island health

DRINKING WATER SYSTEM ANNUAL REPORT

Reporting Period: January 1st to December 31st, 2019 (year)

Water System Strathcona Provincial Park (Buttle Lake Campground)

Water System Owner BC Parks

Primary Contact Name (Operator or Manager) 43K Wilderness Solutions (Ben McGibbon)

Phone Number (Operator or Manager) 250-230-2087

E-mail (Operator or Manager) ben@43k.ca

DESCRIBE YOUR WATER SUPPLY SYSTEM

What is the Source(s) of Raw Water?

☒ Deep Well ☐ Shallow Well ☐ Surface Water ☐ Other

If other, specify details:

Does the Drinking Water System have Primary Disinfection? ☐ Yes ☒ No

☐ Chlorination ☐ Ultraviolet Light ☐ Ozone ☐ Other

If other, specify details:

Does the Drinking Water System have Secondary Disinfection? ☐ Yes ☒ No

☐ Chlorination ☐ Other

If other, specify details:

Does the Drinking Water System have Filtration? ☐ Yes ☒ No

Check all boxes that apply

☐ Cartridge Filter(s) ☐ Carbon Filter ☐ Sand Filtration ☐ Reverse Osmosis ☐ Other

If other, specify details:

PUBLIC REPORTING

Emergency Response & Contingency Plan (ERCP)

Is your ERCP up to Date? ☒ Yes ☐ No

How do you Inform the System Users of the ERCP?

☐ Hand Delivered ☒ Bulletin Board ☐ Newspaper ☐ Utility Bill Insert ☐ Website

☐ Other (specify details)

Drinking Water System Annual Report

How do you Inform the System Users of the Annual Report?

☐ Hand Delivered ☒ Bulletin Board ☐ Newspaper ☐ Utility Bill Insert ☒ Website

☐ Other (specify details)

COMPLIANCE WITH OPERATING PERMIT

List the conditions of your Operating Permit (Contact the DWO for a copy if needed):

Attached

Are you in compliance with your Operating Permit? ■ Yes ☐ No

BACTERIOLOGICAL TESTING AND DRINKING WATER PROTECTION REGULATION WATER QUALITY STANDARDS

How many bacteriological samples were collected during this reporting period? 33

What is the minimum required sampling frequency for this system? (#samples/month) 2

Additional sampling details:

Was the minimum required sampling frequency achieved? ■ Yes ☐ No

Comments:

Bacteriological summary attached to this report? ■ Yes ☐ No

If no, how do the users of the system view the results?

WATER QUALITY STANDARDS FOR POTABLE WATER

Parameter:	***Standard:***	**Did this system meet standard?**	
Escherichia coli (for all samples)	No detectable *Escherichia coli* per 100ml	■ Yes	☐ No
Total Coliform Bacteria *(if only 1 sample collected in a 30 day period)*	No detectable total coliform bacteria per 100ml	☐ Yes	■ No
Total Coliform Bacteria *(if more than 1 sample collected in a 30 day period)*	No more than 10% of samples contain total coliform bacteria, **and** No sample has more than 10 total coliform bacteria per 100ml	■ Yes	☐ No

If the system did not meet any of above Drinking Water Protection Regulation standards, record the results in the table below; attach additional sheets if necessary.

Date	TC/100ml	E.coli/100ml	Reason	Corrective Action
July 17th sample on Wellhead #1 showed 35 total coliform; contaminated sample was determined				

CHEMICAL SAMPLING COMPLETED DURING THIS REPORTING PERIOD

Was any chemical sampling conducted during reporting period?	■ Yes	☐ No
If no, when were the last chemical samples conducted for this system? (date)		■ Don't know
If yes, attach a list of the chemical results attached		
If any water samples did not meet the Guidelines for Canadian Drinking Water Quality, record the results in the table below; attach additional sheets if necessary.		
Next scheduled full chemical test (date) 2023?		

Parameter	Result	Corrective Action / Treatment / Comments

ADDITIONAL TESTING

Does the system have analyzers for continuous monitoring? ☐ Yes ■ No

If yes, check all boxes that apply:

☐ Chlorine ☐ Turbidity ☐ Other (details)

Are the results available on request?

