17-04B	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE BH17-05B	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE BH17-06B	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE BH17-05B	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	7 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE BH17-04B	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	8 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE BH17-06B	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	8 days	* EHTR
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>										
Amber glass/Teflon lined cap (sodium bisulfate) BH17-04A	E641A	23-Aug-2020	01-Sep-2020	14 days	9 days	✓	02-Sep-2020	40 days	0 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> BH17-04B	E641A	23-Aug-2020	01-Sep-2020	14 days	9 days	✔	02-Sep-2020	40 days	0 days	✔	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> BH17-06A	E641A	23-Aug-2020	01-Sep-2020	14 days	9 days	✔	02-Sep-2020	40 days	0 days	✔	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> BH17-06B	E641A	23-Aug-2020	01-Sep-2020	14 days	9 days	✔	02-Sep-2020	40 days	0 days	✔	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> BH17-07A	E641A	23-Aug-2020	01-Sep-2020	14 days	9 days	✔	02-Sep-2020	40 days	0 days	✔	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> BH17-07B	E641A	23-Aug-2020	01-Sep-2020	14 days	9 days	✔	02-Sep-2020	40 days	0 days	✔	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> BH17-04A	E611A	23-Aug-2020	31-Aug-2020	14 days	7 days	✔	01-Sep-2020	6 days	0 days	✔	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> BH17-06A	E611A	23-Aug-2020	31-Aug-2020	14 days	7 days	✔	01-Sep-2020	6 days	0 days	✔	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> BH17-04B	E611A	23-Aug-2020	31-Aug-2020	14 days	8 days	✔	01-Sep-2020	5 days	0 days	✔	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> BH17-06B	E611A	23-Aug-2020	31-Aug-2020	14 days	8 days	✔	01-Sep-2020	5 days	0 days	✔	





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> BH17-07A	E611A	23-Aug-2020	31-Aug-2020	14 days	8 days	✓	01-Sep-2020	5 days	0 days	✓
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> BH17-07B	E611A	23-Aug-2020	31-Aug-2020	14 days	8 days	✓	01-Sep-2020	5 days	0 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHTR: Exceeded ALS recommended hold time prior to sample receipt.

Rec. HT: ALS recommended hold time (see units).



## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Acidity by Titration	E283	78895	1	16	6.2	5.0	✓
Alkalinity Species by Titration	E290	78897	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	80951	1	14	7.1	5.0	✓
BTEX by Headspace GC-MS	E611A	79341	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	78889	1	7	14.2	5.0	✓
Conductivity in Water	E100	78898	1	7	14.2	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	79472	1	19	5.2	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	80466	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	79473	2	20	10.0	5.0	✓
Fluoride in Water by IC	E235.F	78890	1	7	14.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	78892	1	7	14.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	78893	1	7	14.2	5.0	✓
pH by Meter	E108	78896	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	78894	1	7	14.2	5.0	✓
TDS by Gravimetry	E162	78768	1	20	5.0	5.0	✓
Turbidity by Nephelometry	E121	79259	2	40	5.0	5.0	✓
<b>Laboratory Control Samples (LCS)</b>							
Acidity by Titration	E283	78895	1	16	6.2	5.0	✓
Alkalinity Species by Titration	E290	78897	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	80951	1	14	7.1	5.0	✓
BC PHC - EPH by GC-FID	E601A	79806	1	20	5.0	5.0	✓
BTEX by Headspace GC-MS	E611A	79341	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	78889	1	7	14.2	5.0	✓
Conductivity in Water	E100	78898	1	7	14.2	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	79472	1	19	5.2	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	80466	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	79473	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	78890	1	7	14.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	78892	1	7	14.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	78893	1	7	14.2	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	79807	2	21	9.5	5.0	✓
pH by Meter	E108	78896	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	78894	1	7	14.2	5.0	✓
TDS by Gravimetry	E162	78768	1	20	5.0	5.0	✓
Turbidity by Nephelometry	E121	79259	2	40	5.0	5.0	✓
<b>Method Blanks (MB)</b>							
Acidity by Titration	E283	78895	1	16	6.2	5.0	✓



Matrix: **Water**

Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<i>Analytical Methods</i>							
<b>Method Blanks (MB) - Continued</b>							
Alkalinity Species by Titration	E290	78897	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	80951	1	14	7.1	5.0	✓
BC PHC - EPH by GC-FID	E601A	79806	1	20	5.0	5.0	✓
BTEX by Headspace GC-MS	E611A	79341	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	78889	1	7	14.2	5.0	✓
Conductivity in Water	E100	78898	1	7	14.2	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	79472	1	19	5.2	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	80466	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	79473	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	78890	1	7	14.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	78892	1	7	14.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	78893	1	7	14.2	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	79807	2	21	9.5	5.0	✓
Sulfate in Water by IC	E235.SO4	78894	1	7	14.2	5.0	✓
TDS by Gravimetry	E162	78768	1	20	5.0	5.0	✓
Turbidity by Nephelometry	E121	79259	2	40	5.0	5.0	✓
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	80951	1	14	7.1	5.0	✓
BTEX by Headspace GC-MS	E611A	79341	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	78889	1	7	14.2	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	79472	1	19	5.2	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	80466	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	79473	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	78890	1	7	14.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	78892	1	7	14.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	78893	1	7	14.2	5.0	✓
Sulfate in Water by IC	E235.SO4	78894	1	7	14.2	5.0	✓



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 Vancouver - Environmental	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TDS by Gravimetry	E162 Vancouver - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Acidity by Titration	E283 Vancouver - Environmental	Water	APHA 2310 B (mod)	Acidity is determined by potentiometric titration to a specified endpoint.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L Vancouver - Environmental	Water	APHA 3030 B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS
Dissolved Mercury in Water by CVAAS	E509 Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
BC PHC - EPH by GC-FID	E601A Vancouver - Environmental	Water	BC MOE Lab Manual	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.
BTEX by Headspace GC-MS	E611A Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by Hexane LVI GC-MS	E641A Vancouver - Environmental	Water	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by large volume injection (LVI) GC-MS.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> ), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
LEPH and HEPH: EPH-PAH	EC600A Vancouver - Environmental	Water	BC MOE Lab Manual (LEPH and HEPH) (mod)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Acenaphthene, Acridine, Anthracene, Fluorene, Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(a)pyrene, Fluoranthene, and Pyrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
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<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Dissolved Metals Water Filtration	EP421  Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO <sub>3</sub> .
Dissolved Mercury Water Filtration	EP509  Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
VOCs Preparation for Headspace Analysis	EP581  Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601  Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

## QUALITY CONTROL REPORT

**Work Order** : **VA20B3890**

Page : 1 of 16

**Amendment** : **1**

Client : Wood Canada Ltd.  
 Contact : Jeremiah Gladu  
 Address : 1235 Main Street P.O. Box 2356  
 Smithers BC Canada V0J 2N0  
 Telephone : ----  
 Project : VE52655D  
 PO : ----  
 C-O-C number : ----  
 Sampler : Ardy M.  
 Site : ----  
 Quote number : VA20-SEAB100-0003 - Wood/Seabridge Gold  
 No. of samples received : 7  
 No. of samples analysed : 7

Laboratory : Vancouver - Environmental  
 Account Manager : Selam Worku  
 Address : 8081 Lougheed Highway  
 Burnaby, British Columbia Canada V5A 1W9  
 Telephone : +1 604 253 4188  
 Date Samples Received : 28-Aug-2020 10:10  
 Date Analysis Commenced : 28-Aug-2020  
 Issue Date : 27-Oct-2020 16:09

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

### *Signatories*

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Brianna Allen	Department Manager - Organics	Organics, Burnaby, British Columbia
Bruna Botti	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Clarie Tejano		Metals, Burnaby, British Columbia
Cristina Alexandre	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Harsha Attanayake	Laboratory Analyst	Organics, Burnaby, British Columbia
Kevin Duarte	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics - Water Quality, Burnaby, British Columbia
Shaneel Dayal	Analyst	Metals, Burnaby, British Columbia



## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

# = Indicates a QC result that did not meet the ALS DQO.





### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 78768)</b>											
VA20B3842-021	Anonymous	solids, total dissolved [TDS]	----	E162	13	mg/L	47	48	1	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 78895)</b>											
VA20B3839-003	Anonymous	acidity (as CaCO3)	----	E283	2.0	mg/L	19.0	19.0	0	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 78896)</b>											
VA20B3890-002	BH17-04B	pH	----	E108	0.10	pH units	7.49	7.54	0.665%	4%	----
<b>Physical Tests (QC Lot: 78897)</b>											
VA20B3890-002	BH17-04B	alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	112	112	0.00%	20%	----
		alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	112	112	0.00%	20%	----
<b>Physical Tests (QC Lot: 78898)</b>											
VA20B3890-002	BH17-04B	conductivity	----	E100	2.0	µS/cm	438	443	1.14%	10%	----
<b>Physical Tests (QC Lot: 79259)</b>											
KS2001568-001	Anonymous	turbidity	----	E121	0.10	NTU	0.11	<0.10	0.01	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 79432)</b>											
VA20B3890-002	BH17-04B	turbidity	----	E121	0.10	NTU	0.90	0.91	0.004	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78889)</b>											
VA20B3890-002	BH17-04B	chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78890)</b>											
VA20B3890-002	BH17-04B	fluoride	16984-48-8	E235.F	0.020	mg/L	0.074	0.072	0.002	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78892)</b>											
VA20B3890-002	BH17-04B	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0100	0.0093	0.0008	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78893)</b>											
VA20B3890-002	BH17-04B	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0012	0.0015	0.0003	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78894)</b>											
VA20B3890-002	BH17-04B	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	114	114	0.0216%	20%	----
<b>Anions and Nutrients (QC Lot: 80951)</b>											
VA20B3890-002	BH17-04B	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.105	0.105	0.0477%	20%	----
<b>Dissolved Metals (QC Lot: 79472)</b>											
VA20B3811-001	Anonymous	chromium, dissolved	7440-47-3	E421.Cr-L	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----



Sub-Matrix: **Water**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 79473)</b>											
VA20B3811-001	Anonymous	selenium, dissolved	7782-49-2	E421	0.000250	mg/L	0.000558	0.000508	0.000050	Diff <2x LOR	----
VA20B3811-001	Anonymous	aluminum, dissolved	7429-90-5	E421	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		arsenic, dissolved	7440-38-2	E421	0.00050	mg/L	0.0366	0.0363	0.800%	20%	----
		barium, dissolved	7440-39-3	E421	0.00050	mg/L	0.0270	0.0265	1.83%	20%	----
		beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		bismuth, dissolved	7440-69-9	E421	0.000250	mg/L	<0.000250	<0.000250	0	Diff <2x LOR	----
		boron, dissolved	7440-42-8	E421	0.050	mg/L	0.211	0.209	0.002	Diff <2x LOR	----
		cadmium, dissolved	7440-43-9	E421	0.0000500	mg/L	<0.0000500	<0.0000500	0	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E421	0.250	mg/L	566	552	2.42%	20%	----
		cesium, dissolved	7440-46-2	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		cobalt, dissolved	7440-48-4	E421	0.00050	mg/L	1.93	1.89	2.06%	20%	----
		copper, dissolved	7440-50-8	E421	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E421	0.050	mg/L	1.30	1.34	3.65%	20%	----
		lead, dissolved	7439-92-1	E421	0.000250	mg/L	<0.000250	<0.000250	0	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E421	0.0050	mg/L	0.0135	0.0135	0.000007	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	0.500	mg/L	35.0	34.2	2.14%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00050	mg/L	15.0	15.0	0.0850%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.000250	mg/L	0.105	0.106	0.484%	20%	----
		nickel, dissolved	7440-02-0	E421	0.00250	mg/L	0.0142	0.0142	0.00009	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E421	0.250	mg/L	<0.250	<0.250	0	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	0.500	mg/L	9.37	9.35	0.237%	20%	----
		rubidium, dissolved	7440-17-7	E421	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	0.250	mg/L	10.6	10.8	1.39%	20%	----
		silver, dissolved	7440-22-4	E421	0.000050	mg/L	0.000110	<0.000050	0.000060	Diff <2x LOR	----
		sodium, dissolved	17341-25-2	E421	0.250	mg/L	759	774	1.92%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00100	mg/L	3.06	3.19	4.22%	20%	----
		sulfur, dissolved	7704-34-9	E421	2.50	mg/L	1160	1200	3.30%	20%	----
		tellurium, dissolved	13494-80-9	E421	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		thallium, dissolved	7440-28-0	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		thorium, dissolved	7440-29-1	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		tin, dissolved	7440-31-5	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		titanium, dissolved	7440-32-6	E421	0.00150	mg/L	<0.00150	<0.00150	0	Diff <2x LOR	----
		tungsten, dissolved	7440-33-7	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E421	0.000050	mg/L	0.00311	0.00313	0.406%	20%	----
		vanadium, dissolved	7440-62-2	E421	0.00250	mg/L	<0.00250	<0.00250	0	Diff <2x LOR	----

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 Work Order : VA20B3890 Amendment 1  
 Client : Wood Canada Ltd.  
 Project : VE52655D



Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 79473) - continued</b>											
VA20B3811-001	Anonymous	zinc, dissolved	7440-66-6	E421	0.0050	mg/L	0.0116	0.0120	0.0004	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 80466)</b>											
VA20B3851-006	Anonymous	mercury dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Volatile Organic Compounds (QC Lot: 79341)</b>											
VA20B3890-001	BH17-04A	benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

### Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 78768)</b>						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
<b>Physical Tests (QCLot: 78895)</b>						
acidity (as CaCO3)	----	E283	2	mg/L	2.0	----
<b>Physical Tests (QCLot: 78897)</b>						
alkalinity, bicarbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, carbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, hydroxide (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
<b>Physical Tests (QCLot: 78898)</b>						
conductivity	----	E100	1	µS/cm	<1.0	----
<b>Physical Tests (QCLot: 79259)</b>						
turbidity	----	E121	0.1	NTU	<0.10	----
<b>Physical Tests (QCLot: 79432)</b>						
turbidity	----	E121	0.1	NTU	<0.10	----
<b>Anions and Nutrients (QCLot: 78889)</b>						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
<b>Anions and Nutrients (QCLot: 78890)</b>						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
<b>Anions and Nutrients (QCLot: 78892)</b>						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 78893)</b>						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 78894)</b>						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
<b>Anions and Nutrients (QCLot: 80951)</b>						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
<b>Dissolved Metals (QCLot: 79472)</b>						
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	<0.00010	----
<b>Dissolved Metals (QCLot: 79473)</b>						
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 79473) - continued</b>						
barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	---
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	---
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	---
boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	---
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	---
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	---
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	---
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	---
copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	---
iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	---
lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	---
lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	---
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	---
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	---
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	---
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	---
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	---
potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	---
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	---
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	---
silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	---
silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	---
sodium, dissolved	17341-25-2	E421	0.05	mg/L	<0.050	---
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	---
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	---
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	---
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	---
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	---
tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	---
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	---
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	---
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	---
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	---
zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	---
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	---
<b>Dissolved Metals (QCLot: 80466)</b>						



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 80466) - continued</b>						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	---
<b>Volatile Organic Compounds (QCLot: 79341)</b>						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	---
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	---
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	---
styrene	100-42-5	E611A	0.5	µg/L	<0.50	---
toluene	108-88-3	E611A	0.5	µg/L	<0.50	---
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	<0.50	---
xylene, o-	95-47-6	E611A	0.5	µg/L	<0.50	---
<b>Hydrocarbons (QCLot: 79806)</b>						
EPH (C10-C19)	---	E601A	250	µg/L	<250	---
EPH (C19-C32)	---	E601A	250	µg/L	<250	---
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 79807)</b>						
acenaphthene	83-32-9	E641A	0.01	µg/L	<0.010	---
acenaphthylene	208-96-8	E641A	0.01	µg/L	<0.010	---
acridine	260-94-6	E641A	0.01	µg/L	<0.010	---
anthracene	120-12-7	E641A	0.01	µg/L	<0.010	---
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	<0.010	---
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	---
benzo(b+j)fluoranthene	---	E641A	0.01	µg/L	<0.010	---
benzo(b+j+k)fluoranthene	---	E641A	0.015	µg/L	<0.015	---
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	<0.010	---
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	<0.010	---
chrysene	218-01-9	E641A	0.01	µg/L	<0.010	---
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	<0.0050	---
fluoranthene	206-44-0	E641A	0.01	µg/L	<0.010	---
fluorene	86-73-7	E641A	0.01	µg/L	<0.010	---
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	<0.010	---
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	<0.010	---
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	<0.010	---
naphthalene	91-20-3	E641A	0.05	µg/L	<0.050	---
phenanthrene	85-01-8	E641A	0.02	µg/L	<0.020	---
pyrene	129-00-0	E641A	0.01	µg/L	<0.010	---
quinoline	6027-02-7	E641A	0.05	µg/L	<0.050	---
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 82054)</b>						
acenaphthene	83-32-9	E641A	0.01	µg/L	<0.010	---



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 82054) - continued</b>						
acenaphthylene	208-96-8	E641A	0.01	µg/L	<0.010	---
acridine	260-94-6	E641A	0.01	µg/L	<0.010	---
anthracene	120-12-7	E641A	0.01	µg/L	<0.010	---
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	<0.010	---
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	---
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	<0.010	---
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	---
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	<0.010	---
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	<0.010	---
chrysene	218-01-9	E641A	0.01	µg/L	<0.010	---
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	<0.0050	---
fluoranthene	206-44-0	E641A	0.01	µg/L	<0.010	---
fluorene	86-73-7	E641A	0.01	µg/L	<0.010	---
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	<0.010	---
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	<0.010	---
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	<0.010	---
naphthalene	91-20-3	E641A	0.05	µg/L	<0.050	---
phenanthrene	85-01-8	E641A	0.02	µg/L	<0.020	---
pyrene	129-00-0	E641A	0.01	µg/L	<0.010	---
quinoline	6027-02-7	E641A	0.05	µg/L	<0.050	---



## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Physical Tests (QCLot: 78768)</b>									
solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	102	85.0	115	----
<b>Physical Tests (QCLot: 78895)</b>									
acidity (as CaCO3)	----	E283	2	mg/L	50 mg/L	102	85.0	115	----
<b>Physical Tests (QCLot: 78896)</b>									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
<b>Physical Tests (QCLot: 78897)</b>									
alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	229 mg/L	97.2	75.0	125	----
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	113	85.0	115	----
<b>Physical Tests (QCLot: 78898)</b>									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	102	90.0	110	----
<b>Physical Tests (QCLot: 79259)</b>									
turbidity	----	E121	0.1	NTU	200 NTU	97.5	85.0	115	----
<b>Physical Tests (QCLot: 79432)</b>									
turbidity	----	E121	0.1	NTU	200 NTU	102	85.0	115	----
<b>Anions and Nutrients (QCLot: 78889)</b>									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	95.0	90.0	110	----
<b>Anions and Nutrients (QCLot: 78890)</b>									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	95.1	90.0	110	----
<b>Anions and Nutrients (QCLot: 78892)</b>									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	95.1	90.0	110	----
<b>Anions and Nutrients (QCLot: 78893)</b>									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	95.6	90.0	110	----
<b>Anions and Nutrients (QCLot: 78894)</b>									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	96.0	90.0	110	----
<b>Anions and Nutrients (QCLot: 80951)</b>									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.12 mg/L	105	85.0	115	----
<b>Dissolved Metals (QCLot: 79472)</b>									
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	0.25 mg/L	99.5	80.0	120	----
<b>Dissolved Metals (QCLot: 79473)</b>									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	103	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	96.4	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	98.0	80.0	120	----





Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 79473) - continued</b>									
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	106	80.0	120	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	101	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	98.9	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	97.6	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	98.8	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	103	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	101	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	101	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	99.8	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	98.6	80.0	120	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	101	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	104	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	97.9	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	101	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	99.6	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	98.8	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	102	70.0	130	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	99.7	80.0	120	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	99.7	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	97.5	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	106	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	102	80.0	120	----
sodium, dissolved	17341-25-2	E421	0.05	mg/L	50 mg/L	98.8	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	104	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	107	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	106	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	99.2	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	93.1	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	100	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	90.7	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	95.1	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	97.2	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	100	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	104	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	97.8	80.0	120	----
<b>Dissolved Metals (QCLot: 80466)</b>									
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	87.7	80.0	120	----



Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 79341)</b>									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	95.1	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	90.2	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	110	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	90.4	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	93.9	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	200 µg/L	93.8	70.0	130	----
xylene, o-	95-47-6	E611A	0.5	µg/L	100 µg/L	92.4	70.0	130	----
<b>Hydrocarbons (QCLot: 79806)</b>									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	109	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	104	70.0	130	----
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 79807)</b>									
acenaphthene	83-32-9	E641A	0.01	µg/L	0.5 µg/L	107	60.0	130	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5 µg/L	108	60.0	130	----
acridine	260-94-6	E641A	0.01	µg/L	0.5 µg/L	93.0	60.0	130	----
anthracene	120-12-7	E641A	0.01	µg/L	0.5 µg/L	103	60.0	130	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5 µg/L	102	60.0	130	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5 µg/L	105	60.0	130	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	0.5 µg/L	105	60.0	130	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	1 µg/L	111	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5 µg/L	107	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5 µg/L	116	60.0	130	----
chrysene	218-01-9	E641A	0.01	µg/L	0.5 µg/L	111	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	0.5 µg/L	110	60.0	130	----
fluoranthene	206-44-0	E641A	0.01	µg/L	0.5 µg/L	105	60.0	130	----
fluorene	86-73-7	E641A	0.01	µg/L	0.5 µg/L	97.1	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5 µg/L	109	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5 µg/L	108	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	0.5 µg/L	103	60.0	130	----
naphthalene	91-20-3	E641A	0.05	µg/L	0.5 µg/L	101	50.0	130	----
phenanthrene	85-01-8	E641A	0.02	µg/L	0.5 µg/L	101	60.0	130	----
pyrene	129-00-0	E641A	0.01	µg/L	0.5 µg/L	109	60.0	130	----
quinoline	6027-02-7	E641A	0.05	µg/L	0.5 µg/L	111	60.0	130	----
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 82054)</b>									
acenaphthene	83-32-9	E641A	0.01	µg/L	0.5 µg/L	106	60.0	130	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5 µg/L	111	60.0	130	----
acridine	260-94-6	E641A	0.01	µg/L	0.5 µg/L	113	60.0	130	----



Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 82054) - continued</b>									
anthracene	120-12-7	E641A	0.01	µg/L	0.5 µg/L	117	60.0	130	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5 µg/L	120	60.0	130	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5 µg/L	117	60.0	130	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	0.5 µg/L	118	60.0	130	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	1 µg/L	122	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5 µg/L	107	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5 µg/L	126	60.0	130	----
chrysene	218-01-9	E641A	0.01	µg/L	0.5 µg/L	114	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	0.5 µg/L	107	60.0	130	----
fluoranthene	206-44-0	E641A	0.01	µg/L	0.5 µg/L	112	60.0	130	----
fluorene	86-73-7	E641A	0.01	µg/L	0.5 µg/L	101	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5 µg/L	120	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5 µg/L	104	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	0.5 µg/L	99.3	60.0	130	----
naphthalene	91-20-3	E641A	0.05	µg/L	0.5 µg/L	99.1	50.0	130	----
phenanthrene	85-01-8	E641A	0.02	µg/L	0.5 µg/L	110	60.0	130	----
pyrene	129-00-0	E641A	0.01	µg/L	0.5 µg/L	117	60.0	130	----
quinoline	6027-02-7	E641A	0.05	µg/L	0.5 µg/L	119	60.0	130	----



### Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 78889)</b>										
VA20B3890-003	BH17-05B	chloride	16887-00-6	E235.Cl	520 mg/L	500 mg/L	104	75 0	125	----
<b>Anions and Nutrients (QCLot: 78890)</b>										
VA20B3890-003	BH17-05B	fluoride	16984-48-8	E235 F	5.33 mg/L	5 mg/L	107	75 0	125	----
<b>Anions and Nutrients (QCLot: 78892)</b>										
VA20B3890-003	BH17-05B	nitrate (as N)	14797-55-8	E235 NO3-L	13.0 mg/L	12.5 mg/L	104	75 0	125	----
<b>Anions and Nutrients (QCLot: 78893)</b>										
VA20B3890-003	BH17-05B	nitrite (as N)	14797-65-0	E235 NO2-L	2.61 mg/L	2.5 mg/L	104	75 0	125	----
<b>Anions and Nutrients (QCLot: 78894)</b>										
VA20B3890-003	BH17-05B	sulfate (as SO4)	14808-79-8	E235.SO4	536 mg/L	500 mg/L	107	75 0	125	----
<b>Anions and Nutrients (QCLot: 80951)</b>										
VA20B3890-003	BH17-05B	ammonia, total (as N)	7664-41-7	E298	0.209 mg/L	0.2 mg/L	104	75 0	125	----
<b>Dissolved Metals (QCLot: 79472)</b>										
VA20B3811-002	Anonymous	chromium, dissolved	7440-47-3	E421.Cr-L	0.197 mg/L	0.2 mg/L	98.7	70 0	130	----
<b>Dissolved Metals (QCLot: 79473)</b>										
VA20B3811-002	Anonymous	aluminum, dissolved	7429-90-5	E421	1.01 mg/L	1 mg/L	101	70 0	130	----
		antimony, dissolved	7440-36-0	E421	0.100 mg/L	0.1 mg/L	100	70 0	130	----
		arsenic, dissolved	7440-38-2	E421	0.102 mg/L	0.1 mg/L	102	70 0	130	----
		barium, dissolved	7440-39-3	E421	0 0990 mg/L	0.1 mg/L	99.0	70 0	130	----
		beryllium, dissolved	7440-41-7	E421	0.201 mg/L	0.2 mg/L	100	70 0	130	----
		bismuth, dissolved	7440-69-9	E421	0 0443 mg/L	0.05 mg/L	88.6	70 0	130	----
		boron, dissolved	7440-42-8	E421	0.466 mg/L	0.5 mg/L	93.3	70 0	130	----
		cadmium, dissolved	7440-43-9	E421	0 0190 mg/L	0.02 mg/L	95.2	70 0	130	----
		calcium, dissolved	7440-70-2	E421	ND mg/L	20 mg/L	ND	70 0	130	----
		cesium, dissolved	7440-46-2	E421	0 0494 mg/L	0.05 mg/L	98.7	70 0	130	----
		cobalt, dissolved	7440-48-4	E421	ND mg/L	0.1 mg/L	ND	70 0	130	----
		copper, dissolved	7440-50-8	E421	0 0915 mg/L	0.1 mg/L	91.5	70 0	130	----
		iron, dissolved	7439-89-6	E421	9.19 mg/L	10 mg/L	91.9	70 0	130	----
		lead, dissolved	7439-92-1	E421	0 0909 mg/L	0.1 mg/L	90.9	70 0	130	----
		lithium, dissolved	7439-93-2	E421	0.530 mg/L	0.5 mg/L	106	70 0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 79473) - continued</b>										
VA20B3811-002	Anonymous	magnesium, dissolved	7439-95-4	E421	ND mg/L	5 mg/L	ND	70.0	130	----
		manganese, dissolved	7439-96-5	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.183 mg/L	0.2 mg/L	91.4	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	54.0 mg/L	50 mg/L	108	70.0	130	----
		potassium, dissolved	7440-09-7	E421	20.6 mg/L	20 mg/L	103	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.101 mg/L	0.1 mg/L	101	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.200 mg/L	0.2 mg/L	100	70.0	130	----
		silicon, dissolved	7440-21-3	E421	46.7 mg/L	50 mg/L	93.4	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.0188 mg/L	0.02 mg/L	93.8	70.0	130	----
		sodium, dissolved	17341-25-2	E421	ND mg/L	10 mg/L	ND	70.0	130	----
		strontium, dissolved	7440-24-6	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		sulfur, dissolved	7704-34-9	E421	ND mg/L	100 mg/L	ND	70.0	130	----
		tellurium, dissolved	13494-80-9	E421	0.203 mg/L	0.2 mg/L	102	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.0178 mg/L	0.02 mg/L	88.9	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0994 mg/L	0.1 mg/L	99.4	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.100 mg/L	0.1 mg/L	100	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.202 mg/L	0.2 mg/L	101	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0961 mg/L	0.1 mg/L	96.1	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.0191 mg/L	0.02 mg/L	95.6	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.519 mg/L	0.5 mg/L	104	70.0	130	----
		zinc, dissolved	7440-66-6	E421	1.85 mg/L	2 mg/L	92.7	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.214 mg/L	0.2 mg/L	107	70.0	130	----
<b>Dissolved Metals (QCLot: 80466)</b>										
VA20B3851-007	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000993 mg/L	0.0001 mg/L	99.3	70.0	130	----
<b>Volatile Organic Compounds (QCLot: 79341)</b>										
VA20B3890-002	BH17-04B	benzene	71-43-2	E611A	94.4 µg/L	100 µg/L	94.4	60.0	140	----
		ethylbenzene	100-41-4	E611A	89.3 µg/L	100 µg/L	89.3	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	111 µg/L	100 µg/L	111	60.0	140	----
		styrene	100-42-5	E611A	89.6 µg/L	100 µg/L	89.6	60.0	140	----
		toluene	108-88-3	E611A	92.9 µg/L	100 µg/L	92.9	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	185 µg/L	200 µg/L	92.7	60.0	140	----
		xylene, o-	95-47-6	E611A	92.1 µg/L	100 µg/L	92.1	60.0	140	----

Page : 16 of 16  
Work Order : VA20B3890 Amendment 1  
Client : Wood Canada Ltd.  
Project : VE52655D

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# Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

### Affix ALS barcode label here

(lab use only)

COC Number: 17 -

Page 1 of 1

<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>			<b>Select Service Level Below - Contact your AM to confirm all E&amp;P TATs (surcharges may apply)</b>																																																																																																									
Company: Wood.		Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)			Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply																																																																																																									
Contact: Jeremiah Gladu		Quality Control (QC) Report with Report <input type="checkbox"/> YES <input type="checkbox"/> NO			4 day [P4-20%] <input type="checkbox"/>		EMERGENCY 1 Business day [E - 100%] <input type="checkbox"/>																																																																																																							
Phone:		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked			3 day [P3-25%] <input type="checkbox"/>		Same Day, Weekend or Statutory holiday [E2 -200%] <input type="checkbox"/>																																																																																																							
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			2 day [P2-60%] <input type="checkbox"/>		(Laboratory opening fees may apply)																																																																																																							
Street: 4445 Lougheed Hwy.		Email 1 or Fax: jeremiah.gladu@woodplc.com			Date and Time Required for all E&P TATs:			dd-mmm-yy hh:mm																																																																																																						
City/Province: Burnaby/BC		Email 2			For tests that can not be performed according to the service level selected, you will be contacted.																																																																																																									
Postal Code: V5C 0E4		Email 3			<b>Analysis Request</b>																																																																																																									
<b>Invoice To</b>		<b>Invoice Distribution</b>			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below																																																																																																									
Same as Report To <input type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution: <input type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX																																																																																																												
Copy of Invoice with Report <input type="checkbox"/> YES <input type="checkbox"/> NO		Email 1 or Fax			<table border="1"> <tr> <th rowspan="10">NUMBER OF CONTAINERS</th> <th>BTEX/EPH</th> <th>PAH</th> <th>General chemistry *</th> <th>DISSOLVED METALS</th> <th colspan="5"></th> </tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>						NUMBER OF CONTAINERS	BTEX/EPH	PAH	General chemistry *	DISSOLVED METALS																																																																																															
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ALS Account # / Quote #:		AFE/Cost Center:		PO#																																																																																																										
Job #: VE52655D		Major/Minor Code:		Routing Code:																																																																																																										
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LSD:		Location:																																																																																																												
ALS Lab Work Order # (lab use only): 3890		ALS Contact: Selam Worku		Sampler: Ardy M.																																																																																																										
<b>ALS Sample # (lab use only)</b>		<b>Sample Identification and/or Coordinates</b> (This description will appear on the report)		<b>Date</b> (dd-mmm-yy)	<b>Time</b> (hh:mm)	<b>Sample Type</b>																																																																																																								
1	BH17-04A		23-Aug-20	16:30	GW	R	R																																																																																																							
2	BH17-04B		23-Aug-20	14:30	GW	R	R	R	R																																																																																																					
3	BH17-05B		23-Aug-20	10:00	GW			R	R																																																																																																					
4	BH17-06A		23-Aug-20	16:24	GW	R	R																																																																																																							
5	BH17-06B		23-Aug-20	11:00	GW	R	R	R	R																																																																																																					
6	BH17-07A		23-Aug-20	13:35	GW	R	R																																																																																																							
7	BH17-07B		23-Aug-20	13:00	GW	R	R																																																																																																							
<b>Drinking Water (DW) Samples<sup>1</sup> (client use)</b>		<b>Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)</b>			<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>																																																																																																									
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO		*GENERAL WATER CHEMISTRY TO INCLUDE: pH, Alkalinity, bicarbonate, carbonate, chloride, conductivity, fluoride, hardness, hydroxide, nitrate, nitrite, ammonia, sulphate, turbidity, TDS, acidity.			Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>																																																																																																									
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO					Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>																																																																																																									
					Cooling Initiated <input type="checkbox"/>																																																																																																									
					INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C																																																																																																						
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<b>SHIPMENT RELEASE (client use)</b>		<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>			<b>FINAL SHIPMENT RECEPTION (lab use only)</b>																																																																																																									
Released by: Andy Mansourpour		Date: Aug 26 20	Time:	Received by: [Signature]	Date:	Time:	Received by: cm	Date: 28 Aug. 20 20	Time: 10:10 am																																																																																																					

Environmental Division  
Vancouver  
Work Order Reference  
**VA20B3890**

Telephone : +1 604 253 4188

**SAMPLES ON HOLD**

SUSPECTED HAZARD (see Special Instructions)



**CERTIFICATE OF ANALYSIS**

**Work Order** : **VA20B3891**  
**Amendment** : **2**  
**Client** : **Wood Canada Ltd.**  
**Contact** : Jeremiah Gladu  
**Address** : 600 - 4445 Lougheed Hwy  
Burnaby BC Canada V5C 0E4  
**Telephone** : 604 294 3811  
**Project** : VE52655D  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : Ardy M.  
**Site** : ----  
**Quote number** : VA20-SEAB100-0003 - Wood/Seabridge Gold  
**No. of samples received** : 9  
**No. of samples analysed** : 8

**Page** : 1 of 11  
**Laboratory** : Vancouver - Environmental  
**Account Manager** : Selam Worku  
**Address** : 8081 Lougheed Highway  
Burnaby BC Canada V5A 1W9  
**Telephone** : +1 604 253 4188  
**Date Samples Received** : 28-Aug-2020 10:10  
**Date Analysis Commenced** : 29-Aug-2020  
**Issue Date** : 27-Oct-2020 16:09

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

**Signatories**

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Brianna Allen	Department Manager - Organics	Organics, Burnaby, British Columbia
Bruna Botti	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Clarie Tejano		Metals, Burnaby, British Columbia
Cristina Alexandre	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Harsha Attanayake	Laboratory Analyst	Organics, Burnaby, British Columbia
Kevin Duarte	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics - Water Quality, Burnaby, British Columbia
Ophelia Chiu	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Shaneel Dayal	Analyst	Metals, Burnaby, British Columbia







## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
-	No Unit
µg/L	micrograms per litre
µS/cm	Microsiemens per centimetre
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in reports identified as "Preliminary Report" are considered authorized for use.

## Workorder Comments

Sample "BH17-17A" VOC vials received broken in Transit.

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLCI	Detection Limit Raised: Chromatographic interference due to co-elution.
RRV	Reported result verified by repeat analysis.



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					BH17-12A	BH17-12B	BH17-17A	BH17-24A	BH17-24B
Client sampling date / time					24-Aug-2020 11:05	24-Aug-2020 09:43	24-Aug-2020 13:00	24-Aug-2020 15:00	24-Aug-2020 14:40
Analyte	CAS Number	Method	LOR	Unit	VA20B3891-001	VA20B3891-002	VA20B3891-003	VA20B3891-005	VA20B3891-006
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
acidity (as CaCO3)	----	E283	2.0	mg/L	----	----	----	<2.0	2.7
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	----	----	----	176	12.2
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	----	----	----	<1.0	<1.0
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	----	----	----	<1.0	<1.0
alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L	----	----	----	<1.0	<1.0
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	----	----	----	176	12.2
conductivity	----	E100	2.0	µS/cm	----	----	----	313	26.3
pH	----	E108	0.10	pH units	----	----	----	7.79	6.41
solids, total dissolved [TDS]	----	E162	10	mg/L	----	----	----	172	18
turbidity	----	E121	0.10	NTU	----	----	----	7.00	0.69
hardness (as CaCO3), dissolved	----	EC100	600	µg/L	----	----	----	133000	10900
<b>Anions and Nutrients</b>									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	----	----	----	0.0266	<0.0050
chloride	16887-00-6	E235.Cl	0.50	mg/L	----	----	----	<0.50	<0.50
fluoride	16984-48-8	E235.F	0.020	mg/L	----	----	----	0.466	0.027
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	----	----	----	<0.0050	0.0066
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	----	----	----	<0.0010	<0.0010
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	----	----	----	24.4	1.11
<b>Dissolved Metals</b>									
aluminum, dissolved	7429-90-5	E421	1.0	µg/L	----	----	----	1.2	<1.0
antimony, dissolved	7440-36-0	E421	0.10	µg/L	----	----	----	0.24	<0.10
arsenic, dissolved	7440-38-2	E421	0.10	µg/L	----	----	----	3.51	0.40
barium, dissolved	7440-39-3	E421	0.10	µg/L	----	----	----	42.5	4.34
beryllium, dissolved	7440-41-7	E421	0.100	µg/L	----	----	----	<0.100	<0.100
bismuth, dissolved	7440-69-9	E421	0.050	µg/L	----	----	----	<0.050	<0.050
boron, dissolved	7440-42-8	E421	10	µg/L	----	----	----	<10	<10
cadmium, dissolved	7440-43-9	E421	0.0050	µg/L	----	----	----	<0.0050	0.120
calcium, dissolved	7440-70-2	E421	50	µg/L	----	----	----	37600	3500
cesium, dissolved	7440-46-2	E421	0.010	µg/L	----	----	----	0.016	<0.010
chromium, dissolved	7440-47-3	E421.Cr-L	0.10	µg/L	----	----	----	<0.10	<0.10



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					BH17-12A	BH17-12B	BH17-17A	BH17-24A	BH17-24B
Client sampling date / time					24-Aug-2020 11:05	24-Aug-2020 09:43	24-Aug-2020 13:00	24-Aug-2020 15:00	24-Aug-2020 14:40
Analyte	CAS Number	Method	LOR	Unit	VA20B3891-001	VA20B3891-002	VA20B3891-003	VA20B3891-005	VA20B3891-006
					Result	Result	Result	Result	Result
<b>Dissolved Metals</b>									
cobalt, dissolved	7440-48-4	E421	0.10	µg/L	----	----	----	<0.10	<0.10
copper, dissolved	7440-50-8	E421	0.20	µg/L	----	----	----	<0.20	0.27
iron, dissolved	7439-89-6	E421	10	µg/L	----	----	----	61	<10
lead, dissolved	7439-92-1	E421	0.050	µg/L	----	----	----	<0.050	<0.050
lithium, dissolved	7439-93-2	E421	1.0	µg/L	----	----	----	8.4	<1.0
magnesium, dissolved	7439-95-4	E421	5.0	µg/L	----	----	----	9490	520
manganese, dissolved	7439-96-5	E421	0.10	µg/L	----	----	----	93.6	0.50
mercury, dissolved	7439-97-6	E509	0.0050	µg/L	----	----	----	<0.0050	<0.0050
molybdenum, dissolved	7439-98-7	E421	0.050	µg/L	----	----	----	3.03	0.069
nickel, dissolved	7440-02-0	E421	0.50	µg/L	----	----	----	<0.50	<0.50
phosphorus, dissolved	7723-14-0	E421	50	µg/L	----	----	----	<50	<50
potassium, dissolved	7440-09-7	E421	50	µg/L	----	----	----	2610	181
rubidium, dissolved	7440-17-7	E421	0.20	µg/L	----	----	----	3.41	0.35
selenium, dissolved	7782-49-2	E421	0.050	µg/L	----	----	----	<0.050	0.285
silicon, dissolved	7440-21-3	E421	50	µg/L	----	----	----	7460	1930
silver, dissolved	7440-22-4	E421	0.010	µg/L	----	----	----	<0.010	<0.010
sodium, dissolved	17341-25-2	E421	50	µg/L	----	----	----	12200	492
strontium, dissolved	7440-24-6	E421	0.20	µg/L	----	----	----	511	20.9
sulfur, dissolved	7704-34-9	E421	500	µg/L	----	----	----	8490	<500
tellurium, dissolved	13494-80-9	E421	0.20	µg/L	----	----	----	<0.20	<0.20
thallium, dissolved	7440-28-0	E421	0.010	µg/L	----	----	----	<0.010	<0.010
thorium, dissolved	7440-29-1	E421	0.10	µg/L	----	----	----	<0.10	<0.10
tin, dissolved	7440-31-5	E421	0.10	µg/L	----	----	----	<0.10	<0.10
titanium, dissolved	7440-32-6	E421	0.30	µg/L	----	----	----	<0.30	<0.30
tungsten, dissolved	7440-33-7	E421	0.10	µg/L	----	----	----	<0.10	<0.10
uranium, dissolved	7440-61-1	E421	0.010	µg/L	----	----	----	0.060	<0.010
vanadium, dissolved	7440-62-2	E421	0.50	µg/L	----	----	----	<0.50	<0.50
zinc, dissolved	7440-66-6	E421	1.0	µg/L	----	----	----	<1.0	7.0
zirconium, dissolved	7440-67-7	E421	0.20	µg/L	----	----	----	<0.20	<0.20
dissolved mercury filtration location	----	EP509	-	-	----	----	----	Field	Field
dissolved metals filtration location	----	EP421	-	-	----	----	----	Field	Field



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					BH17-12A	BH17-12B	BH17-17A	BH17-24A	BH17-24B
Client sampling date / time					24-Aug-2020 11:05	24-Aug-2020 09:43	24-Aug-2020 13:00	24-Aug-2020 15:00	24-Aug-2020 14:40
Analyte	CAS Number	Method	LOR	Unit	VA20B3891-001	VA20B3891-002	VA20B3891-003	VA20B3891-005	VA20B3891-006
					Result	Result	Result	Result	Result
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>									
benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	<0.50	----	----
ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	<0.50	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	<0.50	----	----
styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	<0.50	----	----
toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	<0.50	----	----
xylene, m+p-	179601-23-1	E611A	0.50	µg/L	<0.50	<0.50	<0.50	----	----
xylene, o-	95-47-6	E611A	0.50	µg/L	<0.50	<0.50	<0.50	----	----
xylenes, total	1330-20-7	E611A	0.75	µg/L	<0.75	<0.75	<0.75	----	----
BTEX, total	----	E611A	1.2	µg/L	<1.2	<1.2	----	----	----
<b>Volatile Organic Compounds Surrogates</b>									
bromofluorobenzene, 4-	460-00-4	E611A	0.50	%	92.8	92.7	99.4	----	----
difluorobenzene, 1,4-	540-36-3	E611A	0.50	%	118	115	105	----	----
<b>Hydrocarbons</b>									
EPH (C10-C19)	----	E601A	250	µg/L	530	<250	<250	----	----
EPH (C19-C32)	----	E601A	250	µg/L	280	<250	<250	----	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	----	----	<100	----	----
HEPHw	----	EC600A	250	µg/L	280	<250	<250	----	----
LEPHw	----	EC600A	250	µg/L	530	<250	<250	----	----
VPHw	----	EC580A	100	µg/L	----	----	<100	----	----
<b>Hydrocarbons Surrogates</b>									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%	93.0	91.2	88.5	----	----
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	----	----	99.5	----	----
<b>Polycyclic Aromatic Hydrocarbons</b>									
acenaphthene	83-32-9	E641A	0.010	µg/L	<0.010	0.011	<0.012 <sup>DLCI</sup>	----	----
acenaphthylene	208-96-8	E641A	0.010	µg/L	0.011	<0.010	<0.010	----	----
acridine	260-94-6	E641A	0.010	µg/L	0.025	<0.010	<0.017 <sup>DLCI</sup>	----	----
anthracene	120-12-7	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	<0.0050	<0.0050	<0.0050	----	----
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	<0.015	<0.015	----	----



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					BH17-12A	BH17-12B	BH17-17A	BH17-24A	BH17-24B
Client sampling date / time					24-Aug-2020 11:05	24-Aug-2020 09:43	24-Aug-2020 13:00	24-Aug-2020 15:00	24-Aug-2020 14:40
Analyte	CAS Number	Method	LOR	Unit	VA20B3891-001	VA20B3891-002	VA20B3891-003	VA20B3891-005	VA20B3891-006
					Result	Result	Result	Result	Result
<b>Polycyclic Aromatic Hydrocarbons</b>									
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----
chrysene	218-01-9	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	<0.0050	<0.0050	<0.0050	----	----
fluoranthene	206-44-0	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----
fluorene	86-73-7	E641A	0.010	µg/L	<0.010	<0.010	0.014	----	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	0.024	0.026	0.116	----	----
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	0.040	<0.010	0.124	----	----
naphthalene	91-20-3	E641A	0.050	µg/L	<0.050	<0.050	<0.050	----	----
phenanthrene	85-01-8	E641A	0.020	µg/L	<0.020	<0.020	<0.020	----	----
pyrene	129-00-0	E641A	0.010	µg/L	0.035	<0.010	<0.010	----	----
quinoline	6027-02-7	E641A	0.050	µg/L	<0.050	<0.050	<0.050	----	----
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>									
acridine-d9	34749-75-2	E641A	0.010	%	109	23.0 <sup>RRV</sup>	89.5	----	----
chrysene-d12	1719-03-5	E641A	0.010	%	121	101	104	----	----
naphthalene-d8	1146-65-2	E641A	0.010	%	105	95.3	105	----	----
phenanthrene-d10	1517-22-2	E641A	0.010	%	109	102	102	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

					BH17-11A	BH17-11B	BH17-62B	----	----
					24-Aug-2020 16:30	24-Aug-2020 16:30	24-Aug-2020 11:05	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B3891-007	VA20B3891-008	VA20B3891-009	-----	-----
					Result	Result	Result	---	---
<b>Physical Tests</b>									
acidity (as CaCO3)	---	E283	2.0	mg/L	<2.0	<2.0	---	---	---
alkalinity, bicarbonate (as CaCO3)	---	E290	1.0	mg/L	111	100	---	---	---
alkalinity, carbonate (as CaCO3)	---	E290	1.0	mg/L	<1.0	<1.0	---	---	---
alkalinity, hydroxide (as CaCO3)	---	E290	1.0	mg/L	<1.0	<1.0	---	---	---
alkalinity, phenolphthalein (as CaCO3)	---	E290	1.0	mg/L	<1.0	<1.0	---	---	---
alkalinity, total (as CaCO3)	---	E290	1.0	mg/L	111	100	---	---	---
conductivity	---	E100	2.0	µS/cm	250	223	---	---	---
pH	---	E108	0.10	pH units	7.62	7.67	---	---	---
solids, total dissolved [TDS]	---	E162	10	mg/L	146	138	---	---	---
turbidity	---	E121	0.10	NTU	0.21	99.3	---	---	---
hardness (as CaCO3), dissolved	---	EC100	600	µg/L	103000	95000	---	---	---
<b>Anions and Nutrients</b>									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	0.0118	---	---	---
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	---	---	---
fluoride	16984-48-8	E235.F	0.020	mg/L	0.332	0.161	---	---	---
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0050	---	---	---
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	---	---	---
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	22.3	16.2	---	---	---
<b>Dissolved Metals</b>									
aluminum, dissolved	7429-90-5	E421	1.0	µg/L	<1.0	3.4	---	---	---
antimony, dissolved	7440-36-0	E421	0.10	µg/L	<0.10	<0.10	---	---	---
arsenic, dissolved	7440-38-2	E421	0.10	µg/L	0.19	1.87	---	---	---
barium, dissolved	7440-39-3	E421	0.10	µg/L	39.4	45.8	---	---	---
beryllium, dissolved	7440-41-7	E421	0.100	µg/L	<0.100	<0.100	---	---	---
bismuth, dissolved	7440-69-9	E421	0.050	µg/L	<0.050	<0.050	---	---	---
boron, dissolved	7440-42-8	E421	10	µg/L	<10	<10	---	---	---
cadmium, dissolved	7440-43-9	E421	0.0050	µg/L	0.0346	<0.0050	---	---	---
calcium, dissolved	7440-70-2	E421	50	µg/L	34300	32300	---	---	---
cesium, dissolved	7440-46-2	E421	0.010	µg/L	<0.010	<0.010	---	---	---
chromium, dissolved	7440-47-3	E421.Cr-L	0.10	µg/L	<0.10	<0.10	---	---	---
cobalt, dissolved	7440-48-4	E421	0.10	µg/L	<0.10	<0.10	---	---	---



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					BH17-11A	BH17-11B	BH17-62B	----	----
Client sampling date / time					24-Aug-2020 16:30	24-Aug-2020 16:30	24-Aug-2020 11:05	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B3891-007	VA20B3891-008	VA20B3891-009	-----	-----
					Result	Result	Result	---	---
<b>Dissolved Metals</b>									
copper, dissolved	7440-50-8	E421	0.20	µg/L	<0.20	<0.20	----	----	----
iron, dissolved	7439-89-6	E421	10	µg/L	<10	106	----	----	----
lead, dissolved	7439-92-1	E421	0.050	µg/L	<0.050	<0.050	----	----	----
lithium, dissolved	7439-93-2	E421	1.0	µg/L	2.5	1.9	----	----	----
magnesium, dissolved	7439-95-4	E421	5.0	µg/L	4280	3490	----	----	----
manganese, dissolved	7439-96-5	E421	0.10	µg/L	217	389	----	----	----
mercury, dissolved	7439-97-6	E509	0.0050	µg/L	<0.0050	<0.0050	----	----	----
molybdenum, dissolved	7439-98-7	E421	0.050	µg/L	7.98	8.37	----	----	----
nickel, dissolved	7440-02-0	E421	0.50	µg/L	<0.50	<0.50	----	----	----
phosphorus, dissolved	7723-14-0	E421	50	µg/L	<50	<50	----	----	----
potassium, dissolved	7440-09-7	E421	50	µg/L	2240	2990	----	----	----
rubidium, dissolved	7440-17-7	E421	0.20	µg/L	0.28	0.56	----	----	----
selenium, dissolved	7782-49-2	E421	0.050	µg/L	<0.050	<0.050	----	----	----
silicon, dissolved	7440-21-3	E421	50	µg/L	6310	4710	----	----	----
silver, dissolved	7440-22-4	E421	0.010	µg/L	<0.010	<0.010	----	----	----
sodium, dissolved	17341-25-2	E421	50	µg/L	8770	4580	----	----	----
strontium, dissolved	7440-24-6	E421	0.20	µg/L	422	295	----	----	----
sulfur, dissolved	7704-34-9	E421	500	µg/L	7660	5170	----	----	----
tellurium, dissolved	13494-80-9	E421	0.20	µg/L	<0.20	<0.20	----	----	----
thallium, dissolved	7440-28-0	E421	0.010	µg/L	<0.010	<0.010	----	----	----
thorium, dissolved	7440-29-1	E421	0.10	µg/L	<0.10	<0.10	----	----	----
tin, dissolved	7440-31-5	E421	0.10	µg/L	<0.10	<0.10	----	----	----
titanium, dissolved	7440-32-6	E421	0.30	µg/L	<0.30	<0.30	----	----	----
tungsten, dissolved	7440-33-7	E421	0.10	µg/L	<0.10	<0.10	----	----	----
uranium, dissolved	7440-61-1	E421	0.010	µg/L	1.07	0.574	----	----	----
vanadium, dissolved	7440-62-2	E421	0.50	µg/L	<0.50	<0.50	----	----	----
zinc, dissolved	7440-66-6	E421	1.0	µg/L	<1.0	<1.0	----	----	----
zirconium, dissolved	7440-67-7	E421	0.20	µg/L	<0.20	<0.20	----	----	----
dissolved mercury filtration location	----	EP509	-	-	Field	Field	----	----	----
dissolved metals filtration location	----	EP421	-	-	Field	Field	----	----	----
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>									





## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					BH17-11A	BH17-11B	BH17-62B	----	----
Client sampling date / time					24-Aug-2020 16:30	24-Aug-2020 16:30	24-Aug-2020 11:05	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B3891-007	VA20B3891-008	VA20B3891-009	-----	-----
					Result	Result	Result	---	---
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>									
benzene	71-43-2	E611A	0.50	µg/L	----	----	<0.50	----	----
ethylbenzene	100-41-4	E611A	0.50	µg/L	----	----	<0.50	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	----	----	<0.50	----	----
styrene	100-42-5	E611A	0.50	µg/L	----	----	<0.50	----	----
toluene	108-88-3	E611A	0.50	µg/L	----	----	<0.50	----	----
xylene, m+p-	179601-23-1	E611A	0.50	µg/L	----	----	<0.50	----	----
xylene, o-	95-47-6	E611A	0.50	µg/L	----	----	<0.50	----	----
xylenes, total	1330-20-7	E611A	0.75	µg/L	----	----	<0.75	----	----
BTEX, total	----	E611A	1.2	µg/L	----	----	<1.2	----	----
<b>Volatile Organic Compounds Surrogates</b>									
bromofluorobenzene, 4-	460-00-4	E611A	0.50	%	----	----	92.8	----	----
difluorobenzene, 1,4-	540-36-3	E611A	0.50	%	----	----	119	----	----
<b>Hydrocarbons</b>									
EPH (C10-C19)	----	E601A	250	µg/L	----	----	<250	----	----
EPH (C19-C32)	----	E601A	250	µg/L	----	----	<250	----	----
HEPHw	----	EC600A	250	µg/L	----	----	<250	----	----
LEPHw	----	EC600A	250	µg/L	----	----	<250	----	----
<b>Hydrocarbons Surrogates</b>									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%	----	----	91.8	----	----
<b>Polycyclic Aromatic Hydrocarbons</b>									
acenaphthene	83-32-9	E641A	0.010	µg/L	----	----	<0.010	----	----
acenaphthylene	208-96-8	E641A	0.010	µg/L	----	----	<0.010	----	----
acridine	260-94-6	E641A	0.010	µg/L	----	----	<0.010	----	----
anthracene	120-12-7	E641A	0.010	µg/L	----	----	<0.010	----	----
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	----	----	<0.010	----	----
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	----	----	<0.0050	----	----
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	----	----	<0.010	----	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	----	----	<0.015	----	----
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	----	----	<0.010	----	----
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	----	----	<0.010	----	----
chrysene	218-01-9	E641A	0.010	µg/L	----	----	<0.010	----	----



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					BH17-11A	BH17-11B	BH17-62B	----	----
					24-Aug-2020 16:30	24-Aug-2020 16:30	24-Aug-2020 11:05	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B3891-007	VA20B3891-008	VA20B3891-009	-----	-----
					Result	Result	Result	---	---
<b>Polycyclic Aromatic Hydrocarbons</b>									
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	----	----	<0.0050	----	----
fluoranthene	206-44-0	E641A	0.010	µg/L	----	----	<0.010	----	----
fluorene	86-73-7	E641A	0.010	µg/L	----	----	<0.010	----	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	----	----	<0.010	----	----
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	----	----	<0.010	----	----
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	----	----	<0.010	----	----
naphthalene	91-20-3	E641A	0.050	µg/L	----	----	<0.050	----	----
phenanthrene	85-01-8	E641A	0.020	µg/L	----	----	<0.020	----	----
pyrene	129-00-0	E641A	0.010	µg/L	----	----	<0.010	----	----
quinoline	6027-02-7	E641A	0.050	µg/L	----	----	<0.050	----	----
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>									
acridine-d9	34749-75-2	E641A	0.010	%	----	----	44.1 <sup>RRV</sup>	----	----
chrysene-d12	1719-03-5	E641A	0.010	%	----	----	106	----	----
naphthalene-d8	1146-65-2	E641A	0.010	%	----	----	99.2	----	----
phenanthrene-d10	1517-22-2	E641A	0.010	%	----	----	106	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>VA20B3891</b>	Page	: 1 of 17
Amendment	: <b>2</b>		
Client	: <b>Wood Canada Ltd.</b>	Laboratory	: Vancouver - Environmental
Contact	: Jeremiah Gladu	Account Manager	: Selam Worku
Address	: 600 - 4445 Lougheed Hwy Burnaby BC Canada V5C 0E4	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: VE52655D	Date Samples Received	: 28-Aug-2020 10:10
PO	: ----	Issue Date	: 27-Oct-2020 16:09
C-O-C number	: ----		
Sampler	: Ardy M.		
Site	: ----		
Quote number	: VA20-SEAB100-0003 - Wood/Seabridge Gold		
No. of samples received	: 9		
No. of samples analysed	: 8		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

## Summary of Outliers

### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- Test sample Surrogate recovery outliers exist for all regular sample matrices - please see following pages for full details.

### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.

### **Outliers : Analysis Holding Time Compliance (Breaches)**

- Analysis Holding Time Outliers exist - please see following pages for full details.

### **Outliers : Frequency of Quality Control Samples**

- No Quality Control Sample Frequency Outliers occur.





**Regular Sample Surrogates**

Sub-Matrix: **Groundwater**

Analyte Group	Laboratory sample ID	Client/Ref Sample D	Analyte	CAS Number	Result	Limits	Comment
<b>Samples Submitted</b>							
Polycyclic Aromatic Hydrocarbons Surrogates	VA20B3891-002	BH17-12B	acridine-d9	34749-75-2	23.0 %	60.0-130 %	Recovery less than lower data quality objective
Polycyclic Aromatic Hydrocarbons Surrogates	VA20B3891-009	BH17-62B	acridine-d9	34749-75-2	44.1 %	60.0-130 %	Recovery less than lower data quality objective



## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> BH17-11A	E298	24-Aug-2020	----	----	----		04-Sep-2020	28 days	10 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> BH17-11B	E298	24-Aug-2020	----	----	----		04-Sep-2020	28 days	10 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> BH17-24A	E298	24-Aug-2020	----	----	----		04-Sep-2020	28 days	10 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> BH17-24B	E298	24-Aug-2020	----	----	----		04-Sep-2020	28 days	10 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> BH17-11A	E235.Cl	24-Aug-2020	----	----	----		30-Aug-2020	28 days	5 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> BH17-11B	E235.Cl	24-Aug-2020	----	----	----		30-Aug-2020	28 days	5 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> BH17-24A	E235.Cl	24-Aug-2020	----	----	----		30-Aug-2020	28 days	5 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE BH17-24B	E235.Cl	24-Aug-2020	----	----	----		30-Aug-2020	28 days	5 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE BH17-11A	E235.F	24-Aug-2020	----	----	----		30-Aug-2020	28 days	5 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE BH17-11B	E235.F	24-Aug-2020	----	----	----		30-Aug-2020	28 days	5 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE BH17-24A	E235.F	24-Aug-2020	----	----	----		30-Aug-2020	28 days	5 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE BH17-24B	E235.F	24-Aug-2020	----	----	----		30-Aug-2020	28 days	5 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE BH17-11A	E235.NO3-L	24-Aug-2020	----	----	----		30-Aug-2020	3 days	5 days	* EHTR	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE BH17-11B	E235.NO3-L	24-Aug-2020	----	----	----		30-Aug-2020	3 days	5 days	* EHTR	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE BH17-24A	E235.NO3-L	24-Aug-2020	----	----	----		30-Aug-2020	3 days	5 days	* EHTR	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE BH17-24B	E235.NO3-L	24-Aug-2020	----	----	----		30-Aug-2020	3 days	5 days	* EHTR	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE BH17-11A	E235.NO2-L	24-Aug-2020	----	----	----		30-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE BH17-11B	E235.NO2-L	24-Aug-2020	----	----	----		30-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE BH17-24A	E235.NO2-L	24-Aug-2020	----	----	----		30-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE BH17-24B	E235.NO2-L	24-Aug-2020	----	----	----		30-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE BH17-11A	E235.SO4	24-Aug-2020	----	----	----		30-Aug-2020	28 days	5 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE BH17-11B	E235.SO4	24-Aug-2020	----	----	----		30-Aug-2020	28 days	5 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE BH17-24A	E235.SO4	24-Aug-2020	----	----	----		30-Aug-2020	28 days	5 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE BH17-24B	E235.SO4	24-Aug-2020	----	----	----		30-Aug-2020	28 days	5 days	✓	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
HDPE dissolved (nitric acid) BH17-11A	E421.Cr-L	24-Aug-2020	31-Aug-2020	180 days	7 days	✓	02-Sep-2020	172 days	1 days	✓	





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> BH17-11B	E421.Cr-L	24-Aug-2020	31-Aug-2020	180 days	7 days	✔	02-Sep-2020	172 days	1 days	✔	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> BH17-24A	E421.Cr-L	24-Aug-2020	31-Aug-2020	180 days	7 days	✔	02-Sep-2020	172 days	1 days	✔	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> BH17-24B	E421.Cr-L	24-Aug-2020	31-Aug-2020	180 days	7 days	✔	02-Sep-2020	172 days	1 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> BH17-11A	E509	24-Aug-2020	02-Sep-2020	28 days	8 days	✔	02-Sep-2020	19 days	0 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> BH17-11B	E509	24-Aug-2020	02-Sep-2020	28 days	8 days	✔	02-Sep-2020	19 days	0 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> BH17-24A	E509	24-Aug-2020	02-Sep-2020	28 days	8 days	✔	02-Sep-2020	19 days	0 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> BH17-24B	E509	24-Aug-2020	02-Sep-2020	28 days	8 days	✔	02-Sep-2020	19 days	0 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> BH17-11A	E421	24-Aug-2020	31-Aug-2020	180 days	7 days	✔	02-Sep-2020	172 days	1 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> BH17-11B	E421	24-Aug-2020	31-Aug-2020	180 days	7 days	✔	02-Sep-2020	172 days	1 days	✔	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> BH17-24A	E421	24-Aug-2020	31-Aug-2020	180 days	7 days	✓	02-Sep-2020	172 days	1 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> BH17-24B	E421	24-Aug-2020	31-Aug-2020	180 days	7 days	✓	02-Sep-2020	172 days	1 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> BH17-17A	E601A	24-Aug-2020	24-Sep-2020	14 days	31 days	* EHT	25-Sep-2020	40 days	0 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> BH17-12A	E601A	24-Aug-2020	01-Sep-2020	14 days	8 days	✓	02-Sep-2020	40 days	0 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> BH17-12B	E601A	24-Aug-2020	01-Sep-2020	14 days	8 days	✓	02-Sep-2020	40 days	0 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> BH17-62B	E601A	24-Aug-2020	01-Sep-2020	14 days	8 days	✓	02-Sep-2020	40 days	0 days	✓	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> BH17-17A	E581.VH+F1	24-Aug-2020	24-Sep-2020	14 days	31 days	* EHT	25-Sep-2020	-18 days	0 days	*	
<b>Physical Tests : Acidity by Titration</b>											
<b>HDPE</b> BH17-11A	E283	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✓	
<b>Physical Tests : Acidity by Titration</b>											
<b>HDPE</b> BH17-11B	E283	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Acidity by Titration</b>										
HDPE BH17-24A	E283	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Acidity by Titration</b>										
HDPE BH17-24B	E283	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE BH17-11A	E290	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE BH17-11B	E290	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE BH17-24A	E290	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE BH17-24B	E290	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE BH17-11A	E100	24-Aug-2020	----	----	----		29-Aug-2020	28 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE BH17-11B	E100	24-Aug-2020	----	----	----		29-Aug-2020	28 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE BH17-24A	E100	24-Aug-2020	----	----	----		29-Aug-2020	28 days	4 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times Rec Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval	
<b>Physical Tests : Conductivity in Water</b>											
HDPE BH17-24B	E100	24-Aug-2020	----	----	----		29-Aug-2020	28 days	4 days	✓	
<b>Physical Tests : pH by Meter</b>											
HDPE BH17-11A	E108	24-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	114 hrs	* EHTR-FM	
<b>Physical Tests : pH by Meter</b>											
HDPE BH17-11B	E108	24-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	114 hrs	* EHTR-FM	
<b>Physical Tests : pH by Meter</b>											
HDPE BH17-24A	E108	24-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	116 hrs	* EHTR-FM	
<b>Physical Tests : pH by Meter</b>											
HDPE BH17-24B	E108	24-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	116 hrs	* EHTR-FM	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE BH17-11A	E162	24-Aug-2020	----	----	----		10-Sep-2020	7 days	16 days	* EHT	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE BH17-11B	E162	24-Aug-2020	----	----	----		10-Sep-2020	7 days	16 days	* EHT	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE BH17-24A	E162	24-Aug-2020	----	----	----		10-Sep-2020	7 days	17 days	* EHT	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE BH17-24B	E162	24-Aug-2020	----	----	----		10-Sep-2020	7 days	17 days	* EHT	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE BH17-11A	E121	24-Aug-2020	----	----	----		31-Aug-2020	3 days	7 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE BH17-11B	E121	24-Aug-2020	----	----	----		31-Aug-2020	3 days	7 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE BH17-24A	E121	24-Aug-2020	----	----	----		31-Aug-2020	3 days	7 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE BH17-24B	E121	24-Aug-2020	----	----	----		31-Aug-2020	3 days	7 days	* EHTR
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>										
Amber glass/Teflon lined cap (sodium bisulfate) BH17-17A	E641A	24-Aug-2020	24-Sep-2020	14 days	31 days	* EHT	25-Sep-2020	40 days	0 days	✓
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>										
Amber glass/Teflon lined cap (sodium bisulfate) BH17-12A	E641A	24-Aug-2020	01-Sep-2020	14 days	8 days	✓	02-Sep-2020	40 days	0 days	✓
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>										
Amber glass/Teflon lined cap (sodium bisulfate) BH17-12B	E641A	24-Aug-2020	01-Sep-2020	14 days	8 days	✓	02-Sep-2020	40 days	0 days	✓
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>										
Amber glass/Teflon lined cap (sodium bisulfate) BH17-62B	E641A	24-Aug-2020	01-Sep-2020	14 days	8 days	✓	02-Sep-2020	40 days	0 days	✓
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>										
Amber glass/Teflon lined cap (sodium bisulfate) BH17-17A	E611A	24-Aug-2020	24-Sep-2020	14 days	31 days	* EHT	25-Sep-2020	-18 days	0 days	* EHTR



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> BH17-12A	E611A	24-Aug-2020	31-Aug-2020	14 days	7 days	✓	01-Sep-2020	6 days	0 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> BH17-12B	E611A	24-Aug-2020	31-Aug-2020	14 days	7 days	✓	01-Sep-2020	6 days	0 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> BH17-62B	E611A	24-Aug-2020	31-Aug-2020	14 days	7 days	✓	01-Sep-2020	6 days	0 days	✓	

**Legend & Qualifier Definitions**

- EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended
- EHTR: Exceeded ALS recommended hold time prior to sample receipt.
- EHT: Exceeded ALS recommended hold time prior to analysis.
- Rec. HT: ALS recommended hold time (see units).



## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Acidity by Titration	E283	78895	1	16	6.2	5.0	✓
Alkalinity Species by Titration	E290	78897	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	80951	1	14	7.1	5.0	✓
BTEX by Headspace GC-MS	E611A	79394	2	15	13.3	5.0	✓
Chloride in Water by IC	E235.Cl	78889	1	7	14.2	5.0	✓
Conductivity in Water	E100	78898	1	7	14.2	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	79471	1	18	5.5	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	80466	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	79470	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	78890	1	7	14.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	78892	1	7	14.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	78893	1	7	14.2	5.0	✓
pH by Meter	E108	78896	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	78894	1	7	14.2	5.0	✓
TDS by Gravimetry	E162	84100	1	4	25.0	5.0	✓
Turbidity by Nephelometry	E121	79452	1	20	5.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	91133	1	20	5.0	5.0	✓
<b>Laboratory Control Samples (LCS)</b>							
Acidity by Titration	E283	78895	1	16	6.2	5.0	✓
Alkalinity Species by Titration	E290	78897	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	80951	1	14	7.1	5.0	✓
BC PHC - EPH by GC-FID	E601A	79806	2	21	9.5	5.0	✓
BTEX by Headspace GC-MS	E611A	79394	2	15	13.3	5.0	✓
Chloride in Water by IC	E235.Cl	78889	1	7	14.2	5.0	✓
Conductivity in Water	E100	78898	1	7	14.2	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	79471	1	18	5.5	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	80466	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	79470	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	78890	1	7	14.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	78892	1	7	14.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	78893	1	7	14.2	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	79807	2	21	9.5	5.0	✓
pH by Meter	E108	78896	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	78894	1	7	14.2	5.0	✓
TDS by Gravimetry	E162	84100	1	4	25.0	5.0	✓
Turbidity by Nephelometry	E121	79452	1	20	5.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	91133	1	20	5.0	5.0	✓



Matrix: **Water**

Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<b>Analytical Methods</b>							
<b>Method Blanks (MB)</b>							
Acidity by Titration	E283	78895	1	16	6.2	5.0	✓
Alkalinity Species by Titration	E290	78897	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	80951	1	14	7.1	5.0	✓
BC PHC - EPH by GC-FID	E601A	79806	2	21	9.5	5.0	✓
BTEX by Headspace GC-MS	E611A	79394	2	15	13.3	5.0	✓
Chloride in Water by IC	E235.Cl	78889	1	7	14.2	5.0	✓
Conductivity in Water	E100	78898	1	7	14.2	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	79471	1	18	5.5	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	80466	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	79470	2	20	10.0	5.0	✓
Fluoride in Water by IC	E235.F	78890	1	7	14.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	78892	1	7	14.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	78893	1	7	14.2	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	79807	2	21	9.5	5.0	✓
Sulfate in Water by IC	E235.SO4	78894	1	7	14.2	5.0	✓
TDS by Gravimetry	E162	84100	1	4	25.0	5.0	✓
Turbidity by Nephelometry	E121	79452	1	20	5.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	91133	1	20	5.0	5.0	✓
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	80951	1	14	7.1	5.0	✓
BTEX by Headspace GC-MS	E611A	79394	2	15	13.3	5.0	✓
Chloride in Water by IC	E235.Cl	78889	1	7	14.2	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	79471	1	18	5.5	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	80466	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	79470	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	78890	1	7	14.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	78892	1	7	14.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	78893	1	7	14.2	5.0	✓
Sulfate in Water by IC	E235.SO4	78894	1	7	14.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	91133	1	20	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 Vancouver - Environmental	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TDS by Gravimetry	E162 Vancouver - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Acidity by Titration	E283 Vancouver - Environmental	Water	APHA 2310 B (mod)	Acidity is determined by potentiometric titration to a specified endpoint.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L Vancouver - Environmental	Water	APHA 3030 B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS
Dissolved Mercury in Water by CVAAS	E509 Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
VH and F1 by Headspace GC-FID	E581.VH+F1 Vancouver - Environmental	Water	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
BC PHC - EPH by GC-FID	E601A Vancouver - Environmental	Water	BC MOE Lab Manual	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.
BTEX by Headspace GC-MS	E611A Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by Hexane LVI GC-MS	E641A Vancouver - Environmental	Water	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by large volume injection (LVI) GC-MS.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> ), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
VPH: VH-BTEX-Styrene	EC580A Vancouver - Environmental	Water	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VPHw = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
LEPH and HEPH: EPH-PAH	EC600A  Vancouver - Environmental	Water	BC MOE Lab Manual (LEPH and HEPH) (mod)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Acenaphthene, Acridine, Anthracene, Fluorene, Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(a)pyrene, Fluoranthene, and Pyrene.
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Dissolved Metals Water Filtration	EP421  Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO <sub>3</sub> .
Dissolved Mercury Water Filtration	EP509  Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
VOCs Preparation for Headspace Analysis	EP581  Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601  Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

## QUALITY CONTROL REPORT

**Work Order** : **VA20B3891**  
**Amendment** : **2**

Page : 1 of 17

Client : Wood Canada Ltd.  
 Contact : Jeremiah Gladu  
 Address : 1235 Main Street P.O. Box 2356  
           Smithers BC Canada V0J 2N0  
 Telephone : ----  
 Project : VE52655D  
 PO : ----  
 C-O-C number : ----  
 Sampler : Ardy M.  
 Site : ----  
 Quote number : VA20-SEAB100-0003 - Wood/Seabridge Gold  
 No. of samples received : 9  
 No. of samples analysed : 8

Laboratory : Vancouver - Environmental  
 Account Manager : Selam Worku  
 Address : 8081 Lougheed Highway  
           Burnaby, British Columbia Canada V5A 1W9  
 Telephone : +1 604 253 4188  
 Date Samples Received : 28-Aug-2020 10:10  
 Date Analysis Commenced : 29-Aug-2020  
 Issue Date : 27-Oct-2020 16:09

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Brianna Allen	Department Manager - Organics	Organics, Burnaby, British Columbia
Bruna Botti	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Clarie Tejano		Metals, Burnaby, British Columbia
Cristina Alexandre	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Harsha Attanayake	Laboratory Analyst	Organics, Burnaby, British Columbia
Kevin Duarte	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics - Water Quality, Burnaby, British Columbia
Ophelia Chiu	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Shaneel Dayal	Analyst	Metals, Burnaby, British Columbia

Page : 2 of 17  
Work Order : VA20B3891 Amendment 2  
Client : Wood Canada Ltd.  
Project : VE52655D

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## **General Comments**

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

# = Indicates a QC result that did not meet the ALS DQO.



### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 78895)</b>											
VA20B3839-003	Anonymous	acidity (as CaCO3)	----	E283	2.0	mg/L	19.0	19.0	0	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 78896)</b>											
VA20B3890-002	Anonymous	pH	----	E108	0.10	pH units	7.49	7.54	0.665%	4%	----
<b>Physical Tests (QC Lot: 78897)</b>											
VA20B3890-002	Anonymous	alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	112	112	0.00%	20%	----
		alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	112	112	0.00%	20%	----
<b>Physical Tests (QC Lot: 78898)</b>											
VA20B3890-002	Anonymous	conductivity	----	E100	2.0	µS/cm	438	443	1.14%	10%	----
<b>Physical Tests (QC Lot: 79452)</b>											
VA20B3728-001	Anonymous	turbidity	----	E121	0.10	NTU	23.6	24.2	2.51%	15%	----
<b>Physical Tests (QC Lot: 84100)</b>											
VA20B3891-005	BH17-24A	solids, total dissolved [TDS]	----	E162	20	mg/L	172	180	7	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78889)</b>											
VA20B3890-002	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78890)</b>											
VA20B3890-002	Anonymous	fluoride	16984-48-8	E235.F	0.020	mg/L	0.074	0.072	0.002	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78892)</b>											
VA20B3890-002	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0100	0.0093	0.0008	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78893)</b>											
VA20B3890-002	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0012	0.0015	0.0003	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78894)</b>											
VA20B3890-002	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	114	114	0.0216%	20%	----
<b>Anions and Nutrients (QC Lot: 80951)</b>											
VA20B3890-002	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.105	0.105	0.0477%	20%	----
<b>Dissolved Metals (QC Lot: 79470)</b>											
VA20B3891-005	BH17-24A	aluminum, dissolved	7429-90-5	E421	1.00	mg/L	1.2 µg/L	0.0011	0.00009	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E421	0.100	mg/L	0.24 µg/L	0.00024	0.0000006	Diff <2x LOR	----
		arsenic, dissolved	7440-38-2	E421	0.100	mg/L	3.51 µg/L	0.00354	0.618%	20%	----



Sub-Matrix: **Water**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 79470) - continued</b>											
VA20B3891-005	BH17-24A	barium, dissolved	7440-39-3	E421	0.100	mg/L	42.5 µg/L	0.0423	0.594%	20%	----
		beryllium, dissolved	7440-41-7	E421	0.100	mg/L	<0.100 µg/L	<0.000100	0	Diff <2x LOR	----
		bismuth, dissolved	7440-69-9	E421	0.0500	mg/L	<0.050 µg/L	<0.000050	0	Diff <2x LOR	----
		boron, dissolved	7440-42-8	E421	10.0	mg/L	<10 µg/L	<0.010	0	Diff <2x LOR	----
		cadmium, dissolved	7440-43-9	E421	0.00500	mg/L	<0.0050 µg/L	<0.0000050	0	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E421	50.0	mg/L	37600 µg/L	37.1	1.34%	20%	----
		cesium, dissolved	7440-46-2	E421	0.0100	mg/L	0.016 µg/L	0.000015	0.000001	Diff <2x LOR	----
		cobalt, dissolved	7440-48-4	E421	0.100	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.200	mg/L	<0.20 µg/L	<0.00020	0	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E421	10.0	mg/L	61 µg/L	0.060	0.002	Diff <2x LOR	----
		lead, dissolved	7439-92-1	E421	0.0500	mg/L	<0.050 µg/L	<0.000050	0	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E421	1.00	mg/L	8.4 µg/L	0.0082	0.0001	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	5.00	mg/L	9490 µg/L	9.43	0.676%	20%	----
		manganese, dissolved	7439-96-5	E421	0.100	mg/L	93.6 µg/L	0.0929	0.839%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.0500	mg/L	3.03 µg/L	0.00302	0.444%	20%	----
		nickel, dissolved	7440-02-0	E421	0.500	mg/L	<0.50 µg/L	<0.00050	0	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E421	50.0	mg/L	<50 µg/L	<0.050	0	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	50.0	mg/L	2610 µg/L	2.63	0.770%	20%	----
		rubidium, dissolved	7440-17-7	E421	0.200	mg/L	3.41 µg/L	0.00368	7.61%	20%	----
		selenium, dissolved	7782-49-2	E421	0.0500	mg/L	<0.050 µg/L	<0.000050	0	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	50.0	mg/L	7460 µg/L	7.16	4.12%	20%	----
		silver, dissolved	7440-22-4	E421	0.0100	mg/L	<0.010 µg/L	<0.000010	0	Diff <2x LOR	----
		sodium, dissolved	17341-25-2	E421	50.0	mg/L	12200 µg/L	12.2	0.236%	20%	----
		strontium, dissolved	7440-24-6	E421	0.200	mg/L	511 µg/L	0.525	2.71%	20%	----
		sulfur, dissolved	7704-34-9	E421	500	mg/L	8490 µg/L	8.43	0.650%	20%	----
		tellurium, dissolved	13494-80-9	E421	0.200	mg/L	<0.20 µg/L	<0.00020	0	Diff <2x LOR	----
		thallium, dissolved	7440-28-0	E421	0.0100	mg/L	<0.010 µg/L	<0.000010	0	Diff <2x LOR	----
		thorium, dissolved	7440-29-1	E421	0.100	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		tin, dissolved	7440-31-5	E421	0.100	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		titanium, dissolved	7440-32-6	E421	0.300	mg/L	<0.30 µg/L	<0.00030	0	Diff <2x LOR	----
		tungsten, dissolved	7440-33-7	E421	0.100	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E421	0.0100	mg/L	0.060 µg/L	0.000064	0.000004	Diff <2x LOR	----
		vanadium, dissolved	7440-62-2	E421	0.500	mg/L	<0.50 µg/L	<0.00050	0	Diff <2x LOR	----
		zinc, dissolved	7440-66-6	E421	1.00	mg/L	<1.0 µg/L	<0.0010	0	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.200	mg/L	<0.20 µg/L	<0.00020	0	Diff <2x LOR	----

**Dissolved Metals (QC Lot: 79471)**



Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 79471) - continued</b>											
VA20B3891-005	BH17-24A	chromium, dissolved	7440-47-3	E421.Cr-L	0.100	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 80466)</b>											
VA20B3851-006	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Volatile Organic Compounds (QC Lot: 79394)</b>											
VA20B3891-001	BH17-12A	benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
<b>Volatile Organic Compounds (QC Lot: 91134)</b>											
VA20B3891-003	BH17-17A	benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
<b>Hydrocarbons (QC Lot: 91133)</b>											
VA20B3891-003	BH17-17A	VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.00%	30%	----





## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

### Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 78895)</b>						
acidity (as CaCO3)	----	E283	2	mg/L	2.0	----
<b>Physical Tests (QCLot: 78897)</b>						
alkalinity, bicarbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, carbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, hydroxide (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
<b>Physical Tests (QCLot: 78898)</b>						
conductivity	----	E100	1	µS/cm	<1.0	----
<b>Physical Tests (QCLot: 79452)</b>						
turbidity	----	E121	0.1	NTU	<0.10	----
<b>Physical Tests (QCLot: 84100)</b>						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
<b>Anions and Nutrients (QCLot: 78889)</b>						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
<b>Anions and Nutrients (QCLot: 78890)</b>						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
<b>Anions and Nutrients (QCLot: 78892)</b>						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 78893)</b>						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 78894)</b>						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
<b>Anions and Nutrients (QCLot: 80951)</b>						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
<b>Dissolved Metals (QCLot: 79470)</b>						
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 79470) - continued</b>						
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
sodium, dissolved	17341-25-2	E421	0.05	mg/L	<0.050	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	MBRR
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
<b>Dissolved Metals (QCLot: 79471)</b>						
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	<0.00010	----
<b>Dissolved Metals (QCLot: 80466)</b>						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
<b>Volatile Organic Compounds (QCLot: 79394)</b>						



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Volatile Organic Compounds (QCLot: 79394) - continued</b>						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	----
styrene	100-42-5	E611A	0.5	µg/L	<0.50	----
toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	<0.50	----
xylene, o-	95-47-6	E611A	0.5	µg/L	<0.50	----
<b>Volatile Organic Compounds (QCLot: 91134)</b>						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	----
styrene	100-42-5	E611A	0.5	µg/L	<0.50	----
toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	<0.50	----
xylene, o-	95-47-6	E611A	0.5	µg/L	<0.50	----
<b>Hydrocarbons (QCLot: 79806)</b>						
EPH (C10-C19)	----	E601A	250	µg/L	<250	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	----
<b>Hydrocarbons (QCLot: 91133)</b>						
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
<b>Hydrocarbons (QCLot: 91254)</b>						
EPH (C10-C19)	----	E601A	250	µg/L	<250	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	----
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 79807)</b>						
acenaphthene	83-32-9	E641A	0.01	µg/L	<0.010	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	<0.010	----
acridine	260-94-6	E641A	0.01	µg/L	<0.010	----
anthracene	120-12-7	E641A	0.01	µg/L	<0.010	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	<0.010	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	<0.010	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	<0.010	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	<0.010	----
chrysene	218-01-9	E641A	0.01	µg/L	<0.010	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	<0.0050	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 79807) - continued</b>						
fluoranthene	206-44-0	E641A	0.01	µg/L	<0.010	----
fluorene	86-73-7	E641A	0.01	µg/L	<0.010	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	<0.010	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	<0.010	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	<0.010	----
naphthalene	91-20-3	E641A	0.05	µg/L	<0.050	----
phenanthrene	85-01-8	E641A	0.02	µg/L	<0.020	----
pyrene	129-00-0	E641A	0.01	µg/L	<0.010	----
quinoline	6027-02-7	E641A	0.05	µg/L	<0.050	----
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 91255)</b>						
acenaphthene	83-32-9	E641A	0.01	µg/L	<0.010	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	<0.010	----
acridine	260-94-6	E641A	0.01	µg/L	<0.010	----
anthracene	120-12-7	E641A	0.01	µg/L	<0.010	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	<0.010	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	<0.010	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	<0.010	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	<0.010	----
chrysene	218-01-9	E641A	0.01	µg/L	<0.010	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	<0.0050	----
fluoranthene	206-44-0	E641A	0.01	µg/L	<0.010	----
fluorene	86-73-7	E641A	0.01	µg/L	<0.010	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	<0.010	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	<0.010	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	<0.010	----
naphthalene	91-20-3	E641A	0.05	µg/L	<0.050	----
phenanthrene	85-01-8	E641A	0.02	µg/L	<0.020	----
pyrene	129-00-0	E641A	0.01	µg/L	<0.010	----
quinoline	6027-02-7	E641A	0.05	µg/L	<0.050	----



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## Qualifiers

Qualifier	Description
MBRR	<i>Initial MB for this submission had positive results for flagged analyte (data not shown). Low level samples were repeated with new QC (2nd MB results shown). High level results (&gt;5x initial MB level) and non-detect results were reported and are defensible</i>

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## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: <b>Water</b>					Laboratory Control Sample (LCS) Report				
					Spike Concentration	Recovery (%) LCS	Recovery Limits (%)		Qualifier
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Physical Tests (QCLot: 78895)</b>									
acidity (as CaCO3)	---	E283	2	mg/L	50 mg/L	102	85.0	115	---
<b>Physical Tests (QCLot: 78896)</b>									
pH	---	E108	---	pH units	7 pH units	100	98.0	102	---
<b>Physical Tests (QCLot: 78897)</b>									
alkalinity, phenolphthalein (as CaCO3)	---	E290	1	mg/L	229 mg/L	97.2	75.0	125	---
alkalinity, total (as CaCO3)	---	E290	1	mg/L	500 mg/L	113	85.0	115	---
<b>Physical Tests (QCLot: 78898)</b>									
conductivity	---	E100	1	µS/cm	146.9 µS/cm	102	90.0	110	---
<b>Physical Tests (QCLot: 79452)</b>									
turbidity	---	E121	0.1	NTU	200 NTU	101	85.0	115	---
<b>Physical Tests (QCLot: 84100)</b>									
solids, total dissolved [TDS]	---	E162	10	mg/L	1000 mg/L	95.4	85.0	115	---
<b>Anions and Nutrients (QCLot: 78889)</b>									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	95.0	90.0	110	---
<b>Anions and Nutrients (QCLot: 78890)</b>									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	95.1	90.0	110	---
<b>Anions and Nutrients (QCLot: 78892)</b>									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	95.1	90.0	110	---
<b>Anions and Nutrients (QCLot: 78893)</b>									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	95.6	90.0	110	---
<b>Anions and Nutrients (QCLot: 78894)</b>									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	96.0	90.0	110	---
<b>Anions and Nutrients (QCLot: 80951)</b>									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.12 mg/L	105	85.0	115	---
<b>Dissolved Metals (QCLot: 79470)</b>									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	105	80.0	120	---
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	102	80.0	120	---
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	100	80.0	120	---
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	102	80.0	120	---
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	102	80.0	120	---
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	102	80.0	120	---
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	94.8	80.0	120	---



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 79470) - continued</b>									
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	98.4	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	100	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	101	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	100	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	99.7	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	98.3	80.0	120	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	100	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	102	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	97.3	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	99.1	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	102	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	96.5	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	98.4	70.0	130	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	99.0	80.0	120	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	98.7	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	98.3	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	107	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	103	80.0	120	----
sodium, dissolved	17341-25-2	E421	0.05	mg/L	50 mg/L	98.5	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	105	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	95.6	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	109	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	99.3	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	97.1	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	99.6	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	95.2	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	97.4	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	102	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	99.6	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	101	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	98.2	80.0	120	----
<b>Dissolved Metals (QCLot: 79471)</b>									
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	0.25 mg/L	97.6	80.0	120	----
<b>Dissolved Metals (QCLot: 80466)</b>									
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	87.7	80.0	120	----
<b>Volatile Organic Compounds (QCLot: 79394)</b>									



Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 79394) - continued</b>									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	97.3	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	92.9	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	105	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	93.2	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	93.9	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	200 µg/L	98.7	70.0	130	----
xylene, o-	95-47-6	E611A	0.5	µg/L	100 µg/L	94.9	70.0	130	----
<b>Volatile Organic Compounds (QCLot: 91134)</b>									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	107	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	110	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	109	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	106	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	106	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	200 µg/L	103	70.0	130	----
xylene, o-	95-47-6	E611A	0.5	µg/L	100 µg/L	102	70.0	130	----
<b>Hydrocarbons (QCLot: 79806)</b>									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	109	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	104	70.0	130	----
<b>Hydrocarbons (QCLot: 91133)</b>									
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	86.0	70.0	130	----
<b>Hydrocarbons (QCLot: 91254)</b>									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	110	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	110	70.0	130	----
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 79807)</b>									
acenaphthene	83-32-9	E641A	0.01	µg/L	0.5 µg/L	107	60.0	130	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5 µg/L	108	60.0	130	----
acridine	260-94-6	E641A	0.01	µg/L	0.5 µg/L	93.0	60.0	130	----
anthracene	120-12-7	E641A	0.01	µg/L	0.5 µg/L	103	60.0	130	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5 µg/L	102	60.0	130	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5 µg/L	105	60.0	130	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	0.5 µg/L	105	60.0	130	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	1 µg/L	111	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5 µg/L	107	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5 µg/L	116	60.0	130	----
chrysene	218-01-9	E641A	0.01	µg/L	0.5 µg/L	111	60.0	130	----





Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 79807) - continued</b>									
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	0.5 µg/L	110	60.0	130	----
fluoranthene	206-44-0	E641A	0.01	µg/L	0.5 µg/L	105	60.0	130	----
fluorene	86-73-7	E641A	0.01	µg/L	0.5 µg/L	97.1	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5 µg/L	109	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5 µg/L	108	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	0.5 µg/L	103	60.0	130	----
naphthalene	91-20-3	E641A	0.05	µg/L	0.5 µg/L	101	50.0	130	----
phenanthrene	85-01-8	E641A	0.02	µg/L	0.5 µg/L	101	60.0	130	----
pyrene	129-00-0	E641A	0.01	µg/L	0.5 µg/L	109	60.0	130	----
quinoline	6027-02-7	E641A	0.05	µg/L	0.5 µg/L	111	60.0	130	----
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 91255)</b>									
acenaphthene	83-32-9	E641A	0.01	µg/L	0.5 µg/L	121	60.0	130	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5 µg/L	117	60.0	130	----
acridine	260-94-6	E641A	0.01	µg/L	0.5 µg/L	94.7	60.0	130	----
anthracene	120-12-7	E641A	0.01	µg/L	0.5 µg/L	110	60.0	130	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5 µg/L	106	60.0	130	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5 µg/L	120	60.0	130	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	0.5 µg/L	108	60.0	130	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	1 µg/L	113	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5 µg/L	120	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5 µg/L	118	60.0	130	----
chrysene	218-01-9	E641A	0.01	µg/L	0.5 µg/L	109	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	0.5 µg/L	117	60.0	130	----
fluoranthene	206-44-0	E641A	0.01	µg/L	0.5 µg/L	116	60.0	130	----
fluorene	86-73-7	E641A	0.01	µg/L	0.5 µg/L	106	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5 µg/L	112	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5 µg/L	126	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	0.5 µg/L	122	60.0	130	----
naphthalene	91-20-3	E641A	0.05	µg/L	0.5 µg/L	120	50.0	130	----
phenanthrene	85-01-8	E641A	0.02	µg/L	0.5 µg/L	109	60.0	130	----
pyrene	129-00-0	E641A	0.01	µg/L	0.5 µg/L	118	60.0	130	----
quinoline	6027-02-7	E641A	0.05	µg/L	0.5 µg/L	124	60.0	130	----



### Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 78889)</b>										
VA20B3890-003	Anonymous	chloride	16887-00-6	E235.Cl	520 mg/L	500 mg/L	104	75 0	125	----
<b>Anions and Nutrients (QCLot: 78890)</b>										
VA20B3890-003	Anonymous	fluoride	16984-48-8	E235 F	5.33 mg/L	5 mg/L	107	75 0	125	----
<b>Anions and Nutrients (QCLot: 78892)</b>										
VA20B3890-003	Anonymous	nitrate (as N)	14797-55-8	E235 NO3-L	13.0 mg/L	12.5 mg/L	104	75 0	125	----
<b>Anions and Nutrients (QCLot: 78893)</b>										
VA20B3890-003	Anonymous	nitrite (as N)	14797-65-0	E235 NO2-L	2.61 mg/L	2.5 mg/L	104	75 0	125	----
<b>Anions and Nutrients (QCLot: 78894)</b>										
VA20B3890-003	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	536 mg/L	500 mg/L	107	75 0	125	----
<b>Anions and Nutrients (QCLot: 80951)</b>										
VA20B3890-003	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.209 mg/L	0.2 mg/L	104	75 0	125	----
<b>Dissolved Metals (QCLot: 79470)</b>										
VA20B3891-006	BH17-24B	aluminum, dissolved	7429-90-5	E421	0.204 mg/L	0.2 mg/L	102	70 0	130	----
		antimony, dissolved	7440-36-0	E421	0.0206 mg/L	0.02 mg/L	103	70 0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0205 mg/L	0.02 mg/L	102	70 0	130	----
		barium, dissolved	7440-39-3	E421	0.0201 mg/L	0.02 mg/L	101	70 0	130	----
		beryllium, dissolved	7440-41-7	E421	0.0420 mg/L	0.04 mg/L	105	70 0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00996 mg/L	0.01 mg/L	99.6	70 0	130	----
		boron, dissolved	7440-42-8	E421	0.096 mg/L	0.1 mg/L	95.6	70 0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00405 mg/L	0.004 mg/L	101	70 0	130	----
		calcium, dissolved	7440-70-2	E421	3.99 mg/L	4 mg/L	99.8	70 0	130	----
		cesium, dissolved	7440-46-2	E421	0.0101 mg/L	0.01 mg/L	101	70 0	130	----
		cobalt, dissolved	7440-48-4	E421	0.0203 mg/L	0.02 mg/L	102	70 0	130	----
		copper, dissolved	7440-50-8	E421	0.0203 mg/L	0.02 mg/L	102	70 0	130	----
		iron, dissolved	7439-89-6	E421	1.89 mg/L	2 mg/L	94.6	70 0	130	----
		lead, dissolved	7439-92-1	E421	0.0204 mg/L	0.02 mg/L	102	70 0	130	----
		lithium, dissolved	7439-93-2	E421	0.102 mg/L	0.1 mg/L	102	70 0	130	----
		magnesium, dissolved	7439-95-4	E421	0.962 mg/L	1 mg/L	96.2	70 0	130	----
		manganese, dissolved	7439-96-5	E421	0.0200 mg/L	0.02 mg/L	99.8	70 0	130	----
		molybdenum, dissolved	7439-98-7	E421	0.0199 mg/L	0.02 mg/L	99.6	70 0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 79470) - continued</b>										
VA20B3891-006	BH17-24B	nickel, dissolved	7440-02-0	E421	0.0398 mg/L	0.04 mg/L	99.5	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	9.88 mg/L	10 mg/L	98.8	70.0	130	----
		potassium, dissolved	7440-09-7	E421	3.96 mg/L	4 mg/L	99.0	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.0199 mg/L	0.02 mg/L	99.5	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0437 mg/L	0.04 mg/L	109	70.0	130	----
		silicon, dissolved	7440-21-3	E421	9.28 mg/L	10 mg/L	92.8	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00407 mg/L	0.004 mg/L	102	70.0	130	----
		sodium, dissolved	17341-25-2	E421	1.97 mg/L	2 mg/L	98.3	70.0	130	----
		strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		sulfur, dissolved	7704-34-9	E421	19.6 mg/L	20 mg/L	98.3	70.0	130	----
		tellurium, dissolved	13494-80-9	E421	0.0454 mg/L	0.04 mg/L	114	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00399 mg/L	0.004 mg/L	99.8	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0209 mg/L	0.02 mg/L	105	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0200 mg/L	0.02 mg/L	100.0	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0380 mg/L	0.04 mg/L	95.1	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0198 mg/L	0.02 mg/L	98.8	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.00401 mg/L	0.004 mg/L	100	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.0989 mg/L	0.1 mg/L	98.9	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.446 mg/L	0.4 mg/L	111	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0411 mg/L	0.04 mg/L	103	70.0	130	----
<b>Dissolved Metals (QCLot: 79471)</b>										
VA20B3891-006	BH17-24B	chromium, dissolved	7440-47-3	E421.Cr-L	0.0392 mg/L	0.04 mg/L	97.9	70.0	130	----
<b>Dissolved Metals (QCLot: 80466)</b>										
VA20B3851-007	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000993 mg/L	0.0001 mg/L	99.3	70.0	130	----
<b>Volatile Organic Compounds (QCLot: 79394)</b>										
VA20B3891-002	BH17-12B	benzene	71-43-2	E611A	100 µg/L	100 µg/L	100	60.0	140	----
		ethylbenzene	100-41-4	E611A	96.3 µg/L	100 µg/L	96.3	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	106 µg/L	100 µg/L	106	60.0	140	----
		styrene	100-42-5	E611A	94.2 µg/L	100 µg/L	94.2	60.0	140	----
		toluene	108-88-3	E611A	108 µg/L	100 µg/L	108	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	203 µg/L	200 µg/L	102	60.0	140	----
		xylene, o-	95-47-6	E611A	97.7 µg/L	100 µg/L	97.7	60.0	140	----
<b>Volatile Organic Compounds (QCLot: 91134)</b>										
VA20B5408-001	Anonymous	benzene	71-43-2	E611A	103 µg/L	100 µg/L	103	60.0	140	----
		ethylbenzene	100-41-4	E611A	106 µg/L	100 µg/L	106	60.0	140	----

Page : 17 of 17  
 Work Order : VA20B3891 Amendment 2  
 Client : Wood Canada Ltd.  
 Project : VE52655D



Sub-Matrix: **Water**

					<i>Matrix Spike (MS) Report</i>					
					<i>Spike</i>		<i>Recovery (%)</i>	<i>Recovery Limits (%)</i>		
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>Concentration</i>	<i>Target</i>	<i>MS</i>	<i>Low</i>	<i>High</i>	<i>Qualifier</i>
<b>Volatile Organic Compounds (QCLot: 91134) - continued</b>										
VA20B5408-001	Anonymous	methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	103 µg/L	100 µg/L	103	60 0	140	----
		styrene	100-42-5	E611A	99.8 µg/L	100 µg/L	99.8	60 0	140	----
		toluene	108-88-3	E611A	101 µg/L	100 µg/L	101	60 0	140	----
		xylene, m+p-	179601-23-1	E611A	201 µg/L	200 µg/L	100	60 0	140	----
		xylene, o-	95-47-6	E611A	99.4 µg/L	100 µg/L	99.4	60 0	140	----
<b>Hydrocarbons (QCLot: 91133)</b>										
VA20B3891-003	BH17-17A	VHw (C6-C10)	----	E581.VH+F1	4510 µg/L	6310 µg/L	71.5	60 0	140	----



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Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

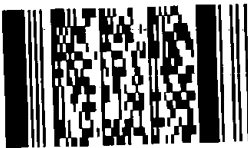
Affix ALS barcode label here (lab use only)

COC Number: 17 -

Page 1 of 1

<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>			<b>Select Service Level Below - Contact your AM to confirm all E&amp;P TATs (surcharges may apply)</b>											
Company: Wood.		Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)			Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply											
Contact: Jeremiah Gladu		Quality Control (QC) Report with Report <input type="checkbox"/> YES <input type="checkbox"/> NO			PROPERTY (Business Days)	4 day [P4-20%] <input type="checkbox"/>		EMERGENCY	1 Business day [E - 100%] <input type="checkbox"/>							
Phone:		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked				3 day [P3-25%] <input type="checkbox"/>			Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] <input type="checkbox"/>							
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX				2 day [P2-50%] <input type="checkbox"/>										
Street: 4445 Lougheed Hwy.		Email 1 or Fax: jeremiah.gladu@woodplc.com			Date and Time Required for all E&P TATs:		dd-mmm-yy hh:mm									
City/Province: Burnaby/BC		Email 2			For tests that can not be performed according to the service level selected, you will be contacted.											
Postal Code: V5C 0E4		Email 3			<b>Analysis Request</b>											
<b>Invoice To</b>		<b>Invoice Distribution</b>			<b>NUMBER OF CONTAINERS</b>	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below							<b>SAMPLES ON HOLD</b>	<b>SUSPECTED HAZARD (see Special Instructions)</b>		
Same as Report To <input type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX				BTEX	EPH/PAH	General chemistry *	DISSOLVED METALS							
Copy of Invoice with Report <input type="checkbox"/> YES <input type="checkbox"/> NO		Email 1 or Fax														
Company:		Email 2														
Contact:		Email 2														
<b>Project Information</b>		<b>Oil and Gas Required Fields (client use)</b>														
ALS Account # / Quote #:		AFE/Cost Center:	PO#:													
Job #: VE52855D		Major/Minor Code:	Routing Code:													
PO / AFE:		Requisitioner:														
LSD:		Location:														
ALS Lab Work Order # (lab use only): 3891		ALS Contact: Selam Worku	Sampler: Ardy M.													
<b>ALS Sample # (lab use only)</b>	<b>Sample Identification and/or Coordinates (This description will appear on the report)</b>	<b>Date (dd-mmm-yy)</b>	<b>Time (hh:mm)</b>	<b>Sample Type</b>												
1	BH17-12A	24-Aug-20	11:05	GW	R	R										
2	BH17-12B	24-Aug-20	9:43	GW	R	R										
3	BH17-17A	24-Aug-20	13:00	GW									HOLD			
4	BH17-17B	24-Aug-20	12:00	GW									HOLD			
5	BH17-24A	24-Aug-20	15:00	GW			R	R								
6	BH17-24B	24-Aug-20	14:40	GW			R	R								
7	BH17-11A	24-Aug-20	16:30	GW			R	R								
8	BH17-11B	24-Aug-20	16:30	GW			R	R								
9	BH17-62B	24-Aug-20	11:05	GW	R	R										

Environmental Division Vancouver Work Order Reference VA20B3891



Telephone : + 1 604 253 4188

<b>Drinking Water (DW) Samples<sup>1</sup> (client use)</b>		<b>Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)</b>			<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>								
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO		*GENERAL WATER CHEMISTRY TO INCLUDE: pH, Alkalinity, bicarbonate, carbonate, chloride, conductivity, fluoride, hardness, hydroxide, nitrate, nitrite, ammonia, sulphate, turbidity, TDS, acidity.			Frozen <input type="checkbox"/>		SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>						
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO					Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/>		Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>						
					Cooling Initiated <input type="checkbox"/>		INITIAL COOLER TEMPERATURES °C		FINAL COOLER TEMPERATURES °C				
									5.2				
<b>SHIPMENT RELEASE (client use)</b>				<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>				<b>FINAL SHIPMENT RECEPTION (lab use only)</b>					
Released by: Ardy Mansourpour		Date: Aug 26 20		Received by: AS		Date:		Received by: em		Date: 28 Aug. 2020		Time: 10:10am	



CERTIFICATE OF ANALYSIS

Work Order : VA20B4083
Amendment : 1
Client : Wood Canada Ltd.
Contact : Jeremiah Gladu
Address : 600 - 4445 Lougheed Hwy
Burnaby BC Canada V5C 0E4
Telephone : 604 294 3811
Project : VE52655D
PO : ---
C-O-C number : ---
Sampler : Ardy M.
Site : ---
Quote number : VA20-SEAB100-0003 - Wood/Seabridge Gold
No. of samples received : 3
No. of samples analysed : 3

Page : 1 of 6
Laboratory : Vancouver - Environmental
Account Manager : Selam Worku
Address : 8081 Lougheed Highway
Burnaby BC Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 29-Aug-2020 08:10
Date Analysis Commenced : 01-Sep-2020
Issue Date : 27-Oct-2020 09:32

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
Analytical Results
Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Table with 3 columns: Signatories, Position, Laboratory Department. Lists names like Caitlin Macey, Clarie Tejano, Cristina Alexandre, Kevin Duarte, Lindsay Gung, Ophelia Chiu, and Shaneel Dayal with their respective roles and departments.



## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
-	No Unit
µg/L	micrograms per litre
µS/cm	Microsiemens per centimetre
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in reports identified as "Preliminary Report" are considered authorized for use.

## Workorder Comments

The units for trace metals have been updated to ug/L in this report.



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					MW17-09B	MW17-27A	MW17-23A	----	----
Client sampling date / time					28-Aug-2020 15:00	28-Aug-2020 13:00	28-Aug-2020 11:00	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B4083-001	VA20B4083-002	VA20B4083-003	-----	-----
					Result	Result	Result	----	----
<b>Physical Tests</b>									
acidity (as CaCO3)	----	E283	2.0	mg/L	5.0	2.2	----	----	----
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	69.8	134	----	----	----
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	----	----	----
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	----	----	----
alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	----	----	----
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	69.8	134	----	----	----
conductivity	----	E100	2.0	µS/cm	388	386	----	----	----
pH	----	E108	0.10	pH units	7.11	7.88	----	----	----
solids, total dissolved [TDS]	----	E162	10	mg/L	274	255	----	----	----
turbidity	----	E121	0.10	NTU	7.91	45.3	----	----	----
hardness (as CaCO3), dissolved	----	EC100	600	µg/L	187000	204000	----	----	----
<b>Anions and Nutrients</b>									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0311	0.0187	----	----	----
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	----	----	----
fluoride	16984-48-8	E235.F	0.020	mg/L	0.043	0.052	----	----	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0196	<0.0050	----	----	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0016	<0.0010	----	----	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	123	67.4	----	----	----
<b>Dissolved Metals</b>									
aluminum, dissolved	7429-90-5	E421	1.0	µg/L	2.2	2.1	----	----	----
antimony, dissolved	7440-36-0	E421	0.10	µg/L	<0.10	0.98	----	----	----
arsenic, dissolved	7440-38-2	E421	0.10	µg/L	0.11	2.94	----	----	----
barium, dissolved	7440-39-3	E421	0.10	µg/L	18.5	53.6	----	----	----
beryllium, dissolved	7440-41-7	E421	0.100	µg/L	<0.100	<0.100	----	----	----
bismuth, dissolved	7440-69-9	E421	0.050	µg/L	<0.050	<0.050	----	----	----
boron, dissolved	7440-42-8	E421	10	µg/L	108	<10	----	----	----
cadmium, dissolved	7440-43-9	E421	0.0050	µg/L	0.0802	0.114	----	----	----
calcium, dissolved	7440-70-2	E421	50	µg/L	66700	73100	----	----	----
cesium, dissolved	7440-46-2	E421	0.010	µg/L	0.015	<0.010	----	----	----
chromium, dissolved	7440-47-3	E421.Cr-L	0.10	µg/L	0.14	<0.10	----	----	----





## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					MW17-09B	MW17-27A	MW17-23A	----	----
Client sampling date / time					28-Aug-2020 15:00	28-Aug-2020 13:00	28-Aug-2020 11:00	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B4083-001	VA20B4083-002	VA20B4083-003	-----	-----
					Result	Result	Result	---	---
<b>Dissolved Metals</b>									
cobalt, dissolved	7440-48-4	E421	0.10	µg/L	2.96	1.44	----	----	----
copper, dissolved	7440-50-8	E421	0.20	µg/L	0.28	<0.20	----	----	----
iron, dissolved	7439-89-6	E421	10	µg/L	335	62	----	----	----
lead, dissolved	7439-92-1	E421	0.050	µg/L	<0.050	<0.050	----	----	----
lithium, dissolved	7439-93-2	E421	1.0	µg/L	<1.0	1.6	----	----	----
magnesium, dissolved	7439-95-4	E421	5.0	µg/L	5000	5140	----	----	----
manganese, dissolved	7439-96-5	E421	0.10	µg/L	3320	653	----	----	----
mercury, dissolved	7439-97-6	E509	0.0050	µg/L	<0.0050	<0.0050	----	----	----
molybdenum, dissolved	7439-98-7	E421	0.050	µg/L	0.221	0.514	----	----	----
nickel, dissolved	7440-02-0	E421	0.50	µg/L	1.43	0.92	----	----	----
phosphorus, dissolved	7723-14-0	E421	50	µg/L	<50	<50	----	----	----
potassium, dissolved	7440-09-7	E421	50	µg/L	2430	3490	----	----	----
rubidium, dissolved	7440-17-7	E421	0.20	µg/L	3.84	2.09	----	----	----
selenium, dissolved	7782-49-2	E421	0.050	µg/L	<0.050	0.052	----	----	----
silicon, dissolved	7440-21-3	E421	50	µg/L	2140	4860	----	----	----
silver, dissolved	7440-22-4	E421	0.010	µg/L	<0.010	<0.010	----	----	----
sodium, dissolved	17341-25-2	E421	50	µg/L	4400	1860	----	----	----
strontium, dissolved	7440-24-6	E421	0.20	µg/L	257	394	----	----	----
sulfur, dissolved	7704-34-9	E421	500	µg/L	39700	22500	----	----	----
tellurium, dissolved	13494-80-9	E421	0.20	µg/L	<0.20	<0.20	----	----	----
thallium, dissolved	7440-28-0	E421	0.010	µg/L	<0.010	<0.010	----	----	----
thorium, dissolved	7440-29-1	E421	0.10	µg/L	<0.10	<0.10	----	----	----
tin, dissolved	7440-31-5	E421	0.10	µg/L	<0.10	<0.10	----	----	----
titanium, dissolved	7440-32-6	E421	0.30	µg/L	<0.30	<0.30	----	----	----
tungsten, dissolved	7440-33-7	E421	0.10	µg/L	<0.10	<0.10	----	----	----
uranium, dissolved	7440-61-1	E421	0.010	µg/L	0.206	0.264	----	----	----
vanadium, dissolved	7440-62-2	E421	0.50	µg/L	<0.50	<0.50	----	----	----
zinc, dissolved	7440-66-6	E421	1.0	µg/L	6.6	2.0	----	----	----
zirconium, dissolved	7440-67-7	E421	0.20	µg/L	<0.20	<0.20	----	----	----
dissolved mercury filtration location	----	EP509	-	-	Field	Field	----	----	----
dissolved metals filtration location	----	EP421	-	-	Field	Field	----	----	----



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					MW17-09B	MW17-27A	MW17-23A	----	----
Client sampling date / time					28-Aug-2020 15:00	28-Aug-2020 13:00	28-Aug-2020 11:00	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B4083-001	VA20B4083-002	VA20B4083-003	-----	-----
					Result	Result	Result	---	---
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>									
benzene	71-43-2	E611A	0.50	µg/L	----	----	<0.50	----	----
ethylbenzene	100-41-4	E611A	0.50	µg/L	----	----	<0.50	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	----	----	<0.50	----	----
styrene	100-42-5	E611A	0.50	µg/L	----	----	<0.50	----	----
toluene	108-88-3	E611A	0.50	µg/L	----	----	<0.50	----	----
xylene, m+p-	179601-23-1	E611A	0.50	µg/L	----	----	<0.50	----	----
xylene, o-	95-47-6	E611A	0.50	µg/L	----	----	<0.50	----	----
xylenes, total	1330-20-7	E611A	0.75	µg/L	----	----	<0.75	----	----
BTEX, total	----	E611A	1.2	µg/L	----	----	<1.2	----	----
<b>Volatile Organic Compounds Surrogates</b>									
bromofluorobenzene, 4-	460-00-4	E611A	0.50	%	----	----	91.0	----	----
difluorobenzene, 1,4-	540-36-3	E611A	0.50	%	----	----	110	----	----
<b>Hydrocarbons</b>									
EPH (C10-C19)	----	E601A	250	µg/L	----	----	<250	----	----
EPH (C19-C32)	----	E601A	250	µg/L	----	----	<250	----	----
HEPHw	----	EC600A	250	µg/L	----	----	<250	----	----
LEPHw	----	EC600A	250	µg/L	----	----	<250	----	----
<b>Hydrocarbons Surrogates</b>									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%	----	----	95.3	----	----
<b>Polycyclic Aromatic Hydrocarbons</b>									
acenaphthene	83-32-9	E641A	0.010	µg/L	----	----	<0.010	----	----
acenaphthylene	208-96-8	E641A	0.010	µg/L	----	----	<0.010	----	----
acridine	260-94-6	E641A	0.010	µg/L	----	----	<0.010	----	----
anthracene	120-12-7	E641A	0.010	µg/L	----	----	<0.010	----	----
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	----	----	<0.010	----	----
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	----	----	<0.0050	----	----
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	----	----	<0.010	----	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	----	----	<0.015	----	----
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	----	----	<0.010	----	----
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	----	----	<0.010	----	----
chrysene	218-01-9	E641A	0.010	µg/L	----	----	<0.010	----	----



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					MW17-09B	MW17-27A	MW17-23A	----	----
					28-Aug-2020 15:00	28-Aug-2020 13:00	28-Aug-2020 11:00	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B4083-001	VA20B4083-002	VA20B4083-003	-----	-----
					Result	Result	Result	---	---
<b>Polycyclic Aromatic Hydrocarbons</b>									
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	----	----	<0.0050	----	----
fluoranthene	206-44-0	E641A	0.010	µg/L	----	----	<0.010	----	----
fluorene	86-73-7	E641A	0.010	µg/L	----	----	<0.010	----	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	----	----	<0.010	----	----
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	----	----	<0.010	----	----
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	----	----	<0.010	----	----
naphthalene	91-20-3	E641A	0.050	µg/L	----	----	<0.050	----	----
phenanthrene	85-01-8	E641A	0.020	µg/L	----	----	<0.020	----	----
pyrene	129-00-0	E641A	0.010	µg/L	----	----	<0.010	----	----
quinoline	6027-02-7	E641A	0.050	µg/L	----	----	<0.050	----	----
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>									
acridine-d9	34749-75-2	E641A	0.010	%	----	----	79.2	----	----
chrysene-d12	1719-03-5	E641A	0.010	%	----	----	78.4	----	----
naphthalene-d8	1146-65-2	E641A	0.010	%	----	----	91.0	----	----
phenanthrene-d10	1517-22-2	E641A	0.010	%	----	----	95.8	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>VA20B4083</b>	Page	: 1 of 11
Amendment	: 1		
Client	: <b>Wood Canada Ltd.</b>	Laboratory	: Vancouver - Environmental
Contact	: Jeremiah Gladu	Account Manager	: Selam Worku
Address	: 600 - 4445 Lougheed Hwy Burnaby BC Canada V5C 0E4	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: VE52655D	Date Samples Received	: 29-Aug-2020 08:10
PO	: ----	Issue Date	: 27-Oct-2020 09:32
C-O-C number	: ----		
Sampler	: Ardy M.		
Site	: ----		
Quote number	: VA20-SEAB100-0003 - Wood/Seabridge Gold		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

## Summary of Outliers

### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.

### **Outliers : Analysis Holding Time Compliance (Breaches)**

- Analysis Holding Time Outliers exist - please see following pages for full details.

### **Outliers : Frequency of Quality Control Samples**

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> MW17-09B	E298	28-Aug-2020	----	----	----		05-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> MW17-27A	E298	28-Aug-2020	----	----	----		05-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> MW17-09B	E235.Cl	28-Aug-2020	----	----	----		01-Sep-2020	28 days	4 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> MW17-27A	E235.Cl	28-Aug-2020	----	----	----		01-Sep-2020	28 days	4 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
<b>HDPE</b> MW17-09B	E235.F	28-Aug-2020	----	----	----		01-Sep-2020	28 days	4 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
<b>HDPE</b> MW17-27A	E235.F	28-Aug-2020	----	----	----		01-Sep-2020	28 days	4 days	✓
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
<b>HDPE</b> MW17-09B	E235.NO3-L	28-Aug-2020	----	----	----		01-Sep-2020	3 days	4 days	* EHT



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE MW17-27A	E235.NO3-L	28-Aug-2020	----	----	----		01-Sep-2020	3 days	4 days	* EHT
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE MW17-09B	E235.NO2-L	28-Aug-2020	----	----	----		01-Sep-2020	3 days	4 days	* EHT
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE MW17-27A	E235.NO2-L	28-Aug-2020	----	----	----		01-Sep-2020	3 days	4 days	* EHT
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE MW17-09B	E235.SO4	28-Aug-2020	----	----	----		01-Sep-2020	28 days	4 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE MW17-27A	E235.SO4	28-Aug-2020	----	----	----		01-Sep-2020	28 days	4 days	✓
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
HDPE dissolved (nitric acid) MW17-27A	E421.Cr-L	28-Aug-2020	02-Sep-2020	180 days	5 days	✓	04-Sep-2020	174 days	2 days	✓
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
HDPE dissolved (nitric acid) MW17-09B	E421.Cr-L	28-Aug-2020	02-Sep-2020	180 days	5 days	✓	04-Sep-2020	175 days	2 days	✓
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
Glass vial dissolved (hydrochloric acid) MW17-09B	E509	28-Aug-2020	03-Sep-2020	28 days	6 days	✓	03-Sep-2020	21 days	0 days	✓
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
Glass vial dissolved (hydrochloric acid) MW17-27A	E509	28-Aug-2020	03-Sep-2020	28 days	6 days	✓	03-Sep-2020	21 days	0 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> MW17-27A	E421	28-Aug-2020	02-Sep-2020	180 days	5 days	✓	04-Sep-2020	174 days	2 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> MW17-09B	E421	28-Aug-2020	02-Sep-2020	180 days	5 days	✓	04-Sep-2020	175 days	2 days	✓
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> MW17-23A	E601A	28-Aug-2020	03-Sep-2020	14 days	6 days	✓	04-Sep-2020	40 days	1 days	✓
<b>Physical Tests : Acidity by Titration</b>										
<b>HDPE</b> MW17-09B	E283	28-Aug-2020	----	----	----		01-Sep-2020	14 days	4 days	✓
<b>Physical Tests : Acidity by Titration</b>										
<b>HDPE</b> MW17-27A	E283	28-Aug-2020	----	----	----		01-Sep-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
<b>HDPE</b> MW17-09B	E290	28-Aug-2020	----	----	----		01-Sep-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
<b>HDPE</b> MW17-27A	E290	28-Aug-2020	----	----	----		01-Sep-2020	14 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
<b>HDPE</b> MW17-09B	E100	28-Aug-2020	----	----	----		01-Sep-2020	28 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
<b>HDPE</b> MW17-27A	E100	28-Aug-2020	----	----	----		01-Sep-2020	28 days	4 days	✓





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : pH by Meter</b>											
HDPE MW17-27A	E108	28-Aug-2020	----	----	----		01-Sep-2020	0.25 hrs	100 hrs	*	EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE MW17-09B	E108	28-Aug-2020	----	----	----		01-Sep-2020	0.25 hrs	98 hrs	*	EHTR-FM
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE MW17-09B	E162	28-Aug-2020	----	----	----		03-Sep-2020	7 days	6 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE MW17-27A	E162	28-Aug-2020	----	----	----		03-Sep-2020	7 days	6 days	✓	
<b>Physical Tests : Turbidity by Nephelometry</b>											
HDPE MW17-09B	E121	28-Aug-2020	----	----	----		01-Sep-2020	3 days	3 days	✓	
<b>Physical Tests : Turbidity by Nephelometry</b>											
HDPE MW17-27A	E121	28-Aug-2020	----	----	----		01-Sep-2020	3 days	3 days	✓	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>											
Amber glass/Teflon lined cap (sodium bisulfate) MW17-23A	E641A	28-Aug-2020	03-Sep-2020	14 days	6 days	✓	04-Sep-2020	40 days	0 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
Glass vial (sodium bisulfate) MW17-23A	E611A	28-Aug-2020	01-Sep-2020	14 days	4 days	✓	01-Sep-2020	9 days	0 days	✓	

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended  
 EHT: Exceeded ALS recommended hold time prior to analysis.  
 Rec. HT: ALS recommended hold time (see units).



## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Acidity by Titration	E283	79811	1	6	16.6	5.0	✓
Alkalinity Species by Titration	E290	79809	1	10	10.0	5.0	✓
Ammonia by Fluorescence	E298	81571	1	19	5.2	5.0	✓
BTEX by Headspace GC-MS	E611A	79732	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	79791	1	20	5.0	5.0	✓
Conductivity in Water	E100	79810	1	16	6.2	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	80477	1	13	7.6	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	81229	1	11	9.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	80476	1	16	6.2	5.0	✓
Fluoride in Water by IC	E235.F	79792	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	79794	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	79795	1	20	5.0	5.0	✓
pH by Meter	E108	79808	1	15	6.6	5.0	✓
Sulfate in Water by IC	E235.SO4	79796	1	20	5.0	5.0	✓
TDS by Gravimetry	E162	81419	1	20	5.0	5.0	✓
Turbidity by Nephelometry	E121	79730	1	18	5.5	5.0	✓
<b>Laboratory Control Samples (LCS)</b>							
Acidity by Titration	E283	79811	1	6	16.6	5.0	✓
Alkalinity Species by Titration	E290	79809	1	10	10.0	5.0	✓
Ammonia by Fluorescence	E298	81571	1	19	5.2	5.0	✓
BC PHC - EPH by GC-FID	E601A	81020	1	17	5.8	5.0	✓
BTEX by Headspace GC-MS	E611A	79732	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	79791	1	20	5.0	5.0	✓
Conductivity in Water	E100	79810	1	16	6.2	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	80477	1	13	7.6	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	81229	1	11	9.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	80476	1	16	6.2	5.0	✓
Fluoride in Water by IC	E235.F	79792	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	79794	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	79795	1	20	5.0	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	81019	1	17	5.8	5.0	✓
pH by Meter	E108	79808	1	15	6.6	5.0	✓
Sulfate in Water by IC	E235.SO4	79796	1	20	5.0	5.0	✓
TDS by Gravimetry	E162	81419	1	20	5.0	5.0	✓
Turbidity by Nephelometry	E121	79730	1	18	5.5	5.0	✓
<b>Method Blanks (MB)</b>							
Acidity by Titration	E283	79811	1	6	16.6	5.0	✓



Matrix: **Water**

Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<i>Analytical Methods</i>							
<b>Method Blanks (MB) - Continued</b>							
Alkalinity Species by Titration	E290	79809	1	10	10.0	5.0	✓
Ammonia by Fluorescence	E298	81571	1	19	5.2	5.0	✓
BC PHC - EPH by GC-FID	E601A	81020	1	17	5.8	5.0	✓
BTEX by Headspace GC-MS	E611A	79732	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	79791	1	20	5.0	5.0	✓
Conductivity in Water	E100	79810	1	16	6.2	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	80477	1	13	7.6	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	81229	1	11	9.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	80476	1	16	6.2	5.0	✓
Fluoride in Water by IC	E235.F	79792	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	79794	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	79795	1	20	5.0	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	81019	1	17	5.8	5.0	✓
Sulfate in Water by IC	E235.SO4	79796	1	20	5.0	5.0	✓
TDS by Gravimetry	E162	81419	1	20	5.0	5.0	✓
Turbidity by Nephelometry	E121	79730	1	18	5.5	5.0	✓
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	81571	1	19	5.2	5.0	✓
BTEX by Headspace GC-MS	E611A	79732	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	79791	1	20	5.0	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	80477	1	13	7.6	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	81229	1	11	9.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	80476	1	16	6.2	5.0	✓
Fluoride in Water by IC	E235.F	79792	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	79794	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	79795	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	79796	1	20	5.0	5.0	✓



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 Vancouver - Environmental	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TDS by Gravimetry	E162 Vancouver - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Acidity by Titration	E283 Vancouver - Environmental	Water	APHA 2310 B (mod)	Acidity is determined by potentiometric titration to a specified endpoint.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L Vancouver - Environmental	Water	APHA 3030 B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS
Dissolved Mercury in Water by CVAAS	E509 Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
BC PHC - EPH by GC-FID	E601A Vancouver - Environmental	Water	BC MOE Lab Manual	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.
BTEX by Headspace GC-MS	E611A Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by Hexane LVI GC-MS	E641A Vancouver - Environmental	Water	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by large volume injection (LVI) GC-MS.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> ), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
LEPH and HEPH: EPH-PAH	EC600A Vancouver - Environmental	Water	BC MOE Lab Manual (LEPH and HEPH) (mod)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Acenaphthene, Acridine, Anthracene, Fluorene, Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(a)pyrene, Fluoranthene, and Pyrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
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<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO <sub>3</sub> .
Dissolved Mercury Water Filtration	EP509 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
VOCs Preparation for Headspace Analysis	EP581 Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

## QUALITY CONTROL REPORT

**Work Order** : **VA20B4083**

**Page** : 1 of 14

**Amendment** : **1**

**Client** : Wood Canada Ltd.  
**Contact** : Jeremiah Gladu  
**Address** : 1235 Main Street P.O. Box 2356  
 Smithers BC Canada V0J 2N0

**Laboratory** : Vancouver - Environmental  
**Account Manager** : Selam Worku  
**Address** : 8081 Lougheed Highway  
 Burnaby, British Columbia Canada V5A 1W9

**Telephone** : ----  
**Project** : VE52655D

**Telephone** : +1 604 253 4188  
**Date Samples Received** : 29-Aug-2020 08:10

**PO** : ----  
**C-O-C number** : ----

**Date Analysis Commenced** : 01-Sep-2020  
**Issue Date** : 27-Oct-2020 09:32

**Sampler** : Ardy M.  
**Site** : ----  
**Quote number** : VA20-SEAB100-0003 - Wood/Seabridge Gold  
**No. of samples received** : 3  
**No. of samples analysed** : 3

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

### *Signatories*

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Caitlin Macey	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Clarie Tejano		Metals, Burnaby, British Columbia
Cristina Alexandre	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kevin Duarte	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics - Water Quality, Burnaby, British Columbia
Ophelia Chiu	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Shaneel Dayal	Analyst	Metals, Burnaby, British Columbia



## **General Comments**

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

# = Indicates a QC result that did not meet the ALS DQO.





### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 79730)</b>											
VA20B4059-008	Anonymous	turbidity	----	E121	0.10	NTU	5.35	5.75	7.21%	15%	----
<b>Physical Tests (QC Lot: 79808)</b>											
VA20B4067-002	Anonymous	pH	----	E108	0.10	pH units	7.92	7.93	0.101%	4%	----
<b>Physical Tests (QC Lot: 79809)</b>											
VA20B4067-002	Anonymous	alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	53.2	53.1	0.188%	20%	----
		alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	53.2	53.1	0.188%	20%	----
<b>Physical Tests (QC Lot: 79810)</b>											
VA20B4067-002	Anonymous	conductivity	----	E100	2.0	µS/cm	278	278	0.00%	10%	----
<b>Physical Tests (QC Lot: 79811)</b>											
VA20B4067-002	Anonymous	acidity (as CaCO3)	----	E283	2.0	mg/L	<2.0	<2.0	0	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 81419)</b>											
VA20B3998-001	Anonymous	solids, total dissolved [TDS]	----	E162	20	mg/L	663	640	3.53%	20%	----
<b>Anions and Nutrients (QC Lot: 79791)</b>											
VA20B3928-009	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 79792)</b>											
VA20B3928-009	Anonymous	fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 79794)</b>											
VA20B3928-009	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 79795)</b>											
VA20B3928-009	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 79796)</b>											
VA20B3928-009	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	<0.30	<0.30	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 81571)</b>											
VA20B3953-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 80476)</b>											
VA20B3998-001	Anonymous	aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0028	0.0021	0.0008	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00014	0.00014	0.000007	Diff <2x LOR	----
		arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00012	0.00011	0.000007	Diff <2x LOR	----



Sub-Matrix: **Water** *Laboratory Duplicate (DUP) Report*

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 80476) - continued</b>											
VA20B3998-001	Anonymous	barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0914	0.0913	0.0803%	20%	----
		beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000585	0.0000698	17.6%	20%	----
		calcium, dissolved	7440-70-2	E421	0.050	mg/L	115	117	1.42%	20%	----
		cesium, dissolved	7440-46-2	E421	0.000010	mg/L	0.000011	<0.000010	0.0000007	Diff <2x LOR	----
		cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00045	0.00046	0.000002	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0091	0.0092	0.0001	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	58.4	58.8	0.689%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00018	0.00022	0.00004	Diff <2x LOR	----
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000806	0.000755	6.51%	20%	----
		nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00179	0.00187	0.00008	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	0.050	mg/L	1.20	1.22	1.22%	20%	----
		rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00102	0.00100	0.00002	Diff <2x LOR	----
		selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.0121	0.0116	4.23%	20%	----
		silicon, dissolved	7440-21-3	E421	0.050	mg/L	1.84	1.79	2.89%	20%	----
		silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		sodium, dissolved	17341-25-2	E421	0.050	mg/L	3.27	3.19	2.42%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.280	0.279	0.534%	20%	----
		sulfur, dissolved	7704-34-9	E421	0.50	mg/L	98.7	96.2	2.59%	20%	----
		tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.00276	0.00278	0.757%	20%	----
		vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0029	0.0036	0.0008	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----

**Dissolved Metals (QC Lot: 80477)**



Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 80477) - continued</b>											
VA20B3998-001	Anonymous	chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 81229)</b>											
VA20B4067-005	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Volatile Organic Compounds (QC Lot: 79732)</b>											
VA20B3842-009	Anonymous	benzene	71-43-2	E611A	0.0005	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.0005	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.0005	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.0005	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.0005	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		xylylene, m+p-	179601-23-1	E611A	0.0005	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		xylylene, o-	95-47-6	E611A	0.0005	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

### Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 79730)</b>						
turbidity	---	E121	0.1	NTU	<0.10	---
<b>Physical Tests (QCLot: 79809)</b>						
alkalinity, bicarbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
alkalinity, carbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
alkalinity, hydroxide (as CaCO3)	---	E290	1	mg/L	<1.0	---
alkalinity, phenolphthalein (as CaCO3)	---	E290	1	mg/L	<1.0	---
alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
<b>Physical Tests (QCLot: 79810)</b>						
conductivity	---	E100	1	µS/cm	<1.0	---
<b>Physical Tests (QCLot: 79811)</b>						
acidity (as CaCO3)	---	E283	2	mg/L	2.2	---
<b>Physical Tests (QCLot: 81419)</b>						
solids, total dissolved [TDS]	---	E162	10	mg/L	<10	---
<b>Anions and Nutrients (QCLot: 79791)</b>						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
<b>Anions and Nutrients (QCLot: 79792)</b>						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
<b>Anions and Nutrients (QCLot: 79794)</b>						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	---
<b>Anions and Nutrients (QCLot: 79795)</b>						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	---
<b>Anions and Nutrients (QCLot: 79796)</b>						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
<b>Anions and Nutrients (QCLot: 81571)</b>						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
<b>Dissolved Metals (QCLot: 80476)</b>						
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	---
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	---
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	---
barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	---
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	---
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	---
boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	---



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 80476) - continued</b>						
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
sodium, dissolved	17341-25-2	E421	0.05	mg/L	<0.050	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
<b>Dissolved Metals (QCLot: 80477)</b>						
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	<0.00010	----
<b>Dissolved Metals (QCLot: 81229)</b>						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
<b>Volatile Organic Compounds (QCLot: 79732)</b>						



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Volatile Organic Compounds (QCLot: 79732) - continued</b>						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	----
styrene	100-42-5	E611A	0.5	µg/L	<0.50	----
toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	<0.50	----
xylene, o-	95-47-6	E611A	0.5	µg/L	<0.50	----
<b>Hydrocarbons (QCLot: 81020)</b>						
EPH (C10-C19)	----	E601A	250	µg/L	<250	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	----
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 81019)</b>						
acenaphthene	83-32-9	E641A	0.01	µg/L	<0.010	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	<0.010	----
acridine	260-94-6	E641A	0.01	µg/L	<0.010	----
anthracene	120-12-7	E641A	0.01	µg/L	<0.010	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	<0.010	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	<0.010	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	<0.010	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	<0.010	----
chrysene	218-01-9	E641A	0.01	µg/L	<0.010	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	<0.0050	----
fluoranthene	206-44-0	E641A	0.01	µg/L	<0.010	----
fluorene	86-73-7	E641A	0.01	µg/L	<0.010	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	<0.010	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	<0.010	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	<0.010	----
naphthalene	91-20-3	E641A	0.05	µg/L	<0.050	----
phenanthrene	85-01-8	E641A	0.02	µg/L	<0.020	----
pyrene	129-00-0	E641A	0.01	µg/L	<0.010	----
quinoline	6027-02-7	E641A	0.05	µg/L	<0.050	----



## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: <b>Water</b>					Laboratory Control Sample (LCS) Report				
					Spike Concentration	Recovery (%) LCS	Recovery Limits (%)		Qualifier
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Physical Tests (QCLot: 79730)</b>									
turbidity	---	E121	0.1	NTU	200 NTU	99.0	85.0	115	---
<b>Physical Tests (QCLot: 79808)</b>									
pH	---	E108	---	pH units	7 pH units	99.8	98.0	102	---
<b>Physical Tests (QCLot: 79809)</b>									
alkalinity, phenolphthalein (as CaCO <sub>3</sub> )	---	E290	1	mg/L	229 mg/L	104	75.0	125	---
alkalinity, total (as CaCO <sub>3</sub> )	---	E290	1	mg/L	500 mg/L	101	85.0	115	---
<b>Physical Tests (QCLot: 79810)</b>									
conductivity	---	E100	1	µS/cm	146.9 µS/cm	100	90.0	110	---
<b>Physical Tests (QCLot: 79811)</b>									
acidity (as CaCO <sub>3</sub> )	---	E283	2	mg/L	50 mg/L	102	85.0	115	---
<b>Physical Tests (QCLot: 81419)</b>									
solids, total dissolved [TDS]	---	E162	10	mg/L	1000 mg/L	104	85.0	115	---
<b>Anions and Nutrients (QCLot: 79791)</b>									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	---
<b>Anions and Nutrients (QCLot: 79792)</b>									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	101	90.0	110	---
<b>Anions and Nutrients (QCLot: 79794)</b>									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	101	90.0	110	---
<b>Anions and Nutrients (QCLot: 79795)</b>									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.6	90.0	110	---
<b>Anions and Nutrients (QCLot: 79796)</b>									
sulfate (as SO <sub>4</sub> )	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	102	90.0	110	---
<b>Anions and Nutrients (QCLot: 81571)</b>									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.12 mg/L	99.7	85.0	115	---
<b>Dissolved Metals (QCLot: 80476)</b>									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	100	80.0	120	---
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	98.4	80.0	120	---
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	95.4	80.0	120	---
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	97.9	80.0	120	---
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	100	80.0	120	---
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	110	80.0	120	---
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	98.8	80.0	120	---



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 80476) - continued</b>									
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	97.8	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	105	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	100.0	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	95.3	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	95.1	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	90.0	80.0	120	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	105	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	102	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	102	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	95.8	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	101	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	92.3	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	101	70.0	130	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	98.1	80.0	120	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	101	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	93.0	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	102	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	102	80.0	120	----
sodium, dissolved	17341-25-2	E421	0.05	mg/L	50 mg/L	99.6	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	106	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	114	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	101	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	105	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	97.7	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	98.2	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	89.4	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	106	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	107	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	101	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	95.8	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	97.6	80.0	120	----
<b>Dissolved Metals (QCLot: 80477)</b>									
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	0.25 mg/L	96.9	80.0	120	----
<b>Dissolved Metals (QCLot: 81229)</b>									
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	96.8	80.0	120	----
<b>Volatile Organic Compounds (QCLot: 79732)</b>									





Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 79732) - continued</b>									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	98.2	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	91.3	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	113	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	91.4	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	97.3	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	200 µg/L	108	70.0	130	----
xylene, o-	95-47-6	E611A	0.5	µg/L	100 µg/L	94.4	70.0	130	----
<b>Hydrocarbons (QCLot: 81020)</b>									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	114	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	111	70.0	130	----
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 81019)</b>									
acenaphthene	83-32-9	E641A	0.01	µg/L	0.5 µg/L	112	60.0	130	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5 µg/L	113	60.0	130	----
acridine	260-94-6	E641A	0.01	µg/L	0.5 µg/L	97.5	60.0	130	----
anthracene	120-12-7	E641A	0.01	µg/L	0.5 µg/L	115	60.0	130	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5 µg/L	106	60.0	130	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5 µg/L	130	60.0	130	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	0.5 µg/L	117	60.0	130	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	1 µg/L	121	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5 µg/L	115	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5 µg/L	126	60.0	130	----
chrysene	218-01-9	E641A	0.01	µg/L	0.5 µg/L	114	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	0.5 µg/L	116	60.0	130	----
fluoranthene	206-44-0	E641A	0.01	µg/L	0.5 µg/L	111	60.0	130	----
fluorene	86-73-7	E641A	0.01	µg/L	0.5 µg/L	103	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5 µg/L	119	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5 µg/L	117	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	0.5 µg/L	109	60.0	130	----
naphthalene	91-20-3	E641A	0.05	µg/L	0.5 µg/L	105	50.0	130	----
phenanthrene	85-01-8	E641A	0.02	µg/L	0.5 µg/L	109	60.0	130	----
pyrene	129-00-0	E641A	0.01	µg/L	0.5 µg/L	115	60.0	130	----
quinoline	6027-02-7	E641A	0.05	µg/L	0.5 µg/L	121	60.0	130	----



### Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 79791)</b>										
VA20B3997-003	Anonymous	chloride	16887-00-6	E235.Cl	519 mg/L	500 mg/L	104	75 0	125	----
<b>Anions and Nutrients (QCLot: 79792)</b>										
VA20B3997-003	Anonymous	fluoride	16984-48-8	E235 F	4.92 mg/L	5 mg/L	98.5	75 0	125	----
<b>Anions and Nutrients (QCLot: 79794)</b>										
VA20B3997-003	Anonymous	nitrate (as N)	14797-55-8	E235 NO3-L	13.0 mg/L	12.5 mg/L	104	75 0	125	----
<b>Anions and Nutrients (QCLot: 79795)</b>										
VA20B3997-003	Anonymous	nitrite (as N)	14797-65-0	E235 NO2-L	2.45 mg/L	2.5 mg/L	98.1	75 0	125	----
<b>Anions and Nutrients (QCLot: 79796)</b>										
VA20B3997-003	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	ND mg/L	500 mg/L	ND	75 0	125	----
<b>Anions and Nutrients (QCLot: 81571)</b>										
VA20B3953-002	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.203 mg/L	0.2 mg/L	102	75 0	125	----
<b>Dissolved Metals (QCLot: 80476)</b>										
VA20B3998-002	Anonymous	aluminum, dissolved	7429-90-5	E421	0.394 mg/L	0.4 mg/L	98.5	70 0	130	----
		antimony, dissolved	7440-36-0	E421	0.0413 mg/L	0.04 mg/L	103	70 0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0377 mg/L	0.04 mg/L	94.2	70 0	130	----
		barium, dissolved	7440-39-3	E421	0.0375 mg/L	0.04 mg/L	93.8	70 0	130	----
		beryllium, dissolved	7440-41-7	E421	0.0773 mg/L	0.08 mg/L	96.6	70 0	130	----
		bismuth, dissolved	7440-69-9	E421	0.0178 mg/L	0.02 mg/L	89.3	70 0	130	----
		boron, dissolved	7440-42-8	E421	0.169 mg/L	0.2 mg/L	84.6	70 0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00789 mg/L	0.008 mg/L	98.6	70 0	130	----
		calcium, dissolved	7440-70-2	E421	ND mg/L	8 mg/L	ND	70 0	130	----
		cesium, dissolved	7440-46-2	E421	0.0204 mg/L	0.02 mg/L	102	70 0	130	----
		cobalt, dissolved	7440-48-4	E421	0.0370 mg/L	0.04 mg/L	92.4	70 0	130	----
		copper, dissolved	7440-50-8	E421	0.0362 mg/L	0.04 mg/L	90.5	70 0	130	----
		iron, dissolved	7439-89-6	E421	3.76 mg/L	4 mg/L	93.9	70 0	130	----
		lead, dissolved	7439-92-1	E421	0.0366 mg/L	0.04 mg/L	91.6	70 0	130	----
		lithium, dissolved	7439-93-2	E421	0.194 mg/L	0.2 mg/L	97.1	70 0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	2 mg/L	ND	70 0	130	----
		manganese, dissolved	7439-96-5	E421	0.0382 mg/L	0.04 mg/L	95.5	70 0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 80476) - continued</b>										
VA20B3998-002	Anonymous	molybdenum, dissolved	7439-98-7	E421	0.0432 mg/L	0.04 mg/L	108	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0725 mg/L	0.08 mg/L	90.6	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	20.3 mg/L	20 mg/L	102	70.0	130	----
		potassium, dissolved	7440-09-7	E421	8.20 mg/L	8 mg/L	102	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.0393 mg/L	0.04 mg/L	98.3	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0868 mg/L	0.08 mg/L	108	70.0	130	----
		silicon, dissolved	7440-21-3	E421	19.5 mg/L	20 mg/L	97.6	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00833 mg/L	0.008 mg/L	104	70.0	130	----
		sodium, dissolved	17341-25-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		strontium, dissolved	7440-24-6	E421	ND mg/L	0.04 mg/L	ND	70.0	130	----
		sulfur, dissolved	7704-34-9	E421	ND mg/L	40 mg/L	ND	70.0	130	----
		tellurium, dissolved	13494-80-9	E421	0.0835 mg/L	0.08 mg/L	104	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00733 mg/L	0.008 mg/L	91.7	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0419 mg/L	0.04 mg/L	105	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0408 mg/L	0.04 mg/L	102	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0778 mg/L	0.08 mg/L	97.2	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0406 mg/L	0.04 mg/L	102	70.0	130	----
		uranium, dissolved	7440-61-1	E421	ND mg/L	0.008 mg/L	ND	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.203 mg/L	0.2 mg/L	102	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.723 mg/L	0.8 mg/L	90.4	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0827 mg/L	0.08 mg/L	103	70.0	130	----
<b>Dissolved Metals (QCLot: 80477)</b>										
VA20B3998-002	Anonymous	chromium, dissolved	7440-47-3	E421.Cr-L	0.0784 mg/L	0.08 mg/L	97.9	70.0	130	----
<b>Dissolved Metals (QCLot: 81229)</b>										
VA20B4067-006	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000970 mg/L	0.0001 mg/L	97.0	70.0	130	----
<b>Volatile Organic Compounds (QCLot: 79732)</b>										
VA20B3842-011	Anonymous	benzene	71-43-2	E611A	93.2 µg/L	100 µg/L	93.2	60.0	140	----
		ethylbenzene	100-41-4	E611A	87.3 µg/L	100 µg/L	87.3	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	110 µg/L	100 µg/L	110	60.0	140	----
		styrene	100-42-5	E611A	89.2 µg/L	100 µg/L	89.2	60.0	140	----
		toluene	108-88-3	E611A	91.9 µg/L	100 µg/L	91.9	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	207 µg/L	200 µg/L	103	60.0	140	----
		xylene, o-	95-47-6	E611A	90.6 µg/L	100 µg/L	90.6	60.0	140	----

Page : 14 of 14  
Work Order : VA20B4083 Amendment 1  
Client : Wood Canada Ltd.  
Project : VE52655D

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# Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

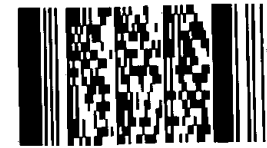
Affix ALS barcode label here (lab use only)

COC Number: 17 -

Page of

<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>			<b>Select Service Level Below - Contact your AM to confirm all E&amp;P TATs (surcharges may apply)</b>							
Company: Wood		Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)			Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply							
Contact: Jeremiah Gladu		Quality Control (QC) Report with Report <input type="checkbox"/> YES <input type="checkbox"/> NO			PRIORITY (Business Days)	4 day [P4-20%] <input type="checkbox"/>		EMERGENCY	1 Business day [E - 100%] <input type="checkbox"/>			
Phone:		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked				3 day [P3-25%] <input type="checkbox"/>			Same Day, Weekend or Statutory holiday [E2 -200%] <input type="checkbox"/>			
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX				2 day [P2-50%] <input type="checkbox"/>			(Laboratory opening fees may apply) ]			
Street: 4445 Lougheed Hwy.		Email 1 or Fax jeremiah.glsdu@woodplc.com			Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm							
City/Province: Burnaby/BC		Email 2			For tests that can not be performed according to the service level selected, you will be contacted.							
Postal Code: V5C 0E4		Email 3			<b>Analysis Request</b>							
Invoice To Same as Report To <input type="checkbox"/> YES <input type="checkbox"/> NO		<b>Invoice Distribution</b>			<b>NUMBER OF CONTAINERS</b>	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below					<b>SAMPLES ON HOLD</b>	
Copy of Invoice with Report <input type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX				BTEX	EPH/PAH	General chemistry *	DISSOLVED METALS			
Company:		Email 1 or Fax										
Contact:		Email 2										
<b>Project Information</b>		<b>Oil and Gas Required Fields (client use)</b>										
ALS Account # / Quote #:		AFE/Cost Center:	PO#									
Job #: VE52855D		Major/Minor Code:	Routing Code:									
PO / AFE:		Requisitioner:										
LSD:		Location:										
ALS Lab Work Order # (lab use only): <b>B4083</b>		ALS Contact: Selam Worku	Sampler: Ardy M.									
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type								
	<del>MW17-09B</del>	<del>25-04-20</del>	<del>15:00</del>	<del>"</del>								
2	MW17-09B	"	15:00	"								
	<del>MW17-27A</del>	<del>"</del>	<del>13:00</del>	<del>"</del>								
3	MW17-27A	"	13:00	"								
	<del>MW17-23A</del>	<del>"</del>	<del>11:00</del>	<del>"</del>								
	MW17-23A	"	11:00	"								

Environmental Division  
Vancouver  
Work Order Reference  
**VA20B4083**



Telephone : + 1 604 253 4188

<b>Drinking Water (DW) Samples<sup>1</sup> (client use)</b>		<b>Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)</b>			<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>				
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO		*GENERAL WATER CHEMISTRY TO INCLUDE: pH, Alkalinity, bicarbonate, carbonate, chloride, conductivity, fluoride, hardness, hydroxide, nitrate, nitrite, ammonia, sulphate, turbidity, TDS, acidity			Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>				
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO					Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>				
<b>SHIPMENT RELEASE (client use)</b>		<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>			Cooling Initiated <input type="checkbox"/>				
Released by: Ardy Mansourpour	Date: Aug 28, 2020	Time:	Received by: Ardy Mansourpour	Date: Aug 29, 2020	Time: 8:10	INITIAL COOLER TEMPERATURES °C		FINAL COOLER TEMPERATURES °C	
					Received by: P. Chawera				
					Date: Aug 29, 2020				
					Time: 8:10				

## CERTIFICATE OF ANALYSIS

<b>Work Order</b>	: <b>VA20B4496</b>	<b>Page</b>	: 1 of 5
<b>Amendment</b>	: <b>2</b>		
<b>Client</b>	: <b>Wood Canada Ltd.</b>	<b>Laboratory</b>	: Vancouver - Environmental
<b>Contact</b>	: Jeremiah Gladu	<b>Account Manager</b>	: Selam Worku
<b>Address</b>	: 600 - 4445 Lougheed Hwy Burnaby BC Canada V5C 0E4	<b>Address</b>	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
<b>Telephone</b>	: 604 294 3811	<b>Telephone</b>	: +1 604 253 4188
<b>Project</b>	: VE52655D	<b>Date Samples Received</b>	: 04-Sep-2020 12:20
<b>PO</b>	: ---	<b>Date Analysis Commenced</b>	: 05-Sep-2020
<b>C-O-C number</b>	: ---	<b>Issue Date</b>	: 29-Oct-2020 09:48
<b>Sampler</b>	: Ardy M.		
<b>Site</b>	: ---		
<b>Quote number</b>	: VA20-SEAB100-0003 - Wood/Seabridge Gold		
<b>No. of samples received</b>	: 1		
<b>No. of samples analysed</b>	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Angelo Salandanan	Lab Assistant	Metals, Burnaby, British Columbia
Bruna Botti	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Cristina Alexandre	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics - Water Quality, Burnaby, British Columbia
Shaneel Dayal	Analyst	Metals, Burnaby, British Columbia



## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
-	No Unit
µg/L	micrograms per litre
µS/cm	Microsiemens per centimetre
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in reports identified as "Preliminary Report" are considered authorized for use.

## Workorder Comments

Cesium, Rubidium, Tellurium, Thorium and Tungsten have been added to the report.



## Analytical Results

Sub-Matrix: Water					Client sample ID	MW17-09A	---	---	---	---
(Matrix: Water)					Client sampling date / time	29-Aug-2020	---	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20B4496-001	-----	-----	-----	-----	-----
					Result	---	---	---	---	---
<b>Physical Tests</b>										
acidity (as CaCO3)	---	E283	2.0	mg/L	3.3	---	---	---	---	---
alkalinity, bicarbonate (as CaCO3)	---	E290	1.0	mg/L	167	---	---	---	---	---
alkalinity, carbonate (as CaCO3)	---	E290	1.0	mg/L	<1.0	---	---	---	---	---
alkalinity, hydroxide (as CaCO3)	---	E290	1.0	mg/L	<1.0	---	---	---	---	---
alkalinity, phenolphthalein (as CaCO3)	---	E290	1.0	mg/L	<1.0	---	---	---	---	---
alkalinity, total (as CaCO3)	---	E290	1.0	mg/L	167	---	---	---	---	---
conductivity	---	E100	2.0	µS/cm	386	---	---	---	---	---
hardness (as CaCO3), dissolved	---	EC100	600	µg/L	160000	---	---	---	---	---
pH	---	E108	0.10	pH units	8.03	---	---	---	---	---
solids, total dissolved [TDS]	---	E162	10	mg/L	269	---	---	---	---	---
turbidity	---	E121	0.10	NTU	149	---	---	---	---	---
<b>Anions and Nutrients</b>										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0102	---	---	---	---	---
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	---	---	---	---	---
chloride	16887-00-6	E235.Cl	0.50	mg/L	1.89	---	---	---	---	---
fluoride	16984-48-8	E235.F	0.020	mg/L	0.178	---	---	---	---	---
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0086	---	---	---	---	---
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0011	---	---	---	---	---
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	49.3	---	---	---	---	---
<b>Dissolved Metals</b>										
aluminum, dissolved	7429-90-5	E421	1.0	µg/L	66.5	---	---	---	---	---
antimony, dissolved	7440 36 0	E421	0.10	µg/L	0.36	---	---	---	---	---
arsenic, dissolved	7440-38-2	E421	0.10	µg/L	3.03	---	---	---	---	---
barium, dissolved	7440 39 3	E421	0.10	µg/L	90.4	---	---	---	---	---
beryllium, dissolved	7440-41-7	E421	0.020	µg/L	<0.020	---	---	---	---	---
bismuth, dissolved	7440-69-9	E421	0.050	µg/L	<0.050	---	---	---	---	---
boron, dissolved	7440-42-8	E421	10	µg/L	66	---	---	---	---	---
cadmium, dissolved	7440-43-9	E421	0.0050	µg/L	0.0174	---	---	---	---	---
calcium, dissolved	7440-70-2	E421	50	µg/L	53200	---	---	---	---	---
cesium, dissolved	7440-46-2	E421	0.010	µg/L	0.029	---	---	---	---	---
chromium, dissolved	7440-47-3	E421.Cr-L	0.10	µg/L	<0.10	---	---	---	---	---





## Analytical Results

Sub-Matrix: Water					Client sample ID	MW17-09A	----	----	----	----
(Matrix: Water)					Client sampling date / time	29-Aug-2020	----	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B4496-001	-----	-----	-----	-----	
					Result	---	---	---	---	
<b>Dissolved Metals</b>										
cobalt, dissolved	7440-48-4	E421	0.10	µg/L	0.56	----	----	----	----	
copper, dissolved	7440-50-8	E421	0.20	µg/L	<0.20	----	----	----	----	
iron, dissolved	7439-89-6	E421	10	µg/L	1970	----	----	----	----	
lead, dissolved	7439-92-1	E421	0.050	µg/L	0.437	----	----	----	----	
lithium, dissolved	7439-93-2	E421	1.0	µg/L	8.5	----	----	----	----	
magnesium, dissolved	7439-95-4	E421	100	µg/L	6630	----	----	----	----	
manganese, dissolved	7439-96-5	E421	0.10	µg/L	1760	----	----	----	----	
mercury, dissolved	7439-97-6	E509	0.0050	µg/L	<0.0050	----	----	----	----	
molybdenum, dissolved	7439-98-7	E421	0.050	µg/L	4.08	----	----	----	----	
nickel, dissolved	7440-02-0	E421	0.50	µg/L	1.95	----	----	----	----	
phosphorus, dissolved	7723-14-0	E421	50	µg/L	<50	----	----	----	----	
potassium, dissolved	7440-09-7	E421	100	µg/L	6360	----	----	----	----	
rubidium, dissolved	7440-17-7	E421	0.20	µg/L	2.11	----	----	----	----	
selenium, dissolved	7782-49-2	E421	0.050	µg/L	0.217	----	----	----	----	
silicon, dissolved	7440-21-3	E421	50	µg/L	5470	----	----	----	----	
silver, dissolved	7440-22-4	E421	0.010	µg/L	<0.010	----	----	----	----	
sodium, dissolved	17341-25-2	E421	50	µg/L	36300	----	----	----	----	
strontium, dissolved	7440-24-6	E421	0.20	µg/L	332	----	----	----	----	
sulfur, dissolved	7704-34-9	E421	500	µg/L	21200	----	----	----	----	
tellurium, dissolved	13494-80-9	E421	0.20	µg/L	<0.20	----	----	----	----	
thallium, dissolved	7440-28-0	E421	0.010	µg/L	<0.010	----	----	----	----	
thorium, dissolved	7440-29-1	E421	0.10	µg/L	<0.10	----	----	----	----	
tin, dissolved	7440-31-5	E421	0.10	µg/L	0.28	----	----	----	----	
titanium, dissolved	7440-32-6	E421	0.30	µg/L	7.02	----	----	----	----	
tungsten, dissolved	7440-33-7	E421	0.10	µg/L	<0.10	----	----	----	----	
uranium, dissolved	7440-61-1	E421	0.010	µg/L	5.94	----	----	----	----	
vanadium, dissolved	7440-62-2	E421	0.50	µg/L	<0.50	----	----	----	----	
zinc, dissolved	7440-66-6	E421	1.0	µg/L	9.3	----	----	----	----	
zirconium, dissolved	7440-67-7	E421	0.30	µg/L	<0.30	----	----	----	----	
dissolved mercury filtration location	----	EP509	-	-	Field	----	----	----	----	
dissolved metals filtration location	----	EP421	-	-	Field	----	----	----	----	



Please refer to the General Comments section for an explanation of any qualifiers detected.

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## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>VA20B4496</b>	Page	: 1 of 9
Amendment	: <b>2</b>		
Client	: <b>Wood Canada Ltd.</b>	Laboratory	: Vancouver - Environmental
Contact	: Jeremiah Gladu	Account Manager	: Selam Worku
Address	: 600 - 4445 Lougheed Hwy Burnaby BC Canada V5C 0E4	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: VE52655D	Date Samples Received	: 04-Sep-2020 12:20
PO	: ----	Issue Date	: 29-Oct-2020 09:48
C-O-C number	: ----		
Sampler	: Ardy M.		
Site	: ----		
Quote number	: VA20-SEAB100-0003 - Wood/Seabridge Gold		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

## Summary of Outliers

### Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

### Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

### Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

### Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers occur - please see following pages for full details.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> MW17-09A	E298	29-Aug-2020	----	----	----		11-Sep-2020	28 days	12 days	✓
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
<b>HDPE</b> MW17-09A	E235.Br-L	29-Aug-2020	----	----	----		05-Sep-2020	28 days	6 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> MW17-09A	E235.Cl	29-Aug-2020	----	----	----		05-Sep-2020	28 days	6 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
<b>HDPE</b> MW17-09A	E235.F	29-Aug-2020	----	----	----		05-Sep-2020	28 days	6 days	✓
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
<b>HDPE</b> MW17-09A	E235.NO3-L	29-Aug-2020	----	----	----		05-Sep-2020	3 days	6 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
<b>HDPE</b> MW17-09A	E235.NO2-L	29-Aug-2020	----	----	----		05-Sep-2020	3 days	6 days	* EHTR
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
<b>HDPE</b> MW17-09A	E235.SO4	29-Aug-2020	----	----	----		05-Sep-2020	28 days	6 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> MW17-09A	E421.Cr-L	29-Aug-2020	11-Sep-2020	180 days	12 days	✓	11-Sep-2020	167 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> MW17-09A	E509	29-Aug-2020	06-Sep-2020	28 days	7 days	✓	06-Sep-2020	20 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> MW17-09A	E421	29-Aug-2020	11-Sep-2020	180 days	12 days	✓	11-Sep-2020	167 days	0 days	✓	
<b>Physical Tests : Acidity by Titration</b>											
<b>HDPE</b> MW17-09A	E283	29-Aug-2020	----	----	----		05-Sep-2020	14 days	6 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> MW17-09A	E290	29-Aug-2020	----	----	----		05-Sep-2020	14 days	6 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
<b>HDPE</b> MW17-09A	E100	29-Aug-2020	----	----	----		05-Sep-2020	28 days	6 days	✓	
<b>Physical Tests : pH by Meter</b>											
<b>HDPE</b> MW17-09A	E108	29-Aug-2020	----	----	----		05-Sep-2020	0.25 hrs	163 hrs	* EHTR-FM	
<b>Physical Tests : TDS by Gravimetry</b>											
<b>HDPE</b> MW17-09A	E162	29-Aug-2020	----	----	----		05-Sep-2020	7 days	6 days	✓	
<b>Physical Tests : Turbidity by Nephelometry</b>											
<b>HDPE</b> MW17-09A	E121	29-Aug-2020	----	----	----		08-Sep-2020	3 days	9 days	* EHTR	

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHTR: Exceeded ALS recommended hold time prior to sample receipt.

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Work Order : VA20B4496 Amendment 2  
Client : Wood Canada Ltd.  
Project : VE52655D

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Rec. HT: ALS recommended hold time (see units).

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## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Acidity by Titration	E283	82123	0	1	0.0	5.0	✖
Alkalinity Species by Titration	E290	82120	0	2	0.0	5.0	✖
Ammonia by Fluorescence	E298	84471	1	19	5.2	5.0	✔
Bromide in Water by IC (Low Level)	E235.Br-L	82109	1	14	7.1	5.0	✔
Chloride in Water by IC	E235.Cl	82107	1	14	7.1	5.0	✔
Conductivity in Water	E100	82121	1	2	50.0	5.0	✔
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	84373	1	1	100.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	82452	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	84372	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	82108	1	14	7.1	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	82110	1	15	6.6	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	82111	1	15	6.6	5.0	✔
pH by Meter	E108	82119	1	3	33.3	5.0	✔
Sulfate in Water by IC	E235.SO4	82112	1	14	7.1	5.0	✔
TDS by Gravimetry	E162	82114	1	19	5.2	5.0	✔
Turbidity by Nephelometry	E121	82696	1	20	5.0	5.0	✔
<b>Laboratory Control Samples (LCS)</b>							
Acidity by Titration	E283	82123	1	1	100.0	5.0	✔
Alkalinity Species by Titration	E290	82120	1	2	50.0	5.0	✔
Ammonia by Fluorescence	E298	84471	1	19	5.2	5.0	✔
Bromide in Water by IC (Low Level)	E235.Br-L	82109	1	14	7.1	5.0	✔
Chloride in Water by IC	E235.Cl	82107	1	14	7.1	5.0	✔
Conductivity in Water	E100	82121	1	2	50.0	5.0	✔
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	84373	1	1	100.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	82452	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	84372	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	82108	1	14	7.1	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	82110	1	15	6.6	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	82111	1	15	6.6	5.0	✔
pH by Meter	E108	82119	1	3	33.3	5.0	✔
Sulfate in Water by IC	E235.SO4	82112	1	14	7.1	5.0	✔
TDS by Gravimetry	E162	82114	1	19	5.2	5.0	✔
Turbidity by Nephelometry	E121	82696	1	20	5.0	5.0	✔
<b>Method Blanks (MB)</b>							
Acidity by Titration	E283	82123	1	1	100.0	5.0	✔
Alkalinity Species by Titration	E290	82120	1	2	50.0	5.0	✔
Ammonia by Fluorescence	E298	84471	1	19	5.2	5.0	✔





Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<i>Analytical Methods</i>							
<b>Method Blanks (MB) - Continued</b>							
Bromide in Water by IC (Low Level)	E235.Br-L	82109	1	14	7.1	5.0	✔
Chloride in Water by IC	E235.Cl	82107	1	14	7.1	5.0	✔
Conductivity in Water	E100	82121	1	2	50.0	5.0	✔
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	84373	1	1	100.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	82452	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	84372	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	82108	1	14	7.1	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	82110	1	15	6.6	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	82111	1	15	6.6	5.0	✔
Sulfate in Water by IC	E235.SO4	82112	1	14	7.1	5.0	✔
TDS by Gravimetry	E162	82114	1	19	5.2	5.0	✔
Turbidity by Nephelometry	E121	82696	1	20	5.0	5.0	✔
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	84471	1	19	5.2	5.0	✔
Bromide in Water by IC (Low Level)	E235.Br-L	82109	1	14	7.1	5.0	✔
Chloride in Water by IC	E235.Cl	82107	1	14	7.1	5.0	✔
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	84373	0	1	0.0	5.0	✖
Dissolved Mercury in Water by CVAAS	E509	82452	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	84372	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	82108	1	14	7.1	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	82110	1	15	6.6	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	82111	1	15	6.6	5.0	✔
Sulfate in Water by IC	E235.SO4	82112	1	14	7.1	5.0	✔



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 Vancouver - Environmental	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TDS by Gravimetry	E162 Vancouver - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Bromide in Water by IC (Low Level)	E235.Br-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Acidity by Titration	E283  Vancouver - Environmental	Water	APHA 2310 B (mod)	Acidity is determined by potentiometric titration to a specified endpoint.
Alkalinity Species by Titration	E290  Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298  Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
Dissolved Metals in Water by CRC ICPMS	E421  Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L  Vancouver - Environmental	Water	APHA 3030 B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS
Dissolved Mercury in Water by CVAAS	E509  Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
Dissolved Hardness (Calculated)	EC100  Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> ), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals Water Filtration	EP421  Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO <sub>3</sub> .
Dissolved Mercury Water Filtration	EP509  Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.

## QUALITY CONTROL REPORT

**Work Order** : **VA20B4496**

**Page** : 1 of 11

**Amendment** : **2**

**Client** : Wood Canada Ltd.  
**Contact** : Jeremiah Gladu  
**Address** : 1235 Main Street P.O. Box 2536  
 Smithers BC Canada V0J 2N0

**Laboratory** : Vancouver - Environmental  
**Account Manager** : Selam Worku  
**Address** : 8081 Lougheed Highway  
 Burnaby, British Columbia Canada V5A 1W9

**Telephone** : ----  
**Project** : VE52655D  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : Ardy M.  
**Site** : ----  
**Quote number** : VA20-SEAB100-0003 - Wood/Seabridge Gold  
**No. of samples received** : 1  
**No. of samples analysed** : 1

**Telephone** : +1 604 253 4188  
**Date Samples Received** : 04-Sep-2020 12:20  
**Date Analysis Commenced** : 05-Sep-2020  
**Issue Date** : 29-Oct-2020 09:48

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Angelo Salandanan	Lab Assistant	Metals, Burnaby, British Columbia
Bruna Botti	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Cristina Alexandre	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics - Water Quality, Burnaby, British Columbia
Shaneel Dayal	Analyst	Metals, Burnaby, British Columbia



## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

# = Indicates a QC result that did not meet the ALS DQO.



### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 82114)</b>											
VA20B4461-001	Anonymous	solids, total dissolved [TDS]	----	E162	20	mg/L	251	243	3.24%	20%	----
<b>Physical Tests (QC Lot: 82119)</b>											
VA20B4492-001	Anonymous	pH	----	E108	0.10	pH units	8.27	8.28	0.121%	4%	----
<b>Physical Tests (QC Lot: 82121)</b>											
VA20B4492-001	Anonymous	conductivity	----	E100	2.0	µS/cm	390	389	0.257%	10%	----
<b>Physical Tests (QC Lot: 82696)</b>											
KS2001625-001	Anonymous	turbidity	----	E121	0.10	NTU	2.76	2.82	1.79%	15%	----
<b>Anions and Nutrients (QC Lot: 82107)</b>											
KS2001630-002	Anonymous	chloride	16887-00-6	E235.Cl	2.50	mg/L	46.8	47.1	0.696%	20%	----
<b>Anions and Nutrients (QC Lot: 82108)</b>											
KS2001630-002	Anonymous	fluoride	16984-48-8	E235.F	0.100	mg/L	0.202	0.197	0.006	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 82109)</b>											
KS2001630-002	Anonymous	bromide	24959-67-9	E235.Br-L	0.250	mg/L	<0.250	<0.250	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 82110)</b>											
KS2001630-002	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	<0.0250	<0.0250	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 82111)</b>											
KS2001630-002	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 82112)</b>											
KS2001630-002	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	1.50	mg/L	406	417	2.61%	20%	----
<b>Anions and Nutrients (QC Lot: 84471)</b>											
VA20B4374-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.500	mg/L	8.22	8.31	1.13%	20%	----
<b>Dissolved Metals (QC Lot: 82452)</b>											
VA20B4493-010	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 84372)</b>											
VA20B4496-001	MW17-09A	aluminum, dissolved	7429-90-5	E421	1.00	mg/L	66.5 µg/L	0.0656	1.35%	20%	----
		antimony, dissolved	7440-36-0	E421	0.100	mg/L	0.36 µg/L	0.00036	0.000003	Diff <2x LOR	----
		arsenic, dissolved	7440-38-2	E421	0.100	mg/L	3.03 µg/L	0.00316	4.35%	20%	----
		barium, dissolved	7440-39-3	E421	0.100	mg/L	90.4 µg/L	0.0908	0.487%	20%	----
		beryllium, dissolved	7440-41-7	E421	0.0200	mg/L	<0.020 µg/L	<0.000020	0	Diff <2x LOR	----
		bismuth, dissolved	7440-69-9	E421	0.0500	mg/L	<0.050 µg/L	<0.000050	0	Diff <2x LOR	----
		boron, dissolved	7440-42-8	E421	10.0	mg/L	66 µg/L	0.065	0.001	Diff <2x LOR	----



Sub-Matrix: **Water** *Laboratory Duplicate (DUP) Report*

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 84372) - continued</b>											
VA20B4496-001	MW17-09A	cadmium, dissolved	7440-43-9	E421	0.00500	mg/L	0 0174 µg/L	0.0000143	0.0000031	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E421	50 0	mg/L	53200 µg/L	53.5	0.495%	20%	----
		cesium, dissolved	7440-46-2	E421	0 0100	mg/L	0.029 µg/L	0 000028	0.0000005	Diff <2x LOR	----
		cobalt, dissolved	7440-48-4	E421	0.100	mg/L	0.56 µg/L	0.00055	0 000005	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.200	mg/L	<0.20 µg/L	<0.00020	0	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E421	10 0	mg/L	1970 µg/L	2 04	3.53%	20%	----
		lead, dissolved	7439-92-1	E421	0 0500	mg/L	0.437 µg/L	0 000447	0 000009	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E421	1.00	mg/L	8.5 µg/L	0.0084	0.0002	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	100	mg/L	6630 µg/L	6 88	3.67%	20%	----
		manganese, dissolved	7439-96-5	E421	0.100	mg/L	1760 µg/L	1.77	0.516%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0 0500	mg/L	4.08 µg/L	0.00403	1.29%	20%	----
		nickel, dissolved	7440-02-0	E421	0.500	mg/L	1.95 µg/L	0.00199	0.00004	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E421	50 0	mg/L	<50 µg/L	<0.050	0	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	100	mg/L	6360 µg/L	6 51	2.40%	20%	----
		rubidium, dissolved	7440-17-7	E421	0.200	mg/L	2.11 µg/L	0.00207	1.81%	20%	----
		selenium, dissolved	7782-49-2	E421	0 0500	mg/L	0.217 µg/L	0 000178	0 000039	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	50 0	mg/L	5470 µg/L	5.72	4.34%	20%	----
		silver, dissolved	7440-22-4	E421	0 0100	mg/L	<0.010 µg/L	<0 000010	0	Diff <2x LOR	----
		sodium, dissolved	17341-25-2	E421	50 0	mg/L	36300 µg/L	37.4	3.10%	20%	----
		strontium, dissolved	7440-24-6	E421	0.200	mg/L	332 µg/L	0.333	0.139%	20%	----
		sulfur, dissolved	7704-34-9	E421	500	mg/L	21200 µg/L	21.9	3.15%	20%	----
		tellurium, dissolved	13494-80-9	E421	0.200	mg/L	<0.20 µg/L	<0.00020	0	Diff <2x LOR	----
		thallium, dissolved	7440-28-0	E421	0 0100	mg/L	<0.010 µg/L	<0 000010	0	Diff <2x LOR	----
		thorium, dissolved	7440-29-1	E421	0.100	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		tin, dissolved	7440-31-5	E421	0.100	mg/L	0.28 µg/L	0.00030	0.00002	Diff <2x LOR	----
		titanium, dissolved	7440-32-6	E421	0.300	mg/L	7.02 µg/L	0.00667	5.07%	20%	----
		tungsten, dissolved	7440-33-7	E421	0.100	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E421	0 0100	mg/L	5.94 µg/L	0.00610	2.56%	20%	----
		vanadium, dissolved	7440-62-2	E421	0.500	mg/L	<0.50 µg/L	<0.00050	0	Diff <2x LOR	----
		zinc, dissolved	7440-66-6	E421	1.00	mg/L	9.3 µg/L	0.0096	0.0002	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.300	mg/L	<0.30 µg/L	<0.00030	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 84373)</b>											
VA20B4496-001	MW17-09A	chromium, dissolved	7440-47-3	E421.Cr-L	0.100	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 82114)</b>						
solids, total dissolved [TDS]	---	E162	10	mg/L	<10	---
<b>Physical Tests (QCLot: 82120)</b>						
alkalinity, bicarbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
alkalinity, carbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
alkalinity, hydroxide (as CaCO3)	---	E290	1	mg/L	<1.0	---
alkalinity, phenolphthalein (as CaCO3)	---	E290	1	mg/L	<1.0	---
alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
<b>Physical Tests (QCLot: 82121)</b>						
conductivity	---	E100	1	µS/cm	<1.0	---
<b>Physical Tests (QCLot: 82123)</b>						
acidity (as CaCO3)	---	E283	2	mg/L	<2.0	---
<b>Physical Tests (QCLot: 82696)</b>						
turbidity	---	E121	0.1	NTU	<0.10	---
<b>Anions and Nutrients (QCLot: 82107)</b>						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
<b>Anions and Nutrients (QCLot: 82108)</b>						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
<b>Anions and Nutrients (QCLot: 82109)</b>						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	---
<b>Anions and Nutrients (QCLot: 82110)</b>						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	---
<b>Anions and Nutrients (QCLot: 82111)</b>						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	---
<b>Anions and Nutrients (QCLot: 82112)</b>						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
<b>Anions and Nutrients (QCLot: 84471)</b>						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
<b>Dissolved Metals (QCLot: 82452)</b>						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	---
<b>Dissolved Metals (QCLot: 84372)</b>						
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	---
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	---
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	---





Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 84372) - continued</b>						
barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
sodium, dissolved	17341-25-2	E421	0.05	mg/L	<0.050	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
<b>Dissolved Metals (QCLot: 84373)</b>						

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Work Order : VA20B4496 Amendment 2  
Client : Wood Canada Ltd.  
Project : VE52655D



Sub-Matrix: **Water**

<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Result</i>	<i>Qualifier</i>
<b>Dissolved Metals (QCLot: 84373) - continued</b>						
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	<0.00010	----



## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: <b>Water</b>					Laboratory Control Sample (LCS) Report				
					Spike Concentration	Recovery (%) LCS	Recovery Limits (%)		Qualifier
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Physical Tests (QCLot: 82114)</b>									
solids, total dissolved [TDS]	---	E162	10	mg/L	1000 mg/L	105	85.0	115	----
<b>Physical Tests (QCLot: 82119)</b>									
pH	---	E108	----	pH units	7 pH units	100	98.0	102	----
<b>Physical Tests (QCLot: 82120)</b>									
alkalinity, phenolphthalein (as CaCO3)	---	E290	1	mg/L	229 mg/L	87.4	75.0	125	----
alkalinity, total (as CaCO3)	---	E290	1	mg/L	500 mg/L	102	85.0	115	----
<b>Physical Tests (QCLot: 82121)</b>									
conductivity	---	E100	1	µS/cm	146.9 µS/cm	103	90.0	110	----
<b>Physical Tests (QCLot: 82123)</b>									
acidity (as CaCO3)	---	E283	2	mg/L	50 mg/L	97.8	85.0	115	----
<b>Physical Tests (QCLot: 82696)</b>									
turbidity	---	E121	0.1	NTU	200 NTU	101	85.0	115	----
<b>Anions and Nutrients (QCLot: 82107)</b>									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	100	90.0	110	----
<b>Anions and Nutrients (QCLot: 82108)</b>									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	100	90.0	110	----
<b>Anions and Nutrients (QCLot: 82109)</b>									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	94.4	85.0	115	----
<b>Anions and Nutrients (QCLot: 82110)</b>									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	100	90.0	110	----
<b>Anions and Nutrients (QCLot: 82111)</b>									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.6	90.0	110	----
<b>Anions and Nutrients (QCLot: 82112)</b>									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	101	90.0	110	----
<b>Anions and Nutrients (QCLot: 84471)</b>									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.12 mg/L	94.0	85.0	115	----
<b>Dissolved Metals (QCLot: 82452)</b>									
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	102	80.0	120	----
<b>Dissolved Metals (QCLot: 84372)</b>									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	107	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	99.2	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	103	80.0	120	----



Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 84372) - continued</b>									
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	109	80.0	120	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	104	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	106	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	105	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	108	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	103	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	98.7	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	105	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	104	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	99.7	80.0	120	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	106	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	105	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	92.2	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	118	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	100	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	103	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	97.7	70.0	130	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	107	80.0	120	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	105	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	104	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	106	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	102	80.0	120	----
sodium, dissolved	17341-25-2	E421	0.05	mg/L	50 mg/L	108	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	101	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	89.0	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	102	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	105	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	99.8	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	102	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	103	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	104	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	107	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	105	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	110	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	98.3	80.0	120	----
<b>Dissolved Metals (QCLot: 84373)</b>									
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	0.25 mg/L	106	80.0	120	----



### Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 82107)</b>										
KS2001630-003	Anonymous	chloride	16887-00-6	E235.Cl	507 mg/L	500 mg/L	101	75 0	125	----
<b>Anions and Nutrients (QCLot: 82108)</b>										
KS2001630-003	Anonymous	fluoride	16984-48-8	E235 F	5.04 mg/L	5 mg/L	101	75 0	125	----
<b>Anions and Nutrients (QCLot: 82109)</b>										
KS2001630-003	Anonymous	bromide	24959-67-9	E235 Br-L	2.40 mg/L	2.5 mg/L	95.8	75 0	125	----
<b>Anions and Nutrients (QCLot: 82110)</b>										
KS2001630-003	Anonymous	nitrate (as N)	14797-55-8	E235 NO3-L	12.6 mg/L	12.5 mg/L	101	75 0	125	----
<b>Anions and Nutrients (QCLot: 82111)</b>										
KS2001630-003	Anonymous	nitrite (as N)	14797-65-0	E235 NO2-L	2.50 mg/L	2.5 mg/L	100	75 0	125	----
<b>Anions and Nutrients (QCLot: 82112)</b>										
KS2001630-003	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	500 mg/L	500 mg/L	100	75 0	125	----
<b>Anions and Nutrients (QCLot: 84471)</b>										
VA20B4378-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	11.4 mg/L	10 mg/L	114	75 0	125	----
<b>Dissolved Metals (QCLot: 82452)</b>										
VA20B4493-011	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000929 mg/L	0 0001 mg/L	92.9	70 0	130	----
<b>Dissolved Metals (QCLot: 84372)</b>										
VA20B4470-002	Anonymous	aluminum, dissolved	7429-90-5	E421	0.198 mg/L	0.2 mg/L	98.8	70 0	130	----
		antimony, dissolved	7440-36-0	E421	0 0201 mg/L	0.02 mg/L	101	70 0	130	----
		arsenic, dissolved	7440-38-2	E421	0 0185 mg/L	0.02 mg/L	92.3	70 0	130	----
		barium, dissolved	7440-39-3	E421	0 0198 mg/L	0.02 mg/L	98.9	70 0	130	----
		beryllium, dissolved	7440-41-7	E421	0 0414 mg/L	0.04 mg/L	104	70 0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00985 mg/L	0.01 mg/L	98.5	70 0	130	----
		boron, dissolved	7440-42-8	E421	0.097 mg/L	0.1 mg/L	97.0	70 0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00389 mg/L	0.004 mg/L	97.4	70 0	130	----
		calcium, dissolved	7440-70-2	E421	3.97 mg/L	4 mg/L	99.4	70 0	130	----
		cesium, dissolved	7440-46-2	E421	0.00985 mg/L	0.01 mg/L	98.5	70 0	130	----
		cobalt, dissolved	7440-48-4	E421	0 0192 mg/L	0.02 mg/L	96.1	70 0	130	----
		copper, dissolved	7440-50-8	E421	0 0190 mg/L	0.02 mg/L	95.1	70 0	130	----
		iron, dissolved	7439-89-6	E421	1.86 mg/L	2 mg/L	93.3	70 0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 84372) - continued</b>										
VA20B4470-002	Anonymous	lead, dissolved	7439-92-1	E421	0.0203 mg/L	0.02 mg/L	102	70.0	130	----
		lithium, dissolved	7439-93-2	E421	0.101 mg/L	0.1 mg/L	101	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	0.993 mg/L	1 mg/L	99.3	70.0	130	----
		manganese, dissolved	7439-96-5	E421	0.0187 mg/L	0.02 mg/L	93.5	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	0.0199 mg/L	0.02 mg/L	99.4	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0385 mg/L	0.04 mg/L	96.2	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	9.80 mg/L	10 mg/L	98.0	70.0	130	----
		potassium, dissolved	7440-09-7	E421	3.92 mg/L	4 mg/L	97.9	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.0187 mg/L	0.02 mg/L	93.6	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0392 mg/L	0.04 mg/L	97.9	70.0	130	----
		silicon, dissolved	7440-21-3	E421	9.07 mg/L	10 mg/L	90.7	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00407 mg/L	0.004 mg/L	102	70.0	130	----
		sodium, dissolved	17341-25-2	E421	2.21 mg/L	2 mg/L	110	70.0	130	----
		strontium, dissolved	7440-24-6	E421	0.0193 mg/L	0.02 mg/L	96.6	70.0	130	----
		sulfur, dissolved	7704-34-9	E421	20.4 mg/L	20 mg/L	102	70.0	130	----
		tellurium, dissolved	13494-80-9	E421	0.0428 mg/L	0.04 mg/L	107	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00402 mg/L	0.004 mg/L	100	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0204 mg/L	0.02 mg/L	102	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0188 mg/L	0.02 mg/L	94.3	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0379 mg/L	0.04 mg/L	94.7	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0200 mg/L	0.02 mg/L	100	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.00388 mg/L	0.004 mg/L	97.0	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.0947 mg/L	0.1 mg/L	94.7	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.403 mg/L	0.4 mg/L	101	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0402 mg/L	0.04 mg/L	100	70.0	130	----



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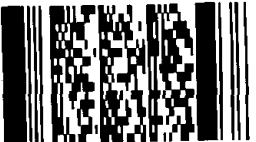
**Chain of Custody (COC) / Analytical Request Form**

Canada Toll Free: 1 800 668 9878

**Affix ALS barcode label here**  
(lab use only)

COC Number: 17 -

Page of

<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>			<b>Select Service Level Below - Contact your AM to confirm all E&amp;P TATs (surcharges may apply)</b>					
Company: Wood.		Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)			<b>Regular [R]</b> <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply					
Contact: Jeremiah Gladu		Quality Control (QC) Report with Report <input type="checkbox"/> YES <input type="checkbox"/> NO			PROPERTY (Business Days) 4 day [P4-20%] <input type="checkbox"/> 3 day [P3-25%] <input type="checkbox"/> 2 day [P2-50%] <input type="checkbox"/>		EMERGENCY 1 Business day [E - 100%] <input type="checkbox"/> Same Day, Weekend or Statutory holiday [E2 -200%] (Laboratory opening fees may apply) <input type="checkbox"/>			
Phone:		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked								
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm					
Street: 4445 Lougheed Hwy.		Email 1 or Fax jeremiah.gladu@woodpic.com			For tests that can not be performed according to the service level selected, you will be contacted.					
City/Province: Burnaby/BC		Email 2 a.mansour@			<b>Analysis Request</b> Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below					
Postal Code: V5C 0E4		Email 3								
<b>Invoice To</b>		<b>Invoice Distribution</b>			<b>NUMBER OF CONTAINERS</b>					
Same as Report To <input type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX								
Copy of Invoice with Report <input type="checkbox"/> YES <input type="checkbox"/> NO		Email 1 or Fax								
Company:		Email 2								
Contact:										
<b>Project Information</b>		<b>Oil and Gas Required Fields (client use)</b>								
ALS Account # / Quote #:		AFE/Cost Center:	PO#:							
Job #: VE52655D		Major/Minor Code:	Routing Code:							
PO / AFE:		Requisitioner:								
LSD:		Location:								
ALS Lab Work Order # (lab use only):		ALS Contact: Selam Worku		Sampler: Ardy M.		<div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>Environmental Division Vancouver Work Order Reference <b>VA20B4496</b></p>  <p>Telephone: +1 604 253 4188</p> </div>				
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)		Date (dd-mmm-yy)	Time (hh:mm)	Sample Type					
	MW17-09A		29-Aug-20	AM	GW					
<b>Drinking Water (DW) Samples<sup>1</sup> (client use)</b>		<b>Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)</b>			<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>					
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO		*GENERAL WATER CHEMISTRY TO INCLUDE: pH, Alkalinity, bicarbonate, carbonate, chloride, conductivity, fluoride, hardness, hydroxide, nitrate, nitrite, ammonia, sulphate, turbidity, TDS, acidity.			Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>					
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO					Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>					
					Cooling Initiated <input type="checkbox"/>					
					INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
					2.1°C			4.5		
<b>SHIPMENT RELEASE (client use)</b>		<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>			<b>FINAL SHIPMENT RECEPTION (lab use only)</b>					
Released by: Ardy Mansourpour		Date: 02-09-2020	Time:	Received by:	Date: Sept 3 2020	Time: 9:20	Received by: em	Date: 04 Sept. 2020	Time: 12:20pm	

**SAMPLES ON HOLD**

SUSPECTED HAZARD (see Special Instructions)

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

Water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.



CERTIFICATE OF ANALYSIS

Work Order : VA20B4087
Amendment : 2
Client : Wood Canada Ltd.
Contact : Jeremiah Gladu
Address : 600 - 4445 Lougheed Hwy
Burnaby BC Canada V5C 0E4
Telephone : 604 294 3811
Project : VE52655D
PO : ---
C-O-C number : ---
Sampler : Ardy M.
Site : ---
Quote number : VA20-SEAB100-0003 - Wood/Seabridge Gold
No. of samples received : 6
No. of samples analysed : 2

Page : 1 of 9
Laboratory : Vancouver - Environmental
Account Manager : Selam Worku
Address : 8081 Lougheed Highway
Burnaby BC Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 29-Aug-2020 08:10
Date Analysis Commenced : 01-Sep-2020
Issue Date : 27-Oct-2020 09:39

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
Analytical Results
Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Table with 3 columns: Signatories, Position, Laboratory Department. Lists names like Annabelle Prasad, Bruna Botti, Caitlin Macey, etc., along with their roles and lab departments.





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
-	No Unit
µg/L	micrograms per litre
µS/cm	Microsiemens per centimetre
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in reports identified as "Preliminary Report" are considered authorized for use.

## Workorder Comments

Sample "MW-17-72B": Sample Not Received At Laboratory.

**Multiple Samples Received but not listed on submitted Chain of Custody: Sample "MW17-22A\*", Sample "MW17-22B\*", Sample "DUP", and Sample "MW17-13". All samples placed on hold. Please contact Account Manager.**

**Total Metals and Total Mercury bottles received for Samples "MW17-22A" and "MW17-22B". Samples logged in for Total Metals and Total Mercury Analyses.**

The units for trace metals have been updated to ug/L in this report.

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLQ	Detection Limit raised due to co-eluting interference. GCMS qualifier ion ratio did not meet acceptance criteria.



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					MW17-22A	MW17-22B	----	----	----
					28-Aug-2020 16:30	28-Aug-2020 16:30	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B4087-001	VA20B4087-002	-----	-----	-----
					Result	Result	----	----	----
<b>Physical Tests</b>									
acidity (as CaCO3)	----	E283	2.0	mg/L	<2.0	3.4	----	----	----
acidity, hot peroxide treated (as CaCO3)	----	E284A	25	mg/L	-114	<25	----	----	----
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	136	18.8	----	----	----
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	----	----	----
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	----	----	----
alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	----	----	----
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	136	18.8	----	----	----
conductivity	----	E100	2.0	µS/cm	350	44.9	----	----	----
hardness (as CaCO3), from total Ca/Mg	----	EC100A	600	µg/L	138000	----	----	----	----
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	----	20.2	----	----	----
pH	----	E108	0.10	pH units	8.06	6.86	----	----	----
solids, total dissolved [TDS]	----	E162	10	mg/L	213	30	----	----	----
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	<3.0	<3.0	----	----	----
turbidity	----	E121	0.10	NTU	3.26	0.17	----	----	----
hardness (as CaCO3), dissolved	----	EC100	600	µg/L	147000	24400	----	----	----
<b>Anions and Nutrients</b>									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0169	<0.0050	----	----	----
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	----	----	----
cyanate	88402-73-7	E343	0.20	mg/L	<0.20	<0.20	----	----	----
fluoride	16984-48-8	E235.F	0.020	mg/L	0.584	<0.020	----	----	----
Kjeldahl nitrogen, total [TKN]	----	E318	0.200	mg/L	0.202	<0.050	----	----	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	0.0342	----	----	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	----	----	----
nitrogen, total	7727-37-9	E366	0.030	mg/L	0.196	<0.030	----	----	----
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0676	0.0035	----	----	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	44.0	1.93	----	----	----
<b>Cyanides</b>									
cyanide, free	----	E339	0.0050	mg/L	<0.0050	<0.0050	----	----	----
cyanide, strong acid dissociable (total)	----	E333	0.0050	mg/L	<0.0050	<0.0050	----	----	----
cyanide, weak acid dissociable	----	E336	0.0050	mg/L	<0.0050	<0.0050	----	----	----



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					MW17-22A	MW17-22B	----	----	----
Client sampling date / time					28-Aug-2020 16:30	28-Aug-2020 16:30	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20B4087-001	VA20B4087-002	-----	-----	-----
					Result	Result	---	---	---
<b>Cyanides</b>									
thiocyanate	302-04-5	E344	0.50	mg/L	<0.50	<0.50	----	----	----
<b>Organic / Inorganic Carbon</b>									
carbon, total inorganic [TIC]	----	E354-L	0.50	mg/L	33.3	7.04	----	----	----
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	2.46	0.52	----	----	----
<b>Total Metals</b>									
aluminum, total	7429-90-5	E420	3.0	µg/L	244	9.6	----	----	----
antimony, total	7440-36-0	E420	0.10	µg/L	0.50	<0.10	----	----	----
arsenic, total	7440-38-2	E420	0.10	µg/L	3.24	<0.10	----	----	----
barium, total	7440-39-3	E420	0.10	µg/L	43.6	6.79	----	----	----
beryllium, total	7440-41-7	E420	0.100	µg/L	<0.100	<0.100	----	----	----
bismuth, total	7440-69-9	E420	0.050	µg/L	<0.050	<0.050	----	----	----
boron, total	7440-42-8	E420	10	µg/L	13	<10	----	----	----
cadmium, total	7440-43-9	E420	0.0050	µg/L	0.165	0.0532	----	----	----
calcium, total	7440-70-2	E420	50	µg/L	41000	7150	----	----	----
cesium, total	7440-46-2	E420	0.010	µg/L	0.023	<0.010	----	----	----
chromium, total	7440-47-3	E420.Cr-L	0.10	µg/L	1.07	<0.10	----	----	----
cobalt, total	7440-48-4	E420	0.10	µg/L	0.30	<0.10	----	----	----
copper, total	7440-50-8	E420	0.50	µg/L	2.78	<0.50	----	----	----
iron, total	7439-89-6	E420	10	µg/L	840	20	----	----	----
lead, total	7439-92-1	E420	0.050	µg/L	1.07	<0.050	----	----	----
lithium, total	7439-93-2	E420	1.0	µg/L	5.4	<1.0	----	----	----
magnesium, total	7439-95-4	E420	5.0	µg/L	8670	576	----	----	----
manganese, total	7439-96-5	E420	0.10	µg/L	337	1.90	----	----	----
mercury, total	7439-97-6	E508	0.0050	µg/L	<0.0050	<0.0050	----	----	----
molybdenum, total	7439-98-7	E420	0.050	µg/L	2.54	0.064	----	----	----
nickel, total	7440-02-0	E420	0.50	µg/L	1.73	<0.50	----	----	----
phosphorus, total	7723-14-0	E420	50	µg/L	85	<50	----	----	----
potassium, total	7440-09-7	E420	50	µg/L	4170	421	----	----	----
rubidium, total	7440-17-7	E420	0.20	µg/L	1.32	0.67	----	----	----
selenium, total	7782-49-2	E420	0.050	µg/L	0.144	<0.050	----	----	----
silicon, total	7440-21-3	E420	100	µg/L	6030	2100	----	----	----



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					MW17-22A	MW17-22B	----	----	----
Client sampling date / time					28-Aug-2020 16:30	28-Aug-2020 16:30	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20B4087-001	VA20B4087-002	-----	-----	-----
					Result	Result	---	---	---
<b>Total Metals</b>									
silver, total	7440-22-4	E420	0.010	µg/L	0.015	<0.010	----	----	----
sodium, total	17341-25-2	E420	50	µg/L	15200	647	----	----	----
strontium, total	7440-24-6	E420	0.20	µg/L	372	29.9	----	----	----
sulfur, total	7704-34-9	E420	500	µg/L	16600	600	----	----	----
tellurium, total	13494-80-9	E420	0.20	µg/L	<0.20	<0.20	----	----	----
thallium, total	7440-28-0	E420	0.010	µg/L	0.012	<0.010	----	----	----
thorium, total	7440-29-1	E420	0.10	µg/L	<0.10	<0.10	----	----	----
tin, total	7440-31-5	E420	0.10	µg/L	1.71	<0.10	----	----	----
titanium, total	7440-32-6	E420	0.30	µg/L	9.34	0.31	----	----	----
tungsten, total	7440-33-7	E420	0.10	µg/L	<0.10	<0.10	----	----	----
uranium, total	7440-61-1	E420	0.010	µg/L	0.652	<0.010	----	----	----
vanadium, total	7440-62-2	E420	0.50	µg/L	0.64	<0.50	----	----	----
zinc, total	7440-66-6	E420	3.0	µg/L	10.6	<3.0	----	----	----
zirconium, total	7440-67-7	E420	0.20	µg/L	0.37	<0.20	----	----	----
<b>Dissolved Metals</b>									
aluminum, dissolved	7429-90-5	E421	1.0	µg/L	5.6	1.7	----	----	----
antimony, dissolved	7440-36-0	E421	0.10	µg/L	0.25	<0.10	----	----	----
arsenic, dissolved	7440-38-2	E421	0.10	µg/L	1.56	<0.10	----	----	----
barium, dissolved	7440-39-3	E421	0.10	µg/L	39.3	8.13	----	----	----
beryllium, dissolved	7440-41-7	E421	0.100	µg/L	<0.100	<0.100	----	----	----
bismuth, dissolved	7440-69-9	E421	0.050	µg/L	<0.050	<0.050	----	----	----
boron, dissolved	7440-42-8	E421	10	µg/L	14	<10	----	----	----
cadmium, dissolved	7440-43-9	E421	0.0050	µg/L	0.0388	0.0537	----	----	----
calcium, dissolved	7440-70-2	E421	50	µg/L	44800	8540	----	----	----
cesium, dissolved	7440-46-2	E421	0.010	µg/L	<0.010	<0.010	----	----	----
chromium, dissolved	7440-47-3	E421.Cr-L	0.10	µg/L	<0.10	<0.10	----	----	----
cobalt, dissolved	7440-48-4	E421	0.10	µg/L	<0.10	<0.10	----	----	----
copper, dissolved	7440-50-8	E421	0.20	µg/L	3.67	<0.20	----	----	----
iron, dissolved	7439-89-6	E421	10	µg/L	32	<10	----	----	----
lead, dissolved	7439-92-1	E421	0.050	µg/L	0.192	<0.050	----	----	----
lithium, dissolved	7439-93-2	E421	1.0	µg/L	5.1	<1.0	----	----	----



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					MW17-22A	MW17-22B	----	----	----
Client sampling date / time					28-Aug-2020 16:30	28-Aug-2020 16:30	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20B4087-001	VA20B4087-002	-----	-----	-----
					Result	Result	---	---	---
<b>Dissolved Metals</b>									
magnesium, dissolved	7439-95-4	E421	5.0	µg/L	8590	755	----	----	----
manganese, dissolved	7439-96-5	E421	0.10	µg/L	183	0.99	----	----	----
mercury, dissolved	7439-97-6	E509	0.0050	µg/L	<0.0050	<0.0050	----	----	----
molybdenum, dissolved	7439-98-7	E421	0.050	µg/L	2.60	0.069	----	----	----
nickel, dissolved	7440-02-0	E421	0.50	µg/L	0.89	<0.50	----	----	----
phosphorus, dissolved	7723-14-0	E421	50	µg/L	<50	<50	----	----	----
potassium, dissolved	7440-09-7	E421	50	µg/L	4000	443	----	----	----
rubidium, dissolved	7440-17-7	E421	0.20	µg/L	0.91	0.78	----	----	----
selenium, dissolved	7782-49-2	E421	0.050	µg/L	0.065	<0.050	----	----	----
silicon, dissolved	7440-21-3	E421	50	µg/L	5720	1900	----	----	----
silver, dissolved	7440-22-4	E421	0.010	µg/L	<0.010	<0.010	----	----	----
sodium, dissolved	17341-25-2	E421	50	µg/L	15600	696	----	----	----
strontium, dissolved	7440-24-6	E421	0.20	µg/L	396	33.1	----	----	----
sulfur, dissolved	7704-34-9	E421	500	µg/L	16400	<500	----	----	----
tellurium, dissolved	13494-80-9	E421	0.20	µg/L	<0.20	<0.20	----	----	----
thallium, dissolved	7440-28-0	E421	0.010	µg/L	<0.010	<0.010	----	----	----
thorium, dissolved	7440-29-1	E421	0.10	µg/L	<0.10	<0.10	----	----	----
tin, dissolved	7440-31-5	E421	0.10	µg/L	0.38	<0.10	----	----	----
titanium, dissolved	7440-32-6	E421	0.30	µg/L	<0.30	<0.30	----	----	----
tungsten, dissolved	7440-33-7	E421	0.10	µg/L	<0.10	<0.10	----	----	----
uranium, dissolved	7440-61-1	E421	0.010	µg/L	0.624	0.018	----	----	----
vanadium, dissolved	7440-62-2	E421	0.50	µg/L	<0.50	<0.50	----	----	----
zinc, dissolved	7440-66-6	E421	1.0	µg/L	4.6	1.1	----	----	----
zirconium, dissolved	7440-67-7	E421	0.20	µg/L	<0.20	<0.20	----	----	----
dissolved mercury filtration location	----	EP509	-	-	Field	Field	----	----	----
dissolved metals filtration location	----	EP421	-	-	Field	Field	----	----	----
<b>Aggregate Organics</b>									
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	<20	----	----	----
phenols, total (4AAP)	----	E562	0.0010	mg/L	<0.0010	<0.0010	----	----	----
<b>Volatile Organic Compounds</b>									
chlorobenzene	108-90-7	E611C	0.50	µg/L	<0.50	<0.50	----	----	----



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					MW17-22A	MW17-22B	----	----	----
Client sampling date / time					28-Aug-2020 16:30	28-Aug-2020 16:30	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20B4087-001	VA20B4087-002	-----	-----	-----
					Result	Result	---	---	---
<b>Volatile Organic Compounds</b>									
chloromethane	74-87-3	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
dichloropropane, 1,2-	78-87-5	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
dichloropropylene, cis+trans-1,3-	542-75-6	E611C	0.75	µg/L	<0.75	<0.75	----	----	----
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.20	µg/L	<0.20	<0.20	----	----	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
trichlorofluoromethane	75-69-4	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>									
benzene	71-43-2	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
ethylbenzene	100-41-4	E611C	0.50	µg/L	2.14	<0.50	----	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
styrene	100-42-5	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
toluene	108-88-3	E611C	0.40	µg/L	<0.40	<0.40	----	----	----
xylene, m+p-	179601-23-1	E611C	0.50	µg/L	0.65	<0.50	----	----	----
xylene, o-	95-47-6	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
xylenes, total	1330-20-7	E611C	0.75	µg/L	<0.75	<0.75	----	----	----
<b>Volatile Organic Compounds [Drycleaning]</b>									
carbon tetrachloride	56-23-5	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
chloroethane	75-00-3	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
dichloroethane, 1,1-	75-34-3	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
dichloroethane, 1,2-	107-06-2	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
dichloroethylene, 1,1-	75-35-4	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
dichloroethylene, cis-1,2-	156-59-4	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
dichloroethylene, trans-1,2-	156-60-5	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
dichloromethane	75-09-2	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
tetrachloroethylene	127-18-4	E611C	0.50	µg/L	<0.50	<0.50	----	----	----



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					MW17-22A	MW17-22B	----	----	----
Client sampling date / time					28-Aug-2020 16:30	28-Aug-2020 16:30	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20B4087-001	VA20B4087-002	-----	-----	-----
					Result	Result	---	---	---
<b>Volatile Organic Compounds [Drycleaning]</b>									
trichloroethane, 1,1,1-	71-55-6	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
trichloroethylene	79-01-6	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
vinyl chloride	75-01-4	E611C	0.40	µg/L	<0.40	<0.40	----	----	----
<b>Volatile Organic Compounds Surrogates</b>									
bromofluorobenzene, 4-	460-00-4	E611C	0.50	%	91.6	89.1	----	----	----
difluorobenzene, 1,4-	540-36-3	E611C	0.50	%	102	102	----	----	----
<b>Hydrocarbons</b>									
EPH (C10-C19)	----	E601A	250	µg/L	<250	<250	----	----	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	<250	----	----	----
HEPHw	----	EC600A	250	µg/L	<250	<250	----	----	----
LEPHw	----	EC600A	250	µg/L	<250	<250	----	----	----
<b>Hydrocarbons Surrogates</b>									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%	97.4	89.8	----	----	----
<b>Polycyclic Aromatic Hydrocarbons</b>									
acenaphthene	83-32-9	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
acenaphthylene	208-96-8	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
acridine	260-94-6	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
anthracene	120-12-7	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	<0.0050	<0.0050	----	----	----
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	<0.015	----	----	----
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
chrysene	218-01-9	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	<0.0050	<0.0050	----	----	----
fluoranthene	206-44-0	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
fluorene	86-73-7	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	2.90	<0.010	----	----	----
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	3.63	<0.010	----	----	----



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					MW17-22A	MW17-22B	----	----	----
					28-Aug-2020 16:30	28-Aug-2020 16:30	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20B4087-001	VA20B4087-002	-----	-----	-----
					Result	Result	---	---	---
<b>Polycyclic Aromatic Hydrocarbons</b>									
naphthalene	91-20-3	E641A	0.050	µg/L	4.27	<0.050	----	----	----
phenanthrene	85-01-8	E641A	0.020	µg/L	<0.020	<0.020	----	----	----
pyrene	129-00-0	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
quinoline	6027-02-7	E641A	0.050	µg/L	<5.50 <sup>DLQ</sup>	<0.050	----	----	----
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>									
acridine-d9	34749-75-2	E641A	0.010	%	92.1	89.7			
chrysene-d12	1719-03-5	E641A	0.010	%	93.6	98.4	----	----	----
naphthalene-d8	1146-65-2	E641A	0.010	%	97.5	93.8	----	----	----
phenanthrene-d10	1517-22-2	E641A	0.010	%	104	104	----	----	----
<b>Volatile Organic Compounds [THMs]</b>									
bromodichloromethane	75-27-4	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
bromoform	75-25-2	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
chloroform	67-66-3	E611C	0.50	µg/L	<0.50	<0.50	----	----	----
dibromochloromethane	124-48-1	E611C	0.50	µg/L	<0.50	<0.50	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.



## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>VA20B4087</b>	Page	: 1 of 20
Amendment	: <b>2</b>		
Client	: <b>Wood Canada Ltd.</b>	Laboratory	: Vancouver - Environmental
Contact	: Jeremiah Gladu	Account Manager	: Selam Worku
Address	: 600 - 4445 Lougheed Hwy Burnaby BC Canada V5C 0E4	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: VE52655D	Date Samples Received	: 29-Aug-2020 08:10
PO	: ----	Issue Date	: 27-Oct-2020 09:39
C-O-C number	: ----		
Sampler	: Ardy M.		
Site	: ----		
Quote number	: VA20-SEAB100-0003 - Wood/Seabridge Gold		
No. of samples received	: 6		
No. of samples analysed	: 2		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

## Summary of Outliers

### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.

### **Outliers : Analysis Holding Time Compliance (Breaches)**

- Analysis Holding Time Outliers exist - please see following pages for full details.

### **Outliers : Frequency of Quality Control Samples**

- No Quality Control Sample Frequency Outliers occur.





## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>										
<b>Amber glass total (sulfuric acid)</b> MW17-22A	E559	28-Aug-2020	----	----	----		03-Sep-2020	28 days	5 days	✓
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>										
<b>Amber glass total (sulfuric acid)</b> MW17-22B	E559	28-Aug-2020	----	----	----		03-Sep-2020	28 days	5 days	✓
<b>Aggregate Organics : Phenols (4AAP) in Water by Colorimetry</b>										
<b>Amber glass total (sulfuric acid)</b> MW17-22A	E562	28-Aug-2020	----	----	----		03-Sep-2020	28 days	5 days	✓
<b>Aggregate Organics : Phenols (4AAP) in Water by Colorimetry</b>										
<b>Amber glass total (sulfuric acid)</b> MW17-22B	E562	28-Aug-2020	----	----	----		03-Sep-2020	28 days	5 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> MW17-22A	E298	28-Aug-2020	----	----	----		05-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> MW17-22B	E298	28-Aug-2020	----	----	----		05-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> MW17-22A	E235.Cl	28-Aug-2020	----	----	----		01-Sep-2020	28 days	3 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Chloride in Water by IC</b>											
<b>HDPE</b> MW17-22B	E235.Cl	28-Aug-2020	----	----	----		01-Sep-2020	28 days	3 days	✔	
<b>Anions and Nutrients : Cyanate by Ion Selective Electrode</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> MW17-22A	E343	28-Aug-2020	----	----	----		08-Sep-2020	----	----		
<b>Anions and Nutrients : Cyanate by Ion Selective Electrode</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> MW17-22B	E343	28-Aug-2020	----	----	----		08-Sep-2020	----	----		
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
<b>HDPE</b> MW17-22A	E235.F	28-Aug-2020	----	----	----		01-Sep-2020	28 days	3 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
<b>HDPE</b> MW17-22B	E235.F	28-Aug-2020	----	----	----		01-Sep-2020	28 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
<b>HDPE</b> MW17-22A	E235.NO3-L	28-Aug-2020	----	----	----		01-Sep-2020	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
<b>HDPE</b> MW17-22B	E235.NO3-L	28-Aug-2020	----	----	----		01-Sep-2020	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
<b>HDPE</b> MW17-22A	E235.NO2-L	28-Aug-2020	----	----	----		01-Sep-2020	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
<b>HDPE</b> MW17-22B	E235.NO2-L	28-Aug-2020	----	----	----		01-Sep-2020	3 days	3 days	✔	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
<b>HDPE</b> MW17-22A	E235.SO4	28-Aug-2020	----	----	----		01-Sep-2020	28 days	3 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
<b>HDPE</b> MW17-22B	E235.SO4	28-Aug-2020	----	----	----		01-Sep-2020	28 days	3 days	✓
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>										
<b>Amber glass total (sulfuric acid)</b> MW17-22A	E318	28-Aug-2020	04-Sep-2020	28 days	6 days	✓	07-Sep-2020	21 days	2 days	✓
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>										
<b>Amber glass total (sulfuric acid)</b> MW17-22B	E318	28-Aug-2020	04-Sep-2020	28 days	6 days	✓	07-Sep-2020	21 days	2 days	✓
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>										
<b>Amber glass total (sulfuric acid)</b> MW17-22A	E366	28-Aug-2020	04-Sep-2020	28 days	6 days	✓	08-Sep-2020	21 days	3 days	✓
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>										
<b>Amber glass total (sulfuric acid)</b> MW17-22B	E366	28-Aug-2020	04-Sep-2020	28 days	6 days	✓	08-Sep-2020	21 days	3 days	✓
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>										
<b>Amber glass total (sulfuric acid)</b> MW17-22A	E372-U	28-Aug-2020	04-Sep-2020	28 days	6 days	✓	05-Sep-2020	21 days	0 days	✓
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>										
<b>Amber glass total (sulfuric acid)</b> MW17-22B	E372-U	28-Aug-2020	04-Sep-2020	28 days	6 days	✓	05-Sep-2020	21 days	0 days	✓
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> MW17-22A	E339	28-Aug-2020	----	----	----		04-Sep-2020	14 days	6 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> MW17-22B	E339	28-Aug-2020	----	----	----		04-Sep-2020	14 days	6 days	✔
<b>Cyanides : Thiocyanate by Colourimetry</b>										
<b>HDPE total (nitric acid)</b> MW17-22A	E344	28-Aug-2020	----	----	----		04-Sep-2020	14 days	7 days	✔
<b>Cyanides : Thiocyanate by Colourimetry</b>										
<b>HDPE total (nitric acid)</b> MW17-22B	E344	28-Aug-2020	----	----	----		04-Sep-2020	14 days	7 days	✔
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> MW17-22A	E333	28-Aug-2020	----	----	----		04-Sep-2020	14 days	6 days	✔
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> MW17-22B	E333	28-Aug-2020	----	----	----		04-Sep-2020	14 days	6 days	✔
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> MW17-22A	E336	28-Aug-2020	----	----	----		04-Sep-2020	14 days	6 days	✔
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> MW17-22B	E336	28-Aug-2020	----	----	----		04-Sep-2020	14 days	6 days	✔
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> MW17-22A	E421.Cr-L	28-Aug-2020	01-Sep-2020	180 days	4 days	✔	02-Sep-2020	175 days	0 days	✔
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> MW17-22B	E421.Cr-L	28-Aug-2020	01-Sep-2020	180 days	4 days	✔	02-Sep-2020	175 days	0 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> MW17-22A	E509	28-Aug-2020	03-Sep-2020	28 days	5 days	✔	03-Sep-2020	22 days	0 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> MW17-22B	E509	28-Aug-2020	03-Sep-2020	28 days	5 days	✔	03-Sep-2020	22 days	0 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> MW17-22A	E421	28-Aug-2020	01-Sep-2020	180 days	4 days	✔	02-Sep-2020	175 days	0 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> MW17-22B	E421	28-Aug-2020	01-Sep-2020	180 days	4 days	✔	02-Sep-2020	175 days	0 days	✔	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> MW17-22A	E601A	28-Aug-2020	03-Sep-2020	14 days	5 days	✔	04-Sep-2020	40 days	1 days	✔	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> MW17-22B	E601A	28-Aug-2020	03-Sep-2020	14 days	5 days	✔	04-Sep-2020	40 days	1 days	✔	
<b>Organic / Inorganic Carbon : Total Inorganic Carbon by Combustion (Low Level)</b>											
<b>HDPE</b> MW17-22A	E354-L	28-Aug-2020	----	----	----		02-Sep-2020	14 days	4 days	✔	
<b>Organic / Inorganic Carbon : Total Inorganic Carbon by Combustion (Low Level)</b>											
<b>HDPE</b> MW17-22B	E354-L	28-Aug-2020	----	----	----		02-Sep-2020	14 days	4 days	✔	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> MW17-22A	E355-L	28-Aug-2020	----	----	----		05-Sep-2020	28 days	7 days	✔	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>										
<b>Amber glass total (sulfuric acid)</b> MW17-22B	E355-L	28-Aug-2020	----	----	----		05-Sep-2020	28 days	7 days	✓
<b>Physical Tests : Acidity by Titration (Peroxide Treated)</b>										
<b>HDPE</b> MW17-22A	E284A	28-Aug-2020	----	----	----		15-Sep-2020	14 days	17 days	* EHT
<b>Physical Tests : Acidity by Titration (Peroxide Treated)</b>										
<b>HDPE</b> MW17-22B	E284A	28-Aug-2020	----	----	----		15-Sep-2020	14 days	17 days	* EHT
<b>Physical Tests : Acidity by Titration</b>										
<b>HDPE</b> MW17-22A	E283	28-Aug-2020	----	----	----		01-Sep-2020	14 days	4 days	✓
<b>Physical Tests : Acidity by Titration</b>										
<b>HDPE</b> MW17-22B	E283	28-Aug-2020	----	----	----		01-Sep-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
<b>HDPE</b> MW17-22A	E290	28-Aug-2020	----	----	----		01-Sep-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
<b>HDPE</b> MW17-22B	E290	28-Aug-2020	----	----	----		01-Sep-2020	14 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
<b>HDPE</b> MW17-22A	E100	28-Aug-2020	----	----	----		01-Sep-2020	28 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
<b>HDPE</b> MW17-22B	E100	28-Aug-2020	----	----	----		01-Sep-2020	28 days	4 days	✓





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : pH by Meter</b>										
HDPE MW17-22A	E108	28-Aug-2020	----	----	----		01-Sep-2020	0.25 hrs	96 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE MW17-22B	E108	28-Aug-2020	----	----	----		01-Sep-2020	0.25 hrs	96 hrs	* EHTR-FM
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE MW17-22A	E162	28-Aug-2020	----	----	----		03-Sep-2020	7 days	6 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE MW17-22B	E162	28-Aug-2020	----	----	----		03-Sep-2020	7 days	6 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE MW17-22A	E160-H	28-Aug-2020	----	----	----		01-Sep-2020	7 days	4 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE MW17-22B	E160-H	28-Aug-2020	----	----	----		01-Sep-2020	7 days	4 days	✓
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE MW17-22A	E121	28-Aug-2020	----	----	----		01-Sep-2020	3 days	4 days	* EHT
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE MW17-22B	E121	28-Aug-2020	----	----	----		01-Sep-2020	3 days	4 days	* EHT
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>										
Amber glass/Teflon lined cap (sodium bisulfate) MW17-22A	E641A	28-Aug-2020	03-Sep-2020	14 days	5 days	✓	04-Sep-2020	40 days	0 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> MW17-22B	E641A	28-Aug-2020	03-Sep-2020	14 days	5 days	✔	04-Sep-2020	40 days	0 days	✔	
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE total (nitric acid)</b> MW17-22A	E420.Cr-L	28-Aug-2020	----	----	----		05-Sep-2020	180 days	7 days	✔	
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE total (nitric acid)</b> MW17-22B	E420.Cr-L	28-Aug-2020	----	----	----		05-Sep-2020	180 days	7 days	✔	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
<b>Glass vial total (hydrochloric acid)</b> MW17-22A	E508	28-Aug-2020	----	----	----		03-Sep-2020	28 days	5 days	✔	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
<b>Glass vial total (hydrochloric acid)</b> MW17-22B	E508	28-Aug-2020	----	----	----		03-Sep-2020	28 days	5 days	✔	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE total (nitric acid)</b> MW17-22A	E420	28-Aug-2020	----	----	----		05-Sep-2020	180 days	7 days	✔	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE total (nitric acid)</b> MW17-22B	E420	28-Aug-2020	----	----	----		05-Sep-2020	180 days	7 days	✔	
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> MW17-22A	E611C	28-Aug-2020	03-Sep-2020	----	----		04-Sep-2020	----	----		
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> MW17-22B	E611C	28-Aug-2020	03-Sep-2020	----	----		04-Sep-2020	----	----		



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> MW17-22A	E611C	28-Aug-2020	03-Sep-2020	14 days	5 days	✓	04-Sep-2020	8 days	0 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> MW17-22B	E611C	28-Aug-2020	03-Sep-2020	14 days	5 days	✓	04-Sep-2020	8 days	0 days	✓	
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> MW17-22A	E611C	28-Aug-2020	03-Sep-2020	----	----		04-Sep-2020	----	----		
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> MW17-22B	E611C	28-Aug-2020	03-Sep-2020	----	----		04-Sep-2020	----	----		
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> MW17-22A	E611C	28-Aug-2020	03-Sep-2020	----	----		04-Sep-2020	----	----		
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> MW17-22B	E611C	28-Aug-2020	03-Sep-2020	----	----		04-Sep-2020	----	----		

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended  
 EHT: Exceeded ALS recommended hold time prior to analysis.  
 Rec. HT: ALS recommended hold time (see units).



## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Acidity by Titration	E283	79811	1	6	16.6	5.0	✔
Acidity by Titration (Peroxide Treated)	E284A	86039	1	2	50.0	5.0	✔
Alkalinity Species by Titration	E290	79809	1	10	10.0	5.0	✔
Ammonia by Fluorescence	E298	81674	1	11	9.0	5.0	✔
Chemical Oxygen Demand by Colourimetry	E559	81008	1	18	5.5	5.0	✔
Chloride in Water by IC	E235.Cl	79791	1	20	5.0	5.0	✔
Conductivity in Water	E100	79810	1	16	6.2	5.0	✔
Cyanate by Ion Selective Electrode	E343	82829	1	6	16.6	5.0	✔
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	79884	1	14	7.1	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	81229	1	11	9.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	79885	1	17	5.8	5.0	✔
Fluoride in Water by IC	E235.F	79792	1	20	5.0	5.0	✔
Free Cyanide by CFA	E339	81653	1	2	50.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	79794	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	79795	1	20	5.0	5.0	✔
pH by Meter	E108	79808	1	15	6.6	5.0	✔
Phenols (4AAP) in Water by Colorimetry	E562	81035	1	3	33.3	5.0	✔
Sulfate in Water by IC	E235.SO4	79796	1	20	5.0	5.0	✔
TDS by Gravimetry	E162	81419	1	20	5.0	5.0	✔
Thiocyanate by Colourimetry	E344	81891	1	2	50.0	5.0	✔
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	81131	1	18	5.5	5.0	✔
Total Cyanide by CFA	E333	81651	1	6	16.6	5.0	✔
Total Inorganic Carbon by Combustion (Low Level)	E354-L	80229	1	3	33.3	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	81719	1	18	5.5	5.0	✔
Total Mercury in Water by CVAAS	E508	81242	1	20	5.0	5.0	✔
Total Metals in Water by CRC ICPMS	E420	81130	1	19	5.2	5.0	✔
Total Nitrogen by Colourimetry	E366	81675	1	10	10.0	5.0	✔
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	81678	1	4	25.0	5.0	✔
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	81676	1	15	6.6	5.0	✔
TSS by Gravimetry	E160-H	79933	1	9	11.1	5.0	✔
Turbidity by Nephelometry	E121	79936	1	7	14.2	5.0	✔
VOCs (BC List) by Headspace GC-MS	E611C	81017	1	6	16.6	5.0	✔
WAD Cyanide by CFA	E336	81652	1	6	16.6	5.0	✔
<b>Laboratory Control Samples (LCS)</b>							
Acidity by Titration	E283	79811	1	6	16.6	5.0	✔
Acidity by Titration (Peroxide Treated)	E284A	86039	1	2	50.0	5.0	✔
Alkalinity Species by Titration	E290	79809	1	10	10.0	5.0	✔



Matrix: **Water**

Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<i>Analytical Methods</i>							
<b>Laboratory Control Samples (LCS) - Continued</b>							
Ammonia by Fluorescence	E298	81674	1	11	9.0	5.0	✓
BC PHC - EPH by GC-FID	E601A	81020	1	17	5.8	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	81008	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	79791	1	20	5.0	5.0	✓
Conductivity in Water	E100	79810	1	16	6.2	5.0	✓
Cyanate by Ion Selective Electrode	E343	82829	1	6	16.6	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	79884	1	14	7.1	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	81229	1	11	9.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	79885	1	17	5.8	5.0	✓
Fluoride in Water by IC	E235.F	79792	1	20	5.0	5.0	✓
Free Cyanide by CFA	E339	81653	1	2	50.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	79794	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	79795	1	20	5.0	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	81019	1	17	5.8	5.0	✓
pH by Meter	E108	79808	1	15	6.6	5.0	✓
Phenols (4AAP) in Water by Colorimetry	E562	81035	1	3	33.3	5.0	✓
Sulfate in Water by IC	E235.SO4	79796	1	20	5.0	5.0	✓
TDS by Gravimetry	E162	81419	1	20	5.0	5.0	✓
Thiocyanate by Colourimetry	E344	81891	1	2	50.0	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	81131	1	18	5.5	5.0	✓
Total Cyanide by CFA	E333	81651	1	6	16.6	5.0	✓
Total Inorganic Carbon by Combustion (Low Level)	E354-L	80229	1	3	33.3	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	81719	1	18	5.5	5.0	✓
Total Mercury in Water by CVAAS	E508	81242	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	81130	1	19	5.2	5.0	✓
Total Nitrogen by Colourimetry	E366	81675	1	10	10.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	81678	1	4	25.0	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	81676	1	15	6.6	5.0	✓
TSS by Gravimetry	E160-H	79933	1	9	11.1	5.0	✓
Turbidity by Nephelometry	E121	79936	1	7	14.2	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	81017	1	6	16.6	5.0	✓
WAD Cyanide by CFA	E336	81652	1	6	16.6	5.0	✓
<b>Method Blanks (MB)</b>							
Acidity by Titration	E283	79811	1	6	16.6	5.0	✓
Acidity by Titration (Peroxide Treated)	E284A	86039	1	2	50.0	5.0	✓
Alkalinity Species by Titration	E290	79809	1	10	10.0	5.0	✓
Ammonia by Fluorescence	E298	81674	1	11	9.0	5.0	✓
BC PHC - EPH by GC-FID	E601A	81020	1	17	5.8	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	81008	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	79791	1	20	5.0	5.0	✓
Conductivity in Water	E100	79810	1	16	6.2	5.0	✓



Matrix: **Water**

Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<b>Analytical Methods</b>							
<b>Method Blanks (MB) - Continued</b>							
Cyanate by Ion Selective Electrode	E343	82829	1	6	16.6	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	79884	1	14	7.1	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	81229	1	11	9.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	79885	2	17	11.7	5.0	✓
Fluoride in Water by IC	E235.F	79792	1	20	5.0	5.0	✓
Free Cyanide by CFA	E339	81653	1	2	50.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	79794	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	79795	1	20	5.0	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	81019	1	17	5.8	5.0	✓
Phenols (4AAP) in Water by Colorimetry	E562	81035	1	3	33.3	5.0	✓
Sulfate in Water by IC	E235.SO4	79796	1	20	5.0	5.0	✓
TDS by Gravimetry	E162	81419	1	20	5.0	5.0	✓
Thiocyanate by Colourimetry	E344	81891	1	2	50.0	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	81131	1	18	5.5	5.0	✓
Total Cyanide by CFA	E333	81651	1	6	16.6	5.0	✓
Total Inorganic Carbon by Combustion (Low Level)	E354-L	80229	1	3	33.3	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	81719	1	18	5.5	5.0	✓
Total Mercury in Water by CVAAS	E508	81242	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	81130	1	19	5.2	5.0	✓
Total Nitrogen by Colourimetry	E366	81675	1	10	10.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	81678	1	4	25.0	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	81676	1	15	6.6	5.0	✓
TSS by Gravimetry	E160-H	79933	1	9	11.1	5.0	✓
Turbidity by Nephelometry	E121	79936	1	7	14.2	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	81017	1	6	16.6	5.0	✓
WAD Cyanide by CFA	E336	81652	1	6	16.6	5.0	✓
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	81674	1	11	9.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	81008	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	79791	1	20	5.0	5.0	✓
Cyanate by Ion Selective Electrode	E343	82829	1	6	16.6	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	79884	1	14	7.1	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	81229	1	11	9.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	79885	1	17	5.8	5.0	✓
Fluoride in Water by IC	E235.F	79792	1	20	5.0	5.0	✓
Free Cyanide by CFA	E339	81653	1	2	50.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	79794	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	79795	1	20	5.0	5.0	✓
Phenols (4AAP) in Water by Colorimetry	E562	81035	1	3	33.3	5.0	✓
Sulfate in Water by IC	E235.SO4	79796	1	20	5.0	5.0	✓
Thiocyanate by Colourimetry	E344	81891	1	2	50.0	5.0	✓



Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<i>Analytical Methods</i>							
<b>Matrix Spikes (MS) - Continued</b>							
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	81131	1	18	5.5	5.0	✔
Total Cyanide by CFA	E333	81651	1	6	16.6	5.0	✔
Total Inorganic Carbon by Combustion (Low Level)	E354-L	80229	1	3	33.3	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	81719	1	18	5.5	5.0	✔
Total Mercury in Water by CVAAS	E508	81242	1	20	5.0	5.0	✔
Total Metals in Water by CRC ICPMS	E420	81130	1	19	5.2	5.0	✔
Total Nitrogen by Colourimetry	E366	81675	1	10	10.0	5.0	✔
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	81678	1	4	25.0	5.0	✔
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	81676	1	15	6.6	5.0	✔
VOCs (BC List) by Headspace GC-MS	E611C	81017	1	6	16.6	5.0	✔
WAD Cyanide by CFA	E336	81652	1	6	16.6	5.0	✔



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 Vancouver - Environmental	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TSS by Gravimetry	E160-H Vancouver - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
TDS by Gravimetry	E162 Vancouver - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.





Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Acidity by Titration	E283 Vancouver - Environmental	Water	APHA 2310 B (mod)	Acidity is determined by potentiometric titration to a specified endpoint.
Acidity by Titration (Peroxide Treated)	E284A Vancouver - Environmental	Water	APHA 2310 B (mod)	Acidity is determined by potentiometric titration with preliminary hot peroxide treatment to a specified endpoint.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Total Kjeldahl Nitrogen is determined using block digestion followed by flow-injection analysis with fluorescence detection.
Total Cyanide by CFA	E333 Vancouver - Environmental	Water	ISO 14403 (mod)	Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.
WAD Cyanide by CFA	E336 Vancouver - Environmental	Water	APHA 4500-CN I (mod)	Weak Acid Dissociable (WAD) cyanide is determined by in-line sample distillation with final determination by colourimetric analysis.
Free Cyanide by CFA	E339 Vancouver - Environmental	Water	ASTM D7237 (mod)	Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.
Cyanate by Ion Selective Electrode	E343 Waterloo - Environmental	Water	APHA 4500-CN L (mod)	This analysis is carried out using procedures adapted from APHA method 4500-CN "Cyanide". Cyanate is determined by the Cyanate hydrolysis method using an ammonia selective electrode
Thiocyanate by Colourimetry	E344 Vancouver - Environmental	Water	APHA 4500-CN M (mod)	Thiocyanate is determined by the ferric nitrate colourimetric method. Water samples containing high levels of hexavalent chromium, cyanide (together with sulfide), reducing agents, or hydrocarbons may cause negative or positive interferences with this method.
Total Inorganic Carbon by Combustion (Low Level)	E354-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Inorganic Carbon is determined by the high temperature combustion method with measurement by an infrared detector, where the sample is acidified in a reaction chamber to convert all inorganic carbons (carbonates) to carbon dioxide for analysis.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L  Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO <sub>2</sub> . NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Total Nitrogen by Colourimetry	E366  Vancouver - Environmental	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U  Vancouver - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Metals in Water by CRC ICPMS	E420  Vancouver - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L  Vancouver - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS.
Dissolved Metals in Water by CRC ICPMS	E421  Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L  Vancouver - Environmental	Water	APHA 3030 B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS
Total Mercury in Water by CVAAS	E508  Vancouver - Environmental	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
Dissolved Mercury in Water by CVAAS	E509  Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
Chemical Oxygen Demand by Colourimetry	E559  Vancouver - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Phenols (4AAP) in Water by Colorimetry	E562 Waterloo - Environmental	Water	EPA 9066	This automated method is based on the distillation of phenol and subsequent reaction of the distillate with alkaline ferricyanide (K <sub>3</sub> Fe(CN) <sub>6</sub> ) and 4-amino-antipyrine (4-AAP) to form a red complex which is measured colorimetrically.
BC PHC - EPH by GC-FID	E601A Vancouver - Environmental	Water	BC MOE Lab Manual	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.
VOCs (BC List) by Headspace GC-MS	E611C Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by Hexane LVI GC-MS	E641A Vancouver - Environmental	Water	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by large volume injection (LVI) GC-MS.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> ), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Hardness (Calculated) from Total Ca/Mg	EC100A Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> ), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
LEPH and HEPH: EPH-PAH	EC600A Vancouver - Environmental	Water	BC MOE Lab Manual (LEPH and HEPH) (mod)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Acenaphthene, Acridine, Anthracene, Fluorene, Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(a)pyrene, Fluoranthene, and Pyrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Digestion for TKN in water	EP318 Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Samples are digested using block digestion with Copper Sulfate Digestion Reagent.
Digestion for Total Nitrogen in water	EP366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
Digestion for Total Phosphorus in water	EP372 Vancouver - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO <sub>3</sub> .
Dissolved Mercury Water Filtration	EP509 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
VOCs Preparation for Headspace Analysis	EP581 Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

## QUALITY CONTROL REPORT

**Work Order** : **VA20B4087**

**Page** : 1 of 26

**Amendment** : **2**

**Client** : Wood Canada Ltd.  
**Contact** : Jeremiah Gladu  
**Address** : 1235 Main Street P.O. Box 2356  
 Smithers BC Canada V0J 2N0

**Laboratory** : Vancouver - Environmental  
**Account Manager** : Selam Worku  
**Address** : 8081 Lougheed Highway  
 Burnaby, British Columbia Canada V5A 1W9

**Telephone** : ----  
**Project** : VE52655D  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : Ardy M.  
**Site** : ----  
**Quote number** : VA20-SEAB100-0003 - Wood/Seabridge Gold  
**No. of samples received** : 6  
**No. of samples analysed** : 2

**Telephone** : +1 604 253 4188  
**Date Samples Received** : 29-Aug-2020 08:10  
**Date Analysis Commenced** : 01-Sep-2020  
**Issue Date** : 27-Oct-2020 09:39

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Annabelle Prasad	Analyst	Metals, Burnaby, British Columbia
Bruna Botti	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
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Lindsay Gung	Supervisor - Water Chemistry	Inorganics - Water Quality, Burnaby, British Columbia
Ophelia Chiu	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Shaneel Dayal	Analyst	Metals, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics - Water Quality, Burnaby, British Columbia
Walt Kippenhuck	Team Leader - Inorganics	Inorganics, Waterloo, Ontario

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Work Order : VA20B4087 Amendment 2  
Client : Wood Canada Ltd.  
Project : VE52655D

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## **General Comments**

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

# = Indicates a QC result that did not meet the ALS DQO.



### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 79808)</b>											
VA20B4067-002	Anonymous	pH	----	E108	0.10	pH units	7.92	7.93	0.101%	4%	----
<b>Physical Tests (QC Lot: 79809)</b>											
VA20B4067-002	Anonymous	alkalinity, bicarbonate (as CaCO <sub>3</sub> )	----	E290	1.0	mg/L	53.2	53.1	0.188%	20%	----
		alkalinity, carbonate (as CaCO <sub>3</sub> )	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, hydroxide (as CaCO <sub>3</sub> )	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, phenolphthalein (as CaCO <sub>3</sub> )	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, total (as CaCO <sub>3</sub> )	----	E290	1.0	mg/L	53.2	53.1	0.188%	20%	----
<b>Physical Tests (QC Lot: 79810)</b>											
VA20B4067-002	Anonymous	conductivity	----	E100	2.0	µS/cm	278	278	0.00%	10%	----
<b>Physical Tests (QC Lot: 79811)</b>											
VA20B4067-002	Anonymous	acidity (as CaCO <sub>3</sub> )	----	E283	2.0	mg/L	<2.0	<2.0	0	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 79933)</b>											
VA20B4087-001	MW17-22A	solids, total suspended [TSS]	----	E160-H	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 79936)</b>											
VA20B4061-001	Anonymous	turbidity	----	E121	0.10	NTU	<0.10	<0.10	0	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 81419)</b>											
VA20B3998-001	Anonymous	solids, total dissolved [TDS]	----	E162	20	mg/L	663	640	3.53%	20%	----
<b>Physical Tests (QC Lot: 86039)</b>											
VA20B4087-001	MW17-22A	acidity, hot peroxide treated (as CaCO <sub>3</sub> )	----	E284A	25	mg/L	-114	-113	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 79791)</b>											
VA20B3928-009	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 79792)</b>											
VA20B3928-009	Anonymous	fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 79794)</b>											
VA20B3928-009	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 79795)</b>											
VA20B3928-009	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 79796)</b>											
VA20B3928-009	Anonymous	sulfate (as SO <sub>4</sub> )	14808-79-8	E235.SO4	0.30	mg/L	<0.30	<0.30	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 81674)</b>											



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Anions and Nutrients (QC Lot: 81674) - continued</b>											
VA20B4023-009	Anonymous	ammonia, total (as N)	7664-41-7	E298	0 0050	mg/L	0 0082	0.0078	0.0003	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 81675)</b>											
VA20B4023-009	Anonymous	nitrogen, total	7727-37-9	E366	0.030	mg/L	0.205	0.202	0.002	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 81676)</b>											
VA20B4036-001	Anonymous	phosphorus, total	7723-14-0	E372-U	0 0020	mg/L	0 0052	0.0049	0.0003	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 81719)</b>											
VA20B4157-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.250	mg/L	6.91	7 00	1.18%	20%	----
<b>Anions and Nutrients (QC Lot: 82829)</b>											
WT2000114-010	Anonymous	cyanate	88402-73-7	E343	0.20	mg/L	800	780	2.47%	20%	----
<b>Cyanides (QC Lot: 81651)</b>											
VA20B4084-008	Anonymous	cyanide, strong acid dissociable (total)	----	E333	0 0050	mg/L	<0 0050	<0.0050	0	Diff <2x LOR	----
<b>Cyanides (QC Lot: 81652)</b>											
VA20B4084-008	Anonymous	cyanide, weak acid dissociable	----	E336	0 0050	mg/L	<0 0050	<0.0050	0	Diff <2x LOR	----
<b>Cyanides (QC Lot: 81653)</b>											
VA20B4087-001	MW17-22A	cyanide, free	----	E339	0 0050	mg/L	<0 0050	<0.0050	0	Diff <2x LOR	----
<b>Cyanides (QC Lot: 81891)</b>											
VA20B4087-001	MW17-22A	thiocyanate	302-04-5	E344	0.50	mg/L	<0.50	<0 50	0	Diff <2x LOR	----
<b>Organic / Inorganic Carbon (QC Lot: 80229)</b>											
VA20B3842-017	Anonymous	carbon, total inorganic [TIC]	----	E354-L	0.50	mg/L	13 2	13.3	0.798%	20%	----
<b>Organic / Inorganic Carbon (QC Lot: 81678)</b>											
VA20B4023-009	Anonymous	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	8.28	8 25	0.376%	20%	----
<b>Total Metals (QC Lot: 81130)</b>											
VA20B4084-001	Anonymous	aluminum, total	7429-90-5	E420	0 0030	mg/L	3.19	3 22	1.05%	20%	----
		antimony, total	7440-36-0	E420	0.00010	mg/L	0.00314	0.00319	1.61%	20%	----
		arsenic, total	7440-38-2	E420	0.00010	mg/L	0.131	0.129	1.40%	20%	----
		barium, total	7440-39-3	E420	0.00010	mg/L	0 0209	0.0201	3.67%	20%	----
		beryllium, total	7440-41-7	E420	0.000020	mg/L	0.000373	0 000373	0.0448%	20%	----
		bismuth, total	7440-69-9	E420	0.000050	mg/L	0.00126	0.00122	2.85%	20%	----
		boron, total	7440-42-8	E420	0.010	mg/L	0.138	0.141	2.36%	20%	----
		cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.00118	0.00122	3.18%	20%	----
		calcium, total	7440-70-2	E420	0.050	mg/L	114	116	1.30%	20%	----
		cesium, total	7440-46-2	E420	0.000010	mg/L	0.00716	0.00725	1.24%	20%	----
		cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00189	0.00190	0.279%	20%	----
		copper, total	7440-50-8	E420	0.00050	mg/L	0 0170	0.0169	0.396%	20%	----
		iron, total	7439-89-6	E420	0.010	mg/L	5.29	5 36	1.42%	20%	----





Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Total Metals (QC Lot: 81130) - continued</b>											
VA20B4084-001	Anonymous	lead, total	7439-92-1	E420	0.000050	mg/L	0.427	0.422	1.34%	20%	----
		lithium, total	7439-93-2	E420	0.0010	mg/L	0.0184	0.0189	2.47%	20%	----
		magnesium, total	7439-95-4	E420	0.0050	mg/L	10.3	9.89	3.86%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	2.34	2.37	1.04%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00728	0.00730	0.317%	20%	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	0.0218	0.0218	0.0497%	20%	----
		phosphorus, total	7723-14-0	E420	0.050	mg/L	0.068	0.070	0.001	Diff <2x LOR	----
		potassium, total	7440-09-7	E420	0.050	mg/L	8.84	9.07	2.61%	20%	----
		rubidium, total	7440-17-7	E420	0.00020	mg/L	0.0286	0.0288	0.640%	20%	----
		selenium, total	7782-49-2	E420	0.000050	mg/L	0.000449	0.000525	0.000076	Diff <2x LOR	----
		silicon, total	7440-21-3	E420	0.10	mg/L	20.1	20.2	0.245%	20%	----
		silver, total	7440-22-4	E420	0.000010	mg/L	0.000965	0.000987	2.24%	20%	----
		sodium, total	17341-25-2	E420	0.050	mg/L	17.3	17.2	0.591%	20%	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	0.312	0.313	0.456%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	43.2	43.2	0.0585%	20%	----
		tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		thallium, total	7440-28-0	E420	0.000010	mg/L	0.000268	0.000256	4.48%	20%	----
		thorium, total	7440-29-1	E420	0.00010	mg/L	0.00042	0.00037	0.00005	Diff <2x LOR	----
		tin, total	7440-31-5	E420	0.00010	mg/L	0.00224	0.00228	1.96%	20%	----
		titanium, total	7440-32-6	E420	0.00030	mg/L	0.230	0.233	1.08%	20%	----
		tungsten, total	7440-33-7	E420	0.00010	mg/L	0.0270	0.0265	2.06%	20%	----
		uranium, total	7440-61-1	E420	0.000010	mg/L	0.000646	0.000684	5.79%	20%	----
		vanadium, total	7440-62-2	E420	0.00050	mg/L	0.00942	0.00947	0.600%	20%	----
		zinc, total	7440-66-6	E420	0.0030	mg/L	0.301	0.297	1.38%	20%	----
		zirconium, total	7440-67-7	E420	0.00020	mg/L	0.00074	0.00066	0.00008	Diff <2x LOR	----
<b>Total Metals (QC Lot: 81131)</b>											
VA20B4084-001	Anonymous	chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	0.0111	0.0109	2.40%	20%	----
<b>Total Metals (QC Lot: 81242)</b>											
VA20B4067-005	Anonymous	mercury total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 79884)</b>											
VA20B3887-001	Anonymous	chromium, dissolved	7440-47-3	E421.Cr-L	0.100	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 79885)</b>											
VA20B3887-001	Anonymous	aluminum, dissolved	7429-90-5	E421	1.00	mg/L	3.0 µg/L	0.0027	0.0003	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E421	0.100	mg/L	1.18 µg/L	0.00121	2.65%	20%	----
		arsenic, dissolved	7440-38-2	E421	0.100	mg/L	2.00 µg/L	0.00195	2.61%	20%	----



Sub-Matrix: **Water**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 79885) - continued</b>											
VA20B3887-001	Anonymous	barium, dissolved	7440-39-3	E421	0.100	mg/L	33 0 µg/L	0.0345	4.40%	20%	----
		beryllium, dissolved	7440-41-7	E421	0.100	mg/L	<0.100 µg/L	<0 000100	0	Diff <2x LOR	----
		bismuth, dissolved	7440-69-9	E421	0 0500	mg/L	<0.050 µg/L	<0 000050	0	Diff <2x LOR	----
		boron, dissolved	7440-42-8	E421	10 0	mg/L	<10 µg/L	<0.010	0	Diff <2x LOR	----
		cadmium, dissolved	7440-43-9	E421	0.00500	mg/L	0 0340 µg/L	0.0000304	0.0000036	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E421	50 0	mg/L	47000 µg/L	44.6	5.07%	20%	----
		cesium, dissolved	7440-46-2	E421	0 0100	mg/L	0.011 µg/L	0 000012	0 000001	Diff <2x LOR	----
		cobalt, dissolved	7440-48-4	E421	0.100	mg/L	0.12 µg/L	0.00011	0 000008	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.200	mg/L	0.22 µg/L	0.00020	0.00002	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E421	10 0	mg/L	30 µg/L	0.031	0.0002	Diff <2x LOR	----
		lead, dissolved	7439-92-1	E421	0 0500	mg/L	<0.050 µg/L	<0 000050	0	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E421	1.00	mg/L	5.0 µg/L	0.0050	0.00003	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	5.00	mg/L	8110 µg/L	8.12	0.0781%	20%	----
		manganese, dissolved	7439-96-5	E421	0.100	mg/L	134 µg/L	0.130	2.21%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0 0500	mg/L	4.34 µg/L	0.00441	1.69%	20%	----
		nickel, dissolved	7440-02-0	E421	0.500	mg/L	0.54 µg/L	<0.00050	0.00004	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E421	50 0	mg/L	<50 µg/L	<0.050	0	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	50 0	mg/L	3900 µg/L	3 89	0.103%	20%	----
		rubidium, dissolved	7440-17-7	E421	0.200	mg/L	1.92 µg/L	0.00183	0.00009	Diff <2x LOR	----
		selenium, dissolved	7782-49-2	E421	0 0500	mg/L	0.051 µg/L	<0 000050	0 000001	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	50 0	mg/L	6860 µg/L	6 82	0.641%	20%	----
		silver, dissolved	7440-22-4	E421	0 0100	mg/L	<0.010 µg/L	<0 000010	0	Diff <2x LOR	----
		sodium, dissolved	17341-25-2	E421	50 0	mg/L	17400 µg/L	17.2	1.11%	20%	----
		strontium, dissolved	7440-24-6	E421	0.200	mg/L	484 µg/L	0.510	5.24%	20%	----
		sulfur, dissolved	7704-34-9	E421	500	mg/L	14400 µg/L	14.0	2.06%	20%	----
		tellurium, dissolved	13494-80-9	E421	0.200	mg/L	<0.20 µg/L	<0.00020	0	Diff <2x LOR	----
		thallium, dissolved	7440-28-0	E421	0 0100	mg/L	0.020 µg/L	0 000020	0.00000003	Diff <2x LOR	----
		thorium, dissolved	7440-29-1	E421	0.100	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		tin, dissolved	7440-31-5	E421	0.100	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		titanium, dissolved	7440-32-6	E421	0.300	mg/L	<0.30 µg/L	<0.00030	0	Diff <2x LOR	----
		tungsten, dissolved	7440-33-7	E421	0.100	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E421	0 0100	mg/L	0.325 µg/L	0 000324	0.167%	20%	----
		vanadium, dissolved	7440-62-2	E421	0.500	mg/L	<0.50 µg/L	<0.00050	0	Diff <2x LOR	----
		zinc, dissolved	7440-66-6	E421	1.00	mg/L	<1 0 µg/L	<0.0010	0	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.200	mg/L	<0.20 µg/L	<0.00020	0	Diff <2x LOR	----

**Dissolved Metals (QC Lot: 81229)**



Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 81229) - continued</b>											
VA20B4067-005	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Aggregate Organics (QC Lot: 81008)</b>											
VA20B3842-017	Anonymous	chemical oxygen demand [COD]	----	E559	20	mg/L	<20	<20	0	Diff <2x LOR	----
<b>Aggregate Organics (QC Lot: 81035)</b>											
VA20B4087-001	MW17-22A	phenols, total (4AAP)	----	E562	0 0010	mg/L	<0 0010	<0.0010	0	Diff <2x LOR	----
<b>Volatile Organic Compounds (QC Lot: 81017)</b>											
VA20B4016-001	Anonymous	benzene	71-43-2	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		bromodichloromethane	75-27-4	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		bromoform	75-25-2	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		carbon tetrachloride	56-23-5	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		chlorobenzene	108-90-7	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		chloroethane	75-00-3	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		chloroform	67-66-3	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		chloromethane	74-87-3	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		dibromochloromethane	124-48-1	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		dichlorobenzene, 1,2-	95-50-1	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		dichlorobenzene, 1,3-	541-73-1	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		dichlorobenzene, 1,4-	106-46-7	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		dichloroethane, 1,1-	75-34-3	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		dichloroethane, 1,2-	107-06-2	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		dichloroethylene, 1,1-	75-35-4	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		dichloroethylene, cis-1,2-	156-59-4	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		dichloromethane	75-09-2	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		dichloropropane, 1,2-	78-87-5	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		dichloropropylene, cis-1,3-	10061-01-5	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		dichloropropylene, trans-1,3-	10061-02-6	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		styrene	100-42-5	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.20	µg/L	<0.20	<0 20	0	Diff <2x LOR	----
		tetrachloroethylene	127-18-4	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----
		toluene	108-88-3	E611C	0.40	µg/L	0.80	0 67	0.13	Diff <2x LOR	----
		trichloroethane, 1,1,1-	71-55-6	E611C	0.50	µg/L	<0.50	<0 50	0	Diff <2x LOR	----

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 Work Order : VA20B4087 Amendment 2  
 Client : Wood Canada Ltd.  
 Project : VE52655D



Sub-Matrix: <b>Water</b>					<i>Laboratory Duplicate (DUP) Report</i>						
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Original Result</i>	<i>Duplicate Result</i>	<i>RPD(%) or Difference</i>	<i>Duplicate Limits</i>	<i>Qualifier</i>
<b>Volatile Organic Compounds (QC Lot: 81017) - continued</b>											
VA20B4016-001	Anonymous	trichloroethane, 1,1,2-	79-00-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		trichloroethylene	79-01-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		trichlorofluoromethane	75-69-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		vinyl chloride	75-01-4	E611C	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611C	0.50	µg/L	0.65	<0.50	0.15	Diff <2x LOR	----
		xylene, o-	95-47-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

### Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 79809)</b>						
alkalinity, bicarbonate (as CaCO <sub>3</sub> )	----	E290	1	mg/L	<1.0	----
alkalinity, carbonate (as CaCO <sub>3</sub> )	----	E290	1	mg/L	<1.0	----
alkalinity, hydroxide (as CaCO <sub>3</sub> )	----	E290	1	mg/L	<1.0	----
alkalinity, phenolphthalein (as CaCO <sub>3</sub> )	----	E290	1	mg/L	<1.0	----
alkalinity, total (as CaCO <sub>3</sub> )	----	E290	1	mg/L	<1.0	----
<b>Physical Tests (QCLot: 79810)</b>						
conductivity	----	E100	1	µS/cm	<1.0	----
<b>Physical Tests (QCLot: 79811)</b>						
acidity (as CaCO <sub>3</sub> )	----	E283	2	mg/L	2.2	----
<b>Physical Tests (QCLot: 79933)</b>						
solids, total suspended [TSS]	----	E160-H	3	mg/L	<3.0	----
<b>Physical Tests (QCLot: 79936)</b>						
turbidity	----	E121	0.1	NTU	<0.10	----
<b>Physical Tests (QCLot: 81419)</b>						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
<b>Physical Tests (QCLot: 86039)</b>						
acidity, hot peroxide treated (as CaCO <sub>3</sub> )	----	E284A	25	mg/L	<25	----
<b>Anions and Nutrients (QCLot: 79791)</b>						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
<b>Anions and Nutrients (QCLot: 79792)</b>						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
<b>Anions and Nutrients (QCLot: 79794)</b>						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 79795)</b>						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 79796)</b>						
sulfate (as SO <sub>4</sub> )	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
<b>Anions and Nutrients (QCLot: 81674)</b>						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 81675)</b>						
nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
<b>Anions and Nutrients (QCLot: 81676)</b>						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Anions and Nutrients (QCLot: 81719)</b>						
Kjeldahl nitrogen, total [TKN]	---	E318	0.05	mg/L	<0.050	---
<b>Anions and Nutrients (QCLot: 82829)</b>						
cyanate	88402-73-7	E343	0.2	mg/L	<0.20	---
<b>Cyanides (QCLot: 81651)</b>						
cyanide, strong acid dissociable (total)	---	E333	0.002	mg/L	<0.0020	---
<b>Cyanides (QCLot: 81652)</b>						
cyanide, weak acid dissociable	---	E336	0.002	mg/L	<0.0020	---
<b>Cyanides (QCLot: 81653)</b>						
cyanide, free	---	E339	0.002	mg/L	<0.0020	---
<b>Cyanides (QCLot: 81891)</b>						
thiocyanate	302-04-5	E344	0.5	mg/L	<0.50	---
<b>Organic / Inorganic Carbon (QCLot: 81678)</b>						
carbon, total organic [TOC]	---	E355-L	0.5	mg/L	<0.50	---
<b>Total Metals (QCLot: 81130)</b>						
aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	---
antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	---
arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	---
barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	---
beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	---
bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	---
boron, total	7440-42-8	E420	0.01	mg/L	<0.010	---
cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	---
calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	---
cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	---
cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	---
copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	---
iron, total	7439-89-6	E420	0.01	mg/L	<0.010	---
lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	---
lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	---
magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	---
manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	---
molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	---
nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	---
phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	---
potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	---
rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	---



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Total Metals (QCLot: 81130) - continued</b>						
selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
sodium, total	17341-25-2	E420	0.05	mg/L	<0.050	----
strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
<b>Total Metals (QCLot: 81131)</b>						
chromium, total	7440-47-3	E420.Cr-L	0.0001	mg/L	<0.00010	----
<b>Total Metals (QCLot: 81242)</b>						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
<b>Dissolved Metals (QCLot: 79884)</b>						
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	<0.00010	----
<b>Dissolved Metals (QCLot: 79885)</b>						
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 79885) - continued</b>						
lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
sodium, dissolved	17341-25-2	E421	0.05	mg/L	<0.050	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
<b>Dissolved Metals (QCLot: 81229)</b>						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
<b>Aggregate Organics (QCLot: 81008)</b>						
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	----
<b>Aggregate Organics (QCLot: 81035)</b>						
phenols, total (4AAP)	----	E562	0.001	mg/L	<0.0010	----
<b>Volatile Organic Compounds (QCLot: 81017)</b>						
benzene	71-43-2	E611C	0.5	µg/L	<0.50	----
bromodichloromethane	75-27-4	E611C	0.5	µg/L	<0.50	----
bromoform	75-25-2	E611C	0.5	µg/L	<0.50	----
carbon tetrachloride	56-23-5	E611C	0.5	µg/L	<0.50	----





Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Volatile Organic Compounds (QCLot: 81017) - continued</b>						
chlorobenzene	108-90-7	E611C	0.5	µg/L	<0.50	---
chloroethane	75-00-3	E611C	0.5	µg/L	<0.50	---
chloroform	67-66-3	E611C	0.5	µg/L	<0.50	---
chloromethane	74-87-3	E611C	0.5	µg/L	<0.50	---
dibromochloromethane	124-48-1	E611C	0.5	µg/L	<0.50	---
dichlorobenzene, 1,2-	95-50-1	E611C	0.5	µg/L	<0.50	---
dichlorobenzene, 1,3-	541-73-1	E611C	0.5	µg/L	<0.50	---
dichlorobenzene, 1,4-	106-46-7	E611C	0.5	µg/L	<0.50	---
dichloroethane, 1,1-	75-34-3	E611C	0.5	µg/L	<0.50	---
dichloroethane, 1,2-	107-06-2	E611C	0.5	µg/L	<0.50	---
dichloroethylene, 1,1-	75-35-4	E611C	0.5	µg/L	<0.50	---
dichloroethylene, cis-1,2-	156-59-4	E611C	0.5	µg/L	<0.50	---
dichloroethylene, trans-1,2-	156-60-5	E611C	0.5	µg/L	<0.50	---
dichloromethane	75-09-2	E611C	0.5	µg/L	<0.50	---
dichloropropane, 1,2-	78-87-5	E611C	0.5	µg/L	<0.50	---
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.5	µg/L	<0.50	---
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.5	µg/L	<0.50	---
ethylbenzene	100-41-4	E611C	0.5	µg/L	<0.50	---
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.5	µg/L	<0.50	---
styrene	100-42-5	E611C	0.5	µg/L	<0.50	---
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.5	µg/L	<0.50	---
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.2	µg/L	<0.20	---
tetrachloroethylene	127-18-4	E611C	0.5	µg/L	<0.50	---
toluene	108-88-3	E611C	0.4	µg/L	<0.40	---
trichloroethane, 1,1,1-	71-55-6	E611C	0.5	µg/L	<0.50	---
trichloroethane, 1,1,2-	79-00-5	E611C	0.5	µg/L	<0.50	---
trichloroethylene	79-01-6	E611C	0.5	µg/L	<0.50	---
trichlorofluoromethane	75-69-4	E611C	0.5	µg/L	<0.50	---
vinyl chloride	75-01-4	E611C	0.4	µg/L	<0.40	---
xylene, m+p-	179601-23-1	E611C	0.5	µg/L	<0.50	---
xylene, o-	95-47-6	E611C	0.5	µg/L	<0.50	---
<b>Hydrocarbons (QCLot: 81020)</b>						
EPH (C10-C19)	---	E601A	250	µg/L	<250	---
EPH (C19-C32)	---	E601A	250	µg/L	<250	---
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 81019)</b>						
acenaphthene	83-32-9	E641A	0.01	µg/L	<0.010	---



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 81019) - continued</b>						
acenaphthylene	208-96-8	E641A	0.01	µg/L	<0.010	---
acridine	260-94-6	E641A	0.01	µg/L	<0.010	---
anthracene	120-12-7	E641A	0.01	µg/L	<0.010	---
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	<0.010	---
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	---
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	<0.010	---
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	---
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	<0.010	---
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	<0.010	---
chrysene	218-01-9	E641A	0.01	µg/L	<0.010	---
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	<0.0050	---
fluoranthene	206-44-0	E641A	0.01	µg/L	<0.010	---
fluorene	86-73-7	E641A	0.01	µg/L	<0.010	---
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	<0.010	---
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	<0.010	---
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	<0.010	---
naphthalene	91-20-3	E641A	0.05	µg/L	<0.050	---
phenanthrene	85-01-8	E641A	0.02	µg/L	<0.020	---
pyrene	129-00-0	E641A	0.01	µg/L	<0.010	---
quinoline	6027-02-7	E641A	0.05	µg/L	<0.050	---



## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Physical Tests (QCLot: 79808)</b>									
pH	---	E108	---	pH units	7 pH units	99.8	98.0	102	---
<b>Physical Tests (QCLot: 79809)</b>									
alkalinity, phenolphthalein (as CaCO <sub>3</sub> )	---	E290	1	mg/L	229 mg/L	104	75.0	125	---
alkalinity, total (as CaCO <sub>3</sub> )	---	E290	1	mg/L	500 mg/L	101	85.0	115	---
<b>Physical Tests (QCLot: 79810)</b>									
conductivity	---	E100	1	µS/cm	146.9 µS/cm	100	90.0	110	---
<b>Physical Tests (QCLot: 79811)</b>									
acidity (as CaCO <sub>3</sub> )	---	E283	2	mg/L	50 mg/L	102	85.0	115	---
<b>Physical Tests (QCLot: 79933)</b>									
solids, total suspended [TSS]	---	E160-H	3	mg/L	150 mg/L	103	85.0	115	---
<b>Physical Tests (QCLot: 79936)</b>									
turbidity	---	E121	0.1	NTU	200 NTU	104	85.0	115	---
<b>Physical Tests (QCLot: 81419)</b>									
solids, total dissolved [TDS]	---	E162	10	mg/L	1000 mg/L	104	85.0	115	---
<b>Physical Tests (QCLot: 86039)</b>									
acidity, hot peroxide treated (as CaCO <sub>3</sub> )	---	E284A	25	mg/L	2500 mg/L	98.6	85.0	115	---
<b>Anions and Nutrients (QCLot: 79791)</b>									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	---
<b>Anions and Nutrients (QCLot: 79792)</b>									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	101	90.0	110	---
<b>Anions and Nutrients (QCLot: 79794)</b>									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	101	90.0	110	---
<b>Anions and Nutrients (QCLot: 79795)</b>									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.6	90.0	110	---
<b>Anions and Nutrients (QCLot: 79796)</b>									
sulfate (as SO <sub>4</sub> )	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	102	90.0	110	---
<b>Anions and Nutrients (QCLot: 81674)</b>									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.12 mg/L	99.2	85.0	115	---
<b>Anions and Nutrients (QCLot: 81675)</b>									
nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	99.1	75.0	125	---
<b>Anions and Nutrients (QCLot: 81676)</b>									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	95.0	80.0	120	---



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 81719)</b>									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	104	75.0	125	----
<b>Anions and Nutrients (QCLot: 82829)</b>									
cyanate	88402-73-7	E343	0.2	mg/L	1 mg/L	90.2	85.0	115	----
<b>Cyanides (QCLot: 81651)</b>									
cyanide, strong acid dissociable (total)	----	E333	0.002	mg/L	0.25 mg/L	94.5	80.0	120	----
<b>Cyanides (QCLot: 81652)</b>									
cyanide, weak acid dissociable	----	E336	0.002	mg/L	0.125 mg/L	96.1	80.0	120	----
<b>Cyanides (QCLot: 81653)</b>									
cyanide, free	----	E339	0.002	mg/L	0.125 mg/L	94.2	80.0	120	----
<b>Cyanides (QCLot: 81891)</b>									
thiocyanate	302-04-5	E344	0.5	mg/L	10 mg/L	94.5	85.0	115	----
<b>Organic / Inorganic Carbon (QCLot: 81678)</b>									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	101	80.0	120	----
<b>Total Metals (QCLot: 81130)</b>									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	101	80.0	120	----
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	102	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	101	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	104	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	98.8	80.0	120	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	101	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	99.3	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	101	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	98.2	80.0	120	----
cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	98.3	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	100.0	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	98.4	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	107	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	104	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	98.2	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	100	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	106	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	99.3	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	99.3	80.0	120	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	98.1	80.0	120	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Total Metals (QCLot: 81130) - continued</b>									
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	106	80.0	120	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	106	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	105	80.0	120	----
silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	107	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	102	80.0	120	----
sodium, total	17341-25-2	E420	0.05	mg/L	50 mg/L	103	80.0	120	----
strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	99.8	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	100.0	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	95.6	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	105	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	105	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	100	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	100	80.0	120	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	103	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	105	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	102	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	97.1	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	99.7	80.0	120	----
<b>Total Metals (QCLot: 81131)</b>									
chromium, total	7440-47-3	E420.Cr-L	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
<b>Total Metals (QCLot: 81242)</b>									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	92.8	80.0	120	----
<b>Dissolved Metals (QCLot: 79884)</b>									
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	0.25 mg/L	101	80.0	120	----
<b>Dissolved Metals (QCLot: 79885)</b>									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	103	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	101	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	102	80.0	120	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	104	80.0	120	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	101	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	97.1	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	102	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	100	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	103	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	107	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	104	80.0	120	----



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 79885) - continued</b>									
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	102	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	100	80.0	120	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	99.9	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	99.3	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	101	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	108	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	108	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	104	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	101	70.0	130	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	104	80.0	120	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	100	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	100	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	104	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	108	80.0	120	----
sodium, dissolved	17341-25-2	E421	0.05	mg/L	50 mg/L	106	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	112	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	91.2	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	94.7	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	100	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	95.5	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	99.4	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	102	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	103	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	100	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	104	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	104	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	110	80.0	120	----
<b>Dissolved Metals (QCLot: 81229)</b>									
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	96.8	80.0	120	----
<b>Aggregate Organics (QCLot: 81008)</b>									
chemical oxygen demand [COD]	----	E559	20	mg/L	750 mg/L	101	85.0	115	----
<b>Aggregate Organics (QCLot: 81035)</b>									
phenols, total (4AAP)	----	E562	0.001	mg/L	0.02 mg/L	100	85.0	115	----
<b>Volatile Organic Compounds (QCLot: 81017)</b>									
benzene	71-43-2	E611C	0.5	µg/L	100 µg/L	91.8	70.0	130	----



Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 81017) - continued</b>									
bromodichloromethane	75-27-4	E611C	0.5	µg/L	100 µg/L	98.6	70.0	130	----
bromoform	75-25-2	E611C	0.5	µg/L	100 µg/L	96.6	70.0	130	----
carbon tetrachloride	56-23-5	E611C	0.5	µg/L	100 µg/L	91.6	70.0	130	----
chlorobenzene	108-90-7	E611C	0.5	µg/L	100 µg/L	95.7	70.0	130	----
chloroethane	75-00-3	E611C	0.5	µg/L	100 µg/L	77.5	60.0	140	----
chloroform	67-66-3	E611C	0.5	µg/L	100 µg/L	96.7	70.0	130	----
chloromethane	74-87-3	E611C	0.5	µg/L	100 µg/L	61.6	60.0	140	----
dibromochloromethane	124-48-1	E611C	0.5	µg/L	100 µg/L	96.4	70.0	130	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.5	µg/L	100 µg/L	99.6	70.0	130	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.5	µg/L	100 µg/L	88.3	70.0	130	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.5	µg/L	100 µg/L	101	70.0	130	----
dichloroethane, 1,1-	75-34-3	E611C	0.5	µg/L	100 µg/L	94.6	70.0	130	----
dichloroethane, 1,2-	107-06-2	E611C	0.5	µg/L	100 µg/L	97.3	70.0	130	----
dichloroethylene, 1,1-	75-35-4	E611C	0.5	µg/L	100 µg/L	83.1	70.0	130	----
dichloroethylene, cis-1,2-	156-59-4	E611C	0.5	µg/L	100 µg/L	94.9	70.0	130	----
dichloroethylene, trans-1,2-	156-60-5	E611C	0.5	µg/L	100 µg/L	85.0	70.0	130	----
dichloromethane	75-09-2	E611C	0.5	µg/L	100 µg/L	90.9	70.0	130	----
dichloropropane, 1,2-	78-87-5	E611C	0.5	µg/L	100 µg/L	94.0	70.0	130	----
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.5	µg/L	100 µg/L	99.4	70.0	130	----
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.5	µg/L	100 µg/L	70.3	70.0	130	----
ethylbenzene	100-41-4	E611C	0.5	µg/L	100 µg/L	86.0	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.5	µg/L	100 µg/L	108	70.0	130	----
styrene	100-42-5	E611C	0.5	µg/L	100 µg/L	85.3	70.0	130	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.5	µg/L	100 µg/L	93.4	70.0	130	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.2	µg/L	100 µg/L	103	70.0	130	----
tetrachloroethylene	127-18-4	E611C	0.5	µg/L	100 µg/L	88.7	70.0	130	----
toluene	108-88-3	E611C	0.4	µg/L	100 µg/L	87.0	70.0	130	----
trichloroethane, 1,1,1-	71-55-6	E611C	0.5	µg/L	100 µg/L	86.9	70.0	130	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.5	µg/L	100 µg/L	96.7	70.0	130	----
trichloroethylene	79-01-6	E611C	0.5	µg/L	100 µg/L	92.8	70.0	130	----
trichlorofluoromethane	75-69-4	E611C	0.5	µg/L	100 µg/L	87.3	60.0	140	----
vinyl chloride	75-01-4	E611C	0.4	µg/L	100 µg/L	67.7	60.0	140	----
xylene, m+p-	179601-23-1	E611C	0.5	µg/L	200 µg/L	92.3	70.0	130	----
xylene, o-	95-47-6	E611C	0.5	µg/L	100 µg/L	88.1	70.0	130	----
<b>Hydrocarbons (QCLot: 81020)</b>									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	114	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	111	70.0	130	----



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 81019)</b>									
acenaphthene	83-32-9	E641A	0.01	µg/L	0.5 µg/L	112	60.0	130	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5 µg/L	113	60.0	130	----
acridine	260-94-6	E641A	0.01	µg/L	0.5 µg/L	97.5	60.0	130	----
anthracene	120-12-7	E641A	0.01	µg/L	0.5 µg/L	115	60.0	130	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5 µg/L	106	60.0	130	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5 µg/L	130	60.0	130	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	0.5 µg/L	117	60.0	130	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	1 µg/L	121	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5 µg/L	115	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5 µg/L	126	60.0	130	----
chrysene	218-01-9	E641A	0.01	µg/L	0.5 µg/L	114	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	0.5 µg/L	116	60.0	130	----
fluoranthene	206-44-0	E641A	0.01	µg/L	0.5 µg/L	111	60.0	130	----
fluorene	86-73-7	E641A	0.01	µg/L	0.5 µg/L	103	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5 µg/L	119	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5 µg/L	117	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	0.5 µg/L	109	60.0	130	----
naphthalene	91-20-3	E641A	0.05	µg/L	0.5 µg/L	105	50.0	130	----
phenanthrene	85-01-8	E641A	0.02	µg/L	0.5 µg/L	109	60.0	130	----
pyrene	129-00-0	E641A	0.01	µg/L	0.5 µg/L	115	60.0	130	----
quinoline	6027-02-7	E641A	0.05	µg/L	0.5 µg/L	121	60.0	130	----





## Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level  $\geq 1 \times$  spike level.

