Wasa Septage Ponds
2020 Groundwater Monitoring Annual Report

PREPARED FOR:REGIONAL DISTRICT OF EAST KOOTENAY

PREPARED BY: SPERLING HANSEN ASSOCIATES

February, 2021

PRJ20050

1. INTRODUCTION

Sperling Hansen Associates (SHA) was retained by the Regional District of East Kootenay (RDEK) in 2020 to develop an updated Groundwater Monitoring Program (GMP) for seven (7) Solid Waste Management facilities located within the RDEK As part of this GMP update SHA, along with Subconsultant Bear Environmental Limited (BEAR), will conduct four (4) groundwater sampling events per year, and provide one interim report per event for each site. The goal of this program is to provide the RDEK with valuable information regarding the groundwater quality at disposal sites and to assist in developing appropriate monitoring and management measures for the next five years.

SHA was awarded this contract with the RDEK in April, 2020. The first two quarterly sampling events were completed by the previous consultant EcoLogic in January and April 2020. As SHA was brought on halfway through the year, the results of the first two sampling events were shared with SHA so that a complete data set for 2020 could be compiled, and that the complete data from all four events could be reviewed and included in this Annual report.

The final quarterly water sampling event for the year was completed in October, 2020 over a week period. Samples taken from each site are recorded below, and water quality analysis discussed in Section 4. This report details the sampling notes, lab analysis results, and trends observed at the wells throughout 2020. Section 5 presents recommendations for the next year of monitoring.

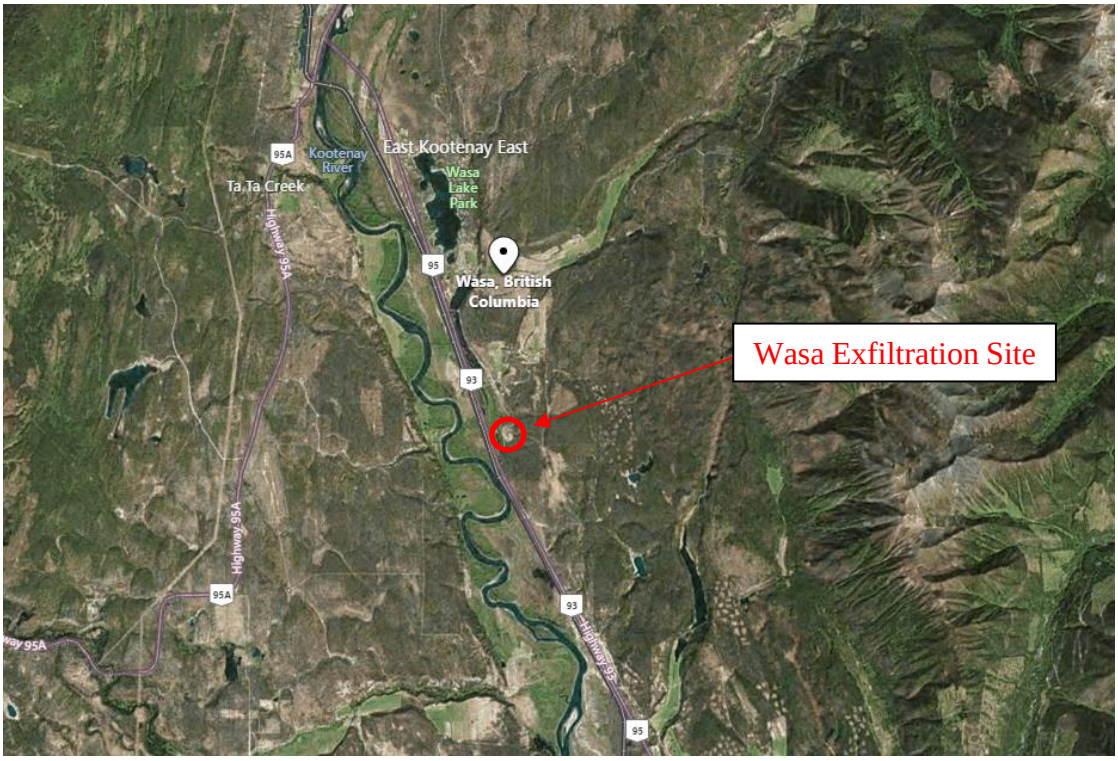

Photo 1-1. Wasa Site Location.