If any additional testing or sampling was conducted, record results in the table below; attach additional sheets if necessary.

Additional Testing & Reason for Sampling	Corrective Action Taken

WATER QUALITY COMPLAINTS

Were there any water quality complaints in this reporting period? (e.g. taste, odour, colour etc.) ☐ Yes ■ No

If yes, complete the table below; attach additional sheets if necessary.

Date	Water Quality Complaint	Corrective Action / Treatment

OPERATIONAL PROBLEMS

Were there any operational problems during this reporting period? (e.g. insufficient water supply, malfunction of disinfection equipment, line breaks, elevated turbidity etc.). ■ Yes ☐ No

If yes, complete the table below; attach additional sheets if necessary.

Incident Date	Type of Operational Problem	Corrective Action Taken
April to June 2019	Low Water Levels on Pump #2	Notice posted on pump. Could not use/sample
July 2019	Pump 3 broke down	Pump was down from July to September

MAJOR UPGRADES/REPAIRS & EXPENSES

Were there any major upgrades/repairs or any major costs incurred during this reporting period? ■ Yes ☐ No

If yes, complete the table below; attach additional sheets if necessary.

Major Upgrades/Expenses	Details
Improvements required by DWO	
Additions/changes to system	
Purchase or install new equipment	
Equipment repair or replacement	Repair pump #3 casing
Annual maintenance of system	
Specialist report	Did full chemical analysis on all wellheads except for Buttle wellhead #3
Other	

FUTURE IMPROVEMENTS

Are there any plans for future improvements? ☐ Yes ■ No

If yes, complete the table below; attach additional sheets if necessary.

Future Upgrades or Improvements	Estimated Date of Completion

Click here to enter a date. April 30, 2020 **DATE COMPLETED:**	Ben McGibbon **COMPLETED BY:**

Facility Sampling History

Buttle Lake Campground; Driftwood Bay Group Site and Service Yard

Location	Date	Total Coliform	E. Coli
Well #3, Well Plate #14048, Well #3, Well Plate #14048	30-Sep-2019	L1	L1
Driftwood Bay Well, Well Plate 14045, Driftwood Bay Well, Well Plate 14045	24-Sep-2019	L1	L1
Service Yard Well, Well Plate #14044, Service Yard Well, Well Plate #14044	24-Sep-2019	L1	L1
Well #1, Well Plate #14047, Well #1, Well Plate #14047	24-Sep-2019	L1	L1
Well #2, Well Plate #14041, Well #2, Well Plate #14041	24-Sep-2019	L1	L1
Driftwood Bay Well, Well Plate 14045, Driftwood Bay Well, Well Plate 14045	11-Sep-2019	L1	L1
Service Yard Well, Well Plate #14044, Service Yard Well, Well Plate #14044	11-Sep-2019	L1	L1
Well #1, Well Plate #14047, Well #1, Well Plate #14047	11-Sep-2019	L1	L1
Well #2, Well Plate #14041, Well #2, Well Plate #14041	11-Sep-2019	L1	L1
Driftwood Bay Well, Well Plate 14045, Driftwood Bay Well, Well Plate 14045	27-Aug-2019	L1	L1
Service Yard Well, Well Plate #14044, Service Yard Well, Well Plate #14044	27-Aug-2019	L1	L1
Well #1, Well Plate #14047, Well #1, Well Plate #14047	27-Aug-2019	L1	L1
Well #2, Well Plate #14041, Well #2, Well Plate #14041	27-Aug-2019	L1	L1
Driftwood Bay Well, Well Plate 14045, Driftwood Bay Well, Well Plate 14045	13-Aug-2019	L1	L1
Service Yard Well, Well Plate #14044, Service Yard Well, Well Plate #14044	13-Aug-2019	L1	L1
Well #1, Well Plate #14047, Well #1, Well Plate #14047	13-Aug-2019	L1	L1
Well #2, Well Plate #14041, Well #2, Well Plate #14041	13-Aug-2019	L1	L1
Well #1, Well Plate #14047, Well #1, Well Plate #14047	31-Jul-2019	L1	L1
Well #2, Well Plate #14041, Well #2, Well Plate #14041	31-Jul-2019	L1	L1
Driftwood Bay Well, Well Plate 14045, Driftwood Bay Well, Well Plate 14045	17-Jul-2019	L1	L1
Service Yard Well, Well Plate #14044, Service Yard Well, Well Plate #14044	17-Jul-2019	L1	L1
Well #1, Well Plate #14047, Well #1, Well Plate #14047	17-Jul-2019	35	0
Well #2, Well Plate #14041, Well #2, Well Plate #14041	17-Jul-2019	0	0
Driftwood Bay Well, Well Plate 14045, Driftwood Bay Well, Well Plate 14045	9-Jul-2019	L1	L1
Service Yard Well, Well Plate #14044, Service Yard Well, Well Plate #14044	9-Jul-2019	L1	L1
Well #1, Well Plate #14047, Well #1, Well Plate #14047	9-Jul-2019	L1	L1
Well #2, Well Plate #14041, Well #2, Well Plate #14041	9-Jul-2019	L1	L1
Well #3, Well Plate #14048, Well #3, Well Plate #14048	9-Jul-2019	L1	L1
Driftwood Bay Well, Well Plate 14045, Driftwood Bay Well, Well Plate 14045	3-Jul-2019	L1	L1
Service Yard Well, Well Plate #14044, Service Yard Well, Well Plate #14044	3-Jul-2019	L1	L1

