

Photo source: JJM (January 2024)

Kingcome Emergency Debris and Sediment Management Project – Construction Completion Report

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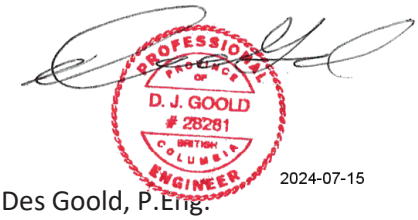
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1 INTRODUCTION

1.1 Purpose of Report

The purpose of this report is to summarize activities and outcomes from construction of the Kingcome Emergency Debris and Sediment Management Project.

1.2 Background

During and following the November 2021 Atmospheric River Event (ARE), there was widespread sediment and debris deposition throughout the streams and floodplains of southwest BC. The two days of unprecedented rainfall resulted in one of the worst natural disasters in BC and Canadian history. The BC Provincial government declared a state of emergency, and activated its emergency management system across the Province to respond to the ARE.

The B.C. Ministry of Environment and Climate Change Strategy (ENV) is responsible for flood impact response and recovery under the Emergency Program Act (EPA). ENV is also the lead agency for flood debris management (Provincial Flood Emergency Plan, 2019).

Dzawada'enuxw First Nation (DFN) was one of the numerous communities adversely affected by the ARE. Many DFN members reside in the traditional village of U'kwa Nalis, located on the east bank of the River approximately 6 km upstream from Kingcome Inlet on the central coast of BC. The River and Kingcome Inlet serve as primary means of access and egress, and the movement of goods back and forth between the Village and the floatplane dock in Kingcome Inlet (Figure 2). The two water bodies also hold much broader cultural value for DFN, so the environmental health of the waterways is paramount.

The intense rainfall from the ARE produced high flows and mobilized large volumes of sediment and debris. This sediment has infilled the River channel, reduced navigable water depths and increased turbulence, particularly near its mouth. Also, a significant amount of submerged, wood debris became partially buried in the riverbed along a 4.5 km long reach downstream from the Village.

The Site Assessment Report for Kingcome (Site KI-1; NHC, 2024) can be found in Appendix A.

1.3 Project Location

The Kingcome River Emergency Debris and Sediment Management Project (the Project) site is located where Kingcome River meets Kingcome Inlet on the central coast of BC, about 73 km northeast of Port McNeill. Figure 1 shows the location of the Kingcome River watershed relative to the central coast and Vancouver Island. Figure 2 is a Google™Earth screenshot showing the Project Area at a larger scale.



Figure 1: Kingcome River Location Map

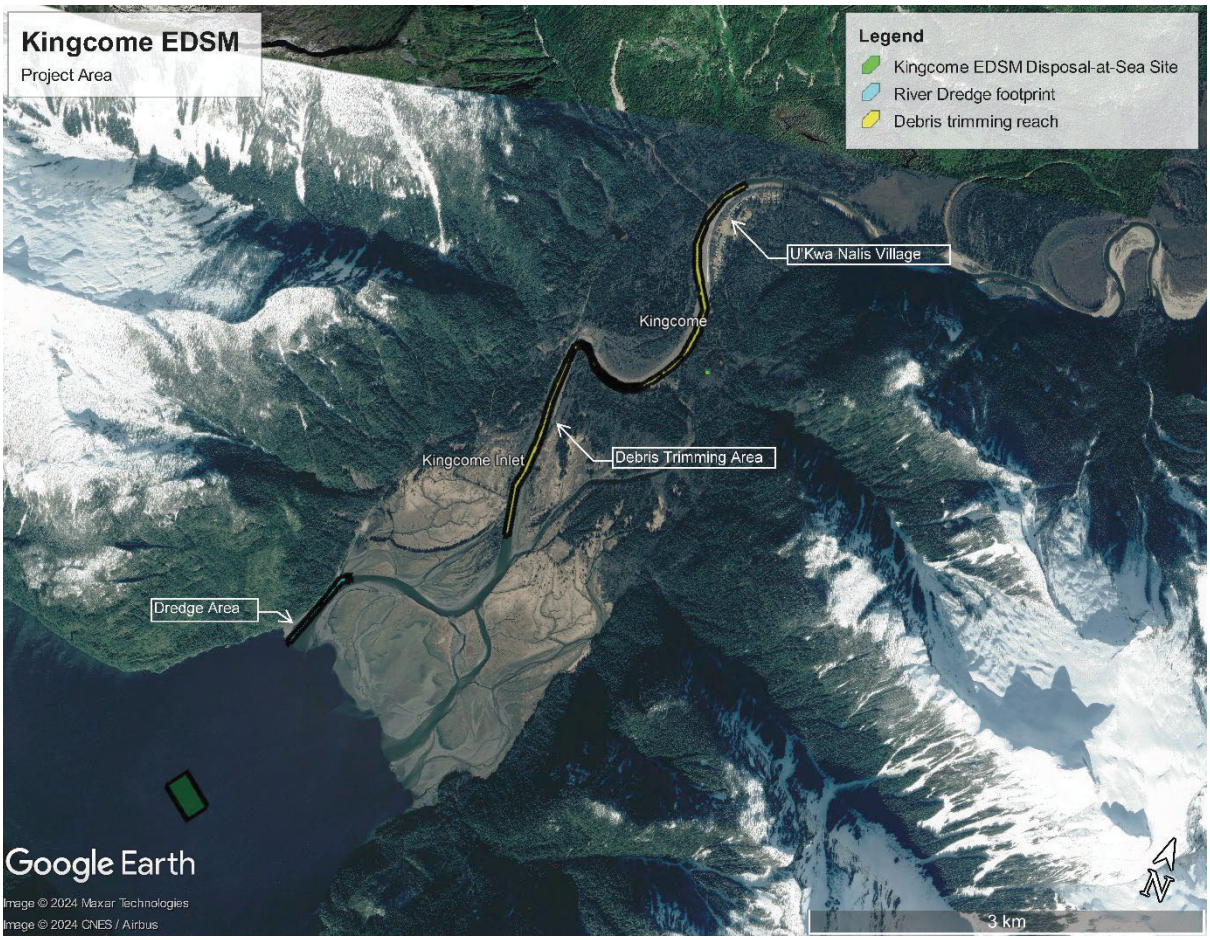


Figure 2: Kingcome Emergency Debris and Sediment Management Project Area

1.4 Scope of Work

A 770 m reach of Kingcome River extending upstream from the mouth is to be dredged, removing approximately 56,000 m^3 of sediment (cyan polygon in Figure 2). The original dredge volume was 71,000 m^3, but was reduced at the time of construction due to budget constraints. The goal is to establish a navigation channel within this area, 17 to 25 m wide across the bottom and about 3 m deep below Lower Low Water Mean Tide. The dredgeate will be comprise of the natural sand, silt and gravel bedload of Kingcome River, and will be relocated to a proposed, sub-tidal disposal site along the margin of Kingcome Delta (green polygon in Figure 2). Depths of water in the proposed disposal area are greater than 35 m.

Wood debris stems and branches sticking up into the water column will be trimmed along a 4.5 km reach of Kingcome River downstream of U'kwa Nalis Village (yellow polygon in Figure 2). The debris will be trimmed by a certified dive team using hydraulic saw(s) suitable for underwater use. Trimmed wood will be cut to lengths no longer than 2 m, and left in the river unless otherwise directed by the environmental monitor. The trimming will focus on debris that is buried within the bed of the river in

navigable portion of the channel. Debris collected in jams along the riverbank and lying parallel to the riverbank will not be trimmed since they provide habitat and naturally protect the banks from erosion.

1.5 Project Team

Table 1.1 summarizes the project team members, their roles, and key activities during the Project.

Table 1.1 Project Team

Organization	Project Role	Key Activities
Dzawada'enuxw First Nation	Owner	• Ownership, Facilitation and Guidance • Construction support services
BC Ministry of Environment and Climate Change Strategy (ENV)	Lead Government Agency	• Project Management/ Program Compliance
BC Emergency Management and Climate Readiness (EMCR)	Funding Government Agency	• Project Funding
ASHO Projects	Project Management	• Project Management agent to ENV
Northwest Hydraulic Consultants Ltd.	Prime Consultant	• Engineering design/ Engineer-of-Record • Construction contract administration • Construction Management
Pacificus Biological Services Ltd.	Sub-Consultant (Environmental Services)	• Construction environmental management plans and permitting support • Environmental compliance reviews during construction
WSP Canada	Sub-Consultant (Archaeological Services)	• Archaeological Assessment and Compliance
JJM Construction	Prime Contractor	• Works construction and site safety

2 DESIGN AND ASSESSMENT

2.1 Design Rationale and Brief

The rationale for the Project is the need to re-establish safe navigation for DFN community members at all tide levels. Water depths in the river, especially near the mouth, are currently too shallow to navigate safely when tides lower than about El. -1.0 m (CGVD 2013) or 1.5 m (Chart Datum). It is estimated that the tide is below this level approximately 25% of the time. Not only is the water depth dangerously low at these times, during incoming tides the bi-directional flow in such shallow water creates high turbulence, sand boils and constantly shifting sand bars.

Wood debris partially buried in the riverbed also contributes to hazardous navigation. Even at higher water levels, stems and limbs project up into the water column but are invisible more than 6 months of the year due to high levels of natural turbidity. Such debris has the potential to damage boat motors or pierce the hulls of boats.

The Design Brief for the Project can be found in Appendix B.

2.2 Engagement with First Nation

DFN is the Owner of the Project and have been a Task Force member and active partner throughout assessment, design and construction. Members of the Design Team visited the community in February 2023, March 2023 and June 2023 to present and discuss aspects of the Project with the Band Administrator, Council Members and the Community at large. Several members of the Community provided monitoring and other support services during construction. DFN's support for the Project has been key in achieving a successful outcome.

DFN's Letter of Support for the Project can be found in Appendix C.

2.3 Environmental Impact Assessment

Pacificus Biological Services Ltd. are the Project's environmental consultant. They have prepared an Environmental Assessment Report, which can be found in Appendix D.

2.4 Archaeological Assessment

WSP Canada is the Project's Archaeological consultant. WSP conducted an archaeological of the Project site on June 8, 2023, accompanied by Ms. Midori Nicolson of DFN. A survey of the river was conducted by boat. Considering the results from a previous archaeological assessment in 2017, which overlapped in area with the current Project area, the significant historic impacts, and unstable nature of the terrain, the Project area for dredging is considered to have low archaeological potential. No areas of archaeological potential were identified, and no archaeological materials or features were observed.

The archaeological overview assessment report can be found in Appendix E.

3 PERMITTING AND APPROVALS

The following permits and approvals were required to advance the project to construction. The permits and approvals, and supporting documentation can be found in Appendix F.

3.1 DFO

The DFO file reference for the Project is 23-HPAC-00804. A letter of advice to implement measures to avoid and mitigate effects to fish and fish habitat was issued on November 2, 2023.

3.2 ECCC

A Disposal-at-Sea Material Management Plan was agreed to and executed by ENV on October 30, 2023. ECCC issued Disposal-at-Sea Permit PYR-00419-1 for the Project on November 1, 2023, and registered it on the Canadian Environmental Protection Act Registry on November 7, 2023.

A 10-day and Final Report of Disposal Activities were issued to ECCC and these can also be found in Appendix F.

3.3 MoF

MoF issued approval to proceed with the Project under Section 11 Notification – 1005915 – Kingcome Rv, on August 29, 2023.

3.4 Navigable Waters

Transport Canada authorized the Project to proceed on October 23, 2023.

4 CONSTRUCTION RECORD

4.1 Construction Phase Scope

The scope of work during construction was as follows:

a. Mobilization to and demobilization from the site;
b. Establishing a work camp and site office;
c. Develop the following Plans:
    I. Construction Quality Management Plan;
    II. Letter of Adherence – Construction Environmental Management (Mitigation) Plan;
    III. Construction Site Safety Plan;
    IV. Communication Plan; and,
    V. Marine Traffic Management Plan.
d. Baseline Construction Scheduling;
e. Weekly construction reporting (Progress, labour, equipment & materials, QAQC, safety etc.)
f. Cash Flow Projection Scheduling;
g. Pre-construction multibeam survey within the working limits of the Kingcome river dredge;
h. Trimming, including underwater trimming, of projecting wood debris stems and branches along the Place of Work (4.5 km reach measured downstream from U'Kwa Nalis);

i. Dredging approximately 56,000 cubic metres of sediment from a 760 m reach of the Kingcome River;

j. Dredgeate disposal at sea, within the designated disposal area;

k. Progress multibeam surveys within the working limits of the Kingcome river dredge (at least one is required at 15%completion; remaining frequency to be determined by the contractor);

l. Post-construction multibeam survey within the working limits of the Kingcome river dredge;

m. Relocation (as directed by the Ministry Representative) of any large wood debris if encountered within the working limits of the Kingcome river dredge; and,

n. Removal of any non-organic debris such as metal, cables or other human-sourced debris at a designated waste facility determined by the Contractor;

o. Cleaning up of the Place of Work; and,

p. Preparation of marked up (red line) Contract Drawings.

4.2 Contract Award

The Construction Contract was awarded to JJM Construction Ltd A copy of the executed contract can be found in Appendix G.

Modification Agreement No. 1 was executed on December 21, 2023 changing the pay item for Debris Trimming to lump sum from its original unit price basis.

4.3 Approach to Construction

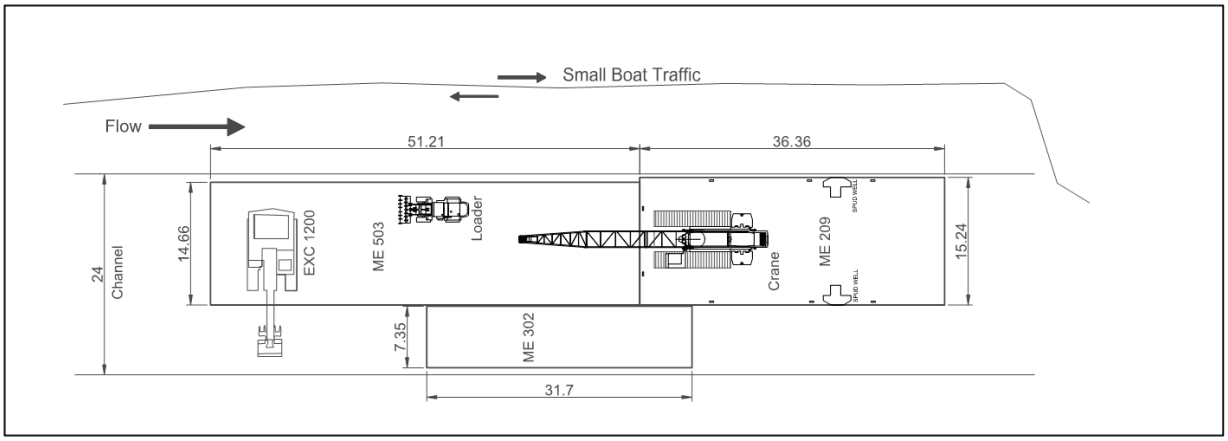
4.3.1 Equipment

A list of all equipment used by JJM is provided below:

- ME-209 - 16m x 37m Spud Barge c/w 17m spuds and a Manitowoc 4000 Crane c/w clam shell bucket
- ME- 503 - 14m x 51m (4000T) Flat Scow c/w 1200 Hitachi Excavator (Clam shell bucket) & 544 Loader
- ME-302 - Mini Dumper (Split-hull hopper) Barge Approx. (7.3mx 31.7m)
- 2- 600hp Work Boats (Mr. Bill) or (MILLER DIAMOND)
- ME-008 - 38’ Crew/ Dive boat (Aqua Queen)
- ME-006 - 24’ Jet Boat - equipped with Bathymetric survey-equipment
- Catherwood 1000 hp Assist Tug
- VARIOUS 4 x 4 Pickups
- Jet Boat (survey)

4.3.2 Dredging

The figure below shows approximate positioning of equipment during dredging operations. The dredging work progressed from the mouth of the Kingcome River heading in an upstream direction. To evaluate and manage head cutting and infilling, the contractor will survey the previously dredged area plus 150 m downstream of dredging operations on a weekly basis.



Bed material was bulk dredged with a crane and clamshell bucket from the ME-209 spud barge, while the refined grades were dredged with an excavator from the ME-503 flat scow. The Catherwood assist tugboat helped position the spud barge and flat scow at the desired station for dredging. Usually the dredged material was loaded onto the split-hull hopper barge and towed by the Catherwood tugboat to the Disposal-at-seat (DAS) site for disposal. However, when the hopper was in transit to the DAS site, the ME-503 would be loaded with dredgeate in order to reduce down time, and when full the assist tug would tow the ME-503 to the DAS site, and off-loading of the dredgeate would be done using the excavator.

Bathymetric Surveys were routinely completed from the JJM ME-006 jet boat, using a Norbit Subsea Sonar. Sounds-velocity measurements were completed using an AML oceanographic sensor.

4.3.3 Debris Trimming

Debris Trimming covered a 4.5 km long reach downstream from U'Kwa Nalis Village. JJM's vessel ME-008 (MV Aqua Queen) was used to carry the dive team and DFN's monitor between work locations. The daily location of debris trimming activities shifted day-to-day depending on tidal conditions and marine traffic. Generally the work stated across from the village and progressed downstream. Debris Trimming only occurred within the main travelled portion of the channel. Debris within untraveled portions will remain, providing additional fish habitat and erosion protection.

4.4 Construction Environmental Management Plan

Pacificus developed the Construction Environmental Management Plan, which can be found in Appendix G, within the Construction Contract.

4.5 Quality Control

JJM provided a comprehensive Quality Control Plan (QCP) that was reviewed and excepted by the Ministry Representative. The QCP can be found in Appendix I. Key elements of quality control were as follows:

- Document transmittal files sent with every one of JJM's submissions, deliverables, corrective action reports, invoices, certificate requests and requests for information (signed by both JJM and the Ministry Representative);
- Holding Major Element Preparedness Meetings at the start of both the Debris Trimming and Dredging operations;
- Submission of regular dredging progress surveys to allow tracking of progress – usually two per week;
- Daily DFN monitoring of the Debris Trimming Work;
- Weekly Meetings between JJM and the Ministry Representative.

Weekly Progress reports by JJM can be found in Appendix J.

4.6 Health and Safety

The Prime Contractor was responsible for implementing and adhering to site safety protocols and procedures, including compliance with the provincial Occupational Health and Safety Regulations and guidelines established under the *Workers Compensation Act*. The contractor did not report any incidents or near-misses, and NHC did not identify any safety concerns during its field review activities. Health and safety performance indices were tracked by JJM weekly and are integrated with their weekly Reports in Appendix J.

4.7 Ministry Representative Progress Reports

NHC (as Ministry Representative) reviewed each of JJM's progress surveys and progress reports and carried out an independent checks of dredge volume and progress against the Project target dredge of 56,000 m^3. Global Mapper™ and Autodesk Civil3D software were used by for this purpose. Areas for which the required dredge volume was reached were signed off on a weekly basis (accounting for both over-dredge and sloughing allowances). Weekly sign-off was necessary due to the constant threat of natural infilling of sediment, and to ensure JJM was fairly compensated for achieved targets.

The Ministry Representative Weekly Reports can be found in Appendix K.

4.8 Construction Monitoring on Behalf of Owner

Environmental and engineering monitoring was carried out weekly by Pacificus and NHC staff, respectively. Hema Willie of DFN carried out daily monitoring of debris trimming activities by Fraser-Burrard Diving aboard JJM's ME-008 (MV "Aqua Queen") Dive Boat.

4.8.1 Weekly Environmental Reports

A Qualified Environmental Professional (QEP) from Pacificus was designated as the on-site environmental monitor (EM) for the duration of in-water works to ensure activities were in compliance with a Fisheries and Oceans Canada (DFO) Avoid and Mitigate Letter1 obtained following a formal Request for Review, the Environment and Climate Change Canada Disposal at Sea Permit, requirements of an Authorized Change as per the Provincial Water Sustainability Act, and the project's Construction Environmental Mitigation Plan (CEMP). Throughout the project Pacificus produced a total of 10 weekly reports summarizing dredging and debris trimming progress, daily turbidity measurements, marine mammal and fish species monitoring, and any pertinent environmental observations, concerns, or incidents that occurred over the duration of the reporting week, such as equipment repair and spills.

Daily turbidity monitoring was conducted for the duration of dredging and dredgeate disposal activities to ensure that turbidity generated by the works did not exceed Provincial Water Quality Guidelines. No exceedances above Provincial Water Quality Guidelines were recorded throughout the duration of work at any station. Dredgeate disposal within the DAS site was conducted without the deployment of silt curtains as the dredgeate was observed to descend quickly through the water column causing no significant plumes of turbid water.

One accidental release of dredgeate material occurred on December 13th, 2023, approximately 90 m outside the DAS site; however, it was determined that negative environmental impacts were unlikely as the surrounding sea floor slopes towards the DAS site and the dredgeate is not known to contain contaminants. All other observed disposals were released within the designated DAS site.

Hazardous debris trimming was monitored periodically between weeks 2 and 4 of work with no issues recorded by the EM. Work involved cutting LWD into segments of 2.0m or less, and any root wads were left intact. As per the CEMP, no segment of debris embedded in the riverbed or banks was dislodged in order to minimize disturbance to the substrate.

No major spill incidents occurred over the duration of the works. On December 7th, 2023, a minor spill occurred from a pinhole leak in the excavator arm, which released approximately 0.5L of hydrocarbon into the ocean. Spill booms were deployed immediately, and the spill was reported to the Province of BC. During week 4 of the project, the EM observed small sheens on the barge deck and surface of the ocean during a heavy rainfall event. It was determined that pooling water was capturing residual hydrocarbons that had accumulated on the barge deck from activities such as fueling. Preventative measures were established by the EM to capture and contain any contaminated runoff during heavy rainfall events and included deploying spill pads and spill socks around pooling water on the barge deck and installing spill socks around the stern of the barge deck for supplementary containment. Following

implementation of these preventative measures, no sheens were observed in the marine environment during heavy rainfall events.

A pod of orcas (Orcinus orca) and Pacific white-sided dolphins (Lagenorhynchus obliquidens) were sighted December 17th, 2023, and dredging works were paused until the pods were no longer in view. Other marine mammal and fish species observed included river otters (Lontra canadensis) and Pacific sand lance (Ammodytes hexapterus). No European green crabs (Carcinus maenas) were observed for the duration of the project. Work was not observed to disrupt aquatic fauna at any point.

All works monitored by a QEP from Pacificus adhered to mitigation measures outlined in the CEMP, Avoid and Mitigate letter, and dredging Code of Practice.

Weekly Environmental Reporting and a Final Summary Report by Pacificus can be found in Appendix L.

4.8.2 Weekly Engineering Field Review Reports

NHC (as Engineer-of-Record) carried out reviews of the work almost daily and produced Weekly Engineer's Field Review Reports. These reports tracked weather and flow conditions, personnel and equipment, field observations and deficiencies, and provided a weekly photo log. The Weekly Engineering Field Reports can be found in Appendix M.

4.9 Changes During Construction

There was a large infill event over the Christmas break, which necessitated re-opening some previously signed-off areas for re-dredge. The re-dredge meant that the upstream limit of construction had to be moved downstream from Station 0+760 to Station 0+713 in to stay within the Project target dredge of 56,000 m^3.

4.10 Provisional and Authorized Work

There were four (4) Provisional Work Orders issued by the Ministry Representative as described below. Payment for provisional and authorized work drew from the Projects $100,000 Provisional Sum, and did not result in any change to the approved project budget of $5,000,000.

- Provisional Work Order #1:
    - Issued for the collection of the following additional bathymetric survey of Kingcome River, scoped as follows:
        - Survey from the 100 m downstream of the downstream limit (0-150), to 100 m upstream of the original, upstream Limit of Construction 1+150. This survey could either be conducted prior to demobilization on Dec. 22, or early in the New Year, when work starts back up.
        - Survey from the 100 m downstream of the downstream limit (0-150), upstream to the Village, or as close as you can get, boat access permitting. This survey could be conducted at or near the end of construction, prior to demobilization.
    - Value $30,191.50

- Provisional Work Order #2:
    - Issued for the hiring of boat services and an operator to assist a crew of drillers on January 18, 2024. The drillers were on site at the Bullpen to establish two (2) drill holes to inform design work for a future project.
    - Value: $1,898.50
- Provisional Work Order #3:
    - Issued to cover a minor amount of over-dredge at the end of the project in order to create an up-sloping taper to the existing streambed upstream of the dredge area. At the completion of dredging, JJM had dredged a total of 56,430 m^3, or 430 m^3 over the 56,000 m^3 payable dredge target. As there is Provisional Sum remaining, it can be used to cover the cost of this over-dredge. Unit price payment for the over-dredge will be at the approved contract rate for dredging, $43.50/ m^3.
    - Value: $18,705.00
- Provisional Work Order #4:
    - To cover the cost of 1 full day loss of revenue by JJM owing to a changed condition. Over the course of the Project, low tide predictions from Fisheries and Oceans Canada Tide Station 08348 Kingcome Inlet have been higher than observed low tides by up to 0.6 m. The difference has been confirmed by NHC and resulted in an inability for JJM's equipment to access the dredge channel safely, at times, when low tides occur during the working day. JJM has estimated the lower than predicted tides has resulted in a cumulative loss of about 1 full day of revenue. Therefore, NHC recommends assigning the balance of the Provisional Sum to cover the loss of revenue. At the contract rate for dredging, $43.50/ m^3, the balance of the Provisional Sum, $49,205.50 will cover a dredge volume of about 1,131 m^3, which does equate to about 1 days' worth of production based on JJM's Daily Dredge Tracker.
    - Value: $49,205.00

4.10.1 Authorized Work

Authorized Work Order #1 was issued January 31, 2024 to approve the re-dredging of previously signed-off areas that infilled with sediment over the holiday break between December 21, 2023 and January 3, 2024. The volume of infill has been estimated at approximately 8,500 m^3.

The infill, especially when combined with daytime low tides impacted JJM's ability to carry out dredging. Between January 4 and January 8, JJM had to re-dredge approximately 2,259 m^3 just to get their equipment back into position. Extreme daytime tides predicted during the weeks of January 18th and January 25th, which would further restrict equipment access and safety. JJM determined that in order to continue working safely and efficiently within these zones, they would need to clear the infilled channel section to a minimum of (0.6m-2.8m = -2.2mCD or El. -4.7m Geodetic).

The infill in these areas also diminishes the navigability of the dredged waterway for DFN, so the re-dredge as proposed by JJM has the added benefit of restoring some of that lost navigability.

The focus of the re-dredge effort would be the western 2/3rds of the dredge channel, and the intent would be to clear only areas that are significantly over El.-4.7m (-2.2CD).

As of Jan. 31, the final day of dredging for the Project, JJM total re-dredge volume amounted to approximately 4,268 m^3 or about 50% of the total infill volume. Payment for the re-dredge will be at the approved contract rate for dredging, $43.50/ m^3. The value of Authorized Work Order No. 1 is $185,658.00. The upstream limit of construction was moved downstream so that the total dredge volume would not exceed the Project target of 56,000 m3 and so the Project budget would not be impacted the cost of Authorized Work Order #1.

4.11 Project Completion

Substantial Completion was achieved on January 30, 2024, and Total Completion was achieved one day later on January 31, 2024. Both completion certificates can be found in Appendix O.

4.12 Deficiencies

Deficiencies with the dredging were tracked and reported on weekly. JJM addressed all such deficiencies, typically during the following week.

There were no deficiencies identified with the Debris Trimming Work.

There were no deficiencies that went uncorrected.

4.13 Summary of Key Dates

The following summarizes the key project milestones during construction:

- Construction Contract Award: October 27, 2023
- All Project Permits secured: November 2, 2023
- JJM Mobilization: November 13-14, 2023
- Pre-construction survey: November 15, 2023
- Start of Dredging: November 17, 2023
- Start of Debris Trimming: November 21, 2023
- Completion of Debris Trimming: December 10, 2023
- Christmas Break: December 22, 2023 to January 2, 2024
- Completion of Dredging: January 29, 2024
- Post-construction (Record) survey: January 29, 2024
- Substantial Completion: January 30, 2024
- Total Completion: January 31, 2024
- Demobilization: February 1-3, 2024

5 PROJECT COSTS

The total project cost was $5,000,000 in keeping with the approved budget.

5.1 Payment Certificates

Payment Certificates were issued monthly based on JJM's progress and can be found in Appendix P.

6 RECORD DRAWINGS

The final record survey was conducted by JJM on January 29, 2024. Record drawings have been prepared by NHC and are available in Appendix Q.

7 FUTURE CONSIDERATIONS

7.1 Maintenance

Maintenance dredging will be required to maintain a navigable channel at the mouth of Kingcome River. Repeat surveys of the dredged area should be carried out on an annual basis for the first five years to measure annual bedload delivery and determine the required frequency of maintenance dredging.

Likewise, Debris Trimming is an activity that should be carried out on an ongoing basis, but again the frequency can only be determined through regular monitoring and reporting.

APPENDIX A

KINGCOME KI-1 SITE ASSESSMENT REPORT

400-235 1st Ave | Kamloops, BC V2C 3J4 | 250.851.9262 | www.nhcweb.com

NHC Reference 3007807-14
April 19, 2024

Flood Debris Management Secretariat, Environmental Protection Division
BC Ministry of Environment and Climate Change Strategy (ENV)
Victoria, BC

Attention: Amy Vallarino, Senior Project Manager, Flood Debris Management Secretariat
Via email: Amy.Vallarino@gov.bc.ca

Re: **Preliminary Site Assessment of Potential Areas of Immediate Concern ENV Site KI-1 Dzawada'enuxw First Nation, Kingcome Inlet, Rev. 5, Final**

1 Introduction

The purpose of this high level and preliminary assessment of identified potential Areas of Immediate Concern is to allow the Province of BC to review and consider risks, potential consequences, and to prioritize urgent mitigation measures, including removal of sediments introduced by the 2021 Atmospheric River (AR) events, and other potential mitigation measures. The objective is to avoid hydraulic restrictions in the Waterways and associated flooding due to the upcoming freshets as well as fall and winter floods, which may cause additional damage to riverbeds, banks, and infrastructure, and pose a significant threat to the safety of people, properties, infrastructure, and the environment.

The assessment of this potential Area of Immediate Concern follows this general approach:

1. High level review: senior engineering review of available, relevant information, site inspections, and communication with stakeholders.
2. Hazard and risk assessment: identification of flood threat to the safety of people, property, infrastructure, and the environment.
3. Flood mitigation: identification and prioritization of potential mitigation measures, including consideration of need and timing of further validation work as well as implementation of mitigation measures.

2 Site Information

U'Kwa Nalis Village is located on the left bank (viewing downstream) of the Kingcome River approximately 6 km upstream of the mouth at Kingcome Inlet (see Figure 1 – Location Map). The focus of this assessment is the reach of Kingcome River between the village and the mouth of the river where it meets Kingcome Inlet (Site I.D: KI-1).

The contemporary landscape of the Kingcome watershed consists of steep rugged slopes and a broad alluvial valley up to 2 km in width, which is the typical 'U'-shaped glacial valley of the Coast Mountains. Sediment produced from the retreating glacial fields likely dominates the river's sediment regime. Additional sediment sources include tributary streams and rivers, and landslides, which are common along

mainstem and tributary slopes. Erosion of main stem riverbanks within the Kingcome floodplain also produces large amounts of sediment and debris.

Table 2-1 Summary of site Information

Site ID	KI-1
Site Description	Kingcome River downstream of Dzawada'enuxw First Nation's U'Kwa Nalis Village
Location	50.952177°N, - 126.193274° W (See Figure 1 – Location Map)
Local Authority	Dzawada'enuxw First Nation
Waterbody	Kingcome River

2.1 AR Events

Two AR events are known to have impacted the Central Coast from mid-November to early December 2021. The River Forecast Centre noted that between 60 and 135 mm of rain was observed on the Central Coast over two days in early December. For context, the observed, extreme daily rainfall for Port Hardy (approximately 90 km west of Kingcome Inlet) is 86.6 mm, and 153.8 mm for the months of November and December, respectively. NHC maintains a staff gauge on the Kingcome River located downstream of U'Kwa Nalis, which recorded the river stage during the AR events. A sustained period of high stage (water level) was noted from November 25 to December 3, 2021, with a smaller peak recorded from November 11 to 17, 2021 (Figure 3-1).

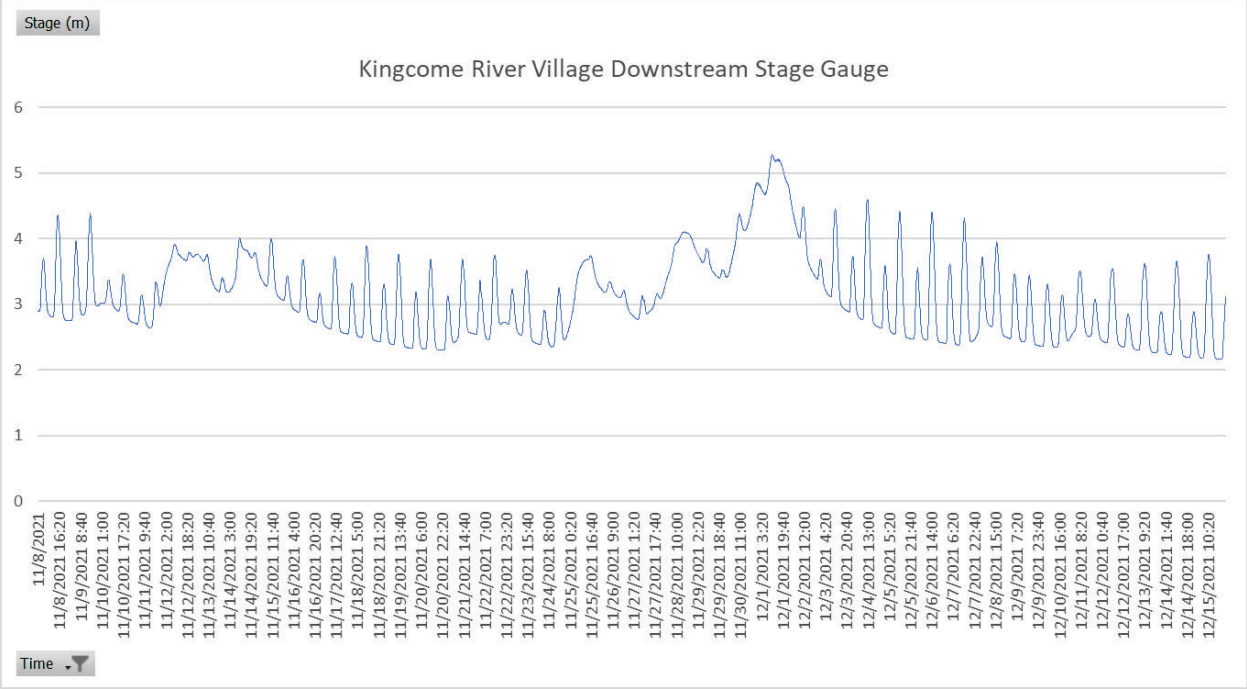


Figure 3-1 Stage (in metres AMSL) on the Kingcome River downstream of the U'Kwa Nalis Village during the 2021 AR events. Tidal influence observed as oscillations, generally outside of high flow periods on the Kingcome River.

The maximum recorded stage during these events was 5.2 m (AMSL). While this is not high enough to have posed a significant flood risk to U'Kwa Nalis, the prolonged, high flow from late November to early December produced abnormally high levels of sedimentation and debris in the river. This situation is common to many communities in BC that were affected by the AR events.

3 Site Hazard

3.1 Hazard Assessment Methodology

NHC visited Site KI-1 on May 18, 2022, with PricewaterhouseCoopers LLC Canada (PwC) staff member Santi Martinez, as well as members of the Dzawada'enuxw First Nation (DFN) community. PwC was the consultant engaged to support ENV in developing a strategic roadmap for assessment, prioritization of works required, and providing oversight. The assessment included a helicopter flight over the Kingcome valley from the mouth of the estuary to the headwaters, at the terminus of the Kingcome Glacier, as well as a river tour by boat from U'Kwa Nalis Village downstream to the mouth of the Kingcome River estuary.

Following the site inspection, the community shared information regarding conditions during 2021 Atmospheric River (AR) events. Tide predictions for Kingcome Inlet during the site inspection were 0.22 m Chart Datum (CD) for low tide at 9:00 am, and a high tide of 4.6 m CD at 3:15 pm. The initial overflight of the estuary occurred near low tide and the inspection of the river by boat occurred slightly after low tide but sufficiently low that it was possible to view large portions of the riverbanks and shallow bed areas.

3.2 Hazard Assessment Summary

The DFN Community relies on boat navigation through the lower Kingcome River as its primary means of moving goods and people from the Village to a government dock in Kingcome Inlet (Figure 1 and Photo 1), and vice-versa. From the dock, floatplanes and larger boats then serve as a link to other coastal and Vancouver Island communities. The only boats that can navigate the river between the inlet and village are small, generally under 20 ft (Photo 2).

Aggradation and wood debris in the lower reaches of the Kingcome River has become so severe that navigation is hazardous for these very small boats. "Pistol Butt" debris embedded in the river is invisible when the water is turbid, and can puncture the hulls of boats or destroy engines (Photos 3 and 4). The community has stated that during periods of low flow, the water depths in the river are now too shallow to navigate the river during tides lower than about 1.5 m CD. It is estimated that the tide is below this elevation approximately 25% of the time. Figure 2 at the end of this report illustrates depths in the river at low tide and low river flow. The mouth of the river is particularly treacherous where the low tides create shifting sand boils and powerful eddies.

Sedimentation has also blocked access to the Bullpen, a man-made tidal channel near the mouth of the Kingcome river which acted as a log dump in the 20th century and to moor larger boats (Photo 5). The Bullpen is at the southern terminus of a maintained gravel road that runs along the west side of lower Kingcome River. Farther north, this road accesses the DFN's hydropower facility and a work camp, which are located across the river from U'Kwa Nalis. The road is used haul fuel from a barge loading ramp located near the mouth of the Bullpen, and to transport construction workers in and out of the camp. However, fuel and workers can only move in and out at higher tides, when the barge ramp and Bullpen

can be accessed safely, so functionality is very limited. The Bullpen is critical infrastructure. It supports the supply of large volumes of goods and services, but, most importantly, it serves as a means of facilitating evacuation during emergencies. During evacuations, it is crucial that the Bullpen be operational, providing access to deep-sea vessels for safe passage out of the region for many community members simultaneously. Currently, the road is maintained through funding by Indigenous Services Canada (ISC).

Crossing between U'Kwa Nalis on the east side of the river and the road on the west side is currently done by boat. Boats simply moor on natural ground, and then passengers must scramble up the riverbank. There is no stable landing or stairs, so this method is not safe for elders, young children, and those with accessibility need. Currently, there is no bridge in place.

An alternative means of transportation to and from U'Kwa Nalis are helicopter flights directly to the landing pad in the village, which is unaffordable to most residents, and very much weather dependent. Low cloud and fog are common in the valley and often lead to the cancelation or delay of flights.

4 Preliminary Risk Evaluation

The preliminary risk evaluation is prepared to assess the flood risks associated with sediment deposition from the AR events The risk ratings associated with public safety, river capacity, environmental and infrastructure for the site are shown in Table 4-1. The risk matrices are appended to this memo for reference.

Table 4-1 Consequence and preliminary risk rating for Site KI-1.

Indices	Preliminary Risk Rating	Anticipated Consequence
Public Health and Safety	Very High	Currently, the river is DFN's primary mode of transportation in and out of U'Kwa Nalis but is rife with hazards. Sediment deposition in lower reaches of the Kingcome River and the Bullpen have resulted in shallow depths during low tides. Woody debris embedded in the river ("Pistol-Butts") create additional hazards to navigation during periods of mid to high tides. The consequences of attempting navigation outside of safe flow/tide conditions is damage to boats and risk of injury or death for the operators and passengers. Community members have lost their lives due to unsafe navigation in the past. Several boats have been damaged since the ARE, with at least one boat capsized. The Bullpen is not operational due to current sediment buildup, so there is no means of evacuating large numbers of community members during emergencies. Mitigation measures are not in place to avoid the recurrence infilling of the Bullpen with sediment.
River Capacity	Medium	Current levels of sedimentation and debris loading in the river increase flood risk due to erosion and could increase flood levels. Flooding in U'Kwa Nalis Village is common and while portions of the Village flood during 10- to 50-year floods, most habitation is above the 60-year flood level mapped in 2013.

Indices	Preliminary Risk Rating	Anticipated Consequence
		Community members are trapped in U'Kwa Nalis by flood events of this magnitude and the flow of supplies in and out during these events in impeded by unsafe navigation in the river and unsafe flying conditions.
Environmental	Medium	Minor habitat loss occurred in areas where bank loss and sediment deposition were high. Excessive sedimentation can also harm spawning grounds.
Infrastructure	Very High	Critical infrastructure impacted by floods and sedimentation includes the barge loading ramp, and the Bullpen Channel. Currently these can only be utilized at higher tide levels making them ineffectual components of an emergency response plan. There is currently no infrastructure to allow all community members to safely cross the river at the village. Ideally there should be a bridge across the river, but in the shorter term a stable stairway up the riverbank should be provided.

5 Site Opinion and Advice

Based on this hazard and risk assessment, NHC's opinion that Site KI-1 is an Area of Immediate Concern (AIC), requiring emergency response work measures to be implemented as soon as possible, and the Kingcome Emergency Debris and Sediment Management Project (the "Project") scope has been developed to see such works completed.

The Project response works proposed to remove hazards, save lives, and reduce suffering are:

1. Dredge a deeper navigation channel through the lower reach of the river to improve navigability over the short term.
2. Trim wood debris that is embedded in the riverbed and posing a navigation hazard.
3. Dredging of the Bullpen Channel to allow a draft of 3 m below low tide levels, and construction of a sediment exclusion structure to prevent the dredged Bullpen from in-filling again. This will allow:
    - Sheltered moorage of large boats (which could then be used to evacuate large numbers of people if required).
    - Safe access and moorage of fuel and other supply barges at all tide levels.
    - Access for heavy equipment for Community maintenance needs.

    Without an exclusion structure, dredging the Bullpen is ineffective. The estuary channel that cuts through the Bullpen will fill it with sediment during just a few tide cycles.

During 2023-2024 instream window, a 770 m long stretch of river upstream of the mouth was dredged, and numerous pieces of debris were trimmed, as outlined in items 1 and 2 above.

Dredging the Bullpen Channel and constructing a sediment exclusion structure to current codes and standards are crucial responses for safeguarding the public health of the DFN community and mitigating further economic and social impacts on the community.

In addition, as part of flood and other emergency response planning, consideration should be given to:

1. A bridge across Kingcome River at U'Kwa Nalis Village. This will provide a corridor for safe access and egress from the village to the ocean at times when river navigation is too dangerous and flights are not operating.
2. Regular dredging of sediments and trimming of debris from the Kingcome River is necessary to maintain safe navigation.
3. Regular maintenance and improvements to the west side road that connects the Bullpen to the hydro facility and work camp.

6 Closure

Please contact Des Goold at 604-837-8289 or dgoold@nhcweb.com if there are additional questions or concerns.

Report prepared by:



Des Goold, P.Eng. 2024-04-19
Principal
Northwest Hydraulic Consultants Ltd.

Report reviewed by:

ADBastani

Arshad Bastani, P.Eng.
ENV Project Manager
ASHO Services Inc.

NHC Permit to Practice #: 1003221

Attachments:

Risk Matrices: Public Safety, River Capacity, Environment, Infrastructure (4)
Photos, Location Map and Figures

DISCLAIMER

This report has been prepared by **Northwest Hydraulic Consultants Ltd.** for the benefit of **Flood Debris Management Secretariat, Environmental Protection Division, BC Ministry of Environment and Climate Change Strategy** for specific application to the **Preliminary Site Assessment of Potential Areas of Immediate Concern Site KI-1, Kingcome Inlet.** The information and data contained herein represent **Northwest Hydraulic Consultants Ltd.** best professional judgment in light of the knowledge and information available to **Northwest Hydraulic Consultants Ltd.** at the time of preparation and was prepared in accordance with generally accepted engineering and geoscience practices.

Except as required by law, this report and the information and data contained herein are to be treated as confidential and may be used and relied upon only by **Flood Debris Management Secretariat, Environmental Protection Division, BC Ministry of Environment and Climate Change Strategy**, its officers and employees. **Northwest Hydraulic Consultants Ltd.** denies any liability whatsoever to other.

Public Health and Safety

Risk Evaluation and Response						
	Consequence Rating	Very Low	Low	Medium	High	Very High
Indices	Public Health and Safety	Minor disruption to few.	Minor, short term disruption to local community or moderate disruption to few.	Moderate disruption to local community, or substantial disruption to few.	Moderate, long term disruption to local community.	Substantial, long term disruption to region.
Likelihood	**Annual Exceedance Probability**	**Very Low**	**Low**	**Medium**	**High**	**Very High**
Very Likely	>0.2	M	H	H	VH	VH
Likely	0.2-0.1	L	M	H	H	VH
Moderate	0.1-0.02	L	L	M	H	H
Unlikely	0.02-0.005	VL	L	L	M	H
Very unlikely	<0.005	VL	VL	L	L	M

Risk Key			
	VH	Very High	Risk is unacceptable short-term (before next flood season); Risk reduction required
	H	High	Risk is unacceptable medium-term; Risk reduction plan must be developed and implemented in a reasonable time frame
	M	Medium	Risk may be tolerable; more detailed review required
	L	Low	Risk is tolerable; monitor
	VL	Very Low	Risk is broadly acceptable; no further review needed

Notes:

Currently, the river is DFN's primary mode of transportation in and out of U'Kwa Nalis but is rife with hazards. Sediment deposition in lower reaches of the Kingcome River and the Bullpen have resulted in shallow depths during low tides. Woody debris embedded in the river ("Pistol-Butts") create additional hazards to navigation during periods of mid to high tides. The consequences of attempting navigation outside of safe flow/tide conditions is damage to boats and risk of injury or death for the operators and passengers. Community members have lost their lives due to unsafe navigation in the past. Several boats have been damaged since the ARE, with at least one boat capsized.

The Bullpen is not operational due to current sediment buildup, so there is no means of evacuating large numbers of community members during emergencies. Mitigation measures are not in place to avoid the recurrence infilling of the Bullpen with sediment.

Selected consequence and risk rating

River Capacity

Risk Evaluation and Response						
	Consequence Rating	Very Low	Low	Medium	High	Very High
Indices	River Capacity	Flow contained within the channel	Flow temporarily floods adjacent land	Flow floods adjacent lands resulting in prolonged flooding	Partial avulsion of flow resulting in flooding, erosion and scour damage to adjacent land and infrastructure	Full avulsion of flow resulting in flooding, erosion and scour damage to adjacent land and infrastructure
Likelihood	**Annual Exceedance Probability**	**Very Low**	**Low**	**Medium**	**High**	**Very High**
Very Likely	>0.2	M	H	H	VH	VH
Likely	0.2-0.1	L	M	H	H	VH
Moderate	0.1-0.02	L	L	M	H	H
Unlikely	0.02-0.005	VL	L	L	M	H
Very unlikely	<0.005	VL	VL	L	L	M

Risk Key			
	VH	Very High	Risk is unacceptable short-term (before next flood season); Risk reduction required
	H	High	Risk is unacceptable medium-term; Risk reduction plan must be developed and implemented in a reasonable time frame
	M	Medium	Risk may be tolerable; more detailed review required
	L	Low	Risk is tolerable; monitor
	VL	Very Low	Risk is broadly acceptable; no further review needed

Notes: Current levels of sedimentation and debris loading in the river increase flood risk due to erosion and could increase flood levels. Flooding in U'Kwa Nalis Village is common and while portions of the Village flood during 10- to 50-year floods, most habitation is above the 60-year flood level mapped in 2013. Community members are trapped in U'Kwa Nalis by flood events of this magnitude and the flow of supplies in and out during these events in impeded by unsafe navigation in the river and unsafe flying conditions.

Selected consequence and risk rating

Environmental

Risk Evaluation and Response						
	Consequence Rating	**Very Low**	**Low**	**Medium**	**High**	**Very High**
Indices	**Environmental**	No noticeable loss or deterioration of habitat, species, unique landscapes, or culturally valued sites.	Small, short term loss or deterioration of important, unique, rare, or endangered habitat, species, landscapes, or culturally valued sites. Moderate, recoverable loss or damage of less valued habitat, species, landscapes, or sites.	Moderate temporary or small permanent loss or deterioration of important, unique, rare, or endangered habitat, species, landscapes, or culturally valued sites. Moderate loss or damage of less valued habitat, species, landscapes, or sites.	Moderate permanent loss or deterioration of important, unique, rare, or endangered habitat, species, landscapes, or culturally valued sites.	Major permanent loss or deterioration of important, unique, rare, or endangered habitat, species, landscapes, or culturally valued sites.
Likelihood	**Annual Exceedance Probability**	**Very Low**	**Low**	**Medium**	**High**	**Very High**
Very Likely	>0.2	**M**	**H**	**H**	**VH**	**VH**
Likely	0.2-0.1	**L**	**M**	**H**	**H**	**VH**
Moderate	0.1-0.02	**L**	**L**	**M**	**H**	**H**
Unlikely	0.02-0.005	**VL**	**L**	**L**	**M**	**H**
Very unlikely	<0.005	**VL**	**VL**	**L**	**L**	**M**

Risk Key			
	VH	Very High	Risk is unacceptable short-term (before next flood season); Risk reduction required
	H	High	Risk is unacceptable medium-term; Risk reduction plan must be developed and implemented in a reasonable time frame
	M	Medium	Risk may be tolerable; more detailed review required
	L	Low	Risk is tolerable; monitor
	VL	Very Low	Risk is broadly acceptable; no further review needed

Notes: Minor habitat loss occurred in areas where bank loss and sediment deposition were high. Excessive sedimentation can also harm spawning grounds.

Selected consequence and risk rating

Infrastructure

Risk Evaluation and Response						
	Consequence Rating	Very Low	Low	Medium	High	Very High
Indices	Infrastructure	No infrastructure impacted	Impacts to infrastructure (minor erosion or scour, some debris accumulation, partial infilling, etc.) are not expected to have an impact of the operation of the infrastructure.	Impacts to infrastructure (erosion or scour, debris accumulation, infilling, etc.) leave infrastructure vulnerable	Impacts to infrastructure (erosion or scour, debris accumulation, infilling, etc.) should be repaired post-freshet	Impacts to infrastructure (erosion or scour, debris accumulation, infilling, etc.) will likely result in failure or irreparable damage to the infrastructure - repairs should commence pre-freshet
Likelihood	**Annual Exceedance Probability**	**Very Low**	**Low**	**Medium**	**High**	**Very High**
Very Likely	>0.2	M	H	H	VH	VH
Likely	0.2-0.1	L	M	H	H	VH
Moderate	0.1-0.02	L	L	M	H	H
Unlikely	0.02-0.005	VL	L	L	M	H
Very unlikely	<0.005	VL	VL	L	L	M

Risk Key			
	VH	Very High	Risk is unacceptable short-term (before next flood season); Risk reduction required
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Notes: Critical infrastructure impacted by floods and sedimentation includes the barge loading ramp, and the Bullpen Channel. Currently these can only be utilized at higher tide levels making them ineffectual components of an emergency response plan.
There is currently no infrastructure to allow all community members to safely cross the river at the village. Ideally there should be a bridge across the river, but in the shorter term a stable stairway up the riverbank should be provided.

Selected consequence and risk rating

KI-1 Site Photos



Photo 1. The government dock in Kingcome Inlet (for location, see Figure 1).



Photo 2. Aerial view of the boats that commonly navigate the river – for scale, the wetter width of the river in this photo is about 200 ft.



Photo 3. Example of "Pistol Butt" debris that would be invisible to boaters and higher tide levels.

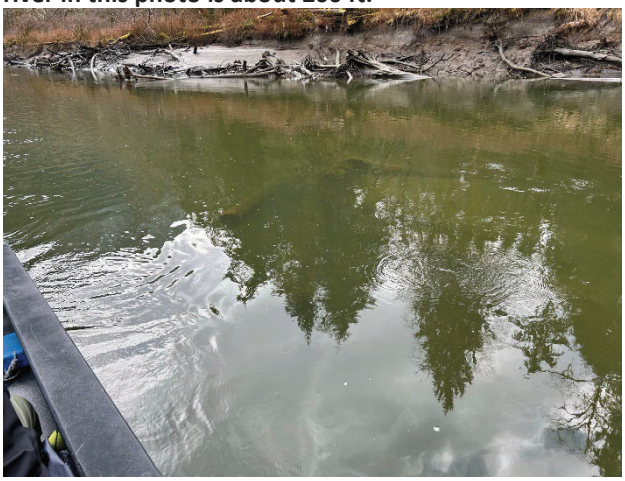


Photo 4. Other examples of debris hidden just below the water surface – invisible under turbid water conditions that exist much of the year.



Photo 5. Looking north at the Bullpen Channel. The barge ramp is at lower left.



Photo 6. Channel condition upstream of U'Kwa Nalis with presence of mid-channel bars and woody debris.

Figure 1. Kingcome Inlet/ River (Site KI-1) Location Map

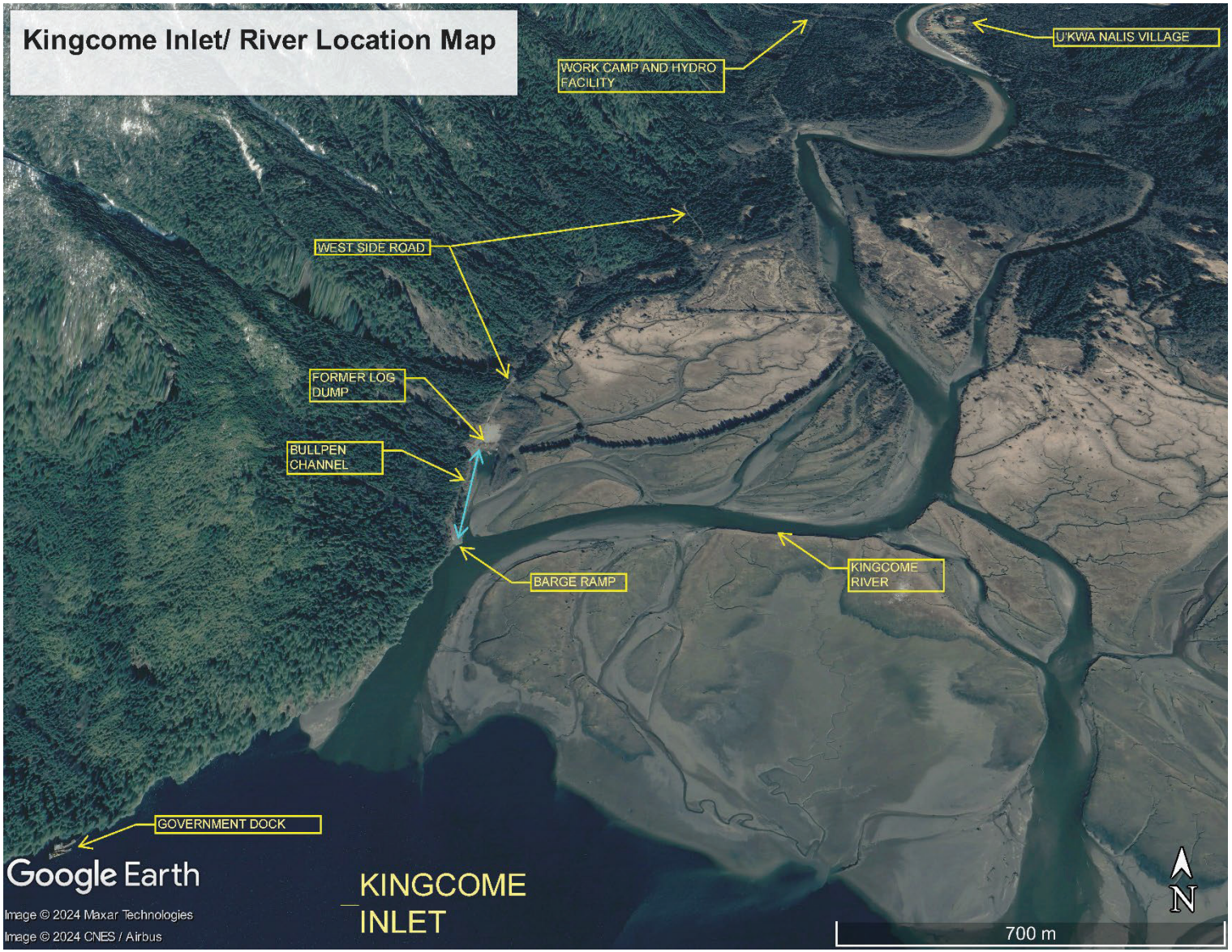


Figure 2. Water depth at the mouth of Kingcome River at low tide and low river flow. White shaded areas are where depths are between 0.5 m and 1.0 m, the bare minimum required for small boats with outboard motors. Brown shading is where depths are less than 0.5 m.



APPENDIX B

DESIGN BRIEF

NHC Reference 3007807
July 31, 2023

Ministry of Environment and Climate Change Strategy and
Flood Debris Management Secretariat
Victoria, BC

Dzawada'enuxw First Nation
32 Ukwanalis Road
Kingcome Inlet, B.C. V0N 2B0

Attention: Thyren Jacobs, Designation(s), Title
Dawn Nicolson, DFN Band Administrator

Via email: Thyren.Jacobs@gov.bc.ca
dfn.administrator@kingcome.ca

Re: **Kingcome Emergency Debris and Sediment Management Project 2900439**
Design Brief Rev. 0

1 Introduction

The B.C. Ministry of Environment and Climate Change Strategy (ENV) is responsible for flood impact response and recovery under the Emergency Program Act (EPA). ENV is also the lead agency for flood debris management (Provincial Flood Emergency Plan, 2019).

During and following the November 2021 Atmospheric River Event (ARE), there was widespread sediment and debris deposition throughout the streams and floodplains of southwest BC. The two days of unprecedented rainfall resulted in one of the worst natural disasters in BC and Canadian history. The BC Provincial government declared a state of emergency, and activated its emergency management system across the Province to respond to the ARE. Response included debris and sediment clean-up as phase 1. The Province is now working towards phase 2, recovery. The goal of recovery is to bring the rivers back to the state they were in before the ARE with respect to debris and sediment.

Dzawada'enuxw First Nation (DFN) was one of the numerous communities adversely affected by the ARE. Many DFN members reside in the traditional village of U'kwa Nalis, located on the east bank of the River approximately 6 km upstream from Kingcome Inlet on the central coast of BC. For DFN, the River and Kingcome Inlet serve as primary means of access and egress, and the movement of goods back and forth between the Village and the floatplane dock in Kingcome Inlet (Figure 2). The River and Inlet also hold much broad value for DFN members, so the environmental health of the waterways is paramount.

The intense rainfall from the ARE produced high flows and mobilized large volumes of sediment and debris. This sediment has infilled the River channel, reduced navigable water depths and increased

turbulence, particularly near its mouth. Also, a significant amount of submerged, wood debris became partially buried in the riverbed along a 4.5 km long reach downstream from the Village.

2 Project Description

2.1 Project Location

The Kingcome River Emergency Debris and Sediment Management Project (the Project) site is located where Kingcome River meets Kingcome Inlet on the central coast of BC, about 73 km northeast of Port McNeill. Figure 1 shows the location of the Kingcome River watershed relative to the central coast and Vancouver Island. Figure 2 is a Google™Earth screenshot showing the Project Area at a larger scale.

2.2 Project Rationale

The rationale for the Project is the need to re-establish safe navigation for DFN community members at all tide levels. The floatplane dock (Figure 2) is the main supply point for goods and materials, and for moving DFN members in and out of the Community. Water depths in the river, especially near the mouth, are currently too shallow to navigate safely when tides lower than about El. -1.0 m (CGVD 2013) or 1.5 m (Chart Datum). It is estimated that the tide is below this level approximately 25% of the time. Not only is the water depth dangerously low at these times, during incoming tides the bi-directional flow in such shallow water creates high turbulence, sand boils and constantly shifting sand bars.

Wood debris partially buried in the riverbed also contributes to hazardous navigation. Even at higher water levels, stems and limbs project up into the water column but are invisible more than 6 months of the year due to high levels of natural turbidity. Such debris has the potential to damage boat motors or pierce the hulls of boats.

NHC is aware of at least one instance in the past year of a community member's boat being capsized in as a result of the hazardous navigation conditions.

2.3 Project Scope

A 1,050 m reach of Kingcome River extending upstream from the mouth is to be dredged, removing approximately 71,000 m^3 of sediment (cyan polygon in Figure 2). The goal is to establish a navigation channel that is 17 to 25 m wide across the bottom and about 3 m deep below Lower Low Water Mean Tide. The dredgeate will be comprise of the natural sand, silt and gravel bedload of Kingcome River, and will be relocated to a proposed, sub-tidal disposal site along the margin of Kingcome Delta (green polygon in Figure 2). Depths of water in the proposed disposal area are greater than 35 m.

Wood debris stems and branches sticking up into the water column will be trimmed along a 4.5 km reach of Kingcome River downstream of U'kwa Nalis Village (yellow polygon in Figure 2). The debris will be trimmed by a certified dive team using hydraulic saw(s) suitable for underwater use. Trimmed wood will be cut to lengths no longer than 2 m, and left in the river unless otherwise directed by the environmental monitor. The trimming will focus on debris that is buried within the bed of the river in

navigable portion of the channel. Debris collected in jams along the riverbank and lying parallel to the riverbank will not be trimmed since they provide habitat and naturally protect the banks from erosion.



Figure 1: Kingcome River Location Map

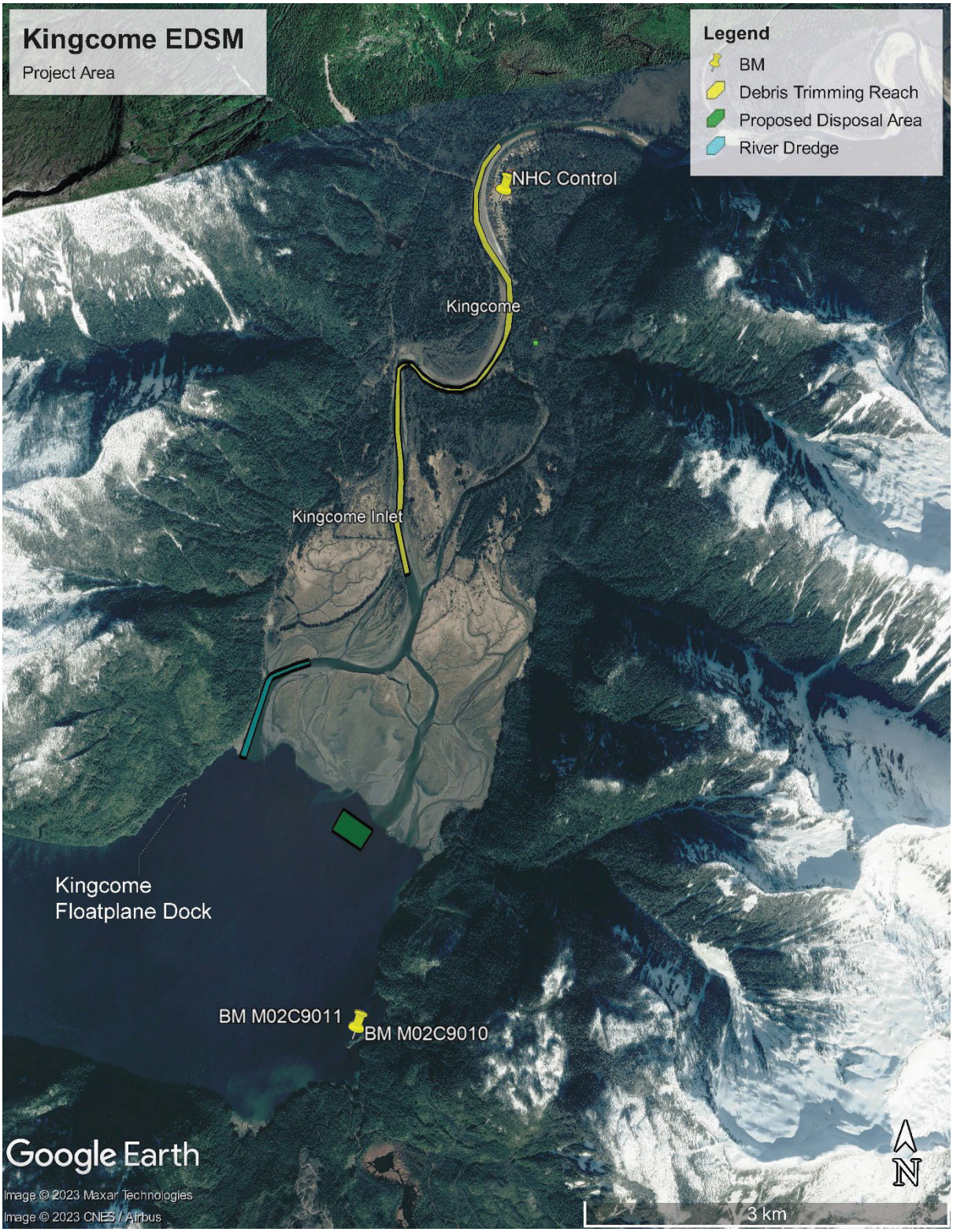


Figure 2: Kingcome Emergency Debris and Sediment Management Project Area

2.4 Construction Timing

Construction of the Project will take place during the marine least risk window from November 15th, 2023 to February 15th, 2024.

2.5 DFN Engagement and Support

The DFN were strong self-advocates in getting the Project established in the first place and have been engaged since the first engineering assessment was made in the spring of 2022. During the design process, members of the design team have visited U'Kwa Nalis several times for meetings, presentations and joint field investigations. A letter of support from DFN is provided in Appendix A.

2.6 Project Drawings

A seventeen (17) sheet drawing set has been prepared under separate cover under the file name: 3007807 NHC 2900439 Kingcome EDSM IFT R0.PDF.

3 Project Data

3.1 Topography, Bathymetry and Imagery

An existing ground surface has been developed for the project by combining bathymetry and topography collected by NHC from October 12th to 17th , 2022, and LiDAR collected by Eagle Mapping Ltd. on November 2nd, 2022.

NHC established the following survey control in U'Kwa Nalis Village:

CONTROL POINTS TABLE

CONTROL POINT	EASTING (m)	NORTHING (m)	ELEVATION (m)
NHC10 BASE	697866.725	5650815.493	4.357
NHC11	697819.031	5650812.744	4.867

In addition there are two federal benchmarks: M02C9010 and M02C9011 established on a small island in Kingcome Inlet southeast of the project area (Figure 2).

Topography was collected using a Trimble R12 GPS Base and Rover, and a Trimble TSC3 Controller with Trimble Access Software. The accuracy (under optimal field conditions) is: Horizontal 8 mm + 1 ppm RMS Vertical 15 mm + 1 ppm RMS.

Bathymetry was collected using 2022 Hypack Hydrographic Acquisition Software and a CeeEcho depth sounder, no pitch, heave, roll, or IMU. The accuracy (under optimal field conditions) is: 0.01 m +/- 0.1% of depth @ 200 kHz.

LiDAR was collected using a Riegl VQ-780ii-S LiDAR unit and an IXM-RS-150F camera unit, at 12 pulses/ m^2. The scan rate was 1600 kHz with a 60-degree field of view and 55 percent overlap. The product resolution is 0.5 m and contours were produced at 1.0 m. Eagle Mapping Ltd. subsequently collected orthoimagery on March 27, 2023.

Coordinate system details for the survey data is as follows:

- Horizontal Datum: NAD83(CSRS)
- Projection: UTM Zone 9 North
- Vertical Datum: CGGD2013
- Geoid: CGG2013

3.2 Climate

The climate in Kingcome during the winter construction window (November to February) is wet and cool. Meteorological data is scarce as there are no active weather stations nearby. Regional weather modeling from Meteoblue shows a mean daily temperature range from 1°C to 7°C with extremes in the range of -13°C to 10°C. Monthly precipitation is mostly rain and typically in the range of 300 to 400 mm. (https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/kingcome-inlet_canada_5992215).

3.3 Streamflow

The Water Survey of Canada (WSC) gauge 08GF008 "Kingcome River above Atlatzi River" operated between 2006 and 2009, and was located approximately 8 km upstream of U'Kwa Nalis Village. Based on that record, and scaling to the mouth of the river, the mean winter monthly flow at the project site is estimated to be 61 m^3/s. Daily extremes in the record range from 6 m^3/s to over 600 m^3/s. Extreme high flows occur during periods of heavy rainfall and relatively warm weather. It is usually possible to anticipate periods of high flow by monitoring regional weather forecasts. When winter high flows do occur, they typically last for no more than a few days.

3.4 Metocean data

3.4.1 Tides

Tide statistics for Kingcome Inlet are shown below:

	CGVD 2013	CHART DATUM
HIGHER HIGH WATER LARGE TIDE	3.22 m	5.73 m
HIGHER HIGH WATER MEAN TIDE	2.36 m	4.87m
MEAN WATER LEVEL	0.60 m	3.11 m
LOWER LOW WATER MEAN TIDE	-1.35 m	1.16 m
LOWER LOW WATER LARGE TIDE	-2.42 m	0.09 m

Tide predictions and heights for Kingcome Inlet (08348) are available online at:
https://www.tides.gc.ca/en/stations/8348

3.4.2 Winds

There is a wind forecasting model which exists for the region. Environment Canada describes the model as: the High-Resolution Deterministic Prediction System, or HDPRS, is a set of nested limited-area model (LAM) forecast grids from the non hydrostatic version of the Global Environment Multiscale (GEM) model with a 2.5 km horizontal grid spacing. HDPRS data is archived by Andrew Berkley for use by NHC. HDPRS data was pulled for Kingcome Inlet at a location roughly 1 km offshore from the Project area (2018 to 2023) and the resulting wind rose is shown in Figure 3.

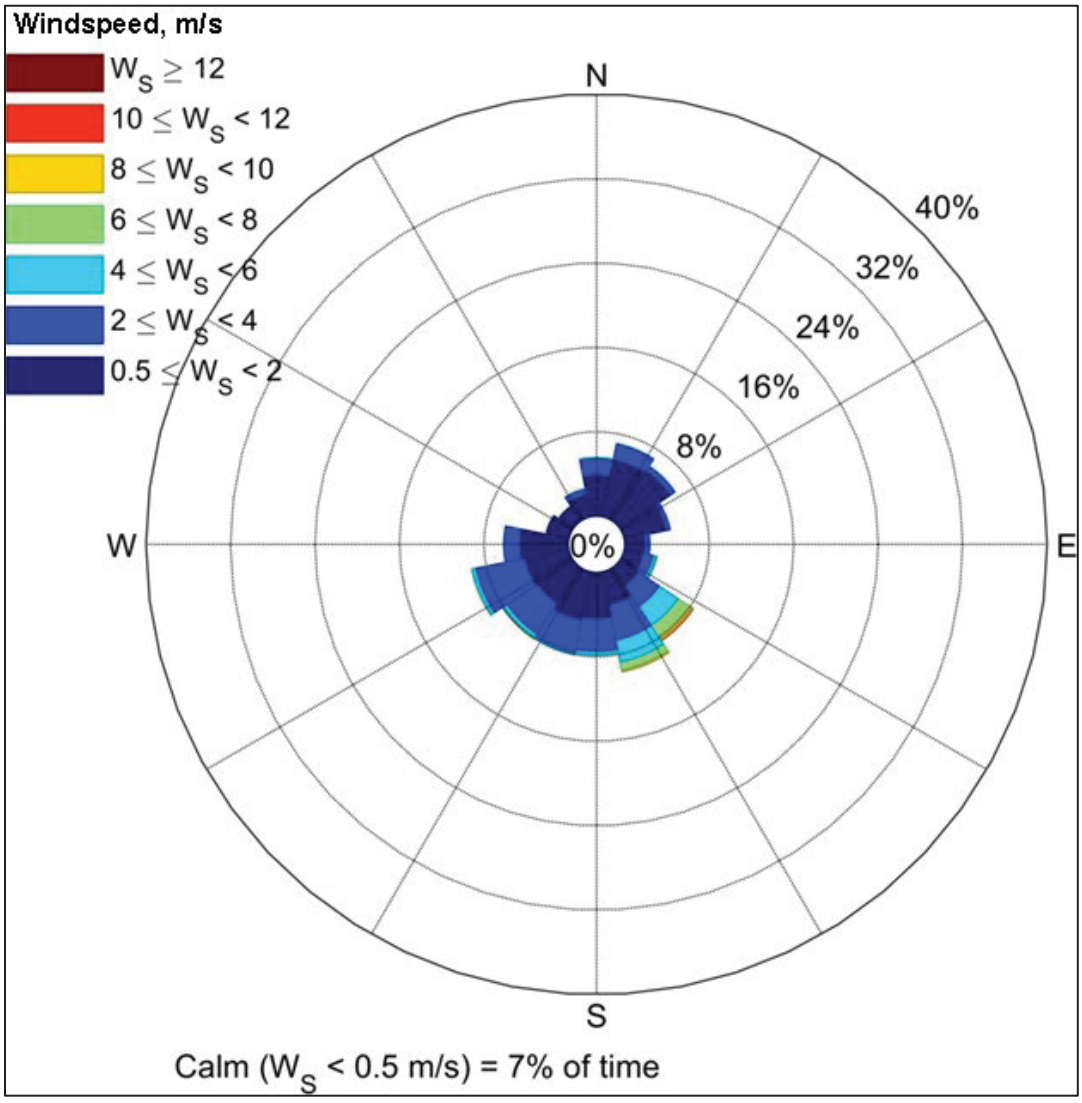


Figure 3: Wind rose for Kingcome Inlet, 1 km offshore (data from 2018 to 2023)

3.5 Seasonal and Flood Hydraulics

3.5.1 Hydraulic Modeling

NHC has developed a two-dimensional hydraulic model of the river from U'Kwa Nalis Village to the mouth, a distance of about 6 km. The model was developed using HEC-RAS (River Analysis System), a computer program developed by the U.S. Army Corps of Engineers Hydrologic Engineering Center (HEC). Version 6.3 is used for this study.

The channel and floodplain geometry is represented by a digital elevation model (DEM), built from the combined survey surface described in Section 3.1. Break lines are used to shape the channel topography as needed. Hydraulic roughness is determined from the orthophotos and other historic imagery.

The boundary conditions are normal depth upstream, and either normal depth or tide level downstream.

3.5.2 Predicted Hydraulics

Hydraulic model simulations have been run for the mean monthly winter flow (61 m^3/s), at both a mean low tide (LLWMT – essentially no tidal influence) and a mean high tide (HHWMT). Average results within the proposed dredge area follows:

Model Flow Condition: Mean winter flow (60 cms) +LLWMT
Main River Channel
Depth: 1.3 – 3.2 m
Velocity: 0.3 – 0.6 m/s (0.6 to 1.2 knots)

Model Flow Condition: Mean winter flow (60 cms) +HHWMT
Main Channel
Depth: 4.5 – 6m
Velocity: 0.05 – 0.07 m/s (0.1 to 0.14 knots)

Appendix B contains figures showing hydraulic conditions for the mean monthly winter flow throughout the entire modelled reach.

4 Environmental Assessment

Pacificus Biological Services Ltd. (PBS) are the Project's environmental consultant. They have prepared an Environmental Assessment Report under separate cover (Pacificus Biological Services Ltd., 2023a), which is part of the Project Reference Materials.

4.1 Construction Environmental Management Plan

PBS have prepared a Construction Environmental Management (Mitigation) Plan under separate cover (Pacificus Biological Services Ltd., 2023b), which is part of the Project Reference Materials.

5 Archaeological Assessment

WSP is the Project's Archaeological consultant. WSP conducted an archaeological of the Project site on June 8, 2023, accompanied by Ms. Midori Nicolson of DFN. A survey of the river was conducted by boat. Considering the results from a previous archaeological assessment in 2017, which overlapped in area with the current Project area, the significant historic impacts, and unstable nature of the terrain, the Project area for dredging is considered to have low archaeological potential. No areas of archaeological potential were identified, and no archaeological materials or features were observed.

An archaeological overview assessment report will be prepared in August 2023 under separate cover.

6 Maintenance Dredging

Future aggradation will occur within the proposed dredge area. The Kingcome watershed's physical characteristics, glacial history and ongoing glacial retreat create a system with a high sediment supply. Sediment supply has also increased since the 1970s due to forestry practices in the upper watershed. While there are no sediment transport measurements, the comparison between the 2011 and 2022 overlapping bathymetric cross sections shows aggradation in most locations downstream of U'Kwa Nalis Village. These data empirically support deposition observations made by the local community.

There have been attempts to estimate annual average bedload sediment yield using empirical data from watersheds with characteristics similar to Kingcome (see list in table below). These estimates provide a range of annual average bedload sediment yield from anywhere from 28,800 to 242,100 (m^3/yr).

	Estimated Annual Bedload Sediment Yield (m^3/yr)		
Method	**Low End**	**Average**	**High End**
Campbell & Church (2002)	None	264,800	None
Church and Slaymaker (1989)	28,800[1]	None	195,300[2]
Loso et al. (2004)	None	216,200	None
Pelpola & Hickin (2003)	48,400	121,000	215,600
Scheifer et al. (2010)	26,060	121,000	242,100

[1]Assumes bedload is 10% of the total load. Estimated from Turowski et al. (2010).

[2]Assumes bedload is 43% of the total load. Estimated from Turowski et al. (2010).

Without an extensive sediment transport measurement program, there is a great deal of uncertainty in how quickly the dredged area will fill. However, it may be reasonable to expect that maintenance dredging could be required within the first 3 to 5 years, or sooner, in order to maintain a reasonable draft.

The dredge area will be re-surveyed pre- and post-construction, and the entire 6 km reach downstream of the Village will be re-surveyed in 2024. This data should help inform estimates of annual bedload yield to the mouth of the river.

DISCLAIMER

This report has been prepared by **Northwest Hydraulic Consultants Ltd.** for the benefit of **Ministry of Environment and Climate Change Strategy and Dzawada'enuxw First Nation** for specific application to the **Kingcome Emergency Debris and Sediment Management Project 2900439.** The information and data contained herein represent **Northwest Hydraulic Consultants Ltd.** best professional judgment in light of the knowledge and information available to **Northwest Hydraulic Consultants Ltd.** at the time of preparation and was prepared in accordance with generally accepted engineering and geoscience practices.

Except as required by law, this report and the information and data contained herein are to be treated as confidential and may be used and relied upon only by **Ministry of Environment and Climate Change Strategy and** , its officers and employees. **Northwest Hydraulic Consultants Ltd.** denies any liability whatsoever to other parties who may obtain access to this report for any injury, loss or damage suffered

Report prepared by:

Des Goold, P.Eng.
Principal
Design Manager

EGBC Permit to Practice Number: 1003221

7 References

Pacificus Biological Services Ltd. (2023b). Proposed Dredging and Hazardous LWD Trimming in the Gwa'yi (Kingcome) River and Estuary, Construction Environmental Mitigation Plan.

Pacificus Biological Services Ltd. (2023a). Proposed Dredging and Hazardous LWD Trimming in The Gwa'yi (Kingcome) River and Estuary, Environmental Assessment Report.

APPENDIX A – DFN LETTER OF SUPPORT

DZAWADA'ENUXW FIRST NATION

July 6, 2023

KINGCOME EMERGENCY DEBRIS AND SEDIMENT MANAGEMENT PROJECT
LETTER OF SUPPORT

To Whom It May Concern:

This Letter of Support for the above captioned project is addressed to all concerned parties at all levels of the provincial government of British Columbia and the federal government of Canada.

At this point in time the channel of Kingcome River provides the only reliable, year-round, means of access, egress, and supply of provisions to and from our community in U'Kwa Nalis Village. For Dzawada̱'enu̱xw First Nation (DFN) the River is our roadway. This puts the DFN in a unique and precarious position relative to other First Nations and peoples within BC. Over the past several decades, sediment accumulation and wood debris entrapment in the riverbed have been increasing, resulting in shallow and dangerous water in which to navigate our boats. The Atmospheric River Event (ARE) which occurred in November 2021 resulted in further acute sediment and debris buildup, and threats to the safety of our people. Following the November 2021 ARE, DFN has been outspoken in our need for funding support to address navigation safety in Kingcome River, and sustainable access for larger vessels to the Bullpen Channel. Since the ARE event, our boat operators have continued to sustain damage to their boats, threats to their personal safety and the safety of their passengers.

DFN declares its support for the Project Year 1 construction activities, which are to include dredging sediment from the mouth of Kingcome River (where sedimentation and tidal interactions make navigation particularly hazardous) and trimming of hazardous debris in the river between the mouth and U'Kwa Nalis Village.

DFN also declares it's support, in principle, for Year 2 construction activities, which will include dredging of the Bullpen Channel and some means of limiting future sedimentation within the Bullpen Channel. Consultation between DFN, the Project Design Team (led by Northwest Hydraulic Consultants Ltd.) and the Ministry of Environment and Climate Change Strategy (ENV) are still ongoing to determine the most appropriate means of managing sedimentation within the Bullpen.

To date, the Project Design Team and ENV have been actively engaged with DFN's Council, Stewardship Committee and Administration. It is DFN's expectation and requirement that this engagement continue in the lead-up to and during both Year 1 and Year 2 construction.

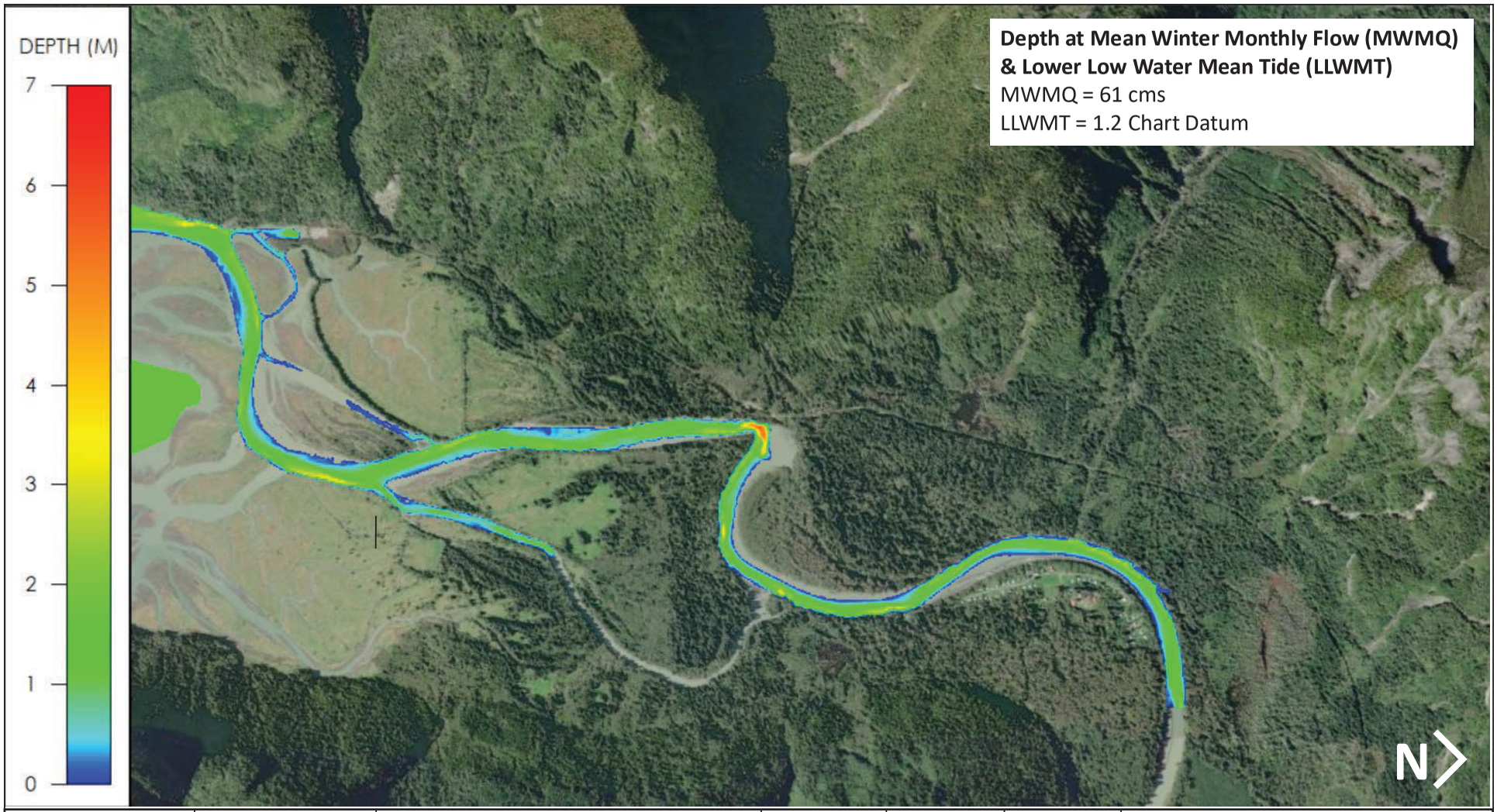
Sincerely,

Dawn Nicolson
DFN Administrator

#32 U'kwa nalis Road, Kingcome Inlet, BC, V0N 2B0 Tel: 250 974 3013 Fax: 250 974 3005

APPENDIX B – FULL REACH HYDRAULIC MODEL RESULTS

MEAN WINTER MONTHLY FLOW AT LLWMT AND HHWMT

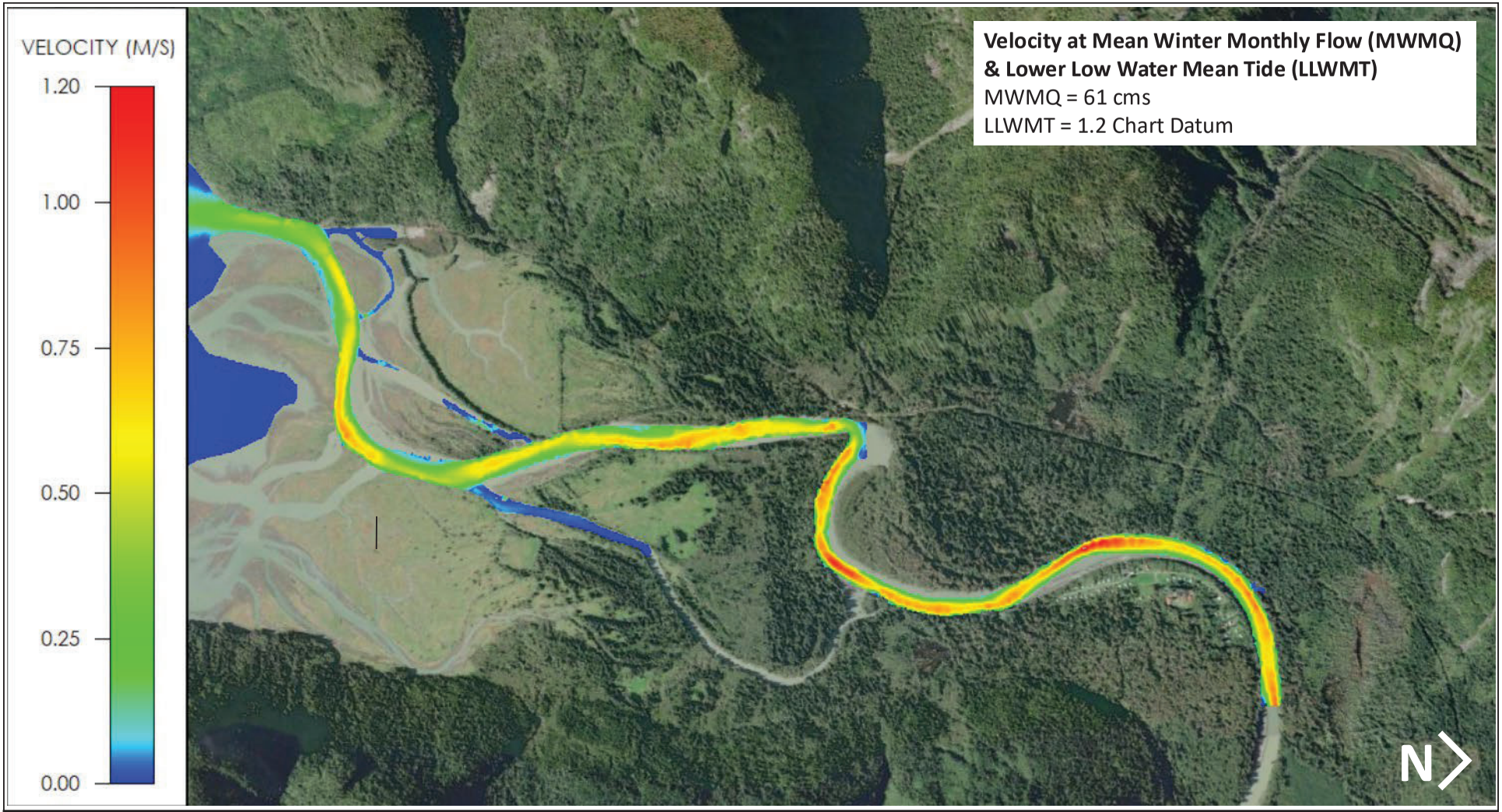


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Job Number		**Date**
3007807		07-JULY-2023

Project ID: 3007807
Project: Kingcome River and Inlet Sediment Management Emergency Works
Location: Kingcome River and Inlet



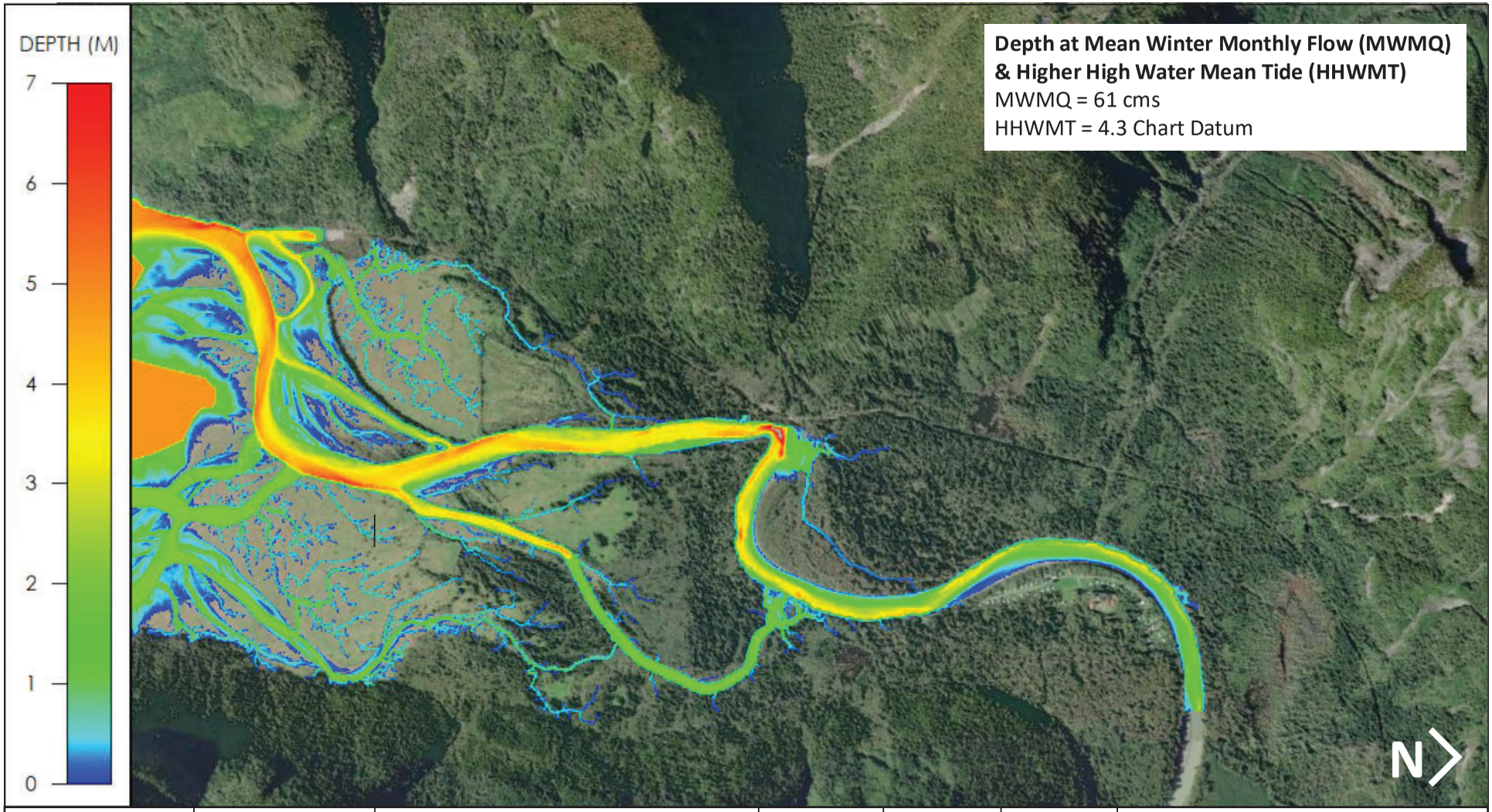
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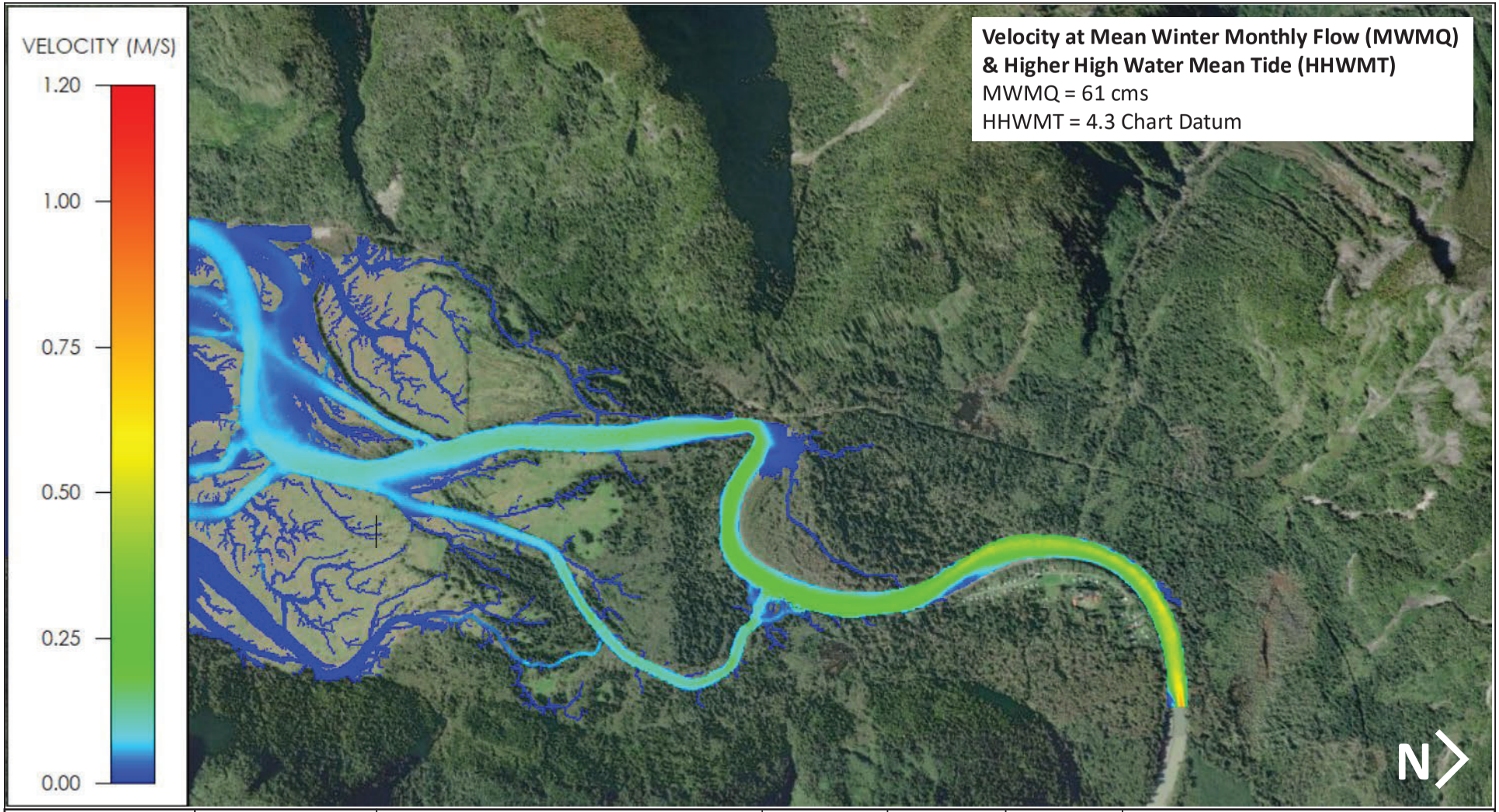
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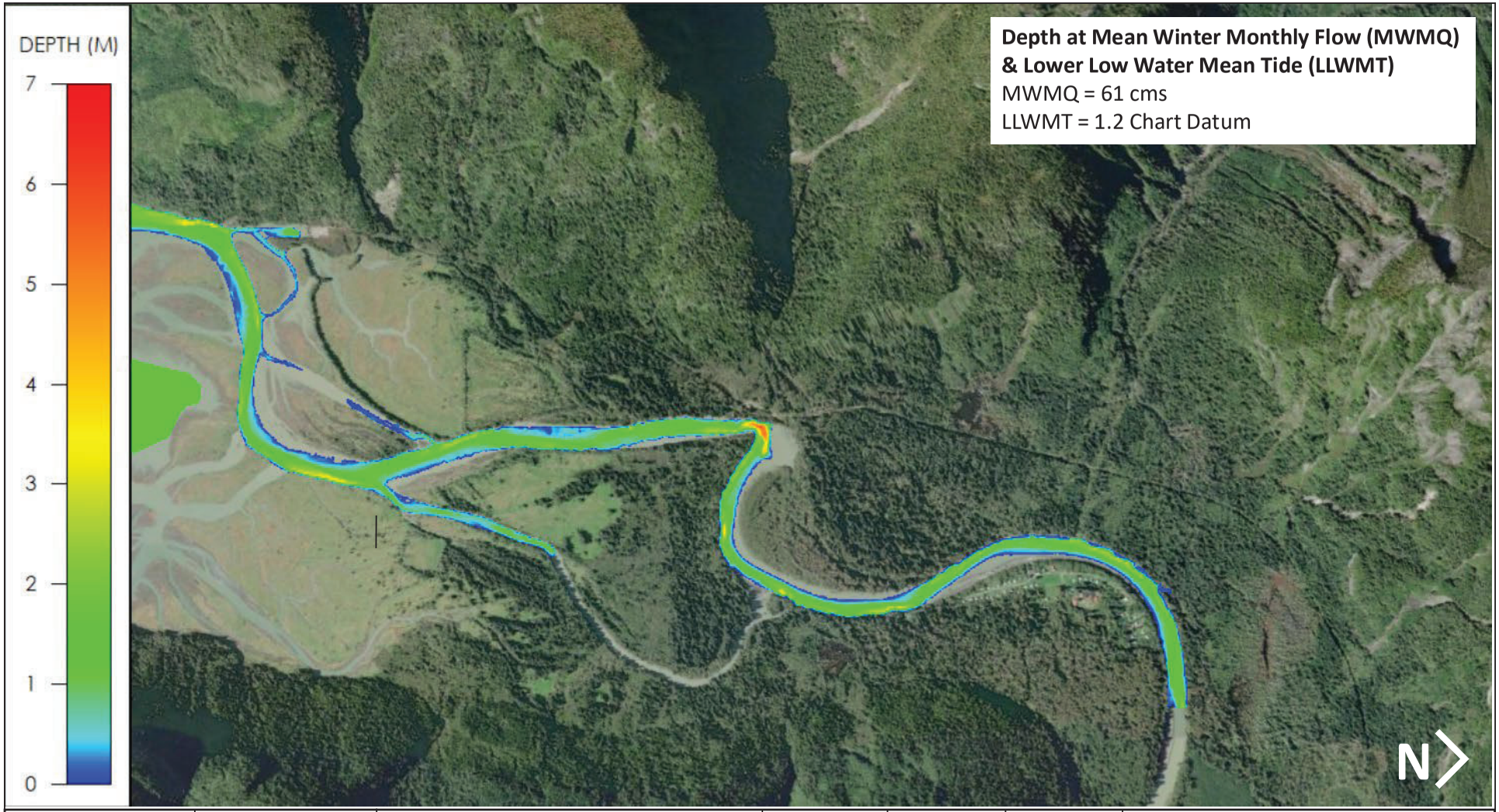
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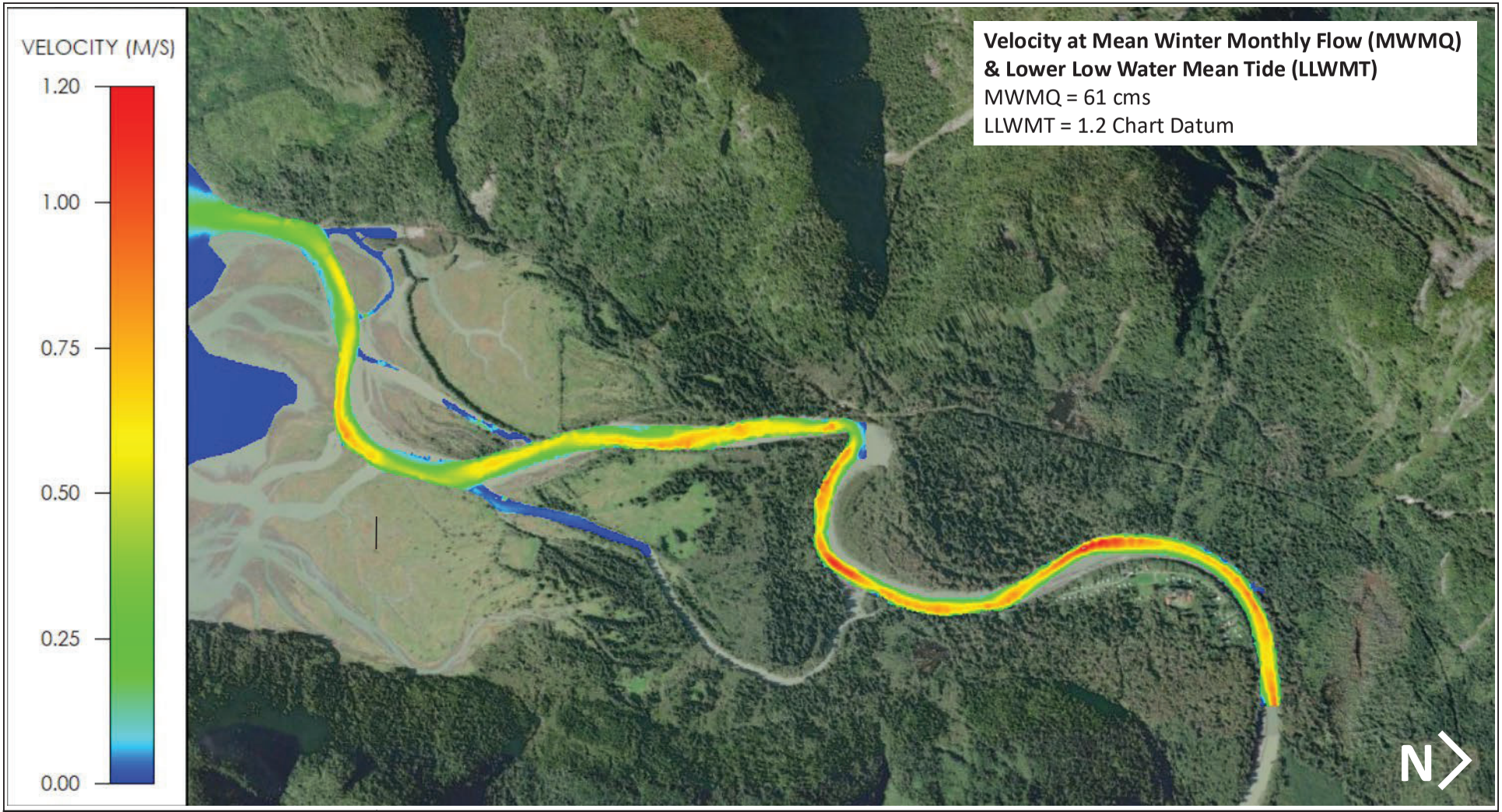
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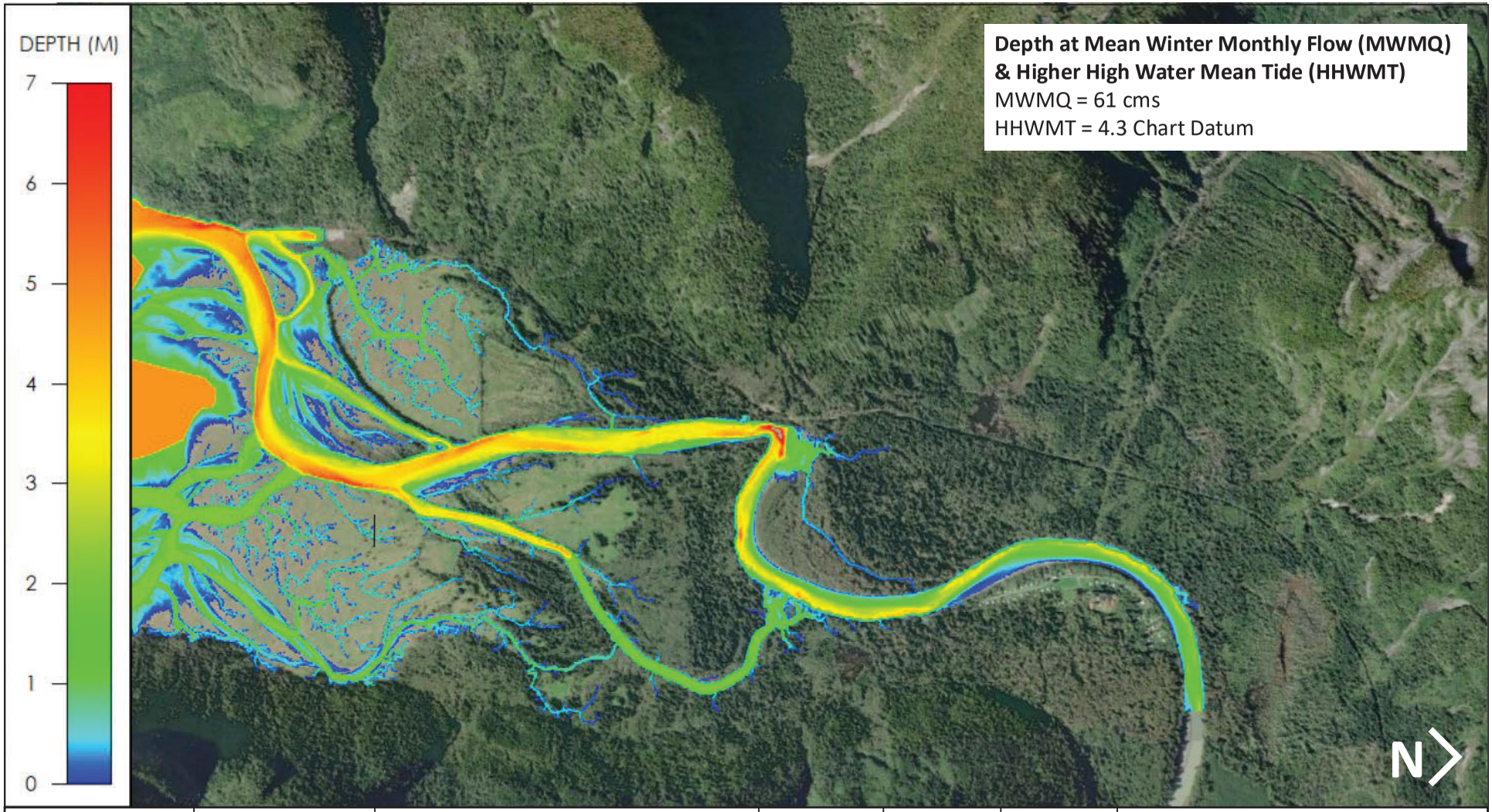


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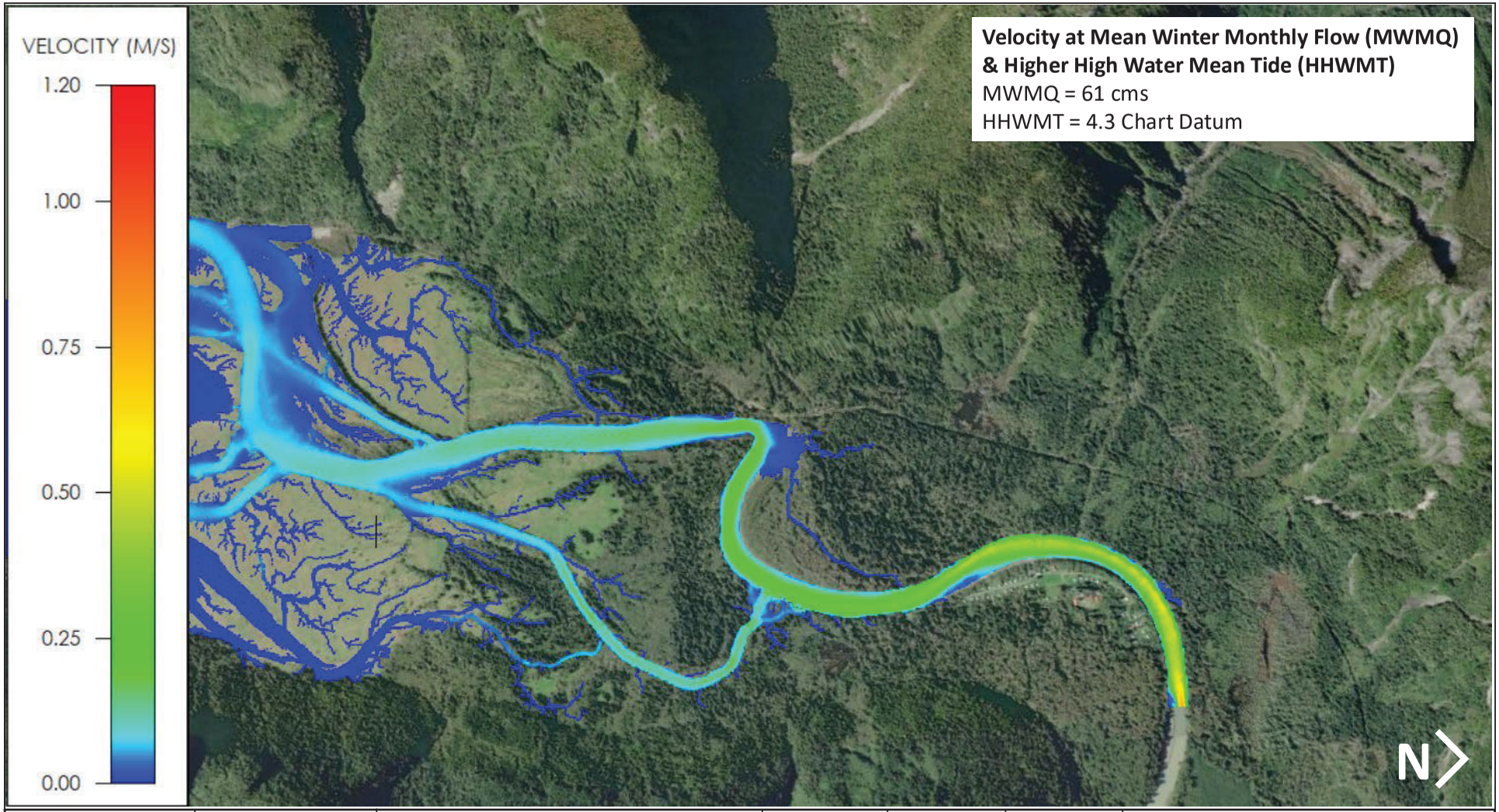
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A. Van Boven		D. Goold

Job Number	Date
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Project: Kingcome River and Inlet Sediment Management Emergency Works
Location: Kingcome River and Inlet

APPENDIX C

DFN LETTER OF SUPPORT

DZAWADA'ENUXW FIRST NATION

September 2023

KINGCOME EMERGENCY DEBRIS AND SEDIMENT MANAGEMENT PROJECT
LETTER OF SUPPORT (UPDATED)

To Whom It May Concern:

This Letter of Support for the above captioned project is addressed to all concerned parties at all levels of the provincial government of British Columbia and the federal government of Canada.

At this point in time the channel of Kingcome River provides the only reliable, year-round, means of access, egress, and supply of provisions to and from our community in U'Kwa Nalis Village. For Dzawada̱'enu̱xw First Nation (DFN) the River is our roadway. This puts the DFN in a unique and precarious position relative to other First Nations and peoples within BC. Over the past several decades, sediment accumulation and wood debris entrapment in the riverbed have been increasing, resulting in shallow and dangerous water in which to navigate our boats. The Atmospheric River Event (ARE) which occurred in November 2021 resulted in further acute sediment and debris buildup, and threats to the safety of our people. Following the November 2021 ARE, DFN has been outspoken in our need for funding support to address navigation safety in Kingcome River, and sustainable access for larger vessels to the Bullpen Channel. Since the ARE event, our boat operators have continued to sustain damage to their boats, threats to their personal safety and the safety of their passengers.

DFN declares its support for the Project Year 1 construction activities, which are to include dredging sediment from the mouth of Kingcome River (where sedimentation and tidal interactions make navigation particularly hazardous) and trimming of hazardous debris in the river between the mouth and U'Kwa Nalis Village. DFN supports plans to dispose of the dredged material in Kingcome Inlet, at the site of historic disposals at sea:

LAT: 50.91667, LONG: -126.21667

DFN also declares it's support, in principle, for Year 2 construction activities, which will include dredging of the Bullpen Channel and some means of limiting future sedimentation within the Bullpen Channel. Consultation between DFN, the Project Design Team (led by Northwest Hydraulic Consultants Ltd.) and the Ministry of Environment and Climate Change Strategy (ENV) are still ongoing to determine the most appropriate means of managing sedimentation within the Bullpen.

To date, the Project Design Team and ENV have been actively engaged with DFN's Council, Stewardship Committee and Administration. It is DFN's expectation and requirement that this engagement continue in the lead-up to and during both Year 1 and Year 2 construction.

Sincerely,

Dawn Nicolson
DFN Administrator

#32 U'kwa nalis Road, Kingcome Inlet, BC, V0N 2B0 Tel: 250 974 3013 Fax: 250 974 3005

APPENDIX D

ENVIRONMENTAL ASSESSMENT REPORT

Proposed Dredging and Hazardous LWD Trimming in the Gwa'yi (Kingcome) River and Estuary Environmental Assessment Report



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Proposed Dredging and Hazardous LWD Trimming in the Gwa'yi (Kingcome) River and Estuary Environmental Assessment Report

Prepared for
Dzawada'enuxw First Nation

and

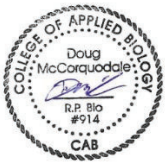
Ministry of Environment and Climate Change Strategy
Flood Debris Management Secretariat

and

Northwest Hydraulic Consultants Ltd.

Written by:
Alex Heckels, MSc., BIT

Reviewed by:



Doug McCorquodale, RPBio

Date:
August 1st, 2023

PACIFICUS
BIOLOGICAL SERVICES LTD

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Executive Summary

Works have been proposed by the Ministry of Environment and Climate Change Strategy and Northwest Hydraulic Consultants Ltd. to improve navigational safety for Dzawada'enuxw First Nation small boat operators in the Gwa'yi (Kingcome) River and Estuary. Work during year 1 will involve dredging of sediment near the confluence of the Kingcome River and Kingcome Inlet, and subsequent disposal of dredgeate in the subtidal area fronting the Kingcome delta. Concurrently, work to trim hazardous large woody debris will be conducted in a 4.5 km reach of river downstream from U'kwa Nalis Village. All works are scheduled to occur in the regional marine and estuarine winter Reduced Risk Work Window between November 15th, 2023, and February 15th, 2024.

An environmental assessment is required prior to the commencement of work. To this end, Northwest Hydraulic Consultants Ltd. contracted Pacificus Biological Services Ltd. to conduct the environmental assessment and to assist with required permitting and approvals. Surveys were conducted throughout the proposed areas for hazardous LWD trimming and dredging, and an underwater SCUBA assessment was conducted in the dredge disposal area. Following the surveys, it was determined that fish habitat quality was poor throughout dredge area, and biological productivity was low in the dredge area and proposed dredge material disposal area. Additionally, it was determined that the trimming of LWD can be conducted without degrading the quality of fish habitat in the Kingcome River.

In consideration of proposed works and the results of environmental assessments, it is not anticipated that year 1 works will result in the *death of fish* or the *harmful alteration, disruption, or destruction of fish habitat.* As works will be occurring below the high-water mark and do not meet the conditions of Code of Practice, it is recommended that the project is submitted for a Request for Review to Fisheries and Oceans Canada. Consultation with Environment and Climate Change Canada should also be conducted to determine whether a Disposal at Sea Permit and associated fieldwork will be required prior to the commencement of works. A *Navigable Waters Protection Act* permits is also being sought from Transport Canada.

Introduction

The Gwa'yi (Kingcome) River drains into Kingcome Inlet on the central mainland coast of British Columbia. The Kingcome River is located within the traditional territory of the Dzawada'enuxw First Nation (DFN), and provides access to U'kwa Nalis Village, located approximately 6 km upstream from Kingcome Inlet.

The Kingcome River drains a very large watershed of approximately 1360 km^2 (WSC: 900-680009) and is fed by several large glaciers. As such, large volumes of sediment, including glacial deposits, are transported downstream to the Kingcome Estuary. These large sediment influxes result in the lower reaches of the Kingcome River experiencing frequent changes in channel morphology, often making safe navigation of the river between the ocean and U'kwa Nalis Village challenging and occasionally impossible.

U'kwa Nalis Village's unreliable access for supplies and egress has been identified as a high risk to public health and safety to DFN. As such, a work plan is being coordinated by the Ministry of Environment and Climate Change Strategy (ENV) to dredge targeted sections of the Kingcome River and trim hazardous large woody debris (LWD) between the confluence with the Pacific Ocean and U'Kwa Nalis Village in order to facilitate reliable passage. Northwest Hydraulic Consultants (NHC) have been engaged by ENV to provide hydrotechnical assistance during all work phases related to sediment management and debris removal. Prior to the commencement of works, an assessment to determine whether works are likely to cause the *death of fish* or the *harmful alteration, disruption or destruction of fish habitat (HADD)*[1] was required. To this end, NHC contracted Pacificus Biological Services Ltd. (Pacificus) to conduct an environmental assessment, produce a construction environmental management plan (CEMP) for all works, and assist with required permitting.

The assessment was conducted over the course of multiple days with the following objectives:

- Inspect the proposed dredge area to describe fish habitat and inventory species that would likely be impacted by dredging works.
- Inspect the proposed dredge material deposition area to describe fish habitat and identify species likely to be negatively impacted by works and propose preferable areas for the deposition of dredged material.
- Determine whether the trimming of hazardous LWD can be conducted without causing a HADD.

[1] Fisheries and Ocean Canada, 2019. Fisheries Act

- Develop a CEMP as a reference for best management practices for all contractors during dredge works.

Description of Proposed Work

A work plan has been proposed by ENV and NHC to improve the safety of navigation of the Kingcome River for members of DFN. All works are to be conducted in lower 6 km of the Kingcome River (Figure 1; Figure 2), and the Kingcome Estuary, within Fisheries and Oceans Canada (DFO) Area 12 – Alert Bay[2]. As such, works are scheduled to be conducted from November 15th, 2023 – February 15th, 2024, during the winter Reduced Risk Work Window (RRWW) to conduct projects in or around water.

Works will begin with dredging of an approximately 64,000 m^2 area near the confluence of the Kingcome River and Pacific Ocean, in order to allow perennial boat access and egress at low tide. Approximately 70,000 m^3 of sediment will be removed from this area using a Derrick barge with a mounted crane or excavator, loaded onto a scow barge, and deposited in subtidal areas fronting the delta at the head of Kingcome Inlet (Figure 2).

Concurrently to dredging activities, hazardous large woody debris (LWD) embedded in the riverbed in a 4.5 km reach of the Kingcome River downstream of U'kwa Nalis Village will be cut to reduce the navigational hazard to small boats (Figure 3; Photo 1; Appendix 1). Numerous DFN small boats navigating the river have been damaged by the large volumes of non-functional LWD embedded in the riverbed, which present a serious safety hazard to boat operators that are required to navigate the river to transport community members and supplies to U'kwa Nalis Village. A small spud barge will be used to transport and anchor divers and equipment in the river, and the debris will be cut into 2 m segments by a commercial diver using a hydraulic underwater saw. The embedded section of the non-functional LWD will remain in the riverbed. Functional LWD accumulated along the banks of the river that promote scour, hydrological complexity, and have the potential to be utilized by fish during upstream migration, will not be trimmed or removed.

Any future maintenance dredging will follow the conditions outlined in the DFO Code of Practice for Routine Maintenance Dredging[3].

[2] Fisheries and Oceans Canada, 2023. British Columbia Marine/Estuarine Timing Windows for the Protection of Fish and Fish Habitat – South Coast and Lower Fraser Areas. https://www.dfo-mpo.gc.ca/pnw-ppe/timing-periodes/bc-s-eng.html (accessed June 23rd, 2023)

[3] Fisheries and Oceans Canada, 2022. Code of Practice: Routine Maintenance Dredging for Navigation. https://www.dfo-mpo.gc.ca/pnw-ppe/codes/dredge-dragage-eng.html (accessed June 23rd, 2023)

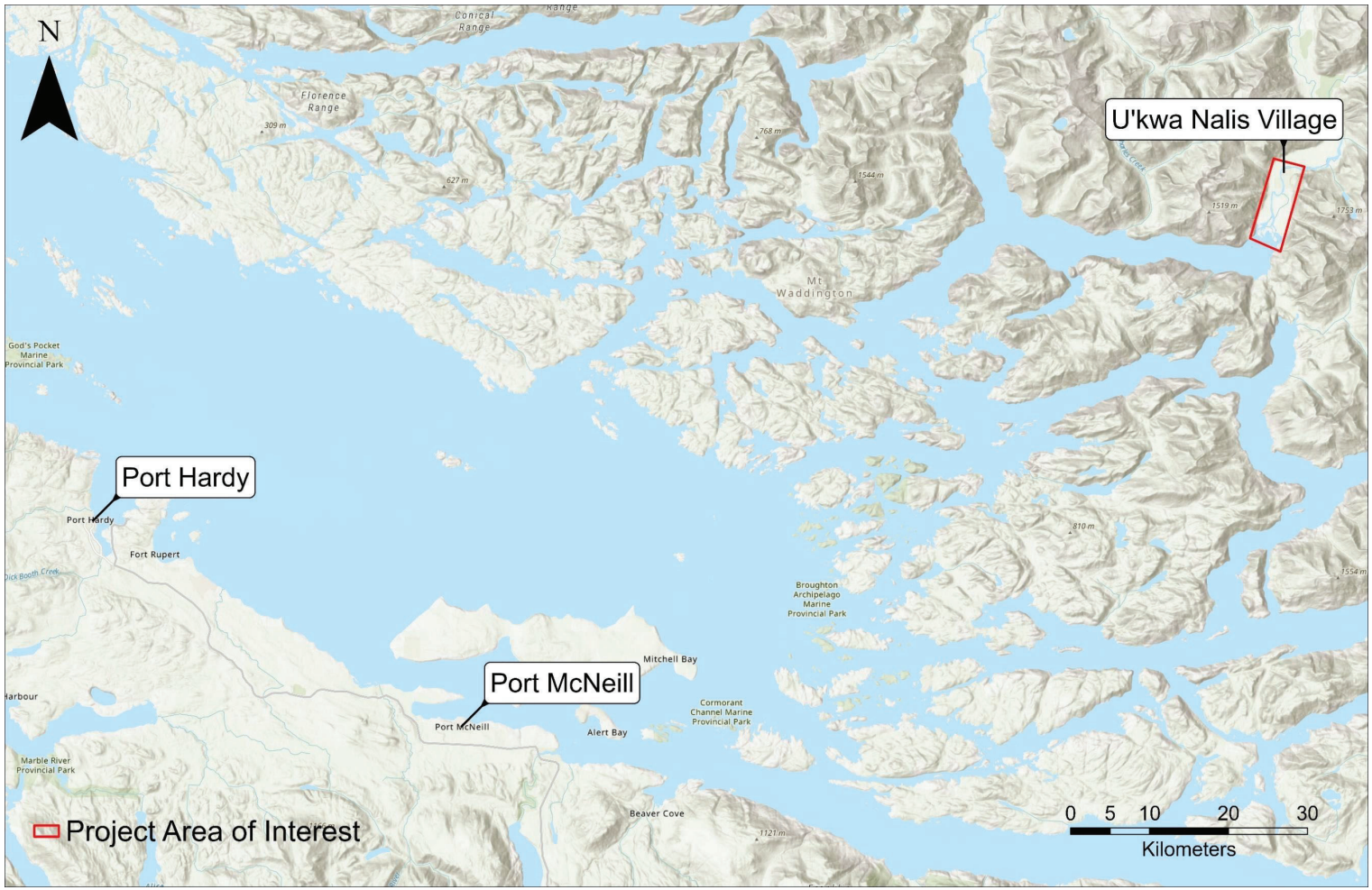


Figure 1. Location of Proposed Dredge Works.

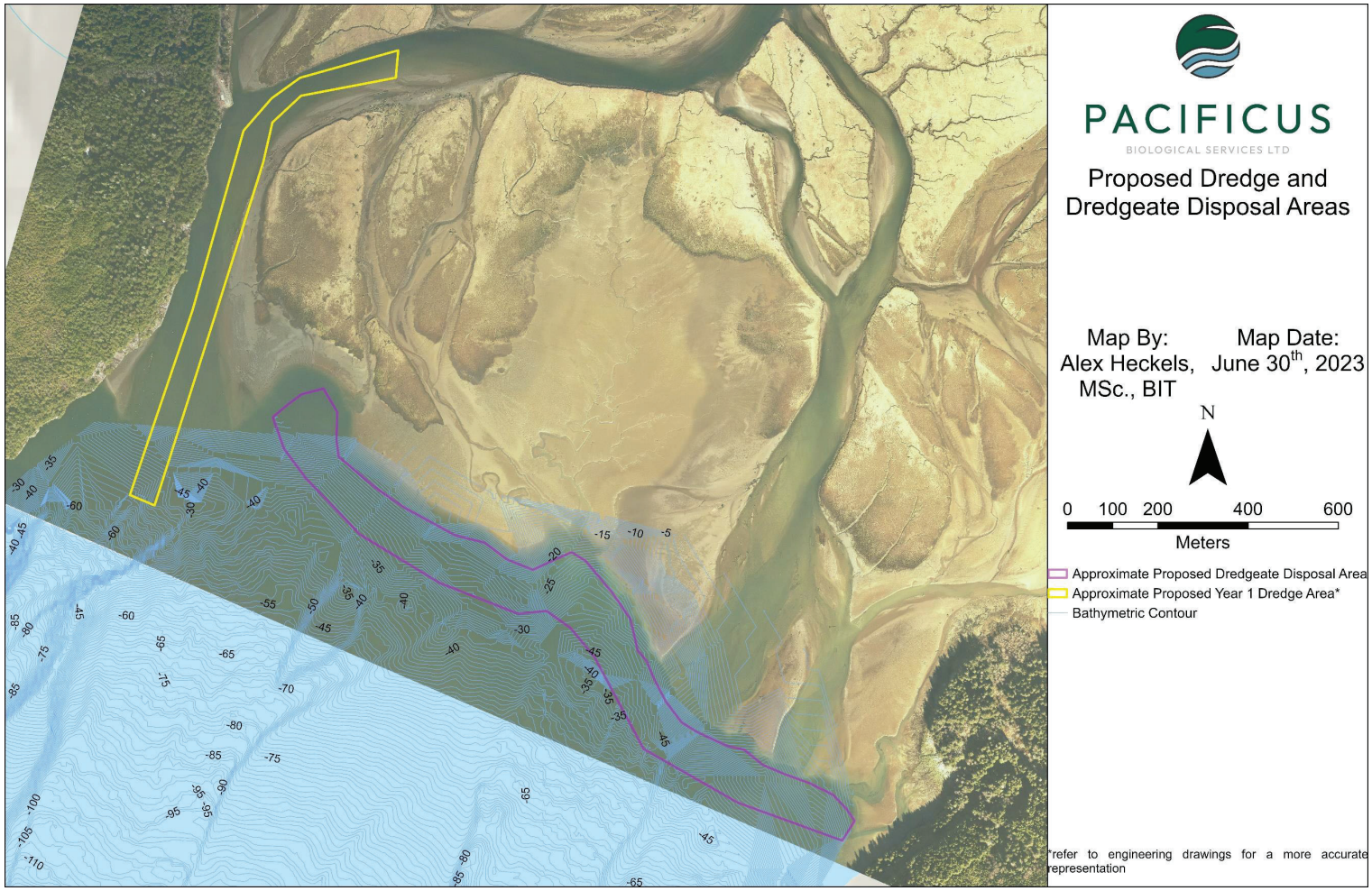


Figure 2. Map Indicating Proposed Dredging and Dredge Material Deposition Areas.

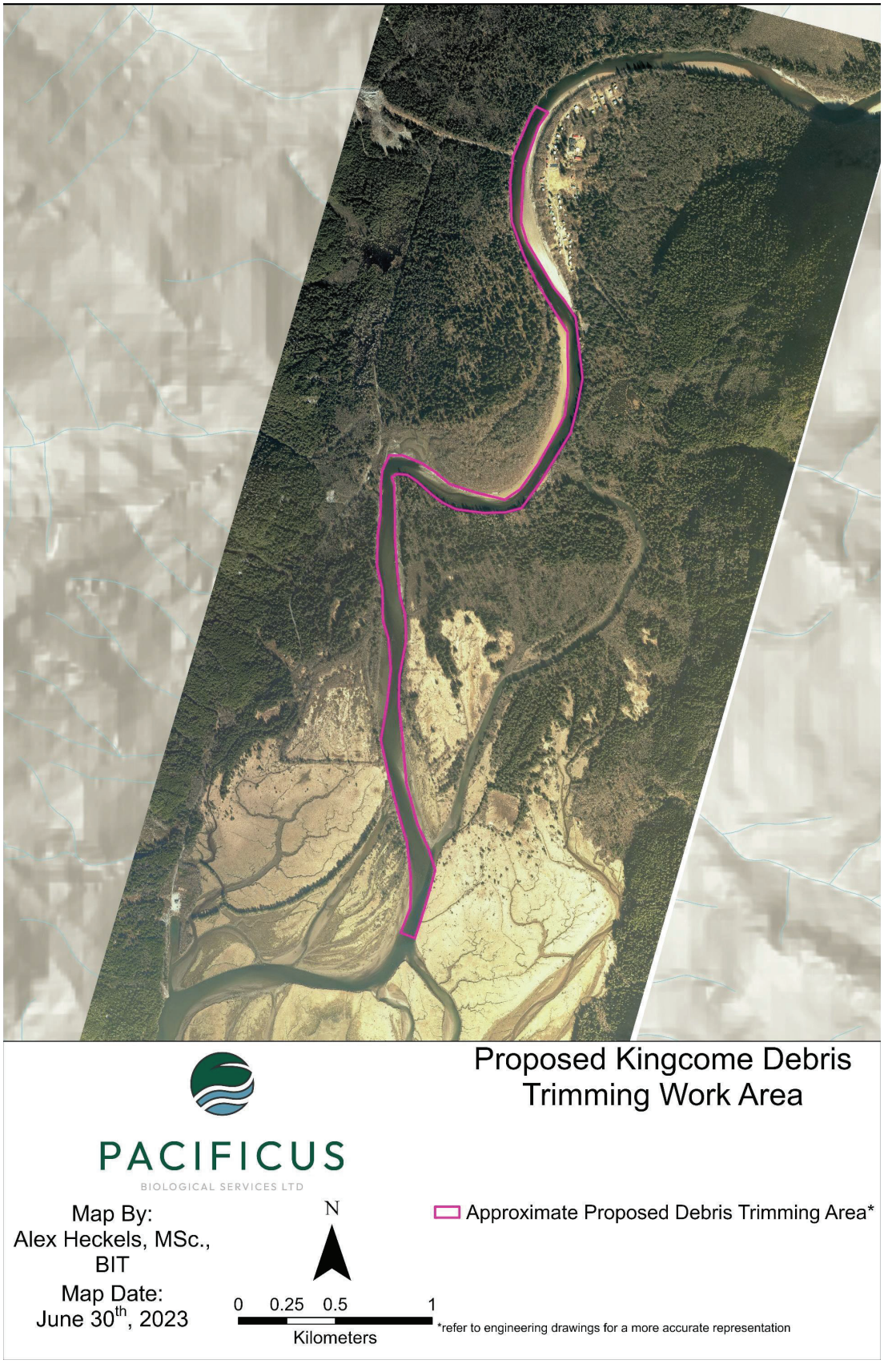


Figure 3. Map Indicating Proposed Debris Trimming Area.



Photo 1. Photo showing potentially hazardous large woody debris (red) embedded in the 4.5 km reach of river downstream of U'kwa Nalis Village. Functional LWD accumulated along the banks (green) will not be trimmed or removed.