1.1 Location and Setting

The Wasa exfiltration site is located in the Central Valley sub-region within the Regional District of East Kootenay. The site is approximately 5 km south of Wasa. The latitude and longitude are 49.73717 N and 115.715356 W respectively.

Photo 1-2. Wasa Site Layout.

1.2 Site Operations

The site consists of two unlined septic waste disposal ponds, inside a fenced area which occupies approximately 0.44 hectares, the rest of the 16.5 hectares of the site are undeveloped. To the south of the two exfiltration ponds is a solid waste collection area at the Transfer Station.

Due to the nature of waste when it comes into contact with water, it is required to monitor the groundwater on and surrounding the site to observe impacts from the exfiltration ponds or stockpiled solid waste. In compliance with Landfill Criteria for Municipal Solid Waste, SHA has been retained to conduct the groundwater monitoring for the four (4) wells identified by the RDEK. The wells identified in Figure 1 are sampled quarterly in January, April, July, and October.

The Operational Certificate for the Wasa Exfiltration site is attached to this report as Appendix A.

2. MONITORING PROGRAM

The monitoring program for the Site is documented in the Site's Operational Certificate 107105 (OC). Four wells are indicated including one background and three downgradient wells.

The following wells were sampled in 2020:

Table 2-1: Groundwater Monitoring Plan Wells

Monitoring Well	Notes
E297150	Upgradient – Damaged (needs investigation)
E297130	Downgradient of Septic Ponds - Sampled
E296151	Downgradient of Septic Ponds - Sampled
E297152	Downgradient of Septic Ponds - Sampled

2.1 Methodology

Q1 2020 and Q2 2020 sampling was conducted by Ecologic. Subconsultant BEAR was hired to implement the monitoring program and conduct field sampling in Q3/Q4 2020. Each well sampled is tested for a set of parameters. These differ from site to site and some are only tested quarterly while others are only tested annually. Table 2-2 shows which parameters are tested Quarterly and Yearly.

Table 2-2 Groundwater Monitoring Parameters

Sampling Parameters	Quarterly	Annually
WASA Exfiltration Ponds	Temperature	Temperature
	Conductivity	Conductivity
	pH	pH
	Nitrite (N)	Nitrite (N)
	Nitrate (N)	Nitrate (N)
	Ammonia Nitrogen (NH3)	Ammonia Nitrogen (NH3)
	Fluoride (F)	Fluoride (F)
	Sulphate (SO4)	Sulphate (SO4)
	Chloride (Cl)	Chloride (Cl)
	Hardness	Hardness
	Total Alkalinity	Total Alkalinity
	Total Suspended Solids	Total Suspended Solids
	Fecal and Total Coliform	Fecal and Total Coliform
	Dissolved Metals	Dissolved Metals
		BTEX
		EPH/VPH

Note that Ecologic did not complete the proper annual sampling in Spring 2020 as sampling for BTEX/EPH/VPH was not completed and analysis was not conducted. SHA will ensure these additional annual parameters are included in the Spring 2021 sampling event.

Additionally, it was noted that E297150 was damaged and sampling could not be completed in 2020. SHA will further investigate this issue prior to the Spring sampling event to determine if the monitoring infrastructure is salvageable or if a new upgradient well is required.

In 2020, sampling was conducted in accordance to the BC Field Sampling Manual. Laboratory Certificates of Analysis are shown in Appendix B. SHA reviewed available COAs from Q1 to Q4. An exceedance of the holding time is noted for bacteriological samples in Q1 2020. With the exception of this, based on internal laboratory QA/QC, results from 2020 are considered reliable.

2.2 Groundwater Flow

The Wasa site is located approximately 700 m east of the Kootenay River. The ground elevation shows the local topography slopes from the east just over 200 m down to the valley where the river lies.