Service Yard Well, Well Plate #14044, Service Yard Well, Well Plate #14044	3-Jul-2019	L1	L1
Well #1, Well Plate #14047, Well #1, Well Plate #14047	3-Jul-2019	L1	L1
Well #2, Well Plate #14041, Well #2, Well Plate #14041	3-Jul-2019	L1	L1
Well #3, Well Plate #14048, Well #3, Well Plate #14048	3-Jul-2019	L1	L1
Driftwood Bay Well, Well Plate 14045, Driftwood Bay Well, Well Plate 14045	18-Jun-2019	L1	L1
Service Yard Well, Well Plate #14044, Service Yard Well, Well Plate #14044	18-Jun-2019	L1	L1
Well #1, Well Plate #14047, Well #1, Well Plate #14047	18-Jun-2019	L1	L1
Well #2, Well Plate #14041, Well #2, Well Plate #14041	18-Jun-2019	L1	L1
Well #3, Well Plate #14048, Well #3, Well Plate #14048	18-Jun-2019	L1	L1
Driftwood Bay Well, Well Plate 14045, Driftwood Bay Well, Well Plate 14045	4-Jun-2019	L1	L1
Service Yard Well, Well Plate #14044, Service Yard Well, Well Plate #14044	4-Jun-2019	L1	L1
Well #1, Well Plate #14047, Well #1, Well Plate #14047	4-Jun-2019	L1	L1
Well #2, Well Plate #14041, Well #2, Well Plate #14041	4-Jun-2019	L1	L1
Well #3, Well Plate #14048, Well #3, Well Plate #14048	4-Jun-2019	L1	L1
Driftwood Bay Well, Well Plate 14045, Driftwood Bay Well, Well Plate 14045	27-May-2019	L1	L1
Service Yard Well, Well Plate #14044, Service Yard Well, Well Plate #14044	27-May-2019	L1	L1
Well #1, Well Plate #14047, Well #1, Well Plate #14047	27-May-2019	L1	L1
Well #3, Well Plate #14048, Well #3, Well Plate #14048	27-May-2019	L1	L1
Driftwood Bay Well, Well Plate 14045, Driftwood Bay Well, Well Plate 14045	7-May-2019	L1	L1
Service Yard Well, Well Plate #14044, Service Yard Well, Well Plate #14044	7-May-2019	L1	L1
Well #1, Well Plate #14047, Well #1, Well Plate #14047	7-May-2019	L1	L1
Well #3, Well Plate #14048, Well #3, Well Plate #14048	7-May-2019	L1	L1
Driftwood Bay Well, Well Plate 14045, Driftwood Bay Well, Well Plate 14045	30-Apr-2019	L1	L1
Service Yard Well, Well Plate #14044, Service Yard Well, Well Plate #14044	30-Apr-2019	L1	L1
Well #1, Well Plate #14047, Well #1, Well Plate #14047	30-Apr-2019	L1	L1
Well #3, Well Plate #14048, Well #3, Well Plate #14048	30-Apr-2019	L1	L1
Driftwood Bay Well, Well Plate 14045, Driftwood Bay Well, Well Plate 14045	10-Apr-2019	L1	L1
Service Yard Well, Well Plate #14044, Service Yard Well, Well Plate #14044	10-Apr-2019	L1	L1
Well #1, Well Plate #14047, Well #1, Well Plate #14047	10-Apr-2019	L1	L1
Well #3, Well Plate #14048, Well #3, Well Plate #14048	10-Apr-2019	L1	L1