Location

Proposed dredging works will be conducted in the Kingcome Estuary approximately 74 km northeast of Port McNeill, BC. Dredging will be concentrated in the confluence of the main channel of the Kingcome River and Kingcome Inlet (50.9372817°N 126.2088546°W).

The removal of hazardous LWD will take place between the outlet of the Kingcome River (50.9332637°N 126.2105762°W) and U'kwa Nalis Village (50.9769835°N 126.1802131°W), approximately 6 km upstream.

Consultations

All works will take place within the traditional, ancestral, and unceded territory of DFN. The purpose of the work is to improve the safety and consistency of access to U'kwa Nalis Village, and as such DFN have been in consultation from the initial planning stages of work and have informed ENV and NHC of requirements.

Community engagement meetings have been held with members of DFN throughout the process, and regular taskforce meetings have had DFN representation to provide input and guidance throughout the planning and design stages. A Letter of Support for the Kingcome Dredge from DFN has been appended to this document (Appendix 5).

Description of Fish and Fish Habitat

Environmental Assessment Methodology

Prior to an in-field assessment, a comprehensive search of Provincial and Federal databases was conducted to identify species of concern that may be impacted by proposed work and inform future survey efforts (Appendix 2). Reviewed databases included the BC Conservation Data Centre, Habitat Wizard, DFO Aquatic Species at Risk Map, and Environment and Climate Change Canada Species at Risk Range Map Extents.

Photographic evidence of substrate composition within the Kingcome River dredge area was collected during an assessment by NHC staff on December 17th, 2022. Identification of LWD to be trimmed and assessment of fish habitat within the work area in Kingcome River was conducted by Des Goold, P.Eng, of NHC, and Alex Heckels, MSc., BIT, of Pacificus on March 13th, 2023.

In order to assess the physical and biological environment within the proposed dredge material deposition area, Qualified Environmental Professionals Alex Heckels and WorksafeBC - Certified SCUBA Divers and QEPs Nick Biebach, BSc., BIT, Kendra Freund, BSc., BIT, and Teddy Vukovic, BSc., BIT, of Pacificus, conducted a dive assessment on May 11th, 2023. The weather on the date of the assessment was sunny and underwater visibility was poor.

The assessment consisted of an inspection of the dredge area to identify fish or fish habitat that may be impacted and four transect dives conducted in the foreshroe area fronting the Kingcome River delta (Figure 4). Underwater surveys could not be conducted within the Kingcome River due to the shallow depths and safety concerns of diving in a strong current. During the four transect dives, information detailing substrate composition and visual estimates of abundance of biota were collected for each transect, and later verified through dive video analysis. Abundance was recorded as counts, percentage coverage or density estimates based on the organism being assessed.

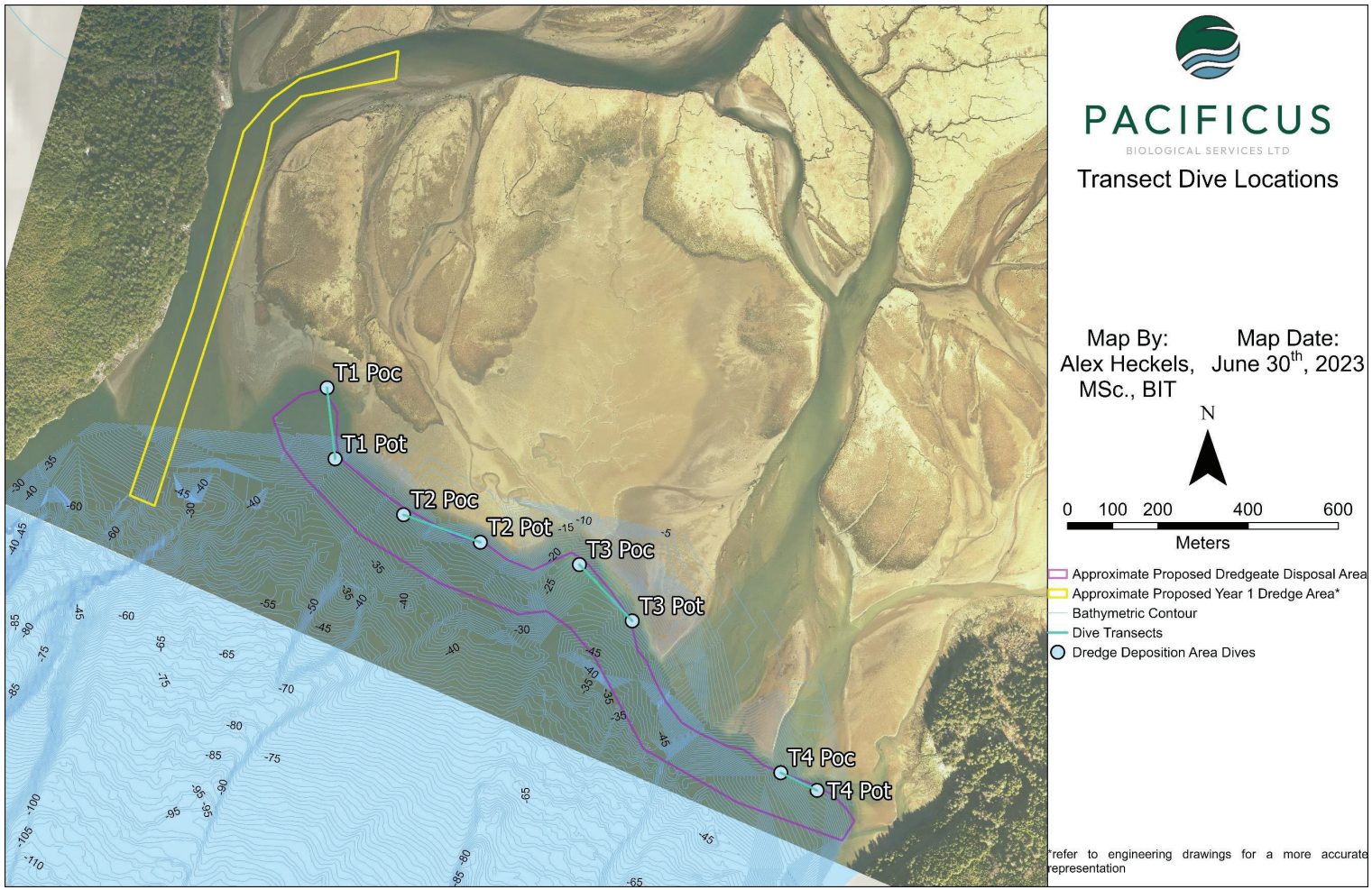


Figure 4. Map Indicating Transect Dives in the Area Fronting the Kingcome Estuary.

Description of Physical Environment

Within the proposed dredge area in the Kingcome River, the substrate was composed of a matrix of sand and silt containing some gravel and cobble (Photo 2). The dredge area is tidally influenced and is in the main channel in a highly braided river delta. The bathymetry is very shallow within the river channel, and sediment accumulates at the confluence with Kingcome estuary to the extent that large sections of the riverbed are exposed at low tide, and the width of the channel is reduced (Photo 3).

In the diveable foreshore area fronting the Kingcome River Delta, the substrate was entirely composed of silt and the bathymetric profile was gently sloped from the shoreline to the edge of the proposed disposal area.



Photo 2. Photo demonstrating substrate near the confluence of the Kingcome River and Kingcome Inlet. Although substrate composition in this area is consistent with the proposed dredge area, it was not possible to obtain a photo of the substrate within the dredge area at the time of assessment. Photo taken March 13, 2023, at 11:37 am.



Photo 3. Photo showing channel conditions at the Kingcome River confluence with the Pacific Ocean during low tide. Photograph taken March 13, 2023, at 11:35 am.

Description of Biological Environment

The Kingcome River is known to contain all five species of Pacific salmon, and Steelhead (*Oncorhynchus mykiss*) and Cutthroat trout (*O.clarkii*). The substrate provided poor quality spawning habitat for salmonids within the proposed dredge area of the Kingcome River due to lack of interstitial space and channel instability as a consequence of large volumes of sediment input. Fish passage was unimpeded from Kingcome Inlet to Kingcome River. Fish habitat within the Kingcome River consisted of LWD embedded within the riverbed and banks. LWD accumulations formed large log jams at multiple sites in the lower reach of the Kingcome River. Deep pool habitat was present within the proposed debris trimming area. Capelin (*Mallotus villosus*) were observed migrating for spawning in the Kingcome River during the March 13th assessment. No other fish species were observed within the proposed dredge area.

Biological productivity and species diversity was observed to be low throughout the dredge material disposal area (Figure 5). No freshwater or marine vegetation was observed during the assessment in the dredge area and dredge material deposition area. Notable marine invertebrate observations within the dredge material deposition area included Dungeness crab (*Cancer magister*), kelp crab (*Pugettia sp.*), and tanner crab (*Chionoecetes bairdi*). Clam siphon holes were observed throughout the assessment area in moderate abundance; however, species identification was not possible. Marine vertebrates observed included Starry flounder (*Platichthys setllatus*) and Sturgeon poacher (*Podothecus accipenserinus*). A full list of species observed during the dive assessment is appended to this report (Appendix 3).

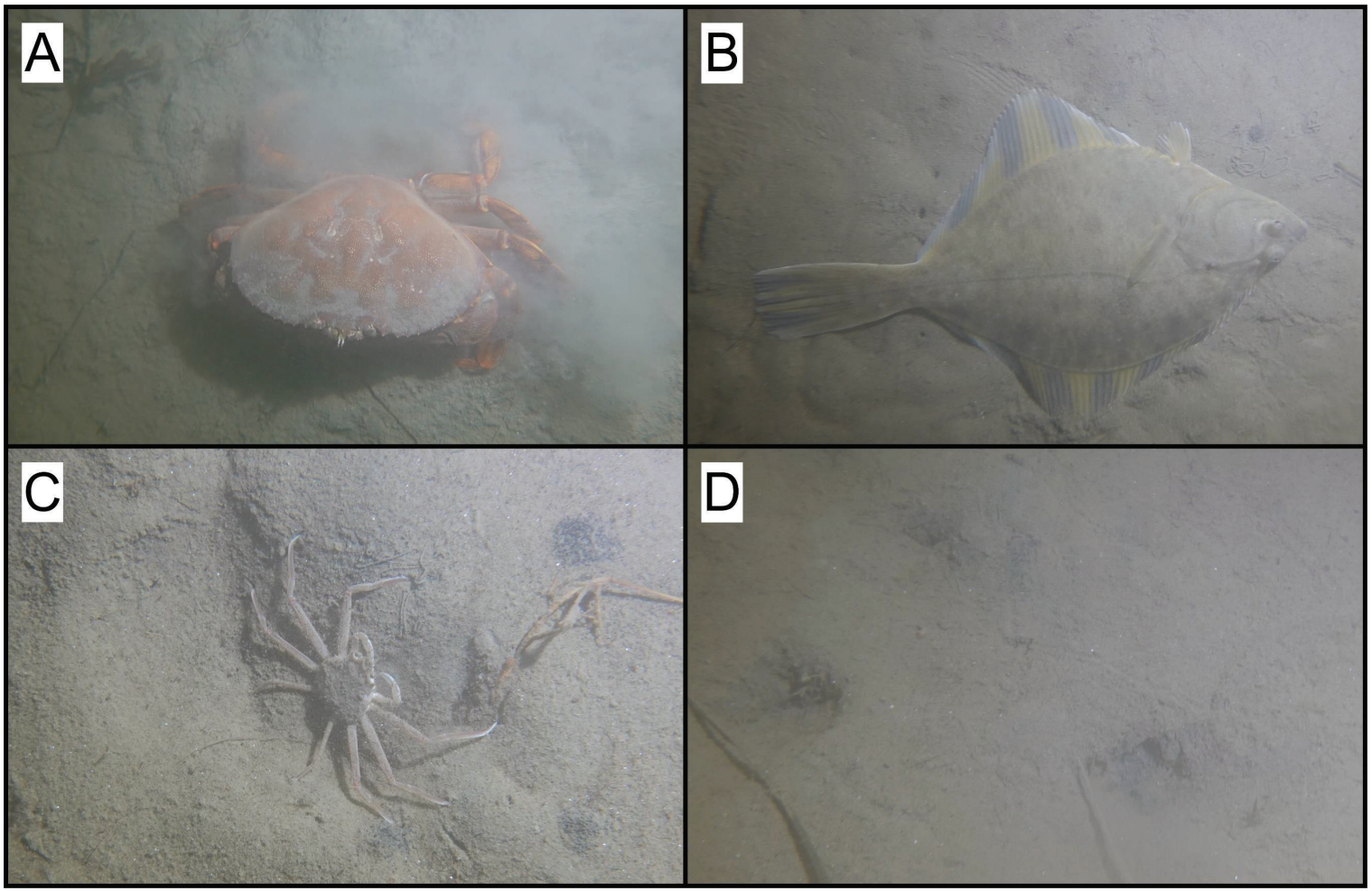


Figure 5. Figure showing marine fauna and substrate conditions observed within the proposed dredgeate disposal area during the dive assessment conducted on May 11th, 2023. A) Dungeness crab (Cancer magista). B) Starry flounder (Platichthys stellatus). C) Tanner crab (Chionoecetes bairdi). D) Siphon holes of unidentified subtidal clam species.

Traditional, Commercial and Recreational Interests

Following consultation prior to the commencement of work, the location of any traditional DFN fisheries will be considered during dredge disposal and must be avoided. Online mapping records indicate that there are no commercial or recreational fisheries located in proximity to the proposed work areas in the Kingcome Inlet. There are no rockfish conservation areas within Kingcome Inlet. Pacific Herring (*Clupea pallasii*) spawning events have occurred periodically in the Kingcome Inlet, and the last spawning event recorded within the work area occurred in 2016.

Description of Effects on Fish and Fish Habitat

Proposed dredge and debris trimming works within the Kingcome River and Kingcome Estuary are likely to have a range of impacts on multiple fish species and fish habitat. Dredging will be conducted in an area of approximately 64,000 m^2. The proposed dredge deposition area covers an approximately 170,000 m^2 subtidal area fronting the Kingcome Estuary. Trimming of hazardous LWD will occur in the 4.5 km reach of river downstream from U'kwa Nalis Village.

Proposed dredging and subsequent sediment deposition is not anticipated to result in the death of adult salmonids. Juvenile salmonids are unlikely to be impacted by dredging work due to works being conducted during the winter RRWW and lack of suitable rearing habitat. It is not anticipated that trimming of LWD that poses a navigational hazard in the Kingcome River will result in the loss of rearing habitat for juvenile salmonids as the embedded portion of the debris will remain in the river, and any debris trimmed along the banks will be altered so as to maintained hydraulic complexity and resultant pool habitat. Eggs and alevins of spawning salmonids are unlikely to be disturbed or destroyed by dredging due to poor spawning substrate quality with the proposed work area. Although Capelin were observed within the proposed dredge area, as works will be conducted within the winter RRWW, dredging will be complete before the migratory spawning runs of smelt species begin. No other fish species were observed within the proposed dredge area. As such, it is not anticipated that dredging will result in a HADD.

No net loss of fish habitat is anticipated following the deposition of dredge material, as dredgeate will be composed of substrate similar to the deposition area, and large sediment volumes from the Kingcome River are naturally deposited in the area fronting the Kingcome River delta. Species observed during the underwater assessment (Appendix 3) have the potential to be negatively impacted by works include multiple crab species, unidentified subtidal clams, and adult and juvenile Starry flounder (*P. setllatus*) and Sturgeon poacher (*P. accipenserinus*). However, it is anticipated that a HADD will not occur provided appropriate mitigation measures are implemented (Appendix 4).

Two fish species of note that are known to spawn in Kingcome Estuary and Kingcome Inlet are Eulachon (*Thaleichthys pacificus*) and Pacific Herring (*C. pallasii*). Historic spawning surveys conducted by Pacificus within Kingcome Inlet indicate a spring spawning period for Eulachon between March 31st-May 31st. As works will be completed by the end of the winter RRWW on February 15th, it is not anticipated that works will negatively impact Eulachon. Pacific Herring (*C.pallasii*) are known to periodically spawn in Kingcome Inlet. No spawning event has been recorded by DFO as occurring within the proposed sediment deposition area since 2016[4]. Additionally, no spawning event has occurred in this area earlier than March 8th, and no suitable spawning substrate for herring was observed within the dredge material disposal area. Provided works are concluded by the end of the winter RRWW as scheduled and with the outlined disposal area footprint, it is not anticipated that works will negatively impact Pacific Herring.

Measures and Standards to Avoid or Mitigate the Death of Fish or the Harmful Alteration, Disruption, or Destruction of Fish Habitat

Avoidance

There are a number of measures and standards that should be followed during works to prevent the death of fish. All work will be conducted within the marine RRWW for the area between November 15th, 2023, and February 15th, 2024, in order to prevent the death of fish migrating upstream for spawning purposes or rearing juvenile fish. All dredge work will be conducted in areas with substrate that is dominated by silt and is generally unsuitable spawning habitat for fish. Works will be paused should migrating fish be observed in proximity to dredge works and will not resume until all fish have vacated the work area. It is not feasible to install fish exclusion netting around the dredge site due to the size of the river channel, and navigation access for DFN cannot be inhibited for safety reasons.

Mitigation

Appropriate mitigation measures to avoid a HADD should be implemented during debris trimming, dredging, and dredge material deposition. The following measures should be implemented during debris trimming in Kingcome River:

- Only trim debris identified by a qualified engineer or member of DFN as a navigational hazard (Appendix 1).

[4] Fisheries and Oceans Canada, 2023. Section 126, Kingcome Inlet Herring Spawn Records. https://www.pac.dfo-mpo.gc.ca/science/species-especes/pelagic-pelagique/herring-hareng/herspawn/126fig-eng.html (accessed June 23rd, 2023)

- Do not trim wood embedded along the river banks so as to mains the quality of resultant fish habitat.
- Do not attempt to pull on or otherwise dislodge debris embedded in the river, so as to avoid disturbance to the gravel substrate of the river.
- Do not anchor spud barge in areas with active salmonid redds, as identified by an accompanying QEP.

The following measures have been developed with consideration of the DFO Code of Practice for Routine Maintenance Dredging for Navigation and should be implemented during dredging and dredge material deposition:

- Limit the extent of the dredge footprint to the minimum requirement for safe navigation as determined by a qualified engineer.
- Any vertical spuds or anchors should be placed within the footprint of the dredge area.
- Turbidity monitoring should be conducted during dredge works to ensure that turbidity generated by works does not exceed guidelines of a change from background turbidity of 8 NTU at any one time for a duration of 24 hours as outlined by Provincial Water Quality Guidelines[5].
- Limit the sudden deposition of large volumes of dredge material in one area, rather dump in small increments throughout the proposed deposition area to minimize the potential for fatal burial of fish.
- Gradually deposit dredge material to allow motile fauna to vacate the deposition area.

In addition to the avoidance and mitigation measures listed above, a general Construction Environmental Mitigation Plan (CEMP) outlining best management practices during proposed works has been appended to this report (Appendix 4). A QEP shall be available for consultation throughout works to discuss the requirements of the EMP with crews and conditions where pausing works is necessary, as well as to provide advice should any unforeseen situation with the potential to cause a HADD arise.

Monitoring Measures to Evaluate Effectiveness of Mitigation Measures

Monitoring measures will be considered following the completion of work to evaluate the efficacy of measures and standards to avoid or mitigation a HADD, and to minimize the persistence of deleterious effects on fish as a consequence of works. Monitoring measures have been

[5] Ministry of Environmental and Climate Change Strategy, 2021. Ambient Water Quality Guidelines (Criteria) for Turbidity, Suspended and Benthic Sediments.

considered for the three elements of proposed works: LWD trimming, dredging, and dredge material deposition.

As proposed works should not impact the hydrological complexity created by the debris, it is not anticipated that trimming will result in the loss of fish habitat. A survey should be conducted during the winter low flow period in 2024/2025 in the lower 6 km of the Kingcome River where the trimming of LWD for navigational safety has occurred. Surveys will evaluate whether the trimmed LWD is still embedded within the riverbed, and if there has been a significant loss of embedded debris in the channel following works. All LWD pieces to be trimmed have been mapped and georeferenced, allowing the loss of functional LWD and associated fish habitat to be quantified. However, as the lower reaches of the Kingcome experience large sediment fluxes and consequently have an unstable channel that experiences frequent changes in bed morphology, it will be difficult to ascertain if any dislodged debris was a consequence of works, or rather the result of natural hydrologic activity in the channel. This should be considered during the survey, with consultation with DFN, in order to determine if there has likely been a net loss in fish habitat as a direct consequence of LWD trimming.

As the dredge area will transition to a regime of routine maintenance dredging that meets the conditions of the DFO Code of Practice, monitoring requirements following dredging are limited as instream conditions will not return to a pre-dredged condition. Prior to conducting any routine maintenance works, an assessment must be conducted by a QEP to ensure that no critical habitat or residences of species listed under Schedule 1 of the *Species at Risk Act* will be disturbed, and appropriate measures outlined in Code of Practice must be followed to protect fish and fish habitat are implemented in order to prevent a HADD.

It is not anticipated that the deposition of dredge material will cause the long-term alteration, disruption or destruction of fish habitat provided all measures and standards to avoid a HADD are adhered to. Due to the nival flow regime, a dive survey should be conducted at a 1,3, and 5-year interval following the spring high flow period and associated discharge of sediment in order to assess if biological productivity within the dredge deposition is significantly different to pre-construction levels. According to hydrometric data for the Kingcome River, this should occur during the low flow period between December and May[6].

[6] Government of Canada, 2023. Real-Time Hydrometric Data Map Search. https://wateroffice.ec.gc.ca/map/index_e.html (accessed June 23rd, 2023)

Contingency Measures

Contingency measures to be implemented in the event that measures and standards to avoid a HADD do not meet their objectives are required prior to the commencement of work. Although there is difficulty in quantifying the level of disturbance that will be attributed to works due to the volume of discharge and sediment flux in the Kingcome River, should monitoring efforts outlined above indicate LWD trimming and dredge works have resulted in a HADD the following contingency measures should be followed:

- If LWD trimming is determined to have resulted in the loss of fish habitat, a habitat restoration plan to compensate for lost deep pool habitat should be developed with the consultation of a QEP and hydraulic engineer.
- If biological productivity does not return to similar levels compared to the pre-works dive assessment following the 5-year monitoring period, additional offsetting measures should be developed by a QEP to compensate for habitat lost in the dredge material deposition areas.

Conclusion

Dredging and hazardous LWD in the Kingcome River and Estuary are proposed to occur during the winter RRWW between November 15th, 2023, and February 15th, 2024, in order to improve navigational safety for DFN small boat operators. Engineer drawings detailing the footprint and scope of proposed works are appended to this report (Appendix 1).

Surveys of the proposed dredge area, a dive assessment of the dredge material disposal area, and surveys and cataloguing hazardous LWD to be trimmed were conducted in early 2023. It was determined that fish habitat in the area to be dredged and the dredgeate disposal area contained similar substrate and was of low productivity. Additionally, it was judged that hazardous LWD trimming could be conducted without degrading fish habitat in the Kingcome River.

Following a review of proposed works and appropriate surveys, it is not anticipated that works will cause a HADD. Due to the scale of proposed works and the project not meeting the conditions of a Code of Practice, it is recommended that the project should be submitted to DFO for a Request for Review prior to the commencement of works. It is also recommended that consultation with Environment and Climate Change Canada should occur to determine whether a Disposal at Sea Permit and associated field work is required to proceed with year 1 works.

Appendix 1. Engineering Drawings

Below are engineering drawings produced by Northwest Hydraulic Consultants Ltd. outlining proposed dredge works, associated dredge material disposal, and the location of hazardous LWD trimming.

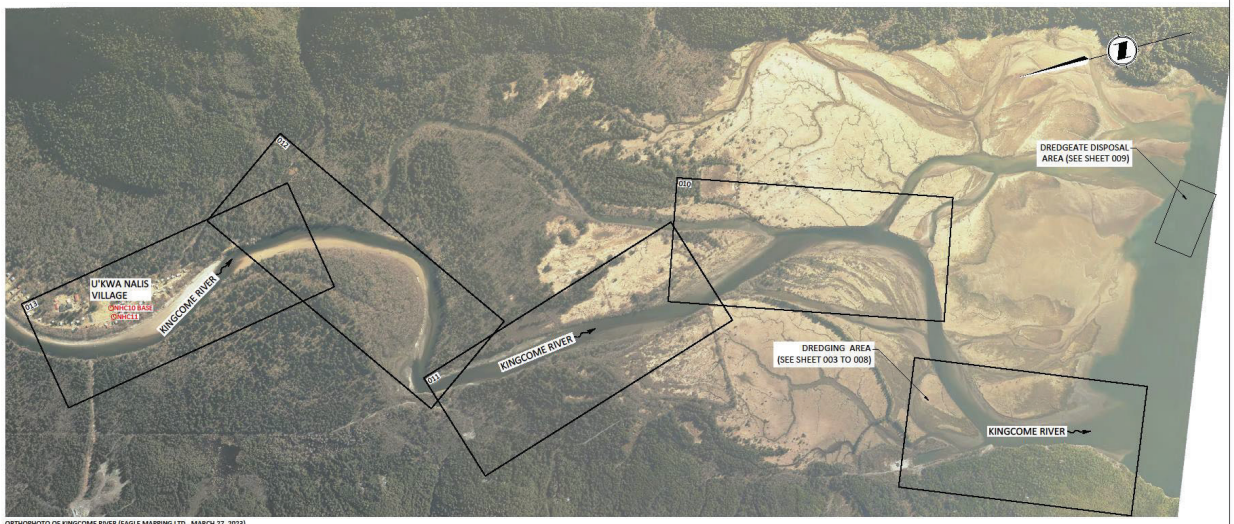
KINGCOME EMERGENCY DEBRIS & SEDIMENT MANAGEMENT PROJECT 2900439

ISSUED FOR TENDER

DRAWING INDEX		
SHEET No.	SHEET DESCRIPTION	REVISION
001	TITLE SHEET AND PROJECT LOCATION	
002	GENERAL NOTES, DATUMS AND CONTROL	
003	DREDGING AREA - EXISTING SITE PLAN	
004	DREDGING AREA - DEVELOPED SITE PLAN	
005	PROFILES	
006	TYPICAL SECTION - DREDGING	
007	DREDGE SECTIONS (1 OF 2)	
008	DREDGE SECTIONS (2 OF 2)	
009	DREDGEATE DISPOSAL AREA DETAILS	
010	DEBRIS TRIMMING SITES LOCATIONS 1 OF 4	
011	DEBRIS TRIMMING SITES LOCATIONS 2 OF 4	
012	DEBRIS TRIMMING SITES LOCATIONS 3 OF 4	
013	DEBRIS TRIMMING SITES LOCATIONS 4 OF 4	
014	DEBRIS TRIMMING SITES - PLAN SHEET 1 PHOTO PLATES	
015	DEBRIS TRIMMING SITES - PLAN SHEET 2 PHOTO PLATES	
016	DEBRIS TRIMMING SITES - PLAN SHEET 3 PHOTO PLATES	
017	DEBRIS TRIMMING SITES - PLAN SHEET 4 PHOTO PLATES	



LOCATION MAP
NOT TO SCALE



ORTHOPHOTO OF KINGCOME RIVER (EAGLE MAPPING LTD., MARCH 27, 2023)

LEGEND
CONTROL POINT NHCXXXX

SITE PLAN
SCALE 1:7500

0 100 200 300 400 500m
SCALE = 1:10,000

CLIENT: BRITISH COLUMBIA

REV	DATE	DESCRIPTION
	20230720	ISSUED FOR TENDER

nhc northwest hydraulic consultants

SEAL:

PERMIT TO PRACTICE:

KINGCOME EMERGENCY DEBRIS & SEDIMENT MANAGEMENT
PROJECT 2900439
TITLE SHEET AND PROJECT LOCATION

DESIGNED: AVB/ VGB	SHEET ID: 3007807 NHC 2900439 KINGCOME EDSM IFT R0-001	SHEET No:	
DRAFTED: CZZ	STATUS: ISSUED FOR TENDER	001	
CHECKED: NAB/GFL	SCALE: AS SHOWN WHEN PLOTTED D SIZE		
APPROVED: DJG	DATE: 20 JUL 2023	REV No:	

SUPERSEDES ALL REVISIONS WITH NUMBER PRECEDING

PACIFICUS

GENERAL NOTES

1. DETAILED REQUIREMENTS FOR CONSTRUCTION ACTIVITIES ARE PROVIDED IN THE SPECIAL PROVISIONS. THE SPECIAL PROVISIONS TAKE PRECEDENCE OVER THESE DRAWINGS.
2. SCALES INDICATED ON THESE DRAWINGS ARE FULL SIZE, 22 IN. X 34 IN. THE DRAWINGS ARE DEVELOPED TO BEST DISPLAY INFORMATION AT FULL SIZE.
3. THE PROJECT OWNERS, DZAWADA'ENUXW FIRST NATION (DFN) AND THE PROVINCE OF BC (ENV) SHALL DESIGNATE A REPRESENTATIVE (OWNER'S REPRESENTATIVE) TO ADVISE, COORDINATE AND MONITOR ACTIVITIES ON BEHALF OF THE OWNER DURING CONSTRUCTION.
4. THE PROJECT OWNERS SHALL DESIGNATE A QUALIFIED ENVIRONMENTAL MONITOR AND QUALIFIED ARCHAEOLOGICAL MONITOR FOR THE PROJECT.
5. ACTIVE SMALL VESSEL OPERATIONS BY DFN WILL BE PRESENT DURING THE EXECUTION OF WORK. THE CONTRACTOR SHALL, IN COOPERATION WITH THE PROJECT OWNERS, DEVELOP A COMMUNICATION PLAN AND A NAVIGATION PLAN TO ENSURE THAT NECESSARY VESSEL OPERATIONS CAN BE CARRIED OUT IN A SAFE MANNER.
6. THE PROJECT SITE IS EXPOSED TO OCEAN AND RIVER CONDITIONS THAT WILL CHANGE OVER TIME. WEATHER EVENTS MAY CAUSE CHANGES IN RIVER FLOW AND CAUSE STORM SURGES AND WAVES. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ACCOUNT FOR AND PLAN WORK AROUND WEATHER AND TIDAL FORECASTS.

BATHYMETRIC SURVEY REQUIREMENTS, DATUMS, DATUM CONVERSIONS AND CONTROL

1. BATHYMETRIC DATA WITHIN THE DREDGE AREA SURVEYED IN OCTOBER 2022 BY NHC.
2. BATHYMETRY DATA OFF-SHORE AND WITHIN THE PROPOSED DISPOSAL AREA IS CANADIAN HYDROGRAPHIC SERVICE NON-NAVIGATIONAL (NONNA) DATA SOURCED FROM: https://data.chs-shc.ca/map.
3. SURVEY CONTROL HAS BEEN ESTABLISHED IN U'KWA NALIS VILLAGE AS SUMMARIZED IN THE TABLE BELOW AND SHOWN ON SHEET 001. CONTRACTOR MAY UTILIZE THIS CONTROL WITH A GNSS SET-UP AND EXTERNAL RADIO. CONTRACTOR MAY ESTABLISH CONTROL NEARER THE DREDGE AREA AT THEIR DISCRETION.

CONTROL POINTS TABLE

CONTROL POINT	EASTING (m)	NORTHING (m)	ELEVATION (m)
NHC10 BASE	697866.725	5650815.493	4.357
NHC11	697819.031	5650812.744	4.867

4. IN ADDITION TO THE CONTROL ESTABLISHED BY NHC, TWO FEDERAL BENCHMARKS ARE LOCATED SOUTHWEST OF THE WORK AREA. DETAILS UNDER THE "BENCHMARKS" TAB HERE: https://www.tides.gc.ca/en/stations/8348
5. CONTRACTOR SHALL CARRY OUT THE FOLLOWING MULTI-BEAM SURVEY:
   a. CONTROL SURVEY (DISCRETIONARY)
   b. PRE-CONSTRUCTION SURVEY
   c. POSITIONING SURVEYS
   d. PROGRESS SURVEYS (DISCRETIONARY)
   e. POST-CONSTRUCTION SURVEY
5. ALL ELEVATIONS SHOWN ON THESE DRAWINGS ARE IN CGVD 2013. SEE BELOW FOR DATUM CONVERSION.

	CGVD 2013	CHART DATUM
HIGHER HIGH WATER LARGE TIDE	3.22 m	5.73 m
HIGHER HIGH WATER MEAN TIDE	2.36 m	4.87m
MEAN WATER LEVEL	0.60 m	3.11 m
LOWER LOW WATER MEAN TIDE	-1.35 m	1.16 m
LOWER LOW WATER LARGE TIDE	-2.42 m	0.09 m

6. TO CONVERT FROM CHART DATUM TO CGVD 2013, SUBTRACT 2.509 m.
7. TO CONVERT FROM CGVD 2013 TO CHART DATUM, ADD 2.509 m
8. TIDE PREDICTIONS AND HEIGHTS FOR KINGCOME INLET (08348) ARE AVAILABLE ONLINE AT: https://www.tides.gc.ca/en/stations/8348

DREDGING:

1. CONTRACTOR MUST DREDGE AS SHOWN ON SHEETS 004 TO 008 OF THIS DRAWING SET. FOR ADDITIONAL REQUIREMENTS, REFER TO THE SPECIAL PROVISIONS.
2. THE PAYABLE OVER-DREDGE ALLOWANCE IS 0.3m WITHIN THE DREDGE AREA.
3. VERTICAL EXCAVATIONS (BOX CUTS) ARE PERSMISSIBLE AT THE UPSTREAM LIMIT AND AT THE MARGINS OF THE DREDGING. THE CONTRACTOR SHALL REMOVE ANY SLOUGH MATERIAL RESULTING FROM BOX CUTS SO THAT THE REQUIRED DREDGE ELEVATION IS ACHIEVED. NO SEPARATE PAYMENT SHALL BE MADE FOR THE REMOVAL OF SLOUGH MATERIAL.
4. CONTRACTOR SHALL NOT PERFORM EXCESSIVE OVER-DREDGING ADJACENT TO STREAM BANKS OF KINGCOME RIVER. DAMAGE TO STREAMBANKS AS A RESULT OF OVER-DREDGING SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
5. IF A HARD BOTTOM SURFACE IS ENCOUNTERED DURING DREDGING, CONTRACTOR SHALL HALT DREDGING IN THE AREA AND INFORM THE OWNER'S REPRESENTATIVE.
6. REFER TO THE CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN FOR ADDITIONAL DIRECTIVES REGARDING DREDGING AND DISPOSAL OF DREDGEATE.
7. IT IS RECOGNIZED THAT SLOUGHING OF THE DREDGED 2H: 1V SIDE SLOPES MAY OCCUR PRIOR TO THE POST-CONSTRUCTION SURVEY. A MINIMUM ACCEPTABLE, POST-CONSTRUCTION, BOTTOM WIDTH OF DREDGE EQUAL TO 17 m WILL BE ACCEPTABLE AS A WAY OF ACCOUNTING FOR SLOUGHING. THIS ALLOWANCE SHALL NOT BE INTERPRETED AS A PAYABLE "UNDER-DREDGE".

DEBRIS TRIMMING

1. REFER TO SHEETS 010 TO 013 FOR THE PHOTO POINTS. THESE ARE VANTAGE POINTS SHOWING THE LOCATION OF UNDERWATER DEBRIS REQUIRING TRIMMING. ACTUAL DEBRIS LOCATIONS ARE AT VARYING DISTANCES FROM THE PHOTO POINTS.
2. REFER TO SHEETS 014 TO 017 FOR PHOTO PLATES.
3. THE DEBRIS SURVEY (COLLECTION OF PHOTO POINTS) WAS CONDUCTED IN MARCH 2023; DEBRIS MAY HAVE SHIFTED SINCE THE SURVEY.
4. ONLY DEBRIS THAT IS PARTIALLY BURIED IN THE RIVERBED, WITHIN THE NAVIGABLE CHANNEL SHALL BE TRIMMED. DEBRIS JAMS FORMED ALONG THE RIVERBANKS TO NOT REQUIRE TRIMMING.
5. DEBRIS TO BE TRIMMED SHALL BE CONFIRMED BY THE ENVIRONMENTAL MONITOR OR OWNERS REPRESENTATIVE AS REQUIRED.
6. TRIMMING REFERS TO THE CUTTING OFF OF STEMS AND/ OR BRANCHES THAT PROTRUDE ABOVE THE RIVERBED AND POSE A THREAT TO SMALL WATERCRAFT.
7. DEBRIS SHALL BE TRIMMED TO LENGTHS NOT EXCEEDING 2m (6 FT). DEBRIS OF THIS SIZE SHALL GENERALLY BE LEFT IN PLACE TO FLOAT DOWN-RIVER AT THE NEXT HIGH FLOW.
8. THE NUMBER OF INDIVIDUAL CUTS REQUIRED MAY VARY BETWEEN 1,200 AND 1,300.
9. TRIMMING MUST BE CARRIED OUT BY A CERTIFIED DIVER, EXPERIENCED IN SUCH ACTIVITY, AND USING A HYDRAULIC SAW INTENDED FOR UNDERWATER USE.

RIVER HYDRAULICS

1. THE FOLLOWING HYDRAULIC CONDITIONS ARE FOR AN ESTIMATED MEAN WINTER FLOW OF 60 m^3/s, AND MEAN HIGH AND LOW TIDES:
   a. AT LOWER LOW WATER MEAN TIDE:
      i. RIVER FLOW DEPTH RANGE: 1.3 m TO 3.2 m
      ii. RIVER FLOW VELOCITY RANGE: 0.3 m/s TO 0.6 m/s (0.6 TO 1.2 KNOTS)
   b. AT HIGHER HIGH WATER MEAN TIDE:
      i. RIVER FLOW DEPTH RANGE: 4.5 m TO 6.0 m
      ii. RIVER FLOW VELOCITY RANGE: 0.05 m/s TO 0.07 m/s (0.1 TO 0.14 KNOTS)
2. RIVER FLOW FORECASTS ARE NOT AVAILABLE FOR KINGCOME RIVER.

CLIENT: BRITISH COLUMBIA

REV.	DATE	DESCRIPTION
	20230720	ISSUED FOR TENDER

nhc northwest hydraulic consultants

SEAL:

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KINGCOME EMERGENCY DEBRIS & SEDIMENT MANAGEMENT
PROJECT 2900439

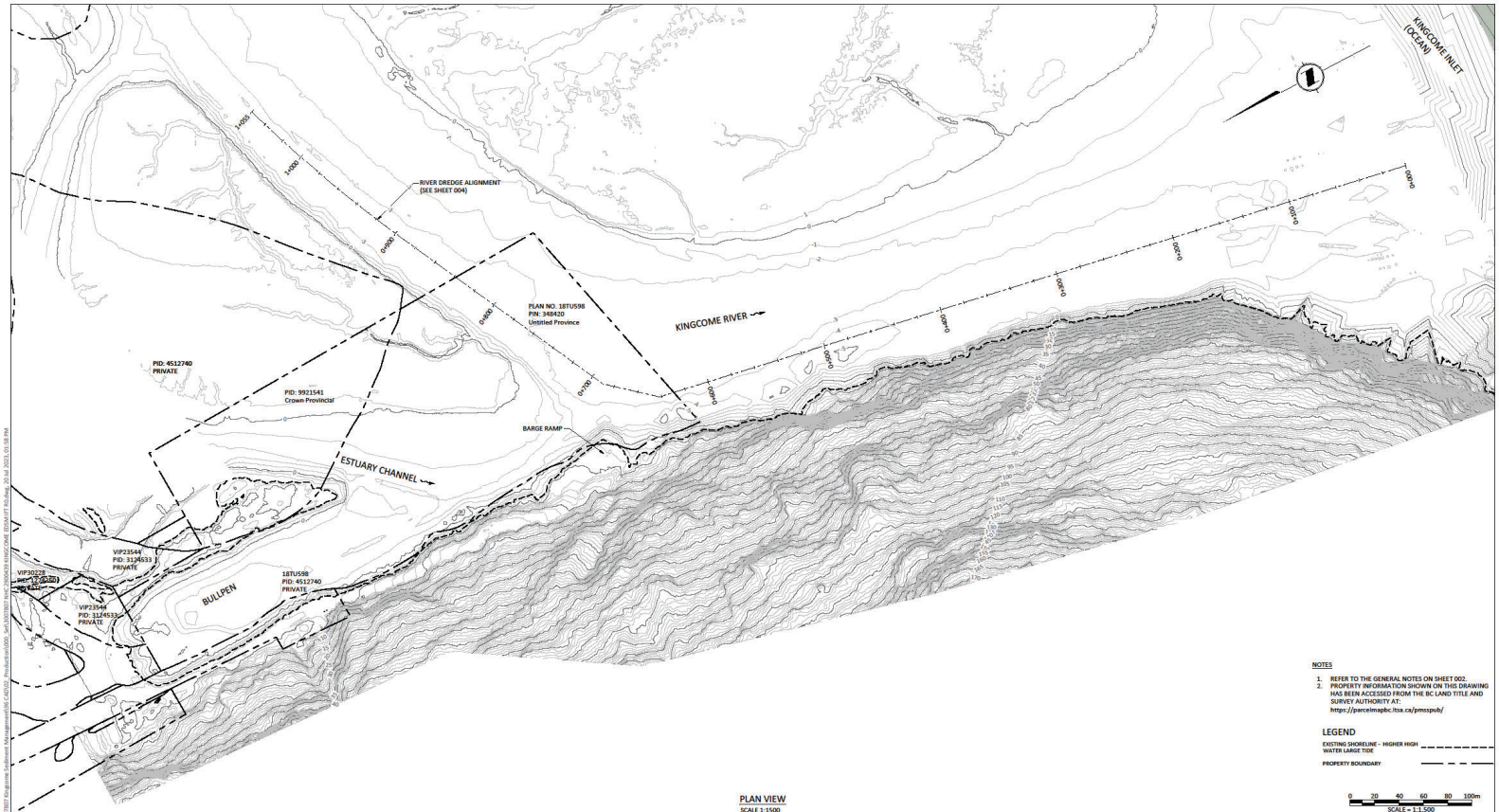
SHEET 002 GENERAL NOTES, DATUMS AND CONTROL

DESIGNED: AVB/ VGB	SHEET ID: 3007807 NHC 2900439 KINGCOME EDSM IFT R0-002	SHEET No:	002
DRAFTED: CZZ	STATUS: ISSUED FOR TENDER		
CHECKED: NAB/GFL	SCALE: AS SHOWN WHEN PLOTTED D SIZE		
APPROVED: DJG	DATE: 20 JUL 2023	REV No:	

SUPERSEDES ALL REVISIONS WITH NUMBER PRECEDING

D:\BIM\C:\Users\file.revit\Desktop\3007807 Kingcome Sediment Management\NHC CAD\2D_Production\2D\02_Set\3007807 NHC 2900439 KINGCOME EDSM IFT R0.dwg, 20 Jul 2023, 01:18 PM

PACIFICUS



PLAN VIEW
SCALE 1:1500

CLIENT:

REV.	DATE	DESCRIPTION
	20230720	ISSUED FOR TENDER

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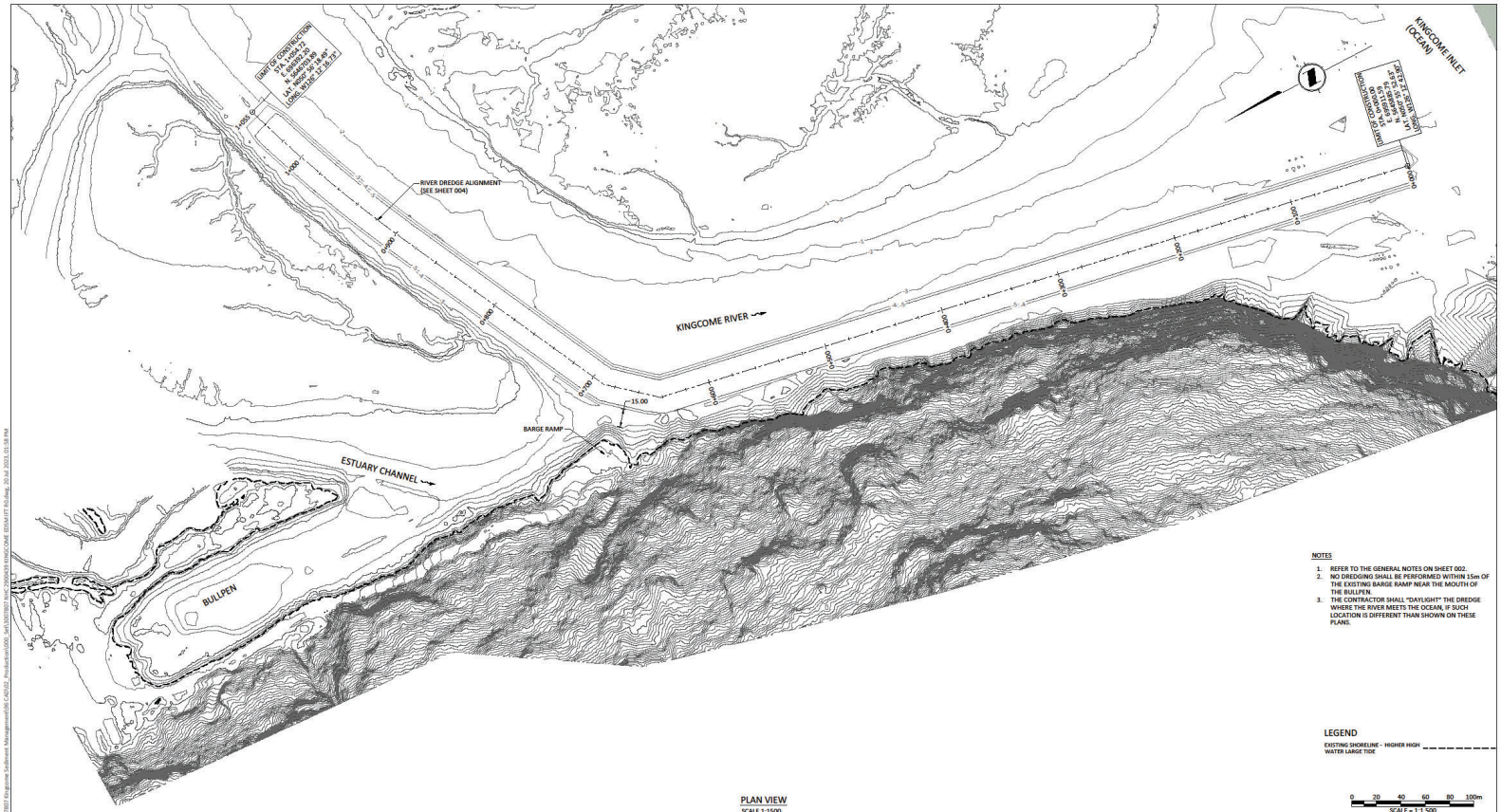
KINGCOME EMERGENCY DEBRIS & SEDIMENT MANAGEMENT
PROJECT 2900439

KINGCOME RIVER DREDGE - EXISTING SITE PLAN

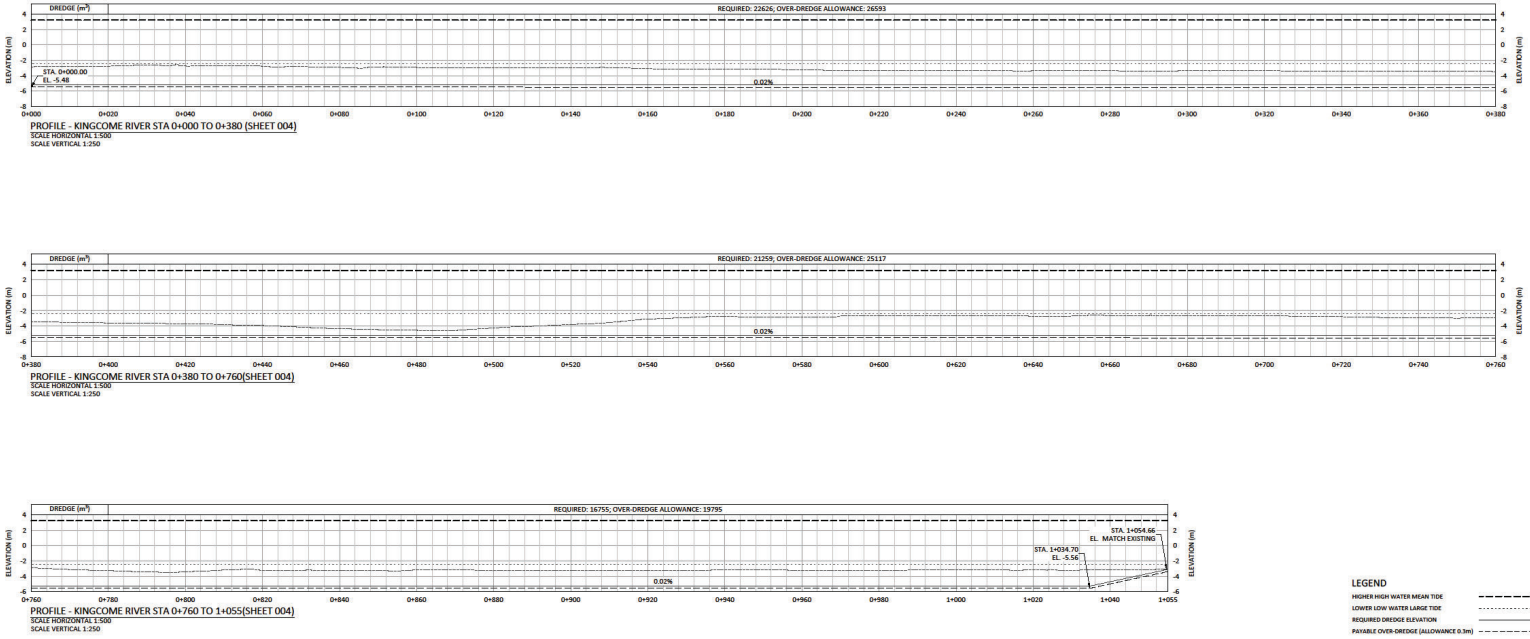
DESIGNED:	AVB/ VGB	SHEET ID: 3007807 NHC 2900439 KINGCOME EDSM IFT R0-003	SHEET No: 003
DRAFTED:	CZZ	STATUS: ISSUED FOR TENDER	
CHECKED:	NAB/GFL	SCALE: AS SHOWN WHEN PLOTTED D SIZE	
APPROVED:	DJG	DATE: 20 JUL 2023	REV No:

SUPERSEDES ALL REVISIONS WITH NUMBER PRECEDING

PACIFICUS


KINGCOME INLET (OCEAN)
DRIFT C CONSTRUCTION
UTM 9 N 5556547
N 5660702.89
E 0607.74
LONG 126°10'.27
LAT 50°08'.57
DRIFT C CONSTRUCTION
UTM 9 N 5556547
N 5660702.89
E 0607.74
LONG 126°10'.27
LAT 50°08'.57
RIVER DREDGE ALIGNMENT
(SEE SHEET 004)
KINGCOME RIVER
BARGE RAMP
15.00
ESTUARY CHANNEL
BULLPEN
PLAN VIEW
SCALE 1:1500
NOTES
1. REFER TO THE GENERAL NOTES ON SHEET 002.
2. NO DREDGING SHALL BE PERFORMED WITHIN 15m OF THE EXISTING BARGE RAMP NEAR THE MOUTH OF THE BULLPEN.
3. THE CONTRACTOR SHALL "DAYLIGHT" THE DREDGE WHERE THE RIVER MEETS THE OCEAN, IF SUCH LOCATION IS DIFFERENT THAN SHOWN ON THESE PLANS.
LEGEND
EXISTING SHORELINE - HIGHER HIGH WATER LARGE TIDE
0 20 40 60 80 100m
SCALE = 1:1,500
CLIENT:
BRITISH COLUMBIA
REV. DATE DESCRIPTION
20230720 ISSUED FOR TENDER
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SEAL:
PERMIT TO PRACTICE:
KINGCOME EMERGENCY DEBRIS & SEDIMENT MANAGEMENT
PROJECT 2900439
KINGCOME RIVER DREDGE - DEVELOPED SITE PLAN
DESIGNED: AVB/ VGB
DRAFTED: CZZ
CHECKED: NAB/GFL
APPROVED: DJG
SHEET ID: 3007807 NHC 2900439 KINGCOME EDSM IFT R0-004
STATUS: ISSUED FOR TENDER
SCALE: AS SHOWN WHEN PLOTTED D SIZE
DATE: 20 JUL 2023
SHEET No: 004
REV No:
SUPERSEDES ALL REVISIONS WITH NUMBER PRECEDING

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LEGEND

- HIGHER HIGH WATER MEAN TIDE
- LOWER LOW WATER LARGE TIDE
- REQUIRED DREDGE ELEVATION
- PAYABLE OVER-DREDGE (ALLOWANCE 0.3m)
- EXISTING RIVERBED

NOTES

1. REFER TO THE GENERAL NOTES ON SHEET 002.
2. DAMAGE TO STREAMBANKS AS A RESULT OF OVER-DREDGING SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
3. THE CONTRACTOR SHALL "DAYLIGHT" THE DREDGE WHERE THE RIVER MEETS THE OCEAN, IF SUCH LOCATION IS DIFFERENT THAN SHOWN ON THESE PLANS.

CLIENT: BRITISH COLUMBIA

REV.	DATE	DESCRIPTION
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SEAL:

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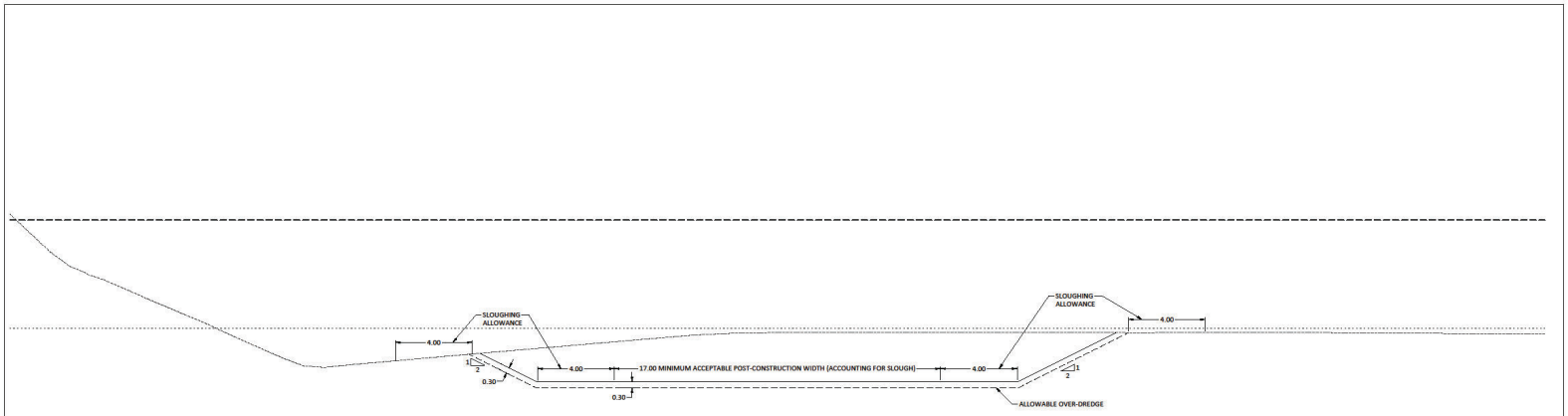
KINGCOME EMERGENCY DEBRIS & SEDIMENT MANAGEMENT
PROJECT 2900439

PROFILES - KINGCOME RIVER DREDGE

DESIGNED: AVB/ VGB	SHEET ID: 3007807 NHC 2900439 KINGCOME EDSM IFT R0-005		SHEET No: 005
DRAFTED: CZZ	STATUS: ISSUED FOR TENDER		
CHECKED: NAB/GFL	SCALE: AS SHOWN WHEN PLOTTED D SIZE		
APPROVED: DJG	DATE: 20 JUL 2023		REV No:

SUPERSEDES ALL REVISIONS WITH NUMBER PRECEDING

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TYPICAL SECTION - KINGCOME RIVER DREDGING
SCALE HORIZONTAL 1:100
SCALE VERTICAL 1:100

LEGEND
- HIGHER HIGH WATER MEAN TIDE
- LOWER LOW WATER LARGE TIDE
- REQUIRED DREDGE ELEVATION
- PAYABLE OVER-DREDGE (ALLOWANCE 0.5m)
- EXISTING RIVERBED

NOTES
1. REFER TO THE GENERAL NOTES ON SHEET 002.
2. ALL SECTIONS ARE PLOTTED LOOKING UPSTREAM.

CLIENT: BRITISH COLUMBIA

REV.	DATE	DESCRIPTION
	20230720	ISSUED FOR TENDER

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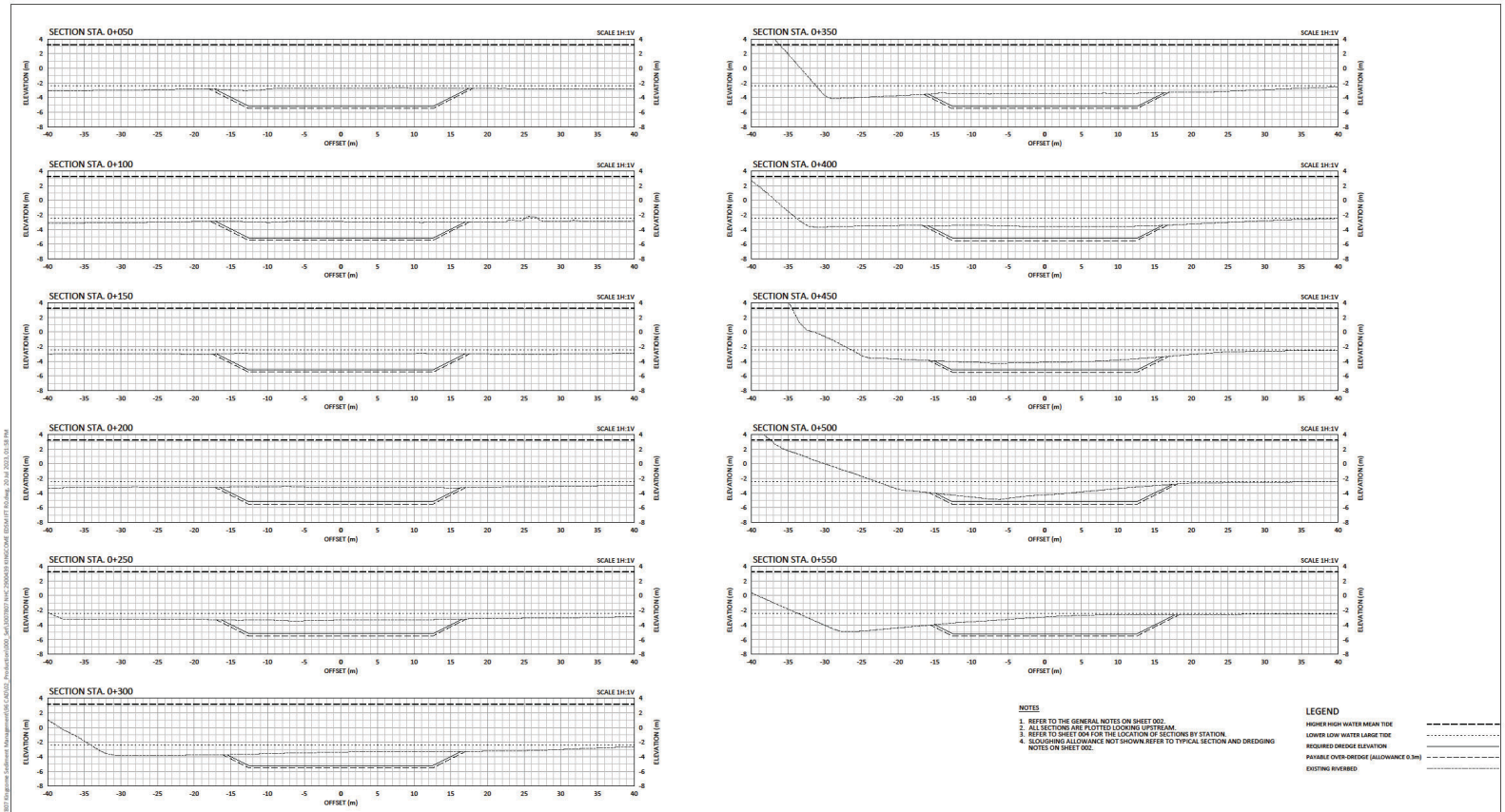
KINGCOME EMERGENCY DEBRIS & SEDIMENT MANAGEMENT
PROJECT 2900439
TYPICAL SECTIONS - KINGCOME RIVER DREDGE

DESIGNED: AVB/ VGB	SHEET ID: 3007807 NHC 2900439 KINGCOME EDSM IFT R0-006	SHEET No:	
DRAFTED: CZZ	STATUS: ISSUED FOR TENDER	006	
CHECKED: NAB/GFL	SCALE: AS SHOWN WHEN PLOTTED D SIZE		
APPROVED: DJG	DATE: 20 JUL 2023	REV No:	

SUPERSEDES ALL REVISIONS WITH NUMBER PRECEDING

D:\BIM360 \\nwhfile-svr\Projects\3007807 Kingcome Sediment Management\06 CAD\2_Production\05_SHEETS\3007807 NHC 2900439 KINGCOME EDSM IFT R0.dwg, 20 Jul 2023, 01:08 PM

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NOTES

1. REFER TO THE GENERAL NOTES ON SHEET 002.
2. ALL SECTIONS ARE PLOTTED LOOKING UPSTREAM.
3. REFER TO SHEET 004 FOR THE LOCATION OF SECTIONS BY STATION.
4. SLOUGHING ALLOWANCE NOT SHOWN.REFER TO TYPICAL SECTION AND DREDGING NOTES ON SHEET 002.

LEGEND

- HIGHER HIGH WATER MEAN TIDE
- LOWER LOW WATER LARGE TIDE
- REQUIRED DREDGE ELEVATION
- PAYABLE OVER-DREDGE (ALLOWANCE 0.3m)
- EXISTING RIVERBED

CLIENT: BRITISH COLUMBIA

REV.	DATE	DESCRIPTION
	20230720	ISSUED FOR TENDER

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SEAL:

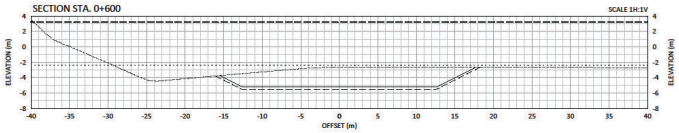
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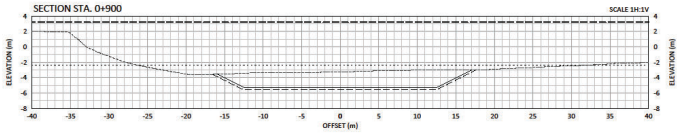
KINGCOME EMERGENCY DEBRIS & SEDIMENT MANAGEMENT
PROJECT 2900439
DREDGE SECTIONS (1 OF 2)

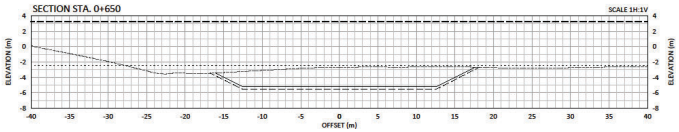
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CHECKED: NAB/GFL	SCALE: AS SHOWN WHEN PLOTTED D SIZE		
APPROVED: DJG	DATE: 20 JUL 2023	REV No:	

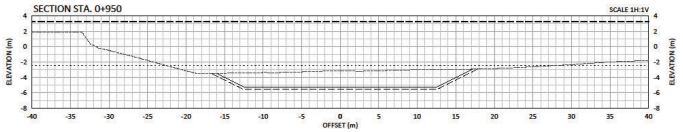
SUPERSEDES ALL REVISIONS WITH NUMBER PRECEDING

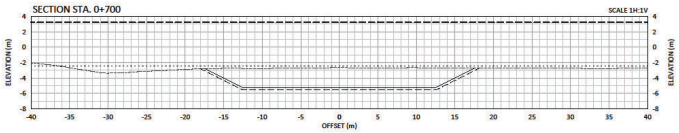
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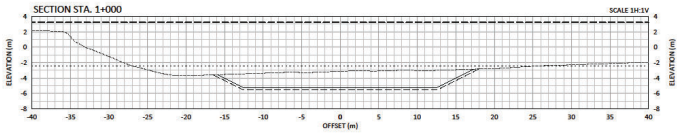


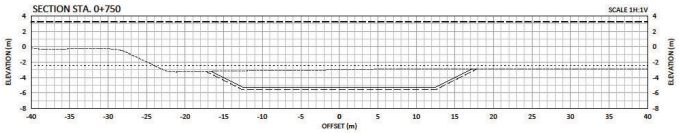


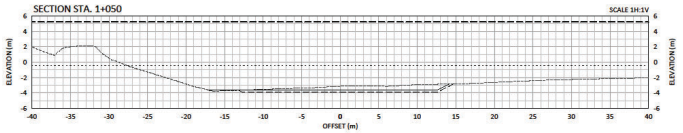


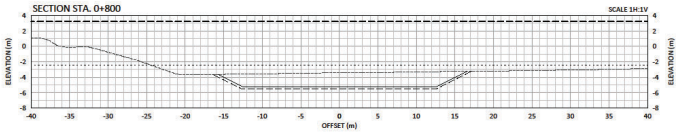


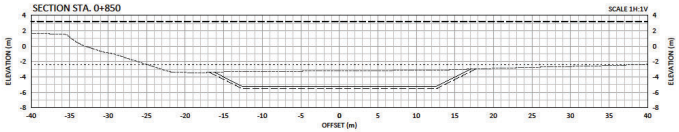












NOTES

1. REFER TO THE GENERAL NOTES ON SHEET 002.
2. ALL SECTIONS ARE PLOTTED LOOKING UPSTREAM.
3. REFER TO SHEET 004 FOR THE LOCATION OF SECTIONS BY STATION.
4. SLOUGHING ALLOWANCE NOT SHOWN.REFER TO TYPICAL SECTION AND DREDGING NOTES ON SHEET 002.

LEGEND

- HIGHER HIGH WATER MEAN TIDE
- LOWER LOW WATER LARGE TIDE
- REQUIRED DREDGE ELEVATION
- PAYABLE OVER-DREDGE (ALLOWANCE 0.3m)
- EXISTING RIVERBED

CLIENT: BRITISH COLUMBIA

REV.	DATE	DESCRIPTION
	20230720	ISSUED FOR TENDER

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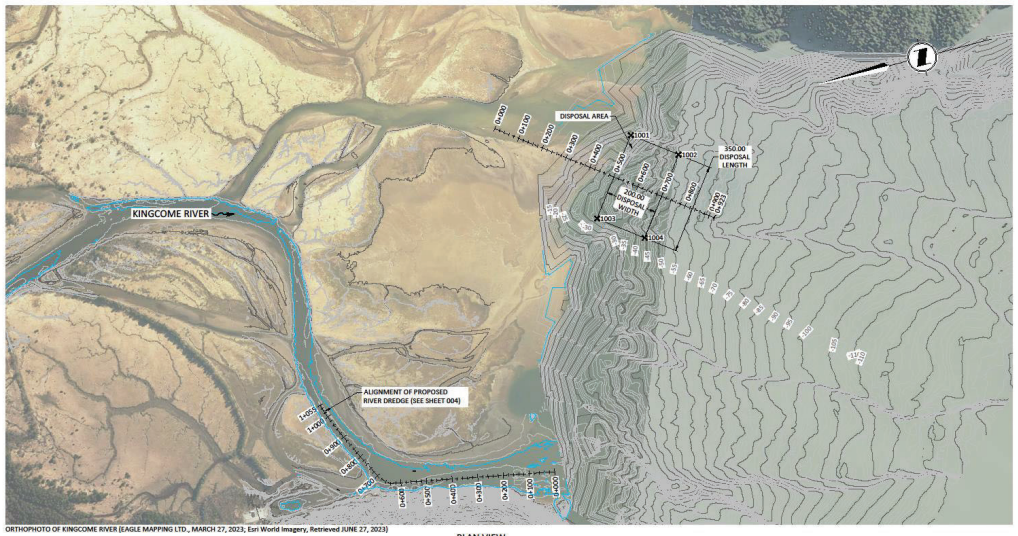
KINGCOME EMERGENCY DEBRIS & SEDIMENT MANAGEMENT
PROJECT 2900439

DREDGE SECTIONS (2 OF 2)

DESIGNED: AVB/ VGB	SHEET ID: 3007807 NHC 2900439 KINGCOME EDSM IFT R0-008	SHEET No:	
DRAFTED: CZZ	STATUS: ISSUED FOR TENDER	008	
CHECKED: NAB/GFL	SCALE: AS SHOWN WHEN PLOTTED D SIZE		
APPROVED: DJG	DATE: 20 JUL 2023	REV No:	

SUPERSEDES ALL REVISIONS WITH NUMBER PRECEDING

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ORTHOPHOTO OF KINGCOME RIVER (EAGLE MAPPING LTD., MARCH 27, 2023, Esri World Imagery, Retrieved JUNE 27, 2023)

PLAN VIEW
SCALE 1:7500

NOTES

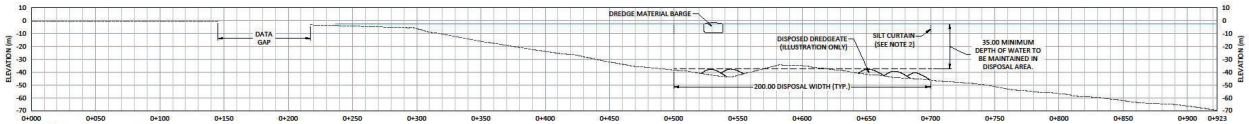
1. REFER TO THE GENERAL NOTES ON SHEET 002.
2. SILT CURTAIN LOCATIONS AND DEPTH TO BE DETERMINED IN CONSULTATION BETWEEN QEP AND CONTRACTOR.
3. BATHYMETRIC CONTOURS IN KINGCOME INLET BASED ON UNDATED CHS DATA AND MAY NOT BE ACCURATE. CONTRACTOR SHALL CARRY OUT A PRE-CONSTRUCTION SURVEY TO CONFIRM DEPTHS IN THE DISPOSAL AREA.
4. THE ENVIRONMENTAL QP SHALL CARRY OUT A DIVE SURVEY PRIOR TO CONSTRUCTION AND MAY REQUIRE ADJUSTMENT TO THE POSITION OF THE DISPOSAL POLYGON TO AVOID IMPACTS TO WILDLIFE.
5. REFER TO THE CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN FOR ADDITIONAL DIRECTIVES REGARDING DISPOSAL OF DREDGEATE.

DISPOSAL AREA
COORDINATES TABLE

POINT #	EASTING (m)	NORTHING (m)
1001	697104.82	5645268.08
1002	696985.33	5645107.70
1003	696824.16	5645477.20
1004	696704.67	5645316.81

LEGEND

LOWER LOW WATER LARGE TIDE



PROFILE - DISPOSAL AREA EAST
SCALE 1:1500

CLIENT:

REV.	DATE	DESCRIPTION
	20230720	ISSUED FOR TENDER

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PROJECT 2900439

DREDGEATE DISPOSAL AREA DETAILS

DESIGNED: AVB/ VGB	SHEET ID: 3007807 NHC 2900439 KINGCOME EDSM IFT R0-009	SHEET No:	
DRAFTED: CZZ	STATUS: ISSUED FOR TENDER	009	
CHECKED: NAB/GFL	SCALE: AS SHOWN WHEN PLOTTED D SIZE		
APPROVED: DJG	DATE: 20 JUL 2023	REV No:	

SUPERSEDES ALL REVISIONS WITH NUMBER PRECEDING

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0 20 40 60 80 100m
SCALE = 1:2,000

PLAN VIEW
SCALE 1:2000

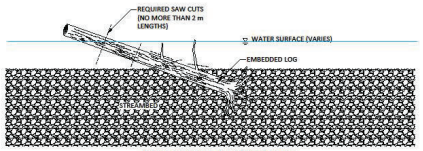
NOTES

1. REFER TO THE GENERAL NOTES ON SHEET 002.
2. THE PHOTO I.D. POINTS ARE VANTAGE POINTS SHOWING THE APPROXIMATE LOCATIONS OF DEBRIS TO BE TRIMMED.
3. PHOTO PLATES CORRESPONDING TO EACH PHOTO I.D ARE SHOWN ON SHEETS 014 TO 017.

LEGEND

PHOTO I.D IMG_XXXX

PHOTO DIRECTION →



EMBEDDED LOG TRIMMING DETAIL
(NTS)

CLIENT:

BRITISH COLUMBIA

REV.	DATE	DESCRIPTION
	20230720	ISSUED FOR TENDER

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PROJECT 2900439

DEBRIS TRIMMING SITE LOCATIONS 1 OF 4

DESIGNED:	AVB/ VGB	SHEET ID: 3007807 NHC 2900439 KINGCOME EDSM IFT R0-010	SHEET No: 010
DRAFTED:	CZZ	STATUS: ISSUED FOR TENDER	
CHECKED:	NAB/GFL	SCALE: AS SHOWN WHEN PLOTTED D SIZE	
APPROVED:	DJG	DATE: 20 JUL 2023	REV No:

SUPERSEDES ALL REVISIONS WITH NUMBER PRECEDING

PACIFICUS



PLAN VIEW
SCALE 1:2000

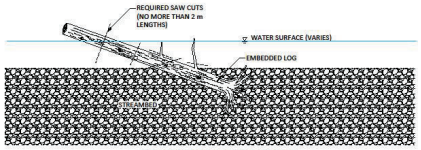
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SCALE = 1:2,000

NOTES

1. REFER TO THE GENERAL NOTES ON SHEET 002.
2. THE PHOTO I.D. POINTS ARE VANTAGE POINTS SHOWING THE APPROXIMATE LOCATIONS OF DEBRIS TO BE TRIMMED.
3. PHOTO PLATES CORRESPONDING TO EACH PHOTO I.D ARE SHOWN ON SHEETS 014 TO 017.

LEGEND

PHOTO I.D IMG_XXXX
PHOTO DIRECTION



EMBEDDED LOG TRIMMING DETAIL
(NTS)

CLIENT: BRITISH COLUMBIA

REV.	DATE	DESCRIPTION
	20230720	ISSUED FOR TENDER

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KINGCOME EMERGENCY DEBRIS & SEDIMENT MANAGEMENT
PROJECT 2900439

DEBRIS TRIMMING SITE LOCATIONS 2 OF 4

DESIGNED:	AVB/ VGB	SHEET ID: 3007807 NHC 2900439 KINGCOME EDSM IFT R0-011	SHEET No: 011
DRAFTED:	CZZ	STATUS: ISSUED FOR TENDER	
CHECKED:	NAB/GFL	SCALE: AS SHOWN WHEN PLOTTED D SIZE	
APPROVED:	DJG	DATE: 20 JUL 2023	REV No:

SUPERSEDES ALL REVISIONS WITH NUMBER PRECEDING

PACIFICUS



PLAN VIEW
SCALE 1:2000

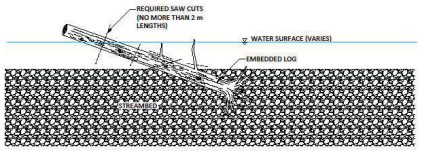
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SCALE = 1:2,000

NOTES

1. REFER TO THE GENERAL NOTES ON SHEET 002.
2. THE PHOTO I.D. POINTS ARE VANTAGE POINTS SHOWING THE APPROXIMATE LOCATIONS OF DEBRIS TO BE TRIMMED.
3. PHOTO PLATES CORRESPONDING TO EACH PHOTO I.D ARE SHOWN ON SHEETS 014 TO 017.

LEGEND

PHOTO I.D IMG_XXXX
PHOTO DIRECTION →



EMBEDDED LOG TRIMMING DETAIL
(NTS)

CLIENT: BRITISH COLUMBIA

REV.	DATE	DESCRIPTION
	20230720	ISSUED FOR TENDER

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KINGCOME EMERGENCY DEBRIS & SEDIMENT MANAGEMENT
PROJECT 2900439

DEBRIS TRIMMING SITE LOCATIONS 3 OF 4

DESIGNED:	AVB/ VGB	SHEET ID:	3007807 NHC 2900439 KINGCOME EDSM IFT R0-012
DRAFTED:	CZZ	STATUS:	ISSUED FOR TENDER
CHECKED:	NAB/GFL	SCALE:	AS SHOWN WHEN PLOTTED D SIZE
APPROVED:	DJG	DATE:	20 JUL 2023

SHEET No: 012
REV No:

SUPERSEDES ALL REVISIONS WITH NUMBER PRECEDING

PACIFICUS



PLAN VIEW
SCALE 1:2000

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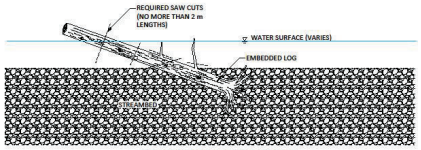
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1. REFER TO THE GENERAL NOTES ON SHEET 002.
2. THE PHOTO I.D. POINTS ARE VANTAGE POINTS SHOWING THE APPROXIMATE LOCATIONS OF DEBRIS TO BE TRIMMED.
3. PHOTO PLATES CORRESPONDING TO EACH PHOTO I.D ARE SHOWN ON SHEETS 014 TO 017.

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EMBEDDED LOG TRIMMING DETAIL
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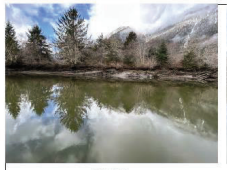
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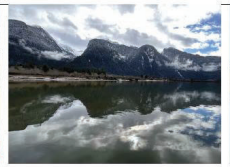
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DEBRIS TRIMMING SITES - PLAN SHEET 1 PHOTO PLATES

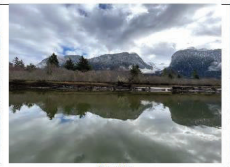
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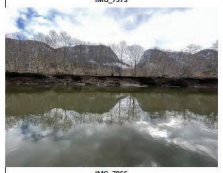

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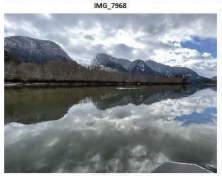

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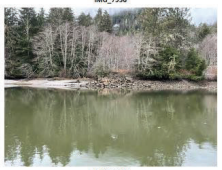

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NOTES

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DEBRIS TRIMMING SITES - PLAN SHEET 3 PHOTO PLATES

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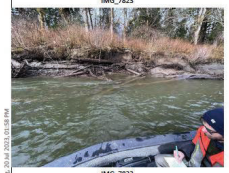

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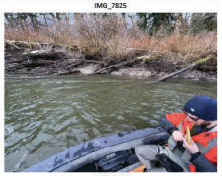

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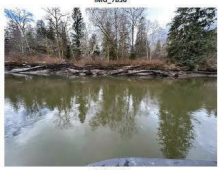

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1. REFER TO THE GENERAL NOTES ON SHEET 002.

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DEBRIS TRIMMING SITES - PLAN SHEET 4 PHOTO PLATES

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Appendix 2. Database Review of Species Potentially in the Proposed Work Area

Table 1. Animals potentially found within Kingcome Inlet and their conservation status according to Provincial, Federal, and global metrics.

	Scientific Name	English Name	Provincial	BC List	Global	COSEWIC	SARA	MBCA
Birds	*Pluvialis dominica*	American Golden-Plover	S3S4B (2015)	Blue	G5 (2016)			Y
	Synthliboramphus antiquus	Ancient Murrelet	S2S3B,S4N (2022)	Blue	G4 (2016)	SC	1-SC (2006)	Y
	Haliaeetus leucocephalus	Bald Eagle	S5B,S5N (2015)	Yellow	G5 (2016)	NAR		N
	Patagioenas fasciata	Band-tailed Pigeon	S3S4 (2022)	Blue	G4 (2016)	SC	1-SC (2011)	Y
	Riparia riparia	Bank Swallow	S4?B (2022)	Yellow	G5 (2016)	T	1-T (2017)	Y
	Hirundo rustica	Barn Swallow	S4B (2022)	Yellow	G5 (2016)	SC	1-T (2017)	Y
	Melanitta americana	Black Scoter	S3S4N (2015)	Blue	G5 (2016)			Y
	Cypseloides niger	Black Swift	S2S4B (2022)	Blue	G4 (2016)	E	1-E (2019)	Y
	Branta bernicla	Brant	S3M (2015)	Blue	G5 (2016)			Y
	Larus californicus	California Gull	S1B,SNRN (2022)	Red	G5 (2016)			Y
	Branta canadensis	Canada Goose	S5 (2015)	Yellow	G5 (2016)			Y
	Ptychoramphus aleuticus	Cassin's Auklet	S2B,S3N (2018)	Red	G4 (2016)	SC	1-SC (2019)	Y
	Mergus merganser	Common merganser	S5 (2015)	Yellow	G5 (2016)			Y
	Uria aalge	Common Murre	S2B,S3S4N (2015)	Red	G5 (2016)			Y
	Chordeiles minor	Common Nighthawk	S3S5B (2022)	Blue	G5 (2016)	SC	1-T (2010)	Y
	Nannopterum auritum	Double-crested Cormorant	S3S4 (2015)	Blue	G5 (2016)	NAR		N
	Podiceps nigricollis	Eared Grebe	S3B (2015)	Blue	G5 (2016)			Y
	Coccothraustes vespertinus	Evening Grosbeak	S5 (2022)	Yellow	G5 (2016)	SC	1-SC (2019)	Y
	Podiceps auritus	Horned Grebe (Western population)	S4B,SNRN (2015)	Yellow	G5 (2016)	SC	1-SC	Y
	Ardea herodias	Great Blue Heron	S3 (2015)	No status	G5 (2016)			Y
	Brachyramphus marmoratus	Marbled Murrelet	S3 (2022)	Blue	G3 (2016)	T	1-T (2003)	Y
	Contopus cooperi	Olive–sided Flycatcher	S4B (2022)	Yellow	G4 (2016)	SC	1-T (2010)	Y
	Falco peregrinus	Peregrine Falcon	S3 (2015)	No Status	G4 (2016)	SC	1-SC	N
	Calidris canutus	Red Knot	S3?M (2022)	Blue	G4 (2016)	T	1-T (2010)	Y
	Phalaropus lobatus	Red-necked Phalarope	S3S4B (2015)	Blue	G4G5 (2016)	SC	1-SC (2019)	Y
	Limnodromus griseus	Short-billed Dowitcher	S2S3B (2015)	Blue	G5 (2016)			Y
	Asio flammeus	Short–eared Owl	S3B,S1N (2022)	Blue	G5 (2016)	T	1-SC (2012)	N
	Phoebastria albatrus	Short–tailed Albatross	S1N (2022)	Red	G1 (2016)	T	1-T (2005)	Y
	Tringa incana	Wandering Tattler	S3B (2015)	Blue	G4G5 (2016)			Y
	Aechmophorus occidentalis	Western Grebe	S1B,S2N (2015)	Red	G5 (2016)	SC	1-SC (2017)	Y
	Megascops kennicottii kennicottii	Western Screech-owl kennicottii subspecies	S2S3 (2017)	Blue	G4G5T4 (2016)	T	1-T (2005)	N

	Scientific Name	English Name	Provincial	BC List	Global	COSEWIC	SARA	MBCA
Mammals - Terrestrial	*Ursus americanus*	American Black Bear	S5 (2015)	Yellow	G5 (2016)	NAR		
	Ursus arctos	Grizzly Bear	S3? (2015)	Blue	G4 (2022)	SC	1-SC (2018)	
	Gulo gulo	Wolverine	S3 (2015)	No Status	G4 (2016)	SC	1-SC (2018)	
Mammals - Marine	*Eschrichtius robustus*	Grey Whale	S3 (2006)	Blue	G4 (2016)	SC/E/NAR	1-SC (2005	
	Phocoena phocoena	Harbour Porpoise	S3 (2006)	Blue	G4G5 (2016)	SC	1-SC (2005)	
	Megaptera novaeangliae	Humpback Whale	S3 (2006)	Blue	G4 (2016)	SC	1-SC (2017)	
	Orcinus orca pop. 3	Killer Whale (Northeast Pacific Transient Population)	S2 (2011)	Red	G4G5T3Q (1998)	T	1-T (2003)	
	Orcinus orca pop. 6	Killer Whale (Northeast Pacific Northern Resident Population)	S2 (2011)	Red	G4G5T2Q (2006)	T	1-T (2003)	
	Lagenorhynchus obliquidens	Pacific White-Sided Dolphin	S4S5 (2006)	Yellow	G5 (2016)	NAR		
	Eumetopias jubatus	Stellar Sea Lion	S3S4B,S4N (2022)	Blue	G3 (2016)	SC	1-SC (2005)	
Amphibians	*Ascaphus truei*	Coastal Tailed Frog	S4 (2022)	Yellow	G4 (2016)	SC	1-SC (2003)	
	Rana aurora	Northern Red-legged Frog	S3 (2022)	Blue	G4 (2015)	SC	1-SC (2005)	
	Anaxyrus boreas	Western Toad	S4 (2022)	Yellow	G4 (2008)	SC	1-SC (2018)	
Fish	*Oncorhynchus tshawytscha*	Chinook Salmon	SNR (2019)	Not Reviewed	G5 (2017)	E/T/SC/DD /NAR		
	Oncorhynchus keta	Chum Salmon	SNR (2019)	Not Reviewed	G5 (2016)			
	Oncorhynchus kisutch	Coho Salmon	SNR (2019)	Not Reviewed	G5 (2017)			
	Oncorhynchus clarkii	Cutthroat Trout	S4 (2000)	No Status	G5 (2017)			
	Thaleichthys pacificus	Eulachon	S2S3 (2004)	Blue	G5 (2005)	E/T		
	Acipenser medirostris	Green Sturgeon	S2S3N (2019)	Blue	G2 (2022)	SC	1-SC (2006)	
	Clupea pallasii	Pacific Herring	SNR	Not Reviewed	G5 (2017)			
	Oncorhynchus gorbuscha	Pink Salmon	SNR (2019)	Not Reviewed	G5 (2016)			
	Oncorhynchus nerka	Sockye Salmon	SNR (2019)	Not Reviewed	G5 (2022)			
	Oncorhynchus mykiss	Steelhead	S5 (2011)	Yellow	G5 (2022)			
Gastropods	*Haliotis kamtschatkana*	Northern Abalone	S2 (2002)	Red	G3G4 (2010)	E	1-E	

*This table provides a list of potential animal species within the area, with a focus on species with conservation status. This is not an exhaustive list of all animal species or species with conservation status within the area. Please refer to Tables 2-6 for a description of each of the conservation ranks. This list was compiled from the following Provincial and Federal databases: BC Species and Ecosystems Explorer[7], iMap BC[8], Habitat Wizard[9], Aquatic Species at Risk Map,[10] and Range Map extents– Species at Risk Canada[11]

[7] Province of B.C. 2023. B.C. Species and Ecosystems Explorer. Accessed: February 22, 2023. BC Species & Ecosystems Explorer - Province of British Columbia (gov.bc.ca)
[8] Province of B.C. 2023. iMapBC. Accessed: February 22, 2023. iMapBC - Province of British Columbia (gov.bc.ca)
[9] Province of B.C. 2023. Habitat Wizard. Accessed February 22, 2023. Habitat Wizard (gov.bc.ca)
[10] Department of fisheries and Oceans Canada. 2022. Aquatic Species at Risk Map. Accessed February 22, 2023. Aquatic species at risk map (dfo-mpo.gc.ca)
[11] Environment and Climate Change Canada. 2022. Range Map extents – Species at Risk – Canada. Range Map extents - Species at Risk - Canada - Open Government Portal

Provincial status applies to a species or ecological community's conservation status in B.C. The number in parenthesis is the year the rank was reviewed. The meaning of status ranks are provided below (Table 2).

Table 2. Provincial conservation status descriptions.

Provincial	
SX	Presumed extirpated
SH	Historical species
S1	Critically imperiled
S2	Imperiled
S3	Special concern, vulnerable to extirpation or extinction
S4	Apparently secure
S5	Demonstrably widespread, abundant, secure
SU	Unrankable

*Definitions retrieved from BC Species & Ecosystem Explorer.

BC Lists are based on the Provincial conservation status. The meaning of each designation is provided below (Table 3).

Table 3. BC list descriptions.

BC List	
Red	Any species or ecosystem at risk of extirpated, endangered, or threatened status in B.C. (SX, SH, S1, S1S2, S2, S2?, S1S3)
Blue	Any species or ecosystem of special concern in B.C. (S2S3, S2S4, S3, S3?, S3S4, S3S5)
Yellow	Any species or ecosystem that is apparently secure or secure (S4, S5, S4S5, S5)
Extinct	Species that no longer exist

*Definitions retrieved from BC Species & Ecosystem Explorer.

Global Status applies to a species or ecological community throughout its range. The meaning of status ranks are provided below (Table 4).

Table 4. Global conservation status descriptions.

Global	
GX	Presumed extinct
GH	Possibly extinct
G1	Critically imperiled
G2	Imperiled
G3	Vulnerable to extirpation or extinction
G4	Apparently secure
G5	Demonstrably widespread, abundant, secure
GU	Unrankable

*Definitions retrieved from BC Species & Ecosystem Explorer.

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) status applies to a species' conservation status in Canada. The meaning of status ranks are provided below (Table 5).

Table 5. COSEWIC status descriptions.

COSEWIC	
Extinct (X)	A species no longer exists
Extirpated (XT)	A species that no loner exist in the wild in Canada, but occurring elsewhere
Endangered (E)	A species facing imminent extirpation or extinction
Threatened (T)	A species that is likely to become endangered if limiting factors are not reversed
Special Concern (SC)	A species of special concern because of characteristics that makes it particularly sensitive to human activities or natural events
Not At Risk (NAR)	A species that has been evaluated and found to be not at risk
Data Deficient (DD)	A species for which there is insufficient scientific information to support status designation

*Definitions retrieved from BC Species & Ecosystem Explorer.

The values for the Federal Species at Risk Act (SARA) status apply to a species' conservation status in Canada. A description of the SARA schedule numbers are provided below (Table 6).

Table 6. SARA schedule descriptions.

SARA	
Schedule 1	The official list of wildlife species at risk
Schedule 2	Species designated by COSEWIC, prior to new criteria, and as of 2001 had not been reassessed by COESWIC.
Schedule 3	Species previously designated by COSEWIC as Special Concern, that have not been reassessed using the new criteria.

*Definitions retrieved from BC Species & Ecosystem Explorer.

Appendix 3. Species Observed During Dive Assessment

Table 1. Summary of substrate composition, aquatic organisms, and relative abundance observed during the dive assessment in the proposed dredge material disposal area located in the subtidal area fronting the Kingcome River delta.

TRANSECT DIVES - ESTUARY					
Transect Location	**Chart Datum (m)**	**Substrate**	**Biota**		
			Common Name	**Scientific Name**	**Abundance**
50.9317471°N 126.2068916°W	**2.4m - 5.4m**	silt	Dungeness crab	*Cancer magister*	4
			juvenile kelp crab	*Pugettia sp.*	7
			subtidal clam siphon holes	-	1-5/m^2
			tanner crab	*Chionoecetes bairdi*	1
			juvenile starry flounder	*Platichthys stellatus*	2
			juvenile sturgeon poacher	*Podothecus accipenserinus*	<1/m^2
50.9292047°N 126.2044666°W	**1.4m - 4.4m**	silt	Dungeness crab	*Cancer magister*	3
			juvenile kelp crab	*Pugettia sp.*	5
			subtidal clam siphon holes	-	2-6/m^2
			tanner crab	*Chionoecetes bairdi*	1
			juvenile starry flounder	*Platichthys stellatus*	6
			juvenile sturgeon poacher	*Podothecus accipenserinus*	2
126.1989318°W 50.9282466°N	**2.4m - 5.4m**	silt	graceful decorator crab	*Oregonia gracelis*	1
			kelp crab	*Pugettia sp.*	5
			subtidal clam siphon holes	-	2-6/m^2
			tanner crab	*Chionoecetes bairdi*	1
			starry flounder	*Platichthys stellatus*	10
			sturgeon poacher	*Podothecus accipenserinus*	2
50.9241052°N 126.1925456°W	**2.4m- 6.4m**	silt	subtidal clam siphon holes	-	1-4/m^2
			kelp crab	*Pugettia sp.*	3

Appendix 4. Construction Environmental Mitigation Plan

The intent of the measures and standards listed within this Construction Environmental Mitigation Plan (CEMP) are to avoid causing the *death of fish* or the *harmful alteration, disruption, or destruction of fish habitat* during year 1 works to improve the navigation safety for Dzawada'enuxw First Nation small boat operators. Three aspects of work are considered within the CEMP: dredging, dredge material disposal, and hazardous LWD trimming. Measures and standards were informed by best management practices (BMPs) outlined within the Code of Practice for Routine Maintenance Dredging for Navigation, as well as a review of Fisheries and Oceans Canada (DFO) pathways of effect for dredging and the use of industrial machines for projects near water.

The CEMP provides a list of mitigation measures and BMPs to be established prior to the commencement of works and followed throughout. It is expected that negative impacts to fish and fish habitat can be avoided during proposed works provided that the CEMP is implemented appropriately. Mitigation measures should include, but are not limited to the following:

Environmental Monitor

A Qualified Environmental Professional (QEP) to act as an environmental Monitor (EM) must be available both for consultation and onsite if necessary, during all in-water work. The EM will be responsible for the following activities:

- Conducting a pre-work meeting with construction crews to review details of the CEMP.
- Providing advice and guidance to construction crews with regards to environmental concerns was necessary.
- Reviewing the implementation of mitigation measures prior to the commencement of each stage of work.
- Communicating conditions for stopping work with construction crews.
- Developing contingency measures and revisions to mitigation measures in order to prevent a HADD if appropriate.

Dredging

The following measures should be implemented and followed during all dredging works in the Kingcome River and Estuary:

- Limit the extent of the dredge footprint to the minimum requirement for safe navigation as determined by a qualified engineer.
- Any vertical spuds or anchors should be placed within the footprint of the dredge area.
- Turbidity monitoring should be conducted during dredge works to ensure that turbidity generated by works does not exceed guidelines of a change from background turbidity of 8 NTU at any one time for a duration of 24 hours as outlined by Provincial Water Quality Guidelines.
- Silt curtains should be available for deployment around the dredge area if Provincial Water Quality Guidelines cannot be maintained. Silt curtains are not required to be in contact with the riverbed but should be as deep as feasible considering working conditions.

Dredgeate Disposal

The following measures should be implemented and followed during the disposal of dredgeate in the subtidal area fronting the Kingcome River delta:

- Deploy weighted silt curtains around the scow barge during material disposal to prevent excess migration of sediment into Kingcome Inlet. Silt curtains are not required to be in contact with the sea floor but should be as deep as feasible considering working conditions.
- Limit the sudden disposal of large volumes of dredge material in one area, rather dump in small increments throughout the proposed disposal area to minimize the potential for fatal burial of fish.
- Gradually dispose of dredge material to allow motile fauna to vacate the disposal area.

Hazardous LWD Trimming

The following measures should be implemented and followed during the trimming of hazardous LWD in the lower 6 km of the Kingcome River between U'kwa Nalis Village and the Pacific Ocean:

- Only trim debris identified by a qualified engineer or member of DFN as a navigational hazard.
- Trim debris to a minimal extent to remove the navigational hazard; do not attempt to pull on or otherwise dislodge the debris from the riverbed.

- Trim debris into a maximum of 2 m segments as outlined in engineering drawings produced by Northwest Hydraulic Consultants Ltd. in order to maintain the integrity of surrounding fish habitat.
- Do not anchor spud barge in areas with active salmonid redds, as identified by an accompanying QEP.
- Works should be paused if sawdust accumulation is judged to be deleterious to fish. Only resume trimming when revised mitigation measures have been approved by a QEP and implemented adequately.

Spill Prevention and Waste Removal

The following measures should be implemented and followed throughout year 1 work in the Kingcome River and Estuary in order to prevent and mitigate the spill of deleterious material into the aquatic environment:

- All machinery should be inspected by the EM prior to entering the work site to ensure it is clean and free of leaks.
- Each piece of machinery should be accompanied by a fully stocked and readily available spill kit, including a floating boom sock, to deploy in the event of a spill.
- All vessels used to transport machinery to and from the work site must also be clean before approaching the vicinity of the works.
- All fueling and routine/equipment maintenance must be conducted away from the site and with appropriate measures to ensure no deleterious substance enters the marine or freshwater environment.
- Any waste produced from crew accommodation (float or land camp) should be disposed of appropriately and must not enter the marine or freshwater environment.

Appendix 5. Dzawada̲'enu̲xw First Nation Letter of Support

DZAWADA'ENUXW FIRST NATION

July 6, 2023

KINGCOME EMERGENCY DEBRIS AND SEDIMENT MANAGEMENT PROJECT
LETTER OF SUPPORT

To Whom It May Concern:

This Letter of Support for the above captioned project is addressed to all concerned parties at all levels of the provincial government of British Columbia and the federal government of Canada.

At this point in time the channel of Kingcome River provides the only reliable, year-round, means of access, egress, and supply of provisions to and from our community in U'Kwa Nalis Village. For Dzawada̲'enu̲xw First Nation (DFN) the River is our roadway. This puts the DFN in a unique and precarious position relative to other First Nations and peoples within BC. Over the past several decades, sediment accumulation and wood debris entrapment in the riverbed have been increasing, resulting in shallow and dangerous water in which to navigate our boats. The Atmospheric River Event (ARE) which occurred in November 2021 resulted in further acute sediment and debris buildup, and threats to the safety of our people. Following the November 2021 ARE, DFN has been outspoken in our need for funding support to address navigation safety in Kingcome River, and sustainable access for larger vessels to the Bullpen Channel. Since the ARE event, our boat operators have continued to sustain damage to their boats, threats to their personal safety and the safety of their passengers.

DFN declares its support for the Project Year 1 construction activities, which are to include dredging sediment from the mouth of Kingcome River (where sedimentation and tidal interactions make navigation particularly hazardous) and trimming of hazardous debris in the river between the mouth and U'Kwa Nalis Village.

DFN also declares it's support, in principle, for Year 2 construction activities, which will include dredging of the Bullpen Channel and some means of limiting future sedimentation within the Bullpen Channel. Consultation between DFN, the Project Design Team (led by Northwest Hydraulic Consultants Ltd.) and the Ministry of Environment and Climate Change Strategy (ENV) are still ongoing to determine the most appropriate means of managing sedimentation within the Bullpen.

To date, the Project Design Team and ENV have been actively engaged with DFN's Council, Stewardship Committee and Administration. It is DFN's expectation and requirement that this engagement continue in the lead-up to and during both Year 1 and Year 2 construction.

Sincerely,

Dawn Nicolson
DFN Administrator

#32 U'kwa nalis Road, Kingcome Inlet, BC, V0N 2B0 Tel: 250 974 3013 Fax: 250 974 3005

APPENDIX E

ARCHAEOLOGICAL OVERVIEW ASSESSMENT REPORT

REPORT

Archaeological Services Related to Flood Debris Removal Project in the Kingcome River Inlet, British Columbia

Archaeological Overview Assessment

Submitted to:

Northwest Hydraulic Consultants

Attention: Des Goold, PEng, Principal
30 Gostick Place
North Vancouver, BC V7M 3G3

Submitted by:

WSP Canada Inc.

1935 Bollinger Road, Nanaimo, British Columbia, V9S 5W9

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8 July 2024

Distribution List

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Executive Summary

At the request of Northwest Hydraulic Consultants and Dzawada'enuxw First Nation, WSP Canada Inc. undertook an archaeological overview assessment (AOA) for the Kingcome River Emergency Flood Repair Project (the Project) located within the Gwa'yi (Kingcome) River, British Columbia (Figure 1). The Project consists of two sequential phases (Phase 1 and 2) to facilitate the removal of flood-related sedimentation and debris and maintain access for the Dzawada'enuxw First Nation community at U'Kwanalis (Kingcome) Village. Phase 1 proposed project activities involve dredging of the river mouth. Phase 2 proposed project activities involve underwater trimming of submerged trees along the river from U'Kwanalis to the ocean.

The AOA objectives were to:

1) Identify and describe known archaeological and historical sites within the Project Area, to the degree possible, using existing records and reports.

2) Identify and evaluate archaeological potential within the Project Area.

3) Assess the need for more detailed archaeological investigations, if warranted.

4) Provide archaeological recommendations for the Project Area.

Readily available information pertaining to the local physical setting (e.g., slope; aspect; vegetation classes; soil types; distance to various water bodies including rivers, streams, creeks, and wetlands; and trails), cultural background, and archaeological and ethnographic information (e.g., site deposits, site locations, land use, and place names) were used to inform the desktop review for archaeological potential for the Project Area. The desktop review was complemented with a preliminary field reconnaissance of the Project Area, conducted on 8th June 2023.

The desktop review indicates that the Project Area has archaeological potential due to its location on the river, but the level of historic disturbance is well documented in the area and has likely decreased the potential for the presence of any existing cultural material or features. The preliminary field reconnaissance did not identify any newly observed cultural or archaeological materials. These results align with previous reports that recognize the archaeological potential along with the highly disturbed nature of the intertidal and shoreline areas within the Phase 1 Project Area. Based on these findings, WSP Canada Inc. recommends that Phase 1 proceed and does not require further archaeological assessment, but a Chance Find Management Plan should be implemented and provided to the construction crew. If the Phase 1 Project Area footprint is altered to include areas not previously assessed in the AOA, further archaeological work may be warranted. WSP Canada Inc. further recommends that a preliminary field reconnaissance be undertaken prior to commencement of Phase 2 activities to identify any cultural materials or features that may have been exposed during the winter weather events.

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APPENDICES

APPENDIX A
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1.0 INTRODUCTION

At the request of Northwest Hydraulic Consultants (NHC) and the Dzawada'enuxw First Nation (DFN), WSP Canada Inc. (WSP) undertook an archaeological overview assessment (AOA) for the proposed Kingcome River Emergency Flood Repair Project (the Project) located in Kingcome River Inlet, British Columbia (the Project Area; Figure 1). NHC proposes dredging the mouth of the Gwa'yi (Kingcome) River to remove extensive sediment accumulation, as well as the removal of flood debris from the mouth of Gwa'yi to U'Kwanalis (Kingcome Village).

1.1 Objectives and Scope

The AOA objectives were to:

- Identify and describe known archaeological and historical sites within the Project Area, to the degree possible, using existing records and reports.
- Identify and evaluate archaeological potential within the Project Area.
- Assess the need for more detailed archaeological investigations, if warranted.
- Provide archaeological recommendations for the Project Area.

For the purposes of this report, archaeological sites are defined as locations that contain physical remains of past human activity and are associated with pre-contact and/or post-contact periods. Historical sites are defined as any structure, site, or thing that is of historical or architectural significance. Historical sites and locations in British Columbia are primarily attributable to post-contact Euro Canadian settlement and land use but can also include habitations and other evidence left by Indigenous peoples. These historical resources include structures, engineering works, architectural features, and artifacts.

Archaeological potential refers to an assessed likelihood that archaeological sites are, or were at one time, present, and is based on an evaluation of ethnographic, historical, environmental, and archaeological data relating to past Indigenous peoples' land use patterns and known archaeological site locations.

This study is concerned with potential impacts to archaeological sites by proposed development activities. It does not address potential impacts to traditional use activities and sites. Therefore, this report does not comprehensively document all Indigenous peoples' interest in the land. The study was conducted without prejudice to Indigenous groups' treaty negotiations, Aboriginal rights, or Aboriginal title.

2.0 PROPOSED PROJECT

2.1 Project Description and Location

The Project consists of the removal of sediment accumulation and flood debris from Kingcome River Inlet to aid in the maintenance of the DFN community who live in U'Kwanalis and the surrounding area (Figure 1). Specifically, the proposed project will mitigate the significant landscape changes that took place during and after a November, 2021, Atmospheric River event (Northwest Hydraulics Consultants, 2022). This event resulted in substantive sedimentation and the deposition of embedded woody debris, which has resulted in shallow river depths and waterway obstructions that impact the safety and ability of DFN to access the float plane and barge docks at the mouth of the river, as well as to travel to other communities (Ram Consulting, 2022). These impacts are noted as a Very High risk to Public Health and Safety for the DFN community and pose a High risk to the community's infrastructure (Northwest Hydraulics Consultants, 2022).

We understand that the proposed project will dredge approximately 71,000 m^3 of sediment from the lower 1 km of the Gwa'yi River, which may require roadworks to support the movement of dredging equipment across the Project Area, and underwater trimming of woody debris along a 4 km of the Kingcome River downstream from Kingcome (Figure 1). These measures are proposed to facilitate a deeper navigation channel for the "Bullpen" Channel boat launch and to mitigate the risks of boat travel from Kingcome Inlet to U'Kwanalis (Figure 2). The dredging will take place during Phase 1 of the proposed Project, with the underwater trimming taking place during Phase 2.

3.0 HERITAGE LEGISLATION, POLICIES, AND PERMITTING

In terms of key legislation and policy frameworks, there are various political entities from the international to the local level that play a role in archaeological protection and management. The following sections provide a brief overview.

3.1 The United Nations Declaration on the Rights of Indigenous People

The United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) is a global framework for protecting the rights of Indigenous peoples across the world (United Nations General Assembly 2007). UNDRIP was passed in 2007 and was adopted by the Government of Canada in 2016. creating an obligation for the Crown to introduce legislation for UNDRIP's implementation. Subsequently, in 2021, the *United Nations Declaration on the Rights of Indigenous Peoples Act* received Royal Assent. The Act affirms UNDRIP as an international human rights instrument and provides a framework to advance implementation of UNDRIP at the federal level. It is essentially a universal framework of minimum standards for the survival, dignity, and well-being of all Indigenous peoples and elaborates on existing human rights standards and fundamental freedoms as they apply to specific situations of Indigenous peoples.

3.2 British Columbia Declaration on the Rights of Indigenous Peoples Act

In British Columbia, the provincial governmental chose to recognize UNDRIP and passed the *Declaration on the Rights of Indigenous Peoples Act* (*Declaration Act*) in 2019 (Government of British Columbia 2019a). The *Declaration Act* establishes UNDRIP as the Province's framework for reconciliation, as called for by the Truth and Conciliation Commission's Calls to Action. The Act aims to create a path forward that respects the human rights of Indigenous peoples while introducing better transparency and predictability in work that is done.

3.3 Heritage Conservation Act

All heritage resources in British Columbia, including archaeological sites and regardless of condition (i.e., sites in an undisturbed or disturbed state), on provincial Crown or private land that predate AD 1846 are automatically protected under the *Heritage Conservation Act* (HCA; Government of British Columbia 2019b). Note that the HCA is not specific to archaeological resources and the term, "heritage resources" is often interchanged with "cultural heritage resources" and "archaeological resources". Generally, the terms are similar, but the key differentiator is anything predating AD 1846 is an archaeological resource and subject to protection under the HCA, while more recent cultural heritage sites may not be protected under legislation. Certain sites, including burials and rock art sites that have historical or archaeological value are also protected, regardless of age. Heritage wrecks, consisting of the remains of vessels and aircrafts after two or more years since they sank, crashed, or were abandoned, including being placed in a terrestrial environment as part of a landfill, may also be also protected.

3.3.1 Heritage Permits

Subsurface investigation of an archaeological site or investigation with the intent to locate a site requires a Heritage Inspection Permit (HIP) under Section 12.2 of the HCA. The Archaeology Branch (Ministry of Forests) is the provincial government agency responsible for administering the HCA, issuing permits, maintaining a database of recorded heritage resources (Provincial Heritage Register (PHR)), and handling referrals from various development agencies.

Site protection under the HCA does not necessarily preclude development; in some cases, development may proceed following an impact assessment and the implementation of mitigative actions, if warranted. Apart from impacts occurring under a Section 12.2 permit, any alteration to a known archaeological site requires a Section 12.4 Site Alteration Permit (SAP). A SAP can be held by the individual responsible for the site alteration and/or co-held by a qualified archaeologist and often includes a requirement for data recovery or other mitigative actions (e.g., archaeological monitoring or archaeological excavation) under a HIP. Therefore, concurrent inspection and alteration permits may need to be obtained for development within a known archaeological site.

Project related land-altering activities have the potential to adversely affect heritage resources protected under the HCA. Excavation, demolition, ditching, clearing, grading, paving, the installation of subsurface utilities, landscaping, and maintenance all have potential to affect heritage resources by disturbing cultural deposits and features, damaging artifacts, hindering or increasing access to archaeological deposits, and destroying contextual information that is essential for interpreting site function and age (Davis et al. 2004). Post-construction remedial and maintenance activities also have the potential to affect buried heritage resources due to compression, altered drainage patterns, and use of agrochemicals which leach into archaeological deposits (Davis et al. 2004).

The provincial government is currently undertaking the Heritage Conservation Act Transformation Project (HCATP). The province has a mandate to undertake Phase 1 of the HCATP, which includes broad engagement with Modern Treaty Nations, First Nations, and key stakeholders on the HCA and its administration. Phase 1 will serve to inform priority areas of change to align the HCA with DRIPA and to transform the HCA to better meet the needs of everyone. Phase 1 commenced in 2022 and current changes to the HCA are anticipated to occur sometime within the next five years. How those changes will influence future archaeological resource management policies is not clear but significant changes are expected.

3.4 Municipal By-laws

Historic sites that are not protected by the HCA may be protected by municipal by-law, under the authority of the BC *Local Government Act*. These sites are usually documented on Municipally administered Community Heritage Registers (CHRs), the PHR, and the Canadian Register of Historic Places. A CHR entry generates a degree of recognition for these sites; however, without a site-specific protection mechanism such as a heritage designation bylaw, heritage revitalization agreement bylaw, or heritage restrictive covenant, inclusion on a CHR, the PHR, and/or the Canadian Register of Historic Places does not provide automatic protection for these sites.

3.5 First Nations Heritage Policy and Permitting Systems

Many BC First Nations have developed their own heritage policies and permitting systems. The professional archaeological community largely respect these requirements, although they are not required by the province or federal government to meet regulatory requirements.

First Nations heritage policies and permitting systems exist to protect cultural heritage (which includes archaeology) on unceded traditional lands and treaty lands. While aspects of these policies parallel the HCA, many diverge when it comes to the definition of a heritage resource. Most First Nations heritage policies take a broader view of heritage resources that require management, compared to the HCA (Mason 2011). Tracking archaeological assessments through these permitting systems provides First Nations the ability to protect their Aboriginal rights and maintain oversight of archaeological work being planned or carried out in their territory. The preservation of these sites is critical to understanding the past, is a significant part of Indigenous identity, and is consistent with The United Nations Declaration on the Rights of Indigenous People (UNDRIP) and British Columbia's Declaration on the Rights of Indigenous People (DRIPA).

Many Indigenous communities who may not currently have heritage policies and heritage permitting systems, are in the process of creating such processes and it is the expectation that eventually all communities may have heritage policies and permitting systems in place. Even where heritage policies have not been developed, First Nations may have protocols or preferred procedures related to heritage, which may be communicated during engagement meetings.

4.0 METHODS

4.1 First Nation Communication

Typically, archaeological consultants review the Contacts for First Nation Consultation Areas Public Map Service (CAD), maintained by the BC Ministry of Indigenous Relations and Reconciliation (MIRR 2023), to identify First Nations groups or organizations with interests in the Project Area and provide project-specific Notice of Intents (NOI) informing the Nations about the proposed work and seeking any information the Nations may wish to share concerning archaeological potential and/or resources. However, this Project was initiated at the request to the DFN and WSP was directly contacted by the DFN to undertake the AOA, which precluded an official NOI. Representatives of the DFN engaged directly with WSP Senior Archaeologist Heather Pratt to share information that informed the AOA.

4.2 Background Research

WSP assembled and reviewed readily available information for the Project Area pertaining to the local environmental setting, cultural background, previous archaeological research and recorded archaeological sites, and historical land use and disturbance. The sources of available information that were reviewed include:

- Provincial Heritage Register (PHR); using the Remote Access to Archaeological Data (RAAD) application maintained by the Archaeology Branch (MOF 2023a)
- Keyword search of the Provincial Archaeological Report Library (PARL) application maintained by the Archaeology Branch (MOF 2023b)
- Canadian Register of Historic Places (Parks Canada 2023)
- Community Heritage Register
- Readily available ethnographic and archaeological reports
- Available Orthographic maps (e.g., Google Earth)
- iMapBC online application maintained by the Government of British Columbia (Government of British Columbia 2023a)
- The BC Geographical Names Information System maintained by the Government of British Columbia (Government of British Columbia 2023b)
- Vegetation Resource Index (Government of British Columbia 2023c)

4.3 Archaeological Potential Assessment

Archaeological potential refers to the likelihood that archaeological sites are present and can be located using archaeological techniques. Archaeological potential often considers factors such as proximity to previously recorded archaeological sites and landscape features (i.e., distance to aquatic features, slope, aspect, etc.) that tend to correlate with current understanding of archaeological site locations in the same region. Consistent with the British Columbia Archaeological Impact Assessment Guidelines, the Project Area was classified as either having archaeological potential or having low archaeological potential.

Recorded archaeological sites in BC tend to be positively correlated with some of the following biophysical characteristics:

- Favourable south and west aspects and slopes of less than 15%
- Good ground drainage
- Proximity to fresh water and food sources
- Proximity to traditional use areas or areas of cultural significance
- Proximity to known archaeological sites, particularly where comparable environmental and terrain parameters are present
- Steep to very steep rock outcrops suitable for rock art panels
- Microtopographical features such as terraces, benches and knolls
- Any of the above conditions that existed in the past that are not present today (e.g., palaeoshores, extinct river channels, etc.)

Biophysical characteristics considered to decrease the likelihood of discovering an archaeological site include:

- Large undifferentiated areas lacking in microtopographical features (i.e., featureless terrain)
- Terrain with greater than 15% slope
- Poor ground drainage
- Massive ground disturbance such as landslides
- Locations where potential archaeological deposits have been removed to sterile sediments (disturbance, e.g., through development)

The results of the background research were used to determine the potential for encountering as yet unknown archaeological materials and/or features in the Project Area.

4.4 Preliminary Field Reconnaissance

A PFR was conducted to further evaluate the archaeological sensitivity of the Project Area and identify areas of archaeological potential. The PFR was guided by local knowledge shared by the DFN, as well as previous research, and focused on portions of the Project that overlapped the proposed Phase 1 ground disturbance (i.e., dredging). Archaeological materials and/or features were visually sought, including: cultural depressions such as plant processing pits; clam gardens, fish traps/weirs, lithic (stone) tools and debitage (flakes from the production and use of stone tools); burial mounds and cairns; trails; remains such as bone and charred plants; rock art; architectural remains such as cabins; culturally modified trees; and other obvious cultural materials or features. A handheld GPS was used to record the location of pedestrian and boat-based survey traverses and photographs of the Project Area were taken.

5.0 RESULTS

5.1 First Nations Communication

Based on information obtained from CAD (MIRR 2023), WSP understands the Project Area is located within the area of interest of the Dzawada'enuxw First Nation (DFN), and who requested the AOA. This AOA did not require a permit and the DFN provided input into and guided the archaeological approach.

Two community consultation meetings were held with representatives from NHC and the DFN to discuss the Project and its potential impacts. The first meeting took place 12 February, 2023, and was a roundtable format that provided the context and motivation for the Project and received community input from DFN regarding concerns about the changing landscape, access to the Inlet, and maintaining the current ecology of the Project Area (Dzawada'enuxw Community Meeting 2023a). The second meeting took place 12 March, 2023, and consisted of members of DFN and representatives from NHC and Pacificus Biological Services Ltd. This meeting emphasised the continue danger and urgency for DFN to have safe and accessible routes to and from their village out into Kingcome Inlet, with the highest dredging priorities being the "Bullpen" and the mouth of the river, as well as trimming hazardous debris from the channel and river (Dzawada'enuxw Community Meeting, 2023b).

5.2 Environmental Background

The physical and biological environment influences many of the activities that contribute to the character of the regional archaeological record. These variables are interconnected and include physical aspects of the land (e.g., topography or river and stream history) and resource availability (e.g., flora and fauna). Linking both are the valuation of landscapes through Indigenous knowledge of seasonality and distribution of animal and plant communities which influences past travel, settlement, and subsistence patterns in the region (Turner and Jones 2000). Accordingly, understanding the environmental setting in the Project Area provides a lens through which to identify potential cultural activities that may have taken place in the Project Area. It is fundamental to gain this perspective on the potential use of the Project Area and its environs by Indigenous groups, and to consider known historical environmental variables to assess archaeological potential.

This AOA reviewed available physical environmental data, which included physiography and surficial geology, biogeoclimatic zones, aquatic setting, previous archaeological research, as well as historical and interdisciplinary report reviews (i.e., geotechnical, hydrogeological and environmental reports). The results are provided in the subsections below and are discussed considering their contribution to the assessment of archaeological potential within the Project Area.

5.2.1 Physical Setting

The Project Area consists of 6 km of the Gwa'yi River from the village of U'Kwanalis to the head of Kingcome Inlet (Figure 1), which provides the area with diverse marine, aquatic, and terrestrial resources. These resources are important for peoples in the area past and present and have also changed and fluctuated through time due to major changes in climate and landscape formation.

Across the Pleistocene (~2,500,000 years ago to ~12,000 years ago), most of the central coast of British Columbia, including the Project Area, was habitually glaciated by icesheets extending across the Georgia Depression from the mainland (Clague 1983, 1989; Jackson and Clague 1991). Local alpine glaciers and caps

produced ice tongues that flowed down and eroded out river valleys and gullies, which were inundated with water to form modern fjords and finger lakes, as seen in the Project Area. Geomorphological effects of glaciation included the deposition of glacial (e.g., tills) and glacio-fluvial (e.g., sands) sediments in many locations. The Cordilleran ice sheet covered the Project Area starting during the Pleistocene from about 30,000 years ago (30 ka) until the onset of the Holocene, 12 – 10 ka (Clague and Ward, 2011).

Palaeoecological studies indicate that from 11 – 10 ka, the regional climate across the Northwest Coast was much cooler than it is today. Subsequently, the climate warmed across the early to mid-Holocene ~10-4 ka, with summer temperatures being likely higher and winter temperatures lower than today's averages. This warming resulted in significant changes in flora and fauna for the region. Gradual cooling and an increase in annual precipitation started between 4-3 ka, with temperatures gradually shifting to those seen in the region today (Heusser et al. 1985; Pellatt and Mathewes 1997).

Quaternary climatic changes coupled with tectonic and gravity effects resulted in substantive sea level variability along the entire coastline of the Northwest Coast during the Holocene (Belanger 2013:110-111). Such processes included variability in sea levels, isostatic depression and rebound in response to ice loading/unloading, migration of isostatic forebulges in response to ice loading/unloading, local and regional tectonic processes, and gravitational influences of ice masses on nearby waterbodies. Coupled with glacial ice melt and sea level rises, these effects resulted in a dynamic coastal environment that would have impacted the Project Area across the past 10 ka, with sea levels rising and falling rapidly to ~ 46 m above and below modern levels along the Northwest Coast, until gradually decreasing from ~4 m above present at ~5.5 ka to modern sea levels (Belanger 2013:108).

5.2.1.1 Bedrock Geology

The bedrock geology of the Project Area is described as MKm, which reflects mid-Cretaceous mafic intrusive diorite and gabbro (Cui et al, 2017).

5.2.1.2 Surficial Geology

The surficial geology of the Project Area is noted by Clague et al. (1982) and consists of Fo along the river and Ra inland from the Kingcome River on either side. Fo is majority fine-grained sand and silt overbank deposits that include organic materials and channel deposits. These sediments are characterized by horizontal and ripple laminations which may have been destroyed by plant rooting activities. Sediments generally occur in upward fining units and may enclose sinuous bodies of channel sands and gravels, but as a minor part of the deposit.

Ra reflects rock with discontinuous colluvium and till – alpine mountains, with major rock landforms consisting of aretes, cirques, glaciated valleys, and various other alpine glacial forms. A discontinuous mantle of colluvial rubble is present on most slopes and aprons and cones of colluvial debris occur at the toes of many slopes. Colluvium and till are generally less than 2 m thick.

5.3 Natural Environment

A review of biogeoclimatic zones can further our understanding of pre-contact and historical use of the Project Area. First Nations peoples and early settlers utilized the natural resources available to them, including select animals, fish, and plant species. Many archaeological, traditional use, and historical heritage sites are the result of activities associated with the use of these natural resources or are situated in locations that would maximize access to particular resources. Fluctuation in climate through time influenced biogeoclimatic zone distribution, site location selection, and the archaeological remains of human behavior.

5.3.1 Biogeoclimatic Zones

The Project Area is in the Coastal Western Hemlock biogeoclimatic zone, Very Wet Maritime Subzone Montane Variant (Pojar et al. 1991). This zone occurs at low to middle elevations west of the coastal mountains and is on average the rainiest zone in the British Columbia. Mean annual temperature is 8°C and most precipitation occurs as rain from October to February.

5.3.2 Plant Resources

Plant resources in the Project Area are characterised by the prominence of western hemlock, the sparse herb layer, and the ubiquity of several moss species (Pojar et al. 1991). Forested areas are characterized by western hemlock, western redcedar, with Douglas-fir, amablis fir (balsam), yellow-cedar, red alder, black cottonwood, and Sitka spruce also being variably present. Pojar et al. (1991) provide further detail on the diversity of shrub, herb, and moss species present in the Project Area.

5.3.3 Faunal Resources

There is a rich faunal diversity present in the Project Area, consisting of birds, terrestrial and marine mammals, amphibians, fish, and gastropods, and which are described further in the environmental impact assessment report prepared by Pacificus (2023). There are several resources of note that are of importance to the DFN community and may be impacted by this Project, specifically migratory birds, such as the provincially blue-listed and Species at Risk Act (SARA)-listed marbled murrelet (Government of Canada 2002). Moreover, the Project Area is located within the Great Bear Rainforest and noted as a critical habitat for the blue-listed and SARA-listed grizzly bear (*Ursus arctos horribilis*) (MOF 2016).

The Project Area is also significant for being located in the spawning grounds of all five species of Pacific anadromous salmon: Chinook, chum, coho, pink, and sockeye, as well as anadromous types of rainbow and cutthroat trout, and Dolly Varden (Pacificus 2023). Perhaps most significant of all is the presence of eulachon, which is significant for the DFN and noted in both the pre- and post-contact history of the Project Area. Eulachon are an oily species of smelt only found on the West Coast of North America and breed in a limited number of glacially fed rivers, including Gwa'yi River. The eulachon population in the Project Area is listed as endangered (Government of Canada 2023).

5.3.4 Aquatic History

The Project Area is a 6 km portion of Gwa'yi River from U'Kwanalis Village to the head of Kingcome Inlet (Figure 1). In this respect, the Project Area encompasses both aquatic and marine resources. The Gwa'yi River results from glaciers further inland and therefore largely seasonal in flow (Pickard 1961). As noted above, the Project Area was strongly influenced by climatic and geomorphic changes resulting from the retreat of the Cordilleran Ice Sheet and the gradual warming in temperature and rise in sea level to present values (Belanger 2013:110-111; Clague and Ward, 2011). This dynamism would have affected the flora and fauna present in the Project Area and influenced settlement and subsistence strategies employed by past peoples in the region.

5.4 Cultural Background

First Nation organizations that have potential interests in the Project Area were identified using the Consultative Areas Database (CAD). WSP collaborated with DFN representatives to conduct the AOA and PFR. A brief overview of ethnographic sources for DFN is provided below. These overviews represent historically documented cultural practices and therefore are described in the past tense; this is not intended to suggest that the described cultural and economic activities are no longer practiced.

5.4.1 Ethnographic Background - Dzawada'enuxw First Nation (DFN)

The DFN refer to themselves as both the Dzawada'enuxw and the Musgamagw Dzawada'enuxw, and their name translates to "People-of-the-Eulachon-Country", emphasising the history of connection to and importance of eulachon to the community. Musgamagw Dzawada'enuxw is identified by the Government of Canada as consisting of four tribes in the lower central region of the Pacific Northwest Coast, the Dzawada'enuxw, Gwawa'enuxw; kwikwasut'inuxw; and, Haxwa'mis, however, they see themselves as One People and have a long history of interconnection, intermarriage, co-habitation, co-operation, and shared resource (Dzawada'enuxw First Nation 2022a). The importance of the landscape and the DFN's connection with other groups and nations is demonstrated in their Origin Story, which is shared on the DFN's website (Dzawada'enuxw First Nation 2022b).

The DFN are members of the Kwakwaka'wakw group of First Nations and related through social connections, culture, and language to the other Kwakwaka'wakw nations. Kwakwaka'wakw practice a bilineal system of kinship, which is used to organise access and rights to different resources across the landscape. Subsistence and settlement strategies were organised and adapted to the seasons. Winter months reflect larger multi-family settlements that made use of the resources procured during the warmer parts of the year, such as smoked fish, as well as the resources available in the local environment. Summer months reflect less sedentary settlement patterns with smaller groups dispersing across the landscape to make use of resource abundances. Potlatches and communal feasting are important practices Kwakwaka'wakw peoples, as are strong and enduring artistic traditions, and the significance of copper (Thompson and Doonan, 2019). Hunting, fishing, including the use of fish traps, and the collection of plants and trees for food and resources were all scheduled following the seasons, and strategies were flexible and respectful of the flora and fauna, as they are considered relations to the DFN.

Fish and shellfish are important resource, and especially considering the number of fish species that spawn in the Project Area. Of note are the eulachon, a resource of pre- and post-contact importance for the DFN and other nations along the Pacific Northwest Coast. The eulachon, also known as "candle fish" may consist of up to 15% fat during spawning season, making them crucial as both a food and as a grease/oil resource. Eulachon grease was an item of significance for trade between groups and Nations, and especially with inland communities. The

routes the traders took across the landscape became known as grease trails, referring to the volume of eulachon grease and oil that was being traded and which was spilled on these paths (Kuhnlein et al. 1982; Hobler 1990; Stewart 1977; Kuhnlein et al. 1996; Kuhnlein and Chan 1998). Eulachon are a species at risk and conservation efforts are becoming increasingly community-driven, which acknowledges the long-term role in the management and conservation of eulachon that Indigenous peoples, including the DFN, have played (Beveridge et al. 2020).

Floral resources include the diverse tree species located in the Project Area, as well as a variety of plants. Trees, such as the species noted above, were used for the construction of houses and boats, clothing, and for carving and artistic expressions and decorations. Plant species were also important resources and the DFN have a long history of cultivating gardens, and specifically complex and terraced estuarine root gardens (Cruz et al. 2018; Deur et al. 2005; Deur et al. 2013).

The DFN has a long artistic tradition, which manifests as rock art, petroglyphs, and portable art, such as symbolic extensions of clothing, ornaments, and jewellery. This artistic tradition is perhaps best known outside of DFN through the installations of Marianne Nicholson, and as discussed by Williams (2003).

5.4.2 Traditional Land Use and Place Names

Place names and their locations are important as they can demonstrate First Nations use and, in some cases, provide an indication of the range of activities that may have taken place in general or specific locations. Similarly named places indicate that these names do not necessarily refer to fixed geographical locations, but instead refer to general areas or activities. Variations in the spelling of place names may be the product of different orthography standards or dialects. A limited review of published ethnographic research was undertaken to identify First Nation place names and land use areas. Apart from Gwa'yi (Kingcome Village), no documented First Nations place names are located within the Project Area.

5.4.3 Travel Routes

Travel routes, also described as trail networks, were integral to First Nation's subsistence, settlement, and exchange systems. Some trails linked village sites with resource collection localities, summer camps, and special purpose sites. Others supported important exchange networks with neighboring families or groups. Knowledge held by present-day communities helps to identify these landscape features.

As with other Kwakwaka'wakw Nations, the DFN utilised rivers, inlets, channels, and the ocean to travel across landscapes and visit with relations. With respect to this Project, the Project Area encompasses the main travel route from the current village location to the ocean along the Gwa'yi River, making it incredibly important for the DFN in terms of practising their lifeways and having autonomy and mobility within the region.

5.5 Archaeological Setting

The Project Area and surrounding central Pacific Northwest Coast region have been occupied at least since the climatic amelioration associated with Pleistocene-Holocene transition and the retreat of the Cordilleran Ice Sheet 12 – 10 ka (Clague and Ward, 2011). There is a rich and dynamic culture history for this region, reflected in the diverse and technologies, practices, and artistic expressions demonstrated in the region's record of material culture and oral histories (Matson 1992).

5.5.1 Previous Archaeological Studies

Previous archaeological research in this region is extensive but not necessarily well published.

An archaeological impact assessment (AIA; HCA permit 2017-0232) was conducted in 2017 by Sources Archaeological Heritage Research Inc. due to forestry road upgrades and the maintenance of gravel quarries by Interfor Forest Products (Sources Archaeological and Heritage Consultants n.d). A portion of the previous AIA study area overlaps with the western component of the current Project Area. The Sources AIA focused on survey and archaeological monitoring during development activities. The AIA identified one culturally modified tree (CMT) on the shoreline adjacent the river mouth and near the mouth of the Bullpen. The CMT was recorded as archaeological site EfSn-23 (discussed further below).

Two other AIAs were conducted in the Project Area, one in 2017 (HCA permit 2017-0294) in support of the proposed Padakus Hydropower Project and the other in 2011 (HCA permit 2011-0208) as part of the International Forest Products Limited's proposed forestry operations (MOF 2023a). However, neither of these AIAs have reports are currently available through the British Columbia's Provincial Archaeological Report Library (MOF 2023b), which limits our ability to access their information.

The Project Area was visited under HCA permit 1968-15, although the site recorded under this permit (EfSn-9) is not mentioned in the report. The Project Area has also been visited by researchers who have documented rock art and DFN culture, such as Doris Lundy (1974) and Francis Barrow in the 1930s.

The Central Coast Land Resource Management Plan report provides an AOA undertaken in 1999 on behalf of the MOF. This report details the cultural heritage resources in the area and developed a series of predictive models to inform and assess the need for impact assessments and PRFs in the study region (Golder Associates, 1999). The model identifies areas of potential along the mouth of the Gwa'yi River and up the river to U'Kwanalis.

The Musgamagw Dzawada'enuxw Tribal Council (MDTC) coordinated a multiple year research program from 2015 to 2017 to document intertidal features including fish traps across MDTC (Cullon et al. 2015; Cullon et al. 2016). Survey was conducted across 18 beaches, including Gwa'yi River, and recorded 68 features, which consisted of wooden stake fish trap features, clam gardens, cultural shell midden deposits, and stone trap fishing features. The success of this survey further emphasises the importance of these complex technologies for procuring fish and shellfish, something that is noted more broadly across the Northwest Coast from at least 4590 BP (Moss and Erlandson 1998). The survey included three sites within the Kingcome Inlet Region, Gwa'yi River, Holden Creek, and Belle Island Sound. Results for the Gwa'yi River survey reflect the challenging estuary and river conditions, which have been exacerbated over time with increased sedimentation and erosion, which limited the survey's scope. While no fish traps or intertidal features were recorded, the reports note the importance and productivity of the fish runs at Gwa'yi River and comments on the potential for fish traps and other related features.

In 2017, and as part of the multi-year research program MDTC commissioned an archaeological overview assessment that focused on their traditional territory (Pratt and Cullon 2018). This study used a map-based predictive model and ethnographic data to inform archaeological potential across the approximately 530,000 ha of lands within the MDTC traditional territory. Importantly, this modelling included parameters for CMTs as well as estimated heritage trails that would have facilitated the movements of peoples and resources across the area. The modelling identifies the entire Project Area as high potential for archaeological materials and also identifies the importance of the Gwa'yi River as a potential trail route connecting the interior to the ocean.

5.5.2 Registered Archaeological Sites

EfSn-08

Archaeological site EfSn-08 consists of three groups of red and black pigment pictographs at Petley Point and is only accessible by boat. The pictographs include representations of two historic ships, one possibly being named the Sutsuma, one of the ships being associated with the dates 1921 and 1927. Eight painted coppers painted prior to 1933 and one larger copper painted in 2001 are also present. This site is associated with the 8.5 m by 11.5 m pictography painted by DFN artist Marianne Nicholson.

EfSn-09

Archaeological site EfSn-09 is located approximately 400 m west of Petley Point and consists of pictographs depicting one whole and one half copper. The site is likely related to EfSn-08 and contains both red and black pigments.

EfSn-10

Archaeological site EfSn-10 is located at the head of the inlet and consists of two petroglyphs. The site itself is also associated with the previous location of U'Kwanalis. Both petroglyphs were present in the village prior to contact with European settlers, however, both have subsequently been removed, one long ago and the other within the last few years. The one present until recently was described as a perfectly round rock, approximately 30 cm in diameter, with a face pecked on the surface. This petroglyph lived in an unoccupied long house at the former village site until its disappearance.

EfSn-23

Archaeological site EfSn-23 consists of one CMT identified during an AIA conducted in 2017 by Sources Archaeological and Heritage Consultants (n.d.). The site is on the western side of the mouth of Kingcome Inlet. The CMT was determined to be pre-contact based on toolmarks, tree stand age class 9 (>251 years) and the large tree diameters in the forest stand. Historically, this area is noted as being hand-logged by the DFN (Sources Archaeological and Heritage Consultants n.d.).