Per the BC Water Resource Atlas, there is no mapped aquifer underlying the site, however, the site is located adjacent to the south east of the boundary of Aquifer 540, which runs north to south and covers the greater area of Wasa Lake. Aquifer 540 is described as highly vulnerable to pollution and is unconfined over much of the aquifer with water use described as domestic/commercial. The regional groundwater flow is inferred to follow the Kootenay River, which is south, southeast.

Locally, groundwater flow can be affected by building foundations, recharge areas, drainage and subsurface utilities. Depending on their depth, underground structures may significantly influence shallow groundwater flow in the vicinity of the Site. Locally, based on groundwater elevation measurements, groundwater appears to flow northwest. Well details are shown in the Table 2-3 below.

Table 2-3. Well Details and Water Level

Well ID	Well Construction	Q1 Water Level (from EcoLogic Reports)	Q2 Water Level (from EcoLogic Reports)	Q3 Depth to Water BGS (m)	Q4 Depth to Water BGS (m)
E297130	2" PVC	13.48	13.47	12.445	11.625
E297151	2" PVC	13.16	13.35	9.515	14.395
E297152	2" PVC	16.09	16.28	12.53	13.255

2.3 Regulatory Criteria

Per the OC published in 2014, there are no specified criteria for water quality comparison at the Wasa site.

The BC Contaminated Sites Regulation (CSR) Protocol 21 indicates that Aquatic Life Standards (AW) generally apply to all groundwater located within 500 m of a surface water body containing aquatic life. The Site is located approximately 700m east of Kootenay River. For sites located at a distance greater than 500m from a surface water body, investigations must show that groundwater containing substances at concentrations greater than the applicable aquatic life water use standards do not have the potential to migrate to within 500 m of a surface water body used by aquatic life, considering preferential flow corridors. Without further investigation of the Site, the Aquatic Life for Freshwater (AW) standards will apply.

The CSR Protocol 21 indicates that Drinking Water (DW) Standards generally apply to groundwater and surface water where drinking water sources are within 500m of a site, or if a property is situated on an aquifer that could be used in the future for Drinking Water. A search for water wells revealed that there are no domestic use water wells within 500m of the Site. Information from the BC Water Atlas indicates that there are no mapped aquifers underlying the Site. Although current DW use appears to not apply to the site, without further investigation, future DW standards are assumed to apply. Note that future drinking water use applies where information is unavailable or inadequate to demonstrate an absence of drinking water aquifers below a site.

Recent standards and guidelines have been applied by SHA to include:

- The Schedule 3.2 of the BC CSR with consideration to Aquatic Life (AW) and Drinking Water (DW);

These standards and guidelines are the most recent published by BC ENV used to assess groundwater at contaminated sites and the quality of drinking water.

3. RESULTS

Per the OC Section 8.1.2., parameters tested in 2020 included:

- Temperature, conductivity, pH, nitrite, nitrate, ammonia nitrogen, fluoride, chloride, sulphate, hardness, total alkalinity, total suspended solids, fecal and total coliform.

Laboratory Certificates are included in Appendix B. Table B- 1 outlines the water quality analysis alongside the applicable water standards.

3.1 Exceedances

All parameters tested were detected below applicable BC CSR AW standards.

Parameters above the BC CSR DW standards included:

- Nitrate (as N)
- Cobalt
- Lithium

Note that Fecal Coliforms were present in some wells in numbers that exceed Canadian Drinking Water Standards.

Maximum concentrations are shown in the Table below:

Table 3-1. Maximum Concentrations Above BC CSR DW Standards

Parameter	BC CSR DW Standard	Maximum Concentration (mg/L)	Well Name
Lithium (Li)	0.008 mg/L	**0.0214**	E297152
Cobalt (Co)	0.001 mg/L	**0.00384**	E297130
Nitrate (as N)	10 mg/L	**21.7**	E297151
Fecal Coliforms	*No detectable bacteria per 100 mL	**6000**	E297130

"*" Denotes applicable Canadian Drinking Water Standard as the is no BC CSR standards for coliforms.
Green shading indicates a concentration above applicable standards.
Note: concentrations listed in the table are all above applicable DW standards. Maximum concentrations are shown in **bold.**