Client/Code

43K Wilderness Solutions
Box 550
Port McNeill, BC
V0N 2R0

TEL: 250-230-2087
ben@43k.ca

Date 18Jul19 3:00p
Source Well
Type of Sample water
No. of Samples 7

No. W148625

Comments Arrival temp.:
Pd Visa Batch 922

Sample: Strathcona Provincial Park - Well Heads

	Site Code	Date	Time	CFU/100 ml TC	T-NC	CFU/100 ml FC	F-NC	CFU/100 mL E.coli
1	#1 Buttle Lake 14047	17Jul19	08:00a	35	5600	0	0	0
2	#2 Buttle Lake 14041	17Jul19	08:00a	0	800	0	0	0
4	#1 Ralph River 14046	17Jul19	09:30a	0	1800	0	0	0
5	#2 Ralph River 14042	17Jul19	09:45a	0	96	0	0	0
6	#3 Ralph River 14043	17Jul19	09:50a	0	40	0	0	0
7	#1 Driftwd Bay 14045	17Jul19	09:00a	0	3000	0	0	0
8	#1 Park HQ 14044	17Jul19	09:00a	0	2	0	0	0

WATER DISTRICT SCREEN

	Sample	Date	Time	Lactose Fermentors	Coliforms Total	Fecal	E.coli	Total Aeromonas	Sulfur Reducing/ Iron Bacteria	Yeast/Fungi	TPC*
1	#1 Buttle Lake 14047	17Jul19	08:00a	56.0	0.35	ND	ND	2.0	ND / ND	ND / ND	512
2	#2 Buttle Lake 14041	17Jul19	08:00a	8.00	ND	ND	ND	ND	ND / ND	ND / ND	976
4	#1 Ralph River 14046	17Jul19	09:30a	18.0	ND	ND	ND	ND	ND / ND	ND / ND	288
5	#2 Ralph River 14042	17Jul19	09:45a	0.96	ND	ND	ND	ND	ND / ND	ND / ND	80.0
6	#3 Ralph River 14043	17Jul19	09:50a	0.40	ND	ND	ND	ND	ND / ND	ND / ND	240
7	#1 Driftwd Bay 14045	17Jul19	09:00a	30.0	ND	ND	ND	ND	ND / ND	ND / ND	416
8	#1 Park HQ 14044	17Jul19	09:00a	ND	ND	ND	ND	ND	ND / ND	ND / ND	64.0

* all counts are colony forming units per milli-litre

TC = total coliform bacteria FC = fecal coliform bacteria (aka Thermotolerant Coliforms)
NC = non-coliform bacteria ND = none detected
TPC = total plate count- spread plate method - 35C/48hr TGEA FDA/BAM 8th ed, 1995 + Revision A, 1998, May 2009
CFU = colony forming units

Results may be adversely affected if samples are submitted to the laboratory more than 24 to 30 hours after collection.

E. coli = Escherichia coli, FDA/BAM 8th ed, 1995 + Revision A, 1998
Bergy's Manual of Systematic Bacteriology vol 1, AOAC 1984; J.Clin.Micro., J.Intern.Systm.Bact.