Sub-Matrix: **Water**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	Target	MS	Low	High	
<b>Anions and Nutrients (QCLot: 79791)</b>										
VA20B3997-003	Anonymous	chloride	16887-00-6	E235.Cl	519 mg/L	500 mg/L	104	75.0	125	----
<b>Anions and Nutrients (QCLot: 79792)</b>										
VA20B3997-003	Anonymous	fluoride	16984-48-8	E235.F	4.92 mg/L	5 mg/L	98.5	75.0	125	----
<b>Anions and Nutrients (QCLot: 79794)</b>										
VA20B3997-003	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	13.0 mg/L	12.5 mg/L	104	75.0	125	----
<b>Anions and Nutrients (QCLot: 79795)</b>										
VA20B3997-003	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	2.45 mg/L	2.5 mg/L	98.1	75.0	125	----
<b>Anions and Nutrients (QCLot: 79796)</b>										
VA20B3997-003	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	ND mg/L	500 mg/L	ND	75.0	125	----
<b>Anions and Nutrients (QCLot: 81674)</b>										
VA20B4023-010	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.206 mg/L	0.2 mg/L	103	75.0	125	----
<b>Anions and Nutrients (QCLot: 81675)</b>										
VA20B4023-010	Anonymous	nitrogen, total	7727-37-9	E366	0.390 mg/L	0.4 mg/L	97.6	70.0	130	----
<b>Anions and Nutrients (QCLot: 81676)</b>										
VA20B4036-002	Anonymous	phosphorus, total	7723-14-0	E372-U	ND mg/L	0.05 mg/L	ND	70.0	130	----
<b>Anions and Nutrients (QCLot: 81719)</b>										
VA20B4157-002	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	13.0 mg/L	2.5 mg/L	104	70.0	130	----
<b>Anions and Nutrients (QCLot: 82829)</b>										
WT2000114-010	Anonymous	cyanate	88402-73-7	E343	ND mg/L	2 mg/L	ND	70.0	130	----
<b>Cyanides (QCLot: 81651)</b>										
VA20B4084-009	Anonymous	cyanide, strong acid dissociable (total)	----	E333	0.461 mg/L	0.5 mg/L	92.2	75.0	125	----
<b>Cyanides (QCLot: 81652)</b>										
VA20B4084-009	Anonymous	cyanide, weak acid dissociable	----	E336	0.247 mg/L	0.25 mg/L	98.8	75.0	125	----
<b>Cyanides (QCLot: 81653)</b>										
VA20B4087-002	MW17-22B	cyanide, free	----	E339	0.124 mg/L	0.125 mg/L	99.1	75.0	125	----
<b>Cyanides (QCLot: 81891)</b>										
VA20B4087-002	MW17-22B	thiocyanate	302-04-5	E344	9.97 mg/L	10 mg/L	99.7	75.0	125	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Lab rat ry sample ID	Client sample ID	Analyte	CAS Number	Method	C n entrati n	Target	MS	L w	High	Qualifier
<b>Organic / Inorganic Carbon (QCLot: 80229)</b>										
VA20B4087-001	MW17-22A	carbon, total inorganic [TIC]	----	E354-L	ND mg/L	10 mg/L	ND	70 0	130	----
<b>Organic / Inorganic Carbon (QCLot: 81678)</b>										
VA20B4023-010	Anonymous	carbon, total organic [TOC]	----	E355-L	4.70 mg/L	5 mg/L	94.0	70 0	130	----
<b>Total Metals (QCLot: 81130)</b>										
VA20B4084-002	Anonymous	aluminum, total	7429-90-5	E420	ND mg/L	0.2 mg/L	ND	70 0	130	----
		antimony, total	7440-36-0	E420	0.0212 mg/L	0.02 mg/L	106	70 0	130	----
		arsenic, total	7440-38-2	E420	ND mg/L	0.02 mg/L	ND	70 0	130	----
		barium, total	7440-39-3	E420	0.0210 mg/L	0.02 mg/L	105	70 0	130	----
		beryllium, total	7440-41-7	E420	0.0414 mg/L	0.04 mg/L	104	70 0	130	----
		bismuth, total	7440-69-9	E420	0.00999 mg/L	0.01 mg/L	99.9	70 0	130	----
		boron, total	7440-42-8	E420	ND mg/L	0.1 mg/L	ND	70 0	130	----
		cadmium, total	7440-43-9	E420	0.00411 mg/L	0.004 mg/L	103	70 0	130	----
		calcium, total	7440-70-2	E420	ND mg/L	4 mg/L	ND	70 0	130	----
		cesium, total	7440-46-2	E420	0.0102 mg/L	0.01 mg/L	102	70 0	130	----
		cobalt, total	7440-48-4	E420	0.0199 mg/L	0.02 mg/L	99.3	70 0	130	----
		copper, total	7440-50-8	E420	0.0186 mg/L	0.02 mg/L	93.1	70 0	130	----
		iron, total	7439-89-6	E420	ND mg/L	2 mg/L	ND	70 0	130	----
		lead, total	7439-92-1	E420	ND mg/L	0.02 mg/L	ND	70 0	130	----
		lithium, total	7439-93-2	E420	0.0997 mg/L	0.1 mg/L	99.7	70 0	130	----
		magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70 0	130	----
		manganese, total	7439-96-5	E420	ND mg/L	0.02 mg/L	ND	70 0	130	----
		molybdenum, total	7439-98-7	E420	0.0212 mg/L	0.02 mg/L	106	70 0	130	----
		nickel, total	7440-02-0	E420	0.0397 mg/L	0.04 mg/L	99.3	70 0	130	----
		phosphorus, total	7723-14-0	E420	10.9 mg/L	10 mg/L	109	70 0	130	----
		potassium, total	7440-09-7	E420	ND mg/L	4 mg/L	ND	70 0	130	----
		rubidium, total	7440-17-7	E420	ND mg/L	0.02 mg/L	ND	70 0	130	----
		selenium, total	7782-49-2	E420	0.0448 mg/L	0.04 mg/L	112	70 0	130	----
		silicon, total	7440-21-3	E420	ND mg/L	10 mg/L	ND	70 0	130	----
		silver, total	7440-22-4	E420	0.00391 mg/L	0.004 mg/L	97.7	70 0	130	----
		sodium, total	17341-25-2	E420	ND mg/L	2 mg/L	ND	70 0	130	----
		strontium, total	7440-24-6	E420	ND mg/L	0.02 mg/L	ND	70 0	130	----
		sulfur, total	7704-34-9	E420	ND mg/L	20 mg/L	ND	70 0	130	----
		tellurium, total	13494-80-9	E420	0.0400 mg/L	0.04 mg/L	99.9	70 0	130	----
		thallium, total	7440-28-0	E420	0.00401 mg/L	0.004 mg/L	100	70 0	130	----
		thorium, total	7440-29-1	E420	0.0217 mg/L	0.02 mg/L	108	70 0	130	----
		tin, total	7440-31-5	E420	0.0205 mg/L	0.02 mg/L	103	70 0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Lab rat ry sample ID	Client sample ID	Analyte	CAS Number	Method	C n entrati n	Target	MS	L w	High	Qualifier
<b>Total Metals (QCLot: 81130) - continued</b>										
VA20B4084-002	Anonymous	titanium, total	7440-32-6	E420	ND mg/L	0.04 mg/L	ND	70 0	130	----
		tungsten, total	7440-33-7	E420	ND mg/L	0.02 mg/L	ND	70 0	130	----
		uranium, total	7440-61-1	E420	0.00437 mg/L	0.004 mg/L	109	70 0	130	----
		vanadium, total	7440-62-2	E420	0.104 mg/L	0.1 mg/L	104	70 0	130	----
		zinc, total	7440-66-6	E420	0.383 mg/L	0.4 mg/L	95.9	70 0	130	----
		zirconium, total	7440-67-7	E420	0 0413 mg/L	0.04 mg/L	103	70 0	130	----
<b>Total Metals (QCLot: 81131)</b>										
VA20B4084-002	Anonymous	chromium, total	7440-47-3	E420.Cr-L	0 0409 mg/L	0.04 mg/L	102	70 0	130	----
<b>Total Metals (QCLot: 81242)</b>										
VA20B4067-006	Anonymous	mercury, total	7439-97-6	E508	0.000103 mg/L	0 0001 mg/L	103	70 0	130	----
<b>Dissolved Metals (QCLot: 79884)</b>										
VA20B3887-002	Anonymous	chromium, dissolved	7440-47-3	E421.Cr-L	0 0394 mg/L	0.04 mg/L	98.5	70 0	130	----
<b>Dissolved Metals (QCLot: 79885)</b>										
VA20B3887-002	Anonymous	aluminum, dissolved	7429-90-5	E421	0.196 mg/L	0.2 mg/L	98.1	70 0	130	----
		antimony, dissolved	7440-36-0	E421	0 0201 mg/L	0.02 mg/L	101	70 0	130	----
		arsenic, dissolved	7440-38-2	E421	0 0206 mg/L	0.02 mg/L	103	70 0	130	----
		barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70 0	130	----
		beryllium, dissolved	7440-41-7	E421	0 0404 mg/L	0.04 mg/L	101	70 0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00888 mg/L	0.01 mg/L	88.8	70 0	130	----
		boron, dissolved	7440-42-8	E421	0.096 mg/L	0.1 mg/L	96.0	70 0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00388 mg/L	0.004 mg/L	97.1	70 0	130	----
		calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70 0	130	----
		cesium, dissolved	7440-46-2	E421	0.00967 mg/L	0.01 mg/L	96.7	70 0	130	----
		cobalt, dissolved	7440-48-4	E421	0 0195 mg/L	0.02 mg/L	97.7	70 0	130	----
		copper, dissolved	7440-50-8	E421	0 0196 mg/L	0.02 mg/L	97.9	70 0	130	----
		iron, dissolved	7439-89-6	E421	1.93 mg/L	2 mg/L	96.7	70 0	130	----
		lead, dissolved	7439-92-1	E421	0 0195 mg/L	0.02 mg/L	97.4	70 0	130	----
		lithium, dissolved	7439-93-2	E421	0 0984 mg/L	0.1 mg/L	98.4	70 0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70 0	130	----
		manganese, dissolved	7439-96-5	E421	0 0201 mg/L	0.02 mg/L	100	70 0	130	----
		molybdenum, dissolved	7439-98-7	E421	0 0195 mg/L	0.02 mg/L	97.6	70 0	130	----
		nickel, dissolved	7440-02-0	E421	0 0391 mg/L	0.04 mg/L	97.8	70 0	130	----
		phosphorus, dissolved	7723-14-0	E421	10.2 mg/L	10 mg/L	102	70 0	130	----
		potassium, dissolved	7440-09-7	E421	4.34 mg/L	4 mg/L	108	70 0	130	----
		rubidium, dissolved	7440-17-7	E421	0 0186 mg/L	0.02 mg/L	93.1	70 0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 79885) - continued</b>										
VA20B3887-002	Anonymous	selenium, dissolved	7782-49-2	E421	0.0412 mg/L	0.04 mg/L	103	70.0	130	----
		silicon, dissolved	7440-21-3	E421	8.88 mg/L	10 mg/L	88.8	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00389 mg/L	0.004 mg/L	97.3	70.0	130	----
		sodium, dissolved	17341-25-2	E421	2.18 mg/L	2 mg/L	109	70.0	130	----
		strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		sulfur, dissolved	7704-34-9	E421	19.1 mg/L	20 mg/L	95.6	70.0	130	----
		tellurium, dissolved	13494-80-9	E421	0.0385 mg/L	0.04 mg/L	96.3	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00387 mg/L	0.004 mg/L	96.7	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0209 mg/L	0.02 mg/L	104	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0192 mg/L	0.02 mg/L	96.3	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0395 mg/L	0.04 mg/L	98.8	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0201 mg/L	0.02 mg/L	100	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.00407 mg/L	0.004 mg/L	102	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.104 mg/L	0.1 mg/L	104	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.399 mg/L	0.4 mg/L	99.7	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0412 mg/L	0.04 mg/L	103	70.0	130	----
<b>Dissolved Metals (QCLot: 81229)</b>										
VA20B4067-006	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000970 mg/L	0.0001 mg/L	97.0	70.0	130	----
<b>Aggregate Organics (QCLot: 81008)</b>										
VA20B4087-001	MW17-22A	chemical oxygen demand [COD]	----	E559	480 mg/L	500 mg/L	95.9	75.0	125	----
<b>Aggregate Organics (QCLot: 81035)</b>										
VA20B4087-001	MW17-22A	phenols, total (4AAP)	----	E562	0.0206 mg/L	0.02 mg/L	103	75.0	125	----
<b>Volatile Organic Compounds (QCLot: 81017)</b>										
VA20B4016-003	Anonymous	benzene	71-43-2	E611C	91.4 µg/L	100 µg/L	91.4	60.0	140	----
		bromodichloromethane	75-27-4	E611C	95.3 µg/L	100 µg/L	95.3	60.0	140	----
		bromoform	75-25-2	E611C	95.1 µg/L	100 µg/L	95.1	60.0	140	----
		carbon tetrachloride	56-23-5	E611C	91.7 µg/L	100 µg/L	91.7	60.0	140	----
		chlorobenzene	108-90-7	E611C	100 µg/L	100 µg/L	100	60.0	140	----
		chloroethane	75-00-3	E611C	75.6 µg/L	100 µg/L	75.6	50.0	150	----
		chloroform	67-66-3	E611C	95.4 µg/L	100 µg/L	95.4	60.0	140	----
		chloromethane	74-87-3	E611C	60.2 µg/L	100 µg/L	60.2	50.0	150	----
		dibromochloromethane	124-48-1	E611C	96.8 µg/L	100 µg/L	96.8	60.0	140	----
		dichlorobenzene, 1,2-	95-50-1	E611C	99.5 µg/L	100 µg/L	99.5	60.0	140	----
		dichlorobenzene, 1,3-	541-73-1	E611C	92.9 µg/L	100 µg/L	92.9	60.0	140	----
		dichlorobenzene, 1,4-	106-46-7	E611C	105 µg/L	100 µg/L	105	60.0	140	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 81017) - continued</b>										
VA20B4016-003	Anonymous	dichloroethane, 1,1-	75-34-3	E611C	94.4 µg/L	100 µg/L	94.4	60.0	140	----
		dichloroethane, 1,2-	107-06-2	E611C	95.4 µg/L	100 µg/L	95.4	60.0	140	----
		dichloroethylene, 1,1-	75-35-4	E611C	82.5 µg/L	100 µg/L	82.5	60.0	140	----
		dichloroethylene, cis-1,2-	156-59-4	E611C	94.1 µg/L	100 µg/L	94.1	60.0	140	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	84.2 µg/L	100 µg/L	84.2	60.0	140	----
		dichloromethane	75-09-2	E611C	89.6 µg/L	100 µg/L	89.6	60.0	140	----
		dichloropropane, 1,2-	78-87-5	E611C	92.3 µg/L	100 µg/L	92.3	60.0	140	----
		dichloropropylene, cis-1,3-	10061-01-5	E611C	76.1 µg/L	100 µg/L	76.1	60.0	140	----
		dichloropropylene, trans-1,3-	10061-02-6	E611C	69.5 µg/L	100 µg/L	69.5	60.0	140	----
		ethylbenzene	100-41-4	E611C	90.6 µg/L	100 µg/L	90.6	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	109 µg/L	100 µg/L	109	60.0	140	----
		styrene	100-42-5	E611C	86.9 µg/L	100 µg/L	86.9	60.0	140	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	95.5 µg/L	100 µg/L	95.5	60.0	140	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611C	97.1 µg/L	100 µg/L	97.1	60.0	140	----
		tetrachloroethylene	127-18-4	E611C	96.2 µg/L	100 µg/L	96.2	60.0	140	----
		toluene	108-88-3	E611C	103 µg/L	100 µg/L	103	60.0	140	----
		trichloroethane, 1,1,1-	71-55-6	E611C	87.4 µg/L	100 µg/L	87.4	60.0	140	----
		trichloroethane, 1,1,2-	79-00-5	E611C	98.4 µg/L	100 µg/L	98.4	60.0	140	----
		trichloroethylene	79-01-6	E611C	91.8 µg/L	100 µg/L	91.8	60.0	140	----
		trichlorofluoromethane	75-69-4	E611C	95.7 µg/L	100 µg/L	95.7	50.0	150	----
		vinyl chloride	75-01-4	E611C	64.2 µg/L	100 µg/L	64.2	50.0	150	----
		xylene, m+p-	179601-23-1	E611C	198 µg/L	200 µg/L	98.8	60.0	140	----
		xylene, o-	95-47-6	E611C	92.6 µg/L	100 µg/L	92.6	60.0	140	----

**Reference Material (RM) Report**

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix: **Water**

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
<b>Organic / Inorganic Carbon (QCLot: 80229)</b>									
QC-80229-002	RM	carbon, total inorganic [TIC]	----	E354-L	8 mg/L	97.9	80.0	120	----

Page : 26 of 26  
Work Order : VA20B4087 Amendment 2  
Client : Wood Canada Ltd.  
Project : VE52655D

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Chain of Custody (COC) / Analytical Request Form

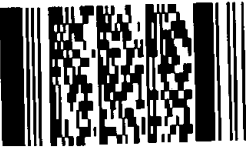
Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here

(lab use only)

COC Number: 17 -

Page of

<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>			<b>Select Service Level Below - Contact your AM to confirm all E&amp;P TATs (surcharges may apply)</b>																																																																																																																										
Company: Wood		Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)			Regular [R] <input checked="" type="checkbox"/> Standard TAT If received by 3 pm - business days - no surcharges apply																																																																																																																										
Contact: Jeremiah Gladu		Quality Control (QC) Report with Report <input type="checkbox"/> YES <input type="checkbox"/> NO			PRIORITY (Business Days) 4 day [P4-20%] <input type="checkbox"/> 3 day [P3-26%] <input type="checkbox"/> 2 day [P2-50%] <input type="checkbox"/>		EMERGENCY 1 Business day [E - 100%] <input type="checkbox"/> Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] <input type="checkbox"/>																																																																																																																								
Phone:		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked			Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm																																																																																																																										
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			For tests that can not be performed according to the service level selected, you will be contacted.																																																																																																																										
Street: 4445 Loughheed Hwy.		Email 1 or Fax: jeremiah.gladu@woodplc.com			<b>Analysis Request</b>																																																																																																																										
City/Province: Burnaby/BC		Email 2 <i>a.m.pour@woodplc.com</i>			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below																																																																																																																										
Postal Code: V5C 0E4		Email 3			<table border="1"> <tr> <td rowspan="10">NUMBER OF CONTAINERS</td> <td>BTEX / VOC (BC)</td> <td>EPH/PAH</td> <td>General chemistry *</td> <td>DISSOLVED METALS</td> <td>Cyanide (CLO)</td> <td>Cyanides (BC)</td> <td>General TIC (BC)</td> <td>NO<sub>3</sub>/Toc/CO<sub>3</sub>/TK<sub>3</sub></td> <td>TN / TP</td> <td>NH<sub>3</sub> / PHEN</td> <td>SCN (BC)</td> <td rowspan="10">SAMPLES ON HOLD</td> <td rowspan="10">SUSPECTED HAZARD (see Special Instructions)</td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table>										NUMBER OF CONTAINERS	BTEX / VOC (BC)	EPH/PAH	General chemistry *	DISSOLVED METALS	Cyanide (CLO)	Cyanides (BC)	General TIC (BC)	NO <sub>3</sub> /Toc/CO <sub>3</sub> /TK <sub>3</sub>	TN / TP	NH <sub>3</sub> / PHEN	SCN (BC)	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)																																																																																																			
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ALS Lab Work Order # (lab use only): <i>B4087</i>		ALS Contact: Selam Worku		Sampler: Ardy M.																																																																																																																											
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)			Date (dd-mmm-yy)	Time (hh:mm)	Sample Type																																																																																																																									
1	MW17-22A			23 Aug 20	16:30	GW																																																																																																																									
2	MW17-22B			"	16:30	GW																																																																																																																									
3	MW17-72B			"	"	"																																																																																																																									
<p>Environmental Division Vancouver Work Order Reference <b>VA20B4087</b></p>  <p>Telephone : +1 604 253 4188</p>																																																																																																																															
<b>Drinking Water (DW) Samples<sup>1</sup> (client use)</b>		Special instructions / specify criteria to add on report by clicking on the drop-down list below (electronic COC only)			<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>																																																																																																																										
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO		*GENERAL WATER CHEMISTRY TO INCLUDE: pH, Alkalinity, bicarbonate, carbonate, chloride, conductivity, fluoride, hardness, hydroxide, nitrate, nitrite, ammonia, sulphate, turbidity, TDS, acidity, <i>TSS, LOR</i>			Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>																																																																																																																										
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO					Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>																																																																																																																										
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<b>SHIPMENT RELEASE (client use)</b>				<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>				<b>FINAL SHIPMENT RECEPTION (lab use only)</b>																																																																																																																							
Released by: Ardy Mansourpour		Date: Aug 28, 2020		Time:		Received by:		Date: AUG 29 2020		Time: 8:10																																																																																																																					



**CERTIFICATE OF ANALYSIS**

**Work Order** : **VA20B4178**  
**Client** : **Wood Canada Ltd.**  
**Contact** : Jeremiah Gladu  
**Address** : 600 - 4445 Lougheed Hwy  
Burnaby BC Canada V5C 0E4  
**Telephone** : 604 294 3811  
**Project** : VE52655D  
**PO** : ----  
**C-O-C number** : ----  
**Sampler** : Ardy M.  
**Site** : ----  
**Quote number** : VA20-SEAB100-0003 - Wood/Seabridge Gold  
**No. of samples received** : 3  
**No. of samples analysed** : 3

**Page** : 1 of 5  
**Laboratory** : Vancouver - Environmental  
**Account Manager** : Selam Worku  
**Address** : 8081 Lougheed Highway  
Burnaby BC Canada V5A 1W9  
**Telephone** : +1 604 253 4188  
**Date Samples Received** : 01-Sep-2020 11:20  
**Date Analysis Commenced** : 03-Sep-2020  
**Issue Date** : 10-Sep-2020 17:44

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

**Signatories**

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Brianna Allen	Department Manager - Organics	Organics, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia





## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
µg/L	micrograms per litre
mg/L	milligrams per litre

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in reports identified as "Preliminary Report" are considered authorized for use.



## Analytical Results

Sub-Matrix: Water					Client sample ID	SW20-01	SW20-02	SW20-03	----	----
(Matrix: Water)										
Client sampling date / time					29-Aug-2020	29-Aug-2020	29-Aug-2020	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA20B4178-001	VA20B4178-002	VA20B4178-003	-----	-----	
					Result	Result	Result	----	----	
<b>Total Metals</b>										
cadmium, total	7440-43-9	E420	0.000050	mg/L	0.000316	----	----	----	----	----
iron, total	7439-89-6	E420	0.010	mg/L	0.349	----	----	----	----	----
magnesium, total	7439-95-4	E420	0.0050	mg/L	4.23	----	----	----	----	----
manganese, total	7439-96-5	E420	0.00010	mg/L	----	0.192	----	----	----	----
<b>Volatile Organic Compounds</b>										
chlorobenzene	108-90-7	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	----
chloromethane	74-87-3	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	----
dichloropropane, 1,2-	78-87-5	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	----
dichloropropylene, cis+trans-1,3-	542-75-6	E611C	0.75	µg/L	----	<0.75	<0.75	----	----	----
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.20	µg/L	----	<0.20	<0.20	----	----	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	----
trichlorofluoromethane	75-69-4	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	----
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>										
benzene	71-43-2	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	----
ethylbenzene	100-41-4	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	----
styrene	100-42-5	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	----
toluene	108-88-3	E611C	0.40	µg/L	----	<0.40	<0.40	----	----	----
xylene, m+p-	179601 23 1	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	----
xylene, o-	95-47-6	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	----
xylenes, total	1330-20-7	E611C	0.75	µg/L	----	<0.75	<0.75	----	----	----
<b>Volatile Organic Compounds [Drycleaning]</b>										
carbon tetrachloride	56-23-5	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	----
chloroethane	75-00-3	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	----
dichloroethane, 1,1-	75-34-3	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	----
dichloroethane, 1,2-	107-06-2	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	----



## Analytical Results

Sub-Matrix: Water					Client sample ID	SW20-01	SW20-02	SW20-03	----	----
(Matrix: Water)										
Client sampling date / time					29-Aug-2020	29-Aug-2020	29-Aug-2020	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA20B4178-001	VA20B4178-002	VA20B4178-003	-----	-----	
					Result	Result	Result	----	----	
<b>Volatile Organic Compounds [Drycleaning]</b>										
dichloroethylene, 1,1-	75-35-4	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	
dichloroethylene, cis-1,2-	156-59-4	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	
dichloroethylene, trans-1,2-	156-60-5	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	
dichloromethane	75-09-2	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	
tetrachloroethylene	127-18-4	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	
trichloroethane, 1,1,1-	71-55-6	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	
trichloroethylene	79-01-6	E611C	0.50	µg/L	----	<0.50	<0.50	----	----	
vinyl chloride	75-01-4	E611C	0.40	µg/L	----	<0.40	<0.40	----	----	
<b>Volatile Organic Compounds Surrogates</b>										
bromofluorobenzene, 4-	460-00-4	E611C	0.50	%	----	107	111	----	----	
difluorobenzene, 1,4-	540-36-3	E611C	0.50	%	----	111	106	----	----	
<b>Hydrocarbons</b>										
EPH (C10-C19)	----	E601A	250	µg/L	----	<250	<250	----	----	
EPH (C19-C32)	----	E601A	250	µg/L	----	<250	<250	----	----	
HEPHw	----	EC600A	250	µg/L	----	<250	<250	----	----	
LEPHw	----	EC600A	250	µg/L	----	<250	<250	----	----	
<b>Hydrocarbons Surrogates</b>										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%	----	85.9	88.4	----	----	
<b>Polycyclic Aromatic Hydrocarbons</b>										
acenaphthene	83-32-9	E641A	0.010	µg/L	----	<0.010	<0.010	----	----	
acenaphthylene	208-96-8	E641A	0.010	µg/L	----	<0.010	<0.010	----	----	
acridine	260-94-6	E641A	0.010	µg/L	----	<0.010	<0.010	----	----	
anthracene	120-12-7	E641A	0.010	µg/L	----	<0.010	<0.010	----	----	
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	----	<0.010	<0.010	----	----	
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	----	<0.0050	<0.0050	----	----	
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	----	<0.010	<0.010	----	----	
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	----	<0.015	<0.015	----	----	
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	----	<0.010	<0.010	----	----	
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	----	<0.010	<0.010	----	----	
chrysene	218-01-9	E641A	0.010	µg/L	----	<0.010	<0.010	----	----	
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	----	<0.0050	<0.0050	----	----	



## Analytical Results

Sub-Matrix: Water

Client sample ID

(Matrix: Water)

					SW20-01	SW20-02	SW20-03	----	----
Client sampling date / time					29-Aug-2020	29-Aug-2020	29-Aug-2020	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B4178-001	VA20B4178-002	VA20B4178-003	-----	-----
					Result	Result	Result	----	----
<b>Polycyclic Aromatic Hydrocarbons</b>									
fluoranthene	206-44-0	E641A	0.010	µg/L	----	<0.010	<0.010	----	----
fluorene	86-73-7	E641A	0.010	µg/L	----	<0.010	<0.010	----	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	----	<0.010	<0.010	----	----
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	----	0.024	<0.010	----	----
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	----	0.018	<0.010	----	----
naphthalene	91-20-3	E641A	0.050	µg/L	----	<0.050	<0.050	----	----
phenanthrene	85-01-8	E641A	0.020	µg/L	----	<0.020	<0.020	----	----
pyrene	129-00-0	E641A	0.010	µg/L	----	<0.010	<0.010	----	----
quinoline	6027-02-7	E641A	0.050	µg/L	----	<0.050	<0.050	----	----
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>									
acridine-d9	34749-75-2	E641A	0.010	%	----	103	103	----	----
chrysene-d12	1719-03-5	E641A	0.010	%	----	102	106	----	----
naphthalene-d8	1146-65-2	E641A	0.010	%	----	90.0	90.6	----	----
phenanthrene-d10	1517-22-2	E641A	0.010	%	----	102	103	----	----
<b>Volatile Organic Compounds [THMs]</b>									
bromodichloromethane	75-27-4	E611C	0.50	µg/L	----	<0.50	<0.50	----	----
bromoform	75-25-2	E611C	0.50	µg/L	----	<0.50	<0.50	----	----
chloroform	67-66-3	E611C	0.50	µg/L	----	<0.50	<0.50	----	----
dibromochloromethane	124-48-1	E611C	0.50	µg/L	----	<0.50	<0.50	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>VA20B4178</b>	Page	: 1 of 6
Client	: <b>Wood Canada Ltd.</b>	Laboratory	: Vancouver - Environmental
Contact	: Jeremiah Gladu	Account Manager	: Selam Worku
Address	: 600 - 4445 Lougheed Hwy Burnaby BC Canada V5C 0E4	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: VE52655D	Date Samples Received	: 01-Sep-2020 11:20
PO	: ----	Issue Date	: 10-Sep-2020 17:44
C-O-C number	: ----		
Sampler	: Ardy M.		
Site	: ----		
Quote number	: VA20-SEAB100-0003 - Wood/Seabridge Gold		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

## Summary of Outliers

### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.

### **Outliers : Analysis Holding Time Compliance (Breaches)**

- No Analysis Holding Time Outliers exist.

### **Outliers : Frequency of Quality Control Samples**

- No Quality Control Sample Frequency Outliers occur.

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## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> SW20-02	E601A	29-Aug-2020	04-Sep-2020	14 days	5 days	✓	08-Sep-2020	40 days	3 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> SW20-03	E601A	29-Aug-2020	04-Sep-2020	14 days	5 days	✓	08-Sep-2020	40 days	3 days	✓	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> SW20-02	E641A	29-Aug-2020	04-Sep-2020	14 days	5 days	✓	05-Sep-2020	40 days	0 days	✓	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> SW20-03	E641A	29-Aug-2020	04-Sep-2020	14 days	5 days	✓	05-Sep-2020	40 days	0 days	✓	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE total (nitric acid)</b> SW20-01	E420	29-Aug-2020	----	----	----		04-Sep-2020	180 days	5 days	✓	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE total (nitric acid)</b> SW20-02	E420	29-Aug-2020	----	----	----		04-Sep-2020	180 days	5 days	✓	
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> SW20-02	E611C	29-Aug-2020	03-Sep-2020	----	----		04-Sep-2020	----	----		



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) SW20-03	E611C	29-Aug-2020	03-Sep-2020	----	----		04-Sep-2020	----	----	
<b>Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) SW20-02	E611C	29-Aug-2020	03-Sep-2020	14 days	4 days	✓	04-Sep-2020	9 days	0 days	✓
<b>Volatile Organic Compounds [BTEXS+MTBE] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) SW20-03	E611C	29-Aug-2020	03-Sep-2020	14 days	4 days	✓	04-Sep-2020	9 days	0 days	✓
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) SW20-02	E611C	29-Aug-2020	03-Sep-2020	----	----		04-Sep-2020	----	----	
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) SW20-03	E611C	29-Aug-2020	03-Sep-2020	----	----		04-Sep-2020	----	----	
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) SW20-02	E611C	29-Aug-2020	03-Sep-2020	----	----		04-Sep-2020	----	----	
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) SW20-03	E611C	29-Aug-2020	03-Sep-2020	----	----		04-Sep-2020	----	----	

**Legend & Qualifier Definitions**

Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Total Metals in Water by CRC ICPMS	E420	81440	1	18	5.5	5.0	✔
VOCs (BC List) by Headspace GC-MS	E611C	81036	1	14	7.1	5.0	✔
<b>Laboratory Control Samples (LCS)</b>							
BC PHC - EPH by GC-FID	E601A	81695	1	7	14.2	5.0	✔
PAHs by LVI GC-MS	E641A	81694	1	20	5.0	5.0	✔
Total Metals in Water by CRC ICPMS	E420	81440	1	18	5.5	5.0	✔
VOCs (BC List) by Headspace GC-MS	E611C	81036	1	14	7.1	5.0	✔
<b>Method Blanks (MB)</b>							
BC PHC - EPH by GC-FID	E601A	81695	1	7	14.2	5.0	✔
PAHs by LVI GC-MS	E641A	81694	1	20	5.0	5.0	✔
Total Metals in Water by CRC ICPMS	E420	81440	1	18	5.5	5.0	✔
VOCs (BC List) by Headspace GC-MS	E611C	81036	1	14	7.1	5.0	✔
<b>Matrix Spikes (MS)</b>							
Total Metals in Water by CRC ICPMS	E420	81440	1	18	5.5	5.0	✔
VOCs (BC List) by Headspace GC-MS	E611C	81036	1	14	7.1	5.0	✔



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Metals in Water by CRC ICPMS	E420 Vancouver - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
BC PHC - EPH by GC-FID	E601A Vancouver - Environmental	Water	BC MOE Lab Manual	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.
VOCs (BC List) by Headspace GC-MS	E611C Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by LVI GC-MS	E641A Vancouver - Environmental	Water	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by large volume injection (LVI) GC-MS.
LEPH and HEPH: EPH-PAH	EC600A Vancouver - Environmental	Water	BC MOE Lab Manual (LEPH and HEPH) (mod)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Acenaphthene, Acridine, Anthracene, Fluorene, Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(a)pyrene, Fluoranthene, and Pyrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
VOCs Preparation for Headspace Analysis	EP581 Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

## QUALITY CONTROL REPORT

<b>Work Order</b>	<b>: VA20B4178</b>	<b>Page</b>	<b>: 1 of 10</b>
<b>Client</b>	: Wood Canada Ltd.	<b>Laboratory</b>	: Vancouver - Environmental
<b>Contact</b>	: Jeremiah Gladu	<b>Account Manager</b>	: Selam Worku
<b>Address</b>	: 1235 Main Street P.O. Box 2356 Smithers BC Canada V0J 2N0	<b>Address</b>	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
<b>Telephone</b>	: ----	<b>Telephone</b>	: +1 604 253 4188
<b>Project</b>	: VE52655D	<b>Date Samples Received</b>	: 01-Sep-2020 11:20
<b>PO</b>	: ----	<b>Date Analysis Commenced</b>	: 03-Sep-2020
<b>C-O-C number</b>	: ----	<b>Issue Date</b>	: 10-Sep-2020 17:44
<b>Sampler</b>	: Ardy M.		
<b>Site</b>	: ----		
<b>Quote number</b>	: VA20-SEAB100-0003 - Wood/Seabridge Gold		
<b>No. of samples received</b>	: 3		
<b>No. of samples analysed</b>	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

### *Signatories*

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Brianna Allen	Department Manager - Organics	Organics, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia

Page : 2 of 10  
Work Order : VA20B4178  
Client : Wood Canada Ltd.  
Project : VE52655D

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## **General Comments**

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

# = Indicates a QC result that did not meet the ALS DQO.



### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Total Metals (QC Lot: 81440)</b>											
VA20B4106-002	Anonymous	cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000076	0.0000114	0.0000038	Diff <2x LOR	----
		iron, total	7439-89-6	E420	0.010	mg/L	0.036	0.040	0.003	Diff <2x LOR	----
		magnesium, total	7439-95-4	E420	0.0050	mg/L	0.570	0.579	1.51%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	0.00317	0.00302	4.71%	20%	----
<b>Volatile Organic Compounds (QC Lot: 81036)</b>											
VA20B4168-002	Anonymous	benzene	71-43-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		bromodichloromethane	75-27-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		bromoform	75-25-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		carbon tetrachloride	56-23-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		chlorobenzene	108-90-7	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		chloroethane	75-00-3	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		chloroform	67-66-3	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		chloromethane	74-87-3	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dibromochloromethane	124-48-1	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichlorobenzene, 1,2-	95-50-1	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichlorobenzene, 1,3-	541-73-1	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichlorobenzene, 1,4-	106-46-7	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloroethane, 1,1-	75-34-3	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloroethane, 1,2-	107-06-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloroethylene, 1,1-	75-35-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloroethylene, cis-1,2-	156-59-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloromethane	75-09-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloropropane, 1,2-	78-87-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloropropylene, cis-1,3-	10061-01-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloropropylene, trans-1,3-	10061-02-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.20	µg/L	<0.20	<0.20	0	Diff <2x LOR	----
		tetrachloroethylene	127-18-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----

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 Work Order : VA20B4178  
 Client : Wood Canada Ltd.  
 Project : VE52655D



Sub-Matrix: **Water**

*Laboratory Duplicate (DUP) Report*

<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Original Result</i>	<i>Duplicate Result</i>	<i>RPD(%) or Difference</i>	<i>Duplicate Limits</i>	<i>Qualifier</i>
<b>Volatile Organic Compounds (QC Lot: 81036) - continued</b>											
VA20B4168-002	Anonymous	toluene	108-88-3	E611C	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		trichloroethane, 1,1,1-	71-55-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		trichloroethane, 1,1,2-	79-00-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		trichloroethylene	79-01-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		trichlorofluoromethane	75-69-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		vinyl chloride	75-01-4	E611C	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

### Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Total Metals (QCLot: 81440)</b>						
cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
<b>Volatile Organic Compounds (QCLot: 81036)</b>						
benzene	71-43-2	E611C	0.5	µg/L	<0.50	----
bromodichloromethane	75-27-4	E611C	0.5	µg/L	<0.50	----
bromoform	75-25-2	E611C	0.5	µg/L	<0.50	----
carbon tetrachloride	56-23-5	E611C	0.5	µg/L	<0.50	----
chlorobenzene	108-90-7	E611C	0.5	µg/L	<0.50	----
chloroethane	75-00-3	E611C	0.5	µg/L	<0.50	----
chloroform	67-66-3	E611C	0.5	µg/L	<0.50	----
chloromethane	74-87-3	E611C	0.5	µg/L	<0.50	----
dibromochloromethane	124-48-1	E611C	0.5	µg/L	<0.50	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.5	µg/L	<0.50	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.5	µg/L	<0.50	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.5	µg/L	<0.50	----
dichloroethane, 1,1-	75-34-3	E611C	0.5	µg/L	<0.50	----
dichloroethane, 1,2-	107-06-2	E611C	0.5	µg/L	<0.50	----
dichloroethylene, 1,1-	75-35-4	E611C	0.5	µg/L	<0.50	----
dichloroethylene, cis-1,2-	156-59-4	E611C	0.5	µg/L	<0.50	----
dichloroethylene, trans-1,2-	156-60-5	E611C	0.5	µg/L	<0.50	----
dichloromethane	75-09-2	E611C	0.5	µg/L	<0.50	----
dichloropropane, 1,2-	78-87-5	E611C	0.5	µg/L	<0.50	----
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.5	µg/L	<0.50	----
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.5	µg/L	<0.50	----
ethylbenzene	100-41-4	E611C	0.5	µg/L	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.5	µg/L	<0.50	----
styrene	100-42-5	E611C	0.5	µg/L	<0.50	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.5	µg/L	<0.50	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.2	µg/L	<0.20	----
tetrachloroethylene	127-18-4	E611C	0.5	µg/L	<0.50	----
toluene	108-88-3	E611C	0.4	µg/L	<0.40	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Volatile Organic Compounds (QCLot: 81036) - continued</b>						
trichloroethane, 1,1,1-	71-55-6	E611C	0.5	µg/L	<0.50	---
trichloroethane, 1,1,2-	79-00-5	E611C	0.5	µg/L	<0.50	---
trichloroethylene	79-01-6	E611C	0.5	µg/L	<0.50	---
trichlorofluoromethane	75-69-4	E611C	0.5	µg/L	<0.50	---
vinyl chloride	75-01-4	E611C	0.4	µg/L	<0.40	---
xylene, m+p-	179601-23-1	E611C	0.5	µg/L	<0.50	---
xylene, o-	95-47-6	E611C	0.5	µg/L	<0.50	---
<b>Hydrocarbons (QCLot: 81695)</b>						
EPH (C10-C19)	---	E601A	250	µg/L	<250	---
EPH (C19-C32)	---	E601A	250	µg/L	<250	---
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 81694)</b>						
acenaphthene	83-32-9	E641A	0.01	µg/L	<0.010	---
acenaphthylene	208-96-8	E641A	0.01	µg/L	<0.010	---
acridine	260-94-6	E641A	0.01	µg/L	<0.010	---
anthracene	120-12-7	E641A	0.01	µg/L	<0.010	---
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	<0.010	---
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	---
benzo(b+j)fluoranthene	---	E641A	0.01	µg/L	<0.010	---
benzo(b+j+k)fluoranthene	---	E641A	0.015	µg/L	<0.015	---
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	<0.010	---
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	<0.010	---
chrysene	218-01-9	E641A	0.01	µg/L	<0.010	---
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	<0.0050	---
fluoranthene	206-44-0	E641A	0.01	µg/L	<0.010	---
fluorene	86-73-7	E641A	0.01	µg/L	<0.010	---
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	<0.010	---
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	<0.010	---
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	<0.010	---
naphthalene	91-20-3	E641A	0.05	µg/L	<0.050	---
phenanthrene	85-01-8	E641A	0.02	µg/L	<0.020	---
pyrene	129-00-0	E641A	0.01	µg/L	<0.010	---
quinoline	6027-02-7	E641A	0.05	µg/L	<0.050	---





## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Total Metals (QCLot: 81440)</b>									
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	99.2	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	93.7	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	98.3	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	101	80.0	120	----
<b>Volatile Organic Compounds (QCLot: 81036)</b>									
benzene	71-43-2	E611C	0.5	µg/L	100 µg/L	119	70.0	130	----
bromodichloromethane	75-27-4	E611C	0.5	µg/L	100 µg/L	127	70.0	130	----
bromoform	75-25-2	E611C	0.5	µg/L	100 µg/L	101	70.0	130	----
carbon tetrachloride	56-23-5	E611C	0.5	µg/L	100 µg/L	111	70.0	130	----
chlorobenzene	108-90-7	E611C	0.5	µg/L	100 µg/L	115	70.0	130	----
chloroethane	75-00-3	E611C	0.5	µg/L	100 µg/L	95.4	60.0	140	----
chloroform	67-66-3	E611C	0.5	µg/L	100 µg/L	129	70.0	130	----
chloromethane	74-87-3	E611C	0.5	µg/L	100 µg/L	83.9	60.0	140	----
dibromochloromethane	124-48-1	E611C	0.5	µg/L	100 µg/L	123	70.0	130	----
dichlorobenzene, 1,2-	95-50-1	E611C	0.5	µg/L	100 µg/L	96.6	70.0	130	----
dichlorobenzene, 1,3-	541-73-1	E611C	0.5	µg/L	100 µg/L	87.7	70.0	130	----
dichlorobenzene, 1,4-	106-46-7	E611C	0.5	µg/L	100 µg/L	92.4	70.0	130	----
dichloroethane, 1,1-	75-34-3	E611C	0.5	µg/L	100 µg/L	124	70.0	130	----
dichloroethane, 1,2-	107-06-2	E611C	0.5	µg/L	100 µg/L	97.3	70.0	130	----
dichloroethylene, 1,1-	75-35-4	E611C	0.5	µg/L	100 µg/L	106	70.0	130	----
dichloroethylene, cis-1,2-	156-59-4	E611C	0.5	µg/L	100 µg/L	125	70.0	130	----
dichloroethylene, trans-1,2-	156-60-5	E611C	0.5	µg/L	100 µg/L	106	70.0	130	----
dichloromethane	75-09-2	E611C	0.5	µg/L	100 µg/L	126	70.0	130	----
dichloropropane, 1,2-	78-87-5	E611C	0.5	µg/L	100 µg/L	130	70.0	130	----
dichloropropylene, cis-1,3-	10061-01-5	E611C	0.5	µg/L	100 µg/L	124	70.0	130	----
dichloropropylene, trans-1,3-	10061-02-6	E611C	0.5	µg/L	100 µg/L	122	70.0	130	----
ethylbenzene	100-41-4	E611C	0.5	µg/L	100 µg/L	112	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.5	µg/L	100 µg/L	113	70.0	130	----
styrene	100-42-5	E611C	0.5	µg/L	100 µg/L	119	70.0	130	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.5	µg/L	100 µg/L	120	70.0	130	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.2	µg/L	100 µg/L	108	70.0	130	----
tetrachloroethylene	127-18-4	E611C	0.5	µg/L	100 µg/L	94.4	70.0	130	----
toluene	108-88-3	E611C	0.4	µg/L	100 µg/L	103	70.0	130	----



Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 81036) - continued</b>									
trichloroethane, 1,1,1-	71-55-6	E611C	0.5	µg/L	100 µg/L	119	70.0	130	----
trichloroethane, 1,1,2-	79-00-5	E611C	0.5	µg/L	100 µg/L	111	70.0	130	----
trichloroethylene	79-01-6	E611C	0.5	µg/L	100 µg/L	114	70.0	130	----
trichlorofluoromethane	75-69-4	E611C	0.5	µg/L	100 µg/L	116	60.0	140	----
vinyl chloride	75-01-4	E611C	0.4	µg/L	100 µg/L	87.8	60.0	140	----
xylene, m+p-	179601-23-1	E611C	0.5	µg/L	200 µg/L	120	70.0	130	----
xylene, o-	95-47-6	E611C	0.5	µg/L	100 µg/L	120	70.0	130	----
<b>Hydrocarbons (QCLot: 81695)</b>									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	116	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	113	70.0	130	----
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 81694)</b>									
acenaphthene	83-32-9	E641A	0.01	µg/L	0.5 µg/L	104	60.0	130	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5 µg/L	108	60.0	130	----
acridine	260-94-6	E641A	0.01	µg/L	0.5 µg/L	108	60.0	130	----
anthracene	120-12-7	E641A	0.01	µg/L	0.5 µg/L	113	60.0	130	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5 µg/L	118	60.0	130	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5 µg/L	119	60.0	130	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	0.5 µg/L	108	60.0	130	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	1 µg/L	108	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5 µg/L	113	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5 µg/L	108	60.0	130	----
chrysene	218-01-9	E641A	0.01	µg/L	0.5 µg/L	123	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	0.5 µg/L	118	60.0	130	----
fluoranthene	206-44-0	E641A	0.01	µg/L	0.5 µg/L	109	60.0	130	----
fluorene	86-73-7	E641A	0.01	µg/L	0.5 µg/L	99.0	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5 µg/L	120	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5 µg/L	105	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	0.5 µg/L	101	60.0	130	----
naphthalene	91-20-3	E641A	0.05	µg/L	0.5 µg/L	98.3	50.0	130	----
phenanthrene	85-01-8	E641A	0.02	µg/L	0.5 µg/L	107	60.0	130	----
pyrene	129-00-0	E641A	0.01	µg/L	0.5 µg/L	113	60.0	130	----
quinoline	6027-02-7	E641A	0.05	µg/L	0.5 µg/L	124	60.0	130	----



### Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Total Metals (QCLot: 81440)</b>										
KS2001604-002	Anonymous	cadmium, total	7440-43-9	E420	0.0198 mg/L	0.02 mg/L	99.0	70.0	130	----
		iron, total	7439-89-6	E420	9.01 mg/L	10 mg/L	90.1	70.0	130	----
		magnesium, total	7439-95-4	E420	ND mg/L	5 mg/L	ND	70.0	130	----
		manganese, total	7439-96-5	E420	0.102 mg/L	0.1 mg/L	102	70.0	130	----
<b>Volatile Organic Compounds (QCLot: 81036)</b>										
VA20B4168-003	Anonymous	benzene	71-43-2	E611C	115 µg/L	100 µg/L	115	60.0	140	----
		bromodichloromethane	75-27-4	E611C	138 µg/L	100 µg/L	138	60.0	140	----
		bromoform	75-25-2	E611C	105 µg/L	100 µg/L	105	60.0	140	----
		carbon tetrachloride	56-23-5	E611C	111 µg/L	100 µg/L	111	60.0	140	----
		chlorobenzene	108-90-7	E611C	117 µg/L	100 µg/L	117	60.0	140	----
		chloroethane	75-00-3	E611C	82.6 µg/L	100 µg/L	82.6	50.0	150	----
		chloroform	67-66-3	E611C	126 µg/L	100 µg/L	126	60.0	140	----
		chloromethane	74-87-3	E611C	62.4 µg/L	100 µg/L	62.4	50.0	150	----
		dibromochloromethane	124-48-1	E611C	125 µg/L	100 µg/L	125	60.0	140	----
		dichlorobenzene, 1,2-	95-50-1	E611C	101 µg/L	100 µg/L	101	60.0	140	----
		dichlorobenzene, 1,3-	541-73-1	E611C	93.9 µg/L	100 µg/L	93.9	60.0	140	----
		dichlorobenzene, 1,4-	106-46-7	E611C	99.6 µg/L	100 µg/L	99.6	60.0	140	----
		dichloroethane, 1,1-	75-34-3	E611C	129 µg/L	100 µg/L	129	60.0	140	----
		dichloroethane, 1,2-	107-06-2	E611C	137 µg/L	100 µg/L	137	60.0	140	----
		dichloroethylene, 1,1-	75-35-4	E611C	98.3 µg/L	100 µg/L	98.3	60.0	140	----
		dichloroethylene, cis-1,2-	156-59-4	E611C	130 µg/L	100 µg/L	130	60.0	140	----
		dichloroethylene, trans-1,2-	156-60-5	E611C	108 µg/L	100 µg/L	108	60.0	140	----
		dichloromethane	75-09-2	E611C	130 µg/L	100 µg/L	130	60.0	140	----
		dichloropropane, 1,2-	78-87-5	E611C	136 µg/L	100 µg/L	136	60.0	140	----
		dichloropropylene, cis-1,3-	10061-01-5	E611C	129 µg/L	100 µg/L	129	60.0	140	----
		dichloropropylene, trans-1,3-	10061-02-6	E611C	124 µg/L	100 µg/L	124	60.0	140	----
		ethylbenzene	100-41-4	E611C	108 µg/L	100 µg/L	108	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	116 µg/L	100 µg/L	116	60.0	140	----
		styrene	100-42-5	E611C	118 µg/L	100 µg/L	118	60.0	140	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611C	135 µg/L	100 µg/L	135	60.0	140	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611C	116 µg/L	100 µg/L	116	60.0	140	----

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 Work Order : VA20B4178  
 Client : Wood Canada Ltd.  
 Project : VE52655D



Sub-Matrix: **Water**

					<i>Matrix Spike (MS) Report</i>					
					<i>Spike</i>		<i>Recovery (%)</i>	<i>Recovery Limits (%)</i>		
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>Concentration</i>	<i>Target</i>	<i>MS</i>	<i>Low</i>	<i>High</i>	<i>Qualifier</i>
<b>Volatile Organic Compounds (QCLot: 81036) - continued</b>										
VA20B4168-003	Anonymous	tetrachloroethylene	127-18-4	E611C	94.9 µg/L	100 µg/L	94.9	60.0	140	----
		toluene	108-88-3	E611C	100 µg/L	100 µg/L	100	60.0	140	----
		trichloroethane, 1,1,1-	71-55-6	E611C	127 µg/L	100 µg/L	127	60.0	140	----
		trichloroethane, 1,1,2-	79-00-5	E611C	114 µg/L	100 µg/L	114	60.0	140	----
		trichloroethylene	79-01-6	E611C	119 µg/L	100 µg/L	119	60.0	140	----
		trichlorofluoromethane	75-69-4	E611C	136 µg/L	100 µg/L	136	50.0	150	----
		vinyl chloride	75-01-4	E611C	66.3 µg/L	100 µg/L	66.3	50.0	150	----
		xylene, m+p-	179601-23-1	E611C	241 µg/L	200 µg/L	120	60.0	140	----
		xylene, o-	95-47-6	E611C	118 µg/L	100 µg/L	118	60.0	140	----



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Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here

(lab use only)

COC Number: 17 -

Page 1 of 1

<b>Report To</b> Contact and company name below will appear on the final report			<b>Report Format / Distribution</b>			<b>Select Service Level Below - Contact your AM to confirm all E&amp;P TATs (surcharges may apply)</b>																																																																											
Company: Wood.			Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)			Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply																																																																											
Contact: Jeremiah Gladu			Quality Control (QC) Report with Report <input type="checkbox"/> YES <input type="checkbox"/> NO			4 day [P4-20%] <input type="checkbox"/>																																																																											
Phone:			<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked			3 day [P3-25%] <input type="checkbox"/>																																																																											
Company address below will appear on the final report			Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			2 day [P2-50%] <input type="checkbox"/>																																																																											
Street: 4445 Loughheed Hwy.			Email 1 or Fax jeremiah.glsdu@woodplc.com			EMERGENCY 1 Business day [E - 100%] <input type="checkbox"/>																																																																											
City/Province: Burnaby/BC			Email 2			Same Day, Weekend or Statutory holiday [E2 -200%] <input type="checkbox"/>																																																																											
Postal Code: V5C 0E4			Email 3			(Laboratory opening fees may apply) ]																																																																											
Invoice To Same as Report To <input type="checkbox"/> YES <input type="checkbox"/> NO			<b>Invoice Distribution</b>			Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm																																																																											
Copy of Invoice with Report <input type="checkbox"/> YES <input type="checkbox"/> NO			Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			For tests that can not be performed according to the service level selected, you will be contacted.																																																																											
Company:			Email 1 or Fax			<b>Analysis Request</b> Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below																																																																											
Contact:			Email 2																																																																														
<b>Project Information</b>			<b>Oil and Gas Required Fields (client use)</b>																																																																														
ALS Account # / Quote #:			AFE/Cost Center: PO#																																																																														
Job #: VE52855D			Major/Minor Code: Routing Code:			<table border="1"> <tr> <td rowspan="10"><b>NUMBER OF CONTAINERS</b></td> <td>BTEX / VOC</td> <td>EPH/PAH</td> <td>General chemistry*</td> <td>DISSOLVED METALS</td> <td>Manganese (total)</td> <td>Iron (total)</td> <td>Cadmium (total)</td> <td rowspan="10"><b>SAMPLES ON HOLD</b></td> <td rowspan="10">SUSPECTED HAZARD (see Special Instructions)</td> </tr> <tr> <td>✓</td> <td>✓</td> <td></td> <td></td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>✓</td> <td>✓</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>			<b>NUMBER OF CONTAINERS</b>	BTEX / VOC	EPH/PAH	General chemistry*	DISSOLVED METALS	Manganese (total)	Iron (total)	Cadmium (total)	<b>SAMPLES ON HOLD</b>	SUSPECTED HAZARD (see Special Instructions)	✓	✓			✓	✓	✓	✓	✓																																																						
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ALS Lab Work Order # (lab use only):			ALS Contact: Selam Worku Sampler: Ardy M.			<table border="1"> <tr> <td>Environmental Division</td> <td>Work Order Reference</td> <td>VA20B4178</td> </tr> <tr> <td colspan="3">Telephone: +1 604 253 4188</td> </tr> </table>			Environmental Division	Work Order Reference	VA20B4178	Telephone: +1 604 253 4188																																																																					
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ALS Sample # (lab use only)			Sample Identification and/or Coordinates (This description will appear on the report)			Date (dd-mmm-yy)			Time (hh:mm)			Sample Type																																																																					
SW20-01			Terrace Shipping Coolers x 5			29-Aug-20			PM			Water																																																																					
SW20-02																																																																																	
SW20-03																																																																																	
Drinking Water (DW) Samples <sup>1</sup> (client use)			Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)			SAMPLE CONDITION AS RECEIVED (lab use only)			Frozen <input type="checkbox"/>			SIF Observations: Yes <input type="checkbox"/> No <input type="checkbox"/>																																																																					
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO			*GENERAL WATER CHEMISTRY TO INCLUDE: pH, Alkalinity, bicarbonate, carbonate, chloride, conductivity, fluoride, hardness, hydroxide, nitrate, nitrite, ammonia, sulphate, turbidity, TDS, acidity			Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/>			Custody seal intact: Yes <input type="checkbox"/> No <input type="checkbox"/>			Cooling Initiated <input type="checkbox"/>																																																																					
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO						INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C																																																																								
SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)			28			0.8																																																																					
Released by: Ardy Mansour			Received by: Chris Allison			Received by: cm			Date: 01 Sept. 2020			Date: 11:20 am																																																																					

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

NOV 2016 FRONT

**Appendix C  
Box Plot Data**



**Treatment Area 1 - Hydrocarbons Box Plot Data**

Sampling Event	2017 In-Situ (LEPH)	2017 In-Situ (HEPH)	2018 (Year End) LEPH	2018 (Year End) HEPH	2019 (Mid-Year) LEPH	2019 (Mid-Year) HEPH	2019 (Year End) LEPH	2019 (Year End) HEPH	2020 (Year End) LEPH	2020 (Year End) HEPH
Min	2480	300	370	200	350	230	320	250	300	400
Q1	2683	375	900	300	703	298	340	295	400	400
Median	3095	450	1490	310	1140	350	410	340	500	400
Q3	3550	525	2015	430	1698	395	890	385	915	400
Max	3880	600	5310	490	2230	440	1730	430	1330	400
IQR	868	150	1115	130	995	98	550	90	515	0
Upper Outliers	0	0	1	0	0	0	1	0	0	0
Lower Outliers	0	0	0	0	0	0	0	0	0	0
Q2-Q1	412.5	75.0	590	10	437.5	52.5	70	45	100	0
Q3-Q2	455	75	525	120	557.5	45	480	45	415	0
Q3+1.5*IQR	4851.25	750	3687.5	625	3190	541.25	1715	520	1687.5	400
Q1-1.5*IQR	1381.25	150	-772.5	105	-790	151.25	-485	160	-372.5	400
Upper Whisker (95P)	3748	570	3582	466	2005	422	1394	412	1164	400
Lower Whisker (5P)	2561	330	640	240	505	257	328	268	340	400
Wupper-Q3	198	45	1567	36	307.5	27	504	27	249	0
Q1-Wlower	121.5	45	260	60	197.5	40.5	12	27	60	0
Data Table - LEPH and HEPH Concentrations (mg/kg)	2750	<200	370	<200	350	<200	<200	<200	<200	<200
	3440	< 600	820	<200	660	<200	<200	<200	<200	<200
	3880	< 300	980	< 200	830	230	320	<200	<200	<200
	2480	<200	1490	< 300	1450	320	340	<200	<200	<200
			1600	< 310	1780	380	410	<200	300	<200
			2430	< 430	2230	440	890	250	500	<200
		5310	490			1730	430	1330	400	

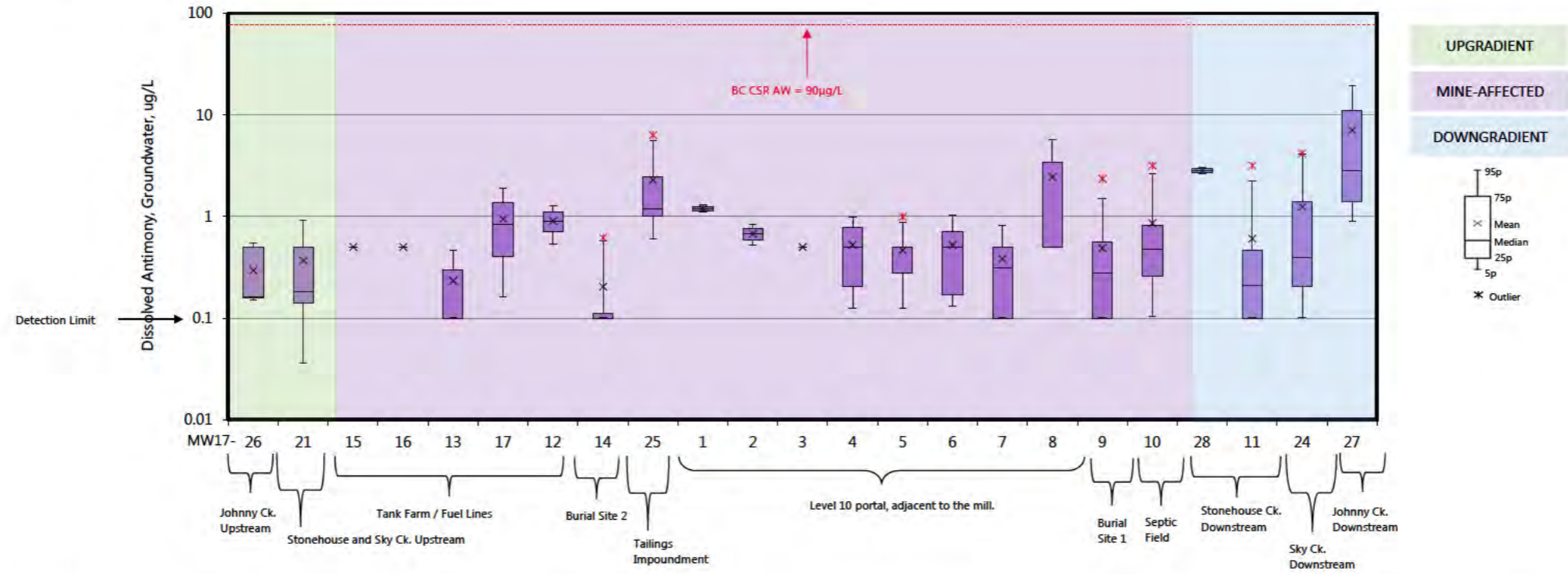
**Treatment Area 2 - Hydrocarbons Box Plot Data**

<b>Sampling Event</b>	<b>2017 In-Situ (LEPH)</b>	<b>2017 In-Situ (HEPH)</b>	<b>2019 (Year End) LEPH</b>	<b>2019 (Year End) HEPH</b>	<b>2020 (Year End) LEPH</b>	<b>2020 (Year End) HEPH</b>
<b>Min</b>	2480	300	530	240	210	250
<b>Q1</b>	2683	375	995	240	360	300
<b>Median</b>	3095	450	1280	250	990	350
<b>Q3</b>	3550	525	2055	270	1050	425
<b>Max</b>	3880	600	3420	320	1660	500
<b>IQR</b>	868	150	1060	30	690	125
<b>Upper Outliers</b>	0	0	0	1	0	0
<b>Lower Outliers</b>	0	0	0	0	0	0
<b>Q2-Q1</b>	412.5	75.0	285	10	630	50
<b>Q3-Q2</b>	455	75	775	20	60	75
<b>Q3+1.5*IQR</b>	4851.25	750	3645	315	2085	612.5
<b>Q1-1.5*IQR</b>	1381.25	150	-595	195	-675	112.5
<b>Upper Whisker (95P)</b>	3748	570	2772	300	1292	470
<b>Lower Whisker (5P)</b>	2561	330	782	240	242	270
<b>Upper-Q3</b>	198	45	717	30	242	45
<b>Q1-Whisker</b>	121.5	45	213	0	118	30
<b>Data Table - LEPH and HEPH Concentrations</b>	< 2750	<200	530	<200	<200	<200
	< 3440	< 600	950	<200	<200	<200
	< 3880	< 300	1040	< 240	<200	<200
	< 2480	<200	1280	< 240	<200	<200
	-	-	1770	< 250	210	<200
	-	-	2340	< 270	250	<200
	-	-	3420	320	360	<200





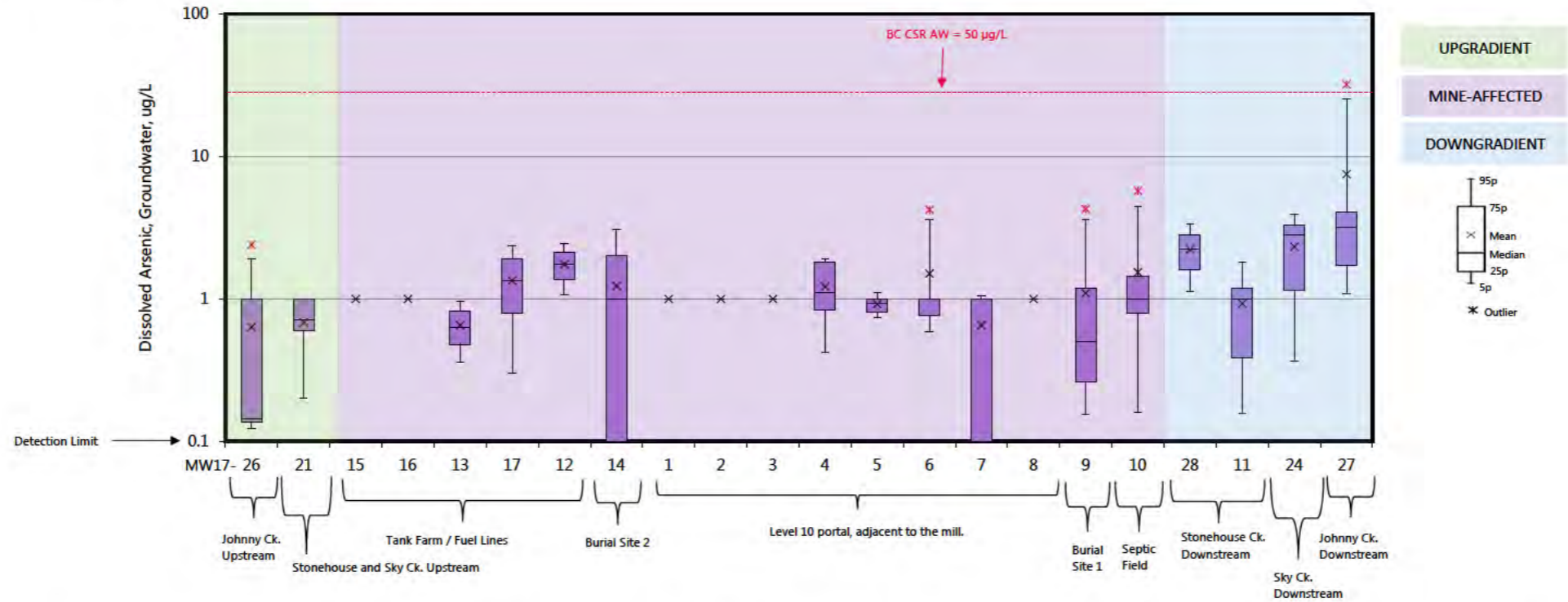
# Box Plot - Antimony in Groundwater



Monitoring Well	26	21	15	16	13	17	12	14	25	1	2	3	4	5	6	7	8	9	10	28	11	24	27	
Min	0.2	0.0	0.5	0.5	0.1	0.1	0.5	0.1	0.5	1.1	0.5	0.5	0.1	0.1	0.1	0.1	0.5	0.1	0.1	0.5	0.1	0.1	0.9	
Q <sub>1</sub>	0.2	0.1	0.5	0.5	0.1	0.4	0.7	0.1	1.0	1.1	0.6	0.5	0.2	0.3	0.2	0.1	0.5	0.1	0.3	2.7	0.1	0.2	1.4	
Median	0.2	0.2	0.5	0.5	0.1	0.8	0.9	0.1	1.2	1.2	0.7	0.5	0.5	0.5	0.5	0.3	0.5	0.3	0.5	2.8	0.2	0.4	2.8	
Q <sub>3</sub>	0.5	0.5	0.5	0.5	0.3	1.4	1.1	0.1	2.5	1.3	0.8	0.5	0.8	0.5	0.7	0.5	3.4	0.6	0.8	3.0	0.5	1.4	11.0	
Max	0.6	1.0	0.5	0.5	0.5	2.0	1.3	0.6	6.3	1.3	0.9	0.5	1.1	1.0	1.1	0.9	6.4	2.4	3.2	3.1	3.2	4.2	21.2	
IQR	0.3	0.4	0.0	0.0	0.2	1.0	0.4	0.0	1.5	0.1	0.2	0.0	0.6	0.2	0.5	0.4	2.9	0.5	0.5	0.2	0.4	1.2	9.7	
Upper Outliers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	2.0	0.0	1.0	2.0	0.0	
Lower Outliers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
<b>For the Box (IQR and Median)</b>																								
Q <sub>2</sub> -Q <sub>1</sub>	0.0025	0.04	0	0	0	0.43	0.2025	0	0.1725	0.055	0.1	0	0.295	0.225	0.33	0.21	0	0.18	0.22	0.115	0.11	0.19	1.4525	
Q <sub>3</sub> -Q <sub>2</sub>	0.34	0.32	0	0	0.2	0.5475	0.2025	0.01	1.2925	0.055	0.0875	0	0.27	0	0.21	0.19	2.935	0.28	0.3275	0.115	0.26	1.005	8.2025	
<b>For the Whiskers</b>																								
Q <sub>3</sub> +1.5*IQR	1.01375	1.04	0.5	0.5	0.6	2.84375	1.715	0.125	4.665	1.42	1.025	0.5	1.6175	0.8375	1.52	1.1	7.8375	1.25	1.62875	3.3	1.025	3.1925	25.525	
Q <sub>1</sub> -1.5*IQR	-0.35625	-0.4	0.5	0.5	-0.2	-1.06625	0.095	0.085	-1.195	0.98	0.325	0.5	-0.6425	-0.0625	-0.64	-0.5	-3.9025	-0.59	-0.56125	2.38	-0.455	-1.5875	-13.095	
5P	0.5455	0.908	0.5	0.5	0.46	1.8995	1.2695	0.572	5.5575	1.299	0.8325	0.5	0.99	0.8675	1.03	0.82	5.783	1.5085	2.666	3.047	2.2355	4.1455	19.325	
95P	0.15	0.036	0.5	0.5	0.1	0.16	0.5405	0.1	0.6005	1.101	0.5175	0.5	0.125	0.125	0.13	0.1	0.5	0.1	0.1035	2.633	0.1	0.1	0.8975	
W <sub>upper</sub> -Q <sub>3</sub>	0.0455	0.408	0	0	0.16	0.522	0.162	0.462	3.09	0.044	0.07	0	0.22	0.3675	0.32	0.32	2.3	0.9485	1.8585	0.092	1.7655	2.7455	8.2825	
Q <sub>1</sub> -W <sub>lower</sub>	0.0075	0.104	0	0	0	0.24	0.162	0	0.402	0.044	0.07	0	0.08	0.15	0.04	0	0.0	0	0.1565	0.1	0	0.105	0.49	
Mean	0.3	0.4	0.5	0.5	0.2	0.9	0.9	0.2	2.3	1.2	0.7	0.5	0.5	0.5	0.5	0.4	2.5	0.5	0.9	2.8	0.6	1.3	7.1	
<b>Data Table</b>																								
	0.15	1.01	0.5	0.5	0.1	1.16	1.31	0.1	6.33	1.31	0.85	0.5	0.15	0.99	0.71	0.9	6.37	2.35	1.73	2.61	0.11	0.48	21.2	
	0.16	0.18	0.5		0.5	2.03	0.5	0.62	1.18	1.09	0.5		1.14	0.5	0.5	0.31	0.5	0.82	0.5	3.07	0.1	0.31	0.87	
	0.5	0.5			0.1	0.1		0.1	1.17				0.1	0.5	0.12	0.5	0.5	0.74	0.11		0.5	4.17	13.7	
	0.16	0.14				0.5		0.1	0.5				0.84	0.2	0.17	0.1		0.1	0.1		0.46	4.1	0.98	
	0.5	0.01						0.1					0.59	0.5	1.11	0.1		0.4	0.5		0.31	0.24	2.61	
	0.16							0.1					0.5	0.1				0.36	0.46		3.17	0.1	3.07	
	0.15							0.5					0.24					0.2	0.31		0.1	0.5		
	0.57							0.11					0.7					0.1	3.17		0.1	0.1		
								0.1					0.84					0.1						
													0.5					0.5						
													0.17					0.1						

**Notes:**  
 Well installed in overburden.  
 Well installed in bedrock.

# Box Plot - Arsenic in Groundwater



Monitoring Well	26	21	15	16	13	17	12	14	1	2	3	4	5	6	7	8	9	10	28	11	24	27
Min	0.1	0.1	1.0	1.0	0.3	0.2	1.0	0.1	1.0	1.0	1.0	0.4	0.7	0.5	0.1	1.0	0.1	0.2	1.0	0.2	0.4	1.0
Q1	0.1	0.6	1.0	1.0	0.5	0.8	1.4	0.1	1.0	1.0	1.0	0.8	0.8	0.8	0.1	1.0	0.3	0.8	1.6	0.4	1.2	1.7
Median	0.1	0.7	1.0	1.0	0.6	1.4	1.8	1.0	1.0	1.0	1.0	1.1	0.9	1.0	1.0	1.0	0.5	1.0	2.2	1.0	2.8	3.2
Q3	1.0	1.0	1.0	1.0	0.8	1.9	2.1	2.0	1.0	1.0	1.0	1.8	1.0	1.0	1.0	1.0	1.2	1.4	2.8	1.2	3.3	4.1
Max	2.4	1.0	1.0	1.0	1.0	2.5	2.5	3.4	1.0	1.0	1.0	2.0	1.1	4.2	1.1	1.0	4.3	5.7	3.5	2.0	4.2	32.1
IQR	0.9	0.4	0.0	0.0	0.3	1.1	0.8	1.9	0.0	0.0	0.0	1.0	0.2	0.2	0.9	0.0	0.9	0.6	1.2	0.8	2.1	2.4
Upper Outliers	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	1.0	0.0	0.0	0.0	1.0
Lower Outliers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

**For the Box (IQR and Median)**

Q2-Q1	0.0075	0.11	0	0	0.15	0.555	0.375	0.9	0	0.0	0	0.28	0.13	0.24	0.9	0	0.24	0.205	0.6125	0.615	1.665	1.47
Q3-Q2	0.855	0.29	0	0	0.185	0.5475	0.375	1.01	0	0	0	0.69	0.07	0	0	0	0.6775	0.4425	0.6125	0.195	0.4625	0.8925

**For the Whiskers**

Q3+1.5*IQR	2.29375	1.6	1	1	1.3175	3.55125	3.25	4.875	1	1	1	3.255	1.3	1.36	2.35	1	2.55375	2.41375	4.675	2.41	6.46875	7.63125
Q1-1.5*IQR	-1.15625	0	1	1	-0.0225	-0.85875	0.25	-2.765	1	1	1	-0.625	0.5	0.4	-1.25	1	-1.11625	-0.17625	-0.225	-0.83	-2.04125	-1.81875
5P	1.91	1	1	1	0.963	2.3715	2.425	3.092	1	1	1	1.925	1.105	3.584	1.048	1	3.5925	4.4275	3.3275	1.8075	3.926	25.15
95P	0.1235	0.2	1	1	0.36	0.303	1.075	0.1	1	1	1	0.42	0.7425	0.584	0.1	1	0.154	0.1605	1.1225	0.1575	0.3675	1.08
W <sub>upper</sub> -Q <sub>3</sub>	0.91	0	0	0	0.148	0.474	0.3	1.082	0	0	0	0.125	0.105	2.584	0.048	0	2.415	2.985	0.49	0.6125	0.6485	21.0625
Q <sub>1</sub> -W <sub>lower</sub>	0.014	0.4	0	0	0.12	0.492	0.3	0	0	0	0	0.41	0.0575	0.176	0	0	0.106	0.6345	0.49	0.2275	0.7825	0.645
Mean	0.6	0.7	1.0	1.0	0.7	1.3	1.8	1.2	1.0	1.0	1.0	1.2	0.9	1.5	0.7	1.0	1.1	1.5	2.2	0.9	2.3	7.5

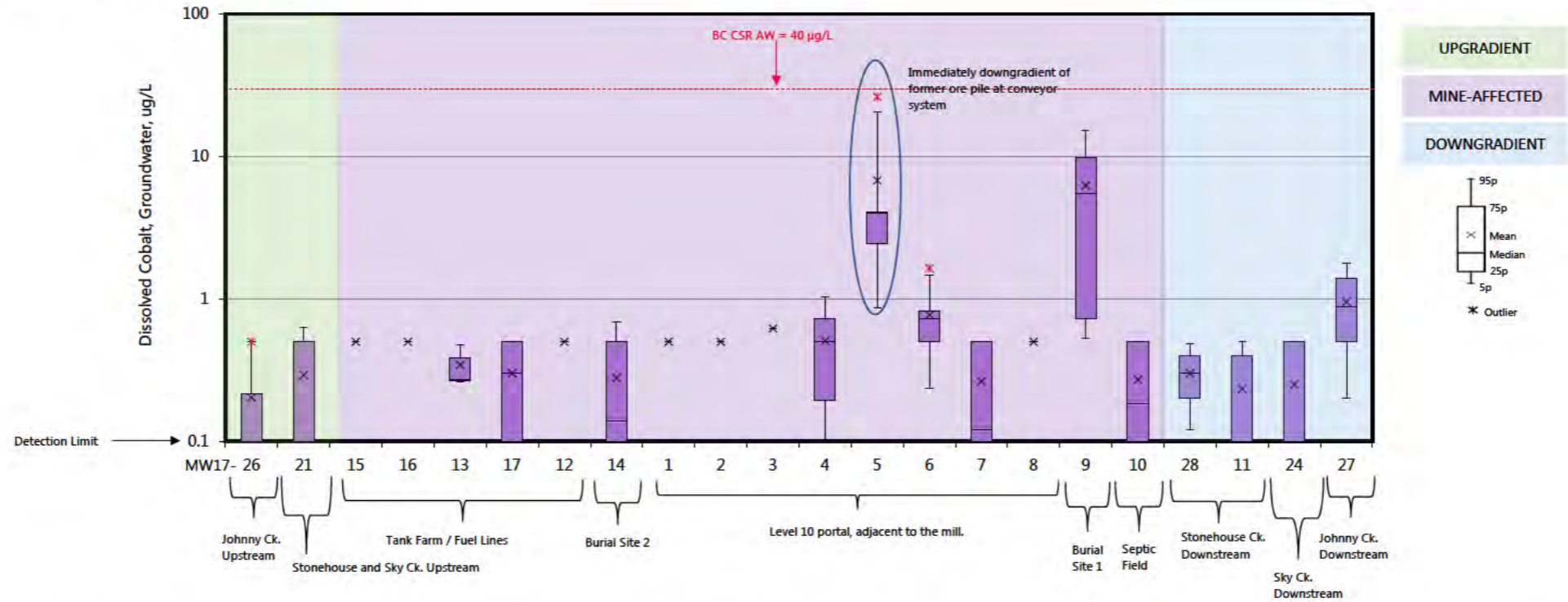
**Data Table**

0.13	1	1	1	0.33	2.49	2.5	0.76	1	1	1	1.88	1	1	1	1	4.28	5.74	3.45	0.18	4.15	32.1
0.14	0.71	1		1	1.7	1	1	1	1		1	1	1	1.06	1	0.66	1	1	0.15	2.53	1.32
1	1			0.63	0.18		2.63				1.97	0.78	0.54	1	1	1	0.18		1	3.1	4.3
0.14	0.6				1		3.4				0.41	1.14	0.76	0.1		0.28	0.15		1.99	3.2	2.94
1	0.1						0.1				1.36	0.73	4.23	0.1		1.71	1		1.26	3.51	3.45
0.12							0.1				1.8	0.86				3.03	1.99		1	0.35	1
0.15							1				0.92					0.34	1.26			1.4	
2.4							0.1				1.11					0.2	1			0.4	
							2.01				0.43					0.32					
											1.8					1					
											0.74					0.19					
																0.11					

**Notes:**

- Well installed in overburden.
- Well installed in bedrock.

# Box Plot - Cobalt in Groundwater



Monitoring Well	26	21	15	16	13	17	12	14	1	2	3	4	5	6	7	8	9	10	28	11	24	27
Min	0.1	0.1	0.5	0.5	0.3	0.1	0.5	0.1	0.5	0.5	0.6	0.1	0.5	0.2	0.1	0.5	0.5	0.1	0.1	0.1	0.1	0.1
Q1	0.1	0.1	0.5	0.5	0.3	0.1	0.5	0.1	0.5	0.5	0.6	0.2	2.4	0.5	0.1	0.5	0.7	0.1	0.2	0.1	0.1	0.5
Median	0.1	0.1	0.5	0.5	0.3	0.3	0.5	0.1	0.5	0.5	0.6	0.5	4.0	0.7	0.1	0.5	5.5	0.2	0.3	0.1	0.1	0.9
Q3	0.2	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.7	4.1	0.8	0.5	0.5	9.7	0.5	0.4	0.4	0.5	1.4
Max	0.5	0.7	0.5	0.5	0.5	0.5	0.5	0.8	0.5	0.5	0.6	1.1	26.2	1.6	0.5	0.5	15.8	0.5	0.5	0.5	0.5	1.9
IQR	0.1	0.4	0.0	0.0	0.1	0.4	0.0	0.4	0.0	0.0	0.0	0.5	1.6	0.3	0.4	0.0	9.0	0.4	0.2	0.3	0.4	0.9
Upper Outliers	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lower Outliers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

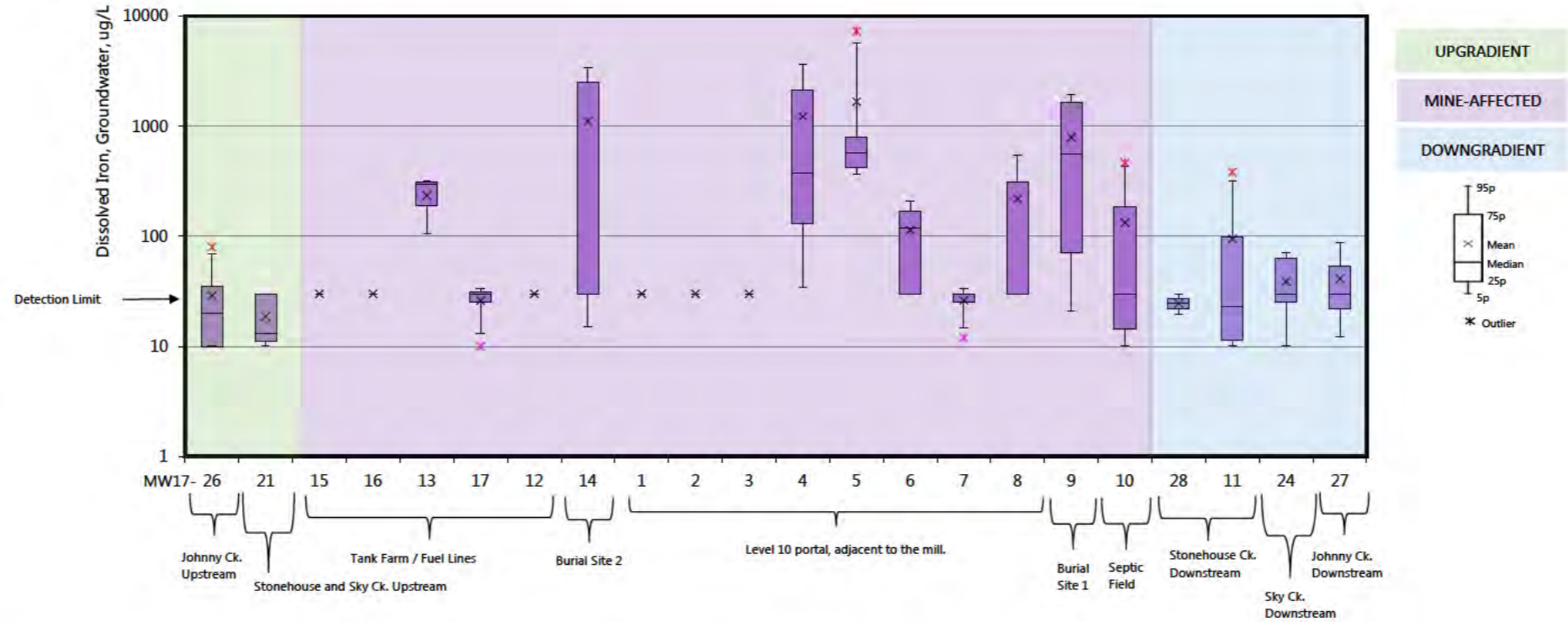
For the Box (IQR and Median)																						
Q2-Q1	0	0	0	0	0.005	0.2	0	0.04	0	0.0	0	0.305	1.525	0.22	0.02	0	4.7725	0.085	0.1	0	0	0.385
Q3-Q2	0.115	0.4	0	0	0.115	0.2	0	0.36	0	0	0	0.23	0.1075	0.1	0.38	0	4.235	0.315	0.1	0.3	0.4	0.5125

For the Whiskers																						
Q3+1.5*IQR	0.3875	1.1	0.5	0.5	0.565	1.1	0.5	1.1	0.5	0.5	0.62	1.5325	6.52125	1.3	1.1	0.5	23.24625	1.1	0.7	0.85	1.1	2.74375
Q1-1.5*IQR	-0.0725	-0.5	0.5	0.5	0.085	-0.5	0.5	-0.5	0.5	0.5	0.62	-0.6075	-0.00875	0.02	-0.5	0.5	-12.7838	-0.5	-0.1	-0.35	-0.5	-0.84625
5P	0.5	0.628	0.5	0.5	0.477	0.5	0.5	0.686	0.5	0.5	0.62	1.03	20.675	1.476	0.5	0.5	15.14	0.5	0.48	0.5	0.5	1.785
95P	0.1	0.1	0.5	0.5	0.261	0.1	0.5	0.1	0.5	0.5	0.62	0.1	0.86	0.236	0.1	0.5	0.533	0.1	0.12	0.1	0.1	0.2
W <sub>upper</sub> -Q <sub>3</sub>	0.285	0.128	0	0	0.092	0	0	0.186	0	0	0	0.3	16.6025	0.656	0	0	5.405	0	0.08	0.1	0	0.3875
Q <sub>1</sub> -W <sub>lower</sub>	0	0	0	0	0.004	0	0	0	0	0	0	0.095	1.58	0.264	0	0	0.1945	0	0.08	0	0	0.3
Mean	0.2	0.3	0.5	0.5	0.3	0.3	0.5	0.3	0.5	0.5	0.6	0.5	6.8	0.8	0.3	0.5	6.3	0.3	0.3	0.2	0.3	1.0

Data Table																						
0.1	0.5	0.5	0.5	0.26	0.1	0.5	0.1	0.5	0.5	0.62	0.1	0.5	0.5	0.5	0.5	0.76	0.27	0.1	0.1	0.1	0.5	
0.1	0.1	0.5		0.5	0.5	0.5	0.5	0.5	0.5		0.5	26.2	1.64	0.12	0.5	0.93	0.5	0.5	0.1	0.1	1.27	
0.5	0.66			0.27	0.1		0.14				0.1	3.99	0.72	0.5	0.5	0.5	0.1		0.5	0.5	1.9	
0.1	0.1				0.5		0.16				0.18	3.94	0.82	0.1		14.6	0.1		0.1	0.5	1.44	
0.5	0.1						0.1				0.74	4.1	0.17	0.1		0.63	0.5		0.1	0.1	0.1	
0.1							0.1				0.99	1.94				0.56	0.1		0.5	0.1	0.5	
0.1							0.5				0.72					13.8	0.1				0.1	
0.12							0.1				0.56					8.38	0.5				0.1	
							0.81				0.21					15.8						
											1.07					8.04						
											0.41					8.19						
																2.96						

**Notes:**  
 Well installed in overburden.  
 Well installed in bedrock.

# Box Plot - Iron in Groundwater



Monitoring Well	26	21	15	16	13	17	12	14	1	2	3	4	5	6	7	8	9	10	28	11	24	27
Min	10.0	10.0	30.0	30.0	85.0	10.0	30.0	10.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	12.0	30.0	10.0	10.0	19.0	10.0	10.0
Q <sub>1</sub>	10.0	11.0	30.0	30.0	189.5	25.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	25.0	30.0	30.0	71.5	14.5	21.8	25.0
Median	20.0	13.0	30.0	30.0	294.0	30.0	30.0	30.0	30.0	30.0	30.0	374.0	578.5	118.0	30.0	30.0	30.0	557.0	30.0	24.5	23.0	30.0
Q <sub>3</sub>	35.3	30.0	30.0	30.0	309.0	31.0	30.0	2480.0	30.0	30.0	30.0	2130.0	790.5	170.0	30.0	313.5	1645.0	185.5	27.3	97.5	62.5	54.0
Max	80.0	30.0	30.0	30.0	324.0	34.0	30.0	3800.0	30.0	30.0	30.0	4170.0	7290.0	221.0	34.0	597.0	1970.0	465.0	30.0	382.0	72.0	96.0
IQR	25.3	19.0	0.0	0.0	119.5	6.0	0.0	2450.0	0.0	0.0	0.0	1999.5	364.8	140.0	5.0	283.5	1573.5	171.0	5.5	86.0	37.5	32.3
Upper Outliers	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0
Lower Outliers	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

**For the Box (IQR and Median)**

Q <sub>2</sub> -Q <sub>1</sub>	10	2	0	0	104.5	5	0	0	0	0.0	0	243.5	152.75	88	5	0	485.5	15.5	2.75	11.5	5	8.25
Q <sub>3</sub> -Q <sub>2</sub>	15.25	17	0	0	15	1	0	2450	0	0	0	1756	212	52	0	283.5	1088	155.5	2.75	74.5	32.5	24

**For the Whiskers**

Q <sub>3</sub> +1.5*IQR	73.125	58.5	30	30	488.25	40	30	6155	30	30	30	5129.25	1337.625	380	37.5	738.75	4005.25	442	35.5	226.5	118.75	102.375
Q <sub>1</sub> -1.5*IQR	-27.875	-17.5	30	30	10.25	16	30	-3645	30	30	30	-2868.75	-121.375	-180	17.5	-395.25	-2288.75	-242	13.5	-117.5	-31.25	-26.625
5P	69.85	30	30	30	321	33.4	30	3436	30	30	30	3640	5679	210.8	33.2	540.3	1915	435.95	29.45	316.5	70.25	87.5
95P	10	10.2	30	30	105.9	13	30	15.2	30	30	30	34.5	366	30	14.6	30	21	10	19.55	10	10	12.25
W <sub>upper</sub> -Q <sub>3</sub>	34.6	0	0	0	12	2.4	0	956	0	0	0	1510	4888.5	40.8	3.2	226.8	270	250.45	2.2	219	7.75	33.5
Q <sub>1</sub> -W <sub>lower</sub>	0	0.8	0	0	83.6	12	0	14.8	0	0	0	96	59.75	0	10.4	0	50.5	4.5	2.2	1.5	15	9.5
Mean	28.9	18.8	30.0	30.0	234.3	26.0	30.0	1101.4	30.0	30.0	30.0	1223.7	1673.5	113.8	26.2	219.0	787.8	132.9	24.5	94.7	38.8	41.2

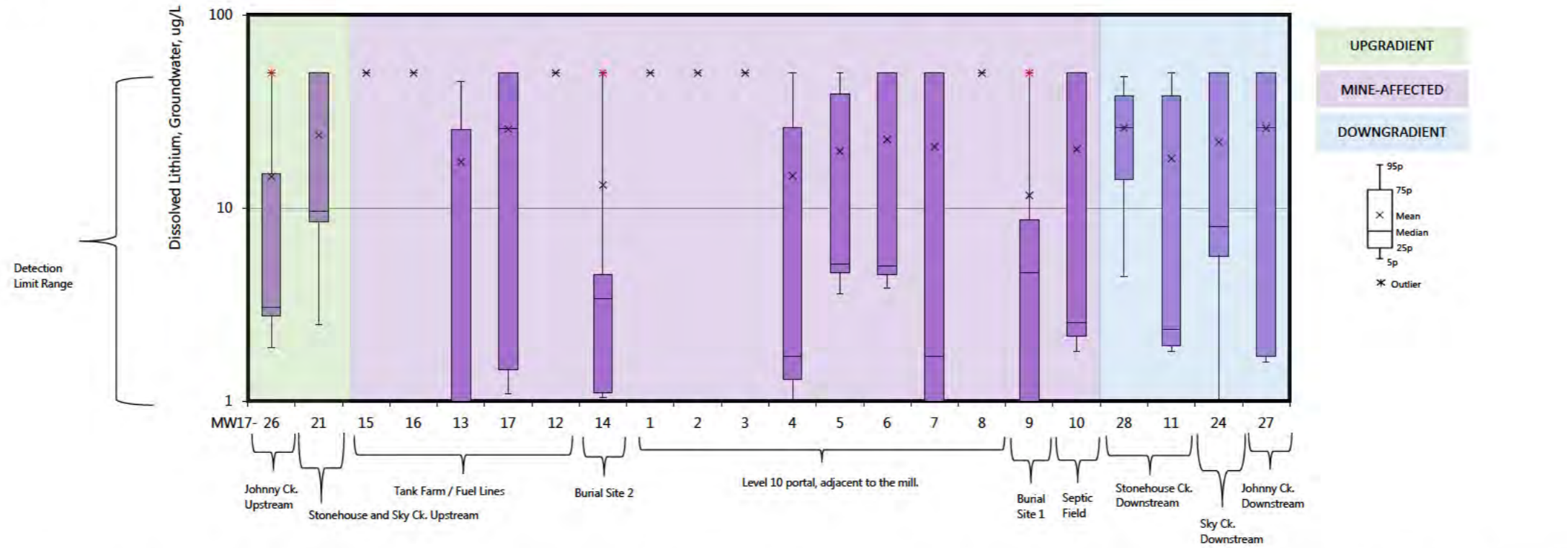
**Data Table**

51	30	30	30	294	34	30	620	30	30	30	335	358	30	30	597	10	465	19	10	67	30
10	13	30		85	30	30	30	30	30		30	7290	30	34	30	37	30	30	10	72	10
30	30			324	10		2890				39	533	170	30	30	30	10		30	30	96
10	11				30		2480				123	846	221	25		1640	10		120	30	62
30	10						10				882	624	118	12		250	30		16	61	19
10							30				3110	390				1970	120		382	10	30
10							30				4170					1660	16			30	
80							23				1160					789	382			10	
							3800				138					1870					
											3100					83					
											374					779					
																335					

**Notes:**

- Well installed in overburden.
- Well installed in bedrock.