5.6 Historical Background

Understanding the historical setting of the region in which the Project is being undertaken provides further insight into the potential impacts the Project may have on the region, as well as a better understanding of the heritage and current cultural contexts for the Project Area. The description of the Project Area's historical setting focuses on available historical research and a discussion of known historical sites.

5.6.1 Previous Historical Research

The Project Area is in an area that has a deep time history and connection with the DFN, as described in sections 5.4 and 5.5 of this report. This history is described in the oral history described above and emphasise the connection the DFN has with the landscape.

The post-contact history involves the colonisation of the region by European settlers, with the earliest contact possibly in 1778 with Captain James Cook sailing the coast initially and subsequently with the mapping of the Inside Passage by George Vancouver in 1792 (Williams 2003:32). Missionaries were present in the broader region from as early as the 1890s with the Church Missionary Society, and with the Columbia Coast Mission from the late 1920's (Dzawada'enuxw First Nation 2022c). The novel "I Heard the Owl Call My Name" by Margaret Craven describes a fictional account of an Anglican priest sent to Kingcome to work with the DFN.

The natural resources in the region attracted several industries, specifically fish harvesting and logging. Kingcome Inlet was home to a salmon cannery from 1914 to 1924 until it burned down. Commercial logging and silviculture have also had a long history in the region based on the natural forest in the region, which has resulted in logging roads and development of the mouth of the inlet for transportation of the timber (Dzawada'enuxw First Nation 2022c).

5.6.2 Known Historical Sites

A search of the Canadian Register of Historic Places and the Directory of Federal Heritage Designations identified no heritage structures overlapping or in the vicinity of the Project Area.

The major known historical site is the old village of Kingcome, which is described in the site report for EfSn-10. This area represents the previous village for the DFN and is of historical and cultural importance. Moreover, this area constitutes the location of the petroglyphs described above.

The rock art at and near Petley Point (EfSn-08 and EfSn-09) are also known historic sites, with panels being painted recently, in the 1900s, and prior to contact.

The Project Area has been heavily affected by logging activities from the late 1800s and early 1900s onward. This activity resulted in the harvesting of forests and the development of infrastructure to facilitate the extraction of these resources and is documented to some extent in the Museum at Campbell River with photographs from the Powell River Co.'s operations at Kingcome Inlet (Campbell River Museum and Archives, n.d.). With respect to the Project Area, these activities and particularly the development of logging camps and infrastructure to support the movement of timber from the forest to the mouth of Kingcome Inlet likely resulted in the development of what is now known as the Bullpen, where timber could be moved from the shoreline to ships and transported to mills for processing. This area would have also been developed for logging roads and for rail transit of timber, with blasting and blast rock visible from the shoreline today.

5.7 Preliminary Field Reconnaissance

A PFR focusing on the proposed Phase 1 sediment management plan location within the Project Area was undertaken on 8 June, 2023 by WSP Principal Archaeologist Heather Pratt. Pratt was accompanied by Midori Nicholson from DFN for the boat-based inspection of the shoreline and mouth of the river and Bullpen (Figure 2). The PFR focused on Phase 1 of the Project, as this Phase is the most urgent.

Photographs of the Project Area taken during the PFR can be found in Appendix 1. Field observations including terrain and archaeological potential for the Project Area are noted below.

5.7.1 Surface Inspection

The PFR was limited to a boat-based survey. Factors including shallow water impeded landing along with the instability of exposed intertidal terrain, and the significant presence of riprap limited landing on dryland and conducting a pedestrian survey.

5.7.1.1 Observed Terrain

The shoreline terrain is somewhat unstable with substantive sedimentation occurring in the area, and especially in the Bullpen since the previous MDTC Fish Trap survey conducted in 2015 (Cullon et al. 2015). This increase in sedimentation and general instability is linked to and largely resultant of the Atmospheric River Event in 2021 and is the overarching motivation for the Project.

5.7.1.2 Observed Hydrology

The Gwa'yi river was substantively effected by the 2021 Atmospheric River Event. These effects include increased sedimentation in the Inlet and the increased presence of snags and stumps in the river itself. Apart from these effects, the hydrology is consistent with previous studies in the region.

5.7.1.3 Observed Disturbance

No disturbances to known archaeological sites were observed. Observed areas of archaeological potential, especially along the coast and intertidal areas may have been disturbed by the increased sedimentation.

6.0 ARCHAEOLOGICAL POTENTIAL ASSESSMENT

In practice, "archaeological potential" refers to those locations that have a greater likelihood for archaeological materials or features to be present and detectable using standard investigative techniques such as surface inspection, manual subsurface testing, and/or mechanical backhoe test pits. Such determinations of potential are based on an analysis of known site locations, cultural practices, and those biophysical characteristics (e.g., aquatic features, slope, forest cover, aspect) that typically correlate with archaeological site locations.

The assessment of "low" potential does not mean "no" potential for the presence of archaeological sites. Areas having low potential still retain archaeological potential as human behaviour can be variable and unpredictable, forming sites in unexpected locations. Archaeological site types in low potential areas can include, but are not limited to, brief occupational camps, isolated finds, expedient resource processing sites, and low density artifact scatters.

The results of the desktop research and PFR together indicate that Phase 1 of the Project Area demonstrates archaeological potential due to its location at the mouth of Gwa'yi River. However, the noted levels of historic disturbance (including ongoing erosion) have decreased the potential for the preservation and recovery of archaeological materials and features. Moreover, the PFR did not identify any new archaeological or cultural materials and features and further reinforced observations of the highly disturbed nature of the intertidal and shoreline areas within Phase 1 of the Project (Figure 2).

Archaeological potential outside of the direct Project Area should also be considered if these areas are utilised for the construction or refurbishment of infrastructure, such as roads, to facilitate the Project. The recorded presence of CMTs in this region reflects the potential that the development of such infrastructure may have an archaeological impact. However, and as noted above, this area has been heavily utilized for historic logging and silviculture, which may disturb any potential archaeological features and lower the potential for preserved cultural materials in this area.

The PFR focused on the area within Phase 1 of the Project, and therefore further work may be needed when considering Phase 2 of the Project.

7.0 RECOMMENDATIONS

Based on the AOA results, Phase 1 of the Project is considered to have low potential for the disturbance of as yet unknown archaeological sites within the Project Area. In this respect, WSP recommends that Phase 1 of the Project proceed and that it does not require further archaeological assessment, however a Chance Find Management Plan should be implemented and provided to the construction crew. If the Phase 1 Project Area footprint is altered to include areas not previously assessed in the AOA, further archaeological work may be warranted.

WSP further recommends that a PFR be undertaken prior to the commencement of Phase 2 of the Project. This PFR will assess the area between U'Kwanalis and the mouth of the Gwa'yi River and is warranted on the basis of areas of high archaeological potential identified through previous archaeological modelling. A second PFR focusing on Phase 2 will also provide an opportunity to identify any cultural materials or features that may be exposed during winter weather events.

8.0 CLOSURE

This report was prepared for the exclusive use of NHC. Any use, reliance, or decisions made by third parties on the basis of this report are the responsibility of such third parties.

This report does not represent consultation for the purpose of defining or limiting Aboriginal title and rights. The results and recommendations presented in this report do not derogate from or abrogate Aboriginal title and rights.

We trust this report provides you with the information you require at this time. Should you have any questions regarding the contents of this report, or require any further information, please do not hesitate to contact the undersigned.

WSP Canada Inc.





Ben Collins, PhD
Archaeologist

Heather Pratt, MA, RPCA
Principal Archaeologist

BC/HP/lih

https://wsponlinecan.sharepoint.com/sites/ca-ca00043432422/shared documents/06. deliverables/3.0_issued/ca0004343.2422-001-r-rev0/ca0004343.2422-001-r-rev0-ca kingcome river aoa 08jul_24.docx

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APPENDIX A

Select Photographs



Photo 1: Mouth of the Kingcome River with the Bullpen along the shoreline. Note the low water level. Image taken by Heather Pratt



Photo 2: Western shoreline at the mouth the Kingcome River. Note the riprap along the shoreline and the low water level. Image taken by Heather Pratt



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APPENDIX F

PERMITTING DOCUMENTATION

Fisheries and Oceans Canada
Pêches et Océans Canada

Pacific Region
Ecosystem Management Branch
3190 Hammond Bay Road
Nanaimo, BC
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Région du Pacifique
Direction de la gestion des écosystèmes
3190, rue Hammond Bay
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V9T 6N7

November 2, 2023

Our file *Notre référence*
23-HPAC-00804

BC Ministry of Environment & Climate Change Strategy
ATTENTION: Amy Vallarino, Sr. Project Manager
Flood Debris Management Secretariat
Environmental Emergencies and Land Remediation
Victoria, BC

Via email: Amy.Vallarino@gov.bc.ca

Dear Amy Vallarino,

Subject: Dredging, Kingcome River, U'kwa Nalis Village – Implementation of Measures to Avoid and Mitigate the Potential for Prohibited Effects to Fish and Fish Habitat

The Fish and Fish Habitat Protection Program (the Program) of Fisheries and Oceans Canada (DFO) received your proposal on August 30, 2023. We understand that dredging and large woody debris trimming is proposed within the Kingcome River to provide safe access to the U'kwa Nalis Village. The proposed project is expected to require the following:

- Dredging approximately 35,000 m^2 of sediment from the Kingcome River with disposal of sediment at a nearby Disposal at Sea site under permit from Environment and Climate Change Canada; and
- Selectively trimming large woody debris that is hazardous for navigation within a 6 km reach of the lower Kingcome River, downstream of the U'kwa Nalis Village.

Our review considered the following information:

- *Request for Review* prepared by Northwest Hydraulic Consultants Ltd. (NHC), submitted by email on August 30, 2023;
- *Proposed Dredging and Hazardous LWD Trimming in the Gwa'yi (Kingcome) River and Estuary Environmental Assessment Report*, prepared by Pacificus Biological Services Ltd., dated August 28, 2023;
- Drone footage and aerial site photos submitted by NHC by email on September 22, 2023; and
- Letter *Re: Sediment Characterization Report for the Disposal at Sea Permit Application for Proposed Dredging Activities in Kingcome Inlet*, prepared by Pacificus Biological Services Ltd., dated October 23, 2023.

Your proposal has been reviewed to determine whether it is likely to result in:

- the death of fish by means other than fishing and the harmful alteration, disruption or destruction of fish habitat which are prohibited under subsections 34.4(1) and 35(1) of the *Fisheries Act*;
- effects to listed aquatic species at risk, any part of their critical habitat or the residences of their individuals in a manner which is prohibited under sections 32, 33 and subsection 58(1) of the *Species at Risk Act*; and
- the introduction of aquatic species into regions or bodies of water frequented by fish where they are not indigenous, which is prohibited under section 10 of the *Aquatic Invasive Species Regulations*.

The aforementioned outcomes are prohibited unless authorized under their respective legislation and regulations.

We understand the following aquatic species listed under the *Species at Risk Act* may use the area in the vicinity of where your proposal is to be located:

- Leatherback Sea Turtle (Pacific Population), listed as Endangered;
- Killer Whale (Northeast Pacific Transient population), listed as Threatened; and
- Yelloweye Rockfish (Pacific Ocean Inside Waters population), Harbour Porpoise (Pacific Ocean population), Humpback Whale (North Pacific population), and Stellar Sea Lion, all listed as Special Concern.

In addition, the following aquatic species are subject to the *Aquatic Invasive Species Regulations* and may be found in the vicinity of your proposed work, undertaking, or activity:

- European Green Crab

To avoid and mitigate the potential for prohibited effects to fish and fish habitat (as listed above), we recommend implementing the measures listed below:

- Conduct environmental monitoring, including water quality monitoring, during all project activities that may result in potential negative effects to fish and fish habitat.
- Complete project works within the least risk timing window for Area 12 – Alert Bay (Winter work window: November 15 – February 15).
- Limit the duration of in-water works, undertakings and activities so that it does not diminish the ability of fish to carry out one or more of their life processes (spawning, rearing, feeding, migrating)
- Woody debris removal will be limited to trimming non-functional large woody debris pieces that are hazardous to navigation. The embedded portions of trimmed large woody debris pieces will remain in place in the river bed.
- Implement the applicable measures from DFO's *Code of practice: Routine maintenance dredging for navigation* (https://www.dfo-mpo.gc.ca/pnw-ppe/codes/dredge-dragage-eng.html).
- Clearly delineate the perimeter of the dredge area prior to dredging activities to ensure the work is restricted the planned dredge footprint.

- Ensure vessels are not operating in shallow water causing direct physical disturbance to the seabed/habitat from prop scour.
- Water-based equipment is not to ground upon the seabed except for the use of anchors or spuds needed to keep the equipment in place.
- Minimize movements/repositioning of barges and subsequent spudding and anchoring to minimize direct, physical disturbance to the seabed outside of the dredge footprint.
- Develop and implement a sediment control plan to avoid the introduction and minimize resuspension of sediment into any waterbody during all phases of the work, undertaking or activity.
- Dredged material should be stored on a barge and stabilized to prevent sediment re-entry to the waterbody. Dredged material is to be disposed of at the designated Disposal At Sea site under permit from Environment and Climate Change Canada.
- Deploy a silt curtain around the barge during material disposal to limit migration of excess sediment into Kingcome Inlet.
- Regularly inspect and maintain sediment control measures/structures for effectiveness and keep additional sediment control materials (i.e., sediment curtains) readily available on site in sufficient quantities for local conditions.
- Develop and implement a response plan to avoid a spill of deleterious substances into the marine environment.
- Maintain all machinery on site in a clean condition and free of fluid leaks.
- Inspect the project areas for the presence of European green crab prior to starting work. Immediately report any aquatic invasive species (AIS) to DFO: AISPACIFIC@dfo-mpo.gc.ca. If no AIS are detected, take the following precautionary measures to avoid the introduction and/or transportation of AIS into other waters by:
    - Clean – Inspect and clean plants, animals, mud and sediment from all equipment used below the HWM.
    - Drain all water from equipment used below the HWM.
    - Dry all parts of equipment completely before leaving the site.
    - All organic matter and wash water generated during cleaning must be disposed of on land.

Provided that you incorporate these measures into your plans, the Program is of the view that your proposal is not likely to result in the contravention of the above mentioned prohibitions and requirements.

Should your plans change or if you have omitted some information in your proposal, further review by the Program may be required. Consult our website (http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html) or consult with a qualified environmental consultant to determine if further review may be necessary. It remains your responsibility to remain in compliance with the *Fisheries Act*, the *Species at Risk Act* and the *Aquatic Invasive Species Regulations.*

It is also your Duty to Notify DFO if you have caused, or are about to cause, the death of fish by means other than fishing and/or the harmful alteration, disruption or destruction of fish habitat. Such notifications should be directed to the DFO-Pacific Observe, Record and Report phone line at 1-800-465-4336 or by email at DFO.ORR-ONS.MPO@dfo-mpo.gc.ca.

Please notify the Program by email at Michelle.Spani@dfo-mpo.gc.ca at least 10 days before starting your project, ensuring your file number and appropriate on-site contact information is included. We recommend that a copy of this letter be kept on site while the work is in progress. It remains your responsibility to meet all other federal, provincial and municipal requirements that apply to your proposal.

Please note that the advice provided in this letter will remain valid for a period of one year from the date of issuance. If you plan to execute your proposal after the expiry of this letter, we recommend that you contact the Program to ensure that the advice remains up-to-date and accurate. Furthermore, the validity of the advice is also subject to there being no change in the relevant aquatic environment, including any legal protection orders or designations, during the one year period.

If you have any questions with the content of this letter, please contact Michelle Spani at our Nanaimo office at 778-268-3859 or by email. Please refer to the file number referenced above when corresponding with the Program.

Yours sincerely,

Andrew MacInnis
Senior Biologist
Fish and Fish Habitat Protection Program

c.c.: Dawn Nicolson, Dzawada̲’enu̲x̲w First Nation, dfn.administrator@kingcome.ca
Des Goold, Northwest Hydraulic Consultants Ltd., DGoold@nhcweb.com
Doug McCorquodale, Pacificus Biological Services, doug@pacificus.ca
Alex Heckels, Pacificus Biological Services, aheckels@pacificus.ca

MATERIAL MANAGEMENT PLAN

Disposal at Sea Permit
PYR-00419-1

Submitted by:

British Columbia Ministry of Environment and Climate Change Strategy
Environmental Emergencies & Land Remediation
PO Box 9342 Stn Prov Govt
Victoria, BC V8W 9M1

Submitted to:

Environment and Climate Change Canada
Marine Programs
101 – 401 Burrard St.
Vancouver, BC V6C 3R2

October, 2023

INTRODUCTION:

This plan fulfills the requirements of Disposal at Sea Permit PYR-00419-1 issued by the Minister of the Environment under the provisions of the *Canadian Environmental Protection Act, 1999*, authorizing the loading, transport and disposal at sea of dredged material. This plan is submitted to Environment and Climate Change Canada (ECCC) prior to the start of the disposal at sea permit.

Project Contact information:

- Amy Valarino, British Columbia Ministry of Environment and Climate Change Strategy, 778-943-6904, Amy.Vallarino@gov.bc.ca
- Des Goold, Northwest Hydraulic Consultants, 604-980-6011, dgoold@nhcweb.com

Load site Description:

- Load site: Gwa'yi (Kingcome) River and Inlet

Figure 1. Load Site Boundary

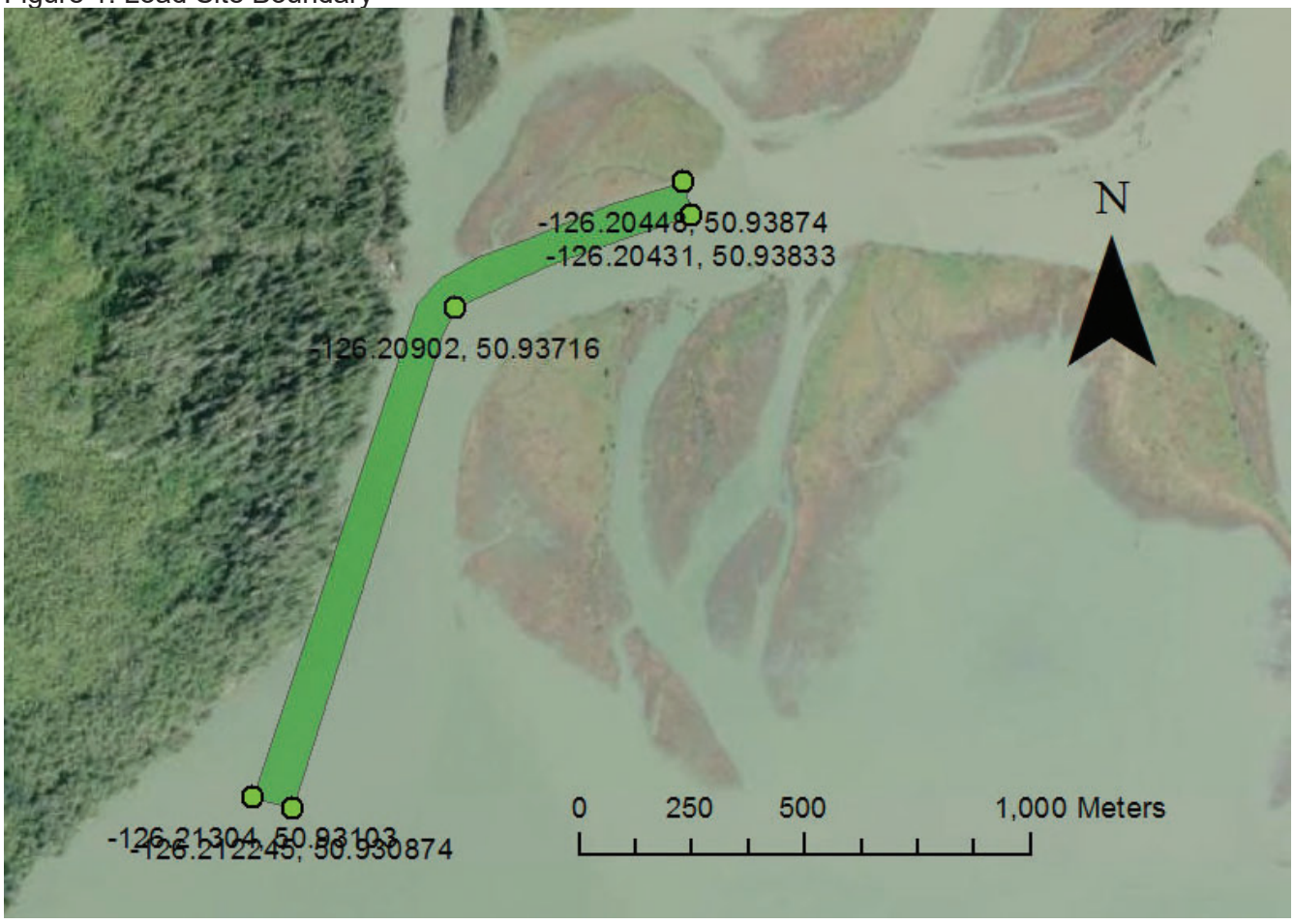


Figure 2. Disposal Site Boundary

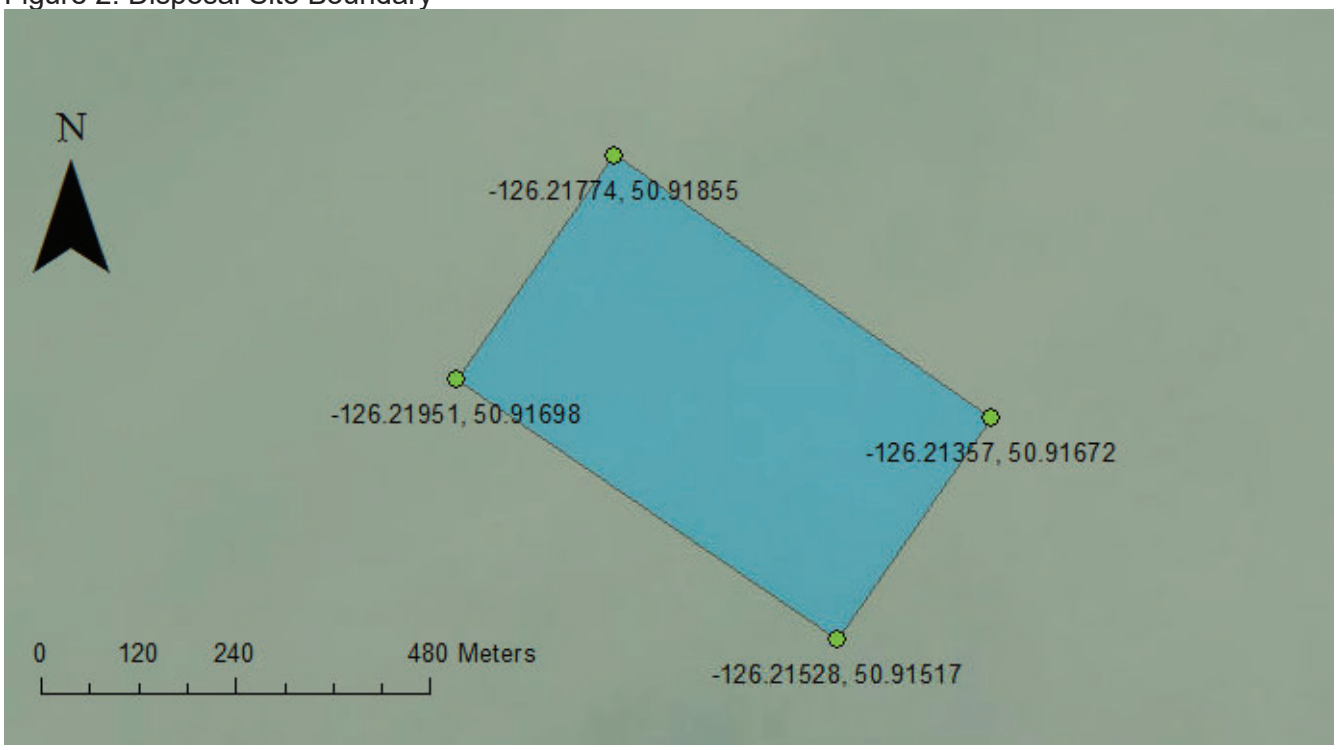
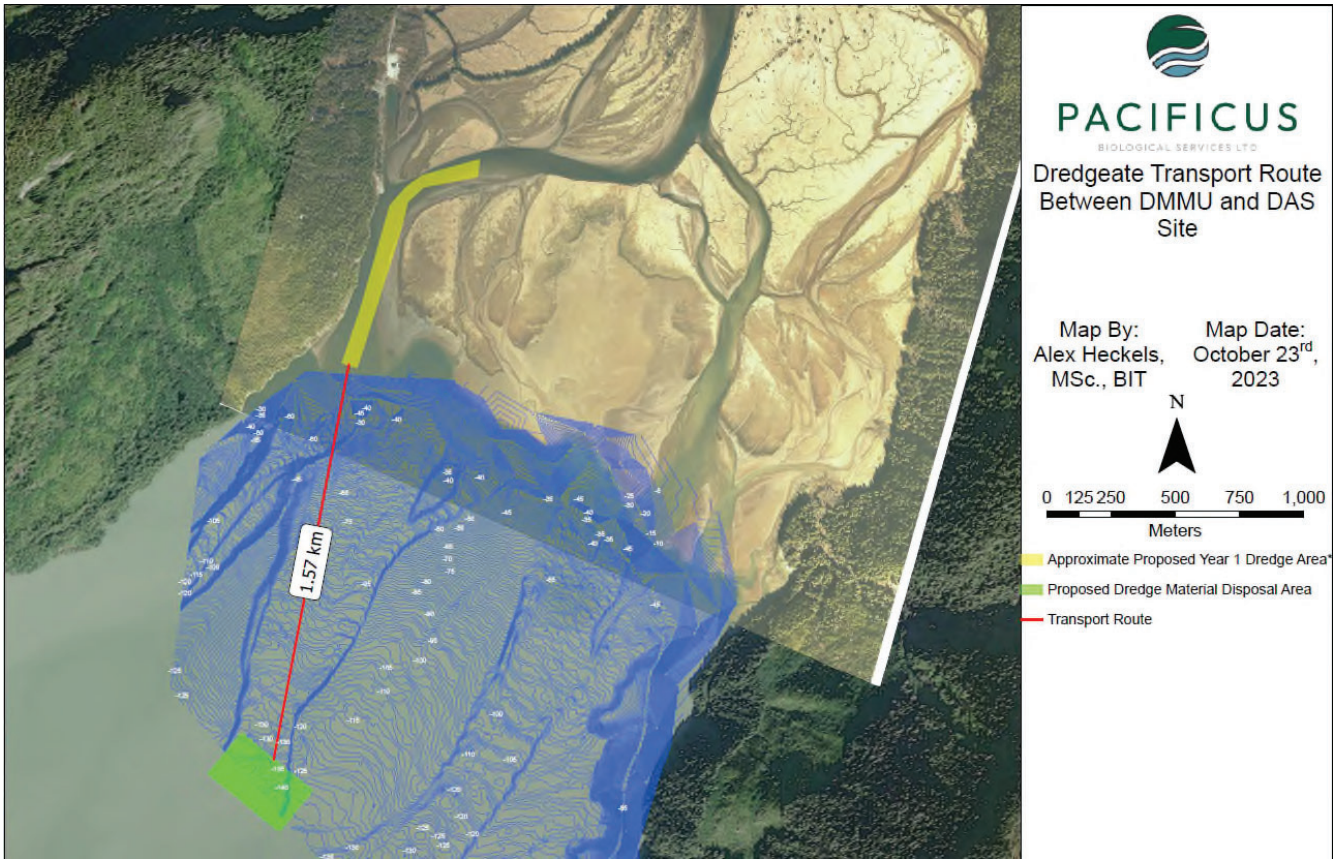


Figure 3. Route to Disposal Site



PROCEDURES:

Loading, transport, and disposal will be carried out using equipment as specified in the permit. The process to estimate or measure the quantity of material will be place measure. Material will not be stockpiled or be stored temporarily on land at any point. All equipment involved in the transportation and/or disposal at sea will be equipped with a differential global positioning system to record latitude and longitude information. 48 hours notice will be submitted to ECCC as specified in permit PYR-00419-1.

INFORMATION REQUIREMENTS:

For each voyage to the disposal site, the following information will be collected and recorded in the disposal tracking spreadsheet (see Appendix 1):

1. Permit_number
2. Disposal_number (e.g., *1, 2, 3;* OR *1-Start, 1-Finish, 2-Start, 2-Finish* for end dumping)
3. Load_site_name (where the material was dredged/excavated)
4. Date_of_disposal (yyyymmdd)
5. Time_of_disposal (e.g., *0430*) (time of disposal at disposal site, start and end times required for end dumping)
6. Latitude_of_disposal_DD (decimal degrees with 5 decimal places in NAD83 datum)
7. Longitude_of_disposal_DD (decimal degrees with 5 decimal places in NAD83 datum)
8. Quantity_m3
9. Comments
10. Disposal_Site (where the material was disposed)
11. Woodwaste_percent
12. Tug_name
13. AIS_ID (Automatic Identification Systems ID– automatic tracking system used by vessel traffic services)
14. Material (e.g., dredged material, or inert inorganic geological matter)

Completed Appendix 1 - disposal tracking spreadsheet will be submitted to ECCC as specified in permit PYR-00419-1.

ENVIRONMENTAL MITIGATION MEASURES:

- The Project is to be carried out in compliance with all applicable legislation including the *Species at Risk Act*, the *Fisheries Act* and *Marine Mammal Regulations,* and the *Canadian Environmental Protection Act, 1999* and *Disposal at Sea Regulations*.

- Vessel operators will be appropriately trained, qualified, and familiar with the operational area.

- Vessels must be appropriately marked in accordance with the *Collision Regulations* administered by Transport Canada.

- All equipment should be clean / free of excess grease and oils and in good operating condition to minimize any overflow or spillage from the barges. Biodegradable hydraulic fluids and oils should be used where feasible.

- Scheduling of activities will take into account tides and currents and undertaken only in suitable weather conditions.

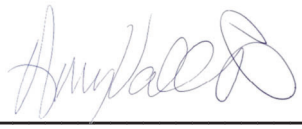
- Every reasonable effort will be made to minimize any overflow or spillage from barges.
- Direct or indirect releases of water containing elevated suspended solids or elevated turbidity will be minimized.
- The most direct navigational route from the load site to the disposal site will be taken.
- The material to be disposed will have the appropriate physical characteristics for disposal and the contaminant levels will meet the criteria stipulated in the *Disposal at Sea Regulations* of the *Canadian Environmental Protection Act, 1999.*
- All disposal activity must occur within the specified disposal site boundaries.
- Every reasonable effort will be made to minimize disposal time.
- Daily checks for spills and leaks must be conducted before starting works. Secondary containment must be available for spills.
- Indigenous monitors will be present if the site is located near a culturally important site.
- An archeology assessment should be conducted for each site (Archaeology Overview Assessment or Archaeology Impact Assessment depending on location). For sites with low risk, a chance find management procedure should be available at the site and all personnel should be trained in following it.
- Dredging operators will:
    - be properly trained and operate equipment based on industry best practices that will minimize the re-suspension of sediments in the water column.
    - ensure vessels are not grounded or generate unnecessary propwash, except in an absolute emergency situation where no other alternative is available and human life is endangered.
    - ensure the bucket is raised slowly through the water column and completely emptied into the scow before redeployment over the water.
    - only use single-grabs (i.e. per cycle) into the sediments to reduce sediment resuspension caused by impact waves from the clamshell bucket hitting the river-bed / sea floor. Implement a soft start immediately prior to commencing dredging activities by slowly lowering the closed clamshell bucket onto the riverbed / sea floor and opening and closing the bucket at least once.
- Equipment and machinery will be located and secured in such a way as to prevent grounding onto intertidal marshes, the foreshore, or the riverbed.
- Anchors and spuds should avoid sensitive aquatic habitats.
- Dredging time will be minimized to the extent possible and appropriate techniques will be utilized to keep sediment within the immediate work area.

- The percent volume of wood waste in the dredge material will be visually estimated at the time of dredging and recorded in the Disposal Tracking Spreadsheet.

- Silt curtains should be available on site and used if deemed feasible by the environmental monitor.

COMMITMENT TO MATERIAL MANAGEMENT PLAN:

British Columbia Ministry of Environment and Climate Change Strategy will carry out project activities authorized by the permit in accordance with all the procedures and mitigation measures stipulated in this Material Management Plan.



Signature of permit holder

2023-10-30

Date

Department of the Environment
Canadian Environmental Protection Act, 1999

Notice is hereby given that the Minister of the Environment, pursuant to section 127 of the *Canadian Environmental Protection Act, 1999* (CEPA), is issuing disposal at sea permit no. PYR-00419-1, authorizing the loading for disposal and the disposal of waste or other matter at sea. The permit is published in the Canadian Environmental Protection Act Registry on Tuesday, November 7, 2023. All documents referenced in this permit are available upon request by email at immersionpy-disposalatseapyr@ec.gc.ca.

1. Permittee: British Columbia Ministry of Environment and Climate Change Strategy, Victoria, British Columbia.

2. Waste or other matter to be disposed of: dredged material.

2.1. Nature of waste or other matter: dredged material consisting of rock, gravel, sand, silt, and clay.

3. Duration of permit: The permit is valid from November 15, 2023, to February 15, 2024.

4. Reference document: Material Management Plan (October 2023), as submitted in support of the permit application.

5. Loading site: Gwa'yi (Kingcome) River, British Columbia at approximately 50.93457° N, 126.21077° W North American Datum of 1983 (NAD83), as described in the Material Management Plan referenced in paragraph 4.

6. Disposal site: Kingcome Inlet disposal site, bound by 50.91698° N, 126.21951° W; 50.91517° N, 126.21528° W; 50.91672° N, 126.21357° W; 50.91855° N, 126.21774° W (NAD83), as described in the Material Management Plan referenced in paragraph 4.

7. Method of loading: Loading will be carried out using a barge-mounted mechanical dredge, a clamshell dredge, and/or a crane equipped with a clamshell dredge.

8. Route to disposal site and method of transport: most direct navigational route from the loading site to the disposal site via hopper scow/barge and/or flat scow/barge.

9. Method of disposal: Disposal will be carried out by bottom dumping, end dumping, and/or or hopper dredge.

10. Total quantity to be disposed of: not to exceed 71 000 cubic metres, place measure.

10.1. The procedures to measure or estimate quantities of dredged material disposed of at the disposal site are as stipulated in the Material Management Plan identified in paragraph 4.

11. Fees: The fee prescribed by the *Disposal at Sea Permit Fee Regulations* must be paid by the permittee in accordance with those regulations as modified according to the provisions of the *Service Fees Act*. The applicable fee rates for April 1, 2023, are in effect for the duration of this permit.

12. Inspection and records:

12.1. Pursuant to Part 10 of CEPA, the permittee and its contractors are subject to inspection by enforcement officers designated under CEPA.

12.2. The permittee must keep records of all loading and disposal activities aboard any ship involved with the disposal operations. The records must be accessible to enforcement officers designated under CEPA.

12.3. At all times, a paper or digital copy of this permit and of the document referenced in paragraph 4 must be available at the loading site and on all powered ships directly engaged in the loading and disposal operations. The document must be accessible to enforcement officers designated under CEPA for the duration of this permit.

12.4. The permittee must retain records of all loading and disposal activities at its principal place of business in Canada for the duration of the permit and for 5 years following the expiry of the permit.

12.5. The loading or disposal at sea referred to under this permit must not be carried out by any person without written authorization from the permittee. The authorization must be accessible to enforcement officers designated under CEPA.

13. Reporting and notification:

13.1. The permittee must provide the following information, in writing, at least 48 hours before loading and disposal activities commence: name or identification number of ships, platforms or structures to be used to carry out the loading and/or disposal, name of the contractor including corporate and on-site contact information, and expected period of loading and disposal activities. The above-noted information must be submitted to the following:

For the Department of the Environment:

Environmental Protection Operations Directorate
Department of the Environment
Pacific and Yukon Region
101-401 Burrard St
Vancouver BC V6C 3R2

Email: immersionpy-disposalatseapyr@ec.gc.ca

For the representatives of potentially affected First Nations:

a. Dzawada'enuxw First Nation
   32 U'Kwa Nalis Rd
   Kingcome Inlet BC V0N 2B0

   Email: mdtcreferrals@shaw.ca; dfn.administrator@kingcome.ca

13.2. The permittee must send all project-related notifications, in writing, to the First Nation identified in paragraph 13.1.

13.3. The permittee must provide the First Nation representatives identified in paragraph 13.1 at least 48 hours' written notice of the work itinerary.

13.4. The permittee must submit a report of disposal activities, in writing, to the minister, as represented by the regional director of the Environmental Protection Operations Directorate, Pacific and Yukon Region. The report must be submitted two times: within 10 days after the first disposal activity; and, within 30 days after the expiry of the permit. Each report must contain a list of all work from the start of the permit, including the information from the previous report. The report must include the location of the loading and disposal sites, the quantity of matter disposed of at each disposal site, and the dates on which disposal activities occurred. The report must be sent to the regional director at any of the following coordinates:

Regional Director
c/o Elizabeth Boyle
Environmental Protection Operations Directorate
Pacific and Yukon Region
101-401 Burrard St
Vancouver BC V6C 3R2

Email: immersionpy-disposalatseapyr@ec.gc.ca

14. Special precautions:

14.1. The permittee must carry out project activities authorized by this permit in accordance with all procedures and mitigation measures outlined in the Material Management Plan referenced in paragraph 4.

14.2. Modifications to the Material Management Plan must be made only with the written approval of the minister, as represented by the regional director of the Environmental Protection Operations Directorate, Pacific and Yukon Region identified in paragraph 13.4.

14.3. The permittee must consult with the potentially affected First Nations listed in paragraph 13.1 on any modifications to the Material Management Plan.

On behalf of the Minister of Environment and Climate Change

Jennifer Tennant
Acting Regional Director
Environmental Protection Operations Directorate
Pacific and Yukon Region

Signed on: November 1, 2023

From: Roden, Jacqueline FOR:EX <Jacqueline.Roden@gov.bc.ca>
Sent: Tuesday, August 29, 2023 12:26 PM
To: Vallarino, Amy ENV:EX <Amy.Vallarino@gov.bc.ca>; 'aheckels@pacificus.ca' <aheckels@pacificus.ca>
Subject: Response to Section 11 Notification - 1005915 - Kingcome Rv

Thank you for your Authorized Change Application for changes in and about a stream regarding stream channel restoration/maintenance along Kingcome River. This email acknowledges that the proposed activities listed in your application meet the requirements as identified for Authorized Changes under the *Water Sustainability Act*.

Habitat Officer Kyle Rezansoff has reviewed your application and you may proceed with your proposed changes with the following conditions:

- No concerns provided EMP and related BMPs are followed.

This document does not supersede the requirements of the *Water Sustainability Act* and Regulations, *Federal Fisheries Act* or any other related legislation. The proponent is obligated to comply with all applicable federal, provincial, or municipal enactments. For more information on the *Water Sustainability Act,* Section 11 Change Approval and Authorization for "Changes In and About a Stream" can be found at: http://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-licensing-rights/working-around-water.

Retain a copy of this document on site during construction of the works.

If you have any questions or concerns, please contact Kyle.Rezansoff@gov.bc.ca via email or by phone at 250 956-5047.

Thank you,

Jacqueline Roden
Program Assistant
Ministry of Forests
Jacqueline.Roden@gov.bc.ca
Phone (250) 739-8272

xe'xe'tumuxw/ sacred land
With great respect and humility, we acknowledge and honor the lands of the Snuneymuxw people.

From: Gordon Eisenhuth
To: Des Goold; "Vallarino, Amy ENV:EX"
Subject: NHC Projects 3007807 (Kingcome)
Date: Monday, October 23, 2023 11:19:34 AM
Attachments: image001.png
image003.png

CAUTION: This email originated from outside of NHC. Do not open links or attachments before verifying sender.

HI Des/Amy. I have copied a snippet from the TC CNWA Application Web Portal Page (below).

While not an Approval (which is not required under this section of the Act) this is a TC statement that the project has fulfilled the requirements of the Act for this work at this location. The process required acknowledgement that a concern was raised and resolved.

Please contact me if you have any questions.

Cheers,
Gordie

G.R.E. Consulting Ltd.
Gordon Eisenhuth
788 Mapleton Place
Victoria BC V8Z 6W2
PH 250-580-7100
geisenhuth@shaw.ca

Government of Canada / Gouvernement du Canada

My notifications of work on non-scheduled waterways (public resolution)

Registry Number	Application Title	Submission Status	Actions	Comments Status
8313	Kingcome River Dredging and Navigation Hazard Removal	**Submitted** 2023-07-22 11:50:16 AM	Download View comments	You can proceed with your project on 2023-10-23

Northwest Hydraulic Consultants Inc.
30 Gostick Place
North Vancouver, BC V7M 3G3
Tel: (604) 980-6011
www.nhcweb.com

NHC Reference 3007807
November 28, 2023

Environmental Protections Operations Directorate
Department of the Environment
Pacific and Yukon Region
101-401 Burrard Street
Vancouver, BC V6C 3R2

Attention: Elizabeth Boyle, Regional Director
Copy to: Amy Vallarino (ENV, Flood Debris Management Secretariat); Dawn Nicolson (DFN, Band Administrator

Via email: immersionpy-disposalatseapyr@ec.gc.ca; amy.vallarino@gov.bc.ca; dfn.administrator@kingcome.ca

Re: **Kingcome EDSM**
10-Day Report of Disposal Activities Final Report, Rev. 0

Dear Ms. Boyle:

Dredging work for the above-captioned Project began on Friday, November 17th, 2023. JJM Construction Ltd. is the Prime Contractor for the work. The Owners of the work are the Dzawada'enuxw First Nation (DFN) and the BC Ministry of Environment and Climate Change Strategy (MoECCS or ENV).

Sunday, November 26th, 2023 marked the 10th day since dredging activity began, and this letter has been prepared for your review per the conditions of Disposal at Sea Permit PYR-00419-1.

The Load Site for dredge material is located within the lower 1 km reach of Kingcome River, bounded by an upstream coordinate of LAT N 50° 56’ 18.49”, LONG W 126° 12’ 16.73”, and a downstream coordinate of LAT N 50° 55’ 52.63”, LONG W 126° 12’ 42.90”.

The Disposal at Sea area is a rectangular zone located in Kingcome Inlet, roughly 1.5 km from the Load Site, and bounded by the coordinates:

- LAT N 50° 55' 6.05", LONG W 126° 13' 3.80"
- LAT N 50° 54' 58.95", LONG W 126° 12' 49.83"
- LAT N 50° 54' 53.93", LONG W 126° 12' 56.28"
- LAT N 50° 55' 1.03", LONG W 126° 13' 10.25"

The attached disposal tracking spreadsheet summarizes the loads and disposals conducted each day from November 17th to November 28th. As noted in the top-right corner of the first page, the estimated,

total volume disposed of to date is 9,655 m^3. The maximum dredge volume to be achieved by the end of construction (February 15th, 2024) is 71,000 m^3.

Closure

We trust this report meets your needs. If you have any questions or requests, please feel free to contact the undersigned.

Sincerely,

Northwest Hydraulic Consultants Ltd.

Report prepared by:

Des Goold, P.Eng.
Principal
Ministry Representative
604-837-8289

EGBC Permit to Practice Number: 1003221

Load number	Load Site	Disposal Date	Disposal Time	Latitude of Dump		Longitude of Dump		Comments	Disposal Site	Barge Name	Material	Approx Volume m3	Total Approx Volume
1	Kingcome Inlet	11/17/2023	1359	50° 55.050'		126° 13.008'		Trouble dumping, locks stuck	Kingcome	ME302	Dredged material	150	9655
2	Kingcome Inlet	11/17/2023	1659	50° 55.030'		126° 13.040'			Kingcome	ME302	Dredged material	150	
3	Kingcome Inlet	11/18/2023	1122-1205	50° 55.039'	50° 54.990'	126° 13.073'	126° 13.039'	First offload of scow	Kingcome	ME503	Dredged material	400	
4	Kingcome Inlet	11/18/2023	1346	50° 55.055'		126° 13.046'			Kingcome	ME302	Dredged material	150	
5	Kingcome Inlet	11/18/2023	1503	50° 55.006		126° 12.951'		Some wood debris dug up	Kingcome	ME302	Dredged material	150	
6	Kingcome Inlet	11/18/2023	1623	50° 55.037'		126° 13.005'			Kingcome	ME302	Dredged material	150	
7	Kingcome Inlet	11/18/2023	1741	50° 55.012'		126° 12.932'			Kingcome	ME302	Dredged material	150	
8	Kingcome Inlet	11/19/2023	819	50° 55.037'		126° 12.981			Kingcome	ME302	Dredged material	150	
9	Kingcome Inlet	11/19/2023	922	50° 55.048'		126° 13.016'			Kingcome	ME302	Dredged material	150	
10	Kingcome Inlet	11/19/2023	1020	50° 55.018'		126° 13.039'			Kingcome	ME302	Dredged material	150	
11	Kingcome Inlet	11/19/2023	1131	50° 54.986'		126° 13.025'			Kingcome	ME302	Dredged material	150	
12	Kingcome Inlet	11/19/2023	1242	50° 55.029'		126° 13.013'			Kingcome	ME302	Dredged material	150	
13	Kingcome Inlet	11/19/2023	1350	50° 55.054'		126° 13.033'			Kingcome	ME302	Dredged material	150	
14	Kingcome Inlet	11/19/2023	1600-1701	50° 54.966'	50° 55.073'	126°12.978'	126°13.066'	Offloading Scow	Kingcome	ME503	Dredged material	230	
15	Kingcome Inlet	11/20/2023	937	50° 55.042'		126° 13.024'			Kingcome	ME302	Dredged material	200	
16	Kingcome Inlet	11/20/2023	1114	50° 55.005'		126° 13.027'			Kingcome	ME302	Dredged material	200	
17	Kingcome Inlet	11/20/2023	1308	50° 55.012'		126° 12.994'			Kingcome	ME302	Dredged material	200	
18	Kingcome Inlet	11/20/2023	1523	50° 55.009		126° 13.008'			Kingcome	ME302	Dredged material	200	
19	Kingcome Inlet	11/21/2023	944	50° 55.060'		126° 13.039'			Kingcome	ME302	Dredged material	200	
20	Kingcome Inlet	11/21/2023	1107	50° 55.0157'		126° 13.053'		Log Removed	Kingcome	ME302	Dredged material	200	
21	Kingcome Inlet	11/21/2023	1203	50° 55.063'		126° 13.042'			Kingcome	ME302	Dredged material	200	
22	Kingcome Inlet	11/21/2023	1344	50° 55.001		126° 13.005'			Kingcome	ME302	Dredged material	200	
22	Kingcome Inlet	11/21/2023	1450	50° 55.048'		126° 13.016'			Kingcome	ME302	Dredged material	200	

23	Kingcome Inlet	11/21/2023	1548	50° 55.021'	126° 12.964'		Kingcome	ME302	Dredged material	200
24	Kingcome Inlet	11/21/2023	1642	50° 55.057'	126° 13.065'		Kingcome	ME302	Dredged material	200
25	Kingcome Inlet	11/22/2023	1150	50° 55.015'	126° 13.978'	Hopper Electrical Problem	Kingcome	ME302	Dredged material	200
26	Kingcome Inlet	11/22/2023	1237	50° 55.015'	126° 13.969'		Kingcome	ME302	Dredged material	200
27	Kingcome Inlet	11/22/2023	1324	50° 55.016'	126° 13.003'		Kingcome	ME302	Dredged material	200
28	Kingcome Inlet	11/22/2023	1443	50° 55.042'	126° 13.018'		Kingcome	ME302	Dredged material	200
29	Kingcome Inlet	11/22/2023	1611	50° 55.019'	126° 12.965'	Removed Log with Crane/Hoe into inlet	Kingcome	ME302	Dredged material	200
30	Kingcome Inlet	11/22/2023	1711	50° 55.043'	126° 13.025'		Kingcome	ME302	Dredged material	200
31	Kingcome Inlet	11/23/2023	856	50° 55.051'	126° 13.030'		Kingcome	ME302	Dredged material	200
32	Kingcome Inlet	11/23/2023	958	50° 55.001'	126° 13.012'		Kingcome	ME302	Dredged material	200
33	Kingcome Inlet	11/23/2023	1046	50° 55.010'	126° 12.990'		Kingcome	ME302	Dredged material	200
34	Kingcome Inlet	11/23/2023	1139	50° 55.070'	126° 13.056'		Kingcome	ME302	Dredged material	200
35	Kingcome Inlet	11/23/2023	1226	50° 55.033'	126° 13.092'		Kingcome	ME302	Dredged material	200
36	Kingcome Inlet	11/23/2023	1319	50° 54.991'	126° 13.072'		Kingcome	ME302	Dredged material	200
37	Kingcome Inlet	11/23/2023	1401	50° 55.071'	126° 13.062'		Kingcome	ME302	Dredged material	200
38	Kingcome Inlet	11/23/2023	1446	50° 55.049'	126° 13.064'		Kingcome	ME302	Dredged material	200
39	Kingcome Inlet	11/23/2023	1553	50° 54.985'	126° 12.922'		Kingcome	ME302	Dredged material	200
	Kingcome Inlet	11/24/2023	No Dredging							0
40	Kingcome Inlet	11/25/2023	1412	50° 55.022'	126° 13.004'		Kingcome	ME302	Dredged material	200
41	Kingcome Inlet	11/25/2023	1533	50° 55.073'	126° 13.060'		Kingcome	ME302	Dredged material	200
42	Kingcome Inlet	11/26/2023	1326	50° 55.042'	126° 13.006'	Repair Hopper	Kingcome	ME302	Dredged material	200
43	Kingcome Inlet	11/26/2023	1458	50° 55.055'	126° 12.992'		Kingcome	ME302	Dredged material	200
44	Kingcome Inlet	11/27/2023	1102	50° 55.031'	126° 12.951'		Kingcome	ME302	Dredged material	175
45	Kingcome Inlet	11/27/2023	1253	50° 55.035'	126° 13.037'		Kingcome	ME302	Dredged material	175

46	Kingcome Inlet	11/27/2023	1436	50° 54.997'	126° 13.032'		Kingcome	ME302	Dredged material	175
47	Kingcome Inlet	11/28/2023	1011	50° 55.037'	126° 12.985'		Kingcome	ME302	Dredged material	175
48	Kingcome Inlet	11/28/2023	1444	50° 55.062'	126° 13.028'		Kingcome	ME302	Dredged material	175
49	Kingcome Inlet	11/28/2023	1302	50° 54.998'	126° 13.038'		Kingcome	ME302	Dredged material	175
50	Kingcome Inlet	11/28/2023	1436				Kingcome	ME302	Dredged material	175
51	Kingcome Inlet									

Northwest Hydraulic Consultants Inc.
30 Gostick Place
North Vancouver, BC V7M 3G3
Tel: (604) 980-6011
www.nhcweb.com

NHC Reference 3007807
February 29, 2024

Environmental Protections Operations Directorate
Department of the Environment
Pacific and Yukon Region
101-401 Burrard Street
Vancouver, BC V6C 3R2

Attention: Elizabeth Boyle, Regional Director
Copy to: Amy Vallarino (ENV, Flood Debris Management Secretariat); Dawn Nicolson (DFN, Band Administrator

Via email: immersionpy-disposalatseapyr@ec.gc.ca; amy.vallarino@gov.bc.ca; dfn.administrator@kingcome.ca

Re: **Kingcome EDSM – Disposal at Sea Permit PYR-00419-1**
Final Report of Disposal Activities Final Report, Rev. 0

Dear Ms. Boyle:

Dredging work for the above-captioned Project began on Friday, November 17th, 2023. JJM Construction Ltd. is the Prime Contractor for the work. The Owners of the work are the Dzawada'enuxw First Nation (DFN) and the BC Ministry of Environment and Climate Change Strategy (MoECCS or ENV).

There was a short break in dredging activity between Thursday, December 21st, 2023 and January 3rd, 2024.

The dredging was restarted on January 3rd, 2024 and completed on January 29th, 2024, 2 weeks ahead of the closure of DFO's work window. This letter has been prepared for your review per the conditions of Disposal at Sea Permit PYR-00419-1.

The Load Site for dredge material is located within the lower 1 km reach of Kingcome River, bounded by an upstream coordinate of LAT N 50° 56' 18.49", LONG W 126° 12' 16.73", and a downstream coordinate of LAT N 50° 55' 52.63", LONG W 126° 12' 42.90".

The Disposal at Sea area is a rectangular zone located in Kingcome Inlet, roughly 1.5 km from the Load Site, and bounded by the coordinates:

- LAT N 50° 55' 6.05", LONG W 126° 13' 3.80"
- LAT N 50° 54' 58.95", LONG W 126° 12' 49.83"
- LAT N 50° 54' 53.93", LONG W 126° 12' 56.28"

- LAT N 50° 55' 1.03", LONG W 126° 13' 10.25"

The attached PDF disposal tracking sheet summarizes the loads and disposals conducted each day from November 17th, 2023 to January 29th, 2024. The disposal tracking will also be provided to you separately as in Excel™. As noted in the bottom right corner on the last page of the PDF, the total volume disposed for the Project is 59,137 m^3. The permitted disposal volume was 71,000 m^3, so we will seek a refund for the difference (11,863 m^3).

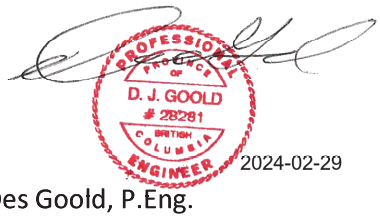
Closure

We trust this report meets your needs. If you have any questions or requests, please feel free to contact the undersigned.

Sincerely,

Northwest Hydraulic Consultants Ltd.

Report prepared by:



2024-02-29

Des Goold, P.Eng.
Principal
Ministry Representative
604-837-8289

EGBC Permit to Practice Number: 1003221

1033 - KINGCOME - EDSM - JJM Construciton Final Disposal Records

Load number	Load Site	Permit #	Disposal Date	Tug/AIS	Disposal Time	Latitude of Dump		Longitude of Dump		Wood %	Disposal Site	Barge Name	Material	Load Volume m3	Total Volume	Daily Total
1	Kingcome	PYR-00419-1	11/17/2023	sea Imp VIII	1359	50° 55.050'		126° 13.008'			Kingcome Inlet	ME302	Dredged material	182	182	
2	Kingcome	PYR-00419-1	11/17/2023	sea Imp VIII	1659	50° 55.030'		126° 13.040'			Kingcome Inlet	ME302	Dredged material	182	364	364
3	Kingcome	PYR-00419-1	11/18/2023	sea Imp VIII	1122-1205	50° 55.039'	50° 54.990'	126° 13.073'	126° 13.039'	<1%	Kingcome Inlet	ME503	Dredged material	182	546	
4	Kingcome	PYR-00419-1	11/18/2023	sea Imp VIII	1346	50° 55.055'		126° 13.046'		<1%	Kingcome Inlet	ME302	Dredged material	182	728	
5	Kingcome	PYR-00419-1	11/18/2023	sea Imp VIII	1503	50° 55.006		126° 12.951'		<1%	Kingcome Inlet	ME302	Dredged material	182	910	
6	Kingcome	PYR-00419-1	11/18/2023	sea Imp VIII	1623	50° 55.037'		126° 13.005'		<1%	Kingcome Inlet	ME302	Dredged material	182	1092	
7	Kingcome	PYR-00419-1	11/18/2023	sea Imp VIII	1741	50° 55.012'		126° 12.932'		<1%	Kingcome Inlet	ME302	Dredged material	182	1273	910
8	Kingcome	PYR-00419-1	11/19/2023	sea Imp VIII	819	50° 55.037'		126° 12.981		<1%	Kingcome Inlet	ME302	Dredged material	182	1455	
9	Kingcome	PYR-00419-1	11/19/2023	sea Imp VIII	922	50° 55.048'		126° 13.016'		<1%	Kingcome Inlet	ME302	Dredged material	182	1637	
10	Kingcome	PYR-00419-1	11/19/2023	sea Imp VIII	1020	50° 55.018'		126° 13.039'		<1%	Kingcome Inlet	ME302	Dredged material	182	1819	
11	Kingcome	PYR-00419-1	11/19/2023	sea Imp VIII	1131	50° 54.986'		126° 13.025'		<1%	Kingcome Inlet	ME302	Dredged material	182	2001	
12	Kingcome	PYR-00419-1	11/19/2023	sea Imp VIII	1242	50° 55.029'		126° 13.013'		<1%	Kingcome Inlet	ME302	Dredged material	182	2183	
13	Kingcome	PYR-00419-1	11/19/2023	sea Imp VIII	1350	50° 55.054'		126° 13.033'		<1%	Kingcome Inlet	ME302	Dredged material	182	2365	
14	Kingcome	PYR-00419-1	11/19/2023	sea Imp VIII	1600-1701	50° 54.966'	50° 55.073'	126°12.978'	126°13.066'	<1%	Kingcome Inlet	ME503	Dredged material	182	2547	1273
15	Kingcome	PYR-00419-1	11/20/2023	sea Imp VIII	937	50° 55.042'		126° 13.024'		<1%	Kingcome Inlet	ME302	Dredged material	182	2729	
16	Kingcome	PYR-00419-1	11/20/2023	sea Imp VIII	1114	50° 55.005'		126° 13.027'		<5%	Kingcome Inlet	ME302	Dredged material	182	2911	
17	Kingcome	PYR-00419-1	11/20/2023	sea Imp VIII	1308	50° 55.012'		126° 12.994'		<1%	Kingcome Inlet	ME302	Dredged material	182	3093	
18	Kingcome	PYR-00419-1	11/20/2023	sea Imp VIII	1523	50° 55.009		126° 13.008'		<1%	Kingcome Inlet	ME302	Dredged material	182	3275	728
19	Kingcome	PYR-00419-1	11/21/2023	sea Imp VIII	944	50° 55.060'		126° 13.039'		<1%	Kingcome Inlet	ME302	Dredged material	182	3456	
20	Kingcome	PYR-00419-1	11/21/2023	sea Imp VIII	1107	50° 55.0157'		126° 13.053'		<1%	Kingcome Inlet	ME302	Dredged material	182	3638	
21	Kingcome	PYR-00419-1	11/21/2023	sea Imp VIII	1203	50° 55.063'		126° 13.042'		<1%	Kingcome Inlet	ME302	Dredged material	182	3820	

Load number	Load Site	Permit #	Disposal Date	Tug/AIS	Disposal Time	Latitude of Dump	Longitude of Dump	Wood %	Disposal Site	Barge Name	Material	Load Volume m3	Total Volume	Daily Total
22	Kingcome	PYR-00419-1	11/21/2023	sea Imp VIII	1344	50° 55.001	126° 13.005'	<1%	Kingcome Inlet	ME302	Dredged material	182	4002	
23	Kingcome	PYR-00419-1	11/21/2023	sea Imp VIII	1450	50° 55.048'	126° 13.016'	<1%	Kingcome Inlet	ME302	Dredged material	182	4184	
24	Kingcome	PYR-00419-1	11/21/2023	sea Imp VIII	1548	50° 55.021'	126° 12.964'	<1%	Kingcome Inlet	ME302	Dredged material	182	4366	
25	Kingcome	PYR-00419-1	11/21/2023	sea Imp VIII	1642	50° 55.057'	126° 13.065'	<1%	Kingcome Inlet	ME302	Dredged material	182	4548	1273
26	Kingcome	PYR-00419-1	11/22/2023	sea Imp VIII	1150	50° 55.015'	126° 12.969'	<1%	Kingcome Inlet	ME302	Dredged material	182	4730	
27	Kingcome	PYR-00419-1	11/22/2023	sea Imp VIII	1237	50° 55.015'	126° 12.978'	<1%	Kingcome Inlet	ME302	Dredged material	182	4912	
28	Kingcome	PYR-00419-1	11/22/2023	sea Imp VIII	1324	50° 55.016'	126° 13.003'	<1%	Kingcome Inlet	ME302	Dredged material	182	5094	
29	Kingcome	PYR-00419-1	11/22/2023	sea Imp VIII	1443	50° 55.042'	126° 13.018'	<1%	Kingcome Inlet	ME302	Dredged material	182	5276	
30	Kingcome	PYR-00419-1	11/22/2023	sea Imp VIII	1611	50° 55.019'	126° 12.965'	<1%	Kingcome Inlet	ME302	Dredged material	182	5458	
31	Kingcome	PYR-00419-1	11/22/2023	sea Imp VIII	1711	50° 55.043'	126° 13.025'	<1%	Kingcome Inlet	ME302	Dredged material	182	5640	1092
32	Kingcome	PYR-00419-1	11/23/2023	sea Imp VIII	856	50° 55.051'	126° 13.030'	<1%	Kingcome Inlet	ME302	Dredged material	182	5821	
33	Kingcome	PYR-00419-1	11/23/2023	sea Imp VIII	958	50° 55.001'	126° 13.012'	<1%	Kingcome Inlet	ME302	Dredged material	182	6003	
34	Kingcome	PYR-00419-1	11/23/2023	sea Imp VIII	1046	50° 55.010'	126° 12.990'	<1%	Kingcome Inlet	ME302	Dredged material	182	6185	
35	Kingcome	PYR-00419-1	11/23/2023	sea Imp VIII	1139	50° 55.070'	126° 13.056'	<1%	Kingcome Inlet	ME302	Dredged material	182	6367	
36	Kingcome	PYR-00419-1	11/23/2023	sea Imp VIII	1226	50° 55.033'	126° 13.092'	<1%	Kingcome Inlet	ME302	Dredged material	182	6549	
37	Kingcome	PYR-00419-1	11/23/2023	sea Imp VIII	1319	50° 54.991'	126° 13.072'	<1%	Kingcome Inlet	ME302	Dredged material	182	6731	
38	Kingcome	PYR-00419-1	11/23/2023	sea Imp VIII	1401	50° 55.071'	126° 13.062'	<1%	Kingcome Inlet	ME302	Dredged material	182	6913	
39	Kingcome	PYR-00419-1	11/23/2023	sea Imp VIII	1446	50° 55.049'	126° 13.064'	<1%	Kingcome Inlet	ME302	Dredged material	182	7095	
40	Kingcome	PYR-00419-1	11/23/2023	sea Imp VIII	1553	50° 54.985'	126° 12.922'	<1%	Kingcome Inlet	ME302	Dredged material	182	7277	1637
41	Kingcome	PYR-00419-1	11/25/2023	sea Imp VIII	1412	50° 55.022'	126° 13.004'	<1%	Kingcome Inlet	ME302	Dredged material	182	7459	
42	Kingcome	PYR-00419-1	11/25/2023	sea Imp VIII	1533	50° 55.073'	126° 13.060'	<1%	Kingcome Inlet	ME302	Dredged material	182	7641	364
43	Kingcome	PYR-00419-1	11/26/2023	sea Imp VIII	1326	50° 55.042'	126° 13.006'	<1%	Kingcome Inlet	ME302	Dredged material	182	7823	
44	Kingcome	PYR-00419-1	11/26/2023	sea Imp VIII	1458	50° 55.055'	126° 12.992'	<1%	Kingcome Inlet	ME302	Dredged material	182	8004	364

Load number	Load Site	Permit #	Disposal Date	Tug/AIS	Disposal Time	Latitude of Dump	Longitude of Dump	Wood %	Disposal Site	Barge Name	Material	Load Volume m3	Total Volume	Daily Total
45	Kingcome	PYR-00419-1	11/27/2023	sea Imp VIII	1102	50° 55.031'	126° 12.951'	<1%	Kingcome Inlet	ME302	Dredged material	182	8186	
46	Kingcome	PYR-00419-1	11/27/2023	sea Imp VIII	1253	50° 55.035'	126° 13.037'	<1%	Kingcome Inlet	ME302	Dredged material	182	8368	
47	Kingcome	PYR-00419-1	11/27/2023	sea Imp VIII	1436	50° 54.997'	126° 13.032'	<1%	Kingcome Inlet	ME302	Dredged material	182	8550	546
48	Kingcome	PYR-00419-1	11/28/2023	sea Imp VIII	1011	50° 55.037'	126° 12.985'	<1%	Kingcome Inlet	ME302	Dredged material	182	8732	
49	Kingcome	PYR-00419-1	11/28/2023	sea Imp VIII	1302	50° 55.062'	126° 13.028'	<5%	Kingcome Inlet	ME302	Dredged material	182	8914	
50	Kingcome	PYR-00419-1	11/28/2023	sea Imp VIII	1444	50° 54.998'	126° 13.038'	<1%	Kingcome Inlet	ME302	Dredged material	182	9096	
51	Kingcome	PYR-00419-1	11/28/2023	sea Imp VIII	1631	50° 54.990'	126° 12.939'	<1%	Kingcome Inlet	ME302	Dredged material	182	9278	728
52	Kingcome	PYR-00419-1	11/29/2023	sea Imp VIII	914	50° 55.015'	126° 12.976'	<1%	Kingcome Inlet	ME302	Dredged material	182	9460	
53	Kingcome	PYR-00419-1	11/29/2023	sea Imp VIII	1039	50° 55.025'	126° 12.952'	<1%	Kingcome Inlet	ME302	Dredged material	182	9642	
54	Kingcome	PYR-00419-1	11/29/2023	sea Imp VIII	1145	50° 54.999'	126° 12.936'	<1%	Kingcome Inlet	ME302	Dredged material	182	9824	
55	Kingcome	PYR-00419-1	11/29/2023	sea Imp VIII	1302	50° 54.990'	126° 12.907'	<1%	Kingcome Inlet	ME302	Dredged material	182	10006	
56	Kingcome	PYR-00419-1	11/29/2023	sea Imp VIII	1428	50° 55.021'	126° 12.973'	<1%	Kingcome Inlet	ME302	Dredged material	182	10188	
57	Kingcome	PYR-00419-1	11/29/2023	sea Imp VIII	1552	50° 54.970'	126° 13.020'	<1%	Kingcome Inlet	ME302	Dredged material	182	10369	
58	Kingcome	PYR-00419-1	11/29/2023	sea Imp VIII	1636	50° 54.994'	126° 13.036'	<5%	Kingcome Inlet	ME503	Dredged material	182	10551	1273
59	Kingcome	PYR-00419-1	11/30/2023	Inlet Royal	1001	50° 55.047'	126° 12.997'	<1%	Kingcome Inlet	ME302	Dredged material	182	10733	
60	Kingcome	PYR-00419-1	11/30/2023	Inlet Royal	1121	50° 55.019'	126° 12.996'	<1%	Kingcome Inlet	ME302	Dredged material	182	10915	
61	Kingcome	PYR-00419-1	11/30/2023	Inlet Royal	1345	50° 55.033'	126° 13.001'	<1%	Kingcome Inlet	ME302	Dredged material	182	11097	
62	Kingcome	PYR-00419-1	11/30/2023	Inlet Royal	1504	50° 55.008'	126° 12.965'	<1%	Kingcome Inlet	ME302	Dredged material	182	11279	
63	Kingcome	PYR-00419-1	11/30/2023	Inlet Royal	1652	50° 55.031'	126° 13.036'	<2%	Kingcome Inlet	ME302	Dredged material	182	11461	
64	Kingcome	PYR-00419-1	11/30/2023	Inlet Royal	1744	50° 54.995'	126° 12.993'	<1%	Kingcome Inlet	ME503	Dredged material	182	11643	1092
65	Kingcome	PYR-00419-1	12/1/2023	Inlet Royal	1028	50° 55.039'	126° 13.038'	<1%	Kingcome Inlet	ME302	Dredged material	182	11825	
66	Kingcome	PYR-00419-1	12/1/2023	Inlet Royal	1129	50° 55.026'	126° 12.984'	<1%	Kingcome Inlet	ME302	Dredged material	182	12007	
67	Kingcome	PYR-00419-1	12/1/2023	Inlet Royal	1349	50° 55.028'	126° 12.981'	<1%	Kingcome Inlet	ME302	Dredged material	182	12189	

Load number	Load Site	Permit #	Disposal Date	Tug/AIS	Disposal Time	Latitude of Dump	Longitude of Dump	Wood %	Disposal Site	Barge Name	Material	Load Volume m3	Total Volume	Daily Total
68	Kingcome	PYR-00419-1	12/1/2023	Inlet Royal	1526	50° 55.036'	126° 13.008'	<1%	Kingcome Inlet	ME302	Dredged material	182	12371	
69	Kingcome	PYR-00419-1	12/1/2023	Inlet Royal	1634	50° 55.032'	126° 13.020'	<1%	Kingcome Inlet	ME503	Dredged material	182	12552	910
70	Kingcome	PYR-00419-1	12/2/2023	Inlet Royal	928	50° 55.031'	126° 12.997'	<1%	Kingcome Inlet	ME302	Dredged material	182	12734	
71	Kingcome	PYR-00419-1	12/2/2023	Inlet Royal	1102	50° 55.029'	126° 12.982'	<1%	Kingcome Inlet	ME302	Dredged material	182	12916	
72	Kingcome	PYR-00419-1	12/2/2023	Inlet Royal	1300	50° 55.035'	126° 12.993'	<3%	Kingcome Inlet	ME302	Dredged material	182	13098	
73	Kingcome	PYR-00419-1	12/2/2023	Inlet Royal	1430	50° 55.022'	126° 12.987'	<1%	Kingcome Inlet	ME302	Dredged material	182	13280	
74	Kingcome	PYR-00419-1	12/2/2023	Inlet Royal	1602	50° 55.029'	126° 13.029'	<1%	Kingcome Inlet	ME302	Dredged material	182	13462	
75	Kingcome	PYR-00419-1	12/2/2023	Inlet Royal	1718	50° 55.019'	126° 12.988'	<1%	Kingcome Inlet	ME302	Dredged material	182	13644	1092
76	Kingcome	PYR-00419-1	12/3/2023	Inlet Royal	838	50° 55.027'	126° 13.010'	<1%	Kingcome Inlet	ME302	Dredged material	182	13826	
77	Kingcome	PYR-00419-1	12/3/2023	Inlet Royal	944	50° 55.014'	126° 12.964'	<1%	Kingcome Inlet	ME302	Dredged material	182	14008	
78	Kingcome	PYR-00419-1	12/3/2023	Inlet Royal	1049	50° 55.024'	126° 12.977'	<3%	Kingcome Inlet	ME302	Dredged material	182	14190	
79	Kingcome	PYR-00419-1	12/3/2023	Inlet Royal	1157	50° 55.018'	126° 12.962'	<1%	Kingcome Inlet	ME302	Dredged material	182	14372	
80	Kingcome	PYR-00419-1	12/3/2023	Inlet Royal	1304	50° 55.030'	126° 12.971'	<1%	Kingcome Inlet	ME302	Dredged material	182	14554	
81	Kingcome	PYR-00419-1	12/3/2023	Inlet Royal	1405	50° 55.021'	126° 12.984'	<1%	Kingcome Inlet	ME302	Dredged material	182	14736	
82	Kingcome	PYR-00419-1	12/3/2023	Inlet Royal	1530	50° 55.017'	126° 12.962'	<2%	Kingcome Inlet	ME302	Dredged material	182	14917	
83	Kingcome	PYR-00419-1	12/3/2023	Inlet Royal	1655	50° 55.021'	126° 12.969'	<1%	Kingcome Inlet	ME302	Dredged material	182	15099	1455
84	Kingcome	PYR-00419-1	12/4/2023	Inlet Royal	1110	50° 55.018'	126° 12.956'	<1%	Kingcome Inlet	ME302	Dredged material	182	15281	
85	Kingcome	PYR-00419-1	12/4/2023	Inlet Royal	1313	50° 55.020'	126° 12.976'	<1%	Kingcome Inlet	ME302	Dredged material	182	15463	
86	Kingcome	PYR-00419-1	12/4/2023	Inlet Royal	1507	50° 55.018'	126° 12.979'	<1%	Kingcome Inlet	ME302	Dredged material	182	15645	
87	Kingcome	PYR-00419-1	12/4/2023	Inlet Royal	1620	50° 55.036'	126° 13.013'	<1%	Kingcome Inlet	ME302	Dredged material	182	15827	728
88	Kingcome	PYR-00419-1	12/5/2023	Inlet Royal	837	50° 55.013'	126° 12.995'	<1%	Kingcome Inlet	ME302	Dredged material	182	16009	
89	Kingcome	PYR-00419-1	12/5/2023	Inlet Royal	952	50° 55.016'	126° 12.988'	<1%	Kingcome Inlet	ME302	Dredged material	182	16191	
90	Kingcome	PYR-00419-1	12/5/2023	Inlet Royal	1118	50° 55.008'	126° 12.964'	<1%	Kingcome Inlet	ME302	Dredged material	182	16373	

Load number	Load Site	Permit #	Disposal Date	Tug/AIS	Disposal Time	Latitude of Dump	Longitude of Dump	Wood %	Disposal Site	Barge Name	Material	Load Volume m3	Total Volume	Daily Total
91	Kingcome	PYR-00419-1	12/5/2023	Inlet Royal	1240	50° 55.025'	126° 12.967'	<1%	Kingcome Inlet	ME302	Dredged material	182	16555	
92	Kingcome	PYR-00419-1	12/5/2023	Inlet Royal	1403	50° 55.014'	126° 12.964'	<1%	Kingcome Inlet	ME302	Dredged material	182	16737	
93	Kingcome	PYR-00419-1	12/5/2023	Inlet Royal	1508	50° 55.011'	126° 12.943'	<1%	Kingcome Inlet	ME302	Dredged material	182	16919	
94	Kingcome	PYR-00419-1	12/5/2023	Inlet Royal	1647	50° 55.026'	126° 13.001'	<1%	Kingcome Inlet	ME302	Dredged material	182	17100	
95	Kingcome	PYR-00419-1	12/5/2023	Inlet Royal	1726	50° 55.024'	126° 12.990'	100%	Kingcome Inlet	ME209/503	Stump and Rootball	182	17282	1455
96	Kingcome	PYR-00419-1	12/6/2023	Inlet Royal	1057	50° 54.990'	126° 12.922'	<1%	Kingcome Inlet	ME302	Dredged material	182	17464	
97	Kingcome	PYR-00419-1	12/6/2023	Inlet Royal	1226	50° 55.075'	126° 13.046'	<1%	Kingcome Inlet	ME302	Dredged material	182	17646	
98	Kingcome	PYR-00419-1	12/6/2023	Inlet Royal	1343	50° 55.044'	126° 13.024'	<1%	Kingcome Inlet	ME302	Dredged material	182	17828	
99	Kingcome	PYR-00419-1	12/6/2023	Inlet Royal	1443	50° 55.041'	126° 13.037'	<1%	Kingcome Inlet	ME302	Dredged material	182	18010	
100	Kingcome	PYR-00419-1	12/6/2023	Inlet Royal	1556	50° 55.025'	126° 13.021'	<1%	Kingcome Inlet	ME302	Dredged material	182	18192	
101	Kingcome	PYR-00419-1	12/6/2023	Inlet Royal	1714	50° 55.041'	126° 13.006'	<1%	Kingcome Inlet	ME302	Dredged material	182	18374	1092
102	Kingcome	PYR-00419-1	12/7/2023	Inlet Royal	838	50° 55.035'	126° 13.029'	<1%	Kingcome Inlet	ME302	Dredged material	182	18556	
103	Kingcome	PYR-00419-1	12/7/2023	Inlet Royal	956	50° 55.019'	126° 13.034'	<1%	Kingcome Inlet	ME302	Dredged material	182	18738	
104	Kingcome	PYR-00419-1	12/7/2023	Inlet Royal	1204	50° 55.040'	126° 13.021'	<1%	Kingcome Inlet	ME302	Dredged material	182	18920	
105	Kingcome	PYR-00419-1	12/7/2023	Inlet Royal	1323	50° 55.028'	126° 13.038'	<1%	Kingcome Inlet	ME302	Dredged material	182	19102	
106	Kingcome	PYR-00419-1	12/7/2023	Inlet Royal	1528	50° 55.008'	126° 13.023'	<1%	Kingcome Inlet	ME302	Dredged material	182	19284	
107	Kingcome	PYR-00419-1	12/7/2023	Inlet Royal	1814	50° 55.023'	126° 13.029'	<1%	Kingcome Inlet	ME302	Dredged material	182	19465	1092
108	Kingcome	PYR-00419-1	12/8/2023	Inlet Royal	904	50° 55.031'	126° 13.001'	<1%	Kingcome Inlet	ME302	Dredged material	182	19647	
109	Kingcome	PYR-00419-1	12/8/2023	Inlet Royal	1013	50° 55.015'	126° 13.024'	<1%	Kingcome Inlet	ME302	Dredged material	182	19829	
110	Kingcome	PYR-00419-1	12/8/2023	Inlet Royal	1127	50° 55.002'	126° 13.026'	<1%	Kingcome Inlet	ME302	Dredged material	182	20011	
111	Kingcome	PYR-00419-1	12/8/2023	Inlet Royal	1237	50° 55.009'	126° 13.032'	<1%	Kingcome Inlet	ME302	Dredged material	182	20193	
112	Kingcome	PYR-00419-1	12/8/2023	Inlet Royal	1353	50° 55.009'	126° 13.027'	<1%	Kingcome Inlet	ME302	Dredged material	182	20375	
113	Kingcome	PYR-00419-1	12/8/2023	Inlet Royal	1454	50° 55.012'	126° 13.020'	<1%	Kingcome Inlet	ME302	Dredged material	182	20557	

Load number	Load Site	Permit #	Disposal Date	Tug/AIS	Disposal Time	Latitude of Dump	Longitude of Dump	Wood %	Disposal Site	Barge Name	Material	Load Volume m3	Total Volume	Daily Total
114	Kingcome	PYR-00419-1	12/8/2023	Inlet Royal	1600	50° 55.017'	126° 13.011'	<1%	Kingcome Inlet	ME302	Dredged material	182	20739	
115	Kingcome	PYR-00419-1	12/8/2023	Inlet Royal	1700	50° 55.006'	126° 13.031'	<1%	Kingcome Inlet	ME302	Dredged material	182	20921	1455
116	Kingcome	PYR-00419-1	12/9/2023	Inlet Royal	840	50° 55.018'	126° 13.025'	<1%	Kingcome Inlet	ME302	Dredged material	182	21103	
117	Kingcome	PYR-00419-1	12/9/2023	Inlet Royal	1007	50° 55.011'	126° 13.023'	<1%	Kingcome Inlet	ME302	Dredged material	182	21285	
118	Kingcome	PYR-00419-1	12/9/2023	Inlet Royal	1128	50° 55.007'	126° 13.018'	<1%	Kingcome Inlet	ME302	Dredged material	182	21467	
119	Kingcome	PYR-00419-1	12/9/2023	Inlet Royal	1254	50° 55.013'	126° 13.034'	<1%	Kingcome Inlet	ME302	Dredged material	182	21648	
120	Kingcome	PYR-00419-1	12/9/2023	Inlet Royal	1431	50° 55.017'	126° 13.024'	<1%	Kingcome Inlet	ME302	Dredged material	182	21830	
121	Kingcome	PYR-00419-1	12/9/2023	Inlet Royal	1545	50° 55.012'	126° 13.023'	<1%	Kingcome Inlet	ME302	Dredged material	182	22012	
122	Kingcome	PYR-00419-1	12/9/2023	Inlet Royal	1703	50° 55.014'	126° 13.038'	<1%	Kingcome Inlet	ME302	Dredged material	182	22194	1273
123	Kingcome	PYR-00419-1	12/10/2023	Inlet Royal	802	50° 55.021'	126° 13.014'	<1%	Kingcome Inlet	ME302	Dredged material	182	22376	
124	Kingcome	PYR-00419-1	12/10/2023	Inlet Royal	912	50° 55.020'	126° 13.014'	<1%	Kingcome Inlet	ME302	Dredged material	182	22558	
125	Kingcome	PYR-00419-1	12/10/2023	Inlet Royal	1033	50° 55.007'	126° 13.019'	<1%	Kingcome Inlet	ME302	Dredged material	182	22740	
126	Kingcome	PYR-00419-1	12/10/2023	Inlet Royal	1143	50° 55.006'	126° 13.014'	<1%	Kingcome Inlet	ME302	Dredged material	182	22922	
127	Kingcome	PYR-00419-1	12/10/2023	Inlet Royal	1256	50° 55.012'	126° 13.033'	<1%	Kingcome Inlet	ME302	Dredged material	182	23104	
128	Kingcome	PYR-00419-1	12/10/2023	Inlet Royal	1410	50° 55.011'	126° 13.021'	<1%	Kingcome Inlet	ME302	Dredged material	182	23286	1092
129	Kingcome	PYR-00419-1	12/11/2023	Inlet Royal	818	50° 55.004'	126° 13.017'	<1%	Kingcome Inlet	ME302	Dredged material	182	23468	
130	Kingcome	PYR-00419-1	12/11/2023	Inlet Royal	934	50° 55.012'	126° 13.021'	<1%	Kingcome Inlet	ME302	Dredged material	182	23650	
131	Kingcome	PYR-00419-1	12/11/2023	Inlet Royal	1039	50° 55.010'	126° 13.017'	<1%	Kingcome Inlet	ME302	Dredged material	182	23832	
132	Kingcome	PYR-00419-1	12/11/2023	Inlet Royal	1153	50° 55.019'	126° 13.020'	<1%	Kingcome Inlet	ME302	Dredged material	182	24013	
133	Kingcome	PYR-00419-1	12/11/2023	Inlet Royal	1308	50° 55.014'	126° 13.017'	<1%	Kingcome Inlet	ME302	Dredged material	182	24195	
134	Kingcome	PYR-00419-1	12/11/2023	Inlet Royal	1419	50° 55.018'	126° 13.020'	<1%	Kingcome Inlet	ME302	Dredged material	182	24377	
135	Kingcome	PYR-00419-1	12/11/2023	Inlet Royal	1419	50° 55.014'	126° 13.019'	<1%	Kingcome Inlet	ME302	Dredged material	182	24559	1273
136	Kingcome	PYR-00419-1	12/12/2023	Inlet Royal	842	50° 55.020'	126° 13.020'	<1%	Kingcome Inlet	ME302	Dredged material	182	24741	

Load number	Load Site	Permit #	Disposal Date	Tug/AIS	Disposal Time	Latitude of Dump	Longitude of Dump	Wood %	Disposal Site	Barge Name	Material	Load Volume m3	Total Volume	Daily Total
137	Kingcome	PYR-00419-1	12/12/2023	Inlet Royal	1011	50° 55.009'	126° 13.020'	<1%	Kingcome Inlet	ME302	Dredged material	182	24923	364
138	Kingcome	PYR-00419-1	12/13/2023	Inlet Royal	935	50° 55.023'	126° 13.019'	<1%	Kingcome Inlet	ME302	Dredged material	182	25105	
139	Kingcome	PYR-00419-1	12/13/2023	Inlet Royal	1050	50° 55.024'	126° 13.013'	<1%	Kingcome Inlet	ME302	Dredged material	182	25287	
140	Kingcome	PYR-00419-1	12/13/2023	Inlet Royal	1214	50° 55.021'	126° 13.012'	<1%	Kingcome Inlet	ME302	Dredged material	182	25469	
141	Kingcome	PYR-00419-1	12/13/2023	Inlet Royal	1410	50° 55.018'	126° 13.016'	<1%	Kingcome Inlet	ME302	Dredged material	182	25651	
142	Kingcome	PYR-00419-1	12/13/2023	Inlet Royal	1521	50° 55.027'	126° 13.022'	<1%	Kingcome Inlet	ME302	Dredged material	182	25833	
143	Kingcome	PYR-00419-1	12/13/2023	Inlet Royal	1725	50° 55.037'	126° 12.997'	<1%	Kingcome Inlet	ME302	Dredged material	182	26015	1092
144	Kingcome	PYR-00419-1	12/14/2023	Inlet Royal	824	50° 55.022'	126° 13.017'	<1%	Kingcome Inlet	ME302	Dredged material	182	26196	
145	Kingcome	PYR-00419-1	12/14/2023	Inlet Royal	943	50° 55.032'	126° 13.024'	<1%	Kingcome Inlet	ME302	Dredged material	182	26378	
146	Kingcome	PYR-00419-1	12/14/2023	Inlet Royal	1109	50° 55.013'	126° 13.025'	<1%	Kingcome Inlet	ME302	Dredged material	182	26560	
147	Kingcome	PYR-00419-1	12/14/2023	Inlet Royal	1208	50° 55.014'	126° 13.027'	<1%	Kingcome Inlet	ME302	Dredged material	182	26742	
148	Kingcome	PYR-00419-1	12/14/2023	Inlet Royal	1307	50° 55.020'	126° 13.027'	<1%	Kingcome Inlet	ME302	Dredged material	182	26924	
149	Kingcome	PYR-00419-1	12/14/2023	Inlet Royal	1409	50° 55.024'	126° 13.032'	<1%	Kingcome Inlet	ME302	Dredged material	182	27106	1092
150	Kingcome	PYR-00419-1	12/15/2023	Inlet Royal	830	50° 55.031'	126° 13.028'	<1%	Kingcome Inlet	ME302	Dredged material	182	27288	
151	Kingcome	PYR-00419-1	12/15/2023	Inlet Royal	1008	50° 55.020'	126° 13.036'	<1%	Kingcome Inlet	ME302	Dredged material	182	27470	
152	Kingcome	PYR-00419-1	12/15/2023	Inlet Royal	1144	50° 54.992'	126° 13.059'	<1%	Kingcome Inlet	ME302	Dredged material	182	27652	
153	Kingcome	PYR-00419-1	12/15/2023	Inlet Royal	1310	50° 54.998'	126° 13.050'	<1%	Kingcome Inlet	ME302	Dredged material	182	27834	
154	Kingcome	PYR-00419-1	12/15/2023	Inlet Royal	1457	50° 55.042'	126° 13.049'	<1%	Kingcome Inlet	ME302	Dredged material	182	28016	
155	Kingcome	PYR-00419-1	12/15/2023	Inlet Royal	1620	50° 54.988'	126° 13.062'	<1%	Kingcome Inlet	ME302	Dredged material	182	28198	1092
156	Kingcome	PYR-00419-1	12/16/2023	Inlet Royal	820	50° 55.027'	126° 13.045'	<1%	Kingcome Inlet	ME302	Dredged material	182	28380	
157	Kingcome	PYR-00419-1	12/16/2023	Inlet Royal	1023	50° 55.025'	126° 13.047'	<1%	Kingcome Inlet	ME302	Dredged material	182	28561	
158	Kingcome	PYR-00419-1	12/16/2023	Inlet Royal	1140	50° 55.011'	126° 13.078'	<1%	Kingcome Inlet	ME302	Dredged material	182	28743	
159	Kingcome	PYR-00419-1	12/16/2023	Inlet Royal	1300	50° 55.020'	126° 13.032'	<1%	Kingcome Inlet	ME302	Dredged material	182	28925	

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160	Kingcome	PYR-00419-1	12/16/2023	Inlet Royal	1408	50° 55.019'	126° 13.043'	<1%	Kingcome Inlet	ME302	Dredged material	182	29107	
161	Kingcome	PYR-00419-1	12/16/2023	Inlet Royal	1533	50° 55.007'	126° 13.015'	<1%	Kingcome Inlet	ME302	Dredged material	182	29289	
162	Kingcome	PYR-00419-1	12/16/2023	Inlet Royal	1730	50° 54.996'	126° 13.042'	<1%	Kingcome Inlet	ME302	Dredged material	182	29471	1273
163	Kingcome	PYR-00419-1	12/17/2023	Inlet Royal	831	50° 54.973'	126° 13.041'	<1%	Kingcome Inlet	ME302	Dredged material	182	29653	
164	Kingcome	PYR-00419-1	12/17/2023	Inlet Royal	930	50° 55.009'	126° 13.058'	<1%	Kingcome Inlet	ME302	Dredged material	182	29835	
165	Kingcome	PYR-00419-1	12/17/2023	Inlet Royal	1037	50° 55.009'	126° 13.043'	<1%	Kingcome Inlet	ME302	Dredged material	182	30017	
166	Kingcome	PYR-00419-1	12/17/2023	Inlet Royal	1128	50° 55.012'	126° 13.078'	<1%	Kingcome Inlet	ME302	Dredged material	182	30199	
167	Kingcome	PYR-00419-1	12/17/2023	Inlet Royal	1231	50° 55.001'	126° 13.063'	<1%	Kingcome Inlet	ME302	Dredged material	182	30381	
168	Kingcome	PYR-00419-1	12/17/2023	Inlet Royal	1406	50° 54.986'	126° 13.043'	<1%	Kingcome Inlet	ME302	Dredged material	182	30563	
169	Kingcome	PYR-00419-1	12/17/2023	Inlet Royal	1501	50° 55.001'	126° 13.020'	<1%	Kingcome Inlet	ME302	Dredged material	182	30744	
170	Kingcome	PYR-00419-1	12/17/2023	Inlet Royal	1645	50° 55.003'	126° 13.033'	<1%	Kingcome Inlet	ME302	Dredged material	182	30926	
171	Kingcome	PYR-00419-1	12/17/2023	Inlet Royal	1724	50° 55.011'	126° 13.015'	<1%	Kingcome Inlet	ME302	Dredged material	182	31108	1637
172	Kingcome	PYR-00419-1	12/18/2023	Inlet Royal	846	50° 55.017'	126° 13.060'	<1%	Kingcome Inlet	ME302	Dredged material	182	31290	
173	Kingcome	PYR-00419-1	12/18/2023	Inlet Royal	1001	50° 55.005'	126° 13.030'	<1%	Kingcome Inlet	ME302	Dredged material	182	31472	
174	Kingcome	PYR-00419-1	12/18/2023	Inlet Royal	1130	50° 55.011'	126° 13.024'	<1%	Kingcome Inlet	ME302	Dredged material	182	31654	
175	Kingcome	PYR-00419-1	12/18/2023	Inlet Royal	1252	50° 54.997'	126° 13.016'	<1%	Kingcome Inlet	ME302	Dredged material	182	31836	
176	Kingcome	PYR-00419-1	12/18/2023	Inlet Royal	1411	50° 55.004'	126° 13.012'	<1%	Kingcome Inlet	ME302	Dredged material	182	32018	
177	Kingcome	PYR-00419-1	12/18/2023	Inlet Royal	1506	50° 55.028'	126° 13.033'	<1%	Kingcome Inlet	ME302	Dredged material	182	32200	
178	Kingcome	PYR-00419-1	12/18/2023	Inlet Royal	1610	50° 55.007'	126° 13.007'	<1%	Kingcome Inlet	ME302	Dredged material	182	32382	
179	Kingcome	PYR-00419-1	12/18/2023	Inlet Royal	1713	50° 55.031'	126° 13.027'	<1%	Kingcome Inlet	ME302	Dredged material	182	32564	1455
180	Kingcome	PYR-00419-1	1/4/2024	Inlet Royal	1038	50° 55.038'	126° 12.979'	<1%	Kingcome Inlet	ME302	Dredged material	163	32727	
181	Kingcome	PYR-00419-1	1/4/2024	Inlet Royal	1129	50° 55.008'	126° 13.009'	<1%	Kingcome Inlet	ME302	Dredged material	163	32890	
182	Kingcome	PYR-00419-1	1/4/2024	Inlet Royal	1231	50° 54.987'	126° 13.017'	<1%	Kingcome Inlet	ME302	Dredged material	163	33053	

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183	Kingcome	PYR-00419-1	1/4/2024	Inlet Royal	1342	50° 54.999'	126° 13.020'	<1%	Kingcome Inlet	ME302	Dredged material	163	33216	
184	Kingcome	PYR-00419-1	1/4/2024	Inlet Royal	1445	50° 54.995'	126° 12.990'	<1%	Kingcome Inlet	ME302	Dredged material	163	33379	
185	Kingcome	PYR-00419-1	1/4/2024	Inlet Royal	1615	50° 54.970'	126° 13.009'	<1%	Kingcome Inlet	ME302	Dredged material	163	33542	
186	Kingcome	PYR-00419-1	1/4/2024	Inlet Royal	1800	50° 54.995'	126° 13.036'	<1%	Kingcome Inlet	ME302	Dredged material	163	33705	1141
187	Kingcome	PYR-00419-1	1/5/2024	Inlet Royal	835	50° 54.985'	126° 13.017'	<1%	Kingcome Inlet	ME302	Dredged material	163	33868	
188	Kingcome	PYR-00419-1	1/5/2024	Inlet Royal	941	50° 54.996'	126° 13.013'	<1%	Kingcome Inlet	ME302	Dredged material	163	34031	
189	Kingcome	PYR-00419-1	1/5/2024	Inlet Royal	1038	50° 54.995'	126° 13.015'	<1%	Kingcome Inlet	ME302	Dredged material	163	34194	
190	Kingcome	PYR-00419-1	1/5/2024	Inlet Royal	1152	50° 54.998'	126° 13.014'	<1%	Kingcome Inlet	ME302	Dredged material	163	34357	
191	Kingcome	PYR-00419-1	1/5/2024	Inlet Royal	1312	50° 54.998'	126° 13.017'	<1%	Kingcome Inlet	ME302	Dredged material	163	34520	
192	Kingcome	PYR-00419-1	1/5/2024	Inlet Royal	1439	50° 54.997'	126° 13.017'	<1%	Kingcome Inlet	ME302	Dredged material	163	34683	
193	Kingcome	PYR-00419-1	1/5/2024	Inlet Royal	1615	50° 54.996'	126° 13.020'	<1%	Kingcome Inlet	ME302	Dredged material	163	34846	
194	Kingcome	PYR-00419-1	1/5/2024	Inlet Royal	1745	50° 54.996'	126° 13.015'	<1%	Kingcome Inlet	ME302	Dredged material	163	35009	1304
195	Kingcome	PYR-00419-1	1/6/2024	Inlet Royal	845	50° 54.997'	126° 13.012'	<1%	Kingcome Inlet	ME302	Dredged material	163	35172	
196	Kingcome	PYR-00419-1	1/6/2024	Inlet Royal	1152	50° 54.998'	126° 13.021'	<1%	Kingcome Inlet	ME302	Dredged material	163	35335	
197	Kingcome	PYR-00419-1	1/6/2024	Inlet Royal	1312	50° 54.998'	126° 13.017'	<1%	Kingcome Inlet	ME302	Dredged material	163	35498	
198	Kingcome	PYR-00419-1	1/6/2024	Inlet Royal	1439	50° 54.997'	126° 13.015'	<1%	Kingcome Inlet	ME302	Dredged material	163	35661	
199	Kingcome	PYR-00419-1	1/6/2024	Inlet Royal	1615	50° 54.993'	126° 13.005'	<1%	Kingcome Inlet	ME302	Dredged material	163	35824	
200	Kingcome	PYR-00419-1	1/6/2024	Inlet Royal	1745	50° 54.996'	126° 13.021'	<1%	Kingcome Inlet	ME302	Dredged material	163	35987	978
201	Kingcome	PYR-00419-1	1/7/2024	Inlet Royal	856	50° 54.997'	126° 13.015'	<1%	Kingcome Inlet	ME302	Dredged material	163	36150	
202	Kingcome	PYR-00419-1	1/7/2024	Inlet Royal	1001	50° 54.998'	126° 13.012'	<1%	Kingcome Inlet	ME302	Dredged material	163	36313	
203	Kingcome	PYR-00419-1	1/7/2024	Inlet Royal	1113	50° 54.997'	126° 13.017'	<1%	Kingcome Inlet	ME302	Dredged material	163	36476	
204	Kingcome	PYR-00419-1	1/7/2024	Inlet Royal	1234	50° 54.997'	126° 13.012'	<1%	Kingcome Inlet	ME302	Dredged material	163	36639	
205	Kingcome	PYR-00419-1	1/7/2024	Inlet Royal	1336	50° 54.998'	126° 13.017'	<1%	Kingcome Inlet	ME302	Dredged material	163	36802	

Load number	Load Site	Permit #	Disposal Date	Tug/AIS	Disposal Time	Latitude of Dump	Longitude of Dump	Wood %	Disposal Site	Barge Name	Material	Load Volume m3	Total Volume	Daily Total
206	Kingcome	PYR-00419-1	1/7/2024	Inlet Royal	1439	50° 54.996'	126° 13.012'	<1%	Kingcome Inlet	ME302	Dredged material	163	36965	
207	Kingcome	PYR-00419-1	1/7/2024	Inlet Royal	1545	50° 54.996'	126° 13.015'	<1%	Kingcome Inlet	ME302	Dredged material	163	37128	1141
208	Kingcome	PYR-00419-1	1/8/2024	Inlet Royal	845	50° 54.997'	126° 13.017'	<1%	Kingcome Inlet	ME302	Dredged material	163	37291	
209	Kingcome	PYR-00419-1	1/8/2024	Inlet Royal	1018	50° 54.996'	126° 13.014'	<1%	Kingcome Inlet	ME302	Dredged material	163	37454	
210	Kingcome	PYR-00419-1	1/8/2024	Inlet Royal	1152	50° 54.998'	126° 13.016'	<1%	Kingcome Inlet	ME302	Dredged material	163	37617	
211	Kingcome	PYR-00419-1	1/8/2024	Inlet Royal	1346	50° 54.999'	126° 13.017'	<1%	Kingcome Inlet	ME302	Dredged material	163	37780	652
212	Kingcome	PYR-00419-1	1/9/2024	Inlet Royal	831	50° 54.997'	126° 13.045'	<1%	Kingcome Inlet	ME302	Dredged material	163	37943	
213	Kingcome	PYR-00419-1	1/9/2024	Inlet Royal	1023	50° 54.998'	126° 13.047'	<1%	Kingcome Inlet	ME302	Dredged material	163	38106	
214	Kingcome	PYR-00419-1	1/9/2024	Inlet Royal	1140	50° 54.998'	126° 13.078'	<1%	Kingcome Inlet	ME302	Dredged material	163	38269	
215	Kingcome	PYR-00419-1	1/9/2024	Inlet Royal	1300	50° 54.996'	126° 13.032'	<1%	Kingcome Inlet	ME302	Dredged material	163	38432	
216	Kingcome	PYR-00419-1	1/9/2024	Inlet Royal	1435	50° 54.998'	126° 13.043'	<1%	Kingcome Inlet	ME302	Dredged material	163	38595	
217	Kingcome	PYR-00419-1	1/9/2024	Inlet Royal	1545	50° 54.997'	126° 13.015'	<1%	Kingcome Inlet	ME302	Dredged material	163	38758	978
218	Kingcome	PYR-00419-1	1/10/2024	Inlet Royal	826	50° 55.021'	126° 13.008'	<1%	Kingcome Inlet	ME302	Dredged material	163	38921	
219	Kingcome	PYR-00419-1	1/10/2024	Inlet Royal	949	50° 55.006'	126° 13.000'	<1%	Kingcome Inlet	ME302	Dredged material	163	39084	
220	Kingcome	PYR-00419-1	1/10/2024	Inlet Royal	1152	50° 55.017'	126° 13.009'	<1%	Kingcome Inlet	ME302	Dredged material	163	39247	
221	Kingcome	PYR-00419-1	1/10/2024	Inlet Royal	1325	50° 55.013'	126° 13.002'	<1%	Kingcome Inlet	ME302	Dredged material	163	39410	
222	Kingcome	PYR-00419-1	1/10/2024	Inlet Royal	1454	50° 55.018'	126° 13.001'	<1%	Kingcome Inlet	ME302	Dredged material	163	39573	
223	Kingcome	PYR-00419-1	1/10/2024	Inlet Royal	1625	50° 55.022'	126° 13.008'	<1%	Kingcome Inlet	ME302	Dredged material	163	39736	978
224	Kingcome	PYR-00419-1	1/11/2024	Inlet Royal	911	50° 55.016'	126° 13.013'	<1%	Kingcome Inlet	ME302	Dredged material	163	39899	
225	Kingcome	PYR-00419-1	1/11/2024	Inlet Royal	1015	50° 55.014'	126° 13.017'	<1%	Kingcome Inlet	ME302	Dredged material	163	40062	
226	Kingcome	PYR-00419-1	1/11/2024	Inlet Royal	1136	50° 55.015'	126° 13.004'	<1%	Kingcome Inlet	ME302	Dredged material	163	40225	
227	Kingcome	PYR-00419-1	1/11/2024	Inlet Royal	1311	50° 55.010'	126° 13.008'	<1%	Kingcome Inlet	ME302	Dredged material	163	40388	
228	Kingcome	PYR-00419-1	1/11/2024	Inlet Royal	1506	50° 55.019'	126° 13.013'	<1%	Kingcome Inlet	ME302	Dredged material	163	40551	

Load number	Load Site	Permit #	Disposal Date	Tug/AIS	Disposal Time	Latitude of Dump	Longitude of Dump	Wood %	Disposal Site	Barge Name	Material	Load Volume m3	Total Volume	Daily Total
229	Kingcome	PYR-00419-1	1/11/2024	Inlet Royal	1616	50° 55.009'	126° 13.007'	<1%	Kingcome Inlet	ME302	Dredged material	163	40714	978
230	Kingcome	PYR-00419-1	1/12/2024	Inlet Royal	834	50° 55.014'	126° 13.006'	<1%	Kingcome Inlet	ME302	Dredged material	163	40877	
231	Kingcome	PYR-00419-1	1/12/2024	Inlet Royal	938	50° 55.015'	126° 13.011'	<1%	Kingcome Inlet	ME302	Dredged material	163	41040	
232	Kingcome	PYR-00419-1	1/12/2024	Inlet Royal	1045	50° 55.012'	126° 13.004'	<1%	Kingcome Inlet	ME302	Dredged material	163	41203	
233	Kingcome	PYR-00419-1	1/12/2024	Inlet Royal	1213	50° 55.020'	126° 13.009'	<1%	Kingcome Inlet	ME302	Dredged material	163	41366	
234	Kingcome	PYR-00419-1	1/12/2024	Inlet Royal	1317	50° 55.021'	126° 13.010'	<1%	Kingcome Inlet	ME302	Dredged material	163	41529	
235	Kingcome	PYR-00419-1	1/12/2024	Inlet Royal	1431	50° 55.021'	126° 13.013'	<1%	Kingcome Inlet	ME302	Dredged material	163	41692	
236	Kingcome	PYR-00419-1	1/12/2024	Inlet Royal	1526	50° 55.010'	126° 13.007'	<1%	Kingcome Inlet	ME302	Dredged material	163	41855	1141
237	Kingcome	PYR-00419-1	1/13/2024	Inlet Royal	839	50° 55.020'	126° 13.009'	<1%	Kingcome Inlet	ME302	Dredged material	163	42018	
238	Kingcome	PYR-00419-1	1/13/2024	Inlet Royal	1141	50° 55.021'	126° 13.010'	<1%	Kingcome Inlet	ME302	Dredged material	163	42181	326
239	Kingcome	PYR-00419-1	1/14/2024	Inlet Royal	1045	50° 55.012'	126° 13.004'	<1%	Kingcome Inlet	ME302	Dredged material	163	42344	
240	Kingcome	PYR-00419-1	1/14/2024	Inlet Royal	1213	50° 55.020'	126° 13.009'	<1%	Kingcome Inlet	ME302	Dredged material	163	42507	
241	Kingcome	PYR-00419-1	1/14/2024	Inlet Royal	1345	50° 55.021'	126° 13.010'	<1%	Kingcome Inlet	ME302	Dredged material	163	42670	
242	Kingcome	PYR-00419-1	1/14/2024	Inlet Royal	1501	50° 55.021'	126° 13.013'	<1%	Kingcome Inlet	ME302	Dredged material	163	42833	
243	Kingcome	PYR-00419-1	1/14/2024	Inlet Royal	1645	50° 55.010'	126° 13.007'	<1%	Kingcome Inlet	ME302	Dredged material	163	42996	815
244	Kingcome	PYR-00419-1	1/15/2024	Inlet Royal	834	50° 55.014'	126° 13.006'	<1%	Kingcome Inlet	ME302	Dredged material	163	43159	
245	Kingcome	PYR-00419-1	1/15/2024	Inlet Royal	938	50° 55.015'	126° 13.011'	<1%	Kingcome Inlet	ME302	Dredged material	163	43322	
246	Kingcome	PYR-00419-1	1/15/2024	Inlet Royal	1045	50° 55.012'	126° 13.004'	<1%	Kingcome Inlet	ME302	Dredged material	163	43485	
247	Kingcome	PYR-00419-1	1/15/2024	Inlet Royal	1213	50° 55.020'	126° 13.009'	<1%	Kingcome Inlet	ME302	Dredged material	163	43648	
248	Kingcome	PYR-00419-1	1/15/2024	Inlet Royal	1317	50° 55.021'	126° 13.010'	<1%	Kingcome Inlet	ME302	Dredged material	163	43811	
249	Kingcome	PYR-00419-1	1/15/2024	Inlet Royal	1431	50° 55.021'	126° 13.013'	<1%	Kingcome Inlet	ME302	Dredged material	163	43974	
250	Kingcome	PYR-00419-1	1/15/2024	Inlet Royal	1545	50° 55.015'	126° 13.004'	<1%	Kingcome Inlet	ME302	Dredged material	163	44137	
251	Kingcome	PYR-00419-1	1/15/2024	Inlet Royal	1615	50° 55.010'	126° 13.008'	<1%	Kingcome Inlet	ME302	Dredged material	163	44300	1304

Load number	Load Site	Permit #	Disposal Date	Tug/AIS	Disposal Time	Latitude of Dump	Longitude of Dump	Wood %	Disposal Site	Barge Name	Material	Load Volume m3	Total Volume	Daily Total
252	Kingcome	PYR-00419-1	1/16/2024	Inlet Royal	1152	50° 55.017'	126° 13.009'	<1%	Kingcome Inlet	ME302	Dredged material	163	44463	
253	Kingcome	PYR-00419-1	1/16/2024	Inlet Royal	1325	50° 55.013'	126° 13.002'	<1%	Kingcome Inlet	ME302	Dredged material	163	44626	
254	Kingcome	PYR-00419-1	1/16/2024	Inlet Royal	1454	50° 55.018'	126° 13.001'	<1%	Kingcome Inlet	ME302	Dredged material	163	44789	489
255	Kingcome	PYR-00419-1	1/17/2024	Inlet Royal	650	50° 55.074'	126° 13.053'	<1%	Kingcome Inlet	ME302	Dredged material	163	44952	
256	Kingcome	PYR-00419-1	1/17/2024	Inlet Royal	803	50° 55.043'	126° 13.030'	<1%	Kingcome Inlet	ME302	Dredged material	163	45115	
257	Kingcome	PYR-00419-1	1/17/2024	Inlet Royal	908	50° 55.048'	126° 13.018'	<1%	Kingcome Inlet	ME302	Dredged material	163	45278	489
258	Kingcome	PYR-00419-1	1/18/2024	Inlet Royal	830	50° 55.079'	126° 13.036'	<1%	Kingcome Inlet	ME302	Dredged material	163	45441	
259	Kingcome	PYR-00419-1	1/18/2024	Inlet Royal	955	50° 55.083'	126° 13.038'	<1%	Kingcome Inlet	ME302	Dredged material	163	45604	
260	Kingcome	PYR-00419-1	1/18/2024	Inlet Royal	1058	50° 55.080'	126° 13.027'	<2%	Kingcome Inlet	ME302	Dredged material	163	45767	
261	Kingcome	PYR-00419-1	1/18/2024	Inlet Royal	1214	50° 55.035'	126° 13.030'	<1%	Kingcome Inlet	ME302	Dredged material	163	45930	
262	Kingcome	PYR-00419-1	1/18/2024	Inlet Royal	1604	50° 55.075'	126° 13.036'	<1%	Kingcome Inlet	ME302	Dredged material	163	46093	
263	Kingcome	PYR-00419-1	1/18/2024	Inlet Royal	1711	50° 55.062'	126° 13.033'	<1%	Kingcome Inlet	ME302	Dredged material	163	46256	978
264	Kingcome	PYR-00419-1	1/19/2024	Inlet Royal	920	50° 55.063'	126° 13.038'	<1%	Kingcome Inlet	ME302	Dredged material	163	46419	
265	Kingcome	PYR-00419-1	1/19/2024	Inlet Royal	1026	50° 55.080'	126° 13.027'	<1%	Kingcome Inlet	ME302	Dredged material	163	46582	
266	Kingcome	PYR-00419-1	1/19/2024	Inlet Royal	1147	50° 55.074'	126° 13.035'	<1%	Kingcome Inlet	ME302	Dredged material	163	46745	
267	Kingcome	PYR-00419-1	1/19/2024	Inlet Royal	1320	50° 55.086'	126° 13.039'	<1%	Kingcome Inlet	ME302	Dredged material	163	46908	
268	Kingcome	PYR-00419-1	1/19/2024	Inlet Royal	1704	50° 55.062'	126° 13.038'	<1%	Kingcome Inlet	ME302	Dredged material	163	47071	815
269	Kingcome	PYR-00419-1	1/20/2024	Inlet Royal	845	50° 55.073'	126° 13.032'	<1%	Kingcome Inlet	ME302	Dredged material	163	47234	
270	Kingcome	PYR-00419-1	1/20/2024	Inlet Royal	1003	50° 55.033'	126° 13.031'	<1%	Kingcome Inlet	ME302	Dredged material	163	47397	
271	Kingcome	PYR-00419-1	1/20/2024	Inlet Royal	1136	50° 55.081'	126° 13.033'	<1%	Kingcome Inlet	ME302	Dredged material	163	47560	
272	Kingcome	PYR-00419-1	1/20/2024	Inlet Royal	1259	50° 55.061'	126° 13.028'	<2%	Kingcome Inlet	ME302	Dredged material	163	47723	
273	Kingcome	PYR-00419-1	1/20/2024	Inlet Royal	1420	50° 55.058'	126° 13.032'	<2%	Kingcome Inlet	ME302	Dredged material	163	47886	
274	Kingcome	PYR-00419-1	1/20/2024	Inlet Royal	1647	50° 55.056'	126° 13.046'	<1%	Kingcome Inlet	ME302	Dredged material	163	48049	978

Load number	Load Site	Permit #	Disposal Date	Tug/AIS	Disposal Time	Latitude of Dump	Longitude of Dump	Wood %	Disposal Site	Barge Name	Material	Load Volume m3	Total Volume	Daily Total
275	Kingcome	PYR-00419-1	1/21/2024	Inlet Royal	840	50° 55.075'	126° 13.039'	<1%	Kingcome Inlet	ME302	Dredged material	163	48212	
276	Kingcome	PYR-00419-1	1/21/2024	Inlet Royal	955	50° 55.069'	126° 13.032'	<1%	Kingcome Inlet	ME302	Dredged material	163	48375	
277	Kingcome	PYR-00419-1	1/21/2024	Inlet Royal	1131	50° 55.042'	126° 13.036'	<1%	Kingcome Inlet	ME302	Dredged material	163	48538	
278	Kingcome	PYR-00419-1	1/21/2024	Inlet Royal	1243	50° 55.062'	126° 13.040'	<1%	Kingcome Inlet	ME302	Dredged material	163	48701	
279	Kingcome	PYR-00419-1	1/21/2024	Inlet Royal	1405	50° 55.061'	126° 13.034'	<1%	Kingcome Inlet	ME302	Dredged material	163	48864	
280	Kingcome	PYR-00419-1	1/21/2024	Inlet Royal	1527	50° 55.064'	126° 13.038'	<1%	Kingcome Inlet	ME302	Dredged material	163	49027	
281	Kingcome	PYR-00419-1	1/21/2024	Inlet Royal	1636	50° 55.067'	126° 13.037'	<1%	Kingcome Inlet	ME302	Dredged material	163	49190	
282	Kingcome	PYR-00419-1	1/21/2024	Inlet Royal	1751	50° 55.055'	126° 13.037'	<1%	Kingcome Inlet	ME302	Dredged material	163	49353	1304
283	Kingcome	PYR-00419-1	1/22/2024	Inlet Royal	820	50° 55.066'	126° 13.041'	<1%	Kingcome Inlet	ME302	Dredged material	163	49516	
284	Kingcome	PYR-00419-1	1/22/2024	Inlet Royal	930	50° 55.060'	126° 13.045'	<1%	Kingcome Inlet	ME302	Dredged material	163	49679	
285	Kingcome	PYR-00419-1	1/22/2024	Inlet Royal	1116	50° 55.063'	126° 13.041'	<2%	Kingcome Inlet	ME302	Dredged material	164	49843	
286	Kingcome	PYR-00419-1	1/22/2024	Inlet Royal	1242	50° 55.070'	126° 13.037'	<1%	Kingcome Inlet	ME302	Dredged material	164	50007	
287	Kingcome	PYR-00419-1	1/22/2024	Inlet Royal	1351	50° 55.065'	126° 13.038'	<1%	Kingcome Inlet	ME302	Dredged material	164	50171	
288	Kingcome	PYR-00419-1	1/22/2024	Inlet Royal	1501	50° 55.066'	126° 13.033'	<1%	Kingcome Inlet	ME302	Dredged material	164	50335	982
289	Kingcome	PYR-00419-1	1/23/2024	Inlet Royal	832	50° 55.065'	126° 13.042'	<1%	Kingcome Inlet	ME302	Dredged material	163	50498	
290	Kingcome	PYR-00419-1	1/23/2024	Inlet Royal	934	50° 55.060'	126° 13.033'	<1%	Kingcome Inlet	ME302	Dredged material	163	50661	
291	Kingcome	PYR-00419-1	1/23/2024	Inlet Royal	1054	50° 55.0664	126° 13.039'	<1%	Kingcome Inlet	ME302	Dredged material	163	50824	
292	Kingcome	PYR-00419-1	1/23/2024	Inlet Royal	1216	50° 55.063'	126° 13.030'	<1%	Kingcome Inlet	ME302	Dredged material	163	50987	
293	Kingcome	PYR-00419-1	1/23/2024	Inlet Royal	1404	50° 55.066'	126° 13.034'	<1%	Kingcome Inlet	ME302	Dredged material	163	51150	
294	Kingcome	PYR-00419-1	1/23/2024	Inlet Royal	1527	50° 55.060'	126° 13.040'	<1%	Kingcome Inlet	ME302	Dredged material	163	51313	978
295	Kingcome	PYR-00419-1	1/24/2024	Inlet Royal	830	50° 55.070'	126° 13.036'	<1%	Kingcome Inlet	ME302	Dredged material	163	51476	
296	Kingcome	PYR-00419-1	1/24/2024	Inlet Royal	943	50° 55.068'	126° 13.034'	<1%	Kingcome Inlet	ME302	Dredged material	163	51639	
297	Kingcome	PYR-00419-1	1/24/2024	Inlet Royal	1131	50° 55.063'	126° 13.034'	<1%	Kingcome Inlet	ME302	Dredged material	163	51802	

Load number	Load Site	Permit #	Disposal Date	Tug/AIS	Disposal Time	Latitude of Dump	Longitude of Dump	Wood %	Disposal Site	Barge Name	Material	Load Volume m3	Total Volume	Daily Total
298	Kingcome	PYR-00419-1	1/24/2024	Inlet Royal	1248	50° 55.066	126° 13.037'	<1%	Kingcome Inlet	ME302	Dredged material	163	51965	
299	Kingcome	PYR-00419-1	1/24/2024	Inlet Royal	1435	50° 55.059'	126° 13.040'	<1%	Kingcome Inlet	ME302	Dredged material	163	52128	
300	Kingcome	PYR-00419-1	1/24/2024	Inlet Royal	1549	50° 55.043'	126° 13.035'	<1%	Kingcome Inlet	ME302	Dredged material	163	52291	
301	Kingcome	PYR-00419-1	1/24/2024	Inlet Royal	1728	50° 55.060'	126° 13.048'	<1%	Kingcome Inlet	ME302	Dredged material	163	52454	1141
302	Kingcome	PYR-00419-1	1/25/2024	Inlet Royal	846	50° 55.059'	126° 13.042'	<1%	Kingcome Inlet	ME302	Dredged material	163	52617	
303	Kingcome	PYR-00419-1	1/25/2024	Inlet Royal	1008	50° 55.058'	126° 13.042'	<1%	Kingcome Inlet	ME302	Dredged material	163	52780	
304	Kingcome	PYR-00419-1	1/25/2024	Inlet Royal	1112	50° 55.066'	126° 13.037'	<1%	Kingcome Inlet	ME302	Dredged material	163	52943	
305	Kingcome	PYR-00419-1	1/25/2024	Inlet Royal	1229	50° 55.079'	126° 13.032'	<1%	Kingcome Inlet	ME302	Dredged material	163	53106	
306	Kingcome	PYR-00419-1	1/25/2024	Inlet Royal	1340	50° 55.061'	126° 13.035'	<1%	Kingcome Inlet	ME302	Dredged material	163	53269	
307	Kingcome	PYR-00419-1	1/25/2024	Inlet Royal	1457	50° 55.055'	126° 13.034'	<1%	Kingcome Inlet	ME302	Dredged material	163	53432	
308	Kingcome	PYR-00419-1	1/25/2024	Inlet Royal	1618	50° 55.060'	126° 13.039'	<1%	Kingcome Inlet	ME302	Dredged material	163	53595	
309	Kingcome	PYR-00419-1	1/25/2024	Inlet Royal	1737	50° 55.057'	126° 13.037'	<1%	Kingcome Inlet	ME302	Dredged material	163	53758	1304
310	Kingcome	PYR-00419-1	1/26/2024	Inlet Royal	835	50° 55.064'	126° 13.035'	<1%	Kingcome Inlet	ME302	Dredged material	163	53921	
311	Kingcome	PYR-00419-1	1/26/2024	Inlet Royal	951	50° 55.063'	126° 13.039'	<1%	Kingcome Inlet	ME302	Dredged material	163	54084	
312	Kingcome	PYR-00419-1	1/26/2024	Inlet Royal	1045	50° 55.054'	126° 13.038'	<1%	Kingcome Inlet	ME302	Dredged material	163	54247	
313	Kingcome	PYR-00419-1	1/26/2024	Inlet Royal	1201	50° 55.069'	126° 13.033'	<1%	Kingcome Inlet	ME302	Dredged material	163	54410	
314	Kingcome	PYR-00419-1	1/26/2024	Inlet Royal	1306	50° 55.067'	126° 13.034'	<1%	Kingcome Inlet	ME302	Dredged material	163	54573	
315	Kingcome	PYR-00419-1	1/26/2024	Inlet Royal	1403	50° 55.067'	126° 13.034'	<1%	Kingcome Inlet	ME302	Dredged material	163	54736	
316	Kingcome	PYR-00419-1	1/26/2024	Inlet Royal	1456	50° 55.055'	126° 13.038'	<1%	Kingcome Inlet	ME302	Dredged material	163	54899	
317	Kingcome	PYR-00419-1	1/26/2024	Inlet Royal	1602	50° 55.059'	126° 13.034'	<1%	Kingcome Inlet	ME302	Dredged material	163	55062	
318	Kingcome	PYR-00419-1	1/26/2024	Inlet Royal	1703	50° 55.048'	126° 13.040'	<1%	Kingcome Inlet	ME302	Dredged material	163	55225	1467
319	Kingcome	PYR-00419-1	1/27/2024	Inlet Royal	826	50° 55.050'	126° 13.038'	<1%	Kingcome Inlet	ME302	Dredged material	163	55388	
320	Kingcome	PYR-00419-1	1/27/2024	Inlet Royal	933	50° 55.052'	126° 13.033'	<1%	Kingcome Inlet	ME302	Dredged material	163	55551	

Load number	Load Site	Permit #	Disposal Date	Tug/AIS	Disposal Time	Latitude of Dump	Longitude of Dump	Wood %	Disposal Site	Barge Name	Material	Load Volume m3	Total Volume	Daily Total
321	Kingcome	PYR-00419-1	1/27/2024	Inlet Royal	1031	50° 55.050'	126° 13.037'	<1%	Kingcome Inlet	ME302	Dredged material	163	55714	
322	Kingcome	PYR-00419-1	1/27/2024	Inlet Royal	1136	50° 55.045'	126° 13.038'	<1%	Kingcome Inlet	ME302	Dredged material	163	55877	
323	Kingcome	PYR-00419-1	1/27/2024	Inlet Royal	1250	50° 55.052'	126° 13.036'	<1%	Kingcome Inlet	ME302	Dredged material	163	56040	
324	Kingcome	PYR-00419-1	1/27/2024	Inlet Royal	1342	50° 55.061'	126° 13.044'	<1%	Kingcome Inlet	ME302	Dredged material	163	56203	
325	Kingcome	PYR-00419-1	1/27/2024	Inlet Royal	1440	50° 55.065'	126° 13.034'	<1%	Kingcome Inlet	ME302	Dredged material	163	56366	
326	Kingcome	PYR-00419-1	1/27/2024	Inlet Royal	1607	50° 55.049'	126° 13.048'	<1%	Kingcome Inlet	ME302	Dredged material	163	56529	1304
327	Kingcome	PYR-00419-1	1/28/2024	Inlet Royal	820	50° 55.049'	126° 13.042'	<1%	Kingcome Inlet	ME302	Dredged material	163	56692	
328	Kingcome	PYR-00419-1	1/28/2024	Inlet Royal	912	50° 55.052'	126° 13.037'	<1%	Kingcome Inlet	ME302	Dredged material	163	56855	
329	Kingcome	PYR-00419-1	1/28/2024	Inlet Royal	1011	50° 55.050'	126° 13.037'	<1%	Kingcome Inlet	ME302	Dredged material	163	57018	
330	Kingcome	PYR-00419-1	1/28/2024	Inlet Royal	1122	50° 55.048'	126° 13.039'	<1%	Kingcome Inlet	ME302	Dredged material	163	57181	
331	Kingcome	PYR-00419-1	1/28/2024	Inlet Royal	1220	50° 55.052'	126° 13.035'	<1%	Kingcome Inlet	ME302	Dredged material	163	57344	
332	Kingcome	PYR-00419-1	1/28/2024	Inlet Royal	1343	50° 55.061'	126° 13.042'	<1%	Kingcome Inlet	ME302	Dredged material	163	57507	
333	Kingcome	PYR-00419-1	1/28/2024	Inlet Royal	1436	50° 55.063'	126° 13.031'	<1%	Kingcome Inlet	ME302	Dredged material	163	57670	
334	Kingcome	PYR-00419-1	1/28/2024	Inlet Royal	1526	50° 55.047'	126° 13.034'	<1%	Kingcome Inlet	ME302	Dredged material	163	57833	
335	Kingcome	PYR-00419-1	1/28/2024	Inlet Royal	1624	50° 55.051'	126° 13.039'	<1%	Kingcome Inlet	ME302	Dredged material	163	57996	
336	Kingcome	PYR-00419-1	1/28/2024	Inlet Royal	1724	50° 55.060'	126° 13.045'	<1%	Kingcome Inlet	ME302	Dredged material	163	58159	1630
337	Kingcome	PYR-00419-1	1/29/2024	Inlet Royal	1322	50° 55.055'	126° 13.036'	<1%	Kingcome Inlet	ME302	Dredged material	163	58322	
338	Kingcome	PYR-00419-1	1/29/2024	Inlet Royal	1420	50° 55.032'	126° 13.021'	<1%	Kingcome Inlet	ME302	Dredged material	163	58485	
339	Kingcome	PYR-00419-1	1/29/2024	Inlet Royal	1520	50° 55.052'	126° 13.035'	<1%	Kingcome Inlet	ME302	Dredged material	163	58648	
340	Kingcome	PYR-00419-1	1/29/2024	Inlet Royal	1622	50° 55.046'	126° 13.046'	<1%	Kingcome Inlet	ME302	Dredged material	163	58811	
341	Kingcome	PYR-00419-1	1/29/2024	Inlet Royal	1717	50° 55.057'	126° 13.045'	<1%	Kingcome Inlet	ME302	Dredged material	163	58974	
342	Kingcome	PYR-00419-1	1/29/2024	Inlet Royal	1812	50° 55.049'	126° 13.034'	<1%	Kingcome Inlet	ME302	Dredged material	163	59137	978

APPENDIX G

CONSTRUCTION CONTRACT

APPENDIX H

CONSTRUCTION DRAWINGS

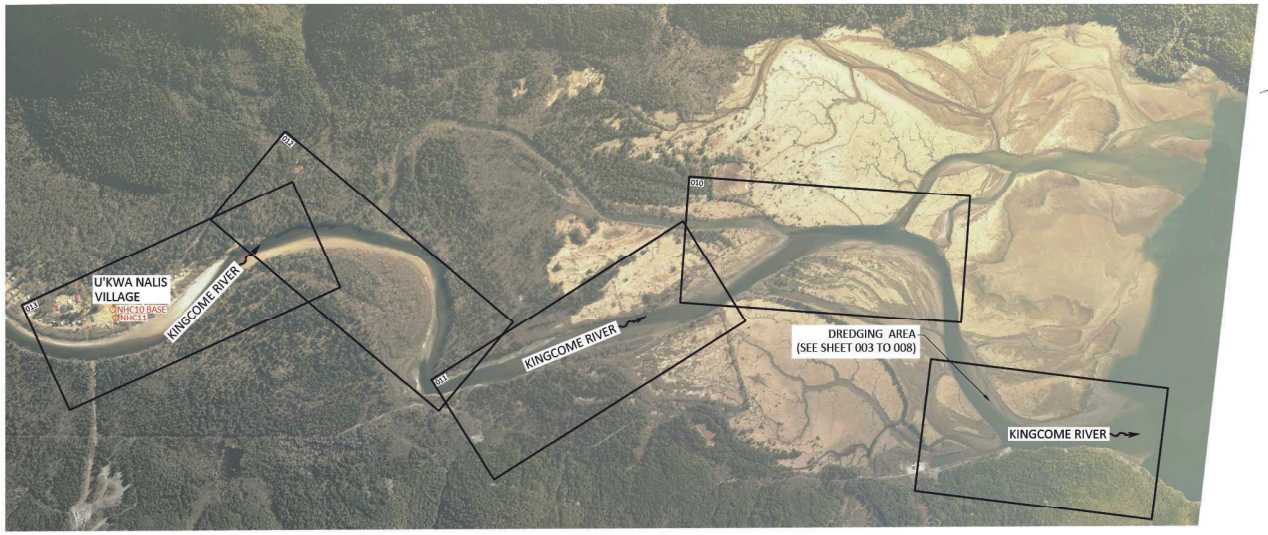
KINGCOME EMERGENCY DEBRIS & SEDIMENT MANAGEMENT PROJECT 2900439

ISSUED FOR CONSTRUCTION

DRAWING INDEX		
SHEET No.	SHEET DESCRIPTION	REVISION
001	TITLE SHEET AND PROJECT LOCATION	1
002	GENERAL NOTES, DATUMS AND CONTROL	1
003	KINGCOME RIVER DREDGE - EXISTING SITE PLAN	1
004	KINGCOME RIVER DREDGE - DEVELOPED SITE PLAN	1
005	PROFILES - KINGCOME RIVER DREDGE	1
006	TYPICAL SECTIONS - KINGCOME RIVER DREDGE	1
007	DREDGE SECTIONS (1 OF 2)	1
008	DREDGE SECTIONS (2 OF 2)	1
009	DREDGEATE DISPOSAL AREA DETAILS	1
010	DEBRIS TRIMMING SITES LOCATIONS 1 OF 4	
011	DEBRIS TRIMMING SITES LOCATIONS 2 OF 4	
012	DEBRIS TRIMMING SITES LOCATIONS 3 OF 4	
013	DEBRIS TRIMMING SITES LOCATIONS 4 OF 4	
014	DEBRIS TRIMMING SITES - PLAN SHEET 1 PHOTO PLATES	
015	DEBRIS TRIMMING SITES - PLAN SHEET 2 PHOTO PLATES	
016	DEBRIS TRIMMING SITES - PLAN SHEET 3 PHOTO PLATES	
017	DEBRIS TRIMMING SITES - PLAN SHEET 4 PHOTO PLATES	



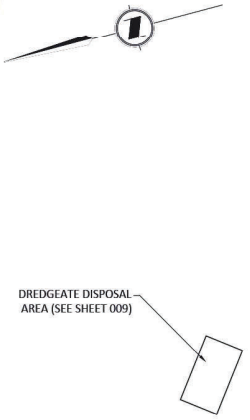
LOCATION MAP
NOT TO SCALE



ORTHOPHOTO OF KINGCOME RIVER (EAGLE MAPPING LTD., MARCH 27, 2023)

LEGEND
CONTROL POINT NHC0000

SITE PLAN
SCALE 1:12,500



0 0.25 0.5km
SCALE = 1:12,500

CLIENT:

REV.	DATE	DESCRIPTION
1	20231117	ISSUED FOR CONSTRUCTION

nhc northwest hydraulic consultants

SEAL:

PERMIT TO PRACTICE
NORTHWEST HYDRAULIC CONSULTANTS LTD.
PERMIT NUMBER: 1003221
The Association of Professional Engineers and Geoscientists of British Columbia

KINGCOME EMERGENCY DEBRIS & SEDIMENT MANAGEMENT PROJECT 2900439

TITLE SHEET AND PROJECT LOCATION

DESIGNED: AVB/VGB	SHEET ID: 20231117 3007807 NHC 2900439 KINGCOME EDSM IFC_1-001	SHEET No: 001
DRAFTED: CZZ	STATUS: ISSUED FOR CONSTRUCTION R1	
CHECKED: NAB/GFL	SCALE: AS SHOWN WHEN PLOTTED D SIZE	
APPROVED: DJG	DATE: 17 NOV 2023	REV No: 1

SUPERSEDES ALL REVISIONS WITH NUMBER PRECEDING

FILENAME: \\nanfile-van\Projects\Active\3007807 Kingcome Sediment Management\06 CAD\01_Production\000_dwt\20231117 3007807 NHC 2900439 KINGCOME EDSM IFC_1.dwg, 17 Nov 2023, 03:15 PM

GENERAL NOTES

1. DETAILED REQUIREMENTS FOR CONSTRUCTION ACTIVITIES ARE PROVIDED IN THE SPECIAL PROVISIONS. THE SPECIAL PROVISIONS TAKE PRECEDENCE OVER THESE DRAWINGS.
2. SCALES INDICATED ON THESE DRAWINGS ARE FULL SIZE, 22 IN. X 34 IN. THE DRAWINGS ARE DEVELOPED TO BEST DISPLAY INFORMATION AT FULL SIZE.
3. THE PROJECT OWNERS, DZAWADA'ENUXW FIRST NATION (DFN) AND THE PROVINCE OF BC (ENV) SHALL DESIGNATE A REPRESENTATIVE (OWNER'S REPRESENTATIVE) TO ADVISE, COORDINATE AND MONITOR ACTIVITIES ON BEHALF OF THE OWNER DURING CONSTRUCTION.
4. THE PROJECT OWNERS SHALL DESIGNATE A QUALIFIED ENVIRONMENTAL MONITOR AND QUALIFIED ARCHAEOLOGICAL MONITOR FOR THE PROJECT.
5. ACTIVE SMALL VESSEL OPERATIONS BY DFN WILL BE PRESENT DURING THE EXECUTION OF WORK. THE CONTRACTOR SHALL, IN COOPERATION WITH THE PROJECT OWNERS, DEVELOP A COMMUNICATION PLAN AND A NAVIGATION PLAN TO ENSURE THAT NECESSARY VESSEL OPERATIONS CAN BE CARRIED OUT IN A SAFE MANNER.
6. THE PROJECT SITE IS EXPOSED TO OCEAN AND RIVER CONDITIONS THAT WILL CHANGE OVER TIME. WEATHER EVENTS MAY CAUSE CHANGES IN RIVER FLOW AND CAUSE STORM SURGES AND WAVES. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ACCOUNT FOR AND PLAN WORK AROUND WEATHER AND TIDAL FORECASTS.

BATHYMETRIC SURVEY REQUIREMENTS, DATUMS, DATUM CONVERSIONS AND CONTROL

1. BATHYMETRIC DATA WITHIN THE DREDGE AREA SURVEYED IN NOVEMBER 2023 BY JIM.
2. BATHYMETRY DATA OFF-SHORE AND WITHIN THE PROPOSED DISPOSAL AREA IS CANADIAN HYDROGRAPHIC SERVICE NON-NAVIGATIONAL (NONNA) DATA SOURCED FROM: https://data.chs-shc.ca/map.
3. SURVEY CONTROL HAS BEEN ESTABLISHED IN U'KWA NALIS VILLAGE AS SUMMARIZED IN THE TABLE BELOW AND SHOWN ON SHEET 001. CONTRACTOR MAY UTILIZE THIS CONTROL WITH A GNSS SET-UP AND EXTERNAL RADIO. CONTRACTOR MAY ESTABLISH CONTROL NEARER THE DREDGE AREA AT THEIR DISCRETION.

CONTROL POINTS TABLE

CONTROL POINT	EASTING (m)	NORTHING (m)	ELEVATION (m)
NHC10 BASE	697866.725	5650815.493	4.357
NHC11	697819.031	5650812.744	4.867

4. IN ADDITION TO THE CONTROL ESTABLISHED BY NHC, TWO FEDERAL BENCHMARKS ARE LOCATED SOUTHWEST OF THE WORK AREA. DETAILS UNDER THE "BENCHMARKS" TAB HERE: https://www.tides.gc.ca/en/stations/8348
5. CONTRACTOR SHALL CARRY OUT THE FOLLOWING MULTI-BEAM SURVEY:
   a. CONTROL SURVEY (DISCRETIONARY)
   b. PRE-CONSTRUCTION SURVEY
   c. POSITIONING SURVEYS
   d. PROGRESS SURVEYS (DISCRETIONARY)
   e. POST-CONSTRUCTION SURVEY
5. ALL ELEVATIONS SHOWN ON THESE DRAWINGS ARE IN CGVD 2013. SEE BELOW FOR DATUM CONVERSION.