3.2 Notes on Regional Background Concentrations

As per the British Columbia Contaminated Sites Regulation (CSR) Schedule 3.2, 2019, the drinking water limit for Lithium (Li) is 8 µg/L or 0.008 mg/L. Many regions in B.C. have background concentrations of lithium that exceed this limit, which poses a complication for monitored sites that are required under Operation Certificates or Permits to avoid exceedances of harmful parameters. In response, the B.C. Ministry of Environment and Climate Change (BC ENV) published a document in 2018 qualifying the limit and providing background concentrations for three regions in the province for five metals, including lithium. The limits published in the *Technical Bulletin 3: Regional Background Concentrations for Select Inorganic Substances in Groundwater* account for naturally occurring levels of the five metals, and are therefore higher than the limit within the CSR currently.

However, these three regions only comprise the Lower Mainland, South Vancouver Island, and Thompson-Okanagan. SHA believes the exceedances in lithium observed at the RDEK sites are attributable to natural background concentrations that are not accounted for in the CSR Schedule 3.2 or *Technical Bulletin 3*. It should be noted that Eco/Logic did not have a limit for lithium, which explains the discrepancy in exceedances despite there being little difference between 2019 and 2020 results.

Thompson-Okanagan, the nearest region to the RDEK with a back ground concentration qualifier for lithium, has a qualified concentration in the Bulletin of 96 µg/L, or 0.096 mg/L. None of the wells monitored in July, 2020 would exceed a limit of 0.096 mg/L, so SHA recommends keeping a note of this and a close eye on this parameter in ongoing monitoring. SHA does not believe the RD needs to look into

remediation measures at this point, but recommends the RD flag this exceedance history in the case that the Ministry publishes a background concentration for the Kootenay region.

4. DISCUSSION

All parameters tested were below applicable BC CSR Schedule 3.2 AW standards.

Parameters above applicable BC CSR Schedule 3.2 DW standards included the following.

- Lithium
- Cobalt
- Nitrate
- Fecal Coliform (above the Canadian Drinking Water Standard)

The maximum concentration of lithium was found at E297152 at 0.0214 mg/L versus the BC CSR DW standard of 0.008 mg/L. The maximum concentration of cobalt was also found at E297130 at 0.00384 mg/L versus the BC CSR DW standard of 0.001 mg/L. The maximum nitrate concentration was found at E297151 at 21.7 mg/L versus the CSR DW limit of 10 mg/L.

These maximums are calculated as the following times respective standards:

- Lithium – 2.7
- Cobalt – 3.8
- Nitrate – 2.1

Wells E297151, E297252, and E297130 are located downgradient of the septic ponds, to the west, east, and north west respectively, according to the 2014 OC and Figure 1.

Note that bacterial coliforms and elevated nitrate were found in site groundwater indicating expected local impacts from the sewage exfiltration basins.

SHA reviewed Site and surrounding water use per CSR Protocol 21. Although current DW use appears to not apply to the site, without further investigation of the underlying unmapped aquifer, future DW standards are assumed to apply.

Based on this information regarding current water use, and results that show concentrations below applicable AW standards, SHA considers the impacts of the sewage infiltration basin to the surrounding environment to be low.

4.1 Trend Analysis

To illustrate the trends observed in key parameters at the wells sampled, SHA has prepared figures that combine the 2020 analytical results with the applicable criteria limits.

- Figure 2 – Lithium concentrations
- Figure 3 – Sulfate concentrations

- Figure 4 – Sodium concentrations
- Figure 5 – Chloride concentrations
- Figure 6 – Nitrate Concentrations
- Figure 7 – Specific Conductance (Conductivity)

The red line on each figure represents the limit for that parameter according to the criteria, to show if wells are under or exceeding the maximum allowable concentration at the time of each quarterly sampling event.

Sulfate, sodium, chloride, nitrate, and conductivity are graphed because they are typical landfill indicators. As shown in the graphs, these parameters are below allowable limits and show the landfill is not impacting groundwater chemistry beyond regulatory standards.

Please note that the graphs provided are for observing trends, and data less than or equal to the detection limit for a parameter appears on graphs as trace concentrations. If a well shows to have no data on the graph, please refer to the master data table for the exact parameter concentration.