# Box Plot - Lithium in Groundwater



Monitoring Well	26	21	15	16	13	17	12	14	1	2	3	4	5	6	7	8	9	10	28	11	24	27
Min	1.5	1.0	50.0	50.0	1.0	1.0	50.0	1.0	50.0	50.0	50.0	1.0	3.3	3.7	1.0	50.0	1.0	1.8	2.0	1.8	1.0	1.6
Q <sub>1</sub>	2.8	8.5	50.0	50.0	1.0	1.5	50.0	1.1	50.0	50.0	50.0	1.3	4.6	4.5	1.0	50.0	1.0	2.2	14.0	1.9	5.7	1.7
Median	3.1	9.6	50.0	50.0	1.0	25.8	50.0	3.4	50.0	50.0	50.0	1.7	5.1	5.0	1.7	50.0	4.7	2.6	26.0	2.4	8.0	26.0
Q <sub>3</sub>	15.1	50.0	50.0	50.0	25.5	50.0	50.0	4.5	50.0	50.0	50.0	26.0	38.8	50.0	50.0	50.0	8.7	50.0	38.0	38.1	50.0	50.0
Max	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
IQR	12.3	41.5	0.0	0.0	24.5	48.6	0.0	3.4	0.0	0.0	0.0	24.7	34.2	45.5	49.0	0.0	7.7	47.8	24.0	36.2	44.4	48.3
Upper Outliers	2.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0
Lower Outliers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

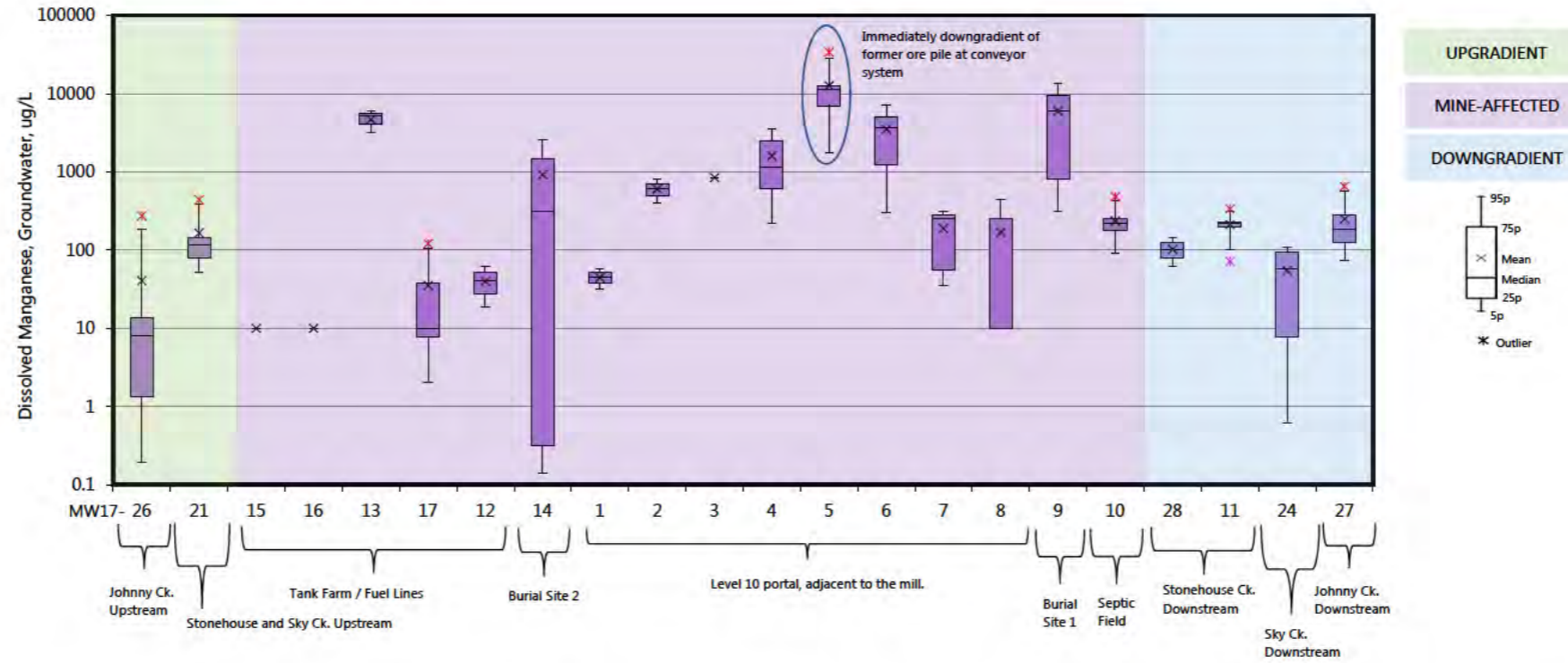
For the Box (IQR and Median)		26	21	15	16	13	17	12	14	1	2	3	4	5	6	7	8	9	10	28	11	24	27
Q <sub>2</sub> -Q <sub>1</sub>	0.3	1.1	0	0	0	24.35	0	2.3	0	0.0	0	0.4	0.475	0.5	0.7	0	3.65	0.375	12	0.425	2.35	24.3	
Q <sub>3</sub> -Q <sub>2</sub>	12	40.4	0	0	24.5	24.2	0	1.1	0	0	0	24.25	33.7	45	48.3	0	4	47.45	12	35.75	42	24	

For the Whiskers		26	21	15	16	13	17	12	14	1	2	3	4	5	6	7	8	9	10	28	11	24	27
Q <sub>3</sub> +1.5*IQR	33.5	112.25	50	50	62.25	122.825	50	9.6	50	50	50	62.925	90.0625	118.25	123.5	50	20.125	121.738	74	92.3625	116.525	122.45	
Q <sub>1</sub> -1.5*IQR	-15.7	-53.75	50	50	-35.75	-71.375	50	-4	50	50	50	-35.675	-46.6375	-63.75	-72.5	50	-10.475	-69.5625	-22	-52.3375	-60.875	-70.75	
5P	50	50	50	50	45.1	50	50	50	50	50	50	50	50	50	50	50	50	50	47.6	50	50	50	
95P	1.885	2.5	50	50	1	1.09	50	1.04	50	50	50	1	3.6	3.86	1	50	1	1.8	4.4	1.8	1	1.6	
W <sub>upper</sub> -Q <sub>3</sub>	34.95	0	0	0	19.6	0	0	45.5	0	0	0	24.05	11.2	0	0	0	41.35	0	9.6	11.9	0	0	
Q <sub>1</sub> -W <sub>lower</sub>	0.865	6	0	0	0	0.36	0	0.06	0	0	0	0.3	1.025	0.64	0	0	0	0.375	9.6	0.125	4.65	0.1	
Mean	14.6	23.8	50.0	50.0	17.3	25.7	50.0	13.2	50.0	50.0	50.0	14.7	19.7	22.6	20.7	50.0	11.6	20.1	26.0	18.1	21.9	25.9	

Data Table		26	21	15	16	13	17	12	14	1	2	3	4	5	6	7	8	9	10	28	11	24	27
	2.6	50	50	50	1	1.6	50	3.4	50	50	50	1.7	50	50	50	50	7.3	2.7	2	2.3	7.6	50	
	3	9.6	50		50	50	50	50	50	50		50	50	50	1.7	50	7.5	50	50	2.4	7.2	1.6	
	50	50			1	1		4.5				1.8	5	4.5	50	50	50	2.3		50	50	50	
	3.1	8.5				50		3.4				1	4.5	5	1		1	2.4		1.8	50	1.6	
	50	1						1.1				1.1	5.2	3.7	1		9.1	50		1.8	8.4	2	
	2.8							1				50	3.3				8.5	1.8		50	1	50	
	3.4							50				1.5					2	1.8			50		
	1.5							1.1				1.6					1	50			1		
								3.9				1					1						
												50					50						
												1.9					1						

**Notes:**  
 Well installed in overburden.  
 Well installed in bedrock.

# Box Plot - Manganese in Groundwater



Monitoring Well	26	21	15	16	13	17	12	14	1	2	3	4	5	6	7	8	9	10	28	11	24	27
Min	0.1	44.3	10.0	10.0	2980.0	0.6	16.0	0.1	30.0	384.0	843.0	128.0	434.0	71.3	29.2	10.0	303.0	71.6	58.0	198.8	0.5	58.0
Q <sub>1</sub>	1.4	80.0	10.0	10.0	4050.0	7.7	28.0	0.3	37.3	492.8	843.0	619.0	7025.0	1220.0	56.2	10.0	792.5	177.3	80.0	198.8	7.7	126.5
Median	8.0	117.0	10.0	10.0	5120.0	10.0	40.0	315.0	44.5	601.5	843.0	1140.0	11400.0	3620.0	251.0	10.0	6015.0	218.0	102.0	218.0	58.5	181.5
Q <sub>3</sub>	13.5	146.0	10.0	10.0	5550.0	37.8	52.0	1450.0	51.8	710.3	843.0	2455.0	12400.0	4990.0	283.0	249.0	9510.0	256.3	124.0	227.5	95.7	276.3
Max	274.0	439.0	10.0	10.0	5980.0	121.0	64.0	2890.0	59.0	819.0	843.0	3590.0	34000.0	7660.0	321.0	488.0	13700.0	481.0	146.0	335.0	114.0	653.0
IQR	12.1	66.0	0.0	0.0	1500.0	30.1	24.0	1449.7	14.5	217.5	0.0	1836.0	5375.0	3770.0	226.8	239.0	8717.5	79.0	44.0	28.8	88.0	149.8
Upper Outliers	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0	0.0	1.0
Lower Outliers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0

**For the Box (IQR and Median)**

Q2-Q1	6.6875	37	0	0	1070	2.3475	12	314.68	7.25	108.8	0	521	4375	2400	194.8	0	5222.5	40.75	22	19.25	50.7925	55
Q3-Q2	5.455	29	0	0	430	27.75	12	1135	7.25	108.75	0	1315	1000	1370	32	239	3495	38.25	22	9.5	37.2	94.75

**For the Whiskers**

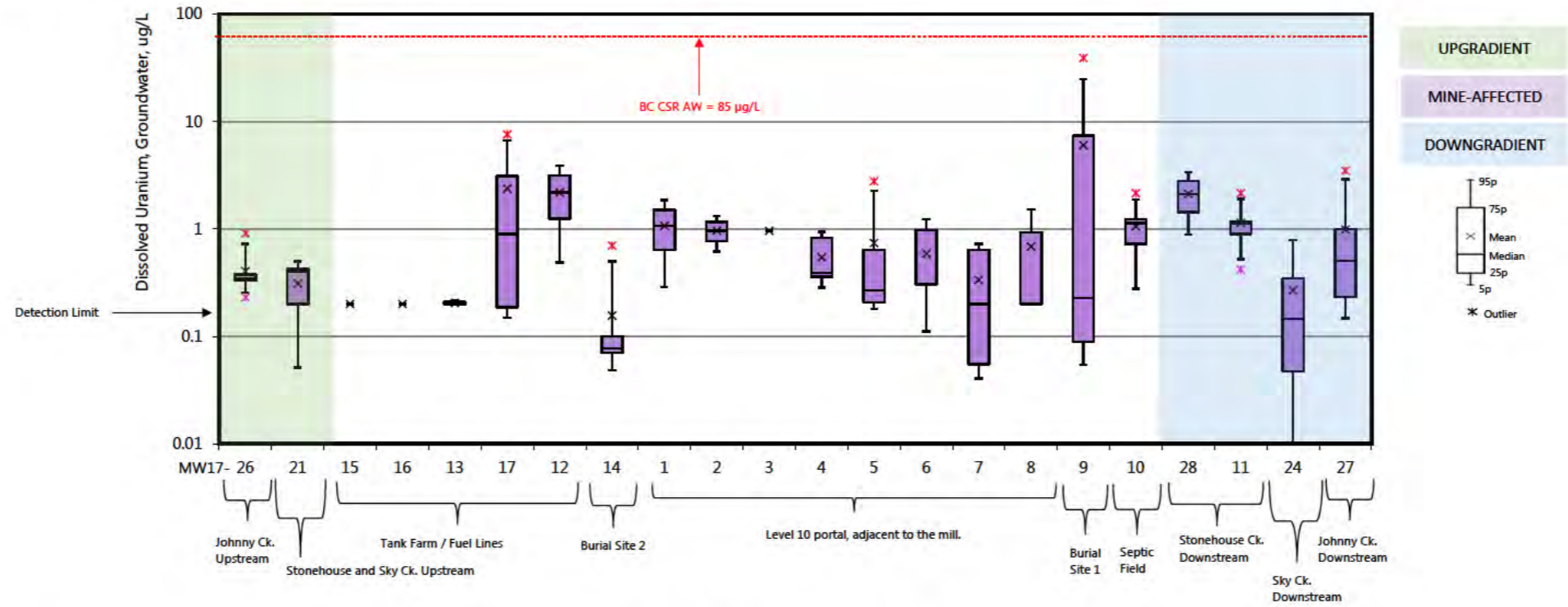
Q <sub>3</sub> +1.5*IQR	31.71375	245	10	10	7800	82.89625	88	3624.52	73.5	1036.5	843	5209	20462.5	10645	623.2	607.5	22586.25	374.75	190	270.625	227.6888	500.875
Q <sub>1</sub> -1.5*IQR	-16.8563	-19	10	10	1800	-37.4938	-8	-2174.2	15.5	166.5	843	-2135	-1037.5	-4435	-284	-348.5	-12283.8	58.75	14	155.625	-124.281	-98.125
5P	185.45	380.4	10	10	5894	104.35	61.6	2618	57.55	797.25	843	3565	28650	7126	313.4	440.2	13315	429.9	141.6	308.75	109.8	563.75
95P	0.191	51.44	10	10	3194	2.0185	18.4	0.14	31.45	405.75	843	216	1750.5	301.04	34.6	10	309.05	92.04	62.4	101.95	0.6155	73.5
W <sub>upper</sub> -Q <sub>3</sub>	171.95	234.4	0	0	344	66.6	9.6	1168	5.8	87	0	1110	16250	2136	30.4	191.2	3805	173.65	17.6	81.25	14.1	287.5
Q <sub>1</sub> -W <sub>lower</sub>	1.1665	28.56	0	0	856	5.634	9.6	0.18	5.8	87	0	403	5274.5	918.96	21.6	0	483.45	85.21	17.6	96.8	7.092	53
Mean	40.5	165.3	10.0	10.0	4693.3	35.4	40.0	917.3	44.5	601.5	843.0	1605.5	12589.0	3512.3	188.1	169.3	5941.1	234.6	102.0	210.9	54.7	248.3

**Data Table**

6.09	80	10	10	5980	121	64	1380	59	384	843	304	434	1220	251	488	509	481	146	216	102	296
0.36	146	10		2980	10	16	315	30	819		128	34000	7660	321	10	303	130	58	230	114	120
10	439			5120	0.61		2890				383	11000	3620	283	10	314	216		220	58	217
11	117				10		2210				855	12600	4990	56.2		13000	230		335	59	653
21	44.3						0.2				1800	11800	71.3	29.2		887	220		71.6	93.6	146
0.1							0.1				3540	5700				1760	335		193	0.83	58
1.69							10				3070					8710	71.6			10	
274							0.32				1840					9080	193			0.5	
							1450				1010					13700					
											3590					10800					
											1140					8910					
																3320					

**Notes:**  
 Well installed in overburden.  
 Well installed in bedrock.

# Box Plot - Uranium in Groundwater



Monitoring Well	26	21	15	16	13	17	12	14	1	2	3	4	5	6	7	8	9	10	28	11	24	27
Min	0.2	0.0	0.2	0.2	0.2	0.1	0.3	0.0	0.2	0.6	1.0	0.2	0.2	0.1	0.0	0.2	0.1	0.2	0.1	0.2	0.1	0.2
Q1	0.3	0.2	0.2	0.2	0.2	0.2	1.2	0.1	0.6	0.8	1.0	0.4	0.2	0.3	0.1	0.2	0.1	0.2	0.1	0.7	1.4	0.9
Median	0.3	0.4	0.2	0.2	0.2	0.9	2.2	0.1	1.1	1.0	1.0	0.4	0.3	0.3	0.2	0.2	0.2	1.1	2.1	1.1	0.1	0.5
Q3	0.4	0.4	0.2	0.2	0.2	3.1	3.1	0.1	1.5	1.2	1.0	0.8	0.6	1.0	0.6	0.9	7.4	1.2	2.8	1.2	0.3	1.0
Max	0.9	0.5	0.2	0.2	0.2	7.6	4.1	0.7	1.9	1.4	1.0	1.0	2.8	1.3	0.8	1.7	39.1	2.2	3.5	2.2	0.8	3.5
IQR	0.0	0.2	0.0	0.0	0.0	2.9	1.9	0.0	0.9	0.4	0.0	0.5	0.4	0.7	0.6	0.7	7.3	0.5	1.4	0.3	0.3	0.8
Upper Outliers	1.0	0.0	0.0	0.0	0.0	1.0	0.0	2.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0	1.0
Lower Outliers	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0

**For the Box (IQR and Median)**

Q2-Q1	0.01725	0.198	0	0	0.002	0.71475	0.945	0.007	0.435	0.2	0	0.0315	0.06125	0.004	0.145	0	0.13775	0.4065	0.685	0.23125	0.098	0.276
Q3-Q2	0.03125	0.025	0	0	0.0085	2.195	0.945	0.023	0.435	0.1925	0	0.439	0.371	0.671	0.436	0.73	7.1535	0.105	0.685	0.04	0.1995	0.483

**For the Whiskers**

Q3+1.5*IQR	0.45	0.7575	0.2	0.2	0.22425	7.459625	5.97	0.145	2.81	1.735	0.96	1.53475	1.288375	1.9925	1.5075	2.025	18.31688	2.00225	4.86	1.576875	0.79125	2.1285
Q1-1.5*IQR	0.256	-0.1345	0.2	0.2	0.18225	-4.17938	-1.59	0.025	-0.67	0.195	0.96	-0.34725	-0.44063	-0.7075	-0.8165	-0.895	-10.8481	-0.04375	-0.62	0.491875	-0.39875	-0.9075
5P	0.72905	0.5006	0.2	0.2	0.2153	6.683	3.891	0.5	1.853	1.3115	0.96	0.9395	2.2725	1.228	0.7272	1.514	24.635	1.8875	3.353	1.9075	0.7865	2.885
95P	0.2538	0.0512	0.2	0.2	0.1964	0.14985	0.489	0.0484	0.287	0.6185	0.96	0.2845	0.18	0.1114	0.0406	0.2	0.054	0.27665	0.887	0.5205	0.01	0.1465
W <sub>upper</sub> -Q3	0.3518	0.0776	0	0	0.0068	3.588	0.756	0.4	0.348	0.154	0	0.1105	1.6325	0.248	0.0912	0.584	17.255	0.6525	0.548	0.7375	0.4415	1.895
Q1-W <sub>lower</sub>	0.07495	0.1488	0	0	0.0016	0.0354	0.756	0.0216	0.348	0.154	0	0.074	0.02775	0.1936	0.0144	0	0.03475	0.44685	0.548	0.37825	0.0375	0.0845
Mean	0.4	0.3	0.2	0.2	0.2	2.4	2.2	0.2	1.1	1.0	1.0	0.5	0.7	0.6	0.3	0.7	6.0	1.1	2.1	1.1	0.3	1.0

**Data Table**

0.352	0.52	0.2	0.2	0.217	1.6	4.08	0.04	1.94	0.58	0.96	0.357	2.78	1.29	0.75	1.66	39.1	1.4	3.49	1.18	0.109	1.07
0.339	0.423	0.2		0.2	7.58	0.3	0.7	0.2	1.35		0.89	0.75	0.98	0.636	0.2	1.95	0.2	0.75	1.14	0.182	0.122
0.34	0.2			0.196	0.141		0.083				0.212	0.228	0.305	0.2	0.2	11.7	1.18		1.12	0.78	0.22
0.372	0.398				0.2		0.077				0.357	0.31	0.309	0.055		0.079	1.14		0.419	0.79	0.264
0.91	0.014						0.061				0.835	0.201	0.063	0.037		12.8	1.12		0.825	0.06	3.49
0.298							0.077				0.37	0.173				5.94	0.419		2.15	0.01	0.75
0.393							0.2				0.823					0.247	0.825			0.2	
0.23							0.07				0.989					0.054	2.15			0.01	
							0.1				0.36					0.092					
											0.39					0.2					
											0.39					0.054					
																0.206					

**Notes:**  
 Well installed in overburden.  
 Well installed in bedrock.



**wood.**

**Appendix D**  
**Surface Water Monitoring Certificate of**  
**Analysis**







ERM Consultants Canada Ltd.  
ATTN: Elizabeth Boyle  
1500-1111 West Hastings Street  
Vancouver BC V6E 2J3

Date Received: 09-JUL-19  
Report Date: 18-JUL-19 13:14 (MT)  
Version: FINAL

Client Phone: 604-689-9460

## Certificate of Analysis

**Lab Work Order #:** L2306476  
Project P.O. #: NOT SUBMITTED  
Job Reference: 0492759-0004  
C of C Numbers: 17-756320, 17-756321  
Legal Site Desc:

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Amber Springer, B.Sc  
Account Manager

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ADDRESS: 8081 Lougheed Hwy, Suite 100, Burnaby, BC V5A 1W9 Canada | Phone: +1 604 253 4188 | Fax: +1 604 253 6700  
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## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2306476-1	L2306476-2	L2306476-3	L2306476-4	L2306476-5
		Description	WATER	WATER	WATER	WATER	WATER
		Sampled Date	07-JUL-19	07-JUL-19	07-JUL-19	07-JUL-19	07-JUL-19
		Sampled Time	09:55	11:00	10:35	11:36	11:52
		Client ID	JM14	JM11	JM6	JM5	TMF1
Grouping	Analyte						
<b>WATER</b>							
<b>Physical Tests</b>	Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
	Conductivity (uS/cm)	53.0	50.4	50.5	276	50.5	50.5
	Hardness (as CaCO3) (mg/L)	22.2	21.1	21.1	149	20.3	20.3
	pH (pH)	7.88	7.84	7.82	8.25	7.40	7.40
	Total Suspended Solids (mg/L)	93.6	120	100	3.0	<3.0	<3.0
	Total Dissolved Solids (mg/L)	35	36	35	160	30	30
	Turbidity (NTU)	40.5	42.7	33.6	0.51	0.50	0.50
<b>Anions and Nutrients</b>	Acidity (as CaCO3) (mg/L)	1.5	1.5	1.6	<1.0	1.7	1.7
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	25.3	24.0	24.1	124	9.6	9.6
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	25.3	24.0	24.1	124	9.6	9.6
	Ammonia, Total (as N) (mg/L)	<0.0050	<0.0050	0.0234	0.0122	0.0074	0.0074
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	<0.020	<0.020	<0.020	0.026	<0.020	<0.020
	Nitrate (as N) (mg/L)	<0.0050	0.0055	<0.0050 <sup>HTD</sup>	<0.0050	<0.0050	<0.0050
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010 <sup>HTD</sup>	<0.0010	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	<0.050	<0.050	<0.050	0.116	<0.050	<0.050
	Total Nitrogen (mg/L)	<0.030	<0.030	0.047	0.095	0.061	0.061
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total (mg/L)	0.0691	0.110	0.119	<0.0020	<0.0020	<0.0020
Sulfate (SO4) (mg/L)	2.66	2.55	2.92	27.4	12.2	12.2	
<b>Cyanides</b>	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Cyanide, Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Cyanide, Free (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
<b>Organic / Inorganic Carbon</b>	Dissolved Organic Carbon (mg/L)	0.76	1.05	1.02	1.52	1.04	1.04
	Total Organic Carbon (mg/L)	<0.50	0.56	0.72	1.64	0.80	0.80
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	1.75	2.25	2.06	<0.0030	0.0200	0.0200
	Antimony (Sb)-Total (mg/L)	0.00017	0.00021	0.00021	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00055	0.00065	0.00061	0.00039	0.00013	0.00013
	Barium (Ba)-Total (mg/L)	0.0735	0.0842	0.0842	0.0325	0.00833	0.00833
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Total (mg/L)	0.000059	0.000085	0.000075	<0.000050	<0.000050	<0.000050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	0.000736	0.00121	0.000918	0.0000503	0.0000299	0.0000299

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2306476-6	L2306476-7	L2306476-8	L2306476-9	L2306476-10
		Description	WATER	WATER	WATER	WATER	WATER
		Sampled Date	07-JUL-19	07-JUL-19	07-JUL-19	07-JUL-19	07-JUL-19
		Sampled Time	11:08	12:20	12:55	13:23	13:59
		Client ID	DUP1	JM4	JM26	SHCR3	SHC5
Grouping	Analyte						
<b>WATER</b>							
<b>Physical Tests</b>	Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	<5.0	
	Conductivity (uS/cm)	51.9	380	51.0	63.0	149	
	Hardness (as CaCO3) (mg/L)	21.1	186	19.6	26.4	72.4	
	pH (pH)	7.88	7.96	8.13	8.02	8.20	
	Total Suspended Solids (mg/L)	125	5.0	203	358	<3.0	
	Total Dissolved Solids (mg/L)	36	265	40	55	85	
	Turbidity (NTU)	37.4	1.86	136	190	0.12	
<b>Anions and Nutrients</b>	Acidity (as CaCO3) (mg/L)	1.3	2.4	<1.0	<1.0	<1.0	
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	24.5	57.5	25.3	27.9	62.5	
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Total (as CaCO3) (mg/L)	24.5	57.5	25.3	27.9	62.5	
	Ammonia, Total (as N) (mg/L)	<0.0050	0.405	<0.0050	<0.0050	0.0093	
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050	
	Chloride (Cl) (mg/L)	<0.50	0.60	<0.50	<0.50	<0.50	
	Fluoride (F) (mg/L)	<0.020	0.060	<0.020	<0.020	<0.020	
	Nitrate (as N) (mg/L)	0.0057	0.0794	0.0072	0.0197	<0.0050	
	Nitrite (as N) (mg/L)	<0.0010	0.0030	<0.0010	<0.0010	<0.0010	
	Total Kjeldahl Nitrogen (mg/L)	<0.050	0.742	<0.050	<0.050	<0.050	
	Total Nitrogen (mg/L)	<0.030	0.853	<0.030	0.038	<0.030	
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	0.0186	0.0011	0.0017	<0.0010	
	Phosphorus (P)-Total (mg/L)	0.119	0.0516	0.201	0.153	<0.0020	
	Sulfate (SO4) (mg/L)	2.60	131	2.35	6.30	15.2	
<b>Cyanides</b>	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
	Cyanide, Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
	Cyanide, Free (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
<b>Organic / Inorganic Carbon</b>	Dissolved Organic Carbon (mg/L)	1.41 <sup>RRV</sup>	1.99	1.59 <sup>RRV</sup>	1.78 <sup>RRV</sup>	<0.50	
	Total Organic Carbon (mg/L)	<0.50 <sup>RRV</sup>	2.02	0.65 <sup>RRV</sup>	0.55 <sup>RRV</sup>	<0.50	
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	0.876	0.0537	3.13	5.47	0.0165	
	Antimony (Sb)-Total (mg/L)	0.00010	0.00046	0.00026	0.00055	0.00011	
	Arsenic (As)-Total (mg/L)	0.00034	0.00014	0.00081	0.00367	0.00036	
	Barium (Ba)-Total (mg/L)	0.0531	0.0406	0.114	0.253	0.0466	
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	0.00021	<0.00010	
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	0.000121	<0.000050	<0.000050	
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010	
	Cadmium (Cd)-Total (mg/L)	0.000868	0.000233	0.00170	0.000548	0.0000118	

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2306476-11	L2306476-12	L2306476-13	L2306476-14	L2306476-15
		Description	WATER	WATER	WATER	WATER	WATER
		Sampled Date	07-JUL-19	07-JUL-19	07-JUL-19	07-JUL-19	07-JUL-19
		Sampled Time	14:28	15:20	15:35	16:09	16:26
		Client ID	SHC3	JM1	JM10	SHC1	JM12
Grouping	Analyte						
<b>WATER</b>							
<b>Physical Tests</b>	Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
	Conductivity (uS/cm)	109	361	70.2	75.7	77.3	
	Hardness (as CaCO3) (mg/L)	52.0	194	31.7	33.5	35.8	
	pH (pH)	7.99	8.06	7.99	8.11	8.06	
	Total Suspended Solids (mg/L)	45.6	15.4	698	564	657	
	Total Dissolved Solids (mg/L)	69	248	91	68	93	
	Turbidity (NTU)	15.2	15.9	371	399	420	
<b>Anions and Nutrients</b>	Acidity (as CaCO3) (mg/L)	1.5	2.3	1.4	1.1	1.4	
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	40.0	87.8	33.0	34.3	34.0	
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Total (as CaCO3) (mg/L)	40.0	87.8	33.0	34.3	34.0	
	Ammonia, Total (as N) (mg/L)	<0.0050	<0.0050	0.0052	0.0121	0.0139	
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050	
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50	
	Fluoride (F) (mg/L)	<0.020	0.044	<0.020	<0.020	<0.020	
	Nitrate (as N) (mg/L)	<0.0050	<0.0050 <sup>HTD</sup>	0.0244 <sup>HTD</sup>	<0.0050	<0.0050	
	Nitrite (as N) (mg/L)	<0.0010	<0.0010 <sup>HTD</sup>	<0.0010 <sup>HTD</sup>	<0.0010	<0.0010	
	Total Kjeldahl Nitrogen (mg/L)	<0.050	<0.050	<0.050	<0.050	0.067	
	Total Nitrogen (mg/L)	<0.030	<0.030	<0.030	0.036	0.043	
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	0.0014	<0.0010	<0.0010	
	Phosphorus (P)-Total (mg/L)	0.0284	0.0369	0.282	0.251	0.530	
	Sulfate (SO4) (mg/L)	14.3	103	6.18	6.11	6.24	
<b>Cyanides</b>	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
	Cyanide, Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
	Cyanide, Free (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
<b>Organic / Inorganic Carbon</b>	Dissolved Organic Carbon (mg/L)	0.89	0.87	2.05 <sup>RRV</sup>	2.06 <sup>RRV</sup>	1.83 <sup>RRV</sup>	
	Total Organic Carbon (mg/L)	<0.50	<0.50	0.75 <sup>RRV</sup>	0.67 <sup>RRV</sup>	0.66 <sup>RRV</sup>	
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	0.817	0.646	5.12	6.66	1.95	
	Antimony (Sb)-Total (mg/L)	0.00013	0.00020	0.00050	0.00061	0.00021	
	Arsenic (As)-Total (mg/L)	0.00044	0.00211	0.00283	0.00363	0.00104	
	Barium (Ba)-Total (mg/L)	0.0624	0.0252	0.257	0.292	0.157	
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	0.00020	0.00024	0.00010	
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010	
	Cadmium (Cd)-Total (mg/L)	0.000102	0.00615	0.000541	0.000585	0.000360	

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2306476-16	L2306476-17	L2306476-18	L2306476-19	L2306476-20
		Description	WATER	WATER	WATER	WATER	WATER
		Sampled Date	07-JUL-19	07-JUL-19	07-JUL-19	07-JUL-19	07-JUL-19
		Sampled Time	16:44	16:55	17:17	12:01	
		Client ID	JM3	JM13	JM7	DUP2	TRAVEL BLANK
Grouping	Analyte						
<b>WATER</b>							
<b>Physical Tests</b>	Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
	Conductivity (uS/cm)	203	210	104	49.9	<2.0	
	Hardness (as CaCO3) (mg/L)	101	104	49.6	20.9		
	pH (pH)	8.13	8.13	8.03	7.37	5.61	
	Total Suspended Solids (mg/L)	86.2	54.6	406	3.6	<3.0	
	Total Dissolved Solids (mg/L)	127	140	100	33	<10	
	Turbidity (NTU)	62.8	40.6	255	0.64	<0.10	
<b>Anions and Nutrients</b>	Acidity (as CaCO3) (mg/L)	1.4	1.4	1.4	1.8	1.9	RRV
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	65.8	67.6	41.3	9.7	<1.0	
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Total (as CaCO3) (mg/L)	65.8	67.6	41.3	9.7	<1.0	
	Ammonia, Total (as N) (mg/L)	<0.0050	0.0234	0.0086	<0.0050	<0.0050	
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050	
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50	
	Fluoride (F) (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020	
	Nitrate (as N) (mg/L)	0.0057	<0.0050	<0.0050	<0.0050	<0.0050	
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Total Kjeldahl Nitrogen (mg/L)	<0.050	0.053	0.057	<0.050	<0.050	
	Total Nitrogen (mg/L)	<0.030	0.041	0.037	0.056	<0.030	
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Phosphorus (P)-Total (mg/L)	0.0384	0.0277	0.191	0.0021	<0.0020	
	Sulfate (SO4) (mg/L)	39.6	39.5	12.3	12.3	<0.30	
<b>Cyanides</b>	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
	Cyanide, Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
	Cyanide, Free (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
<b>Organic / Inorganic Carbon</b>	Dissolved Organic Carbon (mg/L)	1.41	0.92	3.27	1.00	<0.50	RRV
	Total Organic Carbon (mg/L)	0.58	0.55	0.76	0.83	<0.50	RRV
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	1.64	1.49	4.26	0.0323	<0.0030	
	Antimony (Sb)-Total (mg/L)	0.00028	0.00025	0.00040	<0.00010	<0.00010	
	Arsenic (As)-Total (mg/L)	0.00086	0.00074	0.00203	0.00012	<0.00010	
	Barium (Ba)-Total (mg/L)	0.0983	0.0880	0.230	0.00861	<0.00010	
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	0.00016	<0.00010	<0.00010	
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010	
	Cadmium (Cd)-Total (mg/L)	0.000283	0.000252	0.000532	0.0000256	<0.000050	

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	Sample ID	Description	Sampled Date	Sampled Time	Client ID
		L2306476-21	WATER	07-JUL-19		F ELD BLANK
<b>WATER</b>						
<b>Physical Tests</b>	Colour, True (CU)			<5.0		
	Conductivity (uS/cm)			<2.0		
	Hardness (as CaCO3) (mg/L)			<0.50		
	pH (pH)			5.59		
	Total Suspended Solids (mg/L)			<3.0		
	Total Dissolved Solids (mg/L)			<10		
	Turbidity (NTU)			<0.10		
<b>Anions and Nutrients</b>	Acidity (as CaCO3) (mg/L)			2.1 <sup>RRV</sup>		
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)			<1.0		
	Alkalinity, Carbonate (as CaCO3) (mg/L)			<1.0		
	Alkalinity, Hydroxide (as CaCO3) (mg/L)			<1.0		
	Alkalinity, Total (as CaCO3) (mg/L)			<1.0		
	Ammonia, Total (as N) (mg/L)			<0.0050		
	Bromide (Br) (mg/L)			<0.050		
	Chloride (Cl) (mg/L)			<0.50		
	Fluoride (F) (mg/L)			<0.020		
	Nitrate (as N) (mg/L)			<0.0050		
	Nitrite (as N) (mg/L)			<0.0010		
	Total Kjeldahl Nitrogen (mg/L)			<0.050		
	Total Nitrogen (mg/L)			<0.030		
	Orthophosphate-Dissolved (as P) (mg/L)			<0.0010		
	Phosphorus (P)-Total (mg/L)			<0.0020		
	Sulfate (SO4) (mg/L)			<0.30		
<b>Cyanides</b>	Cyanide, Weak Acid Diss (mg/L)			<0.0050		
	Cyanide, Total (mg/L)			<0.0050		
	Cyanide, Free (mg/L)			<0.0050		
<b>Organic / Inorganic Carbon</b>	Dissolved Organic Carbon (mg/L)			<0.50		
	Total Organic Carbon (mg/L)			<0.50		
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)			<0.0030		
	Antimony (Sb)-Total (mg/L)			<0.00010		
	Arsenic (As)-Total (mg/L)			<0.00010		
	Barium (Ba)-Total (mg/L)			<0.00010		
	Beryllium (Be)-Total (mg/L)			<0.00010		
	Bismuth (Bi)-Total (mg/L)			<0.000050		
	Boron (B)-Total (mg/L)			<0.010		
	Cadmium (Cd)-Total (mg/L)			<0.000050		

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2306476-1	L2306476-2	L2306476-3	L2306476-4	L2306476-5
		Description	WATER	WATER	WATER	WATER	WATER
		Sampled Date	07-JUL-19	07-JUL-19	07-JUL-19	07-JUL-19	07-JUL-19
		Sampled Time	09:55	11:00	10:35	11:36	11:52
		Client ID	JM14	JM11	JM6	JM5	TMF1
Grouping	Analyte						
<b>WATER</b>							
<b>Total Metals</b>	Calcium (Ca)-Total (mg/L)		8.53	9.06	9.09	49.1	7.13
	Chromium (Cr)-Total (mg/L)		0.00013	0.00019	0.00018	0.00031	<0.00010
	Cobalt (Co)-Total (mg/L)		0.00090	0.00118	0.00108	<0.00010	<0.00010
	Copper (Cu)-Total (mg/L)		0.0106	0.0163	0.0132	0.00132	0.00130
	Iron (Fe)-Total (mg/L)		2.06	2.76	2.50	0.104	<0.030
	Lead (Pb)-Total (mg/L)		0.0127	0.0195	0.0162	<0.000050	0.000065
	Lithium (Li)-Total (mg/L)		0.0015	0.0018	0.0019	<0.0010	<0.0010
	Magnesium (Mg)-Total (mg/L)		1.37	1.60	1.47	4.43	0.897
	Manganese (Mn)-Total (mg/L)		0.182	0.273	0.212	0.312	0.0113
	Mercury (Hg)-Total (mg/L)		<0.000025 <sup>DLM</sup>	<0.000025 <sup>DLM</sup>	<0.000025 <sup>DLM</sup>	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)		0.000165	0.000175	0.000179	0.000713	<0.000050
	Nickel (Ni)-Total (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Total (mg/L)		<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Total (mg/L)		1.56	1.83	1.95	1.36	0.549
	Selenium (Se)-Total (mg/L)		0.000056	<0.000050	0.000059	0.000171	0.000060
	Silicon (Si)-Total (mg/L)		3.46	4.28	4.66	1.20	0.16
	Silver (Ag)-Total (mg/L)		0.000034	0.000045	0.000042	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)		<2.0	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Total (mg/L)		0.0557	0.0569	0.0584	0.256	0.0338
	Sulfur (S)-Total (mg/L)		0.69	0.71	0.63	9.74	3.84
	Thallium (Tl)-Total (mg/L)		0.000051	0.000069	0.000065	<0.000010	<0.000010
	Tin (Sn)-Total (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)		0.095	0.123	0.115	<0.010	<0.010
	Uranium (U)-Total (mg/L)		0.000116	0.000129	0.000126	0.000127	<0.000010
	Vanadium (V)-Total (mg/L)		0.00399	0.00515	0.00529	<0.00050	<0.00050
	Zinc (Zn)-Total (mg/L)		0.139	0.200	0.157	<0.0030	<0.0030
<b>Dissolved Metals</b>	Dissolved Mercury Filtration Location		LAB	LAB	LAB	LAB	LAB
	Dissolved Metals Filtration Location		LAB	LAB	LAB	LAB	LAB
	Aluminum (Al)-Dissolved (mg/L)		0.0438	0.0557	0.0368	<0.0030	0.0072
	Antimony (Sb)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	0.00034	<0.00010
	Barium (Ba)-Dissolved (mg/L)		0.0213	0.0212	0.0215	0.0339	0.00835
	Beryllium (Be)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Dissolved (mg/L)		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)		<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)		0.000327	0.000420	0.000384	0.0000428	0.0000173
	Calcium (Ca)-Dissolved (mg/L)		8.09	7.71	7.64	52.7	6.83

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2306476-6	L2306476-7	L2306476-8	L2306476-9	L2306476-10
		Description	WATER	WATER	WATER	WATER	WATER
		Sampled Date	07-JUL-19	07-JUL-19	07-JUL-19	07-JUL-19	07-JUL-19
		Sampled Time	11:08	12:20	12:55	13:23	13:59
		Client ID	DUP1	JM4	JM26	SHCR3	SHC5
Grouping	Analyte						
<b>WATER</b>							
<b>Total Metals</b>	Calcium (Ca)-Total (mg/L)		8.48	57.5	9.48	16.6	24.3
	Chromium (Cr)-Total (mg/L)		<0.00010	<0.00010	0.00026	0.00066	<0.00010
	Cobalt (Co)-Total (mg/L)		0.00056	0.00038	0.00158	0.00372	<0.00010
	Copper (Cu)-Total (mg/L)		0.00925	0.0261	0.0222	0.0111	<0.00050
	Iron (Fe)-Total (mg/L)		1.10	0.213	3.71	7.93	<0.030
	Lead (Pb)-Total (mg/L)		0.0121	0.000390	0.0275	0.0296	<0.000050
	Lithium (Li)-Total (mg/L)		0.0010	0.0014	0.0025	0.0048	<0.0010
	Magnesium (Mg)-Total (mg/L)		0.888	9.86	1.86	4.23	2.50
	Manganese (Mn)-Total (mg/L)		0.176	0.400	0.354	0.808	0.00086
	Mercury (Hg)-Total (mg/L)		<0.000025 <sup>DLM</sup>	<0.0000050	<0.000025 <sup>DLM</sup>	<0.000025 <sup>DLM</sup>	<0.0000050
	Molybdenum (Mo)-Total (mg/L)		0.000135	0.000276	0.000179	0.000493	0.000728
	Nickel (Ni)-Total (mg/L)		<0.00050	<0.00050	<0.00050	0.00083	<0.00050
	Phosphorus (P)-Total (mg/L)		<0.30	<0.30	<0.30	0.57	<0.30
	Potassium (K)-Total (mg/L)		1.09	2.50	2.65	4.15	1.87
	Selenium (Se)-Total (mg/L)		0.000066	0.000230	0.000068	0.000095	0.000233
	Silicon (Si)-Total (mg/L)		2.03	2.48	7.04	12.3	1.13
	Silver (Ag)-Total (mg/L)		0.000019	<0.000010	0.000062	0.000152	<0.000010
	Sodium (Na)-Total (mg/L)		<2.0	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Total (mg/L)		0.0519	0.426	0.0570	0.115	0.174
	Sulfur (S)-Total (mg/L)		0.71	46.5	0.56	1.85	5.06
	Thallium (Tl)-Total (mg/L)		0.000031	0.000018	0.000092	0.000224	<0.000010
	Tin (Sn)-Total (mg/L)		<0.00010	<0.00010	<0.00010	0.00012	<0.00010
	Titanium (Ti)-Total (mg/L)		0.047	<0.010	0.170	0.342	<0.010
	Uranium (U)-Total (mg/L)		0.000102	0.000489	0.000161	0.000416	0.000124
	Vanadium (V)-Total (mg/L)		0.00234	<0.00050	0.00818	0.0136	<0.00050
	Zinc (Zn)-Total (mg/L)		0.119	0.0749	0.270	0.0950	<0.0030
<b>Dissolved Metals</b>	Dissolved Mercury Filtration Location		LAB	LAB	LAB	LAB	LAB
	Dissolved Metals Filtration Location		LAB	LAB	LAB	LAB	LAB
	Aluminum (Al)-Dissolved (mg/L)		0.0750	0.0373	0.0832	0.0891	0.0094
	Antimony (Sb)-Dissolved (mg/L)		<0.00010	0.00047	<0.00010	<0.00010	0.00011
	Arsenic (As)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	0.00025	0.00032
	Barium (Ba)-Dissolved (mg/L)		0.0210	0.0433	0.0197	0.0265	0.0519
	Beryllium (Be)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Dissolved (mg/L)		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)		<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)		0.000412	0.000217	0.000530	0.0000261	0.0000103
	Calcium (Ca)-Dissolved (mg/L)		7.69	58.5	7.17	9.59	25.1

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.



## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2306476-11	L2306476-12	L2306476-13	L2306476-14	L2306476-15
		Description	WATER	WATER	WATER	WATER	WATER
		Sampled Date	07-JUL-19	07-JUL-19	07-JUL-19	07-JUL-19	07-JUL-19
		Sampled Time	14:28	15:20	15:35	16:09	16:26
		Client ID	SHC3	JM1	JM10	SHC1	JM12
Grouping	Analyte						
<b>WATER</b>							
<b>Total Metals</b>	Calcium (Ca)-Total (mg/L)		18.2	63.6	16.2	16.5	13.8
	Chromium (Cr)-Total (mg/L)		0.00016	0.00032	0.00053	0.00079	0.00020
	Cobalt (Co)-Total (mg/L)		0.00046	0.00205	0.00350	0.00437	0.00149
	Copper (Cu)-Total (mg/L)		0.00831	0.326	0.0107	0.0143	0.00652
	Iron (Fe)-Total (mg/L)		0.922	5.44	7.41	9.00	2.60
	Lead (Pb)-Total (mg/L)		0.00387	0.00775	0.0310	0.0357	0.0197
	Lithium (Li)-Total (mg/L)		0.0011	0.0021	0.0047	0.0058	0.0021
	Magnesium (Mg)-Total (mg/L)		2.00	11.1	4.05	5.05	1.87
	Manganese (Mn)-Total (mg/L)		0.0975	0.376	0.769	0.850	0.442
	Mercury (Hg)-Total (mg/L)		<0.0000050	<0.000025 <sup>DLM</sup>	<0.000025 <sup>DLM</sup>	0.0000073	<0.000025 <sup>DLM</sup>
	Molybdenum (Mo)-Total (mg/L)		0.000401	0.000328	0.000434	0.000493	0.000255
	Nickel (Ni)-Total (mg/L)		<0.00050	<0.00050	0.00067	0.00104	<0.00050
	Phosphorus (P)-Total (mg/L)		<0.30	<0.30	0.44	0.44	<0.30
	Potassium (K)-Total (mg/L)		1.72	1.87	3.96	4.91	2.26
	Selenium (Se)-Total (mg/L)		0.000093	0.000542	0.000069	0.000060	0.000067
	Silicon (Si)-Total (mg/L)		2.80	2.63	10.8	14.2	4.04
	Silver (Ag)-Total (mg/L)		0.000016	0.000044	0.000119	0.000179	0.000060
	Sodium (Na)-Total (mg/L)		<2.0	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Total (mg/L)		0.132	0.357	0.110	0.115	0.0948
	Sulfur (S)-Total (mg/L)		4.99	39.0	1.73	1.89	2.13
	Thallium (Tl)-Total (mg/L)		0.000035	0.000019	0.000208	0.000273	0.000088
	Tin (Sn)-Total (mg/L)		<0.00010	<0.00010	0.00012	0.00017	<0.00010
	Titanium (Ti)-Total (mg/L)		0.047	0.015	0.315	0.413	0.104
	Uranium (U)-Total (mg/L)		0.000212	0.000655	0.000358	0.000419	0.000247
	Vanadium (V)-Total (mg/L)		0.00210	0.00069	0.0130	0.0164	0.00478
	Zinc (Zn)-Total (mg/L)		0.0163	1.16	0.0944	0.115	0.0466
<b>Dissolved Metals</b>	Dissolved Mercury Filtration Location		LAB	LAB	LAB	LAB	LAB
	Dissolved Metals Filtration Location		LAB	LAB	LAB	LAB	LAB
	Aluminum (Al)-Dissolved (mg/L)		0.0466	0.0244	0.0963	0.0993	0.103
	Antimony (Sb)-Dissolved (mg/L)		<0.00010	0.00012	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)		0.00016	<0.00010	0.00024	0.00025	0.00026
	Barium (Ba)-Dissolved (mg/L)		0.0339	0.0212	0.0300	0.0332	0.0335
	Beryllium (Be)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Dissolved (mg/L)		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)		<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)		0.0000381	0.00398	0.0000336	0.0000391	0.0000368
	Calcium (Ca)-Dissolved (mg/L)		18.4	62.4	11.7	12.3	13.2

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2306476-16	L2306476-17	L2306476-18	L2306476-19	L2306476-20
		Description	WATER	WATER	WATER	WATER	WATER
		Sampled Date	07-JUL-19	07-JUL-19	07-JUL-19	07-JUL-19	07-JUL-19
		Sampled Time	16:44	16:55	17:17	12:01	
		Client ID	JM3	JM13	JM7	DUP2	TRAVEL BLANK
Grouping	Analyte						
<b>WATER</b>							
<b>Total Metals</b>	Calcium (Ca)-Total (mg/L)		33.0	36.7	20.4	7.14	<0.050
	Chromium (Cr)-Total (mg/L)		0.00023	0.00026	0.00050	<0.00010	<0.00010
	Cobalt (Co)-Total (mg/L)		0.00131	0.00103	0.00285	<0.00010	<0.00010
	Copper (Cu)-Total (mg/L)		0.0871	0.0714	0.0199	0.00170	0.00074 <sup>RRV</sup>
	Iron (Fe)-Total (mg/L)		2.25	1.84	5.65	0.031	<0.030
	Lead (Pb)-Total (mg/L)		0.00772	0.00625	0.0277	0.000084	<0.000050
	Lithium (Li)-Total (mg/L)		0.0025	0.0023	0.0039	<0.0010	<0.0010
	Magnesium (Mg)-Total (mg/L)		5.51	5.04	4.10	0.907	<0.0050
	Manganese (Mn)-Total (mg/L)		0.323	0.292	0.720	0.0120	<0.00010
	Mercury (Hg)-Total (mg/L)		<0.000025 <sup>DLM</sup>	<0.000025 <sup>DLM</sup>	<0.000025 <sup>DLM</sup>	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)		0.000402	0.000431	0.000404	<0.000050	<0.000050
	Nickel (Ni)-Total (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Total (mg/L)		<0.30	<0.30	0.40	<0.30	<0.30
	Potassium (K)-Total (mg/L)		2.53	2.61	3.63	0.544	<0.050
	Selenium (Se)-Total (mg/L)		0.000140	0.000154	0.000099	<0.000050	<0.000050
	Silicon (Si)-Total (mg/L)		4.63	4.41	9.20	0.18	<0.10
	Silver (Ag)-Total (mg/L)		0.000037	0.000031	0.000112	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)		<2.0	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Total (mg/L)		0.378	0.357	0.147	0.0329	<0.00020
	Sulfur (S)-Total (mg/L)		13.5	14.2	4.04	3.73	<0.50
	Thallium (Tl)-Total (mg/L)		0.000073	0.000062	0.000174	<0.000010	<0.000010
	Tin (Sn)-Total (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)		0.093	0.080	0.259	<0.010	<0.010
	Uranium (U)-Total (mg/L)		0.000664	0.000556	0.000378	<0.000010	<0.000010
	Vanadium (V)-Total (mg/L)		0.00400	0.00339	0.0105	<0.00050	<0.00050
	Zinc (Zn)-Total (mg/L)		0.0520	0.0438	0.0809	0.0034	<0.0030
<b>Dissolved Metals</b>	Dissolved Mercury Filtration Location		LAB	LAB	LAB	LAB	
	Dissolved Metals Filtration Location		LAB	LAB	LAB	LAB	
	Aluminum (Al)-Dissolved (mg/L)		0.0434	0.0383	0.0917	0.0074	
	Antimony (Sb)-Dissolved (mg/L)		0.00015	0.00014	<0.00010	<0.00010	
	Arsenic (As)-Dissolved (mg/L)		0.00015	0.00012	0.00018	0.00011	
	Barium (Ba)-Dissolved (mg/L)		0.0401	0.0407	0.0374	0.00895	
	Beryllium (Be)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	
	Bismuth (Bi)-Dissolved (mg/L)		<0.000050	<0.000050	<0.000050	<0.000050	
	Boron (B)-Dissolved (mg/L)		<0.010	<0.010	<0.010	<0.010	
	Cadmium (Cd)-Dissolved (mg/L)		0.000129	0.000117	0.0000534	0.0000191	
	Calcium (Ca)-Dissolved (mg/L)		33.3	35.3	17.9	7.02	

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	Sample ID	Description	Sampled Date	Sampled Time	Client ID
		L2306476-21	WATER	07-JUL-19		F ELD BLANK
<b>WATER</b>						
<b>Total Metals</b>	Calcium (Ca)-Total (mg/L)			<0.050		
	Chromium (Cr)-Total (mg/L)			<0.00010		
	Cobalt (Co)-Total (mg/L)			<0.00010		
	Copper (Cu)-Total (mg/L)			<0.00050		
	Iron (Fe)-Total (mg/L)			<0.030		
	Lead (Pb)-Total (mg/L)			<0.000050		
	Lithium (Li)-Total (mg/L)			<0.0010		
	Magnesium (Mg)-Total (mg/L)			<0.0050		
	Manganese (Mn)-Total (mg/L)			<0.00010		
	Mercury (Hg)-Total (mg/L)			<0.0000050		
	Molybdenum (Mo)-Total (mg/L)			<0.000050		
	Nickel (Ni)-Total (mg/L)			<0.00050		
	Phosphorus (P)-Total (mg/L)			<0.30		
	Potassium (K)-Total (mg/L)			<0.050		
	Selenium (Se)-Total (mg/L)			<0.000050		
	Silicon (Si)-Total (mg/L)			<0.10		
	Silver (Ag)-Total (mg/L)			<0.000010		
	Sodium (Na)-Total (mg/L)			<2.0		
	Strontium (Sr)-Total (mg/L)			<0.00020		
	Sulfur (S)-Total (mg/L)			<0.50		
	Thallium (Tl)-Total (mg/L)			<0.000010		
	Tin (Sn)-Total (mg/L)			<0.00010		
	Titanium (Ti)-Total (mg/L)			<0.010		
	Uranium (U)-Total (mg/L)			<0.000010		
	Vanadium (V)-Total (mg/L)			<0.00050		
	Zinc (Zn)-Total (mg/L)			<0.0030		
<b>Dissolved Metals</b>	Dissolved Mercury Filtration Location		LAB			
	Dissolved Metals Filtration Location		LAB			
	Aluminum (Al)-Dissolved (mg/L)			<0.0030		
	Antimony (Sb)-Dissolved (mg/L)			<0.00010		
	Arsenic (As)-Dissolved (mg/L)			<0.00010		
	Barium (Ba)-Dissolved (mg/L)			<0.00010		
	Beryllium (Be)-Dissolved (mg/L)			<0.00010		
	Bismuth (Bi)-Dissolved (mg/L)			<0.000050		
	Boron (B)-Dissolved (mg/L)			<0.010		
	Cadmium (Cd)-Dissolved (mg/L)			<0.0000050		
	Calcium (Ca)-Dissolved (mg/L)			<0.050		

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID	L2306476-1 WATER 07-JUL-19 09:55 JM14	L2306476-2 WATER 07-JUL-19 11:00 JM11	L2306476-3 WATER 07-JUL-19 10:35 JM6	L2306476-4 WATER 07-JUL-19 11:36 JM5	L2306476-5 WATER 07-JUL-19 11:52 TMF1
Grouping	Analyte				
<b>WATER</b>					
<b>Dissolved Metals</b>	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Dissolved (mg/L)	<0.00050	0.00056	<0.00050	0.00082
	Iron (Fe)-Dissolved (mg/L)	<0.030	0.037	<0.030	<0.030
	Lead (Pb)-Dissolved (mg/L)	0.000200	0.000357	0.000197	<0.000050
	Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Dissolved (mg/L)	0.484	0.459	0.479	4.13
	Manganese (Mn)-Dissolved (mg/L)	0.0514	0.0675	0.0611	0.333
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000144	0.000141	0.000146	0.000654
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)	0.510	0.478	0.488	1.39
	Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	0.000166
	Silicon (Si)-Dissolved (mg/L)	0.624	0.576	0.611	1.33
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Dissolved (mg/L)	0.0500	0.0489	0.0508	0.260
	Sulfur (S)-Dissolved (mg/L)	0.74	1.03	0.71	8.99
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	0.000056	0.000042	0.000052	0.000128
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	0.0054	0.0071	0.0051	0.0019

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	Description	Sampled Date	Sampled Time	Client ID	L2306476-6	L2306476-7	L2306476-8	L2306476-9	L2306476-10
					WATER	WATER	WATER	WATER	WATER
		07-JUL-19	11:08	DUP1	07-JUL-19	07-JUL-19	07-JUL-19	07-JUL-19	07-JUL-19
					11:08	12:20	12:55	13:23	13:59
					DUP1	JM4	JM26	SHCR3	SHC5
Grouping	Analyte								
<b>WATER</b>									
<b>Dissolved Metals</b>	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	0.00040	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Dissolved (mg/L)	0.00068	0.0165	0.00093	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Iron (Fe)-Dissolved (mg/L)	0.052	0.030	0.066	0.064	<0.030	<0.030	<0.030	<0.030
	Lead (Pb)-Dissolved (mg/L)	0.000451	<0.000050	0.000587	0.000252	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Dissolved (mg/L)	<0.0010	0.0014	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Dissolved (mg/L)	0.457	9.59	0.424	0.604	2.35	2.35	2.35	2.35
	Manganese (Mn)-Dissolved (mg/L)	0.0716	0.438	0.0864	0.0356	0.00021	0.00021	0.00021	0.00021
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000126	0.000271	0.000137	0.000296	0.000678	0.000678	0.000678	0.000678
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)	0.481	2.57	0.459	0.694	1.95	1.95	1.95	1.95
	Selenium (Se)-Dissolved (mg/L)	<0.000050	0.000332 <sup>DTSE</sup>	<0.000050	<0.000050	0.000239	0.000239	0.000239	0.000239
	Silicon (Si)-Dissolved (mg/L)	0.692	2.57	0.643	0.819	1.26	1.26	1.26	1.26
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Dissolved (mg/L)	0.0484	0.427	0.0459	0.0716	0.179	0.179	0.179	0.179
	Sulfur (S)-Dissolved (mg/L)	0.83	45.2	0.56	1.99	5.57	5.57	5.57	5.57
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	0.000015	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	0.000046	0.000476	0.000034	0.000122	0.000124	0.000124	0.000124	0.000124
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	0.0088	0.0594	0.0115	0.0012	<0.0010	<0.0010	<0.0010	<0.0010

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	Description	Sampled Date	Sampled Time	Client ID	L2306476-11	L2306476-12	L2306476-13	L2306476-14	L2306476-15
					WATER	WATER	WATER	WATER	WATER
					07-JUL-19	07-JUL-19	07-JUL-19	07-JUL-19	07-JUL-19
					14:28	15:20	15:35	16:09	16:26
					SHC3	JM1	JM10	SHC1	JM12
Grouping	Analyte								
<b>WATER</b>									
<b>Dissolved Metals</b>	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	0.00141	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Dissolved (mg/L)	0.00206	0.0151	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Iron (Fe)-Dissolved (mg/L)	<0.030	<0.030	0.070	0.071	0.067	0.067	0.067	0.067
	Lead (Pb)-Dissolved (mg/L)	0.000101	<0.000050	0.000296	0.000302	0.000280	0.000280	0.000280	0.000280
	Lithium (Li)-Dissolved (mg/L)	<0.0010	0.0018	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Dissolved (mg/L)	1.46	9.20	0.619	0.694	0.671	0.671	0.671	0.671
	Manganese (Mn)-Dissolved (mg/L)	0.0202	0.302	0.0429	0.0492	0.0530	0.0530	0.0530	0.0530
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000372	0.000228	0.000324	0.000324	0.000311	0.000311	0.000311	0.000311
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	0.00057	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)	1.25	1.85	0.833	0.910	0.893	0.893	0.893	0.893
	Selenium (Se)-Dissolved (mg/L)	0.000056	0.000423	0.000054	0.000061	0.000057	0.000057	0.000057	0.000057
	Silicon (Si)-Dissolved (mg/L)	1.30	2.11	0.924	1.02	0.916	0.916	0.916	0.916
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Dissolved (mg/L)	0.125	0.342	0.0774	0.0830	0.0837	0.0837	0.0837	0.0837
	Sulfur (S)-Dissolved (mg/L)	4.88	38.7	2.20	2.19	1.98	1.98	1.98	1.98
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	0.000012	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	0.00017	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	0.000158	0.000204	0.000121	0.000112	0.000115	0.000115	0.000115	0.000115
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	0.0017	0.645	0.0015	0.0012	0.0012	0.0012	0.0012	0.0012

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	Description	Sampled Date	Sampled Time	Client ID	L2306476-16	L2306476-17	L2306476-18	L2306476-19	L2306476-20
					WATER	WATER	WATER	WATER	WATER
		07-JUL-19	16:44	JM3	07-JUL-19	16:55	07-JUL-19	17:17	07-JUL-19
					JM3	JM13	JM7	12:01	DUP2
									TRAVEL BLANK
Grouping	Analyte								
<b>WATER</b>									
<b>Dissolved Metals</b>	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	0.00026				
	Cobalt (Co)-Dissolved (mg/L)	0.00036	0.00028	<0.00010	<0.00010				
	Copper (Cu)-Dissolved (mg/L)	0.0109	0.0102	0.00102	0.00094				
	Iron (Fe)-Dissolved (mg/L)	<0.030	<0.030	0.057	<0.030				
	Lead (Pb)-Dissolved (mg/L)	0.000053	<0.000050	0.000246	<0.000050				
	Lithium (Li)-Dissolved (mg/L)	0.0012	0.0011	<0.0010	<0.0010				
	Magnesium (Mg)-Dissolved (mg/L)	4.35	3.80	1.22	0.822				
	Manganese (Mn)-Dissolved (mg/L)	0.186	0.175	0.0647	0.00086				
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050				
	Molybdenum (Mo)-Dissolved (mg/L)	0.000375	0.000370	0.000341	<0.000050				
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050				
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30				
	Potassium (K)-Dissolved (mg/L)	1.60	1.73	1.07	0.579				
	Selenium (Se)-Dissolved (mg/L)	0.000104	0.00010	0.000078	0.000051				
	Silicon (Si)-Dissolved (mg/L)	1.49	1.63	1.08	0.281				
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010				
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0				
	Strontium (Sr)-Dissolved (mg/L)	0.364	0.350	0.125	0.0343				
	Sulfur (S)-Dissolved (mg/L)	14.0	13.9	4.35	3.81				
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010				
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010				
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010				
	Uranium (U)-Dissolved (mg/L)	0.000557	0.000457	0.000165	<0.000010				
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050				
	Zinc (Zn)-Dissolved (mg/L)	0.0095	0.0096	0.0014	0.0021				

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	Sample ID	Description	Sampled Date	Sampled Time	Client ID
		L2306476-21	WATER	07-JUL-19		F ELD BLANK
<b>WATER</b>						
<b>Dissolved Metals</b>	Chromium (Cr)-Dissolved (mg/L)					<0.00010
	Cobalt (Co)-Dissolved (mg/L)					<0.00010
	Copper (Cu)-Dissolved (mg/L)					<0.00050
	Iron (Fe)-Dissolved (mg/L)					<0.030
	Lead (Pb)-Dissolved (mg/L)					<0.000050
	Lithium (Li)-Dissolved (mg/L)					<0.0010
	Magnesium (Mg)-Dissolved (mg/L)					<0.0050
	Manganese (Mn)-Dissolved (mg/L)					<0.00010
	Mercury (Hg)-Dissolved (mg/L)					<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)					<0.000050
	Nickel (Ni)-Dissolved (mg/L)					<0.00050
	Phosphorus (P)-Dissolved (mg/L)					<0.30
	Potassium (K)-Dissolved (mg/L)					<0.050
	Selenium (Se)-Dissolved (mg/L)					<0.000050
	Silicon (Si)-Dissolved (mg/L)					0.126
	Silver (Ag)-Dissolved (mg/L)					<0.000010
	Sodium (Na)-Dissolved (mg/L)					<2.0
	Strontium (Sr)-Dissolved (mg/L)					<0.00020
	Sulfur (S)-Dissolved (mg/L)					<0.50
	Thallium (Tl)-Dissolved (mg/L)					<0.000010
	Tin (Sn)-Dissolved (mg/L)					<0.00010
	Titanium (Ti)-Dissolved (mg/L)					<0.010
	Uranium (U)-Dissolved (mg/L)					<0.000010
	Vanadium (V)-Dissolved (mg/L)					<0.00050
	Zinc (Zn)-Dissolved (mg/L)					<0.0010

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.



## Reference Information

## Qualifiers for Individual Samples Listed:

Sample Number	Client Sample ID	Qualifier	Description
L2306476-14	SHC1	WSMT	Water sample(s) for total mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.

## QC Samples with Qualifiers &amp; Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Cyanide, Total	B	L2306476-10, -11, -12, -13, -14, -15, -16
Method Blank	Cyanide, Weak Acid Diss	B	L2306476-10, -11, -12, -13, -14, -15, -16
Method Blank	Cyanide, Weak Acid Diss	B	L2306476-10, -9
Method Blank	Ammonia, Total (as N)	B	L2306476-21
Laboratory Control Sample	Cyanide, Weak Acid Diss	LCS-H	L2306476-11, -12, -13, -14, -15, -16
Laboratory Control Sample	Sulfur (S)-Total	MES	L2306476-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2306476-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -21, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2306476-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -21, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2306476-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -21, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2306476-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -21, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Aluminum (Al)-Total	MS-B	L2306476-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Aluminum (Al)-Total	MS-B	L2306476-20, -21
Matrix Spike	Arsenic (As)-Total	MS-B	L2306476-21
Matrix Spike	Barium (Ba)-Total	MS-B	L2306476-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Total	MS-B	L2306476-21
Matrix Spike	Calcium (Ca)-Total	MS-B	L2306476-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Total	MS-B	L2306476-21
Matrix Spike	Calcium (Ca)-Total	MS-B	L2306476-20, -21
Matrix Spike	Iron (Fe)-Total	MS-B	L2306476-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2306476-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2306476-21
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2306476-20, -21
Matrix Spike	Manganese (Mn)-Total	MS-B	L2306476-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Manganese (Mn)-Total	MS-B	L2306476-21
Matrix Spike	Manganese (Mn)-Total	MS-B	L2306476-20, -21
Matrix Spike	Potassium (K)-Total	MS-B	L2306476-21
Matrix Spike	Potassium (K)-Total	MS-B	L2306476-20, -21
Matrix Spike	Sodium (Na)-Total	MS-B	L2306476-21
Matrix Spike	Sodium (Na)-Total	MS-B	L2306476-20, -21
Matrix Spike	Strontium (Sr)-Total	MS-B	L2306476-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Total	MS-B	L2306476-21
Matrix Spike	Strontium (Sr)-Total	MS-B	L2306476-20, -21
Matrix Spike	Titanium (Ti)-Total	MS-B	L2306476-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Nitrate (as N)	MS-B	L2306476-12, -13
Matrix Spike	Phosphorus (P)-Total	MS-B	L2306476-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Orthophosphate-Dissolved (as P)	MS-B	L2306476-1, -10, -2, -3, -4, -5, -6, -7, -8, -9

## Qualifiers for Individual Parameters Listed:

Qualifier	Description
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## Reference Information

B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
DTSE	Dissolved Se concentration exceeds total. Positive bias on D-Se suspected due to signal enhancement from volatile selenium species. Contact ALS if an alternative test to address this interference is needed.
HTD	Hold time exceeded for re-analysis or dilution, but initial testing was conducted within hold time.
LCS-H	Lab Control Sample recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

### Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
<b>ACY-PCT-VA</b>	Water	Acidity by Automatic Titration	APHA 2310 Acidity
This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.			
Samples of industrial wastes, acid mine drainage, or other solutions that contain appreciable amounts of hydrolyzable metal ions such as aluminum, iron, and manganese may require hot peroxide treatment to ensure oxidation and hydrolysis of reduced forms of polyvalent cations. Acidity results may be highly variable if this procedure is not followed. Results in this report for 'Acidity (as CaCO3)' have not been peroxide treated.			
<b>ALK-TITR-VA</b>	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity
This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.			
<b>BR-L-IC-N-VA</b>	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
<b>CARBONS-DOC-VA</b>	Water	Dissolved organic carbon by combustion	APHA 5310B
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.			
<b>CARBONS-TOC-VA</b>	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
<b>CL-IC-N-VA</b>	Water	Chloride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
<b>CN-FREE-CFA-VA</b>	Water	Free Cyanide in water by CFA	ASTM 7237
This analysis is carried out using procedures adapted from ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.			
<b>CN-T-CFA-VA</b>	Water	Total Cyanide in water by CFA	ISO 14403:2002
This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.			
<b>CN-WAD-CFA-VA</b>	Water	Weak Acid Diss. Cyanide in water by CFA	APHA 4500-CN CYANIDE
This analysis is carried out using procedures adapted from APHA Method 4500-CN I. "Weak Acid Dissociable Cyanide". Weak Acid Dissociable (WAD) cyanide is determined by in-line sample distillation with final determination by colourimetric analysis.			
<b>COLOUR-TRUE-VA</b>	Water	Colour (True) by Spectrometer	BCMOE Colour Single Wavelength
This analysis is carried out using procedures adapted from British Columbia Environmental Manual "Colour- Single Wavelength." Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method.			
Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.			
<b>EC-PCT-VA</b>	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.
This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.			
<b>EC-SCREEN-VA</b>	Water	Conductivity Screen (Internal Use Only)	APHA 2510

## Reference Information

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

**F-IC-N-VA** Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**HARDNESS-CALC-VA** Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO<sub>3</sub> equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

**HG-D-CVAA-VA** Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

**HG-T-CVAA-VA** Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

**MET-D-CCMS-VA** Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

**MET-T-CCMS-VA** Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

**N-T-COL-VA** Water Total Nitrogen in water by Colour APHA4500-P(J)/NEMI9171/USGS03-4174

This analysis is carried out using procedures adapted from APHA Method 4500-P (J) "Persulphate Method for Simultaneous Determination of Total Nitrogen and Total Phosphorus" and National Environmental Methods Index - Nemi method 5735.

**NH3-F-VA** Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

**NO2-L-IC-N-VA** Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**NO3-L-IC-N-VA** Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**P-T-PRES-COL-VA** Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

**PH-PCT-VA** Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

**PO4-DO-COL-VA** Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

**SO4-IC-N-VA** Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**TDS-VA** Water Total Dissolved Solids by Gravimetric APHA 2540 C - GRAVIMETRIC

## Reference Information

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

**TKN-F-VA** Water TKN in Water by Fluorescence APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

**TSS-VA** Water Total Suspended Solids by Gravimetric APHA 2540 D - GRAVIMETRIC

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

**TURBIDITY-VA** Water Turbidity by Meter APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

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\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

*The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:*

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Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

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### Chain of Custody Numbers:

17-756320 17-756321

### GLOSSARY OF REPORT TERMS

*Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.*

*mg/kg - milligrams per kilogram based on dry weight of sample.*

*mg/kg wwt - milligrams per kilogram based on wet weight of sample.*

*mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.*

*mg/L - milligrams per litre.*

*< - Less than.*

*D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).*

*N/A - Result not available. Refer to qualifier code and definition for explanation.*

*Test results reported relate only to the samples as received by the laboratory.*

**UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.**

*Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.*



Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878



L2306476-COFC

COC Number: 17 - 756320

Page 2 of 2

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<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>			Below - Contact your AM to confirm all E&P TATs (surcharges may apply)														
Company: <b>ERM</b>		Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL   <input type="checkbox"/> EDD (DIGITAL)			Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply														
Contact: <b>Elizabeth Boyle</b>		Quality Control (QC) Report with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO			Priority (Business days): 4 day [P4-20%] <input type="checkbox"/> 3 day [P3-25%] <input type="checkbox"/> 2 day [P2-50%] <input type="checkbox"/>														
Phone: <b>604-689-9460</b>		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked			EMERGENCY: 1 Business day [E - 100%] Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)]														
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL   <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm														
Street: <b>1111 Hastings (West)</b>		Email 1 or Fax: <b>elizabeth.boyle@erm.com</b>			For tests that can not be performed according to the service level selected, you will be contacted.														
City/Province: <b>Vancouver, BC</b>		Email 2: <b>wade.burnham@erm.com</b>			<b>Analysis Request</b>														
Postal Code:		Email 3:			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below														
Invoice To: Same as Report To <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		<b>Invoice Distribution</b>			<table border="1"> <tr> <td colspan="12" style="text-align: center;">074326</td> </tr> </table>			074326											
074326																			
Copy of Invoice with Report <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		Select Invoice Distribution: <input type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX																	
Company: <b>Seabridge Gold</b>		Email 1 or Fax:																	
Contact: <b>Elizabeth Miller</b>		Email 2:																	
<b>Project Information</b>		<b>Oil and Gas Required Fields (client use)</b>																	
ALS Account # / Quote #: <b>Q74326</b>		AFE/Cost Center: PO#																	
Job #: <b>0492759-0004</b>		Major/Minor Code: Routing Code:																	
PO / AFE:		Requisitioner:																	
LSD:		Location:																	
ALS Lab Work Order # (lab use only):		ALS Contact: <b>A. Springer</b> Sampler: <b>R. Qin</b>																	
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	<table border="1"> <tr> <td colspan="12" style="text-align: center;">074326</td> </tr> </table>	074326												<b>SAMPLES ON HOLD</b> SUSPECTED HAZARD (see Special Instructions)	
074326																			
	JM10	07-07-19	15:35	water															
	SHC1	07-July-19	16:09																
	JM12		16:26																
	JM3		16:44																
	JM13		16:55																
	JM7		17:17																
	DUP 2		12:01																
	Travel Blank																		
	Field Blank																		
<b>Drinking Water (DW) Samples<sup>1</sup> (client use)</b>		<b>Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)</b>			<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>														
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO					Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>														
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO					Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>														
					Cooling Initiated <input checked="" type="checkbox"/>														
					INITIAL COOLER TEMPERATURES °C														
					FINAL COOLER TEMPERATURES °C														
					9														
<b>SHIPMENT RELEASE (client use)</b>		<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>			<b>FINAL SHIPMENT RECEPTION (lab use only)</b>														
Released by: <b>Coby Hall</b>	Date: <b>July 8/2019</b>	Time:	Received by:	Date:	Time:	Received by: <b>HA</b>	Date: <b>7/9</b>	Time: <b>12 PM</b>											

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - LABORATORY COPY YELLOW - CLIENT COPY JUNE 2010 PRINT

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.



L2306476-COFC

COC Number: 17-756321

Page 1 of 2

<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b> Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)		contact your AM to confirm all E&P TATs (surcharges may apply)																																																													
Company: <u>ERM</u>		Quality Control (QC) Report with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		<b>Regular [R]</b> <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply																																																													
Contact: <u>Elizabeth Boyle</u>		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked		<b>PRIORITY (Business Days)</b>																																																													
Phone: <u>604-689-9460</u>		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX		4 day [P4-20%] <input type="checkbox"/>																																																													
Company address below will appear on the final report		Email 1 or Fax: <u>elizabeth.boyle@erm.com</u>		3 day [P3-25%] <input type="checkbox"/>																																																													
Street: <u>111 West Hastings</u>		Email 2: <u>wade.burham@erm.com</u>		2 day [P2-50%] <input type="checkbox"/>																																																													
City/Province: <u>Vancouver, BC</u>		Email 3:		<b>EMERGENCY</b>																																																													
Postal Code:		Invoice Distribution		1 Business day [E - 100%] <input type="checkbox"/>																																																													
Invoice To: Same as Report To <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		Select Invoice Distribution: <input type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX		Same Day, Weekend or Statutory holiday [E2 - 200% (Laboratory opening fees may apply)] <input type="checkbox"/>																																																													
Copy of Invoice with Report <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		Email 1 or Fax:		Date and Time Required for all E&P TATs: _____ dd-mmm-yy hh:mm																																																													
Company: <u>Senbridge Gold</u>		Email 2:		For tests that can not be performed according to the service level selected, you will be contacted.																																																													
Contact: <u>Elizabeth Miller</u>		Email 3:		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td colspan="12" style="text-align: center;">Analysis Request</td> </tr> <tr> <td colspan="12" style="text-align: center;">Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below</td> </tr> <tr> <td colspan="12" style="text-align: center; font-size: 2em;">Q 74326</td> </tr> <tr> <td colspan="12" style="text-align: center; font-size: 2em;">SAMPLES ON HOLD</td> </tr> <tr> <td colspan="12" style="text-align: center; font-size: 0.8em;">SUSPECTED HAZARD (see Special Instructions)</td> </tr> </table>		Analysis Request												Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below												Q 74326												SAMPLES ON HOLD												SUSPECTED HAZARD (see Special Instructions)											
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Project Information		Oil and Gas Required Fields (client use)																																																															
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PO / AFE: _____		Requisitioner: _____																																																															
LSD: _____		Location: _____																																																															
ALS Lab Work Order # (lab use only): _____		ALS Contact: <u>A. Springer</u> Sampler: <u>R. Qin</u>																																																															
ALS Sample # (lab use only)		Sample Identification and/or Coordinates (This description will appear on the report)		Date (dd-mmm-yy)																																																													
				Time (hh:mm)																																																													
				Sample Type																																																													
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		<u>JM11</u>		<u>09:55</u>																																																													
		<u>JM6</u>		<u>11:00</u>																																																													
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		<u>JM4</u>		<u>11:08</u>																																																													
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		<u>JM1</u>		<u>14:28</u>																																																													
				<u>15:20</u>																																																													
<b>Drinking Water (DW) Samples<sup>1</sup> (client use)</b>		Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)		<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>																																																													
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO				Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>																																																													
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO				Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>																																																													
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REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.



ERM Consultants Canada Ltd.  
ATTN: Wade Brunham  
1500-1111 West Hastings Street  
Vancouver BC V6E 2J3

Date Received: 25-AUG-19  
Report Date: 03-OCT-19 11:37 (MT)  
Version: FINAL REV. 3

Client Phone: 604-689-9460

## Certificate of Analysis

Lab Work Order #: L2335590  
Project P.O. #: NOT SUBMITTED  
Job Reference: 492759-0005  
C of C Numbers:  
Legal Site Desc:

Comments:

16-SEP-2019 TIC data has been added.  
3-OCT-2019 Free Cyanide data has been added.

---

Amber Springer, B.Sc  
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 8081 Lougheed Hwy, Suite 100, Burnaby, BC V5A 1W9 Canada | Phone: +1 604 253 4188 | Fax: +1 604 253 6700  
ALS CANADA LTD Part of the ALS Group An ALS Limited Company

# ALS ENVIRONMENTAL ANALYTICAL REPORT

	<b>Sample ID</b> <b>Description</b> <b>Sampled Date</b> <b>Sampled Time</b> <b>Client ID</b>	L2335590-1			
		WATER	23-AUG-19	16:00	JM10-2018
Grouping	Analyte				
<b>WATER</b>					
<b>Physical Tests</b>	Conductivity (uS/cm)	104			
	Hardness (as CaCO3) (mg/L)	14.4 <sup>HTC</sup>			
	pH (pH)	7.80			
	Total Dissolved Solids (mg/L)	76			
	Turbidity (NTU)	10.7			
<b>Anions and Nutrients</b>	Acidity-Hot Peroxide Treated (as CaCO3) (mg/L)	<25			
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	34.3			
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0			
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0			
	Alkalinity, Total (as CaCO3) (mg/L)	34.3			
	Ammonia, Total (as N) (mg/L)	0.0057			
	Bromide (Br) (mg/L)	<0.050			
	Chloride (Cl) (mg/L)	<0.50			
	Fluoride (F) (mg/L)	0.021			
	Nitrate (as N) (mg/L)	<0.0050			
	Nitrite (as N) (mg/L)	<0.0010			
	Sulfate (SO4) (mg/L)	15.9			
	<b>Cyanides</b>	Cyanide, Weak Acid Diss (mg/L)	<0.0050		
Cyanide, Total (mg/L)		<0.0050			
Cyanate (mg/L)		<0.20			
Thiocyanate (SCN) (mg/L)		0.69			
Cyanide, Free (mg/L)		<0.0050			
<b>Organic / Inorganic Carbon</b>	Total Inorganic Carbon (mg/L)	8.23			
	Total Organic Carbon (mg/L)	1.42			
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	0.631			
	Antimony (Sb)-Total (mg/L)	0.00010			
	Arsenic (As)-Total (mg/L)	0.00161			
	Barium (Ba)-Total (mg/L)	0.0113			
	Beryllium (Be)-Total (mg/L)	<0.00010			
	Bismuth (Bi)-Total (mg/L)	<0.000050			
	Boron (B)-Total (mg/L)	<0.010			
	Cadmium (Cd)-Total (mg/L)	0.0000682			
	Calcium (Ca)-Total (mg/L)	4.72			
	Chromium (Cr)-Total (mg/L)	0.00092			
	Cobalt (Co)-Total (mg/L)	0.00042			
	Copper (Cu)-Total (mg/L)	0.00271			

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.



# ALS ENVIRONMENTAL ANALYTICAL REPORT

	<b>Sample ID</b> <b>Description</b> <b>Sampled Date</b> <b>Sampled Time</b> <b>Client ID</b>	L2335590-1 WATER 23-AUG-19 16:00 JM10-2018			
Grouping	Analyte				
<b>WATER</b>					
<b>Total Metals</b>	Iron (Fe)-Total (mg/L)	1.01			
	Lead (Pb)-Total (mg/L)	0.00137			
	Lithium (Li)-Total (mg/L)	<0.0010			
	Magnesium (Mg)-Total (mg/L)	0.630			
	Manganese (Mn)-Total (mg/L)	0.0458			
	Mercury (Hg)-Total (mg/L)	<0.0000050			
	Molybdenum (Mo)-Total (mg/L)	0.000126			
	Nickel (Ni)-Total (mg/L)	0.00125			
	Phosphorus (P)-Total (mg/L)	<0.30			
	Potassium (K)-Total (mg/L)	0.564			
	Selenium (Se)-Total (mg/L)	0.000054			
	Silicon (Si)-Total (mg/L)	2.09			
	Silver (Ag)-Total (mg/L)	0.000032			
	Sodium (Na)-Total (mg/L)	<2.0			
	Strontium (Sr)-Total (mg/L)	0.0229			
	Sulfur (S)-Total (mg/L)	0.82			
	Thallium (Tl)-Total (mg/L)	0.000011			
	Tin (Sn)-Total (mg/L)	<0.00010			
	Titanium (Ti)-Total (mg/L)	0.025			
	Uranium (U)-Total (mg/L)	0.000013			
	Vanadium (V)-Total (mg/L)	0.00157			
	Zinc (Zn)-Total (mg/L)	0.0119			
<b>Aggregate Organics</b>	COD (mg/L)	<20			
<b>Volatile Organic Compounds</b>	Benzene (mg/L)	<0.00050			
	Bromodichloromethane (mg/L)	<0.0010			
	Bromoform (mg/L)	<0.0010			
	Carbon Tetrachloride (mg/L)	<0.00050			
	Chlorobenzene (mg/L)	<0.0010			
	Dibromochloromethane (mg/L)	<0.0010			
	Chloroethane (mg/L)	<0.0010			
	Chloroform (mg/L)	<0.0010			
	Chloromethane (mg/L)	<0.0050			
	1,2-Dichlorobenzene (mg/L)	<0.00050			
	1,3-Dichlorobenzene (mg/L)	<0.0010			
	1,4-Dichlorobenzene (mg/L)	<0.0010			
	1,1-Dichloroethane (mg/L)	<0.0010			

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

# ALS ENVIRONMENTAL ANALYTICAL REPORT

	<b>Sample ID</b> <b>Description</b> <b>Sampled Date</b> <b>Sampled Time</b> <b>Client ID</b>	L2335590-1	WATER	23-AUG-19	16:00	JM10-2018
Grouping	Analyte					
<b>WATER</b>						
<b>Volatile Organic Compounds</b>	1,2-Dichloroethane (mg/L)	<0.0010				
	1,1-Dichloroethylene (mg/L)	<0.0010				
	cis-1,2-Dichloroethylene (mg/L)	<0.0010				
	trans-1,2-Dichloroethylene (mg/L)	<0.0010				
	Dichloromethane (mg/L)	<0.0050				
	1,2-Dichloropropane (mg/L)	<0.0010				
	cis-1,3-Dichloropropylene (mg/L)	<0.00050				
	trans-1,3-Dichloropropylene (mg/L)	<0.00050				
	1,3-Dichloropropene (cis & trans) (mg/L)	<0.0010				
	Ethy benzene (mg/L)	<0.00050				
	Methyl t-butyl ether (MTBE) (mg/L)	<0.00050				
	Styrene (mg/L)	<0.00050				
	1,1,1,2-Tetrachloroethane (mg/L)	<0.0010				
	1,1,2,2-Tetrachloroethane (mg/L)	<0.00020				
	Tetrachloroethylene (mg/L)	<0.0010				
	Toluene (mg/L)	<0.00045				
	1,1,1-Trichloroethane (mg/L)	<0.0010				
	1,1,2-Trichloroethane (mg/L)	<0.00050				
	Trichloroethylene (mg/L)	<0.0010				
	Trichlorofluoromethane (mg/L)	<0.0010				
	Vinyl Chloride (mg/L)	<0.00040				
	ortho-Xylene (mg/L)	<0.00050				
	meta- & para-Xylene (mg/L)	<0.00050				
Xylenes (mg/L)	<0.00075					
F1 (C6-C10) (mg/L)	<0.10					
Surrogate: 4-Bromofluorobenzene (SS) (%)	78.2					
Surrogate: 1,4-Difluorobenzene (SS) (%)	104.4					
<b>Hydrocarbons</b>	EPH10-19 (mg/L)	<0.25				
	EPH19-32 (mg/L)	<0.25				
	LEPH (mg/L)	<0.25				
	HEPH (mg/L)	<0.25				
	F1-BTEX (mg/L)	<0.10				
	F2 (C10-C16) (mg/L)	<0.30				
	F3 (C16-C34) (mg/L)	<0.30				
	F4 (C34-C50) (mg/L)	<0.30				
	Volatile Hydrocarbons (VH6-10) (mg/L)	<0.10				
	VPH (C6-C10) (mg/L)	<0.10				

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

# ALS ENVIRONMENTAL ANALYTICAL REPORT

	<b>Sample ID</b> <b>Description</b> <b>Sampled Date</b> <b>Sampled Time</b> <b>Client ID</b>	L2335590-1	WATER	23-AUG-19	16:00	JM10-2018
Grouping	Analyte					
<b>WATER</b>						
<b>Hydrocarbons</b>	Surrogate: 2-Bromobenzotrifluoride (%)	86.9				
	Surrogate: 2-Bromobenzotrifluoride, F2-F4 (%)	84.8				
	Surrogate: 3,4-Dichlorotoluene (SS) (%)	110.1				
<b>Polycyclic Aromatic Hydrocarbons</b>	Acenaphthene (mg/L)	<0.000010				
	Acenaphthylene (mg/L)	<0.000010				
	Acridine (mg/L)	<0.000010				
	Anthracene (mg/L)	<0.000010				
	Benz(a)anthracene (mg/L)	<0.000010				
	Benzo(a)pyrene (mg/L)	<0.0000050				
	Benzo(b&j)fluoranthene (mg/L)	<0.000010				
	Benzo(b+j+k)fluoranthene (mg/L)	<0.000015				
	Benzo(g,h,i)perylene (mg/L)	<0.000010				
	Benzo(k)fluoranthene (mg/L)	<0.000010				
	Chrysene (mg/L)	<0.000010				
	Dibenz(a,h)anthracene (mg/L)	<0.0000050				
	Fluoranthene (mg/L)	<0.000010				
	Fluorene (mg/L)	<0.000010				
	Indeno(1,2,3-c,d)pyrene (mg/L)	<0.000010				
	1-Methylnaphthalene (mg/L)	<0.000050				
	2-Methylnaphthalene (mg/L)	<0.000050				
	Naphthalene (mg/L)	<0.000050				
	Phenanthrene (mg/L)	<0.000020				
	Pyrene (mg/L)	<0.000010				
	Quinoline (mg/L)	<0.000050				
	Surrogate: Acridine d9 (%)	108.4				
	Surrogate: Chrysene d12 (%)	105.5				
Surrogate: Naphthalene d8 (%)	86.4					
Surrogate: Phenanthrene d10 (%)	98.3					

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## Reference Information

### QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Laboratory Control Sample	Benz(a)anthracene	LCS-ND	L2335590-1
Matrix Spike	Total Inorganic Carbon	MS-B	L2335590-1
Matrix Spike	Barium (Ba)-Total	MS-B	L2335590-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L2335590-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2335590-1
Matrix Spike	Manganese (Mn)-Total	MS-B	L2335590-1
Matrix Spike	Sodium (Na)-Total	MS-B	L2335590-1
Matrix Spike	Strontium (Sr)-Total	MS-B	L2335590-1

### Qualifiers for Individual Parameters Listed:

Qualifier	Description
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
LCS-ND	Lab Control Sample recovery was slightly outside ALS DQO. Reported non-detect results for associated samples were unaffected.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

### Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
<b>ACY-H2O2-MAN-VA</b>	Water	Acidity by Hot Peroxide Titration	APHA - ACIDITY (2310)
This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". The procedure involves preliminary sample treatment by the hot peroxide procedure, and Acidity is subsequently determined by potentiometric titration to a specified endpoint (i.e. pH = 8.3).			
<b>ALK-TITR-VA</b>	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity
This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.			
<b>BR-L-IC-N-VA</b>	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
<b>CARBONS-TIC-VA</b>	Water	Total inorganic carbon by CO2 purge	APHA 5310B TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
<b>CARBONS-TOC-VA</b>	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
<b>CL-IC-N-VA</b>	Water	Chloride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
<b>CN-CNO-WT</b>	Water	Cyanate	APHA 4500-CN-L
This analysis is carried out using procedures adapted from APHA method 4500-CN "Cyanide". Cyanate is determined by the Cyanate hydrolysis method using an ammonia selective electrode			
<b>CN-FREE-CFA-VA</b>	Water	Free Cyanide in water by CFA	ASTM 7237
This analysis is carried out using procedures adapted from ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.			
<b>CN-SCN-VA</b>	Water	Thiocyanate by Colour	APHA 4500-CN CYANIDE
This analysis is carried out using procedures adapted from APHA Method 4500-CN- M "Thiocyanate" Thiocyanate is determined by the ferric nitrate colourimetric method. Water samples containing high levels of hexavalent chromium, cyanide (together with sulfide), reducing agents, or hydrocarbons may cause negative or positive interferences with this method. Contact ALS for additional information if required.			
<b>CN-T-CFA-VA</b>	Water	Total Cyanide in water by CFA	ISO 14403:2002
This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.			
<b>CN-WAD-CFA-VA</b>	Water	Weak Acid Diss. Cyanide in water by CFA	APHA 4500-CN CYANIDE
This analysis is carried out using procedures adapted from APHA Method 4500-CN I. "Weak Acid Dissociable Cyanide". Weak Acid Dissociable (WAD) cyanide is determined by in-line sample distillation with final determination by colourimetric analysis.			
<b>COD-COL-VA</b>	Water	Chemical Oxygen Demand by Colorimetric	APHA 5220 D. CHEMICAL OXYGEN DEMAND

## Reference Information

This analysis is carried out using procedures adapted from APHA Method 5220 "Chemical Oxygen Demand (COD)". Chemical oxygen demand is determined using the closed reflux colourimetric method.

**EC-PCT-VA** Water Conductivity (Automated) APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

**EC-SCREEN-VA** Water Conductivity Screen (Internal Use Only) APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

**EPH-ME-FID-VA** Water EPH in Water BC Lab Manual

EPH is extracted from water using a hexane micro-extraction technique, with analysis by GC-FID, as per the BC Lab Manual. EPH results include PAHs and are therefore not equivalent to LEPH or HEPH.

**F-IC-N-VA** Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**F1-BTX-CALC-VA** Water F1-Total BTX CCME CWS PHC TIER 1 (2001)

This analysis is based on the "Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1 Method, Canadian Council of Ministers of the Environment, December 2000." For F1 (C6-C10), the sample undergoes a purge and trap extraction prior to analysis by GC/FID. The F1-BTEX result is calculated as follows:

F1-BTEX: F1 (C6-C10) minus benzene, toluene, ethyl benzene and xylenes (BTEX).

**F1-HSFID-VA** Water CCME F1 By Headspace with GCFID EPA 5021A/CCME CWS PHC (Pub# 1310)

This analysis is based on the "Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1 Method, Canadian Council of Ministers of the Environment, December 2000." For F1 (C6-C10), the sample undergoes a headspace purge prior to analysis by GC/FID.

F1 (C6-C10): Sum of all hydrocarbons that elute between nC6 and nC10.

**F2-F4-ME-FID-VA** Water CCME F2-F4 Hydrocarbons in Water CCME CWS-PHC, Pub #1310, Dec 2001

F2-F4 is extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Tier 1 Method, CCME, Dec 2001.

**HARDNESS-CALC-VA** Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO<sub>3</sub> equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

**HG-T-CVAA-VA** Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

**LEPH/HEPH-CALC-VA** Water LEPHs and HEPHs BC MOE LEPH/HEPH

LEPHw and HEPHw are measures of Light and Heavy Extractable Petroleum Hydrocarbons in water. Results are calculated by subtraction of applicable PAH concentrations from EPH10-19 and EPH19-32, as per the BC Lab Manual LEPH/HEPH calculation procedure.

LEPHw = EPH10-19 minus Acenaphthene, Acridine, Anthracene, Fluorene, Naphthalene and Phenanthrene.

HEPHw = EPH19-32 minus Benz(a)anthracene, Benzo(a)pyrene, Fluoranthene, and Pyrene.

**MET-T-CCMS-VA** Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

**NH3-F-VA** Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

**NO2-L-IC-N-VA** Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**NO3-L-IC-N-VA** Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**PAH-ME-MS-VA** Water PAHs in Water EPA 3511/8270D (mod)

PAHs are extracted from water using a hexane micro-extraction technique, with analysis by GC/MS. Because the two isomers cannot be readily separated chromatographically, benzo(j)fluoranthene is reported as part of the benzo(b)fluoranthene parameter.

## Reference Information

<b>PH-PCT-VA</b>	Water	pH by Meter (Automated)	APHA 4500-H pH Value
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode			
It is recommended that this analysis be conducted in the field.			
<b>SO4-IC-N-VA</b>	Water	Sulfate in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
<b>TDS-VA</b>	Water	Total Dissolved Solids by Gravimetric	APHA 2540 C - GRAVIMETRIC
This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.			
<b>TURBIDITY-VA</b>	Water	Turbidity by Meter	APHA 2130 Turbidity
This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.			
<b>VH-HSFID-VA</b>	Water	VH in Water by Headspace GCFID	BC Env. Lab Manual (VH in Water)
The water sample, with added reagents, is heated in a sealed vial to equilibrium. The headspace from the vial is transferred into a gas chromatograph. Compounds eluting between n-hexane and n-decane are measured and summed together using flame-ionization detection.			
<b>VH-SURR-FID-VA</b>	Water	VH Surrogates for Waters	BC Env. Lab Manual (VH in Solids)
<b>VOC-HSMS-VA</b>	Water	VOCs in water by Headspace GCMS	EPA 5021A/8260C
The water sample, with added reagents, is heated in a sealed vial to equilibrium. The headspace from the vial is transferred into a gas chromatograph. Target compound concentrations are measured using mass spectrometry detection.			
<b>VOC7-HSMS-VA</b>	Water	BTEX/MTBE/Styrene by Headspace GCMS	EPA 5021A/8260C
The water sample, with added reagents, is heated in a sealed vial to equilibrium. The headspace from the vial is transferred into a gas chromatograph. Target compound concentrations are measured using mass spectrometry detection.			
<b>VOC7/VOC-SURR-MS-VA</b>	Water	VOC7 and/or VOC Surrogates for Waters	EPA 5035A/5021A/8260C
<b>VPH-CALC-VA</b>	Water	VPH is VH minus select aromatics	BC MOE VPH
VPHw measures Volatile Petroleum Hydrocarbons in water. Results are calculated by subtraction of specific Monocyclic Aromatic Hydrocarbons from VH6-10, as per the BC Lab Manual VPH calculation procedure. VPHw = VH6-10 minus Benzene, Toluene, Ethylbenzene, Xylenes, and Styrene			
<b>XYLENES-CALC-VA</b>	Water	Sum of Xylene Isomer Concentrations	CALCULATION
Calculation of Total Xylenes			
Total Xylenes is the sum of the concentrations of the ortho, meta, and para Xylene isomers. Results below detection limit (DL) are treated as zero. The DL for Total Xylenes is set to a value no less than the square root of the sum of the squares of the DLs of the individual Xylenes.			

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

*The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:*

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

### Chain of Custody Numbers:

#### GLOSSARY OF REPORT TERMS

*Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.*

*mg/kg - milligrams per kilogram based on dry weight of sample.*

*mg/kg wwt - milligrams per kilogram based on wet weight of sample.*

*mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.*

*mg/L - milligrams per litre.*

*< - Less than.*

*D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).*

*N/A - Result not available. Refer to qualifier code and definition for explanation.*

*Test results reported relate only to the samples as received by the laboratory.*

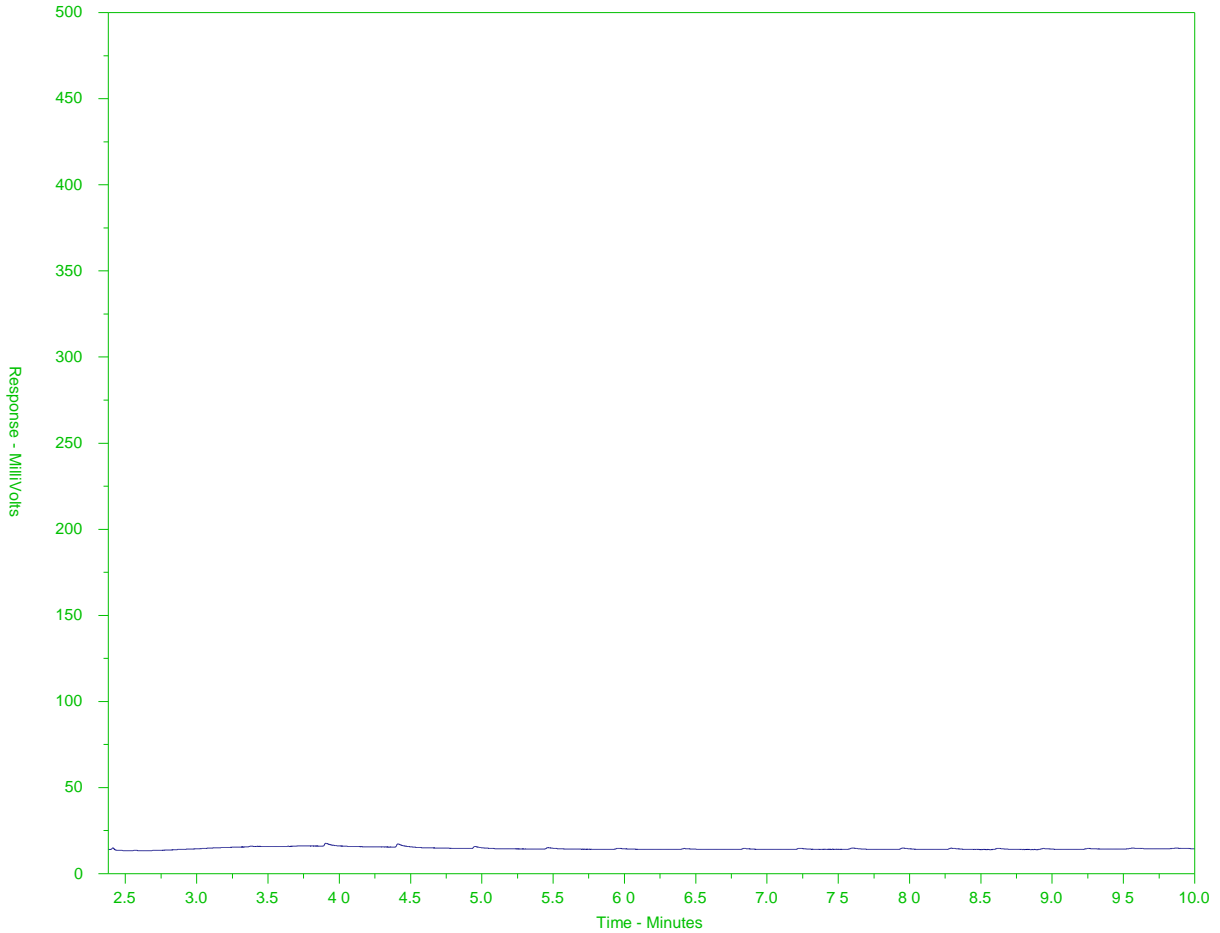
**UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.**

*Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.*

# BC EPH HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2335590-1  
 Client Sample ID: JM10-2018



← EPH10-19 →		← EPH19-32 →	
nC10	nC19	nC29	nC32
174°C	330°C	467°C	467°C
346°F	626°F	873°F	873°F
← Gasoline →		← Diesel/ Jet Fuels →	
		← Motor Oils/ Lube Oils/ Grease →	

The BC EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

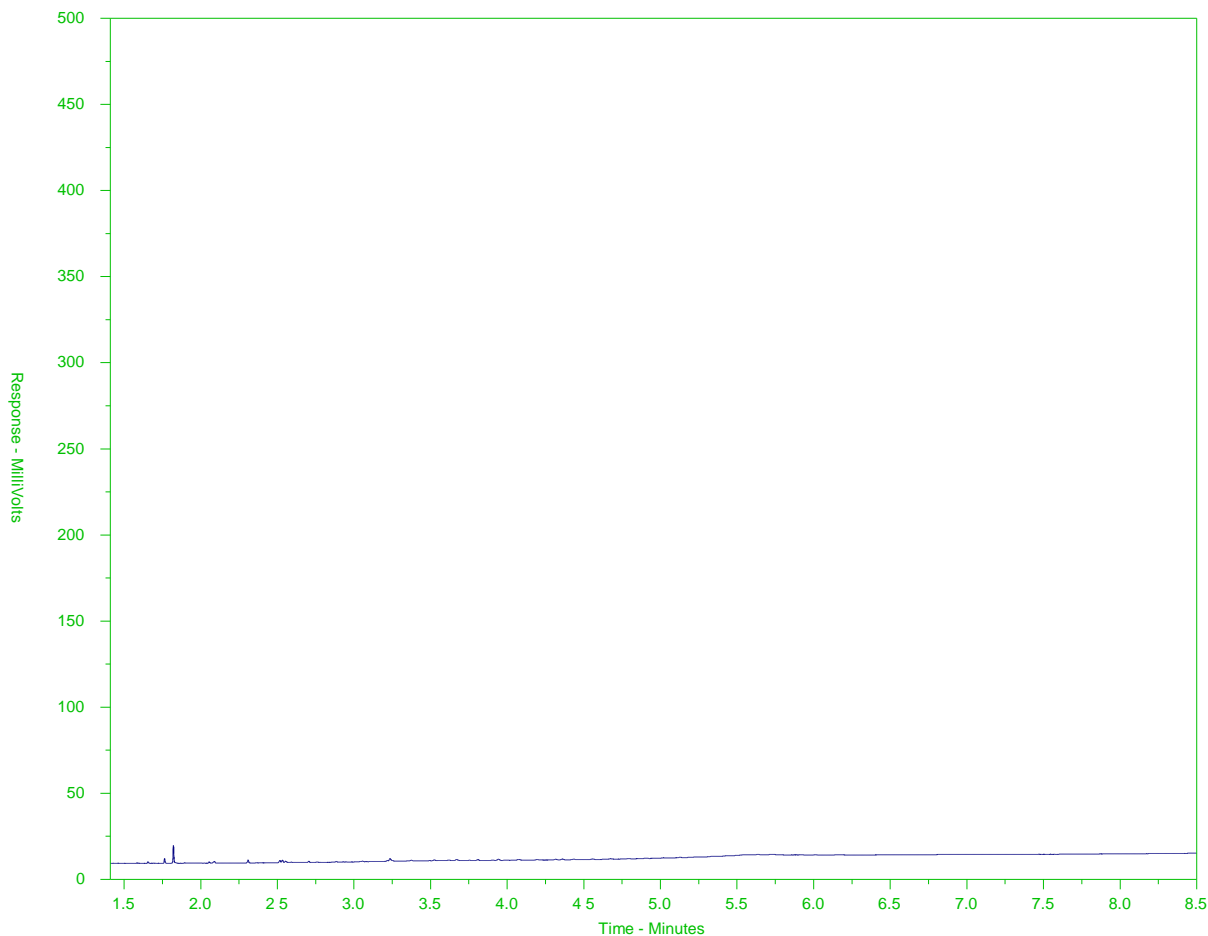
A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Note: This chromatogram was produced using GC conditions that are specific to the ALS Canada EPH method. Refer to the ALS Canada EPH Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at [www.alsglobal.com](http://www.alsglobal.com).

# CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2335590-C-1  
 Client Sample ID: JM10-2018



← F2 →		← F3 →		← F4 →	
nC10	nC16			nC34	nC50
174°C	287°C			481°C	575°C
346°F	549°F			898°F	1067°F
← Gasoline →		← Motor Oils/ Lube Oils/ Grease →			
← Diesel/ Jet Fuels →					

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at [www.alsglobal.com](http://www.alsglobal.com).





Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com



L2335590-COFC

COC Number: 15 -

Page 1 of 1

<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>				<b>Select Service Level Below - Please confirm all E&amp;P TATs with your AM - surcharges will apply</b>											
Company:	ERM CONSULTANTS CANADA	Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input checked="" type="checkbox"/> EDD (DIGITAL)				<b>Regular [R]</b> <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply											
Contact:	WADE BRUNHAM	Quality Control (QC) Report with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO				<b>PRIORITY</b> (Business days)	4 day [P4] <input type="checkbox"/>				<b>EMERGENCY</b>	1 Business day [E1] <input type="checkbox"/>					
Phone:	250-877-7838	<input checked="" type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked					3 day [P3] <input type="checkbox"/>					Same Day, Weekend or Statutory holiday [E0] <input type="checkbox"/>					
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX					2 day [P2] <input type="checkbox"/>										
Street:	3790 ALFRED AVENUE	Email 1 or Fax WADE.BRUNHAM@ERM.COM				Date and Time Required for all E&P TATs:						dd-mmm-yy hh:mm					
City/Province:	SMITHERS, BC	Email 2 Elizabeth.Boyle@erm.com				For tests that can not be performed according to the service level selected, you will be contacted.											
Postal Code:	V0J2N0	Email 3 jill.zyla@erm.com				<b>Analysis Request</b>											
<b>Invoice To</b>		<b>Invoice Distribution</b>				Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below											
Same as Report To <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX															
Copy of Invoice with Report <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		Email 1 or Fax ELIZABETH@SEABRIDGEGOLD.NET															
Company:	SEABRIDGE GOLD	Email 2 KSMADMIN@SEABRIDGEGOLD.NET															
Contact:	ELIZABETH MILLER	<b>Oil and Gas Required Fields (client use)</b>															
<b>Project Information</b>		AFE/Cost Center:				PO#											
ALS Account # / Quote #: (Q75476)		Major/Minor Code:				Routing Code:											
Job #:	492759-0005	Requisitioner:															
PO / AFE:		Location:															
LSD:																	
<b>ALS Lab Work Order # (lab use only)</b>		<b>ALS Contact:</b> Amber Springer		<b>Sampler:</b> Tyler Gale, Liam Clerke													
<b>ALS Sample # (lab use only)</b>	<b>Sample Identification and/or Coordinates (This description will appear on the report)</b>	<b>Field Site ID</b>	<b>Date (dd-mmm-yy)</b>	<b>Time (hh:mm)</b>	<b>Sample Type</b>	<b>GENERAL PARAMETERS / ANIONS</b>	<b>TOTAL METALS</b>	<b>TOTAL MERCURY</b>	<b>NUTRIENTS (TOC)</b>	<b>TOTAL AND WAD CYANIDE</b>	<b>BTEX, VOC, F1, VPH</b>	<b>SCN</b>	<b>PAH/EPH/F2-F4</b>	<b>Cyanate</b>	<b>Number of Containers</b>		
	JM10-2018		23-Aug-19	16:00	WATER	R	R	R	R	R	R	R	R	R	12		
<b>Drinking Water (DW) Samples<sup>1</sup> (client use)</b>		<b>Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)</b>				<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>											
Are samples taken from a Regulated DW System? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Please send the EDD to jill.zyla@erm.com				Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>											
Are samples for human drinking water use? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO						Ice Packs <input type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>											
						Cooling Initiated <input type="checkbox"/>											
						INITIAL COOLER TEMPERATURES °C					FINAL COOLER TEMPERATURES °C						
											19.6°C						
<b>SHIPMENT RELEASE (client use)</b>				<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>				<b>FINAL SHIPMENT RECEPTION (lab use only)</b>									
Released by: Tyler Gale	Date: 25-Aug-2019	Time: AM	Received by:	Date:	Time:	Received by: RT	Date: 25/08/19	Time: 3:30									

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FORM

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.



ERM Consultants Canada Ltd.  
ATTN: Wade Brunham  
1500-1111 West Hastings Street  
Vancouver BC V6E 2J3

Date Received: 25-AUG-19  
Report Date: 09-SEP-19 16:33 (MT)  
Version: FINAL

Client Phone: 604-689-9460

## Certificate of Analysis

**Lab Work Order #:** L2335592  
Project P.O. #: NOT SUBMITTED  
Job Reference: 492759-0004  
C of C Numbers:  
Legal Site Desc:

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Amber Springer, B.Sc  
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 8081 Lougheed Hwy, Suite 100, Burnaby, BC V5A 1W9 Canada | Phone: +1 604 253 4188 | Fax: +1 604 253 6700  
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## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L2335592-1 WATER 23-AUG-19 10:15 JM1	L2335592-2 WATER 24-AUG-19 10:45 JM1-ALT	L2335592-3 WATER 23-AUG-19 11:45 JM2	L2335592-4 WATER 23-AUG-19 13:00 JM3	L2335592-5 WATER 23-AUG-19 12:25 JM4
Grouping	Analyte					
<b>WATER</b>						
<b>Physical Tests</b>	Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	<5.0
	Conductivity (uS/cm)	97.5	308	805	181	412
	Hardness (as CaCO3) (mg/L)	40.2	136	409	80.9	173
	pH (pH)	7.88	7.17	4.84	7.95	4.38
	Total Suspended Solids (mg/L)	<3.0	31.0	26.2	21.8	198
	Total Dissolved Solids (mg/L)	52	203	705	111	319
	Turbidity (NTU)	0.28	33.4	23.0	10.6	196
<b>Anions and Nutrients</b>	Acidity (as CaCO3) (mg/L)	1.7	2.7 <sup>RRR</sup>	26.6	1.5	26.5
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	38.2	18.5	<1.0	48.9	<1.0
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	38.2	18.5	<1.0	48.9	<1.0
	Ammonia, Total (as N) (mg/L)	0.0135	<0.0050	0.0245	0.0607	0.0323
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.25 <sup>DLDS</sup>	<0.050	<0.050
	Chloride (Cl) (mg/L)	<0.50	<0.50	<2.5 <sup>DLDS</sup>	<0.50	0.62
	Fluoride (F) (mg/L)	<0.020	0.055	0.13	0.024	0.066
	Nitrate (as N) (mg/L)	<0.0050	<0.0050	0.134	0.0062	0.370
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0050 <sup>DLDS</sup>	0.0012	0.0022
	Total Kjeldahl Nitrogen (mg/L)	<0.050	<0.050	0.057	0.560	0.287
	Total Nitrogen (mg/L)	0.059	<0.030	0.118	0.584	0.575
	Orthophosphate-Dissolved (as P) (mg/L)	0.0014	<0.0010	<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total (mg/L)	0.010	0.0620	0.0022	0.0165	0.223
Sulfate (SO4) (mg/L)	10.4	126	407	38.3	181	
<b>Cyanides</b>	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Cyanide, Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
<b>Organic / Inorganic Carbon</b>	Dissolved Organic Carbon (mg/L)	<0.50	1.46	1.32	0.54	0.66
	Total Organic Carbon (mg/L)	<0.50	2.40	1.33	<0.50	3.85
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	0.0329	1.17	6.65	0.563	7.40
	Antimony (Sb)-Total (mg/L)	<0.00010	0.00014	<0.00010	0.00013	0.00147
	Arsenic (As)-Total (mg/L)	0.00014	0.00549	0.00042	0.00038	0.00593
	Barium (Ba)-Total (mg/L)	0.0231	0.0265	0.0313	0.0384	0.134
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	0.00057	<0.00010	0.00032
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	0.00195
	Boron (B)-Total (mg/L)	<0.010	<0.010	0.013	<0.010	0.013
	Cadmium (Cd)-Total (mg/L)	0.0000634	0.00855	0.00943	0.000620	0.00618
	Calcium (Ca)-Total (mg/L)	16.0	44.3	110	26.6	50.2

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L2335592-6 WATER 23-AUG-19 09:05 JM5	L2335592-7 WATER 23-AUG-19 08:20 JM6	L2335592-8 WATER 23-AUG-19 14:20 JM7	L2335592-9 WATER 23-AUG-19 11:10 JM10	L2335592-10 WATER 23-AUG-19 08:45 JM11
Grouping	Analyte					
<b>WATER</b>						
<b>Physical Tests</b>	Colour, True (CU)	<5.0	5.8	<5.0	<5.0	<5.0
	Conductivity (uS/cm)	58.3	73.3	112	102	79.7
	Hardness (as CaCO3) (mg/L)	24.3	32.8	52.0	42.2	33.5
	pH (pH)	7.29	7.79	7.79	7.86	7.81
	Total Suspended Solids (mg/L)	4.6	17.8	216	103	27.8
	Total Dissolved Solids (mg/L)	38	52	89	80	56
	Turbidity (NTU)	2.99	6.52	128	75.9	13.1
<b>Anions and Nutrients</b>	Acidity (as CaCO3) (mg/L)	1.6	1.6	1.7	1.5	1.4
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	9.7	31.7	35.8	40.0	34.5
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	9.7	31.7	35.8	40.0	34.5
	Ammonia, Total (as N) (mg/L)	<0.0050	0.0122	0.0246	0.0060	<0.0050
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Nitrate (as N) (mg/L)	<0.0050	0.0201	0.0132	0.0290	0.0219
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	0.095	<0.050	0.135	<0.050	<0.050
	Total Nitrogen (mg/L)	0.091	0.069	0.168	0.057	0.047
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	<0.0010	0.0018	0.0011
	Phosphorus (P)-Total (mg/L)	0.0090	0.0247	0.111	0.096	0.0305
Sulfate (SO4) (mg/L)	16.2	6.23	20.3	11.7	6.42	
<b>Cyanides</b>	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Cyanide, Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
<b>Organic / Inorganic Carbon</b>	Dissolved Organic Carbon (mg/L)	1.16	<0.50	<0.50	<0.50	<0.50
	Total Organic Carbon (mg/L)	1.28	0.57	1.05	<0.50	<0.50
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	0.140	0.389	2.21	2.58	0.570
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	0.00020	0.00022	<0.00010
	Arsenic (As)-Total (mg/L)	0.00031	0.00022	0.00120	0.00111	0.00029
	Barium (Ba)-Total (mg/L)	0.0130	0.0442	0.0884	0.117	0.0534
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	0.000053	<0.000050	<0.000050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	0.0000825	0.000247	0.000574	0.000298	0.000329
	Calcium (Ca)-Total (mg/L)	7.64	11.3	17.7	16.6	13.3

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2335592-11	L2335592-12	L2335592-13	L2335592-14	L2335592-15
		Description	WATER	WATER	WATER	WATER	WATER
		Sampled Date	23-AUG-19	23-AUG-19	23-AUG-19	23-AUG-19	23-AUG-19
		Sampled Time	13:45	14:10	08:00	09:20	17:40
		Client ID	JM12	JM13	JM14	TMF1	JM26
Grouping	Analyte						
<b>WATER</b>							
<b>Physical Tests</b>	Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	<5.0	
	Conductivity (uS/cm)	345	152	72.7	57.2	83.2	
	Hardness (as CaCO3) (mg/L)	152	63.3	29.6	22.4	34.0	
	pH (pH)	5.47	7.82	7.78	7.31	7.84	
	Total Suspended Solids (mg/L)	73.4	113	21.6	6.6	26.6	
	Total Dissolved Solids (mg/L)	273	104	48	38	58	
	Turbidity (NTU)	79.5	61.4	11.2	3.65	22.8	
<b>Anions and Nutrients</b>	Acidity (as CaCO3) (mg/L)	9.2	1.9	1.8	1.8	1.7	
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	<1.0	39.5	29.6	10.4	32.0	
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Total (as CaCO3) (mg/L)	<1.0	39.5	29.6	10.4	32.0	
	Ammonia, Total (as N) (mg/L)	0.0090	0.0423	0.0158	0.0316	<0.0050	
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050	
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50	
	Fluoride (F) (mg/L)	0.052	0.022	<0.020	<0.020	<0.020	
	Nitrate (as N) (mg/L)	0.153	0.0051	0.0173	<0.0050	0.0238	
	Nitrite (as N) (mg/L)	0.0012	<0.0010	<0.0010	<0.0010	<0.0010	
	Total Kjeldahl Nitrogen (mg/L)	0.130	0.339	<0.050	0.155	<0.050	
	Total Nitrogen (mg/L)	0.259	0.343	0.083	0.123	0.056	
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	
	Phosphorus (P)-Total (mg/L)	0.0669	<0.0020	0.0047	0.0093	0.0325	
Sulfate (SO4) (mg/L)	154	33.7	5.74	14.3	7.96		
<b>Cyanides</b>	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
	Cyanide, Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
<b>Organic / Inorganic Carbon</b>	Dissolved Organic Carbon (mg/L)	<0.50	0.67	<0.50	1.23	<0.50	
	Total Organic Carbon (mg/L)	1.27	0.69	<0.50	1.32	<0.50	
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	3.26	0.610	0.669	0.151	0.740	
	Antimony (Sb)-Total (mg/L)	0.00062	0.00013	<0.00010	<0.00010	0.00010	
	Arsenic (As)-Total (mg/L)	0.00224	0.00044	0.00029	0.00037	0.00032	
	Barium (Ba)-Total (mg/L)	0.0675	0.0331	0.0497	0.0129	0.0605	
	Beryllium (Be)-Total (mg/L)	0.00017	<0.00010	<0.00010	<0.00010	<0.00010	
	Bismuth (Bi)-Total (mg/L)	0.000798	<0.000050	<0.000050	<0.000050	<0.000050	
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010	
	Cadmium (Cd)-Total (mg/L)	0.00448	0.000600	0.000284	0.0000905	0.000406	
	Calcium (Ca)-Total (mg/L)	47.8	23.4	11.4	7.75	13.0	

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L2335592-16 WATER 23-AUG-19 09:45 SHC5	L2335592-17 WATER 23-AUG-19 13:20 SHC1	L2335592-18 WATER 22-AUG-19 17:15 SHCR3	L2335592-19 WATER 23-AUG-19 17:00 SHC3	L2335592-20 WATER 23-AUG-19 10:15 FIELD BLANK
Grouping	Analyte					
<b>WATER</b>						
<b>Physical Tests</b>	Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	<5.0
	Conductivity (uS/cm)	151	105	108	105	<2.0
	Hardness (as CaCO3) (mg/L)	67.9	52.0	43.0	43.8	<0.50
	pH (pH)	8.08	8.06	7.80	7.83	5.59
	Total Suspended Solids (mg/L)	4.0	273	55.5	23.8	<3.0
	Total Dissolved Solids (mg/L)	91	89	80	70	<10
	Turbidity (NTU)	0.96	166	70.1	6.52	<0.10
<b>Anions and Nutrients</b>	Acidity (as CaCO3) (mg/L)	1.5	1.6	1.6	1.4	1.4
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	58.3	38.3	36.4	35.4	<1.0
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	58.3	38.3	36.4	35.4	<1.0
	Ammonia, Total (as N) (mg/L)	<0.0050	<0.0050	0.0099	<0.0050	0.0170 <sup>RRV</sup>
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Nitrate (as N) (mg/L)	0.0191	0.0205	0.0430	0.0778	<0.0050
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	<0.050	<0.050	<0.050	0.095	<0.050
	Total Nitrogen (mg/L)	0.042	0.051	0.070	0.192	<0.030
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	0.0016	<0.0010	<0.0010
	Phosphorus (P)-Total (mg/L)	0.0063	0.220	0.0584	0.0244	<0.0020
Sulfate (SO4) (mg/L)	15.3	11.9	16.6	15.9	<0.30	
<b>Cyanides</b>	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Cyanide, Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
<b>Organic / Inorganic Carbon</b>	Dissolved Organic Carbon (mg/L)	<0.50	<0.50	<0.50	0.54	<0.50
	Total Organic Carbon (mg/L)	<0.50	<0.50	<0.50	0.66	<0.50
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	0.100	5.57	2.16	0.434	<0.0030
	Antimony (Sb)-Total (mg/L)	<0.00010	0.00043	0.00019	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00039	0.00264	0.00077	0.00044	<0.00010
	Barium (Ba)-Total (mg/L)	0.0443	0.199	0.101	0.0363	<0.00010
	Beryllium (Be)-Total (mg/L)	<0.00010	0.00019	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	0.0000303	0.000825	0.000247	0.000157	<0.0000050
	Calcium (Ca)-Total (mg/L)	24.8	21.0	17.3	16.8	<0.050

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2335592-21	L2335592-22	L2335592-23	L2335592-24	L2335592-25
		Description	WATER	WATER	WATER	WATER	WATER
		Sampled Date	23-AUG-19	23-AUG-19	23-AUG-19	24-AUG-19	23-AUG-19
		Sampled Time	10:15	12:25	10:45	10:00	10:15
		Client ID	DUP1	DUP2	JM1-SEEPAGE	JM2-SEEPAGE	TRAVEL BLANK
Grouping	Analyte						
<b>WATER</b>							
<b>Physical Tests</b>	Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
	Conductivity (uS/cm)	96.5	425	279	909	<2.0	<2.0
	Hardness (as CaCO3) (mg/L)	42.5	160	129	444	<0.50	<0.50
	pH (pH)	7.86	4.29	8.12	4.29	5.57	5.57
	Total Suspended Solids (mg/L)	<3.0	169	<3.0	17.0	<3.0	<3.0
	Total Dissolved Solids (mg/L)	49	336	179	870	<10	<10
	Turbidity (NTU)	0.26	186	<0.10	41.1	<0.10	<0.10
<b>Anions and Nutrients</b>	Acidity (as CaCO3) (mg/L)	1.7	28.6	1.2	58.6	1.7	1.7
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	38.6	<1.0	75.6	<1.0	<1.0	<1.0
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	38.6	<1.0	75.6	<1.0	<1.0	<1.0
	Ammonia, Total (as N) (mg/L)	0.0058	0.0396	0.0566	0.0114	<0.0050	<0.0050
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.25 <sup>DLDS</sup>	<0.050	<0.050
	Chloride (Cl) (mg/L)	<0.50	0.63	<0.50	<2.5 <sup>DLDS</sup>	<0.50	<0.50
	Fluoride (F) (mg/L)	<0.020	0.079	<0.020	0.16	<0.020	<0.020
	Nitrate (as N) (mg/L)	<0.0050	0.365	0.0248	0.125 <sup>DLDS</sup>	<0.0050	<0.0050
	Nitrite (as N) (mg/L)	<0.0010	0.0022	<0.0010	<0.0050	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	<0.050	0.271	<0.050	0.063	<0.050	<0.050
	Total Nitrogen (mg/L)	0.102	0.643	0.115	0.138	<0.030	<0.030
	Orthophosphate-Dissolved (as P) (mg/L)	0.0017	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total (mg/L)	0.0082	0.224	<0.0020	0.0133	<0.0020	<0.0020
Sulfate (SO4) (mg/L)	10.4	184	63.1	469	<0.30	<0.30	
<b>Cyanides</b>	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050 <sup>CNP</sup>	<0.0050	<0.0050
	Cyanide, Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050
<b>Organic / Inorganic Carbon</b>	Dissolved Organic Carbon (mg/L)	<0.50	0.73	0.59	1.32	<0.50	<0.50
	Total Organic Carbon (mg/L)	<0.50	3.50	<0.50	1.51 <sup>HTP</sup>	<0.50	<0.50
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	0.0291	8.05	<0.0030	6.95	<0.0030	<0.0030
	Antimony (Sb)-Total (mg/L)	<0.00010	0.00156	0.00015	0.00011	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00014	0.00664	<0.00010	0.00121	<0.00010	<0.00010
	Barium (Ba)-Total (mg/L)	0.0239	0.142	0.0542	0.0318	<0.00010	<0.00010
	Beryllium (Be)-Total (mg/L)	<0.00010	0.00034	<0.00010	0.00061	<0.00010	<0.00010
	Bismuth (Bi)-Total (mg/L)	<0.000050	0.00203	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Total (mg/L)	<0.010	0.012	<0.010	0.015	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	0.0000565	0.00653	0.0000320	0.0101	<0.000050	<0.000050
	Calcium (Ca)-Total (mg/L)	15.0	50.6	43.3	117	<0.050	<0.050

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	Description	Sampled Date	Sampled Time	Client ID	L2335592-1	L2335592-2	L2335592-3	L2335592-4	L2335592-5
					WATER	WATER	WATER	WATER	WATER
		23-AUG-19	10:15	JM1	23-AUG-19	24-AUG-19	23-AUG-19	23-AUG-19	23-AUG-19
					JM1	JM1-ALT	JM2	JM3	JM4
Grouping	Analyte								
<b>WATER</b>									
<b>Total Metals</b>	Chromium (Cr)-Total (mg/L)	<0.00010	0.00057	0.00017	0.00015	0.00356			
	Cobalt (Co)-Total (mg/L)	<0.00010	0.00928	0.0266	0.00197	0.0204			
	Copper (Cu)-Total (mg/L)	0.00265	0.926	2.29	0.213	2.08			
	Iron (Fe)-Total (mg/L)	0.038	13.7	1.51	1.51	20.3			
	Lead (Pb)-Total (mg/L)	0.000125	0.00511	0.00364	0.00191	0.0764			
	Lithium (Li)-Total (mg/L)	<0.0010	0.0024	0.0052	0.0012	0.0064			
	Magnesium (Mg)-Total (mg/L)	1.37	6.81	31.2	2.95	10.2			
	Manganese (Mn)-Total (mg/L)	0.00758	1.27	4.93	0.328	2.68			
	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000239			
	Molybdenum (Mo)-Total (mg/L)	0.000380	0.000218	0.000230	0.000345	0.000980			
	Nickel (Ni)-Total (mg/L)	<0.00050	0.00143	0.00889	<0.00050	0.00548			
	Phosphorus (P)-Total (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30			
	Potassium (K)-Total (mg/L)	1.09	1.57	4.07	1.76	4.70			
	Selenium (Se)-Total (mg/L)	0.000089	0.000457	0.000707	0.000156	0.00123			
	Silicon (Si)-Total (mg/L)	1.36	2.24	4.60	1.86	10.5			
	Silver (Ag)-Total (mg/L)	<0.000010	0.000061	0.000050	0.000024	0.00204			
	Sodium (Na)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0			
	Strontium (Sr)-Total (mg/L)	0.138	0.229	0.702	0.212	0.349			
	Sulfur (S)-Total (mg/L)	3.78	46.0	154	14.1	65.9			
	Thallium (Tl)-Total (mg/L)	0.000011	0.000015	0.000025	0.000013	0.000161			
	Tin (Sn)-Total (mg/L)	<0.00010	0.00066	<0.00010	<0.00010	0.00038			
	Titanium (Ti)-Total (mg/L)	<0.010	<0.010	<0.010	0.015	0.290			
	Uranium (U)-Total (mg/L)	0.000037	0.000563	0.000840	0.000273	0.00118			
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	<0.00050	0.00082	0.0123			
	Zinc (Zn)-Total (mg/L)	0.0039	1.44	1.23	0.0668	0.883			
<b>Dissolved Metals</b>	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD			
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD			
	Aluminum (Al)-Dissolved (mg/L)	0.0115	0.0178	3.52	0.0622	2.15			
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	0.00011	0.00011			
	Arsenic (As)-Dissolved (mg/L)	0.00017	<0.00010	0.00039	<0.00010	0.00021			
	Barium (Ba)-Dissolved (mg/L)	0.0215	0.0314	0.0327	0.0354	0.0462			
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	0.00045	<0.00010	0.00017			
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050			
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010	0.014	<0.010	0.010			
	Cadmium (Cd)-Dissolved (mg/L)	0.0000489	0.00808	0.00935	0.000527	0.00614			
	Calcium (Ca)-Dissolved (mg/L)	14.1	42.9	115	27.6	56.1			
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	0.00015	<0.00010	<0.00010	0.00016			

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.



## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID	L2335592-6 WATER 23-AUG-19 09:05 JM5	L2335592-7 WATER 23-AUG-19 08:20 JM6	L2335592-8 WATER 23-AUG-19 14:20 JM7	L2335592-9 WATER 23-AUG-19 11:10 JM10	L2335592-10 WATER 23-AUG-19 08:45 JM11	
Grouping	Analyte					
<b>WATER</b>						
<b>Total Metals</b>	Chromium (Cr)-Total (mg/L)	0.00015	<0.00010	0.00037	0.00029	<0.00010
	Cobalt (Co)-Total (mg/L)	0.00013	0.00028	0.00245	0.00171	0.00041
	Copper (Cu)-Total (mg/L)	0.00525	0.00349	0.133	0.00571	0.00440
	Iron (Fe)-Total (mg/L)	0.192	0.550	3.73	3.47	0.811
	Lead (Pb)-Total (mg/L)	0.000612	0.00303	0.0158	0.0175	0.00437
	Lithium (Li)-Total (mg/L)	<0.0010	<0.0010	0.0022	0.0025	<0.0010
	Magnesium (Mg)-Total (mg/L)	0.973	1.04	2.85	2.58	1.24
	Manganese (Mn)-Total (mg/L)	0.0337	0.0592	0.416	0.291	0.0847
	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)	0.000123	0.000166	0.000294	0.000459	0.000188
	Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050	0.00067	<0.00050	<0.00050
	Phosphorus (P)-Total (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Total (mg/L)	0.708	0.969	2.37	2.82	1.16
	Selenium (Se)-Total (mg/L)	0.000086	0.000067	0.000116	0.000108	0.000094
	Silicon (Si)-Total (mg/L)	0.36	1.52	4.64	5.45	1.73
	Silver (Ag)-Total (mg/L)	0.000014	0.000012	0.000091	0.000060	0.000016
	Sodium (Na)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Total (mg/L)	0.0393	0.0769	0.116	0.114	0.0870
	Sulfur (S)-Total (mg/L)	5.38	2.02	7.93	4.18	2.45
	Thallium (Tl)-Total (mg/L)	<0.000010	0.000015	0.000076	0.000095	0.000021
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)	<0.010	0.027	0.151	0.183	0.040
	Uranium (U)-Total (mg/L)	<0.000010	0.000107	0.000226	0.000234	0.000137
	Vanadium (V)-Total (mg/L)	<0.00050	0.00108	0.00611	0.00776	0.00152
	Zinc (Zn)-Total (mg/L)	0.0076	0.0361	0.0732	0.0417	0.0503
<b>Dissolved Metals</b>	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0131	0.0248	0.0678	0.0415	0.0264
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.00017	0.00012	0.00010	0.00023	0.00013
	Barium (Ba)-Dissolved (mg/L)	0.0107	0.0343	0.0335	0.0399	0.0365
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)	0.0000692	0.000145	0.000264	0.0000341	0.000161
	Calcium (Ca)-Dissolved (mg/L)	8.14	11.7	18.2	15.1	11.9
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2335592-11	L2335592-12	L2335592-13	L2335592-14	L2335592-15
		Description	WATER	WATER	WATER	WATER	WATER
		Sampled Date	23-AUG-19	23-AUG-19	23-AUG-19	23-AUG-19	23-AUG-19
		Sampled Time	13:45	14:10	08:00	09:20	17:40
		Client ID	JM12	JM13	JM14	TMF1	JM26
Grouping	Analyte						
<b>WATER</b>							
<b>Total Metals</b>	Chromium (Cr)-Total (mg/L)		0.00151	0.00017	0.00011	0.00015	<0.00010
	Cobalt (Co)-Total (mg/L)		0.0134	0.00214	0.00038	0.00017	0.00049
	Copper (Cu)-Total (mg/L)		1.49	0.228	0.00403	0.00366	0.00484
	Iron (Fe)-Total (mg/L)		9.51	1.63	0.820	0.219	0.985
	Lead (Pb)-Total (mg/L)		0.0319	0.00294	0.00346	0.000775	0.00526
	Lithium (Li)-Total (mg/L)		0.0039	0.0011	<0.0010	<0.0010	0.0010
	Magnesium (Mg)-Total (mg/L)		7.62	2.27	1.10	0.962	1.33
	Manganese (Mn)-Total (mg/L)		1.75	0.320	0.0704	0.0441	0.0934
	Mercury (Hg)-Total (mg/L)		<0.0000050	0.0000060	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)		0.000516	0.000298	0.000166	0.000180	0.000202
	Nickel (Ni)-Total (mg/L)		0.00322	<0.00050	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Total (mg/L)		<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Total (mg/L)		3.10	1.53	1.10	0.698	1.24
	Selenium (Se)-Total (mg/L)		0.000610	0.000122	0.000071	0.000065	0.000101
	Silicon (Si)-Total (mg/L)		6.24	1.96	2.10	0.38	2.02
	Silver (Ag)-Total (mg/L)		0.000900	0.000040	0.000012	0.000013	0.000019
	Sodium (Na)-Total (mg/L)		<2.0	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Total (mg/L)		0.294	0.148	0.0780	0.0378	0.0893
	Sulfur (S)-Total (mg/L)		55.7	11.7	2.22	4.85	2.93
	Thallium (Tl)-Total (mg/L)		0.000070	0.000015	0.000022	<0.000010	0.000026
	Tin (Sn)-Total (mg/L)		0.00014	<0.00010	0.00012	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)		0.108	0.018	0.038	<0.010	0.047
	Uranium (U)-Total (mg/L)		0.000699	0.000239	0.000103	0.000016	0.000151
	Vanadium (V)-Total (mg/L)		0.00446	0.00079	0.00166	<0.00050	0.00190
	Zinc (Zn)-Total (mg/L)		0.606	0.0674	0.0438	0.0080	0.0644
<b>Dissolved Metals</b>	Dissolved Mercury Filtration Location		FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location		FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)		0.133	0.0604	0.0244	0.0117	0.0246
	Antimony (Sb)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)		0.00011	<0.00010	0.00012	0.00019	0.00014
	Barium (Ba)-Dissolved (mg/L)		0.0369	0.0293	0.0310	0.0100	0.0381
	Beryllium (Be)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Dissolved (mg/L)		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)		<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)		0.00435	0.000490	0.000133	0.0000612	0.000212
	Calcium (Ca)-Dissolved (mg/L)		50.1	22.0	10.5	7.49	12.1
	Chromium (Cr)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2335592-16	L2335592-17	L2335592-18	L2335592-19	L2335592-20
		Description	WATER	WATER	WATER	WATER	WATER
		Sampled Date	23-AUG-19	23-AUG-19	22-AUG-19	23-AUG-19	23-AUG-19
		Sampled Time	09:45	13:20	17:15	17:00	10:15
		Client ID	SHC5	SHC1	SHCR3	SHC3	FIELD BLANK
Grouping	Analyte						
<b>WATER</b>							
<b>Total Metals</b>	Chromium (Cr)-Total (mg/L)		0.00012	0.00068	0.00017	0.00018	<0.00010
	Cobalt (Co)-Total (mg/L)		0.00011	0.00459	0.00139	0.00048	<0.00010
	Copper (Cu)-Total (mg/L)		0.00068	0.122	0.00441	0.0340	<0.00050
	Iron (Fe)-Total (mg/L)		0.176	8.08	2.76	0.826	<0.030
	Lead (Pb)-Total (mg/L)		0.000345	0.0374	0.0141	0.00257	<0.000050
	Lithium (Li)-Total (mg/L)		<0.0010	0.0056	0.0023	<0.0010	<0.0010
	Magnesium (Mg)-Total (mg/L)		2.15	5.41	2.48	1.48	<0.0050
	Manganese (Mn)-Total (mg/L)		0.00941	0.762	0.231	0.0953	<0.00010
	Mercury (Hg)-Total (mg/L)		<0.0000050	0.0000081	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)		0.000578	0.000611	0.000559	0.000335	<0.000050
	Nickel (Ni)-Total (mg/L)		<0.00050	0.00127	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Total (mg/L)		<0.30	0.31	<0.30	<0.30	<0.30
	Potassium (K)-Total (mg/L)		1.67	4.25	2.45	1.41	<0.050
	Selenium (Se)-Total (mg/L)		0.000221	0.000097	0.000101	0.000128	<0.000050
	Silicon (Si)-Total (mg/L)		1.08	10.9	5.03	2.26	<0.10
	Silver (Ag)-Total (mg/L)		<0.000010	0.000135	0.000047	0.000025	<0.000010
	Sodium (Na)-Total (mg/L)		<2.0	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Total (mg/L)		0.151	0.136	0.125	0.0992	<0.00020
	Sulfur (S)-Total (mg/L)		5.72	8.55	5.72	5.22	<0.50
	Thallium (Tl)-Total (mg/L)		<0.000010	0.000196	0.000081	0.000016	<0.000010
	Tin (Sn)-Total (mg/L)		<0.00010	0.00013	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)		<0.010	0.390	0.155	0.027	<0.010
	Uranium (U)-Total (mg/L)		0.000091	0.000349	0.000274	0.000110	<0.000010
	Vanadium (V)-Total (mg/L)		0.00058	0.0159	0.00677	0.00128	<0.00050
	Zinc (Zn)-Total (mg/L)		<0.0030	0.129	0.0370	0.0179	<0.0030
<b>Dissolved Metals</b>	Dissolved Mercury Filtration Location		FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location		FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)		0.0078	0.0719	0.0448	0.0397	<0.0030
	Antimony (Sb)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)		0.00027	0.00010	0.00025	0.00012	<0.00010
	Barium (Ba)-Dissolved (mg/L)		0.0432	0.0443	0.0389	0.0281	<0.00010
	Beryllium (Be)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Dissolved (mg/L)		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)		<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)		0.0000140	0.000250	0.0000384	0.0000947	<0.0000050
	Calcium (Ca)-Dissolved (mg/L)		23.7	17.8	15.3	15.4	<0.050
	Chromium (Cr)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	Description	Sampled Date	Sampled Time	Client ID	L2335592-21	L2335592-22	L2335592-23	L2335592-24	L2335592-25
					WATER	WATER	WATER	WATER	WATER
		23-AUG-19	10:15	DUP1	23-AUG-19	23-AUG-19	23-AUG-19	24-AUG-19	23-AUG-19
					10:15	12:25	10:45	10:00	10:15
					DUP1	DUP2	JM1-SEEPAGE	JM2-SEEPAGE	TRAVEL BLANK
Grouping	Analyte								
<b>WATER</b>									
<b>Total Metals</b>	Chromium (Cr)-Total (mg/L)	<0.00010	0.00367	<0.00010	0.00030	<0.00010			
	Cobalt (Co)-Total (mg/L)	<0.00010	0.0210	<0.00010	0.0323	<0.00010			
	Copper (Cu)-Total (mg/L)	0.00268	2.13	<0.00050	3.08	<0.00050			
	Iron (Fe)-Total (mg/L)	0.036	21.7	<0.030	8.64	<0.030			
	Lead (Pb)-Total (mg/L)	0.000177	0.0761	<0.000050	0.00463	<0.000050			
	Lithium (Li)-Total (mg/L)	<0.0010	0.0072	<0.0010	0.0067	<0.0010			
	Magnesium (Mg)-Total (mg/L)	1.27	10.1	5.02	34.1	<0.0050			
	Manganese (Mn)-Total (mg/L)	0.00744	2.87	0.00026	5.19	<0.00010			
	Mercury (Hg)-Total (mg/L)	<0.0000050	0.0000275	<0.0000050	<0.0000050	<0.0000050			
	Molybdenum (Mo)-Total (mg/L)	0.000374	0.000968	0.000385	0.000144	<0.000050			
	Nickel (Ni)-Total (mg/L)	<0.00050	0.00577	<0.00050	0.0111	<0.00050			
	Phosphorus (P)-Total (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30			
	Potassium (K)-Total (mg/L)	1.11	5.04	2.63	4.24	<0.050			
	Selenium (Se)-Total (mg/L)	0.000088	0.00111	0.000323	0.000982	<0.000050			
	Silicon (Si)-Total (mg/L)	1.42	12.0	1.61	5.19	<0.10			
	Silver (Ag)-Total (mg/L)	<0.000010	0.00209	<0.000010	0.000063	<0.000010			
	Sodium (Na)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0			
	Strontium (Sr)-Total (mg/L)	0.133	0.327	0.210	0.747	<0.00020			
	Sulfur (S)-Total (mg/L)	3.51	69.9	25.3	188	<0.50			
	Thallium (Tl)-Total (mg/L)	<0.000010	0.000166	<0.000010	0.000030	<0.000010			
	Tin (Sn)-Total (mg/L)	<0.00010	0.00038	<0.00010	<0.00010	<0.00010			
	Titanium (Ti)-Total (mg/L)	<0.010	0.341	<0.010	<0.010	<0.010			
	Uranium (U)-Total (mg/L)	0.000037	0.00131	0.000120	0.000980	<0.000010			
	Vanadium (V)-Total (mg/L)	<0.00050	0.0134	<0.00050	<0.00050	<0.00050			
	Zinc (Zn)-Total (mg/L)	0.0041	0.947	<0.0030	1.36	<0.0030			
<b>Dissolved Metals</b>	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD			
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD			
	Aluminum (Al)-Dissolved (mg/L)	0.0107	1.96	<0.0030	6.02	<0.0030			
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	0.00011	<0.00010	<0.00010			
	Arsenic (As)-Dissolved (mg/L)	0.00010	0.00015	<0.00010	0.00037	<0.00010			
	Barium (Ba)-Dissolved (mg/L)	0.0229	0.0416	0.0535	0.0310	<0.00010			
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	0.00015	<0.00010	0.00059	<0.00010			
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050			
	Boron (B)-Dissolved (mg/L)	<0.010	0.011	<0.010	0.015	<0.010			
	Cadmium (Cd)-Dissolved (mg/L)	0.0000469	0.00543	0.0000318	0.00981	<0.0000050			
	Calcium (Ca)-Dissolved (mg/L)	14.9	50.9	43.5	123	<0.050			
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	0.00011	<0.00010	0.00010	<0.00010			

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID	L2335592-1 WATER 23-AUG-19 10:15 JM1	L2335592-2 WATER 24-AUG-19 10:45 JM1-ALT	L2335592-3 WATER 23-AUG-19 11:45 JM2	L2335592-4 WATER 23-AUG-19 13:00 JM3	L2335592-5 WATER 23-AUG-19 12:25 JM4	
Grouping	Analyte					
<b>WATER</b>						
<b>Dissolved Metals</b>	Cobalt (Co)-Dissolved (mg/L)	<0.00010	0.00900	0.0257	0.00183	0.0185
	Copper (Cu)-Dissolved (mg/L)	0.00162	0.123	2.13	0.0232	2.06
	Iron (Fe)-Dissolved (mg/L)	<0.030	0.084	0.040	<0.030	2.15
	Lead (Pb)-Dissolved (mg/L)	<0.000050	0.000070	0.00116	<0.000050	0.00649
	Lithium (Li)-Dissolved (mg/L)	<0.0010	0.0024	0.0054	0.0012	0.0039
	Magnesium (Mg)-Dissolved (mg/L)	1.23	6.91	29.5	2.90	8.04
	Manganese (Mn)-Dissolved (mg/L)	0.00432	1.29	4.76	0.298	2.40
	Mercury (Hg)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000359	0.000055	0.000167	0.000264	<0.000050
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	0.00126	0.00875	<0.00050	0.00371
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)	0.991	1.57	3.88	1.73	2.63
	Selenium (Se)-Dissolved (mg/L)	0.000075	0.000328	0.000738	0.000087	0.000419
	Silicon (Si)-Dissolved (mg/L)	1.41	1.91	4.54	1.52	3.25
	Silver (Ag)-Dissolved (mg/L)	<0.000010	0.000016	0.000022	<0.000010	0.000025
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Dissolved (mg/L)	0.123	0.227	0.672	0.208	0.345
	Sulfur (S)-Dissolved (mg/L)	4.37	41.1	150	13.3	63.5
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	0.000013	0.000026	0.000011	0.000035
	Tin (Sn)-Dissolved (mg/L)	<0.00010	0.00448 <sup>DTC</sup>	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	0.000033	0.000015	0.000491	0.000101	0.000844
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	0.0027	1.24	1.19	0.0414	0.811

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	Description	Sampled Date	Sampled Time	Client ID	L2335592-6	L2335592-7	L2335592-8	L2335592-9	L2335592-10
					WATER	WATER	WATER	WATER	WATER
		23-AUG-19	09:05	JM5	23-AUG-19	08:20	23-AUG-19	14:20	23-AUG-19
					JM5	JM6	JM7	JM10	JM11
Grouping	Analyte								
<b>WATER</b>									
<b>Dissolved Metals</b>	Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	0.00091	<0.00010	<0.00010	0.00091	<0.00010	<0.00010
	Copper (Cu)-Dissolved (mg/L)	0.00263	0.00092	0.0144	<0.00050	<0.00050	0.0144	<0.00050	<0.00050
	Iron (Fe)-Dissolved (mg/L)	<0.030	<0.030	0.033	<0.030	<0.030	0.033	<0.030	<0.030
	Lead (Pb)-Dissolved (mg/L)	<0.000050	0.000117	0.000172	0.000236	0.000111	0.000172	0.000236	0.000111
	Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Dissolved (mg/L)	0.953	0.896	1.62	1.10	0.897	1.62	1.10	0.897
	Manganese (Mn)-Dissolved (mg/L)	0.0132	0.0156	0.155	0.0169	0.0182	0.155	0.0169	0.0182
	Mercury (Hg)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000067	0.000153	0.000263	0.000402	0.000169	0.000263	0.000402	0.000169
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)	0.659	0.804	1.25	1.23	0.796	1.25	1.23	0.796
	Selenium (Se)-Dissolved (mg/L)	0.000075	0.000071	0.000102	0.000062	0.000085	0.000102	0.000062	0.000085
	Silicon (Si)-Dissolved (mg/L)	0.153	0.953	1.13	0.868	0.816	1.13	0.868	0.816
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Dissolved (mg/L)	0.0382	0.0788	0.111	0.103	0.0834	0.111	0.103	0.0834
	Sulfur (S)-Dissolved (mg/L)	5.50	2.30	7.17	4.20	2.38	7.17	4.20	2.38
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	<0.000010	0.000094	0.000091	0.000163	0.000106	0.000091	0.000163	0.000106
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	0.0029	0.0037	0.0176	<0.0010	0.0042	0.0176	<0.0010	0.0042

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	Description	Sampled Date	Sampled Time	Client ID	L2335592-11	L2335592-12	L2335592-13	L2335592-14	L2335592-15
					WATER	WATER	WATER	WATER	WATER
		23-AUG-19	13:45	JM12	23-AUG-19	14:10	23-AUG-19	08:00	23-AUG-19
					JM12	JM13	JM14	TMF1	JM26
Grouping	Analyte								
<b>WATER</b>									
<b>Dissolved Metals</b>	Cobalt (Co)-Dissolved (mg/L)	0.0123	0.00185	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Dissolved (mg/L)	1.23	0.0369	0.00084	0.00130	<0.00050			
	Iron (Fe)-Dissolved (mg/L)	1.11	0.033	<0.030	<0.030	<0.030			
	Lead (Pb)-Dissolved (mg/L)	0.000611	0.000069	0.000104	<0.000050	0.000127			
	Lithium (Li)-Dissolved (mg/L)	0.0030	<0.0010	<0.0010	<0.0010	<0.0010			
	Magnesium (Mg)-Dissolved (mg/L)	6.55	2.06	0.815	0.886	0.939			
	Manganese (Mn)-Dissolved (mg/L)	1.64	0.281	0.0136	0.0162	0.0219			
	Mercury (Hg)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050			
	Molybdenum (Mo)-Dissolved (mg/L)	<0.000050	0.000265	0.000146	0.000074	0.000191			
	Nickel (Ni)-Dissolved (mg/L)	0.00245	<0.00050	<0.00050	<0.00050	<0.00050			
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30			
	Potassium (K)-Dissolved (mg/L)	2.32	1.37	0.686	0.593	0.731			
	Selenium (Se)-Dissolved (mg/L)	0.000278	0.000073	0.000064	<0.000050	0.000082			
	Silicon (Si)-Dissolved (mg/L)	2.64	1.53	1.01	0.135	0.857			
	Silver (Ag)-Dissolved (mg/L)	0.000015	<0.000010	<0.000010	<0.000010	<0.000010			
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0			
	Strontium (Sr)-Dissolved (mg/L)	0.287	0.145	0.0688	0.0375	0.0869			
	Sulfur (S)-Dissolved (mg/L)	54.8	12.2	2.11	5.35	3.00			
	Thallium (Tl)-Dissolved (mg/L)	0.000026	<0.000010	<0.000010	<0.000010	<0.000010			
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010			
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010			
	Uranium (U)-Dissolved (mg/L)	0.000321	0.000083	0.000081	<0.000010	0.000132			
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050			
	Zinc (Zn)-Dissolved (mg/L)	0.547	0.0395	0.0036	0.0018	0.0038			

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	Description	Sampled Date	Sampled Time	Client ID	L2335592-16	L2335592-17	L2335592-18	L2335592-19	L2335592-20
					WATER	WATER	WATER	WATER	WATER
		23-AUG-19	09:45	SHC5	23-AUG-19	13:20	22-AUG-19	23-AUG-19	23-AUG-19
					SHC5	SHC1	SHCR3	SHC3	FIELD BLANK
Grouping	Analyte								
<b>WATER</b>									
<b>Dissolved Metals</b>	Cobalt (Co)-Dissolved (mg/L)	<0.00010	0.00082	<0.00010	0.00017	<0.00010			<0.00010
	Copper (Cu)-Dissolved (mg/L)	<0.00050	0.00683	<0.00050	0.00796	<0.00050			<0.00050
	Iron (Fe)-Dissolved (mg/L)	<0.030	<0.030	0.030	<0.030	<0.030			<0.030
	Lead (Pb)-Dissolved (mg/L)	<0.000050	0.000110	0.000303	0.000073	<0.000050			<0.000050
	Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010			<0.0010
	Magnesium (Mg)-Dissolved (mg/L)	2.11	1.81	1.16	1.28	<0.0050			<0.0050
	Manganese (Mn)-Dissolved (mg/L)	0.00071	0.144	0.0159	0.0410	<0.00010			<0.00010
	Mercury (Hg)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050			<0.000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000568	0.000484	0.000548	0.000323	<0.000050			<0.000050
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30			<0.30
	Potassium (K)-Dissolved (mg/L)	1.60	1.27	1.11	1.24	<0.050			<0.050
	Selenium (Se)-Dissolved (mg/L)	0.000231	0.000121	0.000104	0.000115	<0.000050			<0.000050
	Silicon (Si)-Dissolved (mg/L)	0.973	0.925	1.01	1.75	<0.050			<0.050
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010			<0.000010
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0			<2.0
	Strontium (Sr)-Dissolved (mg/L)	0.148	0.121	0.116	0.0966	<0.00020			<0.00020
	Sulfur (S)-Dissolved (mg/L)	5.96	8.15	6.56	5.73	<0.50			<0.50
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010			<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010			<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010			<0.010
	Uranium (U)-Dissolved (mg/L)	0.000088	0.000048	0.000224	0.000077	<0.000010			<0.000010
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050
	Zinc (Zn)-Dissolved (mg/L)	<0.0010	0.0135	<0.0010	0.0049	<0.0010			<0.0010

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.



## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	Description	Sampled Date	Sampled Time	Client ID	L2335592-21	L2335592-22	L2335592-23	L2335592-24	L2335592-25
					WATER	WATER	WATER	WATER	WATER
		23-AUG-19	10:15	DUP1	23-AUG-19	23-AUG-19	23-AUG-19	24-AUG-19	23-AUG-19
					10:15	12:25	10:45	10:00	10:15
					DUP1	DUP2	JM1-SEEPAGE	JM2-SEEPAGE	TRAVEL BLANK
Grouping	Analyte								
<b>WATER</b>									
<b>Dissolved Metals</b>	Cobalt (Co)-Dissolved (mg/L)	<0.00010	0.0165	<0.00010	0.0314	<0.00010			
	Copper (Cu)-Dissolved (mg/L)	0.00178	1.81	<0.00050	3.07	<0.00050			
	Iron (Fe)-Dissolved (mg/L)	<0.030	1.87	<0.030	0.539	<0.030			
	Lead (Pb)-Dissolved (mg/L)	<0.000050	0.00561	<0.000050	0.00271	<0.000050			
	Lithium (Li)-Dissolved (mg/L)	<0.0010	0.0037	<0.0010	0.0066	<0.0010			
	Magnesium (Mg)-Dissolved (mg/L)	1.28	7.96	5.08	33.3	<0.0050			
	Manganese (Mn)-Dissolved (mg/L)	0.00470	2.29	<0.00010	4.95	<0.00010			
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050			
	Molybdenum (Mo)-Dissolved (mg/L)	0.000379	<0.000050	0.000344	<0.000050	<0.000050			
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	0.00327	<0.00050	0.0109	<0.00050			
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30			
	Potassium (K)-Dissolved (mg/L)	0.996	2.30	2.30	3.91	<0.050			
	Selenium (Se)-Dissolved (mg/L)	0.000088	0.000524	0.000371	0.000923	<0.000050			
	Silicon (Si)-Dissolved (mg/L)	1.31	3.29	1.52	4.73	<0.050			
	Silver (Ag)-Dissolved (mg/L)	<0.000010	0.000020	<0.000010	0.000023	<0.000010			
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0			
	Strontium (Sr)-Dissolved (mg/L)	0.130	0.325	0.205	0.712	<0.00020			
	Sulfur (S)-Dissolved (mg/L)	3.65	68.3	24.1	179	<0.50			
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	0.000031	<0.000010	0.000027	<0.000010			
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010			
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010			
	Uranium (U)-Dissolved (mg/L)	0.000032	0.000757	0.000103	0.000778	<0.000010			
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050			
	Zinc (Zn)-Dissolved (mg/L)	0.0028	0.739	0.0016	1.30	<0.0010			

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## Reference Information

## QC Samples with Qualifiers &amp; Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Acidity (as CaCO3)	B	L2335592-1, -10, -12, -18, -19, -21, -22, -23, -24, -3, -4, -5, -6, -7, -8, -9
Method Blank	Acidity (as CaCO3)	B	L2335592-13, -14, -15, -16, -17
Method Blank	Acidity (as CaCO3)	B	L2335592-2
Laboratory Control Sample	Acidity (as CaCO3)	LCS-H	L2335592-13, -14, -15, -16, -17
Method Blank	Selenium (Se)-Total	MB-LOR	L2335592-25
Method Blank	Silver (Ag)-Total	MB-LOR	L2335592-25
Matrix Spike	Dissolved Organic Carbon	MS-B	L2335592-2
Matrix Spike	Total Organic Carbon	MS-B	L2335592-16
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2335592-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2335592-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2335592-24, -25
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2335592-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2335592-24, -25
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2335592-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2335592-24, -25
Matrix Spike	Barium (Ba)-Total	MS-B	L2335592-25
Matrix Spike	Barium (Ba)-Total	MS-B	L2335592-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Total	MS-B	L2335592-21, -22, -23, -24
Matrix Spike	Barium (Ba)-Total	MS-B	L2335592-2
Matrix Spike	Calcium (Ca)-Total	MS-B	L2335592-25
Matrix Spike	Calcium (Ca)-Total	MS-B	L2335592-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Total	MS-B	L2335592-21, -22, -23, -24
Matrix Spike	Calcium (Ca)-Total	MS-B	L2335592-2
Matrix Spike	Cobalt (Co)-Total	MS-B	L2335592-25
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2335592-25
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2335592-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2335592-21, -22, -23, -24
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2335592-2
Matrix Spike	Manganese (Mn)-Total	MS-B	L2335592-25
Matrix Spike	Molybdenum (Mo)-Total	MS-B	L2335592-25
Matrix Spike	Nickel (Ni)-Total	MS-B	L2335592-25
Matrix Spike	Potassium (K)-Total	MS-B	L2335592-25
Matrix Spike	Sodium (Na)-Total	MS-B	L2335592-25
Matrix Spike	Strontium (Sr)-Total	MS-B	L2335592-25
Matrix Spike	Strontium (Sr)-Total	MS-B	L2335592-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Total	MS-B	L2335592-21, -22, -23, -24
Matrix Spike	Strontium (Sr)-Total	MS-B	L2335592-2
Matrix Spike	Sulfur (S)-Total	MS-B	L2335592-25
Matrix Spike	Uranium (U)-Total	MS-B	L2335592-25
Matrix Spike	Total Nitrogen	MS-B	L2335592-22, -23, -24, -25
Matrix Spike	Ammonia, Total (as N)	MS-B	L2335592-22, -23, -24, -25
Matrix Spike	Orthophosphate-Dissolved (as P)	MS-B	L2335592-18, -19
Matrix Spike	Sulfate (SO4)	MS-B	L2335592-10, -11, -12, -13, -14, -15, -16, -17

## Qualifiers for Individual Parameters Listed:

Qualifier	Description
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Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered

## Reference Information

B	reliable.
CNP	Cyanide test sample appears to have been preserved, but pH was <10 at time of testing. Results may be biased low, particularly for Free CN species.
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DTC	Dissolved concentration exceeds total. Results were confirmed by re-analysis.
HTP	Sample preparation or preservation hold time was exceeded.
LCS-H	Lab Control Sample recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRR	Refer to Report Remarks for issues regarding this analysis
RRV	Reported Result Verified By Repeat Analysis

### Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
<b>ACY-PCT-VA</b>	Water	Acidity by Automatic Titration	APHA 2310 Acidity
This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.			
Samples of industrial wastes, acid mine drainage, or other solutions that contain appreciable amounts of hydrolyzable metal ions such as aluminum, iron, and manganese may require hot peroxide treatment to ensure oxidation and hydrolysis of reduced forms of polyvalent cations. Acidity results may be highly variable if this procedure is not followed. Results in this report for 'Acidity (as CaCO3)' have not been peroxide treated.			
<b>ALK-TITR-VA</b>	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity
This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.			
<b>BR-L-IC-N-VA</b>	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
<b>CARBONS-DOC-VA</b>	Water	Dissolved organic carbon by combustion	APHA 5310B
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.			
<b>CARBONS-TOC-VA</b>	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
<b>CL-IC-N-VA</b>	Water	Chloride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
<b>CN-T-CFA-VA</b>	Water	Total Cyanide in water by CFA	ISO 14403:2002
This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.			
<b>CN-WAD-CFA-VA</b>	Water	Weak Acid Diss. Cyanide in water by CFA	APHA 4500-CN CYANIDE
This analysis is carried out using procedures adapted from APHA Method 4500-CN I. "Weak Acid Dissociable Cyanide". Weak Acid Dissociable (WAD) cyanide is determined by in-line sample distillation with final determination by colourimetric analysis.			
<b>COLOUR-TRUE-VA</b>	Water	Colour (True) by Spectrometer	BCMOE Colour Single Wavelength
This analysis is carried out using procedures adapted from British Columbia Environmental Manual "Colour- Single Wavelength." Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method.			
Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.			
<b>EC-PCT-VA</b>	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.
This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.			
<b>EC-SCREEN-VA</b>	Water	Conductivity Screen (Internal Use Only)	APHA 2510
Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.			
<b>F-IC-N-VA</b>	Water	Fluoride in Water by IC	EPA 300.1 (mod)

## Reference Information

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**HARDNESS-CALC-VA** Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO<sub>3</sub> equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

**HG-D-CVAA-VA** Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

**HG-T-CVAA-VA** Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

**MET-D-CCMS-VA** Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

**MET-T-CCMS-VA** Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

**N-T-COL-VA** Water Total Nitrogen in water by Colour APHA4500-P(J)/NEMI9171/USGS03-4174

This analysis is carried out using procedures adapted from APHA Method 4500-P (J) "Persulphate Method for Simultaneous Determination of Total Nitrogen and Total Phosphorus" and National Environmental Methods Index - Nemi method 5735.

**NH3-F-VA** Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

**NO2-L-IC-N-VA** Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**NO3-L-IC-N-VA** Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**P-T-PRES-COL-VA** Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

**PH-PCT-VA** Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

**PO4-DO-COL-VA** Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

**SO4-IC-N-VA** Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**TDS-VA** Water Total Dissolved Solids by Gravimetric APHA 2540 C - GRAVIMETRIC

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

**TKN-F-VA** Water TKN in Water by Fluorescence APHA 4500-NORG D.

## Reference Information

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

**TSS-VA**                      Water              Total Suspended Solids by Gravimetric                      APHA 2540 D - GRAVIMETRIC

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

**TURBIDITY-VA**                      Water              Turbidity by Meter                      APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

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\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

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*The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:*

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Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

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### Chain of Custody Numbers:

#### GLOSSARY OF REPORT TERMS

*Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.*

*mg/kg - milligrams per kilogram based on dry weight of sample.*

*mg/kg wwt - milligrams per kilogram based on wet weight of sample.*

*mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.*

*mg/L - milligrams per litre.*

*< - Less than.*

*D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).*

*N/A - Result not available. Refer to qualifier code and definition for explanation.*

*Test results reported relate only to the samples as received by the laboratory.*

**UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.**

*Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.*



Chain of Custody (COC) / Analytical Request Form



L2335592-COFC

COC Number: 15 -

Page 1 of 3

Canada Toll Free: 1 800 668 9878

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<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>				Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply																																																																																																																																																																																																																					
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Canada Toll Free: 1 800 668 9878



L2335592-COFC

COC Number: 15 -

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<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>				Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply																													
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Contact:	WADE BRUNHAM	Quality Control (QC) Report with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO				PRIORITY (business days)	4 day [P4] <input type="checkbox"/>					EMERGENCY	1 Business day [E1] <input type="checkbox"/>																						
Phone:	250-877-7838	<input checked="" type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked					3 day [P3] <input type="checkbox"/>						Same Day, Weekend or Statutory holiday [E0] <input type="checkbox"/>																						
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX				Date and Time Required for all E&P TATs:					dd-mmm-yy hh:mm																								
Street:	3790 ALFRED AVENUE	Email 1 or Fax WADE.BRUNHAM@ERM.COM				For tests that can not be performed according to the service level selected, you will be contacted.																													
City/Province:	SMITHERS, BC	Email 2 Elizabeth.Boyle@erm.com				<b>Analysis Request</b>																													
Postal Code:	V0J2N0	Email 3 jill.zyla@erm.com				Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below																													
<b>Invoice To</b>	Same as Report To <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	<b>Invoice Distribution</b>				GENERAL PARAMETERS / ANIONS	TOTAL METALS	DISSOLVED METALS	TOTAL MERCURY	DISSOLVED MERCURY	NUTRIENTS (TOC)	TOTAL AND WAD CYANIDE	Dissolved Nutrients (DOC)							Number of Containers															
	Copy of Invoice with Report <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX																																	
Company:	SEABRIDGE GOLD	Email 1 or Fax ELIZABETH@SEABRIDGEGOLD.NET																																	
Contact:	ELIZABETH MILLER	Email 2 KSMADMIN@SEABRIDGEGOLD.NET																																	
<b>Project Information</b>		<b>Oil and Gas Required Fields (client use)</b>																																	
ALS Account # / Quote #:	(Q74326)	AFE/Cost Center:		PO#																															
Job #:	492759-0004	Major/Minor Code:		Routing Code:																															
PO / AFE:		Requisitioner:																																	
LSD:		Location:																																	
<b>ALS Lab Work Order # (lab use only)</b>		<b>ALS Contact:</b> Amber Springer		<b>Sampler:</b> Tyler Gale, Liam Clerke																															
<b>ALS Sample # (lab use only)</b>	<b>Sample Identification and/or Coordinates (This description will appear on the report)</b>	<b>Field Site ID</b>	<b>Date (dd-mmm-yy)</b>	<b>Time (hh:mm)</b>	<b>Sample Type</b>																														
11	JM12		23-Aug-19	13:45	WATER	R	R	R	R	R	R	R	R							8															
12	JM13		23-Aug-19	14:10	WATER	R	R	R	R	R	R	R	R								8														
13	JM14		23-Aug-19	8:00	WATER	R	R	R	R	R	R	R	R								8														
14	TMF1		23-Aug-19	9:20	WATER	R	R	R	R	R	R	R	R								8														
15	JM26		23-Aug-19	17:40	WATER	R	R	R	R	R	R	R	R								8														
16	SHC5		23-Aug-19	9:45	WATER	R	R	R	R	R	R	R	R								8														
17	SHC1		23-Aug-19	13:20	WATER	R	R	R	R	R	R	R	R								8														
18	SHCR3		22-Aug-19	17:15	WATER	R	R	R	R	R	R	R	R								8														
19	SHC3		23-Aug-19	17:00	WATER	R	R	R	R	R	R	R	R								8														
20	Field Blank		23-Aug-19	10:15	WATER	R	R	R	R	R	R	R	R								8														
21	DUP1		23-Aug-19	10:15	WATER	R	R	R	R	R	R	R	R								8														
22	DUP2		23-Aug-19	12:25	WATER	R	R	R	R	R	R	R	R								8														
<b>Drinking Water (DW) Samples<sup>1</sup> (client use)</b>		<b>Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)</b>				<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>																													
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO		Please send the EDD to jill.zyla@erm.com				Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>																													
Are samples for human drinking water use? <input type="checkbox"/> YES <input type="checkbox"/> NO						Ice Packs <input type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>																													
						Cooling Initiated <input type="checkbox"/>																													
						INITIAL COOLER TEMPERATURES °C					FINAL COOLER TEMPERATURES °C																								
<b>SHIPMENT RELEASE (client use)</b>			<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>			<b>FINAL SHIPMENT RECEPTION (lab use only)</b>																													
Released by: Tyler Gale	Date: 25-Aug-2019	Time: AM	Received by:	Date:	Time:	Received by: RT	Date: 25-08-19	Time: 3:30																											

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - LABORATORY COPY YELLOW - CLIENT COPY OCTOBER 2016 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy. 1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

4c/8c/14c/8c/11c/4c/9c/6c/10c/11c







ERM Consultants Canada Ltd.  
ATTN: Elizabeth Boyle  
1500-1111 West Hastings Street  
Vancouver BC V6E 2J3

Date Received: 01-OCT-19  
Report Date: 18-OCT-19 12:37 (MT)  
Version: FINAL

Client Phone: 604-689-9460

## Certificate of Analysis

Lab Work Order #: L2357754  
Project P.O. #: NOT SUBMITTED  
Job Reference: RES100-SBG100-VA  
C of C Numbers: 17-763276  
Legal Site Desc:

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Amber Springer, B.Sc  
Account Manager

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ADDRESS: 8081 Lougheed Hwy, Suite 100, Burnaby, BC V5A 1W9 Canada | Phone: +1 604 253 4188 | Fax: +1 604 253 6700  
ALS CANADA LTD Part of the ALS Group An ALS Limited Company

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2357754-1	L2357754-2	L2357754-3	L2357754-4	L2357754-5
		Description	Water	Water	Water	Water	Water
		Sampled Date	29-SEP-19	29-SEP-19	29-SEP-19	29-SEP-19	29-SEP-19
		Sampled Time	08:30	09:00	10:50	11:30	11:50
		Client ID	SHC3	SHCR3	JM14	JM6	JM11
Grouping	Analyte						
<b>WATER</b>							
<b>Physical Tests</b>	Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	<5.0	
	Conductivity (uS/cm)	126	134	82.9	95.9	113	
	Hardness (as CaCO3) (mg/L)	56.3	60.7	41.7	45.1	54.1	
	pH (pH)	7.86	7.89	7.74	7.87	7.96	
	Total Suspended Solids (mg/L)	3.3	22.3	<3.0	<3.0	<3.0	
	Total Dissolved Solids (mg/L)	82	82	50	67	73	
	Turbidity (NTU)	1.45	9.93	1.38	1.68	1.86	
<b>Anions and Nutrients</b>	Acidity (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0	
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	43.4	43.4	34.2	38.1	50.0	
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Total (as CaCO3) (mg/L)	43.4	43.4	34.2	38.1	50.0	
	Ammonia, Total (as N) (mg/L)	0.0066	<0.0050	<0.0050	0.0063	<0.0050	
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050	
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50	
	Fluoride (F) (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020	
	Nitrate (as N) (mg/L)	0.102	0.0665	<0.0050	<0.0050	<0.0050	
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Total Kjeldahl Nitrogen (mg/L)	0.070	<0.050	<0.050	<0.050	<0.050	
	Total Nitrogen (mg/L)	0.182	0.105	0.032	0.081	0.035	
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Phosphorus (P)-Total (mg/L)	0.0056	0.0240	0.0024	0.0029	0.0026	
	Sulfate (SO4) (mg/L)	19.8	23.1	8.23	8.20	9.65	
<b>Cyanides</b>	Cyanide, Weak Acid Diss (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	
	Cyanide, Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	
	Cyanide, Free (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	
<b>Organic / Inorganic Carbon</b>	Dissolved Organic Carbon (mg/L)	<0.50	<0.50	0.54	<0.50	<0.50	
	Total Organic Carbon (mg/L)	0.67	<0.50	<0.50	<0.50	<0.50	
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	0.0991	0.621	0.0673	0.0808	0.0886	
	Antimony (Sb)-Total (mg/L)	<0.00010	0.00012	<0.00010	<0.00010	<0.00010	
	Arsenic (As)-Total (mg/L)	0.00012	0.00047	0.00014	<0.00010	0.00013	
	Barium (Ba)-Total (mg/L)	0.0288	0.0603	0.0341	0.0403	0.0501	
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010	
	Cadmium (Cd)-Total (mg/L)	0.000107	0.0000526	0.0000913	0.0000578	0.0000722	

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L2357754-6	L2357754-7	L2357754-8	L2357754-9	L2357754-10
		Water	Water	Water	Water	Water
		29-SEP-19	29-SEP-19	29-SEP-19	29-SEP-19	29-SEP-19
		12:10	12:40	14:00	14:50	15:20
		JM5	TMF1	JM26	SHC5	JM7
Grouping	Analyte					
<b>WATER</b>						
<b>Physical Tests</b>	Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	<5.0
	Conductivity (uS/cm)	65.9	63.8	99.6	171	179
	Hardness (as CaCO3) (mg/L)	27.8	27.1	47.1	83.7	83.9
	pH (pH)	7.23	7.29	7.90	8.14	7.98
	Total Suspended Solids (mg/L)	<3.0	9.0	7.2	3.2	7.4
	Total Dissolved Solids (mg/L)	50	45	70	106	114
	Turbidity (NTU)	2.08	3.59	3.40	0.49	1.76
<b>Anions and Nutrients</b>	Acidity (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	12.0	10.1	42.8	46.9	37.2
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	12.0	10.1	42.8	46.9	37.2
	Ammonia, Total (as N) (mg/L)	<0.0050	0.0067	<0.0050	<0.0050	0.0128
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	<0.020	<0.020	<0.020	<0.020	0.021
	Nitrate (as N) (mg/L)	<0.0050	<0.0050	0.0076	<0.0050	0.0245
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	0.055	0.086	<0.050	<0.050	0.107
	Total Nitrogen (mg/L)	0.10	0.106	0.031	0.035	0.150
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total (mg/L)	0.0049	0.0061	0.0097	0.0022	0.0075
	Sulfate (SO4) (mg/L)	18.2	17.6	10.1	16.4	36.1
<b>Cyanides</b>	Cyanide, Weak Acid Diss (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Cyanide, Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Cyanide, Free (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
<b>Organic / Inorganic Carbon</b>	Dissolved Organic Carbon (mg/L)	1.34	1.39	<0.50	0.51	0.54
	Total Organic Carbon (mg/L)	1.17	1.04	<0.50	<0.50	0.59
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	0.114	0.0830	0.246	0.0591	0.186
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00027	0.00024	0.00020	0.00031	0.00021
	Barium (Ba)-Total (mg/L)	0.0129	0.0119	0.0532	0.0507	0.0376
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	0.0000578	0.0000494	0.000140	0.0000207	0.000225

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2357754-11	L2357754-12	L2357754-13	L2357754-14
		Description	Water	Water	Water	Water
		Sampled Date	29-SEP-19	29-SEP-19	29-SEP-19	29-SEP-19
		Sampled Time	15:30	15:40		
		Client ID	JM13	JM3	DUP1	TRAVEL BLANK
Grouping	Analyte					
<b>WATER</b>						
<b>Physical Tests</b>	Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	<5.0
	Conductivity (uS/cm)	248	319	66.0	<2.0	<2.0
	Hardness (as CaCO3) (mg/L)	119	158	27.4		
	pH (pH)	8.08	8.17	7.25	5.43	5.43
	Total Suspended Solids (mg/L)	3.2	4.0	<3.0	<3.0	<3.0
	Total Dissolved Solids (mg/L)	161	213	49	<10	<10
	Turbidity (NTU)	1.26	1.38	1.83	<0.10	<0.10
<b>Anions and Nutrients</b>	Acidity (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	73.0	58.0	9.6	<1.0	<1.0
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	73.0	58.0	9.6	<1.0	<1.0
	Ammonia, Total (as N) (mg/L)	0.0371	0.0698	0.0095	<0.0050	<0.0050
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	0.028	0.033	<0.020	<0.020	<0.020
	Nitrate (as N) (mg/L)	0.0393	0.0284	<0.0050	<0.0050	<0.0050
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	0.262	0.662	0.071	<0.050	<0.050
	Total Nitrogen (mg/L)	0.343	0.567	0.100	<0.030	<0.030
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total (mg/L)	<0.0020	<0.0020	0.0050	<0.0020	<0.0020
	Sulfate (SO4) (mg/L)	50.9	72.9	18.3	<0.30	<0.30
	<b>Cyanides</b>	Cyanide, Weak Acid Diss (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020
Cyanide, Total (mg/L)		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cyanide, Free (mg/L)		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
<b>Organic / Inorganic Carbon</b>	Dissolved Organic Carbon (mg/L)	0.68	0.53	1.21	<0.50	<0.50
	Total Organic Carbon (mg/L)	<0.50	<0.50	1.20	<0.50	<0.50
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	0.102	0.133	0.0720	<0.0030	<0.0030
	Antimony (Sb)-Total (mg/L)	<0.00010	0.00014	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00020	0.00032	0.00022	<0.00010	<0.00010
	Barium (Ba)-Total (mg/L)	0.0346	0.0352	0.0122	<0.00010	<0.00010
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	0.000304	0.000484	0.0000414	<0.000050	<0.000050

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2357754-1	L2357754-2	L2357754-3	L2357754-4	L2357754-5
		Description	Water	Water	Water	Water	Water
		Sampled Date	29-SEP-19	29-SEP-19	29-SEP-19	29-SEP-19	29-SEP-19
		Sampled Time	08:30	09:00	10:50	11:30	11:50
		Client ID	SHC3	SHCR3	JM14	JM6	JM11
Grouping	Analyte						
<b>WATER</b>							
<b>Total Metals</b>	Calcium (Ca)-Total (mg/L)		20.0	21.1	14.5	16.0	18.8
	Chromium (Cr)-Total (mg/L)		<0.00010	0.00017	0.00011	<0.00010	0.00014
	Cobalt (Co)-Total (mg/L)		0.00015	0.00022	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Total (mg/L)		0.0151	0.00073	0.00085	0.00089	0.00054
	Iron (Fe)-Total (mg/L)		0.133	0.518	0.063	0.071	0.079
	Lead (Pb)-Total (mg/L)		0.000437	0.00246	0.000322	0.000410	0.000437
	Lithium (Li)-Total (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Total (mg/L)		1.71	1.78	1.07	1.20	1.35
	Manganese (Mn)-Total (mg/L)		0.0478	0.0444	0.00633	0.00706	0.00633
	Mercury (Hg)-Total (mg/L)		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)		0.000339	0.000740	0.000199	0.000216	0.000251
	Nickel (Ni)-Total (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Total (mg/L)		<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Total (mg/L)		1.28	1.40	0.875	0.997	1.18
	Selenium (Se)-Total (mg/L)		0.000104	0.000140	0.000089	0.000082	0.000118
	Silicon (Si)-Total (mg/L)		2.09	2.16	1.39	1.40	1.18
	Silver (Ag)-Total (mg/L)		<0.000010	0.000012	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)		<2.0	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Total (mg/L)		0.132	0.183	0.101	0.111	0.126
	Sulfur (S)-Total (mg/L)		6.80	7.40	2.75	2.70	3.03
	Thallium (Tl)-Total (mg/L)		<0.000010	0.000018	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Total (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)		<0.010	0.026	<0.010	<0.010	<0.010
	Uranium (U)-Total (mg/L)		0.000130	0.000367	0.000103	0.000126	0.000166
	Vanadium (V)-Total (mg/L)		<0.00050	0.00129	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Total (mg/L)		0.0092	0.0064	0.0108	0.0069	0.0072
<b>Dissolved Metals</b>	Dissolved Mercury Filtration Location		LAB	LAB	LAB	LAB	LAB
	Dissolved Metals Filtration Location		LAB	LAB	LAB	LAB	LAB
	Aluminum (Al)-Dissolved (mg/L)		0.0220	0.0107	0.0115	0.0119	0.0104
	Antimony (Sb)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)		<0.00010	0.00031	0.00011	<0.00010	<0.00010
	Barium (Ba)-Dissolved (mg/L)		0.0279	0.0487	0.0361	0.0410	0.0497
	Beryllium (Be)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Dissolved (mg/L)		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)		<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)		0.0000855	0.0000105	0.0000817	0.0000467	0.0000521
	Calcium (Ca)-Dissolved (mg/L)		19.8	21.5	14.9	16.1	19.4

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2357754-6	L2357754-7	L2357754-8	L2357754-9	L2357754-10
		Description	Water	Water	Water	Water	Water
		Sampled Date	29-SEP-19	29-SEP-19	29-SEP-19	29-SEP-19	29-SEP-19
		Sampled Time	12:10	12:40	14:00	14:50	15:20
		Client ID	JM5	TMF1	JM26	SHC5	JM7
Grouping	Analyte						
<b>WATER</b>							
<b>Total Metals</b>	Calcium (Ca)-Total (mg/L)		9.26	8.95	16.4	28.7	28.8
	Chromium (Cr)-Total (mg/L)		0.00019	0.00016	0.00012	0.00015	0.00011
	Cobalt (Co)-Total (mg/L)		<0.00010	<0.00010	0.00012	<0.00010	0.00044
	Copper (Cu)-Total (mg/L)		0.00459	0.00270	0.00139	<0.00050	0.0476
	Iron (Fe)-Total (mg/L)		0.143	0.113	0.265	0.092	0.260
	Lead (Pb)-Total (mg/L)		0.000469	0.000394	0.00154	0.000171	0.000932
	Lithium (Li)-Total (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Total (mg/L)		1.00	0.916	1.40	2.70	2.74
	Manganese (Mn)-Total (mg/L)		0.0354	0.0341	0.0238	0.00484	0.138
	Mercury (Hg)-Total (mg/L)		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)		0.000054	<0.000050	0.000296	0.000488	0.000357
	Nickel (Ni)-Total (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Total (mg/L)		<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Total (mg/L)		0.768	0.683	1.22	1.81	1.55
	Selenium (Se)-Total (mg/L)		0.000073	0.000070	0.000121	0.000194	0.000163
	Silicon (Si)-Total (mg/L)		0.32	0.26	1.45	1.26	1.84
	Silver (Ag)-Total (mg/L)		0.000014	0.000013	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)		<2.0	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Total (mg/L)		0.0428	0.0404	0.123	0.202	0.211
	Sulfur (S)-Total (mg/L)		6.11	5.91	3.26	5.36	11.9
	Thallium (Tl)-Total (mg/L)		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Total (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)		<0.010	<0.010	0.015	<0.010	<0.010
	Uranium (U)-Total (mg/L)		<0.000010	<0.000010	0.000197	0.000153	0.000275
	Vanadium (V)-Total (mg/L)		<0.00050	<0.00050	0.00073	0.00051	<0.00050
	Zinc (Zn)-Total (mg/L)		0.0058	0.0045	0.0190	<0.0030	0.0197
<b>Dissolved Metals</b>	Dissolved Mercury Filtration Location		LAB	LAB	LAB	LAB	LAB
	Dissolved Metals Filtration Location		LAB	LAB	LAB	LAB	LAB
	Aluminum (Al)-Dissolved (mg/L)		0.0068	0.0076	0.0141	0.0034	0.0397
	Antimony (Sb)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)		<0.00010	0.00012	0.00011	0.00020	<0.00010
	Barium (Ba)-Dissolved (mg/L)		0.0115	0.0113	0.0502	0.0538	0.0374
	Beryllium (Be)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Dissolved (mg/L)		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)		<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)		0.0000296	0.0000397	0.0000865	0.0000111	0.000198
	Calcium (Ca)-Dissolved (mg/L)		9.52	9.26	16.6	28.9	28.9

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2357754-11	L2357754-12	L2357754-13	L2357754-14
		Description	Water	Water	Water	Water
		Sampled Date	29-SEP-19	29-SEP-19	29-SEP-19	29-SEP-19
		Sampled Time	15:30	15:40		
		Client ID	JM13	JM3	DUP1	TRAVEL BLANK
Grouping	Analyte					
<b>WATER</b>						
<b>Total Metals</b>	Calcium (Ca)-Total (mg/L)		41.5	53.3	9.32	<0.050
	Chromium (Cr)-Total (mg/L)		0.00012	0.00012	0.00015	<0.00010
	Cobalt (Co)-Total (mg/L)		0.00058	0.00097	<0.00010	<0.00010
	Copper (Cu)-Total (mg/L)		0.102	0.193	0.00307	<0.00050
	Iron (Fe)-Total (mg/L)		0.411	0.777	0.085	<0.030
	Lead (Pb)-Total (mg/L)		0.000431	0.000585	0.000272	<0.000050
	Lithium (Li)-Total (mg/L)		0.0012	0.0018	<0.0010	<0.0010
	Magnesium (Mg)-Total (mg/L)		4.33	6.86	0.975	<0.0050
	Manganese (Mn)-Total (mg/L)		0.250	0.347	0.0228	<0.00010
	Mercury (Hg)-Total (mg/L)		<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)		0.000290	0.000340	<0.000050	<0.000050
	Nickel (Ni)-Total (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Total (mg/L)		<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Total (mg/L)		1.86	2.00	0.725	<0.050
	Selenium (Se)-Total (mg/L)		0.000194	0.000198	0.000052	<0.000050
	Silicon (Si)-Total (mg/L)		2.05	2.15	0.26	<0.10
	Silver (Ag)-Total (mg/L)		<0.000010	<0.000010	0.000012	<0.000010
	Sodium (Na)-Total (mg/L)		<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Total (mg/L)		0.352	0.570	0.0444	<0.00020
	Sulfur (S)-Total (mg/L)		17.8	25.1	6.24	<0.50
	Thallium (Tl)-Total (mg/L)		<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Total (mg/L)		0.00201	0.00011	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)		<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Total (mg/L)		0.000451	0.000859	<0.000010	<0.000010
	Vanadium (V)-Total (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Total (mg/L)		0.0349	0.0565	0.0060	<0.0030
<b>Dissolved Metals</b>	Dissolved Mercury Filtration Location		LAB	LAB	LAB	
	Dissolved Metals Filtration Location		LAB	LAB	LAB	
	Aluminum (Al)-Dissolved (mg/L)		0.0352	0.0404	0.0072	
	Antimony (Sb)-Dissolved (mg/L)		0.00011	0.00016	<0.00010	
	Arsenic (As)-Dissolved (mg/L)		<0.00010	0.00011	<0.00010	
	Barium (Ba)-Dissolved (mg/L)		0.0358	0.0356	0.0116	
	Beryllium (Be)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	
	Bismuth (Bi)-Dissolved (mg/L)		<0.000050	<0.000050	<0.000050	
	Boron (B)-Dissolved (mg/L)		<0.010	<0.010	<0.010	
	Cadmium (Cd)-Dissolved (mg/L)		0.000257	0.000387	0.0000293	
	Calcium (Ca)-Dissolved (mg/L)		40.5	51.3	9.36	

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	Description	Sampled Date	Sampled Time	Client ID	L2357754-1	L2357754-2	L2357754-3	L2357754-4	L2357754-5
					Water	Water	Water	Water	Water
		29-SEP-19	08:30	SHC3	29-SEP-19	09:00	29-SEP-19	10:50	29-SEP-19
					SHC3	SHCR3	JM14	JM6	JM11
Grouping	Analyte								
<b>WATER</b>									
<b>Dissolved Metals</b>	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Dissolved (mg/L)	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Dissolved (mg/L)	0.00689	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Iron (Fe)-Dissolved (mg/L)	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Dissolved (mg/L)	1.69	1.70	1.12	1.18	1.38			
	Manganese (Mn)-Dissolved (mg/L)	0.0341	0.00244	0.00287	0.00261	0.00158			
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000343	0.000741	0.000189	0.000205	0.000259			
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)	1.25	1.22	0.904	0.960	1.20			
	Selenium (Se)-Dissolved (mg/L)	0.000088	0.000143	0.000085	0.000107	0.000117			
	Silicon (Si)-Dissolved (mg/L)	2.03	1.36	1.36	1.27	1.07			
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Dissolved (mg/L)	0.124	0.183	0.0987	0.103	0.127			
	Sulfur (S)-Dissolved (mg/L)	6.66	7.78	2.51	2.53	3.22			
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	0.000104	0.000334	0.000100	0.000120	0.000163			
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	0.0068	<0.0010	0.0065	0.0015	0.0012			

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.



## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID	L2357754-6 Water 29-SEP-19 12:10 JM5	L2357754-7 Water 29-SEP-19 12:40 TMF1	L2357754-8 Water 29-SEP-19 14:00 JM26	L2357754-9 Water 29-SEP-19 14:50 SHC5	L2357754-10 Water 29-SEP-19 15:20 JM7
Grouping	Analyte				
<b>WATER</b>					
<b>Dissolved Metals</b>	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	0.00038
	Copper (Cu)-Dissolved (mg/L)	0.00150	0.00103	<0.00050	0.0151
	Iron (Fe)-Dissolved (mg/L)	<0.030	<0.030	<0.030	<0.030
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Dissolved (mg/L)	0.977	0.955	1.38	2.85
	Manganese (Mn)-Dissolved (mg/L)	0.00206	0.00509	0.00320	0.126
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000052	0.000054	0.000298	0.000367
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)	0.730	0.711	1.14	1.55
	Selenium (Se)-Dissolved (mg/L)	0.000062	<0.000050	0.000151	0.000151
	Silicon (Si)-Dissolved (mg/L)	0.153	0.149	1.11	1.69
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Dissolved (mg/L)	0.0410	0.0399	0.121	0.213
	Sulfur (S)-Dissolved (mg/L)	6.07	5.92	3.18	12.5
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	<0.000010	<0.000010	0.000175	0.000193
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	0.0022	0.0016	0.0019	0.0147

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2357754-11	L2357754-12	L2357754-13	L2357754-14	
Description	Water	Water	Water	Water	
Sampled Date	29-SEP-19	29-SEP-19	29-SEP-19	29-SEP-19	
Sampled Time	15:30	15:40			
Client ID	JM13	JM3	DUP1	TRAVEL BLANK	
Grouping	Analyte				
<b>WATER</b>					
<b>Dissolved Metals</b>	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	
	Cobalt (Co)-Dissolved (mg/L)	0.00058	0.00090	<0.00010	
	Copper (Cu)-Dissolved (mg/L)	0.0244	0.0372	0.00151	
	Iron (Fe)-Dissolved (mg/L)	<0.030	<0.030	<0.030	
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	
	Lithium (Li)-Dissolved (mg/L)	0.0011	0.0018	<0.0010	
	Magnesium (Mg)-Dissolved (mg/L)	4.39	7.34	0.979	
	Manganese (Mn)-Dissolved (mg/L)	0.240	0.337	0.00227	
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	
	Molybdenum (Mo)-Dissolved (mg/L)	0.000287	0.000347	<0.000050	
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	
	Potassium (K)-Dissolved (mg/L)	1.91	2.08	0.720	
	Selenium (Se)-Dissolved (mg/L)	0.000178	0.000212	0.000050	
	Silicon (Si)-Dissolved (mg/L)	2.01	2.09	0.142	
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0	
	Strontium (Sr)-Dissolved (mg/L)	0.339	0.547	0.0406	
	Sulfur (S)-Dissolved (mg/L)	17.4	25.5	5.70	
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	
	Uranium (U)-Dissolved (mg/L)	0.000405	0.000748	<0.000010	
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	
	Zinc (Zn)-Dissolved (mg/L)	0.0235	0.0370	0.0022	

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## Reference Information

### QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Laboratory Control Sample	Conductivity	LCS-H	L2357754-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Dissolved Organic Carbon	MS-B	L2357754-10, -11, -12, -13, -14, -8, -9
Matrix Spike	Total Organic Carbon	MS-B	L2357754-10
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2357754-1, -10, -11, -12, -13, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2357754-1, -10, -11, -12, -13, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2357754-1, -10, -11, -12, -13, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2357754-1, -10, -11, -12, -13, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Total	MS-B	L2357754-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Total	MS-B	L2357754-2
Matrix Spike	Calcium (Ca)-Total	MS-B	L2357754-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Total	MS-B	L2357754-2
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2357754-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2357754-2
Matrix Spike	Manganese (Mn)-Total	MS-B	L2357754-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Manganese (Mn)-Total	MS-B	L2357754-2
Matrix Spike	Molybdenum (Mo)-Total	MS-B	L2357754-2
Matrix Spike	Nickel (Ni)-Total	MS-B	L2357754-2
Matrix Spike	Potassium (K)-Total	MS-B	L2357754-2
Matrix Spike	Sodium (Na)-Total	MS-B	L2357754-2
Matrix Spike	Strontium (Sr)-Total	MS-B	L2357754-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Total	MS-B	L2357754-2
Matrix Spike	Sulfur (S)-Total	MS-B	L2357754-2
Matrix Spike	Uranium (U)-Total	MS-B	L2357754-2
Matrix Spike	Phosphorus (P)-Total	MS-B	L2357754-10, -11, -12, -8, -9
Matrix Spike	Phosphorus (P)-Total	MS-B	L2357754-1, -2, -3, -4, -5, -6, -7

### Qualifiers for Individual Parameters Listed:

Qualifier	Description
LCS-H	Lab Control Sample recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

### Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
<b>ACY-PCT-VA</b>	Water	Acidity by Automatic Titration	APHA 2310 Acidity
This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.			
Samples of industrial wastes, acid mine drainage, or other solutions that contain appreciable amounts of hydrolyzable metal ions such as aluminum, iron, and manganese may require hot peroxide treatment to ensure oxidation and hydrolysis of reduced forms of polyvalent cations. Acidity results may be highly variable if this procedure is not followed. Results in this report for 'Acidity (as CaCO3)' have not been peroxide treated.			
<b>ALK-TITR-VA</b>	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity
This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.			
<b>BR-L-IC-N-VA</b>	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
<b>CARBONS-DOC-VA</b>	Water	Dissolved organic carbon by combustion	APHA 5310B
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.			
<b>CARBONS-TOC-VA</b>	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

## Reference Information

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

**CL-IC-N-VA** Water Chloride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**CN-FREE-CFA-WT** Water Free Cyanide in water by CFA ASTM 7237

This analysis is carried out using procedures adapted from ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.

**CN-TOT-WT** Water Cyanide, Total ISO 14403-2

Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference

**CN-WAD-WT** Water Cyanide, Weak Acid Diss APHA 4500CN I-Weak acid Dist Colorimet

Weak acid dissociable cyanide (WAD) is determined by undergoing a distillation procedure. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

**COLOUR-TRUE-VA** Water Colour (True) by Spectrometer BCMOE Colour Single Wavelength

This analysis is carried out using procedures adapted from British Columbia Environmental Manual "Colour- Single Wavelength." Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method.

Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.

**EC-PCT-VA** Water Conductivity (Automated) APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

**EC-SCREEN-VA** Water Conductivity Screen (Internal Use Only) APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

**F-IC-N-VA** Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**HARDNESS-CALC-VA** Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO<sub>3</sub> equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

**HG-D-CVAA-VA** Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

**HG-T-CVAA-VA** Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

**MET-D-CCMS-VA** Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

**MET-T-CCMS-VA** Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

**N-T-COL-VA** Water Total Nitrogen in water by Colour APHA4500-P(J)/NEMI9171/USGS03-4174

This analysis is carried out using procedures adapted from APHA Method 4500-P (J) "Persulphate Method for Simultaneous Determination of Total Nitrogen and Total Phosphorus" and National Environmental Methods Index - Nemi method 5735.

**NH3-F-VA** Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

**NO2-L-IC-N-VA** Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

## Reference Information

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**NO3-L-IC-N-VA** Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**P-T-PRES-COL-VA** Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

**PH-PCT-VA** Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

**PO4-DO-COL-VA** Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

**SO4-IC-N-VA** Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**TDS-VA** Water Total Dissolved Solids by Gravimetric APHA 2540 C - GRAVIMETRIC

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

**TKN-F-VA** Water TKN in Water by Fluorescence APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

**TSS-VA** Water Total Suspended Solids by Gravimetric APHA 2540 D - GRAVIMETRIC

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.

Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

**TURBIDITY-VA** Water Turbidity by Meter APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

*The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:*

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

### Chain of Custody Numbers:

17-763276

## Reference Information

### GLOSSARY OF REPORT TERMS

*Surrogate* - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

*mg/kg* - milligrams per kilogram based on dry weight of sample.

*mg/kg wwt* - milligrams per kilogram based on wet weight of sample.

*mg/kg lwt* - milligrams per kilogram based on lipid-adjusted weight of sample.

*mg/L* - milligrams per litre.

*<* - Less than.

*D.L.* - The reported Detection Limit, also known as the Limit of Reporting (LOR).

*N/A* - Result not available. Refer to qualifier code and definition for explanation.

*Test results reported relate only to the samples as received by the laboratory.*

**UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.**

*Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.*



Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com



L2357754-COFC

COC Number: 17 - 763276

Page 1 of 2

<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>			Low - Contact your AM to confirm all E&P TATs (surcharges may apply)															
Company: <u>ERM Consultants Canada</u>		Select Report Format: <input type="checkbox"/> PDF <input type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)			Regular [R] <input type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply															
Contact:		Quality Control (QC) Report with Report <input type="checkbox"/> YES <input type="checkbox"/> NO			4 day [P4-20%] <input type="checkbox"/>		1 Business day [E - 100%] <input type="checkbox"/>													
Phone:		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked			3 day [P3-25%] <input type="checkbox"/>		Same Day, Weekend or Statutory holiday [E2 - 200% (Laboratory opening fees may apply)] <input type="checkbox"/>													
Company address below will appear on the final report		Select Distribution: <input type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			2 day [P2-50%] <input type="checkbox"/>															
Street:		Email 1 or Fax			Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm															
City/Province:		Email 2			For tests that can not be performed according to the service level selected, you will be contacted.															
Postal Code:		Email 3			<b>Analysis Request</b>															
<b>Invoice To</b>		<b>Invoice Distribution</b>			<table border="1"> <tr> <td colspan="4">Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below</td> </tr> <tr> <td colspan="4" style="text-align: center;">           NUMBER OF CONTAINERS            As Per Q.74326         </td> </tr> <tr> <td colspan="4" style="text-align: center;"> <b>SAMPLES ON HOLD</b>            SUSPECTED HAZARD (see Special Instructions)         </td> </tr> </table>				Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below				NUMBER OF CONTAINERS As Per Q.74326				<b>SAMPLES ON HOLD</b> SUSPECTED HAZARD (see Special Instructions)			
Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below																				
NUMBER OF CONTAINERS As Per Q.74326																				
<b>SAMPLES ON HOLD</b> SUSPECTED HAZARD (see Special Instructions)																				
Same as Report To <input type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution: <input type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX																		
Copy of Invoice with Report <input type="checkbox"/> YES <input type="checkbox"/> NO		Email 1 or Fax																		
Company:		Email 2																		
Contact:																				
<b>Project Information</b>		<b>Oil and Gas Required Fields (client use)</b>																		
ALS Account # / Quote #: <u>Q74326</u>		AFE/Cost Center:	PO#																	
Job #:		Major/Minor Code:	Routing Code:																	
PO / AFE:		Requisitioner:																		
LSD:		Location:																		
ALS Lab Work Order # (lab use only):		ALS Contact: <u>A. Springer</u>	Sampler: <u>K. Hort</u>																	
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type																
	<u>SHC3</u>	<u>29-09-19</u>	<u>08:30</u>	<u>Water</u>																
	<u>SHCR3</u>		<u>09:00</u>																	
	<u>JM14</u>		<u>10:50</u>																	
	<u>JM6</u>		<u>11:30</u>																	
	<u>JM11</u>		<u>11:50</u>																	
	<u>JM5</u>		<u>12:10</u>																	
	<u>TMF1</u>		<u>12:40</u>																	
	<u>JM26</u>		<u>14:00</u>																	
	<u>SHC5</u>		<u>14:50</u>																	
	<u>JM7</u>		<u>15:20</u>																	
	<u>JM13</u>		<u>15:30</u>																	
	<u>JM3</u>	<u>29-09-19</u>	<u>15:40</u>	<u>Water</u>																
<b>Drinking Water (DW) Samples (client use)</b>		<b>Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)</b>			<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>															
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO					Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>															
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO					Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>															
					Cooling Initiated <input type="checkbox"/>															
					INITIAL COOLER TEMPERATURES °C		FINAL COOLER TEMPERATURES °C													
							<u>3</u>													
<b>SHIPMENT RELEASE (client use)</b>		<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>			<b>FINAL SHIPMENT RECEPTION (lab use only)</b>															
Released by: <u>Kimberley Hort</u>		Date: <u>Sep 30, 2019</u>	Time: <u>08:00</u>	Received by:	Date: <u>Oct 1</u>	Time: <u>2045</u>														

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JUNE 2018 FRONT

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.







ERM Consultants Canada Ltd.  
ATTN: Elizabeth Boyle  
1500-1111 West Hastings Street  
Vancouver BC V6E 2J3

Date Received: 03-OCT-19  
Report Date: 17-OCT-19 12:26 (MT)  
Version: FINAL

Client Phone: 604-689-9460

## Certificate of Analysis

Lab Work Order #: L2359242  
Project P.O. #: NOT SUBMITTED  
Job Reference: 0492759-0004  
C of C Numbers: 17-763278  
Legal Site Desc:

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Amber Springer, B.Sc  
Account Manager

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ADDRESS: 8081 Lougheed Hwy, Suite 100, Burnaby, BC V5A 1W9 Canada | Phone: +1 604 253 4188 | Fax: +1 604 253 6700  
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## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2359242-1	L2359242-2	L2359242-3	L2359242-4	L2359242-5
		Description	Water	Water	Water	Water	Water
		Sampled Date	30-SEP-19	30-SEP-19	30-SEP-19	30-SEP-19	30-SEP-19
		Sampled Time	09:14	08:50	08:40	09:40	08:30
		Client ID	JM10	JM1-SEEPAGE	JM1	JM2	JM1-ALT
Grouping	Analyte						
<b>WATER</b>							
<b>Physical Tests</b>	Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
	Conductivity (uS/cm)	138	259	122	741	333	
	Hardness (as CaCO3) (mg/L)	61.6	129	57.1	353	165	
	pH (pH)	7.91	8.00	7.90	4.78	7.97	
	Total Suspended Solids (mg/L)	6.0	<3.0	<3.0	23.3	9.1	
	Total Dissolved Solids (mg/L)	97	183	83	618	222	
	Turbidity (NTU)	2.13	0.37	<0.10	15.3	9.77	
<b>Anions and Nutrients</b>	Acidity (as CaCO3) (mg/L)	2.1	<2.0	<2.0	32.5	2.3	
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	46.5	79.3	45.9	<1.0	77.8	
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Total (as CaCO3) (mg/L)	46.5	79.3	45.9	<1.0	77.8	
	Ammonia, Total (as N) (mg/L)	0.0152	<0.0050	<0.0050	0.0124	<0.0050	
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.25 <sup>DLDS</sup>	<0.050	
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<2.5 <sup>DLDS</sup>	<0.50	
	Fluoride (F) (mg/L)	<0.020	0.021	<0.020	0.12	0.051	
	Nitrate (as N) (mg/L)	0.0343	0.0297	<0.0050	0.136	<0.0050	
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0050 <sup>DLDS</sup>	<0.0010	
	Total Kjeldahl Nitrogen (mg/L)	0.068	<0.050	<0.050	<0.050 <sup>TKNI</sup>	<0.050	
	Total Nitrogen (mg/L)	0.081	0.067	0.035	0.151	0.032	
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	0.0020	<0.0010 <sup>DLM</sup>	<0.0010	
	Phosphorus (P)-Total (mg/L)	0.0076	0.0031	0.0031	<0.0050	0.0150	
Sulfate (SO4) (mg/L)	21.5	51.9	15.1	396	95.7		
<b>Cyanides</b>	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
	Cyanide, Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
	Cyanide, Free (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
<b>Organic / Inorganic Carbon</b>	Dissolved Organic Carbon (mg/L)	<0.50	<0.50	<0.50	1.54	<0.50	
	Total Organic Carbon (mg/L)	<0.50	<0.50	1.75	1.36	<0.50	
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	0.0913	0.0143	0.0128	8.90	0.381	
	Antimony (Sb)-Total (mg/L)	<0.00010	0.00011	<0.00010	<0.00010	0.00012	
	Arsenic (As)-Total (mg/L)	0.00029	0.00010	0.00012	0.00065	0.00122	
	Barium (Ba)-Total (mg/L)	0.0526	0.0501	0.0251	0.0273	0.0247	
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	0.00072	<0.00010	
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010	
	Cadmium (Cd)-Total (mg/L)	0.0000179	0.0000311	0.0000620	0.00769	0.00687	

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2359242-6	L2359242-7	L2359242-8	L2359242-9	L2359242-10
		Description	Water	Water	Water	Water	Water
		Sampled Date	30-SEP-19	30-SEP-19	30-SEP-19	30-SEP-19	30-SEP-19
		Sampled Time	10:00	10:30	10:40	11:10	
		Client ID	JM2-SEEPAGE	JM4	SHC1	JM12	DUP2
Grouping	Analyte						
<b>WATER</b>							
<b>Physical Tests</b>	Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	<5.0	
	Conductivity (uS/cm)	725	337	156	425	153	
	Hardness (as CaCO3) (mg/L)	356	157	69.2	196	68.1	
	pH (pH)	5.00	7.70	7.88	7.81	7.91	
	Total Suspended Solids (mg/L)	23.9	<3.0	4.7	3.5	3.7	
	Total Dissolved Solids (mg/L)	622	245	94	311	95	
	Turbidity (NTU)	17.2	3.38	3.21	4.94	1.91	
<b>Anions and Nutrients</b>	Acidity (as CaCO3) (mg/L)	19.1	2.5	<2.0	2.3	<2.0	
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	<1.0	38.0	46.2	46.5	45.8	
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	
	Alkalinity, Total (as CaCO3) (mg/L)	<1.0	38.0	46.2	46.5	45.8	
	Ammonia, Total (as N) (mg/L)	0.0126	<0.0050	<0.0050	<0.0050	<0.0050	
	Bromide (Br) (mg/L)	<0.25 <sup>DLDS</sup>	<0.050	<0.050	<0.050	<0.050	
	Chloride (Cl) (mg/L)	<2.5 <sup>DLDS</sup>	<0.50	<0.50	<0.50	<0.50	
	Fluoride (F) (mg/L)	<0.10 <sup>DLDS</sup>	0.037	<0.020	0.039	<0.020	
	Nitrate (as N) (mg/L)	0.141	0.209	0.0210	0.137	0.0208	
	Nitrite (as N) (mg/L)	<0.0050 <sup>DLDS</sup>	0.0013	<0.0010	<0.0010	<0.0010	
	Total Kjeldahl Nitrogen (mg/L)	0.064 <sup>TKNI</sup>	0.098	<0.050	<0.050	<0.050	
	Total Nitrogen (mg/L)	0.146	0.286	0.060	0.193	0.063	
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Phosphorus (P)-Total (mg/L)	<0.0050 <sup>DLM</sup>	<0.0020	0.0075	<0.0020	0.0076	
Sulfate (SO4) (mg/L)	384	125	29.9	163	29.1		
<b>Cyanides</b>	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
	Cyanide, Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
	Cyanide, Free (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
<b>Organic / Inorganic Carbon</b>	Dissolved Organic Carbon (mg/L)	1.33	0.74	<0.50	0.77	<0.50	
	Total Organic Carbon (mg/L)	1.17	<0.50	1.03	<0.50	<0.50	
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	8.35	0.355	0.269	0.330	0.269	
	Antimony (Sb)-Total (mg/L)	<0.00010	0.00011	<0.00010	0.00011	<0.00010	
	Arsenic (As)-Total (mg/L)	0.00059	0.00024	0.00023	0.00019	0.00025	
	Barium (Ba)-Total (mg/L)	0.0262	0.0377	0.0505	0.0345	0.0498	
	Beryllium (Be)-Total (mg/L)	0.00064	<0.00010	<0.00010	<0.00010	<0.00010	
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010	
	Cadmium (Cd)-Total (mg/L)	0.00738	0.00101	0.000187	0.00131	0.000173	

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

# ALS ENVIRONMENTAL ANALYTICAL REPORT

	<b>Sample ID</b> <b>Description</b> <b>Sampled Date</b> <b>Sampled Time</b> <b>Client ID</b>	L2359242-11			
		Water			
		30-SEP-19			
		F ELD BLANK			
Grouping	Analyte				
<b>WATER</b>					
<b>Physical Tests</b>	Colour, True (CU)	<5.0			
	Conductivity (uS/cm)	<2.0			
	Hardness (as CaCO3) (mg/L)	<0.50			
	pH (pH)	5.74			
	Total Suspended Solids (mg/L)	<3.0			
	Total Dissolved Solids (mg/L)	<10			
	Turbidity (NTU)	<0.10			
<b>Anions and Nutrients</b>	Acidity (as CaCO3) (mg/L)	2.0			
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	<1.0			
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0			
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0			
	Alkalinity, Total (as CaCO3) (mg/L)	<1.0			
	Ammonia, Total (as N) (mg/L)	<0.0050			
	Bromide (Br) (mg/L)	<0.050			
	Chloride (Cl) (mg/L)	<0.50			
	Fluoride (F) (mg/L)	<0.020			
	Nitrate (as N) (mg/L)	<0.0050			
	Nitrite (as N) (mg/L)	<0.0010			
	Total Kjeldahl Nitrogen (mg/L)	<0.050			
	Total Nitrogen (mg/L)	<0.030			
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010			
	Phosphorus (P)-Total (mg/L)	<0.0020			
	Sulfate (SO4) (mg/L)	<0.30			
	<b>Cyanides</b>	Cyanide, Weak Acid Diss (mg/L)	<0.0050		
Cyanide, Total (mg/L)		<0.0050			
Cyanide, Free (mg/L)		<0.0050			
<b>Organic / Inorganic Carbon</b>	Dissolved Organic Carbon (mg/L)	<0.50			
	Total Organic Carbon (mg/L)	<0.50			
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	<0.0030			
	Antimony (Sb)-Total (mg/L)	<0.00010			
	Arsenic (As)-Total (mg/L)	<0.00010			
	Barium (Ba)-Total (mg/L)	<0.00010			
	Beryllium (Be)-Total (mg/L)	<0.00010			
	Bismuth (Bi)-Total (mg/L)	<0.000050			
	Boron (B)-Total (mg/L)	<0.010			
	Cadmium (Cd)-Total (mg/L)	<0.000050			

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2359242-1	L2359242-2	L2359242-3	L2359242-4	L2359242-5
		Description	Water	Water	Water	Water	Water
		Sampled Date	30-SEP-19	30-SEP-19	30-SEP-19	30-SEP-19	30-SEP-19
		Sampled Time	09:14	08:50	08:40	09:40	08:30
		Client ID	JM10	JM1-SEEPAGE	JM1	JM2	JM1-ALT
Grouping	Analyte						
<b>WATER</b>							
<b>Total Metals</b>	Calcium (Ca)-Total (mg/L)		22.6	44.4	20.0	113	52.2
	Chromium (Cr)-Total (mg/L)		0.00017	0.00030	0.00019	0.00023	0.00027
	Cobalt (Co)-Total (mg/L)		<0.00010	<0.00010	<0.00010	0.0237	0.00243
	Copper (Cu)-Total (mg/L)		<0.00050	<0.00050	0.00124	2.54	0.252
	Iron (Fe)-Total (mg/L)		0.118	<0.030	<0.030	0.835	3.56
	Lead (Pb)-Total (mg/L)		0.000744	0.000058	<0.000050	0.00395	0.00312
	Lithium (Li)-Total (mg/L)		<0.0010	<0.0010	<0.0010	0.0046	0.0016
	Magnesium (Mg)-Total (mg/L)		1.72	4.17	1.76	28.6	8.49
	Manganese (Mn)-Total (mg/L)		0.0153	0.00156	0.00419	4.04	0.437
	Mercury (Hg)-Total (mg/L)		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)		0.000651	0.000521	0.000392	0.000217	0.000243
	Nickel (Ni)-Total (mg/L)		<0.00050	<0.00050	<0.00050	0.00740	0.00074
	Phosphorus (P)-Total (mg/L)		<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Total (mg/L)		1.45	2.64	1.16	3.75	1.74
	Selenium (Se)-Total (mg/L)		0.000105	0.000208	0.000119	0.000594	0.000448
	Silicon (Si)-Total (mg/L)		1.31	1.47	1.27	4.21	2.01
	Silver (Ag)-Total (mg/L)		<0.000010	<0.000010	<0.000010	0.000029	0.000021
	Sodium (Na)-Total (mg/L)		<2.0	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Total (mg/L)		0.190	0.206	0.181	0.660	0.321
	Sulfur (S)-Total (mg/L)		6.30	18.4	4.95	139	32.9
	Thallium (Tl)-Total (mg/L)		<0.000010	<0.000010	<0.000010	0.000016	0.000012
	Tin (Sn)-Total (mg/L)		<0.00010	<0.00010	<0.00010	0.00012	<0.00010
	Titanium (Ti)-Total (mg/L)		<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Total (mg/L)		0.000273	0.000089	0.000049	0.000823	0.000342
	Vanadium (V)-Total (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Total (mg/L)		<0.0030	<0.0030	0.0036	0.873	1.16
<b>Dissolved Metals</b>	Dissolved Mercury Filtration Location		LAB	LAB	LAB	LAB	LAB
	Dissolved Metals Filtration Location		LAB	LAB	LAB	LAB	LAB
	Aluminum (Al)-Dissolved (mg/L)		0.0082	<0.0030	0.0064	3.52	0.0325
	Antimony (Sb)-Dissolved (mg/L)		<0.00010	0.00012	<0.00010	<0.00010	0.00013
	Arsenic (As)-Dissolved (mg/L)		0.00024	<0.00010	0.00010	0.00057	<0.00010
	Barium (Ba)-Dissolved (mg/L)		0.0533	0.0527	0.0275	0.0286	0.0224
	Beryllium (Be)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	0.00056	<0.00010
	Bismuth (Bi)-Dissolved (mg/L)		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)		<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)		0.0000068	0.0000318	0.0000578	0.00783	0.00493
	Calcium (Ca)-Dissolved (mg/L)		21.8	44.0	19.8	96.6	50.6

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2359242-6	L2359242-7	L2359242-8	L2359242-9	L2359242-10
		Description	Water	Water	Water	Water	Water
		Sampled Date	30-SEP-19	30-SEP-19	30-SEP-19	30-SEP-19	30-SEP-19
		Sampled Time	10:00	10:30	10:40	11:10	
		Client ID	JM2-SEEPAGE	JM4	SHC1	JM12	DUP2
Grouping	Analyte						
<b>WATER</b>							
<b>Total Metals</b>	Calcium (Ca)-Total (mg/L)		102	50.5	24.0	74.5	23.7
	Chromium (Cr)-Total (mg/L)		0.00024	0.00035	0.00018	0.00032	0.00020
	Cobalt (Co)-Total (mg/L)		0.0211	0.00230	0.00058	0.00279	0.00055
	Copper (Cu)-Total (mg/L)		2.29	0.226	0.0469	0.213	0.0465
	Iron (Fe)-Total (mg/L)		1.38	1.47	0.126	1.29	0.119
	Lead (Pb)-Total (mg/L)		0.00445	0.00189	0.000729	0.00166	0.000694
	Lithium (Li)-Total (mg/L)		0.0041	<0.0010	<0.0010	0.0012	<0.0010
	Magnesium (Mg)-Total (mg/L)		28.0	6.94	2.23	8.14	2.22
	Manganese (Mn)-Total (mg/L)		4.03	0.607	0.0915	0.806	0.0887
	Mercury (Hg)-Total (mg/L)		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)		0.000231	0.000167	0.000580	0.000171	0.000543
	Nickel (Ni)-Total (mg/L)		0.00721	0.00080	<0.00050	0.00102	<0.00050
	Phosphorus (P)-Total (mg/L)		<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Total (mg/L)		3.81	2.19	1.54	2.79	1.56
	Selenium (Se)-Total (mg/L)		0.000553	0.000238	0.000134	0.000171	0.000170
	Silicon (Si)-Total (mg/L)		3.85	2.51	1.36	2.69	1.38
	Silver (Ag)-Total (mg/L)		0.000028	0.000018	<0.000010	0.000023	<0.000010
	Sodium (Na)-Total (mg/L)		<2.0	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Total (mg/L)		0.587	0.336	0.176	0.473	0.181
	Sulfur (S)-Total (mg/L)		133	41.0	9.93	56.4	9.90
	Thallium (Tl)-Total (mg/L)		0.000015	0.000010	<0.000010	0.000012	<0.000010
	Tin (Sn)-Total (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)		<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Total (mg/L)		0.000838	0.000260	0.000260	0.000242	0.000243
	Vanadium (V)-Total (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Total (mg/L)		0.880	0.129	0.0210	0.138	0.0194
<b>Dissolved Metals</b>	Dissolved Mercury Filtration Location		LAB	LAB	LAB	LAB	LAB
	Dissolved Metals Filtration Location		LAB	LAB	LAB	LAB	LAB
	Aluminum (Al)-Dissolved (mg/L)		1.81	0.010	0.0323	0.0161	0.0309
	Antimony (Sb)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)		0.00046	<0.00010	0.00014	<0.00010	0.00013
	Barium (Ba)-Dissolved (mg/L)		0.0294	0.0409	0.0514	0.0364	0.0514
	Beryllium (Be)-Dissolved (mg/L)		0.00038	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Dissolved (mg/L)		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)		<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)		0.00716	0.000936	0.000176	0.00118	0.000158
	Calcium (Ca)-Dissolved (mg/L)		96.8	49.9	23.9	63.8	23.4

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

# ALS ENVIRONMENTAL ANALYTICAL REPORT

	<b>Sample ID</b> <b>Description</b> <b>Sampled Date</b> <b>Sampled Time</b> <b>Client ID</b>	L2359242-11			
		Water			
		30-SEP-19			
		F ELD BLANK			
Grouping	Analyte				
<b>WATER</b>					
<b>Total Metals</b>	Calcium (Ca)-Total (mg/L)	<0.050			
	Chromium (Cr)-Total (mg/L)	0.00019 <sup>RRV</sup>			
	Cobalt (Co)-Total (mg/L)	<0.00010			
	Copper (Cu)-Total (mg/L)	<0.00050			
	Iron (Fe)-Total (mg/L)	<0.030			
	Lead (Pb)-Total (mg/L)	<0.000050			
	Lithium (Li)-Total (mg/L)	<0.0010			
	Magnesium (Mg)-Total (mg/L)	<0.0050			
	Manganese (Mn)-Total (mg/L)	<0.00010			
	Mercury (Hg)-Total (mg/L)	<0.0000050			
	Molybdenum (Mo)-Total (mg/L)	<0.000050			
	Nickel (Ni)-Total (mg/L)	<0.00050			
	Phosphorus (P)-Total (mg/L)	<0.30			
	Potassium (K)-Total (mg/L)	<0.050			
	Selenium (Se)-Total (mg/L)	<0.000050			
	Silicon (Si)-Total (mg/L)	<0.10			
	Silver (Ag)-Total (mg/L)	<0.000010			
	Sodium (Na)-Total (mg/L)	<2.0			
	Strontium (Sr)-Total (mg/L)	<0.00020			
	Sulfur (S)-Total (mg/L)	<0.50			
	Thallium (Tl)-Total (mg/L)	<0.000010			
	Tin (Sn)-Total (mg/L)	<0.00010			
	Titanium (Ti)-Total (mg/L)	<0.010			
	Uranium (U)-Total (mg/L)	<0.000010			
	Vanadium (V)-Total (mg/L)	<0.00050			
	Zinc (Zn)-Total (mg/L)	<0.0030			
<b>Dissolved Metals</b>	Dissolved Mercury Filtration Location	LAB			
	Dissolved Metals Filtration Location	LAB			
	Aluminum (Al)-Dissolved (mg/L)	<0.0030			
	Antimony (Sb)-Dissolved (mg/L)	<0.00010			
	Arsenic (As)-Dissolved (mg/L)	<0.00010			
	Barium (Ba)-Dissolved (mg/L)	<0.00010			
	Beryllium (Be)-Dissolved (mg/L)	<0.00010			
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050			
	Boron (B)-Dissolved (mg/L)	<0.010			
	Cadmium (Cd)-Dissolved (mg/L)	<0.0000050			
	Calcium (Ca)-Dissolved (mg/L)	<0.050			

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID	L2359242-1 Water 30-SEP-19 09:14 JM10	L2359242-2 Water 30-SEP-19 08:50 JM1-SEEPAGE	L2359242-3 Water 30-SEP-19 08:40 JM1	L2359242-4 Water 30-SEP-19 09:40 JM2	L2359242-5 Water 30-SEP-19 08:30 JM1-ALT	
Grouping	Analyte					
<b>WATER</b>						
<b>Dissolved Metals</b>	Chromium (Cr)-Dissolved (mg/L)	<0.00010	0.00010	0.00011	<0.00010	<0.00010
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	0.0243	0.00230
	Copper (Cu)-Dissolved (mg/L)	<0.00050	<0.00050	0.00106	2.26	0.0173
	Iron (Fe)-Dissolved (mg/L)	<0.030	<0.030	<0.030	0.040	<0.030
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	0.00245	<0.000050
	Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	0.0041	0.0016
	Magnesium (Mg)-Dissolved (mg/L)	1.76	4.70	1.85	27.2	9.27
	Manganese (Mn)-Dissolved (mg/L)	0.00165	<0.00010	0.00375	3.71	0.430
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000592	0.000543	0.000329	0.000090	0.000220
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	0.00756	0.00076
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)	1.41	2.78	1.21	3.78	1.75
	Selenium (Se)-Dissolved (mg/L)	0.000133	0.000256	0.000098	0.000589	0.000394
	Silicon (Si)-Dissolved (mg/L)	1.20	1.48	1.30	3.76	1.91
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Strontium (Sr)-Dissolved (mg/L)	0.170	0.200	0.176	0.604	0.299
	Sulfur (S)-Dissolved (mg/L)	6.96	17.0	4.64	128	30.8
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	0.000018	0.000012
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	0.000279	0.000092	0.000048	0.000612	0.000186
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010	0.0033	1.01	0.908

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.



## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	Description	Sampled Date	Sampled Time	Client ID	L2359242-6	L2359242-7	L2359242-8	L2359242-9	L2359242-10
					Water	Water	Water	Water	Water
		30-SEP-19	10:00	JM2-SEEPAGE	30-SEP-19	30-SEP-19	30-SEP-19	30-SEP-19	30-SEP-19
					10:00	10:30	10:40	11:10	
					JM2-SEEPAGE	JM4	SHC1	JM12	DUP2
Grouping	Analyte								
<b>WATER</b>									
<b>Dissolved Metals</b>	Chromium (Cr)-Dissolved (mg/L)	<0.00010	0.00010	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Dissolved (mg/L)	0.0215	0.00230	0.00049	0.00276	0.00048			
	Copper (Cu)-Dissolved (mg/L)	1.97	0.0255	0.0229	0.0281	0.0229			
	Iron (Fe)-Dissolved (mg/L)	0.036	<0.030	<0.030	<0.030	<0.030			
	Lead (Pb)-Dissolved (mg/L)	0.00152	<0.000050	<0.000050	<0.000050	<0.000050			
	Lithium (Li)-Dissolved (mg/L)	0.0044	<0.0010	<0.0010	0.0012	<0.0010			
	Magnesium (Mg)-Dissolved (mg/L)	27.6	7.89	2.32	8.91	2.34			
	Manganese (Mn)-Dissolved (mg/L)	3.56	0.616	0.0770	0.808	0.0761			
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050			
	Molybdenum (Mo)-Dissolved (mg/L)	0.000124	0.000143	0.000547	0.000152	0.000543			
	Nickel (Ni)-Dissolved (mg/L)	0.00721	0.00088	<0.00050	0.00108	<0.00050			
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30			
	Potassium (K)-Dissolved (mg/L)	3.77	2.26	1.50	2.81	1.52			
	Selenium (Se)-Dissolved (mg/L)	0.000512	0.000238	0.000138	0.000217	0.000168			
	Silicon (Si)-Dissolved (mg/L)	3.39	2.41	1.19	2.57	1.19			
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010			
	Sodium (Na)-Dissolved (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0			
	Strontium (Sr)-Dissolved (mg/L)	0.603	0.336	0.176	0.415	0.175			
	Sulfur (S)-Dissolved (mg/L)	128	41.0	9.41	55.1	9.64			
	Thallium (Tl)-Dissolved (mg/L)	0.000017	0.000010	<0.000010	0.000013	<0.000010			
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010			
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010			
	Uranium (U)-Dissolved (mg/L)	0.000464	0.000145	0.000058	0.000133	0.000063			
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050			
	Zinc (Zn)-Dissolved (mg/L)	1.01	0.126	0.0169	0.129	0.0167			

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

# ALS ENVIRONMENTAL ANALYTICAL REPORT

	<b>Sample ID</b> <b>Description</b> <b>Sampled Date</b> <b>Sampled Time</b> <b>Client ID</b>	L2359242-11	Water	30-SEP-19	F ELD BLANK
Grouping	Analyte				
<b>WATER</b>					
<b>Dissolved Metals</b>	Chromium (Cr)-Dissolved (mg/L)	<0.00010			
	Cobalt (Co)-Dissolved (mg/L)	<0.00010			
	Copper (Cu)-Dissolved (mg/L)	<0.00050			
	Iron (Fe)-Dissolved (mg/L)	<0.030			
	Lead (Pb)-Dissolved (mg/L)	<0.000050			
	Lithium (Li)-Dissolved (mg/L)	<0.0010			
	Magnesium (Mg)-Dissolved (mg/L)	<0.0050			
	Manganese (Mn)-Dissolved (mg/L)	<0.00010			
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050			
	Molybdenum (Mo)-Dissolved (mg/L)	<0.000050			
	Nickel (Ni)-Dissolved (mg/L)	<0.00050			
	Phosphorus (P)-Dissolved (mg/L)	<0.30			
	Potassium (K)-Dissolved (mg/L)	<0.050			
	Selenium (Se)-Dissolved (mg/L)	<0.000050			
	Silicon (Si)-Dissolved (mg/L)	<0.050			
	Silver (Ag)-Dissolved (mg/L)	<0.000010			
	Sodium (Na)-Dissolved (mg/L)	<2.0			
	Strontium (Sr)-Dissolved (mg/L)	<0.00020			
	Sulfur (S)-Dissolved (mg/L)	<0.50			
	Thallium (Tl)-Dissolved (mg/L)	<0.000010			
	Tin (Sn)-Dissolved (mg/L)	<0.00010			
	Titanium (Ti)-Dissolved (mg/L)	<0.010			
	Uranium (U)-Dissolved (mg/L)	<0.000010			
	Vanadium (V)-Dissolved (mg/L)	<0.00050			
	Zinc (Zn)-Dissolved (mg/L)	<0.0010			

\* Please refer to the Reference Information section for an explanation of any qualifiers detected.

## Reference Information

### Qualifiers for Individual Samples Listed:

Sample Number	Client Sample ID	Qualifier	Description
L2359242-10	DUP2	WSMD	Water sample(s) for dissolved mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.
L2359242-4	JM2	WSMT	Water sample(s) for total mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.

### QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Laboratory Control Sample	Lithium (Li)-Dissolved	MES	L2359242-1, -10, -11, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Total Organic Carbon	MS-B	L2359242-10, -11, -3, -4, -5, -6, -7, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2359242-1, -10, -11, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2359242-1, -10, -11, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2359242-1, -10, -11, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2359242-1, -10, -11, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2359242-1, -10, -11, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Aluminum (Al)-Total	MS-B	L2359242-1, -10, -11, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Arsenic (As)-Total	MS-B	L2359242-11
Matrix Spike	Barium (Ba)-Total	MS-B	L2359242-11
Matrix Spike	Calcium (Ca)-Total	MS-B	L2359242-11
Matrix Spike	Calcium (Ca)-Total	MS-B	L2359242-11
Matrix Spike	Iron (Fe)-Total	MS-B	L2359242-1, -10, -11, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2359242-1, -10, -11, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2359242-11
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2359242-11
Matrix Spike	Manganese (Mn)-Total	MS-B	L2359242-1, -10, -11, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Total	MS-B	L2359242-11
Matrix Spike	Strontium (Sr)-Total	MS-B	L2359242-11
Matrix Spike	Strontium (Sr)-Total	MS-B	L2359242-11
Matrix Spike	Titanium (Ti)-Total	MS-B	L2359242-1, -10, -11, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Phosphorus (P)-Total	MS-B	L2359242-10, -11, -3, -4, -5, -6, -7, -8, -9

### Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis
TKNI	TKN result may be biased low due to Nitrate interference. Nitrate-N is > 10x TKN.

### Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
<b>ACY-PCT-VA</b>	Water	Acidity by Automatic Titration	APHA 2310 Acidity
This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.			
Samples of industrial wastes, acid mine drainage, or other solutions that contain appreciable amounts of hydrolyzable metal ions such as aluminum, iron, and manganese may require hot peroxide treatment to ensure oxidation and hydrolysis of reduced forms of polyvalent cations. Acidity results may be highly variable if this procedure is not followed. Results in this report for 'Acidity (as CaCO3)' have not been peroxide treated.			
<b>ALK-TITR-VA</b>	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity
This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.			
<b>BR-L-IC-N-VA</b>	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			

## Reference Information

<b>CARBONS-DOC-VA</b>	Water	Dissolved organic carbon by combustion	APHA 5310B
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.			
<b>CARBONS-TOC-VA</b>	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
<b>CL-IC-N-VA</b>	Water	Chloride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
<b>CN-FREE-CFA-VA</b>	Water	Free Cyanide in water by CFA	ASTM 7237
This analysis is carried out using procedures adapted from ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.			
<b>CN-T-CFA-VA</b>	Water	Total Cyanide in water by CFA	ISO 14403:2002
This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.			
<b>CN-WAD-CFA-VA</b>	Water	Weak Acid Diss. Cyanide in water by CFA	APHA 4500-CN CYANIDE
This analysis is carried out using procedures adapted from APHA Method 4500-CN I. "Weak Acid Dissociable Cyanide". Weak Acid Dissociable (WAD) cyanide is determined by in-line sample distillation with final determination by colourimetric analysis.			
<b>COLOUR-TRUE-VA</b>	Water	Colour (True) by Spectrometer	BCMOE Colour Single Wavelength
This analysis is carried out using procedures adapted from British Columbia Environmental Manual "Colour- Single Wavelength." Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method.			
Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.			
<b>EC-PCT-VA</b>	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.
This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.			
<b>EC-SCREEN-VA</b>	Water	Conductivity Screen (Internal Use Only)	APHA 2510
Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.			
<b>F-IC-N-VA</b>	Water	Fluoride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
<b>HARDNESS-CALC-VA</b>	Water	Hardness	APHA 2340B
Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.			
<b>HG-D-CVAA-VA</b>	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)
Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.			
<b>HG-T-CVAA-VA</b>	Water	Total Mercury in Water by CVAAS or CVAFS	EPA 1631E (mod)
Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.			
<b>MET-D-CCMS-VA</b>	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)
Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.			
Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.			
<b>MET-T-CCMS-VA</b>	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)
Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.			
Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.			
<b>N-T-COL-VA</b>	Water	Total Nitrogen in water by Colour	APHA4500-P(J)/NEMI9171/USGS03-4174
This analysis is carried out using procedures adapted from APHA Method 4500-P (J) "Persulphate Method for Simultaneous Determination of Total Nitrogen and Total Phosphorus" and National Environmental Methods Index - Nemi method 5735.			
<b>NH3-F-VA</b>	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

## Reference Information

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

**NO2-L-IC-N-VA** Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**NO3-L-IC-N-VA** Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**P-T-PRES-COL-VA** Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

**PH-PCT-VA** Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

**PO4-DO-COL-VA** Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

**SO4-IC-N-VA** Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**TDS-VA** Water Total Dissolved Solids by Gravimetric APHA 2540 C - GRAVIMETRIC

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

**TKN-F-VA** Water TKN in Water by Fluorescence APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

**TSS-VA** Water Total Suspended Solids by Gravimetric APHA 2540 D - GRAVIMETRIC

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.

Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

**TURBIDITY-VA** Water Turbidity by Meter APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

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\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

*The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:*

---

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

---

**Chain of Custody Numbers:**

17-763278

## Reference Information

### GLOSSARY OF REPORT TERMS

*Surrogate* - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

*mg/kg* - milligrams per kilogram based on dry weight of sample.

*mg/kg wwt* - milligrams per kilogram based on wet weight of sample.

*mg/kg lwt* - milligrams per kilogram based on lipid-adjusted weight of sample.

*mg/L* - milligrams per litre.

*<* - Less than.

*D.L.* - The reported Detection Limit, also known as the Limit of Reporting (LOR).

*N/A* - Result not available. Refer to qualifier code and definition for explanation.

*Test results reported relate only to the samples as received by the laboratory.*

**UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.**

*Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.*



Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com



L2359242-COFC

COC Number: 17-763278

Page 1 of 1

<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>		<b>Select Service Level Below - Contact your AM to confirm all E&amp;P TATs (surcharges may apply)</b>							
Company: <u>ERM Cons. Hants Canada</u>		Select Report Format: <input type="checkbox"/> PDF <input type="checkbox"/> EXCEL <input type="checkbox"/> EDC (DIGITAL)		Regular [R] <input type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply							
Contact: <u>As per Quote: Q14326</u>		Quality Control (QC) Report with Report <input type="checkbox"/> YES <input type="checkbox"/> NO		4 day [P4-20%] <input type="checkbox"/>							
Phone: <u>As per Quote: Q14326</u>		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked		3 day [P3-25%] <input type="checkbox"/>							
Company address below will appear on the final report		Select Distribution: <input type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX		2 day [P2-50%] <input type="checkbox"/>							
Street:		Email 1 or Fax:		Date and Time Required for all E&P TATs: dd-mm-yy hh:mm							
City/Province:		Email 2:		For tests that can not be performed according to the service level selected, you will be contacted.							
Postal Code:		Email 3:		<b>Analysis Request</b>							
Invoice To: Same as Report To <input type="checkbox"/> YES <input type="checkbox"/> NO		Invoice Distribution		<table border="1"> <tr> <td colspan="2">Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below</td> </tr> <tr> <td colspan="2" style="text-align: center;"> <div style="display: flex; justify-content: space-between;"> <span>NUMBER OF CONTAINERS</span> <span>As per: Q14326</span> </div> </td> </tr> <tr> <td colspan="2" style="text-align: center;"> <div style="display: flex; justify-content: space-between;"> <span>SAMPLES ON HOLD</span> <span>SUSPECTED HAZARD (see Special Instructions)</span> </div> </td> </tr> </table>		Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below		<div style="display: flex; justify-content: space-between;"> <span>NUMBER OF CONTAINERS</span> <span>As per: Q14326</span> </div>		<div style="display: flex; justify-content: space-between;"> <span>SAMPLES ON HOLD</span> <span>SUSPECTED HAZARD (see Special Instructions)</span> </div>	
Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below											
<div style="display: flex; justify-content: space-between;"> <span>NUMBER OF CONTAINERS</span> <span>As per: Q14326</span> </div>											
<div style="display: flex; justify-content: space-between;"> <span>SAMPLES ON HOLD</span> <span>SUSPECTED HAZARD (see Special Instructions)</span> </div>											
Copy of Invoice with Report <input type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX									
Company:		Email 1 or Fax: <u>elizabeth@seabridgegold.net</u>									
Contact:		Email 2:									
<b>Project Information</b>		<b>Oil and Gas Required Fields (client use)</b>									
ALS Account # / Quote #:		AFE/Cost Center:									
Job #: <u>0492759-0004</u>		Major/Minor Code:									
PO / AFE:		Routing Code:									
LSD:		Requisitioner:									
ALS Lab Work Order # (lab use only):		Location:									
ALS Contact: <u>A. Springer</u>		Sampler: <u>K. Hort</u>									
<b>ALS Sample # (lab use only)</b>	<b>Sample Identification and/or Coordinates (This description will appear on the report)</b>	<b>Date (dd-mm-yy)</b>	<b>Time (hh:mm)</b>	<b>Sample Type</b>							
	<u>JM 10</u>	<u>30-Sep-19</u>	<u>09:14</u>	<u>Water</u>	<u>8</u>						
	<u>JM 1 - Seepage</u>		<u>08:50</u>		<u>8</u>						
	<u>JM 1</u>		<u>08:40</u>		<u>8</u>						
	<u>JM 2</u>		<u>09:40</u>		<u>8</u>						
	<u>JM 1 - alt</u>		<u>08:30</u>		<u>8</u>						
	<u>JM 2 - Seepage</u>		<u>10:00</u>		<u>8</u>						
	<u>JM 4</u>		<u>10:30</u>		<u>8</u>						
	<u>SAC 1</u>		<u>10:40</u>		<u>8</u>						
	<u>JM 12</u>		<u>11:10</u>		<u>8</u>						
	<u>DUP 2</u>				<u>8</u>						
	<u>Field Blank</u>	<u>30-Sep-19</u>		<u>Water</u>	<u>8</u>						
<b>Drinking Water (DW) Samples<sup>1</sup> (client use)</b>		<b>Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)</b>		<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>							
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO				Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>							
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO				Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>							
				Cooling Initiated <input type="checkbox"/>							
				INITIAL COOLER TEMPERATURES °C							
				FINAL COOLER TEMPERATURES °C							
				<u>2, 3, 3°C</u>							
<b>SHIPMENT RELEASE (client use)</b>		<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>		<b>FINAL SHIPMENT RECEPTION (lab use only)</b>							
Released by: <u>Kimberley Hort</u>	Date: <u>Oct 1 2019</u>	Time: <u>08:00</u>	Received by:	Date: <u>3 Oct 19</u>	Time: <u>12:00PM</u>						

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JUNE 2018 FRONT

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.



**Environmental**

## CERTIFICATE OF ANALYSIS

**Work Order** : **VA20B3842**  
**Client** : **ERM Consultants Canada Ltd.**  
**Contact** : Jill Zyla  
**Address** : 3790 Alfred Ave  
Smithers BC Canada V0J 2N0  
**Telephone** : (250) 877-7838  
**Project** : 0539378-0012 (WQ ISKUT)  
**PO** : ----  
**C-O-C number** : 17-841428, 17-841426  
**Sampler** : ----  
**Site** : ----  
**Quote number** : Q74326  
**No. of samples received** : 24  
**No. of samples analysed** : 24

**Page** : 1 of 29  
**Laboratory** : Vancouver - Environmental  
**Account Manager** : Amber Springer  
**Address** : 8081 Lougheed Highway  
Burnaby BC Canada V5A 1W9  
**Telephone** : +1 604 253 4188  
**Date Samples Received** : 28-Aug-2020 10:10  
**Date Analysis Commenced** : 28-Aug-2020  
**Issue Date** : 10-Sep-2020 14:18

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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

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## Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Brieanna Allen	Department Manager - Organics	Organics, Burnaby, British Columbia
Bruna Botti	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
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Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics - Water Quality, Burnaby, British Columbia
Walt Kippenhuck	Team Leader - Inorganics	Inorganics, Waterloo, Ontario



## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
-	No Unit
µg/L	micrograms per litre
µS/cm	Microsiemens per centimetre
CU	colour units
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in reports identified as "**Preliminary Report**" are considered authorized for use.

## Workorder Comments

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
DLQ	Detection Limit raised due to co-eluting interference. GCMS qualifier ion ratio did not meet acceptance criteria.
DTC	Dissolved concentration exceeds total. Results were confirmed by re-analysis.
RRV	Reported result verified by repeat analysis.



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					BR4	BR3	DUP1	DUP2	JM13
Client sampling date / time					22-Aug-2020 14:34	22-Aug-2020 14:53	22-Aug-2020 09:50	22-Aug-2020	23-Aug-2020 09:00
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-001	VA20B3842-002	VA20B3842-003	VA20B3842-004	VA20B3842-005
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
acidity (as CaCO3)	----	E283	2.0	mg/L	<2.0	<2.0	<2.0	<2.0	<2.0
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	43.6	42.9	30.2	35.1	42.5
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	43.6	42.9	30.2	35.1	42.5
colour, true	----	E329	5.0	CU	<5.0	<5.0	<5.0	<5.0	<5.0
conductivity	----	E100	2.0	µS/cm	156	153	103	97.3	136
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	71.6	69.3	46.6	47.6	66.3
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	85.6	84.1	45.2	44.4	61.3
pH	----	E108	0.10	pH units	7.63	7.63	7.39	7.46	7.54
solids, total dissolved [TDS]	----	E162	10	mg/L	103	112	69	65	81
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	183	253	17.9	<3.0	<3.0
turbidity	----	E121	0.10	NTU	75.3	106	7.96	0.97	1.48
<b>Anions and Nutrients</b>									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0154	0.0116	0.0102	0.0190	0.0248
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50
fluoride	16984-48-8	E235.F	0.020	mg/L	0.041	0.041	0.023	<0.020	0.022
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	<0.050	0.052	<0.050	<0.050	0.062
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0834	0.0881	0.0534	0.0453	0.0406
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0105
nitrogen, total	7727-37-9	E366	0.030	mg/L	0.119	0.118	0.076	0.084	0.090
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0015	0.0017	<0.0010	<0.0010	<0.0010
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.216	0.302	0.0200	0.0030	<0.0020
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	30.5	30.4	18.9	13.2	25.1
<b>Cyanides</b>									
cyanide, free	----	E339	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cyanide, strong acid dissociable (total)	----	E333	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cyanide, weak acid dissociable	----	E336	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
<b>Organic / Inorganic Carbon</b>									



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	BR4	BR3	DUP1	DUP2	JM13
Client sampling date / time					22-Aug-2020 14:34	22-Aug-2020 14:53	22-Aug-2020 09:50	22-Aug-2020	23-Aug-2020 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-001	VA20B3842-002	VA20B3842-003	VA20B3842-004	VA20B3842-005	
					Result	Result	Result	Result	Result	
<b>Organic / Inorganic Carbon</b>										
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	2.35	1.75	1.27	0.86	0.75	
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	0.58	0.57	<0.50	0.54	0.80	
<b>Total Metals</b>										
aluminum, total	7429-90-5	E420	0.0030	mg/L	4.98	4.29	0.321	0.0864	0.134	
antimony, total	7440-36-0	E420	0.00010	mg/L	0.00025	0.00021	0.00016	<0.00010	<0.00010	
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00259	0.00217	0.00067	0.00014	0.00016	
barium, total	7440-39-3	E420	0.00010	mg/L	0.112	0.108	0.0420	0.0250	0.0258	
beryllium, total	7440-41-7	E420	0.000020	mg/L	0.000100	0.000072	<0.000020	<0.000020	<0.000020	
bismuth, total	7440-69-9	E420	0.000050	mg/L	0.000075	0.000083	<0.000050	<0.000050	<0.000050	
boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.000320	0.000291	0.000123	0.0000538	0.000293	
calcium, total	7440-70-2	E420	0.050	mg/L	26.1	25.8	15.8	15.7	21.4	
chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	0.00740	0.00666	0.00113	<0.00010	<0.00010	
cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00272	0.00259	0.00026	<0.00010	0.00082	
copper, total	7440-50-8	E420	0.00050	mg/L	0.0205	0.0194	0.00161	0.00980	0.0868	
iron, total	7439-89-6	E420	0.010	mg/L	6.20	5.68	0.417	0.120	0.433	
lead, total	7439-92-1	E420	0.000050	mg/L	0.00686	0.00721	0.00118	0.000516	0.000627	
lithium, total	7439-93-2	E420	0.0010	mg/L	0.0032	0.0030	<0.0010	<0.0010	<0.0010	
magnesium, total	7439-95-4	E420	0.100	mg/L	4.97	4.80	1.41	1.28	1.91	
manganese, total	7439-96-5	E420	0.00010	mg/L	0.255	0.268	0.0400	0.0239	0.146	
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00118	0.000869	0.000380	0.000288	0.000172	
nickel, total	7440-02-0	E420	0.00050	mg/L	0.00521	0.00478	0.00052	<0.00050	<0.00050	
phosphorus, total	7723-14-0	E420	0.050	mg/L	0.246	0.252	<0.050	<0.050	<0.050	
potassium, total	7440-09-7	E420	0.100	mg/L	3.64	3.49	1.42	1.08	1.25	
selenium, total	7782-49-2	E420	0.000050	mg/L	0.000352	0.000356	0.000125	0.000095	0.000087	
silicon, total	7440-21-3	E420	0.10	mg/L	8.84	7.25	1.50	1.62	1.39	
silver, total	7440-22-4	E420	0.000010	mg/L	0.000113	0.000106	0.000010	<0.000010	<0.000010	
sodium, total	7440-23-5	E420	0.050	mg/L	0.977	0.761	0.470	0.592	0.480	
strontium, total	7440-24-6	E420	0.00020	mg/L	0.162	0.150	0.0875	0.0965	0.141	
sulfur, total	7704-34-9	E420	0.50	mg/L	11.3	10.4	6.23	4.73	8.64	



## Analytical Results

Sub-Matrix: Water					Client sample ID	BR4	BR3	DUP1	DUP2	JM13
(Matrix: Water)										
Client sampling date / time					22-Aug-2020 14:34	22-Aug-2020 14:53	22-Aug-2020 09:50	22-Aug-2020	23-Aug-2020 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-001	VA20B3842-002	VA20B3842-003	VA20B3842-004	VA20B3842-005	
					Result	Result	Result	Result	Result	
<b>Total Metals</b>										
thallium, total	7440-28-0	E420	0.000010	mg/L	0.000134	0.000130	<0.000010	<0.000010	<0.000010	
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
titanium, total	7440-32-6	E420	0.00030	mg/L	0.308	0.268	0.0177	0.00471	0.00144	
uranium, total	7440-61-1	E420	0.000010	mg/L	0.000178	0.000175	0.000053	0.000096	0.000164	
vanadium, total	7440-62-2	E420	0.00050	mg/L	0.0192	0.0185	0.00128	<0.00050	<0.00050	
zinc, total	7440-66-6	E420	0.0030	mg/L	0.0418	0.0379	0.0131	0.0052	0.0277	
zirconium, total	7440-67-7	E420	0.00030	mg/L	0.00063	<0.00030	<0.00030	<0.00030	<0.00030	
<b>Dissolved Metals</b>										
aluminum, dissolved	7429-90-5	E421	0.0030	mg/L	0.0472	0.0441	0.0271	0.0251	0.0397	
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00011	0.00010	0.00011	<0.00010	<0.00010	
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00025	0.00022	0.00035	<0.00010	<0.00010	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0288	0.0280	0.0366	0.0240	0.0252	
beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000575	0.0000617	0.0000979	0.0000486	0.000252	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	24.7	23.8	16.7	17.2	23.6	
chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00017	0.00018	<0.00010	<0.00010	0.00077	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00046	0.00053	0.00035	0.00558	0.0278	
iron, dissolved	7439-89-6	E421	0.010	mg/L	0.014	0.013	<0.010	0.016	0.045	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	0.000050	0.000073	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
magnesium, dissolved	7439-95-4	E421	0.100	mg/L	2.42	2.40	1.19	1.17	1.82	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0347	0.0358	0.0158	0.0157	0.141	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000969	0.000868	0.000441	0.000307	0.000187	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00053	0.00051	<0.00050	<0.00050	<0.00050	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
potassium, dissolved	7440-09-7	E421	0.100	mg/L	1.88	1.79	1.38	1.04	1.25	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000343	0.000338	0.000067	0.000108	0.000053	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	BR4	BR3	DUP1	DUP2	JM13
Client sampling date / time					22-Aug-2020 14:34	22-Aug-2020 14:53	22-Aug-2020 09:50	22-Aug-2020	23-Aug-2020 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-001	VA20B3842-002	VA20B3842-003	VA20B3842-004	VA20B3842-005	
					Result	Result	Result	Result	Result	
<b>Dissolved Metals</b>										
silicon, dissolved	7440-21-3	E421	0.050	mg/L	1.15	1.13	1.02	1.40	1.21	
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
sodium, dissolved	7440-23-5	E421	0.050	mg/L	0.584	0.590	0.499	0.605	0.527	
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.132	0.131	0.0833	0.0989	0.147	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	10.1	10.0	5.81	4.09	8.34	
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	0.000011	0.000011	<0.000010	<0.000010	<0.000010	
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	0.00064	0.00056	<0.00030	<0.00030	<0.00030	
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000082	0.000081	0.000032	0.000083	0.000092	
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0017	0.0021	0.0053	0.0032	0.0252	
zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	
dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	Field	Field	
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	Field	Field	

Please refer to the General Comments section for an explanation of any qualifiers detected.



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					JM12	SCH1	DUP3	JM3	DUP4
Client sampling date / time					23-Aug-2020 09:32	23-Aug-2020 09:59	23-Aug-2020 09:59	23-Aug-2020 10:14	23-Aug-2020 10:14
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-006	VA20B3842-007	VA20B3842-008	VA20B3842-009	VA20B3842-010
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
acidity (as CaCO3)	----	E283	2.0	mg/L	2.4	<2.0	<2.0	<2.0	<2.0
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	20.8	33.7	33.4	50.6	50.1
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	20.8	33.7	33.4	50.6	50.1
colour, true	----	E329	5.0	CU	<5.0	<5.0	<5.0	<5.0	<5.0
conductivity	----	E100	2.0	µS/cm	233	86.7	87.7	166	167
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	108	41.7	41.7	79.3	78.0
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	103	40.2	40.8	75.1	75.7
pH	----	E108	0.10	pH units	7.08	7.38	7.38	7.57	7.56
solids, total dissolved [TDS]	----	E162	10	mg/L	158	60	62	91	100
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	6.5	23.5	25.9	<3.0	<3.0
turbidity	----	E121	0.10	NTU	8.05	6.89	9.85	2.23	1.98
<b>Anions and Nutrients</b>									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0056	<0.0050	0.0085	0.0390 <sup>RRV</sup>	0.0609 <sup>RRV</sup>
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50
fluoride	16984-48-8	E235.F	0.020	mg/L	0.041	<0.020	<0.020	0.024	0.023
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	<0.050	<0.050	<0.050	0.089	0.096
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0178	<0.0050	<0.0050	0.0678	0.0665
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	<0.0010	0.0200	0.0189
nitrogen, total	7727-37-9	E366	0.030	mg/L	0.038	<0.030	<0.030	0.133	0.157
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	0.0013	<0.0010	<0.0010	<0.0010
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	<0.0020	0.0236	0.0208	<0.0020	<0.0020
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	88.5	9.93	10.3	30.9	30.8
<b>Cyanides</b>									
cyanide, free	----	E339	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cyanide, strong acid dissociable (total)	----	E333	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cyanide, weak acid dissociable	----	E336	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
<b>Organic / Inorganic Carbon</b>									
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	0.62	1.07	1.10	<0.50	0.52



## Analytical Results

Sub-Matrix: Water					Client sample ID	JM12	SCH1	DUP3	JM3	DUP4
(Matrix: Water)										
Client sampling date / time					23-Aug-2020 09:32	23-Aug-2020 09:59	23-Aug-2020 09:59	23-Aug-2020 10:14	23-Aug-2020 10:14	
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-006	VA20B3842-007	VA20B3842-008	VA20B3842-009	VA20B3842-010	
					Result	Result	Result	Result	Result	
<b>Organic / Inorganic Carbon</b>										
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	0.58	<0.50	<0.50	0.57	<0.50	
<b>Total Metals</b>										
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.508	0.362	0.394	0.141	0.139	
antimony, total	7440-36-0	E420	0.00010	mg/L	0.00020	<0.00010	<0.00010	0.00012	0.00012	
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00023	0.00031	0.00038	0.00017	0.00015	
barium, total	7440-39-3	E420	0.00010	mg/L	0.0261	0.0389	0.0402	0.0292	0.0292	
beryllium, total	7440-41-7	E420	0.000020	mg/L	0.000043	<0.000020	<0.000020	<0.000020	<0.000020	
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.00107	0.0000902	0.0000997	0.000351	0.000358	
calcium, total	7440-70-2	E420	0.050	mg/L	34.7	14.1	14.3	25.7	26.0	
chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	0.00014	<0.00010	<0.00010	<0.00010	<0.00010	
cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00369	0.00031	0.00034	0.00073	0.00074	
copper, total	7440-50-8	E420	0.00050	mg/L	0.286	0.00720	0.00859	0.101	0.0985	
iron, total	7439-89-6	E420	0.010	mg/L	1.49	0.533	0.558	0.558	0.535	
lead, total	7439-92-1	E420	0.000050	mg/L	0.00375	0.00480	0.00496	0.000421	0.000395	
lithium, total	7439-93-2	E420	0.0010	mg/L	0.0014	<0.0010	<0.0010	<0.0010	<0.0010	
magnesium, total	7439-95-4	E420	0.100	mg/L	3.93	1.21	1.26	2.64	2.60	
manganese, total	7439-96-5	E420	0.00010	mg/L	0.486	0.0645	0.0685	0.167	0.163	
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000119	0.000347	0.000340	0.000237	0.000213	
nickel, total	7440-02-0	E420	0.00050	mg/L	0.00067	<0.00050	<0.00050	<0.00050	<0.00050	
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
potassium, total	7440-09-7	E420	0.100	mg/L	1.73	1.15	1.19	1.46	1.44	
selenium, total	7782-49-2	E420	0.000050	mg/L	0.000149	0.000100	0.000085	0.000129	0.000081	
silicon, total	7440-21-3	E420	0.10	mg/L	2.25	1.31	1.35	1.42	1.43	
silver, total	7440-22-4	E420	0.000010	mg/L	0.000057	0.000014	0.000013	<0.000010	<0.000010	
sodium, total	7440-23-5	E420	0.050	mg/L	0.639	0.452	0.447	0.552	0.539	
strontium, total	7440-24-6	E420	0.00020	mg/L	0.205	0.0934	0.0910	0.200	0.204	
sulfur, total	7704-34-9	E420	0.50	mg/L	31.3	3.46	3.54	10.5	10.6	
thallium, total	7440-28-0	E420	0.000010	mg/L	0.000016	0.000015	0.000014	<0.000010	<0.000010	





## Analytical Results

Sub-Matrix: Water					Client sample ID	JM12	SCH1	DUP3	JM3	DUP4
(Matrix: Water)										
Client sampling date / time					23-Aug-2020 09:32	23-Aug-2020 09:59	23-Aug-2020 09:59	23-Aug-2020 10:14	23-Aug-2020 10:14	
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-006	VA20B3842-007	VA20B3842-008	VA20B3842-009	VA20B3842-010	
					Result	Result	Result	Result	Result	
<b>Total Metals</b>										
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
titanium, total	7440-32-6	E420	0.00030	mg/L	0.00461	0.0287	0.0301	0.00171	0.00190	
uranium, total	7440-61-1	E420	0.000010	mg/L	0.000198	0.000134	0.000140	0.000249	0.000236	
vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	0.00134	0.00146	<0.00050	<0.00050	
zinc, total	7440-66-6	E420	0.0030	mg/L	0.132	0.0115	0.0132	0.0352	0.0342	
zirconium, total	7440-67-7	E420	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	
<b>Dissolved Metals</b>										
aluminum, dissolved	7429-90-5	E421	0.0030	mg/L	0.0128	0.0360	0.0249	0.0384	0.0371	
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00012	<0.00010	<0.00010	<0.00010	<0.00010	
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	<0.00010	0.00014	0.00013	<0.00010	<0.00010	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0245	0.0282	0.0282	0.0293	0.0291	
beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.00101	0.0000352	0.0000442	0.000309	0.000300	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	37.4	15.2	15.1	27.6	27.2	
chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00356	<0.00010	<0.00010	0.00070	0.00070	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.0812	0.00401	0.00394	0.0215	0.0215	
iron, dissolved	7439-89-6	E421	0.010	mg/L	0.109	0.032	0.013	0.017	0.019	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	0.000168	0.000120	<0.000050	<0.000050	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0013	<0.0010	<0.0010	<0.0010	<0.0010	
magnesium, dissolved	7439-95-4	E421	0.100	mg/L	3.67	0.938	0.964	2.54	2.46	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.470	0.0116	0.0135	0.160	0.157	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000092	0.000376	0.000377	0.000240	0.000234	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00064	<0.00050	<0.00050	<0.00050	<0.00050	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
potassium, dissolved	7440-09-7	E421	0.100	mg/L	1.70	0.995	0.980	1.48	1.41	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000135	0.000053	0.000105	0.000096	0.000096	
silicon, dissolved	7440-21-3	E421	0.050	mg/L	1.88	0.717	0.749	1.34	1.26	



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					JM12	SCH1	DUP3	JM3	DUP4
Client sampling date / time					23-Aug-2020 09:32	23-Aug-2020 09:59	23-Aug-2020 09:59	23-Aug-2020 10:14	23-Aug-2020 10:14
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-006	VA20B3842-007	VA20B3842-008	VA20B3842-009	VA20B3842-010
					Result	Result	Result	Result	Result
<b>Dissolved Metals</b>									
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
sodium, dissolved	7440-23-5	E421	0.050	mg/L	0.661	0.454	0.456	0.574	0.565
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.201	0.0884	0.0926	0.201	0.190
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	30.2	3.27	3.43	10.2	10.3
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	0.000013	<0.000010	<0.000010	<0.000010	<0.000010
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	0.00167	0.00067	<0.00030	<0.00030
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000013	0.000095	0.000091	0.000141	0.000144
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.118	0.0023	0.0026	0.0257	0.0265
zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	Field	Field
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	Field	Field
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>									
benzene	71-43-2	E611A	0.50	µg/L	----	----	----	<0.50	<0.50
ethylbenzene	100-41-4	E611A	0.50	µg/L	----	----	----	<0.50	<0.50
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	----	----	----	<0.50	<0.50
styrene	100-42-5	E611A	0.50	µg/L	----	----	----	<0.50	<0.50
toluene	108-88-3	E611A	0.50	µg/L	----	----	----	<0.50	<0.50
xylene, m+p-	179601-23-1	E611A	0.50	µg/L	----	----	----	<0.50	<0.50
xylene, o-	95-47-6	E611A	0.50	µg/L	----	----	----	<0.50	<0.50
xylenes, total	1330-20-7	E611A	0.75	µg/L	----	----	----	<0.75	<0.75
<b>Volatile Organic Compounds Surrogates</b>									
bromofluorobenzene, 4-	460-00-4	E611A	0.50	%	----	----	----	94.3	93.7
difluorobenzene, 1,4-	540-36-3	E611A	0.50	%	----	----	----	109	106
<b>Hydrocarbons</b>									
EPH (C10-C19)	----	E601A	250	µg/L	----	----	----	<250	<250
EPH (C19-C32)	----	E601A	250	µg/L	----	----	----	<250	<250
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	----	----	----	<100	<100
HEPHw	----	EC600A	250	µg/L	----	----	----	<250	<250
LEPHw	----	EC600A	250	µg/L	----	----	----	<250	<250



## Analytical Results

Sub-Matrix: Water					Client sample ID	JM12	SCH1	DUP3	JM3	DUP4
(Matrix: Water)										
Client sampling date / time					23-Aug-2020 09:32	23-Aug-2020 09:59	23-Aug-2020 09:59	23-Aug-2020 10:14	23-Aug-2020 10:14	
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-006	VA20B3842-007	VA20B3842-008	VA20B3842-009	VA20B3842-010	
					Result	Result	Result	Result	Result	
<b>Hydrocarbons</b>										
VPHw	----	EC580A	100	µg/L	----	----	----	<100	<100	
<b>Hydrocarbons Surrogates</b>										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%	----	----	----	91.8	93.2	
dichlorotoluene, 3,4-	97-75-0	E581 VH+F1	1.0	%				78.3	114	
<b>Polycyclic Aromatic Hydrocarbons</b>										
acenaphthene	83-32-9	E641A	0.010	µg/L	----	----	----	<0.010	<0.010	
acenaphthylene	208-96-8	E641A	0.010	µg/L	----	----	----	<0.010	<0.010	
acridine	260-94-6	E641A	0.010	µg/L	----	----	----	<0.010	<0.010	
anthracene	120-12-7	E641A	0.010	µg/L	----	----	----	<0.010	<0.010	
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	----	----	----	<0.010	<0.010	
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	----	----	----	<0.0050	<0.0050	
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	----	----	----	<0.010	<0.010	
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	----	----	----	<0.015	<0.015	
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	----	----	----	<0.010	<0.010	
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	----	----	----	<0.010	<0.010	
chrysene	218-01-9	E641A	0.010	µg/L	----	----	----	<0.010	<0.010	
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	----	----	----	<0.0050	<0.0050	
fluoranthene	206-44-0	E641A	0.010	µg/L	----	----	----	<0.010	<0.010	
fluorene	86-73-7	E641A	0.010	µg/L	----	----	----	<0.010	<0.010	
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	----	----	----	<0.010	<0.010	
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	----	----	----	<0.010	<0.010	
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	----	----	----	<0.010	<0.010	
naphthalene	91-20-3	E641A	0.050	µg/L	----	----	----	<0.050	<0.050	
phenanthrene	85-01-8	E641A	0.020	µg/L	----	----	----	<0.020	<0.020	
pyrene	129-00-0	E641A	0.010	µg/L	----	----	----	<0.010	<0.010	
quinoline	6027-02-7	E641A	0.050	µg/L	----	----	----	<0.050	<0.050	
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>										
acridine-d9	34749-75-2	E641A	0.010	%	----	----	----	88.2	89.2	
chrysene-d12	1719-03-5	E641A	0.010	%	----	----	----	93.4	88.8	
naphthalene-d8	1146-65-2	E641A	0.010	%	----	----	----	98.1	99.8	
phenanthrene-d10	1517-22-2	E641A	0.010	%	----	----	----	100	103	



Please refer to the General Comments section for an explanation of any qualifiers detected.