	CGVD 2013	CHART DATUM
HIGHER HIGH WATER LARGE TIDE	3.22 m	5.73 m
HIGHER HIGH WATER MEAN TIDE	2.36 m	4.87m
MEAN WATER LEVEL	0.60 m	3.11 m
LOWER LOW WATER MEAN TIDE	-1.35 m	1.16 m
LOWER LOW WATER LARGE TIDE	-2.42 m	0.09 m

6. TO CONVERT FROM CHART DATUM TO CGVD 2013, SUBTRACT 2.509 m.
7. TO CONVERT FROM CGVD 2013 TO CHART DATUM, ADD 2.509 m
8. TIDE PREDICTIONS AND HEIGHTS FOR KINGCOME INLET (08348) ARE AVAILABLE ONLINE AT: https://www.tides.gc.ca/en/stations/8348

DREDGING:

1. CONTRACTOR MUST DREDGE AS SHOWN ON SHEETS 004 TO 008 OF THIS DRAWING SET. FOR ADDITIONAL REQUIREMENTS, REFER TO THE SPECIAL PROVISIONS.
2. THE PAYABLE OVER-DREDGE ALLOWANCE IS 0.3m WITHIN THE DREDGE AREA.
3. VERTICAL EXCAVATIONS (BOX CUTS) ARE PERSMISSIBLE AT THE UPSTREAM LIMIT AND AT THE MARGINS OF THE DREDGING. THE CONTRACTOR SHALL REMOVE ANY SLOUGH MATERIAL RESULTING FROM BOX CUTS SO THAT THE REQUIRED DREDGE ELEVATION IS ACHIEVED. NO SEPARATE PAYMENT SHALL BE MADE FOR THE REMOVAL OF SLOUGH MATERIAL.
4. CONTRACTOR SHALL NOT PERFORM EXCESSIVE OVER-DREDGING ADJACENT TO STREAM BANKS OF KINGCOME RIVER. DAMAGE TO STREAMBANKS AS A RESULT OF OVER-DREDGING SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
5. IF A HARD BOTTOM SURFACE IS ENCOUNTERED DURING DREDGING, CONTRACTOR SHALL HALT DREDGING IN THE AREA AND INFORM THE OWNER'S REPRESENTATIVE.
6. REFER TO THE CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN FOR ADDITIONAL DIRECTIVES REGARDING DREDGING AND DISPOSAL OF DREDGEATE.
7. IT IS RECOGNIZED THAT SLOUGHING OF THE DREGDED 2H: 1V SIDE SLOPES MAY OCCUR PRIOR TO THE POST-CONSTRUCTION SURVEY. A MINIMUM ACCEPTABLE, POST-CONSTRUCTION, BOTTOM WIDTH OF DREDGE EQUAL TO 17 m WILL BE ACCEPTABLE AS A WAY OF ACCOUNTING FOR SLOUGHING. THIS ALLOWANCE SHALL NOT BE INTERPRETED AS A PAYABLE "UNDER-DREDGE"

DEBRIS TRIMMING

1. REFER TO SHEETS 010 TO 013 FOR THE PHOTO POINTS. THESE ARE VANTAGE POINTS SHOWING THE LOCATION OF UNDERWATER DEBRIS REQUIRING TRIMMING. ACTUAL DEBRIS LOCATIONS ARE AT VARYING DISTANCES FROM THE PHOTO POINTS.
2. REFER TO SHEETS 014 TO 017 FOR PHOTO PLATES.
3. THE DEBRIS SURVEY (COLLECTION OF PHOTO POINTS) WAS CONDUCTED IN MARCH 2023; DEBRIS MAY HAVE SHIFTED SINCE THE SURVEY.
4. ONLY DEBRIS THAT IS PARTIALLY BURIED IN THE RIVERBED, WITHIN THE NAVIGABLE CHANNEL SHALL BE TRIMMED. DEBRIS JAMS FORMED ALONG THE RIVERBANKS TO NOT REQUIRE TRIMMING.
5. DEBRIS TO BE TRIMMED SHALL BE CONFIRMED BY THE ENVIRONMENTAL MONITOR OR OWNERS REPRESENTATIVE AS REQUIRED.
6. TRIMMING REFERS TO THE CUTTING OFF OF STEMS AND/ OR BRANCHES THAT PROTRUDE ABOVE THE RIVERBED AND POSE A THREAT TO SMALL WATERCRAFT.
7. DEBRIS SHALL BE TRIMMED TO LENGTHS NOT EXCEEDING 2m (6 FT). DEBRIS OF THIS SIZE SHALL GENERALLY BE LEFT IN PLACE TO FLOAT DOWN-RIVER AT THE NEXT HIGH FLOW.
8. THE NUMBER OF INDIVIDUAL CUTS REQUIRED MAY VARY BETWEEN 1,200 AND 1,300.
9. TRIMMING MUST BE CARRIED OUT BY A CERTIFIED DIVER, EXPERIENCED IN SUCH ACTIVITY, AND USING A HYDRAULIC SAW INTENDED FOR UNDERWATER USE.

RIVER HYDRAULICS

1. THE FOLLOWING HYDRAULIC CONDITIONS ARE FOR AN ESTIMATED MEAN WINTER FLOW OF 60 m^3/s, AND MEAN HIGH AND LOW TIDES:
   a. AT LOWER LOW WATER MEAN TIDE:
      i. RIVER FLOW DEPTH RANGE: 1.3 m TO 3.2 m
      ii. RIVER FLOW VELOCITY RANGE: 0.3 m/s TO 0.6 m/s (0.6 TO 1.2 KNOTS)
   b. AT HIGHER HIGH WATER MEAN TIDE:
      i. RIVER FLOW DEPTH RANGE: 4.5 m TO 6.0 m
      ii. RIVER FLOW VELOCITY RANGE: 0.05 m/s TO 0.07 m/s (0.1 TO 0.14 KNOTS)
2. RIVER FLOW FORECASTS ARE NOT AVAILABLE FOR KINGCOME RIVER.

CLIENT:

REV.	DATE	DESCRIPTION
1	20231117	ISSUED FOR CONSTRUCTION
	20231027	ISSUED FOR CONSTRUCTION

SEAL:

PERMIT TO PRACTICE
NORTHWEST HYDRAULIC CONSULTANTS LTD.
PERMIT NUMBER: 1003221
The Association of Professional Engineers and Geoscientists of British Columbia

KINGCOME EMERGENCY DEBRIS & SEDIMENT MANAGEMENT PROJECT 2900439

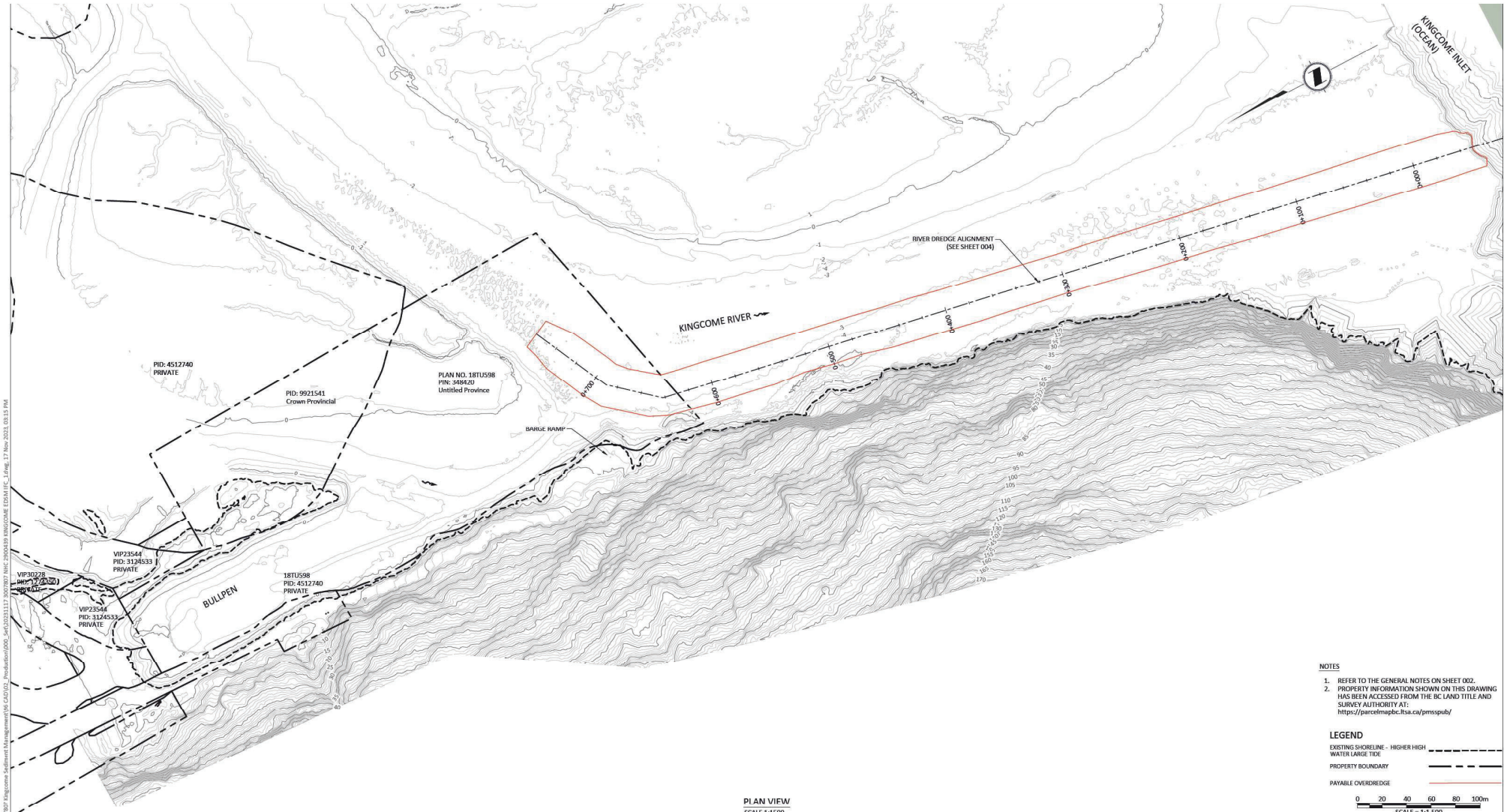
GENERAL NOTES, DATUMS AND CONTROL

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DRAFTED:	CZZ	STATUS:	ISSUED FOR CONSTRUCTION R1
CHECKED:	NAB/GFL	SCALE:	AS SHOWN WHEN PLOTTED D SIZE
APPROVED:	DJG	DATE:	17 NOV 2023

SHEET No: 002
REV No: 1

SUPERSEDES ALL REVISIONS WITH NUMBER PRECEDING

FILENAME: \\nanfile-van1\Projects\Active\3007807 Kingcome Sediment Management\06 CAD\02_Production\00_Set\20231117 3007807 NHC 2900439 KINGCOME EDSM IFC_1.dwg, 17 Nov 2023, 03:15 PM



PLAN VIEW
SCALE 1:1500

NOTES

1. REFER TO THE GENERAL NOTES ON SHEET 002.
2. PROPERTY INFORMATION SHOWN ON THIS DRAWING HAS BEEN ACCESSED FROM THE BC LAND TITLE AND SURVEY AUTHORITY AT: https://parcelmapbc.ltsa.ca/pmsspub/

LEGEND

EXISTING SHORELINE - HIGHER HIGH WATER LARGE TIDE

PROPERTY BOUNDARY

PAYABLE OVERDREDGE

0 20 40 60 80 100m
SCALE = 1:1,500

CLIENT: BRITISH COLUMBIA

REV.	DATE	DESCRIPTION
1	20231117	ISSUED FOR CONSTRUCTION
	20231027	ISSUED FOR CONSTRUCTION

nhc northwest hydraulic consultants

SEAL:

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The Association of Professional Engineers and Geoscientists of British Columbia

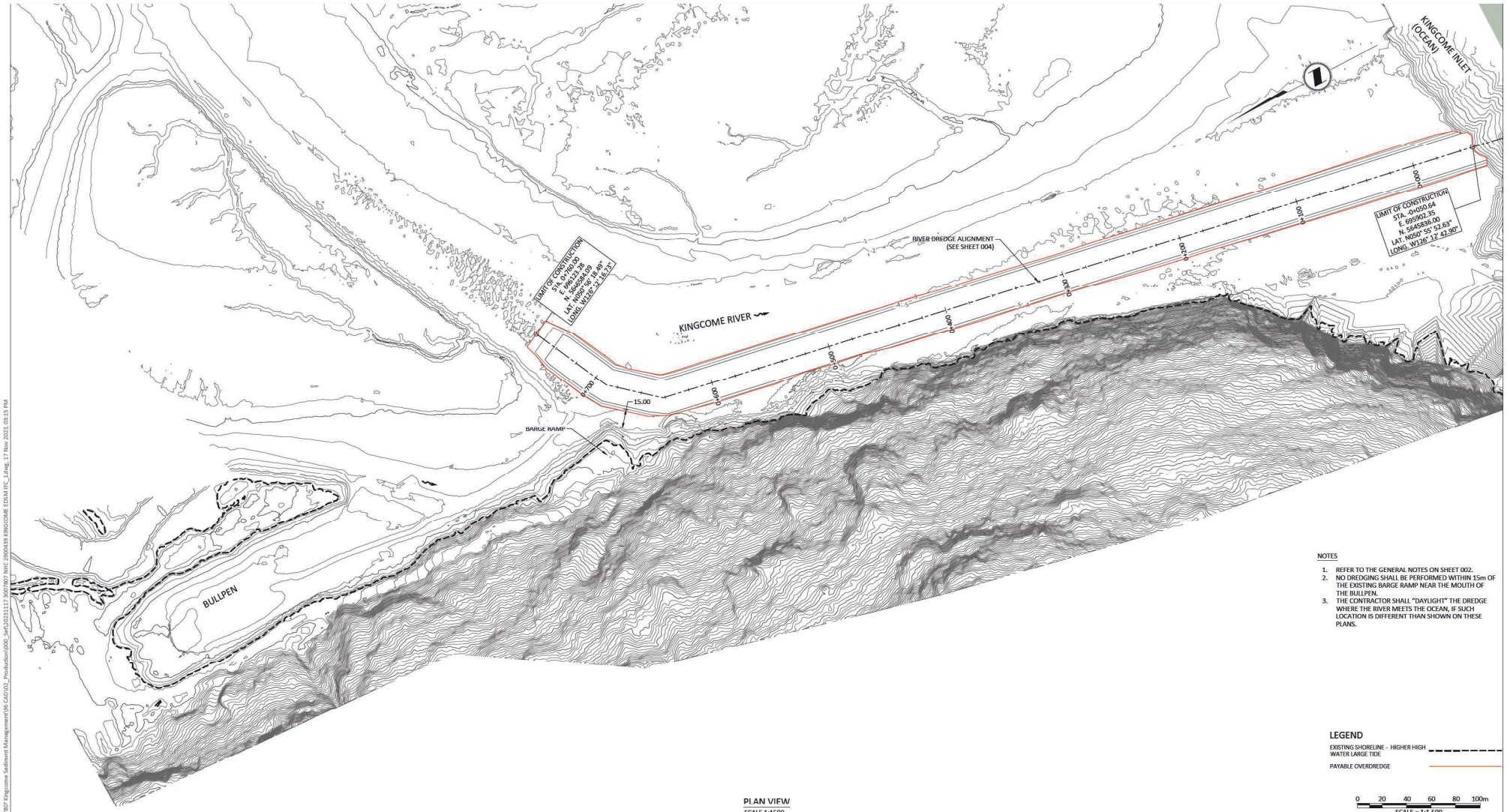
KINGCOME EMERGENCY DEBRIS & SEDIMENT MANAGEMENT PROJECT 2900439

KINGCOME RIVER DREDGE - EXISTING SITE PLAN

DESIGNED:	AVB/VGB	SHEET ID:	20231117 3007807 NHC 2900439 KINGCOME EDSM IFC_1-003	SHEET No: 003
DRAFTED:	CZZ	STATUS:	ISSUED FOR CONSTRUCTION R1	
CHECKED:	NAB/GFL	SCALE:	AS SHOWN WHEN PLOTTED D SIZE	
APPROVED:	DJG	DATE:	17 NOV 2023	REV No: 1

SUPERSEDES ALL REVISIONS WITH NUMBER PRECEDING

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PLAN VIEW
SCALE 1:1500

NOTES

1. REFER TO THE GENERAL NOTES ON SHEET 002.
2. NO DREDGING SHALL BE PERFORMED WITHIN 15m OF THE EXISTING BARGE RAMP NEAR THE MOUTH OF THE BULLPEN.
3. THE CONTRACTOR SHALL "DAYLIGHT" THE DREDGE WHERE THE RIVER MEETS THE OCEAN, IF SUCH LOCATION IS DIFFERENT THAN SHOWN ON THESE PLANS.

LEGEND

EXISTING SHORELINE - HIGHER HIGH WATER LARGE TIDE

PAYABLE OVERDREDGE

0 20 40 60 80 100m
SCALE = 1:1,500

CLIENT: BRITISH COLUMBIA

REV.	DATE	DESCRIPTION
1	20231117	ISSUED FOR CONSTRUCTION
	20231027	ISSUED FOR CONSTRUCTION

nhc northwest hydraulic consultants

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NORTHWEST HYDRAULIC CONSULTANTS LTD.
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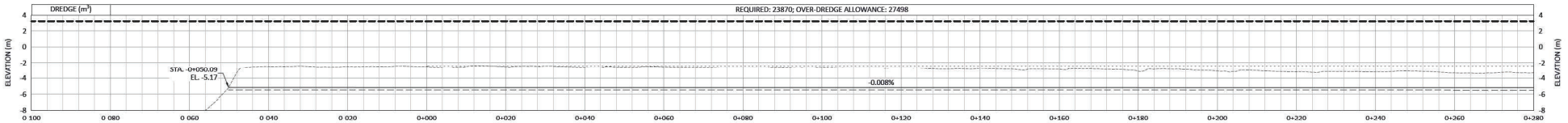
KINGCOME EMERGENCY DEBRIS & SEDIMENT MANAGEMENT PROJECT 2900439

KINGCOME RIVER DREDGE - DEVELOPED SITE PLAN

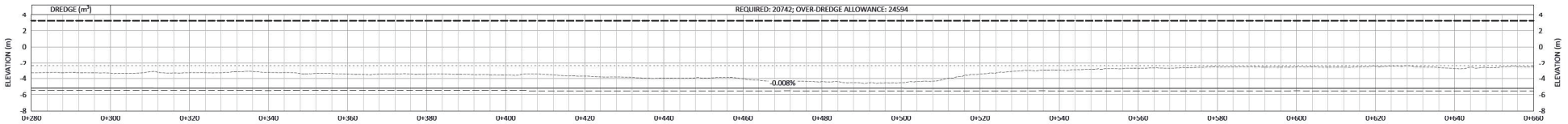
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CHECKED:	NAB/GFL	SCALE:	AS SHOWN WHEN PLOTTED D SIZE		
APPROVED:	DJG	DATE:	17 NOV 2023	REV No:	1

SUPERSEDES ALL REVISIONS WITH NUMBER PRECEDING

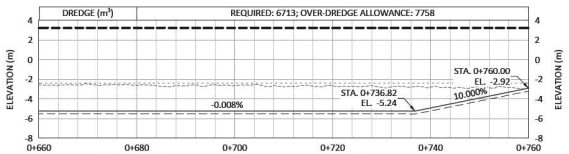
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PROFILE - KINGCOME RIVER STA 0+000 TO 0+380 (SHEET 004)
SCALE HORIZONTAL 1:500
SCALE VERTICAL 1:250



PROFILE - KINGCOME RIVER STA 0+380 TO 0+760(SHEET 004)
SCALE HORIZONTAL 1:500
SCALE VERTICAL 1:250



PROFILE - KINGCOME RIVER STA 0+380 TO 0+760(SHEET 004)
SCALE HORIZONTAL 1:500
SCALE VERTICAL 1:250

LEGEND

- HIGHER HIGH WATER MEAN TIDE
- LOWER LOW WATER LARGE TIDE
- REQUIRED DREDGE ELEVATION
- PAYABLE OVER-DREDGE (ALLOWANCE 0.3m)
- EXISTING RIVERBED

NOTES

1. REFER TO THE GENERAL NOTES ON SHEET 002.
2. DAMAGE TO STREAMBANKS AS A RESULT OF OVER-DREDGING SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
3. THE CONTRACTOR SHALL "DAYLIGHT" THE DREDGE WHERE THE RIVER MEETS THE OCEAN, IF SUCH LOCATION IS DIFFERENT THAN SHOWN ON THESE PLANS.

CLIENT:

REV.	DATE	DESCRIPTION
1	20231117	ISSUED FOR CONSTRUCTION
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KINGCOME EMERGENCY DEBRIS & SEDIMENT MANAGEMENT
PROJECT 2900439

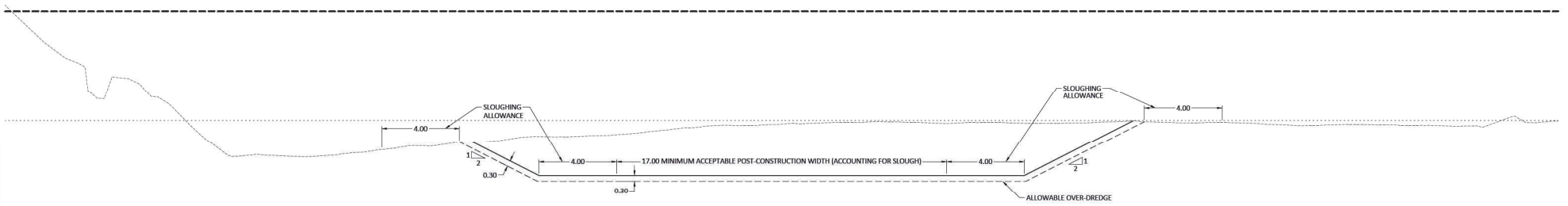
PROFILES - KINGCOME RIVER DREDGE

DESIGNED:	AVB/VGB	SHEET ID:	20231117 3007807 NHC 2900439 KINGCOME EDSM IFC_1-005
DRAFTED:	CZZ	STATUS:	ISSUED FOR CONSTRUCTION R1
CHECKED:	NAB/GFL	SCALE:	AS SHOWN WHEN PLOTTED D SIZE
APPROVED:	DJG	DATE:	17 NOV 2023

SHEET No: 005
REV No: 1

SUPERSEDES ALL REVISIONS WITH NUMBER PRECEDING

FILENAME: \\nasnfile-van1\Projects\Active\3007807 Kingcome Sediment Management\06 CAD\01_Production\005_Set\20231117 3007807 NHC 2900439 KINGCOME EDSM IFC_1.dwg, 17 Nov 2023, 03:15 PM



TYPICAL SECTION - KINGCOME RIVER DREDGING
SCALE HORIZONTAL 1:100
SCALE VERTICAL 1:100

LEGEND

- HIGHER HIGH WATER MEAN TIDE
- LOWER LOW WATER LARGE TIDE
- REQUIRED DREDGE ELEVATION
- PAYABLE OVER-DREDGE (ALLOWANCE 0.3m)
- EXISTING RIVERBED

NOTES

1. REFER TO THE GENERAL NOTES ON SHEET 002.
2. ALL SECTIONS ARE PLOTTED LOOKING UPSTREAM.

FILENAME: \\nanfile-van1\Projects\Active\3007807 Kingcome Sediment Management\06 CAD\02_Production\000_Set\20231117 3007807 NHC 2900439 KINGCOME EDSM IFC_1.dwg, 17 Nov 2023, 03:15 PM

CLIENT: BRITISH COLUMBIA

REV.	DATE	DESCRIPTION
1	20231117	ISSUED FOR CONSTRUCTION

nhc northwest hydraulic consultants

SEAL:

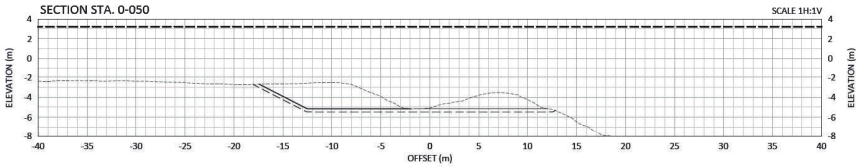
PERMIT TO PRACTICE
NORTHWEST HYDRAULIC CONSULTANTS LTD.
PERMIT NUMBER: 1003221
The Association of Professional Engineers and Geoscientists of British Columbia

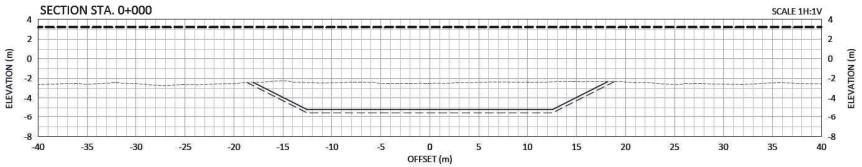
KINGCOME EMERGENCY DEBRIS & SEDIMENT MANAGEMENT PROJECT 2900439

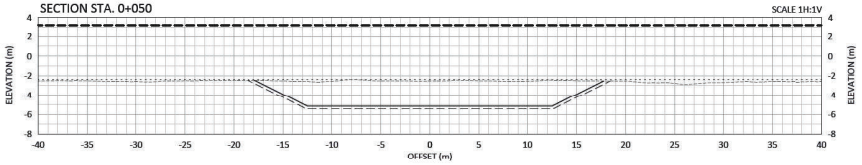
TYPICAL SECTIONS - KINGCOME RIVER DREDGE

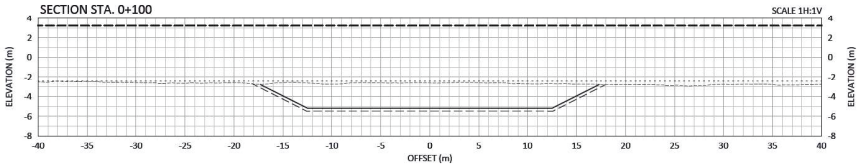
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CHECKED:	NAB/GFL	SCALE:	AS SHOWN WHEN PLOTTED D SIZE	
APPROVED:	DJG	DATE:	17 NOV 2023	REV No: 1

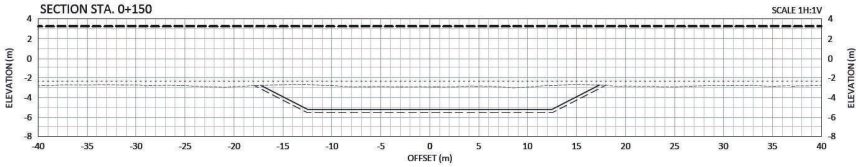
SUPERSEDES ALL REVISIONS WITH NUMBER PRECEDING

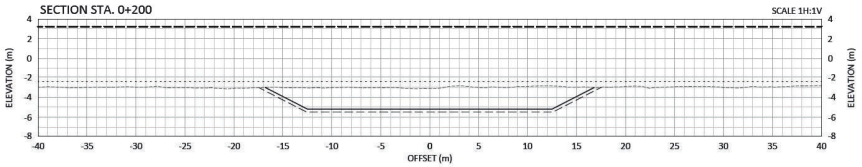


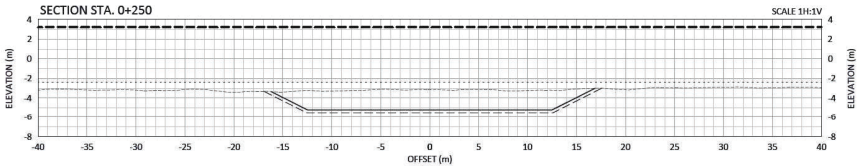


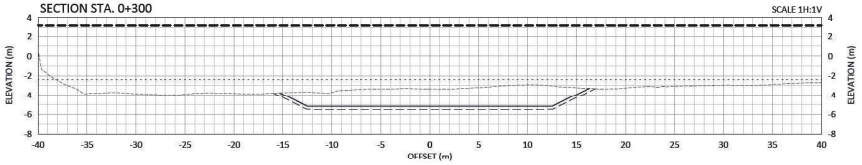


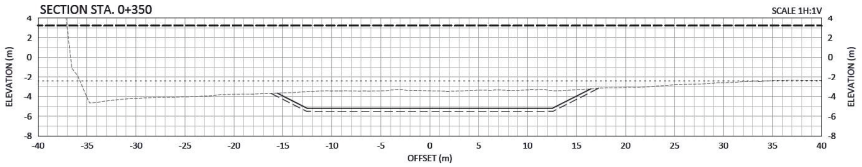












NOTES

1. REFER TO THE GENERAL NOTES ON SHEET 002.
2. ALL SECTIONS ARE PLOTTED LOOKING UPSTREAM.
3. REFER TO SHEET 004 FOR THE LOCATION OF SECTIONS BY STATION.
4. SLOUGHING ALLOWANCE NOT SHOWN.REFER TO TYPICAL SECTION AND DREDGING NOTES ON SHEET 002.

LEGEND

- HIGHER HIGH WATER MEAN TIDE
- LOWER LOW WATER LARGE TIDE
- REQUIRED DREDGE ELEVATION
- PAYABLE OVER-DREDGE (ALLOWANCE 0.3m)
- EXISTING RIVERBED

CLIENT:

BRITISH COLUMBIA

REV.	DATE	DESCRIPTION
1	20231117	ISSUED FOR CONSTRUCTION
	20231027	ISSUED FOR CONSTRUCTION

nhc northwest hydraulic consultants

SEAL:

PERMIT TO PRACTICE
NORTHWEST HYDRAULIC CONSULTANTS LTD.
PERMIT NUMBER: 1003221
The Association of Professional Engineers and Geoscientists of British Columbia

KINGCOME EMERGENCY DEBRIS & SEDIMENT MANAGEMENT
PROJECT 2900439

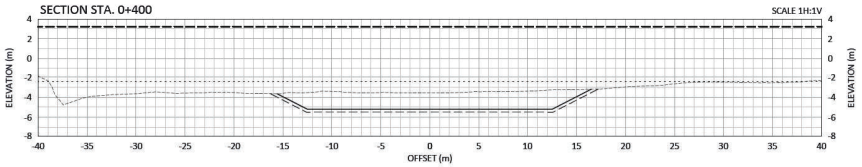
DREDGE SECTIONS (1 OF 2)

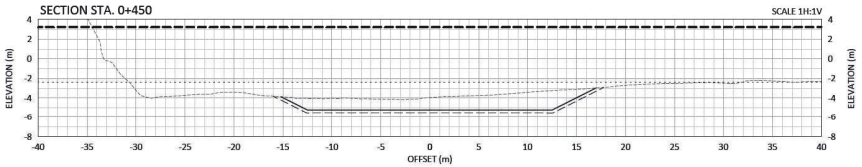
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DRAFTED:	CZZ	STATUS:	ISSUED FOR CONSTRUCTION R1
CHECKED:	NAB/GFL	SCALE:	AS SHOWN WHEN PLOTTED D SIZE
APPROVED:	DJG	DATE:	17 NOV 2023

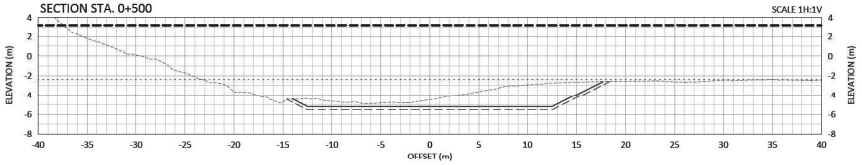
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REV No: 1

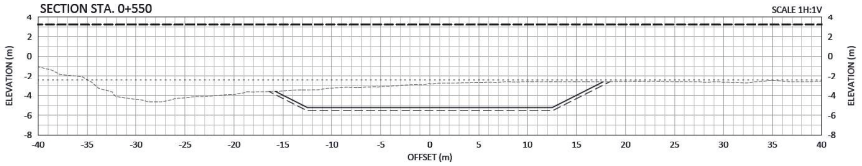
SUPERSEDES ALL REVISIONS WITH NUMBER PRECEDING

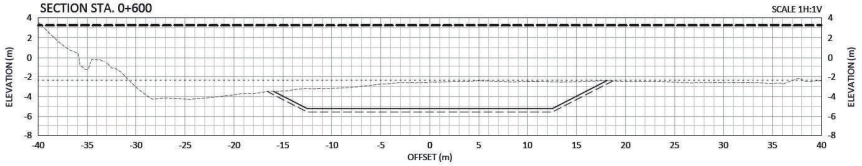
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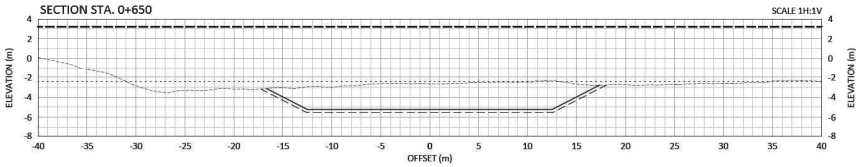


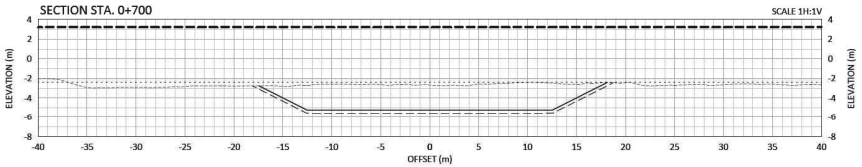


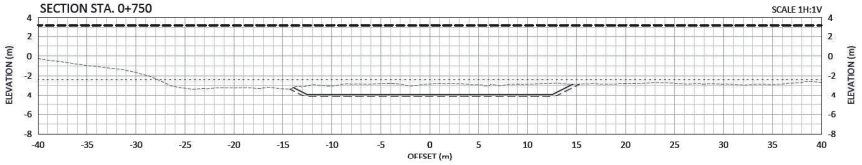


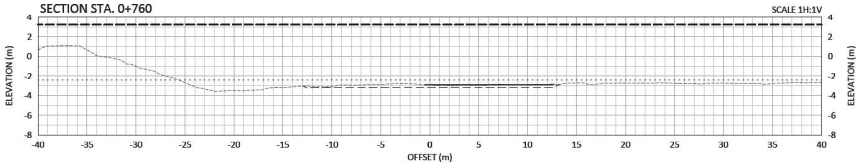












NOTES

1. REFER TO THE GENERAL NOTES ON SHEET 002.
2. ALL SECTIONS ARE PLOTTED LOOKING UPSTREAM.
3. REFER TO SHEET 004 FOR THE LOCATION OF SECTIONS BY STATION.
4. SLOUGHING ALLOWANCE NOT SHOWN.REFER TO TYPICAL SECTION AND DREDGING NOTES ON SHEET 002.

LEGEND

- HIGHER HIGH WATER MEAN TIDE
- LOWER LOW WATER LARGE TIDE
- REQUIRED DREDGE ELEVATION
- PAYABLE OVER-DREDGE (ALLOWANCE 0.3m)
- EXISTING RIVERBED

CLIENT: BRITISH COLUMBIA

REV.	DATE	DESCRIPTION
1	20231117	ISSUED FOR CONSTRUCTION
	20231027	ISSUED FOR CONSTRUCTION

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SEAL:

PERMIT TO PRACTICE
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PERMIT NUMBER: 1003221
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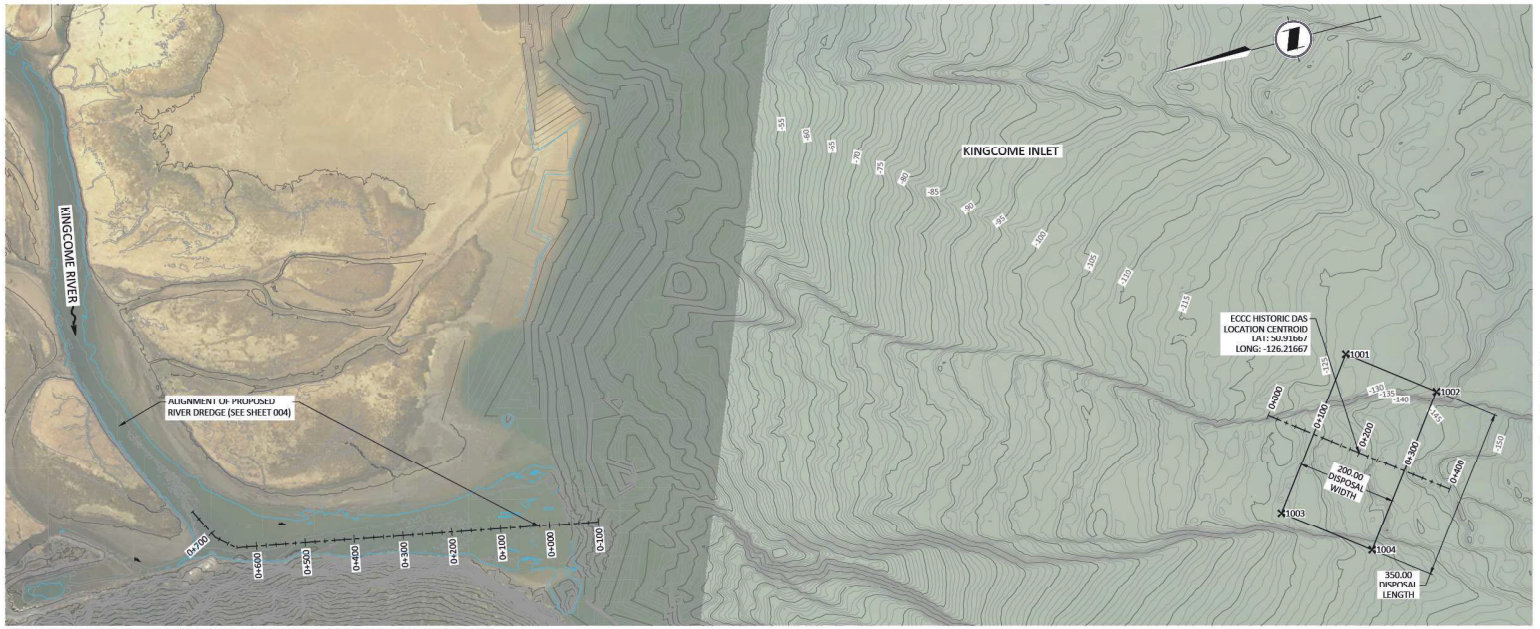
KINGCOME EMERGENCY DEBRIS & SEDIMENT MANAGEMENT
PROJECT 2900439

DREDGE SECTIONS (2 OF 2)

DESIGNED:	AVB/VGB	SHEET ID:	20231117 3007807 NHC 2900439 KINGCOME EDSM IFC_1-008	SHEET No:	008
DRAFTED:	CZZ	STATUS:	ISSUED FOR CONSTRUCTION R1		
CHECKED:	NAB/GFL	SCALE:	AS SHOWN WHEN PLOTTED D SIZE		
APPROVED:	DJG	DATE:	17 NOV 2023	REV No:	1

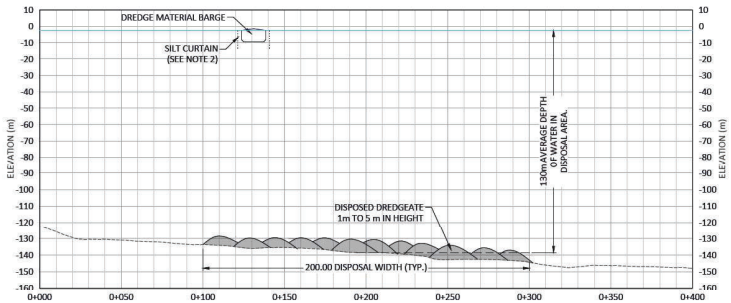
SUPERSEDES ALL REVISIONS WITH NUMBER PRECEDING

FILENAME: \\nanfile-van1\Projects\Active\3007807 Kingcome Sediment Management\06 CAD\01_Production\000_Set\20231117 3007807 NHC 2900439 KINGCOME EDSM IFC_1.dwg, 17 Nov 2023, 03:15 PM



ORTHOPHOTO OF KINGCOME RIVER (EAGLE MAPPING LTD., MARCH 27, 2023; Esri World Imagery, Retrieved JUNE 27, 2023)

PLAN VIEW
SCALE 1:5000



PROFILE - SEA BED AT ECCC HISTORIC DISPOSAL AT SEA SITE
SCALE 1:1500

NOTES

1. REFER TO THE GENERAL NOTES ON SHEET 002.
2. SILT CURTAIN LOCATIONS AND DEPTH TO BE DETERMINED IN CONSULTATION BETWEEN QEP AND CONTRACTOR.
3. BATHYMETRIC CONTOURS IN KINGCOME INLET BASED ON UNDATED CHS DATA AND MAY NOT BE ACCURATE.
4. REFER TO THE CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN FOR ADDITIONAL DIRECTIVES REGARDING DISPOSAL OF DREDGEATE.

DISPOSAL AREA COORDINATES TABLE

POINT #	EASTING (m)	NORTHING (m)
1001	695839.13	5644223.85
1002	695719.64	5644063.47
1003	695558.46	5644432.97
1004	695438.97	5644272.59

LEGEND

LOWER LOW WATER LARGE TIDE

CLIENT:

BRITISH COLUMBIA

REV.	DATE	DESCRIPTION
1	20231117	ISSUED FOR CONSTRUCTION

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KINGCOME EMERGENCY DEBRIS & SEDIMENT MANAGEMENT PROJECT 2900439

DREDGEATE DISPOSAL AREA DETAILS

DESIGNED:	AVB/VGB	SHEET ID:	20231117 3007807 NHC 2900439 KINGCOME EDSM IFC_1-009	SHEET No: 009
DRAFTED:	CZZ	STATUS:	ISSUED FOR CONSTRUCTION R1	
CHECKED:	NAB/GFL	SCALE:	AS SHOWN WHEN PLOTTED D SIZE	
APPROVED:	DJG	DATE:	17 NOV 2023	REV No: 1

SUPERSEDES ALL REVISIONS WITH NUMBER PRECEDING

FILENAME: \\nanfile-van1\Projects\Active\3007807 Kingcome Sediment Management\06 CAD\01_Production\000_Ref\20231117 3007807 NHC 2900439 KINGCOME EDSM IFC_1.dwg, 17 Nov 2023, 03:15 PM



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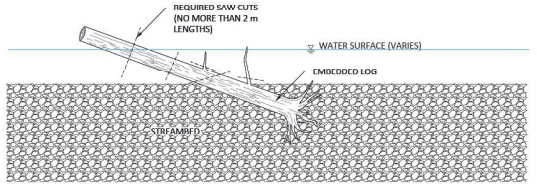
PLAN VIEW
SCALE 1:2000

NOTES

1. REFER TO THE GENERAL NOTES ON SHEET 002.
2. THE PHOTO I.D. POINTS ARE VANTAGE POINTS SHOWING THE APPROXIMATE LOCATIONS OF DEBRIS TO BE TRIMMED.
3. PHOTO PLATES CORRESPONDING TO EACH PHOTO I.D ARE SHOWN ON SHEETS 014 TO 017.

LEGEND

PHOTO I.D IMG_XXXX
PHOTO DIRECTION →



EMBEDDED LOG TRIMMING DETAIL
(NTS)

CLIENT:

REV.	DATE	DESCRIPTION
	20231027	ISSUED FOR CONSTRUCTION

SEAL:

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NORTHWEST HYDRAULIC CONSULTANTS LTD.
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KINGCOME EMERGENCY DEBRIS & SEDIMENT MANAGEMENT
PROJECT 2900439

DEBRIS TRIMMING SITE LOCATIONS 1 OF 4

DESIGNED:	AVB/VGB	SHEET ID:	20231117 3007807 NHC 2900439 KINGCOME EDSM IFC_1-010	SHEET No: 010
DRAFTED:	CZZ	STATUS:	ISSUED FOR CONSTRUCTION	
CHECKED:	NAB/GFL	SCALE:	AS SHOWN WHEN PLOTTED D SIZE	
APPROVED:	DJG	DATE:	17 NOV 2023	REV No:

SUPERSEDES ALL REVISIONS WITH NUMBER PRECEDING

FILENAME: \\vanfile-van\Projects\Active\3007807 Kingcome Sediment Management\06 CAD\02_Production\000_Set\20231117 3007807 NHC 2900439 KINGCOME EDSM IFC_1.dwg, 17 Nov 2023, 03:15 PM



PLAN VIEW
SCALE 1:2000

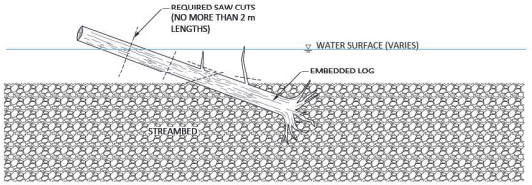
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SCALE = 1:2,000

NOTES

1. REFER TO THE GENERAL NOTES ON SHEET 002.
2. THE PHOTO I.D. POINTS ARE VANTAGE POINTS SHOWING THE APPROXIMATE LOCATIONS OF DEBRIS TO BE TRIMMED.
3. PHOTO PLATES CORRESPONDING TO EACH PHOTO I.D ARE SHOWN ON SHEETS 014 TO 017.

LEGEND

PHOTO I.D IMG_XXXX
PHOTO DIRECTION →



EMBEDDED LOG TRIMMING DETAIL
(NTS)

CLIENT:

REV.	DATE	DESCRIPTION
	20231027	ISSUED FOR CONSTRUCTION

SEAL:

PERMIT TO PRACTICE
NORTHWEST HYDRAULIC CONSULTANTS LTD.
PERMIT NUMBER: 1003221
The Association of Professional Engineers and Geoscientists of British Columbia

KINGCOME EMERGENCY DEBRIS & SEDIMENT MANAGEMENT PROJECT 2900439

DEBRIS TRIMMING SITE LOCATIONS 2 OF 4

DESIGNED:	AVB/VGB	SHEET ID:	20231117 3007807 NHC 2900439 KINGCOME EDSM IFC_1-011	SHEET No: 011
DRAFTED:	CZZ	STATUS:	ISSUED FOR CONSTRUCTION	
CHECKED:	NAB/GFL	SCALE:	AS SHOWN WHEN PLOTTED D SIZE	
APPROVED:	DJG	DATE:	17 NOV 2023	REV No:

SUPERSEDES ALL REVISIONS WITH NUMBER PRECEDING

FILENAME: \\nasfile-van\Projects\Active\3007807 Kingcome Sediment Management\06 CAD\02_Production\000_Set\20231117 3007807 NHC 2900439 KINGCOME EDSM IFC_1.dwg, 17 Nov 2023, 03:15 PM



PLAN VIEW
SCALE 1:2000

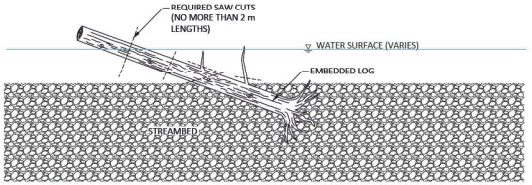
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SCALE = 1:2,000

NOTES

1. REFER TO THE GENERAL NOTES ON SHEET 002.
2. THE PHOTO I.D. POINTS ARE VANTAGE POINTS SHOWING THE APPROXIMATE LOCATIONS OF DEBRIS TO BE TRIMMED.
3. PHOTO PLATES CORRESPONDING TO EACH PHOTO I.D ARE SHOWN ON SHEETS 014 TO 017.

LEGEND

PHOTO I.D IMG_XXXX
PHOTO DIRECTION →



EMBEDDED LOG TRIMMING DETAIL
(NTS)

CLIENT:

REV.	DATE	DESCRIPTION
	20231027	ISSUED FOR CONSTRUCTION

SEAL:

PERMIT TO PRACTICE
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KINGCOME EMERGENCY DEBRIS & SEDIMENT MANAGEMENT PROJECT 2900439

DEBRIS TRIMMING SITE LOCATIONS 3 OF 4

DESIGNED:	AVB/VGB	SHEET ID:	20231117 3007807 NHC 2900439 KINGCOME EDSM IFC_1-012	SHEET No: 012
DRAFTED:	CZZ	STATUS:	ISSUED FOR CONSTRUCTION	
CHECKED:	NAB/GFL	SCALE:	AS SHOWN WHEN PLOTTED D SIZE	
APPROVED:	DJG	DATE:	17 NOV 2023	REV No:

SUPERSEDES ALL REVISIONS WITH NUMBER PRECEDING

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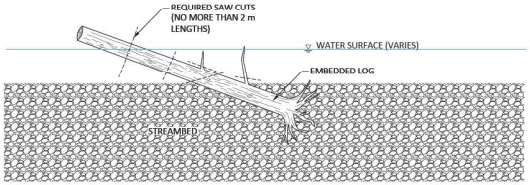
PLAN VIEW
SCALE 1:2000

NOTES

1. REFER TO THE GENERAL NOTES ON SHEET 002.
2. THE PHOTO I.D. POINTS ARE VANTAGE POINTS SHOWING THE APPROXIMATE LOCATIONS OF DEBRIS TO BE TRIMMED.
3. PHOTO PLATES CORRESPONDING TO EACH PHOTO I.D ARE SHOWN ON SHEETS 014 TO 017.

LEGEND

PHOTO I.D IMG_XXXX
PHOTO DIRECTION →



EMBEDDED LOG TRIMMING DETAIL
(NTS)

CLIENT:

REV.	DATE	DESCRIPTION
	20231027	ISSUED FOR CONSTRUCTION

SEAL:

PERMIT TO PRACTICE
NORTHWEST HYDRAULIC CONSULTANTS LTD.
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KINGCOME EMERGENCY DEBRIS & SEDIMENT MANAGEMENT PROJECT 2900439

DEBRIS TRIMMING SITE LOCATIONS 4 OF 4

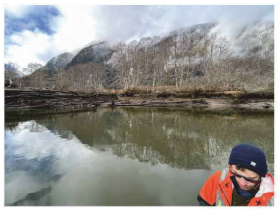
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CHECKED:	NAB/GFL	SCALE:	AS SHOWN WHEN PLOTTED D SIZE	
APPROVED:	DJG	DATE:	17 NOV 2023	REV No:

SUPERSEDES ALL REVISIONS WITH NUMBER PRECEDING

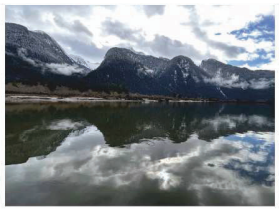
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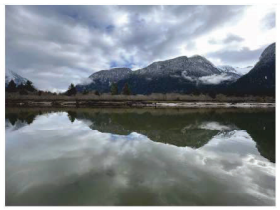
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NOTES

1. REFER TO THE GENERAL NOTES ON SHEET 002.

CLIENT:

BRITISH COLUMBIA

REV.	DATE	DESCRIPTION
	20231027	ISSUED FOR CONSTRUCTION

nhc northwest hydraulic consultants

SEAL:

PERMIT TO PRACTICE

NORTHWEST HYDRAULIC CONSULTANTS LTD.

PERMIT NUMBER: 1003221

The Association of Professional Engineers and Geoscientists of British Columbia

KINGCOME EMERGENCY DEBRIS & SEDIMENT MANAGEMENT
PROJECT 2900439

DEBRIS TRIMMING SITES - PLAN SHEET 1 PHOTO PLATES

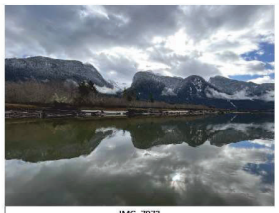
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CHECKED:	NAB/GFL	SCALE:	AS SHOWN WHEN PLOTTED D SIZE
APPROVED:	DJG	DATE:	17 NOV 2023

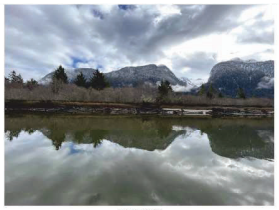
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REV No:

SUPERSEDES ALL REVISIONS WITH NUMBER PRECEDING

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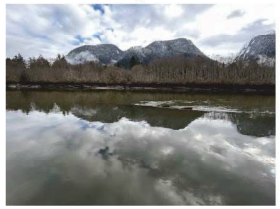

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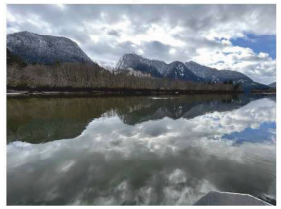

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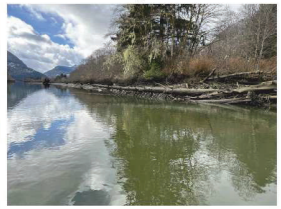

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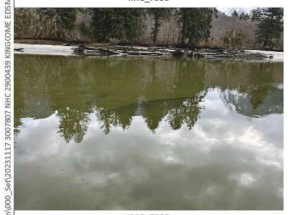

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NOTES

1. REFER TO THE GENERAL NOTES ON SHEET 002.

CLIENT:

BRITISH COLUMBIA

REV.	DATE	DESCRIPTION
	20231027	ISSUED FOR CONSTRUCTION

nhc northwest hydraulic consultants

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PERMIT NUMBER: 1003221

The Association of Professional Engineers and Geoscientists of British Columbia

KINGCOME EMERGENCY DEBRIS & SEDIMENT MANAGEMENT
PROJECT 2900439

DEBRIS TRIMMING SITES - PLAN SHEET 2 PHOTO PLATES

DESIGNED: AVB/VGB	SHEET ID: 20231117 3007807 NHC 2900439 KINGCOME EDSM IFC_1-015	SHEET No: 015
DRAFTED: CZZ	STATUS: ISSUED FOR CONSTRUCTION	
CHECKED: NAB/GFL	SCALE: AS SHOWN WHEN PLOTTED D SIZE	
APPROVED: DJG	DATE: 17 NOV 2023	REV No:

SUPERSEDES ALL REVISIONS WITH NUMBER PRECEDING

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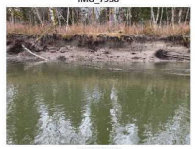

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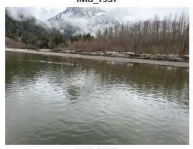

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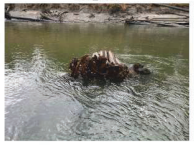

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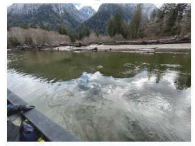

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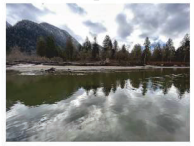

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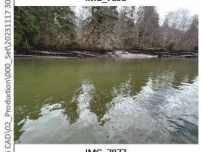

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NOTES

1. REFER TO THE GENERAL NOTES ON SHEET 002.

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KINGCOME EMERGENCY DEBRIS & SEDIMENT MANAGEMENT PROJECT 2900439

DEBRIS TRIMMING SITES - PLAN SHEET 3 PHOTO PLATES

DESIGNED:	AVB/VGB	SHEET ID: 20231117 3007807 NHC 2900439 KINGCOME EDSM IFC_1-016	SHEET No: 016
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CHECKED:	NAB/GFL	SCALE: AS SHOWN WHEN PLOTTED D SIZE	
APPROVED:	DJG	DATE: 17 NOV 2023	REV No:

SUPERSEDES ALL REVISIONS WITH NUMBER PRECEDING

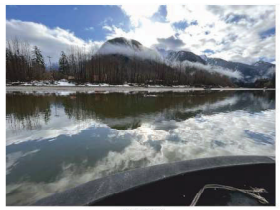
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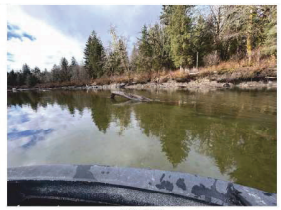

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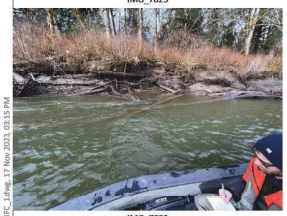

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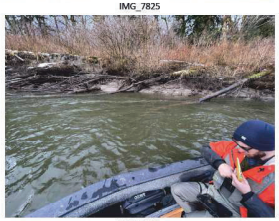

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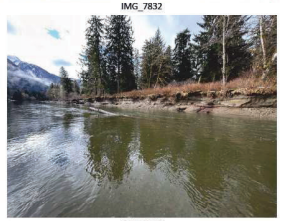

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KINGCOME EMERGENCY DEBRIS & SEDIMENT MANAGEMENT PROJECT 2900439

DEBRIS TRIMMING SITES - PLAN SHEET 4 PHOTO PLATES

DESIGNED:	AVB/VGB	SHEET ID:	20231117 3007807 NHC 2900439 KINGCOME EDSM IFC_1-017	SHEET No: 017
DRAFTED:	CZZ	STATUS:	ISSUED FOR CONSTRUCTION	
CHECKED:	NAB/GFL	SCALE:	AS SHOWN WHEN PLOTTED D SIZE	
APPROVED:	DJG	DATE:	17 NOV 2023	REV No:

SUPERSEDES ALL REVISIONS WITH NUMBER PRECEDING

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APPENDIX J

CONTRACTOR WEEKLY REPORTS

WEEKLY SUMMARY Nov. 12 - Nov. 19										
ACTIVITY	November	12	13	14	15	16	17	18	19	
MOBILE TO S ITE										TOTAL/HRS
	DD Catherwood Tug						DREDGING			
	SEA IMP VII				10	10	12	12	12	56
MANPOWER										
	MITCH BROWN			12	12	12	12	12	12	72
	LIAM GALBRAITH			12	12	12	12	12	12	72
	PROINSIAS BARRETT			12	12	12	12	12	12	72
	LUCAS MCKENZIE			12	12	12	12	12	12	72
	RAY GRAHAM			12	12	12	12	12	12	72
	JACK KRAFT			12	12	12	12	12	12	72
	BRUCE HARDING			12	12	12	12	12	12	72
	BRYON MAXWELL			12	12	12	12	12	12	72
DFN Affiliation	Peter COON			12	12	12	12	12	12	72
								TOTAL/hrs		648
EQUIPMENT										
	ME-209 (SPUD BARGE)			4	10	10	12	12	12	60
	CR-06			4	4	3	8	8	8	35
	ME-503 (FLAT SCOW)			0	10	10	12	12	12	56
	EXO2O			0		4.5	8.5	8.4	8	29.4
	LD019			0	1	0	8	4	3	16
	ME-302			0		0	8	10	10	28
	ME-004 (MILLER TUG)			0	2	6	12	12	12	44
	ME-006 (JET BOAT)			0	0	10	8	8	8	34
	ME-008 (DIVE BOAT)			0	0	0	8	8	8	24
LAND EQUIPMENT										TOTAL/HRS
										0
	LD- 004 (LOADER)				8	8	8	8	8	40
	LT-016				8	8	8	8	8	40
	LT-017				8	8	8	8	8	40
	LT-077				8	8	8	8	8	40
										TOTAL M/3
Dredgeate M/3							250	1000	1300	2550
	Start Station						0-055	0-055	0-035	
	Finish Station						0-035	0-035	0+005	
										MAN / DAYS
DFN /CAMP/MAN DAYS				11	11	11	11	11	11	66

WEEKLY SUMMARY Nov 20 - Nov 26										
ACTIVITY	November		20	21	22	23	24	25	26	
MOBILE TO S ITE			Mon.	Tues	Wed.	Thurs.	Fri.	Sat.	Sun.	TOTAL/HRS
	DD Catherwood Tug						DREDGING			
	SEA IMP VII		12	12	12	12	10	12	12	82
MANPOWER	BRENTON RYAN			12	12	10	10	12	12	68
	MITCH BROWN		12	12	OUT	OUT	OUT	OUT	OUT	24
	LIAM GALBRAITH		12	12	OUT	OUT	OUT	OUT	OUT	24
	PROINSIAS BARRETT		12	12	12	12	12	12	12	84
	LUCAS MCKENZIE		12	12	12	11.5	10	12	12	81.5
	RAY GRAHAM		12	12	12	11.5	10	12	12	81.5
	JACK KRAFT		12	12	12	11.5	10	12	12	81.5
	BRUCE HARDING		12	12	12	9.7	10	12	12	79.7
	BRYON MAXWELL		12	12	12	12	10	12	12	82
DFN Affiliation	Peter COON		12	12	12	12	10	12	12	82
	SUKRI DIGAALIE		12	10	12	12	10	12	12	80
	GUNNAR MAXWELL		12	10	12	12	10	12	12	80
DFN Affiliation	Willie Hemajalas		12	12	12	10	10	10	10	76
								TOTAL/hrs		856.2
EQUIPMENT										
	ME-209 (SPUD BARGE)		12	12	12	12	12	12	12	72
	CR-16		0			3		10		13
	ME-503 (FLAT SCOW)		8	8	8	8	8	8	8	48
	EXO2O		10	10	10	4	0	0	8	32
	LD019		2			2				2
	ME-302		8	8	8	8	8	8	8	48
	ME-004 (MILLER TUG)		6.8	8	8	4	8	8	8	44
	ME-005 (JET BOAT)		4	4	4	4	4	4	4	24
	ME-008 (DIVE BOAT)		1.9	10	10	10	10	10	10	
LAND EQUIPMENT										TOTAL/HRS
	LD- 004 (LOADER)		0	2	0	0	0	0	0	2
	LT-016		8	8	8	8	8	8	8	56
	LT-017		8	8	8	8	8	8	8	56
	LT-077		8	8	8	8	8	8	8	56
										TOTAL M/3
Dredgeate M/3			600	1050	900	1575	0	400	350	4875
	Start Station		0-055	0+020	0+40	0+55		0+75	0+75	
	Finish Station		0-035	0+040	0+50	0+75		0+85	0+85	
										Total/m3
	Survey reconcilliation								3800	8675
DIVERS										TOTAL HRS
	Tony Sandberg		10	10	10	10	6			46
	Richard Snow		10	10	10	10	10	10	10	70
	Kevin Grotheer		10	10	10	10	10	10	10	70
	Micheal Beniot		10	10	10	10	10	10	10	70
	Jaafar Altameemi		10	10	10	10	10	10	10	70
										MAN/DAYS
DFN CAMP			16	16	16	16	16	15	15	110

WEEKLY SUMMARY Nov 27 - Dec 03										
ACTIVITY	November		27	28	29	30	1	2	3	
MOBILE TO S ITE			Mon.	Tues	Wed.	Thurs.	Fri.	Sat.	Sun.	TOTAL/HRS
							DREDGING			
	Rental tug		12	12	12	12	12	12	12	84
MANPOWER	BRENTON RYAN		12	12	12	12	12	12	12	84
	MITCH BROWN							10	12	22
	LIAM GALBRAITH			8	12	12	12	12	12	68
	PROINSIAS BARRETT		12	12	12	12	12	12	12	84
	LUCAS MCKENZIE		12							12
	RAY GRAHAM		12							12
	JACK KRAFT		12							12
	BRUCE HARDING		12	12	12	12	12	12	12	84
	BRYON MAXWELL		12							12
DFN Affiliation	Peter COON		12	12	12	12	12	12	12	84
	SUKRI DIGAALIE		12	12	12	12	12	12	12	84
	GUNNAR MAXWELL		12	12	12	12	12	12	12	84
DFN Affiliation	Willie Hemajalas		12	12	10	12	10	10	12	78
	STEPHEN TALBOT			8	10	12	12	12	12	66
								TOTAL/hrs		702
EQUIPMENT										
	ME-209 (SPUD BARGE)		12	12	12	12	12	12	12	72
	CR-16		0	3		3	2	10		18
	ME-503 (FLAT SCOW)		8	8	8	8	8	8	8	48
	EXO2O		10	10	10	4	0	0	8	32
	LD019		2			2				2
	ME-302		8	8	8	8	8	8	8	48
	ME-004 (MILLER TUG)		6.8	8	8	4	8	8	8	44
	ME-005 (JET BOAT)		4	4	4	4	4	4	4	24
	ME-008 (DIVE BOAT)		10	10	10	10	10	10	10	70
LAND EQUIPMENT										TOTAL/HRS
	LD- 004 (LOADER)		0	2	0	0	0	0	0	2
	LT-016		8	8	8	8	8	8	8	56
	LT-017		8	8	8	8	8	8	8	56
	LT-077		8	8	8	8	8	8	8	56
										TOTAL M/3
Dredgeate M/3			600	800	1620	1420	1000	1200	1600	8240
	Start Station		0-085	0-020	0+85	0+120	0+120	0+135	0+150	
	Finish Station		0-090	0+035	0+100	0+120	0+130	0+122	0+170	
										Total/m3
	Survey reconcilliation									
DIVERS										TOTAL HRS
	Tony Sandberg									0
	Richard Snow		10	10	10	10	10	10	10	70
	Kevin Grotheer		10	10	10	10	10	10	10	70
	Micheal Beniot		10	10	10	10	10	10	10	70
	Jaafar Altameemi		10	10	10	10	10	10	10	70
		CUTS	217	117	196	100	73	97..	117	
										MAN/DAYS
DFN CAMP			15	16	14	14	14	14	14	101

WEEKLY SUMMARY Dec 4 - Dec 10										
ACTIVITY	December		4	5	6	7	8	9	10	
MOBILE TO SITE			Mon.	Tues	Wed.	Thurs.	Fri.	Sat.	Sun.	TOTAL/HRS
								DREDGING		
	Rental tug		12	12	12	12	12	12	12	84
MANPOWER	BRENTON RYAN									0
	MITCH BROWN		12	12	12	12	12	12	12	84
	LIAM GALBRAITH		12	12	12	12	12	12	12	84
	PROINNSIAS BARRETT		12							12
	MICHAEL WESLEY, OFA3		12	12	12	12	12	12	12	84
	LUCAS MACKENZIE			12	12	12	12	12	12	72
	RAY GRAHAM			12	12	12	12	12	12	72
	JACK KRAFT			12	12	12	12	12	12	72
	BRUCE HARDING		12							12
	BRYON MAXWELL			12	12	12	12	12	12	72
DFN Affiliation	Peter COON		12							12
	SHUKRI DIGAALE		12	12	12	12	12	12	12	84
	GUNNAR MARSHALL		12							12
DFN Affiliation	Willie Hemajalas		12	12	12	12	12	12	12	84
	STEPHEN TALBOT		12	12	12	12	12	12	12	84
								TOTAL/hrs		840
EQUIPMENT										
	ME-209 (SPUD BARGE)		12	12	12	12	12	12	12	84
	CR-16		3	2	1	4	11	11	10	42
	ME-503 (FLAT SCOW)		8	8	8	8	8	8	8	56
	EXO2O		11	11	11	8	0	0	0	41
	LD014									0
	ME-302		8	8	8	8	8	8	8	56
	ME-004 (MILLER TUG)		8	10	11	8	10	10	8	65
	ME-005 (JET BOAT)		2	2	3	2	2	4	2	17
	ME-008 (DIVE BOAT)		3	7	10	8	8	8	8	52
LAND EQUIPMENT										TOTAL/HRS
	LD- 004 (LOADER)		0	0	0	0	0	0	0	0
	LT-016		8	8	8	8	8	8	8	56
	LT-017		8	8	8	8	8	8	8	56
	LT-077		8	8	8	8	8	8	8	56
										TOTAL M/3
Dredgeate M/3			800	1400	1200	1200	1600	1400	1400	9000
	Start Station		0+175	0+170	0+185	0+200	0+210	0+230	0+250	
	Finish Station		0+180	0+190	0+200	0+210	0+240	0+245	0+265	
										Total/m3
	Survey reconcilliation									9000
DIVERS										TOTAL HRS
	Tony Sandberg									0
	Richard Snow		10	10	10	10	10	10	10	70
	Kevin Grotheer		10	10	10	10	10	10	10	70
	Micheal Beniot		10	10	10	10	10	10	10	70
	Jaafar Altameemi		10	10	10	10	10	10	10	70
		CUTS	62	117	103	89	89	85	61	
										MAN/DAYS
DFN CAMP			14	15	15	15	15	15	15	104

Date	Weather	Operator	Tug	Starting Station	Ending Station	# of loads	Material	Approx Volume	Comments
2023-12-04	Heavy Rain	Gunner	Inlet Royal	0+170	0+180	4	S/G	800	Clean up area 0+120-125&0+140-150
2023-12-05	Heavy Rain	Gunner/Lucas	Inlet Royal	0+170	0+190	8	S/G/W	1420	Large stump and rootball found
2023-12-06	Sunny/Fog	Lucas M	Inlet Royal	0+185	0+200	6	S/G	1200	
2023-12-07	Sunny/Fog	Lucas M/Liam	Inlet Royal	0+020 - 0+040	0+200 - 0+210	6	S/G/W	1200	Clean up area 0+020-0+040 EX020 break down Crane Dredge 0+200-0+210
2023-12-08	Sunny/Fog	Liam G	Inlet Royal	0+210	0+240	8	S/G	1600	
2023-12-09	Rain	Liam G	Inlet Royal	0+230	0+245	7	S/G	1400	

JJM Construction Ltd.

KINGCOME EDSM - DEBRIS / LOG TRIMMING DAILY REPORTS

NHC10-BASE	5650815.493	697866.73	4.4	MON
NHC11	5650812.744	697819.03	4.9	MON
JJM-499	5647044.311	696061.38	4.9	MON

DATE	POINT ID	Northing	Easting	Eleva	Cuts	Comments
2023-04-12	2312040001	5647621	697170.4	N/A	9	
2023-04-12	2312040002	5649648	697994.8	N/A	10	
2023-04-12	2312040003	5649670	698008.3	N/A	7	
2023-04-12	2312040004	5649697	698012	N/A	27	
2023-04-12	2312040005	5649713	698011	N/A	5	
2023-04-12	2312040006	5649185	697736.1	N/A	3	
2023-04-12	2312040007	5649191	697726.3	N/A	1	
			Daily Total :		62	

Superintendent:		Brenton Ryan
VESSEL	JJM AQUAQUEEN	
FBD Crew		
	Richard	Snow
	Kevin	Grotheer
	Mike	Benoit
	Jaafar	Al-Tameemi
JJM Crew	Hemajlas	Willie

Total to Date :	1635

JJM Construction Ltd.

KINGCOME EDSM - DEBRIS / LOG TRIMMING DAILY REPORTS

NHC10-BASE	5650815.493	697866.725	4.357	MON
NHC11	5650812.744	697819.031	4.867	MON
JJM-499	5647044.311	696061.378	4.931	MON

DATE	POINT ID	Northing	Easting	Elv.	Cuts	Comments
2023-05-12	2312050001	5649815.124	698018.738	N/A	63	
2023-05-12	2312050002	5647569.697	697097.87	N/A	32	
2023-05-12	2312050003	5647661.675	697134.387	N/A	18	
2023-05-12	2312050004	5647649.022	697139.134	N/A	4	

Daily Total :	117

Superintendent:	Mitch/Liam	
VESSEL	JJM AQUAQUEEN	
FBD Crew		
	Richard	Snow
	Kevin	Grotheer
	Mike	Benoit
	Jaafar	Al-Tameemi
JJM Crew	Hemajlas	Willie

Total to Date :	1752

JJM Construction Ltd.

KINGCOME EDSM - DEBRIS / LOG TRIMMING DAILY REPORTS

NHC10-BASE	5650815.493	697866.725	4.357	MON
NHC11	5650812.744	697819.031	4.867	MON
JJM-499	5647044.311	696061.378	4.931	MON

DATE	POINT ID	Northing	Easting	Elv.	Cuts	Comments
2023-06-12	2312060001	5649819.974	698017.605	N/A	42	
2023-06-12	2312060002	5647643.924	697118.825	N/A	42	
2023-06-12	2312060003	5647633.795	697116.655	N/A	19	
			Daily Total :		103	

Superintendent:		Mitch/Liam
VESSEL	JJM AQUAQUEEN	
FBD Crew		
	Richard	Snow
	Kevin	Grotheer
	Mike	Benoit
	Jaafar	Al-Tameemi
JJM Crew	Hemajlas	Willie

Total to Date :	1855

JJM Construction Ltd.

KINGCOME EDSM - DEBRIS / LOG TRIMMING DAILY REPORTS

NHC10-BASE	5650815.493	697866.725	4.357	MON
NHC11	5650812.744	697819.031	4.867	MON
JJM-499	5647044.311	696061.378	4.931	MON

DATE	POINT ID	Northing	Easting	Elv.	Cuts	Comments
2023-07-12	2312070001	5649835.391	698026.189	N/A	14	
2023-07-12	2312070002	5647631.910	697110.925	N/A	40	
2023-07-12	2312070003	5647614.313	697108.062	N/A	16	
2023-07-12	2312070004	5651325.916	697828.338	N/A	19	
			Daily Total :		89	

Superintendent:		Mitch/Liam
VESSEL	JJM AQUAQUEEN	
FBD Crew		
	Richard	Snow
	Kevin	Grotheer
	Mike	Benoit
	Jaafar	Al-Tameemi
JJM Crew	Hemajlas	Willie

Total to Date :	1944

JJM Construction Ltd.

KINGCOME EDSM - DEBRIS / LOG TRIMMING DAILY REPORTS

NHC10-BASE	5650815.493	697866.725	4.357	MON
NHC11	5650812.744	697819.031	4.867	MON
JJM-499	5647044.311	696061.378	4.931	MON

DATE	POINT ID	Northing	Easting	Elv.	Cuts	Comments
2023-08-12	2312080001	5651325.916	697828.338	N/A	23	
2023-08-12	2312080002	5651079.863	697672.117	N/A	43	
2023-08-12	2312080003	5651064.693	697669.420	N/A	12	
2023-08-12	2312080004	5651066.967	697677.217	N/A	6	
2023-08-12	2312080004	5647655.817	697142.276	N/A	5	
			Daily Total :		89	

Superintendent:		Mitch/Liam
VESSEL	JJM AQUAQUEEN	
FBD Crew		
	Richard	Snow
	Kevin	Grotheer
	Mike	Benoit
	Jaafar	Al-Tameemi
JJM Crew	Hemajlas	Willie

Total to Date :	2033

JJM Construction Ltd.

KINGCOME EDSM - DEBRIS / LOG TRIMMING DAILY REPORTS

NHC10-BASE	5650815.493	697866.725	4.357	MON
NHC11	5650812.744	697819.031	4.867	MON
JJM-499	5647044.311	696061.378	4.931	MON

DATE	POINT ID	Northing	Easting	Elv.	Cuts	Comments
2023-09-12	2312090001	5649466.781	697925.393	N/A	26	
2023-09-12	2312090002	5649470.252	697920.224	N/A	28	
2023-09-12	2312090003	5649917.185	697998.170	N/A	2	
2023-09-12	2312090004	5650592.246	697642.651	N/A	15	
2023-09-12	2312090005	5649451.529	697920.8	N/A	14	
			Daily Total :		85	

Superintendent:		Mitch/Liam
VESSEL	JJM AQUAQUEEN	
FBD Crew		
	Richard	Snow
	Kevin	Grotheer
	Mike	Benoit
	Jaafar	Al-Tameemi
JJM Crew	Hemajlas	Willie

Total to Date :	2118

JJM Construction Ltd.

KINGCOME EDSM - DEBRIS / LOG TRIMMING DAILY REPORTS

NHC10-BASE	5650815.493	697866.725	4.357	MON
NHC11	5650812.744	697819.031	4.867	MON
JJM-499	5647044.311	696061.378	4.931	MON

DATE	POINT ID	Northing	Easting	Elv.	Cuts	Comments
2023-10-12	2312100001			N/A	14	
2023-10-12	2312100002			N/A	8	
2023-10-12	2312100003			N/A	39	
			Daily Total :		61	

Superintendent:		Mitch/Liam
VESSEL	JJM AQUAQUEEN	
FBD Crew		
	Richard	Snow
	Kevin	Grotheer
	Mike	Benoit
	Jaafar	Al-Tameemi
JJM Crew	Hemajlas	Willie

Total to Date :	2179

SiteDocs Reporting
Job 1033 Kingcome Emergency Debris & Sediment Management

Week 49 / Week 4	TOTAL	Mon 04-Dec	Tue 05-Dec	Wed 06-Dec	Thu 07-Dec	Fri 08-Dec	Sat 09-Dec	Sun 10-Dec	WK 4	*PROJECT TOTAL	Note	COR Elements / Corrective Action Items
Toolbox Meeting Minutes	7/7	1	1	1	1	1	1	1	7	25	Daily with signatures	2.2/2.3/2.9/2.11/8.11/8.12/8.15/12.2
Corporate Toolbox Talk	4/2	1	1		1			1	4	13	Bi-Weekly with signatures (Working Around Mob. Equip./Envir. Exp./Driving Poor Vis./Fueling)	3.3/3.4/3.5/4.3/4.4/4.5/5.3/6.7/6.9
Management Participation	2/1	CM	PB		CM				2	5	Weekly (participation/signed attendance @ Toolbox Meeting - S. Yee/C. McIntosh)	2.2/2.3/2.9/2.11/8.11/8.12/8.15
Behaviour Observations	4/7			1	2		1		4	11	Daily	2.4/12.2
Site Inspection	1/1				1				1	3	Weekly	9.3/9.5/9.6/9.7/11.6/6.7/6.9/12.2
Ground Disturbance Checklist	0								0	0	Daily when excavating (with two signatures)	2.2/2.3/2.4/12.2
Management Site Inspection	0/1								0	0	Monthly - December (S. Yee/C. McIntosh)	2.11/9.9/12.2
Emergency Drill	0/1								0	1	Monthly - December	11.3/12.2
Orientation	3	1	1	1					3	28	For all new workers, transferred workers, subcontractors, visitors	8.2/8.3/8.5
Confined Space Permit	0								0	0	Issued by Safety Manager when required by Policy	2.1 - 2.11/11.1
Hot Work Permit	0								0	0	Daily when performing hot work (when required by Policy)	2.1 - 2.11/9.7
H2s Gas Mitigation Checklist	0								0	0	Daily when excavating/H2S environment	2.1 - 2.11/9.7
Crane Lift Plan Form	0								0	0	Daily when operating crane	2.1 - 2.11/9.7
Daily Equipment Logs	10	ME004 1200	ME004		1200	CR016 DIAMOND	CR016 DIAMOND	CR016 DIAMOND	10	26	Equipment pre-trip inspections	7.3/7.5/9.1 - 9.10
First Aid (FA)	0								0	0		
Medical Aid (MA)	0								0	0		
Modified Work (MW)	0								0	0		
Lost Time (LT)	0								0	0		
Fatality (F)	0								0	0		
Equipment (EQUIP)	0								0	1		
Property (PROP)	0								0	0		
Auto (MVA)	0								0	0		
Environment (ENVIR)	0								0	0		
Near Miss (NM)	0								0	0		
Hazardous Occurrence (HO)	0								0	1		
Breach of Policy (BP)	0								0	0		
Third Party (THIP)	0								0	0		
Theft (TFT)	0								0	0		

Comments:

Safe Behaviour - Entire crew took the time this morning to eliminate tripping hazards on the walkways of ME302. Working as a team to keep a safe and tidy workplace.
Safe Behaviour - Showing up to the bull pen to start work this morning, the dock our boat is tied to was slick with ice. A worker took it upon himself to get salt and clear it off to insure safe travel.
Safe Behaviour - A worker observed the winch lines were overly tightened and made sure they were slacked off to avoid potential snapping hazard.
Safe Behaviour - A worker observed a Molly missing from a shackle on the closing line for the bucket attached to CR016. He put the bucket on deck and replaced the previous Molly that was ripped off.

Supervisor: Mitch Brown
Supervisor: Liam Galbraith
Supervisor: Brenton Ryan
Manager: Sherman Yee
Manager: Cameron McIntosh

Notes:

*Hazardous Occurrence/Near Miss Incidents - are leading indicators under JJM's OH&S Program. Hazard ID's and Unsafe Behaviours are recorded and corrective actions applied.

WEEKLY SUMMARY Jan 2 - Jan 7										
ACTIVITY	December		1	2	3	4	5	6	7	
MOBILE TO SITE			Mon.	Tues	Wed.	Thurs.	Fri.	Sat.	Sun.	TOTAL/HRS
							DREDGING			
	Rental tug				12	12	12	12	12	60
MANPOWER	BRENTON RYAN									0
	MITCH BROWN				12	12	12	12	12	60
	PROINNSIAS BARRETT				12	12	12	12	12	60
	MICHAEL WESLEY, OFA3									0
	LUCAS MACKENZIE				12	12	12	12	12	60
	RAY GRAHAM				12	12	12	12	12	60
	JACK KRAFT				12	12	12	12	12	60
	BRYON MAXWELL				12	12	12	12	12	60
DFN Affiliation	Peter COON				12	12	12	12	12	60
	SHUKRI DIGAALE				12	12	12	12	12	60
	GUNNAR MARSHALL									0
DFN Affiliation	Willie Hemajalas				4					4
	STEPHEN TALBOT				12	12	12	12	12	60
								TOTAL/hrs		544
EQUIPMENT										
	ME-209 (SPUD BARGE)				10	12	12	12	12	58
	CR-16				5.6	0	0	0	0	5.6
	ME-503 (FLAT SCOW)				8	8	8	8	8	40
	EX020				0	5	8.7	8.3	7.9	29.9
	LD014				0	0	0	0	0	0
	ME-302				8	8	8	8	8	40
	ME-004 (MILLER TUG)				1.7	3	10	6.8	7.4	28.9
	ME-005 (JET BOAT)				1.8	1.5	1.4	1.4	2	8.1
	ME-008 (DIVE BOAT)				2.5	0	0	0	0	2.5
LAND EQUIPMENT										TOTAL/HRS
	LD- 004 (LOADER)				0	0	0	0	0	0
	LT-016				8	8	8	8	8	40
	LT-017				8	8	8	8	8	40
	LT-077				8	8	8	8	8	40
										TOTAL M/3
Dredgeate M/3						1400	1500	1100	1350	5350
	Start Station					0+370	0+390	0+410	0+335	
	Finish Station					0+395	0+415	0+418	0+355	
										Total/m3
	Survey reconcilliation									
										MAN/DAYS
DFN CAMP					9	9	9	9	9	45

Date	Weather	Operator	Tug	Starting Station	Ending Station	# of loads	Material	Approx Volume	Comments	
2023-11-17	Rain/Clouds	Lucas M	Sea Imp VIII	0-055 East	0-035 East	2	S	300	FIRST DAY!	
2023-11-18	Cloudy	Lucas M	Sea Imp VIII	0-055 East	0-035 East	4/1	S	1000		
2023-11-19	Cloudy	Lucas M	Sea Imp VIII	0-035	0+005	6/1	S/G	1130	Dumper repaired	
2023-11-20	Rain	Lucas M	Sea Imp VIII	0-055	0-035	4	S/G	800		
2023-11-21	Rain	Lucas M	Sea Imp VIII	0+020	0+040	7	S/G	1400		
2023-11-22	Cloudy/Sun	Lucas M	Sea Imp VIII	0+040	0+050	6	S/G	1200	Dumper Repaired/Removed Log	
2023-11-23	Sunny	Lucas M	Sea Imp VIII	0+055	0+075	9	S	1800		
2023-11-24	Sunny/Fog	Lucas M	Sea Imp VIII	0+056	0+075	0		0	Dredge Machine change/survey	
2023-11-25	Sunny/Fog	B.Ryan	Sea Imp VIII	0+075	0+085	2	S/G	400	Crane Dredging/Very Low tides	
2023-11-26	Sunny/Fog	Lucas M	Sea Imp VIII	0+075	0+085	2	S	400	Continue Excavator dredging	
2023-11-27	Sunny	Gunner	Sea Imp VIII	0+085	0+090	3	S	600	New OperatorTraining	
2023-11-28	Cloudy/Fog	Gunner	Sea Imp VIII	0-020	0+035	4	S	800	Clean up Previous ground Dredged	
2023-11-29	Cloudy/Sun	Gunner	Sea Imp VIII	0+085	0+100	6/1	S/G	1620		
2023-11-30	Cloudy/rain	Gunner	Inlet Royal	0+120	0+120	5/1	S/G	1420		
2023-12-01	Cloudy/rain	Gunner	Inlet Royal	0+120	0+121	5	S/G	1000		
2023-12-02	Cloudy/rain	Gunner	Inlet Royal	0+135	0+122	6	S/G	1200		
2023-12-03	Rain	Gunner	Inlet Royal	0+150	0+170	8	S	1600		
2023-12-04	Heavy Rain	Gunner	Inlet Royal	0+170	0+180	4	S/G	800	Clean up area 0+120-125&0+140-150	
2023-12-05	Heavy Rain	Gunner/Lucas	Inlet Royal	0+170	0+190	8	S/G/W	1420	Large stump and rootball found Crew Change Day	

2023-12-06	Sunny/Fog	Lucas M	Inlet Royal	0+185	0+200	6	S/G	1200	
2023-12-07	Sunny/Fog	Lucas M/Liam	Inlet Royal	0+020 - 0+040	0+200 - 0+210	6	S/G/W	1200	Clean up area 0+020-0+040 EX020 break down Crane Dredge 0+200-0+210
2023-12-08	Sunny/Fog	Liam G	Inlet Royal	0+210	0+240	8	S/G	1600	
2023-12-09	Rain	Liam G	Inlet Royal	0+230	0+245	7	S/G	1400	
2023-12-10	Sunny/Fog	Liam G	Inlet Royal	0+235	0+250	6	S/G	1200	
2023-12-11	Sunny/Fog	Liam G	Inlet Royal	0+245	0+265	7	S/G	1400	
2023-12-12	Sunny/Fog	Liam G	Inlet Royal	0+260	0+265	2	S/G	400	Crew change day Switch back to EX020 Dredging
2023-12-13	Rain/Clouds	Lucas M	Inlet Royal	0+020	0+055	6	S/G	1200	
2023-12-14	Sunny/Fog	Lucas M	Inlet Royal	0+055-0+070	0+260-0+300	6	S/G/C	1200	
2023-12-15	Heavy Rain	Gunnar/Ray	Inlet Royal	0+285	0+315	6	S/G/C	1200	
2023-12-16	Sunny/Cloudy	Gunnar/Ray	Inlet Royal	0+315	0+340	7	S/G/C	1400	
2023-12-17	Sunny/Cloudy	Lucas M	Inlet Royal	0+340	0+360	9	S/G/C	1800	
2023-12-18	Heavy Rain	Lucas/Ray	Inlet Royal	0+350	0+380	8	S/G/C	1600	
2023-12-19	Light rain	N/A						0	Equipment Repair EX020/Marine Equipment Services
2023-12-20	Light rain/Cloud	N/A						0	Equipment Repair EX020/Move Equipment to mooring location/Prepair rigs&boats for holiday break
2023-12-21									Holiday Break/Fly out
2023-01-03	Light rain/Cloud	N/A	Inlet Royal					0	Fly in after Christmas holiday Boats put in water and survey done
2023-01-04	Rain/Clouds	Lucas/Ray	Inlet Royal	0+370	0+395	7	S/G/C	1400	First bucket at 1000
2023-01-05	Rain/Clouds	Lucas/Ray	Inlet Royal	0+390	0+415	8	S/G/C	1500	
2023-01-06	Sunny	Ray	Inlet Royal	0+410-0+418	0+330-0+335	6	S/G/C	1100	

2023-01-07	Sunny	Lucas/Ray	Inlet Royal	0+335	0+355	7	S/G/C	1350	

SiteDocs Reporting
Job 1033 Kingcome Emergency Debris & Sediment Management

Week 1 / Project Week 8	TOTAL	Mon 01-Jan	Tue 02-Jan	Wed 03-Jan	Thu 04-Jan	Fri 05-Jan	Sat 06-Jan	Sun 07-Jan	WK 1	*PROJECT TOTAL	Note	COR Elements / Corrective Action Items
Toolbox Meeting Minutes	4/5				1	1	1	1	4	45	Daily with signatures	2.2/2.3/2.9/2.11/8.11/8.12/8.15/12.2
Corporate Toolbox Talk	3/1				1	1	1		3	24	Bi-Weekly with signatures (Rigging & Hoisting/Dredging Op./Working wConcrete Pumping Op.)	3.3/3.4/3.5/4.3/4.4/4.5/5.3/6.7/6.9
Management Participation	1/1				PB	PB		PB	1	10	Weekly (participation/signed attendance @ Toolbox Meeting - S. Yee/C. McIntosh)	2.2/2.3/2.9/2.11/8.11/8.12/8.15
Behaviour Observations	3/5			1	1		1		3	15	Daily	2.4/12.2
Site Inspection	0/1								0	3	Weekly	9.3/9.5/9.6/9.7/11.6/6.7/6.9/12.2
Ground Disturbance Checklist	0								0	0	Daily when excavating (with two signatures)	2.2/2.3/2.4/12.2
Management Site Inspection	0/1								0	0	Monthly - January (S. Yee/C. McIntosh)	2.11/9.9/12.2
Emergency Drill	0/1								0	2	Monthly - January	11.3/12.2
Orientation	1				1				1	33	For all new workers, transferred workers, subcontractors, visitors	8.2/8.3/8.5
Confined Space Permit	0								0	0	Issued by Safety Manager when required by Policy	2.1 - 2.11/11.1
Hot Work Permit	0								0	0	Daily when performing hot work (when required by Policy)	2.1 - 2.11/9.7
H2s Gas Mitigation Checklist	0								0	0	Daily when excavating/H2S environment	2.1 - 2.11/9.7
Crane Lift Plan Form	0								0	0	Daily when operating crane	2.1 - 2.11/9.7
Daily Equipment Logs	5			DIAMOND	DIAMOND	DIAMOND	DIAMOND	DIAMOND	5	44	Equipment pre-trip inspections	7.3/7.5/9.1 - 9.10
First Aid (FA)	0								0	0		
Medical Aid (MA)	0								0	0		
Modified Work (MW)	0								0	0		
Lost Time (LT)	0								0	0		
Fatality (F)	0								0	0		
Equipment (EQUIP)	0								0	1		
Property (PROP)	0								0	0		
Auto (MVA)	0								0	0		
Environment (ENVIR)	0								0	0		
Near Miss (NM)	0								0	0		
Hazardous Occurrence (HO)	0								0	1		
Breach of Policy (BP)	0								0	0		
Third Party (THIP)	0								0	0		
Theft (TFT)	0								0	0		

Comments:

Safe Behaviour - A worker observed the crew performing a thorough inspection of barge, locks, cables for any signs of vandalism or theft.
Hazard Identification - A worker observed a winch line starting to fray causing steel jaggers in the cable that can go through someone's glove. Cut down burs and jags and taped. Cable will be cut before bad area and reattached.
Hazard Identification - A worker observed lines were slipped along the barge instead of being tied off which stopped the stern of the dumper from swinging in and caused the barge to slide along into position smoothly. Hazard communicated.

Supervisor: Mitch Brown
Supervisor: Liam Galbraith
Supervisor: Brenton Ryan
Manager: Sherman Yee
Manager: Cameron McIntosh

Notes:

*Hazardous Occurrence/Near Miss Incidents - are leading indicators under JJM's OH&S Program. Hazard ID's and Unsafe Behaviours are recorded and corrective actions applied.

WEEKLY SUMMARY Jan 9- Jan 14										
ACTIVITY	January		8	9	10	11	12	13	14	
MOBILE TO SITE			Mon.	Tues	Wed.	Thurs.	Fri.	Sat.	Sun.	TOTAL/HRS
							DREDGING			
	Rental tug			11	11	11	11	11	11	66
MANPOWER	BRENTON RYAN				11	11	11	11	11	55
	MITCH BROWN			11	11	11	11	11	11	66
	PROINNSIAS BARRETT			11						11
	BRANDON BLAKE				11	11	11	11	11	55
	LUCAS MACKENZIE			11	11	11	11	11	11	66
	RAY GRAHAM			11						11
	JACK KRAFT			11						11
	BRYON MAXWELL			11	11	11	11	11	11	66
DFN Affiliation	Peter COON			11	11	11	11	11	11	66
	SHUKRI DIGAALE			11	11	11	11	11	11	66
	GUNNAR MARSHALL				11	11	11	11	11	55
DFN Affiliation	Willie Hemajalas				8					8
	STEPHEN TALBOT			11	11	11	11	11	11	66
								TOTAL/hrs		547
EQUIPMENT										
	ME-209 (SPUD BARGE)			11	11	11	11	11	11	66
	CR-16			0.9	0	0	8	6	6	20.9
	ME-503 (FLAT SCOW)			8	8	8	8	8	8	48
	EX020			6.1	8	10	11	11	10	56.1
	LD014			0	0	0	0	0	0	0
	ME-302 (CARGO BARGE)			8	8	8	8	8	8	48
	ME-003 (MILLER TUG)			8.4	7.8	6	8	2	8	40.2
	ME-005 (JET BOAT)			1.2	1.8	4	3	4	4	18
	ME-008 (DIVE BOAT)			5.7	0	0	0	2	2	9.7
LAND EQUIPMENT										TOTAL/HRS
	LD- 004 (LOADER)			0	0	0	0	0	0	0
	LT-016			8	8	8	8	8	8	48
	LT-017			8	8	8	8	8	8	48
	LT-077			8	8	8	8	8	8	48
										TOTAL M/3
Dredgeate M/3				948	948	948	1106	316	790	5056
	Start Station			0+410	0+445	0+470	0+500	0+520	0+520	
	Finish Station			0+445	0+470	0+500	0+520	0+525	0+535	
										Total/m3
	Survey reconcilliation									5056
										MAN/DAYS
DFN CAMP				9	9	9	9	9	9	54

Date	Weather	Operator	Tug	Starting Station	Ending Station	# of loads	Material	Approx Volume	Comments	
2023-01-09	Rain/Clouds	Lucas	Inlet Royal	0+410	0+445	6	S/G	948		
2023-01-10	Sunny/Cold	Lucas/Gunnar	Inlet Royal	0+445	0+470	6	S/G/C	948		
2023-01-11	Sunny/Cold	Gunnar	Inlet Royal	0+470	0+500	6	S/G/C	948		
2023-01-12	Sunny/Cold	Lucas	Inlet Royal	0+500	0+520	7	S/G/C	1106		
2023-01-13	Sunny/Cold	Lucas/Gunnar	Inlet Royal	0+520	0+520	2	S/G/C	316	JJM tug boat break down and barge refueling.	
2023-01-14	Sunny/Cold	Gunnar	Inlet Royal	0+520	0+535	5	S/G/C	790		
										5056
										50944
										53.73839662

SiteDocs Reporting
Job 1033 Kingcome Emergency Debris & Sediment Management

Week 2 / Project Week 9	TOTAL	Mon 08-Jan	Tue 09-Jan	Wed 10-Jan	Thu 11-Jan	Fri 12-Jan	Sat 13-Jan	Sun 14-Jan	WK 2	*PROJECT TOTAL	Note	COR Elements / Corrective Action Items
Toolbox Meeting Minutes	7/7	1	1	1	1	1	1	1	7	52	Daily with signatures	2.2/2.3/2.9/2.11/8.11/8.12/8.15/12.2
Corporate Toolbox Talk	7/2	1	1	1	1	1	1	1	7	31	Bi-Weekly with signatures (PPE/Driving Poor Visibility/BOS/Envir. Exposure/Pre-Shift Insp./HK	3.3/3.4/3.5/4.3/4.4/4.5/5.3/6.7/6.9
Management Participation	2/2	CM/PB							2	12	Weekly (participation/signed attendance @ Toolbox Meeting - S. Yee/C. McIntosh)	2.2/2.3/2.9/2.11/8.11/8.12/8.15
Behaviour Observations	0/7								0	15	Daily	2.4/12.2
Site Inspection	1/1			1					1	4	Weekly	9.3/9.5/9.6/9.7/11.6/6.7/6.9/12.2
Ground Disturbance Checklist	0								0	0	Daily when excavating (with two signatures)	2.2/2.3/2.4/12.2
Management Site Inspection	1/1			1					1	1	Monthly - January (S. Yee/C. McIntosh)	2.11/9.9/12.2
Emergency Drill	0/1								0	2	Monthly - January	11.3/12.2
Orientation	1					1			1	34	For all new workers, transferred workers, subcontractors, visitors	8.2/8.3/8.5
Confined Space Permit	0								0	0	Issued by Safety Manager when required by Policy	2.1 - 2.11/11.1
Hot Work Permit	0								0	0	Daily when performing hot work (when required by Policy)	2.1 - 2.11/9.7
H2s Gas Mitigation Checklist	0								0	0	Daily when excavating/H2S environment	2.1 - 2.11/9.7
Crane Lift Plan Form	0								0	0	Daily when operating crane	2.1 - 2.11/9.7
Daily Equipment Logs	7	DIAMOND	DIAMOND	DIAMOND	DIAMOND	DIAMOND	DIAMOND	DIAMOND	7	51	Equipment pre-trip inspections	7.3/7.5/9.1 - 9.10
First Aid (FA)	0								0	0		
Medical Aid (MA)	0								0	0		
Modified Work (MW)	0								0	0		
Lost Time (LT)	0								0	0		
Fatality (F)	0								0	0		
Equipment (EQUIP)	0								0	1		
Property (PROP)	0								0	0		
Auto (MVA)	0								0	0		
Environment (ENVIR)	0								0	0		
Near Miss (NM)	0								0	0		
Hazardous Occurrence (HO)	0								0	1		
Breach of Policy (BP)	0								0	0		
Third Party (THIP)	0								0	0		
Theft (TFT)	0								0	0		

Comments:

Supervisor: Mitch Brown
Supervisor: Liam Galbraith
Supervisor: Brenton Ryan
Manager: Sherman Yee
Manager: Cameron McIntosh

Notes:

*Hazardous Occurrence/Near Miss Incidents - are leading indicators under JJM's OH&S Program. Hazard ID's and Unsafe Behaviours are recorded and corrective actions applied.

Date	Weather	Operator	Tug	Starting Station	Ending Station	# of loads	Material	Approx Volume	Comments	Accumulated Total Dredge	Accumulated Payable	Balance Remaining	Overdredge		notes
2023-01-15	Sunny/Cold	Gunnar	Inlet Royal	0+535	0+550	8	S/G/C	1224		43,748.00	41,512.55	14,487.45			<-estimate with 5% Overdredge
2023-01-16	Sunny/Cold	Gunnar	Inlet Royal	0+550	0+560	3	S	459		44,207.00	41,948.60	14,051.40			<-estimate with 5% Overdredge
2023-01-17	Cold	Gunnar	Inlet Royal	0+560	0+570	3	S/G	459	Completed coolant/turbo fix on ME003 /Inlet Royal transporting barges during high tide	44,666.00	42,384.65	13,615.35			<-estimate with 5% Overdredge
2023-01-18	Snow/Cold	Gunnar	Inlet Royal	0+570	0+580	6	S/G	918	Low tide eveffecting dreging ME302 runs ground	45,584.00	43,256.75	12,743.25			<-estimate with 5% Overdredge
2023-01-19	overcast/rain	Gunnar	Inlet Royal	0+5680	0+585	5	S/G	739		46,323.00	43,958.80	12,041.20			<-estimate with 5% Overdredge
2023-01-20	overcast/rain	Gunnar	Inlet Royal	0+585	0+590	6	S/G	862		47,185.00	44,777.70	11,222.30			<-estimate with 5% Overdredge
2023-01-21	overcast/rain	Gunnar	Inlet Royal	0+590	0+605	8	S/G	1168		48,353.00	45,887.30	10,112.70			<-estimate with 5% Overdredge

WEEKLY SUMMARY Jan 15- Jan 21										
ACTIVITY	January		15	16	17	18	19	20	21	
MOBILE TO SITE			Mon.	Tues	Wed.	Thurs.	Fri.	Sat.	Sun.	TOTAL/HRS
	Rental tug		12	10	10	11	12	11	12	78
MANPOWER	BRENTON RYAN		12	10	10	11	12	11	12	78
	MITCH BROWN		12	10	10					32
	PROINNSIAS BARRETT								12	12
	BRANDON BLAKE		12	10	10	11	12	11	12	78
	LUCAS MACKENZIE		12	10	10					32
	RAY GRAHAM								10	10
	JACK KRAFT								10	10
	BRYON MAXWELL		12	10	10					32
DFN Affiliation	Peter COON		12	10	10	11	12	11	12	78
	SHUKRI DIGAALE		12	10	10					32
	GUNNAR MARSHALL		12	10	10	11	12	11	12	78
DFN Affiliation	Willie Hemajalas									0
	STEPHEN TALBOT		12	10	10	11	12	11	12	78
	ADAM POIRIER						12	11	12	35
								TOTAL/hrs		507
EQUIPMENT										
	ME-209 (SPUD BARGE)		12	10	10	11	12	11	12	78
	CR-16		0	0	0	2	0	0	0	2
	ME-503 (FLAT SCOW)		8	8	8	8	8	8	8	56
	EX020		12	6	4	11	10	10	11	64
	LD014		0	0	0	0	0	0	0	0
	ME-302 (CARGO BARGE)		8	8	8	8	8	8	8	56
	ME-003 (MILLER TUG)		9	1	1	8	4	4	4	31
	ME-005 (JET BOAT)		2	1	2	3	2	1	1	12
	ME-008 (DIVE BOAT)		2	2	0	0	0	0	0	4
LAND EQUIPMENT										TOTAL/HRS
	LD- 004 (LOADER)		0	0	0	0	0	0	0	0
	LT-016		8	8	8	8	8	8	8	56
	LT-017		8	8	8	8	8	8	8	56
	LT-077		8	8	8	8	8	8	8	56
										TOTAL M/3
Dredgeate M/3			1224	459	459	918	739	862	1168	5829
	Start Station		0+520	0+555	0+560	0+560	0+565	0+580	0+590	
	Finish Station		0+550	0+560	0+565	0+570	0+580	0+590	0+605	
										Total/m3
	Survey reconcilliation									5829
										MAN/DAYS
DFN CAMP			11	11	9	9	8	8	11	67

SiteDocs Reporting
Job 1033 Kingcome Emergency Debris & Sediment Management

Week 3 / Project Week 10	TOTAL	Mon 15-Jan	Tue 16-Jan	Wed 17-Jan	Thu 18-Jan	Fri 19-Jan	Sat 20-Jan	Sun 21-Jan	WK 3	*PROJECT TOTAL	Note	COR Elements / Corrective Action Items
Toolbox Meeting Minutes	7/7	1	1	1	1	1	1	1	7	59	Daily with signatures	2.2/2.3/2.9/2.11/8.11/8.12/8.15/12.2
Corporate Toolbox Talk	6/2	1	1		1	1	1	1	6	37	Bi-Weekly with signatures (Use of Cranes/Excavations/Fueling/Chainsaw/3-Point Cont/Conc.B	3.3/3.4/3.5/4.3/4.4/4.5/5.3/6.7/6.9
Management Participation	0/1								0	12	Weekly (participation/signed attendance @ Toolbox Meeting - S. Yee/C. McIntosh)	2.2/2.3/2.9/2.11/8.11/8.12/8.15
Behaviour Observations	3/7	1	1				1		3	18	Daily	2.4/12.2
Site Inspection	0/1								0	4	Weekly	9.3/9.5/9.6/9.7/11.6/6.7/6.9/12.2
Ground Disturbance Checklist	0								0	0	Daily when excavating (with two signatures)	2.2/2.3/2.4/12.2
Management Site Inspection	1/1								0	1	Monthly - January (S. Yee/C. McIntosh)	2.11/9.9/12.2
Emergency Drill	0/1								0	2	Monthly - January	11.3/12.2
Orientation	0								0	34	For all new workers, transferred workers, subcontractors, visitors	8.2/8.3/8.5
Confined Space Permit	0								0	0	Issued by Safety Manager when required by Policy	2.1 - 2.11/11.1
Hot Work Permit	0								0	0	Daily when performing hot work (when required by Policy)	2.1 - 2.11/9.7
H2s Gas Mitigation Checklist	0								0	0	Daily when excavating/H2S environment	2.1 - 2.11/9.7
Crane Lift Plan Form	0								0	0	Daily when operating crane	2.1 - 2.11/9.7
Daily Equipment Logs	9	1200 DIAMOND	1200		1200 CR016 DIAMOND EX020		1200	1200	9	60	Equipment pre-trip inspections	7.3/7.5/9.1 - 9.10
First Aid (FA)	0								0	0		
Medical Aid (MA)	0								0	0		
Modified Work (MW)	0								0	0		
Lost Time (LT)	0								0	0		
Fatality (F)	0								0	0		
Equipment (EQUIP)	0								0	1		
Property (PROP)	0								0	0		
Auto (MVA)	0								0	0		
Environment (ENVIR)	0								0	0		
Near Miss (NM)	0								0	0		
Hazardous Occurrence (HO)	0								0	1		
Breach of Policy (BP)	0								0	0		
Third Party (THIP)	0								0	0		
Theft (TFT)	0								0	0		

Comments:

Safe Behaviour - Supervisor observed an equipment operator/worker performing tasks safely.
Hazard Identification - Icy deck hazard. Controls implemented: Spread De-ice on all of deck on 209. Chip away ice build up area on deck. Communicate hazard.
Safe Behaviour - A new worker has "stepped up" in multiple area as we are short crew members. He shows initiative to learn new tasks and ask questions to ensure the job or task at hand is completed correctly and safely.

Equipment Damage Report - Wear & Tear (No Incident). The concrete deck of ME502 has worn down and been chipping/cracking away under the track closest to the bow section.

Supervisor: Mitch Brown
Supervisor: Liam Galbraith
Supervisor: Brenton Ryan
Manager: Sherman Yee
Manager: Cameron McIntosh

Notes:

*Hazardous Occurrence/Near Miss Incidents - are leading indicators under JJM's OH&S Program. Hazard ID's and Unsafe Behaviours are recorded and corrective actions applied.

APPENDIX K

MINISTRY REPRESENTATIVE WEEKLY REPORTS

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Weekly Progress Report

Project:	Kingcome River – EDSM Project		
To:	Amy Vallarino (amy.vallarino@gov.bc.ca); Dawn Nicolson (dfnadministrator@kingcome.ca); Arshad Bastani (arshad@ashoprojects.com); Cameron McIntosh (cmcintosh@jjmconstruction.com); Sherman Yee (syee@jjmconstruction.com); Alex Heckels (aheckels@pacificus.ca); Liam Galbraith (lgalbraith@jjmconstruction.com); Mitch Brown (mbrown@jjmconstruction.com); Brenton Ryan (bryan@jjmconstruction.com); Heather Pratt (heather.pratt@wsp.com); Midori Nicolson (midorin@telus.net)		
From:	Vero Bourgault, NHC Construction Engineer (KingcomeMR@nhcweb.com)		
Revision:	0	**Contract:**	WK24EPFLOOD0013
Date:	2023-11-15	**NHC No.:**	3007807
Client:	Ministry of Environment and Climate Change (ENV) & Dzawada'enuxw First Nation (DFN)	**Prime:**	JJM Construction Ltd. (JJM)

Northwest Hydraulic Consultants Ltd. (NHC) has prepared the following report summarizing the past weeks construction progress on the Kingcome River – EDSM Project, and a look-ahead to the current weeks work.

Reference Materials:

Materials referenced as part of this memorandum include:

- Drawings:
  - 20231027 3007807 NHC 2900439 KINGCOME EDSM IFC R0
    - The IFC Drawing will be updated at the end of this week to reflect JJM's Pre-construction survey.
- Specifications:
  - WK24EPFLOOD0013 - JJM Construction Ltd.- Kingcome emergency debris and sediment removal - Final - Nov 2
    - Specifications may be updated at weeks end, if needed, based on the results of the Pre-construction survey.
- JJM Bathymetric progress survey data received on:
  - N/A (Pre-construction survey in progress as of November 15)
- Fraser-Burrard Diving GPS progress data received on:
  - N/A (Initial layout of Debris Trimming locations to occur later this week)

Site Conditions:

Weather

- Past week: N/A
- Forecast this week:
  - Rain showers with sunny intervals (November 14, November 15)
  - Heavy rain possible November 18, November 21.

River Conditions

- Past week: N/A
- This week:
  - Flow estimated as 70 to 80 m^3/s on Nov. 14, 2023, and 45 to 55 m^3/s on Nov. 15.
    - Reference Mean winter flow estimate: 60 m^3/s; Reference 2-year flood flow: 860 m^3/s

Activities completed in the past week:

- Fully executed contract delivered to JJM
- All permitting received and filed
- Mobilization logistics
- JJM issued Contract submittals; NHC reviewed and distributed.

Progress Quantity Measurement Summary:

Table 1. Progress Quantity Tracking

Item	unit	Contract Qty.	Days Worked	Measured Qty. Previous	% of Contract Total Previous	Measured Quantity Past Week	% of Contract Total for Past Week	Measured Quantity To Date	% of Contract Total to Date
Dredging	m^3	56,000	0	0	0	0	0	0	0
LWD Debris	Days	28	0	0	0	0	0	0	0
LWD Debris Cuts	Ea.	1300-1500	0	0	0	0	0	0	0

Upcoming activities this week:

- Mobilization to site and arrival at camp (JJM, NHC).
- Final Contract submittals to be received this week.
- Introduction and site visit with DFN and NHC (November 14).
- JJM Pre-construction bathymetric survey (November 15).
- JJM to send NHC bathymetric survey (likely November 16)
- NHC to review bathymetric survey and reissue IFC drawings with updated dredge quantities from updated survey.
- Layout/ environmental review of Debris Trimming reach to be conducted this week.
- Dredging likely to begin November 17.
- Debris Trimming to begin November 21. Debris trimming team arriving at camp November 20.

Anticipated Completion Date: February 15, 2024

Contractor Personnel Employed:

JJM:

- 2 Superintendents on site (Mitch and Liam).
- 6 dredging staff from JJM.
- 2 tugboat staff.

Fraser-Burrard Diving

- N/A

DFN

- Peter Coon (OFA 3 on site with JJM).

- Les Dawson (boat operator picking up arriving staff from Government Dock).
- Alec Heckels (Pacificus) arriving on site November 16.

Other Personnel/ Site Visitors/ Inspections:

- The Contractor and NHC met with Dawn Nicolson, Lucy Puglas, Farron Soukochoff, and Sean Dick from DFN
- AWE Work Camps: Sarah Peterson
- NHC: Veronique Bourgault (On-site Min Rep)

Safety:

- OFA 3, Peter Coon on site.

Environment:

- N/A

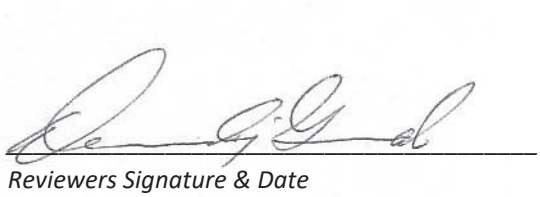
Signature:



_____

November 15, 2023

Veronique Bourgault, EIT, Ministry Representative



_____

Reviewers Signature & Date

Des Goold, P.Eng., Senior Ministry Representative

PHOTOS



Photo 1. Site visit on November 14 – DFN and JJM boat docked at barge.



Photo 2. Site visit on November 14 – JJM crane on site.

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Weekly Progress Report #2

Project:	Kingcome River – EDSM Project		
To:	Amy Vallarino (amy.vallarino@gov.bc.ca); Dawn Nicolson (dfnadministrator@kingcome.ca); Arshad Bastani (arshad@ashoprojects.com); Cameron McIntosh (cmcintosh@jjmconstruction.com); Sherman Yee (syee@jjmconstruction.com); Alex Heckels (aheckels@pacificus.ca); Liam Galbraith (lgalbraith@jjmconstruction.com); Mitch Brown (mbrown@jjmconstruction.com); Brenton Ryan (bryan@jjmconstruction.com); Heather Pratt (heather.pratt@wsp.com); Midori Nicolson (midorin@telus.net)		
From:	Vero Bourgault (NHC; Ministry Representative) (vbourgault@nhcweb.com)		
Revision:	0	**Contract:**	WK24EPFLOOD0013
Date:	2023-11-21	**NHC No.:**	3007807
Client:	Ministry of Environment and Climate Change (ENV) & Dzawada'enuxw First Nation (DFN)	**Prime:**	JJM Construction Ltd. (JJM)

Northwest Hydraulic Consultants Ltd. (NHC) has prepared the following report regarding the construction progress at the Kingcome River – Emergency Debris and Sediment Management Project Site as of end-of-day, Sunday, Nov. 19, 2023. A lookahead is provided for the current weeks' conditions and activities.

Attachments:

- JJM Weekly Summary: 1033-WEEKLY SUMMARY Nov 12 -15.pdf
- JJM Safety KPIs: 1033_Safety KPIs-Nov 12 -19.pdf
- Pacificus Environmental Report: Week 1 Environmental Monitoring Report Nov 17-19 23.pdf

Reference Materials:

Materials referenced as part of this memorandum include:

- Drawings:
  - 20231117 3007807 NHC 2900439 KINGCOME EDSM IFC R1 (Revised set delivered Friday, Nov. 17, 2023)
- Specifications:
  - WK24EPFLOOD0013 - JJM Construction Ltd.- Kingcome emergency debris and sediment removal - Final - Nov. 2
- JJM Bathymetric progress survey data received on:
  - 2023-11-17, Pre-Construction Survey: 20231115_1033JJM_PC UTMZ9_CVGD2013 NAD83 1M_R00.xyz
  - 2023-11-20, Progress Survey: 20231118_1033JJM_KINGC-EDSM_PS_R00.xyz
  - 2023-11-20, Progress Survey: 20231119_1033JJM_KINGC-EDSM_PS_R01.xyz
  - JJM ECCC Disposal at sea tracking spreadsheet: received daily: 1033-Disposal Tracking Spreadsheet.xlsx
- Fraser-Burrard Diving GPS progress data received on:
  - N/A – FRD start on Nov. 21.

Site Conditions:

Weather

- Past week
  - Wet weather over the past weekend.
- This week:

- Weather of note on Tuesday Nov. 21, heavy rains in the morning and heavy fog. Temperatures remained above freezing the past few days.
- Drier weather is currently forecast for the remainder of the week.

River Conditions:

- Past week
  - River flows peaked at about 200 cubic metres per second on Nov. 19 in response to the rain.
- This week
  - Flows declining to an estimated 60 to 70 cubic metres the morning of Nov. 21, then jumping back up to ~150 to 160 cubic metres due to heavy rains.
  - Flows expected to drop to at or below seasonal if drier weather occurs.

Activities completed in the past week:

- NHC delivered revised IFC drawings to JJM on Friday Nov. 17, 2023.
- JJM submitted all final, accepted versions of submittals required by the contract, including an update to the Communication Plan (Rev. 1) on Nov. 21.
- Dredging – Nov. 17 start, Please see Table 1 for progress through Sunday, Nov. 19.
- Debris Trimming – Nov. 21 start (first progress reporting will be the week of Nov. 27)

Progress Quantity Measurement Summary:

JJM's weekly progress reporting is attached to this report. JJM reports a dredged volume of 2,550 m3 to end-of-day, Nov. 19. Dredged quantity has been independently measured by NHC (see Table 1 below). NHC used the Nov. 17 2023 bathymetric surface generated by JJM's Nov. 15 2023 surface, as well as the Nov. 18 and Nov. 19 progress surveys submitted by JJM to NHC on Nov. 20 2023. Volumes were calculated between the Nov. 18 progress survey and Pre-Construction surface and added to the volumes between the Nov. 19 and Nov. 18 progress surveys. Based on these submitted surveys, and NHC's measured progress being close to JJM's approximate progress according to their daily reports, NHC confirms the progress made by JJM over the week of Nov. 13 to Nov. 19. Differences in estimates on the order of a few 100 m3 should be expected.

Table 1. NHC Progress Quantity Tracking to Sunday, Nov. 19

Item	unit	Contract Qty.	Days Worked	Measured Qty. Previous	% of Contract Total Previous	Measured Quantity Past Week (m^3/ cuts)	% of Contract Total for Past Week	Measured Quantity To Date (m^3/ cuts)	% of Contract Total to Date
Dredging	m^3	56,000	3	0	0	2210	4	2210	4%
LWD Debris	Days	28	0	0	0	0	0.0	0	0%
LWD Debris Cuts	Ea.	1300-1500	0	0	0	0	0.0	0	0%

Notes:

- JJM identified that a sediment slide occurred in the south-west corner of the dredge site between Nov. 15 and Nov. 18. This decrease in depth and the associate volume was not considered in the quantity of dredge material removed. This can be seen in Figure 1, where the deep blue and deep red areas outside of the dredge extents show the slide and deposition areas.
- Based on progress made to Nov. 19, measured from JJM's submitted surveys, design dredge depth has not been achieved (see Figures 2 and 3).
- It appears that river and tidal flows caused additional "head-cut" dredging past the end station of dredging on Nov. 19 (STA 0+05.0) – this is an anticipated effect.

- The Nov. 19 survey submitted by JJM has missing data in the southwest corner of the dredge extents (see Figures 1 and 2). There are always other minor "holes" in the survey data due to challenging sounding acoustics. JJM's volume estimates of based on bucket loads presumably, for which there is always some variance. These two facts, the occurrence of head-cutting, survey error and NHC process error, account for the differences between JJM's approximate volume dredged and NHC's estimates shown in Table 1.
- All elevations shown are in CGVD2013.

FIGURES

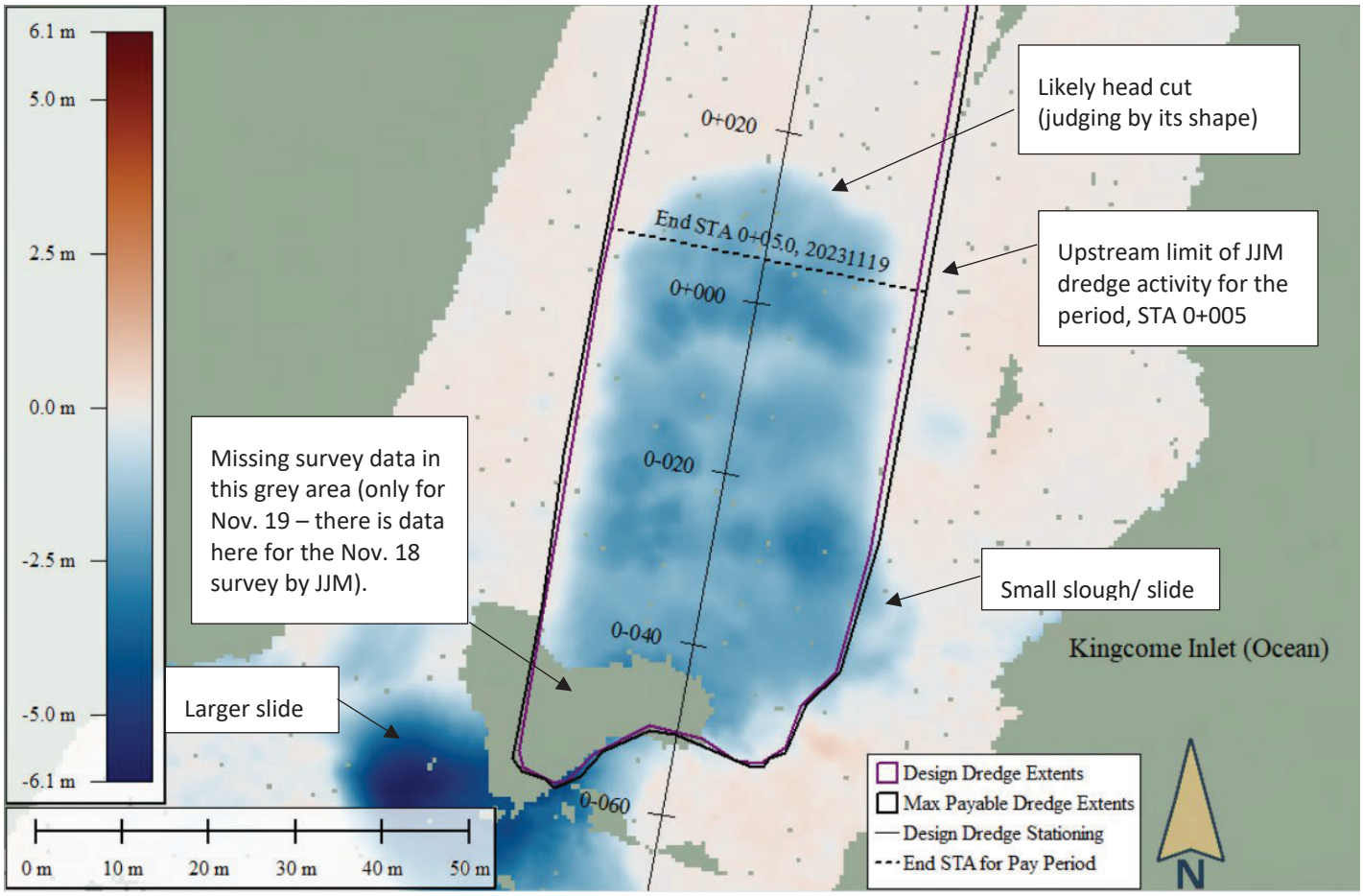


Figure 1. Total Progress Depth: 2023/11/19 Construction Progress Survey surface minus the 2023/11/15 Pre-Construction Survey surface. The shading shows depth of sediment above (red) and below (blue) the pre-construction survey surface. The dark blue area outside the southwest corner of the dredge extents shows a sediment slide which occurred between the pre-construction survey and first progress survey. A smaller slough or slide occurred at the east side of the dredge near the downstream limit.

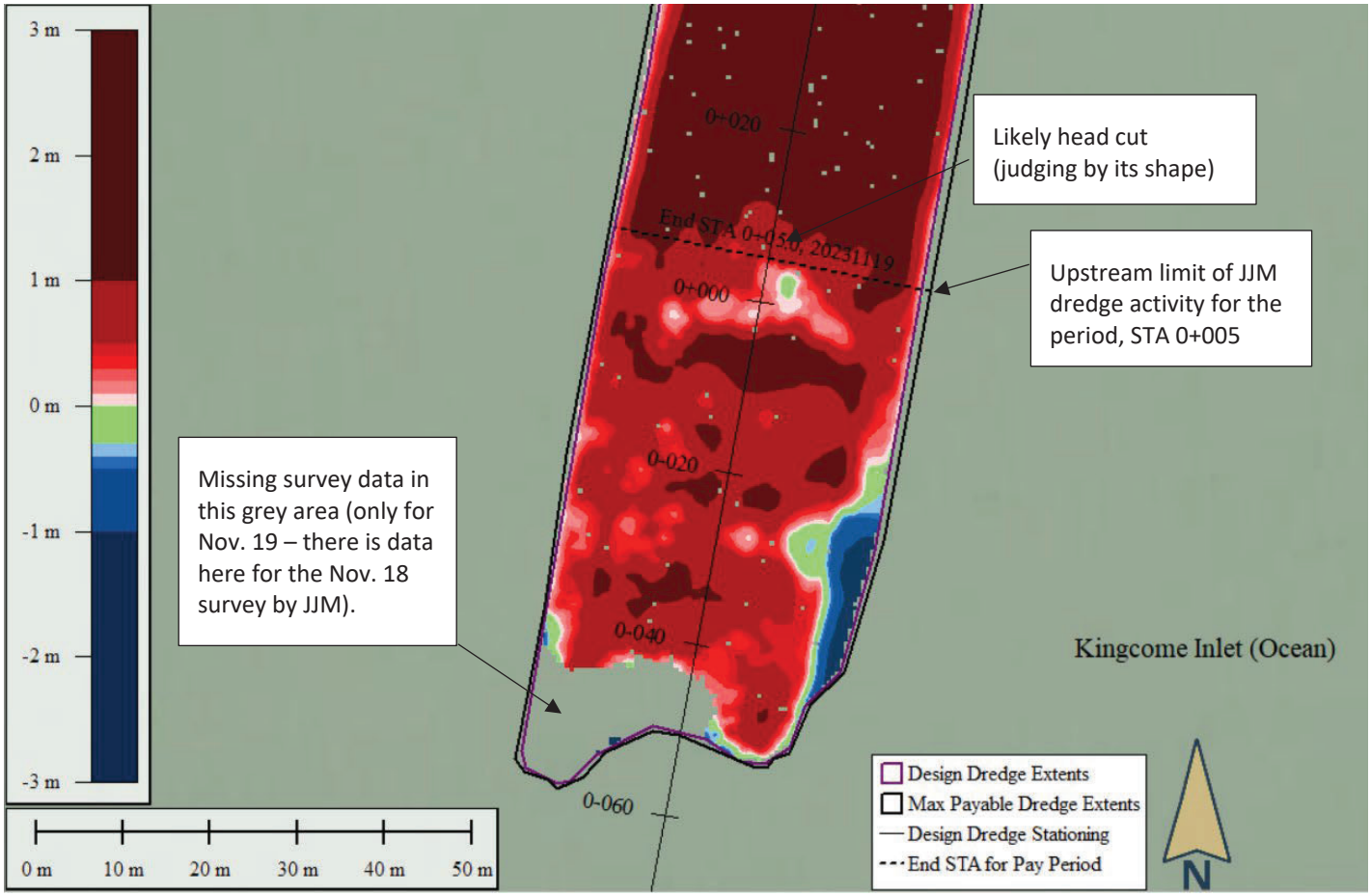


Figure 2. Design Progress Depth relative to design: 2023/11/19 Construction Progress Survey surface minus the IFC R1 Dredge Design surface. The shading shows depth of sediment above (red) and below (blue) the design dredge surface. Design dredge grade tolerances (0.0 m to -0.3 m below contract design grade) are shown in light green.

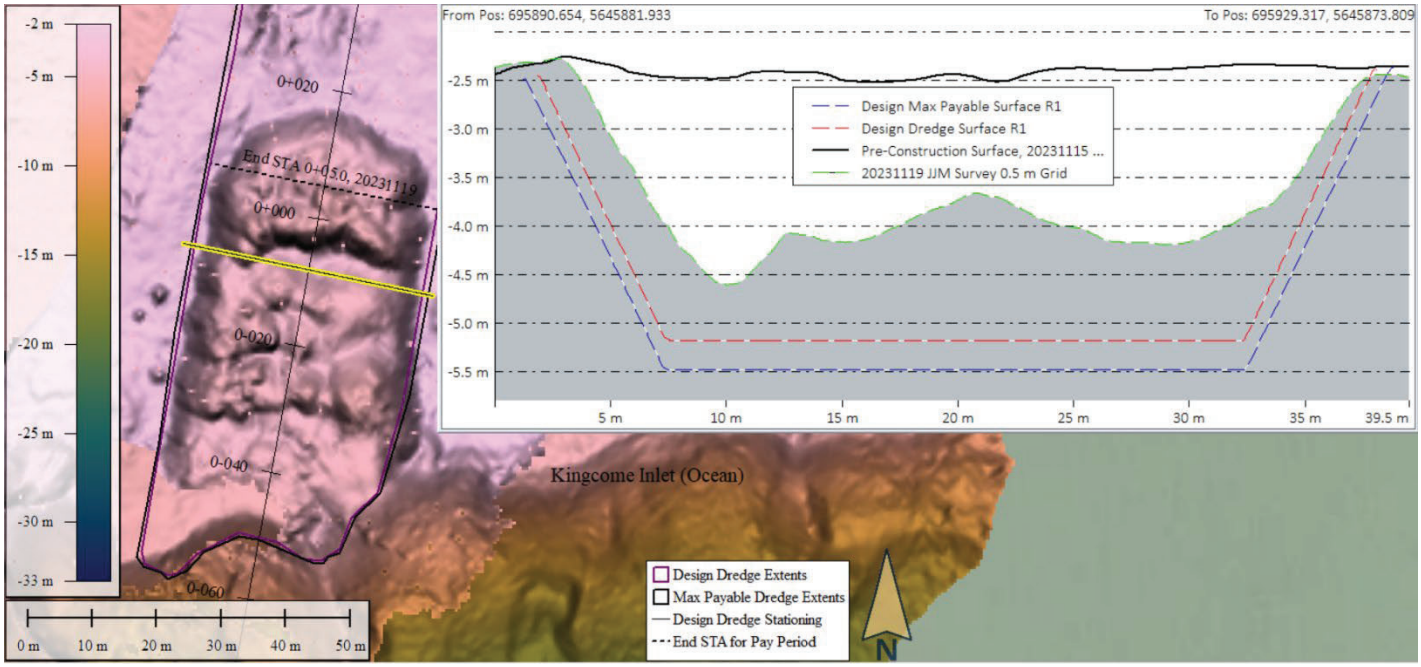


Figure 3. Section view through the currently dredged area, at about Sta. 0-008. The section shows the current dredge versus design and maximum payable surfaces. It should be noted that this is only one location and is not representative of the entire area currently dredged.

Upcoming activities this week:

- Dredging to continue.
- Fraser-Burrard crew expected to mobilize on Nov. 20. (confirmed)
- Weekly Meeting between Min Rep and JJM on Nov. 20.
- Debris Trimming expected to commence Tuesday, Nov. 21. (confirmed)
- Min Rep's Bi-weekly meeting with DFN and the Ministry on Nov. 22.
- Progress/ Payment milestone upcoming on Friday, Nov. 24.

Anticipated Completion Date: February 15, 2024

Contractor Personnel Employed:

JJM:

- 2 Superintendents on site (Mitch and Liam, leaving Nov. 21), Brenton arriving Nov. 21.
- 6 dredging staff from JJM (2 arriving Nov. 21).
- 2 tugboat staff.

Fraser-Burrard Diving (FBD)

- 5 debris trimming underwater divers (arriving Nov. 20, one leaving Nov. 24).

DFN

- Peter Coon (OFA 3 on site with JJM).
- Hema Willie (DFN advisor for woody debris trimming).

Ministry Consultants:

NHC

- Veronique (Vero) Bourgault (Min Rep).
- Vero will be leaving Nov. 23, and will be replaced by Alicia Van Boven.

Pacificus

- Alex Heckels (EM).
- Alex will be leaving Nov. 23, and will be replaced by Danae.

Site Visitors/ Inspections:

- Veronique Bourgault, dredging site inspections Nov. 17 and Nov. 18; assisting with turbidity measurements Nov. 17.
- Alex Heckles: turbidity measurements twice daily. Dredging and disposal site inspection Nov. 17, Nov. 18.

Safety:

- Safety orientations provided to Vero and Alex on Nov. 17.
    - Look-ahead: Safety orientations provided to FBD Nov. 20.
- Morning toolboxes conducted every morning by JJM for everyone on site.

Environment:

- Turbidity measurements looking normal. Please see attached Environmental Monitoring report.

Signature:



_____

Nov. 21, 2023.

Veronique Bourgault, EIT, Ministry Representative

_____

Reviewers Signature & Date

Des Goold, P.Eng., Senior Ministry Representative

PHOTOS



Photo 1. First clam bucket of dredged material being pulled out of Kingcome Inlet, Nov. 17, 2023.



Photo 2. First load in the split barge ready to go out to disposal site, Nov. 17, 2023.



Photo 3. First scow barge load ready for disposal, Nov. 18, 2023.



Photo 4. Excavator and loader disposing of dredged material in the disposal zone, Nov. 18, 2023.

nhc
northwest hydraulic consultants

Weekly Progress Report #3

Project:	Kingcome River – EDSM Project		
To:	Amy Vallarino (amy.vallarino@gov.bc.ca); Dawn Nicolson (dfnadministrator@kingcome.ca); Midori Nicolson (midorin@telus.net); Arshad Bastani (arshad@ashoprojects.com); Cameron McIntosh (cmcintosh@jjmconstruction.com); Sherman Yee (syee@jjmconstruction.com); Liam Galbraith (lgalbraith@jjmconstruction.com); Mitch Brown (mbrown@jjmconstruction.com); Brenton Ryan (bryan@jjmconstruction.com); Heather Pratt (heather.pratt@wsp.com); Alex Heckels (aheckels@pacificus.ca);		
From:	Alicia Van Boven (NHC; Ministry Representative) (KingcomeMR@nhcweb.com)		
Revision:	0	**Contract:**	WK24EPFLOOD0013
Date:	2023-11-28	**NHC No.:**	3007807
Client:	Ministry of Environment and Climate Change (ENV) & Dzawada'enuxw First Nation (DFN)	**Prime:**	JJM Construction Ltd. (JJM)

Northwest Hydraulic Consultants Ltd. (NHC) has prepared the following report regarding the construction progress at the Kingcome River – Emergency Debris and Sediment Management Project Site as of end-of-day, Sunday, Nov. 26, 2023. A lookahead is provided for the current weeks' conditions and activities.

Attachments:

- **Attachment A:** NHC Field Review Report: *20231128 3007807 NHC Kingcome EDSM Field Review Report No.1_R0*
- **Attachment B:** JJM Weekly Summary: *1033-WEEKLY SUMMARY Nov 20-26*
- **Attachment C:** JJM Safety KPIs: *1033_Safety KPIs-Nov 20-26*
- **Attachment D:** JJM LWD Trimming Tracker: *1033-KINGCOME Daily Log Tracker nov 20 – 26*
- **Attachment E:** Flood Outlook and Water Level and Tide Forecasts
- **Attachment F:** Pacificus Environmental Report: *Week 2 Environmental Monitoring Report Nov 20-26*

Reference Materials:

Materials referenced as part of this memorandum include:

- Drawings:
  - *20231117 3007807 NHC 2900439 KINGCOME EDSM IFC R1* (Revised set delivered Friday, Nov. 17, 2023)
- Special Provisions:
  - *WK24EPFLOOD0013 - JJM Construction Ltd.- Kingcome emergency debris and sediment removal - Final - Nov. 2*
- JJM construction progress data received on:
  - 2023-11-22 Progress Survey: *20231121_1033JJM_KINGC-EDSM_PS_R02.xyz*
  - 2023-11-25 Progress Survey: *20231124_1033JJM_KINGC-EDSM_PS_R02.xyz*
  - 2023-11-27 Progress Survey: *20231126_1033JJM_KINGC-EDSM_PS_R02.xyz*
  - Updated Daily: *1033-Disposal Tracking Spreadsheet.xls*
  - Updated Daily: *Daily Dredge Report.xls*
- Fraser-Burrard Diving GPS progress data received on:
  - Updated Daily: *1033-KINGCOME EDSM_Daily Log Tracker.xls*

Progress Quantity Measurement Summary:

FRB provides daily progress logs that tracks both the locations of trimmed LWD and the number of cuts. The total number of cuts and the number of cuts for the week of Nov. 20 to Nov. 26 is provided in **Table 1**, while the locations of debris trimmed is provided in **Figure 1a** & **Figure 1b**.