- see following page for chemistry results -

K. Paneque-Martinez
Microbiologist

W. Riggs
Sr. Microbiologist

Client/Code

43K Wilderness Solutions
Box 550
Port McNeill, BC
V0N 2R0

Date 18Jul19 3:00p No. W148625 pg2
Source Well
Type of Sample water
No. of Samples 7

TEL: 250-230-2087
ben@43k.ca

Comments Arrival temp.:
Pd Visa Batch 922

Sample: Strathcona Provincial Park - Well Heads - 1) #1 Buttle Lake 14047 17Jul19 08:00a
2) #2 Buttle Lake 14041 17Jul19 08:00a 3) #1 Ralph River 14046 17Jul19 09:30a 4) #2 Ralph River 14042 17Jul19 09:45a

ELEMENTS		1 SAMPLE	2 SAMPLE	3 SAMPLE	4 SAMPLE	UNITS	Max.for Aquatic Life Freshwater	Marine	Maximum In Effluent **
1) Aluminium	Al	2.02	0.192	0.213	0.214	mg/L	n/a	1.50	4.00
2) Antimony	Sb	<0.500	<0.500	<0.500	<0.500	ug/L	n/a	200	5.00
3) Arsenic	As	<0.500	<0.500	<0.500	<0.500	ug/L	5.00	12.5	250
4) Barium	Ba	<0.009	<0.009	<0.009	<0.009	mg/L	n/a	1.00	1.00
5) Beryllium	Be	<0.003	<0.003	<0.003	<0.003	mg/L	0.010	1.50	no limit listed
6) Boron	B	0.678	0.588	0.665	0.723	mg/L	n/a	5.00	5.00
7) Cadmium	Cd	<0.010	<0.010	<0.010	<0.010	ug/L	1.05-2.11	0.12	10.0
8) Calcium	Ca	8.03	3.96	4.42	3.60	mg/L	n/a	n/a	no limit listed
9) Chromium	Cr	<0.010	<0.010	<0.010	<0.010	mg/L	0.100	0.050	0.030
10) Cobalt	Co	<0.020	<0.020	<0.020	<0.020	mg/L	1.32	n/a	0.500
11) Copper	Cu	0.019	<0.008	0.029	0.009	mg/L	0.030-0.127	0.050	0.500
12) Gold	Au	<0.040	<0.040	<0.040	<0.040	mg/L	n/a	n/a	no limit listed
13) Iron	Fe	2.92	0.421	0.035	0.079	mg/L	1.00	0.300	1.00
14) Lanthanum	La	<0.020	<0.020	<0.020	<0.020	mg/L	n/a	n/a	no limit listed
15) Lead	Pb	<0.500	<0.500	<0.500	<0.500	ug/L	30.0	50.0	100
16) Magnesium	Mg	2.05	0.710	0.420	0.330	mg/L	n/a	n/a	no limit listed
17) Manganese	Mn	0.051	0.048	<0.004	<0.004	mg/L	n/a	0.100	0.050
18) Mercury	Hg	<0.010	<0.010	<0.010	<0.010	ug/L	2.00	1.00	5.00
19) Molybdenum	Mo	<0.020	<0.020	<0.020	<0.020	mg/L	n/a	n/a	0.500
20) Nickel	Ni	<0.050	<0.050	<0.050	<0.050	mg/L	n/a	0.100	0.500
21) Phosphorus	P	0.063	<0.010	<0.010	<0.010	mg/L	n/a	0.050	1.50
22) Potassium	K	0.470	0.120	0.200	0.140	mg/L	n/a	n/a	no limit listed
23) Scandium	Sc	<0.050	<0.050	<0.050	<0.050	mg/L	n/a	n/a	no limit listed
24) Selenium	Se	<0.500	<0.500	<0.500	<0.500	ug/L	10.0	10.0	100
25) Silicon	Si	5.18	2.71	1.70	1.41	mg/L	n/a	n/a	no limit listed
26) Silver	Ag	<0.010	<0.010	<0.010	<0.010	mg/L	0.010	0.005	1.00
27) Sodium	Na	1.89	0.580	0.620	0.500	mg/L	n/a	n/a	no limit listed
28) Strontium	Sr	0.010	<0.002	<0.002	<0.002	mg/L	75.0	n/a	no limit listed
29) Tin	Sn	<0.020	<0.020	<0.020	<0.020	mg/L	n/a	n/a	no limit listed
30) Titanium	Ti	0.093	<0.010	<0.010	<0.010	mg/L	n/a	n/a	no limit listed
31) Tungsten	W	<0.050	<0.050	<0.050	<0.050	mg/L	n/a	n/a	no limit listed
32) Vanadium	V	<0.010	<0.010	<0.010	<0.010	mg/L	n/a	10.0	no limit listed
33) Zinc	Zn	0.065	0.038	0.048	0.017	mg/L	0.490-1.35	0.100	5.00
Hardness (mg/L CaCO3)		28.5	12.8	12.8	10.3	mg/L	0-75 mg/L = soft		
pH		6.28	6.32	6.35	6.93	units	6.5-9.0	6.5-9.0	5.5-11.0