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## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					JM4	JM2 SEEPAGE	JM2	TMF1	JM5
Client sampling date / time					23-Aug-2020 10:47	23-Aug-2020 11:17	23-Aug-2020 11:35	23-Aug-2020 12:08	23-Aug-2020 12:25
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-011	VA20B3842-012	VA20B3842-013	VA20B3842-014	VA20B3842-015
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
acidity (as CaCO3)	----	E283	2.0	mg/L	3.4	7.8	<2.0	<2.0	<2.0
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	12.8	3.6	34.6	9.3	10.0
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	12.8	3.6	34.6	9.3	10.0
colour, true	----	E329	5.0	CU	<5.0	<5.0	<5.0	<5.0	<5.0
conductivity	----	E100	2.0	µS/cm	219	576	86.4	45.9	53.0
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	115	277	41.4	19.6	23.8
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	94.4	288	39.8	20.0	21.8
pH	----	E108	0.10	pH units	6.81	5.82	7.20	6.62	6.66
solids, total dissolved [TDS]	----	E162	10	mg/L	146	454	57	26	37
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	6.9	19.9	20.1	<3.0	<3.0
turbidity	----	E121	0.10	NTU	10.2	16.0	14.9	1.39	0.75
<b>Anions and Nutrients</b>									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0051	0.0128	0.0170	<0.0050	<0.0050
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50
fluoride	16984-48-8	E235.F	0.020	mg/L	0.042	0.058	<0.020	<0.020	<0.020
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	<0.050	0.067	<0.050	<0.050	<0.050
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0210	0.0616	0.0051	<0.0050	<0.0050
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
nitrogen, total	7727-37-9	E366	0.030	mg/L	0.052	0.068	0.032	0.041	<0.030
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0.0010	<0.0010	<0.0010
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	<0.0020	<0.0080 <sup>DLM</sup>	0.0221	<0.0020	<0.0020
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	85.5	279	9.33	11.3	13.5
<b>Cyanides</b>									
cyanide, free	----	E339	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cyanide, strong acid dissociable (total)	----	E333	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cyanide, weak acid dissociable	----	E336	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
<b>Organic / Inorganic Carbon</b>									
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	1.33	1.62	1.24	1.12	0.90



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					JM4	JM2 SEEPAGE	JM2	TMF1	JM5
Client sampling date / time					23-Aug-2020 10:47	23-Aug-2020 11:17	23-Aug-2020 11:35	23-Aug-2020 12:08	23-Aug-2020 12:25
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-011	VA20B3842-012	VA20B3842-013	VA20B3842-014	VA20B3842-015
					Result	Result	Result	Result	Result
<b>Organic / Inorganic Carbon</b>									
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	<0.50	0.96	<0.50	0.56	<0.50
<b>Total Metals</b>									
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.631	0.244	0.303	0.0840	0.0356
antimony, total	7440-36-0	E420	0.00010	mg/L	0.00027	<0.00010	<0.00010	<0.00010	<0.00010
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00025	0.00020	0.00029	0.00018	0.00012
barium, total	7440-39-3	E420	0.00010	mg/L	0.0305	0.0278	0.0391	0.00895	0.00846
beryllium, total	7440-41-7	E420	0.000020	mg/L	0.000058	0.000193	<0.000020	<0.000020	<0.000020
bismuth, total	7440-69-9	E420	0.000050	mg/L	0.000069	<0.000050	<0.000050	<0.000050	<0.000050
boron, total	7440-42-8	E420	0.010	mg/L	<0.010	0.012	<0.010	<0.010	<0.010
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.00120	0.00511	0.0000643	0.0000300	0.0000188
calcium, total	7440-70-2	E420	0.050	mg/L	31.3	85.6	14.2	6.80	7.43
chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	0.00019	<0.00010	<0.00010	<0.00010	<0.00010
cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00462	0.0144	0.00025	<0.00010	<0.00010
copper, total	7440-50-8	E420	0.00050	mg/L	0.400	1.74	0.00101	0.00167	0.00187
iron, total	7439-89-6	E420	0.010	mg/L	2.40	0.086	0.427	0.116	0.046
lead, total	7439-92-1	E420	0.000050	mg/L	0.00502	0.000599	0.00420	0.000303	0.000125
lithium, total	7439-93-2	E420	0.0010	mg/L	0.0016	0.0037	<0.0010	<0.0010	<0.0010
magnesium, total	7439-95-4	E420	0.100	mg/L	3.94	18.0	1.07	0.732	0.779
manganese, total	7439-96-5	E420	0.00010	mg/L	0.570	2.70	0.0530	0.0183	0.00966
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000194	<0.000050	0.000363	<0.000050	<0.000050
nickel, total	7440-02-0	E420	0.00050	mg/L	0.00086	0.00521	<0.00050	<0.00050	<0.00050
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
potassium, total	7440-09-7	E420	0.100	mg/L	1.61	3.28	1.11	0.487	0.488
selenium, total	7782-49-2	E420	0.000050	mg/L	0.000153	0.000509	0.000064	<0.000050	0.000056
silicon, total	7440-21-3	E420	0.10	mg/L	2.76	3.81	1.32	0.23	0.19
silver, total	7440-22-4	E420	0.000010	mg/L	0.000089	0.000020	0.000010	<0.000010	<0.000010
sodium, total	7440-23-5	E420	0.050	mg/L	0.763	0.686	0.441	0.161	0.148
strontium, total	7440-24-6	E420	0.00020	mg/L	0.200	0.495	0.0900	0.0308	0.0332
sulfur, total	7704-34-9	E420	0.50	mg/L	29.4	109	3.34	3.95	4.77
thallium, total	7440-28-0	E420	0.000010	mg/L	0.000020	0.000022	0.000012	<0.000010	<0.000010



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					JM4	JM2 SEEPAGE	JM2	TMF1	JM5
Client sampling date / time					23-Aug-2020 10:47	23-Aug-2020 11:17	23-Aug-2020 11:35	23-Aug-2020 12:08	23-Aug-2020 12:25
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-011	VA20B3842-012	VA20B3842-013	VA20B3842-014	VA20B3842-015
					Result	Result	Result	Result	Result
<b>Total Metals</b>									
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
titanium, total	7440-32-6	E420	0.00030	mg/L	0.00436	<0.00030	0.0218	0.00301	0.00103
uranium, total	7440-61-1	E420	0.000010	mg/L	0.000257	0.000252	0.000131	<0.000010	<0.000010
vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0.00101	<0.00050	<0.00050
zinc, total	7440-66-6	E420	0.0030	mg/L	0.164	0.641	0.0087	0.0034	<0.0030
zirconium, total	7440-67-7	E420	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
<b>Dissolved Metals</b>									
aluminum, dissolved	7429-90-5	E421	0.0030	mg/L	0.0173	3.36 <sup>DTC</sup>	0.0197	0.0080	0.0063
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00017	<0.00010	<0.00010	<0.00010	<0.00010
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00012	0.00033	0.00017	<0.00010	<0.00010
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0323	0.0241	0.0288	0.00758	0.00799
beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	0.000037	0.000352 <sup>DTC</sup>	<0.000020	<0.000020	<0.000020
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	0.012	<0.010	<0.010	<0.010
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.00186 <sup>DTC</sup>	0.00498	0.0000156	0.0000178	0.0000131
calcium, dissolved	7440-70-2	E421	0.050	mg/L	38.3	83.6	15.2	6.71	8.22
chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	<0.00010	0.00015	<0.00010	<0.00010	<0.00010
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00752 <sup>DTC</sup>	0.0127	<0.00010	<0.00010	<0.00010
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.345	1.93	<0.00020	0.00081	0.00128
iron, dissolved	7439-89-6	E421	0.010	mg/L	0.541	3.11 <sup>DTC</sup>	0.014	<0.010	<0.010
lead, dissolved	7439-92-1	E421	0.000050	mg/L	0.000060	0.00671 <sup>DTC</sup>	0.000141	<0.000050	<0.000050
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0020	0.0039	<0.0010	<0.0010	<0.0010
magnesium, dissolved	7439-95-4	E421	0.100	mg/L	4.65	16.6	0.875	0.698	0.803
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	1.00 <sup>DTC</sup>	2.48	0.00512	0.00214	0.00229
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000074	0.000131 <sup>DTC</sup>	0.000390	<0.000050	<0.000050
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00127	0.00463	<0.00050	<0.00050	<0.00050
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
potassium, dissolved	7440-09-7	E421	0.100	mg/L	1.99	2.86	0.955	0.467	0.523
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000085	0.000440	0.000107	<0.000050	<0.000050
silicon, dissolved	7440-21-3	E421	0.050	mg/L	2.64	3.68	0.745	0.104	0.117



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					JM4	JM2 SEEPAGE	JM2	TMF1	JM5
Client sampling date / time					23-Aug-2020 10:47	23-Aug-2020 11:17	23-Aug-2020 11:35	23-Aug-2020 12:08	23-Aug-2020 12:25
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-011	VA20B3842-012	VA20B3842-013	VA20B3842-014	VA20B3842-015
					Result	Result	Result	Result	Result
<b>Dissolved Metals</b>									
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	0.000029	<0.000010	<0.000010	<0.000010
sodium, dissolved	7440-23-5	E421	0.050	mg/L	0.945	0.623	0.480	0.152	0.155
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.266	0.490	0.0894	0.0289	0.0342
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	35.0	90.1	2.98	3.61	4.44
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	0.000022	0.000018	<0.000010	<0.000010	<0.000010
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	0.00035	0.00063	<0.00030	<0.00030
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000043	0.000744 <sup>DTC</sup>	0.000118	<0.000010	<0.000010
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.227 <sup>DTC</sup>	0.619	<0.0010	0.0013	0.0019
zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	0.00042	<0.00030	<0.00030	<0.00030
dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	Field	Field
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	Field	Field
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>									
benzene	71-43-2	E611A	0.50	µg/L	<0.50	----	<0.50	<0.50	<0.50
ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	----	<0.50	<0.50	<0.50
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	----	<0.50	<0.50	<0.50
styrene	100-42-5	E611A	0.50	µg/L	<0.50	----	<0.50	<0.50	<0.50
toluene	108-88-3	E611A	0.50	µg/L	<0.50	----	<0.50	<0.50	<0.50
xylene, m+p-	179601-23-1	E611A	0.50	µg/L	<0.50	----	<0.50	<0.50	<0.50
xylene, o-	95-47-6	E611A	0.50	µg/L	<0.50	----	<0.50	<0.50	<0.50
xylenes, total	1330-20-7	E611A	0.75	µg/L	<0.75	----	<0.75	<0.75	<0.75
<b>Volatile Organic Compounds Surrogates</b>									
bromofluorobenzene, 4-	460-00-4	E611A	0.50	%	96.4	----	94.7	94.3	94.8
difluorobenzene, 1,4-	540-36-3	E611A	0.50	%	106	----	104	110	111
<b>Hydrocarbons</b>									
EPH (C10-C19)	----	E601A	250	µg/L	<250	----	<250	<250	<250
EPH (C19-C32)	----	E601A	250	µg/L	<250	----	<250	<250	<250
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----	<100	<100	<100
HEPHw	----	EC600A	250	µg/L	<250	----	<250	<250	<250
LEPHw	----	EC600A	250	µg/L	<250	----	<250	<250	<250





## Analytical Results

Sub-Matrix: Water					Client sample ID	JM4	JM2 SEEPAGE	JM2	TMF1	JM5
(Matrix: Water)										
Client sampling date / time					23-Aug-2020 10:47	23-Aug-2020 11:17	23-Aug-2020 11:35	23-Aug-2020 12:08	23-Aug-2020 12:25	
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-011	VA20B3842-012	VA20B3842-013	VA20B3842-014	VA20B3842-015	
					Result	Result	Result	Result	Result	
<b>Hydrocarbons</b>										
VPHw	----	EC580A	100	µg/L	<100	----	<100	<100	<100	<100
<b>Hydrocarbons Surrogates</b>										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%	94.5	----	102	90.7	92.5	
dichlorotoluene, 3,4-	97-75-0	E581 VH+F1	1.0	%	110		106	111	112	
<b>Polycyclic Aromatic Hydrocarbons</b>										
acenaphthene	83-32-9	E641A	0.010	µg/L	0.022	----	<0.010	<0.010	<0.010	<0.010
acenaphthylene	208-96-8	E641A	0.010	µg/L	<0.010	----	<0.010	<0.010	<0.010	<0.010
acridine	260-94-6	E641A	0.010	µg/L	<0.010	----	<0.010	<0.010	<0.010	<0.010
anthracene	120-12-7	E641A	0.010	µg/L	<0.010	----	<0.010	<0.010	<0.010	<0.010
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	<0.010	----	<0.010	<0.010	<0.010	<0.010
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	<0.0050	----	<0.0050	<0.0050	<0.0050	<0.0050
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	<0.010	----	<0.010	<0.010	<0.010	<0.010
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	----	<0.015	<0.015	<0.015	<0.015
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	<0.010	----	<0.010	<0.010	<0.010	<0.010
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	<0.010	----	<0.010	<0.010	<0.010	<0.010
chrysene	218-01-9	E641A	0.010	µg/L	<0.010	----	<0.010	<0.010	<0.010	<0.010
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	<0.0050	----	<0.0050	<0.0050	<0.0050	<0.0050
fluoranthene	206-44-0	E641A	0.010	µg/L	<0.010	----	<0.010	<0.010	<0.010	<0.010
fluorene	86-73-7	E641A	0.010	µg/L	0.032	----	<0.010	<0.010	<0.010	<0.010
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	<0.010	----	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	0.351	----	<0.010	<0.010	<0.010	<0.010
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	0.090	----	<0.010	<0.010	<0.010	<0.010
naphthalene	91-20-3	E641A	0.050	µg/L	<0.070 <sup>DLC</sup>	----	<0.050	<0.050	<0.050	<0.050
phenanthrene	85-01-8	E641A	0.020	µg/L	<0.020	----	<0.020	<0.020	<0.020	<0.020
pyrene	129-00-0	E641A	0.010	µg/L	<0.010	----	<0.010	<0.010	<0.010	<0.010
quinoline	6027-02-7	E641A	0.050	µg/L	<0.050	----	<0.050	<0.050	<0.050	<0.050
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>										
acridine-d9	34749-75-2	E641A	0.010	%	91.7	----	95.7	88.1	91.9	
chrysene-d12	1719-03-5	E641A	0.010	%	96.4	----	103	96.4	91.3	
naphthalene-d8	1146-65-2	E641A	0.010	%	103	----	109	96.9	106	
phenanthrene-d10	1517-22-2	E641A	0.010	%	107	----	111	100	108	



Please refer to the General Comments section for an explanation of any qualifiers detected.

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## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					SK1	JM10-2018	JM11	JM6	JM14
Client sampling date / time					23-Aug-2020 12:48	23-Aug-2020 13:23	23-Aug-2020 14:11	23-Aug-2020 14:32	23-Aug-2020 15:02
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-016	VA20B3842-017	VA20B3842-018	VA20B3842-019	VA20B3842-020
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
acidity (as CaCO3)	---	E283	2.0	mg/L	<2.0	<2.0	<2.0	---	<2.0
acidity, hot peroxide treated (as CaCO3)	---	E284A	25	mg/L	---	-48	---	---	---
alkalinity, bicarbonate (as CaCO3)	---	E290	1.0	mg/L	16.6	55.5	29.4	---	29.0
alkalinity, carbonate (as CaCO3)	---	E290	1.0	mg/L	<1.0	<1.0	<1.0	---	<1.0
alkalinity, hydroxide (as CaCO3)	---	E290	1.0	mg/L	<1.0	<1.0	<1.0	---	<1.0
alkalinity, total (as CaCO3)	---	E290	1.0	mg/L	16.6	55.5	29.4	---	29.0
colour, true	---	E329	5.0	CU	5.1	<5.0	<5.0	---	<5.0
conductivity	---	E100	2.0	µS/cm	40.3	143	65.8	---	64.4
hardness (as CaCO3), dissolved	---	EC100	0.60	mg/L	18.8	68.8	32.0	30.7	28.9
hardness (as CaCO3), from total Ca/Mg	---	EC100A	0.60	mg/L	18.4	66.3	34.2	32.2	30.8
pH	---	E108	0.10	pH units	6.89	7.49	7.19	---	7.18
solids, total dissolved [TDS]	---	E162	10	mg/L	27	80	55	---	49
solids, total suspended [TSS]	---	E160-H	3.0	mg/L	<3.0	<3.0	58.1	<3.0	37.5
turbidity	---	E121	0.10	NTU	0.13	1.31	64.3	220	37.7
<b>Anions and Nutrients</b>									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0063	<0.0050	0.0063	<0.0050	0.0104
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50
cyanate	88402-73-7	E343	0.20	mg/L	---	<0.20	---	---	---
fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	0.020	<0.020	<0.020	<0.020
Kjeldahl nitrogen, total [TKN]	---	E318	0.050	mg/L	<0.050	0.066	<0.050	<0.050	<0.050
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
nitrogen, total	7727-37-9	E366	0.030	mg/L	0.041	0.057	<0.030	<0.030	<0.030
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0.0011	0.0013	<0.0010
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	<0.0020	0.0033	0.0531	0.0380	0.0415
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	3.06	15.4	4.74	4.83	4.64
<b>Cyanides</b>									
cyanide, free	---	E339	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cyanide, strong acid dissociable (total)	---	E333	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cyanide, weak acid dissociable	---	E336	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					SK1	JM10-2018	JM11	JM6	JM14
Client sampling date / time					23-Aug-2020 12:48	23-Aug-2020 13:23	23-Aug-2020 14:11	23-Aug-2020 14:32	23-Aug-2020 15:02
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-016	VA20B3842-017	VA20B3842-018	VA20B3842-019	VA20B3842-020
					Result	Result	Result	Result	Result
<b>Cyanides</b>									
thiocyanate	302-04-5	E344	0.50	mg/L	----	<0.50	----	----	----
<b>Organic / Inorganic Carbon</b>									
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	1.21	1.80	1.94	2.04	1.60
carbon, total inorganic [TIC]	----	E354-L	0.50	mg/L	----	13.2	----	----	----
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	0.75	1.30	<0.50	<0.50	<0.50
<b>Total Metals</b>									
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0080	0.0570	1.12	0.557	0.478
antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	0.00011	<0.00010	<0.00010
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00014	0.00037	0.00032	0.00021	0.00020
barium, total	7440-39-3	E420	0.00010	mg/L	0.00689	0.0168	0.0745	0.0542	0.0513
beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	0.000034	<0.000020	<0.000020
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000239	0.0000258	0.000310	0.000236	0.000237
calcium, total	7440-70-2	E420	0.050	mg/L	6.48	22.7	11.7	11.3	10.8
chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	<0.00010	0.00066	0.00035	0.00035
copper, total	7440-50-8	E420	0.00050	mg/L	<0.00050	0.00084	0.00384	0.00259	0.00295
iron, total	7439-89-6	E420	0.010	mg/L	0.016	0.083	1.16	0.597	0.566
lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	0.000206	0.00577	0.00381	0.00375
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	0.0013	<0.0010	<0.0010
magnesium, total	7439-95-4	E420	0.100	mg/L	0.536	2.30	1.24	0.953	0.940
manganese, total	7439-96-5	E420	0.00010	mg/L	0.00514	0.0165	0.122	0.0806	0.0802
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000051	<0.0000050
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000067	0.000293	0.000184	0.000140	0.000164
nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	0.078	<0.050	0.058
potassium, total	7440-09-7	E420	0.100	mg/L	0.340	1.11	1.28	0.922	0.903
selenium, total	7782-49-2	E420	0.000050	mg/L	0.000062	0.000075	<0.000050	0.000076	0.000070
silicon, total	7440-21-3	E420	0.10	mg/L	1.32	1.11	2.66	1.78	1.65
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0.000016	0.000010	0.000013



## Analytical Results

Sub-Matrix: Water					Client sample ID	SK1	JM10-2018	JM11	JM6	JM14
(Matrix: Water)										
Client sampling date / time					23-Aug-2020 12:48	23-Aug-2020 13:23	23-Aug-2020 14:11	23-Aug-2020 14:32	23-Aug-2020 15:02	
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-016	VA20B3842-017	VA20B3842-018	VA20B3842-019	VA20B3842-020	
					Result	Result	Result	Result	Result	
<b>Total Metals</b>										
sodium, total	7440-23-5	E420	0.050	mg/L	0.381	0.308	0.416	0.427	0.383	
strontium, total	7440-24-6	E420	0.00020	mg/L	0.0301	0.0971	0.0716	0.0676	0.0695	
sulfur, total	7704-34-9	E420	0.50	mg/L	0.96	5.44	1.52	1.58	1.60	
thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0.000037	0.000022	0.000024	
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
titanium, total	7440-32-6	E420	0.00030	mg/L	<0.00030	0.00212	0.0602	0.0305	0.0289	
uranium, total	7440-61-1	E420	0.000010	mg/L	<0.000010	0.000054	0.000139	0.000108	0.000109	
vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0.00230	0.00122	0.00114	
zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	0.0537	0.0365	0.0364	
zirconium, total	7440-67-7	E420	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	
<b>Dissolved Metals</b>										
aluminum, dissolved	7429-90-5	E421	0.0030	mg/L	0.0033	0.0145	0.0368	0.0333	0.0400	
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00012	0.00029	<0.00010	<0.00010	<0.00010	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.00667	0.0163	0.0321	0.0304	0.0301	
beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000155	0.0000205	0.000143	0.000114	0.000124	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	6.68	23.8	11.7	11.2	10.4	
chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	0.00060	0.00024	0.00030	0.00038	
iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	0.015	0.019	0.018	0.022	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	0.000051	0.000148	0.000141	0.000175	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
magnesium, dissolved	7439-95-4	E421	0.100	mg/L	0.511	2.25	0.705	0.693	0.681	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00184	0.0121	0.0273	0.0217	0.0205	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000062	0.000265	0.000178	0.000165	0.000165	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					SK1	JM10-2018	JM11	JM6	JM14
Client sampling date / time					23-Aug-2020 12:48	23-Aug-2020 13:23	23-Aug-2020 14:11	23-Aug-2020 14:32	23-Aug-2020 15:02
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-016	VA20B3842-017	VA20B3842-018	VA20B3842-019	VA20B3842-020
					Result	Result	Result	Result	Result
<b>Dissolved Metals</b>									
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
potassium, dissolved	7440-09-7	E421	0.100	mg/L	0.324	1.12	0.665	0.623	0.630
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	0.000053	<0.000050	0.000052	0.000065
silicon, dissolved	7440-21-3	E421	0.050	mg/L	1.19	0.958	0.608	0.754	0.809
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
sodium, dissolved	7440-23-5	E421	0.050	mg/L	0.377	0.336	0.352	0.368	0.404
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0305	0.0906	0.0677	0.0664	0.0627
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	1.01	5.18	1.34	1.42	1.22
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	0.00040	0.00094	0.00089	0.00103
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	<0.000010	0.000046	0.000091	0.000088	0.000084
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0014	0.0016	0.0030	0.0030	0.0034
zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	Field	Field
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	Field	Field
<b>Aggregate Organics</b>									
chemical oxygen demand [COD]	----	E559	20	mg/L	----	<20	----	----	----
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>									
benzene	71-43-2	E611A	0.50	µg/L	----	<0.50	----	<0.50	----
ethylbenzene	100-41-4	E611A	0.50	µg/L	----	<0.50	----	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	----	<0.50	----	<0.50	----
styrene	100-42-5	E611A	0.50	µg/L	----	<0.50	----	<0.50	----
toluene	108-88-3	E611A	0.50	µg/L	----	<0.50	----	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.50	µg/L	----	<0.50	----	<0.50	----
xylene, o-	95-47-6	E611A	0.50	µg/L	----	<0.50	----	<0.50	----
xylenes, total	1330-20-7	E611A	0.75	µg/L	----	<0.75	----	<0.75	----
<b>Volatile Organic Compounds Surrogates</b>									
bromofluorobenzene, 4-	460-00-4	E611A	0.50	%	----	94.4	----	93.2	----
difluorobenzene, 1,4-	540-36-3	E611A	0.50	%	----	108	----	109	----



## Analytical Results

Sub-Matrix: Water					Client sample ID	SK1	JM10-2018	JM11	JM6	JM14
(Matrix: Water)					Client sampling date / time	23-Aug-2020 12:48	23-Aug-2020 13:23	23-Aug-2020 14:11	23-Aug-2020 14:32	23-Aug-2020 15:02
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-016	VA20B3842-017	VA20B3842-018	VA20B3842-019	VA20B3842-020	
					Result	Result	Result	Result	Result	
<b>Hydrocarbons</b>										
EPH (C10-C19)	---	E601A	250	µg/L	---	<250	---	<250	---	
EPH (C19-C32)	---	E601A	250	µg/L	---	<250	---	<250	---	
VHw (C6-C10)	---	E581.VH+F1	100	µg/L	---	<100	---	<100	---	
HEPHw	---	EC600A	250	µg/L	---	<250	---	<250	---	
LEPHw	---	EC600A	250	µg/L	---	<250	---	<250	---	
VPHw	---	EC580A	100	µg/L	---	<100	---	<100	---	
<b>Hydrocarbons Surrogates</b>										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%	---	90.6	---	88.1	---	
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	---	105	---	110	---	
<b>Polycyclic Aromatic Hydrocarbons</b>										
acenaphthene	83-32-9	E641A	0.010	µg/L	---	<0.010	---	<0.010	---	
acenaphthylene	208-96-8	E641A	0.010	µg/L	---	<0.010	---	<0.010	---	
acridine	260-94-6	E641A	0.010	µg/L	---	<0.010	---	<0.010	---	
anthracene	120-12-7	E641A	0.010	µg/L	---	<0.010	---	<0.010	---	
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	---	<0.010	---	<0.010	---	
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	---	<0.0050	---	<0.0050	---	
benzo(b+j)fluoranthene	---	E641A	0.010	µg/L	---	<0.010	---	<0.010	---	
benzo(b+j+k)fluoranthene	---	E641A	0.015	µg/L	---	<0.015	---	<0.015	---	
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	---	<0.010	---	<0.010	---	
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	---	<0.010	---	<0.010	---	
chrysene	218-01-9	E641A	0.010	µg/L	---	<0.010	---	<0.010	---	
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	---	<0.0050	---	<0.0050	---	
fluoranthene	206-44-0	E641A	0.010	µg/L	---	<0.010	---	<0.010	---	
fluorene	86-73-7	E641A	0.010	µg/L	---	<0.010	---	<0.010	---	
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	---	<0.010	---	<0.010	---	
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	---	<0.010	---	<0.010	---	
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	---	<0.010	---	<0.010	---	
naphthalene	91-20-3	E641A	0.050	µg/L	---	<0.050	---	<0.050	---	
phenanthrene	85-01-8	E641A	0.020	µg/L	---	<0.020	---	<0.020	---	
pyrene	129-00-0	E641A	0.010	µg/L	---	<0.010	---	<0.010	---	
quinoline	6027-02-7	E641A	0.050	µg/L	---	<0.050	---	<0.050	---	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	SK1	JM10-2018	JM11	JM6	JM14
Client sampling date / time					23-Aug-2020 12:48	23-Aug-2020 13:23	23-Aug-2020 14:11	23-Aug-2020 14:32	23-Aug-2020 15:02	
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-016	VA20B3842-017	VA20B3842-018	VA20B3842-019	VA20B3842-020	
					Result	Result	Result	Result	Result	
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>										
acridine-d9	34749-75-2	E641A	0.010	%	----	85.1	----	85.4	----	
chrysene-d12	1719-03-5	E641A	0.010	%	----	87.9	----	92.5	----	
naphthalene-d8	1146-65-2	E641A	0.010	%	----	99.7	----	99.0	----	
phenanthrene-d10	1517-22-2	E641A	0.010	%	----	101	----	100	----	

Please refer to the General Comments section for an explanation of any qualifiers detected.





## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					JM24	DUP5	FIELD BLANK	TRAVEL BLANK	----
Client sampling date / time					23-Aug-2020 15:26	23-Aug-2020 13:23	23-Aug-2020 13:23	23-Aug-2020	----
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-021	VA20B3842-022	VA20B3842-023	VA20B3842-024	-----
					Result	Result	Result	Result	---
<b>Physical Tests</b>									
acidity (as CaCO3)	----	E283	2.0	mg/L	2.0	2.1	<2.0	<2.0	----
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	25.5	54.1	<1.0	<1.0	----
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	----
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	----
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	25.5	54.1	<1.0	<1.0	----
colour, true	----	E329	5.0	CU	<5.0	<5.0	<5.0	<5.0	----
conductivity	----	E100	2.0	µS/cm	61.2	142	<2.0	<2.0	----
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	28.1	67.0	<0.60	----	----
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	31.4	66.1	<0.60	<0.60	----
pH	----	E108	0.10	pH units	7.70	7.87	5.46	5.66	----
solids, total dissolved [TDS]	----	E162	10	mg/L	47	82	<10	<10	----
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	40.2	<3.0	<3.0	<3.0	----
turbidity	----	E121	0.10	NTU	40.2	1.44	<0.10	<0.10	----
<b>Anions and Nutrients</b>									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0051	0.0097	<0.0050	<0.0050	----
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	----
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	<0.50	<0.50	----
fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	0.022	<0.020	<0.020	----
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	<0.050	0.067	<0.050	<0.050	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	----
nitrogen, total	7727-37-9	E366	0.030	mg/L	<0.030	0.066	<0.030	<0.030	----
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	----
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0412	0.0024	<0.0020	<0.0020	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	4.52	15.6	<0.30	<0.30	----
<b>Cyanides</b>									
cyanide, free	----	E339	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	----
cyanide, strong acid dissociable (total)	----	E333	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	----
cyanide, weak acid dissociable	----	E336	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	----
<b>Organic / Inorganic Carbon</b>									
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	1.57	1.67	<0.50	----	----



## Analytical Results

Sub-Matrix: Water					Client sample ID	JM24	DUP5	FIELD BLANK	TRAVEL BLANK	----
(Matrix: Water)										
Client sampling date / time					23-Aug-2020 15:26	23-Aug-2020 13:23	23-Aug-2020 13:23	23-Aug-2020	----	
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-021	VA20B3842-022	VA20B3842-023	VA20B3842-024	-----	
					Result	Result	Result	Result	---	
<b>Organic / Inorganic Carbon</b>										
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	<0.50	1.02	<0.50	<0.50	----	
<b>Total Metals</b>										
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.701	0.0560	<0.0030	<0.0030	----	
antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----	
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00028	0.00036	<0.00010	<0.00010	----	
barium, total	7440-39-3	E420	0.00010	mg/L	0.0566	0.0169	<0.00010	<0.00010	----	
beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	----	
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	----	
boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	----	
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.000262	0.0000232	<0.0000050	<0.0000050	----	
calcium, total	7440-70-2	E420	0.050	mg/L	10.8	22.8	<0.050	<0.050	----	
chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----	
cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00048	<0.00010	<0.00010	<0.00010	----	
copper, total	7440-50-8	E420	0.00050	mg/L	0.00328	0.00075	<0.00050	<0.00050	----	
iron, total	7439-89-6	E420	0.010	mg/L	0.810	0.069	<0.010	<0.010	----	
lead, total	7439-92-1	E420	0.000050	mg/L	0.00494	0.000153	<0.000050	<0.000050	----	
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	----	
magnesium, total	7439-95-4	E420	0.100	mg/L	1.08	2.24	<0.100	<0.100	----	
manganese, total	7439-96-5	E420	0.00010	mg/L	0.0961	0.0150	<0.00010	<0.00010	----	
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	----	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000144	0.000299	<0.000050	<0.000050	----	
nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----	
phosphorus, total	7723-14-0	E420	0.050	mg/L	0.066	<0.050	<0.050	<0.050	----	
potassium, total	7440-09-7	E420	0.100	mg/L	1.03	1.10	<0.100	<0.100	----	
selenium, total	7782-49-2	E420	0.000050	mg/L	0.000059	0.000054	<0.000050	<0.000050	----	
silicon, total	7440-21-3	E420	0.10	mg/L	2.06	1.10	<0.10	<0.10	----	
silver, total	7440-22-4	E420	0.000010	mg/L	0.000013	<0.000010	<0.000010	<0.000010	----	
sodium, total	7440-23-5	E420	0.050	mg/L	0.406	0.297	<0.050	<0.050	----	
strontium, total	7440-24-6	E420	0.00020	mg/L	0.0680	0.0985	<0.00020	<0.00020	----	
sulfur, total	7704-34-9	E420	0.50	mg/L	1.45	5.17	<0.50	<0.50	----	
thallium, total	7440-28-0	E420	0.000010	mg/L	0.000029	<0.000010	<0.000010	<0.000010	----	



## Analytical Results

Sub-Matrix: Water					Client sample ID	JM24	DUP5	FIELD BLANK	TRAVEL BLANK	----
(Matrix: Water)										
Client sampling date / time					23-Aug-2020 15:26	23-Aug-2020 13:23	23-Aug-2020 13:23	23-Aug-2020	----	
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-021	VA20B3842-022	VA20B3842-023	VA20B3842-024	-----	
					Result	Result	Result	Result	---	
<b>Total Metals</b>										
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----	
titanium, total	7440-32-6	E420	0.00030	mg/L	0.0412	0.00163	<0.00030	<0.00030	----	
uranium, total	7440-61-1	E420	0.000010	mg/L	0.000105	0.000054	<0.000010	<0.000010	----	
vanadium, total	7440-62-2	E420	0.00050	mg/L	0.00174	<0.00050	<0.00050	<0.00050	----	
zinc, total	7440-66-6	E420	0.0030	mg/L	0.0452	<0.0030	<0.0030	<0.0030	----	
zirconium, total	7440-67-7	E420	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	----	
<b>Dissolved Metals</b>										
aluminum, dissolved	7429-90-5	E421	0.0030	mg/L	0.0444	0.0125	<0.0030	----	----	
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----	
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00012	0.00024	<0.00010	----	----	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0279	0.0164	<0.00010	----	----	
beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	<0.000020	----	----	
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	----	
boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	<0.010	----	----	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.000118	0.0000220	<0.0000050	----	----	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	10.1	23.2	<0.050	----	----	
chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00046	0.00049	<0.00020	----	----	
iron, dissolved	7439-89-6	E421	0.010	mg/L	0.031	0.011	<0.010	----	----	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	0.000227	<0.000050	<0.000050	----	----	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	<0.0010	----	----	
magnesium, dissolved	7439-95-4	E421	0.100	mg/L	0.687	2.20	<0.100	----	----	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0204	0.0118	<0.00010	----	----	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	----	----	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000159	0.000281	<0.000050	----	----	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	<0.050	----	----	
potassium, dissolved	7440-09-7	E421	0.100	mg/L	0.629	1.11	<0.100	----	----	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000064	<0.000050	<0.000050	----	----	
silicon, dissolved	7440-21-3	E421	0.050	mg/L	0.824	0.928	<0.050	----	----	



## Analytical Results

Sub-Matrix: Water					Client sample ID	JM24	DUP5	FIELD BLANK	TRAVEL BLANK	----
(Matrix: Water)					Client sampling date / time	23-Aug-2020 15:26	23-Aug-2020 13:23	23-Aug-2020 13:23	23-Aug-2020	----
Analyte	CAS Number	Method	LOR	Unit	VA20B3842-021	VA20B3842-022	VA20B3842-023	VA20B3842-024	-----	
					Result	Result	Result	Result	----	
<b>Dissolved Metals</b>										
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	----	----	
sodium, dissolved	7440-23-5	E421	0.050	mg/L	0.383	0.311	<0.050	----	----	
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0640	0.0965	<0.00020	----	----	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	1.32	4.86	<0.50	----	----	
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	----	----	
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----	
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	0.00139	<0.00030	<0.00030	----	----	
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000084	0.000051	<0.000010	----	----	
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----	
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0042	0.0013	<0.0010	----	----	
zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	<0.00030	----	----	
dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	----	----	
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	----	----	

Please refer to the General Comments section for an explanation of any qualifiers detected.

## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>VA20B3842</b>	Page	: 1 of 95
Client	: <b>ERM Consultants Canada Ltd.</b>	Laboratory	: Vancouver - Environmental
Contact	: Jill Zyla	Account Manager	: Amber Springer
Address	: 3790 Alfred Ave Smithers BC Canada V0J 2N0	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: 604 689 9460	Telephone	: +1 604 253 4188
Project	: 0539378-0012 (WQ ISKUT)	Date Samples Received	: 28-Aug-2020 10:10
PO	: ----	Issue Date	: 10-Sep-2020 14:18
C-O-C number	: 17-841428, 17-841426		
Sampler	: ----		
Site	: ----		
Quote number	: Q74326		
No. of samples received	: 24		
No. of samples analysed	: 24		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

**Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.

**CAS Number:** Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

## Summary of Outliers

### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.

### **Outliers : Analysis Holding Time Compliance (Breaches)**

- Analysis Holding Time Outliers exist - please see following pages for full details.

### **Outliers : Frequency of Quality Control Samples**

- No Quality Control Sample Frequency Outliers occur.

RIGHT SOLUTIONS | RIGHT PARTNER



## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry</b>										
<b>Amber glass total (sulfuric acid)</b> JM10-2018	E559	23-Aug-2020	----	----	----		03-Sep-2020	28 days	10 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> DUP3	E298	23-Aug-2020	----	----	----		04-Sep-2020	28 days	12 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> DUP4	E298	23-Aug-2020	----	----	----		04-Sep-2020	28 days	12 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> JM10-2018	E298	23-Aug-2020	----	----	----		04-Sep-2020	28 days	12 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> JM11	E298	23-Aug-2020	----	----	----		04-Sep-2020	28 days	12 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> JM12	E298	23-Aug-2020	----	----	----		04-Sep-2020	28 days	12 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> JM13	E298	23-Aug-2020	----	----	----		04-Sep-2020	28 days	12 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> JM14	E298	23-Aug-2020	----	----	----		04-Sep-2020	28 days	12 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> JM2	E298	23-Aug-2020	----	----	----		04-Sep-2020	28 days	12 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> JM2 SEEPAGE	E298	23-Aug-2020	----	----	----		04-Sep-2020	28 days	12 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> JM3	E298	23-Aug-2020	----	----	----		04-Sep-2020	28 days	12 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> JM4	E298	23-Aug-2020	----	----	----		04-Sep-2020	28 days	12 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> JM5	E298	23-Aug-2020	----	----	----		04-Sep-2020	28 days	12 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> JM6	E298	23-Aug-2020	----	----	----		04-Sep-2020	28 days	12 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> SCH1	E298	23-Aug-2020	----	----	----		04-Sep-2020	28 days	12 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> SK1	E298	23-Aug-2020	----	----	----		04-Sep-2020	28 days	12 days	✓	





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> TMF1	E298	23-Aug-2020	----	----	----		04-Sep-2020	28 days	12 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> BR3	E298	22-Aug-2020	----	----	----		04-Sep-2020	28 days	13 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> BR4	E298	22-Aug-2020	----	----	----		04-Sep-2020	28 days	13 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> DUP1	E298	22-Aug-2020	----	----	----		04-Sep-2020	28 days	13 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> DUP2	E298	22-Aug-2020	----	----	----		04-Sep-2020	28 days	13 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> DUP5	E298	23-Aug-2020	----	----	----		01-Sep-2020	28 days	9 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> FIELD BLANK	E298	23-Aug-2020	----	----	----		01-Sep-2020	28 days	9 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> JM24	E298	23-Aug-2020	----	----	----		01-Sep-2020	28 days	9 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> TRAVEL BLANK	E298	23-Aug-2020	----	----	----		01-Sep-2020	28 days	9 days	✔



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE JM6	E235.Br-L	23-Aug-2020	----	----	----		02-Sep-2020	28 days	10 days	✓
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE JM14	E235.Br-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE JM24	E235.Br-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE TRAVEL BLANK	E235.Br-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE BR3	E235.Br-L	22-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE BR4	E235.Br-L	22-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE DUP2	E235.Br-L	22-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE DUP3	E235.Br-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE DUP4	E235.Br-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE DUP5	E235.Br-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE FIELD BLANK	E235.Br-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE JM10-2018	E235.Br-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE JM11	E235.Br-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE JM12	E235.Br-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE JM13	E235.Br-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE JM2	E235.Br-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE JM2 SEEPAGE	E235.Br-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE JM3	E235.Br-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE JM4	E235.Br-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE JM5	E235.Br-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE SCH1	E235.Br-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE SK1	E235.Br-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE TMF1	E235.Br-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE DUP1	E235.Br-L	22-Aug-2020	----	----	----		29-Aug-2020	28 days	7 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE JM6	E235.Cl	23-Aug-2020	----	----	----		02-Sep-2020	28 days	10 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE JM14	E235.Cl	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE JM24	E235.Cl	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE TRAVEL BLANK	E235.Cl	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE BR3	E235.Cl	22-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE BR4	E235.Cl	22-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE DUP2	E235.Cl	22-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE DUP3	E235.Cl	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE DUP4	E235.Cl	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE DUP5	E235.Cl	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE FIELD BLANK	E235.Cl	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE JM10-2018	E235.Cl	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE JM11	E235.Cl	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE JM12	E235.Cl	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE JM13	E235.Cl	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE JM2	E235.Cl	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE JM2 SEEPAGE	E235.Cl	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE JM3	E235.Cl	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE JM4	E235.Cl	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE JM5	E235.Cl	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE SCH1	E235.Cl	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE SK1	E235.Cl	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE TMF1	E235.Cl	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE DUP1	E235.Cl	22-Aug-2020	----	----	----		29-Aug-2020	28 days	7 days	✓	
<b>Anions and Nutrients : Cyanate by Ion Selective Electrode</b>											
HDPE - total (sodium hydroxide) JM10-2018	E343	23-Aug-2020	----	----	----		08-Sep-2020	----	----		
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE JM6	E378-U	23-Aug-2020	----	----	----		06-Sep-2020	3 days	13 days	* EHTR	
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE DUP3	E378-U	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	* EHTR	
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE DUP4	E378-U	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	* EHTR	
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE DUP5	E378-U	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	* EHTR	
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE FIELD BLANK	E378-U	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	* EHTR	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE JM10-2018	E378-U	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE JM11	E378-U	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE JM12	E378-U	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE JM13	E378-U	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE JM14	E378-U	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE JM2	E378-U	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE JM2 SEEPAGE	E378-U	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE JM24	E378-U	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE JM3	E378-U	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR





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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE JM4	E378-U	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE JM5	E378-U	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE SCH1	E378-U	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE SK1	E378-U	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE TMF1	E378-U	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE TRAVEL BLANK	E378-U	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE BR3	E378-U	22-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE BR4	E378-U	22-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE DUP1	E378-U	22-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE DUP2	E378-U	22-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE JM6	E235.F	23-Aug-2020	----	----	----		02-Sep-2020	28 days	10 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE JM14	E235.F	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE JM24	E235.F	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE TRAVEL BLANK	E235.F	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE BR3	E235.F	22-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE BR4	E235.F	22-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE DUP2	E235.F	22-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE DUP3	E235.F	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE DUP4	E235.F	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE DUP5	E235.F	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE FIELD BLANK	E235.F	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE JM10-2018	E235.F	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE JM11	E235.F	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE JM12	E235.F	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE JM13	E235.F	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE JM2	E235.F	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE JM2 SEEPAGE	E235.F	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE JM3	E235.F	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE JM4	E235.F	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE JM5	E235.F	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE SCH1	E235.F	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE SK1	E235.F	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE TMF1	E235.F	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE DUP1	E235.F	22-Aug-2020	----	----	----		29-Aug-2020	28 days	7 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE JM6	E235.NO3-L	23-Aug-2020	----	----	----		02-Sep-2020	3 days	10 days	* EHTR	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE JM14	E235.NO3-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	* EHTR	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE JM24	E235.NO3-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	* EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE TRAVEL BLANK	E235.NO3-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	* EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE BR3	E235.NO3-L	22-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	* EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE BR4	E235.NO3-L	22-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	* EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE DUP2	E235.NO3-L	22-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	* EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE DUP3	E235.NO3-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	* EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE DUP4	E235.NO3-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	* EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE DUP5	E235.NO3-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	* EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE FIELD BLANK	E235.NO3-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	* EHTR



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE JM10-2018	E235.NO3-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE JM11	E235.NO3-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE JM12	E235.NO3-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE JM13	E235.NO3-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE JM2	E235.NO3-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE JM2 SEEPAGE	E235.NO3-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE JM3	E235.NO3-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE JM4	E235.NO3-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE JM5	E235.NO3-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE SCH1	E235.NO3-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE SK1	E235.NO3-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE TMF1	E235.NO3-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE DUP1	E235.NO3-L	22-Aug-2020	----	----	----		29-Aug-2020	3 days	7 days	*	EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE JM6	E235.NO2-L	23-Aug-2020	----	----	----		02-Sep-2020	3 days	10 days	*	EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE JM14	E235.NO2-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE JM24	E235.NO2-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE TRAVEL BLANK	E235.NO2-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE BR3	E235.NO2-L	22-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE BR4	E235.NO2-L	22-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE DUP2	E235.NO2-L	22-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE DUP3	E235.NO2-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE DUP4	E235.NO2-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE DUP5	E235.NO2-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE FIELD BLANK	E235.NO2-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE JM10-2018	E235.NO2-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE JM11	E235.NO2-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE JM12	E235.NO2-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	*	EHTR





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE JM13	E235.NO2-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE JM2	E235.NO2-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE JM2 SEEPAGE	E235.NO2-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE JM3	E235.NO2-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE JM4	E235.NO2-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE JM5	E235.NO2-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE SCH1	E235.NO2-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE SK1	E235.NO2-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE TMF1	E235.NO2-L	23-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	* EHTR



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE DUP1	E235.NO2-L	22-Aug-2020	----	----	----		29-Aug-2020	3 days	7 days	* EHTR
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE JM6	E235.SO4	23-Aug-2020	----	----	----		02-Sep-2020	28 days	10 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE JM14	E235.SO4	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE JM24	E235.SO4	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE TRAVEL BLANK	E235.SO4	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE BR3	E235.SO4	22-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE BR4	E235.SO4	22-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE DUP2	E235.SO4	22-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE DUP3	E235.SO4	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE DUP4	E235.SO4	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE DUP5	E235.SO4	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE FIELD BLANK	E235.SO4	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE JM10-2018	E235.SO4	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE JM11	E235.SO4	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE JM12	E235.SO4	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE JM13	E235.SO4	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE JM2	E235.SO4	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE JM2 SEEPAGE	E235.SO4	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE JM3	E235.SO4	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE JM4	E235.SO4	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE JM5	E235.SO4	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE SCH1	E235.SO4	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE SK1	E235.SO4	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE TMF1	E235.SO4	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE DUP1	E235.SO4	22-Aug-2020	----	----	----		29-Aug-2020	28 days	7 days	✓
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>										
Amber glass total (sulfuric acid) DUP3	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	31-Aug-2020	22 days	2 days	✓
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>										
Amber glass total (sulfuric acid) DUP4	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	31-Aug-2020	22 days	2 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> DUP5	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	31-Aug-2020	22 days	2 days	✓	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> FIELD BLANK	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	31-Aug-2020	22 days	2 days	✓	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM10-2018	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	31-Aug-2020	22 days	2 days	✓	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM11	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	31-Aug-2020	22 days	2 days	✓	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM12	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	31-Aug-2020	22 days	2 days	✓	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM13	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	31-Aug-2020	22 days	2 days	✓	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM14	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	31-Aug-2020	22 days	2 days	✓	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM2	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	31-Aug-2020	22 days	2 days	✓	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM2 SEEPAGE	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	31-Aug-2020	22 days	2 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM24	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	31-Aug-2020	22 days	2 days	✓	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM3	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	31-Aug-2020	22 days	2 days	✓	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM4	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	31-Aug-2020	22 days	2 days	✓	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM5	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	31-Aug-2020	22 days	2 days	✓	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM6	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	31-Aug-2020	22 days	2 days	✓	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SCH1	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	31-Aug-2020	22 days	2 days	✓	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SK1	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	31-Aug-2020	22 days	2 days	✓	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> TMF1	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	31-Aug-2020	22 days	2 days	✓	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> TRAVEL BLANK	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	31-Aug-2020	22 days	2 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> BR3	E318	22-Aug-2020	29-Aug-2020	28 days	6 days	✔	31-Aug-2020	21 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> BR4	E318	22-Aug-2020	29-Aug-2020	28 days	6 days	✔	31-Aug-2020	21 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> DUP1	E318	22-Aug-2020	29-Aug-2020	28 days	6 days	✔	31-Aug-2020	21 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> DUP2	E318	22-Aug-2020	29-Aug-2020	28 days	6 days	✔	31-Aug-2020	21 days	2 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> DUP3	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✔	01-Sep-2020	22 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> DUP4	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✔	01-Sep-2020	22 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> DUP5	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✔	01-Sep-2020	22 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> FIELD BLANK	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✔	01-Sep-2020	22 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> JM10-2018	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✔	01-Sep-2020	22 days	3 days	✔	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> JM11	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	01-Sep-2020	22 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> JM12	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	01-Sep-2020	22 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> JM13	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	01-Sep-2020	22 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> JM14	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	01-Sep-2020	22 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> JM2	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	01-Sep-2020	22 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> JM2 SEEPAGE	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	01-Sep-2020	22 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> JM24	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	01-Sep-2020	22 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> JM3	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	01-Sep-2020	22 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> JM4	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	01-Sep-2020	22 days	3 days	✓	





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> JM5	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	01-Sep-2020	22 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> JM6	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	01-Sep-2020	22 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> SCH1	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	01-Sep-2020	22 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> SK1	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	01-Sep-2020	22 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> TMF1	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	01-Sep-2020	22 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> TRAVEL BLANK	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	01-Sep-2020	22 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> BR3	E366	22-Aug-2020	29-Aug-2020	28 days	6 days	✓	01-Sep-2020	21 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> BR4	E366	22-Aug-2020	29-Aug-2020	28 days	6 days	✓	01-Sep-2020	21 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> DUP1	E366	22-Aug-2020	29-Aug-2020	28 days	6 days	✓	01-Sep-2020	21 days	3 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> DUP2	E366	22-Aug-2020	29-Aug-2020	28 days	6 days	✓	01-Sep-2020	21 days	3 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> DUP3	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> DUP4	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> DUP5	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> FIELD BLANK	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> JM10-2018	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> JM11	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> JM12	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> JM13	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> JM14	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> JM2	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> JM2 SEEPAGE	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> JM24	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> JM3	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> JM4	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> JM5	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> JM6	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> SCH1	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> SK1	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> TMF1	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> TRAVEL BLANK	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> BR3	E372-U	22-Aug-2020	29-Aug-2020	28 days	6 days	✓	29-Aug-2020	21 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> BR4	E372-U	22-Aug-2020	29-Aug-2020	28 days	6 days	✓	29-Aug-2020	21 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> DUP1	E372-U	22-Aug-2020	29-Aug-2020	28 days	6 days	✓	29-Aug-2020	21 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> DUP2	E372-U	22-Aug-2020	29-Aug-2020	28 days	6 days	✓	29-Aug-2020	21 days	0 days	✓	
<b>Cyanides : Free Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> DUP3	E339	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓	
<b>Cyanides : Free Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> DUP4	E339	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> DUP5	E339	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> FIELD BLANK	E339	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM10-2018	E339	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM11	E339	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM12	E339	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM13	E339	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM14	E339	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM2	E339	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM2 SEEPAGE	E339	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM24	E339	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM3	E339	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM4	E339	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM5	E339	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM6	E339	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SCH1	E339	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SK1	E339	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> TMF1	E339	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> TRAVEL BLANK	E339	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> BR3	E339	22-Aug-2020	----	----	----		04-Sep-2020	14 days	12 days	✓
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> BR4	E339	22-Aug-2020	----	----	----		04-Sep-2020	14 days	12 days	✓
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> DUP1	E339	22-Aug-2020	----	----	----		04-Sep-2020	14 days	12 days	✓
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> DUP2	E339	22-Aug-2020	----	----	----		04-Sep-2020	14 days	12 days	✓
<b>Cyanides : Thiocyanate by Colourimetry</b>										
<b>HDPE (nitric acid)</b> JM10-2018	E344	23-Aug-2020	----	----	----		04-Sep-2020	14 days	12 days	✓
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> DUP3	E333	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> DUP4	E333	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> DUP5	E333	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> FIELD BLANK	E333	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Cyanides : Total Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) JM10-2018	E333	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Total Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) JM11	E333	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Total Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) JM12	E333	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Total Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) JM13	E333	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Total Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) JM14	E333	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Total Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) JM2	E333	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Total Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) JM2 SEEPAGE	E333	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Total Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) JM24	E333	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : Total Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) JM3	E333	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM4	E333	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✔
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM5	E333	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✔
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM6	E333	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✔
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SCH1	E333	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✔
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SK1	E333	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✔
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> TMF1	E333	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✔
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> TRAVEL BLANK	E333	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✔
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> BR3	E333	22-Aug-2020	----	----	----		04-Sep-2020	14 days	12 days	✔
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> BR4	E333	22-Aug-2020	----	----	----		04-Sep-2020	14 days	12 days	✔



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> DUP1	E333	22-Aug-2020	----	----	----		04-Sep-2020	14 days	12 days	✓
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> DUP2	E333	22-Aug-2020	----	----	----		04-Sep-2020	14 days	12 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> DUP3	E336	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> DUP4	E336	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> DUP5	E336	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> FIELD BLANK	E336	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM10-2018	E336	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM11	E336	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM12	E336	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM13	E336	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM14	E336	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM2	E336	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM2 SEEPAGE	E336	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM24	E336	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM3	E336	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM4	E336	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM5	E336	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM6	E336	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SCH1	E336	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✔
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SK1	E336	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✔
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> TMF1	E336	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✔
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> TRAVEL BLANK	E336	23-Aug-2020	----	----	----		04-Sep-2020	14 days	11 days	✔
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> BR3	E336	22-Aug-2020	----	----	----		04-Sep-2020	14 days	12 days	✔
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> BR4	E336	22-Aug-2020	----	----	----		04-Sep-2020	14 days	12 days	✔
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> DUP1	E336	22-Aug-2020	----	----	----		04-Sep-2020	14 days	12 days	✔
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> DUP2	E336	22-Aug-2020	----	----	----		04-Sep-2020	14 days	12 days	✔
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> BR3	E421.Cr-L	22-Aug-2020	01-Sep-2020	180 days	10 days	✔	01-Sep-2020	169 days	0 days	✔



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> BR4	E421.Cr-L	22-Aug-2020	01-Sep-2020	180 days	10 days	✓	01-Sep-2020	169 days	0 days	✓	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> DUP1	E421.Cr-L	22-Aug-2020	01-Sep-2020	180 days	10 days	✓	01-Sep-2020	169 days	0 days	✓	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> DUP2	E421.Cr-L	22-Aug-2020	01-Sep-2020	180 days	10 days	✓	01-Sep-2020	169 days	0 days	✓	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> JM24	E421.Cr-L	23-Aug-2020	01-Sep-2020	180 days	8 days	✓	01-Sep-2020	171 days	0 days	✓	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> DUP3	E421.Cr-L	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> DUP4	E421.Cr-L	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> DUP5	E421.Cr-L	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> FIELD BLANK	E421.Cr-L	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> JM10-2018	E421.Cr-L	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> JM11	E421.Cr-L	23-Aug-2020	01-Sep-2020	180 days	9 days	✔	01-Sep-2020	170 days	0 days	✔
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> JM12	E421.Cr-L	23-Aug-2020	01-Sep-2020	180 days	9 days	✔	01-Sep-2020	170 days	0 days	✔
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> JM13	E421.Cr-L	23-Aug-2020	01-Sep-2020	180 days	9 days	✔	01-Sep-2020	170 days	0 days	✔
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> JM14	E421.Cr-L	23-Aug-2020	01-Sep-2020	180 days	9 days	✔	01-Sep-2020	170 days	0 days	✔
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> JM2	E421.Cr-L	23-Aug-2020	01-Sep-2020	180 days	9 days	✔	01-Sep-2020	170 days	0 days	✔
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> JM2 SEEPAGE	E421.Cr-L	23-Aug-2020	01-Sep-2020	180 days	9 days	✔	01-Sep-2020	170 days	0 days	✔
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> JM3	E421.Cr-L	23-Aug-2020	01-Sep-2020	180 days	9 days	✔	01-Sep-2020	170 days	0 days	✔
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> JM4	E421.Cr-L	23-Aug-2020	01-Sep-2020	180 days	9 days	✔	01-Sep-2020	170 days	0 days	✔
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> JM5	E421.Cr-L	23-Aug-2020	01-Sep-2020	180 days	9 days	✔	01-Sep-2020	170 days	0 days	✔



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> JM6	E421.Cr-L	23-Aug-2020	01-Sep-2020	180 days	9 days	✔	01-Sep-2020	170 days	0 days	✔
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> SCH1	E421.Cr-L	23-Aug-2020	01-Sep-2020	180 days	9 days	✔	01-Sep-2020	170 days	0 days	✔
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> SK1	E421.Cr-L	23-Aug-2020	01-Sep-2020	180 days	9 days	✔	01-Sep-2020	170 days	0 days	✔
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> TMF1	E421.Cr-L	23-Aug-2020	01-Sep-2020	180 days	9 days	✔	01-Sep-2020	170 days	0 days	✔
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
<b>Glass vial dissolved (hydrochloric acid)</b> BR3	E509	22-Aug-2020	02-Sep-2020	28 days	10 days	✔	02-Sep-2020	17 days	0 days	✔
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
<b>Glass vial dissolved (hydrochloric acid)</b> BR4	E509	22-Aug-2020	02-Sep-2020	28 days	10 days	✔	02-Sep-2020	17 days	0 days	✔
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
<b>Glass vial dissolved (hydrochloric acid)</b> DUP2	E509	22-Aug-2020	02-Sep-2020	28 days	10 days	✔	02-Sep-2020	17 days	0 days	✔
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
<b>Glass vial dissolved (hydrochloric acid)</b> DUP3	E509	23-Aug-2020	02-Sep-2020	28 days	10 days	✔	02-Sep-2020	17 days	0 days	✔
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
<b>Glass vial dissolved (hydrochloric acid)</b> DUP4	E509	23-Aug-2020	02-Sep-2020	28 days	10 days	✔	02-Sep-2020	17 days	0 days	✔



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> DUP5	E509	23-Aug-2020	02-Sep-2020	28 days	10 days	✓	02-Sep-2020	17 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> FIELD BLANK	E509	23-Aug-2020	02-Sep-2020	28 days	10 days	✓	02-Sep-2020	17 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> JM10-2018	E509	23-Aug-2020	02-Sep-2020	28 days	10 days	✓	02-Sep-2020	17 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> JM11	E509	23-Aug-2020	02-Sep-2020	28 days	10 days	✓	02-Sep-2020	17 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> JM12	E509	23-Aug-2020	02-Sep-2020	28 days	10 days	✓	02-Sep-2020	17 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> JM13	E509	23-Aug-2020	02-Sep-2020	28 days	10 days	✓	02-Sep-2020	17 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> JM2	E509	23-Aug-2020	02-Sep-2020	28 days	10 days	✓	02-Sep-2020	17 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> JM2 SEEPAGE	E509	23-Aug-2020	02-Sep-2020	28 days	10 days	✓	02-Sep-2020	17 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> JM3	E509	23-Aug-2020	02-Sep-2020	28 days	10 days	✓	02-Sep-2020	17 days	0 days	✓	





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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> JM4	E509	23-Aug-2020	02-Sep-2020	28 days	10 days	✓	02-Sep-2020	17 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> JM5	E509	23-Aug-2020	02-Sep-2020	28 days	10 days	✓	02-Sep-2020	17 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> SCH1	E509	23-Aug-2020	02-Sep-2020	28 days	10 days	✓	02-Sep-2020	17 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> SK1	E509	23-Aug-2020	02-Sep-2020	28 days	10 days	✓	02-Sep-2020	17 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> TMF1	E509	23-Aug-2020	02-Sep-2020	28 days	10 days	✓	02-Sep-2020	17 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> DUP1	E509	22-Aug-2020	02-Sep-2020	28 days	11 days	✓	02-Sep-2020	16 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> JM14	E509	23-Aug-2020	02-Sep-2020	28 days	9 days	✓	02-Sep-2020	18 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> JM24	E509	23-Aug-2020	02-Sep-2020	28 days	9 days	✓	02-Sep-2020	18 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> JM6	E509	23-Aug-2020	02-Sep-2020	28 days	9 days	✓	02-Sep-2020	18 days	0 days	✓	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> BR3	E421	22-Aug-2020	01-Sep-2020	180 days	10 days	✓	01-Sep-2020	169 days	0 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> BR4	E421	22-Aug-2020	01-Sep-2020	180 days	10 days	✓	01-Sep-2020	169 days	0 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> DUP1	E421	22-Aug-2020	01-Sep-2020	180 days	10 days	✓	01-Sep-2020	169 days	0 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> DUP2	E421	22-Aug-2020	01-Sep-2020	180 days	10 days	✓	01-Sep-2020	169 days	0 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> JM24	E421	23-Aug-2020	01-Sep-2020	180 days	8 days	✓	01-Sep-2020	171 days	0 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> DUP3	E421	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> DUP4	E421	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> DUP5	E421	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> FIELD BLANK	E421	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> JM10-2018	E421	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> JM11	E421	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> JM12	E421	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> JM13	E421	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> JM14	E421	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> JM2	E421	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> JM2 SEEPAGE	E421	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> JM3	E421	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> JM4	E421	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> JM5	E421	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> JM6	E421	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> SCH1	E421	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> SK1	E421	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> TMF1	E421	23-Aug-2020	01-Sep-2020	180 days	9 days	✓	01-Sep-2020	170 days	0 days	✓
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> DUP4	E601A	23-Aug-2020	02-Sep-2020	14 days	10 days	✓	03-Sep-2020	40 days	0 days	✓
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> JM2	E601A	23-Aug-2020	02-Sep-2020	14 days	10 days	✓	03-Sep-2020	40 days	0 days	✓
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> JM3	E601A	23-Aug-2020	02-Sep-2020	14 days	10 days	✓	03-Sep-2020	40 days	0 days	✓
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> JM4	E601A	23-Aug-2020	02-Sep-2020	14 days	10 days	✓	03-Sep-2020	40 days	0 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> JM5	E601A	23-Aug-2020	02-Sep-2020	14 days	10 days	✓	03-Sep-2020	40 days	0 days	✓
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> TMF1	E601A	23-Aug-2020	02-Sep-2020	14 days	10 days	✓	03-Sep-2020	40 days	0 days	✓
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> JM10-2018	E601A	23-Aug-2020	02-Sep-2020	14 days	9 days	✓	03-Sep-2020	40 days	0 days	✓
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>										
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> JM6	E601A	23-Aug-2020	02-Sep-2020	14 days	9 days	✓	03-Sep-2020	40 days	0 days	✓
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>										
<b>Glass vial (sodium bisulfate)</b> JM10-2018	E581.VH+F1	23-Aug-2020	02-Sep-2020	14 days	10 days	✓	03-Sep-2020	3 days	0 days	✓
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>										
<b>Glass vial (sodium bisulfate)</b> JM6	E581.VH+F1	23-Aug-2020	01-Sep-2020	14 days	8 days	✓	01-Sep-2020	5 days	0 days	✓
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>										
<b>Glass vial (sodium bisulfate)</b> DUP4	E581.VH+F1	23-Aug-2020	01-Sep-2020	14 days	9 days	✓	01-Sep-2020	4 days	0 days	✓
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>										
<b>Glass vial (sodium bisulfate)</b> JM2	E581.VH+F1	23-Aug-2020	01-Sep-2020	14 days	9 days	✓	01-Sep-2020	4 days	0 days	✓
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>										
<b>Glass vial (sodium bisulfate)</b> JM3	E581.VH+F1	23-Aug-2020	01-Sep-2020	14 days	9 days	✓	01-Sep-2020	4 days	0 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
<b>Glass vial (sodium bisulfate)</b> JM4	E581.VH+F1	23-Aug-2020	01-Sep-2020	14 days	9 days	✓	01-Sep-2020	4 days	0 days	✓	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
<b>Glass vial (sodium bisulfate)</b> JM5	E581.VH+F1	23-Aug-2020	01-Sep-2020	14 days	9 days	✓	01-Sep-2020	4 days	0 days	✓	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
<b>Glass vial (sodium bisulfate)</b> TMF1	E581.VH+F1	23-Aug-2020	01-Sep-2020	14 days	9 days	✓	01-Sep-2020	4 days	0 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> DUP3	E358-L	23-Aug-2020	----	----	----		05-Sep-2020	28 days	12 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> DUP4	E358-L	23-Aug-2020	----	----	----		05-Sep-2020	28 days	12 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> JM10-2018	E358-L	23-Aug-2020	----	----	----		05-Sep-2020	28 days	12 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> JM11	E358-L	23-Aug-2020	----	----	----		05-Sep-2020	28 days	12 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> JM12	E358-L	23-Aug-2020	----	----	----		05-Sep-2020	28 days	12 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> JM13	E358-L	23-Aug-2020	----	----	----		05-Sep-2020	28 days	12 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>										
<b>Amber glass dissolved (sulfuric acid)</b> JM14	E358-L	23-Aug-2020	----	----	----		05-Sep-2020	28 days	12 days	✓
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>										
<b>Amber glass dissolved (sulfuric acid)</b> JM2	E358-L	23-Aug-2020	----	----	----		05-Sep-2020	28 days	12 days	✓
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>										
<b>Amber glass dissolved (sulfuric acid)</b> JM2 SEEPAGE	E358-L	23-Aug-2020	----	----	----		05-Sep-2020	28 days	12 days	✓
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>										
<b>Amber glass dissolved (sulfuric acid)</b> JM3	E358-L	23-Aug-2020	----	----	----		05-Sep-2020	28 days	12 days	✓
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>										
<b>Amber glass dissolved (sulfuric acid)</b> JM4	E358-L	23-Aug-2020	----	----	----		05-Sep-2020	28 days	12 days	✓
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>										
<b>Amber glass dissolved (sulfuric acid)</b> JM5	E358-L	23-Aug-2020	----	----	----		05-Sep-2020	28 days	12 days	✓
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>										
<b>Amber glass dissolved (sulfuric acid)</b> JM6	E358-L	23-Aug-2020	----	----	----		05-Sep-2020	28 days	12 days	✓
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>										
<b>Amber glass dissolved (sulfuric acid)</b> SCH1	E358-L	23-Aug-2020	----	----	----		05-Sep-2020	28 days	12 days	✓
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>										
<b>Amber glass dissolved (sulfuric acid)</b> SK1	E358-L	23-Aug-2020	----	----	----		05-Sep-2020	28 days	12 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> TMF1	E358-L	23-Aug-2020	----	----	----		05-Sep-2020	28 days	12 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> BR3	E358-L	22-Aug-2020	----	----	----		05-Sep-2020	28 days	13 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> BR4	E358-L	22-Aug-2020	----	----	----		05-Sep-2020	28 days	13 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> DUP1	E358-L	22-Aug-2020	----	----	----		05-Sep-2020	28 days	13 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> DUP2	E358-L	22-Aug-2020	----	----	----		05-Sep-2020	28 days	13 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> DUP5	E358-L	23-Aug-2020	----	----	----		07-Sep-2020	28 days	14 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> FIELD BLANK	E358-L	23-Aug-2020	----	----	----		07-Sep-2020	28 days	14 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> JM24	E358-L	23-Aug-2020	----	----	----		07-Sep-2020	28 days	14 days	✓	
<b>Organic / Inorganic Carbon : Total Inorganic Carbon by Combustion (Low Level)</b>											
<b>HDPE</b> JM10-2018	E354-L	23-Aug-2020	----	----	----		02-Sep-2020	14 days	9 days	✓	





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> DUP3	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> DUP4	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> DUP5	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> FIELD BLANK	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM10-2018	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM11	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM12	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM13	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM14	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM2	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM2 SEEPAGE	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM24	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM3	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM4	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM5	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM6	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SCH1	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SK1	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>										
<b>Amber glass total (sulfuric acid)</b> TMF1	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>										
<b>Amber glass total (sulfuric acid)</b> TRAVEL BLANK	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>										
<b>Amber glass total (sulfuric acid)</b> BR3	E355-L	22-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>										
<b>Amber glass total (sulfuric acid)</b> BR4	E355-L	22-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>										
<b>Amber glass total (sulfuric acid)</b> DUP1	E355-L	22-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>										
<b>Amber glass total (sulfuric acid)</b> DUP2	E355-L	22-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Physical Tests : Acidity by Titration (Peroxide Treated)</b>										
<b>HDPE</b> JM10-2018	E284A	23-Aug-2020	----	----	----		01-Sep-2020	14 days	9 days	✓
<b>Physical Tests : Acidity by Titration</b>										
<b>HDPE</b> DUP3	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✓
<b>Physical Tests : Acidity by Titration</b>										
<b>HDPE</b> DUP4	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Acidity by Titration</b>										
HDPE DUP5	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✔
<b>Physical Tests : Acidity by Titration</b>										
HDPE FIELD BLANK	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✔
<b>Physical Tests : Acidity by Titration</b>										
HDPE JM10-2018	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✔
<b>Physical Tests : Acidity by Titration</b>										
HDPE JM11	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✔
<b>Physical Tests : Acidity by Titration</b>										
HDPE JM12	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✔
<b>Physical Tests : Acidity by Titration</b>										
HDPE JM13	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✔
<b>Physical Tests : Acidity by Titration</b>										
HDPE JM14	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✔
<b>Physical Tests : Acidity by Titration</b>										
HDPE JM2	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✔
<b>Physical Tests : Acidity by Titration</b>										
HDPE JM2 SEEPAGE	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : Acidity by Titration</b>											
HDPE JM24	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✔	
<b>Physical Tests : Acidity by Titration</b>											
HDPE JM3	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✔	
<b>Physical Tests : Acidity by Titration</b>											
HDPE JM4	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✔	
<b>Physical Tests : Acidity by Titration</b>											
HDPE JM5	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✔	
<b>Physical Tests : Acidity by Titration</b>											
HDPE SCH1	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✔	
<b>Physical Tests : Acidity by Titration</b>											
HDPE SK1	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✔	
<b>Physical Tests : Acidity by Titration</b>											
HDPE TMF1	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✔	
<b>Physical Tests : Acidity by Titration</b>											
HDPE TRAVEL BLANK	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✔	
<b>Physical Tests : Acidity by Titration</b>											
HDPE BR3	E283	22-Aug-2020	----	----	----		29-Aug-2020	14 days	6 days	✔	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Acidity by Titration</b>										
HDPE BR4	E283	22-Aug-2020	----	----	----		29-Aug-2020	14 days	6 days	✓
<b>Physical Tests : Acidity by Titration</b>										
HDPE DUP1	E283	22-Aug-2020	----	----	----		29-Aug-2020	14 days	6 days	✓
<b>Physical Tests : Acidity by Titration</b>										
HDPE DUP2	E283	22-Aug-2020	----	----	----		29-Aug-2020	14 days	6 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE DUP5	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE FIELD BLANK	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE JM10-2018	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE JM11	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE JM14	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE JM2	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE JM24	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE JM5	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE SK1	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE TMF1	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE TRAVEL BLANK	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE BR3	E290	22-Aug-2020	----	----	----		29-Aug-2020	14 days	6 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE BR4	E290	22-Aug-2020	----	----	----		29-Aug-2020	14 days	6 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE DUP2	E290	22-Aug-2020	----	----	----		29-Aug-2020	14 days	6 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE DUP3	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	6 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE DUP4	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	6 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE JM12	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	6 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE JM13	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	6 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE JM2 SEEPAGE	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	6 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE JM3	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	6 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE JM4	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	6 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE SCH1	E290	23-Aug-2020	----	----	----		29-Aug-2020	14 days	6 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE DUP1	E290	22-Aug-2020	----	----	----		29-Aug-2020	14 days	7 days	✓
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE DUP3	E329	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	* EHTR





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE DUP4	E329	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE DUP5	E329	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE FIELD BLANK	E329	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE JM10-2018	E329	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE JM11	E329	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE JM12	E329	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE JM13	E329	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE JM14	E329	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE JM2	E329	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	* EHTR



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : Colour (True) by Spectrometer</b>											
HDPE JM2 SEEPAGE	E329	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>											
HDPE JM24	E329	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>											
HDPE JM3	E329	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>											
HDPE JM4	E329	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>											
HDPE JM5	E329	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>											
HDPE SCH1	E329	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>											
HDPE SK1	E329	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>											
HDPE TMF1	E329	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>											
HDPE TRAVEL BLANK	E329	23-Aug-2020	----	----	----		29-Aug-2020	3 days	5 days	*	EHTR



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE BR3	E329	22-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE BR4	E329	22-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE DUP1	E329	22-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE DUP2	E329	22-Aug-2020	----	----	----		29-Aug-2020	3 days	6 days	* EHTR
<b>Physical Tests : Conductivity in Water</b>										
HDPE DUP5	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE FIELD BLANK	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE JM10-2018	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE JM11	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE JM14	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Conductivity in Water</b>										
HDPE JM2	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✔
<b>Physical Tests : Conductivity in Water</b>										
HDPE JM24	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✔
<b>Physical Tests : Conductivity in Water</b>										
HDPE JM5	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✔
<b>Physical Tests : Conductivity in Water</b>										
HDPE SK1	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✔
<b>Physical Tests : Conductivity in Water</b>										
HDPE TMF1	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✔
<b>Physical Tests : Conductivity in Water</b>										
HDPE TRAVEL BLANK	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✔
<b>Physical Tests : Conductivity in Water</b>										
HDPE BR3	E100	22-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✔
<b>Physical Tests : Conductivity in Water</b>										
HDPE BR4	E100	22-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✔
<b>Physical Tests : Conductivity in Water</b>										
HDPE DUP2	E100	22-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✔



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Conductivity in Water</b>										
HDPE DUP3	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE DUP4	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE JM12	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE JM13	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE JM2 SEEPAGE	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE JM3	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE JM4	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE SCH1	E100	23-Aug-2020	----	----	----		29-Aug-2020	28 days	6 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE DUP1	E100	22-Aug-2020	----	----	----		29-Aug-2020	28 days	7 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : pH by Meter</b>										
HDPE JM24	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	136 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE TRAVEL BLANK	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	137 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE DUP5	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	138 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE FIELD BLANK	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	138 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE JM14	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	140 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE JM10-2018	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	141 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE JM11	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	141 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE JM5	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	142 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE SK1	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	142 hrs	* EHTR-FM



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : pH by Meter</b>										
HDPE JM2	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	143 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE TMF1	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	143 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE JM2 SEEPAGE	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	144 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE JM4	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	144 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE DUP3	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	145 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE DUP4	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	145 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE JM12	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	145 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE JM3	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	145 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE SCH1	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	145 hrs	* EHTR-FM



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : pH by Meter</b>										
HDPE JM13	E108	23-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	146 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE BR3	E108	22-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	164 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE BR4	E108	22-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	164 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE DUP2	E108	22-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	164 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE DUP1	E108	22-Aug-2020	----	----	----		29-Aug-2020	0.25 hrs	169 hrs	* EHTR-FM
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE DUP3	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE DUP4	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE DUP5	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE FIELD BLANK	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE JM10-2018	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE JM11	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE JM12	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE JM13	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE JM14	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE JM2	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE JM2 SEEPAGE	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE JM24	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE JM3	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE JM4	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE JM5	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE SCH1	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE SK1	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE TMF1	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE TRAVEL BLANK	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE BR3	E162	22-Aug-2020	----	----	----		28-Aug-2020	7 days	6 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE BR4	E162	22-Aug-2020	----	----	----		28-Aug-2020	7 days	6 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE DUP1	E162	22-Aug-2020	----	----	----		28-Aug-2020	7 days	6 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE DUP2	E162	22-Aug-2020	----	----	----		28-Aug-2020	7 days	6 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE DUP3	E160-H	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE DUP4	E160-H	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE DUP5	E160-H	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE FIELD BLANK	E160-H	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE JM10-2018	E160-H	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE JM11	E160-H	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE JM12	E160-H	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE JM13	E160-H	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE JM14	E160-H	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE JM2	E160-H	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE JM2 SEEPAGE	E160-H	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE JM24	E160-H	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE JM3	E160-H	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE JM4	E160-H	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE JM5	E160-H	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE SCH1	E160-H	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE SK1	E160-H	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE TMF1	E160-H	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE TRAVEL BLANK	E160-H	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE BR3	E160-H	22-Aug-2020	----	----	----		28-Aug-2020	7 days	6 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE BR4	E160-H	22-Aug-2020	----	----	----		28-Aug-2020	7 days	6 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE DUP1	E160-H	22-Aug-2020	----	----	----		28-Aug-2020	7 days	6 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE DUP2	E160-H	22-Aug-2020	----	----	----		28-Aug-2020	7 days	6 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE JM6	E160-H	23-Aug-2020	----	----	----		31-Aug-2020	7 days	8 days	* EHT
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE DUP3	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	7 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE DUP4	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	7 days	* EHTR



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE JM14	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	7 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE JM24	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	7 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE JM3	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	7 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE JM6	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	7 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE SCH1	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	7 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE TRAVEL BLANK	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	7 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE BR3	E121	22-Aug-2020	----	----	----		31-Aug-2020	3 days	8 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE BR4	E121	22-Aug-2020	----	----	----		31-Aug-2020	3 days	8 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE DUP1	E121	22-Aug-2020	----	----	----		31-Aug-2020	3 days	8 days	* EHTR



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
Rec	Actual	Rec		Actual						
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE DUP2	E121	22-Aug-2020	----	----	----		31-Aug-2020	3 days	8 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE DUP5	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	8 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE FIELD BLANK	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	8 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE JM10-2018	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	8 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE JM11	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	8 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE JM12	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	8 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE JM13	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	8 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE JM2	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	8 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE JM2 SEEPAGE	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	8 days	* EHTR



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE JM4	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	8 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE JM5	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	8 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE SK1	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	8 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE TMF1	E121	23-Aug-2020	----	----	----		31-Aug-2020	3 days	8 days	* EHTR
<b>Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS</b>										
Amber glass/Teflon lined cap (sodium bisulfate) DUP4	E641A	23-Aug-2020	02-Sep-2020	14 days	10 days	✓	02-Sep-2020	40 days	0 days	✓
<b>Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS</b>										
Amber glass/Teflon lined cap (sodium bisulfate) JM2	E641A	23-Aug-2020	02-Sep-2020	14 days	10 days	✓	02-Sep-2020	40 days	0 days	✓
<b>Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS</b>										
Amber glass/Teflon lined cap (sodium bisulfate) JM3	E641A	23-Aug-2020	02-Sep-2020	14 days	10 days	✓	02-Sep-2020	40 days	0 days	✓
<b>Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS</b>										
Amber glass/Teflon lined cap (sodium bisulfate) JM4	E641A	23-Aug-2020	02-Sep-2020	14 days	10 days	✓	02-Sep-2020	40 days	0 days	✓
<b>Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS</b>										
Amber glass/Teflon lined cap (sodium bisulfate) JM5	E641A	23-Aug-2020	02-Sep-2020	14 days	10 days	✓	02-Sep-2020	40 days	0 days	✓





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> TMF1	E641A	23-Aug-2020	02-Sep-2020	14 days	10 days	✓	02-Sep-2020	40 days	0 days	✓	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> JM10-2018	E641A	23-Aug-2020	02-Sep-2020	14 days	9 days	✓	02-Sep-2020	40 days	0 days	✓	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> JM6	E641A	23-Aug-2020	02-Sep-2020	14 days	9 days	✓	02-Sep-2020	40 days	0 days	✓	
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE total (nitric acid)</b> DUP3	E420.Cr-L	23-Aug-2020	----	----	----		04-Sep-2020	180 days	12 days	✓	
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE total (nitric acid)</b> DUP4	E420.Cr-L	23-Aug-2020	----	----	----		04-Sep-2020	180 days	12 days	✓	
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE total (nitric acid)</b> JM12	E420.Cr-L	23-Aug-2020	----	----	----		04-Sep-2020	180 days	12 days	✓	
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE total (nitric acid)</b> JM13	E420.Cr-L	23-Aug-2020	----	----	----		04-Sep-2020	180 days	12 days	✓	
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE total (nitric acid)</b> JM3	E420.Cr-L	23-Aug-2020	----	----	----		04-Sep-2020	180 days	12 days	✓	
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE total (nitric acid)</b> SCH1	E420.Cr-L	23-Aug-2020	----	----	----		04-Sep-2020	180 days	12 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> BR3	E420.Cr-L	22-Aug-2020	----	----	----		04-Sep-2020	180 days	13 days	✓
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> BR4	E420.Cr-L	22-Aug-2020	----	----	----		04-Sep-2020	180 days	13 days	✓
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> DUP1	E420.Cr-L	22-Aug-2020	----	----	----		04-Sep-2020	180 days	13 days	✓
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> DUP2	E420.Cr-L	22-Aug-2020	----	----	----		04-Sep-2020	180 days	13 days	✓
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> DUP5	E420.Cr-L	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✓
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> FIELD BLANK	E420.Cr-L	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✓
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> JM10-2018	E420.Cr-L	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✓
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> JM11	E420.Cr-L	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✓
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> JM14	E420.Cr-L	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> JM2	E420.Cr-L	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✔
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> JM2 SEEPAGE	E420.Cr-L	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✔
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> JM24	E420.Cr-L	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✔
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> JM4	E420.Cr-L	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✔
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> JM5	E420.Cr-L	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✔
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> JM6	E420.Cr-L	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✔
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> SK1	E420.Cr-L	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✔
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> TMF1	E420.Cr-L	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✔
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> TRAVEL BLANK	E420.Cr-L	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✔



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> DUP3	E508	23-Aug-2020	----	----	----		02-Sep-2020	28 days	10 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> DUP4	E508	23-Aug-2020	----	----	----		02-Sep-2020	28 days	10 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> JM2	E508	23-Aug-2020	----	----	----		02-Sep-2020	28 days	10 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> JM2 SEEPAGE	E508	23-Aug-2020	----	----	----		02-Sep-2020	28 days	10 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> JM3	E508	23-Aug-2020	----	----	----		02-Sep-2020	28 days	10 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> JM4	E508	23-Aug-2020	----	----	----		02-Sep-2020	28 days	10 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> JM5	E508	23-Aug-2020	----	----	----		03-Sep-2020	28 days	10 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> SCH1	E508	23-Aug-2020	----	----	----		02-Sep-2020	28 days	10 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> SK1	E508	23-Aug-2020	----	----	----		02-Sep-2020	28 days	10 days	✓



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> TMF1	E508	23-Aug-2020	----	----	----		02-Sep-2020	28 days	10 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> JM12	E508	23-Aug-2020	----	----	----		31-Aug-2020	28 days	8 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> JM13	E508	23-Aug-2020	----	----	----		31-Aug-2020	28 days	8 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> BR3	E508	22-Aug-2020	----	----	----		31-Aug-2020	28 days	9 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> BR4	E508	22-Aug-2020	----	----	----		31-Aug-2020	28 days	9 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> DUP1	E508	22-Aug-2020	----	----	----		31-Aug-2020	28 days	9 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> DUP2	E508	22-Aug-2020	----	----	----		31-Aug-2020	28 days	9 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> DUP5	E508	23-Aug-2020	----	----	----		02-Sep-2020	28 days	9 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> FIELD BLANK	E508	23-Aug-2020	----	----	----		02-Sep-2020	28 days	9 days	✓



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> JM10-2018	E508	23-Aug-2020	----	----	----		02-Sep-2020	28 days	9 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> JM11	E508	23-Aug-2020	----	----	----		02-Sep-2020	28 days	9 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> JM14	E508	23-Aug-2020	----	----	----		02-Sep-2020	28 days	9 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> JM24	E508	23-Aug-2020	----	----	----		02-Sep-2020	28 days	9 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> JM6	E508	23-Aug-2020	----	----	----		02-Sep-2020	28 days	9 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> TRAVEL BLANK	E508	23-Aug-2020	----	----	----		02-Sep-2020	28 days	9 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> DUP3	E420	23-Aug-2020	----	----	----		04-Sep-2020	180 days	12 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> DUP4	E420	23-Aug-2020	----	----	----		04-Sep-2020	180 days	12 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> JM12	E420	23-Aug-2020	----	----	----		04-Sep-2020	180 days	12 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE total (nitric acid)</b> JM13	E420	23-Aug-2020	----	----	----		04-Sep-2020	180 days	12 days	✓	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE total (nitric acid)</b> JM3	E420	23-Aug-2020	----	----	----		04-Sep-2020	180 days	12 days	✓	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE total (nitric acid)</b> SCH1	E420	23-Aug-2020	----	----	----		04-Sep-2020	180 days	12 days	✓	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE total (nitric acid)</b> BR3	E420	22-Aug-2020	----	----	----		04-Sep-2020	180 days	13 days	✓	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE total (nitric acid)</b> BR4	E420	22-Aug-2020	----	----	----		04-Sep-2020	180 days	13 days	✓	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE total (nitric acid)</b> DUP1	E420	22-Aug-2020	----	----	----		04-Sep-2020	180 days	13 days	✓	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE total (nitric acid)</b> DUP2	E420	22-Aug-2020	----	----	----		04-Sep-2020	180 days	13 days	✓	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE total (nitric acid)</b> DUP5	E420	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✓	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE total (nitric acid)</b> FIELD BLANK	E420	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> JM10-2018	E420	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> JM11	E420	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> JM14	E420	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> JM2	E420	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> JM2 SEEPAGE	E420	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> JM24	E420	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> JM4	E420	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> JM5	E420	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> JM6	E420	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✓





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE total (nitric acid)</b> SK1	E420	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✓	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE total (nitric acid)</b> TMF1	E420	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✓	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE total (nitric acid)</b> TRAVEL BLANK	E420	23-Aug-2020	----	----	----		01-Sep-2020	180 days	9 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> JM10-2018	E611A	23-Aug-2020	02-Sep-2020	14 days	10 days	✓	03-Sep-2020	3 days	0 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> JM6	E611A	23-Aug-2020	01-Sep-2020	14 days	8 days	✓	01-Sep-2020	5 days	0 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> DUP4	E611A	23-Aug-2020	01-Sep-2020	14 days	9 days	✓	01-Sep-2020	4 days	0 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> JM2	E611A	23-Aug-2020	01-Sep-2020	14 days	9 days	✓	01-Sep-2020	4 days	0 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> JM3	E611A	23-Aug-2020	01-Sep-2020	14 days	9 days	✓	01-Sep-2020	4 days	0 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> JM4	E611A	23-Aug-2020	01-Sep-2020	14 days	9 days	✓	01-Sep-2020	4 days	0 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> JM5	E611A	23-Aug-2020	01-Sep-2020	14 days	9 days	✔	01-Sep-2020	4 days	0 days	✔
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> TMF1	E611A	23-Aug-2020	01-Sep-2020	14 days	9 days	✔	01-Sep-2020	4 days	0 days	✔

**Legend & Qualifier Definitions**

- EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended
- EHTR: Exceeded ALS recommended hold time prior to sample receipt.
- EHT: Exceeded ALS recommended hold time prior to analysis.
- Rec. HT: ALS recommended hold time (see units).



## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Acidity by Titration	E283	78794	2	39	5.1	5.0	✔
Acidity by Titration (Peroxide Treated)	E284A	80003	1	1	100.0	5.0	✔
Alkalinity Species by Titration	E290	78792	2	39	5.1	5.0	✔
Ammonia by Fluorescence	E298	78790	2	40	5.0	5.0	✔
Bromide in Water by IC (Low Level)	E235.Br-L	78797	3	55	5.4	5.0	✔
BTEX by Headspace GC-MS	E611A	79732	2	38	5.2	5.0	✔
Chemical Oxygen Demand by Colourimetry	E559	81008	1	18	5.5	5.0	✔
Chloride in Water by IC	E235.Cl	78795	3	56	5.3	5.0	✔
Colour (True) by Spectrometer	E329	78801	2	35	5.7	5.0	✔
Conductivity in Water	E100	78793	2	35	5.7	5.0	✔
Cyanate by Ion Selective Electrode	E343	82829	1	6	16.6	5.0	✔
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	79797	2	32	6.2	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	80464	2	40	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	79798	2	39	5.1	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	81965	2	39	5.1	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	78802	3	49	6.1	5.0	✔
Fluoride in Water by IC	E235.F	78796	3	55	5.4	5.0	✔
Free Cyanide by CFA	E339	81532	2	25	8.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	78798	3	55	5.4	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	78799	3	55	5.4	5.0	✔
pH by Meter	E108	78791	2	39	5.1	5.0	✔
Sulfate in Water by IC	E235.SO4	78800	3	55	5.4	5.0	✔
TDS by Gravimetry	E162	78767	2	39	5.1	5.0	✔
Thiocyanate by Colourimetry	E344	81890	1	20	5.0	5.0	✔
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	79475	2	24	8.3	5.0	✔
Total Cyanide by CFA	E333	81533	2	39	5.1	5.0	✔
Total Inorganic Carbon by Combustion (Low Level)	E354-L	80229	1	3	33.3	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	78786	2	40	5.0	5.0	✔
Total Mercury in Water by CVAAS	E508	79426	5	100	5.0	5.0	✔
Total Metals in Water by CRC ICPMS	E420	79474	2	28	7.1	5.0	✔
Total Nitrogen by Colourimetry	E366	78788	2	40	5.0	5.0	✔
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	78787	2	40	5.0	5.0	✔
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	78789	2	40	5.0	5.0	✔
TSS by Gravimetry	E160-H	78781	3	57	5.2	5.0	✔
Turbidity by Nephelometry	E121	79259	2	40	5.0	5.0	✔
VH and F1 by Headspace GC-FID	E581.VH+F1	79731	2	35	5.7	5.0	✔
WAD Cyanide by CFA	E336	81531	2	35	5.7	5.0	✔



Matrix: **Water**

Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Laboratory Control Samples (LCS)</b>							
Acidity by Titration	E283	78794	2	39	5.1	5.0	✓
Acidity by Titration (Peroxide Treated)	E284A	80003	1	1	100.0	5.0	✓
Alkalinity Species by Titration	E290	78792	2	39	5.1	5.0	✓
Ammonia by Fluorescence	E298	78790	2	40	5.0	5.0	✓
BC PHC - EPH by GC-FID	E601A	80222	1	20	5.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	78797	3	55	5.4	5.0	✓
BTEX by Headspace GC-MS	E611A	79732	2	38	5.2	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	81008	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	78795	3	56	5.3	5.0	✓
Colour (True) by Spectrometer	E329	78801	2	35	5.7	5.0	✓
Conductivity in Water	E100	78793	2	35	5.7	5.0	✓
Cyanate by Ion Selective Electrode	E343	82829	1	6	16.6	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	79797	2	32	6.2	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	80464	2	40	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	79798	2	39	5.1	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	81965	2	39	5.1	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	78802	3	49	6.1	5.0	✓
Fluoride in Water by IC	E235.F	78796	3	55	5.4	5.0	✓
Free Cyanide by CFA	E339	81532	2	25	8.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	78798	3	55	5.4	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	78799	3	55	5.4	5.0	✓
PAHs by LVI GC-MS	E641A	80223	1	20	5.0	5.0	✓
pH by Meter	E108	78791	2	39	5.1	5.0	✓
Sulfate in Water by IC	E235.SO4	78800	3	55	5.4	5.0	✓
TDS by Gravimetry	E162	78767	2	39	5.1	5.0	✓
Thiocyanate by Colourimetry	E344	81890	1	20	5.0	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	79475	2	24	8.3	5.0	✓
Total Cyanide by CFA	E333	81533	2	39	5.1	5.0	✓
Total Inorganic Carbon by Combustion (Low Level)	E354-L	80229	1	3	33.3	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	78786	2	40	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	79426	5	100	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	79474	2	28	7.1	5.0	✓
Total Nitrogen by Colourimetry	E366	78788	2	40	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	78787	2	40	5.0	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	78789	2	40	5.0	5.0	✓
TSS by Gravimetry	E160-H	78781	3	57	5.2	5.0	✓
Turbidity by Nephelometry	E121	79259	2	40	5.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	79731	2	35	5.7	5.0	✓
WAD Cyanide by CFA	E336	81531	2	35	5.7	5.0	✓
<b>Method Blanks (MB)</b>							
Acidity by Titration	E283	78794	2	39	5.1	5.0	✓



Matrix: **Water**

Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Method Blanks (MB) - Continued</b>							
Acidity by Titration (Peroxide Treated)	E284A	80003	1	1	100.0	5.0	✓
Alkalinity Species by Titration	E290	78792	2	39	5.1	5.0	✓
Ammonia by Fluorescence	E298	78790	2	40	5.0	5.0	✓
BC PHC - EPH by GC-FID	E601A	80222	1	20	5.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	78797	3	55	5.4	5.0	✓
BTEX by Headspace GC-MS	E611A	79732	2	38	5.2	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	81008	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	78795	3	56	5.3	5.0	✓
Colour (True) by Spectrometer	E329	78801	2	35	5.7	5.0	✓
Conductivity in Water	E100	78793	2	35	5.7	5.0	✓
Cyanate by Ion Selective Electrode	E343	82829	1	6	16.6	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	79797	2	32	6.2	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	80464	2	40	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	79798	2	39	5.1	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	81965	2	39	5.1	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	78802	3	49	6.1	5.0	✓
Fluoride in Water by IC	E235.F	78796	3	55	5.4	5.0	✓
Free Cyanide by CFA	E339	81532	2	25	8.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	78798	3	55	5.4	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	78799	3	55	5.4	5.0	✓
PAHs by LVI GC-MS	E641A	80223	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	78800	3	55	5.4	5.0	✓
TDS by Gravimetry	E162	78767	2	39	5.1	5.0	✓
Thiocyanate by Colourimetry	E344	81890	1	20	5.0	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	79475	2	24	8.3	5.0	✓
Total Cyanide by CFA	E333	81533	2	39	5.1	5.0	✓
Total Inorganic Carbon by Combustion (Low Level)	E354-L	80229	1	3	33.3	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	78786	2	40	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	79426	5	100	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	79474	2	28	7.1	5.0	✓
Total Nitrogen by Colourimetry	E366	78788	2	40	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	78787	2	40	5.0	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	78789	2	40	5.0	5.0	✓
TSS by Gravimetry	E160-H	78781	3	57	5.2	5.0	✓
Turbidity by Nephelometry	E121	79259	2	40	5.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	79731	2	35	5.7	5.0	✓
WAD Cyanide by CFA	E336	81531	2	35	5.7	5.0	✓
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	78790	2	40	5.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	78797	3	55	5.4	5.0	✓
BTEX by Headspace GC-MS	E611A	79732	2	38	5.2	5.0	✓



Matrix: **Water**

Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<i>Analytical Methods</i>							
<b>Matrix Spikes (MS) - Continued</b>							
Chemical Oxygen Demand by Colourimetry	E559	81008	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	78795	3	56	5.3	5.0	✓
Cyanate by Ion Selective Electrode	E343	82829	1	6	16.6	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	79797	2	32	6.2	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	80464	2	40	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	79798	2	39	5.1	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	81965	2	39	5.1	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	78802	3	49	6.1	5.0	✓
Fluoride in Water by IC	E235.F	78796	3	55	5.4	5.0	✓
Free Cyanide by CFA	E339	81532	2	25	8.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	78798	3	55	5.4	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	78799	3	55	5.4	5.0	✓
Sulfate in Water by IC	E235.SO4	78800	3	55	5.4	5.0	✓
Thiocyanate by Colourimetry	E344	81890	1	20	5.0	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	79475	2	24	8.3	5.0	✓
Total Cyanide by CFA	E333	81533	2	39	5.1	5.0	✓
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Total Mercury in Water by CVAAS	E508	79426	5	100	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	79474	2	28	7.1	5.0	✓
Total Nitrogen by Colourimetry	E366	78788	2	40	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	78787	2	40	5.0	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	78789	2	40	5.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	79731	2	35	5.7	5.0	✓
WAD Cyanide by CFA	E336	81531	2	35	5.7	5.0	✓



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 Vancouver - Environmental	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TSS by Gravimetry	E160-H Vancouver - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
TDS by Gravimetry	E162 Vancouver - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Bromide in Water by IC (Low Level)	E235.Br-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Sulfate in Water by IC	E235.SO4  Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Acidity by Titration	E283  Vancouver - Environmental	Water	APHA 2310 B (mod)	Acidity is determined by potentiometric titration to a specified endpoint.
Acidity by Titration (Peroxide Treated)	E284A  Vancouver - Environmental	Water	APHA 2310 B (mod)	Acidity is determined by potentiometric titration with preliminary hot peroxide treatment to a specified endpoint.
Alkalinity Species by Titration	E290  Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298  Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318  Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Total Kjeldahl Nitrogen is determined using block digestion followed by flow-injection analysis with fluorescence detection.
Colour (True) by Spectrometer	E329  Vancouver - Environmental	Water	APHA 2120 C (mod)	Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment.
Total Cyanide by CFA	E333  Vancouver - Environmental	Water	ISO 14403 (mod)	Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.
WAD Cyanide by CFA	E336  Vancouver - Environmental	Water	APHA 4500-CN I (mod)	Weak Acid Dissociable (WAD) cyanide is determined by in-line sample distillation with final determination by colourimetric analysis.
Free Cyanide by CFA	E339  Vancouver - Environmental	Water	ASTM D7237 (mod)	Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.
Cyanate by Ion Selective Electrode	E343  Waterloo - Environmental	Water	APHA 4500-CN L (mod)	This analysis is carried out using procedures adapted from APHA method 4500-CN "Cyanide". Cyanate is determined by the Cyanate hydrolysis method using an ammonia selective electrode





Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thiocyanate by Colourimetry	E344  Vancouver - Environmental	Water	APHA 4500-CN M (mod)	Thiocyanate is determined by the ferric nitrate colourimetric method. Water samples containing high levels of hexavalent chromium, cyanide (together with sulfide), reducing agents, or hydrocarbons may cause negative or positive interferences with this method.
Total Inorganic Carbon by Combustion (Low Level)	E354-L  Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Inorganic Carbon is determined by the high temperature combustion method with measurement by an infrared detector, where the sample is acidified in a reaction chamber to convert all inorganic carbons (carbonates) to carbon dioxide for analysis.
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L  Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO <sub>2</sub> . NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L  Vancouver - Environmental	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO <sub>2</sub> . NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Nitrogen by Colourimetry	E366  Vancouver - Environmental	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U  Vancouver - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U  Vancouver - Environmental	Water	APHA 4500-P E (mod)	Dissolved Orthophosphate is determined colourimetrically on a water sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.
Total Metals in Water by CRC ICPMS	E420  Vancouver - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L  Vancouver - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals in Water by CRC ICPMS	E421  Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L  Vancouver - Environmental	Water	APHA 3030 B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS
Total Mercury in Water by CVAAS	E508  Vancouver - Environmental	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
Dissolved Mercury in Water by CVAAS	E509  Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
Chemical Oxygen Demand by Colourimetry	E559  Vancouver - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
VH and F1 by Headspace GC-FID	E581.VH+F1  Vancouver - Environmental	Water	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
BC PHC - EPH by GC-FID	E601A  Vancouver - Environmental	Water	BC MOE Lab Manual	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.
BTEX by Headspace GC-MS	E611A  Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by LVI GC-MS	E641A  Vancouver - Environmental	Water	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by large volume injection (LVI) GC-MS.
Dissolved Hardness (Calculated)	EC100  Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> ), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Hardness (Calculated) from Total Ca/Mg	EC100A  Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> ), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
VPH: VH-BTEX-Styrene	EC580A  Vancouver - Environmental	Water	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VPHw = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.
LEPH and HEPH: EPH-PAH	EC600A  Vancouver - Environmental	Water	BC MOE Lab Manual (LEPH and HEPH) (mod)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Acenaphthene, Acridine, Anthracene, Fluorene, Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(a)pyrene, Fluoranthene, and Pyrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Digestion for TKN in water	EP318  Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Samples are digested using block digestion with Copper Sulfate Digestion Reagent.
Digestion for Total Nitrogen in water	EP366  Vancouver - Environmental	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
Digestion for Total Phosphorus in water	EP372  Vancouver - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421  Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO <sub>3</sub> .
Dissolved Mercury Water Filtration	EP509  Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
VOCs Preparation for Headspace Analysis	EP581  Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601  Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

## QUALITY CONTROL REPORT

**Work Order** : **VA20B3842**

**Page** : 1 of 41

**Client** : ERM Consultants Canada Ltd.  
**Contact** : Jill Zyla  
**Address** : # 400 - 106 Front Street East  
 Toronto ON Canada M5A 1E1  
**Telephone** : 604 689 9460  
**Project** : 0539378-0012 (WQ ISKUT)  
**PO** : ----  
**C-O-C number** : 17-841428, 17-841426  
**Sampler** : ----  
**Site** : ----  
**Quote number** : Q74326  
**No. of samples received** : 24  
**No. of samples analysed** : 24

**Laboratory** : Vancouver - Environmental  
**Account Manager** : Amber Springer  
**Address** : 8081 Lougheed Highway  
 Burnaby, British Columbia Canada V5A 1W9  
**Telephone** : +1 604 253 4188  
**Date Samples Received** : 28-Aug-2020 10:10  
**Date Analysis Commenced** : 28-Aug-2020  
**Issue Date** : 10-Sep-2020 14:18

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
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Brianna Allen	Department Manager Organics	Organics, Burnaby, British Columbia
Bruna Botti	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
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Work Order : VA20B3842  
Client : ERM Consultants Canada Ltd.  
Project : 0539378-0012 (WQ ISKUT)

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## **General Comments**

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

# = Indicates a QC result that did not meet the ALS DQO.



### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 78767)</b>											
VA20B3842-001	BR4	solids, total dissolved [TDS]	----	E162	13	mg/L	103	107	4	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 78768)</b>											
VA20B3842-021	JM24	solids, total dissolved [TDS]	----	E162	13	mg/L	47	48	1	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 78781)</b>											
VA20B3842-001	BR4	solids, total suspended [TSS]	----	E160-H	5.0	mg/L	183	210	13.7%	20%	----
<b>Physical Tests (QC Lot: 78782)</b>											
VA20B3842-021	JM24	solids, total suspended [TSS]	----	E160-H	5.0	mg/L	40.2	40.5	0.3	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 78791)</b>											
VA20B3842-003	DUP1	pH	----	E108	0.10	pH units	7.39	7.40	0.135%	4%	----
<b>Physical Tests (QC Lot: 78792)</b>											
VA20B3842-003	DUP1	alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	30.2	30.5	0.988%	20%	----
		alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	30.2	30.5	0.988%	20%	----
<b>Physical Tests (QC Lot: 78793)</b>											
VA20B3842-003	DUP1	conductivity	----	E100	2.0	µS/cm	103	103	0.00%	10%	----
<b>Physical Tests (QC Lot: 78794)</b>											
VA20B3842-002	BR3	acidity (as CaCO3)	----	E283	2.0	mg/L	<2.0	<2.0	0	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 78801)</b>											
VA20B3842-001	BR4	colour, true	----	E329	5.0	CU	<5.0	<5.0	0	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 78808)</b>											
VA20B3842-023	FIELD BLANK	conductivity	----	E100	2.0	µS/cm	<2.0	<2.0	0	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 78809)</b>											
VA20B3842-023	FIELD BLANK	pH	----	E108	0.10	pH units	5.46	5.41	0.920%	4%	----
<b>Physical Tests (QC Lot: 78810)</b>											
VA20B3842-023	FIELD BLANK	alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 78811)</b>											
VA20B3842-022	DUP5	acidity (as CaCO3)	----	E283	2.0	mg/L	2.1	2.0	0.08	Diff <2x LOR	----

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 Work Order : VA20B3842  
 Client : ERM Consultants Canada Ltd.  
 Project : 0539378-0012 (WQ ISKUT)



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 78818)</b>											
VA20B3842-021	JM24	colour, true	----	E329	5.0	CU	<5.0	<5.0	0	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 79259)</b>											
KS2001568-001	Anonymous	turbidity	----	E121	0.10	NTU	0.11	<0.10	0.01	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 79416)</b>											
VA20B3842-011	JM4	turbidity	----	E121	0.10	NTU	10.2	10.7	4.77%	15%	----
<b>Physical Tests (QC Lot: 79531)</b>											
VA20B3754-009	Anonymous	solids, total suspended [TSS]	----	E160-H	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 80003)</b>											
VA20B3842-017	JM10-2018	acidity, hot peroxide treated (as CaCO3)	----	E284A	25	mg/L	-48	-47	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78786)</b>											
VA20B3842-001	BR4	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	<0.050	0.068	0.018	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78788)</b>											
VA20B3842-001	BR4	nitrogen, total	7727-37-9	E366	0.030	mg/L	0.119	0.119	0.0002	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78789)</b>											
VA20B3842-001	BR4	phosphorus, total	7723-14-0	E372-U	0.0200	mg/L	0.216	0.212	2.13%	20%	----
<b>Anions and Nutrients (QC Lot: 78790)</b>											
VA20B3842-001	BR4	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0154	0.0154	0.00007	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78795)</b>											
VA20B3842-001	BR4	chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78796)</b>											
VA20B3842-001	BR4	fluoride	16984-48-8	E235.F	0.020	mg/L	0.041	0.041	0.0004	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78797)</b>											
VA20B3842-001	BR4	bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78798)</b>											
VA20B3842-001	BR4	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0834	0.0872	4.50%	20%	----
<b>Anions and Nutrients (QC Lot: 78799)</b>											
VA20B3842-001	BR4	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78800)</b>											
VA20B3842-001	BR4	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	30.5	30.6	0.390%	20%	----
<b>Anions and Nutrients (QC Lot: 78802)</b>											
VA20B3842-001	BR4	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0015	0.0017	0.0001	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78803)</b>											
VA20B3842-021	JM24	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78805)</b>											
VA20B3842-021	JM24	nitrogen, total	7727-37-9	E366	0.030	mg/L	<0.030	<0.030	0	Diff <2x LOR	----



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 Work Order : VA20B3842  
 Client : ERM Consultants Canada Ltd.  
 Project : 0539378-0012 (WQ ISKUT)



Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Anions and Nutrients (QC Lot: 78806)</b>											
VA20B3842-021	JM24	phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0412	0.0375	9.44%	20%	----
<b>Anions and Nutrients (QC Lot: 78807)</b>											
VA20B3842-021	JM24	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0051	0.0063	0.0012	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78812)</b>											
VA20B3842-021	JM24	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	4.52	4.52	0.00476%	20%	----
<b>Anions and Nutrients (QC Lot: 78813)</b>											
VA20B3842-021	JM24	nitrate (as N)	14797-55-8	E235 NO3-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78814)</b>											
VA20B3842-021	JM24	nitrite (as N)	14797-65-0	E235 NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78815)</b>											
VA20B3842-021	JM24	fluoride	16984-48-8	E235 F	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78816)</b>											
VA20B3842-021	JM24	chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78817)</b>											
VA20B3842-021	JM24	bromide	24959-67-9	E235 Br-L	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78819)</b>											
VA20B3842-021	JM24	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 80313)</b>											
VA20B3842-019	JM6	chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 80315)</b>											
VA20B3842-019	JM6	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	4.83	4.82	0.122%	20%	----
<b>Anions and Nutrients (QC Lot: 80316)</b>											
VA20B3842-019	JM6	nitrate (as N)	14797-55-8	E235 NO3-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 80317)</b>											
VA20B3842-019	JM6	nitrite (as N)	14797-65-0	E235 NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 80318)</b>											
VA20B3842-019	JM6	fluoride	16984-48-8	E235 F	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 80319)</b>											
VA20B3842-019	JM6	bromide	24959-67-9	E235 Br-L	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 82504)</b>											
KS2001653-001	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0100	mg/L	0.0661	0.0654	0.0008	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 82829)</b>											
WT2000114-010	Anonymous	cyanate	88402-73-7	E343	0.20	mg/L	800	780	2.47%	20%	----
<b>Cyanides (QC Lot: 81531)</b>											
VA20B3842-001	BR4	cyanide, weak acid dissociable	----	E336	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Cyanides (QC Lot: 81532)</b>											
VA20B3842-001	BR4	cyanide, free	----	E339	0 0050	mg/L	<0 0050	<0.0050	0	Diff <2x LOR	----
<b>Cyanides (QC Lot: 81533)</b>											
VA20B3842-001	BR4	cyanide, strong acid dissociable (total)	----	E333	0 0050	mg/L	<0 0050	<0.0050	0	Diff <2x LOR	----
<b>Cyanides (QC Lot: 81559)</b>											
VA20B3842-020	JM14	cyanide, strong acid dissociable (total)	----	E333	0 0050	mg/L	<0 0050	<0.0050	0	Diff <2x LOR	----
<b>Cyanides (QC Lot: 81560)</b>											
VA20B3842-020	JM14	cyanide, weak acid dissociable	----	E336	0 0050	mg/L	<0 0050	<0.0050	0	Diff <2x LOR	----
<b>Cyanides (QC Lot: 81561)</b>											
VA20B3842-020	JM14	cyanide, free	----	E339	0 0050	mg/L	<0 0050	<0.0050	0	Diff <2x LOR	----
<b>Cyanides (QC Lot: 81890)</b>											
VA20B3842-017	JM10-2018	thiocyanate	302-04-5	E344	0.50	mg/L	<0.50	<0 50	0	Diff <2x LOR	----
<b>Organic / Inorganic Carbon (QC Lot: 78787)</b>											
VA20B3842-001	BR4	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	0.58	0 68	0.11	Diff <2x LOR	----
<b>Organic / Inorganic Carbon (QC Lot: 78804)</b>											
VA20B3842-021	JM24	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	<0.50	<0 50	0	Diff <2x LOR	----
<b>Organic / Inorganic Carbon (QC Lot: 80229)</b>											
VA20B3842-017	JM10-2018	carbon, total inorganic [TIC]	----	E354-L	0.50	mg/L	13 2	13.3	0.798%	20%	----
<b>Organic / Inorganic Carbon (QC Lot: 81965)</b>											
VA20B3842-001	BR4	carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	2.35	2 36	0.009	Diff <2x LOR	----
<b>Organic / Inorganic Carbon (QC Lot: 82552)</b>											
VA20B3842-021	JM24	carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	1.57	1.44	0.13	Diff <2x LOR	----
<b>Total Metals (QC Lot: 79426)</b>											
VA20B3824-001	Anonymous	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Total Metals (QC Lot: 79427)</b>											
VA20B3842-002	BR3	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Total Metals (QC Lot: 79474)</b>											
VA20B3842-011	JM4	aluminum, total	7429-90-5	E420	0 0030	mg/L	0.631	0.618	2.13%	20%	----
		antimony, total	7440-36-0	E420	0.00010	mg/L	0.00027	0.00026	0.00001	Diff <2x LOR	----
		arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00025	0.00027	0.00002	Diff <2x LOR	----
		barium, total	7440-39-3	E420	0.00010	mg/L	0 0305	0.0316	3.54%	20%	----
		beryllium, total	7440-41-7	E420	0.000020	mg/L	0.000058	0 000058	0.0000006	Diff <2x LOR	----
		bismuth, total	7440-69-9	E420	0.000050	mg/L	0.000069	0 000065	0 000004	Diff <2x LOR	----
		boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.00120	0.00118	2.29%	20%	----



Sub-Matrix: **Water** *Laboratory Duplicate (DUP) Report*

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Total Metals (QC Lot: 79474) - continued</b>											
VA20B3842-011	JM4	calcium, total	7440-70-2	E420	0.050	mg/L	31.3	31.6	1.10%	20%	----
		cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00462	0.00457	0.916%	20%	----
		copper, total	7440-50-8	E420	0.00050	mg/L	0.400	0.393	1.86%	20%	----
		iron, total	7439-89-6	E420	0.010	mg/L	2.40	2.40	0.0350%	20%	----
		lead, total	7439-92-1	E420	0.000050	mg/L	0.00502	0.00490	2.39%	20%	----
		lithium, total	7439-93-2	E420	0.0010	mg/L	0.0016	0.0015	0.00003	Diff <2x LOR	----
		magnesium, total	7439-95-4	E420	0.100	mg/L	3.94	3.94	0.0848%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	0.570	0.565	0.908%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000194	0.000199	0.000004	Diff <2x LOR	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	0.00086	0.00087	0.00001	Diff <2x LOR	----
		phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, total	7440-09-7	E420	0.100	mg/L	1.61	1.62	0.531%	20%	----
		selenium, total	7782-49-2	E420	0.000050	mg/L	0.000153	0.000172	0.000019	Diff <2x LOR	----
		silicon, total	7440-21-3	E420	0.10	mg/L	2.76	2.61	5.38%	20%	----
		silver, total	7440-22-4	E420	0.000010	mg/L	0.000089	0.000088	0.0000004	Diff <2x LOR	----
		sodium, total	7440-23-5	E420	0.050	mg/L	0.763	0.760	0.378%	20%	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	0.200	0.198	1.03%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	29.4	28.5	3.26%	20%	----
		thallium, total	7440-28-0	E420	0.000010	mg/L	0.000020	0.000019	0.0000008	Diff <2x LOR	----
		tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		titanium, total	7440-32-6	E420	0.00030	mg/L	0.00436	0.00445	1.86%	20%	----
		uranium, total	7440-61-1	E420	0.000010	mg/L	0.000257	0.000246	4.66%	20%	----
		vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, total	7440-66-6	E420	0.0030	mg/L	0.164	0.161	2.06%	20%	----
		zirconium, total	7440-67-7	E420	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
<b>Total Metals (QC Lot: 79475)</b>											
VA20B3842-011	JM4	chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	0.00019	0.00020	0.000005	Diff <2x LOR	----
<b>Total Metals (QC Lot: 79989)</b>											
VA20B3842-001	BR4	chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	0.00740	0.00745	0.689%	20%	----
<b>Total Metals (QC Lot: 79990)</b>											
VA20B3842-001	BR4	aluminum, total	7429-90-5	E420	0.0030	mg/L	4.98	4.88	2.00%	20%	----
		antimony, total	7440-36-0	E420	0.00010	mg/L	0.00025	0.00025	0.000002	Diff <2x LOR	----
		arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00259	0.00253	2.48%	20%	----
		barium, total	7440-39-3	E420	0.00010	mg/L	0.112	0.109	2.28%	20%	----
		beryllium, total	7440-41-7	E420	0.000020	mg/L	0.000100	0.000070	0.000030	Diff <2x LOR	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Total Metals (QC Lot: 79990) - continued</b>											
VA20B3842-001	BR4	bismuth, total	7440-69-9	E420	0.000050	mg/L	0.000075	0.000072	0.000003	Diff <2x LOR	----
		boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.000320	0.000284	11.7%	20%	----
		calcium, total	7440-70-2	E420	0.050	mg/L	26.1	26.1	0.0132%	20%	----
		cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00272	0.00268	1.37%	20%	----
		copper, total	7440-50-8	E420	0.00050	mg/L	0.0205	0.0204	0.640%	20%	----
		iron, total	7439-89-6	E420	0.010	mg/L	6.20	6.22	0.240%	20%	----
		lead, total	7439-92-1	E420	0.000050	mg/L	0.00686	0.00669	2.52%	20%	----
		lithium, total	7439-93-2	E420	0.0010	mg/L	0.0032	0.0032	0.00006	Diff <2x LOR	----
		magnesium, total	7439-95-4	E420	0.100	mg/L	4.97	4.92	1.01%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	0.255	0.253	0.996%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00118	0.00116	1.90%	20%	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	0.00521	0.00501	3.92%	20%	----
		phosphorus, total	7723-14-0	E420	0.050	mg/L	0.246	0.247	0.0009	Diff <2x LOR	----
		potassium, total	7440-09-7	E420	0.100	mg/L	3.64	3.62	0.576%	20%	----
		selenium, total	7782-49-2	E420	0.000050	mg/L	0.000352	0.000378	0.000026	Diff <2x LOR	----
		silicon, total	7440-21-3	E420	0.10	mg/L	8.84	8.63	2.38%	20%	----
		silver, total	7440-22-4	E420	0.000010	mg/L	0.000113	0.000108	4.46%	20%	----
		sodium, total	7440-23-5	E420	0.050	mg/L	0.977	0.963	1.47%	20%	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	0.162	0.162	0.220%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	11.3	10.7	4.90%	20%	----
		thallium, total	7440-28-0	E420	0.000010	mg/L	0.000134	0.000138	2.52%	20%	----
		tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		titanium, total	7440-32-6	E420	0.00030	mg/L	0.308	0.306	0.963%	20%	----
		uranium, total	7440-61-1	E420	0.000010	mg/L	0.000178	0.000174	1.95%	20%	----
		vanadium, total	7440-62-2	E420	0.00050	mg/L	0.0192	0.0191	0.255%	20%	----
		zinc, total	7440-66-6	E420	0.0030	mg/L	0.0418	0.0394	5.96%	20%	----
		zirconium, total	7440-67-7	E420	0.00030	mg/L	0.00063	<0.00030	0.00033	Diff <2x LOR	----
<b>Total Metals (QC Lot: 80431)</b>											
KS2001412-001	Anonymous	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Total Metals (QC Lot: 80432)</b>											
VA20B3842-014	TMF1	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	0.0000066	0.0000016	Diff <2x LOR	----
<b>Total Metals (QC Lot: 81045)</b>											
VA20B3842-015	JM5	mercury total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 79797)</b>											