5. CONCLUSIONS AND RECOMMENDATIONS

In 2020, sampling at the Site occurred in accordance with the OC. Note that annual sampling for BTEX/EPH/VPH was not completed, as stated above in Section 2.1. SHA has scheduled the subsequent annual sampling event for Q2 2021.

Some parameters generally associated with sewage effluent including nitrate and fecal coliforms were noted above applicable BC CSR DW Standards, but below BC CSR AW standards in Site groundwater.

Although there appears to be local impacts to groundwater from the Site's sewage exfiltration basins, SHA considers the overall impacts to human health and the surrounding environment to be low based on Site and surrounding water use.

Other metals parameters that appear slightly elevated included lithium and cobalt that may be related to Site impacts but may also be naturally occurring. In conducting analyses for seven different sites within the RDEK with similar exceedances of lithium under the CSR DW limit, SHA believes these elevated concentrations are a region-wide occurrence caused by existing background concentrations rather than impacts caused by activities at the solid waste sites.

SHA recommends the following:

Slight parameter concentrations of dissolved metals above applicable standards were detected in the Site groundwater monitoring wells. SHA recommends that a future groundwater sampling event be conducted using a low flow method to minimize the re-suspension of colloidal materials that can be caused during sampling with bailers and/or Waterra inertia pumps. If this sampling method is effective in providing a more accurate interpretation of groundwater data and able to show the groundwater exceedances are a result of suspended materials from bailer sampling, then SHA could make a recommendation to the Regional District to implement this sampling method for the monitoring going forward.

The next sampling event, scheduled in Q2 in April 2021, will also be the annual sampling and analysis event. SHA believes this makes the most sense as spring is the most likely time of year that all wells are accessible and have adequate water flow for sampling.

Finally, during SHA's proposed Site inspection in early 2021, upgradient well E297150 will be further investigated to conclude if the noted damages to the well can be repaired of if a new well needs to be installed.

6. STATEMENT OF LIMITATIONS

This report has been prepared by Sperling Hansen Associates. (SHA) on behalf of the Regional District of East Kootenay (RDEK) in accordance with generally accepted engineering practices to a level of care and skill normally exercised by other members of the engineering and science professions currently practicing under similar conditions in British Columbia.

The report is based on site visits, project experience, and analysis by SHA staff of data compiled during the preparation of this report from a number of sources. Except where specifically stated to the contrary, the information on which this study is based has been obtained from external sources. This external information has not been independently verified or otherwise examined by SHA to determine its accuracy and completeness. SHA has relied in good faith on this information and does not accept responsibility of any deficiency, misstatements or inaccuracies contained in the reports as a result of omissions, misinterpretation and/or fraudulent acts of the persons interviewed or contacted, or errors or omissions in the reviewed documentation.

The report is intended solely for the use of the RDEK. Any use which other parties makes of this report, or any reliance on, or decisions to be made based on it, are the responsibilities of such other parties. SHA does not accept any responsibility for other uses of the material contained herein nor for damages, if any, suffered by any third party because of decisions made or actions based on this report. Copying of this intellectual property for other purposes is not permitted.
The findings and conclusions of this report are valid only as of the date of this report. The interpretations presented in this report and the conclusions and recommendations that are drawn are based on information that was made available to SHA during the course of this project. Should additional new data become available in the future, SHA should be requested to re-evaluate the findings of this report and modify the conclusions and recommendations drawn, as required.

Should you have any questions on this report or require further assistance or information, please feel free to contact the undersigned at 778-471-7088 or 604-986-7723.