As per Canadian or B.C. limits Ministry of Environment - Water Quality Criteria,
Report No. 80-9, 1980. Task Force of the Canadian Council of Resource & Envir. Min
- Guidelines for Can. Drinking Water Quality, 1996. Ammend. Health Canada (2006)
As per Canadian Environmental Quality Guidelines Summary Table. Updated Dec 2003
Chapter 4, Water: Aquatic Life. EPA-822-R-02-07 & US EPA 822/R-85-100, WHO Eniv.134

R. Bilodeau
Analytical Chemist

H. Hartmann
Sr.Analytical Chemist

Client/Code

43K Wilderness Solutions
Box 550
Port McNeill, BC
V0N 2R0

TEL: 250-230-2087
ben@43k.ca

Date 18Jul19 3:00p
Source Well
Type of Sample water
No. of Samples 7

No. W148625 pg3

Comments Arrival temp.:
Pd Visa Batch 922

Sample: Strathcona Provincial Park - Well Heads - 5) #3 Ralph River 14043 17Jul19 09:50a
6) #1 Driftwd Bay 14045 17Jul19 09:00a 7) #1 Park HQ 14044 17Jul19 09:00a

ELEMENTS		5 SAMPLE	6 SAMPLE	7 SAMPLE	UNITS	Max.for Aquatic Life Freshwater	Marine	Maximum In Effluent **
1) Aluminium	Al	0.193	0.219	0.184	mg/L	n/a	1.50	4.00
2) Antimony	Sb	<0.500	<0.500	0.819	ug/L	n/a	200	5.00
3) Arsenic	As	<0.500	<0.500	<0.500	ug/L	5.00	12.5	250
4) Barium	Ba	<0.009	<0.009	<0.009	mg/L	n/a	1.00	1.00
5) Beryllium	Be	<0.003	<0.003	<0.003	mg/L	0.010	1.50	no limit listed
6) Boron	B	0.643	0.677	0.626	mg/L	n/a	5.00	5.00
7) Cadmium	Cd	<0.010	<0.010	<0.010	ug/L	1.05-2.11	0.12	10.0
8) Calcium	Ca	5.79	28.9	5.38	mg/L	n/a	n/a	no limit listed
9) Chromium	Cr	<0.010	<0.010	<0.010	mg/L	0.100	0.050	0.030
10) Cobalt	Co	<0.020	<0.020	<0.020	mg/L	1.32	n/a	0.500
11) Copper	Cu	0.023	0.013	0.190	mg/L	0.030-0.127	0.050	0.500
12) Gold	Au	<0.040	<0.040	<0.040	mg/L	n/a	n/a	no limit listed
13) Iron	Fe	0.282	0.753	0.096	mg/L	1.00	0.300	1.00
14) Lanthanum	La	<0.020	<0.020	<0.020	mg/L	n/a	n/a	no limit listed
15) Lead	Pb	0.743	0.792	3.04	ug/L	30.0	50.0	100
16) Magnesium	Mg	0.590	7.02	1.13	mg/L	n/a	n/a	no limit listed
17) Manganese	Mn	0.027	0.048	0.004	mg/L	n/a	0.100	0.050
18) Mercury	Hg	<0.010	<0.010	<0.010	ug/L	2.00	1.00	5.00
19) Molybdenum	Mo	<0.020	<0.020	<0.020	mg/L	n/a	n/a	0.500
20) Nickel	Ni	<0.050	<0.050	<0.050	mg/L	n/a	0.100	0.500
21) Phosphorus	P	<0.010	0.014	<0.010	mg/L	n/a	0.050	1.50
22) Potassium	K	0.160	0.350	0.160	mg/L	n/a	n/a	no limit listed