JJM's weekly progress report (*see attached*) reports a dredged volume of 8,675 m^3 to beginning-of-day, Nov. 26. Dredged quantity has been independently measured by NHC (see **Table 1**). Total dredge volume was calculated by comparing the latest end-of-week 2023/11/26 pre-shift progress survey to the 2023/11/15 pre-construction surface (**Figure 2**), while weekly dredge progress was calculated by comparing the end-of-week 2023/11/26 pre-shift progress survey to the beginning-of-week 2023/11/19 post-shift progress survey (**Figure 3**). NHC's measured total dredge volume progress is within a few 100 m^3 of JJM's reported total dredge volume. These small differences in the two estimates should be expected, and therefore NHC considers the dredge volume reported by JJM over the week of Nov. 20 to Nov. 26 to have been verified. Please note that the 2023/11/26 pre-shift survey only captures progress to the end of day Nov. 25 and does not show progress for Nov. 26.

The JJM bathymetric survey from Nov. 26 at the end of week is compared to the IFC dredge design surface in **Figure 4**. The color ramp indicates the depth of bed material compared to the dredge design elevation. The green indicates that the bed elevation is constructed to an acceptable grade and is within the payable over-dredge tolerance of 0.3 m, while blue shows the depth of bed material below the payable over-dredge limit and red shows the depth of non-compliant bed material still above design grade. The over-dredge blue shaded areas are also generally accepted as meeting the design intent. Though green areas in **Figure 4** may be shown to be compliant with the design at this stage, it is possible that natural river processes will cause these areas to begin re-filling with sediment – JJM will not be required to "re-dredge" any area that has formerly been shown as meeting the design intent.

Table 1. NHC Progress Quantity Tracking to Sunday, Nov. 19

Item	unit	Contract	Days Worked	Measured Qty. Previous	% of Contract Total Previous	Measured Quantity Past Week	% of Contract Total for Past Week	Measured Quantity To Date	% of Contract Total to Date
Dredging	m^3	56,000	10	2,210	4%	6,280	11%	8,490	15%
LWD Debris	Days	28 (schedule)	6	0	0%	6	21%	6	21%
LWD Debris	cuts	1300 (estimated)	6	0	0%	660	44%	660	44%

Construction-in-Progress Notes:

- As shown in **Figure 1a** & **Figure 1b**, LWD removal (yellow dots) has not occurred at several of the LWD locations identified in the IFC drawings (camera symbols). This is because the LWD is difficult to identify at high tide which resulted in several hazardous LWD pieces being missed – the debris may have also shifted location since originally being identified in March 2023. To help identify hazardous debris, JJM conducted a field inspection at low tide and marked hazardous LWD with a DFN representative. NHC and DFN will verify the work as it proceeds.
- Dredging was conducted between STA -0+055 to STA 0+085 for the week of Nov 21. to Nov. 26 (**Figure 2**). The start stationing identified in the drawings is STA -0+051, however, the contractor extended the stationing further to the ocean to ensure that there was not a downstream "plug" of sediment as per special provision 4.01(a).
- The end-of-week compared to the beginning-of-week survey comparison (**Figure 3)** indicates that some infilling is occurring in the dredge area. The infilling is likely a result of both natural sediment movement downstream and sloughing or raveling at the dredge boundaries. Frequent survey comparisons will continue to be monitored to determine the extent to which these processes are occurring. As noted above, JJM will not be expected to re-dredge areas that have filled in due to these processes where those same areas were previously observed by NHC to have met the design intent.
- Dredge areas that are verified as meeting the design are shown in green in **Figure 4**.

- Areas up to 4 m wide along the east and west edges of the dredge boundary that are above the IFC design grade due to side slope sloughing will also be considered as meeting the design as per the IFC design drawings. For example, at Sta -0+030 (**Figure 6**), the east side slope has sloughed into the channel within the acceptable tolerance. However, cross sections such as STA -0+010 (**Figure 7**) where the channel bottom width is not dredged to 25 m (as per the IFC design drawings) and there is no evidence of sloughing will be considered non-conforming.
- All elevations shown are in CGVD2013.

Figures:



Figure 1a. Completed Debris Trimming Locations and IFC Large Woody Debris Locations.

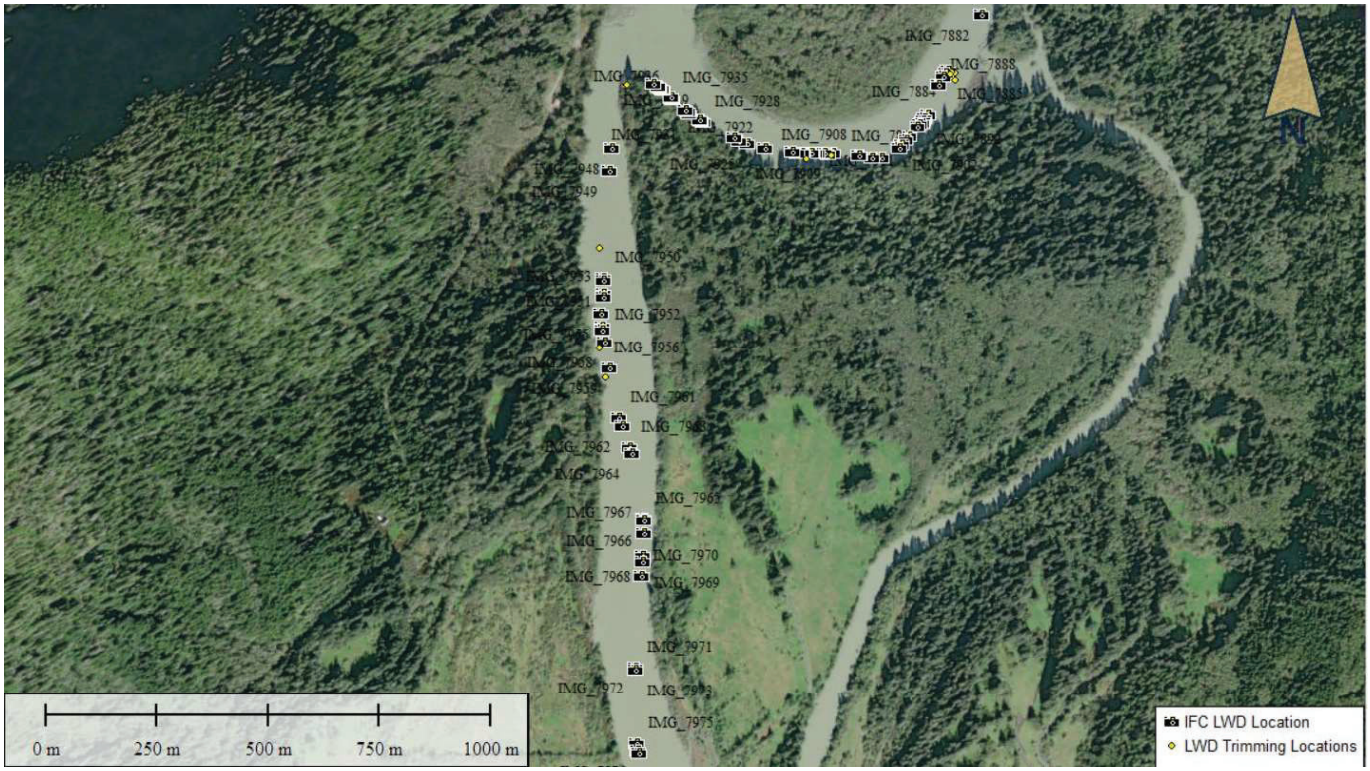


Figure 2b. Completed Debris Trimming Locations and IFC Debris Trimming Locations.

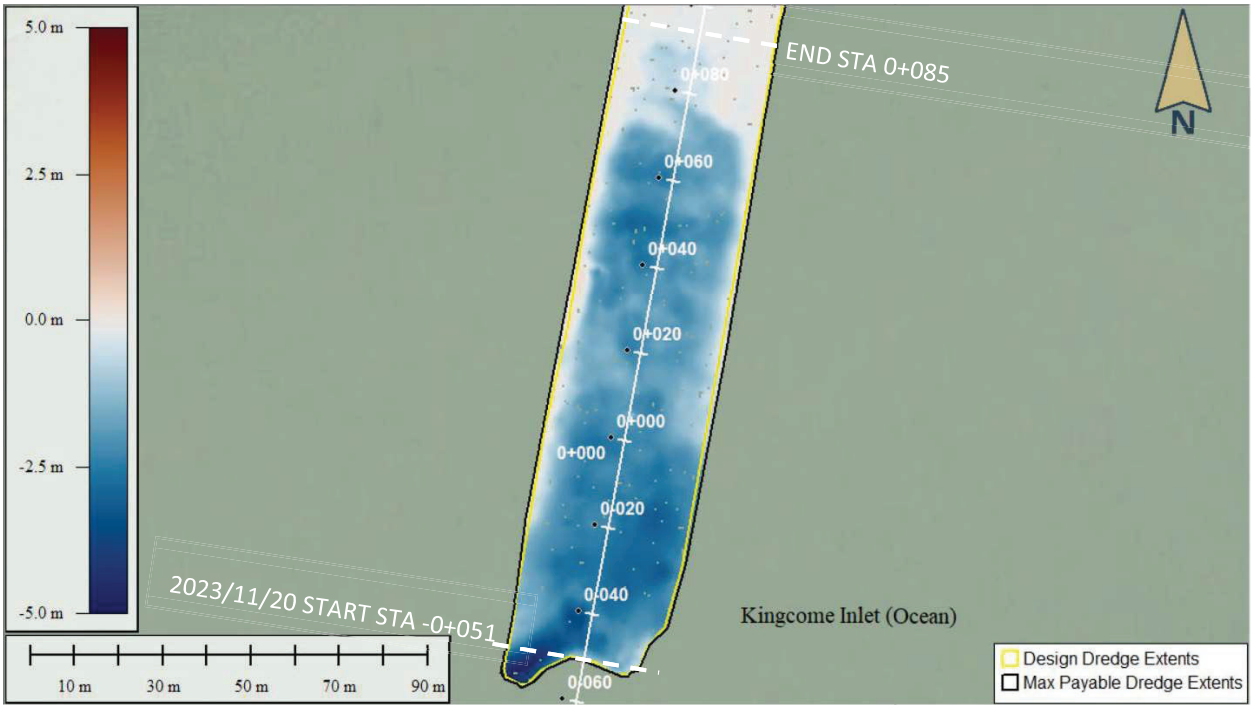


Figure 3. Total Dredge Progress: 2023/11/26 Pre-Shift JJM Progress Survey – 2023/11/15 JJM Pre-Construction Surface.

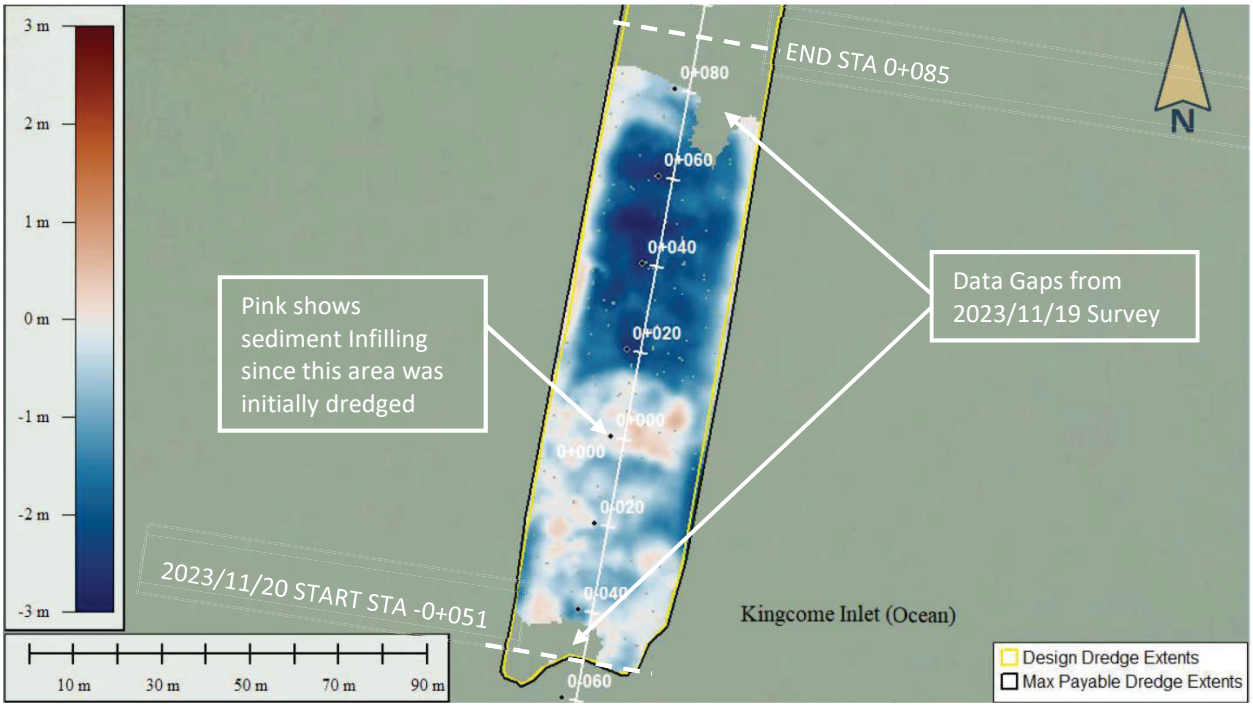


Figure 4. Weekly Dredge Progress: 2023/11/26 Pre-Shift JJM Progress Survey – 2023/11/19 Post-Shift JJM Progress Survey.

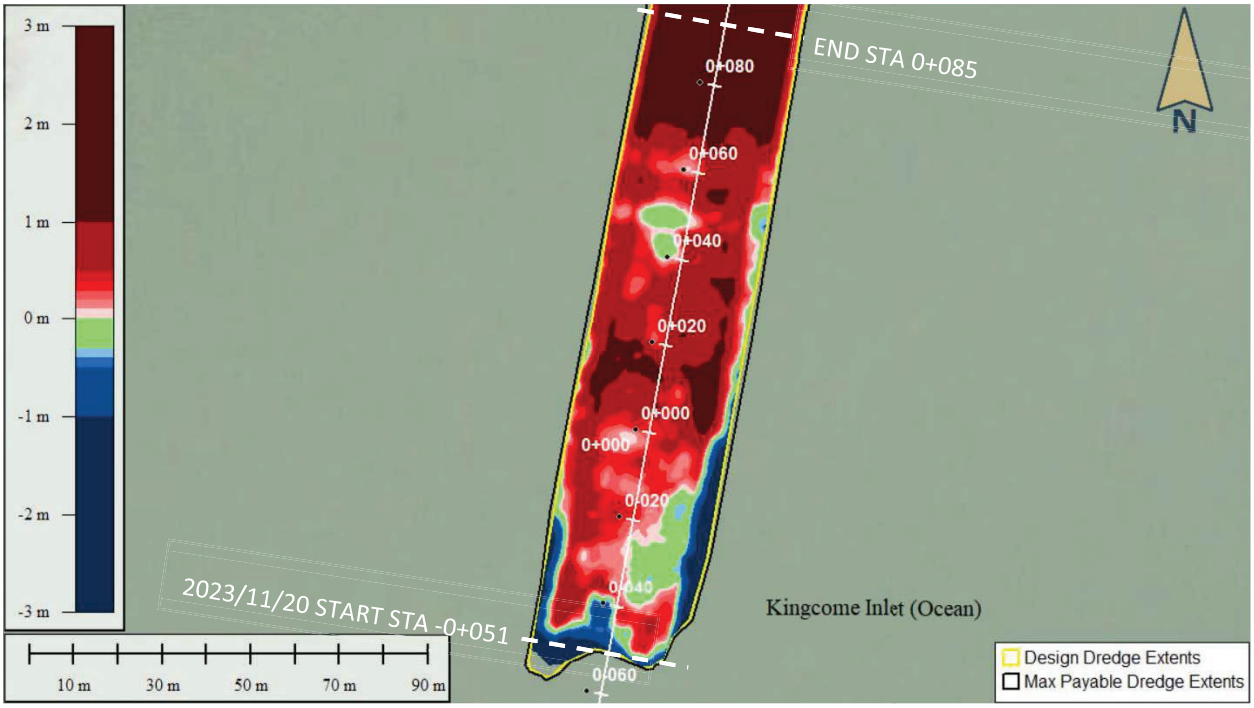


Figure 5. Design Progress: 2023/11/26 Pre-shift JJM Progress Survey – IFC R1 Dredge Design Surface. White to green areas are meeting design or are within the payable over-dredge limit.

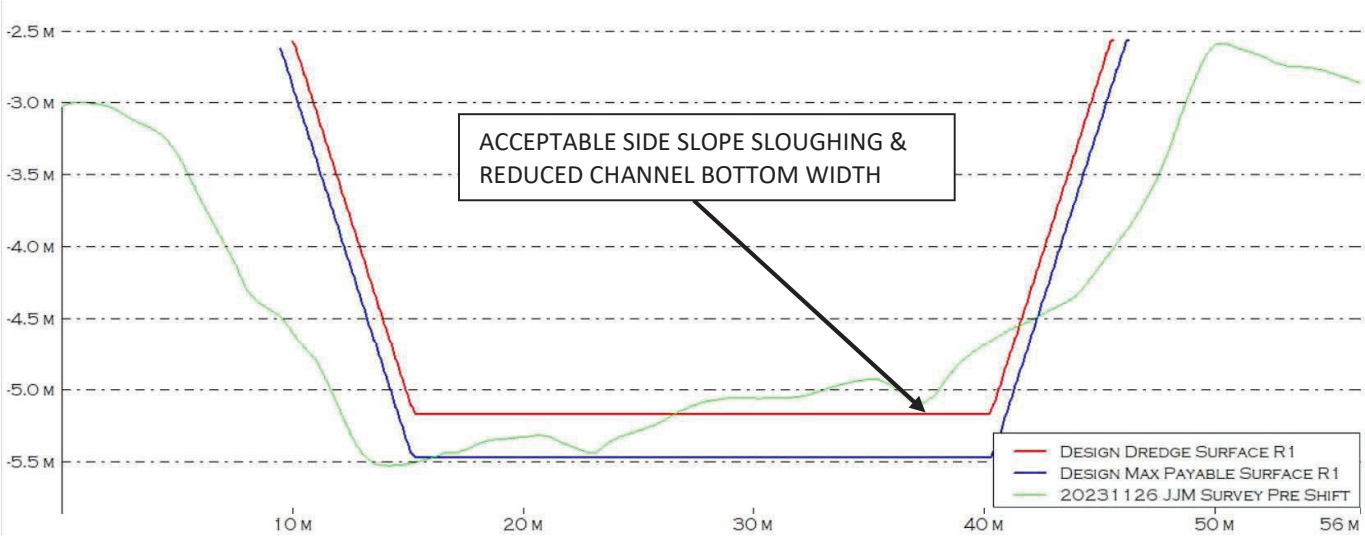


Figure 6. Sta -0+030 Section Looking Downstream. East side slope sloughing to an acceptable tolerance.

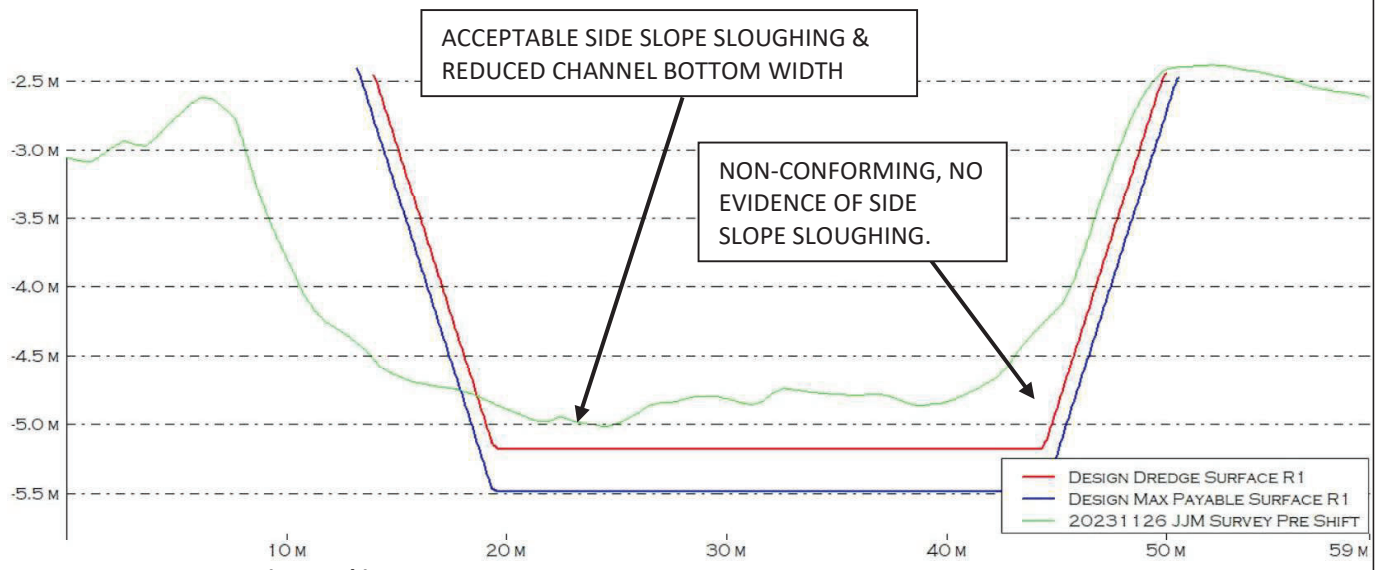


Figure 7. Sta -0+010 Section Looking Downstream.

Site Conditions:

Weather

- Past week (2023/11/20 – 2023/11/26):
  - Refer to the NHC FRR No.1 for the daily weather conditions.
- Upcoming week (2023/11/27 – 2023/12/03):
  - Sunny & Partly Cloudy until Wed Nov. 29, Approximately 10 – 15mm of Rain or snow on both Nov. 30 - Dec. 1. Showers Dec. 2 – 3.
  - Windspeeds not expected to exceed 5km/hr.

River Conditions:

- Past week (2023/11/20 – 2023/11/26):
  - Refer to the NHC's Field Review Report No.1 for the Kingcome inlet tide conditions and Kingcome River water levels.
- Upcoming week (2023/11/27 – 2023/12/03):
  - The first part of the week has been dry and cool, with heavy fog at times. The forecast is calling for increasingly wet conditions beginning Thursday, with daily rainfall amounts of 20 mm to 40 mm through next weekend.
  - Lowest weekly tide is 0.4 m on Nov. 27 at 19:27 and highest weekly tide is 5.4 m on Nov. 28 at 13:10.
  - Kingcome River water level and flows are expected to increase on Nov. 29 and increase again on Dec.2.

Activities completed in the past week:

- Dredging – See **Table 1** for progress through Sunday, Nov. 26.
- Debris Trimming started Nov. 21 – See Table 1 for progress through Sunday, Nov. 26.
- Also refer to Attachment A: NHC Field Review Report No.1.

Upcoming activities this week:

- JJM Dredging and Disposal at Sea (see Table 1, and Attachment B: JJM Weekly Summary of Labour, Equip and Materials)
- FBD Debris Trimming (See attachment D, JJM's LWD Tracker)
- Weekly Meeting between Min Rep and JJM on Nov. 27.
- A 10-day Report on dredging and disposal activities will be issued to ECCC.

Anticipated Completion Date: February 15, 2024

Personnel Employed:

- **Prime Contractor:** JJM Construction Ltd. (JJM)
- **Subcontractor:** Catherwood Towing Ltd. (Catherwood)
- **Subcontractor:** Fraser-Burrard Diving (FBD)
- **Subcontractor:** Dzawada'enuxw First Nation (DFN) OFA 3 & Debris Trimming Monitor
- **Ministry Representative and Engineer:** Northwest Hydraulic Consultants (NHC)
- **Environmental Monitoring:** Pacificus Environmental Ltd. (Pacificus)
- **Archeological Rep:** WSP & DFN

Safety:

- Safety orientations provided to Alicia V. and Danae S. on Nov. 25.
- Safety orientations provided to FBD Nov. 20.
- Morning toolboxes conducted daily by JJM for all workers.
- Peter Coon OFA 3 on site from 06:00– 18:00.
- See attachment C for JJM's Weekly Safety KPIs

Site Visitors/Inspections:

- Veronique B. – Field Review on Nov. 21
- Alicia V. –Field Review on Nov. 25

Environmental Monitoring:

- Pacificus is fulfilling the environmental monitoring (EM) role for the project. See attached for the Weekly EM report.
    - Alex H. – Turbidity measurements twice daily. Environmental Monitoring inspections on Nov. 21
    - Danae S. – Turbidity measurements twice daily. Environmental Monitoring inspections on Nov. 25.

Signature:



Nov. 28, 2023.

Alicia Van Boven, E.I.T., Ministry Representative



Nov. 28, 2023.

Des Goold, P.Eng., Senior Ministry Representative

nhc
northwest hydraulic consultants

Weekly Progress Report #4

Project:	Kingcome River – EDSM Project		
To:	Amy Vallarino (amy.vallarino@gov.bc.ca); Dawn Nicolson (dfnadministrator@kingcome.ca); Midori Nicolson (midorin@telus.net); Arshad Bastani (arshad@ashoprojects.com); Cameron McIntosh (cmcintosh@jjmconstruction.com); Sherman Yee (syee@jjmconstruction.com); Liam Galbraith (lgalbraith@jjmconstruction.com); Mitch Brown (mbrown@jjmconstruction.com); Brenton Ryan (bryan@jjmconstruction.com); Heather Pratt (heather.pratt@wsp.com); Alex Heckels (aheckels@pacificus.ca);		
From:	Sam Xie (NHC; Ministry Representative) (KingcomeMR@nhcweb.com)		
Revision:	0	**Contract:**	WK24EPFLOOD0013
Date:	2023-12-07	**NHC No.:**	3007807
Client:	Ministry of Environment and Climate Change (ENV) & Dzawada'enuxw First Nation (DFN)	**Prime:**	JJM Construction Ltd. (JJM)

Northwest Hydraulic Consultants Ltd. (NHC) has prepared the following report regarding the construction progress at the Kingcome River – Emergency Debris and Sediment Management Project Site as of end-of-day, Sunday, December 3rd, 2023. A lookahead is provided for the current weeks' conditions and activities.

Attachments:

- **Attachment A:** NHC Field Review Report: *20231205 3007807 NHC Kingcome EDSM Field Review Report No.2_R0*
- **Attachment B:** JJM Weekly Summary: *1033-WEEKLY SUMMARY Nov 27 – Dec 3*
- **Attachment C:** JJM Safety KPIs: *1033_Safety KPIs-Week 3_231204*
- **Attachment D:** JJM LWD Trimming Tracker: *1033-KINGCOME debris Tracker Nov 27 – Dec 03*
- **Attachment E:** Pacificus Environmental Report: *Week 3 Environmental Monitoring Report Nov 27 – Dec 3*

Reference Materials:

Materials referenced as part of this memorandum include:

- Drawings:
  - *20231117 3007807 NHC 2900439 KINGCOME EDSM IFC R1* (Revised set delivered Friday, Nov. 17, 2023)
- Special Provisions:
  - *WK24EPFLOOD0013 - JJM Construction Ltd.- Kingcome emergency debris and sediment removal - Final - Nov. 2*
- JJM construction progress survey data received on:
  - 2023-11-27: *20231126_1033JJM_KINGC-EDSM_PS_R04.xyz*
  - *2023-12-02: 20231201_1033JJM_KINGC-EDSM_PS_R05.xyz*
  - *2023-12-04: 20231203_1033JJM_KINGC-EDSM-PS_R06.xyz*
  - Updated Daily: *1033-Disposal Tracking Spreadsheet.xls*
  - Updated Daily: *Daily Dredge Report.xls*
- Fraser-Burrard Diving GPS progress data received on:
  - Updated Daily: *1033-KINGCOME EDSM_Daily Log Tracker.xls*

Progress Quantity Measurement Summary:

For the Debris Trimming work, JJM provides daily reporting that tracks the number of days worked, the locations of trimmed debris and the number of cuts. The total number of cuts and the number of cuts for the week of Nov. 27 to Dec. 3 is provided in **Table 1**, while the locations of debris trimmed is provided in **Figures 1a, 1b, and 1c**. Note: Payment for Debris Trimming is a lump sum with progress against the lump sum tracked by the percentage of work completed within the work area (the bottom row in Table 1). The Debris Trimming team is likely to complete their scope of work by the end of the following week.

For the Dredging work, JJM's weekly progress report (*see attached*) reports a dredged volume of 8,240 m^3 to end-of-day, Dec. 3. JJM's reported quantity is an estimate based on barge loads – therefore it requires some reconciliation with survey data. Dredged quantity has been independently checked by NHC using JJM survey data (see **Table 1**). This past week, JJM did some re-work between Station 0-020 and 0+035, and also completed new dredging from Station 0+085 to 0+170. For the re-work between Station 0-020 to 0+035, NHC estimated the dredged volume as the difference between JJM's Nov 26 survey and their Dec 1 survey, just within those station limits (**Figure 2**). For the new dredge between Station 0+085 and 0+170, the dredge volume is estimated as the difference between JJM's Dec 3 survey and their Pre-Construction survey, again just within those station limits (**Figure 3**). The total progress to date is then the sum of those two estimates for this week, plus the volume reported in Progress Report No. 3.

Overall Dredge Progress

The JJM bathymetric survey from Dec. 3 at the end of week is compared to the IFC dredge design surface in **Figure 4**. The color ramp indicates the depth of bed material compared to the dredge design elevation. The green indicates that the bed elevation is constructed to an acceptable grade and is within the payable over-dredge tolerance of 0.3 m, while blue shows the depth of bed material below the payable over-dredge limit, and red shows areas that are above design grade. The over-dredge (blue shaded) areas are acceptable but not payable. Some red-shaded areas are higher than design due to side-slope sloughing – and may be deemed acceptable for sign-off – other such areas are still high due to under-dredging and require re-work.

Table 1. NHC Progress Quantity Tracking to Sunday, Dec. 3

Item	unit	Quantity	Days Worked	NHC Checked Quantity Previous	% Completed Previous	NHC Checked Quantity Past Week	% Completed for Past Week	NHC Checked Quantity To Date	% Completed to Date
Dredging	m^3	56,000 (Payable Limit)	17	8,490	15%	6,942	13%	15,342	28%
Debris Trimming									
Days of Work		28 (scheduled)	13	6	21%	7	25%	13	46%
No. of Cuts		1300 (estimated)	13	660	51%	917	70%	1577	121%
% of Work Area		Per Drawings	13	~45%		~45%		~90%	

Construction-in-Progress Notes:

- As shown in **Figures 1a, 1b, and 1c**, LWD removal (yellow dots) has not occurred at several of the LWD locations identified in the IFC drawings (camera symbols). This is because the LWD is difficult to identify at high tide which resulted in several hazardous LWD pieces being missed – the debris may have also shifted location since originally being identified in March 2023. To help identify hazardous debris, JJM conducted field inspections at low tide and marked hazardous LWD with a DFN representative. NHC and DFN are verifying the work as it proceeds.
- The start stationing identified in the drawings is STA 0-051, however, the contractor extended the stationing further to the ocean to ensure that there was not a downstream "plug" of sediment as per special provision 4.01(a).
- The weekly design progress plot (**Figure 4)** indicates that some infilling is occurring in the dredge area. The infilling is a result of both natural sediment movement downstream and sloughing or raveling at the dredge boundaries. Frequent survey comparisons will continue to be monitored to determine the extent to which these processes are occurring. JJM will not be expected to re-dredge areas that have filled in due to these processes where those same areas were previously observed by NHC to have met the design intent.
- Between STA 0+015 and 0+070, the riverbed elevation remains higher above the design surface. A review of the progress survey sections indicated that this area has not been dredged to the design elevation, and the higher elevation is not due

to slumping of the side slopes. **Figure 5** shows a cross-section of the survey results at STA 0+060. The area between STA 0+015 and STA 0+070 requires re-work.

- Between STA 0-005 and 0+015, and between 0+075 and 0+085, the riverbed elevation near the bank toes is higher than the design surface. However, NHC has identified sloughing in this area along the edges of the dredged area as shown by the dark blue areas in **Figure 4** that indicate lowered elevation. There is an allowance for sloughing in the Contract, and therefore these areas are still considered acceptable for sign-off. **Figure 6** shows a example cross-section of the survey results at STA 0+010 to illustrate the sloughing.
- Between STA 0-051 and 0-010, the riverbed elevation is higher than the design surface in a large area (**Figure 4**). However, based on previous progress surveys, JJM did achieve the design in most places, but the riverbed has filled back in naturally – JJM is not required to "chase" the dredge is such areas, and so NHC considers these areas acceptable for sign-off. Close to the downstream limit of construction (0-051), a sub-aqueous slide has actually enlarged the navigable waterway beyond the dredge limits, so the slight reduction in water depth in this area is compensated for by a wider waterway due to the slide.
- All elevations shown are in CGVD2013.

Figures:

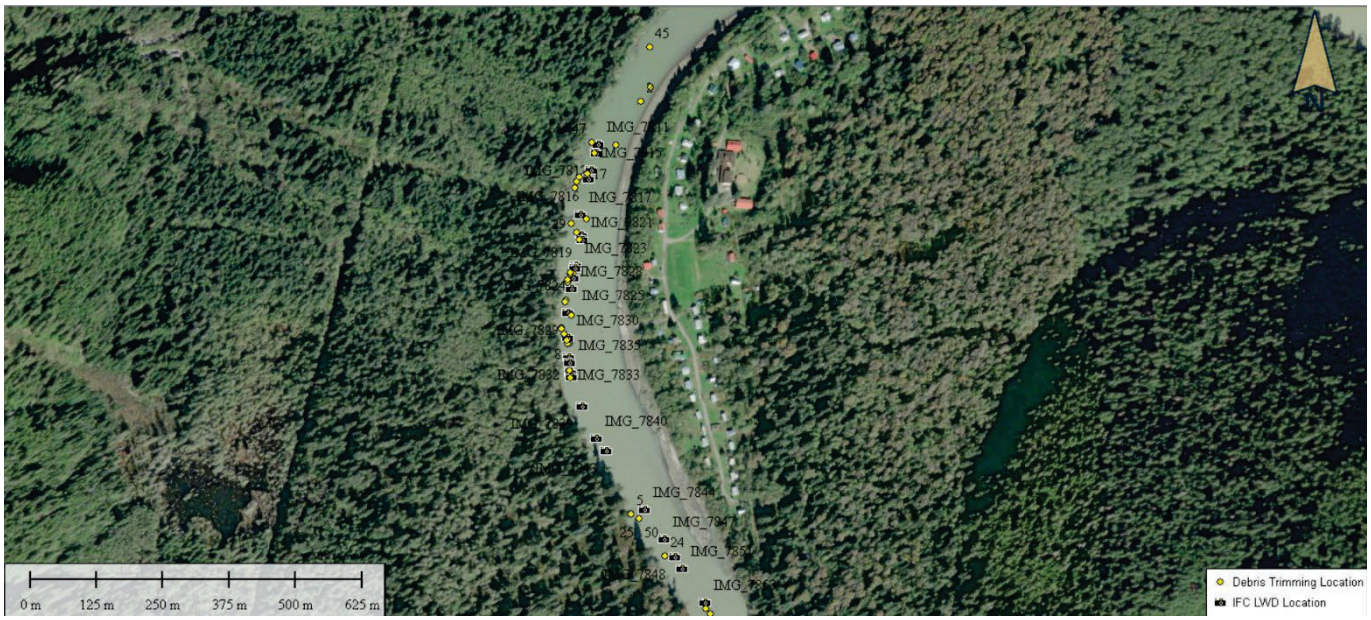


Figure 1a. Completed Debris Trimming Locations and IFC Large Woody Debris Locations.



Figure 1b. Completed Debris Trimming Locations and IFC Debris Trimming Locations.

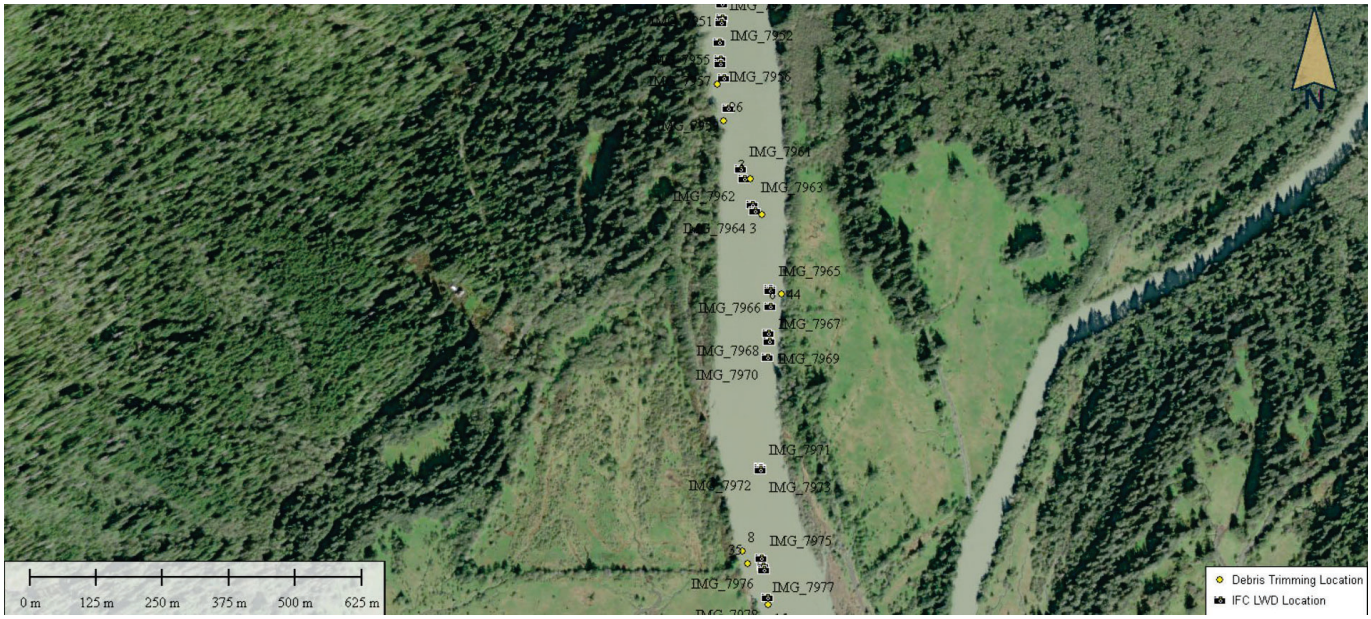


Figure 1c. Completed Debris Trimming Locations and IFC Debris Trimming Locations.



Figure 2. Weekly dredge rework (Sta 0-020 to 0+035): 2023/12/01 Progress Survey – 2023/11/26 Progress Survey.

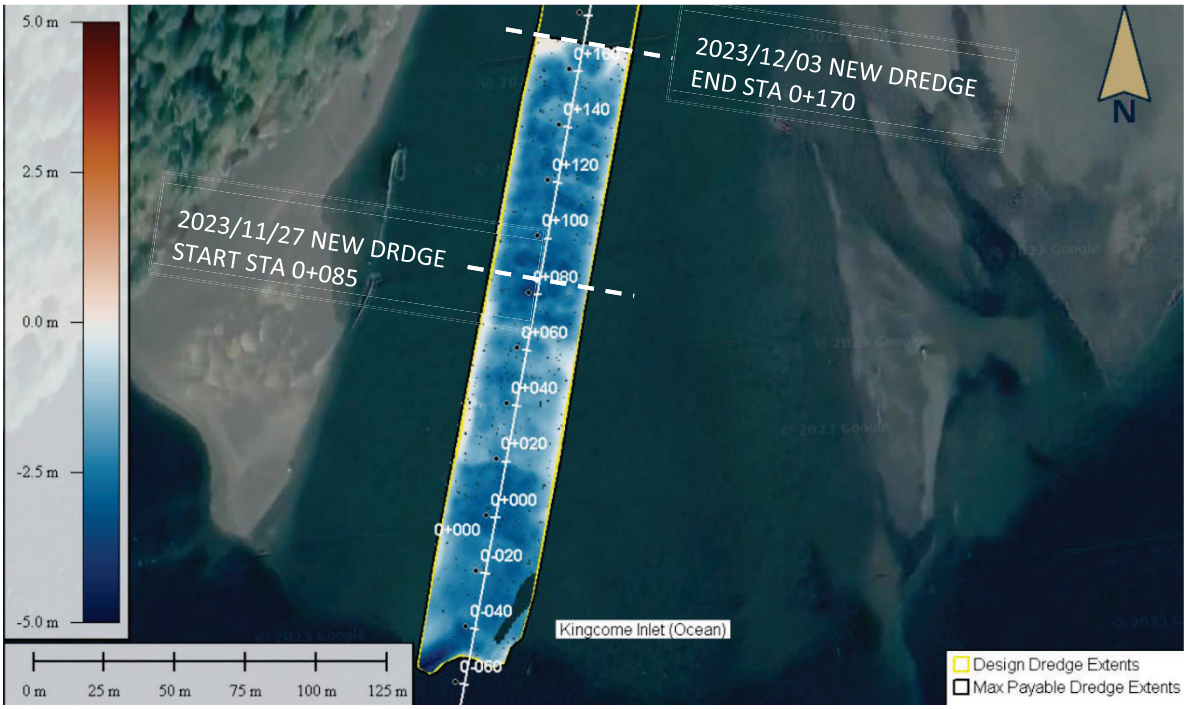


Figure 3. New dredge weekly progress between stations noted, and total current dredged condition: 2023/12/03 JJM Progress Survey minus 2023/11/15 JJM Pre-Construction Surface.

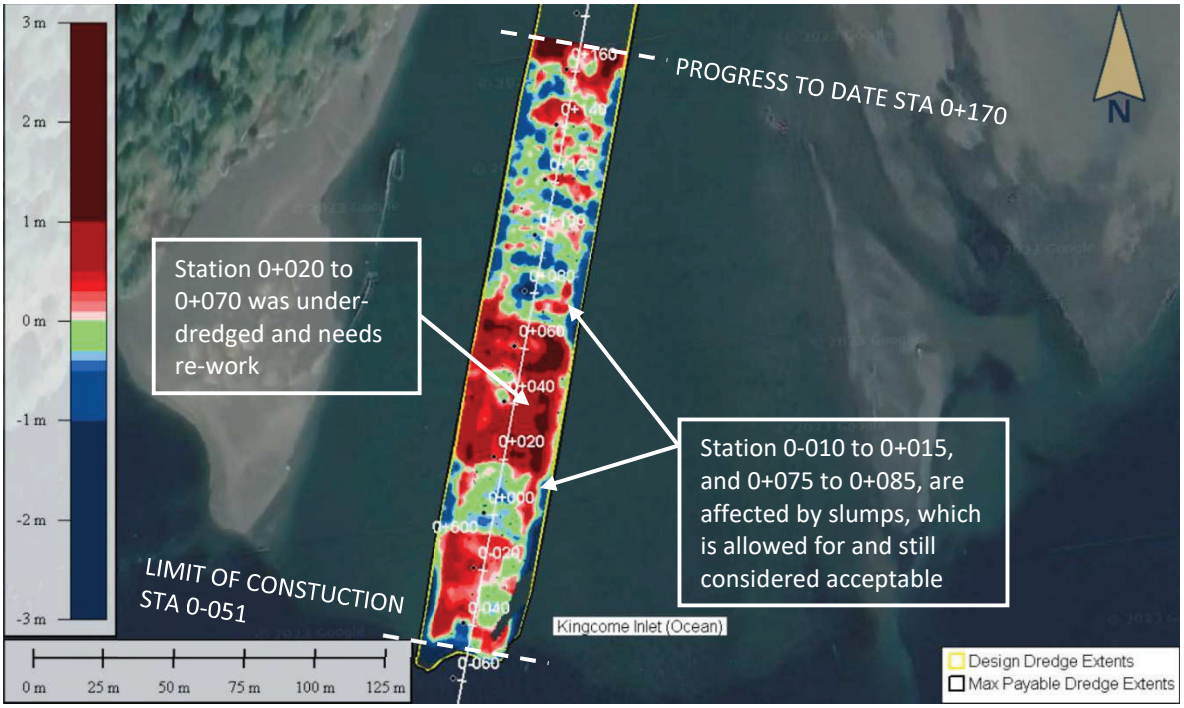


Figure 4. Design Progress: 2023/12/03 JJM Progress Survey minus IFC R1 Dredge Design Surface. White to green areas are meeting design or are between the design surface and the payable over-dredge limit. Sta 0+020 to 0+070 has not yet met design and requires re-work.

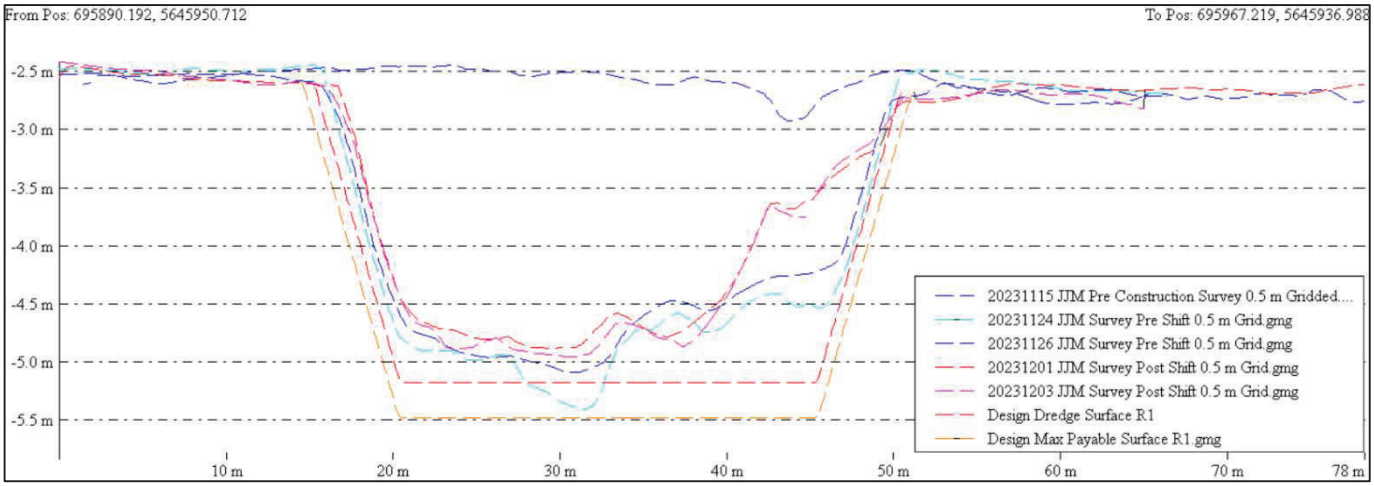


Figure 5. Sta 0+060 section looking upstream. This is an example of the area requiring re-work as noted in Figure 4. The channel is under-dredged.

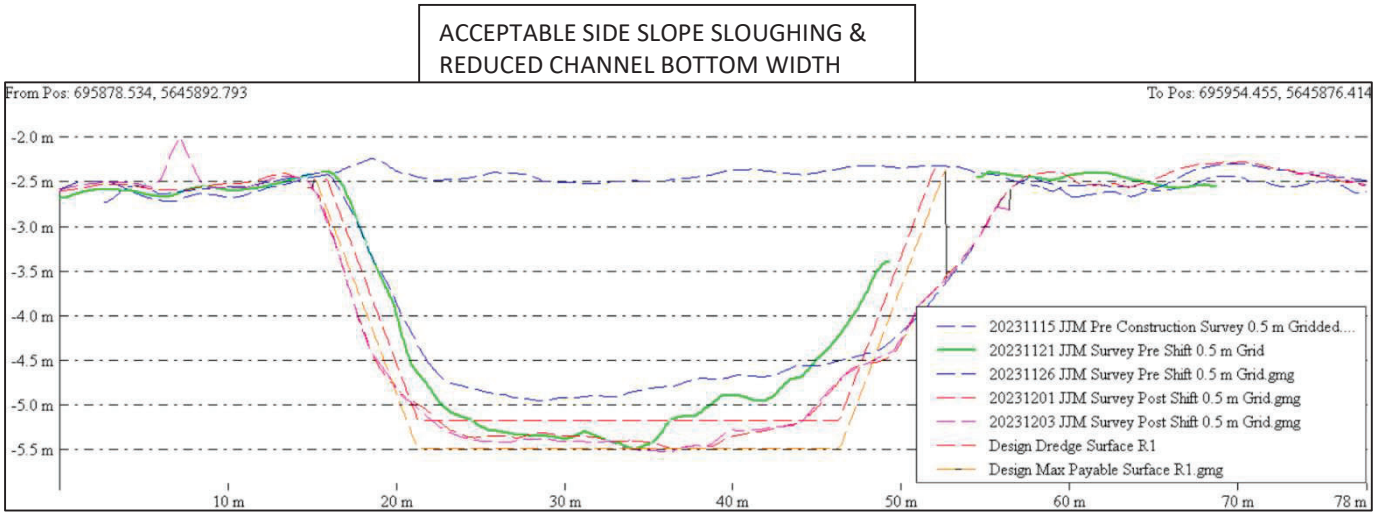


Figure 5. Sta 0+010 section looking upstream. The channel has been dredged to design; however, the dredged channel is higher along the east toe due to a slump on the east slope – by contract this is an allowable condition.

Signed-Off Dredging:

- Dredging has been signed-off by NHC between the following limits:
  - STA 0-051 to STA 0+020 (71 m)
  - STA 0+070 to STA 0+115 (45 m)
  - STA 0+130 to STA 0+150 (20 m)
  - 136 m in total is considered signed-off as of the end-of-day, Dec. 3, 2023.
  - JJM shall not be required to conduct additional work within the above station limits unless a change order is issued and accepted.

Site Conditions:

Weather

- Past week (2023/11/27 – 2023/12/03):
  - Refer to the NHC FRR No.2 for the daily weather conditions.
- Upcoming week (2023/12/04 – 2023/12/10):
  - Dec. 4: heavy rain up to 75 mm, Dec. 5: rain between 10-15 mm, Dec.6: partly cloudy, Dec. 7: snow showers, Dec. 8: mostly cloudy, Dec. 9 and 10: snow
  - Windy on Monday and over the weekend.

River Conditions:

- Past week (2023/11/27 – 2023/12/03):
  - Refer to the NHC's Field Review Report No.2 for the Kingcome inlet tide conditions and Kingcome River water levels.
- Upcoming week (2023/12/04 – 2023/12/10):
  - An atmospheric river event impacting the coastal BC and lower mainland occurred on Dec. 4. The weather is forecasted to be drier towards midweek.
  - Lowest weekly tide is 1.2 m on Dec. 10 at 17:43 and highest weekly tide is 5.0 m on Dec. 10 at 10:42.
    - JJM has determined an offset exists between predicted tides and observed; they have provided data to the Min Rep team.

- Kingcome River flows is estimated to have peaked at around 300 m^3/s between on Dec. 4 and 5.

Activities completed in the past week:

- Dredging – See **Table 1** for progress through Sunday, Dec. 3.
- Debris Trimming – See Table 1 for progress through Sunday, Dec. 3.
- Also refer to Attachment A: NHC Field Review Report No.2.

Upcoming activities this week:

- JJM Dredging and Disposal at Sea
- FBD Debris Trimming – Likely to be wrapping up this week
- Weekly Meeting between Min Rep and JJM on Dec. 4.
- Bi-weekly meeting with ENV on Dec. 6

Anticipated Completion Date: February 15, 2024

Personnel Employed:

- **Prime Contractor:** JJM Construction Ltd. (JJM)
- **Subcontractor:** Catherwood Towing Ltd. (Catherwood)
- **Subcontractor:** Gowlland Towing Ltd.
- **Subcontractor:** Fraser-Burrard Diving (FBD)
- **Subcontractor:** Dzawada'enuxw First Nation (DFN) OFA 3 & Debris Trimming Monitor
- **Ministry Representative and Engineer:** Northwest Hydraulic Consultants (NHC)
    - Alicia Van Boven (to Nov. 29); Sam Xie (Nov. 29 to Dec. 6)
- **Environmental Monitoring:** Pacificus Environmental Ltd. (Pacificus)
- **Archeological Rep:** WSP & DFN

Safety:

- Safety orientations provided to Sam X. on Dec. 1
- Morning toolboxes conducted daily by JJM for all workers.
- Peter Coon OFA 3 on site from 06:00– 18:00.
- See attachment C for JJM's Weekly Safety KPIs

Site Visitors/Inspections:

- Alicia V. – Half-day witnessing of Debris Trimming on Nov. 28 and Nov. 29
- Sam X. – Field Reviews, including Debris Trimming on Dec 1-3

Environmental Monitoring:

- Pacificus is fulfilling the environmental monitoring (EM) role for the project. See attached for the Weekly EM report.
    - Danae S. – Turbidity measurements twice daily.
    - Celeste L. – Turbidity measurements twice daily. Environmental Monitoring inspections on Dec 3.

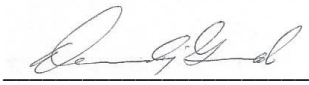
Signature:



_____

Dec. 5, 2023.

Sam Xie, E.I.T., Ministry Representative



_____

Dec. 6, 2023.

Des Goold, P.Eng., Senior Ministry Representative

nhc
northwest hydraulic consultants

Weekly Progress Report #5

Project:	Kingcome River – EDSM Project		
To:	Amy Vallarino (amy.vallarino@gov.bc.ca); Dawn Nicolson (dfnadministrator@kingcome.ca); Midori Nicolson (midorin@telus.net); Arshad Bastani (arshad@ashoprojects.com); Cameron McIntosh (cmcintosh@jjmconstruction.com); Sherman Yee (syee@jjmconstruction.com); Liam Galbraith (lgalbraith@jjmconstruction.com); Mitch Brown (mbrown@jjmconstruction.com); Brenton Ryan (bryan@jjmconstruction.com); Heather Pratt (heather.pratt@wsp.com); Alex Heckels (aheckels@pacificus.ca);		
From:	Sam Xie (NHC; Ministry Representative) (KingcomeMR@nhcweb.com)		
Revision:	0	**Contract:**	WK24EPFLOOD0013
Date:	2023-12-13	**NHC No.:**	3007807
Client:	Ministry of Environment and Climate Change (ENV) & Dzawada'enuxw First Nation (DFN)	**Prime:**	JJM Construction Ltd. (JJM)

Northwest Hydraulic Consultants Ltd. (NHC) has prepared the following report regarding the construction progress at the Kingcome River – Emergency Debris and Sediment Management Project Site as of end-of-day, Sunday, December 10th, 2023. A lookahead is provided for the current weeks' conditions and activities.

Attachments:

- **Attachment A:** NHC Field Review Report: *20231212 3007807 NHC Kingcome EDSM Field Review Report No.3_R0*
- **Attachment B:** JJM Weekly Summary: *1033-WEEKLY SUMMARY Dec 4 to Dec 10*
- **Attachment C:** JJM Safety KPIs: *1033_Safety KPIs-Week 4_231211*
- **Attachment D:** JJM LWD Trimming Tracker: *1033-KINGCOME debris Tracker Dec 4 to Dec 10*
- **Attachment E:** Pacificus Environmental Report: *Week 3 Environmental Monitoring Report Dec 4 to Dec 10*

Reference Materials:

Materials referenced as part of this memorandum include:

- Drawings:
  - *20231117 3007807 NHC 2900439 KINGCOME EDSM IFC R1* (Revised set delivered Friday, Nov. 17, 2023)
- Special Provisions:
  - *WK24EPFLOOD0013 - JJM Construction Ltd.- Kingcome emergency debris and sediment removal - Final - Nov. 2*
- JJM construction progress survey data received on:
  - 2023-11-16 Pre-Construction Survey: *20231115_1033JJM_PC UTMZ9_CVGD2013 NAD83 1M_R00.xyz*
  - 2023-12-08: *20231206_1033JJM_KINGC-EDSM_PS_R07.xyz*
  - 2023-12-09: *20231209_1033JJM_KINGC-EDSM_PS_R08.xyz*
  - Updated Daily: *1033-Disposal Tracking Spreadsheet.xls*
  - Updated Daily: *Daily Dredge Report.xls*
- Fraser-Burrard Diving GPS progress data received on:
  - Updated Daily: *1033-KINGCOME EDSM_Daily Log Tracker.xls*

Progress Quantity Measurement Summary:

For the Debris Trimming work, JJM provides daily reporting that tracks the number of days worked, the locations of trimmed debris and the number of cuts is provided in **Table 1**, while the locations of the boat locations during debris trimming is provided in **Figures 1a, 1b, and 1c**. The work was reviewed by the DFN debris trimming monitor and the debris trimming scope was accepted as complete by a hydrotechnical engineer on Dec 10th, 2023. Note: Payment for Debris Trimming is a lump sum with progress against the lump sum tracked by the percentage of work completed within the work area (the bottom row in Table 1).

For the dredging work, JJM's weekly progress report (*see attached*) reports a weekly dredged volume of 9000 m^3 to end-of-day, Dec. 10. JJM's reported quantity is a visual estimate based on barge loads – therefore it is relatively crude and requires some reconciliation with survey data. JJM submitted progress surveys on Dec. 6 and pre-shift on Dec. 9. Dredged quantity has been independently checked by NHC using JJM survey data (see **Table 1**).

This past week, JJM did some re-work between Station 0+020 to 0+040 and Station 0+120 to 0+150 and completed new dredging from Station 0+170 to 0+265. The total extent of dredge work is shown by comparing the end-of-week 2023/12/09 pre-shift progress survey to the 2023/11/15 pre-construction surface (**Figure 2**). NHC estimated the weekly dredged volume as the difference between JJM's Dec. 3 and Dec. 9 surveys (**Figure 3**), less the non-payable over-dredge volume. The total progress to date is the estimate for this week, plus the volume reported in Progress Report No. 3.

Overall Dredge Progress

The JJM bathymetric survey from Dec. 9 is compared to the IFC dredge design surface in **Figure 4**. The color ramp indicates the depth of bed material compared to the dredge design elevation. The green indicates that the bed elevation is constructed to an acceptable grade and is within the payable over-dredge tolerance of 0.3 m, while blue shows the depth of bed material below the payable over-dredge limit, and red shows areas that are above design grade. The over-dredge (blue shaded) areas are acceptable but not payable. Some red-shaded areas are higher than design due to side-slope sloughing – and may be deemed acceptable for sign-off – other such areas are still high due to under-dredging and require re-work.

Table 1. NHC Progress Quantity Tracking to Sunday, Dec. 3

Item	unit	Quantity	Days Worked	NHC Checked Quantity Previous	% Completed Previous	NHC Checked/ (Un-checked) Quantity Past Week	% Completed for Past Week	NHC Checked/ (Un-checked) Quantity To Date	% Checked/ (Un-checked) Completed to Date
River Dredging									
Dredge Material	m^3	56,000 (Payable Limit)	24	15,342	28%	5,552 (2,600)	11%	20,894 (23,494)	37% (42%)
Debris Trimming									
Days of Work		28 (scheduled)	20	13	46%	7	25%	20	71%
No. of Cuts		1300 (estimated)	20	1577	121%	606	46%	2183	170%
% of Work Area		Per Drawings	20	~90%		~10%		100%	

***Note: Checked Dredge Quantities are based on 2023/12/09 pre-shift survey and only indicate progress to Dec. 08 End-of-Day. Un-checked quantities (in brackets) are from JJM visual barge load estimates on Dec. 9 and 10.**

Construction-in-Progress Notes:

- As shown in Figure 1a, 1b, and 1c, actual Debris Trimming work (green dots) occurred at the majority of LWD locations identified in the IFC drawings (camera symbols). The green dots indicate where the boat was anchored - several LWD cuts were made within a 30 m radius of the dots. The number of cuts at each anchorage is provided in JJM's LWD Trimming Tracker (see attachment D). DFN and NHC have inspected the IFC locations where an anchorage is not shown to verify that hazardous debris has been removed as intended. In some locations, debris had shifted naturally from its IFC location; at other locations, the DFN debris trimming monitor confirmed that debris was removed but the GPS location may not have been recorded.

- The start stationing identified in the drawings is STA 0-051, however, the contractor extended the stationing further to the ocean to ensure that there was not a downstream "plug" of sediment as per special provision 4.01(a).
- The weekly design progress plot (**Figure 4)** indicates that some infilling is occurring in the dredge area. The infilling is a result of both natural sediment movement downstream and sloughing or raveling at the dredge boundaries. Frequent survey comparisons will continue to be monitored to determine the extent to which these processes are occurring. JJM will not be expected to re-dredge signed-off areas that have filled in due to these processes where those same areas were previously observed by NHC to have met the design intent – instead, such areas will be signed off on a weekly basis so that JJM does not have to return to them. In areas that are not yet signed-off, NHC will track any amount of re-dredging of natural infill to ensure the contract maximum volume (56,000 m3) is not exceeded.
- Between STA 0+020 and 0+070, the riverbed elevation remains higher above the design surface. A review of the progress survey sections indicated that this area has never been dredged to the design elevation. In some areas the riverbed has risen since previous dredging due to natural infilling. Therefore, the area between STA 0+020 and STA 0+070 requires re-work. **Figure 5** shows a cross-section of the survey at STA 0+030 **Figure 6** shows a cross-section of the survey results at STA 0+060.
- Between STA 0+170 and 0+190, the riverbed elevation is higher than the design surface in some small areas in the center of the channel (**Figure 4**). As such, the center of the channel requires re-work between these stations. However, as shown in the cross section at STA 0+175 (**Figure 7**), the high areas at the toe of slope are due to side slope sloughing and JJM is not required to "chase" the dredge in these areas, so NHC considers these areas acceptable for sign-off.
- The high areas at the toe of slope between STA 0+070 to STA 0+170 (**Figure 4**) are due to side slope sloughing and NHC considers these areas acceptable for sign-off.All elevations shown are in CGVD2013.

Construction Completion Sign-Off:

- Hazardous LWD Trimming is accepted as complete.
- Dredging has been signed-off by NHC between the following limits:
  - STA 0-051 to STA 0+025 (76 m)
  - STA 0+070 to STA 0+170 (100 m)
  - STA 0+190 to STA 0+220 (30 m)
  - 206 m in total is considered signed-off as of the end-of-day, Dec. 10, 2023. NHC is basing this on the progress survey received Dec. 9, 2023. Any additional sign-off achieved on Sunday, Dec. 10 will be reported next week.
  - JJM shall not be required to conduct additional work within the above station limits unless a change order is issued and accepted.

Figures:



Figure 1a. Completed Debris Trimming Locations and IFC Large Woody Debris Locations.

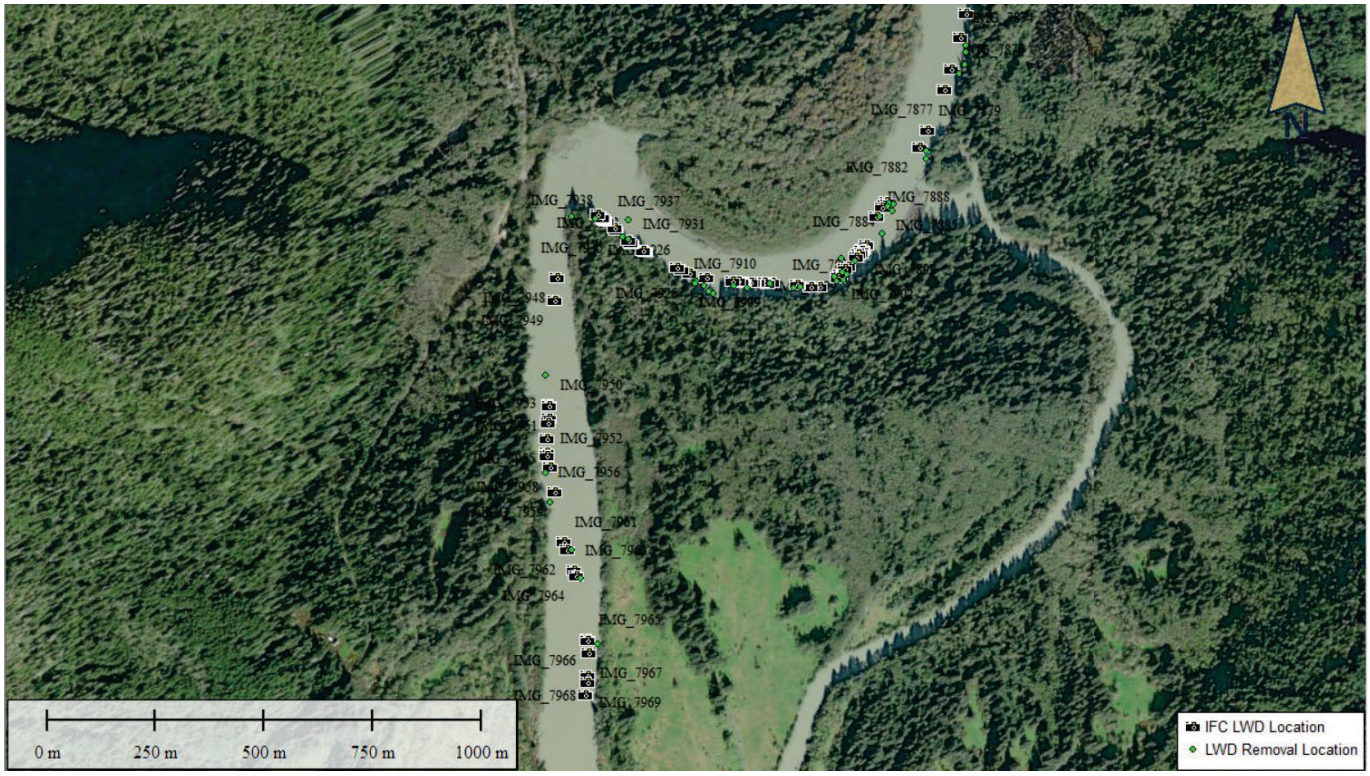


Figure 1b. Completed Debris Trimming Locations and IFC Debris Trimming Locations.

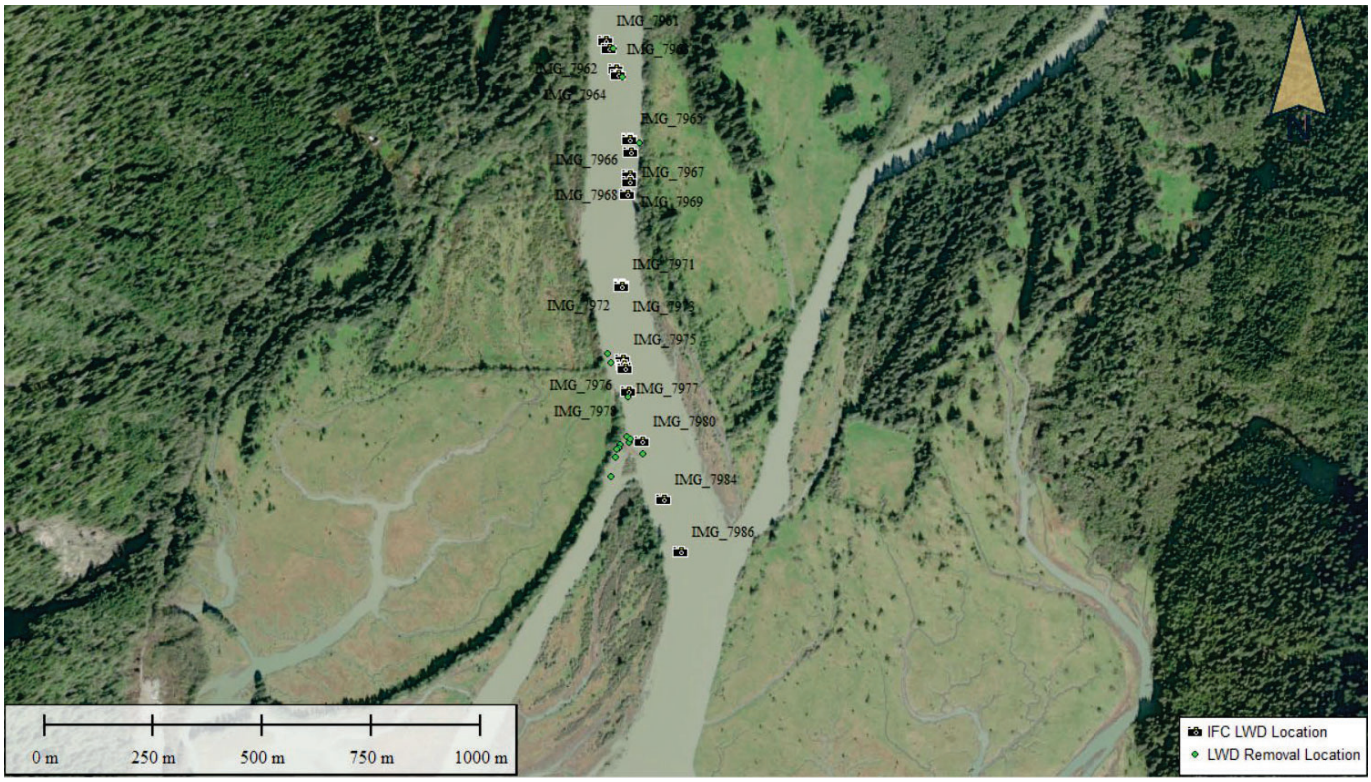


Figure 1c. Completed Debris Trimming Locations and IFC Debris Trimming Locations.



Figure 2. Total Dredge Progress: 2023/12/09 Pre-Shift JJM Progress Survey – 2023/11/15 JJM Pre-Construction Survey

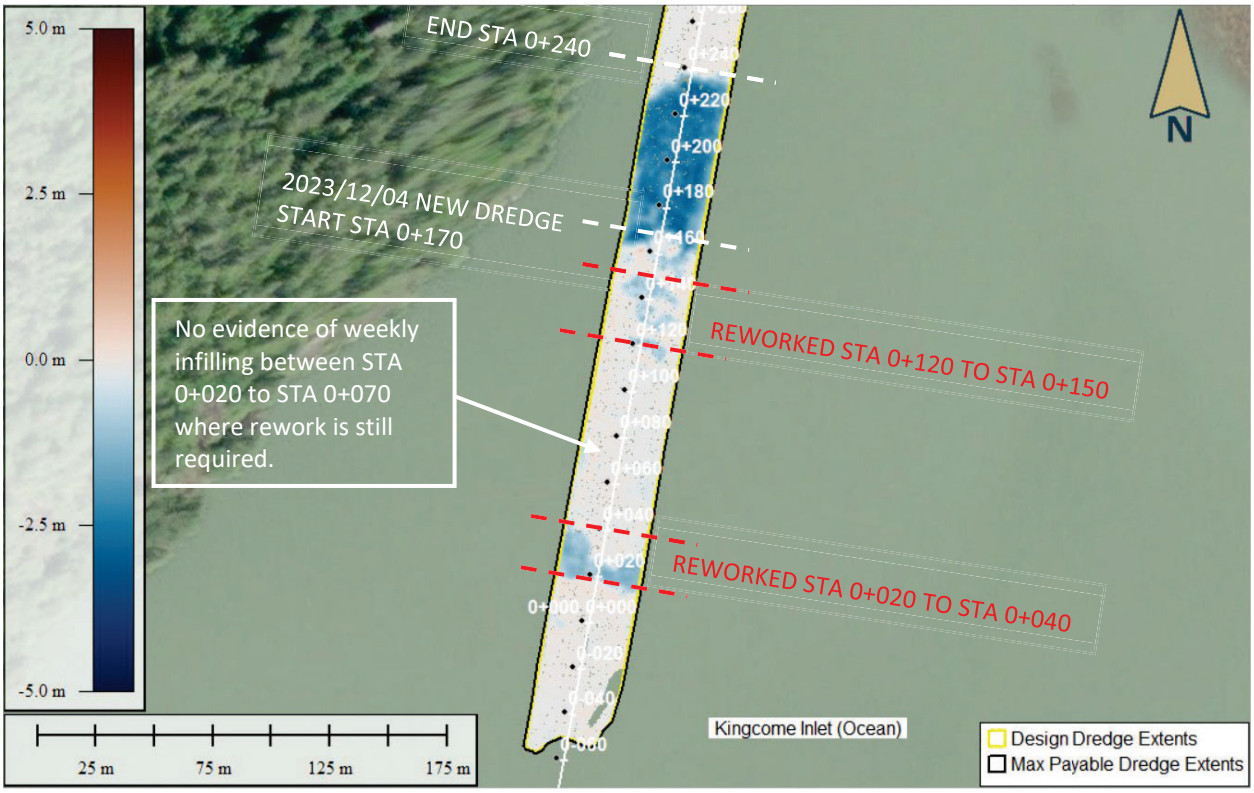


Figure 3. Weekly Dredge Progress: 2023/12/09 Pre-Shift JJM Progress Survey – 2023/12/03 Pre-Shift JJM Progress Survey

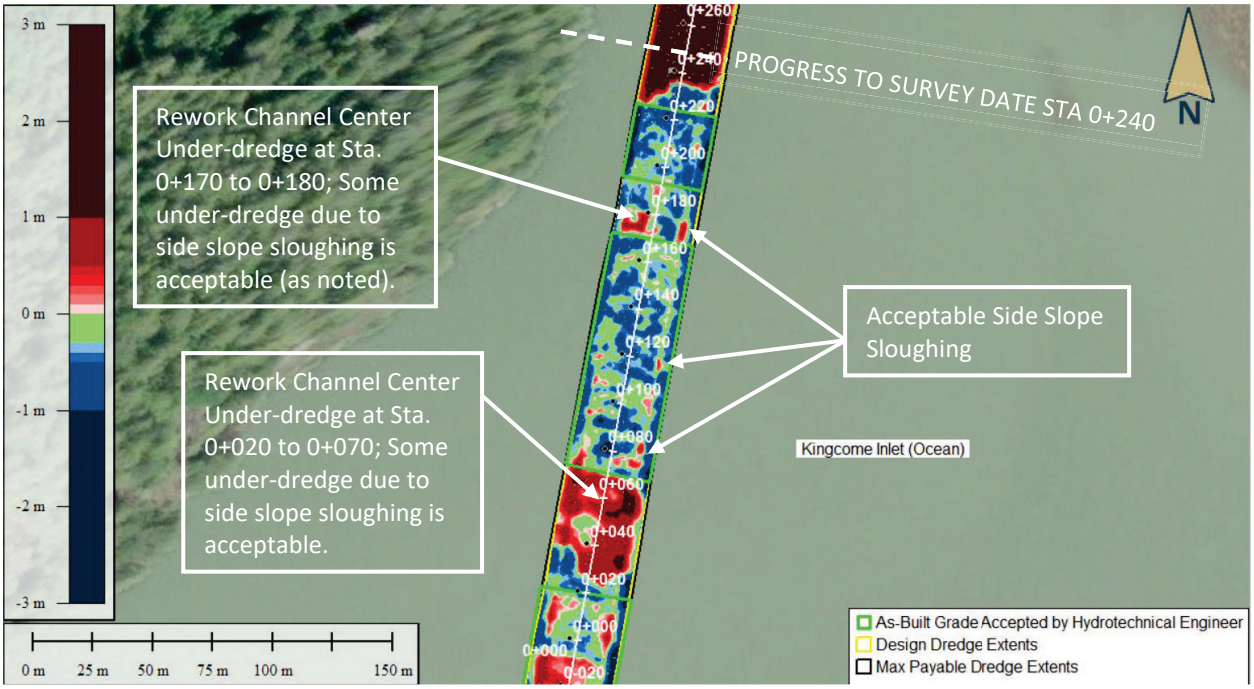


Figure 4. Design Progress: 2023/12/09 JJM Progress Survey – IFC R1 Dredge Design Surface. Green areas are meeting design or are between the design surface and the payable over-dredge limit.

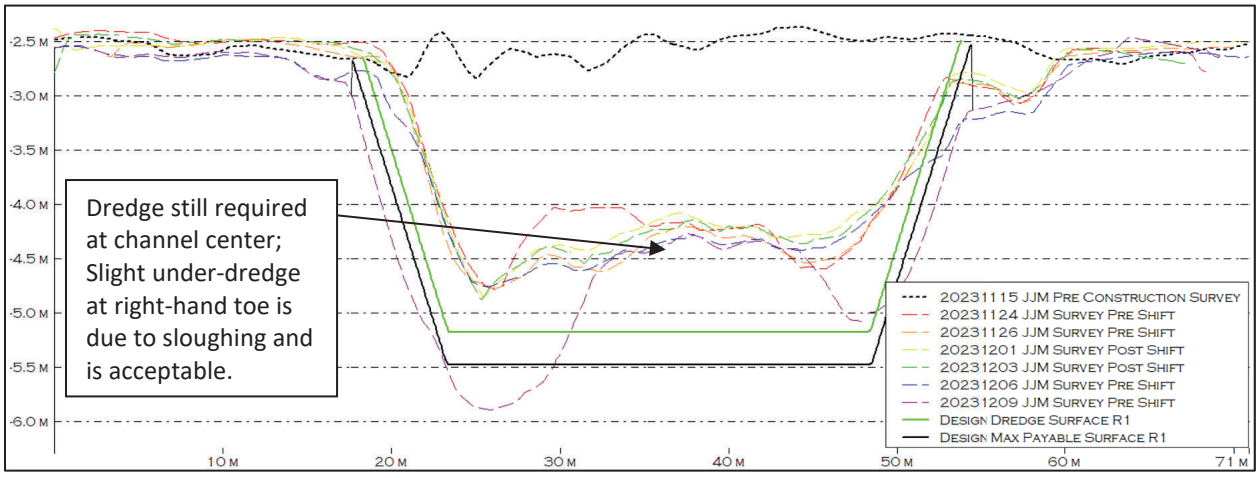


Figure 5. Design Progress: STA 0+030 Cross Section Looking Upstream.

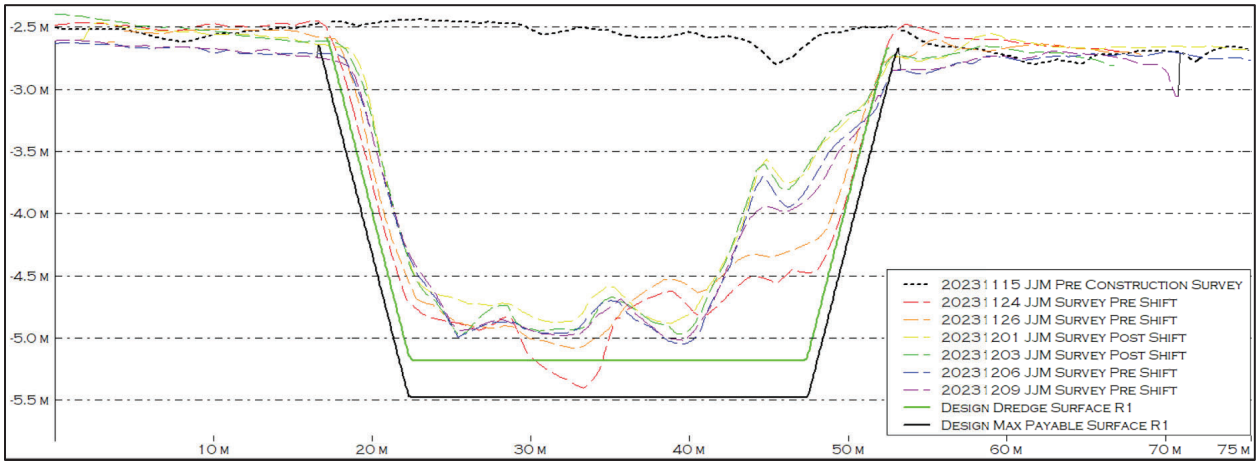


Figure 6. Design Progress: STA 0+060 Cross Section Looking Upstream; some re-work is required here due to the under-dredge, but it is also noted that some natural in-filling has occurred.

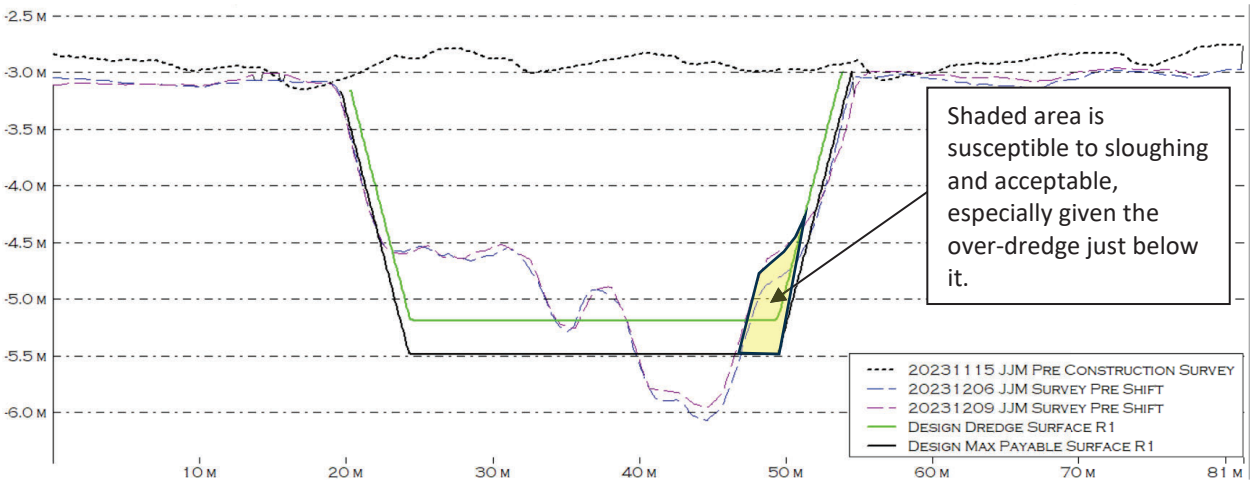


Figure 7. Design Progress: STA 0+175 Cross Section Looking Upstream.

Site Conditions:

Weather

- Past week (2023/12/4 – 2023/12/10):
  - Refer to the NHC FRR No.3 for the daily weather conditions.
- Upcoming week (2023/12/11 – 2023/12/17):
  - Dec. 11: Sunny, Dec. 12: Overcast, Dec.13: moderate rain up to 25 mm, Dec.14: Sunny, Dec. 15: moderate rain up to 30 mm, Dec. 16: Parly Sunny, Dec.17: Light Rain up to 5 mm.

River Conditions:

- Past week (2023/12/4 – 2023/12/10):
  - Refer to the NHC's Field Review Report No.3 for the Kingcome inlet tide conditions and Kingcome River water levels.
- Upcoming week (2023/12/11 – 2023/12/17):
  - Lowest weekly tide is 0.5 m on Dec. 13, Dec. 14 and Dec. 15 at 19:48, 20:33, and 21:19 respectively. High king tides will occur of 5.5 m will occur on Dec. 13 at 12:40 and. Dec. 14 at 13:25.
    - JJM has determined an offset exists between predicted tides and observed; they have provided data to the Min Rep team.

Activities completed in the past week:

- Dredging and Disposal at Sea as noted above
- Debris Trimming (now complete as noted above)
- Weekly meeting between NHC, Pacificus and JJM
- Bi-Weekly Meeting with Owner

Upcoming activities this week:

- Dredging and Disposal at Sea: re-work areas and new areas upstream of Sta 0+220.
- Weekly Meeting between Min Rep and JJM on Dec. 11.

Anticipated Completion Date: February 15, 2024

Personnel Employed:

- **Prime Contractor:** JJM Construction Ltd. (JJM)
- **Subcontractor:** Gowlland Towing Ltd.
- **Subcontractor:** Fraser-Burrard Diving (FBD)
- **Subcontractor:** Dzawada'enuxw First Nation (DFN) OFA 3, Debris Trimming Monitor, Boat Operator.
- **Ministry Representative and Engineer:** Northwest Hydraulic Consultants (NHC)
    - Sam Xie (Dec.4 to Dec. 6) Alicia Van Boven (to Dec. 10)
- **Environmental Monitoring:** Pacificus Environmental Ltd. (Pacificus)
- **Archeological Rep:** WSP & DFN

Safety:

- Morning toolboxes conducted daily by JJM for all workers.
- Mike (JJM) OFA 3 on site from 06:00– 18:00.
- See attachment C for JJM's Weekly Safety KPIs

Site Visitors/Inspections:

- Alicia V. – Field Reviews, including dredging, DAS, debris trimming and bathymetric survey.
- Sam X. – Field Reviews, including dredging, DAS, debris trimming and bathymetric survey.

Environmental Monitoring:

- Pacificus is fulfilling the environmental monitoring (EM) role for the project. See attached for the Weekly EM report.
    - Brittany B. – Turbidity measurements twice daily.
    - Celeste L. – Turbidity measurements twice daily. Environmental monitoring of debris trimming and dredging.
    - Pacificus has been informed of a small (0.5 m litre) un-reported spill on Dec. 7, a portion of which did end up in the river/ ocean; per regulatory requirement the spill will be reported.
    - No environmental monitor on site on Dec. 8 & Dec. 9.

Signature:



Dec. 12, 2023.

Alicia Van Boven, E.I.T., Ministry Representative



Dec. 12, 2023.

Des Goold, P.Eng., Senior Ministry Representative

nhc
northwest hydraulic consultants

Weekly Progress Report #6

Project:	Kingcome River – EDSM Project		
To:	Amy Vallarino (amy.vallarino@gov.bc.ca); Dawn Nicolson (dfnadministrator@kingcome.ca); Midori Nicolson (midorin@telus.net); Arshad Bastani (arshad@ashoprojects.com); Cameron McIntosh (cmcintosh@jjmconstruction.com); Sherman Yee (syee@jjmconstruction.com); Liam Galbraith (lgalbraith@jjmconstruction.com); Mitch Brown (mbrown@jjmconstruction.com); Brenton Ryan (bryan@jjmconstruction.com); Heather Pratt (heather.pratt@wsp.com); Alex Heckels (aheckels@pacificus.ca);		
From:	Veronique Bourgault (NHC; Ministry Representative) (KingcomeMR@nhcweb.com)		
Revision:	0	**Contract:**	WK24EPFLOOD0013
Date:	2023-12-19	**NHC No.:**	3007807
Client:	Ministry of Environment and Climate Change (ENV) & Dzawada'enuxw First Nation (DFN)	**Prime:**	JJM Construction Ltd. (JJM)

Northwest Hydraulic Consultants Ltd. (NHC) has prepared the following report regarding the construction progress at the Kingcome River – Emergency Debris and Sediment Management Project Site as of end-of-day, Sunday, December 17th, 2023. A lookahead is provided for the current weeks' conditions and activities.

Attachments:

- **Attachment A:** NHC Field Review Report: *20231218 3007807 NHC Kingcome EDSM Field Review Report No.4_R0*
- **Attachment B:** JJM Weekly Summary: *1033-WEEKLY SUMMARY Dec 11 to Dec 17*
- **Attachment C:** JJM Safety KPIs: *1033_Safety KPIs-Week 5_231218*
- **Attachment D:** Pacificus Environmental Report: *Week 3 Environmental Monitoring Report Dec 11 to Dec 17*

Reference Materials:

Materials referenced as part of this memorandum include:

- Drawings:
  - *20231117 3007807 NHC 2900439 KINGCOME EDSM IFC R1* (Revised set delivered Friday, Nov. 17, 2023)
- Special Provisions:
  - *WK24EPFLOOD0013 - JJM Construction Ltd.- Kingcome emergency debris and sediment removal - Final - Nov. 2*
- JJM construction progress survey data received on:
  - 2023-11-16 Pre-Construction Survey: *20231115_1033JJM_PC UTMZ9_CVGD2013 NAD83 1M_R00.xyz*
  - No progress surveys received/ reviewed this past week (survey sounding equipment broke down)
  - Updated Daily: *1033-Disposal Tracking Spreadsheet.xls*
  - Updated Daily: *Daily Dredge Report.xls*
- Fraser-Burrard Diving GPS progress data:
  - Debris Trimming scope completed by FBD on December 10. Payment has been awarded for this scope.

Progress Quantity Measurement Summary:

For the dredging work, JJM's weekly progress report (*see attached*) reports a weekly dredged volume of 8200 m^3 to end-of-day, Dec. 17. JJM's reported quantity is a visual estimate based on barge loads – therefore it is relatively crude and requires some reconciliation with survey data. JJM submitted the last progress survey on Dec. 9. Dredged quantity from Dec. 10 to Dec. 17 cannot be independently checked by NHC using JJM survey data, as no surveys have been performed since Dec. 9 due to the Sounder equipment being broken. Reported values in brackets in **Table 1.** are a visual estimate based on barge loads. Partially checked quantities remain the same as for the progress report ending Dec. 10. JJM will submit a survey to NHC before the end of the next invoicing period, which NHC will review and use to reconcile dredged quantities up to December 22, and consider portions of the dredge area for sign-off.

This past week, JJM did some re-work between Station 0+020 to 0+055 and Station 0+55 to 0+070 and completed new dredging from Station 0+245 to 0+360. This will be shown in future progress reports once surveying recommences.

Table 1. NHC Progress Quantity Tracking to Sunday, Dec. 3

Item	unit	Quantity	Days Worked	NHC Checked Quantity Previous	% Completed Previous	NHC Checked/ (Un-checked) Quantity Past Week	% Completed for Past Week	NHC Checked/ (Un-checked) Quantity To Date	% Checked/ (Un-checked) Completed to Date
River Dredging									
Dredge Material	m^3	56,000 Payable Limit	31	15,342	28%	0 (8200)	(15)%	20,894 (33,690)	37% (60%)

***Note: Checked Dredge Quantities are based on 2023/12/09 pre-shift survey and only indicate progress to Dec. 08 End-of-Day. Un-checked quantities (in brackets) are from JJM visual barge load estimates from pre-shift Dec. 9 through end-of-day Dec. 17.**

Construction-in-Progress Notes:

- The start stationing identified in the drawings is STA 0-051, however, the contractor extended the stationing further to the ocean to ensure that there was not a downstream "plug" of sediment as per special provision 4.01(a).
- In the Dec. 10 progress report, the area between STA 0+020 and 0+070 was shown to be in need of re-work due to the riverbed elevation being higher than the design surface. JJM addressed the area between STA 0+020 and 0+070 on Dec. 13 and Dec. 14. A check of this area will be conducted upon submittal of the next progress survey.
- In the Dec. 10 progress report, the area between STA 0+170 and 0+190, was shown to be in need of re-work due to the riverbed elevation being higher than the design surface. JJM has not reworked this area per their reported start- and end-stationing this week – NHC will confirm upon submittal of the next progress survey.

Construction Completion Sign-Off:

- Hazardous LWD Trimming is accepted as complete and is considered signed-off.
- Dredging has been signed-off by NHC between the following limits:
  - STA 0-051 to STA 0+025 (76 m)
  - STA 0+070 to STA 0+170 (100 m)
  - STA 0+190 to STA 0+220 (30 m)
  - 206 m in total is considered signed-off to date. NHC is basing this on the progress survey. Any additional sign-off achieved through Sunday, Dec. 17 will be reported before the Dec. 22 invoicing period.
  - JJM shall not be required to conduct additional work within the above station limits unless a change order is issued and accepted.

Site Conditions:

Weather

- Past week (2023/12/11 – 2023/12/17):
  - Refer to the NHC FRR No.4 for the daily weather conditions.
- Upcoming week (2023/12/18 – 2023/12/25):
  - Dec. 18: Rain, about 25 mm. Dec. 19: Rain, 15 mm. Dec.20: moderate rain up to 25 mm, Dec.21: Heavy rain, 40-50 mm, Dec. 22: light rain, 5mm, Dec. 23: Partly sunny, Dec.24: snow flurries, Dec 25: light snow 1 mm.

River Conditions:

- Past week (2023/12/11 – 2023/12/17):
  - Refer to the NHC's Field Review Report No.4 for the Kingcome inlet tide conditions and Kingcome River water levels.
- Upcoming week (2023/12/17 – 2024/01/02):
  - Lowest weekly tide is 0.6 m on Dec. 25, Dec. 26 and Dec. 27 at 19:32, 20:18, and 21:01 respectively. High king tides will occur of 5.4 m will occur on Dec. 25 at 12:27 and. Dec. 26 at 13:12.
    - JJM has determined an offset exists between predicted tides and observed; they provided data to the Min Rep team. Min Rep Team has determined that this offset is up to 0.62 m lower than the predicted low tides, and up to 0.5 m higher than the predicted high tides.

Activities completed in the past week:

- Dredging and Disposal at Sea as noted above.
- Weekly meeting between NHC, Pacificus and JJM.

Upcoming activities this week:

- Dredging and Disposal at Sea: dredging to continue until Dec. 20. All work shut down from Dec. 22 to Jan. 02, 2024.
- Weekly Meeting between Min Rep and JJM on Dec. 18.
- Monthly Meeting with full project team on Dec. 20.

Anticipated Completion Date: February 15, 2024

Personnel Employed:

- **Prime Contractor:** JJM Construction Ltd. (JJM)
- **Subcontractor:** Gowlland Towing Ltd.
- **Subcontractor:** Fraser-Burrard Diving (FBD)
- **Subcontractor:** Dzawada'enuxw First Nation (DFN) OFA 3, Debris Trimming Monitor, Boat Operator.
- **Ministry Representative and Engineer:** Northwest Hydraulic Consultants (NHC)
  - Alicia Van Boven (Dec.10 to Dec. 14) Veronique Bourgault (to Dec. 22)
- **Environmental Monitoring:** Pacificus Environmental Ltd. (Pacificus)
- **Archeological Rep:** WSP & DFN

Safety:

- Morning toolboxes conducted daily by JJM for all workers.
- Michael Wesley (JJM) OFA 3 on site from 06:00– 18:00.

- See attachment C for JJM's Weekly Safety KPIs

Site Visitors/Inspections:

- Alicia V. – Field Reviews, including dredging, DAS, debris trimming and bathymetric survey.
- Veronique Bourgault. – Field Reviews, including dredging, DAS, debris trimming and bathymetric survey.

Environmental Monitoring:

- Pacificus is fulfilling the environmental monitoring (EM) role for the project. See attached for the Weekly EM report.
  - Brittany B. – Turbidity measurements twice daily.
  - Heather H. – Turbidity measurements twice daily. Environmental monitoring of dredging.
  - Pacificus has been informed of one load of dredged material (150 cubic meters) being dumped outside of the DAS area on December 13. No environmental impact was measured.

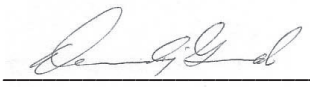
Signature:



_____

Dec. 19, 2023.

Veronique Bourgault, E.I.T., Ministry Representative



_____

Dec. 19, 2023.

Des Goold, P.Eng., Senior Ministry Representative

nhc
northwest hydraulic consultants

Weekly Progress Report #7

Project:	Kingcome River – EDSM Project		
To:	Amy Vallarino (amy.vallarino@gov.bc.ca); Dawn Nicolson (dfn.administrator@kingcome.ca); Midori Nicolson (midorin@telus.net); Arshad Bastani (arshad@ashoprojects.com); Cameron McIntosh (cmcintosh@jjmconstruction.com); Sherman Yee (syee@jjmconstruction.com); Liam Galbraith (lgalbraith@jjmconstruction.com); Mitch Brown (mbrown@jjmconstruction.com); Brenton Ryan (bryan@jjmconstruction.com); Heather Pratt (heather.pratt@wsp.com); Alex Heckels (aheckels@pacificus.ca);		
From:	Sam Xie (NHC; Ministry Representative) (KingcomeMR@nhcweb.com)		
Revision:	0	**Contract:**	WK24EPFLOOD0013
Date:	2023-12-22	**NHC No.:**	3007807
Client:	Ministry of Environment and Climate Change (ENV) & Dzawada'enuxw First Nation (DFN)	**Prime:**	JJM Construction Ltd. (JJM)

Northwest Hydraulic Consultants Ltd. (NHC) has prepared the following report regarding the construction progress at the Kingcome River – Emergency Debris and Sediment Management Project Site as of end-of-day, Thursday, December 21, 2023. A lookahead is provided for the current weeks' conditions and activities.

Attachments:

- **Attachment A:** NHC Field Review Report: *20231221 3007807 NHC Kingcome EDSM Field Review Report No.5_R0*

Reference Materials:

Materials referenced as part of this memorandum include:

- Drawings:
  - *20231117 3007807 NHC 2900439 KINGCOME EDSM IFC R1* (Revised set delivered Friday, Nov. 17, 2023)
- Special Provisions:
  - *WK24EPFLOOD0013 - JJM Construction Ltd.- Kingcome emergency debris and sediment removal - Final - Nov. 2*
- JJM construction progress survey data received on:
  - 2023-11-16 Pre-Construction Survey: *20231115_1033JJM_PC UTMZ9_CVGD2013 NAD83 1M_R00.xyz*
  - 2023-12-09: *20231206_1033JJM_KINGC-EDSM_PS_R08.xyz*
  - 2023-12-19: *20231209_1033JJM_KINGC-EDSM_PS_R09.xyz*
  - Updated Daily: *Daily Dredge Report.xls*
- Fraser-Burrard Diving Debris Trimming scope has been completed.

Progress Quantity Measurement Summary:

This past week, JJM completed new dredging from Station 0+360 to 0+385. The total extent of dredge work is shown by comparing the end-of-week 2023/12/19 pre-shift progress survey (no dredging occurred past Dec. 18) to the 2023/11/15 pre-construction surface (**Figure 1**). There were no progress surveys available between Dec. 9 and Dec. 19, so dredging progress could not be checked by comparing surveys until now. NHC has estimated the dredged volume over the past two weeks as the difference between JJM's Dec. 19 and Dec. 9 surveys (**Figure 2**), less the non-payable over-dredge volume – that estimate is 15,073 m^3. The total progress to date is the estimate for the last two weeks, plus the volume reported in Progress Report No. 5, the last time a survey check was completed – that estimate is 30,415 m^3. JJM has estimated their total payable dredge as 30,867 m^3. The minor difference in volumes is attributed to some infilling that has occurred since the beginning of December, which NHC has recognized but not fully accounted for. NHC has accepted JJM total payable dredge estimate as accurate.

Overall Dredge Progress

The JJM bathymetric survey from Dec. 19 is compared to the IFC dredge design surface in **Figure 3**. The color ramp indicates the depth of bed material compared to the dredge design elevation. The green indicates that the bed elevation is constructed to an acceptable grade and is within the payable over-dredge tolerance of 0.3 m, while blue shows the depth of bed material below the payable over-dredge limit, and red shows areas that are above required dredge grade. The over-dredge (blue shaded) areas are acceptable but not payable. Some red-shaded areas are higher than design due to side-slope sloughing – and may be deemed acceptable for sign-off – other such areas are still high due to under-dredging and require re-work.

Table 1. NHC Progress Quantity Tracking to Friday, Dec. 22.

Item	unit	Quantity	Days Worked	NHC Checked Quantity Previous	% Completed Previous	NHC Checked Quantity Past Two Week	% Completed for Past Week	NHC Checked Quantity To Date	% Checked/ (Un-checked) Completed to Date
River Dredging									
Dredge Material	m^3	56,000 (Payable Limit)	34	15,342	28%	15,525	27.7%	30,867	55.7%

***Note: Checked Dredge Quantities are based on 2023/12/19 pre-shift survey and only indicate progress to Dec. 18 End-of-Day. There are no un-checked quantities as no dredging occurred after Dec. 18.**

Construction-in-Progress Notes:

- The start stationing identified in the drawings is STA 0-051, however, the contractor extended the stationing further to the ocean to ensure that there was not a downstream "plug" of sediment as per special provision 4.01(a).
- The weekly design progress plot (**Figure 3)** indicates that some infilling is occurring in the dredge area. The infilling is a result of both natural sediment movement downstream and sloughing or raveling at the dredge boundaries. Frequent survey comparisons will continue to be monitored to determine the extent to which these processes are occurring. JJM will not be expected to re-dredge signed-off areas that have filled in due to these processes where those same areas were previously observed by NHC to have met the design intent – instead, such areas will be signed off on a weekly basis so that JJM does not have to return to them. In areas that are not yet signed-off, NHC will track any amount of re-dredging of natural infill to ensure the contract maximum volume (56,000 m3) is not exceeded.
- Progress Report No.5 noted that the area between STA 0+020 and STA 0+070 required re-work. This area has been addressed and now meets the required dredge requirements, and NHC considers this area acceptable for sign off. **Figure 4** shows a cross-section of the survey at STA 0+030, and **Figure 5** shows a cross-section of the survey results at STA 0+070.
- Progress Report No.5 noted that in the center of the channel, in the area between STA 0+170 and STA 0+190 required re-work. This area has been addressed and now meets the required dredge requirements, and NHC considers this area acceptable for sign off. **Figure 6** shows the area at STA 0+170 meeting the design dredge requirements.
- New work was completed from STA 0+230 to STA 0+385 from the Dec. 09 survey to the Dec. 19 survey. NHC considers the area between STA 0+230 to STA 0+370 as meeting the required dredge requirements, and considers this area signed off. **Figure 7** to **Figure 10** show sections within this area. There is side slope sloughing along some of the slope in this area.

- The high areas at the toe of slope between STA 0+060 to STA 0+280 (**Figure 3**) are due to side slope sloughing and NHC considers these areas acceptable for sign-off. All elevations shown are in CGVD2013.

Construction Completion Sign-Off:

- Dredging has been signed-off by NHC between the following limits:
  - STA 0-051 to STA 0+370 (421 m)
  - 421 m in total is considered signed-off as of the end-of-day, Dec. 22, 2023. NHC is basing this on the progress survey received Dec. 19, 2023.
  - JJM shall not be required to conduct additional work within the above station limits unless a change order is issued and accepted.

Figures:



Figure 1. Total Dredge Progress: 2023/12/19 Pre-Shift JJM Progress Survey – 2023/11/15 JJM Pre-Construction Survey



Figure 2. Weekly Dredge Progress: 2023/12/19 Pre-Shift JJM Progress Survey – 2023/12/09 Pre-Shift JJM Progress Survey

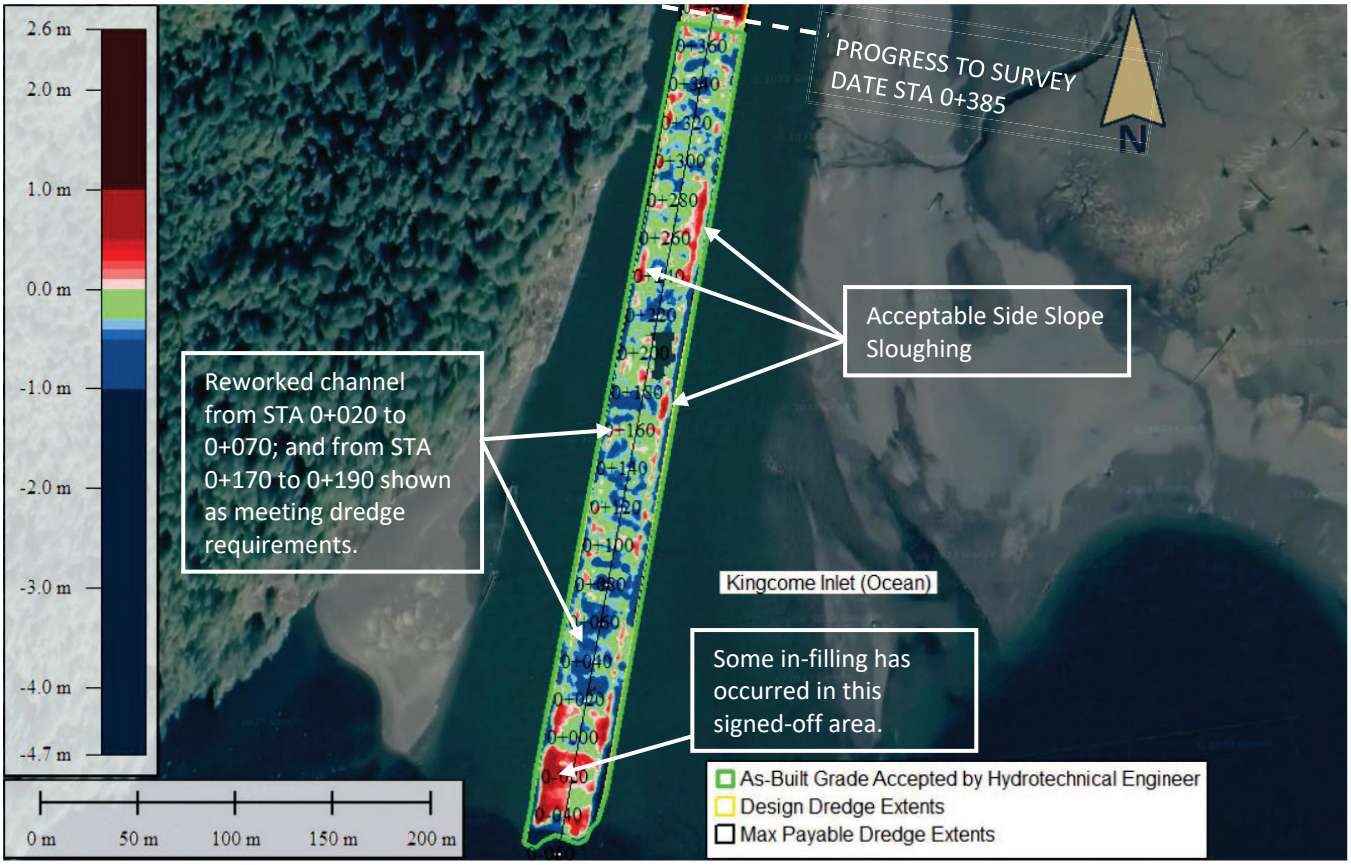


Figure 3. Design Progress: 2023/12/19 JJM Progress Survey – IFC R1 Dredge Design Surface. Green areas are meeting design or are between the design surface and the payable over-dredge limit.

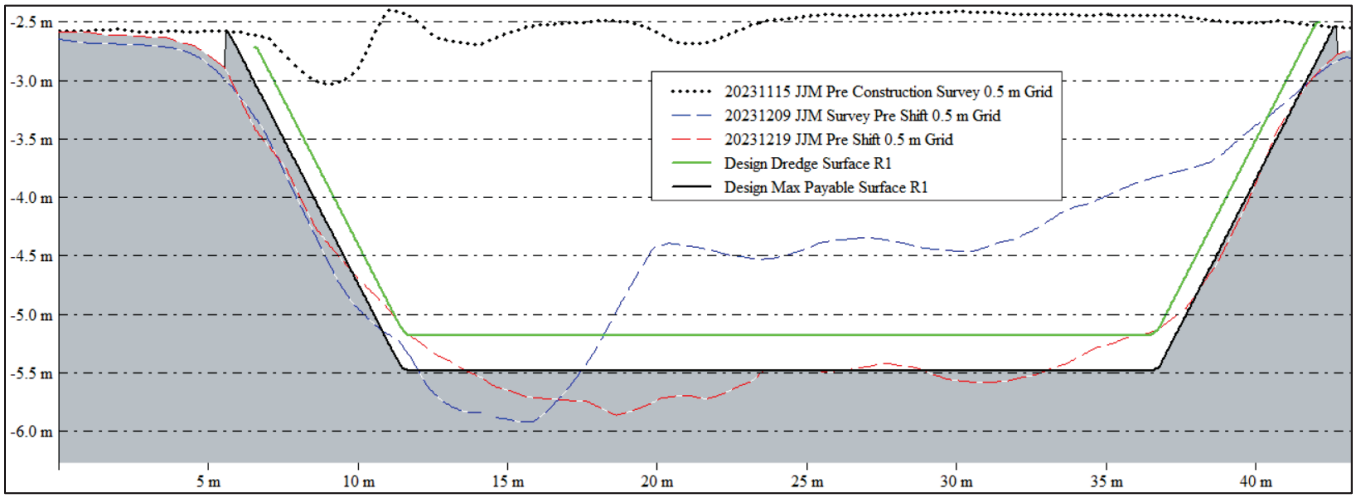


Figure 4. Design Progress: STA 0+030 Cross Section Looking Upstream. Shows the re-worked section from STA 0+020 to STA 0+070 now meeting design dredge requirements.

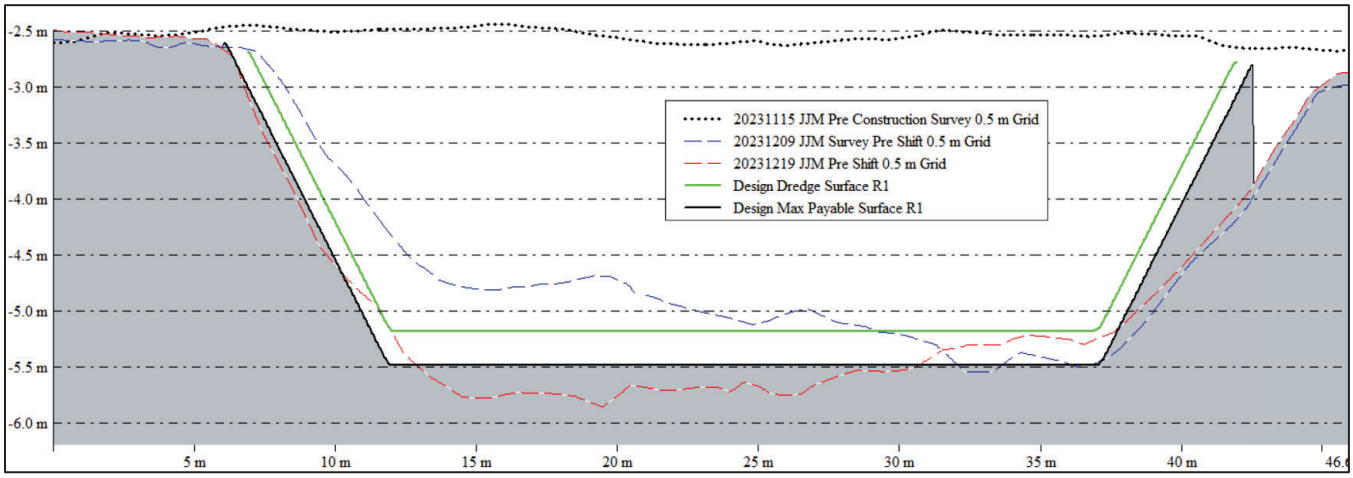


Figure 5. Design Progress: STA 0+070 Cross Section Looking Upstream. Shows the re-worked section from STA 0+020 to STA 0+070 now meeting design dredge requirements.

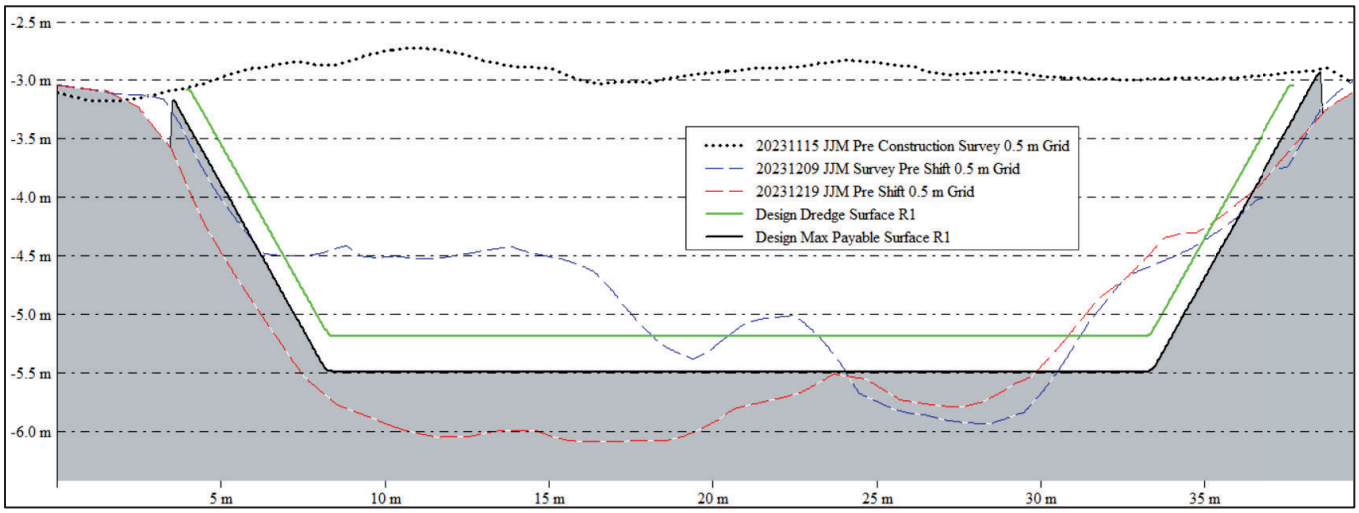


Figure 6. Design Progress: STA 0+170 Cross Section Looking Upstream, showing reworked section from STA 0+170 to STA 0+190. Some side sloughing on the east side of the dredge channel is acceptable and is shown to have occurred between the Dec. 09 and Dec. 19 surveys.

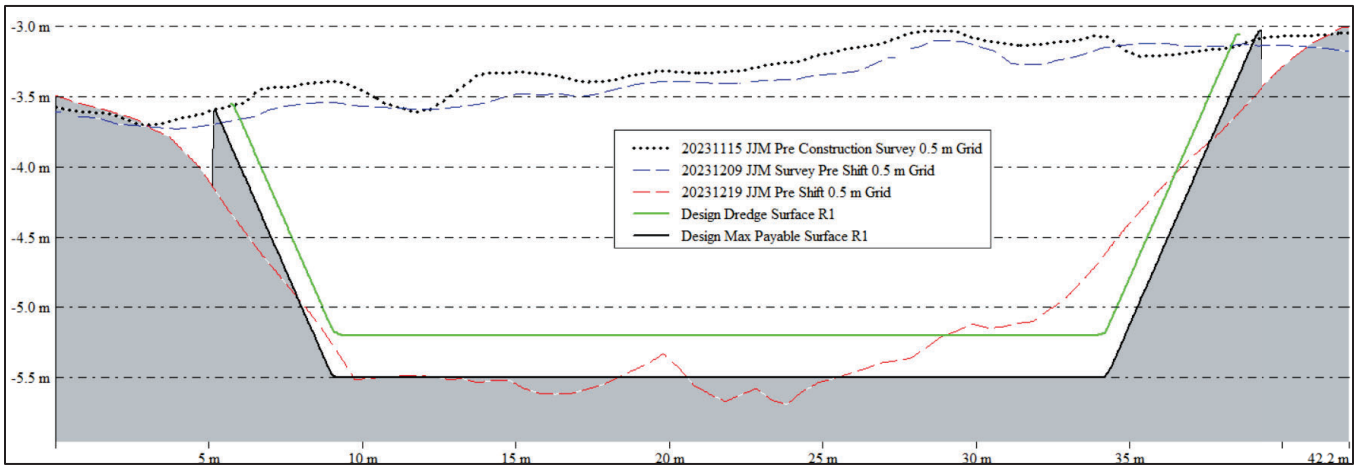


Figure 7. Design Progress: STA 0+270 Cross Section Looking Upstream, showing new work from STA 0+230 to STA 0+385. Side slope sloughing on the east side of the dredge channel is considered acceptable and expected.

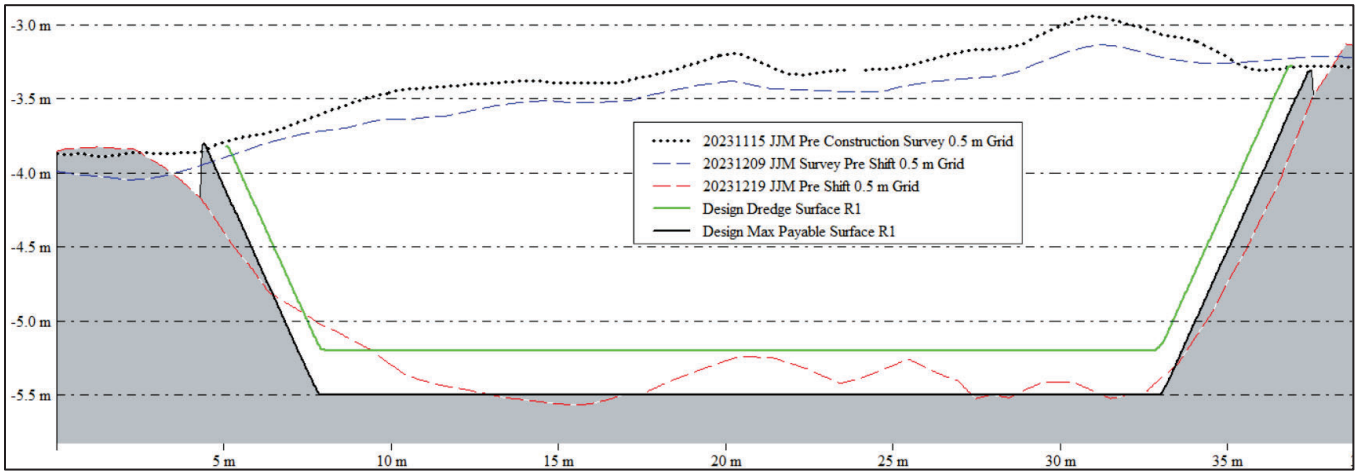


Figure 8. Design Progress: STA 0+310 Cross Section Looking Upstream, showing new work from STA 0+230 to STA 0+385. Side slope sloughing on the west side of the dredge channel is considered acceptable and expected.

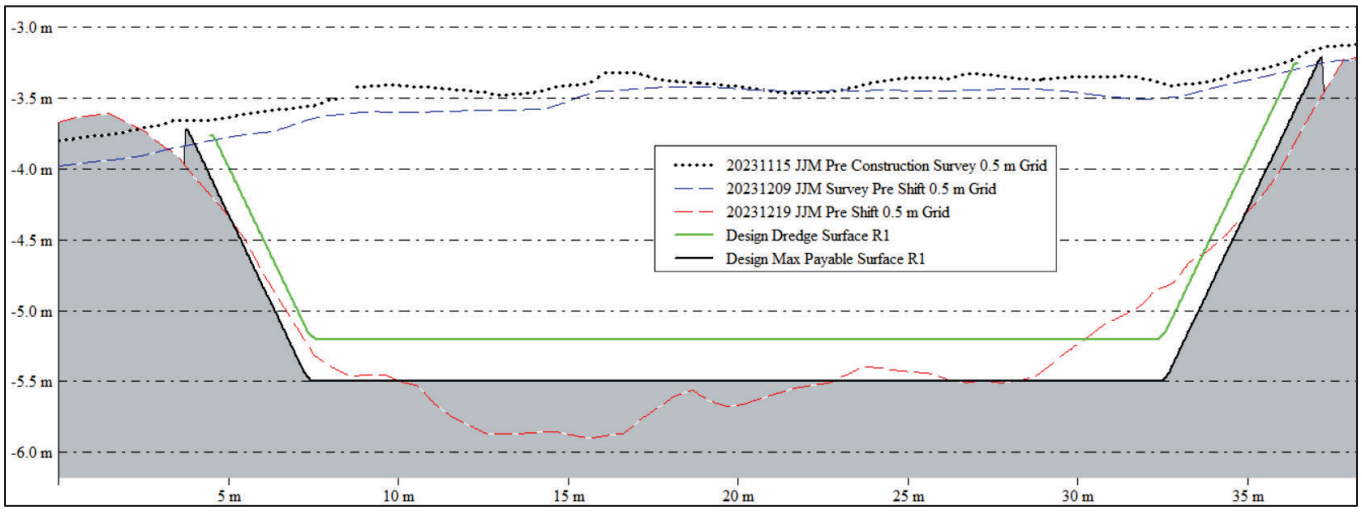


Figure 9. Design Progress: STA 0+350 Cross Section Looking Upstream, showing new work from STA 0+230 to STA 0+385. Side slope sloughing on the east side of the channel is considered acceptable and expected.

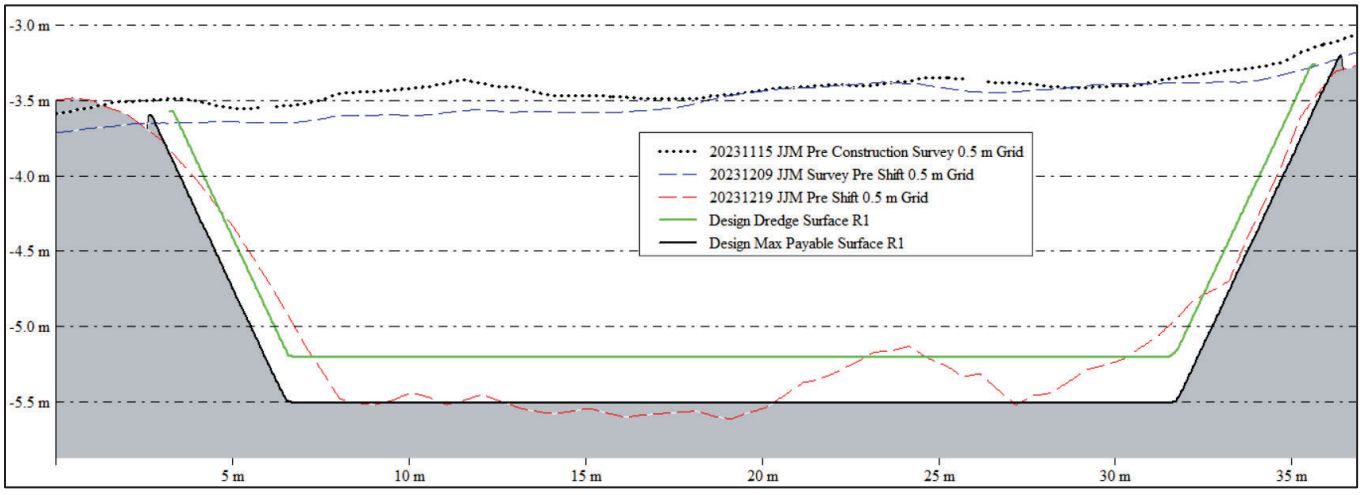


Figure 10. Design Progress: STA 0+370 Cross Section Looking Upstream, showing new work from STA 0+230 to STA 0+385. Side slope sloughing on the east and west side of the dredge channel is considered acceptable and expected.

Site Conditions:

Weather

- Past week (2023/12/18 – 2023/12/22):
  - Refer to the NHC FRR No.5 for the daily weather conditions.
- Upcoming week – Holiday Break (2023/12/22 – 2024/01/02):
  - Dec. 22: light rain, 5mm, Dec. 23: Partly sunny, Dec.24: rain, 10-15 mm, Dec 25: rain, 20-25 mm, Dec 26: rain, 10 mm, Dec 27: sunny, Dec 28: Showers, Dec 29: light rain, Dec 30: mix of rain and snow, 15-20 mm, Dec 31: mix of rain and snow, 15-20 mm, Jan 01: mix of rain and snow, 20-25 mm.

- **River Conditions:**

- Past week (2023/12/18 – 2023/12/21):
  - Refer to the NHC's Field Review Report No.5 for the Kingcome inlet tide conditions and Kingcome River water levels.
- Upcoming week – Holiday Break (2023/12/22 – 2024/01/02):
  - Lowest weekly tide is 0.6 m on Dec. 25, Dec. 26 and Dec. 27 at 19:32, 20:18, and 21:01 respectively. High king tides will occur of 5.4 m will occur on Dec. 25 at 12:27 and. Dec. 26 at 13:12.
    - JJM has determined an offset exists between predicted tides and observed; they provided data to the Min Rep team. Min Rep Team has determined that this offset is up to 0.62 m lower than the predicted low tides, and up to 0.5 m higher than the predicted high tides.

Activities completed in the past week:

- Dredging and Disposal at Sea as noted above
- Weekly meeting between NHC, Pacificus and JJM
- Monthly Meeting with Owner

Upcoming activities this week:

- Dredging and Disposal at Sea: no activity. Christmas Break from Dec. 22 to Jan 02.
- No meetings during the Christmas Break.

Anticipated Completion Date: February 15, 2024

Personnel Employed:

- **Prime Contractor:** JJM Construction Ltd. (JJM)
- **Subcontractor:** Gowlland Towing Ltd.
- **Subcontractor:** Dzawada'enuxw First Nation (DFN) OFA 3, Boat Operator.
- **Ministry Representative and Engineer:** Northwest Hydraulic Consultants (NHC)
  - Veronique Bourgault
- **Environmental Monitoring:** Pacificus Environmental Ltd. (Pacificus)
- **Archeological Rep:** WSP & DFN

Safety:

- Morning toolboxes conducted daily by JJM for all workers.
- Peter Coon (DFN) OFA 3 on site from 06:00– 18:00.
- See attachment C for JJM's Weekly Safety KPIs

Site Visitors/Inspections:

- Veronique B. – Field Reviews, including dredging, DAS, debris trimming and bathymetric survey.

Environmental Monitoring:

- Pacificus is fulfilling the environmental monitoring (EM) role for the project. See attached for the Weekly EM report.
    - Heather Gough. – Turbidity measurements twice daily.

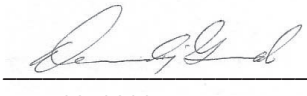
Signature:



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Dec. 22, 2023.

Veronique Bourgault, E.I.T., Ministry Representative



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Dec. 22, 2023.

Des Goold, P.Eng., Senior Ministry Representative

nhc
northwest hydraulic consultants

Weekly Progress Report #8

Project:	Kingcome River – EDSM Project		
To:	Amy Vallarino (amy.vallarino@gov.bc.ca); Dawn Nicolson (dfn.administrator@kingcome.ca); Midori Nicolson (midorin@telus.net); Arshad Bastani (arshad@ashoprojects.com); Cameron McIntosh (cmcintosh@jjmconstruction.com); Sherman Yee (syee@jjmconstruction.com); Liam Galbraith (lgalbraith@jjmconstruction.com); Mitch Brown (mbrown@jjmconstruction.com); Brenton Ryan (bryan@jjmconstruction.com); Heather Pratt (heather.pratt@wsp.com); Alex Heckels (aheckels@pacificus.ca);		
From:	Veronique Bourgault (NHC; Ministry Representative) (KingcomeMR@nhcweb.com)		
Revision:	0	**Contract:**	WK24EPFLOOD0013
Date:	2024-01-10	**NHC No.:**	3007807
Client:	Ministry of Environment and Climate Change (ENV) & Dzawada'enuxw First Nation (DFN)	**Prime:**	JJM Construction Ltd. (JJM)

Northwest Hydraulic Consultants Ltd. (NHC) has prepared the following report regarding the construction progress at the Kingcome River – Emergency Debris and Sediment Management Project Site as of **end-of-day, Monday, January 08, 2024**. A lookahead is provided for the current weeks' conditions and activities.

Attachments:

- **Attachment A:** NHC Field Review Report: *20240110 3007807 NHC Kingcome EDSM Field Review Report No.6_R0*
- **Attachment B:** JJM Weekly Summary and Weekly KPIs: Combined Weekly Report Jan 1 – Jan 8 Rev 1.pdf
- **Attachment C:** Pacificus Weekly Environmental Report: Weekly Monitoring Report Jan 1 – 8 – FINAL – Amended Jan 10 2024.pdf

Reference Materials:

Materials referenced as part of this memorandum include:

- Drawings:
  - *20231117 3007807 NHC 2900439 KINGCOME EDSM IFC R1* (Revised set delivered Friday, Nov. 17, 2023)
- Special Provisions:
  - *WK24EPFLOOD0013 - JJM Construction Ltd.- Kingcome emergency debris and sediment removal - Final - Nov. 2*
- JJM construction progress survey data received on:
  - 2023-11-16 Pre-Construction Survey: *20231115_1033JJM_PC UTMZ9_CVGD2013 NAD83 1M_R00.xyz*
  - 2023-12-19: *20231219_1033JJM_KINGC-EDSM_PS_R09.xyz*
  - 2023-12-20: *20231220_1033JJM_KINGC-EDSM-ADD-S1.xyz*
  - 2024-01-03: *20240103_1033JJM_KINGC-EDSM_PS_R11.xyz*
  - 2024-01-08: *20240108_1033JJM_KINGC-EDSM-PS_R13.xyz*
  - Updated Daily: *Daily Dredge Report.xls*
- Fraser-Burrard Diving Debris Trimming scope has been completed.

Progress Quantity Measurement Summary:

JJM was on holiday break between Dec. 19, 2023 and Jan. 3, 2024. Work re-started with a survey on Jan. 3, 2024. The Jan. 3 survey indicated that there was significant infilling of the dredge channel that occurred over the Christmas break, mostly between Station 0+090 and 0+370, which had been previously signed-off, and up to Station 0+385. NHC has estimated the infilled volume (inside of the payable dredge channel limits) as the difference between JJM's Jan. 3 and Dec. 19 surveys (**Figure 2**) – that estimate is 8,295 m^3.

NHC and JJM have noted that the riverbed upstream of previous dredge progress has risen relative to the Nov. 15, 2023 Pre-con survey. The rise in riverbed has contributed to the amount of dredge that will be required, likely on the order of 1,500 m^3. Going forward, JJM's Jan. 3 survey surface will serve as a baseline, in place of the Nov. 15, 2023 Pre-con.

The end result of the sedimentation over the holiday break is that the upstream limit of construction will have to be moved downstream of Station 0+760 to keep total dredged quantities below the maximum payable 56,000 m^3.

Going forward, the new dredged quantity upstream of STA 0+380, the approximate end station of work before Christmas break, and any re-dredging of material downstream of STA 0+380 will be tracked separately. Both quantities count towards the contract max payable dredge amount of 56,000 m^3. The re-dredged material quantity downstream will be referred to as "Payable Re-Dredged Material" and dredged material upstream of STA 0+380 will be referred to as "Payable Dredged Material".

Overall Dredge Progress

Dredging started again on Jan. 4. Due to low tide levels which occurred during the day last week, JJM needed to re-dredge the dredge channel between STA 0+330 and STA 0+380 to have a deep enough channel in which to position their barges. This is considered "Payable Re-Dredged Material" as noted. JJM completed new dredging from Station 0+380 to 0+430. The total extent of dredge work is shown by comparing the end-of-week 2024/01/08 post-shift progress survey to the 2024/01/03 pre-shift surface, the new baseline. There were no additional progress surveys provided between the end-of-day Jan. 3 and end-of-day Jan. 7. **For this report, progress will be considered to Jan. 8 to reflect the Jan. 8 progress survey submitted by JJM.** Table 1 summarizes dredge progress to date.

Table 1. NHC Progress Quantity Tracking to Monday, Jan. 8.

Item	unit	Quantity	Days Worked	NHC Checked Quantity Previous	% Completed Previous	NHC Checked Quantity Past Week (Un-checked Quantity Past Week)*	% Completed for Past Week*	NHC Checked Quantity To Date (Un-checked Quantity to Date)*	% Checked/ (Un-checked) Completed to Date*
River Dredging									
Payable Dredge Material **	m^3	56,000 – (Payable Limit)	41	30,867	55.7%	2,481 (0)	4.4 (0)	35,607	63.6%
Payable Re-Dredged Material **	m^3			0	N/A	2,259 (0)	4.0 (0)***		
Total Dredged Material = Payable Dredge Material + Payable Re-Dredged Material (max 56,000 m^3)								**35,607** (0)	**63.6%** 0%

***Note: Checked Dredge Quantities are based on 2024/01/03 pre-shift survey and indicate progress to Station 0+430, JJM recorded, upstream work limit to Jan. 08 End-of-Day.**

****Note: The sum of Payable Dredge Material + Payable Re-Dredge Material will count towards the contract max payable dredge amount of 56,000 m^3.**

*****Note: Percentages for Payable Re-Dredged Material is shown as percentage of total dredge volume (56,000 m^3) dredged since this quantity counts towards the total contract value.**

Construction-in-Progress Notes:

- The start stationing identified in the drawings is STA 0-051, however, the contractor extended the stationing further to the ocean to ensure that there was not a downstream "plug" of sediment as per special provision 4.01(a).
- All elevations shown are in CGVD2013.
- Several significant rain events occurred in the break from Dec. 21 to Jan. 03, during temperatures above freezing and abnormally warm for this region, meaning that precipitation which would normally have been held as snow in the watershed fell as rain. This caused moderately high flows which deposited sediment within the dredge channel primarily in the vicinity of the head of the dredge cut, where JJM stopped dredging before the break (~STA 0+330 to 0+380), but also farther downstream.
- The comparison of the Jan. 03 pre-shift surface to the Dec. 19 pre-shift survey shows infilling which occurred in the previously dredged portion of the channel over the Christmas break (**Figure 1**).
- **Figure 2** and **Figure 3** show cross-sections at STA 0+330 and STA 0+370, respectively, and illustrate the significant infilling which occurred within previously sign-off areas – these areas have since been re-dredged to allow space for the barges.
- The comparison of the Jan. 03 pre-shift surface to the Dec. 20 provisional work order survey shows infilling also occurred within the channel farther upstream where dredging had not previously taken place (**Figure 4**).
- **Figure 5** shows the cross-section at STA 0+500 and illustrates the typical net infilling that occurred upstream of STA 0+380.
- JJM carried out re-dredging between STA 0+330 and STA 0+0380, and new dredging from STA 0+380 to STA 0+430. The progress survey submitted on Jan. 8 has been used to check this work (see **Table 1** above). **Figure 6** shows the weekly dredge progress from Jan. 3 to Jan. 8.
- The JJM bathymetric survey from Jan. 8 is compared to the IFC dredge design surface in **Figure 7**. The color ramp indicates the depth of bed material compared to the dredge design elevation. The green indicates that the bed elevation is constructed to an acceptable grade and is between the required dredge and the payable over-dredge limits, while blue shows the depth of bed material below the payable over-dredge limit, and red shows areas that are above the required dredge grade. The over-dredge (blue shaded) areas are acceptable but not payable. Some red-shaded areas in the re-dredged area downstream of STA 0+380 are higher than design due to the holiday break in-fill or due side-slope sloughing. Most of these areas are acceptable, but there may still be some re-dredging required downstream of STA 0+330 – NHC will be deciding on this, in collaboration with DFN and ENV within the coming week.
- **Figure 8, Figure 9,** and **Figure 10** show cross sections at STA 0+380, STA 0+400, and STA 0+418, respectively. The design dredge requirements have been met up to STA 0+418.