Sub-Matrix: **Water** *Laboratory Duplicate (DUP) Report*

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 79797) - continued</b>											
VA20B3842-001	BR4	chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 79798)</b>											
VA20B3842-001	BR4	aluminum, dissolved	7429-90-5	E421	0.0030	mg/L	0.0472	0.0443	6.38%	20%	----
		antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00011	0.00011	0.000001	Diff <2x LOR	----
		arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00025	0.00023	0.00002	Diff <2x LOR	----
		barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0288	0.0277	3.64%	20%	----
		beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		cadmium, dissolved	7440-43-9	E421	0.000050	mg/L	0.0000575	0.0000586	1.91%	20%	----
		calcium, dissolved	7440-70-2	E421	0.050	mg/L	24.7	24.0	2.70%	20%	----
		cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00017	0.00017	0.000003	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00046	0.00046	0.000006	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E421	0.010	mg/L	0.014	0.014	0.0003	Diff <2x LOR	----
		lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	0.100	mg/L	2.42	2.44	0.924%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0347	0.0352	1.53%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000969	0.000995	2.65%	20%	----
		nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00053	<0.00050	0.00003	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	0.100	mg/L	1.88	1.88	0.329%	20%	----
		selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000343	0.000249	0.000094	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	0.050	mg/L	1.15	1.20	4.80%	20%	----
		silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		sodium, dissolved	7440-23-5	E421	0.050	mg/L	0.584	0.581	0.597%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.132	0.133	0.804%	20%	----
		sulfur, dissolved	7704-34-9	E421	0.50	mg/L	10.1	10.0	0.472%	20%	----
		thallium, dissolved	7440-28-0	E421	0.000010	mg/L	0.000011	0.000013	0.000001	Diff <2x LOR	----
		tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		titanium, dissolved	7440-32-6	E421	0.00030	mg/L	0.00064	0.00062	0.00002	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000082	0.000081	0.000002	Diff <2x LOR	----
		vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0017	0.0017	0.00007	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----

**Dissolved Metals (QC Lot: 79799)**



Sub-Matrix: **Water** *Laboratory Duplicate (DUP) Report*

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 79799) - continued</b>											
VA20B3842-021	JM24	aluminum, dissolved	7429-90-5	E421	0.0030	mg/L	0.0444	0.0438	1.27%	20%	----
		antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00012	0.00012	0.000005	Diff <2x LOR	----
		barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0279	0.0285	2.18%	20%	----
		beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.000118	0.000121	2.60%	20%	----
		calcium, dissolved	7440-70-2	E421	0.050	mg/L	10.1	9.74	3.96%	20%	----
		cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00046	0.00045	0.000008	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E421	0.010	mg/L	0.031	0.030	0.001	Diff <2x LOR	----
		lead, dissolved	7439-92-1	E421	0.000050	mg/L	0.000227	0.000219	0.000008	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	0.100	mg/L	0.687	0.673	0.0146	Diff <2x LOR	----
		manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0204	0.0199	2.64%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000159	0.000153	0.000007	Diff <2x LOR	----
		nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	0.100	mg/L	0.629	0.611	0.019	Diff <2x LOR	----
		selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000064	0.000056	0.000008	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	0.050	mg/L	0.824	0.837	1.50%	20%	----
		silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		sodium, dissolved	7440-23-5	E421	0.050	mg/L	0.383	0.374	0.009	Diff <2x LOR	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0640	0.0641	0.0818%	20%	----
		sulfur, dissolved	7704-34-9	E421	0.50	mg/L	1.32	1.16	0.16	Diff <2x LOR	----
		thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		titanium, dissolved	7440-32-6	E421	0.00030	mg/L	0.00139	0.00137	0.00002	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000084	0.000079	0.000004	Diff <2x LOR	----
		vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0042	0.0040	0.0002	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----

<b>Dissolved Metals (QC Lot: 79800)</b>											
VA20B3842-021	JM24	chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----

<b>Dissolved Metals (QC Lot: 80464)</b>											
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Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 80464) - continued</b>											
VA20B3842-001	BR4	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 80465)</b>											
VA20B3842-021	JM24	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Aggregate Organics (QC Lot: 81008)</b>											
VA20B3842-017	JM10-2018	chemical oxygen demand [COD]	----	E559	20	mg/L	<20	<20	0	Diff <2x LOR	----
<b>Volatile Organic Compounds (QC Lot: 79732)</b>											
VA20B3842-009	JM3	benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
<b>Volatile Organic Compounds (QC Lot: 80458)</b>											
VA20B3842-017	JM10-2018	benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
<b>Hydrocarbons (QC Lot: 79731)</b>											
VA20B3842-009	JM3	VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.00%	30%	----
<b>Hydrocarbons (QC Lot: 80457)</b>											
VA20B3842-017	JM10-2018	VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.00%	30%	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

### Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 78767)</b>						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
<b>Physical Tests (QCLot: 78768)</b>						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
<b>Physical Tests (QCLot: 78781)</b>						
solids, total suspended [TSS]	----	E160-H	3	mg/L	<3.0	----
<b>Physical Tests (QCLot: 78782)</b>						
solids, total suspended [TSS]	----	E160-H	3	mg/L	<3.0	----
<b>Physical Tests (QCLot: 78792)</b>						
alkalinity, bicarbonate (as CaCO <sub>3</sub> )	----	E290	1	mg/L	<1.0	----
alkalinity, carbonate (as CaCO <sub>3</sub> )	----	E290	1	mg/L	<1.0	----
alkalinity, hydroxide (as CaCO <sub>3</sub> )	----	E290	1	mg/L	<1.0	----
alkalinity, total (as CaCO <sub>3</sub> )	----	E290	1	mg/L	<1.0	----
<b>Physical Tests (QCLot: 78793)</b>						
conductivity	----	E100	1	µS/cm	<1.0	----
<b>Physical Tests (QCLot: 78794)</b>						
acidity (as CaCO <sub>3</sub> )	----	E283	2	mg/L	2.1	----
<b>Physical Tests (QCLot: 78801)</b>						
colour, true	----	E329	5	CU	<5.0	----
<b>Physical Tests (QCLot: 78808)</b>						
conductivity	----	E100	1	µS/cm	<1.0	----
<b>Physical Tests (QCLot: 78810)</b>						
alkalinity, bicarbonate (as CaCO <sub>3</sub> )	----	E290	1	mg/L	<1.0	----
alkalinity, carbonate (as CaCO <sub>3</sub> )	----	E290	1	mg/L	<1.0	----
alkalinity, hydroxide (as CaCO <sub>3</sub> )	----	E290	1	mg/L	<1.0	----
alkalinity, total (as CaCO <sub>3</sub> )	----	E290	1	mg/L	<1.0	----
<b>Physical Tests (QCLot: 78811)</b>						
acidity (as CaCO <sub>3</sub> )	----	E283	2	mg/L	<2.0	----
<b>Physical Tests (QCLot: 78818)</b>						
colour, true	----	E329	5	CU	<5.0	----
<b>Physical Tests (QCLot: 79259)</b>						
turbidity	----	E121	0.1	NTU	<0.10	----
<b>Physical Tests (QCLot: 79416)</b>						
turbidity	----	E121	0.1	NTU	<0.10	----





Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 79531)</b>						
solids, total suspended [TSS]	---	E160-H	3	mg/L	<3.0	---
<b>Physical Tests (QCLot: 80003)</b>						
acidity, hot peroxide treated (as CaCO3)	---	E284A	25	mg/L	<25	---
<b>Anions and Nutrients (QCLot: 78786)</b>						
Kjeldahl nitrogen, total [TKN]	---	E318	0.05	mg/L	<0.050	---
<b>Anions and Nutrients (QCLot: 78788)</b>						
nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	---
<b>Anions and Nutrients (QCLot: 78789)</b>						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	---
<b>Anions and Nutrients (QCLot: 78790)</b>						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
<b>Anions and Nutrients (QCLot: 78795)</b>						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
<b>Anions and Nutrients (QCLot: 78796)</b>						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
<b>Anions and Nutrients (QCLot: 78797)</b>						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	---
<b>Anions and Nutrients (QCLot: 78798)</b>						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	---
<b>Anions and Nutrients (QCLot: 78799)</b>						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	---
<b>Anions and Nutrients (QCLot: 78800)</b>						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
<b>Anions and Nutrients (QCLot: 78802)</b>						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	---
<b>Anions and Nutrients (QCLot: 78803)</b>						
Kjeldahl nitrogen, total [TKN]	---	E318	0.05	mg/L	<0.050	---
<b>Anions and Nutrients (QCLot: 78805)</b>						
nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	---
<b>Anions and Nutrients (QCLot: 78806)</b>						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	---
<b>Anions and Nutrients (QCLot: 78807)</b>						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
<b>Anions and Nutrients (QCLot: 78812)</b>						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
<b>Anions and Nutrients (QCLot: 78813)</b>						



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Anions and Nutrients (QCLot: 78813) - continued</b>						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 78814)</b>						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 78815)</b>						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
<b>Anions and Nutrients (QCLot: 78816)</b>						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
<b>Anions and Nutrients (QCLot: 78817)</b>						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
<b>Anions and Nutrients (QCLot: 78819)</b>						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 80313)</b>						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
<b>Anions and Nutrients (QCLot: 80315)</b>						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
<b>Anions and Nutrients (QCLot: 80316)</b>						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 80317)</b>						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 80318)</b>						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
<b>Anions and Nutrients (QCLot: 80319)</b>						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
<b>Anions and Nutrients (QCLot: 82504)</b>						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 82829)</b>						
cyanate	88402-73-7	E343	0.2	mg/L	<0.20	----
<b>Cyanides (QCLot: 81531)</b>						
cyanide, weak acid dissociable	----	E336	0.002	mg/L	<0.0020	----
<b>Cyanides (QCLot: 81532)</b>						
cyanide, free	----	E339	0.002	mg/L	<0.0020	----
<b>Cyanides (QCLot: 81533)</b>						
cyanide, strong acid dissociable (total)	----	E333	0.002	mg/L	<0.0020	----
<b>Cyanides (QCLot: 81559)</b>						
cyanide, strong acid dissociable (total)	----	E333	0.002	mg/L	<0.0020	----
<b>Cyanides (QCLot: 81560)</b>						



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Cyanides (QCLot: 81560) - continued</b>						
cyanide, weak acid dissociable	---	E336	0.002	mg/L	<0.0020	---
<b>Cyanides (QCLot: 81561)</b>						
cyanide, free	---	E339	0.002	mg/L	<0.0020	---
<b>Cyanides (QCLot: 81890)</b>						
thiocyanate	302-04-5	E344	0.5	mg/L	<0.50	---
<b>Organic / Inorganic Carbon (QCLot: 78787)</b>						
carbon, total organic [TOC]	---	E355-L	0.5	mg/L	<0.50	---
<b>Organic / Inorganic Carbon (QCLot: 78804)</b>						
carbon, total organic [TOC]	---	E355-L	0.5	mg/L	<0.50	---
<b>Organic / Inorganic Carbon (QCLot: 81965)</b>						
carbon, dissolved organic [DOC]	---	E358-L	0.5	mg/L	<0.50	---
<b>Organic / Inorganic Carbon (QCLot: 82552)</b>						
carbon, dissolved organic [DOC]	---	E358-L	0.5	mg/L	<0.50	---
<b>Total Metals (QCLot: 79426)</b>						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	---
<b>Total Metals (QCLot: 79427)</b>						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	---
<b>Total Metals (QCLot: 79474)</b>						
aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	---
antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	---
arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	---
barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	---
beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	---
bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	---
boron, total	7440-42-8	E420	0.01	mg/L	<0.010	---
cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	---
calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	---
cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	---
copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	---
iron, total	7439-89-6	E420	0.01	mg/L	<0.010	---
lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	---
lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	---
magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	---
manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	---
molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	---
nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	---



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Total Metals (QCLot: 79474) - continued</b>						
phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
<b>Total Metals (QCLot: 79475)</b>						
chromium, total	7440-47-3	E420.Cr-L	0.0001	mg/L	<0.00010	----
<b>Total Metals (QCLot: 79989)</b>						
chromium, total	7440-47-3	E420.Cr-L	0.0001	mg/L	<0.00010	----
<b>Total Metals (QCLot: 79990)</b>						
aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Total Metals (QCLot: 79990) - continued</b>						
molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
<b>Total Metals (QCLot: 80431)</b>						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
<b>Total Metals (QCLot: 80432)</b>						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
<b>Total Metals (QCLot: 81045)</b>						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
<b>Dissolved Metals (QCLot: 79797)</b>						
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	<0.00010	----
<b>Dissolved Metals (QCLot: 79798)</b>						
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 79798) - continued</b>						
copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
<b>Dissolved Metals (QCLot: 79799)</b>						
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 79799) - continued</b>						
lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	---
lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	---
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	---
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	---
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	---
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	---
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	---
potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	---
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	---
silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	---
silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	---
sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	---
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	---
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	---
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	---
tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	---
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	---
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	---
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	---
zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	---
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	---
<b>Dissolved Metals (QCLot: 79800)</b>						
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	<0.00010	---
<b>Dissolved Metals (QCLot: 80464)</b>						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	---
<b>Dissolved Metals (QCLot: 80465)</b>						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	---
<b>Aggregate Organics (QCLot: 81008)</b>						
chemical oxygen demand [COD]	---	E559	20	mg/L	<20	---
<b>Volatile Organic Compounds (QCLot: 79732)</b>						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	---
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	---
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	---
styrene	100-42-5	E611A	0.5	µg/L	<0.50	---
toluene	108-88-3	E611A	0.5	µg/L	<0.50	---
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	<0.50	---



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Volatile Organic Compounds (QCLot: 79732) - continued</b>						
xylene, o-	95-47-6	E611A	0.5	µg/L	<0.50	---
<b>Volatile Organic Compounds (QCLot: 80458)</b>						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	---
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	---
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	---
styrene	100-42-5	E611A	0.5	µg/L	<0.50	---
toluene	108-88-3	E611A	0.5	µg/L	<0.50	---
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	<0.50	---
xylene, o-	95-47-6	E611A	0.5	µg/L	<0.50	---
<b>Hydrocarbons (QCLot: 79731)</b>						
VHw (C6-C10)	---	E581.VH+F1	100	µg/L	<100	---
<b>Hydrocarbons (QCLot: 80222)</b>						
EPH (C10-C19)	---	E601A	250	µg/L	<250	---
EPH (C19-C32)	---	E601A	250	µg/L	<250	---
<b>Hydrocarbons (QCLot: 80457)</b>						
VHw (C6-C10)	---	E581.VH+F1	100	µg/L	<100	---
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 80223)</b>						
acenaphthene	83-32-9	E641A	0.01	µg/L	<0.010	---
acenaphthylene	208-96-8	E641A	0.01	µg/L	<0.010	---
acridine	260-94-6	E641A	0.01	µg/L	<0.010	---
anthracene	120-12-7	E641A	0.01	µg/L	<0.010	---
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	<0.010	---
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	---
benzo(b+j)fluoranthene	---	E641A	0.01	µg/L	<0.010	---
benzo(b+j+k)fluoranthene	---	E641A	0.015	µg/L	<0.015	---
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	<0.010	---
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	<0.010	---
chrysene	218-01-9	E641A	0.01	µg/L	<0.010	---
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	<0.0050	---
fluoranthene	206-44-0	E641A	0.01	µg/L	<0.010	---
fluorene	86-73-7	E641A	0.01	µg/L	<0.010	---
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	<0.010	---
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	<0.010	---
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	<0.010	---
naphthalene	91-20-3	E641A	0.05	µg/L	<0.050	---
phenanthrene	85-01-8	E641A	0.02	µg/L	<0.020	---



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Work Order : VA20B3842  
Client : ERM Consultants Canada Ltd.  
Project : 0539378-0012 (WQ ISKUT)



Sub-Matrix: **Water**

<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Result</i>	<i>Qualifier</i>
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 80223) - continued</b>						
pyrene	129-00-0	E641A	0.01	µg/L	<0.010	---
quinoline	6027-02-7	E641A	0.05	µg/L	<0.050	---



## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Physical Tests (QCLot: 78767)</b>									
solids, total dissolved [TDS]	---	E162	10	mg/L	1000 mg/L	102	85.0	115	---
<b>Physical Tests (QCLot: 78768)</b>									
solids, total dissolved [TDS]	---	E162	10	mg/L	1000 mg/L	102	85.0	115	---
<b>Physical Tests (QCLot: 78781)</b>									
solids, total suspended [TSS]	---	E160-H	3	mg/L	150 mg/L	97.8	85.0	115	---
<b>Physical Tests (QCLot: 78782)</b>									
solids, total suspended [TSS]	---	E160-H	3	mg/L	150 mg/L	99.5	85.0	115	---
<b>Physical Tests (QCLot: 78791)</b>									
pH	---	E108	---	pH units	7 pH units	100	98.0	102	---
<b>Physical Tests (QCLot: 78792)</b>									
alkalinity, total (as CaCO <sub>3</sub> )	---	E290	1	mg/L	500 mg/L	107	85.0	115	---
<b>Physical Tests (QCLot: 78793)</b>									
conductivity	---	E100	1	µS/cm	146.9 µS/cm	103	90.0	110	---
<b>Physical Tests (QCLot: 78794)</b>									
acidity (as CaCO <sub>3</sub> )	---	E283	2	mg/L	50 mg/L	104	85.0	115	---
<b>Physical Tests (QCLot: 78801)</b>									
colour, true	---	E329	5	CU	100 CU	97.1	85.0	115	---
<b>Physical Tests (QCLot: 78808)</b>									
conductivity	---	E100	1	µS/cm	146.9 µS/cm	101	90.0	110	---
<b>Physical Tests (QCLot: 78809)</b>									
pH	---	E108	---	pH units	7 pH units	100	98.0	102	---
<b>Physical Tests (QCLot: 78810)</b>									
alkalinity, total (as CaCO <sub>3</sub> )	---	E290	1	mg/L	500 mg/L	100	85.0	115	---
<b>Physical Tests (QCLot: 78811)</b>									
acidity (as CaCO <sub>3</sub> )	---	E283	2	mg/L	50 mg/L	97.8	85.0	115	---
<b>Physical Tests (QCLot: 78818)</b>									
colour, true	---	E329	5	CU	100 CU	97.9	85.0	115	---
<b>Physical Tests (QCLot: 79259)</b>									
turbidity	---	E121	0.1	NTU	200 NTU	97.5	85.0	115	---
<b>Physical Tests (QCLot: 79416)</b>									
turbidity	---	E121	0.1	NTU	200 NTU	103	85.0	115	---
<b>Physical Tests (QCLot: 79531)</b>									
solids, total suspended [TSS]	---	E160-H	3	mg/L	150 mg/L	98.7	85.0	115	---



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Physical Tests (QCLot: 80003)</b>									
acidity, hot peroxide treated (as CaCO3)	----	E284A	25	mg/L	2500 mg/L	96.6	85.0	115	----
<b>Anions and Nutrients (QCLot: 78786)</b>									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	105	75.0	125	----
<b>Anions and Nutrients (QCLot: 78788)</b>									
nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	98.9	75.0	125	----
<b>Anions and Nutrients (QCLot: 78789)</b>									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	91.6	80.0	120	----
<b>Anions and Nutrients (QCLot: 78790)</b>									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.12 mg/L	100	85.0	115	----
<b>Anions and Nutrients (QCLot: 78795)</b>									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	95.9	90.0	110	----
<b>Anions and Nutrients (QCLot: 78796)</b>									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	94.4	90.0	110	----
<b>Anions and Nutrients (QCLot: 78797)</b>									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	86.7	85.0	115	----
<b>Anions and Nutrients (QCLot: 78798)</b>									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	96.8	90.0	110	----
<b>Anions and Nutrients (QCLot: 78799)</b>									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	95.5	90.0	110	----
<b>Anions and Nutrients (QCLot: 78800)</b>									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	97.5	90.0	110	----
<b>Anions and Nutrients (QCLot: 78802)</b>									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	101	80.0	120	----
<b>Anions and Nutrients (QCLot: 78803)</b>									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	96.8	75.0	125	----
<b>Anions and Nutrients (QCLot: 78805)</b>									
nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	101	75.0	125	----
<b>Anions and Nutrients (QCLot: 78806)</b>									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	95.8	80.0	120	----
<b>Anions and Nutrients (QCLot: 78807)</b>									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.12 mg/L	96.3	85.0	115	----
<b>Anions and Nutrients (QCLot: 78812)</b>									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	97.6	90.0	110	----
<b>Anions and Nutrients (QCLot: 78813)</b>									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	96.8	90.0	110	----
<b>Anions and Nutrients (QCLot: 78814)</b>									



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 78814) - continued</b>									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	95.7	90.0	110	----
<b>Anions and Nutrients (QCLot: 78815)</b>									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	94.6	90.0	110	----
<b>Anions and Nutrients (QCLot: 78816)</b>									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	96.0	90.0	110	----
<b>Anions and Nutrients (QCLot: 78817)</b>									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	88.8	85.0	115	----
<b>Anions and Nutrients (QCLot: 78819)</b>									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	99.6	80.0	120	----
<b>Anions and Nutrients (QCLot: 80313)</b>									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	103	90.0	110	----
<b>Anions and Nutrients (QCLot: 80315)</b>									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	105	90.0	110	----
<b>Anions and Nutrients (QCLot: 80316)</b>									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	103	90.0	110	----
<b>Anions and Nutrients (QCLot: 80317)</b>									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	100	90.0	110	----
<b>Anions and Nutrients (QCLot: 80318)</b>									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	101	90.0	110	----
<b>Anions and Nutrients (QCLot: 80319)</b>									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	97.1	85.0	115	----
<b>Anions and Nutrients (QCLot: 82504)</b>									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	98.7	80.0	120	----
<b>Anions and Nutrients (QCLot: 82829)</b>									
cyanate	88402-73-7	E343	0.2	mg/L	1 mg/L	90.2	85.0	115	----
<b>Cyanides (QCLot: 81531)</b>									
cyanide, weak acid dissociable	----	E336	0.002	mg/L	0.125 mg/L	100	80.0	120	----
<b>Cyanides (QCLot: 81532)</b>									
cyanide, free	----	E339	0.002	mg/L	0.125 mg/L	94.9	80.0	120	----
<b>Cyanides (QCLot: 81533)</b>									
cyanide, strong acid dissociable (total)	----	E333	0.002	mg/L	0.25 mg/L	94.6	80.0	120	----
<b>Cyanides (QCLot: 81559)</b>									
cyanide, strong acid dissociable (total)	----	E333	0.002	mg/L	0.25 mg/L	93.9	80.0	120	----
<b>Cyanides (QCLot: 81560)</b>									
cyanide, weak acid dissociable	----	E336	0.002	mg/L	0.125 mg/L	95.4	80.0	120	----
<b>Cyanides (QCLot: 81561)</b>									



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike Concentration	Recovery (%) LCS	Recovery Limits (%)		Qualifier
						Low	High		
<b>Cyanides (QCLot: 81561) - continued</b>									
cyanide, free	----	E339	0.002	mg/L	0.125 mg/L	94.1	80.0	120	----
<b>Cyanides (QCLot: 81890)</b>									
thiocyanate	302-04-5	E344	0.5	mg/L	10 mg/L	94.7	85.0	115	----
<b>Organic / Inorganic Carbon (QCLot: 78787)</b>									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	99.7	80.0	120	----
<b>Organic / Inorganic Carbon (QCLot: 78804)</b>									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	95.4	80.0	120	----
<b>Organic / Inorganic Carbon (QCLot: 81965)</b>									
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	102	80.0	120	----
<b>Organic / Inorganic Carbon (QCLot: 82552)</b>									
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	97.6	80.0	120	----
<b>Total Metals (QCLot: 79426)</b>									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	97.4	80.0	120	----
<b>Total Metals (QCLot: 79427)</b>									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	101	80.0	120	----
<b>Total Metals (QCLot: 79474)</b>									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	99.8	80.0	120	----
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	104	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	98.7	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	105	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	100	80.0	120	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	102	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	100	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	101	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	104	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	99.7	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	99.6	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	100	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	99.7	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	102	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	100	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	99.1	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	100	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	99.6	80.0	120	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	91.3	80.0	120	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Total Metals (QCLot: 79474) - continued</b>									
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	98.8	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	99.1	80.0	120	----
silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	99.7	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	102	80.0	120	----
sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	104	80.0	120	----
strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	103	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	92.7	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	99.4	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	100	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	93.9	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	97.1	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	98.5	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	103	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	96.6	80.0	120	----
<b>Total Metals (QCLot: 79475)</b>									
chromium, total	7440-47-3	E420.Cr-L	0.0001	mg/L	0.25 mg/L	96.9	80.0	120	----
<b>Total Metals (QCLot: 79989)</b>									
chromium, total	7440-47-3	E420.Cr-L	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
<b>Total Metals (QCLot: 79990)</b>									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	104	80.0	120	----
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	106	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	102	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	103	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	104	80.0	120	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	112	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	100	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	103	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	101	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	101	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	101	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	98.0	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	108	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	101	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	107	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	98.5	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	99.7	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	98.9	80.0	120	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				Qualifier
					Spike Concentration	Recovery (%) LCS	Recovery Limits (%)		
						Low	High		
<b>Total Metals (QCLot: 79990) - continued</b>									
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	102	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	102	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	101	80.0	120	----
silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	104	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	105	80.0	120	----
sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	106	80.0	120	----
strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	104	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	102	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	108	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	102	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	98.4	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	106	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	105	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	103	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	98.2	80.0	120	----
<b>Total Metals (QCLot: 80431)</b>									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	92.6	80.0	120	----
<b>Total Metals (QCLot: 80432)</b>									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	91.7	80.0	120	----
<b>Total Metals (QCLot: 81045)</b>									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	93.6	80.0	120	----
<b>Dissolved Metals (QCLot: 79797)</b>									
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	0.25 mg/L	98.3	80.0	120	----
<b>Dissolved Metals (QCLot: 79798)</b>									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	94.1	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	97.2	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	95.7	80.0	120	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	98.1	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	101	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	96.5	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	97.0	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	104	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	97.6	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	94.9	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	94.6	80.0	120	----



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 79798) - continued</b>									
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	100	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	94.4	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	97.6	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	98.0	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	96.5	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	97.2	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	104	70.0	130	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	97.2	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	102	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	95.8	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	98.6	80.0	120	----
sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	99.3	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	99.8	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	99.6	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	100	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	94.0	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	91.4	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	93.7	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	97.0	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	94.4	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	89.9	80.0	120	----
<b>Dissolved Metals (QCLot: 79799)</b>									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	95.5	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	98.9	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	96.4	80.0	120	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	100	80.0	120	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	100	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	99.1	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	99.0	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	98.2	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	105	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	96.8	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	95.5	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	92.6	80.0	120	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	99.2	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	97.5	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	99.7	80.0	120	----





Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Dissolved Metals (QCLot: 79799) - continued</b>									
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	100	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	97.0	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	96.4	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	116	70.0	130	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	98.8	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	102	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	99.4	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	98.2	80.0	120	----
sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	99.9	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	97.1	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	89.5	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	98.7	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	93.6	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	93.4	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	93.2	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	98.8	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	95.8	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	90.3	80.0	120	----
<b>Dissolved Metals (QCLot: 79800)</b>									
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	0.25 mg/L	97.3	80.0	120	----
<b>Dissolved Metals (QCLot: 80464)</b>									
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	101	80.0	120	----
<b>Dissolved Metals (QCLot: 80465)</b>									
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	96.6	80.0	120	----
<b>Aggregate Organics (QCLot: 81008)</b>									
chemical oxygen demand [COD]	----	E559	20	mg/L	750 mg/L	101	85.0	115	----
<b>Volatile Organic Compounds (QCLot: 79732)</b>									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	98.2	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	91.3	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	113	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	91.4	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	97.3	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	200 µg/L	108	70.0	130	----
xylene, o-	95-47-6	E611A	0.5	µg/L	100 µg/L	94.4	70.0	130	----
<b>Volatile Organic Compounds (QCLot: 80458)</b>									



Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 80458) - continued</b>									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	92.7	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	85.1	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	108	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	85.0	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	89.9	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	200 µg/L	90.8	70.0	130	----
xylene, o-	95-47-6	E611A	0.5	µg/L	100 µg/L	88.9	70.0	130	----
<b>Hydrocarbons (QCLot: 79731)</b>									
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	93.1	70.0	130	----
<b>Hydrocarbons (QCLot: 80222)</b>									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	120	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	114	70.0	130	----
<b>Hydrocarbons (QCLot: 80457)</b>									
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	92.1	70.0	130	----
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 80223)</b>									
acenaphthene	83-32-9	E641A	0.01	µg/L	0.5 µg/L	109	60.0	130	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5 µg/L	110	60.0	130	----
acridine	260-94-6	E641A	0.01	µg/L	0.5 µg/L	100.0	60.0	130	----
anthracene	120-12-7	E641A	0.01	µg/L	0.5 µg/L	110	60.0	130	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5 µg/L	106	60.0	130	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5 µg/L	114	60.0	130	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	0.5 µg/L	110	60.0	130	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	1 µg/L	115	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5 µg/L	116	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5 µg/L	119	60.0	130	----
chrysene	218-01-9	E641A	0.01	µg/L	0.5 µg/L	113	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	0.5 µg/L	119	60.0	130	----
fluoranthene	206-44-0	E641A	0.01	µg/L	0.5 µg/L	111	60.0	130	----
fluorene	86-73-7	E641A	0.01	µg/L	0.5 µg/L	101	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5 µg/L	116	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5 µg/L	107	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	0.5 µg/L	101	60.0	130	----
naphthalene	91-20-3	E641A	0.05	µg/L	0.5 µg/L	102	50.0	130	----
phenanthrene	85-01-8	E641A	0.02	µg/L	0.5 µg/L	106	60.0	130	----
pyrene	129-00-0	E641A	0.01	µg/L	0.5 µg/L	115	60.0	130	----

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 Work Order : VA20B3842  
 Client : ERM Consultants Canada Ltd.  
 Project : 0539378-0012 (WQ ISKUT)



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 80223) - continued</b>									
quinoline	6027-02-7	E641A	0.05	µg/L	0.5 µg/L	119	60.0	130	----



### Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 78786)</b>										
VA20B3842-002	BR3	Kjeldahl nitrogen, total [TKN]	----	E318	2.59 mg/L	2.5 mg/L	104	70.0	130	----
<b>Anions and Nutrients (QCLot: 78788)</b>										
VA20B3842-002	BR3	nitrogen, total	7727-37-9	E366	0.374 mg/L	0.4 mg/L	93.4	70.0	130	----
<b>Anions and Nutrients (QCLot: 78789)</b>										
VA20B3842-002	BR3	phosphorus, total	7723-14-0	E372-U	ND mg/L	0.05 mg/L	ND	70.0	130	----
<b>Anions and Nutrients (QCLot: 78790)</b>										
VA20B3842-002	BR3	ammonia, total (as N)	7664-41-7	E298	0.201 mg/L	0.2 mg/L	100	75.0	125	----
<b>Anions and Nutrients (QCLot: 78795)</b>										
VA20B3842-002	BR3	chloride	16887-00-6	E235.Cl	103 mg/L	100 mg/L	103	75.0	125	----
<b>Anions and Nutrients (QCLot: 78796)</b>										
VA20B3842-002	BR3	fluoride	16984-48-8	E235.F	1.02 mg/L	1 mg/L	102	75.0	125	----
<b>Anions and Nutrients (QCLot: 78797)</b>										
VA20B3842-002	BR3	bromide	24959-67-9	E235.Br-L	0.474 mg/L	0.5 mg/L	94.8	75.0	125	----
<b>Anions and Nutrients (QCLot: 78798)</b>										
VA20B3842-002	BR3	nitrate (as N)	14797-55-8	E235.NO3-L	2.59 mg/L	2.5 mg/L	104	75.0	125	----
<b>Anions and Nutrients (QCLot: 78799)</b>										
VA20B3842-002	BR3	nitrite (as N)	14797-65-0	E235.NO2-L	0.510 mg/L	0.5 mg/L	102	75.0	125	----
<b>Anions and Nutrients (QCLot: 78800)</b>										
VA20B3842-002	BR3	sulfate (as SO4)	14808-79-8	E235.SO4	103 mg/L	100 mg/L	103	75.0	125	----
<b>Anions and Nutrients (QCLot: 78802)</b>										
VA20B3842-002	BR3	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0317 mg/L	0.03 mg/L	106	70.0	130	----
<b>Anions and Nutrients (QCLot: 78803)</b>										
VA20B3842-022	DUP5	Kjeldahl nitrogen, total [TKN]	----	E318	2.51 mg/L	2.5 mg/L	100	70.0	130	----
<b>Anions and Nutrients (QCLot: 78805)</b>										
VA20B3842-022	DUP5	nitrogen, total	7727-37-9	E366	0.396 mg/L	0.4 mg/L	98.9	70.0	130	----
<b>Anions and Nutrients (QCLot: 78806)</b>										
VA20B3842-022	DUP5	phosphorus, total	7723-14-0	E372-U	0.0485 mg/L	0.05 mg/L	97.0	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 78807)</b>										
VA20B3842-022	DUP5	ammonia, total (as N)	7664-41-7	E298	0.210 mg/L	0.2 mg/L	105	75 0	125	----
<b>Anions and Nutrients (QCLot: 78812)</b>										
VA20B3842-022	DUP5	sulfate (as SO4)	14808-79-8	E235.SO4	102 mg/L	100 mg/L	102	75 0	125	----
<b>Anions and Nutrients (QCLot: 78813)</b>										
VA20B3842-022	DUP5	nitrate (as N)	14797-55-8	E235 NO3-L	2.56 mg/L	2.5 mg/L	102	75 0	125	----
<b>Anions and Nutrients (QCLot: 78814)</b>										
VA20B3842-022	DUP5	nitrite (as N)	14797-65-0	E235 NO2-L	0.506 mg/L	0.5 mg/L	101	75 0	125	----
<b>Anions and Nutrients (QCLot: 78815)</b>										
VA20B3842-022	DUP5	fluoride	16984-48-8	E235 F	1.01 mg/L	1 mg/L	101	75 0	125	----
<b>Anions and Nutrients (QCLot: 78816)</b>										
VA20B3842-022	DUP5	chloride	16887-00-6	E235.Cl	102 mg/L	100 mg/L	102	75 0	125	----
<b>Anions and Nutrients (QCLot: 78817)</b>										
VA20B3842-022	DUP5	bromide	24959-67-9	E235 Br-L	0.525 mg/L	0.5 mg/L	105	75 0	125	----
<b>Anions and Nutrients (QCLot: 78819)</b>										
VA20B3842-022	DUP5	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0 0350 mg/L	0.03 mg/L	117	70 0	130	----
<b>Anions and Nutrients (QCLot: 80313)</b>										
WR2000790-001	Anonymous	chloride	16887-00-6	E235.Cl	4520 mg/L	5000 mg/L	90.5	75 0	125	----
<b>Anions and Nutrients (QCLot: 80315)</b>										
WR2000790-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	ND mg/L	5000 mg/L	ND	75 0	125	----
<b>Anions and Nutrients (QCLot: 80316)</b>										
WR2000790-001	Anonymous	nitrate (as N)	14797-55-8	E235 NO3-L	112 mg/L	125 mg/L	90.1	75 0	125	----
<b>Anions and Nutrients (QCLot: 80317)</b>										
WR2000790-001	Anonymous	nitrite (as N)	14797-65-0	E235 NO2-L	22.2 mg/L	25 mg/L	88.6	75 0	125	----
<b>Anions and Nutrients (QCLot: 80318)</b>										
WR2000790-001	Anonymous	fluoride	16984-48-8	E235 F	46.9 mg/L	50 mg/L	93.7	75 0	125	----
<b>Anions and Nutrients (QCLot: 80319)</b>										
WR2000790-001	Anonymous	bromide	24959-67-9	E235 Br-L	20.6 mg/L	25 mg/L	82.5	75 0	125	----
<b>Anions and Nutrients (QCLot: 82504)</b>										
KS2001653-002	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	ND mg/L	0.03 mg/L	ND	70 0	130	----
<b>Anions and Nutrients (QCLot: 82829)</b>										
WT2000114-010	Anonymous	cyanate	88402-73-7	E343	ND mg/L	2 mg/L	ND	70 0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Cyanides (QCLot: 81531)</b>										
VA20B3842-002	BR3	cyanide, weak acid dissociable	----	E336	0.127 mg/L	0.125 mg/L	102	75.0	125	----
<b>Cyanides (QCLot: 81532)</b>										
VA20B3842-002	BR3	cyanide, free	----	E339	0.124 mg/L	0.125 mg/L	99.6	75.0	125	----
<b>Cyanides (QCLot: 81533)</b>										
VA20B3842-002	BR3	cyanide, strong acid dissociable (total)	----	E333	0.250 mg/L	0.25 mg/L	100	75.0	125	----
<b>Cyanides (QCLot: 81559)</b>										
VA20B3842-021	JM24	cyanide, strong acid dissociable (total)	----	E333	0.248 mg/L	0.25 mg/L	99.2	75.0	125	----
<b>Cyanides (QCLot: 81560)</b>										
VA20B3842-021	JM24	cyanide, weak acid dissociable	----	E336	0.129 mg/L	0.125 mg/L	103	75.0	125	----
<b>Cyanides (QCLot: 81561)</b>										
VA20B3842-021	JM24	cyanide, free	----	E339	0.125 mg/L	0.125 mg/L	100	75.0	125	----
<b>Cyanides (QCLot: 81890)</b>										
VA20B3935-003	Anonymous	thiocyanate	302-04-5	E344	9.46 mg/L	10 mg/L	94.6	75.0	125	----
<b>Organic / Inorganic Carbon (QCLot: 78787)</b>										
VA20B3842-002	BR3	carbon, total organic [TOC]	----	E355-L	4.97 mg/L	5 mg/L	99.4	70.0	130	----
<b>Organic / Inorganic Carbon (QCLot: 78804)</b>										
VA20B3842-022	DUP5	carbon, total organic [TOC]	----	E355-L	4.90 mg/L	5 mg/L	98.0	70.0	130	----
<b>Organic / Inorganic Carbon (QCLot: 80229)</b>										
VA20B4087-001	Anonymous	carbon, total inorganic [TIC]	----	E354-L	ND mg/L	10 mg/L	ND	70.0	130	----
<b>Organic / Inorganic Carbon (QCLot: 81965)</b>										
VA20B3842-002	BR3	carbon, dissolved organic [DOC]	----	E358-L	5.18 mg/L	5 mg/L	104	70.0	130	----
<b>Organic / Inorganic Carbon (QCLot: 82552)</b>										
VA20B3842-022	DUP5	carbon, dissolved organic [DOC]	----	E358-L	5.04 mg/L	5 mg/L	101	70.0	130	----
<b>Total Metals (QCLot: 79426)</b>										
VA20B3824-002	Anonymous	mercury, total	7439-97-6	E508	0.000122 mg/L	0.0001 mg/L	122	70.0	130	----
<b>Total Metals (QCLot: 79427)</b>										
VA20B3842-003	DUP1	mercury, total	7439-97-6	E508	0.000102 mg/L	0.0001 mg/L	102	70.0	130	----
<b>Total Metals (QCLot: 79474)</b>										
VA20B3842-012	JM2 SEEPAGE	aluminum, total	7429-90-5	E420	ND mg/L	0.2 mg/L	ND	70.0	130	----
		antimony, total	7440-36-0	E420	0.0200 mg/L	0.02 mg/L	100	70.0	130	----
		arsenic, total	7440-38-2	E420	0.0200 mg/L	0.02 mg/L	100	70.0	130	----
		barium, total	7440-39-3	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Total Metals (QCLot: 79474) - continued</b>										
VA20B3842-012	JM2 SEEPAGE	beryllium, total	7440-41-7	E420	0.0395 mg/L	0.04 mg/L	98.9	70.0	130	----
		bismuth, total	7440-69-9	E420	0.0100 mg/L	0.01 mg/L	100	70.0	130	----
		boron, total	7440-42-8	E420	0.098 mg/L	0.1 mg/L	97.8	70.0	130	----
		cadmium, total	7440-43-9	E420	ND mg/L	0.004 mg/L	ND	70.0	130	----
		calcium, total	7440-70-2	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		cobalt, total	7440-48-4	E420	0.0194 mg/L	0.02 mg/L	97.1	70.0	130	----
		copper, total	7440-50-8	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		iron, total	7439-89-6	E420	1.94 mg/L	2 mg/L	97.3	70.0	130	----
		lead, total	7439-92-1	E420	0.0201 mg/L	0.02 mg/L	100	70.0	130	----
		lithium, total	7439-93-2	E420	0.0960 mg/L	0.1 mg/L	96.0	70.0	130	----
		magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, total	7439-96-5	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		molybdenum, total	7439-98-7	E420	0.0200 mg/L	0.02 mg/L	100	70.0	130	----
		nickel, total	7440-02-0	E420	0.0401 mg/L	0.04 mg/L	100	70.0	130	----
		phosphorus, total	7723-14-0	E420	9.79 mg/L	10 mg/L	97.9	70.0	130	----
		potassium, total	7440-09-7	E420	4.55 mg/L	4 mg/L	114	70.0	130	----
		selenium, total	7782-49-2	E420	0.0438 mg/L	0.04 mg/L	109	70.0	130	----
		silicon, total	7440-21-3	E420	9.30 mg/L	10 mg/L	93.0	70.0	130	----
		silver, total	7440-22-4	E420	0.00390 mg/L	0.004 mg/L	97.5	70.0	130	----
		sodium, total	7440-23-5	E420	2.10 mg/L	2 mg/L	105	70.0	130	----
		strontium, total	7440-24-6	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		sulfur, total	7704-34-9	E420	ND mg/L	20 mg/L	ND	70.0	130	----
		thallium, total	7440-28-0	E420	0.00399 mg/L	0.004 mg/L	99.7	70.0	130	----
		tin, total	7440-31-5	E420	0.0196 mg/L	0.02 mg/L	98.1	70.0	130	----
		titanium, total	7440-32-6	E420	0.0393 mg/L	0.04 mg/L	98.3	70.0	130	----
		uranium, total	7440-61-1	E420	0.00424 mg/L	0.004 mg/L	106	70.0	130	----
		vanadium, total	7440-62-2	E420	0.103 mg/L	0.1 mg/L	103	70.0	130	----
		zinc, total	7440-66-6	E420	ND mg/L	0.4 mg/L	ND	70.0	130	----
		zirconium, total	7440-67-7	E420	0.0427 mg/L	0.04 mg/L	107	70.0	130	----
<b>Total Metals (QCLot: 79475)</b>										
VA20B3842-012	JM2 SEEPAGE	chromium, total	7440-47-3	E420.Cr-L	0.0392 mg/L	0.04 mg/L	98.0	70.0	130	----
<b>Total Metals (QCLot: 79989)</b>										
VA20B3842-002	BR3	chromium, total	7440-47-3	E420.Cr-L	0.0406 mg/L	0.04 mg/L	102	70.0	130	----
<b>Total Metals (QCLot: 79990)</b>										
VA20B3842-002	BR3	aluminum, total	7429-90-5	E420	ND mg/L	0.2 mg/L	ND	70.0	130	----
		antimony total	7440-36-0	E420	0.0210 mg/L	0.02 mg/L	105	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Lab rat ry sample ID	Client sample ID	Analyte	CAS Number	Method	C n entrati n	Target	MS	L w	High	Qualifier
<b>Total Metals (QCLot: 79990) - continued</b>										
VA20B3842-002	BR3	arsenic, total	7440-38-2	E420	0.0198 mg/L	0.02 mg/L	98.8	70.0	130	----
		barium, total	7440-39-3	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		beryllium, total	7440-41-7	E420	0.0400 mg/L	0.04 mg/L	100.0	70.0	130	----
		bismuth, total	7440-69-9	E420	0.0103 mg/L	0.01 mg/L	103	70.0	130	----
		boron, total	7440-42-8	E420	0.101 mg/L	0.1 mg/L	101	70.0	130	----
		cadmium, total	7440-43-9	E420	0.00409 mg/L	0.004 mg/L	102	70.0	130	----
		calcium, total	7440-70-2	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		cobalt, total	7440-48-4	E420	0.0196 mg/L	0.02 mg/L	98.0	70.0	130	----
		copper, total	7440-50-8	E420	0.0198 mg/L	0.02 mg/L	98.8	70.0	130	----
		iron, total	7439-89-6	E420	ND mg/L	2 mg/L	ND	70.0	130	----
		lead, total	7439-92-1	E420	0.0201 mg/L	0.02 mg/L	100	70.0	130	----
		lithium, total	7439-93-2	E420	0.0980 mg/L	0.1 mg/L	98.0	70.0	130	----
		magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, total	7439-96-5	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		molybdenum, total	7439-98-7	E420	0.0200 mg/L	0.02 mg/L	100.0	70.0	130	----
		nickel, total	7440-02-0	E420	0.0392 mg/L	0.04 mg/L	98.1	70.0	130	----
		phosphorus, total	7723-14-0	E420	9.78 mg/L	10 mg/L	97.8	70.0	130	----
		potassium, total	7440-09-7	E420	4.22 mg/L	4 mg/L	106	70.0	130	----
		selenium, total	7782-49-2	E420	0.0407 mg/L	0.04 mg/L	102	70.0	130	----
		silicon, total	7440-21-3	E420	9.22 mg/L	10 mg/L	92.2	70.0	130	----
		silver, total	7440-22-4	E420	0.00421 mg/L	0.004 mg/L	105	70.0	130	----
		sodium, total	7440-23-5	E420	1.99 mg/L	2 mg/L	99.7	70.0	130	----
		strontium, total	7440-24-6	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		sulfur, total	7704-34-9	E420	19.8 mg/L	20 mg/L	99.1	70.0	130	----
		thallium, total	7440-28-0	E420	0.00411 mg/L	0.004 mg/L	103	70.0	130	----
		tin, total	7440-31-5	E420	0.0206 mg/L	0.02 mg/L	103	70.0	130	----
		titanium, total	7440-32-6	E420	ND mg/L	0.04 mg/L	ND	70.0	130	----
		uranium, total	7440-61-1	E420	0.00418 mg/L	0.004 mg/L	104	70.0	130	----
		vanadium, total	7440-62-2	E420	0.105 mg/L	0.1 mg/L	105	70.0	130	----
		zinc, total	7440-66-6	E420	0.404 mg/L	0.4 mg/L	101	70.0	130	----
		zirconium, total	7440-67-7	E420	0.0413 mg/L	0.04 mg/L	103	70.0	130	----
<b>Total Metals (QCLot: 80431)</b>										
KS2001412-002	Anonymous	mercury, total	7439-97-6	E508	0.0000880 mg/L	0.0001 mg/L	88.0	70.0	130	----
<b>Total Metals (QCLot: 80432)</b>										
VA20B3842-016	SK1	mercury, total	7439-97-6	E508	0.0000874 mg/L	0.0001 mg/L	87.4	70.0	130	----
<b>Total Metals (QCLot: 81045)</b>										





Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Lab rat ry sample ID	Client sample ID	Analyte	CAS Number	Method	C n entrati n	Target	MS	L w	High	Qualifier
<b>Total Metals (QCLot: 81045) - continued</b>										
VA20B3986-001	Anonymous	mercury, total	7439-97-6	E508	0.0000916 mg/L	0 0001 mg/L	91.6	70 0	130	----
<b>Dissolved Metals (QCLot: 79797)</b>										
VA20B3842-002	BR3	chromium, dissolved	7440-47-3	E421.Cr-L	0 0382 mg/L	0.04 mg/L	95.6	70 0	130	----
<b>Dissolved Metals (QCLot: 79798)</b>										
VA20B3842-002	BR3	aluminum, dissolved	7429-90-5	E421	0.189 mg/L	0.2 mg/L	94.4	70 0	130	----
		antimony, dissolved	7440-36-0	E421	0 0193 mg/L	0.02 mg/L	96.4	70 0	130	----
		arsenic, dissolved	7440-38-2	E421	0 0192 mg/L	0.02 mg/L	95.9	70 0	130	----
		barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70 0	130	----
		beryllium, dissolved	7440-41-7	E421	0 0402 mg/L	0.04 mg/L	100	70 0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00942 mg/L	0.01 mg/L	94.2	70 0	130	----
		boron, dissolved	7440-42-8	E421	0.102 mg/L	0.1 mg/L	102	70 0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00393 mg/L	0.004 mg/L	98.3	70 0	130	----
		calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70 0	130	----
		cobalt, dissolved	7440-48-4	E421	0 0194 mg/L	0.02 mg/L	97.1	70 0	130	----
		copper, dissolved	7440-50-8	E421	0 0191 mg/L	0.02 mg/L	95.5	70 0	130	----
		iron, dissolved	7439-89-6	E421	1.91 mg/L	2 mg/L	95.4	70 0	130	----
		lead, dissolved	7439-92-1	E421	0 0200 mg/L	0.02 mg/L	100 0	70 0	130	----
		lithium, dissolved	7439-93-2	E421	0 0997 mg/L	0.1 mg/L	99.7	70 0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70 0	130	----
		manganese, dissolved	7439-96-5	E421	ND mg/L	0.02 mg/L	ND	70 0	130	----
		molybdenum, dissolved	7439-98-7	E421	0 0195 mg/L	0.02 mg/L	97.5	70 0	130	----
		nickel, dissolved	7440-02-0	E421	0 0386 mg/L	0.04 mg/L	96.5	70 0	130	----
		phosphorus, dissolved	7723-14-0	E421	10.3 mg/L	10 mg/L	103	70 0	130	----
		potassium, dissolved	7440-09-7	E421	3.79 mg/L	4 mg/L	94.8	70 0	130	----
		selenium, dissolved	7782-49-2	E421	0 0406 mg/L	0.04 mg/L	101	70 0	130	----
		silicon, dissolved	7440-21-3	E421	9.43 mg/L	10 mg/L	94.3	70 0	130	----
		silver, dissolved	7440-22-4	E421	0.00395 mg/L	0.004 mg/L	98.7	70 0	130	----
		sodium, dissolved	7440-23-5	E421	2.03 mg/L	2 mg/L	101	70 0	130	----
		strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70 0	130	----
		sulfur, dissolved	7704-34-9	E421	21.3 mg/L	20 mg/L	106	70 0	130	----
		thallium, dissolved	7440-28-0	E421	0.00363 mg/L	0.004 mg/L	90.7	70 0	130	----
		tin, dissolved	7440-31-5	E421	0 0189 mg/L	0.02 mg/L	94.4	70 0	130	----
		titanium, dissolved	7440-32-6	E421	0 0382 mg/L	0.04 mg/L	95.6	70 0	130	----
		uranium, dissolved	7440-61-1	E421	0.00369 mg/L	0.004 mg/L	92.2	70 0	130	----
		vanadium, dissolved	7440-62-2	E421	0 0972 mg/L	0.1 mg/L	97.2	70 0	130	----
		zinc, dissolved	7440-66-6	E421	0.390 mg/L	0.4 mg/L	97.6	70 0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 79798) - continued</b>										
VA20B3842-002	BR3	zirconium, dissolved	7440-67-7	E421	0.0390 mg/L	0.04 mg/L	97.6	70.0	130	----
<b>Dissolved Metals (QCLot: 79799)</b>										
VA20B3842-022	DUP5	aluminum, dissolved	7429-90-5	E421	0.191 mg/L	0.2 mg/L	95.7	70.0	130	----
		antimony, dissolved	7440-36-0	E421	0.0190 mg/L	0.02 mg/L	95.3	70.0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0194 mg/L	0.02 mg/L	96.9	70.0	130	----
		barium, dissolved	7440-39-3	E421	0.0180 mg/L	0.02 mg/L	90.2	70.0	130	----
		beryllium, dissolved	7440-41-7	E421	0.0413 mg/L	0.04 mg/L	103	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00948 mg/L	0.01 mg/L	94.8	70.0	130	----
		boron, dissolved	7440-42-8	E421	0.103 mg/L	0.1 mg/L	103	70.0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00392 mg/L	0.004 mg/L	98.1	70.0	130	----
		calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		cobalt, dissolved	7440-48-4	E421	0.0194 mg/L	0.02 mg/L	96.8	70.0	130	----
		copper, dissolved	7440-50-8	E421	0.0191 mg/L	0.02 mg/L	95.7	70.0	130	----
		iron, dissolved	7439-89-6	E421	1.87 mg/L	2 mg/L	93.6	70.0	130	----
		lead, dissolved	7439-92-1	E421	0.0199 mg/L	0.02 mg/L	99.6	70.0	130	----
		lithium, dissolved	7439-93-2	E421	0.103 mg/L	0.1 mg/L	103	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, dissolved	7439-96-5	E421	0.0203 mg/L	0.02 mg/L	102	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	0.0197 mg/L	0.02 mg/L	98.6	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0383 mg/L	0.04 mg/L	95.9	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	10.8 mg/L	10 mg/L	108	70.0	130	----
		potassium, dissolved	7440-09-7	E421	3.85 mg/L	4 mg/L	96.4	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0413 mg/L	0.04 mg/L	103	70.0	130	----
		silicon, dissolved	7440-21-3	E421	8.88 mg/L	10 mg/L	88.8	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00385 mg/L	0.004 mg/L	96.2	70.0	130	----
		sodium, dissolved	7440-23-5	E421	2.16 mg/L	2 mg/L	108	70.0	130	----
		strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		sulfur, dissolved	7704-34-9	E421	19.8 mg/L	20 mg/L	99.2	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00359 mg/L	0.004 mg/L	89.8	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0190 mg/L	0.02 mg/L	94.9	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0384 mg/L	0.04 mg/L	95.9	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.00365 mg/L	0.004 mg/L	91.3	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.0981 mg/L	0.1 mg/L	98.1	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.384 mg/L	0.4 mg/L	95.9	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0389 mg/L	0.04 mg/L	97.2	70.0	130	----
<b>Dissolved Metals (QCLot: 79800)</b>										



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Lab rat ry sample ID	Client sample ID	Analyte	CAS Number	Method	C n entrati n	Target	MS	L w	High	Qualifier
<b>Dissolved Metals (QCLot: 79800) - continued</b>										
VA20B3842-022	DUP5	chromium, dissolved	7440-47-3	E421.Cr-L	0.0390 mg/L	0.04 mg/L	97.5	70.0	130	----
<b>Dissolved Metals (QCLot: 80464)</b>										
VA20B3842-002	BR3	mercury, dissolved	7439-97-6	E509	0.000103 mg/L	0.0001 mg/L	103	70.0	130	----
<b>Dissolved Metals (QCLot: 80465)</b>										
VA20B3842-022	DUP5	mercury, dissolved	7439-97-6	E509	0.0000963 mg/L	0.0001 mg/L	96.3	70.0	130	----
<b>Aggregate Organics (QCLot: 81008)</b>										
VA20B4087-001	Anonymous	chemical oxygen demand [COD]	----	E559	480 mg/L	500 mg/L	95.9	75.0	125	----
<b>Volatile Organic Compounds (QCLot: 79732)</b>										
VA20B3842-011	JM4	benzene	71-43-2	E611A	93.2 µg/L	100 µg/L	93.2	60.0	140	----
		ethylbenzene	100-41-4	E611A	87.3 µg/L	100 µg/L	87.3	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	110 µg/L	100 µg/L	110	60.0	140	----
		styrene	100-42-5	E611A	89.2 µg/L	100 µg/L	89.2	60.0	140	----
		toluene	108-88-3	E611A	91.9 µg/L	100 µg/L	91.9	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	207 µg/L	200 µg/L	103	60.0	140	----
		xylene, o-	95-47-6	E611A	90.6 µg/L	100 µg/L	90.6	60.0	140	----
<b>Volatile Organic Compounds (QCLot: 80458)</b>										
VA20B3846-006	Anonymous	benzene	71-43-2	E611A	101 µg/L	100 µg/L	101	60.0	140	----
		ethylbenzene	100-41-4	E611A	92.7 µg/L	100 µg/L	92.7	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	113 µg/L	100 µg/L	113	60.0	140	----
		styrene	100-42-5	E611A	94.3 µg/L	100 µg/L	94.3	60.0	140	----
		toluene	108-88-3	E611A	95.8 µg/L	100 µg/L	95.8	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	200 µg/L	200 µg/L	99.8	60.0	140	----
		xylene, o-	95-47-6	E611A	96.4 µg/L	100 µg/L	96.4	60.0	140	----
<b>Hydrocarbons (QCLot: 79731)</b>										
VA20B3842-010	DUP4	VHw (C6-C10)	----	E581.VH+F1	5670 µg/L	6310 µg/L	89.9	60.0	140	----
<b>Hydrocarbons (QCLot: 80457)</b>										
VA20B3846-002	Anonymous	VHw (C6-C10)	----	E581.VH+F1	6180 µg/L	6310 µg/L	98.0	60.0	140	----



## Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix: **Water**

					Reference Material (RM) Report				
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
							Low	High	
<b>Organic / Inorganic Carbon (QCLot: 80229)</b>									
QC-80229-002	RM	carbon, total inorganic [TIC]	----	E354-L	8 mg/L	97.9	80.0	120	----



Report To		Report Format / Distribution			Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)																																																			
Company: <b>ERM Consultants Canada</b>		Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input checked="" type="checkbox"/> EDD (DIGITAL)			Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply																																																			
Contact: <b>Jill Zyla</b>		Quality Control (QC) Report with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO			4 day [P4-20%] <input type="checkbox"/>		1 Business day [E - 100%] <input type="checkbox"/>																																																	
Phone: <b>250-877-7838</b>		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked			3 day [P3-25%] <input type="checkbox"/>		Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] <input type="checkbox"/>																																																	
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			2 day [P2-50%] <input type="checkbox"/>																																																			
Street: <b>3790 Alford Ave</b>		Email 1 or Fax: <b>Jill.Zyla@erm.com</b>			Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm																																																			
City/Province: <b>Sonituey, BC</b>		Email 2: <b>Wade.Burnham@erm.com</b>			For tests that can not be performed according to the service level selected, you will be contacted.																																																			
Postal Code: <b>V0J 2N0</b>		Email 3: <b>Katay.Gin@erm.com</b>			Analysis Request																																																			
Invoice To: Same as Report To <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below <table border="1" style="width:100%; height: 100%; border-collapse: collapse;"> <tr><td colspan="12" style="text-align: center;">NUMBER OF CONTAINERS</td></tr> <tr><td colspan="12" style="text-align: center;">746 per 074326</td></tr> <tr><td colspan="12" style="text-align: center;">SUSPECTED HAZARD (see Special Instructions)</td></tr> <tr><td colspan="12" style="text-align: center;">SAMPLES ON HOLD</td></tr> </table>				NUMBER OF CONTAINERS												746 per 074326												SUSPECTED HAZARD (see Special Instructions)												SAMPLES ON HOLD											
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Copy of Invoice with Report <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX																																																						
Company: <b>Sea Bridge Gold</b>		Email 1 or Fax: <b>Elizabeth@seabridgegold.net</b>																																																						
Contact: <b>Elizabeth Miller</b>		Email 2: <b>KSM.admin@seabridgegold.net</b>																																																						
Project Information		Oil and Gas Required Fields (client use)																																																						
ALS Account # / Quote #: <b>Q 74326</b>		AFE/Cost Center: PO#																																																						
Job #: <b>0539378-0012 (WO 15K11)</b>		Minor Code: Routing Code:																																																						
PO / AFE:		Requisitioner:																																																						
LSD:		Location:																																																						
ALS Lab Work Order # (lab use only):		ALS Contact:		Sampler:																																																				
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type																																																				
13	JM 2	23-Aug-20	11:35	Water	12																																																			
14	TMF 1	}	12:08	}	12																																																			
15	JMS		12:25		12																																																			
16	SKI		12:48		8																																																			
17	JM 10		13:23		15																																																			
18	JM 11		14:11		8																																																			
19	JM 6		14:32		12																																																			
20	JM 14		15:02		8																																																			
21	JM 24		15:26		8																																																			
22	DUPS		13:23		12																																																			
23	Field Blank (JM 10-2018)		13:23		12																																																			
24	Travel Blank		12																																																					
Drinking Water (DW) Samples <sup>1</sup> (client use)		Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)			SAMPLE CONDITION AS RECEIVED (lab use only)																																																			
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO					Frozen <input checked="" type="checkbox"/> Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/> Cooling Initiated <input type="checkbox"/>																																																			
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO					INITIAL COOLER TEMPERATURES °C: 5.3 5.8 5.4 7.8 FINAL COOLER TEMPERATURES °C: 8°C (CAN 90114)																																																			
SHIPMENT RELEASE (client use)		INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)																																																			
Released by: <b>Talent Baden</b> Date: <b>Aug 24 2020</b> Time:		Received by: <b>[Signature]</b> Date: Time:			Received by: <b>[Signature]</b> Date: <b>28 Aug</b> Time: <b>10:10 AM</b>																																																			

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.



## CERTIFICATE OF ANALYSIS

**Work Order** : **VA20B3846**  
**Client** : **ERM Consultants Canada Ltd.**  
**Contact** : Jill Zyla  
**Address** : 3790 Alfred Ave  
Smithers BC Canada V0J 2N0  
**Telephone** : (250) 877-7838  
**Project** : 0539378-0012  
**PO** : ----  
**C-O-C number** : 17-841425, 17-841424  
**Sampler** : ----  
**Site** : ----  
**Quote number** : Q74326  
**No. of samples received** : 16  
**No. of samples analysed** : 16

**Page** : 1 of 23  
**Laboratory** : Vancouver - Environmental  
**Account Manager** : Amber Springer  
**Address** : 8081 Lougheed Highway  
Burnaby BC Canada V5A 1W9  
**Telephone** : +1 604 253 4188  
**Date Samples Received** : 28-Aug-2020 10:10  
**Date Analysis Commenced** : 28-Aug-2020  
**Issue Date** : 09-Sep-2020 12:43

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Brieanna Allen	Department Manager - Organics	Organics, Burnaby, British Columbia
Bruna Botti	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Cristina Alexandre	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Jashan Kaur	Lab Assistant	Metals, Burnaby, British Columbia
Kevin Duarte	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics - Water Quality, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Richard Chong		Metals, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Shaneel Dayal	Analyst	Metals, Burnaby, British Columbia







## General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
-	No Unit
µg/L	micrograms per litre
µS/cm	Microsiemens per centimetre
CU	colour units
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in reports identified as "**Preliminary Report**" are considered authorized for use.

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DTMF	Dissolved concentration exceeds total for field-filtered metals sample. Metallic contaminants may have been introduced to dissolved sample during field filtration.
RRV	Reported result verified by repeat analysis.



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					FIELD BLANK	JM7	SCH2	SK2	JM10
Client sampling date / time					23-Aug-2020 12:08	24-Aug-2020 10:07	24-Aug-2020 10:26	24-Aug-2020 11:15	24-Aug-2020 11:57
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-001	VA20B3846-002	VA20B3846-003	VA20B3846-004	VA20B3846-005
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
acidity (as CaCO3)	----	E283	2.0	mg/L	2.0	<2.0	<2.0	<2.0	<2.0
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	38.7	38.9	21.4	36.4
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	<1.0	38.7	38.9	21.4	36.4
colour, true	----	E329	5.0	CU	<5.0	<5.0	<5.0	<5.0	<5.0
conductivity	----	E100	2.0	µS/cm	<2.0	115	115	42.7	98.0
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	<0.60	52.7	51.5	19.6	44.5
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	<0.60	56.0	55.7	20.6	48.2
pH	----	E108	0.10	pH units	5.31	7.48	7.59	7.27	7.55
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	63	63	27	49
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	<3.0	8.1	6.9	<3.0	16.7
turbidity	----	E121	0.10	NTU	<0.10	1.53	1.64	<0.10	9.66
<b>Anions and Nutrients</b>									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0201 <sup>RRV</sup>	0.0081	0.0065	<0.0050	<0.0050
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50
fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	<0.020	<0.020	<0.020	<0.020
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	0.0180	0.0165	<0.0050	0.0066
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	0.0029	0.0028	<0.0010	<0.0010
nitrogen, total	7727-37-9	E366	0.030	mg/L	<0.030	0.061	0.091	<0.030	<0.030
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	<0.0020	0.0042	0.0086	<0.0020	0.0174
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	<0.30	19.1	18.5	2.40	13.0
<b>Cyanides</b>									
cyanide, free	----	E339	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cyanide, strong acid dissociable (total)	----	E333	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cyanide, weak acid dissociable	----	E336	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
<b>Organic / Inorganic Carbon</b>									



## Analytical Results

Sub-Matrix: Water					Client sample ID	FIELD BLANK	JM7	SCH2	SK2	JM10
(Matrix: Water)										
Client sampling date / time					23-Aug-2020 12:08	24-Aug-2020 10:07	24-Aug-2020 10:26	24-Aug-2020 11:15	24-Aug-2020 11:57	
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-001	VA20B3846-002	VA20B3846-003	VA20B3846-004	VA20B3846-005	
					Result	Result	Result	Result	Result	
<b>Organic / Inorganic Carbon</b>										
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	<0.50	0.88	0.97 <sup>RRV</sup>	0.85	<0.50	
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	<0.50	<0.50	<0.50 <sup>RRV</sup>	<0.50	<0.50	
<b>Total Metals</b>										
aluminum, total	7429-90-5	E420	0.0030	mg/L	<0.0030	0.132	0.176	0.0040	0.339	
antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
arsenic, total	7440-38-2	E420	0.00010	mg/L	<0.00010	0.00014	0.00020	0.00020	0.00032	
barium, total	7440-39-3	E420	0.00010	mg/L	<0.00010	0.0305	0.0315	0.00384	0.0456	
beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	
cadmium, total	7440-43-9	E420	0.0000050	mg/L	<0.0000050	0.000137	0.000129	0.0000155	0.0000686	
calcium, total	7440-70-2	E420	0.050	mg/L	<0.050	19.6	19.6	6.87	17.2	
chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	0.00028	0.00030	<0.00010	0.00022	
copper, total	7440-50-8	E420	0.00050	mg/L	<0.00050	0.0270	0.0278	<0.00050	0.00090	
iron, total	7439-89-6	E420	0.010	mg/L	<0.010	0.199	0.281	<0.010	0.377	
lead, total	7439-92-1	E420	0.000050	mg/L	0.000060 <sup>RRV</sup>	0.00116	0.00156	<0.000050	0.00405	
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
magnesium, total	7439-95-4	E420	0.100	mg/L	<0.100	1.70	1.66	0.850	1.29	
manganese, total	7439-96-5	E420	0.00010	mg/L	<0.00010	0.0714	0.0767	0.00063	0.0444	
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	<0.000050	0.000315	0.000336	0.000070	0.000475	
nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
potassium, total	7440-09-7	E420	0.100	mg/L	<0.100	1.24	1.23	0.335	1.30	
selenium, total	7782-49-2	E420	0.000050	mg/L	<0.000050	0.000099	0.000101	0.000053	0.000093	
silicon, total	7440-21-3	E420	0.10	mg/L	<0.10	1.36	1.44	1.42	1.43	
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
sodium, total	7440-23-5	E420	0.050	mg/L	<0.050	0.615	0.613	0.449	0.660	
strontium, total	7440-24-6	E420	0.00020	mg/L	<0.00020	0.135	0.136	0.0388	0.116	
sulfur, total	7704-34-9	E420	0.50	mg/L	<0.50	6.81	6.38	0.74	4.60	



## Analytical Results

Sub-Matrix: Water					Client sample ID	FIELD BLANK	JM7	SCH2	SK2	JM10
(Matrix: Water)										
Client sampling date / time					23-Aug-2020 12:08	24-Aug-2020 10:07	24-Aug-2020 10:26	24-Aug-2020 11:15	24-Aug-2020 11:57	
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-001	VA20B3846-002	VA20B3846-003	VA20B3846-004	VA20B3846-005	
					Result	Result	Result	Result	Result	
<b>Total Metals</b>										
thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000012
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
titanium, total	7440-32-6	E420	0.00030	mg/L	<0.00030	0.00563	0.00940	<0.00030	<0.00030	0.0194
uranium, total	7440-61-1	E420	0.000010	mg/L	<0.000010	0.000146	0.000144	<0.000010	<0.000010	0.000189
vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00094
zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	0.0126	0.0129	0.0034	0.0034	0.0083
zirconium, total	7440-67-7	E420	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
<b>Dissolved Metals</b>										
aluminum, dissolved	7429-90-5	E421	0.0030	mg/L	<0.0030	0.0251	0.0274	<0.0030	<0.0030	0.0186
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	0.00015	0.00015	0.00019
barium, dissolved	7440-39-3	E421	0.00010	mg/L	<0.00010	0.0254	0.0273	0.00362	0.00362	0.0336
beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	0.000104	0.000106	0.0000135	0.0000135	0.0000182
calcium, dissolved	7440-70-2	E421	0.050	mg/L	<0.050	18.6	18.1	6.54	6.54	16.1
chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	0.00019	0.00018	<0.00010	<0.00010	<0.00010
copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	0.00983	0.00992	<0.00020	<0.00020	<0.00020
iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	0.012	0.015	<0.010	<0.010	0.010
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	0.000052	0.000053	<0.000050	<0.000050	0.000147
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
magnesium, dissolved	7439-95-4	E421	0.100	mg/L	<0.100	1.51	1.55	0.807	0.807	1.04
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	<0.00010	0.0542	0.0528	0.00016	0.00016	0.00385
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	<0.000050	0.000290	0.000295	0.000055	0.000055	0.000462
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
potassium, dissolved	7440-09-7	E421	0.100	mg/L	<0.100	1.06	1.08	0.323	0.323	0.994
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	0.000072	0.000122	0.000050	0.000050	0.000121



## Analytical Results

Sub-Matrix: Water					Client sample ID	FIELD BLANK	JM7	SCH2	SK2	JM10
(Matrix: Water)										
Client sampling date / time					23-Aug-2020 12:08	24-Aug-2020 10:07	24-Aug-2020 10:26	24-Aug-2020 11:15	24-Aug-2020 11:57	
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-001	VA20B3846-002	VA20B3846-003	VA20B3846-004	VA20B3846-005	
					Result	Result	Result	Result	Result	
<b>Dissolved Metals</b>										
silicon, dissolved	7440-21-3	E421	0.050	mg/L	<0.050	1.21	1.22	1.38	0.872	
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
sodium, dissolved	7440-23-5	E421	0.050	mg/L	<0.050	0.561	0.578	0.429	0.598	
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	<0.00020	0.123	0.122	0.0374	0.119	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	<0.50	6.04	6.09	0.80	4.19	
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	0.00053	
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	<0.000010	0.000113	0.000113	<0.000010	0.000175	
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	0.0084	0.0087	0.0018	0.0015	
zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	
dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	Field	Field	
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	Field	Field	
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>										
benzene	71-43-2	E611A	0.50	µg/L	----	<0.50	----	----	----	
ethylbenzene	100-41-4	E611A	0.50	µg/L	----	<0.50	----	----	----	
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	----	<0.50	----	----	----	
styrene	100-42-5	E611A	0.50	µg/L	----	<0.50	----	----	----	
toluene	108-88-3	E611A	0.50	µg/L	----	<0.50	----	----	----	
xylene, m+p-	179601-23-1	E611A	0.50	µg/L	----	<0.50	----	----	----	
xylene, o-	95-47-6	E611A	0.50	µg/L	----	<0.50	----	----	----	
xylenes, total	1330-20-7	E611A	0.75	µg/L	----	<0.75	----	----	----	
<b>Volatile Organic Compounds Surrogates</b>										
bromofluorobenzene, 4-	460-00-4	E611A	0.50	%	----	97.2	----	----	----	
difluorobenzene, 1,4-	540-36-3	E611A	0.50	%	----	117	----	----	----	
<b>Hydrocarbons</b>										
EPH (C10-C19)	----	E601A	250	µg/L	----	<250	----	----	----	
EPH (C19-C32)	----	E601A	250	µg/L	----	<250	----	----	----	
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	----	<100	----	----	----	
HEPHw	----	EC600A	250	µg/L	----	<250	----	----	----	



## Analytical Results

Sub-Matrix: Water					Client sample ID	FIELD BLANK	JM7	SCH2	SK2	JM10
(Matrix: Water)					Client sampling date / time	23-Aug-2020 12:08	24-Aug-2020 10:07	24-Aug-2020 10:26	24-Aug-2020 11:15	24-Aug-2020 11:57
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-001	VA20B3846-002	VA20B3846-003	VA20B3846-004	VA20B3846-005	
					Result	Result	Result	Result	Result	
<b>Hydrocarbons</b>										
LEPHw	----	EC600A	250	µg/L	----	<250	----	----	----	
VPHw	----	EC580A	100	µg/L	----	<100	----	----	----	
<b>Hydrocarbons Surrogates</b>										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%	----	104	----	----	----	
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	----	105	----	----	----	
<b>Polycyclic Aromatic Hydrocarbons</b>										
acenaphthene	83-32-9	E641A	0.010	µg/L	----	<0.010	----	----	----	
acenaphthylene	208-96-8	E641A	0.010	µg/L	----	<0.010	----	----	----	
acridine	260-94-6	E641A	0.010	µg/L	----	<0.010	----	----	----	
anthracene	120-12-7	E641A	0.010	µg/L	----	<0.010	----	----	----	
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	----	<0.010	----	----	----	
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	----	<0.0050	----	----	----	
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	----	<0.010	----	----	----	
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	----	<0.015	----	----	----	
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	----	<0.010	----	----	----	
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	----	<0.010	----	----	----	
chrysene	218-01-9	E641A	0.010	µg/L	----	<0.010	----	----	----	
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	----	<0.0050	----	----	----	
fluoranthene	206-44-0	E641A	0.010	µg/L	----	<0.010	----	----	----	
fluorene	86-73-7	E641A	0.010	µg/L	----	<0.010	----	----	----	
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	----	<0.010	----	----	----	
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	----	<0.010	----	----	----	
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	----	<0.010	----	----	----	
naphthalene	91-20-3	E641A	0.050	µg/L	----	<0.050	----	----	----	
phenanthrene	85-01-8	E641A	0.020	µg/L	----	<0.020	----	----	----	
pyrene	129-00-0	E641A	0.010	µg/L	----	<0.010	----	----	----	
quinoline	6027-02-7	E641A	0.050	µg/L	----	<0.050	----	----	----	
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>										
acridine-d9	34749-75-2	E641A	0.010	%	----	93.7	----	----	----	
chrysene-d12	1719-03-5	E641A	0.010	%	----	98.9	----	----	----	
naphthalene-d8	1146-65-2	E641A	0.010	%	----	111	----	----	----	



## Analytical Results

Sub-Matrix: **Water**

(Matrix: **Water**)

					Client sample ID	FIELD BLANK	JM7	SCH2	SK2	JM10
					Client sampling date / time	23-Aug-2020 12:08	24-Aug-2020 10:07	24-Aug-2020 10:26	24-Aug-2020 11:15	24-Aug-2020 11:57
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-001	VA20B3846-002	VA20B3846-003	VA20B3846-004	VA20B3846-005	
					Result	Result	Result	Result	Result	
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>										
phenanthrene-d10	1517-22-2	E641A	0.010	%	----	112	----	----	----	

Please refer to the General Comments section for an explanation of any qualifiers detected.



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					JM1	JM1-ALT	JM1-SEEPAGE	JM26	SHCR-4
Client sampling date / time					24-Aug-2020 12:17	24-Aug-2020 12:28	24-Aug-2020 12:49	24-Aug-2020 13:27	24-Aug-2020 13:54
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-006	VA20B3846-007	VA20B3846-008	VA20B3846-009	VA20B3846-010
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
acidity (as CaCO3)	----	E283	2.0	mg/L	<2.0	2.3	<2.0	<2.0	<2.0
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	36.4	55.4	73.6	27.9	32.4
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	36.4	55.4	73.6	27.9	32.4
colour, true	----	E329	5.0	CU	<5.0	<5.0	<5.0	<5.0	<5.0
conductivity	----	E100	2.0	µS/cm	88.1	259	220	64.7	64.9
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	40.5	129	110	29.5	31.1
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	43.3	133	115	33.5	33.0
pH	----	E108	0.10	pH units	7.56	7.47	7.68	7.44	7.51
solids, total dissolved [TDS]	----	E162	10	mg/L	46	161	130	36	37
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	<3.0	13.3	<3.0	38.9	<3.0
turbidity	----	E121	0.10	NTU	<0.10	6.83	<0.10	26.1	<0.10
<b>Anions and Nutrients</b>									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0.0211	<0.0050	<0.0050
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50
fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	0.041	<0.020	<0.020	<0.020
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	<0.050	<0.050	<0.050	0.067	<0.050
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0050	0.0207	<0.0050	<0.0050
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
nitrogen, total	7727-37-9	E366	0.030	mg/L	<0.030	<0.030	0.053	<0.030	<0.030
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0028	<0.0010	0.0020	0.0011	<0.0010
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0024	0.0222	0.0020	0.0418	<0.0020
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	9.18	75.2	40.9	5.42	1.60
<b>Cyanides</b>									
cyanide, free	----	E339	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cyanide, strong acid dissociable (total)	----	E333	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cyanide, weak acid dissociable	----	E336	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
<b>Organic / Inorganic Carbon</b>									
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	0.78	0.95	0.98 <sup>RRV</sup>	0.96 <sup>RRV</sup>	0.94 <sup>RRV</sup>





## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	JM1	JM1-ALT	JM1-SEEPAGE	JM26	SHCR-4
Client sampling date / time					24-Aug-2020 12:17	24-Aug-2020 12:28	24-Aug-2020 12:49	24-Aug-2020 13:27	24-Aug-2020 13:54	
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-006	VA20B3846-007	VA20B3846-008	VA20B3846-009	VA20B3846-010	
					Result	Result	Result	Result	Result	
<b>Organic / Inorganic Carbon</b>										
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	<0.50	<0.50	<0.50 <sup>RRV</sup>	<0.50 <sup>RRV</sup>	<0.50 <sup>RRV</sup>	
<b>Total Metals</b>										
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0226	0.379	<0.0030	0.919	0.0035	
antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	0.00013	0.00013	<0.00010	<0.00010	
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00012	0.00214	<0.00010	0.00025	0.00020	
barium, total	7440-39-3	E420	0.00010	mg/L	0.0226	0.0237	0.0418	0.0662	0.0109	
beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	0.000020	<0.000020	0.000020	<0.000020	
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000566	0.00466	0.0000319	0.000294	<0.0000050	
calcium, total	7440-70-2	E420	0.050	mg/L	15.3	43.9	40.0	11.5	12.5	
chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	0.00022	<0.00010	<0.00010	<0.00010	<0.00010	
cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	0.00313	<0.00010	0.00048	<0.00010	
copper, total	7440-50-8	E420	0.00050	mg/L	0.00200	0.301	<0.00050	0.00332	<0.00050	
iron, total	7439-89-6	E420	0.010	mg/L	<0.010	4.89	<0.010	0.879	<0.010	
lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	0.00246	<0.000050	0.00462	<0.000050	
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	0.0015	<0.0010	0.0010	<0.0010	
magnesium, total	7439-95-4	E420	0.100	mg/L	1.23	5.67	3.60	1.14	0.410	
manganese, total	7439-96-5	E420	0.00010	mg/L	0.00352	0.470	0.00022	0.0929	<0.00010	
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000357	0.000243	0.000358	0.000210	0.000207	
nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	0.00097	<0.00050	<0.00050	<0.00050	
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	0.058	<0.050	0.070	<0.050	
potassium, total	7440-09-7	E420	0.100	mg/L	1.04	1.49	2.53	1.19	0.580	
selenium, total	7782-49-2	E420	0.000050	mg/L	0.000072	0.000374	0.000268	0.000090	0.000149	
silicon, total	7440-21-3	E420	0.10	mg/L	1.29	1.80	1.41	2.14	1.02	
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	0.000024	<0.000010	0.000013	<0.000010	
sodium, total	7440-23-5	E420	0.050	mg/L	0.489	0.482	0.708	0.435	0.302	
strontium, total	7440-24-6	E420	0.00020	mg/L	0.133	0.234	0.184	0.0771	0.0327	
sulfur, total	7704-34-9	E420	0.50	mg/L	3.12	27.0	14.9	1.65	<0.50	
thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	0.000011	<0.000010	0.000028	<0.000010	



## Analytical Results

Sub-Matrix: Water					Client sample ID	JM1	JM1-ALT	JM1-SEEPAGE	JM26	SHCR-4
(Matrix: Water)					Client sampling date / time	24-Aug-2020 12:17	24-Aug-2020 12:28	24-Aug-2020 12:49	24-Aug-2020 13:27	24-Aug-2020 13:54
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-006	VA20B3846-007	VA20B3846-008	VA20B3846-009	VA20B3846-010	
					Result	Result	Result	Result	Result	
<b>Total Metals</b>										
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
titanium, total	7440-32-6	E420	0.00030	mg/L	0.00035	0.00208	<0.00030	0.0419	<0.00030	
uranium, total	7440-61-1	E420	0.000010	mg/L	0.000030	0.000246	0.000081	0.000155	<0.000010	
vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	0.00170	<0.00050	
zinc, total	7440-66-6	E420	0.0030	mg/L	0.0034	0.790	<0.0030	0.0456	<0.0030	
zirconium, total	7440-67-7	E420	0.00030	mg/L	<0.00030	<0.00030	<0.00030	0.00050	<0.00030	
<b>Dissolved Metals</b>										
aluminum, dissolved	7429-90-5	E421	0.0030	mg/L	0.0108	0.0175	<0.0030	0.0397	<0.0030	
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	0.00011	<0.00010	<0.00010	
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00019	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0214	0.0212	0.0376	0.0322	0.0105	
beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000549	0.00337	0.0000233	0.000132	<0.0000050	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	14.3	42.4	38.8	10.6	11.8	
chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	0.00274	<0.00010	<0.00010	<0.00010	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00136	0.0232	<0.00020	0.00021	<0.00020	
iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	0.041	<0.010	0.020	<0.010	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	0.000158	<0.000050	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	0.0013	<0.0010	<0.0010	<0.0010	
magnesium, dissolved	7439-95-4	E421	0.100	mg/L	1.15	5.65	3.30	0.737	0.381	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00300	0.433	<0.00010	0.0224	<0.00010	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000338	0.000157	0.000339	0.000208	0.000166	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
potassium, dissolved	7440-09-7	E421	0.100	mg/L	0.936	1.38	2.20	0.620	0.539	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000070	0.000283	0.000214	0.000060	0.000136	
silicon, dissolved	7440-21-3	E421	0.050	mg/L	1.27	1.64	1.34	0.626	1.01	



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					JM1	JM1-ALT	JM1-SEEPAGE	JM26	SHCR-4
Client sampling date / time					24-Aug-2020 12:17	24-Aug-2020 12:28	24-Aug-2020 12:49	24-Aug-2020 13:27	24-Aug-2020 13:54
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-006	VA20B3846-007	VA20B3846-008	VA20B3846-009	VA20B3846-010
					Result	Result	Result	Result	Result
<b>Dissolved Metals</b>									
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
sodium, dissolved	7440-23-5	E421	0.050	mg/L	0.467	0.472	0.651	0.362	0.280
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.122	0.219	0.169	0.0758	0.0300
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	3.16	25.5	13.2	1.80	0.61
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	<0.00030	0.00096	<0.00030
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000024	0.000088	0.000082	0.000118	<0.000010
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0032	0.548	<0.0010	0.0040	<0.0010
zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	Field	Field
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	Field	Field
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>									
benzene	71-43-2	E611A	0.50	µg/L	<0.50	----	----	----	----
ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	----	----	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	----	----	----	----
styrene	100-42-5	E611A	0.50	µg/L	<0.50	----	----	----	----
toluene	108-88-3	E611A	0.50	µg/L	<0.50	----	----	----	----
xylene, m+p-	179601-23-1	E611A	0.50	µg/L	<0.50	----	----	----	----
xylene, o-	95-47-6	E611A	0.50	µg/L	<0.50	----	----	----	----
xylenes, total	1330-20-7	E611A	0.75	µg/L	<0.75	----	----	----	----
<b>Volatile Organic Compounds Surrogates</b>									
bromofluorobenzene, 4-	460-00-4	E611A	0.50	%	93.1	----	----	----	----
difluorobenzene, 1,4-	540-36-3	E611A	0.50	%	97.6	----	----	----	----
<b>Hydrocarbons</b>									
EPH (C10-C19)	----	E601A	250	µg/L	<250	----	----	----	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	----	----	----	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----	----	----	----
HEPHw	----	EC600A	250	µg/L	<250	----	----	----	----
LEPHw	----	EC600A	250	µg/L	<250	----	----	----	----



## Analytical Results

Sub-Matrix: Water					Client sample ID	JM1	JM1-ALT	JM1-SEEPAGE	JM26	SHCR-4
(Matrix: Water)					Client sampling date / time	24-Aug-2020 12:17	24-Aug-2020 12:28	24-Aug-2020 12:49	24-Aug-2020 13:27	24-Aug-2020 13:54
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-006	VA20B3846-007	VA20B3846-008	VA20B3846-009	VA20B3846-010	
					Result	Result	Result	Result	Result	
<b>Hydrocarbons</b>										
VPHw	----	EC580A	100	µg/L	<100	----	----	----	----	----
<b>Hydrocarbons Surrogates</b>										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%	96.3	----	----	----	----	----
dichlorotoluene, 3,4-	97-75-0	E581 VH+F1	1.0	%	91.9	----	----	----	----	----
<b>Polycyclic Aromatic Hydrocarbons</b>										
acenaphthene	83-32-9	E641A	0.010	µg/L	<0.010	----	----	----	----	----
acenaphthylene	208-96-8	E641A	0.010	µg/L	<0.010	----	----	----	----	----
acridine	260-94-6	E641A	0.010	µg/L	<0.010	----	----	----	----	----
anthracene	120-12-7	E641A	0.010	µg/L	<0.010	----	----	----	----	----
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	<0.010	----	----	----	----	----
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	<0.0050	----	----	----	----	----
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L	<0.010	----	----	----	----	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	----	----	----	----	----
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	<0.010	----	----	----	----	----
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	<0.010	----	----	----	----	----
chrysene	218-01-9	E641A	0.010	µg/L	<0.010	----	----	----	----	----
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	<0.0050	----	----	----	----	----
fluoranthene	206-44-0	E641A	0.010	µg/L	<0.010	----	----	----	----	----
fluorene	86-73-7	E641A	0.010	µg/L	<0.010	----	----	----	----	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	<0.010	----	----	----	----	----
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	<0.010	----	----	----	----	----
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	<0.010	----	----	----	----	----
naphthalene	91-20-3	E641A	0.050	µg/L	<0.050	----	----	----	----	----
phenanthrene	85-01-8	E641A	0.020	µg/L	<0.020	----	----	----	----	----
pyrene	129-00-0	E641A	0.010	µg/L	<0.010	----	----	----	----	----
quinoline	6027-02-7	E641A	0.050	µg/L	<0.050	----	----	----	----	----
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>										
acridine-d9	34749-75-2	E641A	0.010	%	88.7	----	----	----	----	----
chrysene-d12	1719-03-5	E641A	0.010	%	97.1	----	----	----	----	----
naphthalene-d8	1146-65-2	E641A	0.010	%	95.9	----	----	----	----	----
phenanthrene-d10	1517-22-2	E641A	0.010	%	102	----	----	----	----	----



Please refer to the General Comments section for an explanation of any qualifiers detected.

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## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					SHCR-2	SHCR-3	SHC5	SHCR-1	SK4
Client sampling date / time					24-Aug-2020 14:08	24-Aug-2020 14:21	24-Aug-2020 14:38	24-Aug-2020 14:49	24-Aug-2020 16:23
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-011	VA20B3846-012	VA20B3846-013	VA20B3846-014	VA20B3846-015
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
acidity (as CaCO3)	----	E283	2.0	mg/L	<2.0	<2.0	<2.0	<2.0	<2.0
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	51.6	32.1	51.9	34.6	34.5
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	51.6	32.1	51.9	34.6	34.5
colour, true	----	E329	5.0	CU	<5.0	<5.0	<5.0	<5.0	<5.0
conductivity	----	E100	2.0	µS/cm	104	88.5	118	86.5	97.7
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	49.1	38.9	57.0	39.4	42.9
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	51.9	43.4	60.0	41.9	46.4
pH	----	E108	0.10	pH units	7.79	7.50	7.70	7.54	7.47
solids, total dissolved [TDS]	----	E162	10	mg/L	55	54	60	46	61
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	<3.0	33.3	<3.0	<3.0	<3.0
turbidity	----	E121	0.10	NTU	0.16	17.3	0.15	0.13	<0.10
<b>Anions and Nutrients</b>									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0080	<0.0050	0.0065	0.0063	<0.0050
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50
fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	<0.020	<0.020	<0.020	0.023
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.053	<0.050	<0.050	<0.050	0.053
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	0.0180	<0.0050	<0.0050	0.0389
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
nitrogen, total	7727-37-9	E366	0.030	mg/L	<0.030	<0.030	<0.030	<0.030	0.076
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0012	0.0014	<0.0010	0.0034	<0.0010
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	<0.0020	0.0281	<0.0020	0.0034	<0.0020
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	2.91	13.5	9.32	9.56	14.1
<b>Cyanides</b>									
cyanide, free	----	E339	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cyanide, strong acid dissociable (total)	----	E333	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
cyanide, weak acid dissociable	----	E336	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
<b>Organic / Inorganic Carbon</b>									
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	<0.50	0.94	0.58	<0.50	0.81



## Analytical Results

Sub-Matrix: Water					Client sample ID	SHCR-2	SHCR-3	SHC5	SHCR-1	SK4
(Matrix: Water)										
Client sampling date / time					24-Aug-2020 14:08	24-Aug-2020 14:21	24-Aug-2020 14:38	24-Aug-2020 14:49	24-Aug-2020 16:23	
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-011	VA20B3846-012	VA20B3846-013	VA20B3846-014	VA20B3846-015	
					Result	Result	Result	Result	Result	
<b>Organic / Inorganic Carbon</b>										
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.65
<b>Total Metals</b>										
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0173	0.631	0.0190	0.0038	0.0131	
antimony, total	7440-36-0	E420	0.00010	mg/L	0.00020	<0.00010	<0.00010	<0.00010	<0.00010	
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00021	0.00044	0.00031	0.00019	0.00049	
barium, total	7440-39-3	E420	0.00010	mg/L	0.0281	0.0505	0.0334	0.0178	0.0126	
beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000056	0.000111	0.0000101	0.0000127	0.0000396	
calcium, total	7440-70-2	E420	0.050	mg/L	20.0	15.2	21.4	14.1	15.4	
chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	0.00040	<0.00010	<0.00010	<0.00010	
copper, total	7440-50-8	E420	0.00050	mg/L	<0.00050	0.00131	<0.00050	<0.00050	0.00053	
iron, total	7439-89-6	E420	0.010	mg/L	0.034	0.742	0.035	<0.010	0.035	
lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	0.00678	<0.000050	<0.000050	<0.000050	
lithium, total	7439-93-2	E420	0.0010	mg/L	0.0016	<0.0010	<0.0010	<0.0010	<0.0010	
magnesium, total	7439-95-4	E420	0.100	mg/L	0.485	1.32	1.61	1.64	1.94	
manganese, total	7439-96-5	E420	0.00010	mg/L	0.00076	0.0752	0.00126	0.00013	0.00676	
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000287	0.000480	0.000683	0.000556	0.000475	
nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
potassium, total	7440-09-7	E420	0.100	mg/L	2.03	1.30	1.43	0.833	1.50	
selenium, total	7782-49-2	E420	0.000050	mg/L	0.000080	0.000081	0.000204	0.000069	0.000140	
silicon, total	7440-21-3	E420	0.10	mg/L	0.97	1.84	0.79	1.41	1.70	
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	0.000014	<0.000010	<0.000010	<0.000010	
sodium, total	7440-23-5	E420	0.050	mg/L	0.394	0.686	0.428	0.611	0.699	
strontium, total	7440-24-6	E420	0.00020	mg/L	0.0741	0.115	0.129	0.179	0.109	
sulfur, total	7704-34-9	E420	0.50	mg/L	0.80	4.93	3.22	3.17	5.10	
thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	0.000023	<0.000010	<0.000010	<0.000010	



## Analytical Results

Sub-Matrix: Water					Client sample ID	SHCR-2	SHCR-3	SHC5	SHCR-1	SK4
(Matrix: Water)										
Client sampling date / time					24-Aug-2020 14:08	24-Aug-2020 14:21	24-Aug-2020 14:38	24-Aug-2020 14:49	24-Aug-2020 16:23	
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-011	VA20B3846-012	VA20B3846-013	VA20B3846-014	VA20B3846-015	
					Result	Result	Result	Result	Result	
<b>Total Metals</b>										
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
titanium, total	7440-32-6	E420	0.00030	mg/L	0.00050	0.0360	0.00089	<0.00030	0.00067	
uranium, total	7440-61-1	E420	0.000010	mg/L	0.000120	0.000226	0.000081	0.000060	0.000028	
vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	0.00155	<0.00050	<0.00050	<0.00050	
zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	0.0149	<0.0030	<0.0030	0.0038	
zirconium, total	7440-67-7	E420	0.00030	mg/L	<0.00030	0.00046	<0.00030	<0.00030	<0.00030	
<b>Dissolved Metals</b>										
aluminum, dissolved	7429-90-5	E421	0.0030	mg/L	0.0085	0.0204	0.0088	<0.0030	<0.0030	
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00018	<0.00010	<0.00010	<0.00010	<0.00010	
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00016	0.00019	0.00024	0.00013	0.00037	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0258	0.0273	0.0326	0.0157	0.0107	
beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	0.0000181	0.0000055	0.0000071	0.0000268	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	18.9	14.0	20.3	13.4	14.3	
chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	0.00115	<0.00020	<0.00020	0.00041	
iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	0.012	<0.010	<0.010	<0.010	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	0.000214	0.000226 <sup>DTMF</sup>	<0.000050	<0.000050	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0014	<0.0010	<0.0010	<0.0010	<0.0010	
magnesium, dissolved	7439-95-4	E421	0.100	mg/L	0.448	0.956	1.54	1.47	1.75	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00014	0.00500	0.00067	0.00012	0.00260	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000259	0.000440	0.000607	0.000531	0.000421	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
potassium, dissolved	7440-09-7	E421	0.100	mg/L	1.82	0.838	1.34	0.733	1.30	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	0.000052	0.000165	0.000058	0.000100	
silicon, dissolved	7440-21-3	E421	0.050	mg/L	0.973	0.868	0.798	1.44	1.66	





## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					SHCR-2	SHCR-3	SHC5	SHCR-1	SK4
Client sampling date / time					24-Aug-2020 14:08	24-Aug-2020 14:21	24-Aug-2020 14:38	24-Aug-2020 14:49	24-Aug-2020 16:23
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-011	VA20B3846-012	VA20B3846-013	VA20B3846-014	VA20B3846-015
					Result	Result	Result	Result	Result
<b>Dissolved Metals</b>									
silver, dissolved	7440-22-4	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
sodium, dissolved	7440-23-5	E421	0.050	mg/L	0.371	0.574	0.399	0.561	0.719
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0704	0.110	0.127	0.178	0.103
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	0.98	4.14	3.09	3.20	4.44
thallium, dissolved	7440-28-0	E421	0.00010	mg/L	<0.00010	0.00014	<0.00010	<0.00010	<0.00010
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	0.00062	<0.00030	<0.00030	<0.00030
uranium, dissolved	7440-61-1	E421	0.00010	mg/L	0.000117	0.000191	0.000072	0.000062	0.000026
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	0.0012	<0.0010	<0.0010	0.0028
zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	Field	Field
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	Field	Field

Please refer to the General Comments section for an explanation of any qualifiers detected.



## Analytical Results

Sub-Matrix: Water					Client sample ID	SK3	----	----	----	----
(Matrix: Water)					Client sampling date / time	24-Aug-2020 16:52	---	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-016	-----	-----	-----	-----	
					Result	---	---	---	---	
<b>Physical Tests</b>										
acidity (as CaCO3)	---	E283	2.0	mg/L	<2.0	---	---	---	---	
alkalinity, bicarbonate (as CaCO3)	---	E290	1.0	mg/L	23.5	---	---	---	---	
alkalinity, carbonate (as CaCO3)	---	E290	1.0	mg/L	<1.0	---	---	---	---	
alkalinity, hydroxide (as CaCO3)	---	E290	1.0	mg/L	<1.0	---	---	---	---	
alkalinity, total (as CaCO3)	---	E290	1.0	mg/L	23.5	---	---	---	---	
colour, true	---	E329	5.0	CU	<5.0	---	---	---	---	
conductivity	---	E100	2.0	µS/cm	54.7	---	---	---	---	
hardness (as CaCO3), dissolved	---	EC100	0.60	mg/L	24.4	---	---	---	---	
hardness (as CaCO3), from total Ca/Mg	---	EC100A	0.60	mg/L	26.2	---	---	---	---	
pH	---	E108	0.10	pH units	7.37	---	---	---	---	
solids, total dissolved [TDS]	---	E162	10	mg/L	34	---	---	---	---	
solids, total suspended [TSS]	---	E160-H	3.0	mg/L	<3.0	---	---	---	---	
turbidity	---	E121	0.10	NTU	<0.10	---	---	---	---	
<b>Anions and Nutrients</b>										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	---	---	---	---	
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	---	---	---	---	
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	---	---	---	---	
fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	---	---	---	---	
Kjeldahl nitrogen, total [TKN]	---	E318	0.050	mg/L	<0.050	---	---	---	---	
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0329	---	---	---	---	
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	---	---	---	---	
nitrogen, total	7727-37-9	E366	0.030	mg/L	0.059	---	---	---	---	
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	---	---	---	---	
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	<0.0020	---	---	---	---	
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	4.56	---	---	---	---	
<b>Cyanides</b>										
cyanide, free	---	E339	0.0050	mg/L	<0.0050	---	---	---	---	
cyanide, strong acid dissociable (total)	---	E333	0.0050	mg/L	<0.0050	---	---	---	---	
cyanide, weak acid dissociable	---	E336	0.0050	mg/L	<0.0050	---	---	---	---	
<b>Organic / Inorganic Carbon</b>										
carbon, dissolved organic [DOC]	---	E358-L	0.50	mg/L	1.23	---	---	---	---	



## Analytical Results

Sub-Matrix: Water					Client sample ID	SK3	----	----	----	----
(Matrix: Water)					Client sampling date / time	24-Aug-2020 16:52	---	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-016	-----	-----	-----	-----	
					Result	---	---	---	---	
<b>Organic / Inorganic Carbon</b>										
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	0.53	----	----	----	----	
<b>Total Metals</b>										
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0161	----	----	----	----	
antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	----	----	----	----	
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00034	----	----	----	----	
barium, total	7440-39-3	E420	0.00010	mg/L	0.00722	----	----	----	----	
beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	----	----	----	----	
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	----	----	----	----	
boron, total	7440-42-8	E420	0.010	mg/L	<0.010	----	----	----	----	
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000403	----	----	----	----	
calcium, total	7440-70-2	E420	0.050	mg/L	8.56	----	----	----	----	
chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	<0.00010	----	----	----	----	
cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	----	----	----	----	
copper, total	7440-50-8	E420	0.00050	mg/L	0.00056	----	----	----	----	
iron, total	7439-89-6	E420	0.010	mg/L	0.027	----	----	----	----	
lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	----	----	----	----	
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	----	----	----	----	
magnesium, total	7439-95-4	E420	0.100	mg/L	1.17	----	----	----	----	
manganese, total	7439-96-5	E420	0.00010	mg/L	0.00123	----	----	----	----	
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	----	----	----	----	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000100	----	----	----	----	
nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	----	----	----	----	
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	----	----	----	----	
potassium, total	7440-09-7	E420	0.100	mg/L	0.605	----	----	----	----	
selenium, total	7782-49-2	E420	0.000050	mg/L	0.000054	----	----	----	----	
silicon, total	7440-21-3	E420	0.10	mg/L	1.52	----	----	----	----	
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	----	----	----	----	
sodium, total	7440-23-5	E420	0.050	mg/L	0.492	----	----	----	----	
strontium, total	7440-24-6	E420	0.00020	mg/L	0.0483	----	----	----	----	
sulfur, total	7704-34-9	E420	0.50	mg/L	1.52	----	----	----	----	
thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	----	----	----	----	



## Analytical Results

Sub-Matrix: Water					Client sample ID	SK3	----	----	----	----
(Matrix: Water)					Client sampling date / time	24-Aug-2020 16:52	---	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-016	-----	-----	-----	-----	
					Result	---	---	---	---	
<b>Total Metals</b>										
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	----	----	----	----	
titanium, total	7440-32-6	E420	0.00030	mg/L	0.00085	----	----	----	----	
uranium, total	7440-61-1	E420	0.000010	mg/L	<0.000010	----	----	----	----	
vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	----	----	----	----	
zinc, total	7440-66-6	E420	0.0030	mg/L	0.0037	----	----	----	----	
zirconium, total	7440-67-7	E420	0.00030	mg/L	<0.00030	----	----	----	----	
<b>Dissolved Metals</b>										
aluminum, dissolved	7429-90-5	E421	0.0030	mg/L	0.0032	----	----	----	----	
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	----	----	----	----	
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00033	----	----	----	----	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.00662	----	----	----	----	
beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	----	----	----	----	
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	----	----	----	----	
boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	----	----	----	----	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000317	----	----	----	----	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	8.06	----	----	----	----	
chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	<0.00010	----	----	----	----	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	----	----	----	----	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00039	----	----	----	----	
iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	----	----	----	----	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	----	----	----	----	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	----	----	----	----	
magnesium, dissolved	7439-95-4	E421	0.100	mg/L	1.05	----	----	----	----	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00016	----	----	----	----	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	----	----	----	----	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000078	----	----	----	----	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	----	----	----	----	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	----	----	----	----	
potassium, dissolved	7440-09-7	E421	0.100	mg/L	0.552	----	----	----	----	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000073	----	----	----	----	
silicon, dissolved	7440-21-3	E421	0.050	mg/L	1.49	----	----	----	----	



**Analytical Results**

Sub-Matrix: <b>Water</b>					Client sample ID	SK3	---	---	---	---
(Matrix: <b>Water</b> )					Client sampling date / time	24-Aug-2020 16:52	---	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20B3846-016	-----	-----	-----	-----	-----
					Result	---	---	---	---	---
<b>Dissolved Metals</b>										
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	---	---	---	---	---
sodium, dissolved	7440-23-5	E421	0.050	mg/L	0.496	---	---	---	---	---
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0497	---	---	---	---	---
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	1.52	---	---	---	---	---
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	---	---	---	---	---
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	---	---	---	---	---
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	---	---	---	---	---
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	<0.000010	---	---	---	---	---
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	---	---	---	---	---
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0037	---	---	---	---	---
zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	---	---	---	---	---
dissolved mercury filtration location	---	EP509	-	-	Field	---	---	---	---	---
dissolved metals filtration location	---	EP421	-	-	Field	---	---	---	---	---

Please refer to the General Comments section for an explanation of any qualifiers detected.

## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>VA20B3846</b>	Page	: 1 of 66
Client	: <b>ERM Consultants Canada Ltd.</b>	Laboratory	: Vancouver - Environmental
Contact	: Jill Zyla	Account Manager	: Amber Springer
Address	: 3790 Alfred Ave Smithers BC Canada V0J 2N0	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: 604 689 9460	Telephone	: +1 604 253 4188
Project	: 0539378-0012	Date Samples Received	: 28-Aug-2020 10:10
PO	: ----	Issue Date	: 09-Sep-2020 12:43
C-O-C number	: 17-841425, 17-841424		
Sampler	: ----		
Site	: ----		
Quote number	: Q74326		
No. of samples received	: 16		
No. of samples analysed	: 16		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

### Key

- Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.  
**CAS Number:** Chemical Abstracts Services number is a unique identifier assigned to discrete substances.  
**DQO:** Data Quality Objective.  
**LOR:** Limit of Reporting (detection limit).  
**RPD:** Relative Percent Difference.

## Summary of Outliers

### **Outliers : Quality Control Samples**

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

### **Outliers: Reference Material (RM) Samples**

- No Reference Material (RM) Sample outliers occur.

### **Outliers : Analysis Holding Time Compliance (Breaches)**

- Analysis Holding Time Outliers exist - please see following pages for full details.

### **Outliers : Frequency of Quality Control Samples**

- No Quality Control Sample Frequency Outliers occur.