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Environmental Analyst Assistant

Rahim Gaidhar
GIT, Project Geoscientist

Report reviewed by:

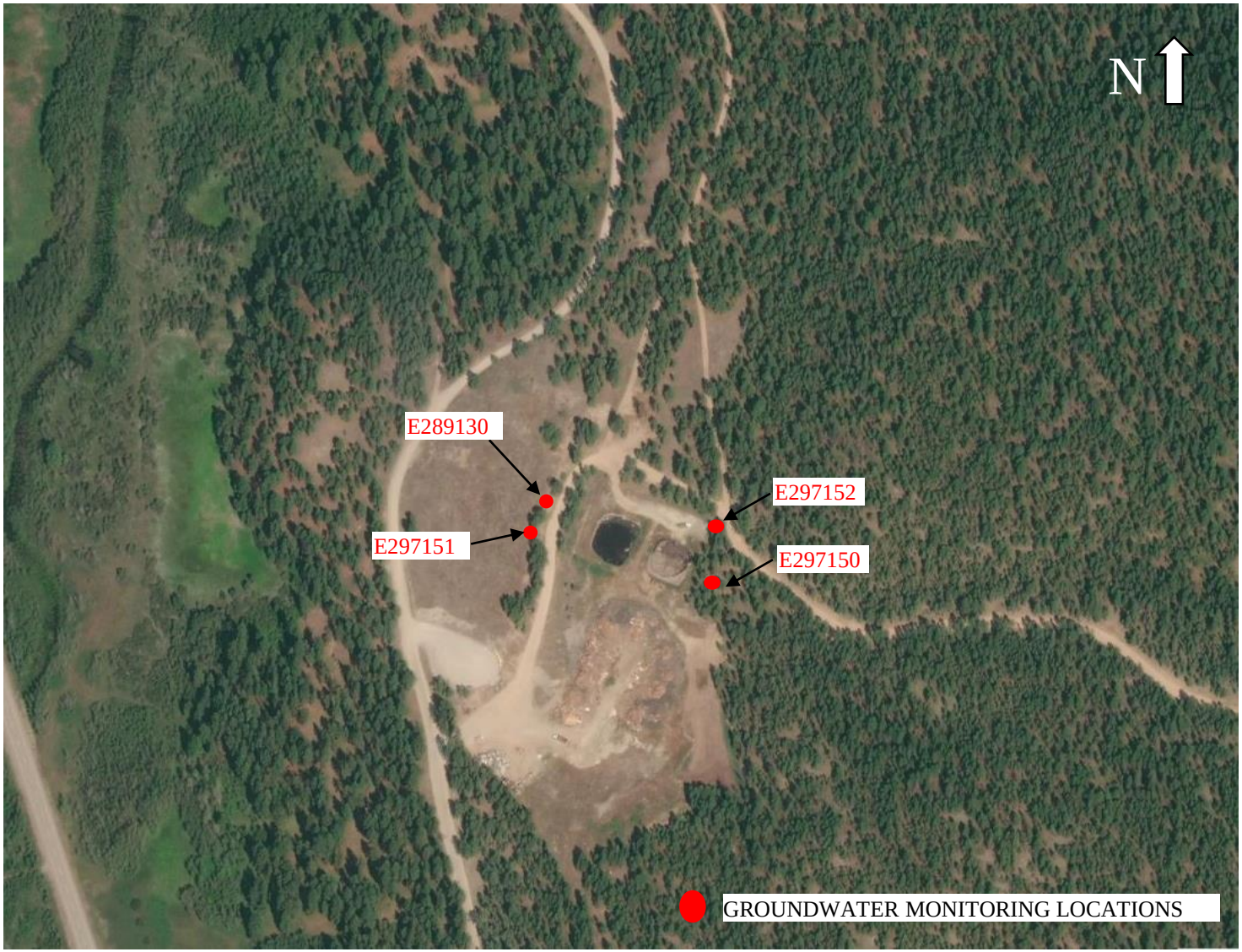
Scott Garthwaite
Sr. Civil Technologist

7. REFERENCES

Environmental Management Act, BC Contaminated Sites Regulation Schedule 3.2, 2019.

Ministry of Environment, BC Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture Summary Report, August 2019.