23) Scandium	Sc	<0.050	<0.050	<0.050	mg/L	n/a	n/a	no limit listed
24) Selenium	Se	<0.500	<0.500	<0.500	ug/L	10.0	10.0	100
25) Silicon	Si	2.05	5.28	3.68	mg/L	n/a	n/a	no limit listed
26) Silver	Ag	<0.010	<0.010	<0.010	mg/L	0.010	0.005	1.00
27) Sodium	Na	0.730	3.29	1.00	mg/L	n/a	n/a	no limit listed
28) Strontium	Sr	<0.002	0.030	0.010	mg/L	75.0	n/a	no limit listed
29) Tin	Sn	<0.020	<0.020	<0.020	mg/L	n/a	n/a	no limit listed
30) Titanium	Ti	<0.010	<0.010	<0.010	mg/L	n/a	n/a	no limit listed
31) Tungsten	W	<0.050	<0.050	<0.050	mg/L	n/a	n/a	no limit listed
32) Vanadium	V	<0.010	<0.010	<0.010	mg/L	n/a	10.0	no limit listed
33) Zinc	Zn	0.066	0.197	0.019	mg/L	0.490-1.35	0.100	5.00
Hardness (mg/L CaCO3)		16.9	101	18.1	mg/L	0-75 mg/L = soft		
pH		6.60	7.02	6.73	units	6.5-9.0	6.5-9.0	5.5-11.0

As per Canadian or B.C. limits Ministry of Environment - Water Quality Criteria,
Report No. 80-9, 1980. Task Force of the Canadian Council of Resource & Envir. Ministers
- Guidelines for Can. Drinking Water Quality, 1996. Ammend. Health Canada (2006)
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Chapter 4, Water: Aquatic Life. EPA-822-R-02-07 & US EPA 822/R-85-100; WHO Eniv.134 1992

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TEL: 250-230-2087
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Date 18Jul19 3:00p
Source Well
Type of Sample water
No. of Samples 7

No. W148625 pg4

Comments Arrival temp.:
Pd Visa Batch 922

Sample: Strathcona Provincial Park - Well Heads

SAMPLE	DATE	TIME	Alkalinity (mg/L)	NH_3-N (ug/L)	Cl^- (mg/L)	Colour (TCU)	E.C. (uS/cm)
1 #1 Buttle Lake 14047	17Jul19	08:00a	45.0	ND	1.23	0.490	61.3
2 #2 Buttle Lake 14041	17Jul19	08:00a	20.0	ND	0.680	0.870	36.6
3 #1 Ralph River 14046	17Jul19	09:30a	25.0	ND	0.280	0.680	32.8
4 #2 Ralph River 14042	17Jul19	09:45a	25.0	1.80	0.160	0.580	35.9
5 #3 Ralph River 14043	17Jul19	09:50a	25.0	ND	0.820	1.15	41.3
6 #1 Driftwd Bay 14045	17Jul19	09:00a	75.0	17.5	42.8	4.96	333
7 #1 Park HQ 14044	17Jul19	09:00a	30.0	ND	0.830	0.960	52.9
Lab Blank			ND	ND	ND	ND	ND
S_o			0.100	0.254	0.015	0.300	0.300
REF. VALUE			200	20.0	1.00	5.00	147
STD ± 2SD			199 ± 11.9	20.0 ± 1.45	0.988 ± 0.089	4.99 ± 0.362	147 ± 7.66