Construction Completion Sign-Off:

- Dredging has been signed-off by NHC between the following limits:
  - STA 0-051 to STA 0+370 (421 m; signed-off prior to holiday break)
  - STA 0+370 to STA 0+418 (48 m)
  - 469 m in total is considered signed-off as of the end-of-day, Jan. 08, 2024. NHC is basing this on the progress survey received Jan. 08, 2024.
  - JJM shall not be required to conduct additional work within the signed-off station limits unless a change order is issued and executed. NHC will be drafting a change order in the coming days to officially authorize the re-dredge that has already occurred, and may still need to occur.
  - NHC will determine a new upstream limit of construction so that the final dredge volume remains below the contract 56,000 m^3. This is necessary due to the sediment infilling that occurred over the break. The new limit will be downstream of the current limit (0+760).

Figures:

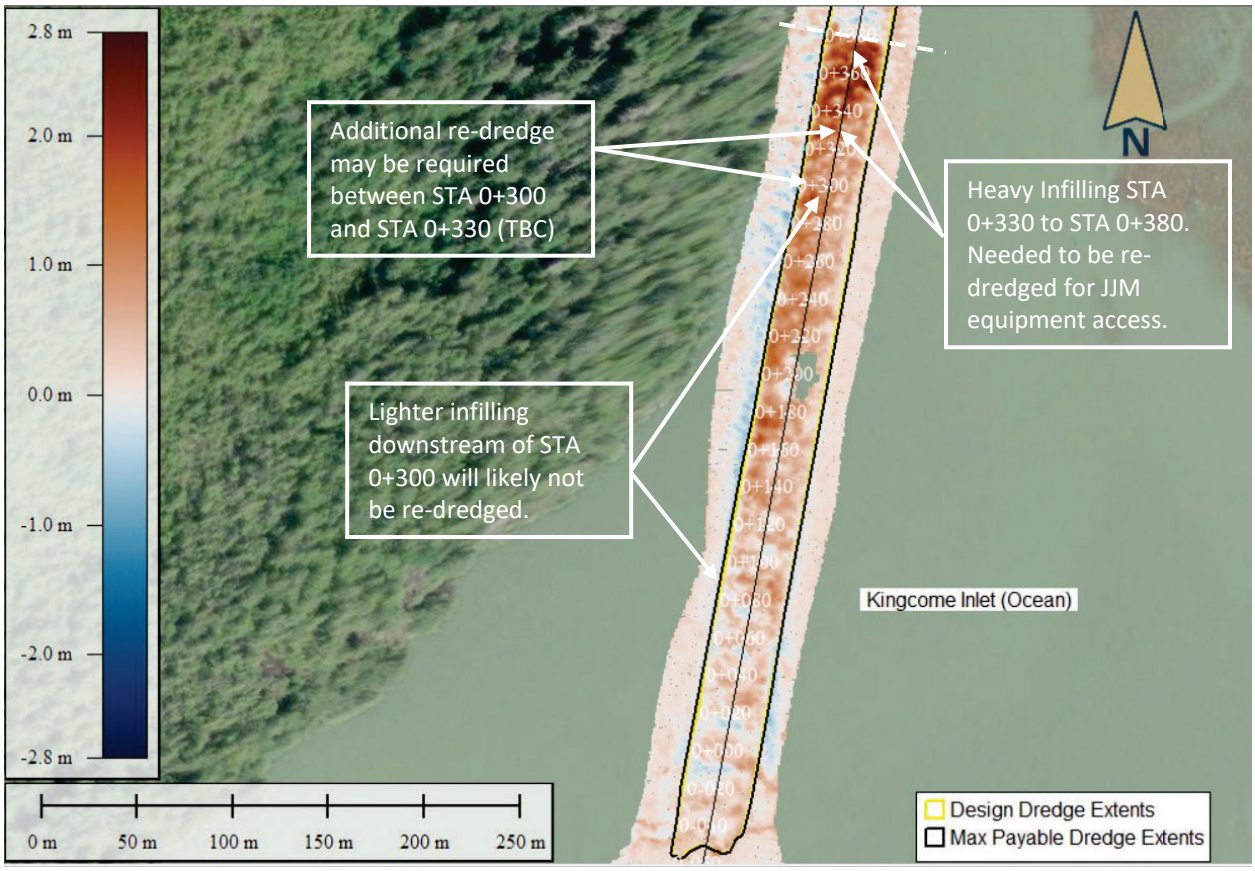


Figure 1. Infilling in the dredge channel which occurred from Dec. 21, 2023 to Jan. 03, 2024.

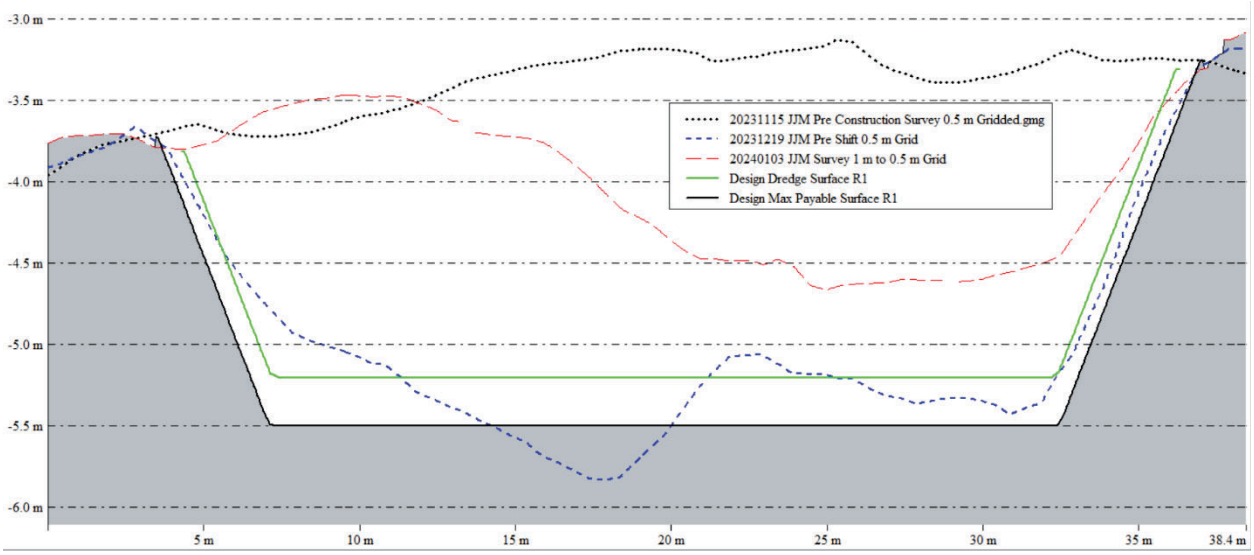


Figure 2. Infilling: STA 0+330 Cross Section Looking Upstream of Jan .3. The difference between the red and blue lines indicates the substantial infilling that occurred over the holiday.

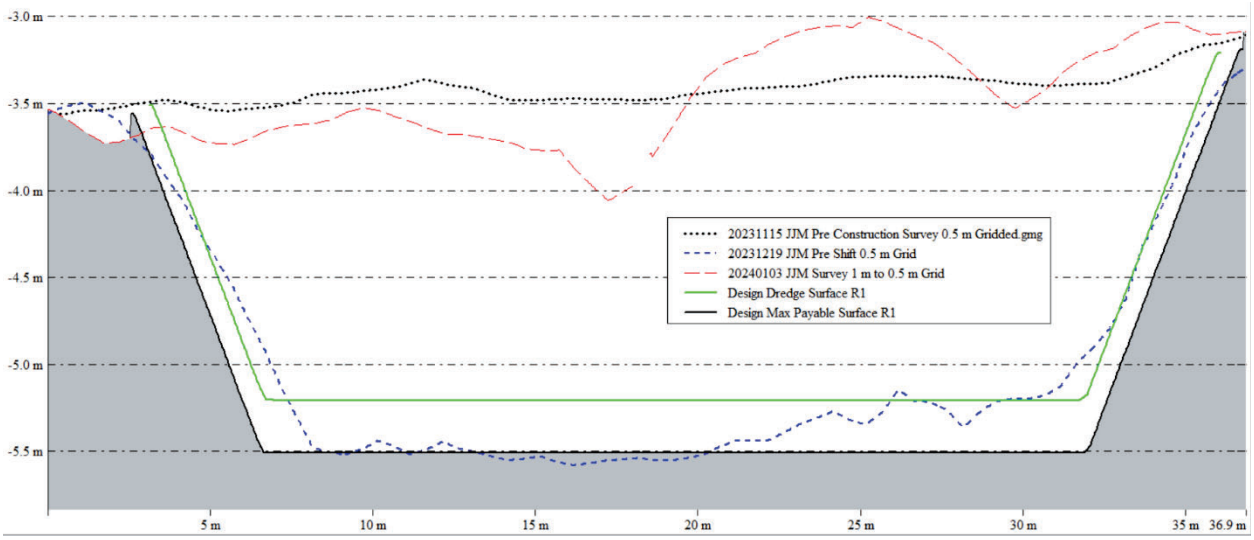


Figure 3. Infilling: STA 0+370 Cross Section Looking Upstream on Jan. 3. The difference between the red and blue lines indicates the substantial infilling that occurred over the holiday.

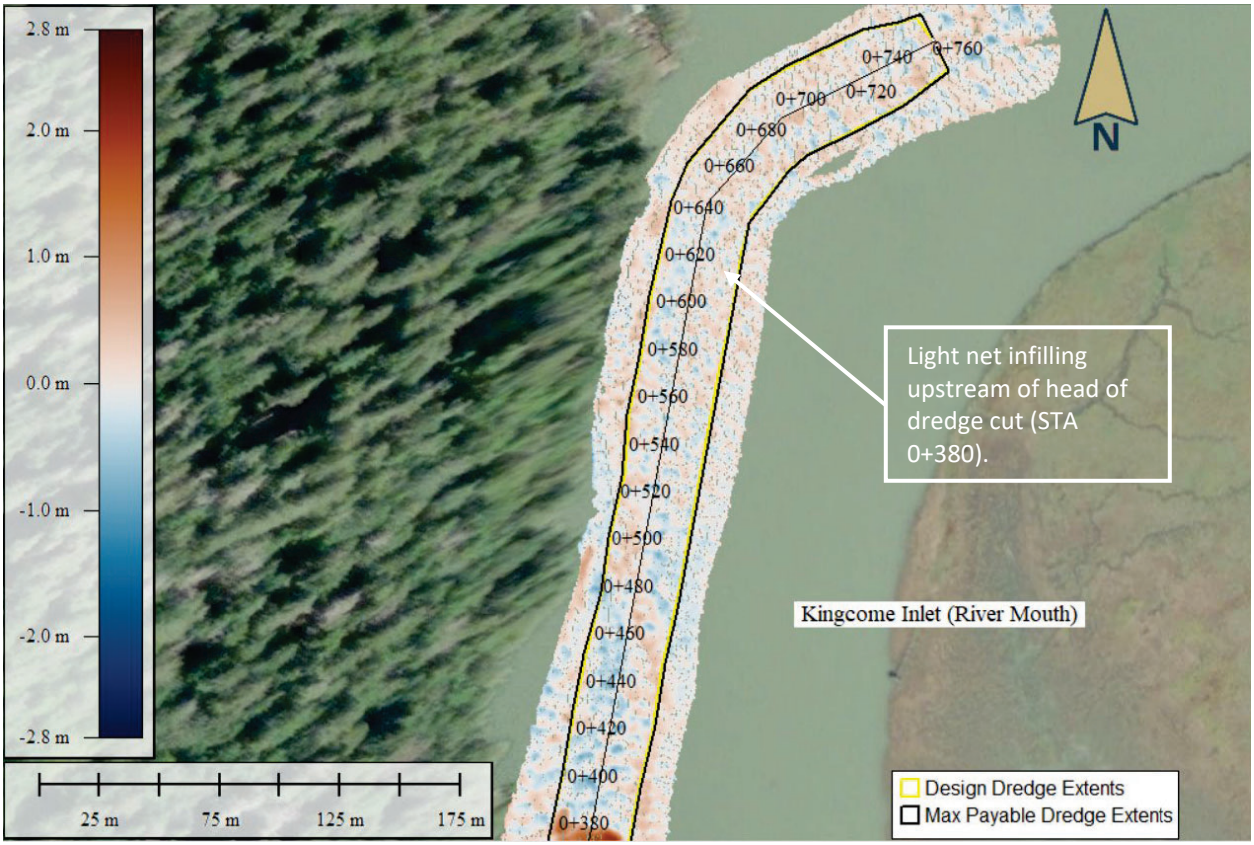


Figure 4. Infilling in the dredge channel upstream of STA 0+430, which occurred from Dec. 21, 2023 to Jan. 03, 2024.

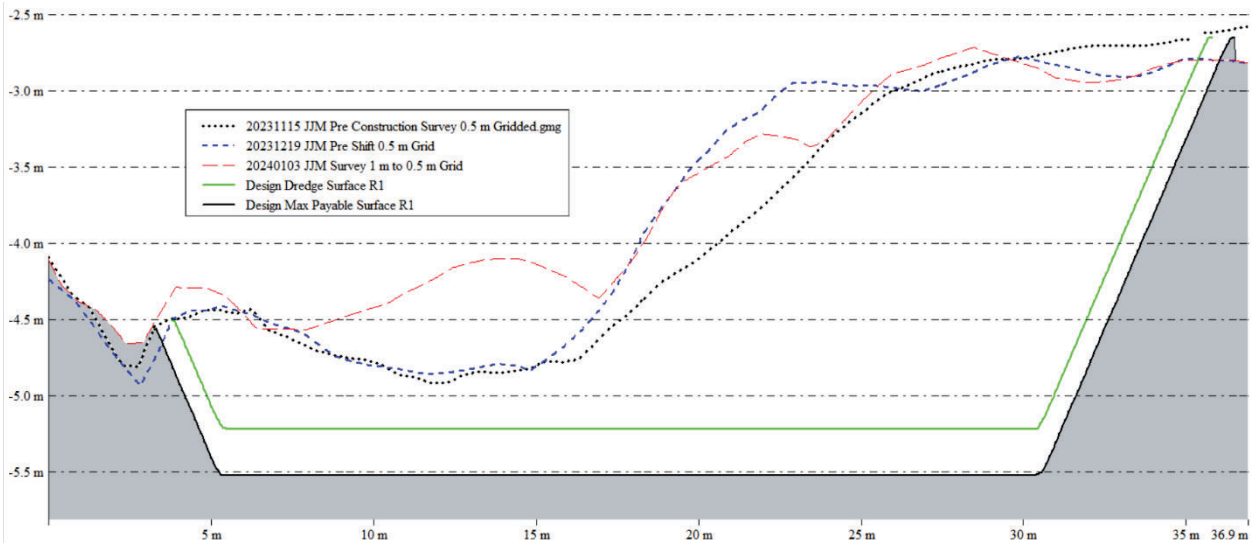


Figure 5. Infilling: STA 0+500 Cross Section Looking Upstream on Jan. 3. This red line compared to the blue is typical of a minor net infill that occurred upstream of Station 0+380 over the holiday break.

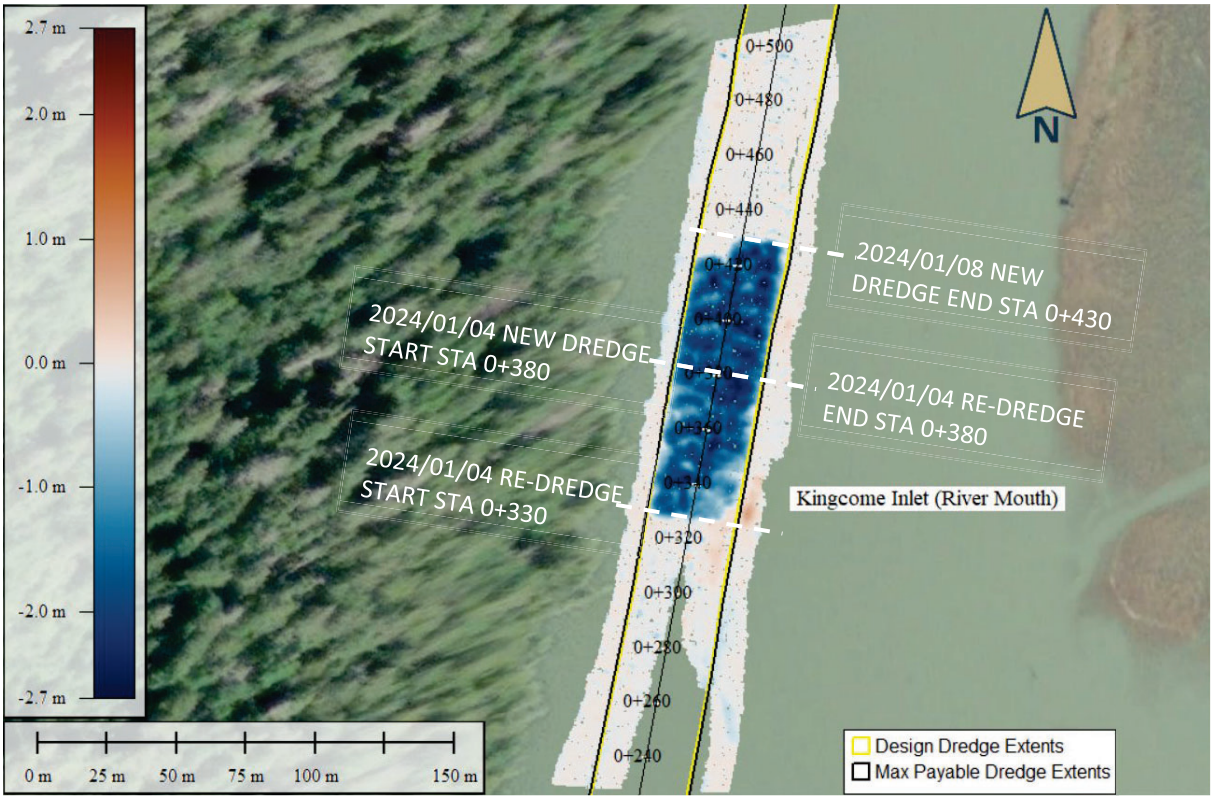


Figure 6. Weekly Dredge Progress: 2024/01/08 Post-Shift JJM Progress Survey – 2024/01/03 Pre-Shift JJM Progress Survey.

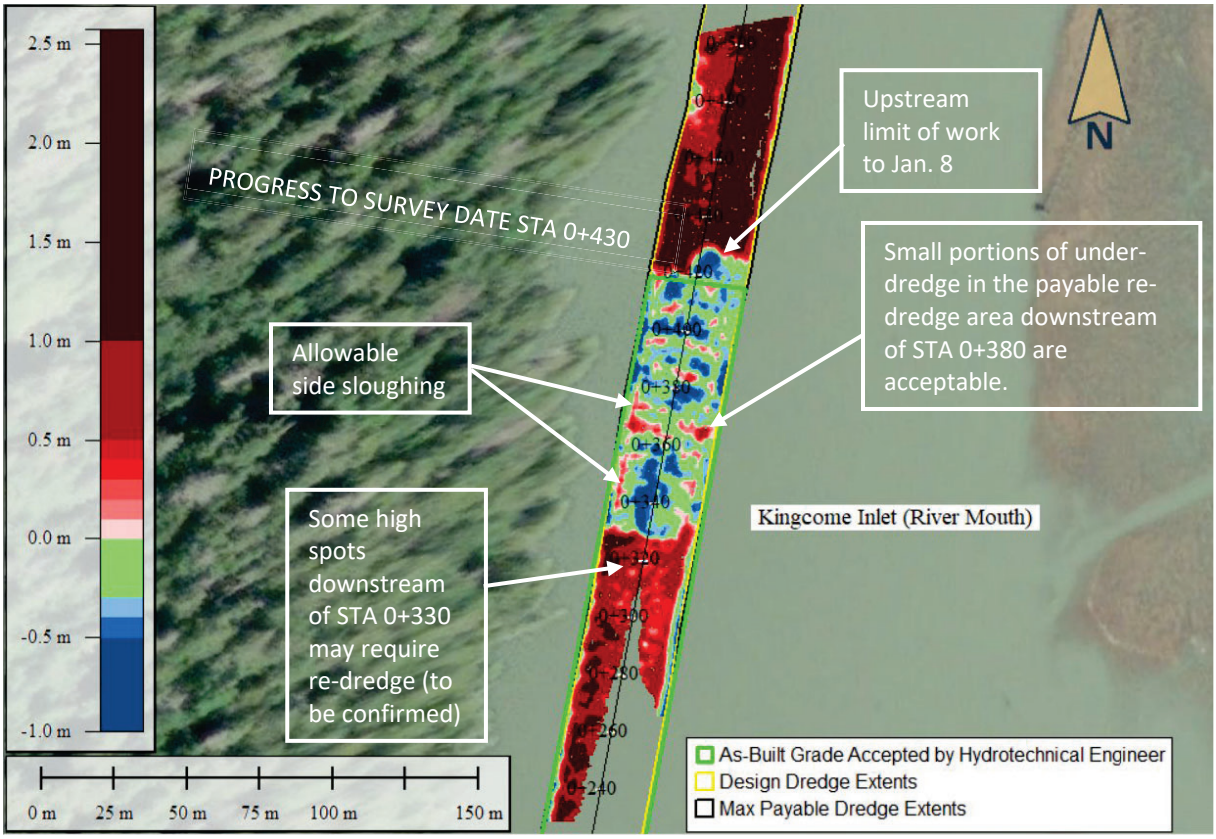


Figure 7. Design Progress: 2024/01/08 JJM Progress Survey – IFC R1 Dredge Design Surface. Green areas are meeting design or are between the design surface and the payable over-dredge limit.

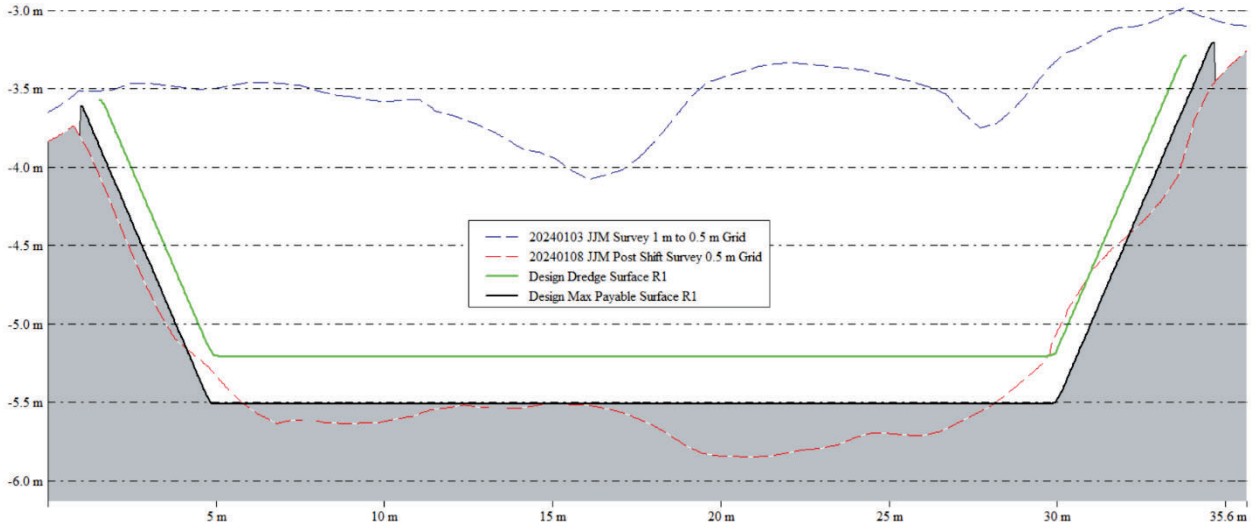


Figure 8. Design Progress: STA 0+380 Cross Section Looking Upstream.

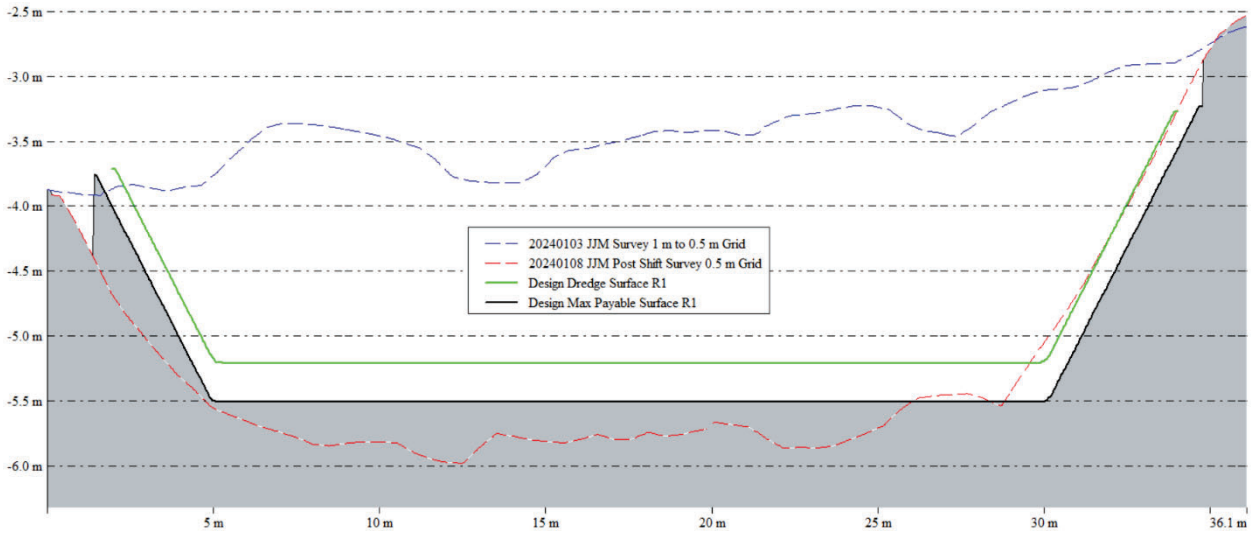


Figure 9. Design Progress: STA 0+400 Cross Section Looking Upstream.

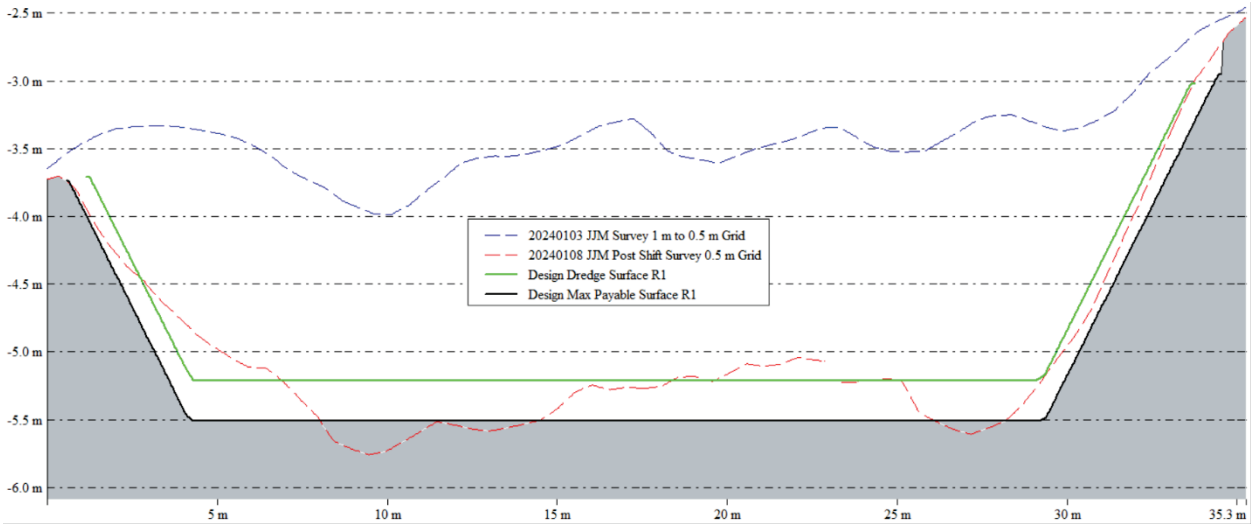


Figure 10. Design Progress: STA 0+418 Cross Section Looking Upstream.

Site Conditions:

Weather

- Past week (2024/01/03 – 2024/01/08):
  - Refer to the NHC FRR No.6 for the daily weather conditions.
- Upcoming week (2024/01/09 – 2024/01/14):
  - Jan. 8: light snow and rain, Jan. 9: Heavy rain, Jan. 10: Sun and Clouds, Jan. 11: Sun and Clouds, Jan. 12: Sun and Clouds, Jan. 13: Sun and Clouds, Jan. 14: Snow Flurries. Low temperature of -20 degrees is expected Friday.

- **River Conditions:**
  - Past week (2024/01/03 – 2023/01/08):
    - Refer to the NHC's Field Review Report No.6 for the Kingcome inlet tide conditions and Kingcome River water levels.
  - Upcoming week – (2024/01/09 – 2024/01/14):
    - Lowest weekly tide is 0.35 m on Jan. 10, Jan. 11 and Jan. 12 at 20:30, 21:15, and 22:15 respectively.
      - JJM has determined an offset exists between predicted tides and observed; they provided data to the Min Rep team. Min Rep Team has determined that this offset is up to 0.62 m lower than the predicted low tides, and up to 0.5 m higher than the predicted high tides.

Activities completed in the past week:

- Dredging and Disposal at Sea as noted above.
- Weekly meeting between NHC, Pacificus and JJM.

Upcoming activities this week:

- Dredging and Disposal at Sea.
- Weekly meeting between NHC, Pacificus and JJM

Anticipated Completion Date: February 15, 2024

Personnel Employed:

- **Prime Contractor:** JJM Construction Ltd. (JJM)
- **Subcontractor:** Gowlland Towing Ltd.
- **Subcontractor:** Dzawada'enuxw First Nation (DFN) OFA 3, Boat Operator.
- **Ministry Representative and Engineer:** Northwest Hydraulic Consultants (NHC)
  - Veronique Bourgault
- **Environmental Monitoring:** Pacificus Environmental Ltd. (Pacificus)
  - Dan Lewis
- **Archeological Rep:** WSP & DFN

Safety:

- Morning toolboxes conducted daily by JJM for all workers.
- Peter Coon (DFN) OFA 3 on site from 06:00– 18:00.
- See attachment C for JJM's Weekly Safety KPIs

Site Visitors/Inspections:

- Veronique B. – Field Reviews, including dredging, DAS, debris trimming and bathymetric survey.

Environmental Monitoring:

- Pacificus is fulfilling the environmental monitoring (EM) role for the project. See attached for the Weekly EM report.
  - Turbidity measurements conducted twice daily.

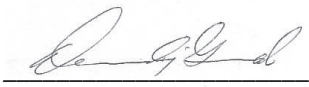
Signature:



_____

Jan. 10, 2023.

Veronique Bourgault, E.I.T., Ministry Representative



_____

Jan. 10, 2023.

Des Goold, P.Eng., Senior Ministry Representative

nhc
northwest hydraulic consultants

Weekly Progress Report #9

Project:	Kingcome River – EDSM Project		
To:	Amy Vallarino (amy.vallarino@gov.bc.ca); Dawn Nicolson (dfn.administrator@kingcome.ca); Midori Nicolson (midorin@telus.net); Arshad Bastani (arshad@ashoprojects.com); Cameron McIntosh (cmcintosh@jjmconstruction.com); Sherman Yee (syee@jjmconstruction.com); Liam Galbraith (lgalbraith@jjmconstruction.com); Mitch Brown (mbrown@jjmconstruction.com); Brenton Ryan (bryan@jjmconstruction.com); Heather Pratt (heather.pratt@wsp.com); Alex Heckels (aheckels@pacificus.ca);		
From:	Sam Xie (NHC; Ministry Representative) (KingcomeMR@nhcweb.com)		
Revision:	0	**Contract:**	WK24EPFLOOD0013
Date:	2024-01-17	**NHC No.:**	3007807
Client:	Ministry of Environment and Climate Change (ENV) & Dzawada'enuxw First Nation (DFN)	**Prime:**	JJM Construction Ltd. (JJM)

Northwest Hydraulic Consultants Ltd. (NHC) has prepared the following report regarding the construction progress at the Kingcome River – Emergency Debris and Sediment Management Project Site as of **end-of-day, Sunday, January 14, 2024**. This report assesses progress from Tuesday, January 9 to Sunday, January 14 – progress on Monday, January 8 was included in Progress Report #8. A lookahead is provided for the current weeks' conditions and activities.

Attachments:

- **Attachment A:** NHC Field Review Report: *20240115 3007807 NHC Kingcome EDSM Field Review Report No.7_R0*
- **Attachment B:** JJM Weekly Summary and Weekly KPIs: Combined Weekly Report Jan 9 – Jan 14.pdf
- **Attachment C:** Pacificus Weekly Environmental Report: Weekly Monitoring Report Jan 9–14.pdf

Reference Materials:

Materials referenced as part of this memorandum include:

- Drawings:
  - *20231117 3007807 NHC 2900439 KINGCOME EDSM IFC R1* (Revised set delivered Friday, Nov. 17, 2023)
- Special Provisions:
  - *WK24EPFLOOD0013 - JJM Construction Ltd.- Kingcome emergency debris and sediment removal - Final - Nov. 2*
- JJM construction progress survey data received on:
  - 2024-01-04: *20240103_1033JJM_KINGC-EDSM-PS_R11 1m.xyz* (new baseline for assessing progress)
  - 2024-01-08: *20240108_1033JJM_KINGC-EDSM-PS_R13.xyz*
  - 2024-01-11: *20240111_0932JJM_KINGC-EDSM-_R14 50cm.xyz*
  - 2024-01-14: *20240114_1037JJM_KINGC-EDSM_R15 1m.xyz* (pre-shift)
  - Updated Daily: *Daily Dredge Report.xlsx*

Progress Quantity Measurement Summary:

During the holiday break between Dec. 19, 2023 and Jan. 3, 2024, significant infilling of the dredge channel occurred, mostly between Station 0+090 and 0+370, and up to Station 0+385. NHC has estimated the infilled volume (inside of the payable dredge channel limits) based on the difference between JJM's Jan. 3 and Dec. 19 surveys – that estimate is 8,295 m^3.

NHC and JJM have noted that the riverbed upstream of previous dredge progress has risen relative to the Nov. 15, 2023 Pre-con survey. The rise in riverbed has contributed to the amount of dredge that will be required, likely on the order of 1,500 m^3. Going forward, JJM's Jan. 3 survey surface will serve as a baseline, in place of the Nov. 15, 2023 Pre-con survey.

The upstream limit of construction will have to be moved downstream of Station 0+760 to keep total dredged quantities below the maximum payable 56,000 m^3. NHC anticipates that the upstream limit will shift downstream to between STA 0+700 and STA. 0+710, but this will be confirmed in the coming weeks.

Going forward, the new dredged quantity upstream of STA 0+380, the approximate end station of work before holiday break, and any re-dredging of material downstream of STA 0+380 will be tracked separately. Both quantities count towards the contract max payable dredge amount of 56,000 m^3. The re-dredged material quantity downstream will be referred to as "Payable Re-Dredged Material" and dredged material upstream of STA 0+380 will be referred to as "Payable Dredged Material".

Overall Dredge Progress

This week, JJM completed dredging from Station 0+420 to 0+523 (See **Figure 1** and **Figure 2**). Progress surveys were provided on Jan. 11 and Jan. 14 (pre-shift survey). The total extent of dredge work is shown by comparing the progress surveys to each other and to the 2024/01/08 surface. Table 1 summarizes dredge progress to date.

Table 1. NHC Progress Quantity Tracking to Sunday, Jan. 14.

Item	unit	Quantity	Days Worked	NHC Checked Quantity Previous	% Completed Previous	NHC Checked Quantity Past Week (Un-checked Quantity Past Week)*	% Completed for Past Week*	NHC Checked Quantity To Date (Un-checked Quantity to Date)*	% Checked/ (Un-checked) Completed to Date*
River Dredging									
Payable Dredge Material **	m^3	56,000 – (Payable Limit)	48	35,607	63.6%	3,816*** (790)	6.8% (1.4)	39,423 (790)	70.4% (71.8%)
Payable Re-Dredged Material **	m^3			0	N/A	0 (0)	0 (0)		
Total Dredged Material = Payable Dredge Material + Payable Re-Dredged Material (max 56,000 m^3)								**39,423** (790)	**70.4%** 71.8%

***Note: Checked Dredge Quantities are based on 2024/01/14 pre-shift survey and indicate progress to Station 0+520, JJM recorded, upstream work limit to Jan. 14 pre-shift. The un-checked amount in parentheses is the sum of estimated barge loads on Jan. 14.**

****Note: The sum of Payable Dredge Material + Payable Re-Dredge Material will count towards the contract max payable dredge amount of 56,000 m^3.**

*****Note: This volume includes 135 m3 of estimated infill that occurred between progress surveys over the past week.**

Construction-in-Progress Notes:

- The start stationing identified in the drawings is STA 0-051, however, the contractor extended the stationing further to the ocean to ensure that there was not a downstream "plug" of sediment as per special provision 4.01(a).
- All elevations shown are in CGVD2013.
- No re-dredging was completed this week. **Figures 1 and 2** show the weekly dredge progress from Jan. 9 to Jan. 11 and from Jan.11 to Jan. 14.

- The JJM bathymetric survey from Jan. 14 is compared to the IFC dredge design surface in **Figure 3**. The color ramp indicates the depth of bed material compared to the dredge design elevation. The green indicates that the bed elevation is constructed to an acceptable grade and is between the required dredge and the payable over-dredge limits, while blue shows the depth of bed material below the payable over-dredge limit, and red shows areas that are above the required dredge grade. The over-dredge (blue shaded) areas are acceptable but not payable.
- The red-shaded areas between STA 0+430 and STA 0+460 show these areas have not been dredged to the design elevation. **Figure 4**, **Figure 5**, and **Figure 6** show cross-sections of the survey results at STA 0+420, STA 0+430, and STA 0+440, respectively. The area between STA 0+430 and STA 0+460 requires re-work.

Construction Completion Sign-Off:

- Dredging has been signed-off by NHC between the following limits:
  - STA 0-051 to STA 0+418 (469 m; previous)
  - STA 0+418 to 0+425; and STA 0+460 to STA 0+495 (42 m)
  - 511 m in total is considered signed-off as of pre-shift, Jan. 14, 2024.
  - JJM shall not be required to conduct additional work within the signed-off station limits unless a change order is issued and executed. NHC will be drafting a change order in the coming days to officially authorize the re-dredge that has already occurred, and may still need to occur.
  - NHC will determine a new upstream limit of construction so that the final dredge volume remains below the contract 56,000 m^3. This is necessary due to the sediment infilling that occurred over the break. The new limit will be downstream of the current limit (0+760).

Figures:

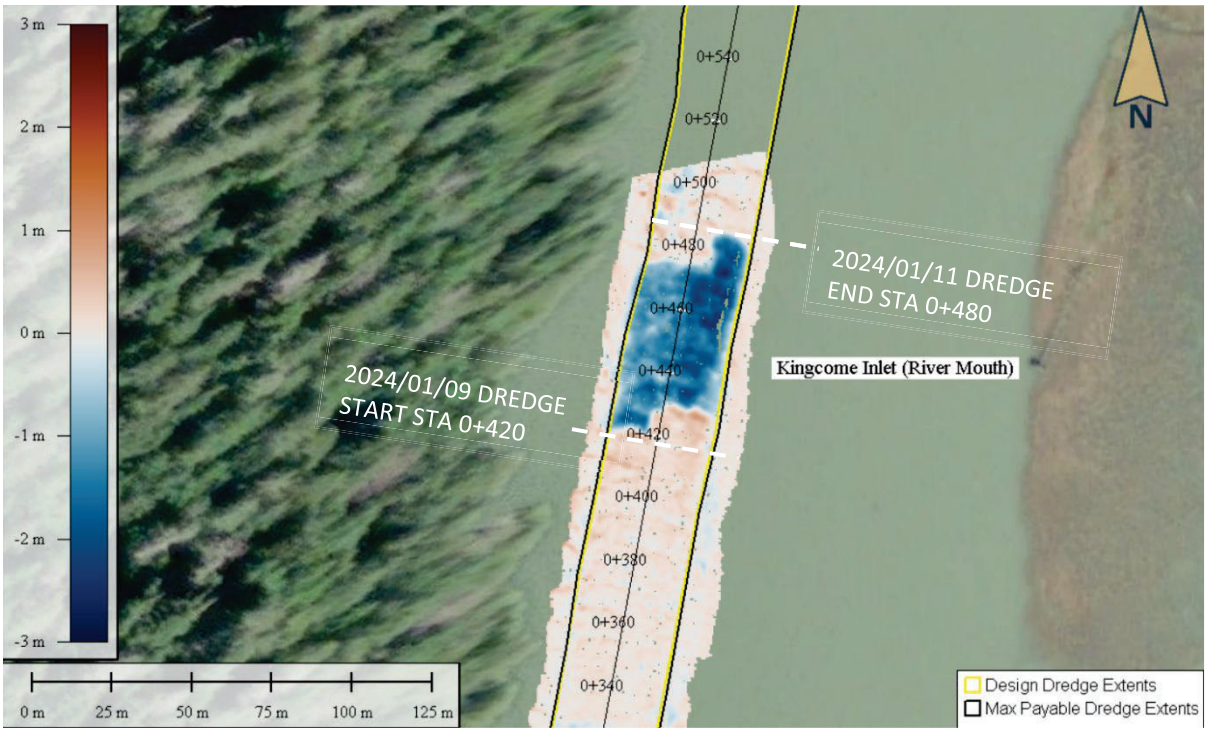


Figure 1. Partial Weekly Dredge Progress: 2024/01/11 Post-Shift JJM Progress Survey – 2024/01/08 Post-Shift JJM Progress Survey.

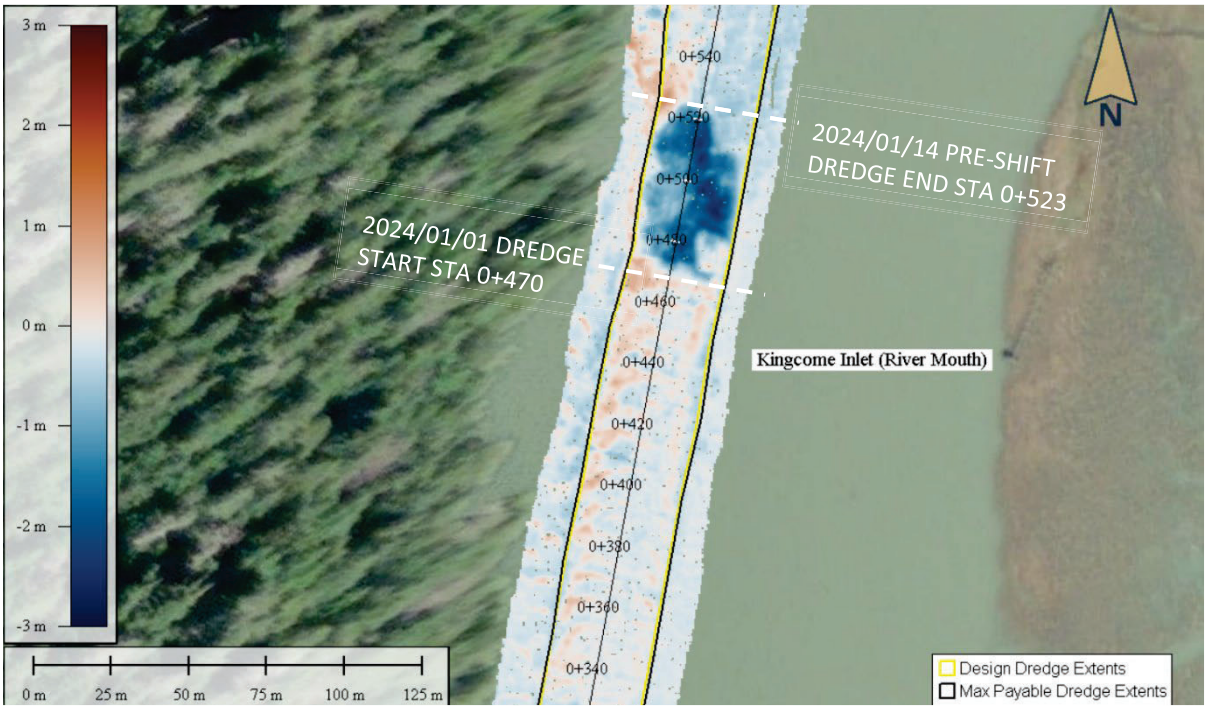


Figure 2. Partial Weekly Dredge Progress: 2024/01/14 Pre-Shift JJM Progress Survey – 2024/01/11 Post-Shift JJM Progress Survey.

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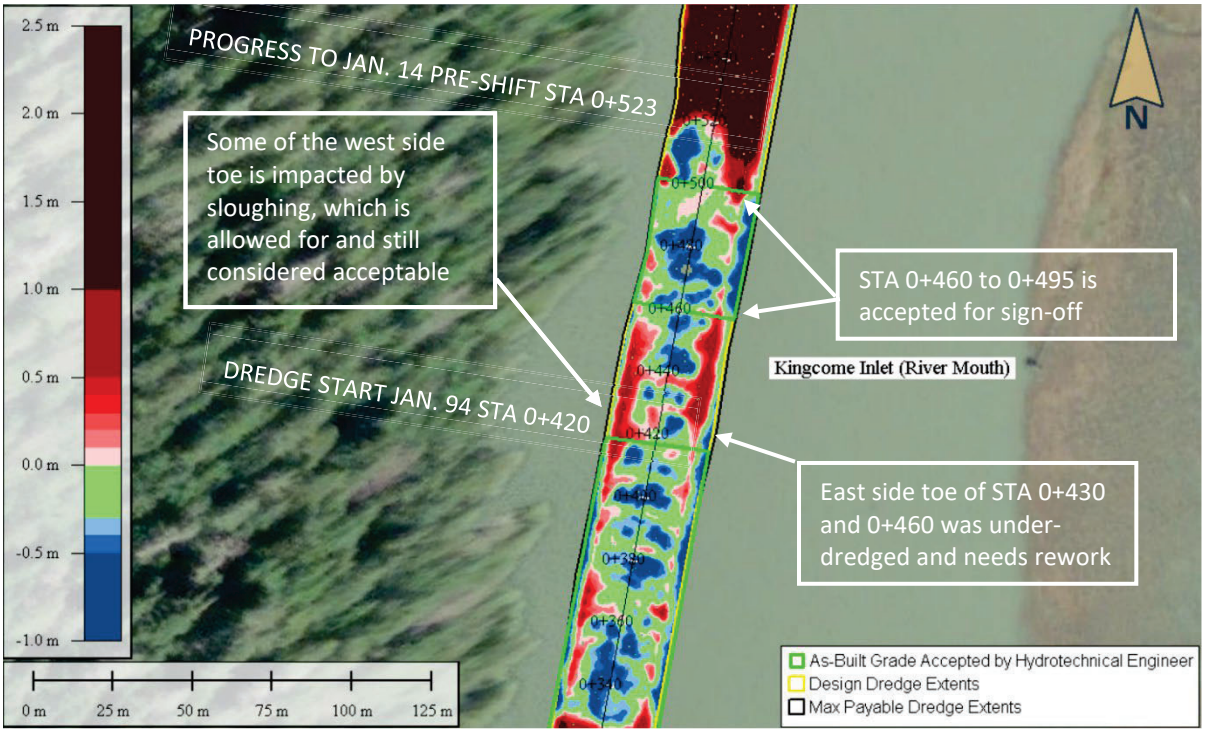


Figure 3. Design Progress: 2024/01/14 Pre-Shift JJM Progress Survey – IFC R1 Dredge Design Surface. Green areas are meeting design or are between the design surface and the payable over-dredge limit. Blue areas are non-payable over-dredge.

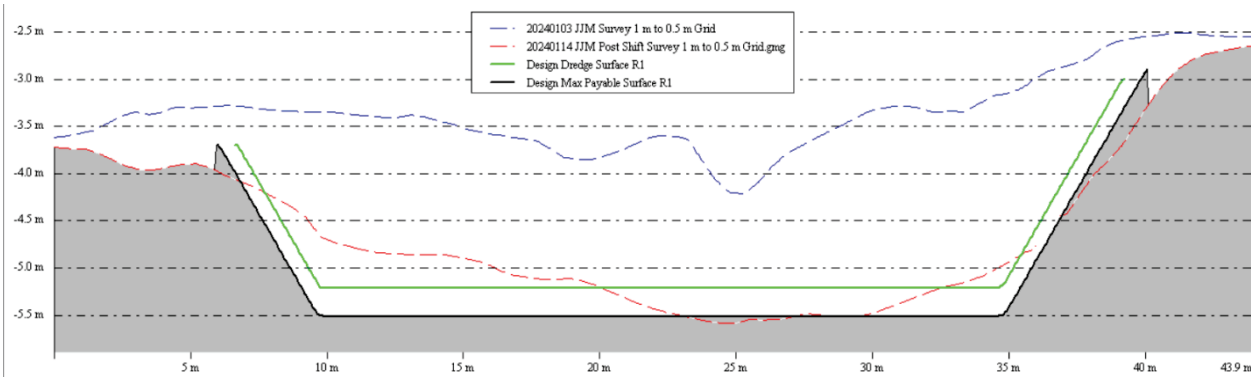


Figure 4. Design Progress: STA 0+420 Cross Section Looking Upstream.

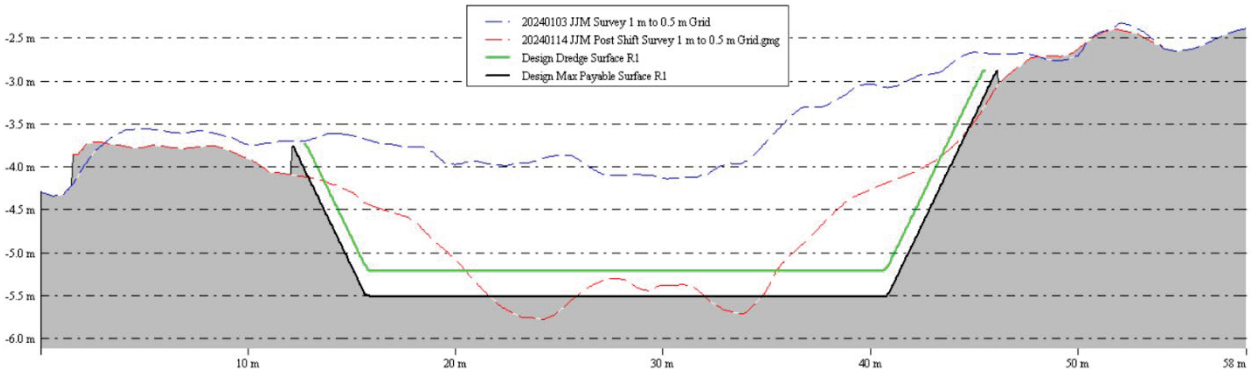


Figure 5. Design Progress: STA 0+430 Cross Section Looking Upstream.

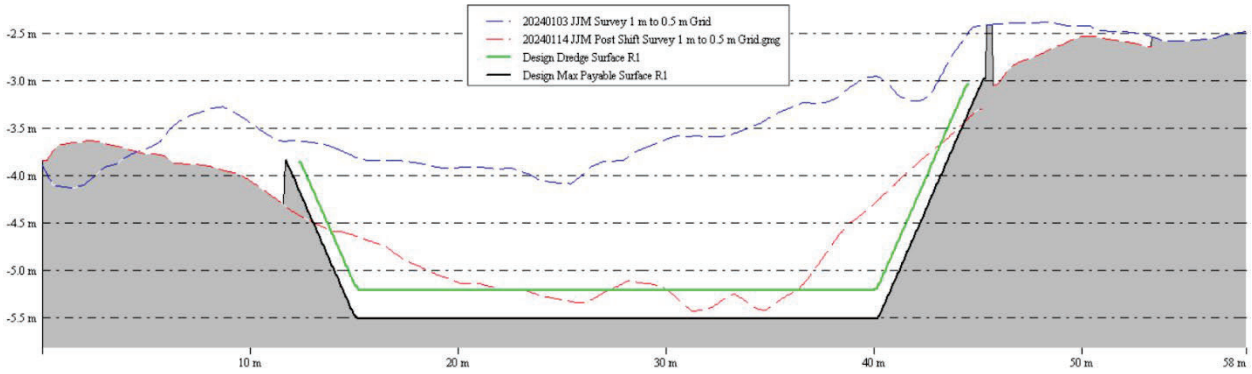


Figure 6. Design Progress: STA 0+440 Cross Section Looking Upstream.

Site Conditions:

Weather

- Past week (2024/01/09 – 2024/01/14):
  - Refer to the NHC FRR No.7 for the daily weather conditions.
- Upcoming week (2024/01/15 – 2024/01/21):
  - Jan. 15: sun and clouds, Jan. 16: wet snow, Jan. 17: light snow, Jan. 18: light snow (10 cm), Jan. 19: rain (30-40 mm), Jan. 20: rain (15-20 mm), Jan. 21: rain (15 mm).

- **River Conditions:**

- Past week (2024/01/09 – 2023/01/14):
  - Refer to the NHC's Field Review Report No.6 for the Kingcome inlet tide conditions and Kingcome River water levels.
- Upcoming week – (2024/01/15 – 2024/01/21):
  - Lowest weekly tide is 0.7 m on Jan. 14. No really low tides expected the rest of the week.
  - Very low tides are expected the week of Jan. 22, and are being planned for.

Activities completed in the past week:

- Dredging and Disposal at Sea as noted above.
- Weekly meeting between NHC, Pacificus and JJM.

Upcoming activities this week:

- Dredging and Disposal at Sea.
- Weekly meeting between NHC, Pacificus and JJM; Bi-weekly meeting on Wednesday, Jan. 17.

Anticipated Completion Date: On or before February 15, 2024

Personnel Employed:

- **Prime Contractor:** JJM Construction Ltd. (JJM)
- **Subcontractor:** Gowlland Towing Ltd.
- **Subcontractor:** Dzawada'enuxw First Nation (DFN) OFA 3, Boat Operator.
- **Ministry Representative and Engineer:** Northwest Hydraulic Consultants (NHC)
  - Veronique Bourgault
- **Environmental Monitoring:** Pacificus Environmental Ltd. (Pacificus)
  - Celeste Landon
- **Archeological Rep:** WSP & DFN

Safety:

- Morning toolboxes conducted daily by JJM for all workers.
- Peter Coon (DFN) OFA 3 on site from 06:00– 18:00.
- See attachment C for JJM's Weekly Safety KPIs

Site Visitors/Inspections:

- Veronique B. – Field Reviews, including dredging, DAS, and bathymetric survey.

- Next week – TJ Hamre for Lewkowich and 2 drillers will be on site Jan. 17-19 to carry out drilling for the Year 2 work.

Environmental Monitoring:

- Pacificus is fulfilling the environmental monitoring (EM) role for the project. See attached for the Weekly EM report.
    - Turbidity measurements are conducted twice daily.

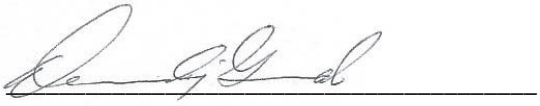
Signature:



_____

Jan. 17, 2023.

Sam Xie, E.I.T., Ministry Representative



_____

Jan. 17, 2023.

Des Goold, P.Eng., Senior Ministry Representative

nhc
northwest hydraulic consultants

Weekly Progress Report #10

Project:	Kingcome River – EDSM Project		
To:	Amy Vallarino (amy.vallarino@gov.bc.ca); Dawn Nicolson (dfn.administrator@kingcome.ca); Midori Nicolson (midorin@telus.net); Arshad Bastani (arshad@ashoprojects.com); Cameron McIntosh (cmcintosh@jjmconstruction.com); Sherman Yee (syee@jjmconstruction.com); Liam Galbraith (lgalbraith@jjmconstruction.com); Mitch Brown (mbrown@jjmconstruction.com); Brenton Ryan (bryan@jjmconstruction.com); Heather Pratt (heather.pratt@wsp.com); Alex Heckels (aheckels@pacificus.ca);		
From:	Alicia Van Boven (NHC; Ministry Representative) (KingcomeMR@nhcweb.com)		
Revision:	0	**Contract:**	WK24EPFLOOD0013
Date:	2024-01-24	**NHC No.:**	3007807
Client:	Ministry of Environment and Climate Change (ENV) & Dzawada'enuxw First Nation (DFN)	**Prime:**	JJM Construction Ltd. (JJM)

Northwest Hydraulic Consultants Ltd. (NHC) has prepared the following report regarding the construction progress at the Kingcome River – Emergency Debris and Sediment Management Project Site from start of shift Sunday, January 14 to end of shift, Sunday, January 21. A previously un-checked dredge volume from Sunday, January 14 has now been verified. A lookahead is provided for the current weeks' conditions and activities.

Attachments:

- **Attachment A:** NHC Field Review Report: *20240123 3007807 NHC Kingcome EDSM Field Review Report No.8_R0*
- **Attachment B:** JJM Weekly Summary and Weekly KPIs: Combined Weekly Report Jan 15 – Jan 21.pdf
- **Attachment C:** Pacificus Weekly Environmental Report: Weekly Monitoring Report Jan 15–21.pdf

Reference Materials:

Materials referenced as part of this memorandum include:

- Drawings:
  - *20231117 3007807 NHC 2900439 KINGCOME EDSM IFC R1* (Revised set delivered Friday, Nov. 17, 2023)
- Special Provisions:
  - *WK24EPFLOOD0013 - JJM Construction Ltd.- Kingcome emergency debris and sediment removal - Final - Nov. 2*
- JJM construction progress survey data received on:
  - 2024-01-04: *20240103_1033JJM_KINGC-EDSM-PS_R11 1m.xyz* (new baseline for assessing progress)
  - 2024-01-14: *20240114_1037JJM_KINGC-EDSM_R15 1m.xyz* (Pre-shift)
  - 2024-01-23: *20240122_1037JJM_KINGC-EDSM_R16 1m.xyz* (Pre-shift)
  - Updated Daily: *Daily Dredge Report.xlsx*

Progress Quantity Measurement Summary:

During the holiday break between Dec. 19, 2023, and Jan. 3, 2024, significant infilling of the dredge channel occurred, mostly between Sta. 0+090 and 0+370, and up to Sta. 0+385. NHC estimated that 8,295 m^3 has infilled the payable dredge channel limits, based on the difference between JJM's Jan. 3 and Dec. 19 surveys. Additionally, NHC and JJM have noted that the riverbed upstream of previous dredge progress has risen relative to the Nov. 15, 2023 Pre-con survey. These increased bed levels have contributed to the amount of dredge that will be required, likely on the order of 1,500 m^3. Therefore, going forward, JJM's Jan. 3 survey surface will serve as a baseline, in place of the Nov. 15, 2023 Pre-con survey.

The approximate end station before the holiday break was Sta. 0+380. The new dredged quantity upstream of STA 0+380 and any re-dredging of infilled material downstream of STA 0+380 will be tracked separately. The re-dredged material quantity downstream will be referred to as "Payable Re-Dredged Material" and dredged material upstream of STA 0+380 will be referred to as "Payable Dredged Material". Both quantities count towards the contract max payable dredge amount of 56,000 m^3.

The upstream construction limit of Sta. 0+760 given in IFC dredge design needs to be shifted downstream to keep total dredged quantities below the maximum payable 56,000 m^3. Once JJM has completed the re-dredging that is required, that volume will be counted against the maximum payable and a revised upstream construction limit will be determined.

Overall Dredge Progress

The overall 2024 dredge progress since the holiday break is shown in **Figure 1**. This week, JJM completed dredging from Station 0+510 to 0+620 (See **Figure 2**). JJM's weekly progress report (see attached) reports a total payable dredged volume of 45,887 m^3 to end-of-day, Jan. 21. JJM's total dredge volume includes the weekly dredged volume estimated from barge loads, which has not been reconciled with the survey data. Dredged quantity has been independently measured by NHC (see **Table 1**). A progress survey was provided on Jan. 22 (pre-shift survey). Total dredge volume was calculated by comparing the latest Jan. 22 progress survey to the Jan. 03 baseline survey, minus non-payable over dredge. There were two barge loads dredged before the survey on Jan. 22 (amounting to ~285 m^3), so that volume has been discounted from NHC's calculations to align with the progress measurement period.

Table 1. NHC Progress Quantity Tracking to Sunday, Jan. 14.

Item	unit	Quantity	Days Worked	NHC Checked Quantity Previous	% Completed Previous	NHC Checked Quantity Past Week*	% Completed for Past Week*	NHC Checked Quantity To Date	% Completed to Date*
River Dredging									
Payable Dredge Material**	m^3	56,000 – (Payable Limit)	67	39,423	70.4%	6,485	11.6%	45,908	82.0%
Payable Re-Dredged Material**	m^3			0	N/A	0	0		
Total Dredged Material = Payable Dredge Material + Payable Re-Dredged Material (max 56,000 m^3)								**45,908*** **	**82.0%**

***Note: Checked Dredge Quantities are based on 2024/01/22 pre-shift survey and indicate progress to Station 0+620.**

****Note: The sum of Payable Dredge Material + Payable Re-Dredge Material will count towards the contract max payable dredge amount of 56,000 m^3.**

*****Note: These estimates discount 285 m^3 that was dredged by JJM prior to the survey on Monday, January 22nd.**

Construction-in-Progress Notes:

- All elevations shown are in CGVD2013.
- The start stationing identified in the drawings is STA 0-051, however, the contractor extended the stationing further to the ocean to ensure that there was not a downstream "plug" of sediment as per special provision 4.01(a).
- No re-dredging downstream of Sta 0+380 was completed this week.
- **Figures 1** shows the total dredge progress since the winter break on Jan. 3rd, 2024.
- The weekly dredge progress between the Jan. 22nd and Jan. 14th, 2024, survey is shown in **Figure 2.**

- The JJM bathymetric survey from Jan. 22nd, 2024, is compared to the IFC dredge design surface in **Figure 3a** & **Figure 3b**. The color ramp indicates the depth of bed material compared to the dredge design elevation. The green indicates that the bed elevation is between the required dredge and the payable over-dredge limits, while blue shows the depth of bed material below the payable over-dredge limit, and red shows areas that are above the required dredge grade. The over-dredge (blue shaded) areas are acceptable but not payable.
- The red-shaded areas between STA 0+425 to STA 0+460 and STA 0+495 to 0+515 show that these areas have not been dredged to the design elevation. While some slide slope sloughing within 4 m of the bottom of the channel is acceptable as per the IFC R1 drawings, the channel thalweg should be excavated to the design grade. See **Figure 3b** for details on specific areas requiring further dredge.

Construction Completion Sign-Off:

- Dredging has been signed-off by NHC between the following limits:
  - STA 0-051 to 0+425; and STA 0+460 to 0+495 (511 m; previous)
  - STA 0+515 to 0+605 (90 m); much of this area is slightly under-dredged, but considering that many areas are now in a similar state due to in-filling, and to maximize the upstream limit of dredging, NHC is signing this areas off.
  - 601 m in total is considered signed-off as of, Jan. 21, 2024.
  - Areas between STA 0+425 and STA 0+460, and between STA 0+495 and STA 0+515 are more significantly under-dredged and require re-work.
  - JJM shall not be required to conduct additional work within the signed-off station limits unless a change order is issued and executed. NHC will be drafting a change order in the coming days to officially authorize the re-dredge that has already occurred from STA 0+325 to 0+380, and that still needs to occur between STA 0+170 to 0+325.

Figures:



Figure 1. Total Dredge Progress in 2024: 2024/01/22 Pre-Shift JJM Progress Survey – 2024/01/03 The 2024 Pre-Construction (Post-winter break)



Figure 2. Weekly Dredge Progress: 2024/01/22 Pre-Shift JJM Progress Survey – 2024/01/14 Post-Shift JJM Progress Survey.

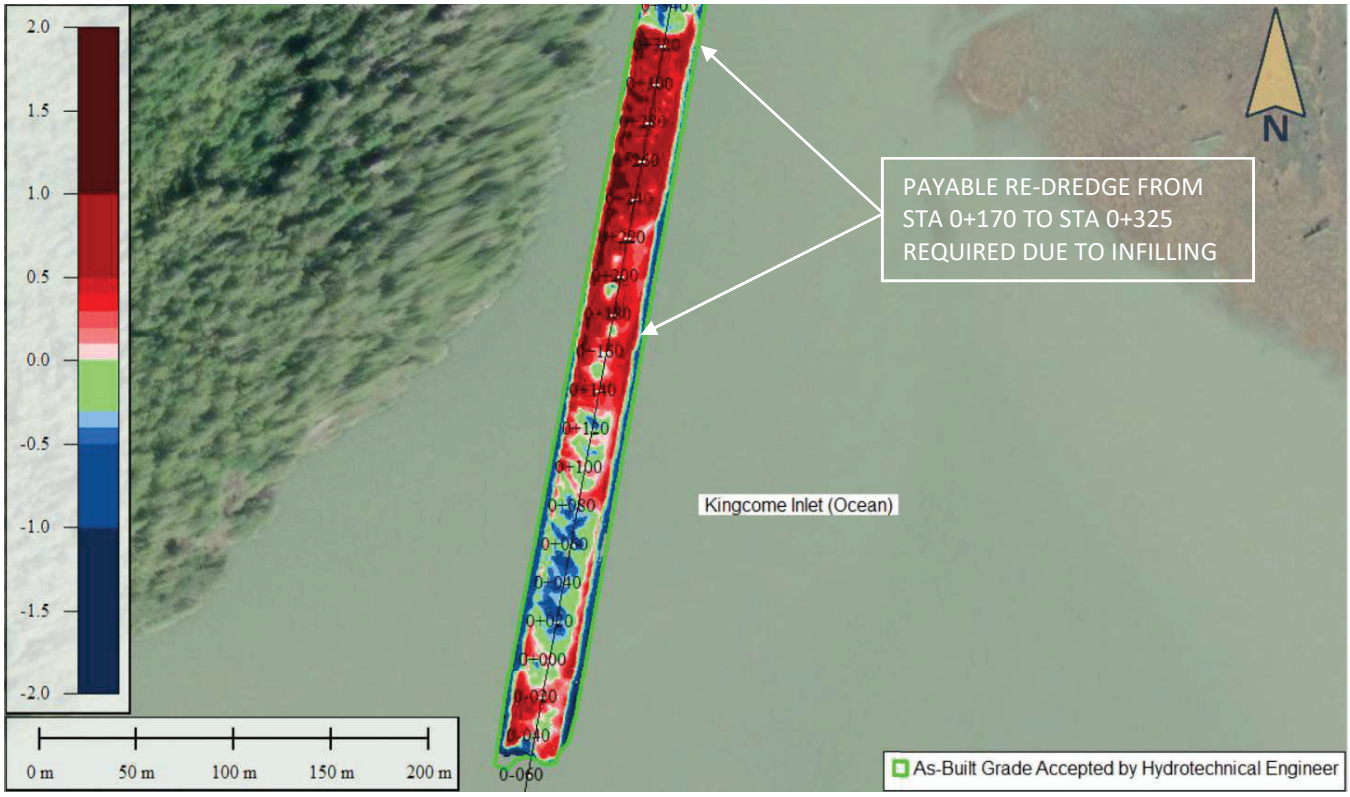


Figure 3a. Design Progress: 2024/01/22 Pre-Shift JJM Progress Survey – IFC R1 Dredge Design Surface. Green polygons delineate dredge extents where the constructed grade has been accepted by a hydrotechnical engineer.

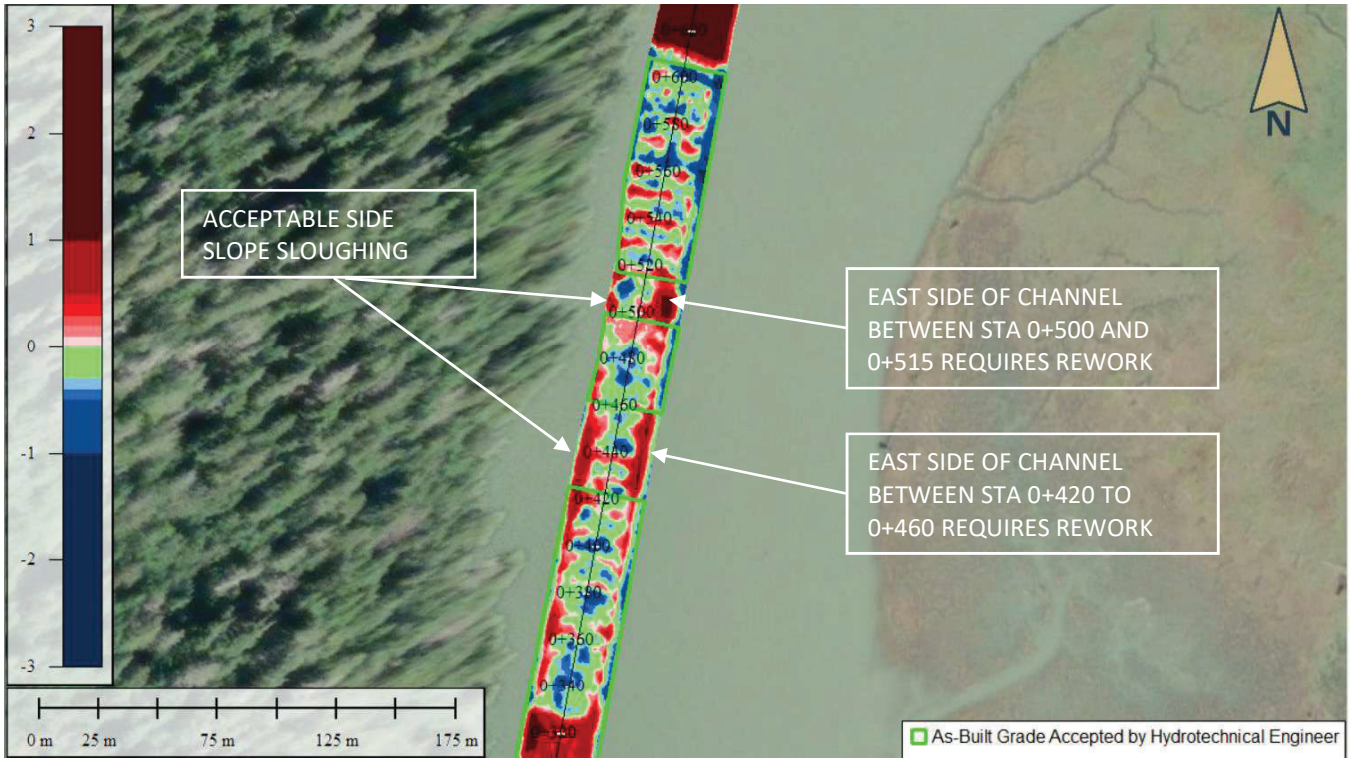


Figure 3b. Design Progress: 2024/01/22 Pre-Shift JJM Progress Survey – IFC R1 Dredge Design Surface. Green polygons delineate dredge extents where the constructed grade has been accepted by a hydrotechnical engineer.

Site Conditions:

Weather

- Past week (2024/01/15 – 2024/01/21):
  - Refer to the NHC FRR No.8 for the daily weather conditions.
- Upcoming week (2024/01/22 – 2024/01/28):
  - Jan. 22: overcast, Jan. 23: rain (15 mm), Jan. 24: rain (15 mm), Jan. 25: rain (10 mm), Jan. 26: rain (25 mm), Jan. 27: rain (25 mm); Jan. 28: rain (35mm)

River Conditions:

- Past week (2024/01/15 – 2024/01/21):
  - Refer to the NHC's Field Review Report No.8 for the Kingcome inlet tide conditions and Kingcome River water levels.
- Upcoming week (2024/01/22 – 2024/01/28):
  - Lowest weekly tides during work hours are 0.8 m on Jan. 23, at 18:23 and 0.7 m on Jan. 24 at 19:06.

Activities completed in the past week:

- Dredging and Disposal at Sea as noted above.
- Weekly meeting between NHC, Pacificus and JJM.

Upcoming activities this week:

- Dredging and Disposal at Sea.
- Weekly meeting between NHC, Pacificus and JJM; Monthly meeting on Thursday, Jan. 25.

Anticipated Completion Date: On or before February 15, 2024

Personnel Employed:

- **Prime Contractor:** JJM Construction Ltd. (JJM)
- **Subcontractor:** Gowlland Towing Ltd.
- **Subcontractor:** Dzawada'enuxw First Nation (DFN) OFA 3, Boat Operator.
- **Ministry Representative and Engineer:** Northwest Hydraulic Consultants (NHC)
    - Alicia Van Boven (Jan. 20 – 21)
    - Sam Xie (Jan. 15 – 20)
- **Environmental Monitoring:** Pacificus Environmental Ltd. (Pacificus)
    - Celeste Landon (Jan. 15 – 20)
    - Brittany Blanchard (Jan. 20 – 21)
- **Archeological Rep:** WSP & DFN

Safety:

- Morning toolboxes conducted daily by JJM for all workers.
- Peter Coon (DFN) OFA 3 on site from 06:00– 18:00.
- See attachment C for JJM's Weekly Safety KPIs

Site Visitors/Inspections:

- Alicia Van Boven & Sam Xie. – Field Reviews, including dredging, DAS, and bathymetric survey.

Environmental Monitoring:

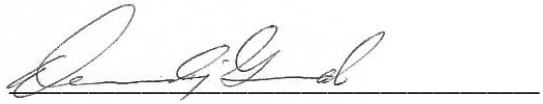
- Pacificus is fulfilling the environmental monitoring (EM) role for the project. See attached for the Weekly EM report.
    - Turbidity measurements are conducted twice daily.

Signature:



Jan. 23, 2023.

Alicia Van Boven, E.I.T., Ministry Representative



Jan. 23, 2023.

Des Goold, P.Eng., Senior Ministry Representative

nhc
northwest hydraulic consultants

Weekly Progress Report #11

Project:	Kingcome River – EDSM Project		
To:	Amy Vallarino (amy.vallarino@gov.bc.ca); Dawn Nicolson (dfn.administrator@kingcome.ca); Midori Nicolson (midorin@telus.net); Arshad Bastani (arshad@ashoprojects.com); Cameron McIntosh (cmcintosh@jjmconstruction.com); Sherman Yee (syee@jjmconstruction.com); Liam Galbraith (lgalbraith@jjmconstruction.com); Mitch Brown (mbrown@jjmconstruction.com); Brenton Ryan (bryan@jjmconstruction.com); Heather Pratt (heather.pratt@wsp.com); Alex Heckels (aheckels@pacificus.ca);		
From:	Veronique Bourgault (NHC; Ministry Representative) (KingcomeMR@nhcweb.com)		
Revision:	0	**Contract:**	WK24EPFLOOD0013
Date:	2024-02-03	**NHC No.:**	3007807
Client:	Ministry of Environment and Climate Change (ENV) & Dzawada'enuxw First Nation (DFN)	**Prime:**	JJM Construction Ltd. (JJM)

Northwest Hydraulic Consultants Ltd. (NHC) has prepared the following report regarding the construction progress at the Kingcome River – Emergency Debris and Sediment Management Project Site from start of shift Monday, January 22 to end of shift, Monday, January 29. A previously un-checked dredge volume from Sunday, January 21 has now been verified.

Attachments:

- **Attachment A:** NHC Field Review Report: *20240203 3007807 NHC Kingcome EDSM Field Review Report No.9_R0*
- **Attachment B:** JJM Weekly Summary and Weekly KPIs: Combined Weekly Report Jan 22 – Jan 29.pdf
- **Attachment C:** Pacificus Weekly Environmental Report: Weekly Monitoring Report Jan 22–29.pdf

Reference Materials:

Materials referenced as part of this memorandum include:

- Drawings:
  - *20231117 3007807 NHC 2900439 KINGCOME EDSM IFC R1* (Revised set delivered Friday, Nov. 17, 2023)
- Special Provisions:
  - *WK24EPFLOOD0013 - JJM Construction Ltd.- Kingcome emergency debris and sediment removal - Final - Nov. 2*
- JJM construction progress survey data received on:
  - 2024-01-04: *20240103_1033JJM_KINGC-EDSM-PS_R11 1m.xyz* (new baseline for assessing progress)
  - 2024-01-25: *20240125_1033JJM_KINGC-EDSM-PS_R17.xyz*
  - 2024-01-27: *20240127_1033JJM_KINGC-EDSM-PS_R18.xyz*
  - 2024-01-28: *20240128_1033JJM_KINGC-EDSM-PS_R19 50cm.xyz*
  - 2024-01-29: *20240129_1033JJM_KINGC-EDSM-FINAL_R20.xyz*
- JJM updated Daily: *Daily Dredge Report.xlsx*

Progress Quantity Measurement Summary:

During the holiday break between Dec. 19, 2023, and Jan. 3, 2024, significant infilling of the dredge channel occurred, mostly between Sta. 0+090 and 0+370, and up to Sta. 0+385. NHC estimated that 8,295 m^3 has infilled the payable dredge channel limits, based on the difference between JJM's Jan. 3 and Dec. 19 surveys. Additionally, NHC and JJM have noted that the riverbed upstream of previous dredge progress has risen relative to the Nov. 15, 2023 Pre-con survey. These increased bed levels have contributed to the amount of dredge that will be required, likely on the order of 1,500 m^3. Therefore, going forward, JJM's Jan. 3 survey surface will serve as a baseline, in place of the Nov. 15, 2023 Pre-con survey.

The approximate end station before the holiday break was Sta. 0+380. The new dredged quantity upstream of STA 0+380 and any re-dredging of infilled material downstream of STA 0+380 will be tracked separately. The re-dredged material quantity downstream will be referred to as "Payable Re-Dredged Material" and dredged material upstream of STA 0+380 will be referred to as "Payable Dredged Material". Both quantities count towards the contract max payable dredge amount of 56,000 m^3.

The upstream construction limit of Sta. 0+760 given in IFC dredge design was shifted downstream to about STA 0+717 for JJM to remain around the maximum payable 56,000 m^3. Payable Dredged Material, and Payable Re-Dredged Material over the holiday break and during two rain events after the holiday break all counted towards the final value of 56,432 m^3 dredged by end of day Jan. 29, 2024.

Overall Dredge Progress

The overall 2024 dredge progress since the holiday break is shown in **Figure 1**. During this period, JJM completed Payable Re-Dredge from STA 0+225 to STA 0+515 and completed New Payable Dredging from Station 0+605 to 0+717 (See **Figure 2**). JJM's weekly progress report (see attached) reports a total payable dredged volume of 56,432 m^3 to end-of-shift, Jan. 29. Dredged quantity has been independently measured by NHC (see **Table 1**). A progress survey was provided on Jan. 29 (post-shift survey). Total dredge volume was calculated by comparing the final Jan. 29 progress survey to the Jan. 03 baseline survey, minus non-payable over dredge. NHC's total payable dredged volume for end of day Jan. 29 is 56,335 m^3. Discrepancies between JJM and NHC values can be attributed to differences in calculation methodology, and NHC accepts and signs off on JJM's value of 56,432 m^3 as the final total payable dredged volume for the Year 1 Kingcome Inlet Project.

Table 1. NHC Progress Quantity Tracking to end-of-shift, Monday, Jan 29.

Item	unit	Quantity	Days Worked	NHC Checked Quantity Previous	% Completed Previous	NHC Checked Quantity Past Week*	% Completed for Past Week*	NHC Checked Quantity To Date	% Completed to Date*
River Dredging									
Payable Dredge Material**	m^3	56,000 – (Payable Limit)	76	45,908	82%	9,344	16.7%	56,335	100.7%
Payable Re-Dredged Material**	m^3			0	N/A	1,083	1.9%		
Total Dredged Material = Payable Dredge Material + Payable Re-Dredged Material (max 56,000 m^3)								**56,432*** **	**100.8%**

***Note: Checked Dredge Quantities are based on 2024/01/22 pre-shift survey and indicate progress to Station 0+620.**
****Note: The sum of Payable Dredge Material + Payable Re-Dredge Material will count towards the contract max payable dredge amount of 56,000 m^3.**
*****Note: This is the final dredge volume reported by JJM and accepted by NHC.**

Construction-in-Progress Notes:

- All elevations shown are in CGVD2013.
- The start stationing identified in the drawings is STA 0-051, however, the contractor extended the stationing further to the ocean to ensure that there was not a downstream "plug" of sediment as per special provision 4.01(a).
- Payable re-dredge occurred from STA 0+235 to STA 0+300, and STA 0+225 to STA 0+515. New dredge occurred from STA 0+615 to STA 0+717.
- **Figure 1** shows the total dredge progress since the winter break on Jan. 3rd, 2024, as well as the start and end stationing for the pay period of Jan. 22 to Jan. 29, 2024.

- The JJM final progress survey from Jan. 29th, 2024 covered the entire dredge area from STA 0-051 to STA 0+717. It is compared to the IFC dredge design surface in **Figure 2a, Figure 2b, and Figure 2c** to show the overall design dredge progress for the Project. The color ramp indicates the depth of bed material compared to the dredge design elevation. The green indicates that the bed elevation is between the required dredge and the payable over-dredge limits, while blue shows the depth of bed material below the payable over-dredge limit, and red shows areas that are above the required dredge grade. Many areas are showing above the required dredge (pink to red areas) due to natural infilling. JJM has re-dredged portions of these areas, but it has not been feasible to re-establish the design dredge depth. Nevertheless, the payable dredge limit has been met and dredging is considered complete and has been accepted

Construction Completion Sign-Off:

- Dredging has been signed-off by NHC between the following limits:
  - STA 0-051 to 0+717 (768 m) as of Jan 29, 2024.
  - The total payable dredge at the end of the Project is 56,432 m3, which is 432 m3 over the Contract payable limit. The excess will be paid for through the Contract Provisional Sum (see *Provisional Work Order #3*).
  - JJM has had to re-dredge at total of 4,268 m3 in previously signed-off areas. This re-dredge counts against the Contract payable. The dredge was authorized by NHC in *Authorized Work Form #1*.

Figures:

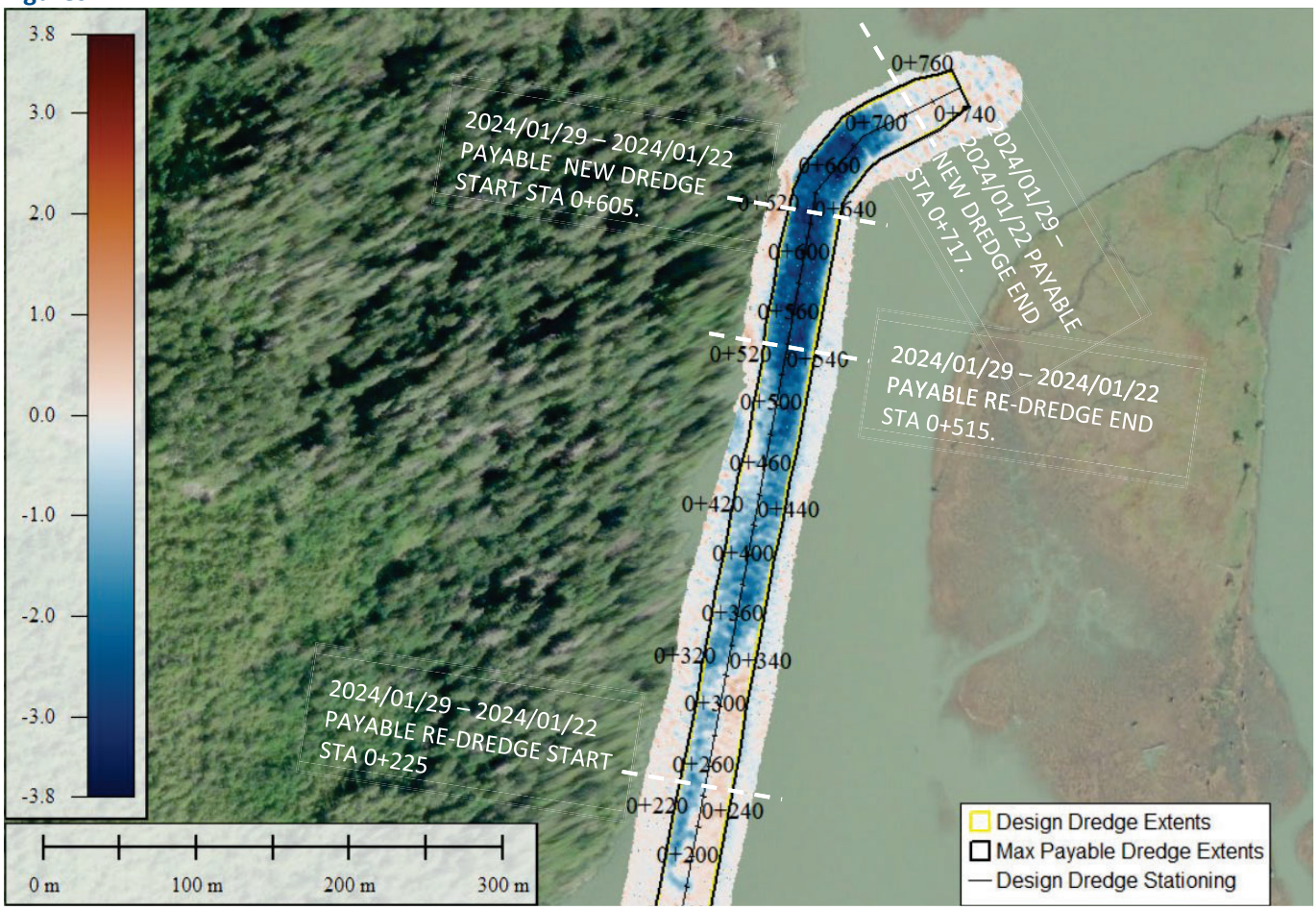


Figure 1. Total Dredge Progress in 2024: 2024/01/29 Post-Shift JJM Progress Survey – 2024/01/03 The 2024 Pre-Construction (Post-winter break).

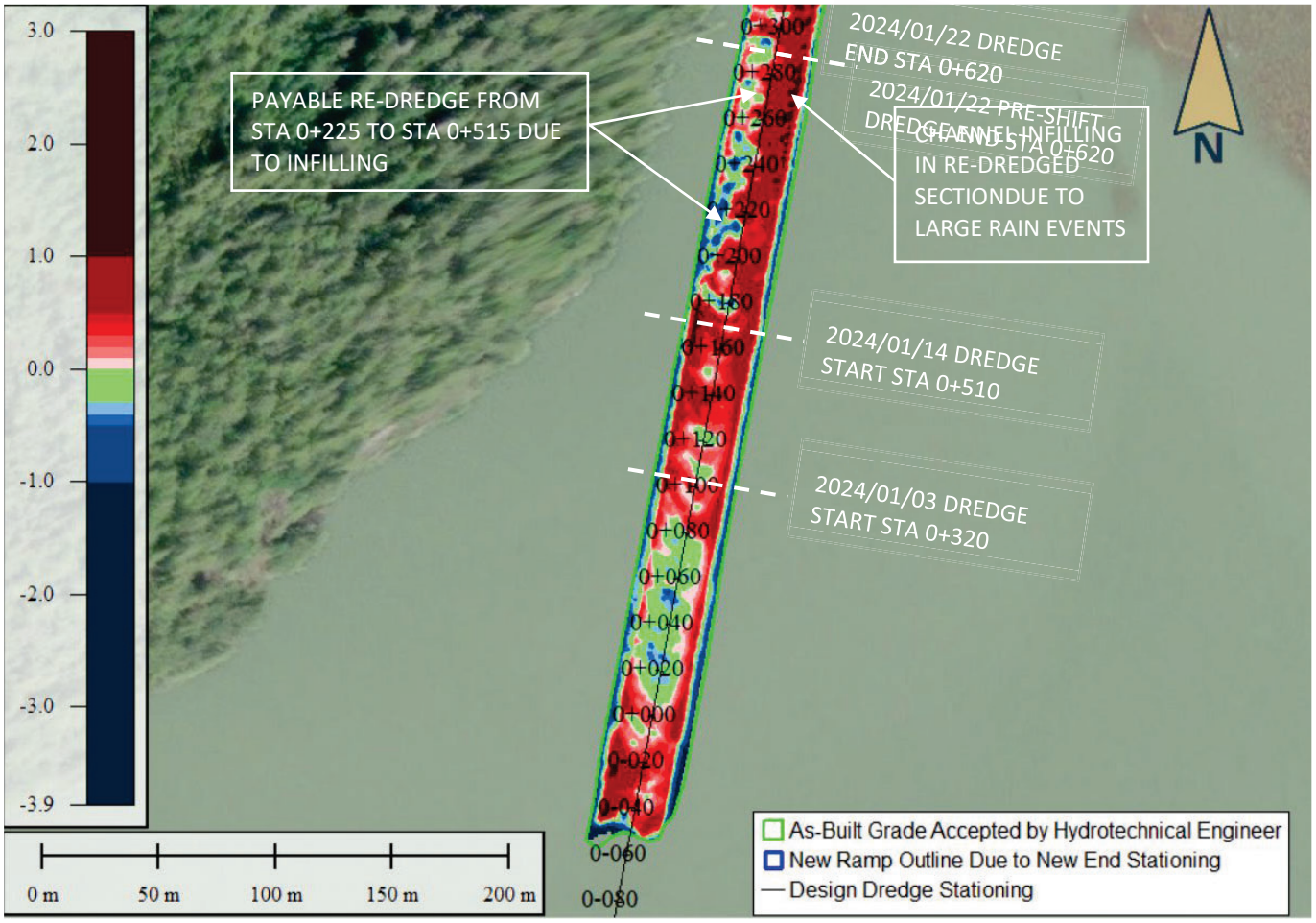


Figure 2a. Design Progress: 2024/01/29 Post-Shift JJM Progress Survey – IFC R1 Dredge Design Surface. STA 0-051 to STA 0+300 shown here. Many areas are showing above the required dredge (pink to red areas) due to natural infilling. JJM has re-dredged portions of these areas but it has not been feasible to re-establish the design dredge depth.

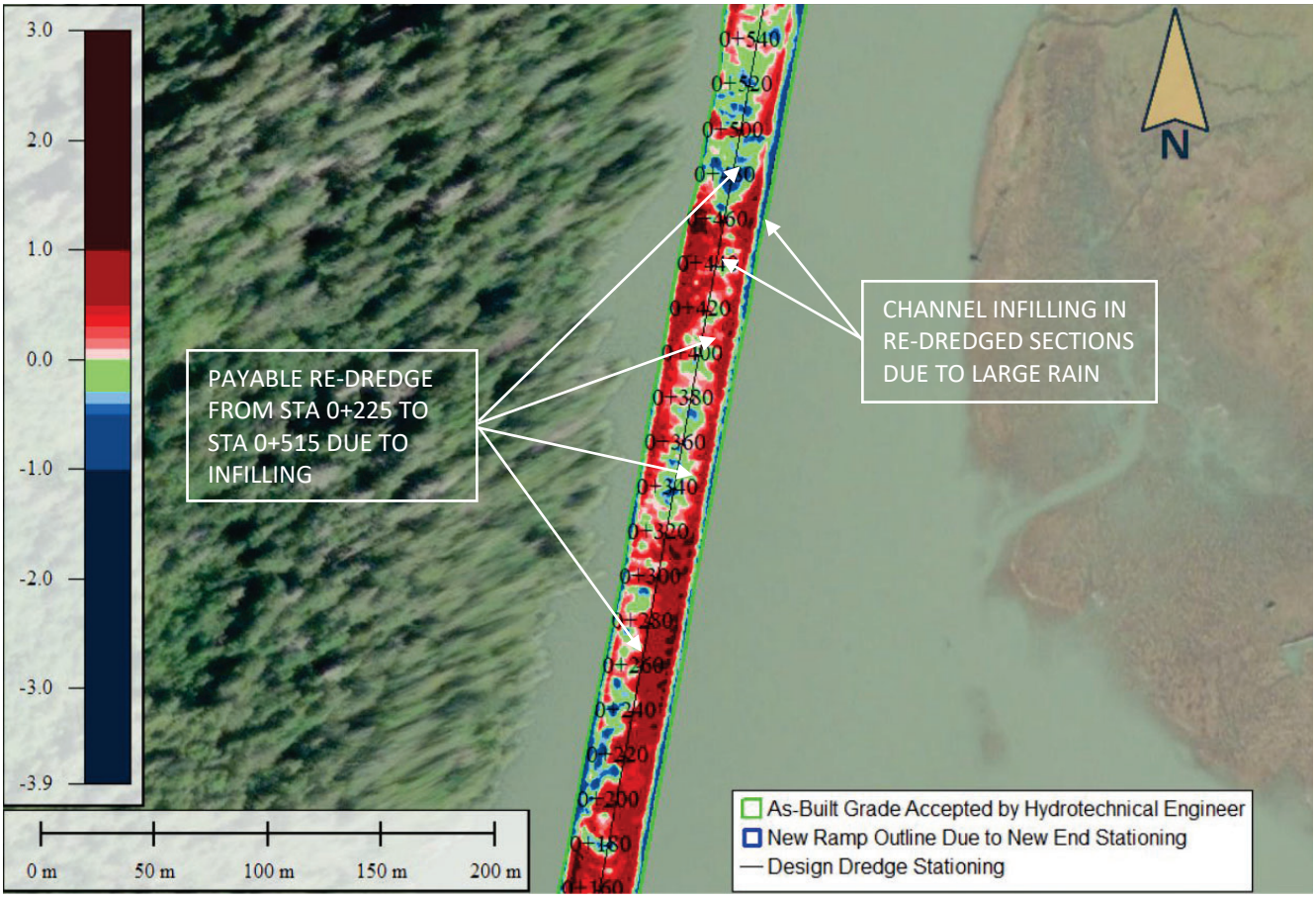


Figure 2b. Design Progress: 2024/01/29 Post-Shift JJM Progress Survey – IFC R1 Dredge Design Surface. STA 0+180 to STA 0+500 shown here. Many areas are showing above the required dredge (pink to red areas) due to natural infilling. JJM has re-dredged portions of these areas but it has not been feasible to re-establish the design dredge depth.

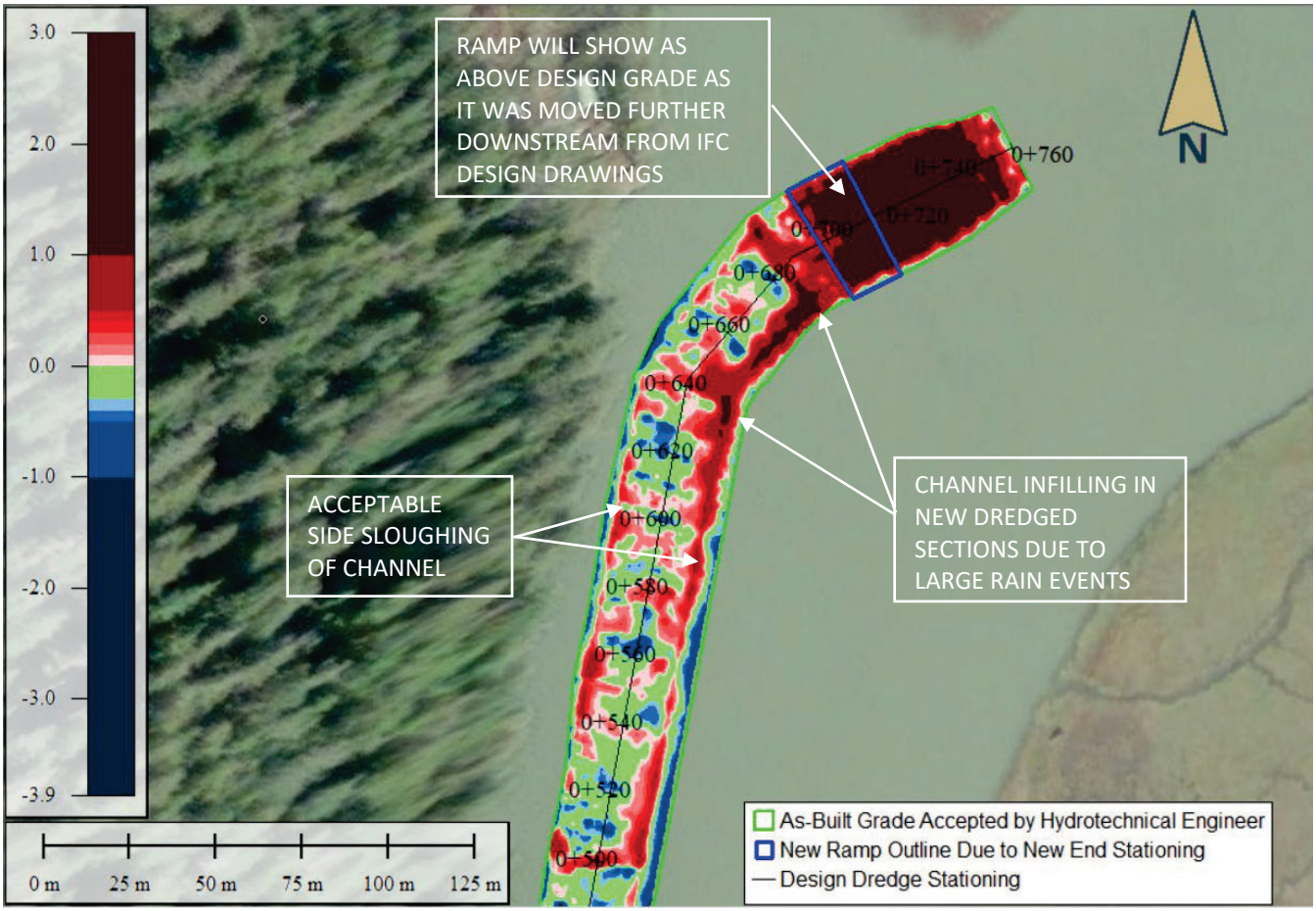


Figure 2c. Design Progress: 2024/01/29 Post-Shift JJM Progress Survey – IFC R1 Dredge Design Surface. STA 0+500 to STA 0+717 shown here. Many areas are showing above the required dredge (pink to red areas) due to natural infilling. The blue polygon indicates the beginning and end stationing of the tie-in to the existing streambed. The tie-in area shows up as red because all of it is shallower than the design dredge depth.



Figure 3a. Upstream dredge channel, showing JJM barges and dragged channel from JJM drone footage.



Figure 3b. Downstream dredge channel, showing JJM barges and dragged channel from JJM drone footage.

Site Conditions:

Weather

- Past week (2024/01/22 – 2024/01/29):
  - Refer to the NHC Field Review Report No.9 for the daily weather conditions.

- **River Conditions:**

- Past week (2024/01/22 – 2024/01/29):
  - Refer to the NHC's Field Review Report No.8 for the Kingcome inlet tide conditions and Kingcome River water levels.

Activities completed in the past week:

- Dredging and Disposal at Sea was completed on Jan 29, 2024.
- Weekly meeting between NHC, Pacificus and JJM.
- Bi-Weekly meeting between NHC, Pacificus, ENV, and DFN.

Upcoming activities this week:

- Demobilization (Feb. 1 – Feb. 3).

Substantial Completion Date: Jan. 29, 2024

Anticipated Total Completion Date: Feb. 7, 2024 (successful demobilisation and all dredge records QC'd and submitted).

Personnel Employed:

- **Prime Contractor:** JJM Construction Ltd. (JJM)
- **Subcontractor:** Gowlland Towing Ltd.
- **Subcontractor:** Dzawada'enuxw First Nation (DFN) OFA 3, Boat Operator.
- **Ministry Representative and Engineer:** Northwest Hydraulic Consultants (NHC)
  - Alicia Van Boven (Jan. 21 – 29)
  - Veronique Bourgault (Jan. 29 – Feb. 2)
- **Environmental Monitoring:** Pacificus Environmental Ltd. (Pacificus)
  - Danae Shephard (Jan. 25 – Jan. 30)
- **Archeological Rep:** WSP & DFN

Safety:

- Morning toolboxes conducted daily by JJM for all workers.
- Peter Coon (DFN) OFA 3 on site from 06:00– 18:00.
- See attachment C for JJM's Weekly Safety KPIs

Site Visitors/Inspections:

- Alicia Van Boven & Veronique Bourgault. – Field Reviews, including dredging, DAS, and bathymetric survey.

Environmental Monitoring:

- Pacificus is fulfilling the environmental monitoring (EM) role for the project. See attached for the Weekly EM report.
  - Turbidity measurements are conducted twice daily.

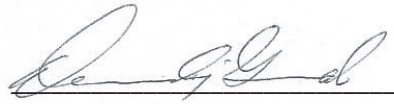
Signature:



_____

Feb. 3, 2023.

Veronique Bourgault, E.I.T., Ministry Representative



_____

Feb. 3, 2023.

Des Goold, P.Eng., Senior Ministry Representative

APPENDIX L

WEEKLY ENVIRONMENTAL REPORTS

Dredging and Hazardous Debris Removal in the Gwa'yi (Kingcome) River

Weekly Environmental Monitoring Report

(November 17th - November 19th, 2023)



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Dredging and Hazardous Debris Removal in the Gwa'yi (Kingcome) River Weekly Environmental Monitoring Report

(November 17th – November 19th, 2023)

Prepared for

Dzawada'enuxw First Nations

and

Ministry of Environment and Climate Change Strategy Flood Degree Management Secretariat

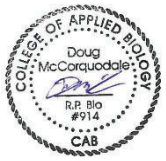
and

Northwest Hydraulic Consultants Ltd.

Written by:

Alex Heckels, MSc., BIT

Reviewed by:



Doug McCorquodale, RPBio.

Report Reviewer

Date:

November 23rd, 2023

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Weekly Summary

1. This weekly summary regards the first week of completed work. Environmental Monitoring (EM) duties were completed by Alex Heckels, MSc., BIT, of Pacificus Biological Services Ltd. from November 17th to November 19th, 2023.

2. Prior to the commencement of work, a safety orientation and kickoff meeting was held between the JJM Construction Crew, Alex Heckels from Pacificus, and Veronique Bourgault of Northwest Hydraulic Consultants.

3. Work predominantly consisted of dredging and disposal at the downstream extent of the pre-defined Dredge Material Management Unit.

4. Turbidity measurements were taken at the start and end of each workday at three stations to ensure that dredging work remained compliant with Provincial Water Quality Guidelines.

5. No marine mammals or fish species were observed during work.

6. No instream debris removal works were conducted.

7. Inspection of machinery and spill response kits were inspected prior to the commencement of works. All machinery was observed to be clean and free of leaks.

Project Overview

A work plan has been coordinated by the Ministry of Environment and Climate Change Strategy (ENV) to dredge targeted sections of the Gwa'yi (Kingcome) River Estuary to address unreliable access for Dzawada'enuxw First Nation (DFN) to U'kwa Nalis Village, with all dredgeate to be disposed of within Kingcome Inlet. Concurrent to dredging, work to trim hazardous large woody debris will be conducted in a 4.5 km reach of river downstream from U'kwa Nalis Village. Northwest Hydraulic Consultants (NHC) have been engaged by ENV to provide hydrotechincal assistance during all work phases related to sediment management and debris removal. JJM Construction Ltd. (JJM) have been selected as the contractors to conduct dredging and debris trimming, with assistance from Fraser Burrard Diving Ltd. Pacificus Biological Services Ltd. (Pacificus) have been retained to assist with environmental permitting and approval, produce a Construction Environmental Mitigation Plan (CEMP), and coordinate and oversee required Environmental Monitoring throughout works. Work is scheduled to occur during the regional Marine and Estuarine Reduced Risk Work Window between November 15th, 2024, and February 15th, 2024.

This letter provides a summary of environmental monitoring work conducted during the first week of the project from November 17th – November 19th, 2023, in order to ensure compliance with all the CEMP, environmental permits, and to avoid causing the *death of fish or the harmful alteration, disruption, or destruction of fish habitat*. As per the Environmental Monitoring Workplan[1], Pacificus are to submit weekly Environmental Monitoring (EM) reports for the duration of the project. All EM duties were completed by Alex Heckels, MSc., BIT, of Pacificus.

Prior to commencement of work on November 17th, 2023, a safety and project review meeting was held between the JJM work crew, Veronique Bourgault of NHC, and Alex Heckels of Pacificus in order to ensure all staff were familiar with proposed works. Requirements of environmental permits were reiterated to the crew at this time. Additionally, prior to the start of work an inspection of spill response equipment was conducted. Adequate and readily available spill response equipment was observed during the inspections, and all machines to be used during work were observed to be clean and free of leaks. Both the excavator and crane on the main barge were observed to have drip trays.

[1] Pacificus, 2023. Environmental Monitoring Workplan during Proposed Dredging and Debris Trimming in the Kingcome River and Estuary.

Meteorological and Hydrometric Conditions

Weather conditions during the first week of work were generally overcast, with periods of heavy rain. Consequently, water levels in the Kingcome River rose throughout the week, with the strongest flows occurring on the morning of November 19th, 2023 (Figure 1).

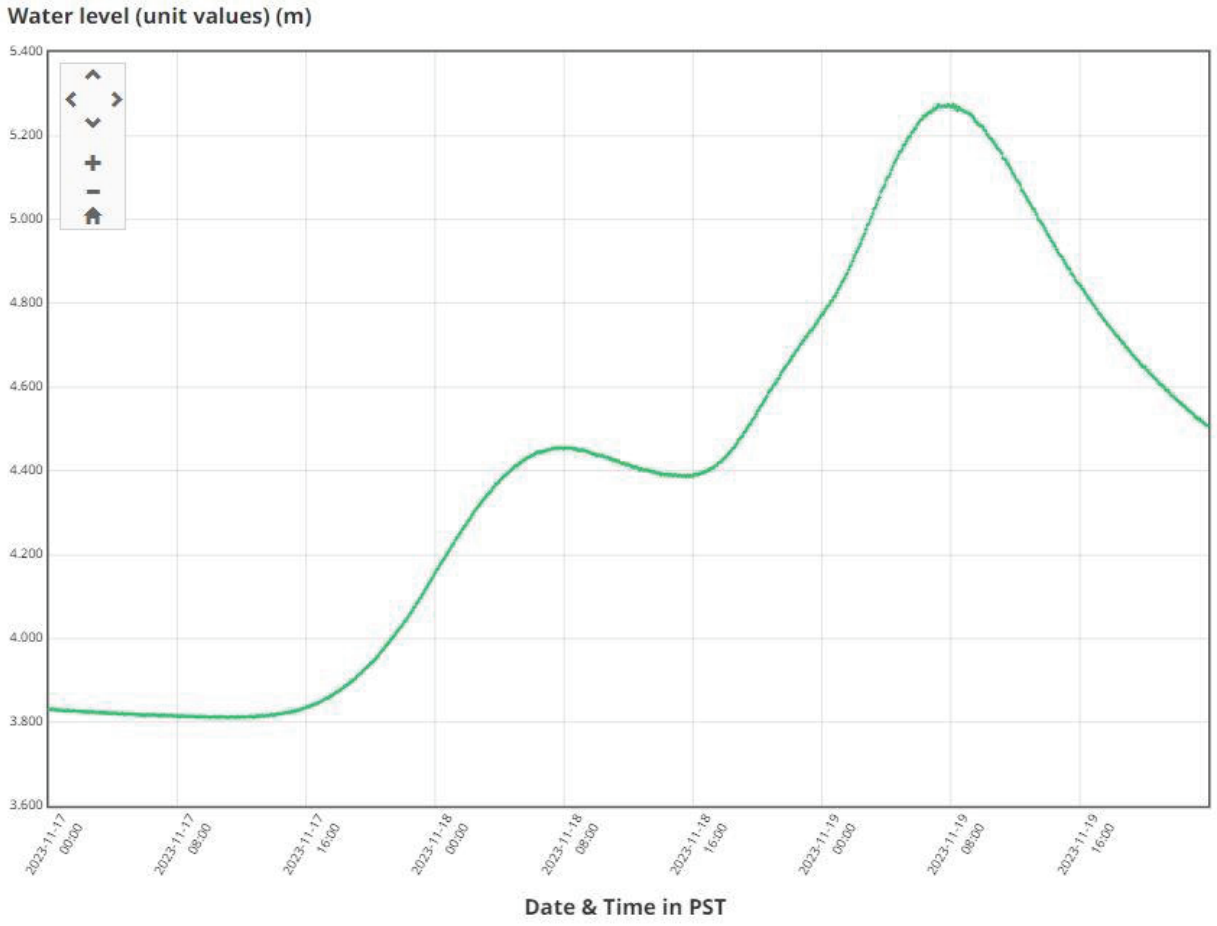


Figure 1. Figure showing water levels in the Kingcome River below Atlatzi River throughout week 1 of dredging work in the Kingcome Esturary.[2]

[2] Government of Canada, 2023. Real-Time Hydrometric Data Graph for Kingcome River Below Atlatzi River. https://wateroffice.ec.gc.ca/report/real_time_e.html?stn=08GF009&mode=Graph&startDate=2023-11-17&endDate=2023-11-21&prm1=46&y1Max=&y1Min=&prm2=-1&y2Max=&y2Min= (Accessed November 21, 2023)

Dredging and Dredgeate Disposal

EM works during week 1 predominantly consisted of dredging at the downstream extent of the Dredge Material Management Unit (DMMU)[3] and dredgeate disposal within the boundary of the historic disposal at sea site in Kingcome Inlet. General EM requirements and recommendations are outlined within the CEMP and the Avoid and Mitigate Letter provided by Fisheries and Oceans Canada (DFO) following a Request for Review[4].

Prior to the start of dredging and material disposal each day, turbidity monitoring was conducted approximately 50 m upstream and downstream of the active dredge area, and within the disposal area. This was to establish background turbidity levels throughout works and to ensure that turbidity did not exceed Provincial Ambient Water Quality Guidelines (Table 1)[5]. Turbidity monitoring was conducted using a LaMotte turbidity meter. All turbidity data collected during week 1 is appended to this report (Appendix 1)

Table 1. BC Ambient Water Quality Guidelines for Turbidity and Total Suspended Solids.

Water Use	Turbidity	Non-Filterable Residue (Total Suspended Solids)
Aquatic Life (fresh, marine, estuarine)	Change from background of 8 NTU at any one time for a duration of 24 h in all waters during clear flows or in clear waters	Change from background of 25 mg/L at any one time for a duration of 24 h in all waters during clear flows or in clear waters
	Change from background of 2 NTU at any one time for a duration of 30 d in all waters during clear flows or in clear waters	Change from background of 5 mg/L at any one time for a duration of 30 d in all waters during clear flows or in clear waters
Aquatic Life (fresh, marine, estuarine)	Change from background of 5 NTU at any time when background is 8 - 50 NTU during high flows or in turbid waters	Change from background of 10 mg/L at any time when background is 25 - 100 mg/L during high flows or in turbid waters
	Change from background of 10% when background is >50 NTU at any time during high flows or in turbid waters	Change from background of 10% when background is >100 mg/L at any time during high flows or in turbid waters

A recommendation within the Avoid and Mitigate Letter is the deployment of silt curtains around the split-hull barge during material disposal. However, upon observation of turbidity during dredging and measurements collected during disposal, it was observed that material was quickly descending through the water column and not causing a noticeable plume that risked causing a HADD. Following discussion with the work crew, it was determined that dredgeate was likely to

[3] Pacificus, 2023. Kingcome Emergency Debris and Sediment Management Project Sampling and Analysis Plan for Disposal at Sea in Kingcome Inlet.
[4] Fisheries and Oceans Canada, 2023. Dredging, Kingcome River, U'kwa Nalis Village – Implementation of Measures to Avoid and Mitigate the Potential of Prohibited Effects to Fish and Fish Habitat.
[5]B.C. Ministry of Environment and Climate Change, 2021. Water Quality- Ambient water Quality Guidelines (Criteria) for Turbidity, Suspended and Benthic Sediments. https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/water-quality-guidelines/approved-wqgs/bc_env_turbidity_waterqualityguideline_overview.pdf (Accessed November 21, 2023)

remain within the Disposal at Sea site regardless of the deployment of a silt curtain. Not deploying a silt curtain also allowed the split-hull barge to be towed through the water during disposal, preventing the buildup of sediment in one location and minimizing the risk of deleteriously impacting marine species. This disposal methodology should be followed for the remainder of the project.

Two occurrences on the first day resulted in an alternative disposal method to the split-hull barge being required. Firstly, during the initial disposal event with the split-hull barge, a very small sheen was observed in the water following disposal. Upon investigation, it was determined that this sheen resulted from recently reinstalled hydraulic pistons on the barge and lubricant that remained on equipment following servicing. Following this, the barge was thoroughly inspected and cleaned, and during subsequent disposal events with the split-hull barge no further sheen was observed. As such, this was not determined to be a spill of hydrocarbons. Secondly, it was observed at the end of the first day of work that the mass of the dredgeate when fully loaded was causing a small gap between the two sections of the barge, allowing small volumes of sediment to escape outside of the designated disposal area. Use of the split-hull barge was paused to allow inspection and steel plates were installed to ensure the barge remained fully closed outside of the disposal area. The alternative disposal method involved piling dredgeate on the scow barge and slowly disposing of the material using the excavator and a loader. Turbidity monitoring was conducted throughout the alternative disposal and no significant increase in turbidity was recorded throughout.

It should be noted that no marine mammals or fish were observed in proximity of the work site, and no European green crabs (*Carcinus maenas*) were observed during work or in the dredged substrate.

Hazardous Debris Trimming

No trimming of hazardous woody debris occurred during the first week of work. Staff from Pacificus, NHC, and JJM twice attempted to survey the location of debris to be trimmed and determine if any additional hazardous woody debris had accumulated in the river since previous surveys. As a consequence of heavy rainfall throughout the watershed and temperatures above freezing, runoff into the Kingcome river resulted in elevated turbidity that restricted visibility within the river. As such, it was not possible to identify any new hazardous debris or identify the location of salmon redds prior to the start of work.

As it was not possible to identify potential salmonid spawning areas, it was communicated with the Fraser Burrard Diving Ltd. crew that minimal repositioning and anchoring of the dive boat will be required until visibility in the river improves. The EM should be present during the first trimming

events to ensure that the anchoring methods are not likely to cause damage to fish spawning habitat.

Upcoming Planned Work.

During the second week of planned work, dredging and disposal will continue as established during week 1. Turbidity monitoring will continue to be conducted daily by the EM. The trimming of hazardous woody debris will commence on November 21st The EM must be present for the commencement of trimming work in order to observe whether sawdust created during trimming has the potential to be harmful to fish or fish habitat, and to confirm that anchoring the dive boat into the substrate does not cause significant alteration to fish spawning habitat within the Kingcome River substrate. Any alterations to proposed works must be approved by the on-site ministry representative from NHC and the EM from Pacificus prior to proceeding.

Appendix 1 – Site Photos

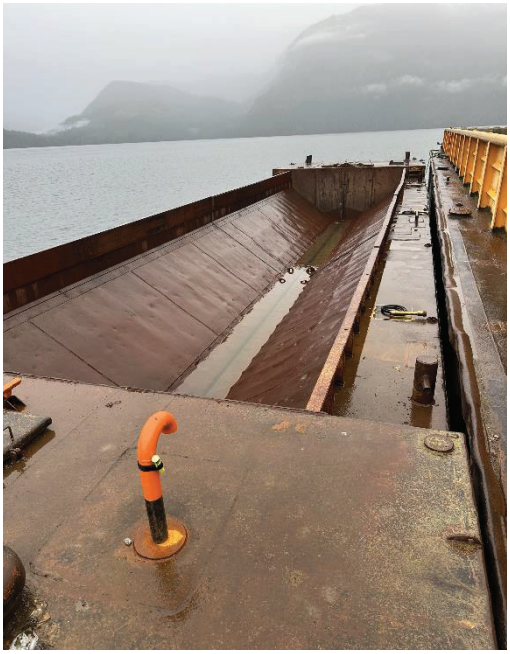


Photo 1. Photo showing the split-hull barge used to transport and dispose of dredgeate in the designated disposal at sea site.



Photo 2. Photo showing dredging with an excavator in the Dredge Material Management Unit.



Photo 3. Photo showing a drip tray beneath the crane on the main work barge.



Photo 4. Photo showing dredgeate in the split-hull barge following a dredge event.



Photo 5. Photo showing the alternative disposal method utilizing an excavator and loader. This disposal method was used when the split-hull barge required repairs.



Photo 6. Photo showing an example of hazardous large woody debris observed during the instream surveys conducted prior to the commencement of removal work.

Appendix 2 – Turbidity Monitoring Data

Kingcome Turbidity Daily Monitoring			
Date	Site	Time	Turbidity (NTU)
17/11/2023	U/S	06:30	6.12
17/11/2023	D/S	06:30	2.94
17/11/2023	DAS	14:20	2.84
18/11/2023	U/S	06:15	3.62
18/11/2023	D/S	06:15	2.15
18/11/2023	DAS	11:25	0.91
18/11/2023	U/S	16:55	4.29
18/11/2023	D/S	16:55	7.72
18/11/2023	DAS	17:10	1.61
19/11/2023	U/S	06:25	3.08
19/11/2023	D/S	06:25	2.10
19/11/2023	DAS	06:40	0.43
19/11/2023	U/S	16:45	8.96
19/11/2023	D/S	16:45	8.96
19/11/2023	DAS	16:35	3.48

*DAS - Disposal at Sea Site, D/S - Downstream of Dredge Barge, U/S – Upstream of Dredge Barge

Dredging and Hazardous Debris Removal in the Gwa'yi (Kingcome) River

Weekly Environmental Monitoring Report

(November 20th - November 26th, 2023)



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Dredging and Hazardous Debris Removal in the Gwa'yi (Kingcome) River Weekly Environmental Monitoring Report

(November 20th – November 26th 2023)

Prepared for

Dzawada'enuxw First Nations

and

Ministry of Environment and Climate Change Strategy Flood Degree Management Secretariat

and

Northwest Hydraulic Consultants Ltd.

Written by:

Danae Shephard, BSc., BIT

Reviewed by:



Doug McCorquodale, RPBio

Date:

November 27th, 2023

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Weekly Summary

1. This weekly summary regards the second week of completed work. Environmental Monitoring (EM) duties were completed by Alex Heckels, MSc., BIT, and Danae Shephard, BSc., BIT, of Pacificus Biological Services Ltd. from November 20th to November 26th, 2023.

2. Work predominantly consisted of instream debris removal, surveying, and dredging and disposal at the downstream extent of the pre-defined Dredge Material Management Unit.

3. Turbidity measurements were generally taken at the start and end of each workday at three stations to ensure that dredging work remained compliant with Provincial Water Quality Guidelines. This schedule was adjusted on a daily basis according to tides and light levels.

4. No marine mammals or fish species were observed during work.

5. Instream debris removal works commenced on November 21st, 2023.

6. All machinery was observed to be clean and free of leaks.

Project Overview

A work plan has been coordinated by the Ministry of Environment and Climate Change Strategy (ENV) to dredge targeted sections of the Gwa'yi (Kingcome) River Estuary to address unreliable access for Dzawada'enuxw First Nation (DFN) to U'kwa Nalis Village, with all dredgeate to be disposed of within Kingcome Inlet. Concurrent to dredging, work to trim hazardous large woody debris will be conducted in a 4.5 km reach of river downstream from U'kwa Nalis Village. Northwest Hydraulic Consultants (NHC) have been engaged by ENV to provide hydrotechnical assistance during all work phases related to sediment management and debris removal. JJM Construction Ltd. (JJM) have been selected as the contractors to conduct dredging and debris trimming, with assistance from Fraser Burrard Diving Ltd. Pacificus Biological Services Ltd. (Pacificus) have been retained to assist with environmental permitting and approval, produce a Construction Environmental Mitigation Plan (CEMP), and coordinate and oversee required Environmental Monitoring throughout works. Work is scheduled to occur during the regional Marine and Estuarine Reduced Risk Work Window between November 15th, 2023, and February 15th, 2024.

This letter provides a summary of environmental monitoring work conducted during the second week of the project from November 20th – November 26th, 2023, in order to ensure compliance with the CEMP, environmental permits, and to avoid causing the *death of fish or the harmful alteration, disruption, or destruction of fish habitat*. As per the Environmental Monitoring Workplan[1], Pacificus are to submit weekly Environmental Monitoring (EM) reports for the duration of the project. All EM duties were completed by Alex Heckels, MSc., BIT, and Danae Shephard, BSc., BIT, of Pacificus.

Prior to commencement of work on November 25th, 2023, a safety and project review meeting was held between the JJM work crew, Alicia Van Boven of NHC, and Danae Shephard of Pacificus in order to ensure all staff were familiar with proposed works. Requirements of environmental permits were reiterated to the crew at this time. It was confirmed that all machinery remained in good working condition and was clean and free of leaks.

[1] Pacificus, 2023. Environmental Monitoring Workplan during Proposed Dredging and Debris Trimming in the Kingcome River and Estuary.

Meteorological and Hydrometric Conditions

Weather conditions during the second week of work were generally overcast or foggy, with periods of clear sky. Consequently, water levels in the Kingcome River fell significantly throughout the week, with the strongest flows occurring on the evening of November 21st, 2023[2].

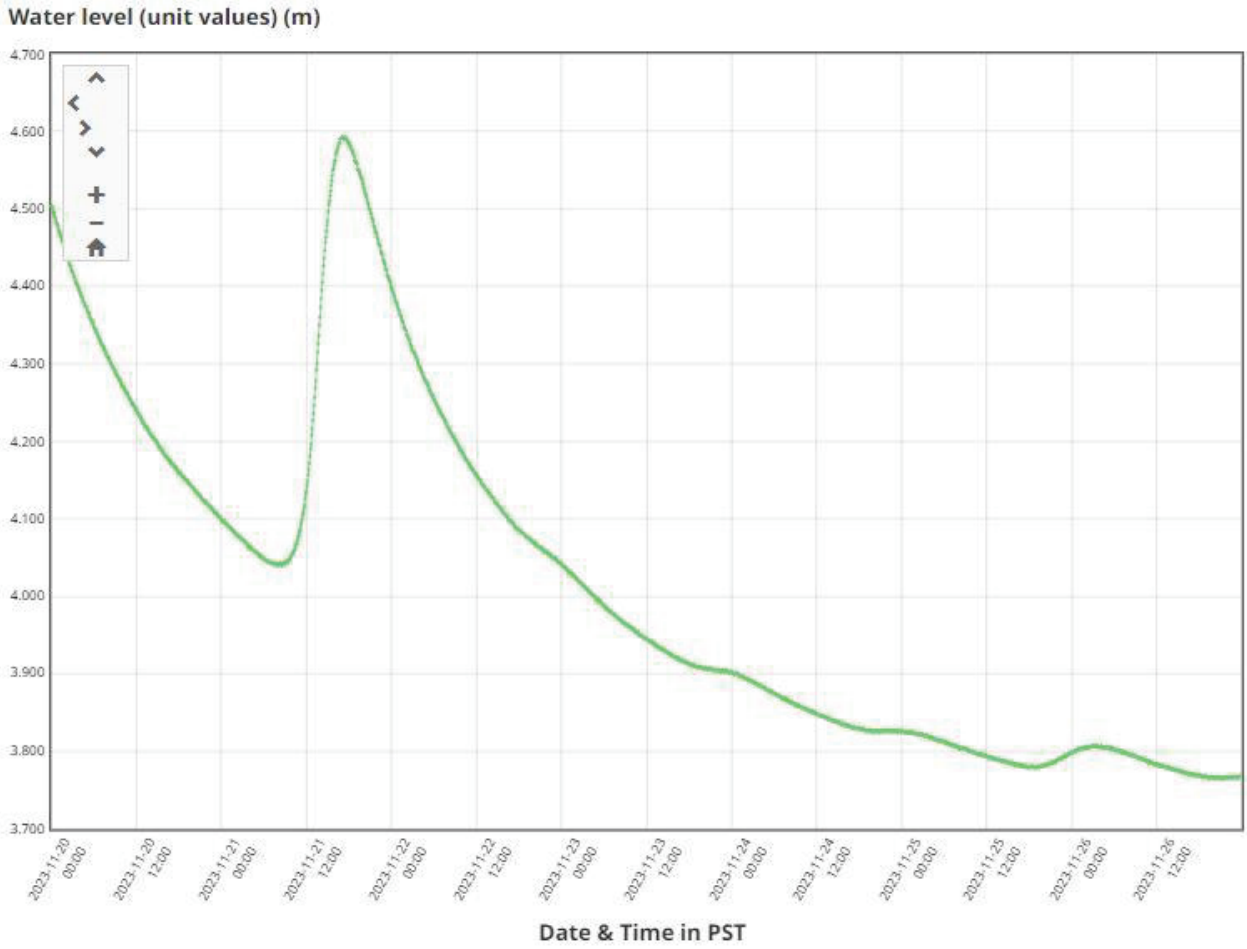


Figure 1. Figure showing water levels in the Kingcome River below Atlatzi River throughout week 2 of dredging work in the Kingcome Esturary.[2]

[2] Government of Canada, 2023. Real-Time Hydrometric Data Graph for Kingcome River Below Atlatzi River. https://wateroffice.ec.gc.ca/report/real_time_e.html?stn=08GF009&mode=Graph&startDate=2023-11-20&endDate=2023-11-26&prm1=46&y1Max=&y1Min=&prm2=-1&y2Max=&y2Min= (Accessed November 27, 2023).

Dredging and Dredgeate Disposal

Works during week 2 predominantly consisted of woody debris removal, bathymetric surveying, machinery repair, dredging at the downstream extent of the Dredge Material Management Unit (DMMU)[3] and dredgeate disposal within the boundary of the historic disposal at sea site in Kingcome Inlet. General EM requirements and recommendations are outlined within the CEMP and the Avoid and Mitigate Letter provided by Fisheries and Oceans Canada (DFO) following a Request for Review[4].

Prior to the start of dredging and material disposal each day, turbidity monitoring was conducted approximately 50 m upstream and downstream of the active dredge area, and within the disposal area. This was to establish background turbidity levels throughout works and to ensure that turbidity did not exceed Provincial Ambient Water Quality Guidelines (Table 1)[5]. Turbidity monitoring was conducted using a LaMotte turbidity meter. All turbidity data collected during week 2 is appended to this report (Appendix 1).

Table 1. BC Ambient Water Quality Guidelines for Turbidity and Total Suspended Solids.

Water Use	Turbidity	Non-Filterable Residue (Total Suspended Solids)
Aquatic Life (fresh, marine, estuarine)	Change from background of 8 NTU at any one time for a duration of 24 h in all waters during clear flows or in clear waters	Change from background of 25 mg/L at any one time for a duration of 24 h in all waters during clear flows or in clear waters
	Change from background of 2 NTU at any one time for a duration of 30 d in all waters during clear flows or in clear waters	Change from background of 5 mg/L at any one time for a duration of 30 d in all waters during clear flows or in clear waters
Aquatic Life (fresh, marine, estuarine)	Change from background of 5 NTU at any time when background is 8 - 50 NTU during high flows or in turbid waters	Change from background of 10 mg/L at any time when background is 25 - 100 mg/L during high flows or in turbid waters
	Change from background of 10% when background is >50 NTU at any time during high flows or in turbid waters	Change from background of 10% when background is >100 mg/L at any time during high flows or in turbid waters

[3] Pacificus, 2023. Kingcome Emergency Debris and Sediment Management Project Sampling and Analysis Plan for Disposal at Sea in Kingcome Inlet.
[4] Fisheries and Oceans Canada, 2023. Dredging, Kingcome River, U'kwa Nalis Village – Implementation of Measures to Avoid and Mitigate the Potential of Prohibited Effects to Fish and Fish Habitat.
[5]B.C. Ministry of Environment and Climate Change, 2021. Water Quality- Ambient water Quality Guidelines (Criteria) for Turbidity, Suspended and Benthic Sediments. https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/water-quality-guidelines/approved-wqgs/bc_env_turbidity_waterqualityguideline_overview.pdf (Accessed November 26, 2023)

Disposal methodology as outlined in week 1 was continued throughout week 2, and should be followed for the remainder of the project[6]. It is noted that any non-natural debris removed during dredging must not be disposed of at sea.

Minimal dredging occurred during week 2 due to issues with machinery and extremely fast, low tides in the afternoons and evenings. On November 23rd, 2023, dredging was halted in the afternoon due to the bucket on the excavator on the scow barge requiring welding repair. Additionally, the upstream and downstream turbidity measurements were not taken on November 23rd due to safety concerns communicated by JJM to the EM and NHC engineer; it was anticipated that the tide would potentially drop low enough to prevent safe return to camp that evening. Therefore, the turbidity measurements upstream and downstream of the barge were not completed on November 23rd. It was agreed that the afternoon turbidity measurements should be taken earlier in the afternoon during the rest of the week to accommodate for increasingly lower tides throughout the week. On November 24th no dredging occurred at all due to continued issues with the excavator; as no dredging occurred, turbidity measurements were not taken on this day. On November 25th a small amount of dredging was conducted within the downstream extent of the DMMU using the crane located on the main barge, and the excavator was repaired in the evening. Additionally, a small gap was observed between the two sections of the split-hull/hopper barge at the end of day on November 25th. Use of the split-hull barge was paused to allow inspection and required welding repair and alterations, which were completed on November 26th. With the exception of the afternoon of November 23rd and the day of November 24th, turbidity monitoring was conducted as normal throughout the remainder of week 2.

It should be noted that no marine mammals or fish were observed in proximity of the work site, and no European green crabs (*Carcinus maenas*) were observed during work or in the dredged substrate.

Hazardous Debris Trimming

Trimming of hazardous woody debris commenced on November 21st, 2023. As a consequence of heavy rain and temperatures above freezing in week 1 and early in week 2, runoff into the Kingcome river resulted in elevated turbidity that restricted visibility within the river. As such, it has been challenging to identify new hazardous debris or identify the location of any salmon redds throughout debris trimming works. As it was not possible to identify potential salmonid spawning areas, in week 1 it was communicated to the Fraser Burrard Diving Ltd. crew that minimal

[6] Pacificus, 2023. Dredging and Hazardous Debris Removal in the Gwa'yi (Kingcome) River Weekly Environmental Monitoring Report (November 17th – November 20th, 2023).

repositioning and anchoring of the dive boat will be required until visibility within the river improves. The EM was present on November 21st for the first trimming events and ensured the divers were not cutting into the substrate to remove debris, and that the anchoring methods were not likely to cause damage to fish spawning habitat. The dive boat was observed operating with two anchors attached to polypropylene rope, not spuds, and the dive crew was advised not to drag the anchors during works. Large woody debris was observed cut in 2.0 m or less pieces during dive crew monitoring on November 26th. On the evening of November 26th, the dive crew surveyed the debris trimming work area at low tide and attached buoys to logs that were difficult to see at high tide in order to expediate debris trimming works moving forward.

Upcoming Planned Work

During the third week of planned work, dredging and disposal will continue as established during week 1 and 2. Turbidity monitoring will continue to be conducted daily by the EM. The trimming of hazardous woody debris will continue as established in week 2 and the EM will continue to monitor debris removal works 2-3 times a week. The dive crew successfully located and marked a substantial amount of the large woody debris (LWD) intended for removal with buoys on November 26th at low tide, so it is expected that they will be producing a higher daily volume of removed LWD moving forward. Any alterations to proposed works must be approved by the on-site ministry representative from NHC and the EM from Pacificus prior to proceeding.