RIGHT SOLUTIONS | RIGHT PARTNER



## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> SK3	E298	24-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> SK4	E298	24-Aug-2020	----	----	----		01-Sep-2020	28 days	7 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> JM1	E298	24-Aug-2020	----	----	----		01-Sep-2020	28 days	8 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> JM10	E298	24-Aug-2020	----	----	----		01-Sep-2020	28 days	8 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> JM1-ALT	E298	24-Aug-2020	----	----	----		01-Sep-2020	28 days	8 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> JM1-SEEPAGE	E298	24-Aug-2020	----	----	----		01-Sep-2020	28 days	8 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> JM26	E298	24-Aug-2020	----	----	----		01-Sep-2020	28 days	8 days	✓





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> JM7	E298	24-Aug-2020	----	----	----		01-Sep-2020	28 days	8 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> SCH2	E298	24-Aug-2020	----	----	----		01-Sep-2020	28 days	8 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> SHC5	E298	24-Aug-2020	----	----	----		01-Sep-2020	28 days	8 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> SHCR-1	E298	24-Aug-2020	----	----	----		01-Sep-2020	28 days	8 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> SHCR-2	E298	24-Aug-2020	----	----	----		01-Sep-2020	28 days	8 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> SHCR-3	E298	24-Aug-2020	----	----	----		01-Sep-2020	28 days	8 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> SHCR-4	E298	24-Aug-2020	----	----	----		01-Sep-2020	28 days	8 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> SK2	E298	24-Aug-2020	----	----	----		01-Sep-2020	28 days	8 days	✓	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> FIELD BLANK	E298	23-Aug-2020	----	----	----		01-Sep-2020	28 days	9 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE JM1	E235.Br-L	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE JM10	E235.Br-L	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE JM1-ALT	E235.Br-L	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE JM1-SEEPAGE	E235.Br-L	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE JM26	E235.Br-L	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE JM7	E235.Br-L	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE SCH2	E235.Br-L	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE SHC5	E235.Br-L	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>											
HDPE SHCR-1	E235.Br-L	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE SHCR-2	E235.Br-L	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE SHCR-3	E235.Br-L	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE SHCR-4	E235.Br-L	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE SK2	E235.Br-L	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE SK3	E235.Br-L	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE SK4	E235.Br-L	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Bromide in Water by IC (Low Level)</b>										
HDPE FIELD BLANK	E235.Br-L	23-Aug-2020	----	----	----		28-Aug-2020	28 days	5 days	✔
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE JM1	E235.Cl	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE JM10	E235.Cl	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE JM1-ALT	E235.Cl	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE JM1-SEEPAGE	E235.Cl	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE JM26	E235.Cl	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE JM7	E235.Cl	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE SCH2	E235.Cl	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE SHC5	E235.Cl	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE SHCR-1	E235.Cl	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE SHCR-2	E235.Cl	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE SHCR-3	E235.Cl	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE SHCR-4	E235.CI	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE SK2	E235.CI	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE SK3	E235.CI	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE SK4	E235.CI	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE FIELD BLANK	E235.CI	23-Aug-2020	----	----	----		28-Aug-2020	28 days	5 days	✓
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>										
HDPE JM1	E378-U	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>										
HDPE JM10	E378-U	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>										
HDPE JM1-ALT	E378-U	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>										
HDPE JM1-SEEPAGE	E378-U	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE JM26	E378-U	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE JM7	E378-U	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE SCH2	E378-U	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE SHC5	E378-U	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE SHCR-1	E378-U	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE SHCR-2	E378-U	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE SHCR-3	E378-U	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE SHCR-4	E378-U	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	*	EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>											
HDPE SK2	E378-U	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	*	EHTR



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>										
HDPE SK3	E378-U	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>										
HDPE SK4	E378-U	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)</b>										
HDPE FIELD BLANK	E378-U	23-Aug-2020	----	----	----		28-Aug-2020	3 days	5 days	* EHTR
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE JM1	E235.F	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE JM10	E235.F	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE JM1-ALT	E235.F	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE JM1-SEEPAGE	E235.F	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE JM26	E235.F	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE JM7	E235.F	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE SCH2	E235.F	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE SHC5	E235.F	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE SHCR-1	E235.F	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE SHCR-2	E235.F	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE SHCR-3	E235.F	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE SHCR-4	E235.F	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE SK2	E235.F	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE SK3	E235.F	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE SK4	E235.F	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE FIELD BLANK	E235.F	23-Aug-2020	----	----	----		28-Aug-2020	28 days	5 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE JM1	E235.NO3-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE JM10	E235.NO3-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE JM1-ALT	E235.NO3-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE JM1-SEEPAGE	E235.NO3-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE JM26	E235.NO3-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE JM7	E235.NO3-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE SCH2	E235.NO3-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE SHC5	E235.NO3-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation			Analysis				
			Preparation Date	Holding Times Rec Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE SHCR-1	E235.NO3-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE SHCR-2	E235.NO3-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE SHCR-3	E235.NO3-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE SHCR-4	E235.NO3-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE SK2	E235.NO3-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE SK3	E235.NO3-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE SK4	E235.NO3-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE FIELD BLANK	E235.NO3-L	23-Aug-2020	----	----	----		28-Aug-2020	3 days	5 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE JM1	E235.NO2-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE JM10	E235.NO2-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE JM1-ALT	E235.NO2-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE JM1-SEEPAGE	E235.NO2-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE JM26	E235.NO2-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE JM7	E235.NO2-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE SCH2	E235.NO2-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE SHC5	E235.NO2-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE SHCR-1	E235.NO2-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE SHCR-2	E235.NO2-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE SHCR-3	E235.NO2-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	*	EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE SHCR-4	E235.NO2-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	*	EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE SK2	E235.NO2-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	*	EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE SK3	E235.NO2-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	*	EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE SK4	E235.NO2-L	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	*	EHTR
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE FIELD BLANK	E235.NO2-L	23-Aug-2020	----	----	----		28-Aug-2020	3 days	5 days	*	EHTR
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE JM1	E235.SO4	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE JM10	E235.SO4	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE JM1-ALT	E235.SO4	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
<b>HDPE</b> JM1-SEEPAGE	E235.S04	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
<b>HDPE</b> JM26	E235.S04	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
<b>HDPE</b> JM7	E235.S04	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
<b>HDPE</b> SCH2	E235.S04	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
<b>HDPE</b> SHC5	E235.S04	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
<b>HDPE</b> SHCR-1	E235.S04	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
<b>HDPE</b> SHCR-2	E235.S04	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
<b>HDPE</b> SHCR-3	E235.S04	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
<b>HDPE</b> SHCR-4	E235.S04	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✔



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE SK2	E235.S04	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE SK3	E235.S04	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE SK4	E235.S04	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
HDPE FIELD BLANK	E235.S04	23-Aug-2020	----	----	----		28-Aug-2020	28 days	5 days	✓
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>										
Amber glass total (sulfuric acid) JM1	E318	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	31-Aug-2020	23 days	2 days	✓
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>										
Amber glass total (sulfuric acid) JM10	E318	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	31-Aug-2020	23 days	2 days	✓
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>										
Amber glass total (sulfuric acid) JM1-ALT	E318	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	31-Aug-2020	23 days	2 days	✓
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>										
Amber glass total (sulfuric acid) JM1-SEEPAGE	E318	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	31-Aug-2020	23 days	2 days	✓
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>										
Amber glass total (sulfuric acid) JM26	E318	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	31-Aug-2020	23 days	2 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM7	E318	24-Aug-2020	29-Aug-2020	28 days	4 days	✔	31-Aug-2020	23 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SCH2	E318	24-Aug-2020	29-Aug-2020	28 days	4 days	✔	31-Aug-2020	23 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SHC5	E318	24-Aug-2020	29-Aug-2020	28 days	4 days	✔	31-Aug-2020	23 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SHCR-1	E318	24-Aug-2020	29-Aug-2020	28 days	4 days	✔	31-Aug-2020	23 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SHCR-2	E318	24-Aug-2020	29-Aug-2020	28 days	4 days	✔	31-Aug-2020	23 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SHCR-3	E318	24-Aug-2020	29-Aug-2020	28 days	4 days	✔	31-Aug-2020	23 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SHCR-4	E318	24-Aug-2020	29-Aug-2020	28 days	4 days	✔	31-Aug-2020	23 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SK2	E318	24-Aug-2020	29-Aug-2020	28 days	4 days	✔	31-Aug-2020	23 days	2 days	✔	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SK3	E318	24-Aug-2020	29-Aug-2020	28 days	4 days	✔	31-Aug-2020	23 days	2 days	✔	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SK4	E318	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	31-Aug-2020	23 days	2 days	✓	
<b>Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> FIELD BLANK	E318	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	31-Aug-2020	22 days	2 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> JM1	E366	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	01-Sep-2020	23 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> JM10	E366	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	01-Sep-2020	23 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> JM1-ALT	E366	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	01-Sep-2020	23 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> JM1-SEEPAGE	E366	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	01-Sep-2020	23 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> JM26	E366	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	01-Sep-2020	23 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> JM7	E366	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	01-Sep-2020	23 days	3 days	✓	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> SCH2	E366	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	01-Sep-2020	23 days	3 days	✓	





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> SHC5	E366	24-Aug-2020	29-Aug-2020	28 days	4 days	✔	01-Sep-2020	23 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> SHCR-1	E366	24-Aug-2020	29-Aug-2020	28 days	4 days	✔	01-Sep-2020	23 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> SHCR-2	E366	24-Aug-2020	29-Aug-2020	28 days	4 days	✔	01-Sep-2020	23 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> SHCR-3	E366	24-Aug-2020	29-Aug-2020	28 days	4 days	✔	01-Sep-2020	23 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> SHCR-4	E366	24-Aug-2020	29-Aug-2020	28 days	4 days	✔	01-Sep-2020	23 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> SK2	E366	24-Aug-2020	29-Aug-2020	28 days	4 days	✔	01-Sep-2020	23 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> SK3	E366	24-Aug-2020	29-Aug-2020	28 days	4 days	✔	01-Sep-2020	23 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> SK4	E366	24-Aug-2020	29-Aug-2020	28 days	4 days	✔	01-Sep-2020	23 days	3 days	✔	
<b>Anions and Nutrients : Total Nitrogen by Colourimetry</b>											
<b>Amber glass total (sulfuric acid)</b> FIELD BLANK	E366	23-Aug-2020	29-Aug-2020	28 days	5 days	✔	01-Sep-2020	22 days	3 days	✔	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> JM1	E372-U	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	29-Aug-2020	23 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> JM10	E372-U	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	29-Aug-2020	23 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> JM1-ALT	E372-U	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	29-Aug-2020	23 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> JM1-SEEPAGE	E372-U	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	29-Aug-2020	23 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> JM26	E372-U	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	29-Aug-2020	23 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> JM7	E372-U	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	29-Aug-2020	23 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> SCH2	E372-U	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	29-Aug-2020	23 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> SHC5	E372-U	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	29-Aug-2020	23 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> SHCR-1	E372-U	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	29-Aug-2020	23 days	0 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> SHCR-2	E372-U	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	29-Aug-2020	23 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> SHCR-3	E372-U	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	29-Aug-2020	23 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> SHCR-4	E372-U	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	29-Aug-2020	23 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> SK2	E372-U	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	29-Aug-2020	23 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> SK3	E372-U	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	29-Aug-2020	23 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> SK4	E372-U	24-Aug-2020	29-Aug-2020	28 days	4 days	✓	29-Aug-2020	23 days	0 days	✓	
<b>Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)</b>											
<b>Amber glass total (sulfuric acid)</b> FIELD BLANK	E372-U	23-Aug-2020	29-Aug-2020	28 days	5 days	✓	29-Aug-2020	22 days	0 days	✓	
<b>Cyanides : Free Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM26	E339	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✓	
<b>Cyanides : Free Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SHC5	E339	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Cyanides : Free Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SHCR-1	E339	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✓	
<b>Cyanides : Free Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SHCR-2	E339	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✓	
<b>Cyanides : Free Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SHCR-3	E339	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✓	
<b>Cyanides : Free Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SHCR-4	E339	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✓	
<b>Cyanides : Free Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SK3	E339	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✓	
<b>Cyanides : Free Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SK4	E339	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✓	
<b>Cyanides : Free Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM1	E339	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✓	
<b>Cyanides : Free Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM10	E339	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✓	
<b>Cyanides : Free Cyanide by CFA</b>											
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM1-ALT	E339	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM1-SEEPAGE	E339	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✔
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM7	E339	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✔
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SCH2	E339	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✔
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SK2	E339	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✔
<b>Cyanides : Free Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> FIELD BLANK	E339	23-Aug-2020	----	----	----		31-Aug-2020	14 days	8 days	✔
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM26	E333	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✔
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SHC5	E333	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✔
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SHCR-1	E333	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✔
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SHCR-2	E333	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✔



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SHCR-3	E333	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✓
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SHCR-4	E333	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✓
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SK3	E333	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✓
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SK4	E333	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✓
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM1	E333	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✓
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM10	E333	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✓
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM1-ALT	E333	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✓
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM1-SEEPAGE	E333	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✓
<b>Cyanides : Total Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM7	E333	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Cyanides : Total Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) SCH2	E333	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✔
<b>Cyanides : Total Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) SK2	E333	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✔
<b>Cyanides : Total Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) FIELD BLANK	E333	23-Aug-2020	----	----	----		31-Aug-2020	14 days	8 days	✔
<b>Cyanides : WAD Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) JM26	E336	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✔
<b>Cyanides : WAD Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) SHC5	E336	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✔
<b>Cyanides : WAD Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) SHCR-1	E336	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✔
<b>Cyanides : WAD Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) SHCR-2	E336	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✔
<b>Cyanides : WAD Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) SHCR-3	E336	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✔
<b>Cyanides : WAD Cyanide by CFA</b>										
UV inhibited HDPE - total (sodium hydroxide) SHCR-4	E336	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SK3	E336	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✔
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SK4	E336	24-Aug-2020	----	----	----		31-Aug-2020	14 days	6 days	✔
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM1	E336	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✔
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM10	E336	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✔
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM1-ALT	E336	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✔
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM1-SEEPAGE	E336	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✔
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> JM7	E336	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✔
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SCH2	E336	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✔
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> SK2	E336	24-Aug-2020	----	----	----		31-Aug-2020	14 days	7 days	✔





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Cyanides : WAD Cyanide by CFA</b>										
<b>UV inhibited HDPE - total (sodium hydroxide)</b> FIELD BLANK	E336	23-Aug-2020	----	----	----		31-Aug-2020	14 days	8 days	✓
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> JM1	E421.Cr-L	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> JM1-ALT	E421.Cr-L	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> JM1-SEEPAGE	E421.Cr-L	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> JM26	E421.Cr-L	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> SHC5	E421.Cr-L	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> SHCR-1	E421.Cr-L	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> SHCR-2	E421.Cr-L	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE dissolved (nitric acid)</b> SHCR-3	E421.Cr-L	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> SHCR-4	E421.Cr-L	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> SK3	E421.Cr-L	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> SK4	E421.Cr-L	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> FIELD BLANK	E421.Cr-L	23-Aug-2020	29-Aug-2020	180 days	5 days	✓	30-Aug-2020	174 days	0 days	✓	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> JM10	E421.Cr-L	24-Aug-2020	29-Aug-2020	180 days	5 days	✓	30-Aug-2020	174 days	0 days	✓	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> JM7	E421.Cr-L	24-Aug-2020	29-Aug-2020	180 days	5 days	✓	30-Aug-2020	174 days	0 days	✓	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> SCH2	E421.Cr-L	24-Aug-2020	29-Aug-2020	180 days	5 days	✓	30-Aug-2020	174 days	0 days	✓	
<b>Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)</b>											
<b>HDPE dissolved (nitric acid)</b> SK2	E421.Cr-L	24-Aug-2020	29-Aug-2020	180 days	5 days	✓	30-Aug-2020	174 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> JM1	E509	24-Aug-2020	01-Sep-2020	28 days	7 days	✓	01-Sep-2020	20 days	0 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> JM10	E509	24-Aug-2020	01-Sep-2020	28 days	7 days	✓	01-Sep-2020	20 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> JM1-ALT	E509	24-Aug-2020	01-Sep-2020	28 days	7 days	✓	01-Sep-2020	20 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> JM1-SEEPAGE	E509	24-Aug-2020	01-Sep-2020	28 days	7 days	✓	01-Sep-2020	20 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> JM26	E509	24-Aug-2020	01-Sep-2020	28 days	7 days	✓	01-Sep-2020	20 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> JM7	E509	24-Aug-2020	01-Sep-2020	28 days	7 days	✓	01-Sep-2020	20 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> SCH2	E509	24-Aug-2020	01-Sep-2020	28 days	7 days	✓	01-Sep-2020	20 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> SHC5	E509	24-Aug-2020	01-Sep-2020	28 days	7 days	✓	01-Sep-2020	20 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> SHCR-1	E509	24-Aug-2020	01-Sep-2020	28 days	7 days	✓	01-Sep-2020	20 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> SHCR-2	E509	24-Aug-2020	01-Sep-2020	28 days	7 days	✓	01-Sep-2020	20 days	0 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> SHCR-3	E509	24-Aug-2020	01-Sep-2020	28 days	7 days	✓	01-Sep-2020	20 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> SHCR-4	E509	24-Aug-2020	01-Sep-2020	28 days	7 days	✓	01-Sep-2020	20 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> SK2	E509	24-Aug-2020	01-Sep-2020	28 days	7 days	✓	01-Sep-2020	20 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> SK3	E509	24-Aug-2020	01-Sep-2020	28 days	7 days	✓	01-Sep-2020	20 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> SK4	E509	24-Aug-2020	01-Sep-2020	28 days	7 days	✓	01-Sep-2020	20 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> FIELD BLANK	E509	23-Aug-2020	01-Sep-2020	28 days	8 days	✓	01-Sep-2020	19 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> JM1	E421	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> JM1-ALT	E421	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> JM1-SEEPAGE	E421	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> JM26	E421	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> SHC5	E421	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> SHCR-1	E421	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> SHCR-2	E421	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> SHCR-3	E421	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> SHCR-4	E421	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> SK3	E421	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> SK4	E421	24-Aug-2020	29-Aug-2020	180 days	4 days	✓	30-Aug-2020	175 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> FIELD BLANK	E421	23-Aug-2020	29-Aug-2020	180 days	5 days	✓	30-Aug-2020	174 days	0 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> JM10	E421	24-Aug-2020	29-Aug-2020	180 days	5 days	✓	30-Aug-2020	174 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> JM7	E421	24-Aug-2020	29-Aug-2020	180 days	5 days	✓	30-Aug-2020	174 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> SCH2	E421	24-Aug-2020	29-Aug-2020	180 days	5 days	✓	30-Aug-2020	174 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> SK2	E421	24-Aug-2020	29-Aug-2020	180 days	5 days	✓	30-Aug-2020	174 days	0 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> JM1	E601A	24-Aug-2020	02-Sep-2020	14 days	9 days	✓	03-Sep-2020	40 days	0 days	✓	
<b>Hydrocarbons : BC PHC - EPH by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> JM7	E601A	24-Aug-2020	02-Sep-2020	14 days	9 days	✓	03-Sep-2020	40 days	0 days	✓	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
<b>Glass vial (sodium bisulfate)</b> JM1	E581.VH+F1	24-Aug-2020	02-Sep-2020	14 days	9 days	✓	03-Sep-2020	4 days	0 days	✓	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
<b>Glass vial (sodium bisulfate)</b> JM7	E581.VH+F1	24-Aug-2020	02-Sep-2020	14 days	9 days	✓	03-Sep-2020	4 days	0 days	✓	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> JM1	E358-L	24-Aug-2020	----	----	----		31-Aug-2020	28 days	6 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> JM10	E358-L	24-Aug-2020	----	----	----		31-Aug-2020	28 days	6 days	✔	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> JM1-ALT	E358-L	24-Aug-2020	----	----	----		31-Aug-2020	28 days	6 days	✔	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> JM1-SEEPAGE	E358-L	24-Aug-2020	----	----	----		31-Aug-2020	28 days	6 days	✔	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> JM26	E358-L	24-Aug-2020	----	----	----		31-Aug-2020	28 days	6 days	✔	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> SHC5	E358-L	24-Aug-2020	----	----	----		31-Aug-2020	28 days	6 days	✔	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> SHCR-1	E358-L	24-Aug-2020	----	----	----		31-Aug-2020	28 days	6 days	✔	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> SHCR-2	E358-L	24-Aug-2020	----	----	----		31-Aug-2020	28 days	6 days	✔	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> SHCR-3	E358-L	24-Aug-2020	----	----	----		31-Aug-2020	28 days	6 days	✔	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> SHCR-4	E358-L	24-Aug-2020	----	----	----		31-Aug-2020	28 days	6 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> SK3	E358-L	24-Aug-2020	----	----	----		31-Aug-2020	28 days	6 days		✔
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> SK4	E358-L	24-Aug-2020	----	----	----		31-Aug-2020	28 days	6 days		✔
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> FIELD BLANK	E358-L	23-Aug-2020	----	----	----		31-Aug-2020	28 days	7 days		✔
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> JM7	E358-L	24-Aug-2020	----	----	----		31-Aug-2020	28 days	7 days		✔
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> SCH2	E358-L	24-Aug-2020	----	----	----		31-Aug-2020	28 days	7 days		✔
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> SK2	E358-L	24-Aug-2020	----	----	----		31-Aug-2020	28 days	7 days		✔
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM1	E355-L	24-Aug-2020	----	----	----		29-Aug-2020	28 days	4 days		✔
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM10	E355-L	24-Aug-2020	----	----	----		29-Aug-2020	28 days	4 days		✔
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM1-ALT	E355-L	24-Aug-2020	----	----	----		29-Aug-2020	28 days	4 days		✔





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM1-SEEPAGE	E355-L	24-Aug-2020	----	----	----		29-Aug-2020	28 days	4 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM26	E355-L	24-Aug-2020	----	----	----		29-Aug-2020	28 days	4 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> JM7	E355-L	24-Aug-2020	----	----	----		29-Aug-2020	28 days	4 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SCH2	E355-L	24-Aug-2020	----	----	----		29-Aug-2020	28 days	4 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SHC5	E355-L	24-Aug-2020	----	----	----		29-Aug-2020	28 days	4 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SHCR-1	E355-L	24-Aug-2020	----	----	----		29-Aug-2020	28 days	4 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SHCR-2	E355-L	24-Aug-2020	----	----	----		29-Aug-2020	28 days	4 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SHCR-3	E355-L	24-Aug-2020	----	----	----		29-Aug-2020	28 days	4 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SHCR-4	E355-L	24-Aug-2020	----	----	----		29-Aug-2020	28 days	4 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SK2	E355-L	24-Aug-2020	----	----	----		29-Aug-2020	28 days	4 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SK3	E355-L	24-Aug-2020	----	----	----		29-Aug-2020	28 days	4 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> SK4	E355-L	24-Aug-2020	----	----	----		29-Aug-2020	28 days	4 days	✓	
<b>Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)</b>											
<b>Amber glass total (sulfuric acid)</b> FIELD BLANK	E355-L	23-Aug-2020	----	----	----		29-Aug-2020	28 days	5 days	✓	
<b>Physical Tests : Acidity by Titration</b>											
<b>HDPE</b> JM1	E283	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✓	
<b>Physical Tests : Acidity by Titration</b>											
<b>HDPE</b> JM10	E283	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✓	
<b>Physical Tests : Acidity by Titration</b>											
<b>HDPE</b> JM1-ALT	E283	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✓	
<b>Physical Tests : Acidity by Titration</b>											
<b>HDPE</b> JM1-SEEPAGE	E283	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✓	
<b>Physical Tests : Acidity by Titration</b>											
<b>HDPE</b> JM26	E283	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Acidity by Titration</b>										
HDPE JM7	E283	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✔
<b>Physical Tests : Acidity by Titration</b>										
HDPE SCH2	E283	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✔
<b>Physical Tests : Acidity by Titration</b>										
HDPE SHC5	E283	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✔
<b>Physical Tests : Acidity by Titration</b>										
HDPE SHCR-1	E283	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✔
<b>Physical Tests : Acidity by Titration</b>										
HDPE SHCR-2	E283	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✔
<b>Physical Tests : Acidity by Titration</b>										
HDPE SHCR-3	E283	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✔
<b>Physical Tests : Acidity by Titration</b>										
HDPE SHCR-4	E283	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✔
<b>Physical Tests : Acidity by Titration</b>										
HDPE SK2	E283	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✔
<b>Physical Tests : Acidity by Titration</b>										
HDPE SK3	E283	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✔



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Acidity by Titration</b>										
HDPE SK4	E283	24-Aug-2020	----	----	----		29-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Acidity by Titration</b>										
HDPE FIELD BLANK	E283	23-Aug-2020	----	----	----		29-Aug-2020	14 days	5 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE SK3	E290	24-Aug-2020	----	----	----		28-Aug-2020	14 days	3 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE JM1	E290	24-Aug-2020	----	----	----		28-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE JM10	E290	24-Aug-2020	----	----	----		28-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE JM1-ALT	E290	24-Aug-2020	----	----	----		28-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE JM1-SEEPAGE	E290	24-Aug-2020	----	----	----		28-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE JM26	E290	24-Aug-2020	----	----	----		28-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE JM7	E290	24-Aug-2020	----	----	----		28-Aug-2020	14 days	4 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE SCH2	E290	24-Aug-2020	----	----	----		28-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE SHC5	E290	24-Aug-2020	----	----	----		28-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE SHCR-1	E290	24-Aug-2020	----	----	----		28-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE SHCR-2	E290	24-Aug-2020	----	----	----		28-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE SHCR-3	E290	24-Aug-2020	----	----	----		28-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE SHCR-4	E290	24-Aug-2020	----	----	----		28-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE SK2	E290	24-Aug-2020	----	----	----		28-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE SK4	E290	24-Aug-2020	----	----	----		28-Aug-2020	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE FIELD BLANK	E290	23-Aug-2020	----	----	----		28-Aug-2020	14 days	5 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE JM1	E329	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE JM10	E329	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE JM1-ALT	E329	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE JM1-SEEPAGE	E329	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE JM26	E329	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE JM7	E329	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE SCH2	E329	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE SHC5	E329	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE SHCR-1	E329	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
Rec	Actual	Rec		Actual						
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE SHCR-2	E329	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE SHCR-3	E329	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE SHCR-4	E329	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE SK2	E329	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE SK3	E329	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE SK4	E329	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Colour (True) by Spectrometer</b>										
HDPE FIELD BLANK	E329	23-Aug-2020	----	----	----		28-Aug-2020	3 days	5 days	* EHTR
<b>Physical Tests : Conductivity in Water</b>										
HDPE SK3	E100	24-Aug-2020	----	----	----		28-Aug-2020	28 days	3 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE JM1	E100	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Conductivity in Water</b>										
HDPE JM10	E100	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE JM1-ALT	E100	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE JM1-SEEPAGE	E100	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE JM26	E100	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE JM7	E100	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE SCH2	E100	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE SHC5	E100	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE SHCR-1	E100	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE SHCR-2	E100	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days	✓





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : Conductivity in Water</b>											
HDPE SHCR-3	E100	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days		✓
<b>Physical Tests : Conductivity in Water</b>											
HDPE SHCR-4	E100	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days		✓
<b>Physical Tests : Conductivity in Water</b>											
HDPE SK2	E100	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days		✓
<b>Physical Tests : Conductivity in Water</b>											
HDPE SK4	E100	24-Aug-2020	----	----	----		28-Aug-2020	28 days	4 days		✓
<b>Physical Tests : Conductivity in Water</b>											
HDPE FIELD BLANK	E100	23-Aug-2020	----	----	----		28-Aug-2020	28 days	5 days		✓
<b>Physical Tests : pH by Meter</b>											
HDPE JM1	E108	24-Aug-2020	----	----	----		28-Aug-2020	0.25 hrs	100 hrs		* EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE JM10	E108	24-Aug-2020	----	----	----		28-Aug-2020	0.25 hrs	100 hrs		* EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE JM1-ALT	E108	24-Aug-2020	----	----	----		28-Aug-2020	0.25 hrs	100 hrs		* EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE SK2	E108	24-Aug-2020	----	----	----		28-Aug-2020	0.25 hrs	101 hrs		* EHTR-FM



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : pH by Meter</b>										
HDPE JM7	E108	24-Aug-2020	----	----	----		28-Aug-2020	0.25 hrs	102 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE SCH2	E108	24-Aug-2020	----	----	----		28-Aug-2020	0.25 hrs	102 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE FIELD BLANK	E108	23-Aug-2020	----	----	----		28-Aug-2020	0.25 hrs	124 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE SK3	E108	24-Aug-2020	----	----	----		28-Aug-2020	0.25 hrs	95 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE SK4	E108	24-Aug-2020	----	----	----		28-Aug-2020	0.25 hrs	96 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE SHCR-1	E108	24-Aug-2020	----	----	----		28-Aug-2020	0.25 hrs	97 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE SHC5	E108	24-Aug-2020	----	----	----		28-Aug-2020	0.25 hrs	98 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE SHCR-2	E108	24-Aug-2020	----	----	----		28-Aug-2020	0.25 hrs	98 hrs	* EHTR-FM
<b>Physical Tests : pH by Meter</b>										
HDPE SHCR-3	E108	24-Aug-2020	----	----	----		28-Aug-2020	0.25 hrs	98 hrs	* EHTR-FM



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : pH by Meter</b>											
HDPE SHCR-4	E108	24-Aug-2020	----	----	----		28-Aug-2020	0.25 hrs	98 hrs	*	EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE JM1-SEEPAGE	E108	24-Aug-2020	----	----	----		28-Aug-2020	0.25 hrs	99 hrs	*	EHTR-FM
<b>Physical Tests : pH by Meter</b>											
HDPE JM26	E108	24-Aug-2020	----	----	----		28-Aug-2020	0.25 hrs	99 hrs	*	EHTR-FM
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE SK3	E162	24-Aug-2020	----	----	----		28-Aug-2020	7 days	3 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE SK4	E162	24-Aug-2020	----	----	----		28-Aug-2020	7 days	3 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE JM1	E162	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE JM10	E162	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE JM1-ALT	E162	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE JM1-SEEPAGE	E162	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE JM26	E162	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✔	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE JM7	E162	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✔	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE SCH2	E162	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✔	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE SHC5	E162	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✔	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE SHCR-1	E162	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✔	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE SHCR-2	E162	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✔	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE SHCR-3	E162	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✔	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE SHCR-4	E162	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✔	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE SK2	E162	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE FIELD BLANK	E162	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✔	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE SK3	E160-H	24-Aug-2020	----	----	----		28-Aug-2020	7 days	3 days	✔	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE SK4	E160-H	24-Aug-2020	----	----	----		28-Aug-2020	7 days	3 days	✔	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE JM1	E160-H	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✔	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE JM10	E160-H	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✔	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE JM1-ALT	E160-H	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✔	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE JM1-SEEPAGE	E160-H	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✔	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE JM26	E160-H	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✔	
<b>Physical Tests : TSS by Gravimetry</b>											
HDPE JM7	E160-H	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✔	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE SCH2	E160-H	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE SHC5	E160-H	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE SHCR-1	E160-H	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE SHCR-2	E160-H	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE SHCR-3	E160-H	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE SHCR-4	E160-H	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE SK2	E160-H	24-Aug-2020	----	----	----		28-Aug-2020	7 days	4 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE FIELD BLANK	E160-H	23-Aug-2020	----	----	----		28-Aug-2020	7 days	5 days	✓
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE SHC5	E121	24-Aug-2020	----	----	----		28-Aug-2020	3 days	3 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE SHCR-1	E121	24-Aug-2020	----	----	----		28-Aug-2020	3 days	3 days	✓
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE SHCR-3	E121	24-Aug-2020	----	----	----		28-Aug-2020	3 days	3 days	✓
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE SK3	E121	24-Aug-2020	----	----	----		28-Aug-2020	3 days	3 days	✓
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE SK4	E121	24-Aug-2020	----	----	----		28-Aug-2020	3 days	3 days	✓
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE JM1	E121	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE JM10	E121	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE JM1-ALT	E121	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE JM1-SEEPAGE	E121	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE JM26	E121	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE JM7	E121	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE SCH2	E121	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE SHCR-2	E121	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE SHCR-4	E121	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE SK2	E121	24-Aug-2020	----	----	----		28-Aug-2020	3 days	4 days	* EHTR
<b>Physical Tests : Turbidity by Nephelometry</b>										
HDPE FIELD BLANK	E121	23-Aug-2020	----	----	----		28-Aug-2020	3 days	5 days	* EHTR
<b>Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS</b>										
Amber glass/Teflon lined cap (sodium bisulfate) JM1	E641A	24-Aug-2020	02-Sep-2020	14 days	9 days	✓	02-Sep-2020	40 days	0 days	✓
<b>Polycyclic Aromatic Hydrocarbons : PAHs by LVI GC-MS</b>										
Amber glass/Teflon lined cap (sodium bisulfate) JM7	E641A	24-Aug-2020	02-Sep-2020	14 days	9 days	✓	02-Sep-2020	40 days	0 days	✓
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
HDPE total (nitric acid) SHC5	E420.Cr-L	24-Aug-2020	----	----	----		29-Aug-2020	180 days	4 days	✓





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> SHCR-1	E420.Cr-L	24-Aug-2020	----	----	----		29-Aug-2020	180 days	4 days	✓
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> SHCR-2	E420.Cr-L	24-Aug-2020	----	----	----		29-Aug-2020	180 days	4 days	✓
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> SHCR-3	E420.Cr-L	24-Aug-2020	----	----	----		29-Aug-2020	180 days	4 days	✓
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> SK3	E420.Cr-L	24-Aug-2020	----	----	----		29-Aug-2020	180 days	4 days	✓
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> SK4	E420.Cr-L	24-Aug-2020	----	----	----		29-Aug-2020	180 days	4 days	✓
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> JM1	E420.Cr-L	24-Aug-2020	----	----	----		29-Aug-2020	180 days	5 days	✓
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> JM10	E420.Cr-L	24-Aug-2020	----	----	----		29-Aug-2020	180 days	5 days	✓
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> JM1-ALT	E420.Cr-L	24-Aug-2020	----	----	----		29-Aug-2020	180 days	5 days	✓
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> JM1-SEEPAGE	E420.Cr-L	24-Aug-2020	----	----	----		29-Aug-2020	180 days	5 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> JM26	E420.Cr-L	24-Aug-2020	----	----	----		29-Aug-2020	180 days	5 days	✓
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> JM7	E420.Cr-L	24-Aug-2020	----	----	----		29-Aug-2020	180 days	5 days	✓
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> SCH2	E420.Cr-L	24-Aug-2020	----	----	----		29-Aug-2020	180 days	5 days	✓
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> SHCR-4	E420.Cr-L	24-Aug-2020	----	----	----		29-Aug-2020	180 days	5 days	✓
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> SK2	E420.Cr-L	24-Aug-2020	----	----	----		29-Aug-2020	180 days	5 days	✓
<b>Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)</b>										
<b>HDPE total (nitric acid)</b> FIELD BLANK	E420.Cr-L	23-Aug-2020	----	----	----		29-Aug-2020	180 days	6 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> SK3	E508	24-Aug-2020	----	----	----		31-Aug-2020	28 days	6 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> SK4	E508	24-Aug-2020	----	----	----		31-Aug-2020	28 days	6 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> JM1	E508	24-Aug-2020	----	----	----		31-Aug-2020	28 days	7 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> JM10	E508	24-Aug-2020	----	----	----		31-Aug-2020	28 days	7 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> JM1-ALT	E508	24-Aug-2020	----	----	----		31-Aug-2020	28 days	7 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> JM1-SEEPAGE	E508	24-Aug-2020	----	----	----		31-Aug-2020	28 days	7 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> JM26	E508	24-Aug-2020	----	----	----		31-Aug-2020	28 days	7 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> JM7	E508	24-Aug-2020	----	----	----		31-Aug-2020	28 days	7 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> SCH2	E508	24-Aug-2020	----	----	----		31-Aug-2020	28 days	7 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> SHC5	E508	24-Aug-2020	----	----	----		31-Aug-2020	28 days	7 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> SHCR-1	E508	24-Aug-2020	----	----	----		31-Aug-2020	28 days	7 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> SHCR-2	E508	24-Aug-2020	----	----	----		31-Aug-2020	28 days	7 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> SHCR-3	E508	24-Aug-2020	----	----	----		31-Aug-2020	28 days	7 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> SHCR-4	E508	24-Aug-2020	----	----	----		31-Aug-2020	28 days	7 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> SK2	E508	24-Aug-2020	----	----	----		31-Aug-2020	28 days	7 days	✓
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> FIELD BLANK	E508	23-Aug-2020	----	----	----		31-Aug-2020	28 days	8 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPCS</b>										
<b>HDPE total (nitric acid)</b> SHC5	E420	24-Aug-2020	----	----	----		29-Aug-2020	180 days	4 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPCS</b>										
<b>HDPE total (nitric acid)</b> SHCR-1	E420	24-Aug-2020	----	----	----		29-Aug-2020	180 days	4 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPCS</b>										
<b>HDPE total (nitric acid)</b> SHCR-2	E420	24-Aug-2020	----	----	----		29-Aug-2020	180 days	4 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPCS</b>										
<b>HDPE total (nitric acid)</b> SHCR-3	E420	24-Aug-2020	----	----	----		29-Aug-2020	180 days	4 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPCS</b>										
<b>HDPE total (nitric acid)</b> SK3	E420	24-Aug-2020	----	----	----		29-Aug-2020	180 days	4 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation			Analysis				
			Preparation Date	Holding Times Rec Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
HDPE total (nitric acid) SK4	E420	24-Aug-2020	----	----	----		29-Aug-2020	180 days	4 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
HDPE total (nitric acid) JM1	E420	24-Aug-2020	----	----	----		29-Aug-2020	180 days	5 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
HDPE total (nitric acid) JM10	E420	24-Aug-2020	----	----	----		29-Aug-2020	180 days	5 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
HDPE total (nitric acid) JM1-ALT	E420	24-Aug-2020	----	----	----		29-Aug-2020	180 days	5 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
HDPE total (nitric acid) JM1-SEEPAGE	E420	24-Aug-2020	----	----	----		29-Aug-2020	180 days	5 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
HDPE total (nitric acid) JM26	E420	24-Aug-2020	----	----	----		29-Aug-2020	180 days	5 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
HDPE total (nitric acid) JM7	E420	24-Aug-2020	----	----	----		29-Aug-2020	180 days	5 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
HDPE total (nitric acid) SCH2	E420	24-Aug-2020	----	----	----		29-Aug-2020	180 days	5 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
HDPE total (nitric acid) SHCR-4	E420	24-Aug-2020	----	----	----		29-Aug-2020	180 days	5 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> SK2	E420	24-Aug-2020	----	----	----		29-Aug-2020	180 days	5 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> FIELD BLANK	E420	23-Aug-2020	----	----	----		29-Aug-2020	180 days	6 days	✓
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> JM1	E611A	24-Aug-2020	02-Sep-2020	14 days	9 days	✓	03-Sep-2020	4 days	0 days	✓
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> JM7	E611A	24-Aug-2020	02-Sep-2020	14 days	9 days	✓	03-Sep-2020	4 days	2 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHTR: Exceeded ALS recommended hold time prior to sample receipt.

Rec. HT: ALS recommended hold time (see units).



## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Acidity by Titration	E283	78556	1	16	6.2	5.0	✓
Alkalinity Species by Titration	E290	78554	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	78807	1	20	5.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	78559	1	16	6.2	5.0	✓
BTEX by Headspace GC-MS	E611A	80458	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	78557	1	16	6.2	5.0	✓
Colour (True) by Spectrometer	E329	78563	1	16	6.2	5.0	✓
Conductivity in Water	E100	78555	1	16	6.2	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	78985	1	16	6.2	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	79608	1	16	6.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	78986	1	16	6.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	79212	1	16	6.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	78564	1	16	6.2	5.0	✓
Fluoride in Water by IC	E235.F	78558	1	16	6.2	5.0	✓
Free Cyanide by CFA	E339	79376	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	78560	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	78561	1	16	6.2	5.0	✓
pH by Meter	E108	78553	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	78562	1	16	6.2	5.0	✓
TDS by Gravimetry	E162	78592	1	16	6.2	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	78887	1	16	6.2	5.0	✓
Total Cyanide by CFA	E333	79377	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	78803	1	20	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	79427	2	40	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	78886	2	17	11.7	5.0	✓
Total Nitrogen by Colourimetry	E366	78805	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	78804	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	78806	1	20	5.0	5.0	✓
TSS by Gravimetry	E160-H	78591	1	16	6.2	5.0	✓
Turbidity by Nephelometry	E121	78566	1	16	6.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	80457	1	18	5.5	5.0	✓
WAD Cyanide by CFA	E336	79375	1	20	5.0	5.0	✓
<b>Laboratory Control Samples (LCS)</b>							
Acidity by Titration	E283	78556	1	16	6.2	5.0	✓
Alkalinity Species by Titration	E290	78554	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	78807	1	20	5.0	5.0	✓
BC PHC - EPH by GC-FID	E601A	80222	1	20	5.0	5.0	✓



Matrix: **Water**

Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Laboratory Control Samples (LCS) - Continued</b>							
Bromide in Water by IC (Low Level)	E235.Br-L	78559	1	16	6.2	5.0	✓
BTEX by Headspace GC-MS	E611A	80458	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	78557	1	16	6.2	5.0	✓
Colour (True) by Spectrometer	E329	78563	1	16	6.2	5.0	✓
Conductivity in Water	E100	78555	1	16	6.2	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	78985	1	16	6.2	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	79608	1	16	6.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	78986	1	16	6.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	79212	1	16	6.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	78564	1	16	6.2	5.0	✓
Fluoride in Water by IC	E235.F	78558	1	16	6.2	5.0	✓
Free Cyanide by CFA	E339	79376	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	78560	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	78561	1	16	6.2	5.0	✓
PAHs by LVI GC-MS	E641A	80223	1	20	5.0	5.0	✓
pH by Meter	E108	78553	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	78562	1	16	6.2	5.0	✓
TDS by Gravimetry	E162	78592	1	16	6.2	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	78887	1	16	6.2	5.0	✓
Total Cyanide by CFA	E333	79377	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	78803	1	20	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	79427	2	40	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	78886	1	17	5.8	5.0	✓
Total Nitrogen by Colourimetry	E366	78805	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	78804	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	78806	1	20	5.0	5.0	✓
TSS by Gravimetry	E160-H	78591	1	16	6.2	5.0	✓
Turbidity by Nephelometry	E121	78566	1	16	6.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	80457	1	18	5.5	5.0	✓
WAD Cyanide by CFA	E336	79375	1	20	5.0	5.0	✓
<b>Method Blanks (MB)</b>							
Acidity by Titration	E283	78556	1	16	6.2	5.0	✓
Alkalinity Species by Titration	E290	78554	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	78807	1	20	5.0	5.0	✓
BC PHC - EPH by GC-FID	E601A	80222	1	20	5.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	78559	1	16	6.2	5.0	✓
BTEX by Headspace GC-MS	E611A	80458	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	78557	1	16	6.2	5.0	✓
Colour (True) by Spectrometer	E329	78563	1	16	6.2	5.0	✓
Conductivity in Water	E100	78555	1	16	6.2	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	78985	1	16	6.2	5.0	✓





Matrix: **Water**

Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Method Blanks (MB) - Continued</b>							
Dissolved Mercury in Water by CVAAS	E509	79608	1	16	6.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	78986	1	16	6.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	79212	1	16	6.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	78564	1	16	6.2	5.0	✓
Fluoride in Water by IC	E235.F	78558	1	16	6.2	5.0	✓
Free Cyanide by CFA	E339	79376	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	78560	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	78561	1	16	6.2	5.0	✓
PAHs by LVI GC-MS	E641A	80223	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	78562	1	16	6.2	5.0	✓
TDS by Gravimetry	E162	78592	1	16	6.2	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	78887	1	16	6.2	5.0	✓
Total Cyanide by CFA	E333	79377	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	78803	1	20	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	79427	2	40	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	78886	1	17	5.8	5.0	✓
Total Nitrogen by Colourimetry	E366	78805	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	78804	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	78806	1	20	5.0	5.0	✓
TSS by Gravimetry	E160-H	78591	1	16	6.2	5.0	✓
Turbidity by Nephelometry	E121	78566	1	16	6.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	80457	1	18	5.5	5.0	✓
WAD Cyanide by CFA	E336	79375	1	20	5.0	5.0	✓
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	78807	1	20	5.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	78559	1	16	6.2	5.0	✓
BTEX by Headspace GC-MS	E611A	80458	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	78557	1	16	6.2	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	78985	1	16	6.2	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	79608	1	16	6.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	78986	1	16	6.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	79212	1	16	6.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	78564	1	16	6.2	5.0	✓
Fluoride in Water by IC	E235.F	78558	1	16	6.2	5.0	✓
Free Cyanide by CFA	E339	79376	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	78560	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	78561	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	78562	1	16	6.2	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	78887	1	16	6.2	5.0	✓
Total Cyanide by CFA	E333	79377	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	78803	1	20	5.0	5.0	✓



Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<i>Analytical Methods</i>							
<b>Matrix Spikes (MS) - Continued</b>							
Total Mercury in Water by CVAAS	E508	79427	2	40	5.0	5.0	✔
Total Metals in Water by CRC ICPMS	E420	78886	1	17	5.8	5.0	✔
Total Nitrogen by Colourimetry	E366	78805	1	20	5.0	5.0	✔
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	78804	1	20	5.0	5.0	✔
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	78806	1	20	5.0	5.0	✔
VH and F1 by Headspace GC-FID	E581.VH+F1	80457	1	18	5.5	5.0	✔
WAD Cyanide by CFA	E336	79375	1	20	5.0	5.0	✔



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 Vancouver - Environmental	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TSS by Gravimetry	E160-H Vancouver - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
TDS by Gravimetry	E162 Vancouver - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Bromide in Water by IC (Low Level)	E235.Br-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Sulfate in Water by IC	E235.S04  Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Acidity by Titration	E283  Vancouver - Environmental	Water	APHA 2310 B (mod)	Acidity is determined by potentiometric titration to a specified endpoint.
Alkalinity Species by Titration	E290  Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298  Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318  Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Total Kjeldahl Nitrogen is determined using block digestion followed by flow-injection analysis with fluorescence detection.
Colour (True) by Spectrometer	E329  Vancouver - Environmental	Water	APHA 2120 C (mod)	Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment.
Total Cyanide by CFA	E333  Vancouver - Environmental	Water	ISO 14403 (mod)	Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.
WAD Cyanide by CFA	E336  Vancouver - Environmental	Water	APHA 4500-CN I (mod)	Weak Acid Dissociable (WAD) cyanide is determined by in-line sample distillation with final determination by colourimetric analysis.
Free Cyanide by CFA	E339  Vancouver - Environmental	Water	ASTM D7237 (mod)	Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L  Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO <sub>2</sub> . NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Organic Carbon by Combustion (Low Level)	E358-L  Vancouver - Environmental	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO <sub>2</sub> . NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Nitrogen by Colourimetry	E366  Vancouver - Environmental	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U  Vancouver - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U  Vancouver - Environmental	Water	APHA 4500-P E (mod)	Dissolved Orthophosphate is determined colourimetrically on a water sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.
Total Metals in Water by CRC ICPMS	E420  Vancouver - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L  Vancouver - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS.
Dissolved Metals in Water by CRC ICPMS	E421  Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L  Vancouver - Environmental	Water	APHA 3030 B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS
Total Mercury in Water by CVAAS	E508  Vancouver - Environmental	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
Dissolved Mercury in Water by CVAAS	E509  Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
VH and F1 by Headspace GC-FID	E581.VH+F1  Vancouver - Environmental	Water	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
BC PHC - EPH by GC-FID	E601A  Vancouver - Environmental	Water	BC MOE Lab Manual	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.
BTEX by Headspace GC-MS	E611A  Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by LVI GC-MS	E641A  Vancouver - Environmental	Water	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by large volume injection (LVI) GC-MS.
Dissolved Hardness (Calculated)	EC100  Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> ), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Hardness (Calculated) from Total Ca/Mg	EC100A  Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> ), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
VPH: VH-BTEX-Styrene	EC580A  Vancouver - Environmental	Water	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VPHw = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.
LEPH and HEPH: EPH-PAH	EC600A  Vancouver - Environmental	Water	BC MOE Lab Manual (LEPH and HEPH) (mod)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Acenaphthene, Acridine, Anthracene, Fluorene, Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(a)pyrene, Fluoranthene, and Pyrene.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Digestion for TKN in water	EP318  Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Samples are digested using block digestion with Copper Sulfate Digestion Reagent.
Digestion for Total Nitrogen in water	EP366  Vancouver - Environmental	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Digestion for Total Phosphorus in water	EP372  Vancouver - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421  Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO <sub>3</sub> .
Dissolved Mercury Water Filtration	EP509  Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
VOCs Preparation for Headspace Analysis	EP581  Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601  Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

## QUALITY CONTROL REPORT

**Work Order** : **VA20B3846**

**Page** : 1 of 21

**Client** : ERM Consultants Canada Ltd.  
**Contact** : Jill Zyla  
**Address** : # 400 - 106 Front Street East  
 Toronto ON Canada M5A 1E1  
**Telephone** : 604 689 9460  
**Project** : 0539378-0012  
**PO** : ----  
**C-O-C number** : 17-841425, 17-841424  
**Sampler** : ----  
**Site** : ----  
**Quote number** : Q74326  
**No. of samples received** : 16  
**No. of samples analysed** : 16

**Laboratory** : Vancouver - Environmental  
**Account Manager** : Amber Springer  
**Address** : 8081 Lougheed Highway  
 Burnaby, British Columbia Canada V5A 1W9  
**Telephone** : +1 604 253 4188  
**Date Samples Received** : 28-Aug-2020 10:10  
**Date Analysis Commenced** : 28-Aug-2020  
**Issue Date** : 09-Sep-2020 12:43

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

### *Signatories*

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
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Work Order : VA20B3846  
Client : ERM Consultants Canada Ltd.  
Project : 0539378-0012

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## **General Comments**

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

# = Indicates a QC result that did not meet the ALS DQO.



### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 78553)</b>											
VA20B3846-001	FIELD BLANK	pH	----	E108	0.10	pH units	5.31	5.34	0.563%	4%	----
<b>Physical Tests (QC Lot: 78554)</b>											
VA20B3846-001	FIELD BLANK	alkalinity, bicarbonate (as CaCO <sub>3</sub> )	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, carbonate (as CaCO <sub>3</sub> )	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, hydroxide (as CaCO <sub>3</sub> )	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, total (as CaCO <sub>3</sub> )	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 78555)</b>											
VA20B3846-001	FIELD BLANK	conductivity	----	E100	2.0	µS/cm	<2.0	<2.0	0	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 78556)</b>											
VA20B3846-002	JM7	acidity (as CaCO <sub>3</sub> )	----	E283	2.0	mg/L	<2.0	<2.0	0	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 78563)</b>											
VA20B3846-001	FIELD BLANK	colour, true	----	E329	5.0	CU	<5.0	<5.0	0	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 78566)</b>											
VA20B3846-001	FIELD BLANK	turbidity	----	E121	0.10	NTU	<0.10	<0.10	0	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 78591)</b>											
VA20B3846-002	JM7	solids, total suspended [TSS]	----	E160-H	3.0	mg/L	8.1	9.7	1.6	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 78592)</b>											
VA20B3846-002	JM7	solids, total dissolved [TDS]	----	E162	13	mg/L	63	55	8	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78557)</b>											
VA20B3846-001	FIELD BLANK	chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78558)</b>											
VA20B3846-001	FIELD BLANK	fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78559)</b>											
VA20B3846-001	FIELD BLANK	bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78560)</b>											
VA20B3846-001	FIELD BLANK	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78561)</b>											
VA20B3846-001	FIELD BLANK	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78562)</b>											
VA20B3846-001	FIELD BLANK	sulfate (as SO <sub>4</sub> )	14808-79-8	E235.SO4	0.30	mg/L	<0.30	<0.30	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78564)</b>											



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Anions and Nutrients (QC Lot: 78564) - continued</b>											
VA20B3846-001	FIELD BLANK	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0 0010	mg/L	<0 0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78803)</b>											
VA20B3842-021	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78805)</b>											
VA20B3842-021	Anonymous	nitrogen, total	7727-37-9	E366	0.030	mg/L	<0.030	<0.030	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 78806)</b>											
VA20B3842-021	Anonymous	phosphorus, total	7723-14-0	E372-U	0 0020	mg/L	0 0412	0.0375	9.44%	20%	----
<b>Anions and Nutrients (QC Lot: 78807)</b>											
VA20B3842-021	Anonymous	ammonia total (as N)	7664-41-7	E298	0 0050	mg/L	0 0051	0.0063	0.0012	Diff <2x LOR	----
<b>Cyanides (QC Lot: 79375)</b>											
VA20B3846-001	FIELD BLANK	cyanide, weak acid dissociable	----	E336	0 0050	mg/L	<0 0050	<0.0050	0	Diff <2x LOR	----
<b>Cyanides (QC Lot: 79376)</b>											
VA20B3846-001	FIELD BLANK	cyanide, free	----	E339	0 0050	mg/L	<0 0050	<0.0050	0	Diff <2x LOR	----
<b>Cyanides (QC Lot: 79377)</b>											
VA20B3846-001	FIELD BLANK	cyanide, strong acid dissociable (total)	----	E333	0 0050	mg/L	<0 0050	<0.0050	0	Diff <2x LOR	----
<b>Organic / Inorganic Carbon (QC Lot 78804)</b>											
VA20B3842-021	Anonymous	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	<0.50	<0 50	0	Diff <2x LOR	----
<b>Organic / Inorganic Carbon (QC Lot: 79212)</b>											
VA20B3846-001	FIELD BLANK	carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	<0.50	<0 50	0	Diff <2x LOR	----
<b>Total Metals (QC Lot: 78886)</b>											
VA20B3846-007	JM1-ALT	titanium, total	7440-32-6	E420	0.00030	mg/L	0.00208	0.00242	0.00034	Diff <2x LOR	----
		vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
VA20B3846-007	JM1-ALT	aluminum, total	7429-90-5	E420	0 0030	mg/L	0.379	0.390	2.90%	20%	----
		antimony, total	7440-36-0	E420	0.00010	mg/L	0.00013	0.00012	0 000008	Diff <2x LOR	----
		arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00214	0.00236	9.87%	20%	----
		barium, total	7440-39-3	E420	0.00010	mg/L	0 0237	0.0239	0.534%	20%	----
		beryllium, total	7440-41-7	E420	0.000020	mg/L	0.000020	<0 000020	0.0000002	Diff <2x LOR	----
		bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0 000050	0	Diff <2x LOR	----
		boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.00466	0.00463	0.544%	20%	----
		calcium, total	7440-70-2	E420	0.050	mg/L	43 9	42.4	3.49%	20%	----
		cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00313	0.00313	0.0522%	20%	----
		copper, total	7440-50-8	E420	0.00050	mg/L	0.301	0.302	0.415%	20%	----
		iron, total	7439-89-6	E420	0.010	mg/L	4.89	4 68	4.46%	20%	----
		lead, total	7439-92-1	E420	0.000050	mg/L	0.00246	0.00250	1.71%	20%	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Total Metals (QC Lot: 78886) - continued</b>											
VA20B3846-007	JM1-ALT	lithium, total	7439-93-2	E420	0.0010	mg/L	0.0015	0.0016	0.00006	Diff <2x LOR	----
		magnesium, total	7439-95-4	E420	0.100	mg/L	5.67	5.75	1.46%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	0.470	0.471	0.184%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000243	0.000226	0.000017	Diff <2x LOR	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	0.00097	0.00058	0.00039	Diff <2x LOR	----
		phosphorus, total	7723-14-0	E420	0.050	mg/L	0.058	<0.050	0.008	Diff <2x LOR	----
		potassium, total	7440-09-7	E420	0.100	mg/L	1.49	1.52	1.50%	20%	----
		selenium, total	7782-49-2	E420	0.000050	mg/L	0.000374	0.000321	0.000052	Diff <2x LOR	----
		silicon, total	7440-21-3	E420	0.10	mg/L	1.80	1.82	1.04%	20%	----
		silver, total	7440-22-4	E420	0.000010	mg/L	0.000024	0.000023	0.0000004	Diff <2x LOR	----
		sodium, total	7440-23-5	E420	0.050	mg/L	0.482	0.493	0.011	Diff <2x LOR	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	0.234	0.227	2.94%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	27.0	27.2	0.425%	20%	----
		thallium, total	7440-28-0	E420	0.000010	mg/L	0.000011	0.000012	0.0000006	Diff <2x LOR	----
		tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		uranium, total	7440-61-1	E420	0.000010	mg/L	0.000246	0.000266	8.07%	20%	----
		zinc, total	7440-66-6	E420	0.0030	mg/L	0.790	0.721	9.06%	20%	----
		zirconium, total	7440-67-7	E420	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
<b>Total Metals (QC Lot: 78887)</b>											
VA20B3846-007	JM1-ALT	chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	<0.00010	0.00010	0.000003	Diff <2x LOR	----
<b>Total Metals (QC Lot: 79427)</b>											
VA20B3842-002	Anonymous	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Total Metals (QC Lot: 79428)</b>											
VA20B3846-016	SK3	mercury total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 78985)</b>											
VA20B3846-003	SCH2	chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 78986)</b>											
VA20B3846-003	SCH2	aluminum, dissolved	7429-90-5	E421	0.0030	mg/L	0.0274	0.0276	0.0002	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0273	0.0278	1.66%	20%	----
		beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		boron dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.000106	0.000100	5.89%	20%	----



Sub-Matrix: **Water** *Laboratory Duplicate (DUP) Report*

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 78986) - continued</b>											
VA20B3846-003	SCH2	calcium, dissolved	7440-70-2	E421	0.050	mg/L	18.1	18.6	2.61%	20%	----
		cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00018	0.00018	0.000002	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00992	0.0101	2.00%	20%	----
		iron, dissolved	7439 89 6	E421	0.010	mg/L	0.015	0.016	0.0004	Diff <2x LOR	----
		lead, dissolved	7439-92-1	E421	0.000050	mg/L	0.000053	0.000057	0.000003	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	0.100	mg/L	1.55	1.59	2.42%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0528	0.0537	1.69%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000295	0.000292	0.000002	Diff <2x LOR	----
		nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	0.100	mg/L	1.08	1.11	2.63%	20%	----
		selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000122	0.000129	0.000008	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	0.050	mg/L	1.22	1.23	0.787%	20%	----
		silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		sodium, dissolved	7440-23-5	E421	0.050	mg/L	0.578	0.597	3.27%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.122	0.130	6.22%	20%	----
		sulfur, dissolved	7704-34-9	E421	0.50	mg/L	6.09	6.24	2.35%	20%	----
		thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----		
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000113	0.000115	2.18%	20%	----		
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----		
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0087	0.0080	0.0007	Diff <2x LOR	----		
zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----		
<b>Dissolved Metals (QC Lot: 79608)</b>											
VA20B3846-001	FIELD BLANK	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Volatile Organic Compounds (QC Lot: 80458)</b>											
VA20B3842-017	Anonymous	benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, m+p-	179601 23 1	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----

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 Work Order : VA20B3846  
 Client : ERM Consultants Canada Ltd.  
 Project : 0539378-0012



Sub-Matrix: <b>Water</b>					<i>Laboratory Duplicate (DUP) Report</i>						
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Original Result</i>	<i>Duplicate Result</i>	<i>RPD(%) or Difference</i>	<i>Duplicate Limits</i>	<i>Qualifier</i>
<b>Hydrocarbons (QC Lot: 80457)</b>											
VA20B3842-017	Anonymous	VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.00%	30%	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

### Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 78554)</b>						
alkalinity, bicarbonate (as CaCO <sub>3</sub> )	----	E290	1	mg/L	<1.0	----
alkalinity, carbonate (as CaCO <sub>3</sub> )	----	E290	1	mg/L	<1.0	----
alkalinity, hydroxide (as CaCO <sub>3</sub> )	----	E290	1	mg/L	<1.0	----
alkalinity, total (as CaCO <sub>3</sub> )	----	E290	1	mg/L	<1.0	----
<b>Physical Tests (QCLot: 78555)</b>						
conductivity	----	E100	1	µS/cm	<1.0	----
<b>Physical Tests (QCLot: 78556)</b>						
acidity (as CaCO <sub>3</sub> )	----	E283	2	mg/L	<2.0	----
<b>Physical Tests (QCLot: 78563)</b>						
colour, true	----	E329	5	CU	<5.0	----
<b>Physical Tests (QCLot: 78566)</b>						
turbidity	----	E121	0.1	NTU	<0.10	----
<b>Physical Tests (QCLot: 78591)</b>						
solids, total suspended [TSS]	----	E160-H	3	mg/L	<3.0	----
<b>Physical Tests (QCLot: 78592)</b>						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
<b>Anions and Nutrients (QCLot: 78557)</b>						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
<b>Anions and Nutrients (QCLot: 78558)</b>						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
<b>Anions and Nutrients (QCLot: 78559)</b>						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
<b>Anions and Nutrients (QCLot: 78560)</b>						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 78561)</b>						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 78562)</b>						
sulfate (as SO <sub>4</sub> )	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
<b>Anions and Nutrients (QCLot: 78564)</b>						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 78803)</b>						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
<b>Anions and Nutrients (QCLot: 78805)</b>						



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Anions and Nutrients (QCLot: 78805) - continued</b>						
nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
<b>Anions and Nutrients (QCLot: 78806)</b>						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
<b>Anions and Nutrients (QCLot: 78807)</b>						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
<b>Cyanides (QCLot: 79375)</b>						
cyanide, weak acid dissociable	----	E336	0.002	mg/L	<0.0020	----
<b>Cyanides (QCLot: 79376)</b>						
cyanide, free	----	E339	0.002	mg/L	<0.0020	----
<b>Cyanides (QCLot: 79377)</b>						
cyanide, strong acid dissociable (total)	----	E333	0.002	mg/L	<0.0020	----
<b>Organic / Inorganic Carbon (QCLot: 78804)</b>						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
<b>Organic / Inorganic Carbon (QCLot: 79212)</b>						
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
<b>Total Metals (QCLot: 78886)</b>						
aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----





Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Total Metals (QCLot: 78886) - continued</b>						
selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
<b>Total Metals (QCLot: 78887)</b>						
chromium, total	7440-47-3	E420.Cr-L	0.0001	mg/L	<0.00010	----
<b>Total Metals (QCLot: 79427)</b>						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
<b>Total Metals (QCLot: 79428)</b>						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
<b>Dissolved Metals (QCLot: 78985)</b>						
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	<0.00010	----
<b>Dissolved Metals (QCLot: 78986)</b>						
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 78986) - continued</b>						
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
<b>Dissolved Metals (QCLot: 79608)</b>						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
<b>Volatile Organic Compounds (QCLot: 80458)</b>						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	----
styrene	100-42-5	E611A	0.5	µg/L	<0.50	----
toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	<0.50	----
xylene, o-	95-47-6	E611A	0.5	µg/L	<0.50	----
<b>Hydrocarbons (QCLot: 80222)</b>						
EPH (C10-C19)	----	E601A	250	µg/L	<250	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	----
<b>Hydrocarbons (QCLot: 80457)</b>						
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 80223)</b>						
acenaphthene	83-32-9	E641A	0.01	µg/L	<0.010	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 80223) - continued</b>						
acenaphthylene	208-96-8	E641A	0.01	µg/L	<0.010	---
acridine	260-94-6	E641A	0.01	µg/L	<0.010	---
anthracene	120-12-7	E641A	0.01	µg/L	<0.010	---
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	<0.010	---
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	---
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	<0.010	---
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	---
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	<0.010	---
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	<0.010	---
chrysene	218-01-9	E641A	0.01	µg/L	<0.010	---
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	<0.0050	---
fluoranthene	206-44-0	E641A	0.01	µg/L	<0.010	---
fluorene	86-73-7	E641A	0.01	µg/L	<0.010	---
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	<0.010	---
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	<0.010	---
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	<0.010	---
naphthalene	91-20-3	E641A	0.05	µg/L	<0.050	---
phenanthrene	85-01-8	E641A	0.02	µg/L	<0.020	---
pyrene	129-00-0	E641A	0.01	µg/L	<0.010	---
quinoline	6027-02-7	E641A	0.05	µg/L	<0.050	---



## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Physical Tests (QCLot: 78553)</b>									
pH	---	E108	---	pH units	7 pH units	100	98.0	102	---
<b>Physical Tests (QCLot: 78554)</b>									
alkalinity, total (as CaCO <sub>3</sub> )	---	E290	1	mg/L	500 mg/L	102	85.0	115	---
<b>Physical Tests (QCLot: 78555)</b>									
conductivity	---	E100	1	µS/cm	146.9 µS/cm	101	90.0	110	---
<b>Physical Tests (QCLot: 78556)</b>									
acidity (as CaCO <sub>3</sub> )	---	E283	2	mg/L	50 mg/L	103	85.0	115	---
<b>Physical Tests (QCLot: 78563)</b>									
colour, true	---	E329	5	CU	100 CU	95.1	85.0	115	---
<b>Physical Tests (QCLot: 78566)</b>									
turbidity	---	E121	0.1	NTU	200 NTU	100	85.0	115	---
<b>Physical Tests (QCLot: 78591)</b>									
solids, total suspended [TSS]	---	E160-H	3	mg/L	150 mg/L	96.2	85.0	115	---
<b>Physical Tests (QCLot: 78592)</b>									
solids, total dissolved [TDS]	---	E162	10	mg/L	1000 mg/L	102	85.0	115	---
<b>Anions and Nutrients (QCLot: 78557)</b>									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	100	90.0	110	---
<b>Anions and Nutrients (QCLot: 78558)</b>									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	99.6	90.0	110	---
<b>Anions and Nutrients (QCLot: 78559)</b>									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	104	85.0	115	---
<b>Anions and Nutrients (QCLot: 78560)</b>									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	101	90.0	110	---
<b>Anions and Nutrients (QCLot: 78561)</b>									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	98.7	90.0	110	---
<b>Anions and Nutrients (QCLot: 78562)</b>									
sulfate (as SO <sub>4</sub> )	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	101	90.0	110	---
<b>Anions and Nutrients (QCLot: 78564)</b>									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	97.6	80.0	120	---
<b>Anions and Nutrients (QCLot: 78803)</b>									
Kjeldahl nitrogen, total [TKN]	---	E318	0.05	mg/L	4 mg/L	96.8	75.0	125	---
<b>Anions and Nutrients (QCLot: 78805)</b>									



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 78805) - continued</b>									
nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	101	75.0	125	----
<b>Anions and Nutrients (QCLot: 78806)</b>									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	95.8	80.0	120	----
<b>Anions and Nutrients (QCLot: 78807)</b>									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.12 mg/L	96.3	85.0	115	----
<b>Cyanides (QCLot: 79375)</b>									
cyanide, weak acid dissociable	----	E336	0.002	mg/L	0.125 mg/L	97.0	80.0	120	----
<b>Cyanides (QCLot: 79376)</b>									
cyanide, free	----	E339	0.002	mg/L	0.125 mg/L	93.8	80.0	120	----
<b>Cyanides (QCLot: 79377)</b>									
cyanide, strong acid dissociable (total)	----	E333	0.002	mg/L	0.25 mg/L	93.0	80.0	120	----
<b>Organic / Inorganic Carbon (QCLot: 78804)</b>									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	95.4	80.0	120	----
<b>Organic / Inorganic Carbon (QCLot: 79212)</b>									
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	110	80.0	120	----
<b>Total Metals (QCLot: 78886)</b>									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	108	80.0	120	----
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	106	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	104	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	102	80.0	120	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	110	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	99.9	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	104	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	104	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	104	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	104	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	102	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	102	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	106	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	102	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	101	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	103	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	105	80.0	120	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Total Metals (QCLot: 78886) - continued</b>									
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	117	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	107	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	107	80.0	120	----
silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	101	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	102	80.0	120	----
sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	105	80.0	120	----
strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	104	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	100	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	104	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	102	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	98.3	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	102	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	106	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	98.5	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	101	80.0	120	----
<b>Total Metals (QCLot: 78887)</b>									
chromium, total	7440-47-3	E420.Cr-L	0.0001	mg/L	0.25 mg/L	104	80.0	120	----
<b>Total Metals (QCLot: 79427)</b>									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	101	80.0	120	----
<b>Total Metals (QCLot: 79428)</b>									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	94.9	80.0	120	----
<b>Dissolved Metals (QCLot: 78985)</b>									
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	0.25 mg/L	106	80.0	120	----
<b>Dissolved Metals (QCLot: 78986)</b>									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	106	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	100	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	102	80.0	120	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	110	80.0	120	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	105	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	110	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	107	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	106	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	108	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	104	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	101	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	103	80.0	120	----



Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 78986) - continued</b>									
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	104	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	106	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	107	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	104	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	105	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	104	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	110	70.0	130	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	104	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	105	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	109	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	102	80.0	120	----
sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	114	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	107	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	106	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	104	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	102	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	99.2	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	108	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	107	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	106	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	109	80.0	120	----
<b>Dissolved Metals (QCLot: 79608)</b>									
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	92.6	80.0	120	----
<b>Volatile Organic Compounds (QCLot: 80458)</b>									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	92.7	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	85.1	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	108	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	85.0	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	89.9	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.5	µg/L	200 µg/L	90.8	70.0	130	----
xylene, o-	95-47-6	E611A	0.5	µg/L	100 µg/L	88.9	70.0	130	----
<b>Hydrocarbons (QCLot: 80222)</b>									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	120	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	114	70.0	130	----
<b>Hydrocarbons (QCLot: 80457)</b>									



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Hydrocarbons (QCLot: 80457) - continued</b>									
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	92.1	70.0	130	----
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 80223)</b>									
acenaphthene	83-32-9	E641A	0.01	µg/L	0.5 µg/L	109	60.0	130	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5 µg/L	110	60.0	130	----
acridine	260-94-6	E641A	0.01	µg/L	0.5 µg/L	100.0	60.0	130	----
anthracene	120-12-7	E641A	0.01	µg/L	0.5 µg/L	110	60.0	130	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5 µg/L	106	60.0	130	----
benzo(a)pyrene	50-32-8	E641A	0 005	µg/L	0.5 µg/L	114	60.0	130	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	0.5 µg/L	110	60.0	130	----
benzo(b+j+k)fluoranthene	----	E641A	0 015	µg/L	1 µg/L	115	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5 µg/L	116	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5 µg/L	119	60.0	130	----
chrysene	218-01-9	E641A	0.01	µg/L	0.5 µg/L	113	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A	0 005	µg/L	0.5 µg/L	119	60.0	130	----
fluoranthene	206-44-0	E641A	0.01	µg/L	0.5 µg/L	111	60.0	130	----
fluorene	86-73-7	E641A	0.01	µg/L	0.5 µg/L	101	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5 µg/L	116	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5 µg/L	107	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	0.5 µg/L	101	60.0	130	----
naphthalene	91-20-3	E641A	0.05	µg/L	0.5 µg/L	102	50.0	130	----
phenanthrene	85-01-8	E641A	0.02	µg/L	0.5 µg/L	106	60.0	130	----
pyrene	129-00-0	E641A	0.01	µg/L	0.5 µg/L	115	60.0	130	----
quinoline	6027-02-7	E641A	0.05	µg/L	0.5 µg/L	119	60.0	130	----





## Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	Target		Low	High	
<b>Anions and Nutrients (QCLot: 78557)</b>										
VA20B3846-002	JM7	chloride	16887-00-6	E235.Cl	101 mg/L	100 mg/L	101	75.0	125	----
<b>Anions and Nutrients (QCLot: 78558)</b>										
VA20B3846-002	JM7	fluoride	16984-48-8	E235.F	1.00 mg/L	1 mg/L	100	75.0	125	----
<b>Anions and Nutrients (QCLot: 78559)</b>										
VA20B3846-002	JM7	bromide	24959-67-9	E235.Br-L	0.510 mg/L	0.5 mg/L	102	75.0	125	----
<b>Anions and Nutrients (QCLot: 78560)</b>										
VA20B3846-002	JM7	nitrate (as N)	14797-55-8	E235.NO3-L	2.53 mg/L	2.5 mg/L	101	75.0	125	----
<b>Anions and Nutrients (QCLot: 78561)</b>										
VA20B3846-002	JM7	nitrite (as N)	14797-65-0	E235.NO2-L	0.496 mg/L	0.5 mg/L	99.2	75.0	125	----
<b>Anions and Nutrients (QCLot: 78562)</b>										
VA20B3846-002	JM7	sulfate (as SO4)	14808-79-8	E235.SO4	100 mg/L	100 mg/L	100	75.0	125	----
<b>Anions and Nutrients (QCLot: 78564)</b>										
VA20B3846-002	JM7	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0305 mg/L	0.03 mg/L	102	70.0	130	----
<b>Anions and Nutrients (QCLot: 78803)</b>										
VA20B3842-022	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	2.51 mg/L	2.5 mg/L	100	70.0	130	----
<b>Anions and Nutrients (QCLot: 78805)</b>										
VA20B3842-022	Anonymous	nitrogen, total	7727-37-9	E366	0.396 mg/L	0.4 mg/L	98.9	70.0	130	----
<b>Anions and Nutrients (QCLot: 78806)</b>										
VA20B3842-022	Anonymous	phosphorus, total	7723-14-0	E372-U	0.0485 mg/L	0.05 mg/L	97.0	70.0	130	----
<b>Anions and Nutrients (QCLot: 78807)</b>										
VA20B3842-022	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.210 mg/L	0.2 mg/L	105	75.0	125	----
<b>Cyanides (QCLot: 79375)</b>										
VA20B3846-002	JM7	cyanide, weak acid dissociable	----	E336	0.129 mg/L	0.125 mg/L	103	75.0	125	----
<b>Cyanides (QCLot: 79376)</b>										
VA20B3846-002	JM7	cyanide, free	----	E339	0.126 mg/L	0.125 mg/L	101	75.0	125	----
<b>Cyanides (QCLot: 79377)</b>										
VA20B3846-002	JM7	cyanide, strong acid dissociable (total)	----	E333	0.270 mg/L	0.25 mg/L	108	75.0	125	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Lab rat ry sample ID	Client sample ID	Analyte	CAS Number	Method	C n entrati n	Target	MS	L w	High	Qualifier
<b>Organic / Inorganic Carbon (QCLot: 78804)</b>										
VA20B3842-022	Anonymous	carbon, total organic [TOC]	----	E355-L	4.90 mg/L	5 mg/L	98.0	70 0	130	----
<b>Organic / Inorganic Carbon (QCLot: 79212)</b>										
VA20B3846-002	JM7	carbon, dissolved organic [DOC]	----	E358-L	5.01 mg/L	5 mg/L	100	70 0	130	----
<b>Total Metals (QCLot: 78886)</b>										
VA20B3846-002	JM7	aluminum, total	7429-90-5	E420	0.217 mg/L	0.2 mg/L	109	70 0	130	----
		antimony, total	7440-36-0	E420	0.0205 mg/L	0.02 mg/L	102	70 0	130	----
		arsenic, total	7440-38-2	E420	0.0209 mg/L	0.02 mg/L	105	70 0	130	----
		barium, total	7440-39-3	E420	ND mg/L	0.02 mg/L	ND	70 0	130	----
		beryllium, total	7440-41-7	E420	0.0394 mg/L	0.04 mg/L	98.4	70 0	130	----
		bismuth, total	7440-69-9	E420	0.0102 mg/L	0.01 mg/L	102	70 0	130	----
		boron, total	7440-42-8	E420	0.099 mg/L	0.1 mg/L	99.3	70 0	130	----
		cadmium, total	7440-43-9	E420	0.00420 mg/L	0.004 mg/L	105	70 0	130	----
		calcium, total	7440-70-2	E420	ND mg/L	4 mg/L	ND	70 0	130	----
		cobalt, total	7440-48-4	E420	0.0214 mg/L	0.02 mg/L	107	70 0	130	----
		copper, total	7440-50-8	E420	ND mg/L	0.02 mg/L	ND	70 0	130	----
		iron, total	7439-89-6	E420	2.14 mg/L	2 mg/L	107	70 0	130	----
		lead, total	7439-92-1	E420	0.0195 mg/L	0.02 mg/L	97.7	70 0	130	----
		lithium, total	7439-93-2	E420	0.110 mg/L	0.1 mg/L	110	70 0	130	----
		magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70 0	130	----
		manganese, total	7439-96-5	E420	ND mg/L	0.02 mg/L	ND	70 0	130	----
		molybdenum, total	7439-98-7	E420	0.0204 mg/L	0.02 mg/L	102	70 0	130	----
		nickel, total	7440-02-0	E420	0.0426 mg/L	0.04 mg/L	106	70 0	130	----
		phosphorus, total	7723-14-0	E420	11.5 mg/L	10 mg/L	115	70 0	130	----
		potassium, total	7440-09-7	E420	4.27 mg/L	4 mg/L	107	70 0	130	----
		selenium, total	7782-49-2	E420	0.0422 mg/L	0.04 mg/L	106	70 0	130	----
		silicon, total	7440-21-3	E420	9.25 mg/L	10 mg/L	92.5	70 0	130	----
		silver, total	7440-22-4	E420	0.00408 mg/L	0.004 mg/L	102	70 0	130	----
		sodium, total	7440-23-5	E420	2.12 mg/L	2 mg/L	106	70 0	130	----
		strontium, total	7440-24-6	E420	ND mg/L	0.02 mg/L	ND	70 0	130	----
		sulfur, total	7704-34-9	E420	21.2 mg/L	20 mg/L	106	70 0	130	----
		thallium, total	7440-28-0	E420	0.00397 mg/L	0.004 mg/L	99.2	70 0	130	----
		tin, total	7440-31-5	E420	0.0200 mg/L	0.02 mg/L	100	70 0	130	----
		titanium, total	7440-32-6	E420	0.0417 mg/L	0.04 mg/L	104	70 0	130	----
		uranium, total	7440-61-1	E420	0.00391 mg/L	0.004 mg/L	97.7	70 0	130	----
		vanadium, total	7440-62-2	E420	0.101 mg/L	0.1 mg/L	101	70 0	130	----
		zinc, total	7440-66-6	E420	0.399 mg/L	0.4 mg/L	99.8	70 0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Lab rat ry sample ID	Client sample ID	Analyte	CAS Number	Method	C n entrati n	Target	MS	L w	High	Qualifier
<b>Total Metals (QCLot: 78886) - continued</b>										
VA20B3846-002	JM7	zirconium, total	7440-67-7	E420	0.0418 mg/L	0.04 mg/L	105	70.0	130	----
<b>Total Metals (QCLot: 78887)</b>										
VA20B3846-002	JM7	chromium, total	7440-47-3	E420.Cr-L	0.0419 mg/L	0.04 mg/L	105	70.0	130	----
<b>Total Metals (QCLot: 79427)</b>										
VA20B3842-003	Anonymous	mercury, total	7439-97-6	E508	0.000102 mg/L	0.0001 mg/L	102	70.0	130	----
<b>Total Metals (QCLot: 79428)</b>										
VA20B3848-001	Anonymous	mercury, total	7439-97-6	E508	0.0000979 mg/L	0.0001 mg/L	97.9	70.0	130	----
<b>Dissolved Metals (QCLot: 78985)</b>										
VA20B3846-002	JM7	chromium, dissolved	7440-47-3	E421.Cr-L	0.0372 mg/L	0.04 mg/L	93.0	70.0	130	----
<b>Dissolved Metals (QCLot: 78986)</b>										
VA20B3846-002	JM7	aluminum, dissolved	7429-90-5	E421	0.190 mg/L	0.2 mg/L	95.0	70.0	130	----
		antimony, dissolved	7440-36-0	E421	0.0199 mg/L	0.02 mg/L	99.4	70.0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0185 mg/L	0.02 mg/L	92.5	70.0	130	----
		barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		beryllium, dissolved	7440-41-7	E421	0.0396 mg/L	0.04 mg/L	99.1	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00950 mg/L	0.01 mg/L	95.0	70.0	130	----
		boron, dissolved	7440-42-8	E421	0.098 mg/L	0.1 mg/L	98.3	70.0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00391 mg/L	0.004 mg/L	97.7	70.0	130	----
		calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		cobalt, dissolved	7440-48-4	E421	0.0189 mg/L	0.02 mg/L	94.7	70.0	130	----
		copper, dissolved	7440-50-8	E421	0.0188 mg/L	0.02 mg/L	93.8	70.0	130	----
		iron, dissolved	7439-89-6	E421	1.89 mg/L	2 mg/L	94.6	70.0	130	----
		lead, dissolved	7439-92-1	E421	0.0191 mg/L	0.02 mg/L	95.6	70.0	130	----
		lithium, dissolved	7439-93-2	E421	0.104 mg/L	0.1 mg/L	104	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, dissolved	7439-96-5	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	0.0195 mg/L	0.02 mg/L	97.6	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0379 mg/L	0.04 mg/L	94.7	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	10.0 mg/L	10 mg/L	100	70.0	130	----
		potassium, dissolved	7440-09-7	E421	3.75 mg/L	4 mg/L	93.7	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0407 mg/L	0.04 mg/L	102	70.0	130	----
		silicon, dissolved	7440-21-3	E421	9.27 mg/L	10 mg/L	92.7	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00392 mg/L	0.004 mg/L	97.9	70.0	130	----
		sodium, dissolved	7440-23-5	E421	2.11 mg/L	2 mg/L	106	70.0	130	----
		strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 78986) - continued</b>										
VA20B3846-002	JM7	sulfur, dissolved	7704-34-9	E421	19.8 mg/L	20 mg/L	98.8	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00382 mg/L	0.004 mg/L	95.4	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0196 mg/L	0.02 mg/L	97.8	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0373 mg/L	0.04 mg/L	93.2	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.00391 mg/L	0.004 mg/L	97.8	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.0979 mg/L	0.1 mg/L	97.9	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.395 mg/L	0.4 mg/L	98.8	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0423 mg/L	0.04 mg/L	106	70.0	130	----
<b>Dissolved Metals (QCLot: 79608)</b>										
VA20B3846-002	JM7	mercury, dissolved	7439-97-6	E509	0.0000904 mg/L	0.0001 mg/L	90.4	70.0	130	----
<b>Volatile Organic Compounds (QCLot: 80458)</b>										
VA20B3846-006	JM1	benzene	71-43-2	E611A	101 µg/L	100 µg/L	101	60.0	140	----
		ethylbenzene	100-41-4	E611A	92.7 µg/L	100 µg/L	92.7	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	113 µg/L	100 µg/L	113	60.0	140	----
		styrene	100-42-5	E611A	94.3 µg/L	100 µg/L	94.3	60.0	140	----
		toluene	108-88-3	E611A	95.8 µg/L	100 µg/L	95.8	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	200 µg/L	200 µg/L	99.8	60.0	140	----
		xylene, o-	95-47-6	E611A	96.4 µg/L	100 µg/L	96.4	60.0	140	----
<b>Hydrocarbons (QCLot: 80457)</b>										
VA20B3846-002	JM7	VHw (C6-C10)	----	E581.VH+F1	6180 µg/L	6310 µg/L	98.0	60.0	140	----



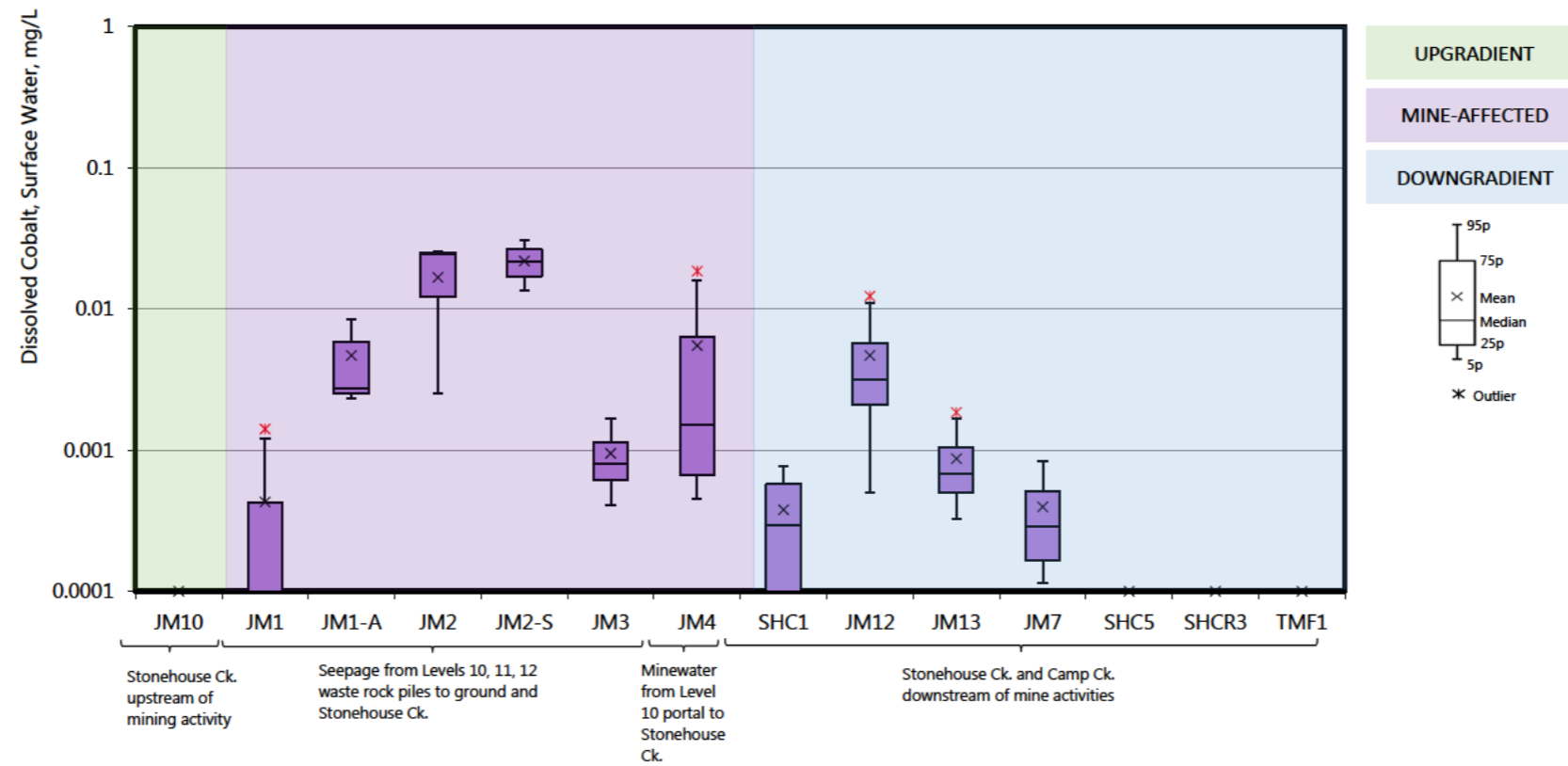




**wood.**

**Appendix E**  
**Box Plot Data Surface Water Monitoring**

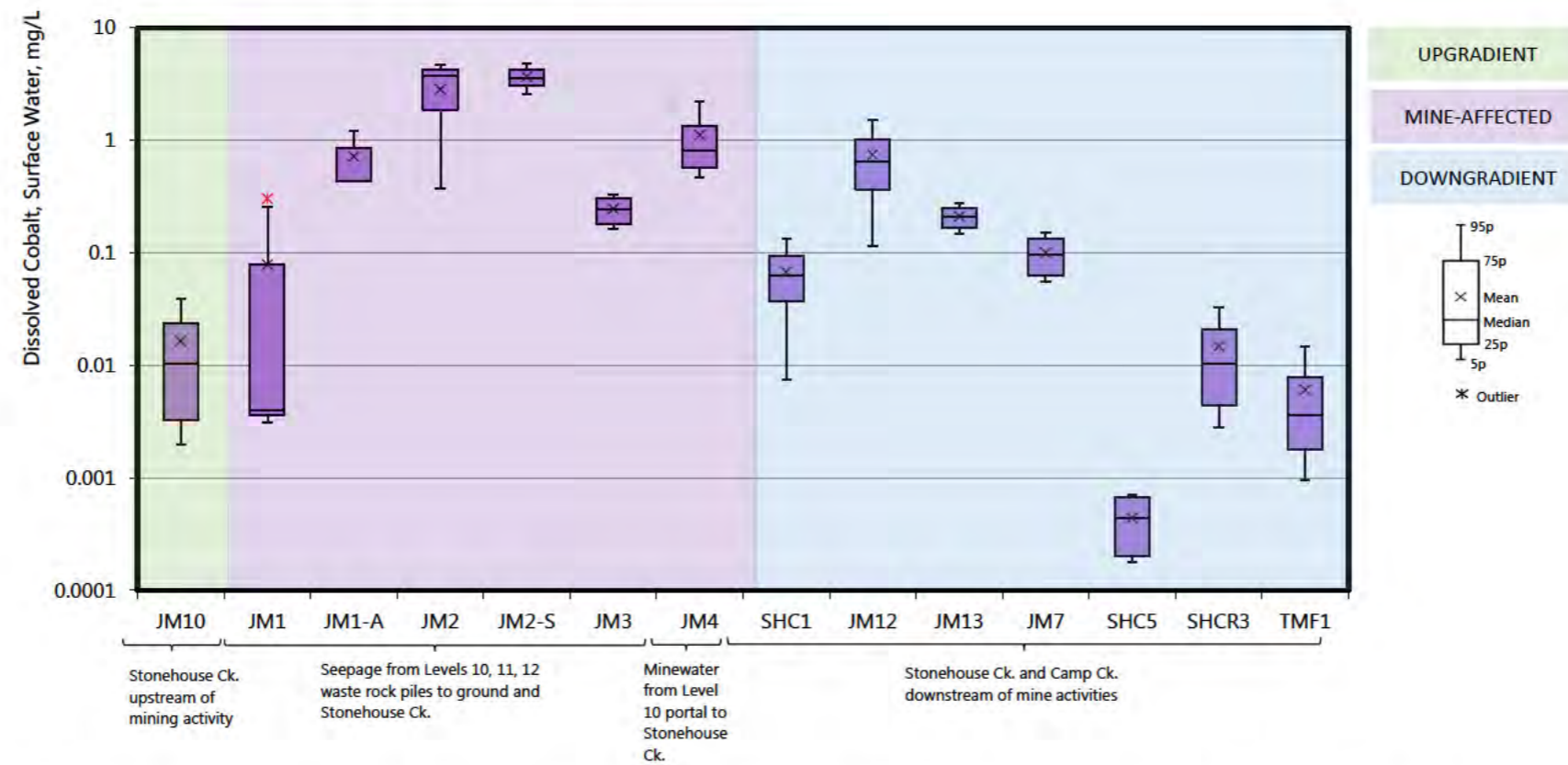
# Box Plot - Cobalt in Surface Water



Monitoring Well	JM10	JM1	JM1-A	JM2	JM2-S	JM3	JM4	SHC1	JM12	JM13	JM7	SHC5	SHCR3	TMF1
Min	0.000	0.000	0.002	0.000	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Q <sub>1</sub>	0.000	0.000	0.003	0.012	0.017	0.001	0.001	0.000	0.002	0.001	0.000	0.000	0.000	0.000
Median	0.000	0.000	0.003	0.024	0.022	0.001	0.002	0.000	0.003	0.001	0.000	0.000	0.000	0.000
Q <sub>3</sub>	0.000	0.000	0.006	0.025	0.026	0.001	0.006	0.001	0.006	0.001	0.001	0.000	0.000	0.000
Max	0.000	0.001	0.009	0.026	0.031	0.002	0.019	0.001	0.012	0.002	0.001	0.000	0.000	0.000
IQR	0.000	0.000	0.003	0.013	0.009	0.001	0.006	0.000	0.004	0.001	0.000	0.000	0.000	0.000
Upper Outliers	0.000	1.000	0.000	0.000	0.000	0.000	1.000	0.000	1.000	1.000	0.000	0.000	0.000	0.000
Lower Outliers	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
<b>For the Box (IQR and Median)</b>														
Q <sub>2</sub> -Q <sub>1</sub>	0	0	0.00022	0.0121	0.0044	0.000185	0.000862	0.000195	0.0	0.00017	0.000118	0	0	0
Q <sub>3</sub> -Q <sub>2</sub>	0	0.000328	0.00313	0.0007	0.00495	0.000333	0.004824	0.000278	0.002585	0.000365	0.000228	0	0	0
<b>For the Whiskers</b>														
Q <sub>3</sub> +1.5*IQR	0.0001	0.000919	0.010895	0.0442	0.040475	0.001909	0.014879	0.001281	0.01122	0.001843	0.00103	0.0001	0.0001	0.0001
Q <sub>1</sub> -1.5*IQR	0.0001	-0.00039	-0.00251	-0.007	0.003075	-0.00016	-0.00787	-0.00061	-0.00338	-0.0003	-0.00035	0.0001	0.0001	0.0001
5P	0.0001	0.001214	0.008374	0.02556	0.03041	0.001691	0.01607	0.000771	0.010989	0.001688	0.000831	0.0001	0.0001	0.0001
95P	0.0001	0.0001	0.002344	0.00252	0.01358	0.000411	0.000453	0.0001	0.000499	0.000325	0.000114	0.0001	0.0001	0.0001
W <sub>upper</sub> -Q <sub>3</sub>	0	0.000786	0.002504	0.00056	0.00396	0.000558	0.00972	0.000198	0.005244	0.000648	0.000318	0	0	0
Q <sub>1</sub> -W <sub>lower</sub>	0	0	0.000176	0.00968	0.00352	0.000204	0.000211	0	0.001596	0.00018	0.000054	0	0	0
Mean	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Data Table</b>														
	0.0001	0.00141	0.009	0.0257	0.0314	0.0009	0.0004	0.0001	0.0001	0.00058	0.00038	0.0001	0.0001	0.0001
	0.0001	0.0001	0.0023	0.0243	0.0215	0.00036	0.0185	0.00082	0.0123	0.00028	0.0001	0.0001	0.0001	0.0001
	0.0001	0.0001				0.00183	0.0023	0.00049	0.00276	0.00185	0.00091	0.0001	0.0001	0.0001
	0.0001	0.0001	0.00274	0.0001	0.0127	0.0007	0.000752	0.0001	0.00356	0.00077	0.00019	0.0001	0.0001	0.0001



# Box Plot - Manganese in Surface Water



Monitoring Well	JM10	JM1	JM1-A	JM2	JM2-S	JM3	JM4	SHC1	JM12	JM13	JM7	SHC5	SHCR3	TMF1
Min	0.002	0.003	0.430	0.005	2.480	0.160	0.438	0.000	0.053	0.141	0.054	0.000	0.002	0.001
Q <sub>1</sub>	0.003	0.004	0.432	1.858	3.020	0.180	0.572	0.037	0.366	0.167	0.062	0.000	0.004	0.002
Median	0.010	0.004	0.433	3.710	3.560	0.242	0.808	0.063	0.639	0.208	0.095	0.000	0.010	0.004
Q <sub>3</sub>	0.023	0.079	0.862	4.235	4.255	0.308	1.350	0.094	1.016	0.250	0.133	0.001	0.021	0.008
Max	0.043	0.302	1.290	4.760	4.950	0.337	2.400	0.144	1.640	0.281	0.155	0.001	0.036	0.016
IQR	0.020	0.075	0.430	2.377	1.235	0.128	0.779	0.057	0.650	0.084	0.071	0.000	0.016	0.006
Upper Outliers	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Lower Outliers	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

For the Box (IQR and Median)														
Q <sub>2</sub> -Q <sub>1</sub>	0.00708	0.00047	0.0015	1.85244	0.54	0.0625	0.2365	0.02617	0.3	0.041	0.03328	0.00024	0.00609	0.00182
Q <sub>3</sub> -Q <sub>2</sub>	0.01303	0.07471	0.4285	0.525	0.695	0.06575	0.542	0.03065	0.377	0.04275	0.0379	0.00024	0.01038	0.00425

For the Whiskers														
Q <sub>3</sub> +1.5*IQR	0.05355	0.19151	1.5065	7.80116	6.1075	0.50013	2.51775	0.17898	1.99138	0.37588	0.24001	0.0014	0.04552	0.01698
Q <sub>1</sub> -1.5*IQR	-0.02685	-0.1092	-0.2135	-1.7086	1.1675	-0.01288	-0.59625	-0.0483	-0.60963	0.04088	-0.04469	-0.00052	-0.02034	-0.00732
5P	0.039	0.25735	1.2043	4.655	4.811	0.33115	2.19	0.13395	1.5152	0.27485	0.15065	0.0007	0.03265	0.01453
95P	0.00198	0.00311	0.4303	0.37561	2.588	0.1639	0.4647	0.00748	0.11555	0.1461	0.05578	0.00018	0.00282	0.00096
W <sub>upper</sub> -Q <sub>3</sub>	0.0156	0.17861	0.3428	0.42	0.556	0.0234	0.84	0.0402	0.4992	0.0246	0.0174	2.4E-05	0.01182	0.00667
Q <sub>1</sub> -W <sub>lower</sub>	0.00132	0.00045	0.0012	1.48195	0.432	0.0156	0.1068	0.02945	0.2502	0.0204	0.0063	2.4E-05	0.00154	0.00083
Mean	0.0	0.1	0.7	2.8	3.7	0.2	1.1	0.1	0.7	0.2	0.1	0.0	0.0	0.0

Data Table														
	0.0429	0.302	1.29	4.76	4.95	0.337	0.438	0.0492	0.053	0.24	0.126	0.00017	0.00244	0.00509
	0.0169	0.00432	0.43	3.71	3.56	0.186	2.4	0.144	1.64	0.175	0.0647	0.00021	0.0356	0.00075
	0.00165	0.00375				0.298	0.616	0.077	0.808	0.281	0.155	0.00071	0.0159	0.0162
	0.00385	0.003	0.433	0.00512	2.48	0.16	1	0.00012	0.47	0.141	0.0542	0.00067	0.005	0.00214

APPENDIX K            JOHNNY MOUNTAIN MINE REVEGETATION MONITORING 2020  
(RTEC 2021F)



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## Memorandum

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To Elizabeth F. Miller, M.Sc., R.P.Bio.,  
Vice President Environment and Social Responsibility (ESR)

From Wade Brunham, M.Sc. PWS, R.P.Bio. and Shannon Seahra, Ph.D.

Date 15 March 2021

Subject Johnny Mountain Mine Revegetation Monitoring 2020

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### 1. INTRODUCTION

The Johnny Mountain Mine (JMM) is a closed underground gold mine located in the Coast Mountain Range of British Columbia, approximately 100 km northwest of Stewart, BC. The JMM is on a sub-alpine plateau near the confluence of the Craig and Iskut Rivers on the northwest face of Johnny Mountain. It is located in the Mountain Hemlock moist maritime subzone leeward variant (MHmm2p) and the Coastal Mountain-heather Alpine Zone Undifferentiated (CMAun) biogeoclimatic units, and is characterized by long, moist, cold winters and short, cool, moist summers. Limited amounts of vegetation have established on the JMM site, even though the site has not been actively used for over 20 years. Vegetation is naturally sparse in this area as the northwest face of Johnny Mountain is covered by an alpine glacier which results in cold air drainage downslope to the former mine site. Therefore, coniferous trees are largely absent and most of the area is comprised of heathers, herbs, and low shrub species (RTEC 2019). Factors limiting vegetation establishment include:

- soil compaction and the high coarse fragment content (CFC) of the runway (surface soils are characterized as predominantly clayey gravels with cobbles; Wood 2019);
- low temperatures ;
- snow cover from October - June;
- very little naturally occurring topsoil;
- low soil moisture regime (0 to 1); and
- a very poor soil nutrient regime (very poor; Green and Klinka 1994).

In July 2019, a set of revegetation trials was established at the north end of the decommissioned airstrip. The northern end of the airstrip was selected to conduct the reclamation trials because it is relatively isolated from the historic mine area and is unlikely to be disturbed by other reclamation activities. The airstrip is also the largest single feature that will be reclaimed at 5.27 ha.

The objective of the trials was to evaluate potential revegetation methods for the site that achieve the closure and reclamation goals from the Updated Closure Plan (RTEC 2020), specifically of revegetating disturbed lands through the development of self-sustaining natural successional processes, and to develop vegetative cover that provide stable and productive wildlife habitat. The trial methods were designed to provide some grass cover while allowing natural ingress and establishment of other native plant species. Based on estimates in the field at the time of the revegetation trials, the soil in the trial area is a silty loam with 60 to 70% CFC and has less than 1% organic matter content (RTEC 2019).

In the revegetation trials, four treatment plots were established that included seeding native grasses at four different rates and transplanting plugs of alpine vegetation (Treatment 1 only; Table 1). The rough and loose technique (Polster 2013) was applied during site preparation prior to seeding/planting by using an excavator to dig a bucket sized hole, and leaving the material mounded at the side of the hole (RTEC 2019). The treatments were applied using two different mounding depths (Table 1) to compare the influence of site preparation on native plant establishment.

Table 1: Planting Site Types, Species, Spacing, and Seeding Rates Applied in 2019 for Four Treatments in Revegetation Trial Plots at JMM.

Treatment	Area (m <sup>2</sup> )	Rough and Loose <sup>1</sup>	Seeding Rate (kg/ha)	Total Planted	Plants/ha	Plant Spacing (m)
Treatment 1	852	Shallow mounds	5	192	2,253	2.1
Treatment 2	887	Shallow mounds	10	0	0	0
Treatment 3	824	Deep mounds	15	0	0	0
Treatment 4	870	Deep mounds	20	0	0	0
Total Area	3,434					

<sup>1</sup> Height difference between the top of the mound and the depression was approximately 0.5 m for shallow mounds and 1 m for deep mounds.

Transplanted plugs were collected from native ecosystems 350m east of the airstrip, adjacent to the exploration road, with drier soil moisture conditions (RTEC 2019). The plugs contained the following plant species in declining order of abundance; the last two species in the list represent only a few individuals:

- Pink mountain-heather - *Phyllodoce empetrifomis*;
- Yellow mountain-heather - *Phyllodoce glanduliflora*;
- White mountain-heather - *Cassiope mertensiana*;
- Partridgefoot - *Luetkea pectinate*;
- Bilberry - *Vaccinium*;
- Altai fescue - *Festuca altaica*;
- Arctic raspberry - *Rubus arcticus*;
- Green reindeer lichen - *Cladina mitis*;
- Curly heron's-bill moss - *Dicranum fuscescens*;
- Sedge species - *Carex* sp.;
- Green alder - *Alnus viridis*; and
- Mountain hemlock - *Tsuga mertensiana*.

Grass species selected for seeding were chosen based on their occurrence in the MHmm2p as well as their availability from nurseries or seed suppliers and included:

- 10% Canada blue joint grass - *Calamagrostis canadensis*;
- 70% Rocky mountain fescue - *Festuca saximontana*; and
- 20% Alpine blue grass - *Poa alpine*.

## 2. OBJECTIVES

The objective of this study was to describe the 2020 monitoring activities, summarize observations of vegetation establishment in the trial plots, and provide a preliminary evaluation on the success of the 2019 reclamation trails in establishing native vegetation.

## 3. METHODS

Monitoring surveys were conducted on July 9, 2020 and September 7, 2020. In July 2020, four 5.64 m radius circular plots were randomly selected in each of the four treatment plots for a total of 16 5.6 m radius circular plots for the site. Within each of these plots, a smaller, 2 m radius plot was established at the centre. Within the 2 m radius plot, three 1 m<sup>2</sup> subplots were randomly selected to survey. The detailed monitoring protocol is included as Appendix A.

During the July 2020 survey, the following variables were measured in each of the four treatments:

- In 2 m radius plots, stem counts of:
  - shrubs, and
  - herbs.
- In 2 m radius plots and 1 m<sup>2</sup> subplots, percent cover of:
  - shrubs,
  - herbs,
  - grass, and
  - lichen and moss.
- In 5.64 m radius plots, percent survival of transplanted plugs of native plants.

In addition to the quantitative measurements above, photos were taken to document the vegetation in the 1 m<sup>2</sup> subplots and in each of the four cardinal directions for the 5.64 m radius plots. During the September 2020 monitoring survey, photos were repeated in the 5.64 m radius plots in each of the four cardinal directions. No additional data were collected in September.

## 4. RESULTS

The vegetation was relatively immature during the first survey period in July. Plants in the trial plots were at early stages of development. Surveyors were unable to consistently identify plants to the species level, but were able to assess vegetation cover by type, and overall survival of transplanted vegetation plugs within the plots sampled. A second set of photos was collected in September to document vegetation establishment and growth later in the season. Raw data for stem counts and percent cover are in Appendix B.

### 4.1 Stem Counts

Stems of shrubs and herbs were counted in the 2 m radius plots, and did not include stems in the plugs as these were counted separately (Treatment 1 only). Since grass was the only vegetation type seeded across the treatments, stem counts indicate the extent of natural colonization by native shrub and herb species. Species observed included fireweed (*Epilobium* spp.), willow (*Salix* spp.), heather (Ericaceae),

Huckleberry (*Vaccinium* spp.), and strawberry (*Fragaria* sp.). Shrub stem count was highest in Treatment 1 (mean = 10.75, SE = 1.80), and lowest in Treatment 4 (mean = 0.75, SE = 0.48) (Figure 1A; Table 2). Herb stem count was highest in Treatment 1 (mean = 56.00, SE = 18.52), and lowest in Treatment 2 (mean = 6.75, SE = 3.64) (Figure 1B; Table 2). Colonization by native shrubs and native herbs was observed in all treatments, but not consistently among all plots. On average, colonization by native herbs was greater than native shrubs.

Table 2: Stem Counts and Percent Cover of Vegetation Types Measured across All Four Treatments, July 2020

Treatment	Shrub Stem Count <sup>1</sup>		Herb Stem Count <sup>1</sup>		Shrub % Cover <sup>1</sup>		Herb % Cover <sup>2</sup>		Grass % Cover <sup>2</sup>		Lichen and Moss % Cover <sup>2</sup>	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Treatment 1	10.75	1.80	56.00	18.52	5.00	2.42	0.97	0.35	2.96	0.80	4.25	1.23
Treatment 2	3.00	2.38	6.75	3.64	0.28	0.24	0.07	0.04	5.93	2.17	3.17	0.92
Treatment 3	2.50	1.04	41.75	16.31	0.08	0.03	0.60	0.18	8.79	1.25	1.04	0.19
Treatment 4	0.75	0.48	33.75	14.76	0.05	0.03	0.27	0.11	5.13	1.34	0.26	0.06

Note: SE = Standard Error

<sup>1</sup> Measured in 2 m radius plots (n = 4 per treatment)

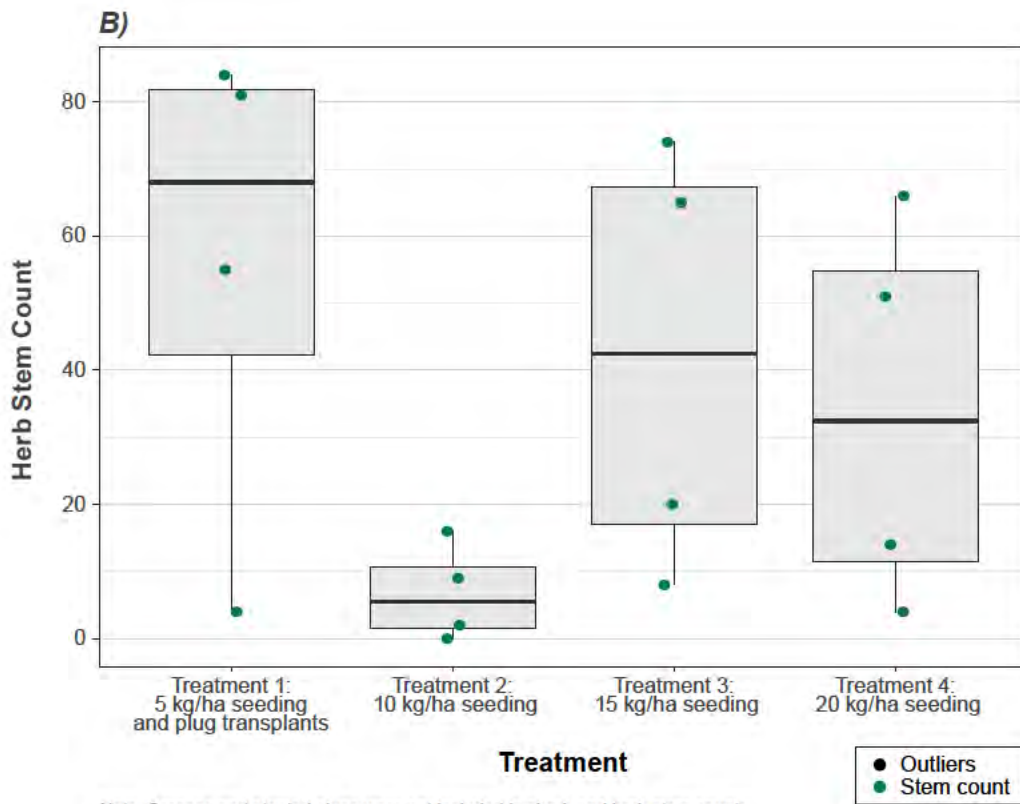
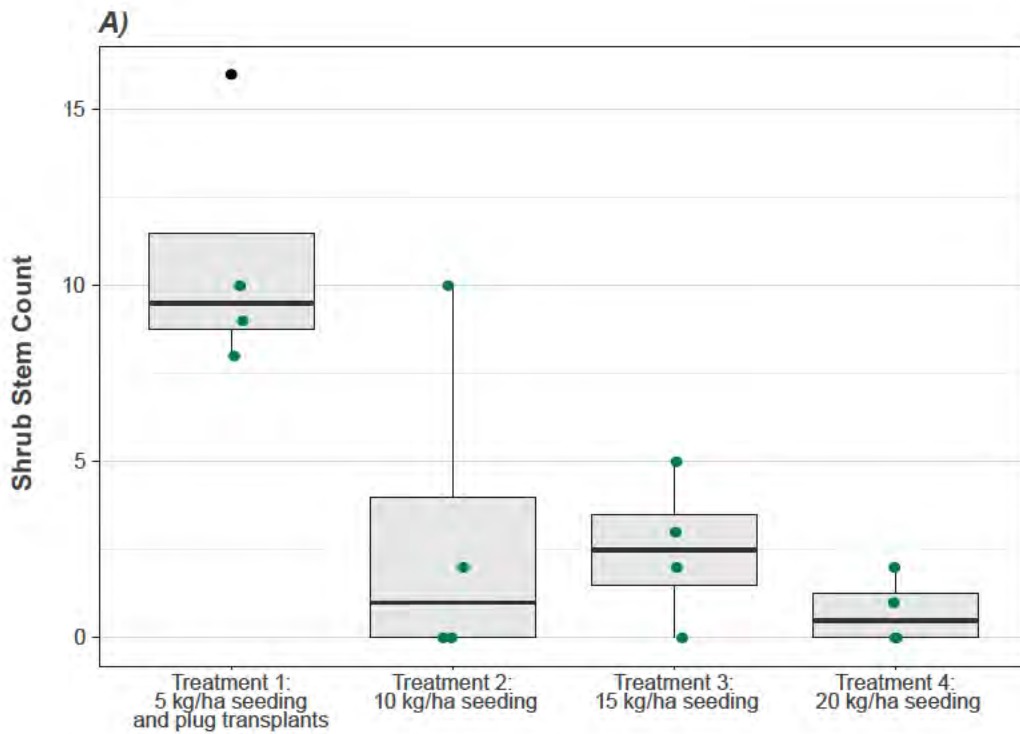
<sup>2</sup> Measured in 1 m subplots (n = 12 per treatment)

#### 4.2 Percent Cover

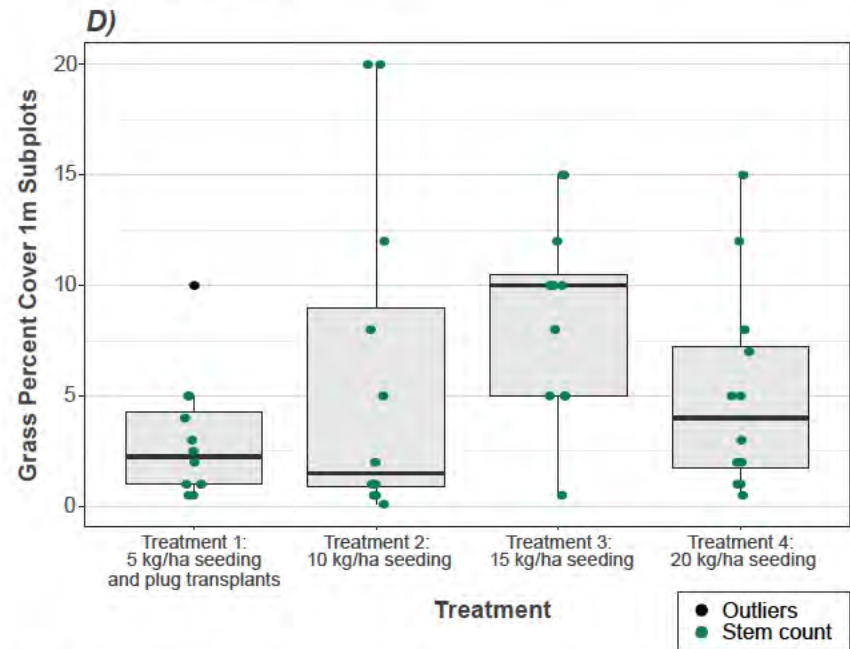
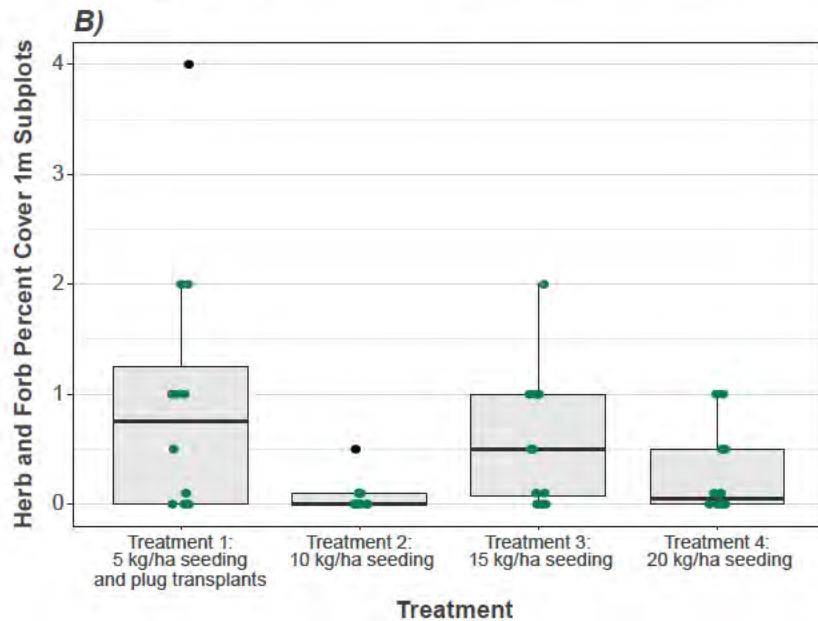
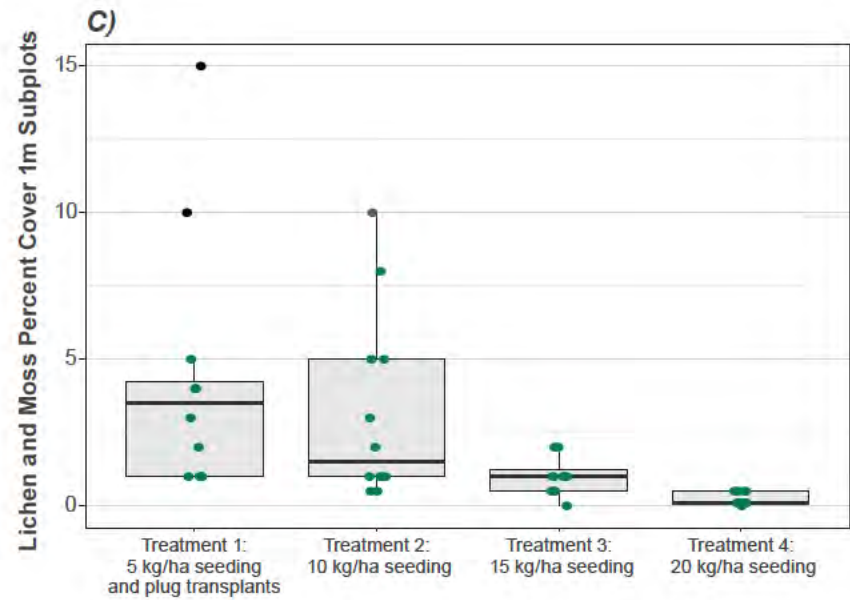
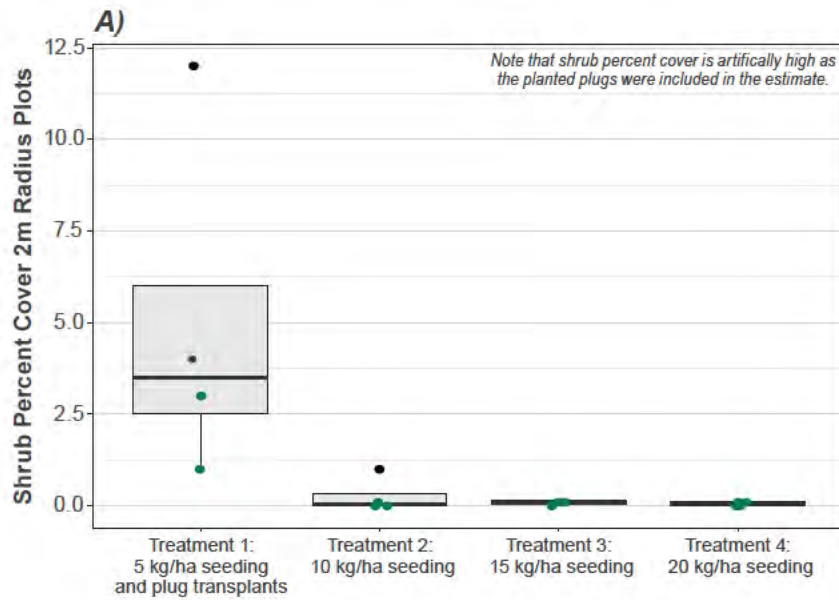
Percent cover was measured in the 2 m radius plots (n = 4 per treatment) and the 1 m<sup>2</sup> subplots (n = 12 per treatment). Percent cover in general was variable and low across all vegetation types in all treatments. Shrub percent cover was measured at the 2 m scale since shrub colonization tends to be patchy, and was highest in Treatment 1 (mean = 5.00%, SE = 2.42%), and lowest in Treatment 4 (mean = 0.05%, SE = 0.03%) (Figure 2A; Table 2). Herb percent cover in the 1 m<sup>2</sup> subplots was highest in Treatment 1 (mean = 0.97%, SE = 0.35%), and lowest in Treatment 2 (mean = 0.07%, SE = 0.04%) (Figure 2B; Table 2). Lichen and moss percent cover in the 1 m<sup>2</sup> subplots was highest in Treatment 1 (mean = 4.25%, SE = 1.23%), and lowest in Treatment 4 (mean = 0.26%, SE = 0.06%) (Figure 2C, Table 2). The higher percent cover of shrub, herb, and lichen and moss observed in Treatment 1 likely reflects the plug transplants as these were included in percent cover measurements. The plugs were included in the percent cover measurements as it was assumed that it would have been difficult for surveyors to differentiate between the original vegetation cover in the plug versus dispersal from the plug across all vegetation cover types. Grass cover increased with seeding rate, except in the highest seeding rate treatment (Treatment 4). Grass percent cover in the 1 m<sup>2</sup> subplots was highest in Treatment 3 (mean = 8.79%, SE = 1.25%), and lowest in Treatment 1 (mean = 2.96%, SE = 0.80%) (Figure 2D, Table 2).

#### 4.3 Live Plugs

Plugs were assessed within four 5.64 m radius plots in Treatment 1, the only treatment that had plugs installed in 2019. Plugs were counted as live if even a portion of the plug was living and percent of the plug alive was recorded. Of the 103 total plugs observed in the plots sampled, 95% were alive and only five of the live plugs had less than 50% live vegetation in July 2020 (Photo 1). Planting conditions in 2019 were hot and dry and not optimal. However, overall survival of the plugs after the first year was high.

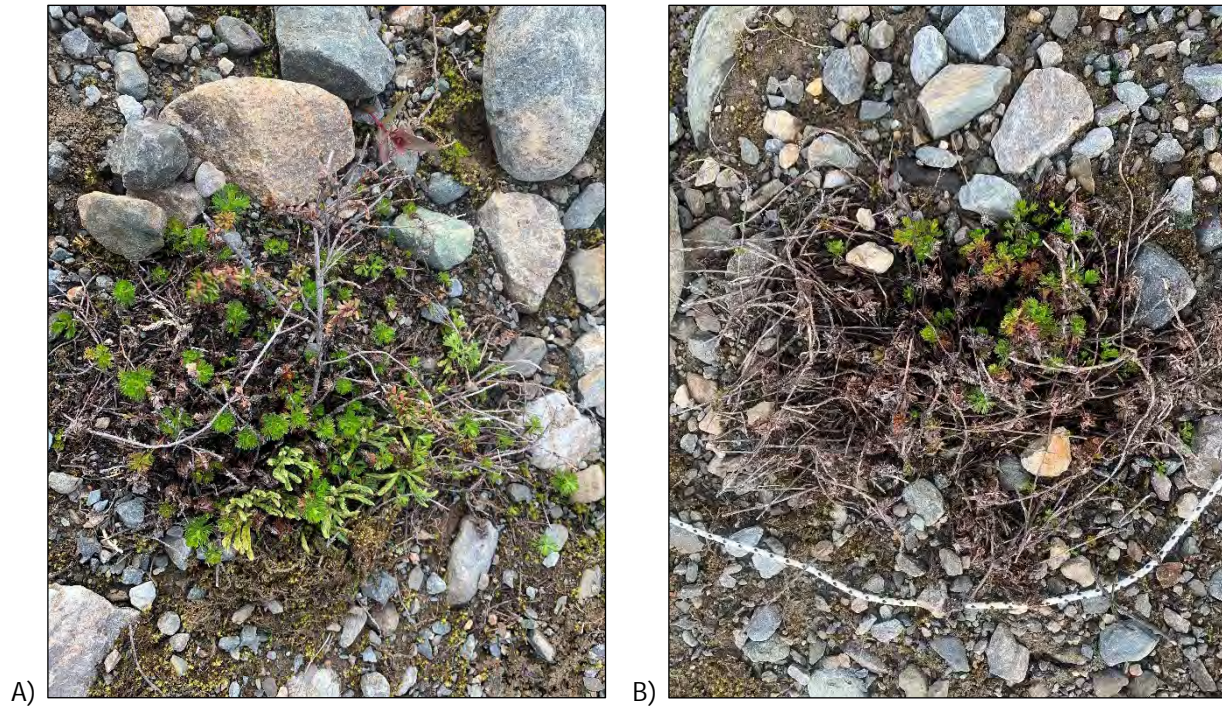


**Figure 1: Box Plots of Stem Counts across Treatments for A) Shrubs, and B) Herbs in 2 m Radius Plots, July 2020**



**Figure 2: Box Plots Showing Distribution of Percent Cover for A) Shrub in 2 m Radius Plots, B) Herbs in 1 m Subplots, C) Grass in 1 m Subplots, and D) Lichen and Moss in 1 m Subplots, July 2020**





*Photo 1: Plugs in Treatment 1 (seeding = 5 kg/ha, planting = 2,253 plants/ha). A Successfully transplanted live plug with high survival, July 2020. B) Plug with less than 50% survival, July 2020.*

#### 4.4 Rough and Loose Treatments

Between the shallow mounds and deep mounds of the two rough and loose treatments, there were no apparent differences in stem counts or percent cover except for lichen and moss, which was often greater in Treatments 1 & 2.

#### 4.5 Photo Monitoring

Photos from September 2020 showed an increase in overall vegetation cover across all vegetation types compared to July 2020 (Photos 2 to 5). The preliminary data collected in July 2020 may underrepresent the first year of vegetation establishment and growth since the data were collected early in the growing season.



*Photo 2: Comparisons between July 2020 and September 2020 for Treatment 1 plots (seeding = 5 kg/ha, planting = 2,253 plants/ha). Vegetation cover increased.*



*Photo 3: Comparisons between July 2020 and September 2020 for Treatment 2 plots (seeding = 10 kg/ha). Vegetation cover increased.*



*Photo 4: Comparisons between July 2020 and September 2020 for Treatment 3 plots (seeding = 15 kg/ha). Vegetation cover increased.*



*Photo 5: Comparisons between July 2020 and September 2020 for Treatment 4 plots (seeding = 20 kg/ha). Vegetation cover increased.*

## 5. SUMMARY

Based on the monitoring results after the first year, Treatment 1 appears to have the highest percent cover of vegetation in general, likely due to the transplanted plugs. Stem count of shrubs and herbs, and mean percent cover of shrubs, herbs, and lichen and moss were highest in Treatment 1, which had shallow mounds applied and the lowest grass seeding rate. It is possible that higher grass seeding rates in the other treatments may have promoted competition with potential colonizing species, and reduced the presence of shrubs, herbs, lichen and moss. Overall vegetation establishment did not appear to differ greatly between the two types of rough and loose treatments thus far, however, this could change over time and these results are only preliminary. Primary succession in alpine environments is a slow process due to the cold climate and short growing seasons.

Plug transplants of native plants had a 95% survival in the first year of monitoring. Therefore, transplanting plugs appears to be a viable approach and could be considered for problematic areas with conditions similar to the airstrip, and areas upwind of the JMM final disturbances to encourage dispersal and establishment of native species.

Native grasses achieved the consistently highest percent cover across the treatments thus far. Revegetation with grasses also has the added benefit of reducing erosion and generating organic material to encourage other plant growth. Increasing vegetation cover via grasses early on may provide the conditions needed to achieve the Closure Plan revegetation objectives of developing self-sustaining natural successional processes and a stable and productive wildlife habitat.

## 6. REFERENCES

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APPENDIX A      JOHNNY MOUNTAIN VEGETATION MONITORING PROTOCOL

# 1. JOHNNY MOUNTAIN VEGETATION MONITORING PROTOCOL

July 2020, updated September 2020

## Background

In 2019, vegetation trials were established on the north end of the airstrip. Four treatment plots were established that included the following treatments: seeding native grasses at four different rates, and transplanting plugs of alpine vegetation (Treatment 1 only).

Plots were marked with flagged and labelled corner stakes.

Table 1: Planting Site Types, Species, Spacing, and Seeding Rates

Plot Number	Area (m <sup>2</sup> )	Seeding Rate (kg/ha)	Total Planted	Plants/ha	Plant Spacing (m)
Plot Treatment 1	852	5	192	2,253	2.1
Plot Treatment 2	887	10	0	0	0
Plot Treatment 3	824	15	0	0	0
Plot Treatment 4	870	20	0	0	0
Total Area: 3,434 m <sup>2</sup>					



*Photo 1: Transplanted plant plug with sedge and two heather species. Transplants are in Treatment Plot 1 only.*

## Objective

Collect vegetation data and photos to compare vegetation establishment among trial plots, including: seeded grass establishment, plug survival and any establishment of non-seeded species (i.e., natural colonization).

### Required Equipment

- GPS
- Camera
- Flagging tape
- Measuring tape (or carpenter's tape)
- Notebook and pencil

### Overview

- On each of the four (4) Treatment plots vegetation data and photos will be collected in four (4) randomly established circular plots.

*Note: if time is limiting, the number of plots can be reduced to 3 per treatment.*

- The total number of plots surveyed is 16 for the whole site (4 circular plots  $\times$  4 treatments = 16 circular plots total for site).

*Note: if time is limiting, total plots would be 12 for the whole site.*

- Data collected in each plot will include the following (details outlined in the procedure below):
  - Photos
  - Stem counts of herbs and shrubs (not grasses) within 2 m radius circular plots (stem counts in planted plugs should be counted separately for Treatment 1)
  - Estimated percent cover of grasses, herbs, shrubs, and lichen/moss within three 1  $\times$  1 m square quadrats
  - Survival of planted plugs (# live, # dead) within a 5.64 m radius plot (Treatment 1 only)

#### 1 x 1 m plots

Estimate percent cover of:

- Grass
- Herbs
- Shrubs
- Lichen/Moss
- Bare ground

#### 2m radius plots

Count number of plants of:

- Shrubs
- Herbs

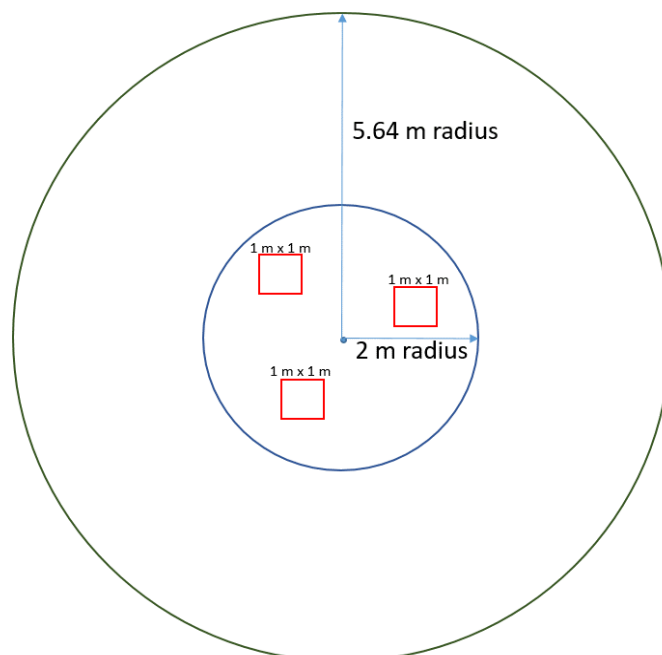
Estimate percent cover of:

- Grass
- Herbs
- Shrubs
- Lichen/Moss
- Bare ground

#### 5.64m radius plots

Count number of:

- Live plugs (anything growing)
- Dead plugs (nothing growing)



### Procedure

For each circular plot (4 per treatment, for each of the 4 treatments):

1. Establish plot centre.
2. Mark/flag centre (e.g., flagging tape wrapped around a rock) and take GPS coordinates for future surveys.
3. Take four (4) photos:
  - a. One photo in each of the four cardinal directions.
  - b. Frame the photos to limit the amount of sky (focus is on capturing the vegetation in the foreground).
  - c. Have a person stand about 5 m away from the photo for scale.
4. Measure a 2 m radius circular plot from plot centre.
5. Within the 2 m plot:
  - a. Count and record the number of:
    - i. forbs
    - ii. shrubsMake notes on species observed if known.
  - b. *Time permitting*, estimate and record the percent cover of:
    - i. forbs
    - ii. grasses
    - iii. shrubs
    - iv. lichen/moss
    - v. bare groundMake notes on species observed if known.
6. Within the 2 m plot, randomly establish three (3), 1 m × 1 m quadrats.
7. For each of the three 1 m × 1 m quadrats:
  - a. Estimate and record the percent cover of:
    - i. forbs
    - ii. grasses
    - iii. shrubs
    - iv. lichen/moss
    - v. bare groundMake notes on species observed if known.
  - b. Take a downward facing photo (1 per quadrat). Record photo number.
8. At Treatment 1 only: Establish a 5.64 m radius plot with the same plot centre:
  - a. Count plug survival #live/#dead - and comment on species that are observed growing in plugs if possible.
  - b. Take some representative photos of live and dead plugs.

Example data sheet:

<b>Date:</b>						
<b>Treatment #:</b>						
<b>Plot #:</b>						
<b>Observers:</b>						
	<b>Northing</b>	<b>Easting</b>				
<b>Plot Centre:</b>						
<b>Plot Photos (record photo number)</b>						
North						
East						
South						
West						
<b>2 m plot</b>						
	<b>Stem Count</b>	<b>List species (if known)</b>				
Herbs/Forbs						
Shrubs (woody species)						
	<b>Percent Cover</b>	<b>List species (if known)</b>				
Grass						
Herbs/Forbs						
Shrubs (woody species)						
Lichens/Moss						
Bare Ground						
<b>1x1 m plots (3 plots within the 2 m plot)</b>						
	<b>Percent Cover Plot 1</b>	<b>List species (if known)</b>	<b>Percent Cover Plot 2</b>	<b>List species (if known)</b>	<b>Percent Cover Plot 3</b>	<b>List species (if known)</b>
Grass						
Herbs/Forbs						
Shrubs (woody species)						
Lichens/Moss						
Bare Ground						
<b>Quadrat Photos (record photo number)</b>						
Plot 1						
Plot 2						
Plot 3						
<b>5.6 m plot (Treatment 1 only)</b>						
<b># Live Plugs</b>	<b># Dead Plugs</b>	<b>List species observed in live plugs (if known)</b>				
<b>Representative Photos (record photo numbers)</b>						



## 2. JOHNNY MOUNTAIN VEGETATION PHOTO MONITORING

September 2020

### Background

In 2019, vegetation trials were established on the north end of the airstrip. Four treatment plots were established that included the following treatments: seeding native grasses at four different rates, and transplanting plugs of alpine vegetation (Treatment 1 only).

Plots were marked with flagged and labelled corner stakes.

Table 1: Planting Site Types, Species, Spacing, and Seeding Rates

Plot Number	Area (m <sup>2</sup> )	Seeding Rate (kg/ha)	Total Planted	Plants/ha	Plant Spacing (m)
Plot Treatment 1	852	5	192	2,253	2.1
Plot Treatment 2	887	10	0	0	0
Plot Treatment 3	824	15	0	0	0
Plot Treatment 4	870	20	0	0	0
Total Area: 3,434 m <sup>2</sup>					



*Photo 1: Transplanted plant plug with sedge and two heather species. Transplants are in Treatment Plot 1 only.*

### Objective

Collect photos to compare vegetation establishment among trial plots by repeating the same photo procedure as was conducted in July 2020.

### Required Equipment

- GPS
- Camera
- Measuring tape (or carpenter's tape)
- Notebook and pencil
- Compass

### Procedure

For each circular plot (4 per treatment, for each of the 4 treatments):

1. Locate plot centre using coordinates below, should be flagged/marked from July 2020 survey.
2. Take four (4) photos (see below for reference photos):
  - a. One photo in each of the four cardinal directions.
  - b. Frame the photos to limit the amount of sky (focus is on capturing the vegetation in the foreground).
  - c. Have a person stand about 5 m away from the photo for scale.
  - d. Record the photo number of each direction for each plot.

Photos from July 2020 for Comparison

Plot	Treatment	Easting	Northing
1	1	373275	6279435

*North*



*East*



*South*



*West*



Plot	Treatment	Easting	Northing
1	2	373262	6279445

*North*



*East*



*South*



*West*



Plot	Treatment	Easting	Northing
1	3	373259	6278438

*North*



*East*



*South*



*West*



Plot	Treatment	Easting	Northing
1	4	373273	6279435

*North*



*East*



*South*



*West*



Plot	Treatment	Easting	Northing
2	1	373249	6279423

*North*



*East*



*South*



*West*



Plot	Treatment	Easting	Northing
2	2	373255	6279428

*North*



*East*



*South*



*West*





Plot	Treatment	Easting	Northing
2	3	373265	6279418

*North*



*East*



*South*



*West*



Plot	Treatment	Easting	Northing
2	4	373255	6279413

*North*



*East*



*South*



*West*



Plot	Treatment	Easting	Northing
3	1	373252	6279397

*North*



*East*



*South*



*West*



Plot	Treatment	Easting	Northing
3	2	373257	6279389

*North*



*East*



*South*



*West*



Plot	Treatment	Easting	Northing
3	3	373248	6279387

*North*



*East*



*South*



*West*



Plot	Treatment	Easting	Northing
3	4	373250	6279391

*North*



*East*



*South*



*West*



Plot	Treatment	Easting	Northing
4	1	373239	6279379

*North*



*East*



*South*



*West*



Plot	Treatment	Easting	Northing
4	2	373248	6279375

*North*



*East*



*South*



*West*





Plot	Treatment	Easting	Northing
4	3	373255	6279366

*North*



*East*



*South*



*West*



Plot	Treatment	Easting	Northing
4	4	373251	6279359

*North*



*East*



*South*



*West*



APPENDIX B      2020 MONITORING DATA

## Appendix B: 2020 Monitoring Data

Treatment	2 m Plot #	Stem Count <sup>1</sup>		Shrubs Percent Cover <sup>1</sup>	Herb Percent Cover			Grass Percent Cover			Lichen and Moss Percent Cover		
		Herbs	Shrubs		Plot1 <sup>2</sup>	Plot2 <sup>2</sup>	Plot3 <sup>2</sup>	Plot1 <sup>2</sup>	Plot2 <sup>2</sup>	Plot3 <sup>2</sup>	Plot1 <sup>2</sup>	Plot2 <sup>2</sup>	Plot3 <sup>2</sup>
1	1	55	9	4.00%	4.00%	0.00%	2.00%	1.00%	1.00%	4.00%	15.00%	5.00%	10.00%
	2	4	10	3.00%	0.00%	0.00%	0.00%	1.00%	2.50%	2.00%	2.00%	4.00%	1.00%
	3	84	16	12.00%	2.00%	0.50%	1.00%	0.50%	5.00%	3.00%	4.00%	4.00%	1.00%
	4	81	8	1.00%	0.10%	1.00%	1.00%	10.00%	5.00%	0.50%	3.00%	1.00%	1.00%
2	1	9	0	0.00%	0.10%	0.10%	0.50%	1.00%	1.00%	0.10%	1.00%	1.00%	1.00%
	2	0	0	0.00%	0.00%	0.00%	0.00%	2.00%	12.00%	1.00%	0.50%	2.00%	10.00%
	3	16	10	1.00%	0.00%	0.00%	0.00%	20.00%	20.00%	0.50%	5.00%	3.00%	0.50%
	4	2	2	0.10%	0.10%	0.00%	0.00%	8.00%	0.50%	5.00%	5.00%	8.00%	1.00%
3	1	20	2	0.10%	0.50%	1.00%	0.00%	12.00%	10.00%	5.00%	1.00%	2.00%	1.00%
	2	8	3	0.10%	0.10%	0.10%	0.00%	10.00%	10.00%	8.00%	1.00%	0.00%	0.50%
	3	65	5	0.10%	1.00%	1.00%	2.00%	5.00%	15.00%	5.00%	0.50%	2.00%	0.50%
	4	74	0	0.00%	0.00%	0.50%	1.00%	15.00%	10.00%	0.50%	1.00%	1.00%	2.00%
4	1	51	2	0.10%	0.00%	1.00%	0.10%	2.00%	1.00%	5.00%	0.50%	0.00%	0.50%
	2	66	1	0.10%	1.00%	0.10%	0.50%	8.00%	15.00%	7.00%	0.50%	0.50%	0.10%
	3	4	0	0.00%	0.00%	0.00%	0.00%	0.50%	5.00%	2.00%	0.50%	0.10%	0.10%
	4	14	0	0.00%	0.50%	0.00%	0.00%	1.00%	3.00%	12.00%	0.10%	0.10%	0.10%

<sup>1</sup> Measured in 2 m radius plots (n = 4 per treatment)

<sup>2</sup> Measured in 1 m subplots (n = 12 per treatment)