SAMPLE	DATE	TIME	CORROSIVITY (Is @20C)	F^- (mg/L)	S^{2-} (ug/L)	TKN (mg/L)	NO_3-N (ug/L)
1 #1 Buttle Lake 14047	17Jul19	08:00a	-2.55	ND	ND	ND	8.90
2 #2 Buttle Lake 14041	17Jul19	08:00a	-3.17	ND	ND	ND	20.8
3 #1 Ralph River 14046	17Jul19	09:30a	-2.99	ND	ND	ND	16.8
4 #2 Ralph River 14042	17Jul19	09:45a	-2.50	ND	ND	0.002	20.9
5 #3 Ralph River 14043	17Jul19	09:50a	-2.63	ND	ND	ND	28.5
6 #1 Driftwd Bay 14045	17Jul19	09:00a	-1.03	ND	ND	0.018	97.8
7 #1 Park HQ 14044	17Jul19	09:00a	-2.45	ND	ND	ND	31.1
Lab Blank				ND	ND	ND	ND
S_o				0.007 ug/L	0.007	0.012	0.160
REF. VALUE				1.00	50.0	0.100	20.0
STD ± 2SD				0.992 ± 0.090	49.0 ± 4.33	0.100 ± 0.007	19.9 ± 1.48

...cont/

Client/Code

43K Wilderness Solutions
Box 550
Port McNeill, BC
V0N 2R0

TEL: 250-230-2087
ben@43k.ca

Date 18Jul19 3:00p
Source Well
Type of Sample water
No. of Samples 7

No. W148625 pg5

Comments Arrival temp.:
Pd Visa Batch 922

Sample: Strathcona Provincial Park - Well Heads

	SAMPLE	DATE	TIME	NO_2-N (ug/L)	SO_4^{2-} (mg/L)	T.O.C. (mg/L)	T&L (mg/L)	TDS (mg/L)
1	#1 Buttle Lake 14047	17Jul19	08:00a	9.80	3.19	3.35	ND	35.6
2	#2 Buttle Lake 14041	17Jul19	08:00a	3.60	1.10	0.860	ND	21.2
3	#1 Ralph River 14046	17Jul19	09:30a	5.00	1.23	1.34	ND	19.0
4	#2 Ralph River 14042	17Jul19	09:45a	22.1	1.06	0.500	ND	20.8
5	#3 Ralph River 14043	17Jul19	09:50a	11.9	1.33	ND	ND	24.0
6	#1 Driftwd Bay 14045	17Jul19	09:00a	3.60	1.20	0.500	0.440	193
7	#1 Park HQ 14044	17Jul19	09:00a	ND	1.13	ND	ND	30.7
	Lab Blank			ND	ND	ND	ND	ND
	S_o			0.300	0.075	0.300	0.070	0.700
	REF. VALUE			10.0	10.0	10.0	1.00	200
	STD ± 2SD			9.94 ± 0.686	10.4 ± 1.01	9.99 ± 0.714	0.999 ± 0.063	206 ± 19.0

	SAMPLE	DATE	TIME	Turbidity (NTU)	UVT (%)
1	#1 Buttle Lake 14047	17Jul19	08:00a	1.25	98.6
2	#2 Buttle Lake 14041	17Jul19	08:00a	5.19	96.1
3	#1 Ralph River 14046	17Jul19	09:30a	0.810	99.3
4	#2 Ralph River 14042	17Jul19	09:45a	1.02	98.2
5	#3 Ralph River 14043	17Jul19	09:50a	4.29	97.3
6	#1 Driftwd Bay 14045	17Jul19	09:00a	27.7	89.3
7	#1 Park HQ 14044	17Jul19	09:00a	0.980	98.4
	Lab Blank			ND	ND
	S_o			0.015	0.003
	REF. VALUE			0.500	90.0
	STD ± 2SD			0.505 ± 0.043	90.1 ± 0.02

SD = standard deviation
STD = secondary standard calibrated to primary standard reference material
S_o = standard deviation at zero analyte concentration; method detection limit is generally considered to be 3x S_o value
ND = none detected n/a = not applicable

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Analytical Chemist

H. Hartmann
Sr.Analytical Chemist