Appendix 1 – Site Photos

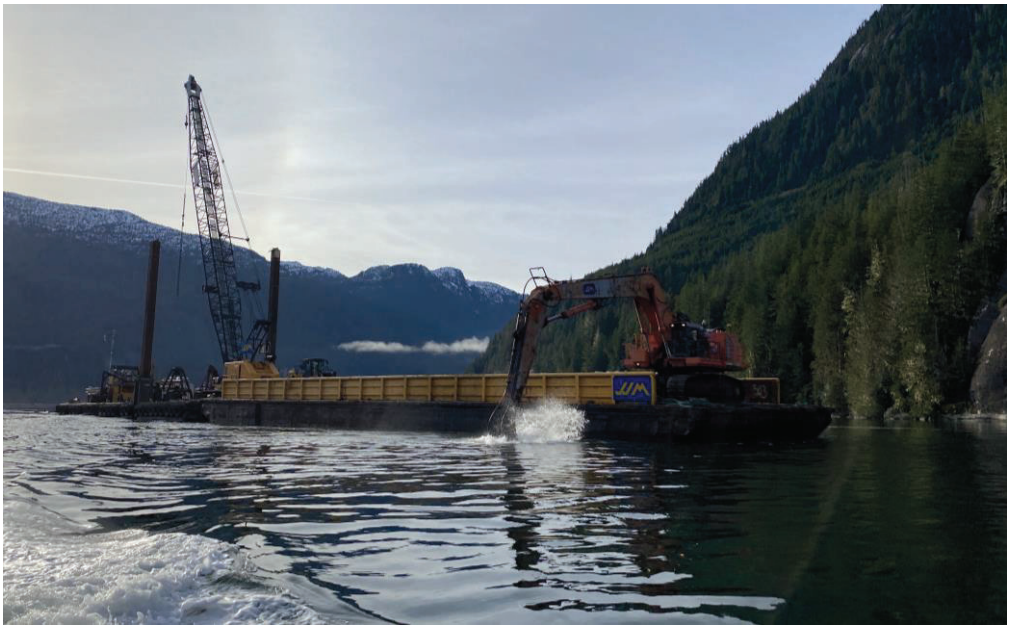


Photo 1. Photo showing dredging with an excavator in the lower downstream extent of the Dredge Material Management Unit.



Photo 2. Photo showing a drip tray beneath the crane on the main work barge.



Photo 3. Photo showing the dive crew at work removing hazardous woody debris.



Photo 4. Photo showing a piece of removed woody debris.

Dredging and Hazardous Debris Removal in the Gwa'yi (Kingcome) River

Weekly Environmental Monitoring Report

(December 4th – December 10th, 2023)



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Dredging and Hazardous Debris Removal in the Gwa'yi (Kingcome) River Weekly Environmental Monitoring Report

(December 4th – December 10th, 2023)

Prepared for

Dzawada'enuxw First Nations

and

Ministry of Environment and Climate Change Strategy - Flood Degree Management Secretariat

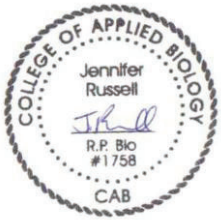
and

Northwest Hydraulic Consultants Ltd.

Written by:

Brittany Blanchard, BBRM.

Reviewed by:



Jennifer Russell, RPBio

Report Reviewer

Date:

December 12th, 2023

PACIFICUS

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Weekly Summary

1. This weekly summary regards the fourth week of completed work. Environmental Monitoring (EM) duties were completed by Celeste Landon, BSc., and Brittany Blanchard, BBRM., of Pacificus Biological Services Ltd. from December 4th to December 10th, 2023.

2. Work predominantly consisted of instream debris trimming, surveying, dredging within the pre-defined Dredge Material Management Unit and disposal of the dredgeate within the historic disposal at sea site. Dredging occurred from station 0+170m – 0+245m throughout week 4.

3. Turbidity measurements were generally taken at the start and end of each workday at the upstream, downstream and DAS monitoring locations to ensure that dredging work remained compliant with Provincial Water Quality Guidelines. This schedule was adjusted as required to account for changing tides, light levels and project demands.

4. No marine mammals or fish species were observed during dredging work.

5. Instream debris trimming continued throughout week 4 and was completed by December 10th, 2023. Selective trimming of a side channel within the estuary was also completed.

6. All machinery was observed to be clean and free of leaks. Small sheens on the surface of the ocean were observed near the Spud barge during heavy rainfall events due to residual oil, grease, and gas that had accumulated on the deck. Spill pads were deployed to reduce hydrocarbon runoff. Spill kits were identified on the barge deck, and supplemental spill materials were stored in a storage room below deck.

Project Overview

A work plan has been coordinated by the Ministry of Environment and Climate Change Strategy - Flood Debris Management Secretariat (ENV) to dredge targeted sections of the Gwa'yi (Kingcome) River Estuary to address unreliable access for Dzawada'enuxw First Nation (DFN) to U'kwa Nalis Village, with all dredgeate to be disposed of within Kingcome Inlet. Concurrent to dredging, work to trim hazardous large woody debris will be conducted in a 4.5 km reach of river downstream from U'kwa Nalis Village. Northwest Hydraulic Consultants (NHC) have been engaged by ENV to provide hydrotechnical assistance during all work phases related to sediment management and debris removal. JJM Construction Ltd. (JJM) have been selected as the contractors to conduct dredging and debris trimming, with assistance from Fraser Burrard Diving Ltd. Pacificus Biological Services Ltd. (Pacificus) have been retained to assist with environmental permitting and approval, produce a Construction Environmental Mitigation Plan (CEMP), and coordinate and oversee required Environmental Monitoring throughout works. Work is scheduled to occur during the regional Marine and Estuarine Reduced Risk Work Window between November 15th, 2023, and February 15th, 2024.

This letter provides a summary of environmental monitoring work conducted during the fourth week of the project from December 4th – December 10th, 2023, in order to ensure compliance with the CEMP, environmental permits, and to avoid causing the *death of fish or the harmful alteration, disruption, or destruction of fish habitat*. As per the Environmental Monitoring Workplan[1], Pacificus are to submit weekly Environmental Monitoring (EM) reports for the duration of the project. All EM duties were completed by Celeste Landon, BSc., and Brittany Blanchard, BBRM., of Pacificus.

As a new representative from DFN was on-site during the fourth week of the project, a safety and project review meeting was held between the JJM work crew, Sam Xie of NHC, and Celeste Landon of Pacificus to ensure all staff were familiar with proposed works. Requirements of environmental permits were reiterated to the crew at this time. It was confirmed that all machinery remained in good working condition and was clean and free of leaks.

Meteorological and Hydrometric Conditions

Weather conditions during the fourth week of work consisted of periods of heavy rainfall, overcast conditions, and periods with sun and clear skies. Consequently, water levels in the Kingcome

[1] Pacificus, 2023. Environmental Monitoring Workplan during Proposed Dredging and Debris Trimming in the Kingcome River and Estuary.

River increased significantly throughout the beginning of the week due to the heavy rainfall event on December 4th, with the strongest flows occurring in the morning of December 5th, 2023[2].

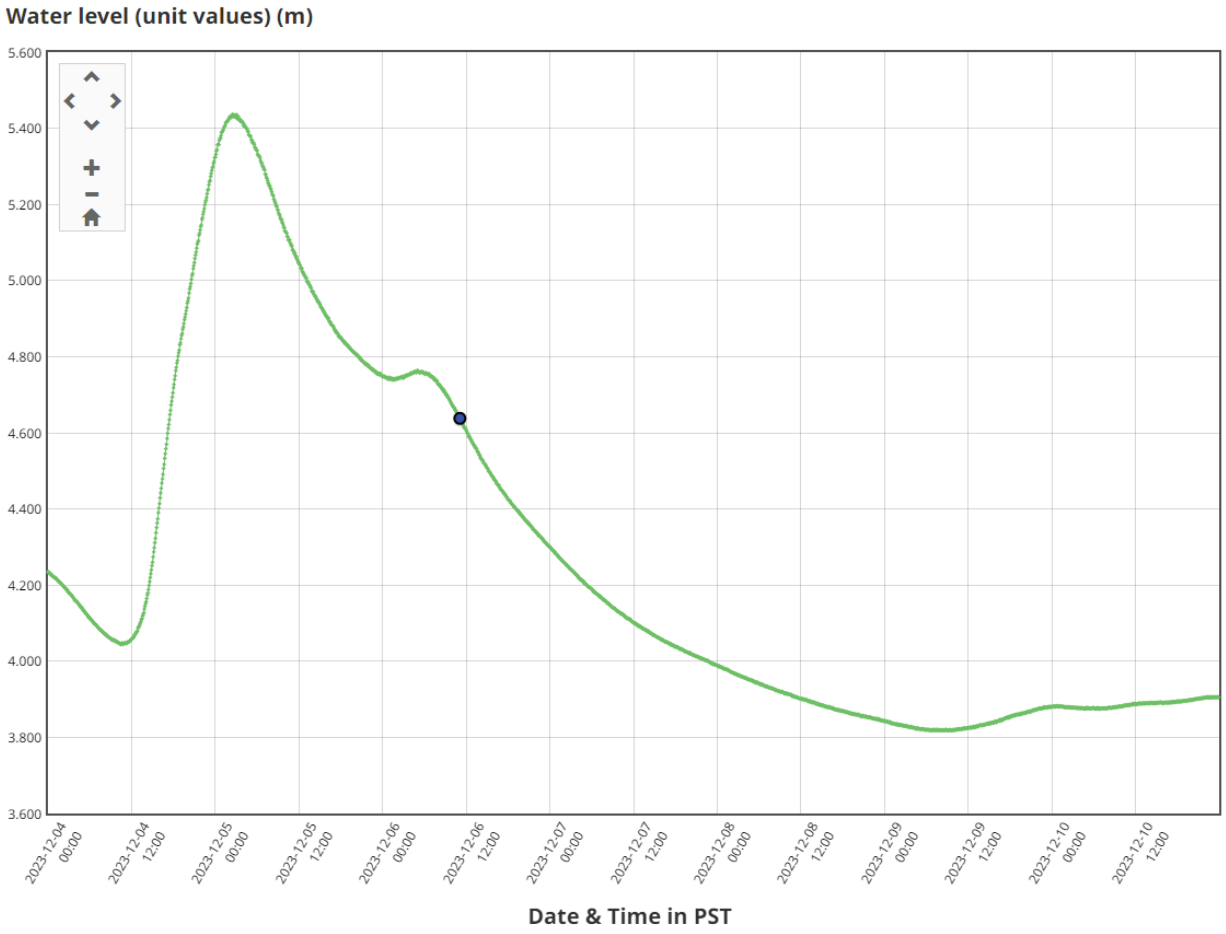


Figure 1. Figure showing water levels in the Kingcome River below Atlatzi River throughout week 4 of dredging work in the Kingcome Estuary.[2]

[2] Government of Canada, 2023. Real-Time Hydrometric Data Graph for Kingcome River Below Atlatzi River. https://wateroffice.ec.gc.ca/report/real_time_e.html?stn=08GF009&mode=Graph&startDate=2023-11-20&endDate=2023-11-26&prm1=46&y1Max=&y1Min=&prm2=-1&y2Max=&y2Min= (Accessed December 3, 2023).

Dredging and Dredgeate Disposal

Works during week 4 predominantly consisted of woody debris removal, bathymetric surveying, machinery repair, dredging within the Dredge Material Management Unit (DMMU)[3] and dredgeate disposal within the boundary of the historic disposal at sea site in Kingcome Inlet. General EM requirements and recommendations are outlined within the CEMP and the Avoid and Mitigate Letter provided by Fisheries and Oceans Canada (DFO) following a Request for Review[4].

Prior to the start of dredging and material disposal each day, turbidity monitoring was conducted approximately 50 m upstream and downstream of the active dredge area, and within the disposal area. This was to establish background turbidity levels throughout works and to ensure that turbidity did not exceed Provincial Ambient Water Quality Guidelines (Table 1)[5]. Turbidity monitoring was conducted using a LaMotte turbidity meter. All turbidity data collected during week 4 is appended to this report (Appendix 1).

Table 1. BC Ambient Water Quality Guidelines for Turbidity and Total Suspended Solids.

Water Use	Turbidity	Non-Filterable Residue (Total Suspended Solids)
Aquatic Life (fresh, marine, estuarine)	Change from background of 8 NTU at any one time for a duration of 24 h in all waters during clear flows or in clear waters	Change from background of 25 mg/L at any one time for a duration of 24 h in all waters during clear flows or in clear waters
	Change from background of 2 NTU at any one time for a duration of 30 d in all waters during clear flows or in clear waters	Change from background of 5 mg/L at any one time for a duration of 30 d in all waters during clear flows or in clear waters
Aquatic Life (fresh, marine, estuarine)	Change from background of 5 NTU at any time when background is 8 - 50 NTU during high flows or in turbid waters	Change from background of 10 mg/L at any time when background is 25 - 100 mg/L during high flows or in turbid waters
	Change from background of 10% when background is >50 NTU at any time during high flows or in turbid waters	Change from background of 10% when background is >100 mg/L at any time during high flows or in turbid waters

Disposal methodology as outlined in week 1 continued throughout subsequent weeks and should be followed for the remainder of the project[6]. Dredgeate disposal also includes a transfer of the split-hull barge between two tugboats. When the split-hull barge is fully loaded with dredgeate, a

[3] Pacificus, 2023. Kingcome Emergency Debris and Sediment Management Project Sampling and Analysis Plan for Disposal at Sea in Kingcome Inlet.
[4] Fisheries and Oceans Canada, 2023. Dredging, Kingcome River, U'kwa Nalis Village – Implementation of Measures to Avoid and Mitigate the Potential of Prohibited Effects to Fish and Fish Habitat.
[5] B.C. Ministry of Environment and Climate Change, 2021. Water Quality- Ambient water Quality Guidelines (Criteria) for Turbidity, Suspended and Benthic Sediments. https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/water-quality-guidelines/approved-wqgs/bc_env_turbidity_waterqualityguideline_overview.pdf (Accessed December 3, 2023)

[6] Pacificus, 2023. Dredging and Hazardous Debris Removal in the Gwa'yi (Kingcome) River Weekly Environmental Monitoring Report (November 17th – November 20th, 2023).

small tugboat must transport the load away from the dredge site to a larger tugboat approximately 100m away from the barge due to the shallow water depths at the dredge site (Photo 1). This process is required to ensure the larger tugboat does not ground when pulling the loaded split-hull barge away from the dredge site, and to minimize propeller wash in shallow waters. The large tugboat then transports material to the disposal site.

Dredging progressed as planned during week 4. On December 4th, a sheen was observed astern of the barge on the portside. It was determined that due to the heavy rainfall, water began pooling on the deck of the barge and captured residual fuel, grease, or oil, which began to flow from the deck into the marine environment. Spill pads and spill socks were deployed to capture pollutants and worked effectively to mitigate the issue (Photo 2). No spill source within the vicinity of the dredge site was found and the EM monitored the perimeter of the barge to ensure it was isolated to the barge deck. It was reiterated to the JJM crew to notify the EM immediately if any substantial sheen is observed in the vicinity of the work site moving forward. Spill response and reporting was reviewed in the toolbox meetings moving forward. On December 5th, the EM observed the waters' surface surrounding the barge to be free of any sheen, proving the measures to mitigate the contaminated runoff to be effective.

From December 4th to the morning of December 7th, dredging proceeded without issue. As no dredging occurred in the morning of December 6th; turbidity monitoring was not conducted. In the afternoon on December 7th, a pinhole leak on the arm of the excavator dredging from the scow barge was discovered, resulting in a minor spill. Fortunately, the pinhole blew while the arm of the excavator was beside the barge, allowing the operator to ground the bucket on the barge, containing most of the spill. A spill boom was deployed, and the crew worked to contain and clean the spill. The spill was reported to the EM on December 10th Brittany Blanchard returned to site, and the volume of hydrocarbon that entered the water was estimated at 0.5 L. The spill has been reported to the Provincial spill reporting portal by Pacificus. As the excavator on the scow barge was no longer operational, the crane on the spud barge was utilized for dredging until the replacement parts arrive on site.

By December 10th, 2023, dredging had progressed to station 0+245m (Figure 1). Turbidity monitoring was not conducted on December 8th, December 9th, or the morning of December 10th. No exceedances above background levels were noted throughout the week. The EM monitored multiple disposals of the dredgeate and the material continued to descend quickly into the water column as observed in previous weeks causing no significant sediment plumes.

No marine mammals or fish were observed in proximity of the work site, and no European green crabs (*Carcinus maenas*) were observed during work or in the dredged substrate. JJM has also been notified that any non-natural debris removed during dredging must not be disposed of at sea.

Hazardous Debris Trimming

Trimming of hazardous woody debris commenced on November 21st, 2023, and continued throughout week 2, 3, and 4 with increased progress made during weeks 3 and 4 due to better weather conditions. By December 4th, the dive crew had mostly completed all the required trimming work in the main channel. Due to the quicker than anticipated completion of trimming in the main channel, the EM and Sam Xie (NHC) inspected the previously surveyed side channel in the downstream portion of the river to determine if additional selective trimming was required and feasible according to the conditions of environmental permits.

The EM observed the selective trimming of a side channel on December 5th and 6th to ensure the divers were not cutting into the substrate to remove debris, and that potential fish habitat, including a root ball, remained undisturbed and in place. Trimming of submerged LWD within the navigation channel occurred during low ride, ensuring that root wads and branches remained intact. The divers communicated to the EM that they were minimizing the repositioning of their anchor by tying their boat off to a piece of large woody debris (LWD) or anchoring upstream of their debris removal sites and then releasing polypropylene rope from the tie-off point to get to the sites downstream. This reduced the overall repositioning of their boat at each debris removal site. Spuds were not used to anchor and will not be required for anchoring throughout the duration of the debris removal works.

On December 6th, total cuts to date recorded were 1855, from November 21st to December 6th. It was noted that a tree had fallen instream on December 4th so the dive team added this tree to their workload (Photo 3). On December 10th, the dive team successfully completed all hazardous debris trimming works and left camp on December 11th. No issues were noted throughout week 4.

Upcoming Planned Work

During the fifth week of planned work, dredging and disposal will continue as established during week 1 to 4. Turbidity monitoring will continue to be conducted daily by the EM. As the trimming of hazardous woody debris is complete, no further monitoring will be required. Any alterations to proposed works must be approved by the on-site ministry representative from NHC and the EM from Pacificus prior to proceeding.

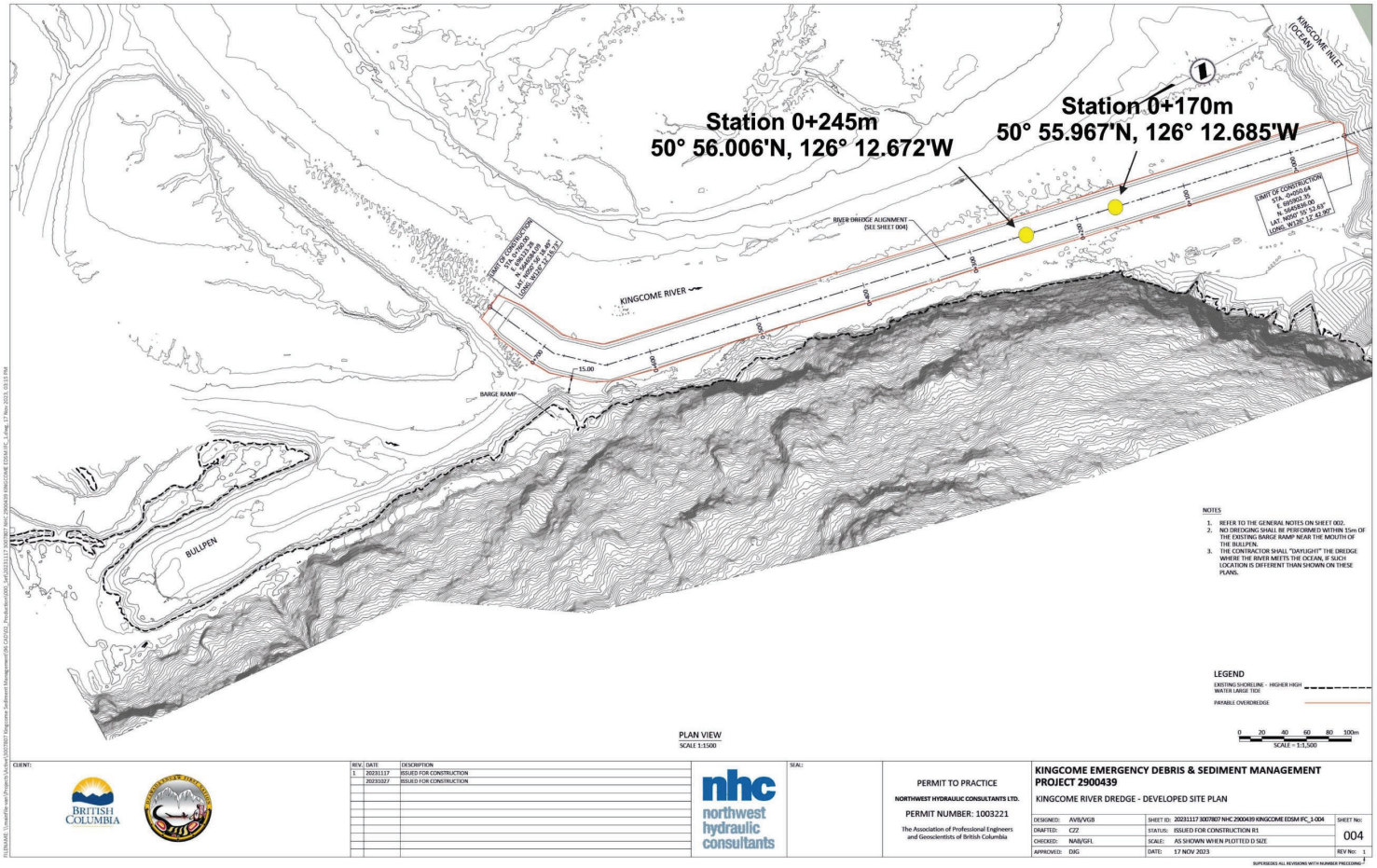


Figure 1. Engineering drawing showing the approximate location of Station 0+245m where dredging had progressed to by the end of week 4. Drawing shows station numbers within the DMMU for the Kingcome Emergency Debris & Sediment Management Project. Engineering drawing produced by Northwest Hydraulic Consultants and edited by Pacificus Biological Services Ltd.

Appendix 1 – Site Photos



Photo 1. Photo showing the two tugboats used to transport the dredgeate in the split-hull barge to the disposal site.

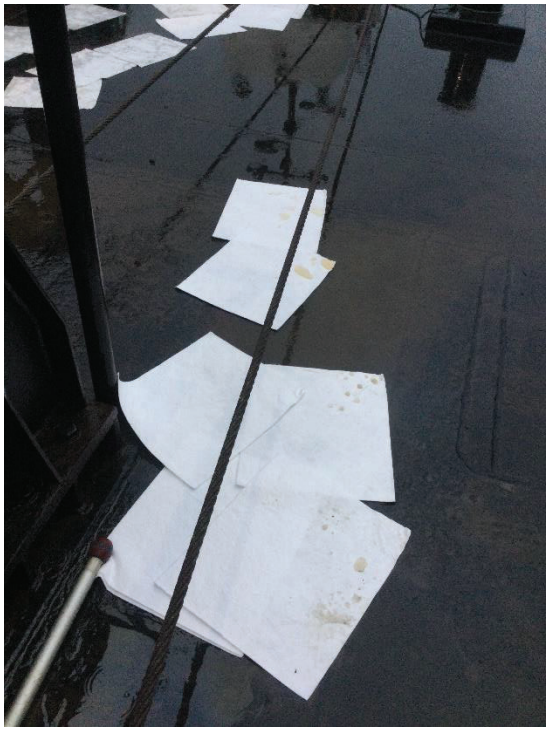


Photo 2. Photo showing the spill pads and socks deployed to capture pollutants prior to flowing from the barge into the marine environment during periods of heavy rainfall.

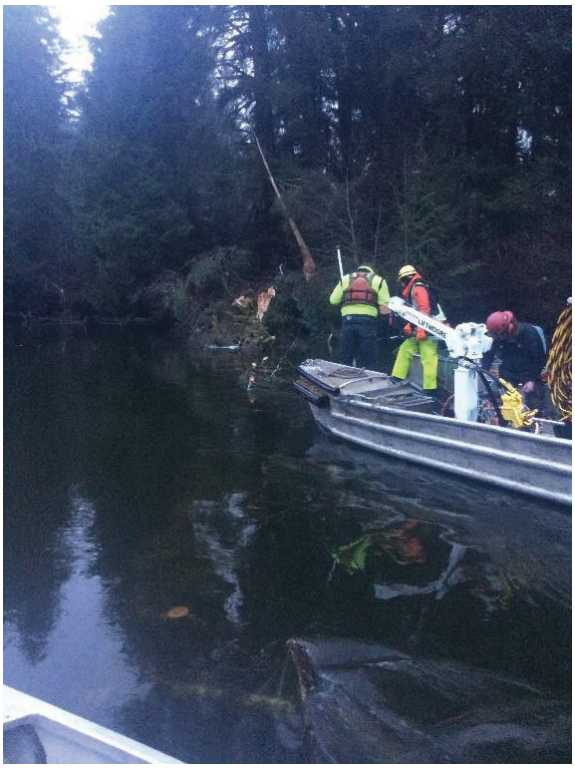


Photo 3. Photo showing the dive team trimming the hazardous tree that fell instream within the navigation channel of the debris trimming area on December 4th, 2023.

Appendix 2 – Turbidity Monitoring Data

Kingcome Turbidity Daily Monitoring

Date	Site	Time	Turbidity (NTU)
04/12/2023	U/S	7:54	1.82
04/12/2023	D/S	7:46	1.57
04/12/2023	DAS	7:37	0.00
04/12/2023	U/S	16:05	2.20
04/12/2023	D/S	16:00	0.93
04/12/2023	DAS	15:50	0.00
05/12/2023	U/S	7:50	6.56
05/12/2023	D/S	7:45	4.20
05/12/2023	DAS	7:35	3.17
05/12/2023	U/S	15:45	3.21
05/12/2023	D/S	15:50	4.07
05/12/2023	DAS	15:35	3.94
06/12/2023	U/S	7:50	2.25
06/12/2023	D/S	7:45	1.45
06/12/2023	DAS	7:35	2.05
06/12/2023	U/S	16:35	1.98
06/12/2023	D/S	16:30	2.10
06/12/2023	DAS	16:25	2.33
07/12/2023	U/S	7:55	1.04
07/12/2023	D/S	7:45	0.39
07/12/2023	DAS	7:35	0.00
07/12/2023	U/S	-	No data
07/12/2023	D/S	-	No data
07/12/2023	DAS	-	No data
08/12/2023	U/S	-	No data
08/12/2023	D/S	-	No data
08/12/2023	DAS	-	No data
08/12/2023	U/S	-	No data
08/12/2023	D/S	-	No data
08/12/2023	DAS	-	No data
09/12/2023	U/S	-	No data
09/12/2023	D/S	-	No data
09/12/2023	DAS	-	No data
09/12/2023	U/S	-	No data
09/12/2023	D/S	-	No data
09/12/2023	DAS	-	No data
10/12/2023	U/S	-	No data
10/12/2023	D/S	-	No data
10/12/2023	DAS	-	No data
10/12/2023	U/S	14:52	0.00
10/12/2023	D/S	14:49	4.45
10/12/2023	DAS	14:45	1.68

*DAS - Disposal at Sea Site, D/S - Downstream of Dredge Barge, U/S – Upstream of Dredge Barge

Dredging and Hazardous Debris Removal in the Gwa'yi (Kingcome) River

Weekly Environmental Monitoring Report

(December 11th – December 17th, 2023)



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Dredging and Hazardous Debris Removal in the Gwa'yi (Kingcome) River Weekly Environmental Monitoring Report

(December 11th – December 17th, 2023)

Prepared for

Dzawada'enuxw First Nations

and

Ministry of Environment and Climate Change Strategy - Flood Degree Management Secretariat

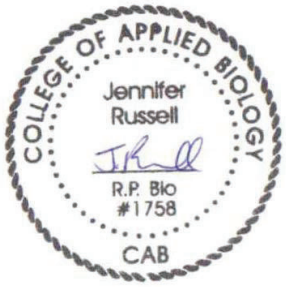
and

Northwest Hydraulic Consultants Ltd.

Written by:

Heather Gough, BEM

Reviewed by:



Jennifer Russell, RPBio

Date:

December 19th, 2023

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Weekly Summary

1. This weekly summary regards the fifth week of completed work. Environmental Monitoring (EM) duties were completed by Brittany Blanchard, BBRM, and Heather Gough, BEM, of Pacificus Biological Services Ltd. from December 11th to December 17th, 2023.

2. Work predominantly consisted of instream dredging within the pre-defined Dredge Material Management Unit and disposal of the dredgeate within the historic disposal at sea (DAS) site. Dredging occurred from station 0+245m – 0+360m throughout week 5.

3. Turbidity measurements were generally taken at the start and end of each workday at the upstream, downstream, and DAS monitoring locations to ensure that dredging work remained compliant with Provincial Water Quality Guidelines. This schedule was adjusted as required to account for changing tides, light levels, and project demands.

4. A pod of orcas (*Orcinus orca)* with a large pod of Pacific white-sided dolphins (*Lagenorhynchus obliquidens*) were sighted on December 17th. Dredging and disposal works were paused until the marine mammals were no longer within view.

5. All machinery was observed to be clean and free of leaks. Small sheens on the surface of Spud barge were observed during a heavy rainfall event. Spill pads and booms were deployed to reduce hydrocarbon runoff. Spill kits were identified on the barge deck, and supplemental spill materials were stored in a storage room below the deck.

Project Overview

A work plan has been coordinated by the Ministry of Environment and Climate Change Strategy - Flood Debris Management Secretariat (ENV) to dredge targeted sections of the Gwa'yi (Kingcome) River Estuary to address unreliable access for Dzawada'enuxw First Nation (DFN) to U'kwa Nalis Village, with all dredgeate to be disposed of within Kingcome Inlet. Concurrent to dredging, work to trim hazardous large woody debris has been conducted in a 4.5 km reach of river downstream from U'kwa Nalis Village. Northwest Hydraulic Consultants (NHC) have been engaged by ENV to provide hydrotechnical assistance during all work phases related to sediment management and debris removal. JJM Construction Ltd. (JJM) have been selected as the contractors to conduct dredging and debris trimming, with assistance from Fraser Burrard Diving Ltd. Pacificus Biological Services Ltd. (Pacificus) have been retained to assist with environmental permitting and approval, produce a Construction Environmental Mitigation Plan (CEMP), and coordinate and oversee required Environmental Monitoring throughout works. Work is scheduled to occur during the regional Marine and Estuarine Reduced Risk Work Window between November 15th, 2023, and February 15th, 2024.

This letter provides a summary of environmental monitoring work conducted during the fifth week of the project from December 11th – December 17th, 2023, in order to ensure compliance with the CEMP, and environmental permits, and to avoid causing the *death of fish or the harmful alteration, disruption, or destruction of fish habitat*. As per the Environmental Monitoring Workplan[1], Pacificus is to submit weekly Environmental Monitoring (EM) reports for the duration of the project. All EM duties were completed by Brittany Blanchard, BBRM., and Heather Gough, BEM, of Pacificus.

Meteorological and Hydrometric Conditions

Weather conditions during the fifth week of work consisted of periods of overcast conditions, heavy rainfall, and periods with sun and clear skies. Consequently, water levels in the Kingcome River increased significantly near the end of the week due to the heavy rainfall event on December 15th.

[1] Pacificus, 2023. Environmental Monitoring Workplan during Proposed Dredging and Debris Trimming in the Kingcome River and Estuary.

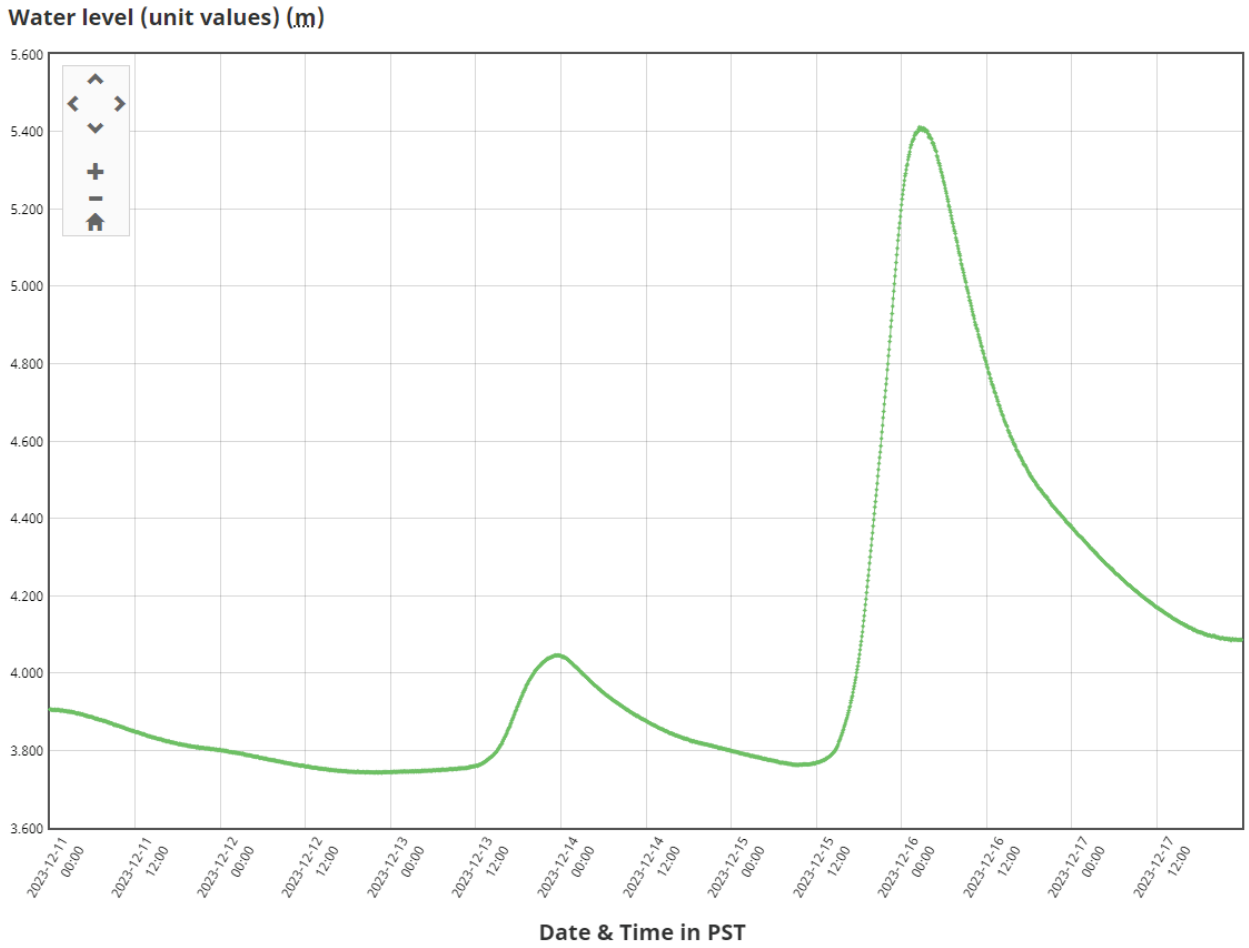


Figure 1. Water levels in the Kingcome River below Atlatzi River throughout the fifth week of dredging work in the Kingcome Estuary[2].

[2] Government of Canada, 2023. Real-Time Hydrometric Data Graph for Kingcome River Below Atlatzi River. Real-Time Hydrometric Data Graph for KINGCOME RIVER BELOW ATLATZI RIVER (08GF009) [BC] - Water Level and Flow - Environment Canada (ec.gc.ca) (Accessed December 18, 2023).

Dredging and Dredgeate Disposal

Works during week five predominantly consisted of dredging within the Dredge Material Management Unit (DMMU)[3] , dredgeate disposal within the boundary of the historic disposal at sea site in Kingcome Inlet, and machinery repair. General EM requirements and recommendations are outlined within the CEMP and the Avoid and Mitigate Letter provided by Fisheries and Oceans Canada (DFO) following a Request for Review[4].

Prior to the start of dredging and material disposal each day, turbidity monitoring was conducted approximately 50 m upstream and downstream of the active dredge area, and within the disposal area. This was to establish background turbidity levels throughout the works. Turbidity monitoring was conducted at the same sites near the end of the day to measure any turbidity generated by the works and to ensure that turbidity did not exceed Provincial Ambient Water Quality Guidelines (Table 1)[5]. Turbidity monitoring was conducted using a LaMotte turbidity meter. Turbidity monitoring was not conducted on the evening of December 12th, as no dredging took place that afternoon. All turbidity data collected during the week is appended to this report (Appendix 2). It was noted by Brittany Blanchard on December 13th that the LaMotte meter being utilized had become faulty and non-operational. Consequently, water samples from the afternoon of December 13th until the morning of December 15th were collected and transported back to the Pacificus Campbell River office to be analyzed with an alternative meter. Heather Gough brought a new meter into the field on December 15th for future use. No persistent turbidity issues were observed by either Brittany Blanchard or Heather Gough, and no turbidity exceedances above background levels were noted throughout the week

[3] Pacificus, 2023. Kingcome Emergency Debris and Sediment Management Project Sampling and Analysis Plan for Disposal at Sea in Kingcome Inlet.
[4] Fisheries and Oceans Canada, 2023. Dredging, Kingcome River, U'kwa Nalis Village – Implementation of Measures to Avoid and Mitigate the Potential of Prohibited Effects to Fish and Fish Habitat.
[5]B.C. Ministry of Environment and Climate Change, 2021. Water Quality- Ambient water Quality Guidelines (Criteria) for Turbidity, Suspended and Benthic Sediments. https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/water-quality-guidelines/approved-wqgs/bc_env_turbidity_waterqualityguideline_overview.pdf (Accessed December 18, 2023)

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Water Use	Turbidity	Non-Filterable Residue (Total Suspended Solids)
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Aquatic Life (fresh, marine, estuarine)	Change from background of 5 NTU at any time when background is 8 - 50 NTU during high flows or in turbid waters	Change from background of 10 mg/L at any time when background is 25 - 100 mg/L during high flows or in turbid waters
	Change from background of 10% when background is >50 NTU at any time during high flows or in turbid waters	Change from background of 10% when background is >100 mg/L at any time during high flows or in turbid waters

The excavator on the scow barge was not operational from December 8th to 12th, as such, the crane on the spud barge was used for dredging over these five days (Photo 1). Also, the bathymetric surveys were not conducted this week as the sounder was broken. It was confirmed that all machinery in use remained in good working condition and was clean and free of leaks.

An accidental disposal of dredgeate outside of the DAS site occurred on December 13th. Approximately 150m^3 of dredgeate was deposited approximately 90m north of the site (50°55.123'N, 126°13.000'W). As the accidental disposal was relatively close to the DAS site, the sea floor slopes toward the DAS site, and the dredgeate is not known to contain contaminants, it is unlikely that this single occurrence resulted in negative environmental consequences. Dredging and dredgeate disposal proceeded without other issues throughout the week (Photos 2 & 3). By December 17th, dredging had progressed to station 0+360m (Figure 1).

The disposal methodology from previous weeks continued throughout the week (Photo 4). The EM monitored multiple disposals of the dredgeate and the material continued to descend quickly into the water column as observed in previous weeks causing no significant sediment plumes.

On December 15th, there was a sheen observed on the deck of the spud barge. This occurred during a heavy rainfall event due to residual oil, grease, and gas that had accumulated on the deck. Spill pads and booms were placed on and around the sheen as containment. No sheen observed within the aquatic environment indicating that the efforts were successful.

On December 17th, a pod of orcas (*Orcinus orca)* and a large pod of pacific white-sided dolphins (*Lagenorhynchus obliquidens*) were observed along the southern shore of Kingcome Inlet (Photo 5). Upon sighting the marine mammals, the crew paused work. Works resumed after the

mammals were no longer within view. There were no European green crabs (*Carcinus maenas*) observed during work or in the dredged substrate.

Hazardous Debris Trimming

The hazardous woody debris trimming was completed before the commencement of this reporting period.

Upcoming Planned Work

During the sixth week of planned work, dredging and disposal will continue until Wednesday, December 20th. Over the following two days, the JJM crew will be shutting down the equipment for the holidays. Their return to work is scheduled for January 2nd, 2024. Turbidity monitoring will continue to be conducted daily by the EM while the dredging and disposal of material is taking place. Any alterations to proposed works must be approved by the on-site ministry representative from NHC and the EM from Pacificus prior to proceeding.

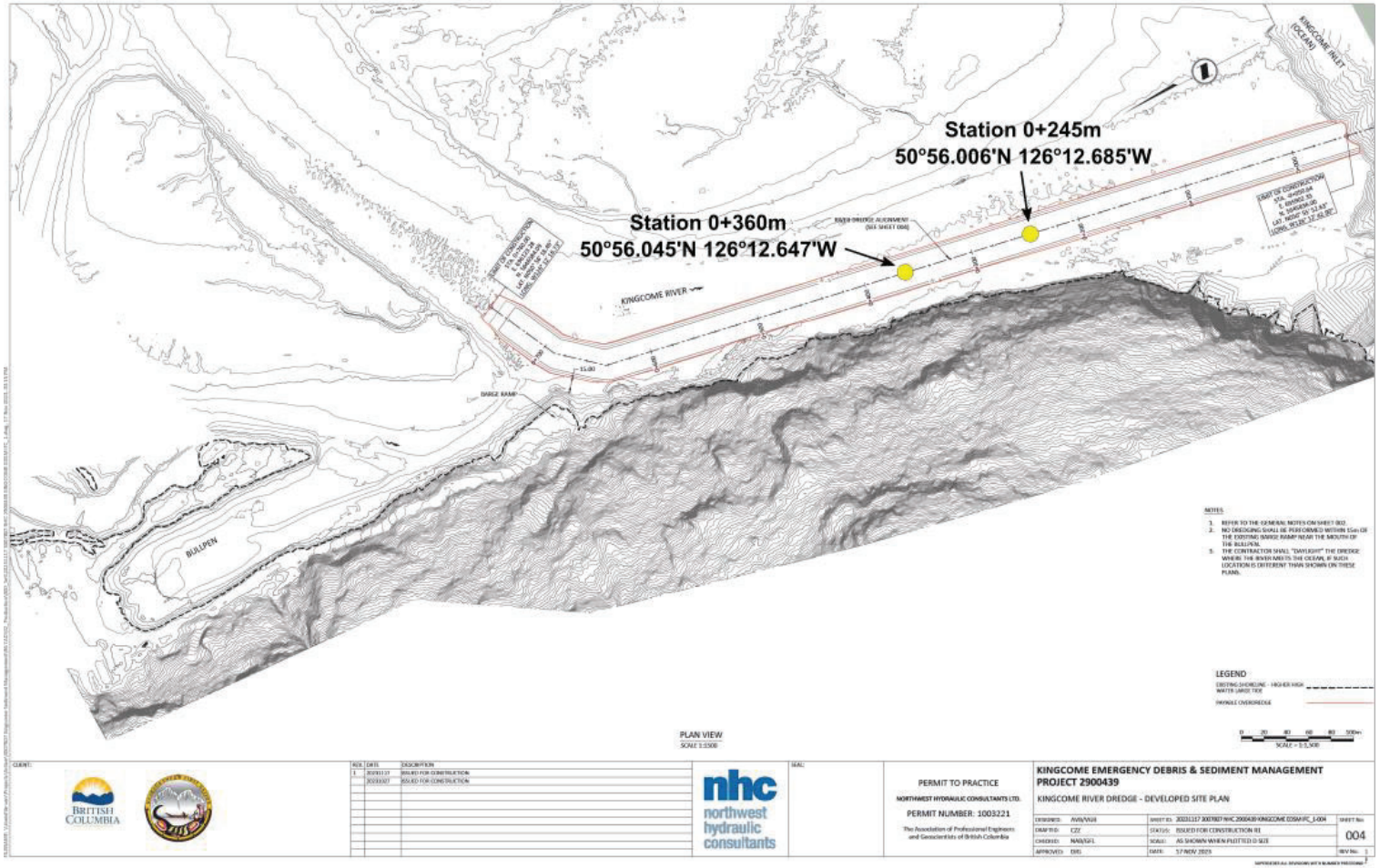


Figure 1. Engineering drawing showing the approximate location of Station 0+360m where dredging had progressed to by the end of week 5. Drawing shows station numbers within the DMMU for the Kingcome Emergency Debris & Sediment Management Project. Engineering drawing produced by Northwest Hydraulic Consultants and edited by Pacificus Biological Services Ltd.

Appendix 1 – Site Photos



Photo 1. The JJM Manitowoc 4000 crane dredging on December 12th, 2023.



Photo 2. The barges and boats at the dredging station on December 16th, 2023.

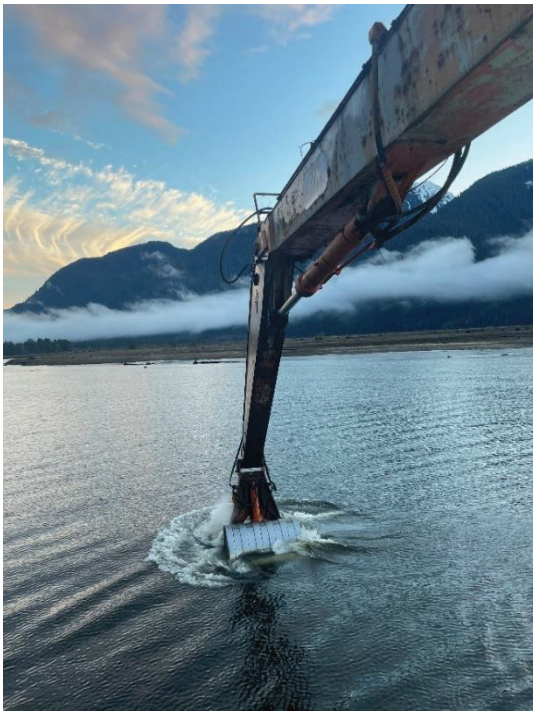


Photo 3. The JJM 1200 excavator dredging on December 17th, 2023.

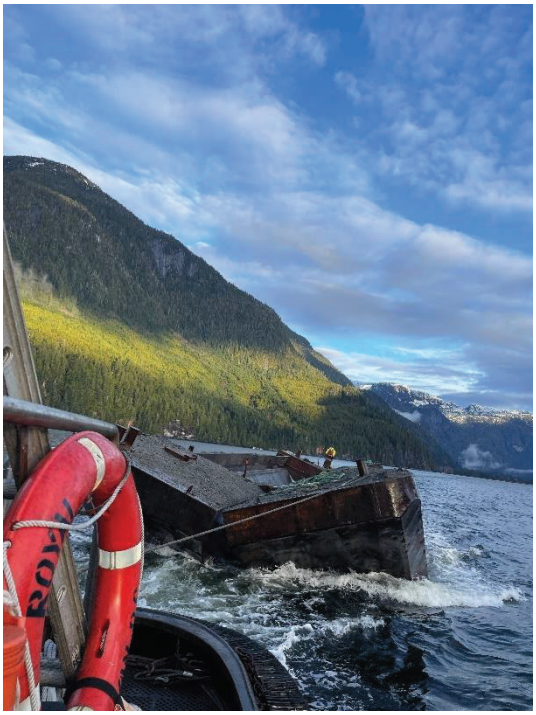


Photo 4. The split barge disposing of dredgeate within the DAS site on December 17th, 2023.



Photo 5. An orca (*Orcinus orca*) sighted near the southern shoreline of Kingcome Inlet on December 17th, 2023. This photo was taken by Mitch Brown of JJM.

Appendix 2 – Turbidity Monitoring Data

Kingcome Turbidity Daily Monitoring			
Date	Site	Time	Turbidity (NTU)
2023-11-12	U/S	7:00	0.00
2023-11-12	D/S	7:05	0.00
2023-11-12	DAS	7:10	13.28
2023-11-12	U/S	16:00	0.00
2023-11-12	D/S	16:05	1.38
2023-11-12	DAS	16:10	0.00
2023-12-12	U/S	7:00	0.00
2023-12-12	D/S	7:05	0.00
2023-12-12	DAS	7:10	0.00
2023-12-12	U/S	-	no data
2023-12-12	D/S	-	no data
2023-12-12	DAS	-	no data
2023-13-12	U/S	7:00	0.00
2023-13-12	D/S	7:05	0.00
2023-13-12	DAS	7:10	0.00
2023-13-12	U/S	15:45	1.29
2023-13-12	D/S	15:50	1.01
2023-13-12	DAS	16:00	0.00
2023-14-12	U/S	7:30	0.46
2023-14-12	D/S	7:35	0.00
2023-14-12	DAS	7:40	0.00
2023-14-12	U/S	16:45	0.00
2023-14-12	D/S	16:50	0.00
2023-14-12	DAS	16:55	0.00
2023-15-12	U/S	7:00	0.00
2023-15-12	D/S	7:05	0.00
2023-15-12	DAS	7:20	0.00
2023-15-12	U/S	16:15	0.90
2023-15-12	D/S	16:10	1.11
2023-15-12	DAS	16:30	0.56
2023-16-12	U/S	7:20	1.58
2023-16-12	D/S	7:25	1.90
2023-16-12	DAS	7:35	1.07
2023-16-12	U/S	16:40	1.19
2023-16-12	D/S	16:30	1.15
2023-16-12	DAS	16:15	1.19
2023-17-12	U/S	7:00	0.96
2023-17-12	D/S	7:05	0.86
2023-17-12	DAS	7:10	0.75
2023-17-12	U/S	16:40	0.87
2023-17-12	D/S	16:35	0.88
2023-17-12	DAS	16:25	0.45

*DAS - Disposal at Sea Site, D/S - Downstream of Dredge Barge, U/S – Upstream of Dredge Barge

Appendix 2 – Turbidity Monitoring Data

Kingcome Turbidity Daily Monitoring

Date	Site	Time	Turbidity (NTU)
20/11/2023	U/S	6:40	4.91
20/11/2023	D/S	6:40	3.01
20/11/2023	DAS	6:40	0.51
20/11/2023	U/S	16:30	9.00
20/11/2023	D/S	16:30	5.84
20/11/2023	DAS	16:30	0.87
21/11/2023	U/S	7:30	3.41
21/11/2023	D/S	7:30	3.15
21/11/2023	DAS	7:30	3.19
21/11/2023	U/S	16:45	5.08
21/11/2023	D/S	16:45	3.27
21/11/2023	DAS	16:45	1.97
22/11/2023	U/S	7:00	3.09
22/11/2023	D/S	7:00	2.96
22/11/2023	DAS	7:00	2.01
22/11/2023	U/S	17:00	4.99
22/11/2023	D/S	17:00	5.68
22/11/2023	DAS	17:00	3.65
23/11/2023	U/S	6:30	3.21
23/11/2023	D/S	6:30	3.68
23/11/2023	DAS	6:30	2.36
23/11/2023	DAS	17:15	1.82
25/11/2023	U/S	9:00	1.27
25/11/2023	D/S	9:00	1.40
25/11/2023	DAS	9:00	2.11
25/11/2023	U/S	15:45	4.62
25/11/2023	D/S	15:45	3.48
25/11/2023	DAS	15:45	1.31
26/11/2023	U/S	8:30	2.03
26/11/2023	D/S	8:30	0.96
26/11/2023	DAS	8:30	3.28
26/11/2023	U/S	1:15	2.61
26/11/2023	D/S	1:15	1.53
26/11/2023	DAS	1:15	2.26

*DAS - Disposal at Sea Site, D/S - Downstream of Dredge Barge, U/S – Upstream of Dredge Barge

Dredging and Hazardous Debris Removal in the Gwa'yi (Kingcome) River

Weekly Environmental Monitoring Report

(January 1st – January 8th, 2024)



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Dredging and Hazardous Debris Removal in the Gwa'yi (Kingcome) River Weekly Environmental Monitoring Report

(January 1st – January 8th, 2024)

Prepared for

Dzawada'enuxw First Nations

and

Ministry of Environment and Climate Change Strategy - Flood Degree Management Secretariat

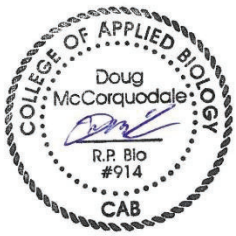
and

Northwest Hydraulic Consultants Ltd.

Written by:

Dan Lewis, RBTech IT

Reviewed by:



Doug McCorquodale, RPBio

Report Reviewer

Date:

January 9th, 2024

Amended January 10th, 2024

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Weekly Summary

1. This weekly summary regards the seventh week of completed work. Environmental Monitoring (EM) duties were completed by Dan Lewis, RBTech IT., of Pacificus Biological Services Ltd. from January 4th to January 8th, 2023.

2. Work predominantly consisted of instream dredging within the pre-defined Dredge Material Management Unit, disposal of the dredgeate within the historic disposal at sea (DAS) site, machinery repairs, and equipment remobilization following shutdown for the holidays. Dredging occurred from station 0+380m – 0+420m throughout week 7.

3. Turbidity measurements were generally taken at the start and end of each workday at the upstream, downstream, and DAS monitoring locations to ensure that dredging work remained compliant with Provincial Water Quality Guidelines. This schedule was adjusted as required to account for changing tides, light levels, and project demands.

4. No marine mammals or fish species were observed during dredging work.

5. All machinery was observed to be clean and free of leaks. Spill kits were identified on the barge deck, and supplemental spill materials were stored in a storage room below the deck.

Project Overview

A work plan has been coordinated by the Ministry of Environment and Climate Change Strategy - Flood Debris Management Secretariat (ENV) to dredge targeted sections of the Gwa'yi (Kingcome) River Estuary to address unreliable access for Dzawada'enuxw First Nation (DFN) to U'kwa Nalis Village, with all dredgeate to be disposed of within Kingcome Inlet. Concurrent to dredging, work to trim hazardous large woody debris has been conducted in a 4.5 km reach of river downstream from U'kwa Nalis Village. Northwest Hydraulic Consultants (NHC) have been engaged by ENV to provide hydrotechnical assistance during all work phases related to sediment management and debris removal. JJM Construction Ltd. (JJM) have been selected as the contractors to conduct dredging and debris trimming, with assistance from Fraser Burrard Diving Ltd. Pacificus Biological Services Ltd. (Pacificus) have been retained to assist with environmental permitting and approval, produce a Construction Environmental Mitigation Plan (CEMP), and coordinate and oversee required Environmental Monitoring throughout works. Work is scheduled to occur during the regional Marine and Estuarine Reduced Risk Work Window between November 15th, 2023, and February 15th, 2024.

This letter provides a summary of environmental monitoring work conducted during the seventh week of the project from January 1st to January 8th, 2024, in order to ensure compliance with the CEMP, and environmental permits, and to avoid causing the *death of fish or the harmful alteration, disruption, or destruction of fish habitat*. As per the Environmental Monitoring Workplan[1], Pacificus is to submit weekly Environmental Monitoring (EM) reports for the duration of the project. All EM duties were completed by Dan Lewis, RBTech IT., of Pacificus.

Meteorological and Hydrometric Conditions

Weather conditions during the seventh week of work consisted of periods of overcast conditions, periodic rainfall, and the consistent lowering of temperatures towards freezing levels. Consequently, water levels in the Kingcome River began to decrease starting on January 3rd and through January 8th.

[1] Pacificus, 2023. Environmental Monitoring Workplan during Proposed Dredging and Debris Trimming in the Kingcome River and Estuary.

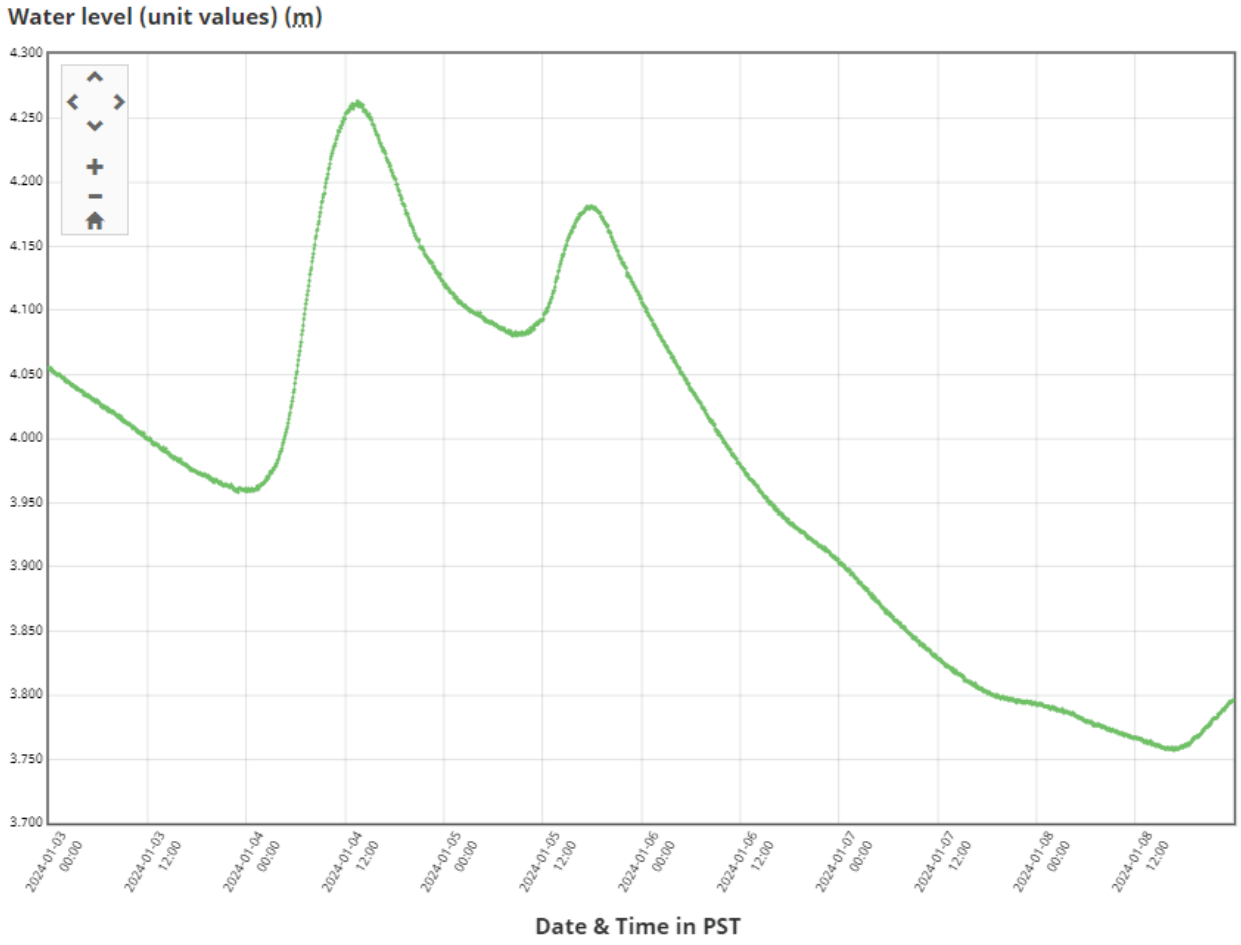


Figure 1. Water levels in the Kingcome River below Atlatzi River throughout the seventh week of dredging work in the Kingcome Estuary[2].

[2] Government of Canada, 2023. Real-Time Hydrometric Data Graph for Kingcome River Below Atlatzi River. Real-Time Hydrometric Data Graph for KINGCOME RIVER BELOW ATLATZI RIVER (08GF009) [BC] - Water Level and Flow - Environment Canada (ec.gc.ca) (Accessed January 7th, 2024).

Dredging and Dredgeate Disposal

Works during week seven predominantly consisted of dredging within the Dredge Material Management Unit (DMMU)[3] , dredgeate disposal within the boundary of the historic disposal at sea site in Kingcome Inlet, machinery repair and surveying. General EM requirements and recommendations are outlined within the CEMP and the Avoid and Mitigate Letter provided by Fisheries and Oceans Canada (DFO) following a Request for Review[4].

Prior to the start of dredging and material disposal each day, turbidity monitoring was conducted approximately 50 m upstream and downstream of the active dredge area, and within the disposal area. This was to establish background turbidity levels throughout the works. Turbidity monitoring was conducted at the same sites near the end of the day to measure any turbidity generated by the works and to ensure that turbidity did not exceed Provincial Ambient Water Quality Guidelines (Table 1)[5]. Turbidity monitoring was conducted using a LaMotte turbidity meter.

Table 1. BC Ambient Water Quality Guidelines for Turbidity and Total Suspended Solids.

Water Use	Turbidity	Non-Filterable Residue (Total Suspended Solids)
Aquatic Life (fresh, marine, estuarine)	Change from background of 8 NTU at any one time for a duration of 24 h in all waters during clear flows or in clear waters	Change from background of 25 mg/L at any one time for a duration of 24 h in all waters during clear flows or in clear waters
	Change from background of 2 NTU at any one time for a duration of 30 d in all waters during clear flows or in clear waters	Change from background of 5 mg/L at any one time for a duration of 30 d in all waters during clear flows or in clear waters
Aquatic Life (fresh, marine, estuarine)	Change from background of 5 NTU at any time when background is 8 - 50 NTU during high flows or in turbid waters	Change from background of 10 mg/L at any time when background is 25 - 100 mg/L during high flows or in turbid waters
	Change from background of 10% when background is >50 NTU at any time during high flows or in turbid waters	Change from background of 10% when background is >100 mg/L at any time during high flows or in turbid waters

Within this reporting period, dredging and dredgeate disposal was conducted beginning on the morning of January 4th, 2024 and continued through to January 8th, 2024. No turbidity exceedances above background levels were recorded. All turbidity data collected during week seven is appended to this report (Appendix 2).

[3] Pacificus, 2023. Kingcome Emergency Debris and Sediment Management Project Sampling and Analysis Plan for Disposal at Sea in Kingcome Inlet.
[4] Fisheries and Oceans Canada, 2023. Dredging, Kingcome River, U'kwa Nalis Village – Implementation of Measures to Avoid and Mitigate the Potential of Prohibited Effects to Fish and Fish Habitat.
[5]B.C. Ministry of Environment and Climate Change, 2021. Water Quality- Ambient water Quality Guidelines (Criteria) for Turbidity, Suspended and Benthic Sediments. https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/water-quality-guidelines/approved-wqgs/bc_env_turbidity_waterqualityguideline_overview.pdf (Accessed January 7th, 2024)

Dredging and dredgeate disposal recommenced following the Christmas break without issue on January 4th, 2024. The disposal methodology from previous weeks continued throughout the week. The EM monitored a disposal event and dredgeate descended quickly in the water column similar to previous weeks, with no significant sediment plumes observed. It was confirmed that all machinery remained in good working condition and was clean and free of leaks. By the end of the day on January 8th, 2024, dredging had progressed to station 0+420m.

Hazardous Debris Trimming

The hazardous woody debris trimming was completed prior to this reporting period.

Upcoming Planned Work

Works are scheduled to continue through week eight (January 9th – January 14th). During the eighth week of planned work, dredging and disposal will continue as established in previous weeks. Turbidity monitoring will continue to be conducted daily by the EM while the dredging and disposal of material is taking place. Any alterations to proposed works must be approved by the on-site ministry representative from NHC and the EM from Pacificus prior to proceeding.

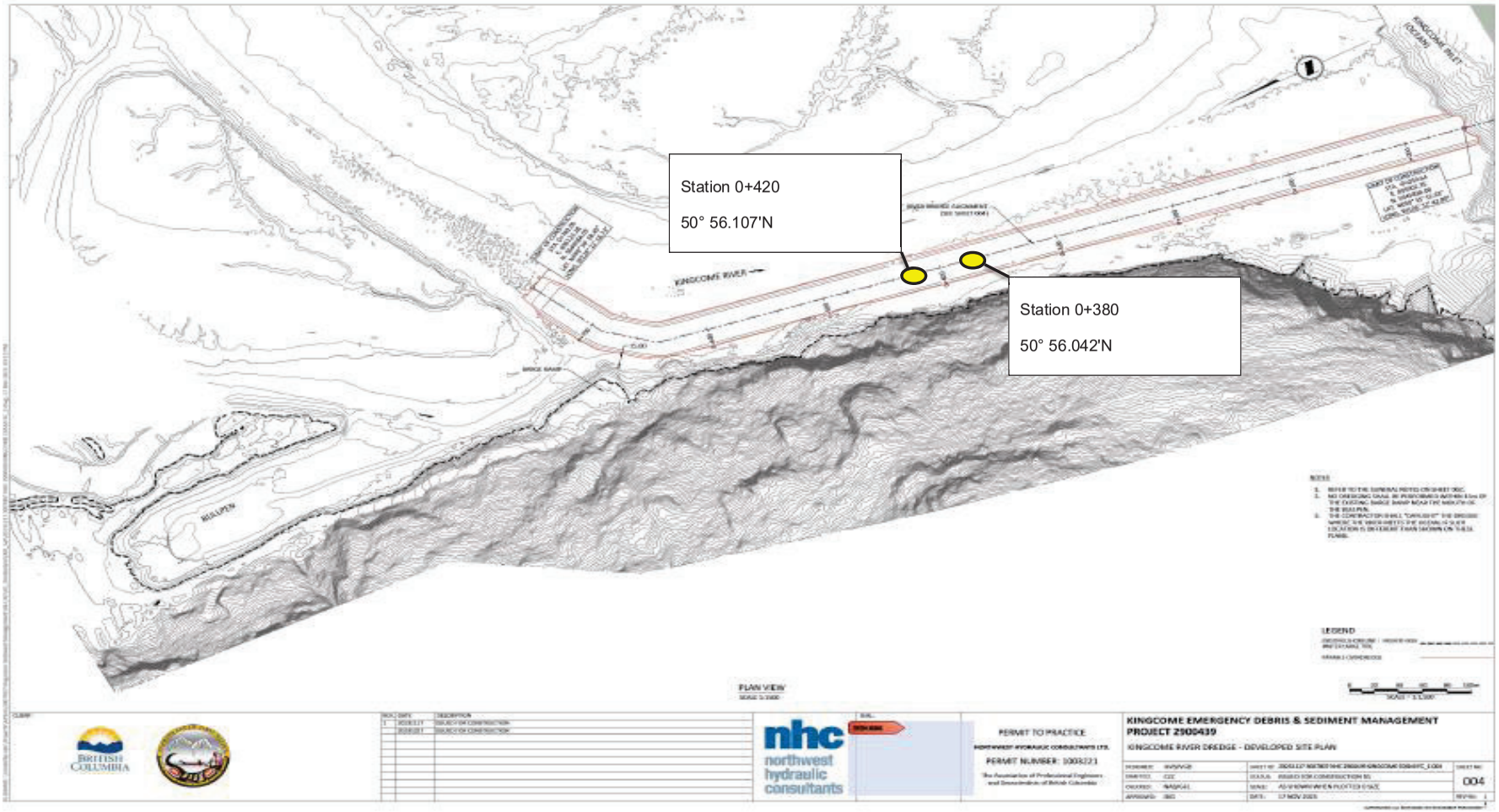


Figure 1. Engineering drawing showing the approximate location of Station 0+385 & Station 0+420m where dredging began and progressed to during week 7. Drawing shows station numbers within the DMMU for the Kingcome Emergency Debris & Sediment Management Project. Engineering drawing produced by Northwest Hydraulic Consultants and edited by Pacificus Biological Services Ltd.

Appendix 1 – Site Photos



Photo 1. View from the spud-barge showing the clam-shelled bucket excavator loading dredgeate material onto the split-hull barge for disposal at the DAS site.



Photo 2. Photo showing the split-hull barge unloading dredgeate material at the DAS site.

Appendix 2 – Turbidity Monitoring Data

Kingcome Turbidity Daily Monitoring

Date	Site	Time	Turbidity (NTU)
2024-04-01	U/S	8:07	0.78
2024-04-01	D/S	8:03	0.75
2024-04-01	DAS	8:00	0.81
2024-04-01	U/S	16:14	0.62
2024-04-01	D/S	16:10	0.56
2024-04-01	DAS	16:04	0.52
2024-05-01	U/S	7:29	1.00
2024-05-01	D/S	7:27	1.02
2024-05-01	DAS	7:23	0.72
2024-05-01	U/S	16:21	0.65
2024-05-01	D/S	16:18	0.83
2024-05-01	DAS	16:09	0.53
2024-06-01	U/S	7:11	0.56
2024-06-01	D/S	7:08	0.76
2024-06-01	DAS	7:04	0.56
2024-06-01	U/S	16:05	1.00
2024-06-01	D/S	16:08	1.40
2024-06-01	DAS	16:13	0.95
2024-07-01	U/S	7:22	0.52
2024-07-01	D/S	7:20	0.43
2024-07-01	DAS	7:13	0.42
2024-07-01	U/S	16:05	0.76
2024-07-01	D/S	16:02	0.91
2024-07-01	DAS	16:15	0.54
2024-08-01	U/S	7:23	0.58
2024-08-01	D/S	7:20	0.46
2024-08-01	DAS	7:13	0.52
2024-08-01	U/S	15:57	0.94
2024-08-01	D/S	15:53	0.74

2024-08-01	DAS	15:45	0.43

*DAS - Disposal at Sea Site, D/S - Downstream of Dredge Barge, U/S – Upstream of Dredge Barge

Dredging and Hazardous Debris Removal in the Gwa'yi (Kingcome) River

Weekly Environmental Monitoring Report

(January 15th – January 21st, 2024)



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Dredging and Hazardous Debris Removal in the Gwa'yi (Kingcome) River Weekly Environmental Monitoring Report

(January 15th – January 21st, 2024)

Prepared for

Dzawada'enuxw First Nations

and

Ministry of Environment and Climate Change Strategy - Flood Degree Management Secretariat

and

Northwest Hydraulic Consultants Ltd.

Written by:

Brittany Blanchard, BBRM.



Reviewed by:

Jennifer Russell, RPBio.

Report Reviewer



Date:

January 23rd, 2024

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Weekly Summary

1. This weekly summary regards the ninth week of completed work. Environmental Monitoring (EM) duties were completed by Celeste Landon, BSc., and Brittany Blanchard, BBRM., of Pacificus Biological Services Ltd. from January 15th to January 21st, 2024.

2. Work predominantly consisted of instream dredging within the pre-defined Dredge Material Management Unit, disposal of the dredgeate within the historic disposal at sea (DAS) site, and machinery repairs. Dredging occurred from station 0+535m – 0+605m throughout Week 9.

3. Turbidity measurements were generally taken at the start and end of each workday at the upstream, downstream, and DAS monitoring locations to ensure that dredging work remained compliant with Provincial Water Quality Guidelines. This schedule was adjusted as required to account for changing tides, light levels, and project demands.

4. No marine mammals were observed during dredging work. A school of Pacific sand lance (*Ammodytes hexapterus*) was observed feeding on krill at the stern of the barge on January 17th, 2024. Dredging continued as they were located along the stern of the barge where no dredging activities were taking place.

5. The small JJM tugboat needed additional maintenance after the coolant leak repair made in Week 8 failed. As such, the small tugboat was out of service on January 17th, 2024 and only the large tugboat was operating for the disposal of the dredgeate. All other machinery was observed to be clean and free of leaks. Spill kits were identified on the barge deck, and supplemental spill materials were stored in a storage room below the deck.

Project Overview

A work plan has been coordinated by the Ministry of Environment and Climate Change Strategy - Flood Debris Management Secretariat (ENV) to dredge targeted sections of the Gwa'yi (Kingcome) River Estuary to address unreliable access for Dzawada'enuxw First Nation (DFN) to U'kwa Nalis Village, with all dredgeate to be disposed of within Kingcome Inlet. Concurrent to dredging, work to trim hazardous large woody debris has been conducted in a 4.5 km reach of river downstream from U'kwa Nalis Village. Northwest Hydraulic Consultants (NHC) have been engaged by ENV to provide hydrotechnical assistance during all work phases related to sediment management and debris removal. JJM Construction Ltd. (JJM) have been selected as the contractors to conduct dredging and debris trimming, with assistance from Fraser Burrard Diving Ltd.. Pacificus Biological Services Ltd. (Pacificus) have been retained to assist with environmental permitting and approval, produce a Construction Environmental Mitigation Plan (CEMP), and coordinate and oversee required Environmental Monitoring throughout works. Work is scheduled to occur during the regional Marine and Estuarine Reduced Risk Work Window between November 15th, 2023, and February 15th, 2024.

This letter provides a summary of environmental monitoring work conducted during the ninth week of the project from January 15th to January 21st, 2024, in order to ensure compliance with the CEMP, and environmental permits, and to avoid causing the *death of fish or the harmful alteration, disruption, or destruction of fish habitat*. As per the Environmental Monitoring Workplan[1], Pacificus is to submit weekly Environmental Monitoring (EM) reports for the duration of the project. EM duties were completed by Celeste Landon, BSc., of Pacificus between January 15th –19th, and the remainder of the week, January 19th – 21st was monitored by Brittany Blanchard, BBRM., of Pacificus.

Meteorological and Hydrometric Conditions

Weather conditions during the ninth week of work were a mix of clear skies with periods of overcast conditions, below freezing temperatures, and some precipitation in the form of snow and rain. Consequently, water levels in the Kingcome River remained relatively low from January 15th through to January 18th, but began increasing on January 19th, 2024, due to the increase in rainfall.

[1] Pacificus, 2023. Environmental Monitoring Workplan during Proposed Dredging and Debris Trimming in the Kingcome River and Estuary.

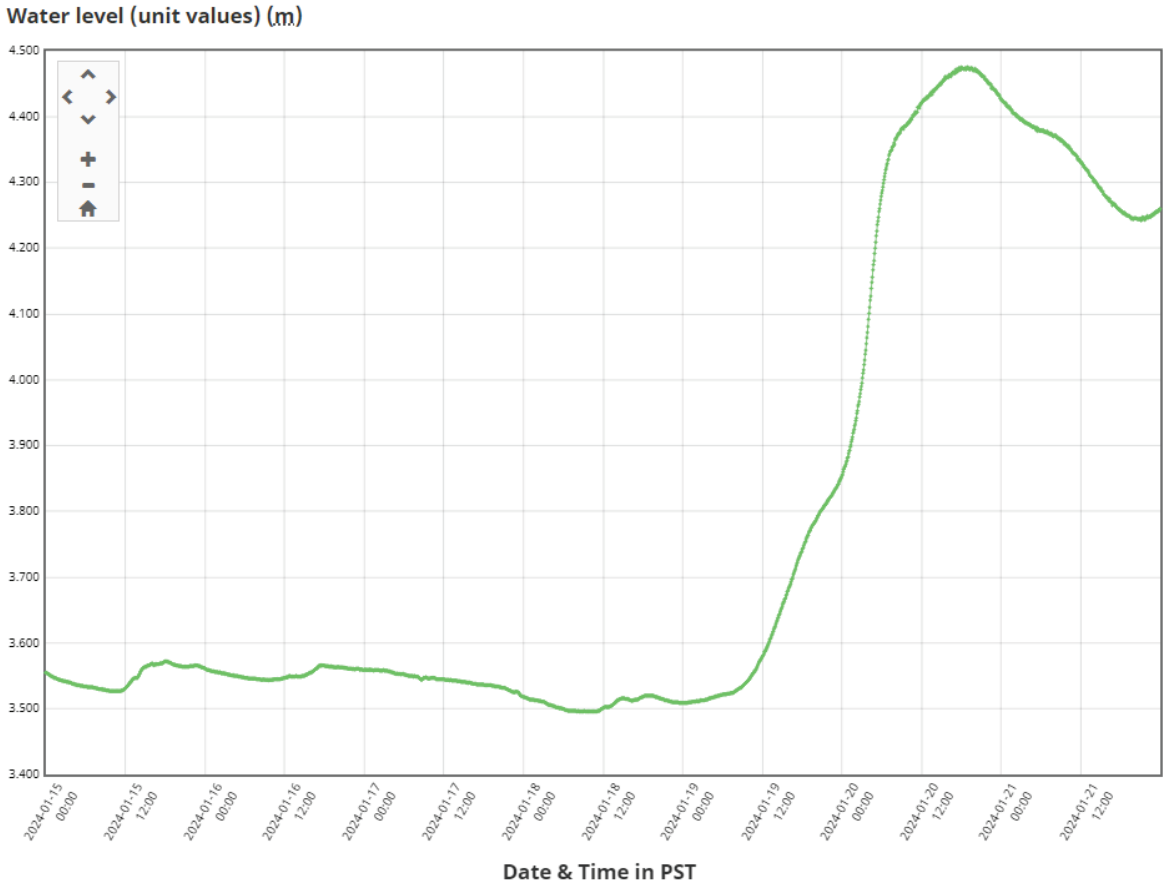


Figure 1. Water levels in the Kingcome River below Atlatzi River throughout the ninth week of dredging work in the Kingcome Estuary[2]

[2] Government of Canada, 2023. Real-Time Hydrometric Data Graph for Kingcome River Below Atlatzi River. Real-Time Hydrometric Data Graph for KINGCOME RIVER BELOW ATLATZI RIVER (08GF009) [BC] - Water Level and Flow - Environment Canada (ec.gc.ca) (Accessed January 20th, 2024).

Dredging and Dredgeate Disposal

Works during week nine consisted of dredging within the Dredge Material Management Unit (DMMU)[3] , dredgeate disposal within the boundary of the historic disposal at sea site in Kingcome Inlet, equipment repair and surveying. General EM requirements and recommendations are outlined within the CEMP and the Avoid and Mitigate Letter provided by Fisheries and Oceans Canada (DFO) following a Request for Review[4].

Prior to the start of dredging and material disposal each day, turbidity monitoring was conducted approximately 50 m upstream and downstream of the active dredge area, and within the disposal area. This was to establish background turbidity levels throughout the works. Turbidity monitoring was conducted at the same sites near the end of the day to measure any turbidity generated by the works and to ensure that turbidity did not exceed Provincial Ambient Water Quality Guidelines (Table 1)[5]. Turbidity monitoring was conducted using a LaMotte turbidity meter.

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	Change from background of 2 NTU at any one time for a duration of 30 d in all waters during clear flows or in clear waters	Change from background of 5 mg/L at any one time for a duration of 30 d in all waters during clear flows or in clear waters
Aquatic Life (fresh, marine, estuarine)	Change from background of 5 NTU at any time when background is 8 - 50 NTU during high flows or in turbid waters	Change from background of 10 mg/L at any time when background is 25 - 100 mg/L during high flows or in turbid waters
	Change from background of 10% when background is >50 NTU at any time during high flows or in turbid waters	Change from background of 10% when background is >100 mg/L at any time during high flows or in turbid waters

Within this reporting period, dredging and dredgeate disposal was conducted beginning on the morning of January 15th, 2024, and continued through to January 21st, 2024. No turbidity

[3] Pacificus, 2023. Kingcome Emergency Debris and Sediment Management Project Sampling and Analysis Plan for Disposal at Sea in Kingcome Inlet.
[4] Fisheries and Oceans Canada, 2023. Dredging, Kingcome River, U'kwa Nalis Village – Implementation of Measures to Avoid and Mitigate the Potential of Prohibited Effects to Fish and Fish Habitat.
[5]B.C. Ministry of Environment and Climate Change, 2021. Water Quality- Ambient water Quality Guidelines (Criteria) for Turbidity, Suspended and Benthic Sediments. https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/water-quality-guidelines/approved-wqgs/bc_env_turbidity_waterqualityguideline_overview.pdf (Accessed January 14th, 2024)

exceedances above background levels were noted. All turbidity data collected during week nine is attached to this report and is within Appendix 2.

On January 15th, 2024, dredging continued from station 0+535m. The disposal methodology established in Week 1 of the project continued throughout week nine. On January 15th, the low tide resulted in the grounding of the scow barge when the tide was below 2m. As such, the schedule was adjusted throughout the week to ensure grounding of the scow barge wouldn't continue to occur. A spill response drill was conducted by JJM in the afternoon.

On January 16th, mechanical issues with the JJM tugboat prevented dredging from occurring during the low tide as the Inlet Royal was unable to operate within the dredge area. Dredging works resumed on January 17th at 04:30 to accommodate for the low tide. A school of Pacific sand lance (*Ammodytes personatus)* (Photo 1) were observed by stern of the barge, assumed to be feeding on krill (*Euphausiacea sp.)* (Photo 2), and appeared to be unaffected by works. Water quality monitoring was not conducted in the afternoon as the low tide prevented access to the monitoring locations.

On January 18th, dredging works continued. Grounding of the starboard side of the scow barge occurred when the distribution load was uneven, resulting in a delay of dredging works until the tide allowed works to resume. Once dredging resumed, the EM monitored the disposal of dredgeate; the material, composed predominantly of sand and gravel (Photo 3), descended quickly into the water column as observed in previous weeks causing no significant sediment plumes.

On January 19th, dredging works continued. Water quality monitoring occurred in the morning prior to dredging, but afternoon sampling was not conducted as the incoming EM was delayed due to cancelled flights. On January 20th, no water quality monitoring was conducted in the morning but was completed in the afternoon upon the arrival of the EM. From January 20th – 21st, dredging proceeded without issue, all machinery was operational and clean and free of leaks, and water quality monitoring was conducted prior to dredging following the onset of works each day. By the end of day January 21st, dredging has progressed to station 0+605m.

No marine mammals were observed throughout week nine.

Hazardous Debris Trimming

The hazardous woody debris trimming was completed before the commencement of this reporting period.

Upcoming Planned Work

Works are scheduled to continue through week ten (January 22nd – January 28th, 2024). During the tenth week of planned work, dredging and disposal will continue as established in previous weeks. Turbidity monitoring will continue to be conducted daily by the EM while the dredging and disposal of material is taking place. Any alterations to proposed works must be approved by the on-site ministry representative from NHC and the EM from Pacificus prior to proceeding.

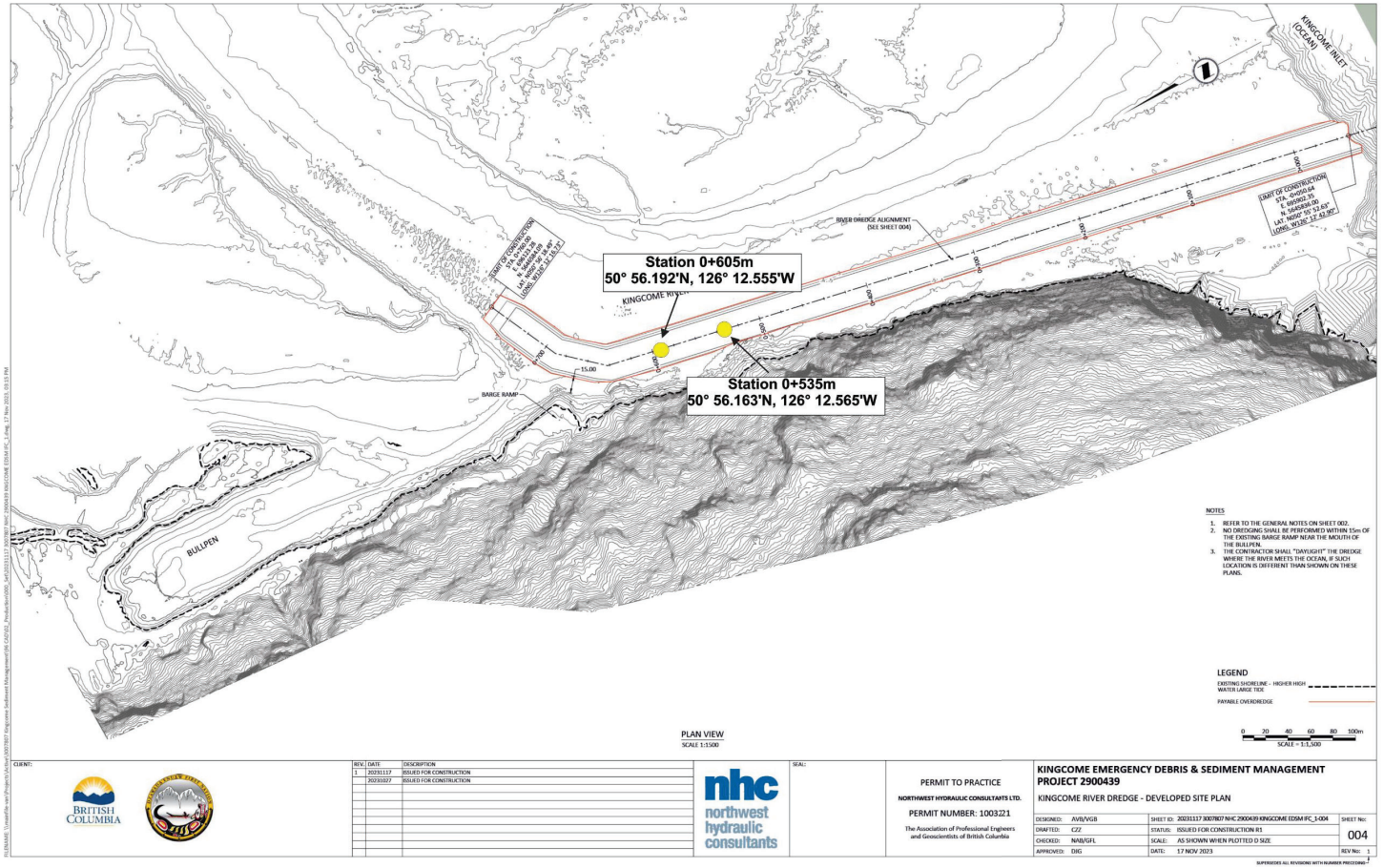


Figure 1. Engineering drawing showing the approximate location of Station 0+535m & Station 0+605m where dredging began and progressed to in Week 9. Drawing shows station numbers within the DMMU for the Kingcome Emergency Debris & Sediment Management Project. Engineering drawing produced by Northwest Hydraulic Consultants and edited by Pacificus Biological Services Ltd.

Appendix 1 – Site Photos



Photo 1. Photo of a Pacific sand lance observed on January 17th, 2024, near the dredge area.



Photo 2. Photo of the Krill observed on January 17th, 2024, in the dredge area.



Photo 3. Photo showing the dredge material observed during the disposal at sea on January 18th, 2024, composed predominantly of sand and gravel.

Appendix 2 – Turbidity Monitoring Data

Kingcome Turbidity Daily Monitoring			
Date	Site	Time	Turbidity (NTU)
2024-15-01	U/S	7:45	0.48
2024-15-01	D/S	7:40	0.56
2024-15-01	DAS	7:25	0.00
2024-15-01	U/S	2:15	0.28
2024-15-01	D/S	2:10	0.23
2024-15-01	DAS	2:00	0.00
2024-16-01	U/S	7:40	0.37
2024-16-01	D/S	7:35	0.29
2024-16-01	DAS	7:25	0.00
2024-16-01	U/S	4:10	0.59
2024-16-01	D/S	4:00	0.11
2024-16-01	DAS	3:50	0.08
2024-17-01	U/S	6:10	0.13
2024-17-01	D/S	6:05	0.14
2024-17-01	DAS	6:00	0.30
2024-18-01	U/S	7:50	0.32
2024-18-01	D/S	7:45	0.25
2024-18-01	DAS	7:40	0.00
2024-18-01	U/S	16:05	0.57
2024-18-01	D/S	16:00	0.42
2024-18-01	DAS	15:40	0.60
2024-19-01	U/S	8:20	0.37
2024-19-01	D/S	7:55	0.28
2024-19-01	DAS	7:40	0.21
2024-19-01	U/S	Not conducted	-
2024-19-01	D/S	Not conducted	-
2024-19-01	DAS	Not conducted	-
2024-20-01	U/S	Not conducted	-
2024-20-01	D/S	Not conducted	-
2024-20-01	DAS	Not conducted	-
2024-20-01	U/S	16:10	2.05

2024-20-01	D/S	16:15	1.80
2024-20-01	DAS	16:00	0.52
2024-21-01	U/S	7.41	1.36
2024-21-01	D/S	9:00	1.27
2024-21-01	DAS	8:50	1.14
2024-21-01	U/S	14:35	1.43
2024-21-01	D/S	14:30	1.28
2024-21-01	DAS	14:11	0.50

*DAS - Disposal at Sea Site, D/S - Downstream of Dredge Barge, U/S – Upstream of Dredge Barge

Dredging and Hazardous Debris Removal in the Gwa'yi (Kingcome) River

Weekly Environmental Monitoring Report

(January 22nd– January 29th, 2024)



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Dredging and Hazardous Debris Removal in the Gwa'yi (Kingcome) River Weekly Environmental Monitoring Report

(January 22nd – January 29th, 2024)

Prepared for

Dzawada'enuxw First Nations

and

Ministry of Environment and Climate Change Strategy - Flood Degree Management Secretariat

and

Northwest Hydraulic Consultants Ltd.

Written by:

Danae Shephard, BSc., BIT

Reviewed by:

Jennifer Russell, RPBio.



Date:

January 31st, 2024

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SAFE CERTIFIED

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Weekly Summary

1. This weekly summary regards the tenth week of completed work. Environmental Monitoring (EM) duties were completed by Brittany Blanchard, BBRM., and Danae Shephard, BSc., BIT, of Pacificus Biological Services Ltd. from January 22nd to January 29th, 2024.

2. Work predominantly consisted of instream dredging within the pre-defined Dredge Material Management Unit, disposal of the dredgeate within the historic disposal at sea (DAS) site, and machinery repairs. Dredging occurred from station 0+605m – 0+717m throughout Week 10.

3. Turbidity measurements were generally taken at the start and end of each workday at the upstream, downstream, and DAS monitoring locations to ensure that dredging work remained compliant with Provincial Water Quality Guidelines. This schedule was adjusted as required to account for changing tides, light levels, and project demands.

4. On January 23rd, river otters (*Lontra canadensis*) were observed near the Dredge Material Management Unit (DMMU). The site super informed the rest of the crew to be mindful of the otters during operations and to pause works if they entered the DMMU.

5. All machinery was observed to be clean and free of leaks, with the exception of a coolant leak from the crane on January 29th, 2024 (4.5L; with no entry to the marine environment). Spill kits were identified on the barge deck, and supplemental spill materials were stored in a storage room below the deck.

6. Dredging works were completed on January 29th, 2024, at station 0+717m.

Project Overview

A work plan has been coordinated by the Ministry of Environment and Climate Change Strategy - Flood Debris Management Secretariat (ENV) to dredge targeted sections of the Gwa'yi (Kingcome) River Estuary to address unreliable access for Dzawada'enuxw First Nation (DFN) to U'kwa Nalis Village, with all dredgeate to be disposed of within Kingcome Inlet. Concurrent to dredging, work to trim hazardous large woody debris has been conducted in a 4.5 km reach of river downstream from U'kwa Nalis Village. Northwest Hydraulic Consultants (NHC) have been engaged by ENV to provide hydrotechnical assistance during all work phases related to sediment management and debris removal. JJM Construction Ltd. (JJM) have been selected as the contractors to conduct dredging and debris trimming, with assistance from Fraser Burrard Diving Ltd.. Pacificus Biological Services Ltd. (Pacificus) have been retained to assist with environmental permitting and approval, produce a Construction Environmental Mitigation Plan (CEMP), and coordinate and oversee required Environmental Monitoring throughout works. Work is scheduled to occur during the regional Marine and Estuarine Reduced Risk Work Window between November 15th, 2023, and February 15th, 2024.

This letter provides a summary of environmental monitoring work conducted during the tenth week of the project from January 22nd to January 29th, 2024, in order to ensure compliance with the CEMP, and environmental permits, and to avoid causing the *death of fish or the harmful alteration, disruption, or destruction of fish habitat*. As per the Environmental Monitoring Workplan[1], Pacificus is to submit weekly Environmental Monitoring (EM) reports for the duration of the project. EM duties were completed by Brittany Blanchard, BBRM, of Pacificus between January 22nd – 25th, and the remainder of the week, January 25th – 29th was monitored by Danae Shephard, BSc., BIT, of Pacificus.

Meteorological and Hydrometric Conditions

Weather conditions during the tenth week of work were a mix of overcast conditions, mild temperatures, and heavy rainfall. Consequently, water levels in the Kingcome River remained moderate from January 22nd through to January 25th, but began increasing on January 26th, 2024, due to the increase in rainfall. Water levels continued to increase throughout the rest of the week.

[1] Pacificus, 2023. Environmental Monitoring Workplan during Proposed Dredging and Debris Trimming in the Kingcome River and Estuary.

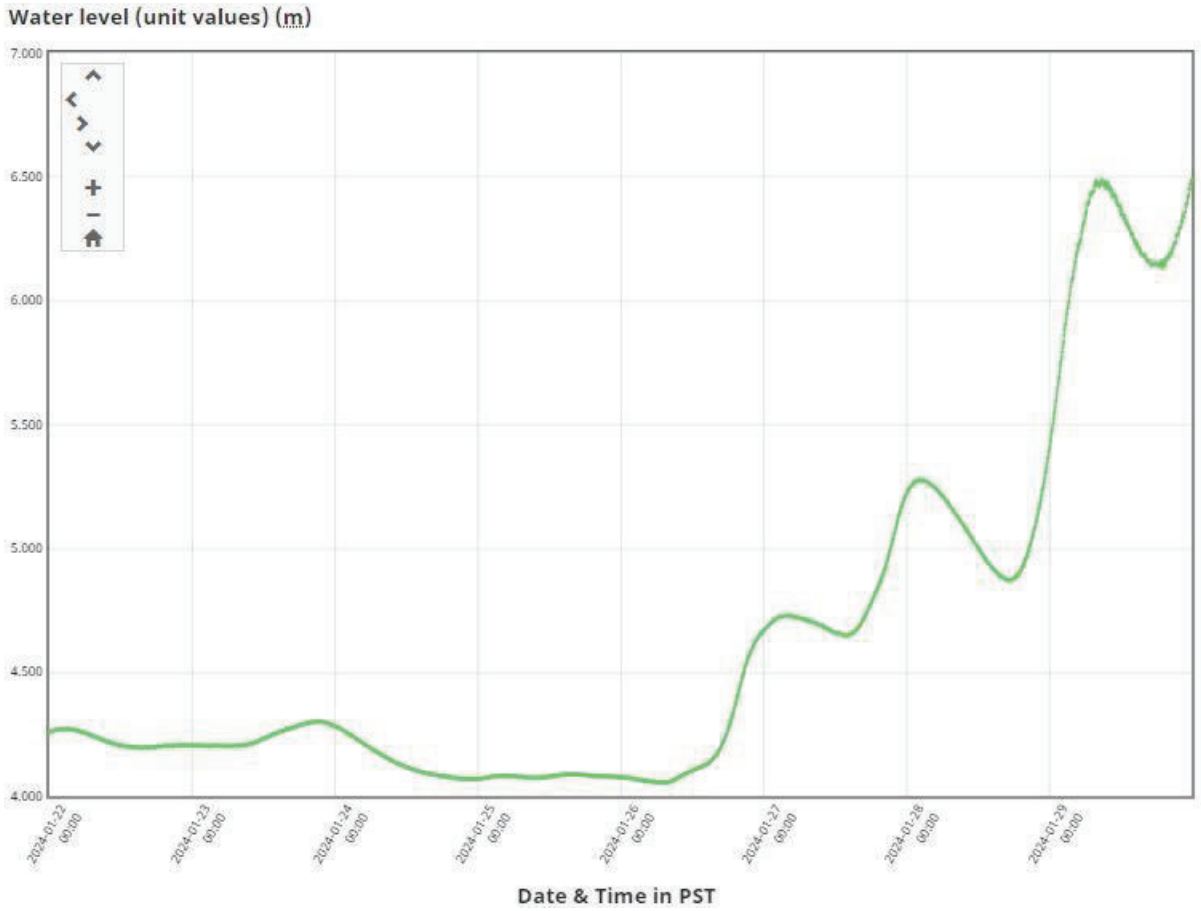


Figure 1. Water levels in the Kingcome River below Atlatzi River throughout the tenth week of dredging work in the Kingcome Estuary[2]

[2] Government of Canada, 2023. Real-Time Hydrometric Data Graph for Kingcome River Below Atlatzi River. Real-Time Hydrometric Data Graph for KINGCOME RIVER BELOW ATLATZI RIVER (08GF009) [BC] - Water Level and Flow - Environment Canada (ec.gc.ca) (Accessed January 30th, 2024).

Dredging and Dredgeate Disposal

Works during week ten consisted of dredging within the Dredge Material Management Unit (DMMU)[3] , dredgeate disposal within the boundary of the historic disposal at sea site in Kingcome Inlet, equipment repair and surveying. General EM requirements and recommendations are outlined within the CEMP and the Avoid and Mitigate Letter provided by Fisheries and Oceans Canada (DFO) following a Request for Review[4].

Prior to the start of dredging and material disposal each day, turbidity monitoring was conducted approximately 50 m upstream and downstream of the active dredge area, and within the disposal area. This was to establish background turbidity levels throughout the works. Turbidity monitoring was conducted at the same sites near the end of the day to measure any turbidity generated by the works and to ensure that turbidity did not exceed Provincial Ambient Water Quality Guidelines (Table 1)[5]. Turbidity monitoring was conducted using a LaMotte turbidity meter.

Table 1. BC Ambient Water Quality Guidelines for Turbidity and Total Suspended Solids.

Water Use	Turbidity	Non-Filterable Residue (Total Suspended Solids)
Aquatic Life (fresh, marine, estuarine)	Change from background of 8 NTU at any one time for a duration of 24 h in all waters during clear flows or in clear waters	Change from background of 25 mg/L at any one time for a duration of 24 h in all waters during clear flows or in clear waters
	Change from background of 2 NTU at any one time for a duration of 30 d in all waters during clear flows or in clear waters	Change from background of 5 mg/L at any one time for a duration of 30 d in all waters during clear flows or in clear waters
Aquatic Life (fresh, marine, estuarine)	Change from background of 5 NTU at any time when background is 8 - 50 NTU during high flows or in turbid waters	Change from background of 10 mg/L at any time when background is 25 - 100 mg/L during high flows or in turbid waters
	Change from background of 10% when background is >50 NTU at any time during high flows or in turbid waters	Change from background of 10% when background is >100 mg/L at any time during high flows or in turbid waters

Within this reporting period, dredging and dredgeate disposal was conducted beginning on the morning of January 22nd, 2024, and continued through to January 29th, 2024. All turbidity data collected during week ten is attached to this report and is within Appendix 2.

[3] Pacificus, 2023. Kingcome Emergency Debris and Sediment Management Project Sampling and Analysis Plan for Disposal at Sea in Kingcome Inlet.
[4] Fisheries and Oceans Canada, 2023. Dredging, Kingcome River, U'kwa Nalis Village – Implementation of Measures to Avoid and Mitigate the Potential of Prohibited Effects to Fish and Fish Habitat.
[5]B.C. Ministry of Environment and Climate Change, 2021. Water Quality- Ambient water Quality Guidelines (Criteria) for Turbidity, Suspended and Benthic Sediments. https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/water-quality-guidelines/approved-wqgs/bc_env_turbidity_waterqualityguideline_overview.pdf (Accessed January 28th, 2024)

On January 22nd, 2024, dredging continued from station 0+605m. The disposal methodology established in Week 1 of the project continued throughout week ten. Machinery was observed to be clean and free of leaks.

On January 23rd, 2024, a group of river otters (*Lontra canadensis*) were observed near the Dredge Material Management Unit (DMMU), and the site supervisor informed the rest of the crew to be mindful of the animals and pause works if they enter the DMMU.

On January 26th, 2024, a small amount of sheen was observed on the deck near the stern. The source of the sheen was located within the vicinity of a spill tray containing a jerry can overflowing with rainwater, which was most likely washing away a small amount of hydrocarbon that was in the spill tray as the rainwater flowed across the stern of the barge. The crew wiped the surface of the deck and placed spill pads in the vicinity of the spill tray to prevent the sheen from entering the marine environment (Photo 1). The spill tray was confirmed to be filled with rainwater and the jerry can lid was securely shut (Photo 2).

On January 27th, 2024, flow speed and water levels in the river were elevated due to rainfall. The EM conducted turbidity measurements as normal and observed operations on the barge in the afternoon. Dredgeate was observed to be clean and free of marine biota and invasive species, consisting mainly of gravel, sand, and fines (Photo 3). On the evening of January 27th, 2024, the main working barge (spud barge) moved due to a spud coming loose and the crew immediately responded; the spuds were removed, the barge was pushed to a location further downstream by the large tug, and the spuds were secured again. No further issues occurred.

On January 28th, 2024, the crew commenced works by immediately moving the barge back upstream to station 0+670m to continue dredging. The EM conducted turbidity measurements as normal and observed operations on the barge. By the end of day on January 28th, 2024, dredging had progressed to station 0+693m.

High rainfall caused elevated water levels in the Kingcome River, which resulted in elevated background turbidity levels prior to the commencement of work on January 29th. On the afternoon of January 29th, the crane on the spud barge had a coolant leak; and approximately 4.5L of coolant was discharged before the leak was stopped. All coolant was captured and contained in buckets and a large steel-lined depression in the deck below the crane (Photo 4). Spill pads and absorbent booms/socks were also placed around the edge of the depression. The coolant and coolant laden water was contained and pumped into an intermediate bulk container tote (IBC tote). No coolant or coolant-laden water entered the marine environment. Dredging works were completed on January 29th, finishing at station 0+717m.

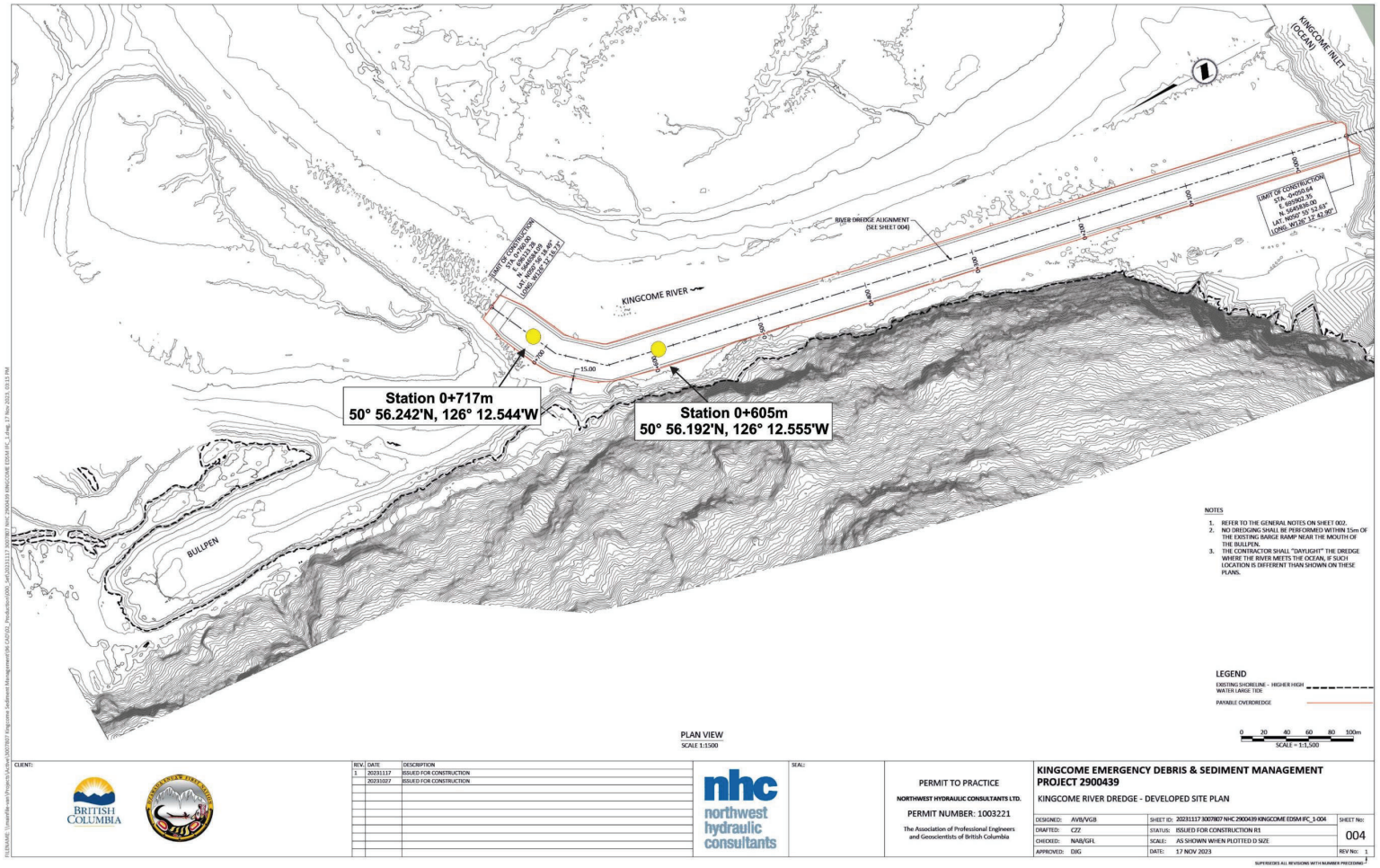


Figure 1. Engineering drawing showing the approximate location of Station 0+605m & Station 0+717m where dredging began and was completed to in Week 10. Drawing shows station numbers within the DMMU for the Kingcome Emergency Debris & Sediment Management Project. Engineering drawing produced by Northwest Hydraulic Consultants and edited by Pacificus Biological Services Ltd.

Appendix 1 – Site Photos



Photo 1. Photo of spill pads placed in vicinity of the spill tray full of rainwater on January 26th, 2024.



Photo 2. Photo of the spill tray full of rainwater and spill pads on January 27th, 2024



Photo 3. Photo showing the dredge material observed on the way out to the disposal at sea on January 28th, 2024, composed predominantly of sand, gravel, and fines.



Photo 4. Photo showing the steel-lined depression below the crane, filled with coolant-laden water and surrounded by sorbent socks on January 29th. The coolant-laden water was later pumped into the nearby IBC tote.

Appendix 2 – Turbidity Monitoring Data

Kingcome Turbidity Daily Monitoring			
Date	Site	Time	Turbidity (NTU)
2024-22-01	U/S	7:15	1.10
2024-22-01	D/S	7:11	0.95
2024-22-01	DAS	7:03	0.22
2024-22-01	U/S	15:10	0.87
2024-22-01	D/S	15:03	1.07
2024-22-01	DAS	14:56	0.47
2024-23-01	U/S	7:16	0.55
2024-23-01	D/S	7:14	0.38
2024-23-01	DAS	7:00	0.14
2024-23-01	U/S	15:05	0.56
2024-23-01	D/S	15:28	0.83
2024-23-01	DAS	15:15	0.34
2024-24-01	U/S	7:16	0.55
2024-24-01	D/S	7:14	0.38
2024-24-01	DAS	7:00	0.14
2024-24-01	U/S	15:05	0.56
2024-24-01	D/S	15:28	0.83
2024-24-01	DAS	15:15	0.37
2024-25-01	U/S	7:00	0.79
2024-25-01	D/S	7:09	0.90
2024-25-01	DAS	7:19	0.38
2024-25-01	U/S	15:00	0.84
2024-25-01	D/S	14:45	0.64
2024-25-01	DAS	14:37	0.17
2024-26-01	U/S	7:10	0.81
2024-26-01	D/S	7:05	0.97
2024-26-01	DAS	7:00	0.43
2024-26-01	U/S	14:35	0.99
2024-26-01	D/S	14:30	0.92
2024-26-01	DAS	14:19	0.24
2024-27-01	U/S	7:13	2.90

2024-27-01	D/S	7:00	2.45
2024-27-01	DAS	6:50	0.89
2024-27-01	U/S	15:00	2.27
2024-27-01	D/S	14:55	2.11
2024-27-01	DAS	14:45	0.62
2024-28-01	U/S	7:25	6.39
2024-28-01	D/S	7:14	4.63
2024-28-01	DAS	7:05	2.33
2024-28-01	U/S	15:20	2.91
2024-28-01	D/S	15:12	3.05
2024-28-01	DAS	15:08	1.64
2024-29-01	U/S	9:55	15.83
2024-29-01	D/S	9:50	16.30
2024-29-01	DAS	9:40	4.94
2024-29-01	U/S	16:48	13.40
2024-29-01	D/S	15:40	16.50
2024-29-01	DAS	16:19	12.50

*DAS - Disposal at Sea Site, D/S - Downstream of Dredge Barge, U/S – Upstream of Dredge Barge

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Des Goold, P.Eng
Northwest Hydraulic Consultants
30 Gostick Place
North Vancouver, BC V7M3G3

February 28th, 2024

Dear Des Goold,

The following letter includes a summary of the environmental monitoring services provided by Pacificus Biological Services Ltd. (Pacificus) for the duration of the dredging and hazardous large woody debris (LWD) trimming activities that occurred from November 17th, 2023, to January 29th, 2024, in the Gwa'yi (Kingcome) River and Estuary, following the conclusion of work. This summary has been written in addition to 10 weekly environmental monitoring summaries provided to Northwest Hydraulic Consultant (NHC) by Pacificus while work was active.

Summary of Environmental Monitoring Services

Pacificus was contracted by NHC to provide environmental monitoring services for the duration of the dredging and hazardous debris removal works in the Gwa'yi (Kingcome) River. Three main aspects of work were monitored; dredging, dredgeate disposal, and trimming of hazardous LWD, to mitigate any negative environmental impacts and to implement measures to protect fish and fish habitat. A Qualified Environmental Professional (QEP) from Pacificus was designated as the on-site environmental monitor (EM) for the duration of in-water works to ensure activities were in compliance with a Fisheries and Oceans Canada (DFO) *Avoid and Mitigate* Letter[1] obtained following a formal *Request for Review*, the Environment and Climate Change Canada *Disposal at Sea Permit*, requirements of an Authorized Change as per the Provincial *Water Sustainability Act,* and the project's Construction Environmental Mitigation Plan[2] (CEMP). Throughout the project Pacificus produced a total of 10 weekly reports summarizing dredging and debris trimming progress, daily turbidity measurements, marine mammal and fish species monitoring, and any pertinent environmental observations, concerns, or incidents that occurred over the duration of the reporting week, such as equipment repair and spills.

Weekly environmental monitoring provided by Pacificus began November 17th, 2023, and concluded January 29th, 2024, with the completion of the dredging works. As per the permitting

[1] Department of Fisheries and Oceans. 2023. Dredging, Kingcome River, U'kwa Nalis Village – Implementation of Measures to Avoid and Mitigate the Potential for Prohibited Effects to Fish and Fish Habitat.
[2] Pacificus Biological Services Ltd. 2023. Proposed Dredging and Hazardous LWD Trimming in the Gwa'yi (Kingcome) River and Estuary Environmental Assessment Report.

requirements, all work was conducted during the Marine and Estuarine Reduced Risk Work Window (November 15th, 2023, to February 15th, 2024). Dredging works were conducted for a ten-week period and were monitored throughout, while debris trimming works were monitored from November 21st, 2023, to their completion in week 4 on December 10th, 2023. Daily turbidity monitoring was conducted for the duration of dredging and dredgeate disposal activities to ensure that turbidity generated by the works did not exceed Provincial Water Quality Guidelines. Turbidity measurements were taken at the start and end of each workday at three stations: immediately upstream and downstream of the dredge area and within the historic disposal at sea (DAS) site. The only exception to this monitoring schedule were days that access to the three stations was prevented by very low tides and/or inclement weather. No exceedances above Provincial Water Quality Guidelines were recorded throughout the duration of work at any station. Dredgeate disposal within the DAS site was conducted without the deployment of silt curtains as the dredgeate was observed to descend quickly through the water column causing no significant plumes of turbid water. One accidental release of dredgeate material occurred on December 13th, 2023, approximately 90 m outside the DAS site; however, it was determined that negative environmental impacts were unlikely as the surrounding sea floor slopes towards the DAS site and the dredgeate is not known to contain contaminants. All other observed disposals were released within the designated DAS site.

Hazardous debris trimming was monitored periodically between weeks 2 and 4 of work with no issues recorded by the EM. Work involved cutting LWD into segments of 2.0m or less, and any root wads were left intact. As per the CEMP, no segment of debris embedded in the riverbed or banks was dislodged in order to minimize disturbance to the substrate. Debris trimming in the main river channel was completed ahead of schedule, which allowed time for additional selective trimming in a previously surveyed side channel.

No major spill incidents occurred over the duration of the works. On December 7th, 2023, a minor spill occurred from a pinhole leak in the excavator arm, which released approximately 0.5L of hydrocarbon into the ocean. Spill booms were deployed immediately, and the spill was reported to the Province of BC. During week 4 of the project, the EM observed small sheens on the barge deck and surface of the ocean during a heavy rainfall event. It was determined that pooling water was capturing residual hydrocarbons that had accumulated on the barge deck from activities such as fueling. Preventative measures were established by the EM to capture and contain any contaminated runoff during heavy rainfall events and included deploying spill pads and spill socks around pooling water on the barge deck and installing spill socks around the stern of the barge deck for supplementary containment. Following implementation of these preventative measures, no sheens were observed in the marine environment during heavy rainfall events.

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A pod of orcas (*Orcinus* orca) and Pacific white-sided dolphins (*Lagenorhynchus obliquidens*) were sighted December 17th, 2023, and dredging works were paused until the pods were no longer in view. Other marine mammal and fish species observed included river otters (*Lontra canadensis*) and Pacific sand lance (*Ammodytes hexapterus*). No European green crabs (*Carcinus maenas*) were observed for the duration of the project. Work was not observed to disrupt aquatic fauna at any point.

All works monitored by a QEP from Pacificus adhered to mitigation measures outlined in the CEMP, *Avoid and Mitigate* letter, and dredging Code of Practice. As such, it is of the opinion of Pacificus that the *death of fish,* or *harmful alteration, disruption, or destruction* of fish habitat did not occur during project activities, and compliance with all relevant permits, legislation, and the CEMP was maintained throughout work.

If you have any questions or concerns regarding the information provided in this letter, please do not hesitate to contact our office at 250-949-9450.

Sincerely,

Celeste Landon, BSc.
Pacificus Biological Services Ltd.

Reviewed by;

COLLEGE OF APPLIED BIOLOGY
Jennifer Russell
R.P. Bio #1758
CAB

Jennifer Russell, RPBio.
Pacificus Biological Services Ltd.

APPENDIX M

WEEKLY ENGINEERING FIELD REPORTS

nhc
northwest hydraulic consultants

Field Review #1

Project:	Kingcome River – Emergency Debris and Sediment Management Project		
To:	Amy Vallarino (amy.vallarino@gov.bc.ca); Dawn Nicolson (dfnadministrator@kingcome.ca); Arshad Bastani (arshad@ashoprojects.com); Cameron McIntosh (cmcintosh@jjmconstruction.com); Sherman Yee (syee@jjmconstruction.com); Alex Heckels (aheckels@pacificus.ca); Liam Galbraith (lgalbraith@jjmconstruction.com); Mitch Brown (mbrown@jjmconstruction.com); Brenton Ryan (bryan@jjmconstruction.com); Heather Pratt (heather.pratt@wsp.com); Midori Nicolson (midorin@telus.net)		
From:	Alicia Van Boven, NHC Construction Engineer (KingcomeMR@nhcweb.com)		
Revision:	0	**Contract:**	WK24EPFLOOD0013
Date:	2023-11-28	**NHC No.:**	3007807
Client:	Ministry of Environment and Climate Change (ENV) & Dzawada'enuxw First Nation (DFN),	**Prime:**	JJM Construction Ltd. (JJM)

Conditions:

Review Date(s):	2023/11/20 – 2023/11/26	**Time(s):**	08:00 – 9:30 & 13:00 – 15:00
Drawing Ref.:	20231117 3007807 NHC 2900439 KINGCOME EDSM IFC R1	**Specification Ref.:**	Special Provisions in WK24EPFLOOD0013-JJM Construction Ltd. – Kingcome emergency debris and sediment removal – Final – Nov 2

Weather & Flow:

Nov.20: 4 – 9˚C; Overcast; Avg. Flow ~60m^3/s; High Tide 4.4m @ 07:16, Low Tide 2.6m CD @ 12:51
Nov.21: 2 – 9˚C; Heavy Rain; Higher Flow~100m^3/s; High Tide 4.5m @ 08:16, Low Tide 2.3m @ 14:20
Nov.22: 1 – 9˚C; Overcast; Avg. Flow ~60m^3/s; High Tide 4.8m @ 09:07, Low Tide 1.9m CD @ 15:28
Nov.23: (-1) – 8˚C; Sunny; Avg. Flow ~60m^3/s; High Tide 5.1m @ 09:51, Low Tide 1.4m CD @ 16:23
Nov.24: 1 – 6˚C; Low visibility fog; Avg. Flow ~60m^3/s; High Tide 5.3m @ 10:32, Low Tide 0.9m CD @ 17:11
Nov.25: (-1) – 6˚C; Low visibility fog; Avg. Flow ~60m^3/s; High Tide 5.5m @ 11:11, Low Tide 0.6m CD @ 17:57
Nov.26: 3 –6˚C; Fog & Sunny; Avg. Flow ~60m^3/s; High Tide 5.6m @ 11:50, Low Tide 0.4m CD @ 18:43

Location: Kingcome River, Kingcome Inlet, BC. (NAD83 UTM 9 N 696123 5646584)

Personnel & Equipment:

Refer to JJM Daily LEM's for Contractor Personnel and Equipment (*see attached*). NHC Min Rep.: Veronique Bourgault (Nov. 20 – Nov. 23) & Alicia Van Boven (Nov. 23 – Nov. 26). Pacificus EM: Alex Heckels (Nov. 20 – Nov. 23) & Danae Shephard (Nov. 23 – Nov. 26)

Observations:

General:

- Compliance verifications of final dredge grades are being reviewed in separate Construction-in-Progress (CIP) memos prepared weekly by NHC using survey data collected by JJM.

Field Review:

- General weekly activities while on-site included:
    - JJM completed dredging between STA -0+051 m to STA 0+075 m. Bed material was bulk dredged with a crane and clamshell bucket from the spud barge (Photo 1), while the refined grades were dredged with an excavator from a flat scow (Photo 2). The dredged material is fine grained silty-sand with some buried LWD.
    - The Catherwood tugboat helps position the spud barge and flat scow at the desired station for dredging (Photo 3).
    - Generally, dredged material was loaded onto a 200 m^3 hopper barge (Photo 4) and towed by the Catherwood tugboat to the DAS site for disposal. In total, 41 hopper barge loads have been disposed at the DAS site (Photo 5).

- Dredged material was loaded onto the flat scow while the hopper barge was at the DAS site (Photo 6). The flat scow is towed to the DAS site by Catherwood tugboat when workspace becomes limited, and the dredged material is offloaded by the JJM loader or excavator (Photo 7). In total, 2 scow loads have been disposed at the DAS site.
- Multibeam Bathymetric Surveys were completed from the JJM ME-006 jet boat on Nov. 21, 24, and 26. using a Norbit Subsea Sonar (Photo 8). Sounds-velocity measurements were completed using an AML oceanographic sensor.
- Divers started debris trimming from the JJM ME-008 jet boat on Nov.21. The debris trimming is being completed from upstream at the U'Kwanalis village to downstream. The jet boat remains anchored in one spot while the divers remain tethered to the boat and remove debris in the vicinity using a small chainsaw, a long chainsaw, a hand saw, or a wedge and hammer (Photo 9). After a reach is complete, the jet boat is anchored again downstream.

- Dredging did not occur on Nov. 24 due to an excavator mechanical failure. Minimal dredging occurred on Nov. 25 and Nov.26 due to continued excavator maintenance and maintenance on the hopper barge.
- The low tide on Kingcome River and mouth of the river typically occurs an hour after the low tide reported by the Kingcome Inlet 03848 tide gauge.
- The hopper barge does not have a scale on the side of the barge. As such, daily dredge disposal volume records required by the DAS permit cannot be estimated by displacement and tonnage calculations. JJM is reporting disposal volumes based on visual approximations of the dredged material relative to the volume of the 200 m^3 hopper barge. When the hopper barge appears full, the disposal volume is reported as 200 m^3 and when the hopper bar appears underfilled the disposal volumes is reported as 150 – 175 m^3.
- NHC reviewed the disposal location coordinates reported by JJM. As per specification 4.01(c), all the dredge disposals were within the disposal site boundaries prescribed in the DAS permit and shown in the IFC drawings.
- NHC witnessed the debris trimming on Nov. 21 and Nov 26. All trimmed LWD observed floating in the river was a maximum length of 2 m (Photo 10), and debris embedded in the banks was not removed as per the special provision 5.01(a). The FBD divers are estimating 2 m cuts based on their personal wingspan.
- Several of the LWD pieces have moved since the IFC LWD locations were identified. As such, a DFN boat operator representative is directing the debris trimming and is satisfied with the LWD removal in DFN's primary navigation channel in Kingcome River (Personal Communications Hema Willie). NHC is reviewing the locations and verifying the field fit approach to the LWD trimming work. Hazardous LWD is identified at low tide, flagged, and trimmed during daylight hours.

Deficiencies:

- No Deficiencies Identified

Photographs:



Photo 1. Crane attachments for dredging and LWD removal.



Photo 2. Looking northwest at JJM excavator dredging from the flat scow at approximately STA 0+040.



Photo 3. Catherwood Tugboat positioning the scow alongside the spud barge.



Photo 4. Excavator loading dredged material on the hopper barge.



Photo 5. Hopper barge dredge disposal at the DAS site.



Photo 6. Excavator loading dredged material on the flat scow.



Photo 7. Excavator and loader disposing of dredged material from the flat scow at the DAS site.



Photo 8. JJM ME-006 Survey Jet Boat

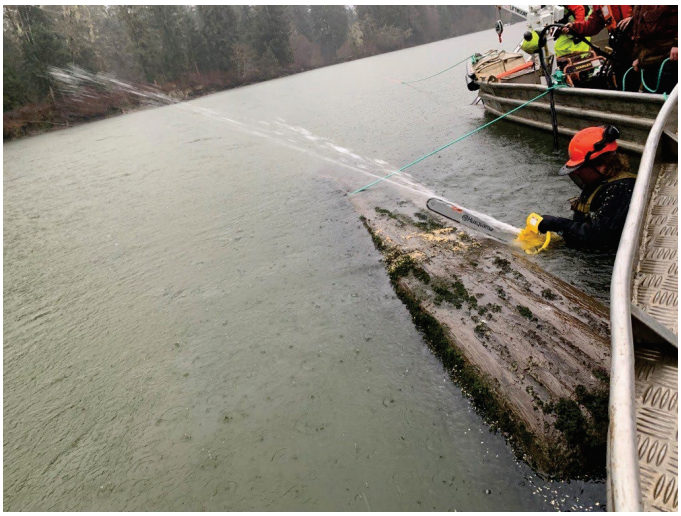


Photo 8. JMM ME-008 Dive Boat and FBD diver trimming LWD.



Photo 9. Log observed floating in river with a length less than 2 m.

Signature:

Alicia Van Boven E.I.T. 2023/11/26

Reviewed by Des Goold P.Eng. 2023/11/28.

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Field Review #2

Project:	Kingcome River – Emergency Debris and Sediment Management Project		
To:	Amy Vallarino (amy.vallarino@gov.bc.ca); Dawn Nicolson (dfnadministrator@kingcome.ca); Arshad Bastani (arshad@ashoprojects.com); Cameron McIntosh (cmcintosh@jjmconstruction.com); Sherman Yee (syee@jjmconstruction.com); Alex Heckels (aheckels@pacificus.ca); Liam Galbraith (lgalbraith@jjmconstruction.com); Mitch Brown (mbrown@jjmconstruction.com); Brenton Ryan (bryan@jjmconstruction.com); Heather Pratt (heather.pratt@wsp.com); Midori Nicolson (midorin@telus.net)		
From:	Sam Xie, NHC Construction Engineer (KingcomeMR@nhcweb.com)		
Revision:	0	**Contract:**	WK24EPFLOOD0013
Date:	2023-12-04	**NHC No.:**	3007807
Client:	Ministry of Environment and Climate Change (ENV) & Dzawada'enuxw First Nation (DFN)	**Prime:**	JJM Construction Ltd. (JJM)

Conditions:

Review Date(s):	2023/11/27 – 2023/12/03	**Time(s):**	06:30 – 8:30 & 15:00 – 16:00
Drawing Ref.:	20231117 3007807 NHC 2900439 KINGCOME EDSM IFC R1	**Specification Ref.:**	Special Provisions in WK24EPFLOOD0013-JJM Construction Ltd. – Kingcome emergency debris and sediment removal – Final – Nov 2

Weather, Flow, and Predicted Tides:

Nov.27: 5 – 10˚C; Overcast; High Tide 5.5 m @ 12:30, Low Tide 2.1 m @ 6:22; Avg. river flow est: 40 m^3/s
Nov.28: 4 – 10˚C; Overcast; High Tide 5.4 m @ 13:10, Low Tide 2.2 m @ 7:05 Avg. river flow est: 37 m^3/s
Nov.29: 0 – 9˚C; Sunny; High Tide 5.2 m @ 13:50, Low Tide 2.4 m @ 7:47 Avg. river flow est: 30 m^3/s
Nov.30: (-1) – 8˚C; Fog and rain; High Tide 5.0 m @ 14:30, Low Tide 2.6 m @ 8:30 Avg. river flow est: 31 m^3/s
Dec.01: Light rain; High Tide 4.7 m @ 15:12, Low Tide 2.7 m @ 9:15 Avg. river flow est: 37 m^3/s
Dec.02: Rain; High Tide 4.4 m @ 15:59, Low Tide 2.9 m @ 10:05 Avg. river flow est: 49 m^3/s
Dec.03: Rain; High Tide 4.1 m @ 16:52 , Low Tide 2.9 m @ 11:05 Avg. river flow est: 82 m^3/s

For Reference: mean winter river flow estimate is 60 m^3/s

Location: Kingcome River, Kingcome Inlet, BC. (NAD83 UTM 9 N 696123 5646584)

Personnel & Equipment:

Refer to JJM Weekly Report for Contractor Personnel and Equipment. NHC Min Rep.: Alicia Van Boven (Nov. 27 – Nov. 30); Sam Xie (Nov. 30 – Dec. 03). Pacificus EM: Danae Shephard (Nov. 27 – Nov. 30); Celeste Landon (Nov. 30. – Dec. 03).

Observations:

General:

- Design progress for dredging is discussed in NHC's weekly Progress Report.

Field Review:

- The past weeks activities on-site included:
    - JJM conducted dredging between STA 0+060 m to STA 0+170 m and re-worked between STA 0-020 and 0+035. Before Dec. 2, bed material was bulk dredged with a crane and clamshell bucket from the spud barge (Photo 1), while the refined grades were dredged with an excavator from a flat scow (Photo 2). The dredged material is fine grained silty-sand with some buried LWD.
    - On Dec. 2, bed material was dredged by the excavator on the flat scow, and the crane with the clamshell bucket focused on transferring the dredged material to the split-hull hopper barge. Starting on Dec. 3, bed material was dredged by the excavator to the flat scow or directly to the split-hull hopper barge, with the loader on the scow pushing materials to the split-hull hopper barge (Photo 3).

- The Catherwood and Gowlland tugboats help position the spud barge and flat scow at the desired station for dredging (Photo 4).
- Generally, dredged material was loaded onto a 200 m^3 split-hull hopper barge (Photo 5) and towed by the tugboats to the DAS site for disposal (Photo 6). In total, 37 split-hull hopper barge loads have been disposed at the DAS site this week.
- Dredged material was loaded onto the flat scow while the split-hull hopper barge was at the DAS site (Photo 7). The flat scow is towed to the DAS site by tugboats when workspace becomes limited, and the dredged material is offloaded by the JJM loader or excavator (Photo 8). In total, 2 scow loads have been disposed at the DAS site this week.
- Multibeam Bathymetric Surveys were completed from the JJM ME-006 jet boat on December 1st and 3rd. using a Norbit Subsea Multibeam Sounder (Photo 9). Sounds-velocity measurements were completed using an AML oceanographic sensor.
- The FBD crew continued debris trimming from the JJM ME-008 jet boat. The debris trimming locations each day depend on the tide and current conditions. The jet boat remains anchored in one spot while the divers remain tethered to the boat and remove debris in the vicinity using a small chainsaw, a long chainsaw, a hand saw, or a wedge and hammer. Some debris trimming can be completed efficiently from the boat by standing in water with a hand saw at low tides (Photo 10).

- NHC witnessed the debris trimming on Nov. 28, Nov. 29, and Dec. 02. All trimmed LWD observed floating in the river was a maximum length of 2 m, and debris embedded in the banks was not removed as per the special provision 5.01(a). Additionally, LWD within 5 m of the channel banks is not being removed because it is outside DFN's navigation channel (Photo 110) The FBD divers are estimating 2 m cuts based on their personal wingspan.
- NHC witnessed that that the LWD identified in IMG_ 7965, IMG_7966, IMG_7978, and IMG_7932 of the IFC R1 drawings was trimmed down to approximately bed level without disturbing the bed material (Photo 12).
- Several of the LWD pieces have moved since the IFC LWD locations were identified. As such, a DFN boat operator representative is directing the debris trimming and is satisfied with the LWD removal in DFN's primary navigation channel in Kingcome River (Personal Communications with DFN's Hema Willie). NHC is reviewing the locations and verifying the field fit approach to the LWD trimming work. Hazardous LWD is identified at low tide, flagged with buoys (Photo 13), and trimmed during daylight hours.
- The NHC Weekly Progress Report No.2 reports a large number of debris cuts that will exceed NHC's initial predictions. This difference may in part be due to there being more debris present under water that could not be observed during the low tide field inspection. However, it was also observed that FBD is reporting cuts for branches 3" diameter and larger (Photo 14), whereas NHC's estimation was based on substantial cuts of tree trucks and larger branches. This discrepancy is not a concern; however, it is resulting in a larger number of measured cuts than initially predicted. The work is still progressing quickly, and it is anticipated that FBD can complete the debris trimming work by Dec. 10.

Deficiencies:

- No Deficiencies Identified.

Photographs:



Photo 1. Crane attachments for dredging and LWD removal.



Photo 2. Looking northwest at JJM excavator dredging from the flat scow at approximately STA 0+040.



Photo 3. Excavator placing dredged material directly onto the split-hull hopper barge, with loader pushing materials from the flat scow to the split-hull hopper barge.



Photo 4. Catherwood Tugboat positioning the scow alongside the spud barge.

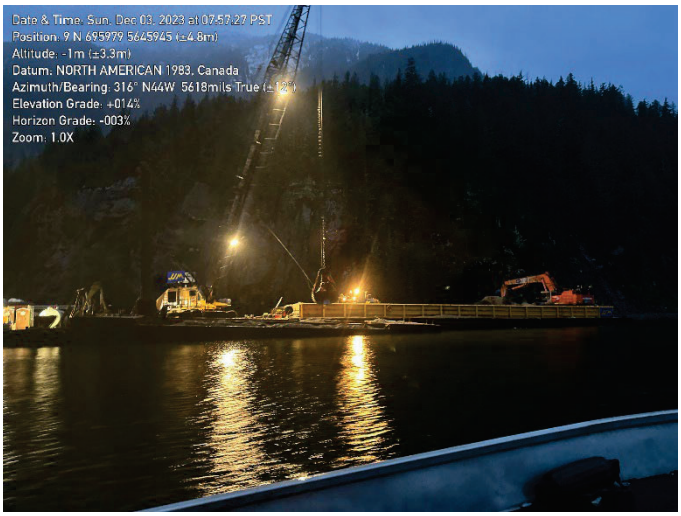


Photo 5. *Crane loading dredged material on the split-hull hopper barge.*

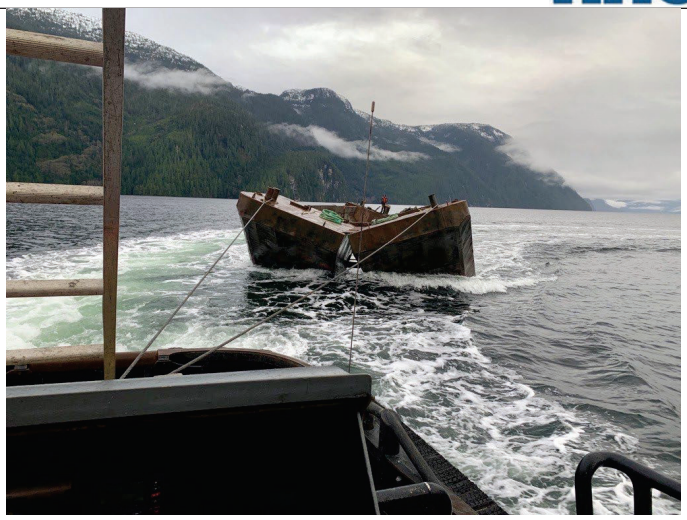


Photo 6. Split-hull hopper barge dredge disposal at the DAS site.



Photo 7. Excavator loading dredged material on the flat scow.



Photo 8. Excavator and loader disposing of dredged material from the flat scow at the DAS site.



***Photo* 9.** *JJM ME-006 Survey Jet Boat*

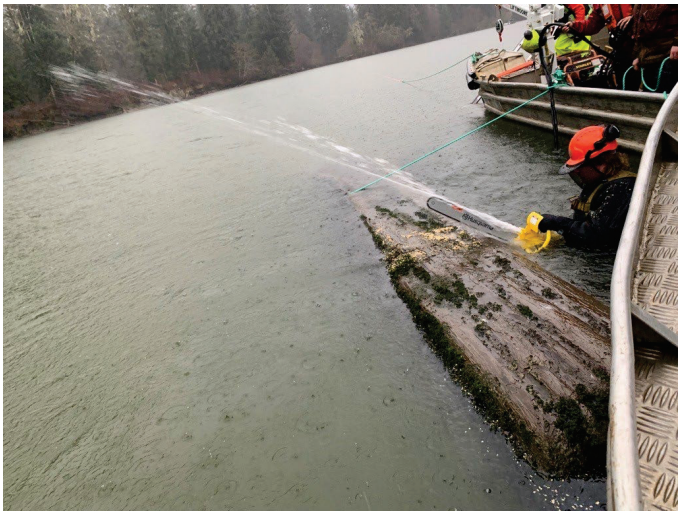


Photo 10. JJM ME-008 Dive Boat and FBD diver trimming LWD.



Photo 11. LWDs within 5 m of the channel banks are not removed.

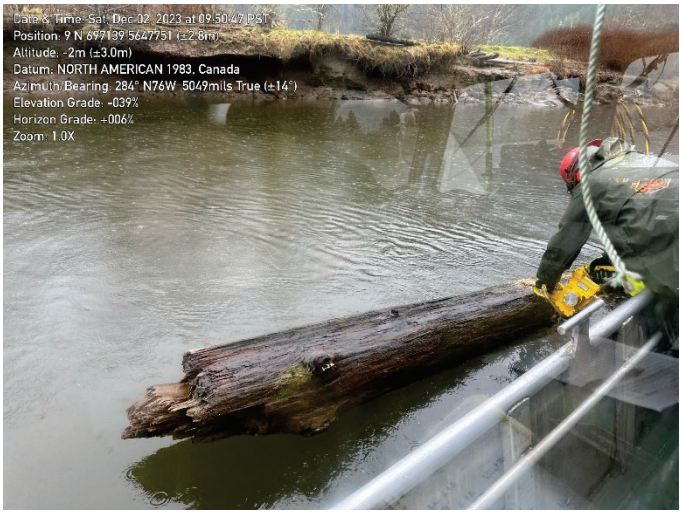


Photo 12. LWD trimmed at IMG_7978 of the IFC R1 drawings



Photo 13. Hazardous debris marked by bouyant at IMG_7843 of the IFC R1 drawings



Photo 14. Branches larger than 3" were trimmed and counted towards number of cuts

Signature:

Sam Xie E.I.T. 2023/12/05

Reviewed by Des Goold P.Eng. 2023/12/05.

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northwest hydraulic consultants

Field Review #3

Project:	Kingcome River – Emergency Debris and Sediment Management Project		
To:	Amy Vallarino (amy.vallarino@gov.bc.ca); Dawn Nicolson (dfnadministrator@kingcome.ca); Arshad Bastani (arshad@ashoprojects.com); Cameron McIntosh (cmcintosh@jjmconstruction.com); Sherman Yee (syee@jjmconstruction.com); Alex Heckels (aheckels@pacificus.ca); Liam Galbraith (lgalbraith@jjmconstruction.com); Mitch Brown (mbrown@jjmconstruction.com); Brenton Ryan (bryan@jjmconstruction.com); Heather Pratt (heather.pratt@wsp.com); Midori Nicolson (midorin@telus.net)		
From:	Alicia Van Boven, NHC Construction Engineer (KingcomeMR@nhcweb.com)		
Revision:	0	**Contract:**	WK24EPFLOOD0013
Date:	2023-12-12	**NHC No.:**	3007807
Client:	Ministry of Environment and Climate Change (ENV) & Dzawada'enuxw First Nation (DFN)	**Prime:**	JJM Construction Ltd. (JJM)

Conditions:

Review Date(s):	2023/12/04 – 2023/12/10	**Time(s):**	06:30 – 8:30 & 16:00 – 17:30
Drawing Ref.:	20231117 3007807 NHC 2900439 KINGCOME EDSM IFC R1	**Specification Ref.:**	Special Provisions in WK24EPFLOOD0013-JJM Construction Ltd. – Kingcome emergency debris and sediment removal – Final – Nov 2

Weather, Flow, and Predicted Tides:

Dec.04: 3 – 5˚C; Heavy Rain; High Tide 3.9m @ 17:55, Low Tide 2.9m @ 12:22; Avg. river flow est: 283 m^3/s
Dec.05: 3 – 6˚C; Heavy Rain; High Tide 4.2m @ 07:32, Low Tide 2.8m @ 13:47 Avg. river flow est: 298 m^3/s
Dec.06: 5 – 7˚C; Overcast; High Tide 4.3m @ 08:17, Low Tide 2.5m @ 14:55 Avg. river flow est: 215 m^3/s
Dec.07: 0 – 7˚C; Sunny; High Tide 4.4m @ 08:56, Low Tide 2.2m @ 15:46 Avg. river flow est: 85 m^3/s
Dec.08: 1 – 6˚C; Sunny; High Tide 4.6m @ 09:32, Low Tide 1.9m @ 16:27 Avg. river flow est: 51 m^3/s
Dec.09: 1 – 7˚C; Light Rain, Wind Warning; High Tide 4.8m @ 10:07, Low Tide 1.5m @ 17:06 Avg. river flow est: 46 m^3/s
Dec.10: 1 – 7˚C; Light Rain; High Tide 5.0m @ 10:42, Low Tide 1.2m @ 17:43 Avg. river flow est: 58 m^3/s

Location: Kingcome River, Kingcome Inlet, BC. (NAD83 UTM 9 N 696123 5646584)

Personnel & Equipment:

Refer to JJM Weekly Report for Contractor Personnel and Equipment. NHC Min Rep.: Sam Xie (Dec. 04 – Dec. 06); Alicia Van Boven (Dec. 06 – Dec. 10). Pacificus EM: Celeste Landon (Dec. 04 – Dec. 07); Brittany (Dec. 10).

Observations:

General:

- Design progress for dredging is discussed in NHC's weekly progress report.

Field Review:

- The past weeks activities on-site included:
    - JJM conducted dredging between STA 0+170 m to STA 0+245 and re-worked between STA 0+020 and 0+040 and STA 0+120 to 0+150. Bed material was bulk dredged with a Manitowoc 4000 Crane on Dec. 07 – Dec. 10 (Photo 1), while refined grades were dredged with a 1200 Hitachi Excavator from a flat scow (Photo 2). The dredged material is fine grained silty-sand with some buried LWD.
    - The JJM 600 hp tugboat maneuvers the hopper barge in the dredge channel to the desired station for dredging and pulls the hopper barge short distances out to sea (Photo 3), while the 1000 hp Gowlland tugboat pulls the hopper barge to and from the DAS site. This construction methodology reduces sediment disturbance in the dredge channel that would occur from the larger 1000hp tugboats propellers.

- Generally, dredged material was loaded onto a 200 m^3 split-hull hopper barge and towed by the tugboat to the DAS site for disposal. This week 39 split-hull hopper barge loads were disposed at the DAS site. A total of 120loads have been disposed since construction began.
- Dredged material was loaded onto the flat scow while the split-hull hopper barge was at the DAS site. Dredged material on the flat scow is managed by the JJM loader, and the excavator offloads the material to the split barge when it returns from the DAS site. (Photo 4).
- Multibeam Bathymetric Surveys were completed from the JJM ME-006 jet boat on December 6th and 9th using a Norbit Subsea Multibeam Sounder. Sounds-velocity measurements were completed using an AML oceanographic sensor.
- The FBD crew continued debris trimming from the JJM ME-008 jet boat. The debris trimming locations each day depend on the tide and current conditions. The jet boat remains anchored in one spot while the divers are tethered to the boat and remove debris in the vicinity using a small hydraulic chainsaw, a long hydraulic chainsaw, a hand saw, or a wedge and hammer. Some debris trimming can be completed efficiently from the boat by standing in water with a hand saw at low tides.

- NHC reviewed the disposal location coordinates reported by JJM. As per special provision 4.01(c), all the dredge disposals were within the disposal site boundaries prescribed in the DAS permit and shown in the IFC drawings.
- NHC witnessed the debris trimming on Dec. 05, and Dec. 07, and Dec. 10. All trimmed LWD observed floating in the river was a maximum length of 2 m (Photo 5) and debris embedded in the banks or bed material was not removed as per the special provision 5.01(a). Additionally, LWD within 5 m of the channel banks is not being removed because it is outside DFN's navigation channel. The FBD divers are estimating 2 m cuts based on their personal wingspan.
- Overnight on Dec. 04, a large tree fell into the river and spanned approximately a third of the mainstem channel at low tide. FBD immediately removed this hazard on Dec. 05 and trimmed back the tree to the bank (Photo 6).
- NHC witnessed that debris identified in IMG_7843 & IMG_7847 of the IFC R1 drawings was trimmed down to approximately bed level without disturbing the banks bed material. Additionally, NHC verified that select debris identified in IMG_7980 at the inlet to the "short cut" channel were trimmed down (Photo 7 & Photo 8) without dismantling the entire log jam (as per the notes on sheet 010 of the IFC drawings). NHC and the DFN debris trimming monitor directed FBD to clear approximately 75 m of the side channel inlet to enhance safe navigation for DFN given that several LWD's were present in this reach (Photo 9).
- Several of the LWD pieces have moved since the IFC LWD locations were identified. As such, a DFN member, Hema Willie, has been directing the debris trimming and has indicated he is satisfied with the LWD removal in DFN's primary navigation channel in Kingcome River (Personal Communications). NHC has been reviewing the locations and verifying the field fit approach to the Debris Trimming work. On Dec. 8 at low tide, NHC and DFN boat operators (Thomas Moon and Hema Willie) carried out a final field review of the IFC Debris Trimming locations and flagged any identified remaining uncut debris with buoys, so that it could be trimmed during daylight hours.
- The NHC Weekly Progress Report No.3 reports a large number of debris cuts that will exceed NHC's initial predictions. This difference may in part be due to there being more debris present under water that could not be observed during the low tide field inspection. However, it was also observed that FBD is reporting cuts for branches 3" diameter and larger, whereas NHC's estimation was based on substantial cuts of tree trunks and larger branches. This discrepancy is not a concern; however, it is resulting in a larger number of measured cuts than initially predicted.
- The debris trimming scope was completed on Dec. 10.
- A small spill of approximately 0.5 L occurred on Dec. 7 and is discussed in detail in the Pacificus weekly environmental report.

Deficiencies:

- No Deficiencies Identified.

Photographs:

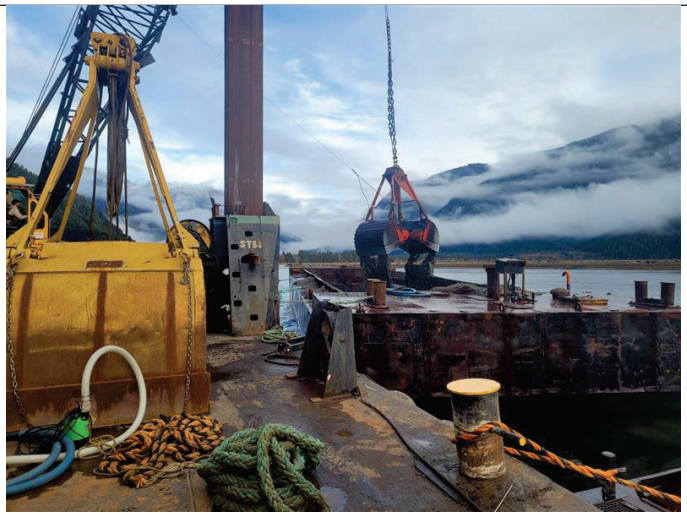


Photo 1. Looking south at JJM Crane bulk dredging material from the spud barge at approximately STA 0+250

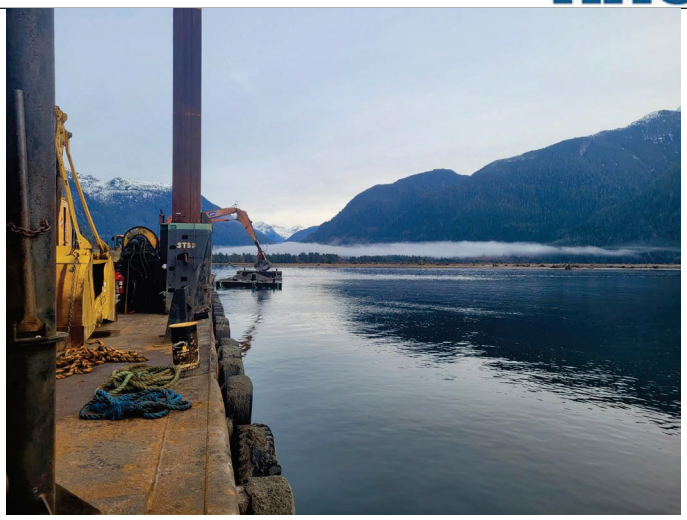


Photo 2. Looking south at JJM 1200 excavator dredging from the flat scow and loading the split haul hopper barge at approximately STA 0+200.



Photo 3. Tugboat hauling the fully loaded split haul hopper barge.

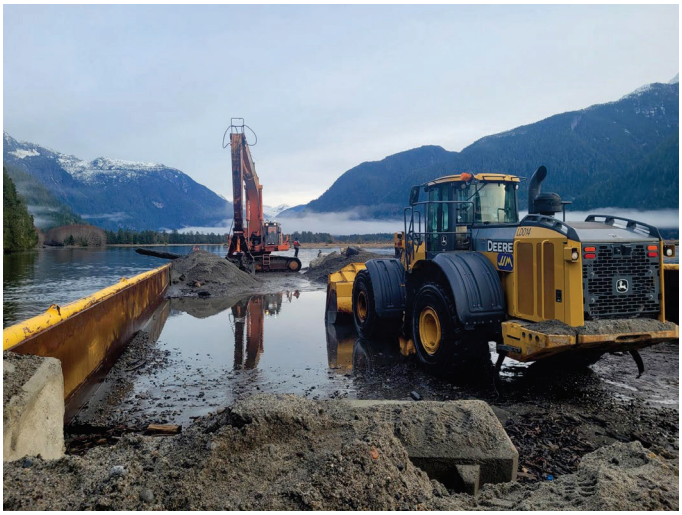


Photo 4. JJM 1200 excavator dredging and loading the flat scow at approximately STA 0+200.

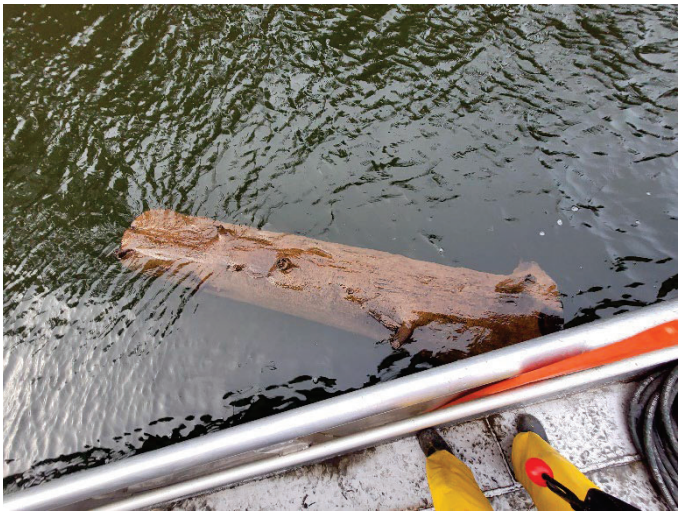


Photo 5. Debris trimmed to a length less than 2m at IMG_7843.



Photo 6. Large tree fell into the river on the left bank approximately 1 km downstream of the U'Kwa Nalis Village.



Photo 7. Debris trimming along the right bank of the "short cut" side channel inlet.

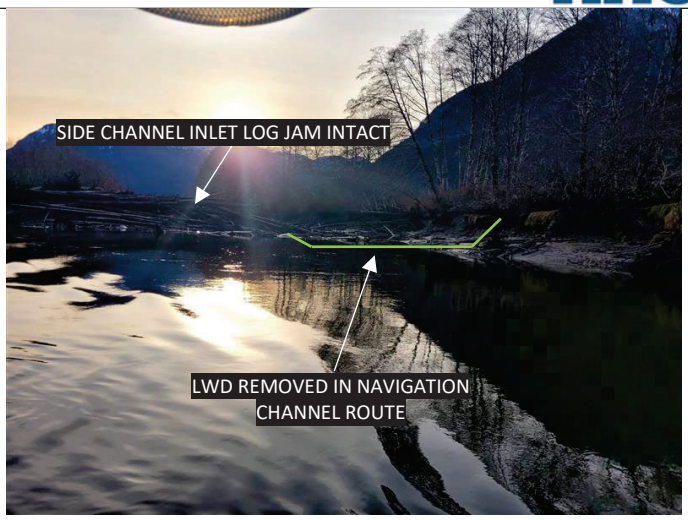


Photo 8. Looking downstream at completed debris trimming of the "Short Cut" side channel inlet located approximately 3.7 km downstream of the U'Kwa Nalis Village.



Photo 9. Looking upstream at debris spanning the "short cut" inlet.

Signature:

Alicia Van Boven E.I.T. 2023/12/12

Reviewed by Des Goold P.Eng. 2023/12/12.

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Field Review #4

Project:	Kingcome River – Emergency Debris and Sediment Management Project		
To:	Amy Vallarino (amy.vallarino@gov.bc.ca); Dawn Nicolson (dfnadministrator@kingcome.ca); Arshad Bastani (arshad@ashoprojects.com); Cameron McIntosh (cmcintosh@jjmconstruction.com); Sherman Yee (syee@jjmconstruction.com); Alex Heckels (aheckels@pacificus.ca); Liam Galbraith (lgalbraith@jjmconstruction.com); Mitch Brown (mbrown@jjmconstruction.com); Brenton Ryan (bryan@jjmconstruction.com); Heather Pratt (heather.pratt@wsp.com); Midori Nicolson (midorin@telus.net)		
From:	Veronique Bourgault, NHC Construction Engineer (KingcomeMR@nhcweb.com)		
Revision:	0	**Contract:**	WK24EPFLOOD0013
Date:	2023-12-19	**NHC No.:**	3007807
Client:	Ministry of Environment and Climate Change (ENV) & Dzawada'enuxw First Nation (DFN)	**Prime:**	JJM Construction Ltd. (JJM)

Conditions:

Review Date(s):	2023/12/10 – 2023/12/17	**Time(s):**	06:30 – 8:30 & 16:00 – 17:30
Drawing Ref.:	20231117 3007807 NHC 2900439 KINGCOME EDSM IFC R1	**Specification Ref.:**	Special Provisions in WK24EPFLOOD0013-JJM Construction Ltd. – Kingcome emergency debris and sediment removal – Final – Nov 2

Weather, Flow, and Predicted Tides:

Dec.10: 2 – 4˚C; Rain; High Tide 5.0m @ 11:42, Low Tide 1.2m @ 18:43; Avg. river flow est: 51 m^3/s
Dec.11: 3 – 7˚C; Sunny; High Tide 5.2m @ 12:19, Low Tide 0.9m @ 19:23; Avg. river flow est: 57 m^3/s
Dec.12: 2 – 8˚C; Sunny and overcast; High Tide 5.4m @ 12:58, Low Tide 0.6m @ 20:04; Avg. river flow est: 39 m^3/s
Dec.13: 4 – 7˚C; Cloudy; High Tide 5.5m @ 13:40, Low Tide 0.5m @ 20:48; Avg. river flow est: 79 m^3/s
Dec.14: 4 – 6˚C; Rain; High Tide 5.5m @ 14:25, Low Tide 0.5m @ 21:33; Avg. river flow est: 62 m^3/s
Dec.15: 1 – 5˚C; Moderate/Heavy Rain Showers; High Tide 5.4m @ 15:14, Low Tide 0.5m @ 22:19 Avg. river flow est: 227 m^3/s
Dec.16: 7˚C; Showers; High Tide 5.2m @ 16:06, Low Tide 0.7m @ 23:06 Avg. river flow est: 317 m^3/s
Dec.17: 10˚C; Sunny + Overcast; High Tide 5.0m @ 017:03, Low Tide 0.9m @ 23:53 Avg. river flow est: 62 m^3/s

For Reference: mean winter river flow estimate is 60 m^3/s

Location: Kingcome River, Kingcome Inlet, BC. (NAD83 UTM 9 N 696123 5646584)

Personnel & Equipment:

Refer to JJM Weekly Report for Contractor Personnel and Equipment. NHC Min Rep.: Alicia Van Boven (Dec. 06 – Dec. 14); Alicia Van Boven (Dec. 14 – Dec. 22). Pacificus EM: Brittany Blanchard (Dec. 10 – Dec. 14); Heather (Dec. 10 – Dec. 20).

Observations:

General:

- Design progress for dredging is discussed in NHC's weekly progress report.
- The debris trimming scope was completed on Dec. 10.

Field Review:

- The past weeks activities on-site included:

- JJM conducted dredging between STA 0+245 m to STA 0+360 and re-worked between STA 0+020 and 0+055, and STA 0+055 and 0+070. Bed material was bulk dredged with a Manitowoc 4000 Crane on Dec. 07 – Dec. 11, while refined grades were dredged with a 1200 Hitachi Excavator from a flat scow (Photo 1, Photo 2). The 1200 Hitachi Excavator was back in action on Dec. 12. The dredged material is fine grained silty-sand, gravel, clay, and some buried LWD.
- The JJM 600 hp tugboat maneuvers the hopper barge in the dredge channel to the desired station for dredging and pulls the hopper barge short distances out to sea, while the 1000 hp Gowlland tugboat pulls the hopper barge to and from the DAS site (Photo 3). This construction methodology reduces sediment disturbance in the dredge channel that would occur from the larger 1000hp tugboats propellers.
- Generally, dredged material was loaded onto a 200 m^3 split-hull hopper barge and towed by the tugboat to the DAS site for disposal. This week 41 split-hull hopper barge loads were disposed at the DAS site (one of those was slightly outside of the DAS site). A total of 169 loads have been disposed since construction began.
- Dredged material was loaded onto the flat scow while the split-hull hopper barge was at the DAS site. Dredged material on the flat scow is managed by the JJM loader, and the excavator offloads the material to the split barge when it returns from the DAS site. (Photo 4, Photo 5, Photo 6).
- JJM's Norbit Subsea Multibeam Sounder broke down on Dec. 10. Multibeam Bathymetric Surveys were not provided from Dec. 10 through Dec. 19, when Proinnsias will bring in another Sonder. Sounds-velocity measurements were completed using an AML oceanographic sensor.
- A night shift crew started on Dec. 13, including Peter Coon from the nation and 3 JJM staff, including a welder. They are conducting welding on the excavator bucket to add armour, as the excavator bucket is slowly wearing out due to the abrasive material. The last evening shift is planned for the night from Dec. 17 to Dec. 18.
- In preparation for the Christmas break, pendant lines are being fixed, and the sand, silt, and clay are being cleaned off of the barge. They are also picking up everything that is laying around and disposing of any trash including wood pellets. The aim is to make sure nothing gets frozen to the deck and there is nothing to move around over the break. Dec. 20 is reserved for finishing the cleaning and organizing, and moving the barge to its holding location for the break, and dredging will not be occurring this day.

Environmental:

- NHC reviewed the disposal location coordinates reported by JJM. One load from the split barge (150 cubic meters) was disposed 90 m outside of the DAS site, on Dec. 13. As per special provision 4.01(c), the rest of the dredge disposals were within the disposal site boundaries prescribed in the DAS permit and shown in the IFC drawings.

Safety:

- Heather received safety orientation for the JJM barge on Dec. 16.

Deficiencies:

- No Deficiencies Identified.

Photographs:

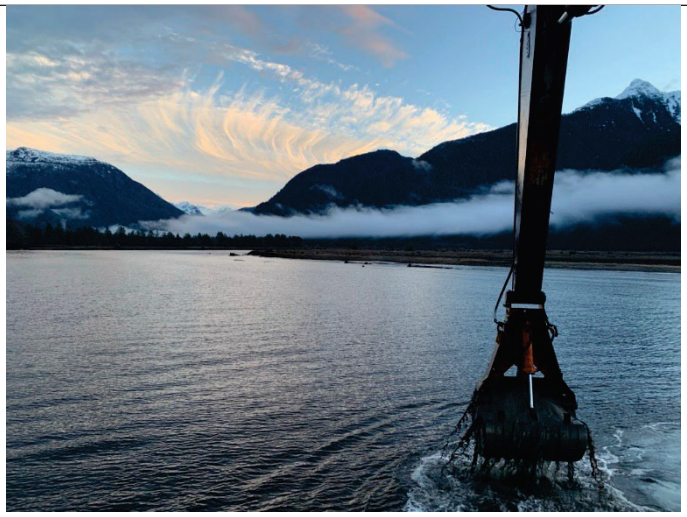


Photo 1. Looking south at JJM Hitachi excavator bulk dredging material from the spud barge at approximately STA 0+340

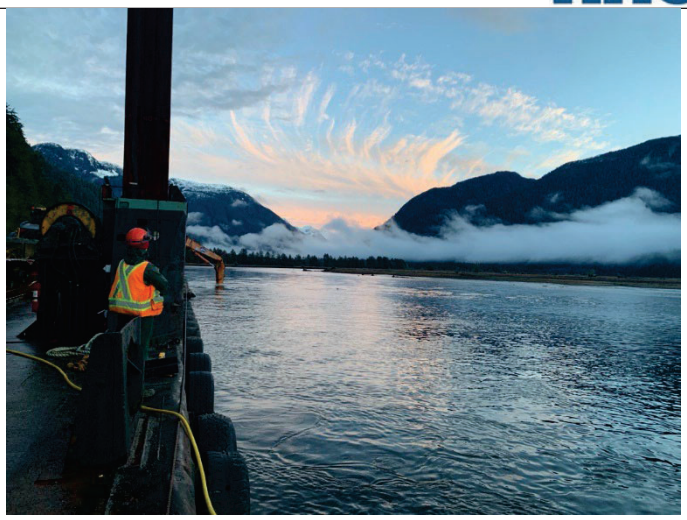


Photo 2. Looking south at JJM 1200 excavator dredging from the flat scow and loading the split haul hopper barge at approximately STA 0+340.

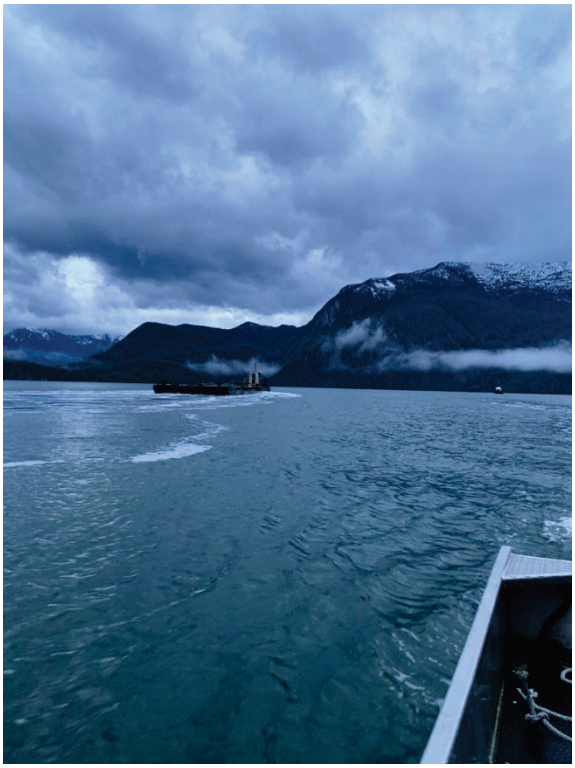


Photo 3. Tugboat hauling the fully loaded split haul hopper barge.



Photo 4. JJM 1200 excavator dredging and loading the flat scow while the split barge is dumping material at DAS site, at approximately STA 0+340.



Photo 5. Dredged material showing primarily sand, silt, and gravel at approximately STA 0+340.

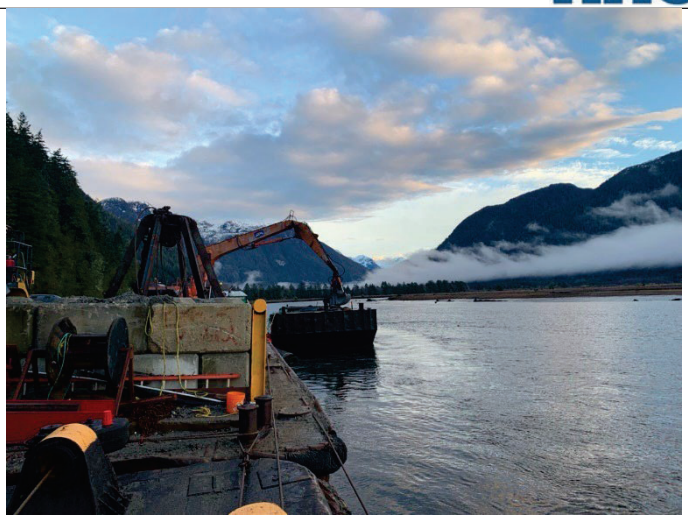


Photo 6. JJM moving material from flat scow to split barge at approximately STA 0+340.

Signature:

Veronique Bourgault E.I.T. 2023/12/19

Reviewed by Des Goold P.Eng. 2023/12/19.

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Field Review #5

Project:	Kingcome River – Emergency Debris and Sediment Management Project		
To:	Amy Vallarino (amy.vallarino@gov.bc.ca); Dawn Nicolson (dfnadministrator@kingcome.ca); Arshad Bastani (arshad@ashoprojects.com); Cameron McIntosh (cmcintosh@jjmconstruction.com); Sherman Yee (syee@jjmconstruction.com); Alex Heckels (aheckels@pacificus.ca); Liam Galbraith (lgalbraith@jjmconstruction.com); Mitch Brown (mbrown@jjmconstruction.com); Brenton Ryan (bryan@jjmconstruction.com); Heather Pratt (heather.pratt@wsp.com); Midori Nicolson (midorin@telus.net)		
From:	Veronique Bourgault, NHC Construction Engineer (KingcomeMR@nhcweb.com)		
Revision:	0	**Contract:**	WK24EPFLOOD0013
Date:	2023-12-22	**NHC No.:**	3007807
Client:	Ministry of Environment and Climate Change (ENV) & Dzawada'enuxw First Nation (DFN)	**Prime:**	JJM Construction Ltd. (JJM)

Conditions:

Review Date(s):	2023/12/18 – 2023/12/21	**Time(s):**	06:30 onward/ variable
Drawing Ref.:	20231117 3007807 NHC 2900439 KINGCOME EDSM IFC R1	**Specification Ref.:**	Special Provisions in WK24EPFLOOD0013-JJM Construction Ltd. – Kingcome emergency debris and sediment removal – Final – Nov 2

Weather, Flow, and Predicted Tides:

Dec.18: 6˚C; Rain; High Tide 4.7m @ 06:39, 18:06, Low Tide 2.4m @ 12:13 Avg. river flow est: 241 m^3/s
Dec.19: 7˚C; Rain; High Tide 4.7m @ 07:32, Low Tide 1.2m @ 00:44 Avg. river flow est: 235 m^3/s
Dec.20: 7˚C; Light Rain; High Tide 4.8m @ 08:23, Low Tide 1.5m @ 01:38 Avg. river flow est: 188 m^3/s
Dec. 21: 6˚C; Rain; High Tide 5.0m @ 09:14, Low Tide 1.7m @ 16:00 Avg. river flow est: 166 m^3/s
Dec. 22: 6˚C; Rain; High Tide 5.1m @ 10:04, Low Tide 1.3m @ 17:00 Avg. river flow est: N/A

For Reference: mean winter river flow estimate is 60 m^3/s

Location: Kingcome River, Kingcome Inlet, BC. (NAD83 UTM 9 N 696123 5646584)

Personnel & Equipment:

Refer to JJM Weekly Report for Contractor Personnel and Equipment. NHC Min Rep.: Veronique Bourgault (Dec. 14 – Dec. 21). Pacificus EM: Heather Gough (Dec. 17 – Dec. 21).

Observations:

General:

- Design progress for dredging is discussed in NHC's weekly progress report.

Field Review:

- The past weeks activities on-site included:
    - JJM conducted dredging between STA 0+360 m to STA 0+375 and did not rework any sections. Bed material was bulk dredged with a 1200 Hitachi Excavator from a flat scow (Photo 2). The dredged material is fine grained silty-sand, gravel, clay, and some buried LWD.
    - The JJM 600 hp tugboat maneuvers the hopper barge in the dredge channel to the desired station for dredging and pulls the hopper barge short distances out to sea (Photo 3), while the 1000 hp Gowlland tugboat pulls the hopper barge to and from the DAS site. This construction methodology reduces sediment disturbance in the dredge channel that would occur from the larger 1000hp tugboats propellers.
    - Generally, dredged material was loaded onto a 200 m^3 split-hull hopper barge and towed by the tugboat to the DAS site for disposal. This week 8 split-hull hopper barge loads were disposed at the DAS site. A total of 179 loads have been disposed since construction began.

- Dredged material was loaded onto the flat scow while the split-hull hopper barge was at the DAS site. Dredged material on the flat scow is managed by the JJM loader, and the excavator offloads the material to the split barge when it returns from the DAS site. (Photo 4).
- JJM's Norbit Subsea Multibeam Sounder broke down on Dec. 10. Multibeam Bathymetric Surveys were not provided from Dec. 10 through Dec. 18, when JJM brought in another Sonder. Sounds-velocity measurements were completed using an AML oceanographic sensor.
- A night shift crew started on Dec. 13, including Peter Coon from the DFN and 3 JJM staff, including a welder. They are conducting welding on the excavator bucket to add armour, as the excavator bucket is slowly wearing out due to the abrasive material. The last evening shift was the night from Dec. 17 to Dec. 18.
- JJM surveyor (Proinnsias) and mechanic (Adam) arrived on Dec. 18. Adam on site to perform multiple services, including replacing bushings and cylinders on the 1200 Hitachi Excavator. The 1200 excavator was down for Dec. 19. No dredging occurred Dec. 19.
- NHC witnessed the bathymetric progress survey performed Dec. 19 to measure changes in the seafloor and dredging area since Dec. 9. NHC received the results of this survey on Dec. 21.
- Dec. 20 is reserved for cleanup and staging and winterizing the barge for the Christmas break, from December 21 to January 2. The JJM crew left Kingcome Dec. 21 on a plane to Vancouver and a water taxi to Port McNeill due to a storm coming into the area during the afternoon of Dec. 21. Pacificus and NHC left Kingcome on Dec. 21, NHC on the plane with JJM to Vancouver and Pacificus on the water taxi to Port McNeill. No dredging occurred on Dec. 20.
- NHC was on site to witness an additional survey, requested from JJM by NHC on behalf of ENV: survey from the 100 m downstream of the downstream limit (0-150), to 100 m upstream of the original, upstream Limit of Construction 1+150, conducted on Dec. 20 AM.
- Primary means of anchoring during the holiday break are spuds from the 209 barge, secondary means are two 8000 lb anchors set off of the bow of the 209 barge at a forty-five degree angle. Deck winches are seated into place and set to be secondary anchor if something fails with the spuds. JJM has retained DFN members to monitor the anchored vessels during the holiday break.

Deficiencies:

- No Deficiencies Identified.

Photographs:



Photo 1. Looking south as JJM conducts bathymetric survey on Dec. 19.

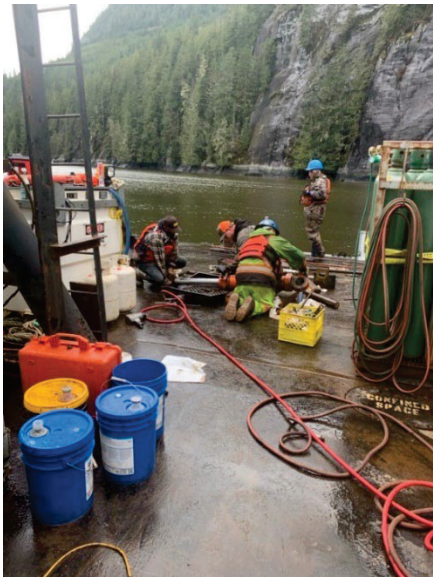


Photo 2. JJM conducting repairs on the 1200 Hitachi Excavator cylinders.

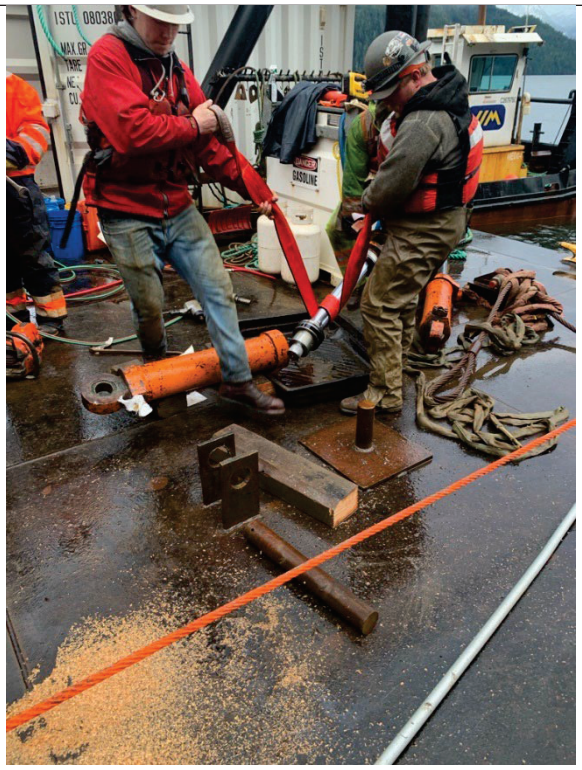


Photo 3. JJM conducting repairs on the 1200 Hitachi Excavator cylinders.



Photo 5. JJM moving barge into position for winterizing and staging over Christmas break.



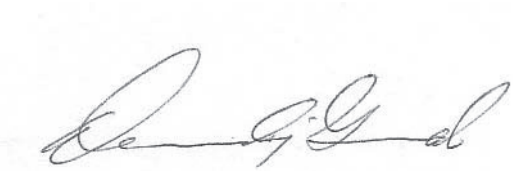
Photo 4. JJM anchoring barge east of the dredging channel.

Signature:



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Veronique Bourgault E.I.T. 2023/12/22



Reviewed by Des Goold P.Eng. 2023/12/22.

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northwest hydraulic consultants

Field Review #6

Project:	Kingcome River – Emergency Debris and Sediment Management Project		
To:	Amy Vallarino (amy.vallarino@gov.bc.ca); Dawn Nicolson (dfnadministrator@kingcome.ca); Arshad Bastani (arshad@ashoprojects.com); Cameron McIntosh (cmcintosh@jjmconstruction.com); Sherman Yee (syee@jjmconstruction.com); Alex Heckels (aheckels@pacificus.ca); Liam Galbraith (lgalbraith@jjmconstruction.com); Mitch Brown (mbrown@jjmconstruction.com); Brenton Ryan (bryan@jjmconstruction.com); Heather Pratt (heather.pratt@wsp.com); Midori Nicolson (midorin@telus.net)		
From:	Veronique Bourgault, NHC Construction Engineer (KingcomeMR@nhcweb.com)		
Revision:	0	**Contract:**	WK24EPFLOOD0013
Date:	2024-01-10	**NHC No.:**	3007807
Client:	Ministry of Environment and Climate Change (ENV) & Dzawada'enuxw First Nation (DFN)	**Prime:**	JJM Construction Ltd. (JJM)

Conditions:

Review Date(s):	2024/01/03 – 2024/01/07	**Time(s):**	06:30 – 8:30 & 16:00 – 17:30
Drawing Ref.:	20231117 3007807 NHC 2900439 KINGCOME EDSM IFC R1	**Specification Ref.:**	Special Provisions in WK24EPFLOOD0013-JJM Construction Ltd. – Kingcome emergency debris and sediment removal – Final – Nov 2

Weather, Flow, and Predicted Tides:

Jan 03: 5˚C; Clouds and Rain; High Tide 4.3m @ 07:17, Low Tide 2.6m @ 13:36; Avg. river flow est: 64 m^3/s
Jan 04: 7˚C; Heavy rain morning, sunny afternoon; High Tide 4.4m @ 07:57, Low Tide 2.2m @ 01:10; Avg. river flow est: 112 m^3/s. Gale warning in effect through Jan 05 AM.
Jan 05: 1 – 4˚C; Rain; High Tide 4.5m @ 08:41, Low Tide 2.2m @ 15:54; Avg. river flow est: 39 m^3/s
Jan 06: 2 – 3˚C; Rain and Snow; High Tide 4.6m @ 09:29, Low Tide 1.9m @ 16:49; Avg. river flow est: 79 m^3/s
Jan 07: 0 – 1˚C; Sunny; High Tide 4.8m @ 10:17, Low Tide 1.5m @ 17:39; Avg. river flow est: 62 m^3/s

Forecast:
Jan 08: 3˚C; Rain and snow; High Tide 5.0m @ 11:06, Low Tide 1.2m @ 18:25 Avg. river flow est: 38
Jan 09: 0 – 2˚C; Snow; High Tide 5.2m @ 11:54, Low Tide 0.9m @ 19:11 Avg. river flow est: 42
Jan 10: 0˚ C; Mix of sun and clouds; High Tide 5.4m @ 12:43, Low Tide 0.6m @ 19:55 Avg. river flow est: N/A
Jan 11: -5 – -10˚C; Sunny; High Tide 5.5m @ 13:31, Low Tide 0.4m @ 20:39 Avg. river flow est: N/A

For Reference: mean winter river flow estimate is 60 m^3/s. Note tides tend to be more extreme than predicted by CHS and peaks occur about an hour and a half before predicted extremes. Cold weather is expected in the coming week, which could affect productivity due to ice and travel ability.

Location: Kingcome River, Kingcome Inlet, BC. (NAD83 UTM 9 N 696123 5646584)

Personnel & Equipment:

Refer to JJM Weekly Report for Contractor Personnel and Equipment. NHC Min Rep.: Veronique Bourgault (Jan. 03 – Jan. 11). Pacificus EM: Dan (Jan. 03 – Jan. 11).

Observations:

General:

- Design progress for dredging is discussed in NHC's weekly progress report.
- The debris trimming scope was completed on Dec. 10, 2023

Field Review:

- Past weeks activities:
    - As part of returning Christmas break, 8 JJM workers were back on-site January 3.
    - Barge was moved from staging location on the morning of January 4 (Photo 1). Anchor and spuds were lifted, and internment spudding and lifting was used to spin the ME209 rig and maneuver it to the dredge channel.
    - Peter Coon from JJM is back on site.
    - Tugboats pulled rig and barges into location for dredging afternoon of Jan 4.
    - JJM conducted dredging between STA 0+380 m to STA 0+418 and re-dredged between STA 0+330 and 0+380.
        - Re-dredge was necessary due to infilling and sediment movement over the break and was discussed on Jan 05 with NHC, JJM, and ENV.
    - The new baseline survey for assessing dredge progress will be the survey taken on January 03 in order to account for the infilling and changed in bed level upstream of the dredge.
    - Bed material was bulk dredged with a 1200 Hitachi Excavator from a flat scow (Photo 3). The dredged material is fine grained silty-sand, gravel, clay, and some buried LWD.
    - The JJM 600 hp tugboat maneuvers the split-hull, hopper barge (ME302) in the dredge channel to the desired station for dredging and pulls the hopper barge short distances out to sea (Photo 3), while the 1000 hp Gowlland tugboat pulls the hopper barge to and from the DAS site. This construction methodology reduces sediment disturbance in the dredge channel that would occur from the larger 1000hp tugboats propellers.
    - Generally, dredged material was loaded onto a 200 m^3 split-hull hopper barge and towed by the tugboat to the DAS site for disposal. This week 28 split-hull hopper barge loads were disposed at the DAS site. A total of 205 loads have been disposed since construction began.
    - Dredged material was loaded onto the flat scow while the split-hull hopper barge was at the DAS site. Dredged material on the flat scow is managed by the JJM loader, and the excavator offloads the material to the split barge when it returns from the DAS site. (Photo 4).
    - In response to the infilling which occurred in the dredge channel over the Christmas break, JJM will be moving backwards on the afternoon of Jan. 06 from STA 0+370 to about STA 0+350, moving downstream to create a pocket in the previously dredged, infilled area in order to have space to position the ME209 barge.
    - At times, given the low tides and the ME209 2.0 m draft, there will not be sufficient water levels to stage the barge overnight where the daily dredging is occurring – thus there is a risk of grounding. To move the rig and barge back to this pocket each day when extreme low tides are forecast, JJM predicts 1 hour to 1.5 hour will be needed out of the daily dredging.

Environmental:

- NHC reviewed the disposal location coordinates reported by JJM. As per special provision 4.01(c), dredge disposals were within the disposal site boundaries prescribed in the DAS permit and shown in the IFC drawings.

Safety:

- Dan received safety orientation for the JJM barge on Jan. 04.

Deficiencies:

- No Deficiencies Identified.



Photo 1. JJM using tugs to maneuver rig from staging area east of dredge channel back to dredge channel Jan 4 AM.



Photo 2. Looking south at JJM 1200 excavator dredging from the flat scow and loading the split haul hopper barge at approximately STA 0+390.



Photo 3. Tugboat hauling the fully loaded split haul hopper barge.



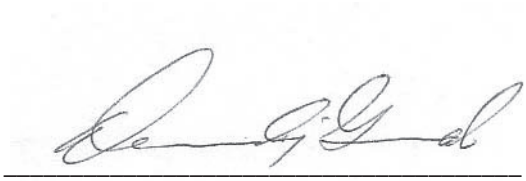
Photo 4. Tugboat returning with split barge after dumping at DAS site.

Signature:



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Veronique Bourgault E.I.T. 2024/01/10



_____

Reviewed by Des Goold P.Eng. 2024/01/10

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northwest hydraulic consultants

Field Review #7

Project:	Kingcome River – Emergency Debris and Sediment Management Project		
To:	Amy Vallarino (amy.vallarino@gov.bc.ca); Dawn Nicolson (dfnadministrator@kingcome.ca); Arshad Bastani (arshad@ashoprojects.com); Cameron McIntosh (cmcintosh@jjmconstruction.com); Sherman Yee (syee@jjmconstruction.com); Alex Heckels (aheckels@pacificus.ca); Liam Galbraith (lgalbraith@jjmconstruction.com); Mitch Brown (mbrown@jjmconstruction.com); Brenton Ryan (bryan@jjmconstruction.com); Heather Pratt (heather.pratt@wsp.com); Midori Nicolson (midorin@telus.net)		
From:	Veronique Bourgault, NHC Construction Engineer (KingcomeMR@nhcweb.com)		
Revision:	0	**Contract:**	WK24EPFLOOD0013
Date:	2024-01-18	**NHC No.:**	3007807
Client:	Ministry of Environment and Climate Change (ENV) & Dzawada'enuxw First Nation (DFN)	**Prime:**	JJM Construction Ltd. (JJM)

Conditions:

Review Date(s):	2024/01/09 – 2024/01/14	**Time(s):**	06:30 – 8:30 & 16:00 – 17:30
Drawing Ref.:	20231117 3007807 NHC 2900439 KINGCOME EDSM IFC R1	**Specification Ref.:**	Special Provisions in WK24EPFLOOD0013-JJM Construction Ltd. – Kingcome emergency debris and sediment removal – Final – Nov 2

Weather, Flow, and Predicted Tides:

Jan 09: 3˚C; Snow and Rain; High Tide 5.2m @ 11:00, Low Tide 0.9m @ 18:15; Avg. river flow est: 42 m^3/s
Jan 10: -4˚C; Sun and clouds; High Tide 5.4m @ 11:45, Low Tide 0.6m @ 17:00; Avg. river flow est: 40 m^3/s.
Arctic outflow and freezing spray through Saturday, Jan 13.
Jan 11: - 14˚C; Sunny; High Tide 5.5m @ 12:31, Low Tide 0.4m @ 19:39; Avg. river flow est: 30 m^3/s
Jan 12: -9 - -13˚C; Sunny; High Tide 5.6m @ 13:20, Low Tide 0.4m @ 20:21; Avg. river flow est: 21.5 m^3/s
Jan 13: -6 - -14˚C; Sunny; High Tide 5.5m @ 14:10, Low Tide 0.4m @ 21:02; Avg. river flow est: 21.2 m^3/s
Jan 14: 0 - -6 ˚C; Sunny; High Tide 5.4m @ 14:59, Low Tide 0.6m @ 21:42; Avg river flow est 20.7 m^3/s

Forecast (tides in CHS CD):
Jan 15: 3˚C; Rain and snow; High Tide 5.1m @ 15:52, Low Tide 0.9m @ 22:22.
Jan 16: 3˚C; Mixed Precipitation; High Tide 4.7m @ 16:48, Low Tide 1.3m @ 23:04.
Jan 17: 2˚ C; Sunny; High Tide 5.0m @ 05:44, Low Tide 1.8m @ 21:04.
Jan 18: 4 ˚ C; Mixed Precipitation; High Tide 5m @ 06:31, Low Tide 1.7m @ 13:16.
Jan 19: 7 ˚ C; Heavy Rain; High Tide 4.95m @ 07:30, Low Tide 1.6m @ 14:30.
Jan 20: 8 ˚ C; Rain; High Tide 4.9m @ 08:30, Low Tide 1.4m @ 15:45.
Jan 21: 9 ˚ C; Rain; High Tide 4.95m @ 09:30, Low Tide 1.2m @ 16:45.

For Reference: mean winter river flow estimate is 60 m^3/s. Note tides tend to be more extreme than predicted by CHS and peaks occur about an hour and a half before predicted extremes. Windy weather is expected in the coming week, which could affect productivity due to waves and travel ability.

Location: Kingcome River, Kingcome Inlet, BC. (NAD83 UTM 9 N 696123 5646584)

Personnel & Equipment:

Refer to JJM Weekly Report for Contractor Personnel and Equipment. NHC Min Rep.: Veronique Bourgault (Jan. 03 – Jan. 15), Sam Xie (Jan. 15 – Jan. 19). Pacificus EM: Dan (Jan. 03 – Jan. 11), Celeste (Jan. 11 – Jan. 19).

Observations:

General:

- Design progress for dredging is discussed in NHC's weekly progress report.
- The debris trimming scope was completed on Dec. 10, 2023

Field Review:

- Past weeks activities and issues:
    - JJM conducted dredging between STA 0+420 m to STA 0+523.
    - Progress Surveys were completed on Jan 11. and Jan 14.
    - Bed material was bulk dredged with a 1200 Hitachi Excavator from a flat scow (Photo 3). The dredged material is fine grained silty-sand, gravel, clay, and some buried LWD.
    - The JJM 600 hp tugboat maneuvers the split-hull, hopper barge (ME302) in the dredge channel to the desired station for dredging and pulls the hopper barge short distances out to sea (Photo 3), while the 1000 hp Gowland tugboat pulls the hopper barge to and from the DAS site. This construction methodology reduces sediment disturbance in the dredge channel that would occur from the larger 1000hp tugboats propellers.
    - Generally, dredged material was loaded onto a 200 m^3 split-hull hopper barge and towed by the tugboat to the DAS site for disposal. This week 36 split-hull hopper barge loads were disposed at the DAS site. A total of 241 loads have been disposed since construction began.
    - Dredged material was loaded onto the flat scow while the split-hull hopper barge was at the DAS site. Dredged material on the flat scow is managed by the JJM loader, and the excavator offloads the material to the split barge when it returns from the DAS site. (Photo 4).
    - At times, given the low tides and the ME209 2.0 m draft, there will not be sufficient water levels to stage the barge overnight where the daily dredging is occurring – thus there is a risk of grounding. The split barge was grounded one time on Jan. 10, and material was moved back into the flat scow to lighten the barge and raise it. Low tides this week also forced JJM to end dredging early, around 4:30pm to be able to access the bullpen.
    - Cold temperatures (-14 degrees Celsius) caused the Kingcome River to freeze, sending ice chunks moving down the river into the inlet starting in the afternoon of Jan. 12. Ice breaking and floating ice was monitored to ensure it would not heavily impact the barge.
    - No dredging occurred after 12:30pm on Jan. 13 for fueling of equipment. JJM moved the barges and rigs back out to the beginning of the channel (around STA 0-051) for fueling and remained there until the late morning on Jan. 14 in order to fully survey the dredge channel. JJM also conducted equipment repairs during the afternoon of Jan. 13.
    - Equipment malfunctions and breaking: JJM split barge switch to open and close the barge was broken on Jan. 12. Fixed by Mitch on morning of Jan. 13. Gowland tugboat had a spring snap in the steering on Jan. 13. Fixed by tugboat captain that afternoon. JJM tugboat also had several malfunctions on Jan. 13, fixed by Lucas on the afternoon of Jan. 13.

Environmental:

- NHC reviewed the disposal location coordinates reported by JJM. As per special provision 4.01(c), dredge disposals were within the disposal site boundaries prescribed in the DAS permit and shown in the IFC drawings.

Safety:

- Brandon received safety orientation for the JJM barge on Jan. 12.

Deficiencies:

- No Deficiencies Identified.

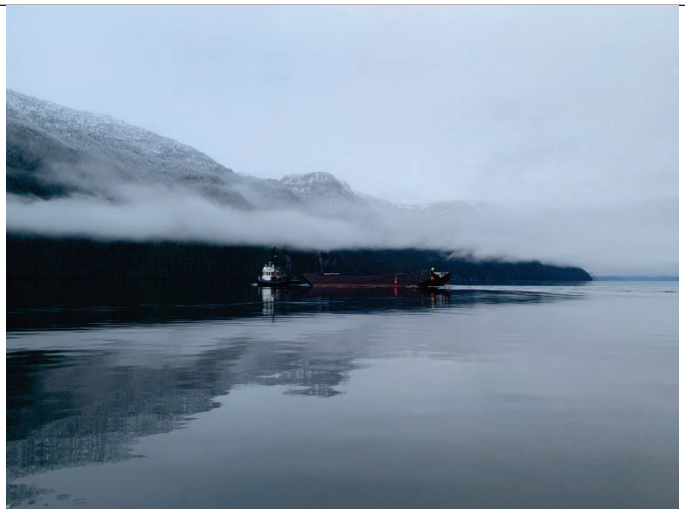


Photo 1. Tugboat bringing fully loaded barge out to disposal site.

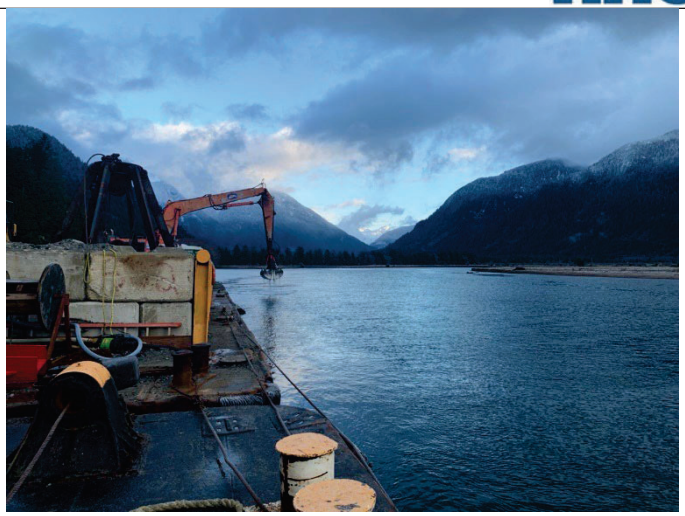


Photo 2. Looking south at JJM 1200 excavator dredging from the flat scow and loading the split haul hopper barge at approximately STA 0+430.



Photo 3. Placing dredged material on flat scow barge while split barge is at DAS site.

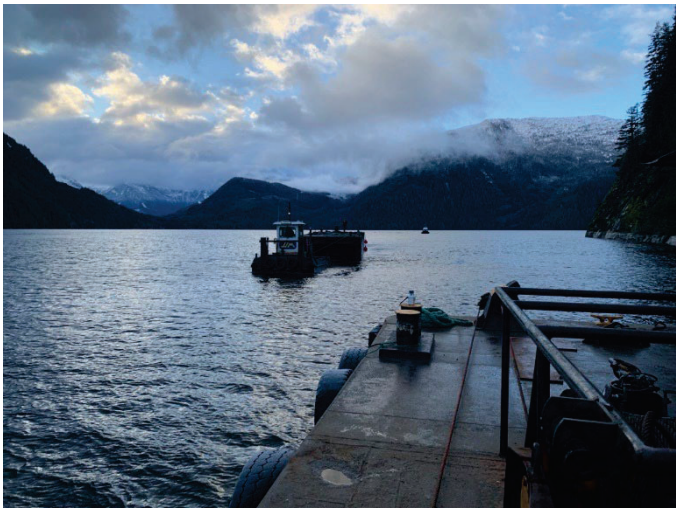


Photo 4. Tugboat returning with split barge after dumping at DAS site.



Photo 5. Kingcome River at 1pm on January 12, showing ice accumulation in the river. DFN members used their boats to break up the ice for access, which resulted in large chunks of ice floating down the river.

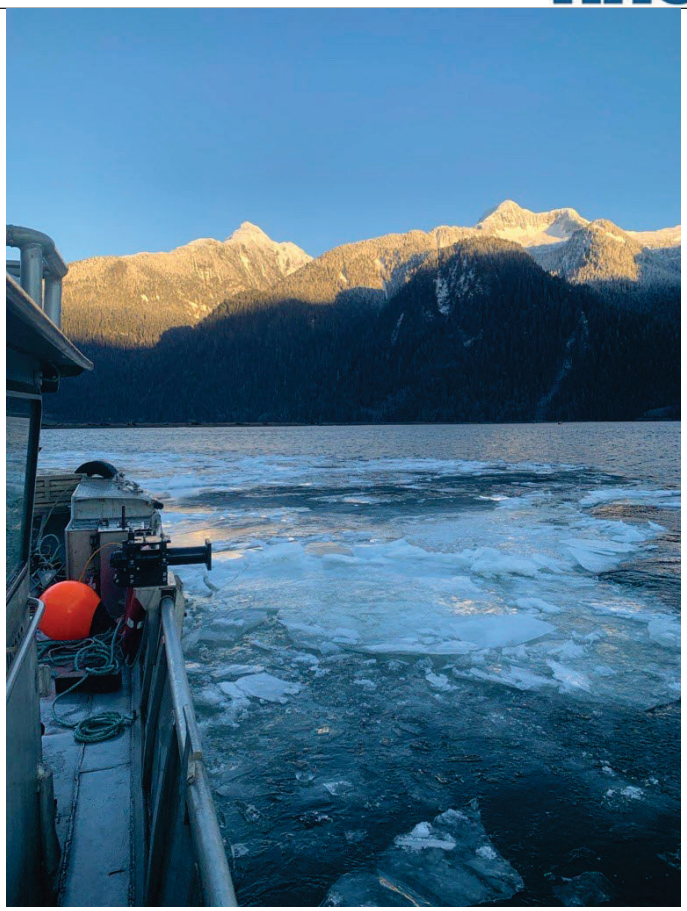


Photo 6. River ice which has entered the inlet and is floating around the barge.

Signature:

Véronique Bourgault

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Veronique Bourgault E.I.T. 2024/01/14

Des Goold

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Reviewed by Des Goold P.Eng. 2024/01/18

nhc
northwest hydraulic consultants

Field Review #8

Project:	Kingcome River – Emergency Debris and Sediment Management Project		
To:	Amy Vallarino (amy.vallarino@gov.bc.ca); Dawn Nicolson (dfnadministrator@kingcome.ca); Arshad Bastani (arshad@ashoprojects.com); Cameron McIntosh (cmcintosh@jjmconstruction.com); Sherman Yee (syee@jjmconstruction.com); Alex Heckels (aheckels@pacificus.ca); Liam Galbraith (lgalbraith@jjmconstruction.com); Mitch Brown (mbrown@jjmconstruction.com); Brenton Ryan (bryan@jjmconstruction.com); Heather Pratt (heather.pratt@wsp.com); Midori Nicolson (midorin@telus.net)		
From:	Alicia Van Boven, NHC Construction Engineer (KingcomeMR@nhcweb.com)		
Revision:	0	**Contract:**	WK24EPFLOOD0013
Date:	2024-01-23	**NHC No.:**	3007807
Client:	Ministry of Environment and Climate Change (ENV) & Dzawada'enuxw First Nation (DFN)	**Prime:**	JJM Construction Ltd. (JJM)

Conditions:

Review Date(s):	2024/01/15 – 2024/01/21	**Time(s):**	06:30 – 8:30 & 16:00 – 17:30
Drawing Ref.:	20231117 3007807 NHC 2900439 KINGCOME EDSM IFC R1	**Specification Ref.:**	Special Provisions in WK24EPFLOOD0013-JJM Construction Ltd. – Kingcome emergency debris and sediment removal – Final – Nov 2

Weather, Flow, and Predicted Tides:

Jan 15: 0˚C; Sun and clouds; High Tide 5.1m @ 15:52, Low Tide 0.9m @ 22:22; Avg. river flow est: 19 m^3/s
Jan 16: 1˚C; Cloudy; High Tide 4.7m @ 16:48, Low Tide 1.3m @ 23:04; Avg. river flow est: 21 m^3/s
Jan 17: -4°C; Sun and clouds; High Tide 5.0m @ 05:44, Low Tide 1.8m @ 12:04; Avg. river flow est: 20 m^3/s
Jan 18: 2°C; Cloudy; High Tide 5.0m @ 06:31, Low Tide 1.7m @ 13:16; Avg. river flow est: 17 m^3/s
Jan 19: 3°C; Showers; High Tide 4.9m @ 07:24, Low Tide 1.6m @ 14:29; Avg. river flow est: 68 m^3/s
Jan 20: High Tide 4.9m @ 08:22, Low Tide 1.4m @ 15:38; Avg. river flow est: 159 m^3/s
Jan 21: High Tide 5.0m @ 09:23, Low Tide 1.2m @ 16:40; Avg. river flow est: 131 m^3/s

For Reference: mean winter river flow estimate is 60 m^3/s. Note tides tend to be more extreme than predicted by CHS and peaks occur about an hour and a half before predicted extremes.

Location: Kingcome River, Kingcome Inlet, BC. (NAD83 UTM 9 N 696123 5646584)

Personnel & Equipment:

Refer to JJM Weekly Report for Contractor Personnel and Equipment. NHC Min Rep.: Sam Xie (Jan. 15 – Jan. 20), Alicia Van Boven (Jan. 20 – Jan. 21). Pacificus EM: Celeste (Jan. 15 – Jan. 19), Brittany Blanchard (Jan. 20 – Jan. 21)

Observations:

General:

- Design progress for dredging is discussed in NHC's weekly progress report.
- The debris trimming scope was completed on Dec. 10, 2023

Field Review:

- Past weeks activities:
    - JJM conducted dredging between STA 0+510 m to STA 0+620 (Photo 1).
    - A bathymetric survey was completed on the morning of Jan 22.
    - Bed material was bulk dredged with a 1200 Hitachi Excavator from a flat scow (Photo 2). The dredged material is fine grained silty-sand and gravel (Photo 3).
    - The JJM 600 hp tugboat maneuvers the split-hull, hopper barge (ME302) in the dredge channel to the desired station for dredging and pulls the hopper barge short distances out to sea (Photo 5), while the 1000 hp Gowlland tugboat pulls the hopper barge to and from the DAS site (Photo 4). This construction methodology reduces sediment disturbance in the dredge channel that would occur from the larger 1000hp tugboats propellers.
    - Generally, dredged material was loaded onto a split-hull hopper barge (Photo 6) and towed by the tugboat to the DAS site for disposal. This week 39 split-hull hopper barge loads were disposed at the DAS site. A total of 280 loads have been disposed since construction began.
    - Dredged material was loaded onto the flat scow while the split-hull hopper barge was at the DAS site. Dredged material on the flat scow is managed by the JJM loader, and the excavator offloads the material to the split barge when it returns from the DAS site.
    - At times, given the low tides and the ME209 2.0 m draft, there will not be sufficient water levels to stage the barge overnight where the daily dredging is occurring – thus there is a risk of grounding. The hopper barge ME302 has a draft of 2.8 m when fully loaded and also has a high risk of grounding at low tides.
    - On Jan. 16, the JJM tugboat was forced out of service due to a coolant leak. On Jan. 17, the JJM crew worked from 04:00 to 10:00 during the high tide before the low tide at noon, as the larger Gowlland tugboat has a higher draft and has a high risk of grounding at the low tide. The JJM tugboat was repaired in the afternoon of Jan. 17, and the crew went back to usual schedule on Jan. 18 and 19.
    - A 3-member drilling team including a geoscientist from Lewkowich Engineering and two crews from Westsoil Sampling arrived in Kingcome on Jan. 17. Sediment core samples were collected during the low tide on Jan. 18.

Environmental:

- NHC reviewed the disposal location coordinates reported by JJM. As per special provision 4.01(c), dredge disposals were within the disposal site boundaries prescribed in the DAS permit and shown in the IFC drawings.

Deficiencies:

- No Deficiencies Identified.

Photographs:



Photo 1. Looking south at dredging at approximately Sta. 0+590.



Photo 2. Looking north at excavator dredging from flat scow.



Photo 3. Silt-sand dredge material.



Photo 4. Gowlland Inlet Royal towing hopper barge to the DAS site.



Photo 5. JJM tugboat moving to transfer the empty hopper barge from the Gowlland Inlet Royal.

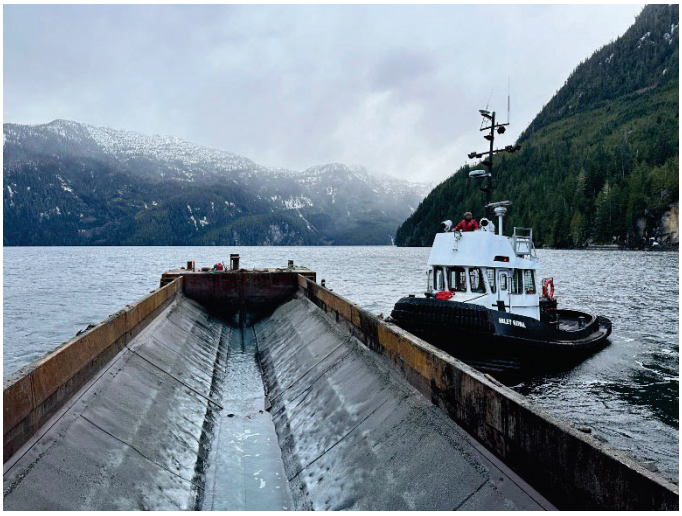
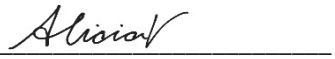
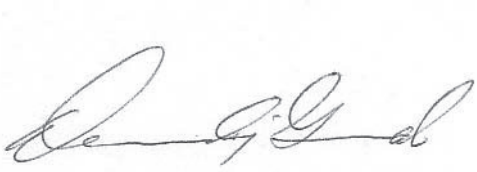


Photo 6. Empty hopper barge after disposal at the DAS site.

Signature:



Alicia Van Boven E.I.T. 2024/01/23



Reviewed by Des Goold P.Eng. 2024/01/23

nhc
northwest hydraulic consultants

Field Review #9

Project:	Kingcome River – Emergency Debris and Sediment Management Project		
To:	Amy Vallarino (amy.vallarino@gov.bc.ca); Dawn Nicolson (dfnadministrator@kingcome.ca); Arshad Bastani (arshad@ashoprojects.com); Cameron McIntosh (cmcintosh@jjmconstruction.com); Sherman Yee (syee@jjmconstruction.com); Alex Heckels (aheckels@pacificus.ca); Liam Galbraith (lgalbraith@jjmconstruction.com); Mitch Brown (mbrown@jjmconstruction.com); Brenton Ryan (bryan@jjmconstruction.com); Heather Pratt (heather.pratt@wsp.com); Midori Nicolson (midorin@telus.net)		
From:	Alicia Van Boven, NHC Construction Engineer (KingcomeMR@nhcweb.com)		
Revision:	0	**Contract:**	WK24EPFLOOD0013
Date:	2024-02-03	**NHC No.:**	3007807
Client:	Ministry of Environment and Climate Change (ENV) & Dzawada'enuxw First Nation (DFN)	**Prime:**	JJM Construction Ltd. (JJM)

Conditions:

Review Date(s):	2024/01/22 – 2024/02/02	**Time(s):**	Various Daily
Drawing Ref.:	20231117 3007807 NHC 2900439 KINGCOME EDSM IFC R1	**Specification Ref.:**	Special Provisions in WK24EPFLOOD0013-JJM Construction Ltd. – Kingcome emergency debris and sediment removal – Final – Nov 2

Weather, Flow, and Predicted Tides:

Jan 22: 8˚C; Showers; High Tide 5m @ 10:22, Low Tide 1m @ 17:35; Avg. river flow est: 101 m^3/s
Jan 23: 7˚C; Showers; High Tide 5.1m @ 11:15, Low Tide 0.8m @ 18:23; Avg. river flow est: 110 m^3/s
Jan 24: 5°C; Showers; High Tide 5.2m @ 12:03, Low Tide 0.7m @ 19:06; Avg. river flow est: 85 m^3/s
Jan 25: 5°C; Showers; High Tide 5.2m @ 12:45, Low Tide 0.7m @ 19:44; Avg. river flow est: 83 m^3/s
Jan 26: 6°C; Heavy Rain; High Tide 5.2m @ 13:24, Low Tide 0.8m @ 20:17; Avg. river flow est: 137 m^3/s
Jan 27: 6°C; Heavy Rain; 5m @ 14:01, Low Tide 0.9m @ 20:47; Avg. river flow est: 201 m^3/s
Jan 28: 7°C; Showers; 4.9m @ 14:37, Low Tide 1.2m @ 21:15; Avg. river flow est: 238 m^3/s
Jan 29: 8°C; Heavy Rain; 4.6m @ 15:13, Low Tide 1.4m @ 21:40; Avg. river flow est: 373 m^3/s
Jan 30: 9°C; Heavy Rain 4.4m @ 15:51, Low Tide 1.7m @ 22:06; Avg. river flow est: 640 m^3/s
Jan 31: 9°C; Showers; High Tide 4.1m @ 16:33, Low Tide 2.0m @ 22:35; Avg. river flow est: 390 m^3/s
Feb 01: 5°C; Weather; High Tide 5.0m @ 09:23, Low Tide 1.2m @ 16:40; Avg. river flow est: 200 m^3/s
Feb 02: 5°C; Weather; 5.0m @ 09:23, Low Tide 1.2m @ 16:40; Avg. river flow est: 131 m^3/s

For Reference: mean winter river flow estimate is 60 m^3/s. Note tides tend to be more extreme than predicted by CHS and peaks occur about an hour and a half before predicted extremes.

Location: Kingcome River, Kingcome Inlet, BC. (NAD83 UTM 9 N 696123 5646584)

Personnel & Equipment:

Refer to JJM Weekly Report for Contractor Personnel and Equipment. NHC Min Rep.: Alicia Van Boven (Jan. 22 – Jan. 29), Veronique Bourgault (Jan. 29 – Feb. 02). Pacificus EM: Brittany Blanchard (Jan. 22 – Feb. 26), Danae Shephard (Jan. 26 – Jan. 30)

Observations:

General:

- Design progress for dredging is discussed in NHC's weekly progress report.
- Dredging work was completed at the end-of-shift, January 29, 2024.
- The debris trimming scope was completed on Dec. 10, 2023.

Field Review:

- Past weeks activities:
    - JJM conducted payable re-dredge from STA 0+225 to STA 0+515 and new dredging between STA 0+605 m to STA 0+715 (Photo 1).
    - Bathymetric progress surveys were completed on Jan. 25, Jan. 27, Jan. 28, and, at end-of-shift Jan. 29 (the final day of dredging).
    - Bed material was bulk dredged with a 1200 Hitachi Excavator from a flat scow (Photo 2). The dredged material is fine grained silty-sand and gravel (Photo 3).
    - The JJM 600 hp tugboat maneuvers the split-hull, hopper barge (ME302) in the dredge channel to the desired station for dredging and pulls the hopper barge short distances out to sea (Photo 5), while the 1000 hp Gowlland tugboat pulls the hopper barge to and from the DAS site (Photo 4). This construction methodology reduces sediment disturbance in the dredge channel that would occur from the larger 1000hp tugboats propellers.
    - Generally, dredged material was loaded onto a split-hull hopper barge (Photo 6) and towed by the tugboat to the DAS site for disposal. This week 60 split-hull hopper barge loads were disposed at the DAS site. A total of 342 loads have been disposed since construction began, for a total disposed volume of 59,138 m^3.
    - Dredged material was loaded onto the flat scow while the split-hull hopper barge was at the DAS site. Dredged material on the flat scow is managed by the JJM loader, and the excavator offloads the material to the split barge when it returns from the DAS site.
    - At times, given the low tides and the ME209 2.0 m draft, there will not be sufficient water levels to stage the barge overnight where the daily dredging is occurring – thus there is a risk of grounding. The hopper barge ME302 has a draft of 2.8 m when fully loaded and also has a high risk of grounding at low tides.

Environmental:

- NHC reviewed the disposal location coordinates reported by JJM. As per special provision 4.01(c), dredge disposals were within the disposal site boundaries prescribed in the DAS permit and shown in the IFC drawings.

Deficiencies:

- No Deficiencies Identified.

Photographs:

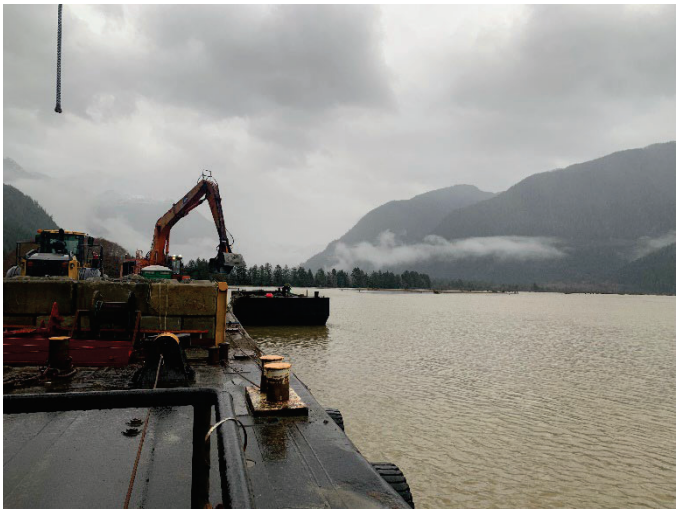


Photo 1. Looking north at dredging at approximately Sta. 0+693, Jan 29.



Photo 2. Looking north at excavator dredging from flat scow, Jan 26.



Photo 3. Silt-sand dredge material, Jan 26.



Photo 4. Gowlland Inlet Royal towing hopper barge to the DAS site, Jan 28.



Photo 5. Hopper barge disposing of material in DAS site, Jan 28.

Signature:



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Veronique Bourgault E.I.T. 2024/02/01



_____

Reviewed by Des Goold P.Eng. 2024/02/03

APPENDIX Q
RECORD DRAWINGS

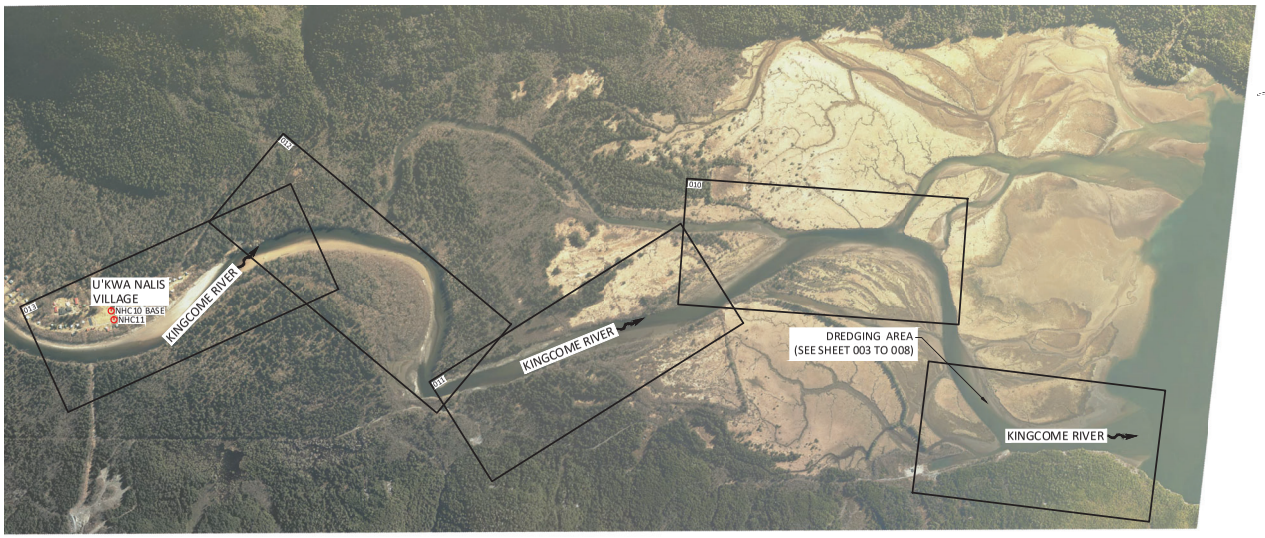
KINGCOME EMERGENCY DEBRIS & SEDIMENT MANAGEMENT PROJECT 2900439

RECORD DRAWINGS

DRAWING INDEX		
SHEET No.	SHEET DESCRIPTION	REVISION
001	TITLE SHEET AND PROJECT LOCATION	A
002	GENERAL NOTES, DATUMS AND CONTROL	A
003	KINGCOME RIVER DREDGE - EXISTING SITE PLAN	A
004	KINGCOME RIVER DREDGE - DEVELOPED SITE PLAN	A
005	PROFILES - KINGCOME RIVER DREDGE	A
006	TYPICAL SECTIONS - KINGCOME RIVER DREDGE	A
007	DREDGE SECTIONS (1 OF 2)	A
008	DREDGE SECTIONS (2 OF 2)	A
009	DREDGEATE DISPOSAL AREA DETAILS	A
010	DEBRIS TRIMMING SITES LOCATIONS 1 OF 4	A
011	DEBRIS TRIMMING SITES LOCATIONS 2 OF 4	A
012	DEBRIS TRIMMING SITES LOCATIONS 3 OF 4	A
013	DEBRIS TRIMMING SITES LOCATIONS 4 OF 4	A



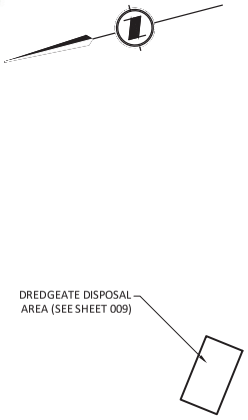
LOCATION MAP
NOT TO SCALE



ORTHOPHOTO OF KINGCOME RIVER (EAGLE MAPPING LTD., MARCH 27, 2023)

LEGEND
CONTROL POINT NHCXXXX

SITE PLAN
SCALE 1:12,500



0 0.25 0.5km
SCALE = 1:12,500

CLIENT:

REV	DATE	DESCRIPTION
A	20240318	RECORD DRAWINGS

nhc northwest hydraulic consultants

SEAL:

2024-03-18

PERMIT TO PRACTICE
NORTHWEST HYDRAULIC CONSULTANTS LTD.
PERMIT NUMBER: 1003221
The Association of Professional Engineers and Geoscientists of British Columbia

KINGCOME EMERGENCY DEBRIS & SEDIMENT MANAGEMENT PROJECT 2900439

TITLE SHEET AND PROJECT LOCATION

DESIGNED:	AVB/VGB	SHEET ID:	3007807 NHC 2900439 KINGCOME EDSM REC-ROB-001	SHEET No:	001
DRAFTED:	CZZ	STATUS:	RECORD DRAWINGS		
CHECKED:	NAB/GFL	SCALE:	AS SHOWN WHEN PLOTTED D SIZE		
APPROVED:	DJG	DATE:	18 MAR 2024	REV No:	A

SUPERSEDES ALL REVISIONS WITH NUMBER PRECEDING

FILENAME: \\nanoffile-svr\Projects\Active\3007807 Kingcome Sediment Management\06 CAD\02_Production\000_Set\3007807 NHC 2900439 KINGCOME EDSM REC-ROB.dwg, 18 Mar 2024, 11:12 AM

GENERAL NOTES

1. DETAILED REQUIREMENTS FOR CONSTRUCTION ACTIVITIES ARE PROVIDED IN THE SPECIAL PROVISIONS. THE SPECIAL PROVISIONS TAKE PRECEDENCE OVER THESE DRAWINGS.
2. SCALES INDICATED ON THESE DRAWINGS ARE FULL SIZE, 22 IN. X 34 IN. THE DRAWINGS ARE DEVELOPED TO BEST DISPLAY INFORMATION AT FULL SIZE.
3. THE PROJECT OWNERS, DZAWADA'ENUXW FIRST NATION (DFN) AND THE PROVINCE OF BC (ENV) SHALL DESIGNATE A REPRESENTATIVE (OWNER'S REPRESENTATIVE) TO ADVISE, COORDINATE AND MONITOR ACTIVITIES ON BEHALF OF THE OWNER DURING CONSTRUCTION.
4. THE PROJECT OWNERS SHALL DESIGNATE A QUALIFIED ENVIRONMENTAL MONITOR AND QUALIFIED ARCHAEOLOGICAL MONITOR FOR THE PROJECT.
5. ACTIVE SMALL VESSEL OPERATIONS BY DFN WILL BE PRESENT DURING THE EXECUTION OF WORK. THE CONTRACTOR SHALL, IN COOPERATION WITH THE PROJECT OWNERS, DEVELOP A COMMUNICATION PLAN AND A NAVIGATION PLAN TO ENSURE THAT NECESSARY VESSEL OPERATIONS CAN BE CARRIED OUT IN A SAFE MANNER.
6. THE PROJECT SITE IS EXPOSED TO OCEAN AND RIVER CONDITIONS THAT WILL CHANGE OVER TIME. WEATHER EVENTS MAY CAUSE CHANGES IN RIVER FLOW AND CAUSE STORM SURGES AND WAVES. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ACCOUNT FOR AND PLAN WORK AROUND WEATHER AND TIDAL FORECASTS.

BATHYMETRIC SURVEY REQUIREMENTS, DATUMS, DATUM CONVERSIONS AND CONTROL

1. BATHYMETRIC DATA WITHIN THE DREDGE AREA SURVEYED IN NOVEMBER 2023 BY JIM.
2. BATHYMETRY DATA OFF-SHORE AND WITHIN THE PROPOSED DISPOSAL AREA IS CANADIAN HYDROGRAPHIC SERVICE NON-NAVIGATIONAL (NONNA) DATA SOURCED FROM: https://data.chs-shc.ca/map.
3. SURVEY CONTROL HAS BEEN ESTABLISHED IN U'KWA NALIS VILLAGE AS SUMMARIZED IN THE TABLE BELOW AND SHOWN ON SHEET 001. CONTRACTOR MAY UTILIZE THIS CONTROL WITH A GNSS SET-UP AND EXTERNAL RADIO. CONTRACTOR MAY ESTABLISH CONTROL NEARER THE DREDGE AREA AT THEIR DISCRETION.

CONTROL POINTS TABLE

CONTROL POINT	EASTING (m)	NORTHING (m)	ELEVATION (m)
NHC10 BASE	697866.725	5650815.493	4.357
NHC11	697819.031	5650812.744	4.867

4. IN ADDITION TO THE CONTROL ESTABLISHED BY NHC, TWO FEDERAL BENCHMARKS ARE LOCATED SOUTHWEST OF THE WORK AREA. DETAILS UNDER THE "BENCHMARKS" TAB HERE: https://www.tides.gc.ca/en/stations/8348
5. CONTRACTOR SHALL CARRY OUT THE FOLLOWING MULTI-BEAM SURVEY:
   a. CONTROL SURVEY (DISCRETIONARY)
   b. PRE-CONSTRUCTION SURVEY
   c. POSITIONING SURVEYS
   d. PROGRESS SURVEYS (DISCRETIONARY)
   e. POST-CONSTRUCTION SURVEY

   A: THE CONTRACTOR CARRIED OUT A SECOND PRE-CON OR BASE LEVEL SURVEY ON JANUARY 3, 2024 TO ACCOUNT FOR CHANGED RIVER CONDITIONS OVER THE HOLIDAY BREAK (DECEMBER 21 TO JANUARY 2).
5. ALL ELEVATIONS SHOWN ON THESE DRAWINGS ARE IN CGVD 2013. SEE BELOW FOR DATUM CONVERSION.

	CGVD 2013	CHART DATUM
HIGHER HIGH WATER LARGE TIDE	3.22 m	5.73 m
HIGHER HIGH WATER MEAN TIDE	2.36 m	4.87m
MEAN WATER LEVEL	0.60 m	3.11 m
LOWER LOW WATER MEAN TIDE	-1.35 m	1.16 m
LOWER LOW WATER LARGE TIDE	-2.42 m	0.09 m

6. TO CONVERT FROM CHART DATUM TO CGVD 2013, SUBTRACT 2.509 m.
7. TO CONVERT FROM CGVD 2013 TO CHART DATUM, ADD 2.509 m
8. TIDE PREDICTIONS AND HEIGHTS FOR KINGCOME INLET (08348) ARE AVAILABLE ONLINE AT: https://www.tides.gc.ca/en/stations/8348

   A: OBSERVED TIDE LEVELS DURING THE PROJECT WERE FOUND TO VARY FROM CHS PREDICTED TIDE LEVELS BY UP TO 0.6m IN SOME CASES.

DREDGING:

1. CONTRACTOR MUST DREDGE AS SHOWN ON SHEETS 004 TO 008 OF THIS DRAWING SET. FOR ADDITIONAL REQUIREMENTS, REFER TO THE SPECIAL PROVISIONS.
2. THE PAYABLE OVER-DREDGE ALLOWANCE IS 0.3m WITHIN THE DREDGE AREA.
3. VERTICAL EXCAVATIONS (BOX CUTS) ARE PERSMISSIBLE AT THE UPSTREAM LIMIT AND AT THE MARGINS OF THE DREDGING. THE CONTRACTOR SHALL REMOVE ANY SLOUGH MATERIAL RESULTING FROM BOX CUTS SO THAT THE REQUIRED DREDGE ELEVATION IS ACHIEVED. NO SEPARATE PAYMENT SHALL BE MADE FOR THE REMOVAL OF SLOUGH MATERIAL.
4. CONTRACTOR SHALL NOT PERFORM EXCESSIVE OVER-DREDGING ADJACENT TO STREAM BANKS OF KINGCOME RIVER. DAMAGE TO STREAMBANKS AS A RESULT OF OVER-DREDGING SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
5. IF A HARD BOTTOM SURFACE IS ENCOUNTERED DURING DREDGING, CONTRACTOR SHALL HALT DREDGING IN THE AREA AND INFORM THE OWNER'S REPRESENTATIVE.
6. REFER TO THE CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN FOR ADDITIONAL DIRECTIVES REGARDING DREDGING AND DISPOSAL OF DREDGEATE.
7. IT IS RECOGNIZED THAT SLOUGHING OF THE DREGDED 2H: 1V SIDE SLOPES MAY OCCUR PRIOR TO THE POST-CONSTRUCTION SURVEY. A MINIMUM ACCEPTABLE, POST-CONSTRUCTION, BOTTOM WIDTH OF DREDGE EQUAL TO 17 m WILL BE ACCEPTABLE AS A WAY OF ACCOUNTING FOR SLOUGHING. THIS ALLOWANCE SHALL NOT BE INTERPRETED AS A PAYABLE "UNDER-DREDGE".

DEBRIS TRIMMING

1. REFER TO SHEETS 010 TO 013 FOR THE PHOTO POINTS. THESE ARE VANTAGE POINTS SHOWING THE LOCATION OF UNDERWATER DEBRIS REQUIRING TRIMMING. ACTUAL DEBRIS LOCATIONS ARE AT VARYING DISTANCES FROM THE PHOTO POINTS.

   A: REPLACED IN THIS DRAWING SET BY THE ACTUAL TRIMMING LOCATIONS.
2. REFER TO SHEETS 014 TO 017 FOR PHOTO PLATES.

   A: REMOVED FROM THIS DRAWING SET
3. THE DEBRIS SURVEY (COLLECTION OF PHOTO POINTS) WAS CONDUCTED IN MARCH 2023; DEBRIS MAY HAVE SHIFTED SINCE THE SURVEY.
4. ONLY DEBRIS THAT IS PARTIALLY BURIED IN THE RIVERBED, WITHIN THE NAVIGABLE CHANNEL SHALL BE TRIMMED. DEBRIS JAMS FORMED ALONG THE RIVERBANKS TO NOT REQUIRE TRIMMING.
5. DEBRIS TO BE TRIMMED SHALL BE CONFIRMED BY THE ENVIRONMENTAL MONITOR OR OWNERS REPRESENTATIVE AS REQUIRED.
6. TRIMMING REFERS TO THE CUTTING OFF OF STEMS AND/ OR BRANCHES THAT PROTRUDE ABOVE THE RIVERBED AND POSE A THREAT TO SMALL WATERCRAFT.
7. DEBRIS SHALL BE TRIMMED TO LENGTHS NOT EXCEEDING 2m (6 FT). DEBRIS OF THIS SIZE SHALL GENERALLY BE LEFT IN PLACE TO FLOAT DOWN-RIVER AT THE NEXT HIGH FLOW.
8. THE NUMBER OF INDIVIDUAL CUTS REQUIRED MAY VARY BETWEEN 1,200 AND 1,300.

   A: OBSERVED TIDE LEVELS DURING THE PROJECT WERE FOUND TO VARY FROM CHS PREDICTED TIDE LEVELS BY UP TO 0.6m IN SOME CASES.
9. TRIMMING MUST BE CARRIED OUT BY A CERTIFIED DIVER, EXPERIENCED IN SUCH ACTIVITY, AND USING A HYDRAULIC SAW INTENDED FOR UNDERWATER USE.

RIVER HYDRAULICS

1. THE FOLLOWING HYDRAULIC CONDITIONS ARE FOR AN ESTIMATED MEAN WINTER FLOW OF 60 m^3/s, AND MEAN HIGH AND LOW TIDES:
   a. AT LOWER LOW WATER MEAN TIDE:
      i. RIVER FLOW DEPTH RANGE: 1.3 m TO 3.2 m
      ii. RIVER FLOW VELOCTIY RANGE: 0.3 m/s TO 0.6 m/s (0.6 TO 1.2 KNOTS)
   b. AT HIGHER HIGH WATER MEAN TIDE:
      i. RIVER FLOW DEPTH RANGE: 4.5 m TO 6.0 m
      ii. RIVER FLOW VELOCTIY RANGE: 0.05 m/s TO 0.07 m/s (0.1 TO 0.14 KNOTS)
2. RIVER FLOW FORECASTS ARE NOT AVAILABLE FOR KINGCOME RIVER.

CLIENT:

REV	DATE	DESCRIPTION
A	20240318	RECORD DRAWINGS

nhc northwest hydraulic consultants

SEAL: D.J. GOULD # 28261 PROFESSIONAL ENGINEER — 2024-03-19

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NORTHWEST HYDRAULIC CONSULTANTS LTD.
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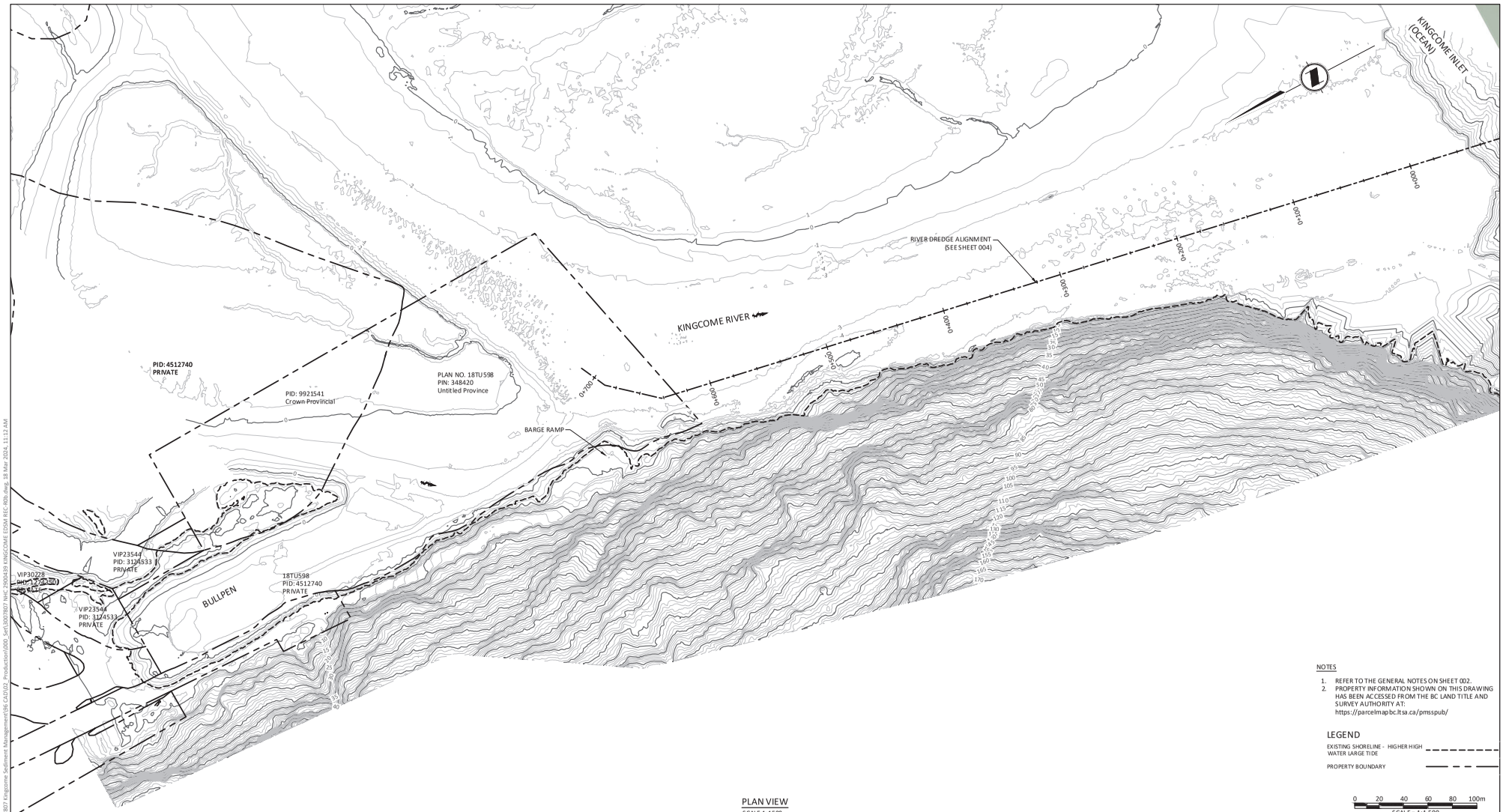
KINGCOME EMERGENCY DEBRIS & SEDIMENT MANAGEMENT PROJECT 2900439

GENERAL NOTES, DATUMS AND CONTROL

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CHECKED:	NAB/GFL	SCALE: AS SHOWN WHEN PLOTTED D SIZE	
APPROVED:	DJG	DATE: 18 MAR 2024	REV No: A

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PLAN VIEW
SCALE 1:1500

NOTES

1. REFER TO THE GENERAL NOTES ON SHEET 002.
2. PROPERTY INFORMATION SHOWN ON THIS DRAWING HAS BEEN ACCESSED FROM THE BC LAND TITLE AND SURVEY AUTHORITY AT: https://parcelmapbc.ltsa.ca/pmsspub/

LEGEND

EXISTING SHORELINE - HIGHER HIGH WATER LARGE TIDE

PROPERTY BOUNDARY

0 20 40 60 80 100m
SCALE = 1:1,500

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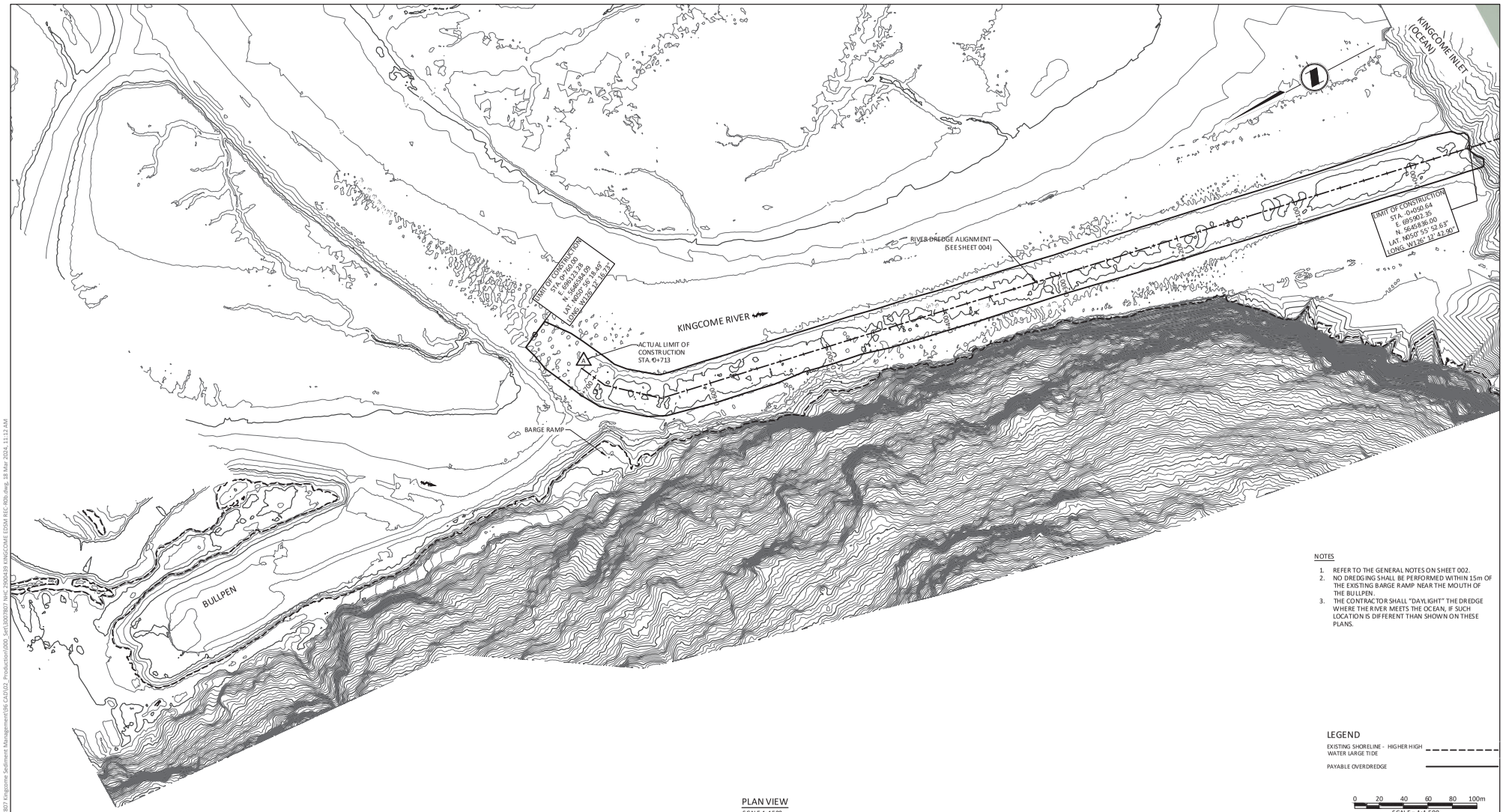
KINGCOME EMERGENCY DEBRIS & SEDIMENT MANAGEMENT PROJECT 2900439

KINGCOME RIVER DREDGE - EXISTING SITE PLAN

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PLAN VIEW
SCALE 1:1500

NOTES

1. REFER TO THE GENERAL NOTES ON SHEET 002.
2. NO DREDGING SHALL BE PERFORMED WITHIN 15m OF THE EXISTING BARGE RAMP NEAR THE MOUTH OF THE BULLPEN.
3. THE CONTRACTOR SHALL "DAYLIGHT" THE DREDGE WHERE THE RIVER MEETS THE OCEAN, IF SUCH LOCATION IS DIFFERENT THAN SHOWN ON THESE PLANS.

LEGEND

EXISTING SHORELINE - HIGHER HIGH WATER LARGE TIDE

PAYABLE OVERDREDGE

0 20 40 60 80 100m
SCALE = 1:1,500

CLIENT:

REV.	DATE	DESCRIPTION
A	20240318	RECORD DRAWINGS

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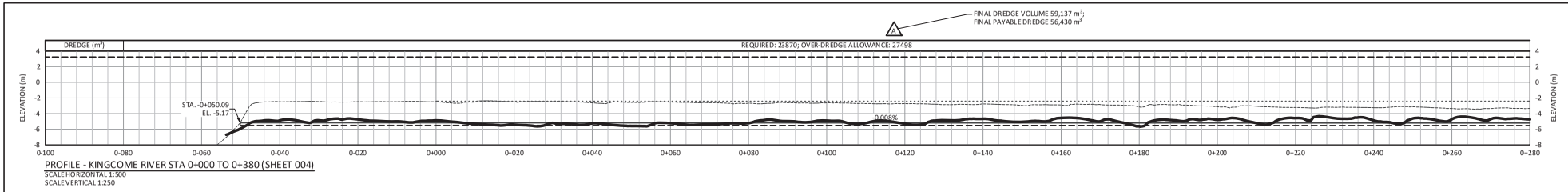
KINGCOME EMERGENCY DEBRIS & SEDIMENT MANAGEMENT PROJECT 2900439

KINGCOME RIVER DREDGE - DEVELOPED SITE PLAN

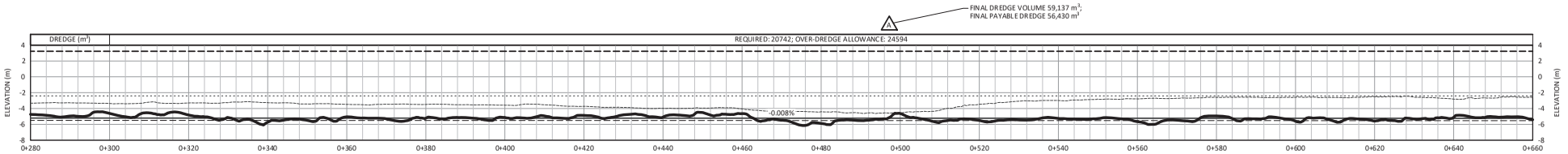
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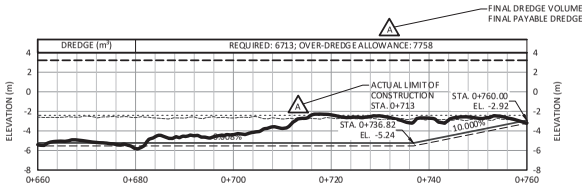
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PROFILE - KINGCOME RIVER STA 0+000 TO 0+380 (SHEET 004)
SCALE HORIZONTAL 1:500
SCALE VERTICAL 1:250



PROFILE - KINGCOME RIVER STA 0+380 TO 0+760(SHEET 004)
SCALE HORIZONTAL 1:500
SCALE VERTICAL 1:250



PROFILE - KINGCOME RIVER STA 0+380 TO 0+760(SHEET 004)
SCALE HORIZONTAL 1:500
SCALE VERTICAL 1:250

LEGEND

- HIGHER HIGH WATER MEAN TIDE
- LOWER LOW WATER LARGE TIDE
- REQUIRED DREDGE ELEVATION
- PAYABLE OVER-DREDGE (ALLOWANCE 0.3m)
- EXISTING RIVERBED
- AS-BUILT DREDGE

NOTES

1. REFER TO THE GENERAL NOTES ON SHEET 002.
2. DAMAGE TO STREAMBANKS AS A RESULT OF OVER-DREDGING SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
3. THE CONTRACTOR SHALL "DAYLIGHT" THE DREDGE WHERE THE RIVER MEETS THE OCEAN, IF SUCH LOCATION IS DIFFERENT THAN SHOWN ON THESE PLANS.

CLIENT:

REV.	DATE	DESCRIPTION
A	20240318	RECORD DRAWINGS

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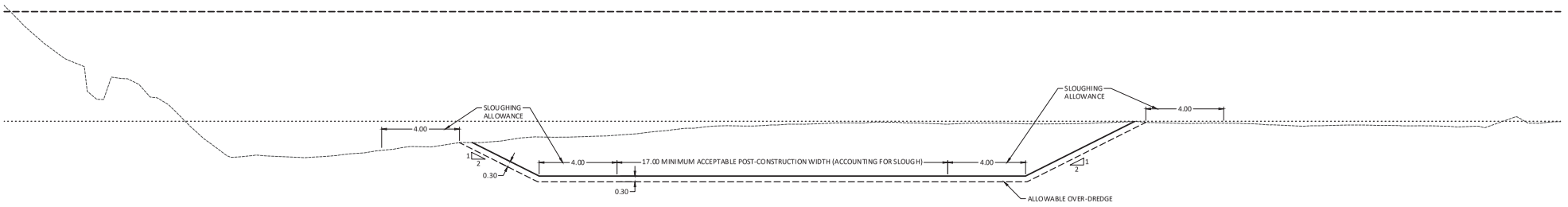
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PROFILES - KINGCOME RIVER DREDGE

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TYPICAL SECTION - KINGCOME RIVER DREDGING
SCALE HORIZONTAL 1:100
SCALE VERTICAL 1:100

LEGEND

- HIGHER HIGH WATER MEAN TIDE
- LOWER LOW WATER LARGE TIDE
- REQUIRED DREDGE ELEVATION
- PAYABLE OVER-DREDGE (ALLOWANCE 0.3m)
- EXISTING RIVERBED

NOTES

1. REFER TO THE GENERAL NOTES ON SHEET 002.
2. ALL SECTIONS ARE PLOTTED LOOKING UPSTREAM.

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REV	DATE	DESCRIPTION
A	20240318	RECORD DRAWINGS

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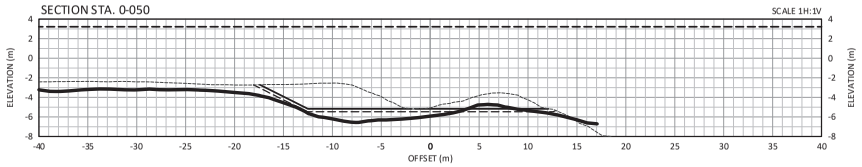
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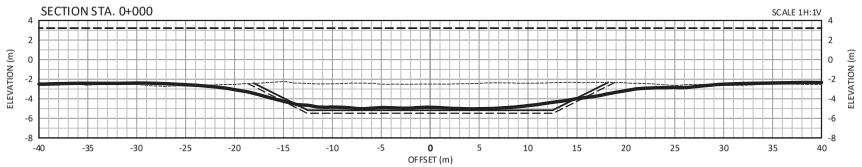
TYPICAL SECTIONS - KINGCOME RIVER DREDGE

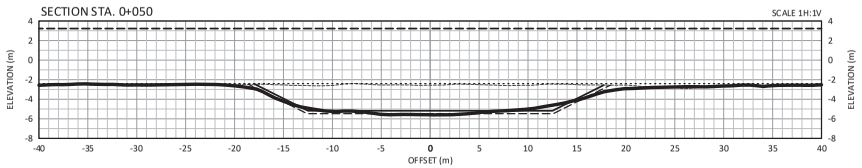
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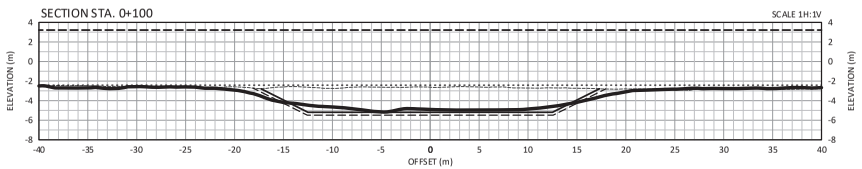
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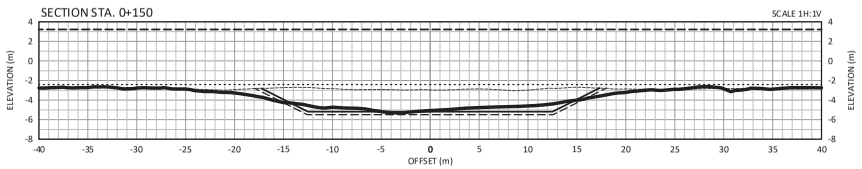
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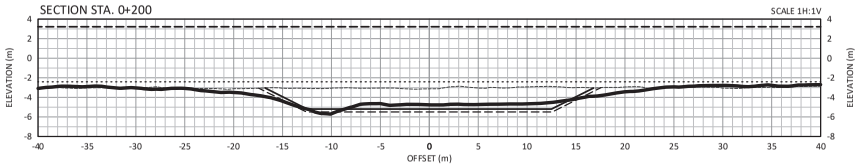


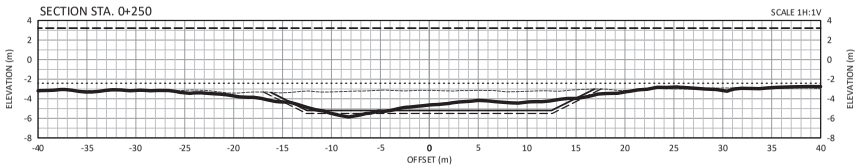


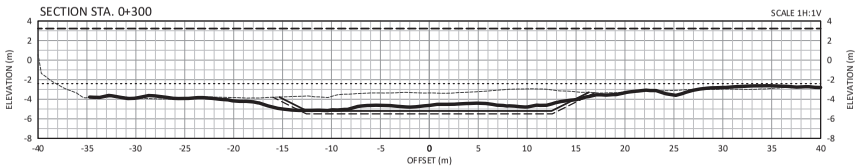


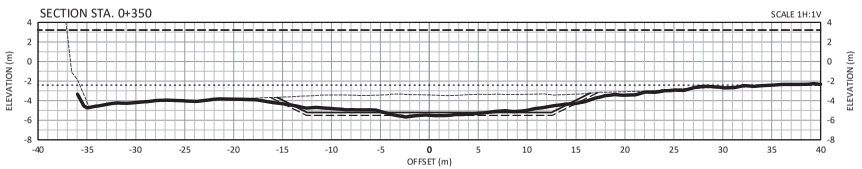












NOTES

1. REFER TO THE GENERAL NOTES ON SHEET 002.
2. ALL SECTIONS ARE PLOTTED LOOKING UPSTREAM.
3. REFER TO SHEET 004 FOR THE LOCATION OF SECTIONS BY STATION.
4. SLOUGHING ALLOWANCE NOT SHOWN. REFER TO TYPICAL SECTION AND DREDGING NOTES ON SHEET 002.

LEGEND

- HIGHER HIGH WATER MEAN TIDE
- LOWER LOW WATER LARGE TIDE
- REQUIRED DREDGE ELEVATION
- PAYABLE OVER-DREDGE (ALLOWANCE 0.3m)
- EXISTING RIVERBED
- AS-BUILT DREDGE

CLIENT: BRITISH COLUMBIA

REV	DATE	DESCRIPTION
A	20240318	RECORD DRAWINGS

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SEAL: D.J. GOULD # 28261 PROFESSIONAL ENGINEER — 2024-03-18

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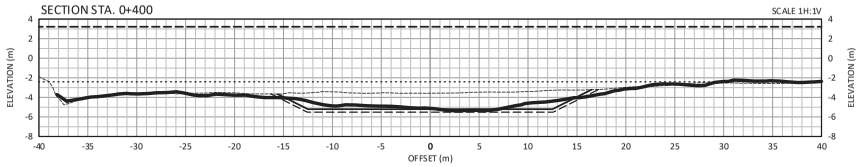
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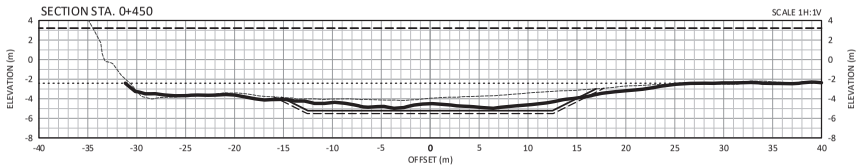
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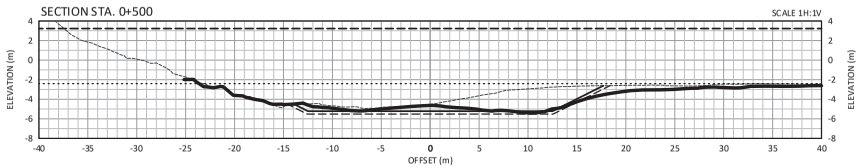
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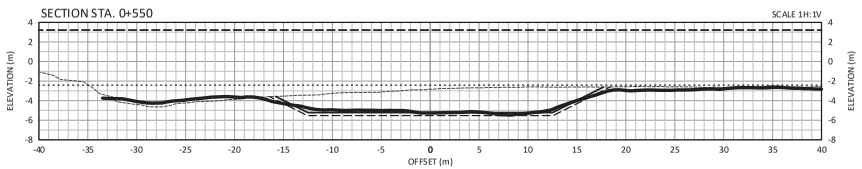
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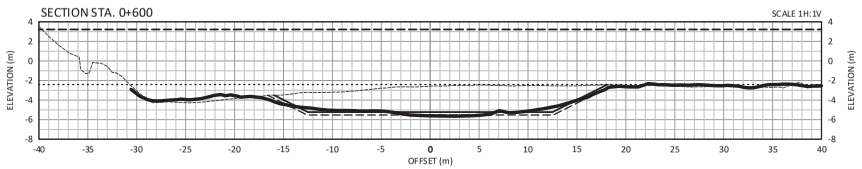
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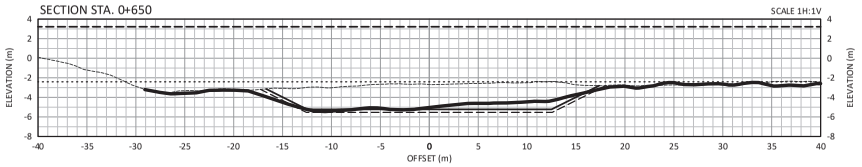


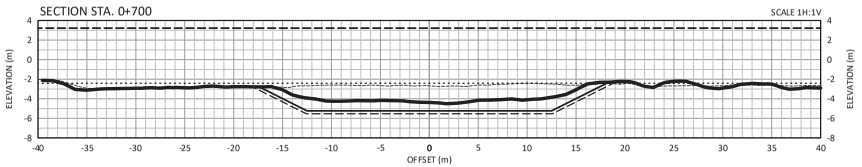


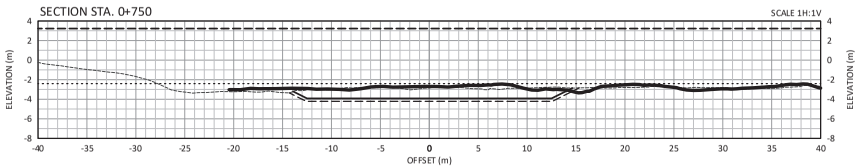


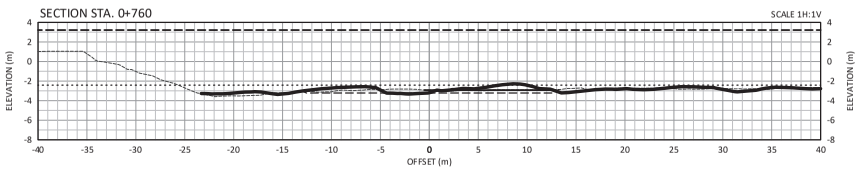












NOTES

1. REFER TO THE GENERAL NOTES ON SHEET 002.
2. ALL SECTIONS ARE PLOTTED LOOKING UPSTREAM.
3. REFER TO SHEET 004 FOR THE LOCATION OF SECTIONS BY STATION.
4. SLOUGHING ALLOWANCE NOT SHOWN. REFER TO TYPICAL SECTION AND DREDGING NOTES ON SHEET 002.

LEGEND

- HIGHER HIGH WATER MEAN TIDE
- LOWER LOW WATER LARGE TIDE
- REQUIRED DREDGE ELEVATION
- PAYABLE OVER-DREDGE (ALLOWANCE 0.3m)
- EXISTING RIVERBED
- AS-BUILT DREDGE

CLIENT:

REV	DATE	DESCRIPTION
A	20240318	RECORD DRAWINGS

nhc northwest hydraulic consultants

SEAL:

D. J. GOULD # 28261 PROFESSIONAL ENGINEER
2024-03-19

PERMIT TO PRACTICE
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PERMIT NUMBER: 1003221
The Association of Professional Engineers and Geoscientists of British Columbia

KINGCOME EMERGENCY DEBRIS & SEDIMENT MANAGEMENT PROJECT 2900439

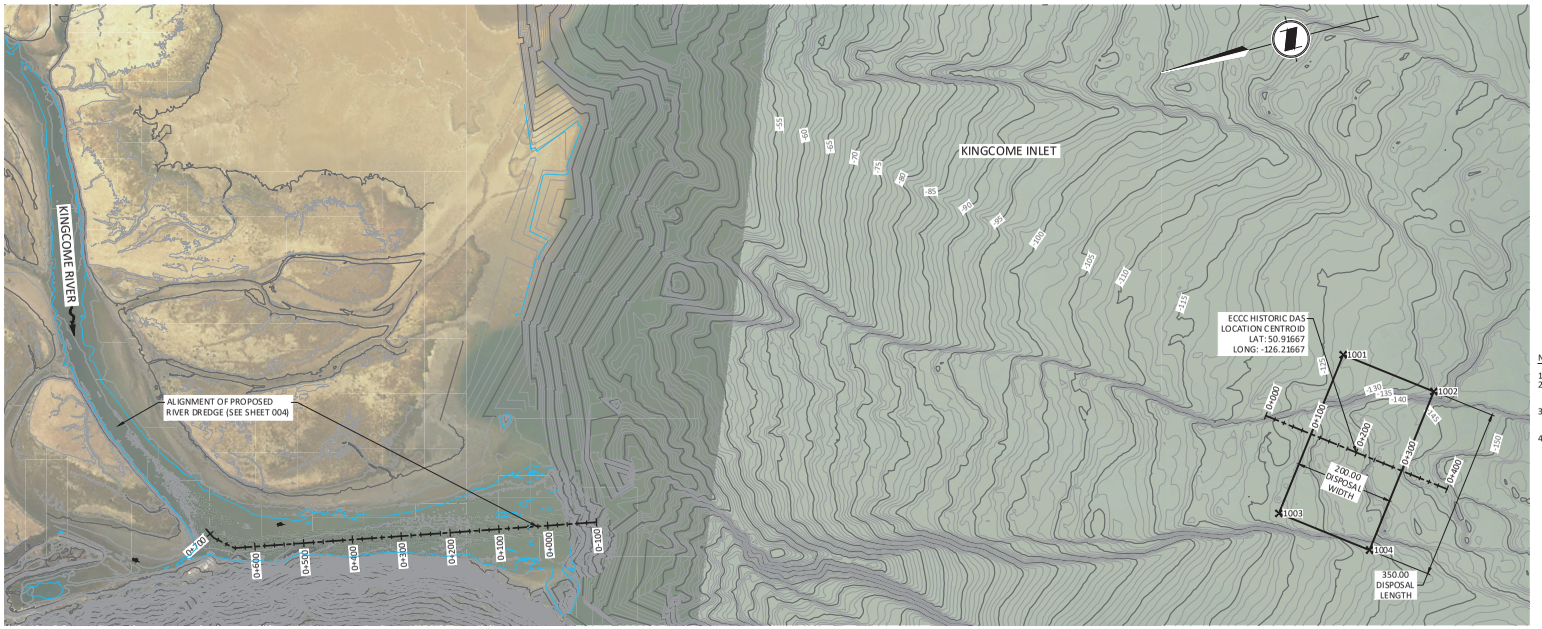
DREDGE SECTIONS (2 OF 2)

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DRAFTED:	CZZ	STATUS:	RECORD DRAWINGS
CHECKED:	NAB/GFL	SCALE:	AS SHOWN WHEN PLOTTED D SIZE
APPROVED:	DJG	DATE:	18 MAR 2024

SHEET No: 008
REV No: A

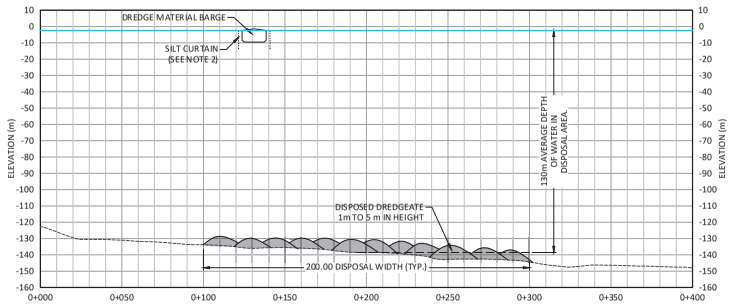
SUPERSEDES ALL REVISIONS WITH NUMBER PRECEDING

FILENAME: \\nanlfile-svr\Projects\Active\3007807 Kingcome Sediment Management\06 CAD\02_Production\000_Set\3007807 NHC 2900439 KINGCOME EDSM REC-ROB.dwg, 18 Mar 2024, 11:12 AM



ORTHOPHOTO OF KINGCOME RIVER (EAGLE MAPPING LTD., MARCH 27, 2023; Esri World Imagery, Retrieved JUNE 27, 2023)

PLAN VIEW
SCALE 1:5000



PROFILE - SEA BED AT ECCC HISTORIC DISPOSAL AT SEA SITE
SCALE 1:1500

NOTES

1. REFER TO THE GENERAL NOTES ON SHEET 002.
2. SILT CURTAIN LOCATIONS AND DEPTH TO BE DETERMINED IN CONSULTATION BETWEEN QEP AND CONTRACTOR.
3. BATHYMETRIC CONTOURS IN KINGCOME INLET BASED ON UNDATED CHS DATA AND MAY NOT BE ACCURATE.
4. REFER TO THE CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN FOR ADDITIONAL DIRECTIVES REGARDING DISPOSAL OF DREDGEATE.

DISPOSAL AREA COORDINATES TABLE

POINT #	EASTING (m)	NORTHING (m)
1001	695839.13	5644223.85
1002	695719.64	5644063.47
1003	695558.46	5644432.97
1004	695438.97	5644272.59

LEGEND

LOWER LOW WATER LARGE TIDE

CLIENT:

BRITISH COLUMBIA

REV	DATE	DESCRIPTION
A	20240318	RECORD DRAWINGS

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2024-03-19

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DREDGEATE DISPOSAL AREA DETAILS

DESIGNED:	AVB/VGB	SHEET ID:	3007807 NHC 2900439 KINGCOME EDSM REC-ROB-009	SHEET No:	009
DRAFTED:	CZZ	STATUS:	RECORD DRAWINGS		
CHECKED:	NAB/GFL	SCALE:	AS SHOWN WHEN PLOTTED D SIZE		
APPROVED:	DJG	DATE:	18 MAR 2024	REV No:	A

SUPERSEDES ALL REVISIONS WITH NUMBER PRECEDING

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0 20 40 60 80 100m
SCALE = 1:2,000

LEGEND

YEAR 1 DEBRIS TRIMMING LOCATION

CUT LOC. #
No. OF CUTS

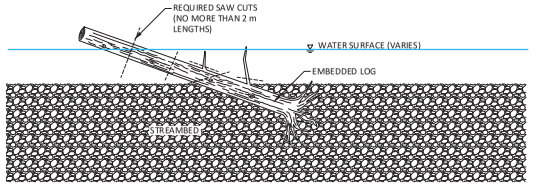
NOTES

1. REFER TO THE GENERAL NOTES ON SHEET 002.
2. THE PHOTO I.D. POINTS ARE VANTAGE POINTS SHOWING THE APPROXIMATE LOCATIONS OF DEBRIS TO BE TRIMMED.
3. PHOTO PLATES CORRESPONDING TO EACH PHOTO I.D ARE SHOWN ON SHEETS 014 TO 017.

A REPLACED IN THIS DRAWING SET BY THE ACTUAL TRIMMING LOCATIONS.

A REMOVED FROM THIS DRAWING SET.

PLAN VIEW
SCALE 1:2000



EMBEDDED LOG TRIMMING DETAIL
(NTS)

CLIENT:

BRITISH COLUMBIA

REV.	DATE	DESCRIPTION
A	20240318	RECORD DRAWINGS

nhc northwest hydraulic consultants

SEAL:

PROFESSIONAL ENGINEER D.J. GOULD # 28061 PROVINCE OF BRITISH COLUMBIA
2024-03-18

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KINGCOME EMERGENCY DEBRIS & SEDIMENT MANAGEMENT PROJECT 2900439

DEBRIS TRIMMING SITE LOCATIONS 1 OF 4

DESIGNED:	AVB/VGB	SHEET ID:	3007807 NHC 2900439 KINGCOME EDSM REC-ROB-010	SHEET No: 010
DRAFTED:	CZZ	STATUS:	RECORD DRAWINGS	
CHECKED:	NAB/GFL	SCALE:	AS SHOWN WHEN PLOTTED D SIZE	
APPROVED:	DJG	DATE:	18 MAR 2024	REV No: A

SUPERSEDES ALL REVISIONS WITH NUMBER PRECEDING

FILENAME: \\nanlfile-svr\Projects\Active\3007807 Kingcome Sediment Management\06 CAD\03_Production\000_Set\3007807 NHC 2900439 KINGCOME EDSM REC-ROB.dwg, 18 Mar 2024, 11:12 AM



PLAN VIEW
SCALE 1:2000

0 20 40 60 80 100m
SCALE = 1:2,000

LEGEND

YEAR 1 DEBRIS TRIMMING LOCATION

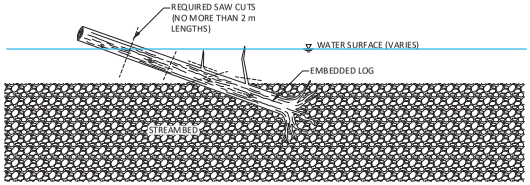
CUT LOC. #
No. OF CUTS

NOTES

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A REPLACED IN THIS DRAWING SET BY THE ACTUAL TRIMMING LOCATIONS.

A REMOVED FROM THIS DRAWING SET.



EMBEDDED LOG TRIMMING DETAIL
(NTS)

CLIENT:

BRITISH COLUMBIA

REV	DATE	DESCRIPTION
A	20240318	RECORD DRAWINGS

nhc northwest hydraulic consultants

SEAL:

PROFESSIONAL ENGINEER D.J. GOULD # 28081 PROVINCE OF BRITISH COLUMBIA

2024-03-18

PERMIT TO PRACTICE

NORTHWEST HYDRAULIC CONSULTANTS LTD.

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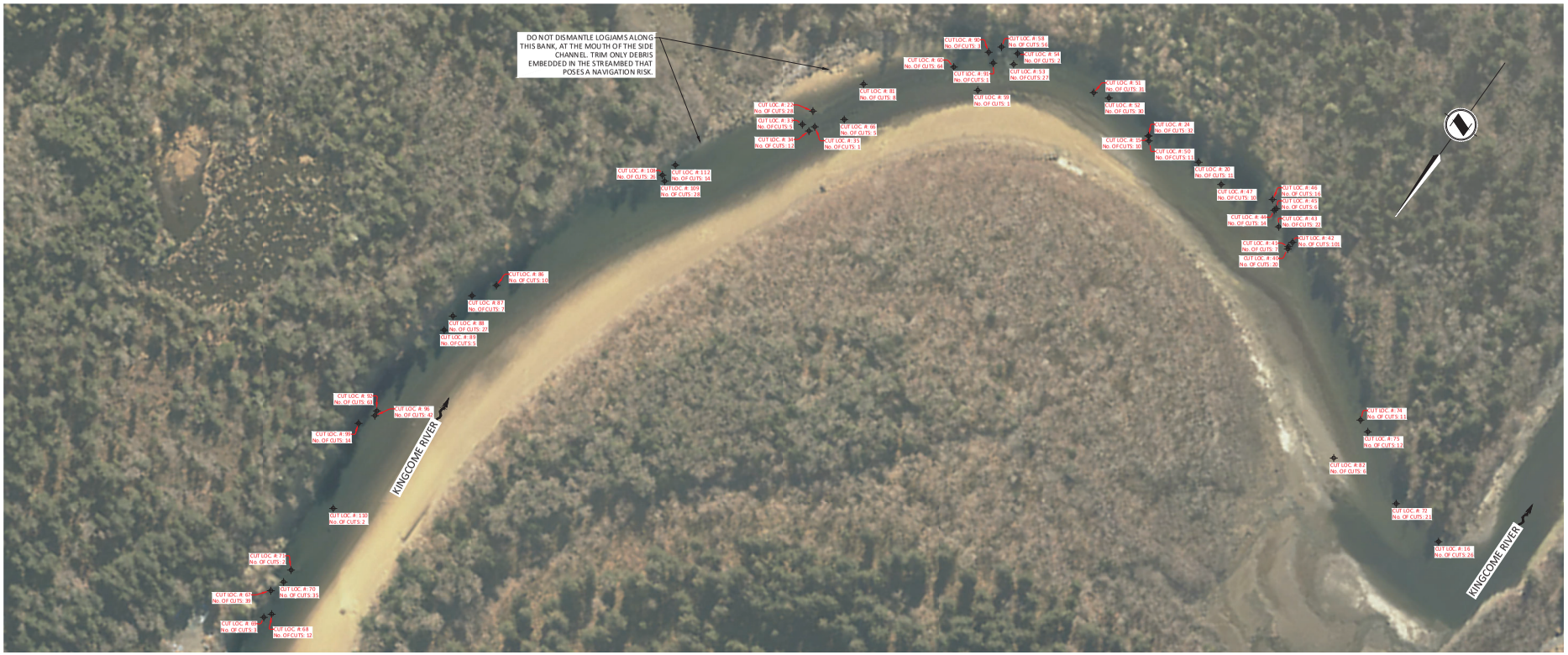
KINGCOME EMERGENCY DEBRIS & SEDIMENT MANAGEMENT PROJECT 2900439

DEBRIS TRIMMING SITE LOCATIONS 2 OF 4

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DRAFTED:	CZZ	STATUS:	RECORD DRAWINGS	
CHECKED:	NAB/GFL	SCALE:	AS SHOWN WHEN PLOTTED D SIZE	
APPROVED:	DJG	DATE:	18 MAR 2024	REV No: A

SUPERSEDES ALL REVISIONS WITH NUMBER PRECEDING

FILENAME: \\nanaimo\fhe-serv\Projects\Active\3007807 Kingcome Sediment Management\06 CAD\02_Production\000_Set\3007807 NHC 2900439 KINGCOME EDSM REC-ROB.dwg, 18 Mar 2024, 11:12 AM



PLAN VIEW
SCALE 1:2000

0 20 40 60 80 100m
SCALE = 1:2,000

LEGEND

YEAR 1 DEBRIS TRIMMING LOCATION

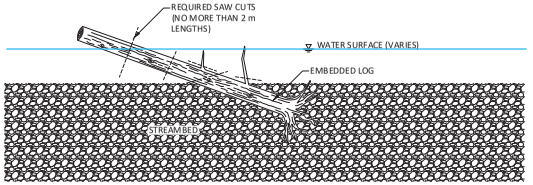
CUT LOC. # No. OF CUTS

NOTES

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A REPLACED IN THIS DRAWING SET BY THE ACTUAL TRIMMING LOCATIONS.

A REMOVED FROM THIS DRAWING SET.



EMBEDDED LOG TRIMMING DETAIL
(NTS)

CLIENT: BRITISH COLUMBIA

REV	DATE	DESCRIPTION
A	20240318	RECORD DRAWINGS

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SEAL: PROFESSIONAL ENGINEER D.J. GOULD # 28081 — 2024-03-19

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DEBRIS TRIMMING SITE LOCATIONS 3 OF 4

DESIGNED:	AVB/VGB	SHEET ID:	3007807 NHC 2900439 KINGCOME EDSM REC-ROB-012	SHEET No:	012
DRAFTED:	CZ	STATUS:	RECORD DRAWINGS		
CHECKED:	NAB/GFL	SCALE:	AS SHOWN WHEN PLOTTED D SIZE		
APPROVED:	DJG	DATE:	18 MAR 2024	REV No:	A

SUPERSEDES ALL REVISIONS WITH NUMBER PRECEDING

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PLAN VIEW
SCALE 1:2000

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SCALE = 1:2,000

LEGEND

YEAR 1 DEBRIS TRIMMING LOCATION

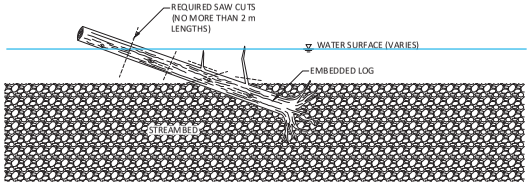
CUT LOC. # No. OF CUTS

NOTES

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A REPLACED IN THIS DRAWING SET BY THE ACTUAL TRIMMING LOCATIONS.

A REMOVED FROM THIS DRAWING SET.



EMBEDDED LOG TRIMMING DETAIL
(NTS)

CLIENT:

BRITISH COLUMBIA

REV	DATE	DESCRIPTION
A	20240318	RECORD DRAWINGS

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SEAL:

PROFESSIONAL ENGINEER D.J. GOULD # 25061 PROVINCE OF BRITISH COLUMBIA

2024-03-19

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DEBRIS TRIMMING SITE LOCATIONS 4 OF 4

DESIGNED:	AVB/VGB	SHEET ID:	3007807 NHC 2900439 KINGCOME EDSM REC-ROB-013	SHEET No: 013
DRAFTED:	CZZ	STATUS:	RECORD DRAWINGS	
CHECKED:	NAB/GFL	SCALE:	AS SHOWN WHEN PLOTTED D SIZE	
APPROVED:	DJG	DATE:	18 MAR 2024	REV No: A

SUPERSEDES ALL REVISIONS WITH NUMBER PRECEDING

FILENAME: \\nanaimo\fs-serv\Projects\Active\3007807 Kingcome Sediment Management\06 CAD\03_Production\300_Set\3007807 NHC 2900439 KINGCOME EDSM REC-ROB dwg, 18 Mar 2024, 11:12 AM