RDEK Public Web Map 2020, retrieved from https://www.rdek.bc.ca/departments/mapping



SPERLING HANSEN ASSOCIATES

Regional District of East Kootenay

PROJECT:

SOLID WASTE FACILITY MONITORING PROGRAM 2020-2025

TITLE:

WASA EXFILTRATION PONDS

MONITORING LOCATIONS

SCALE:	DATE:	PROJECT NO:
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DESIGNED	-	DRAWING NO:
DRAWN	CH	**Figure 1**
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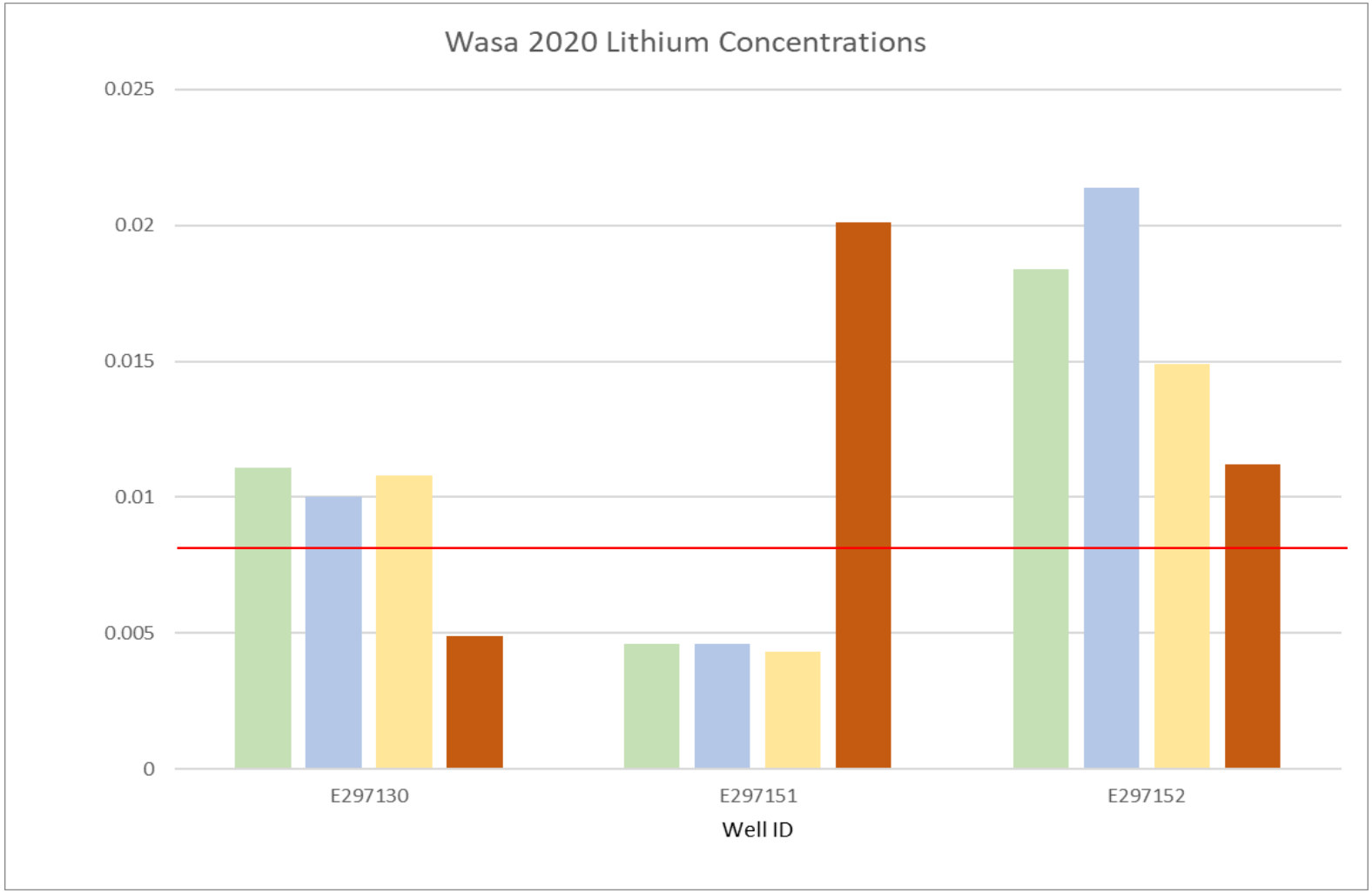

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SCALE:	DATE:	PROJECT NO:
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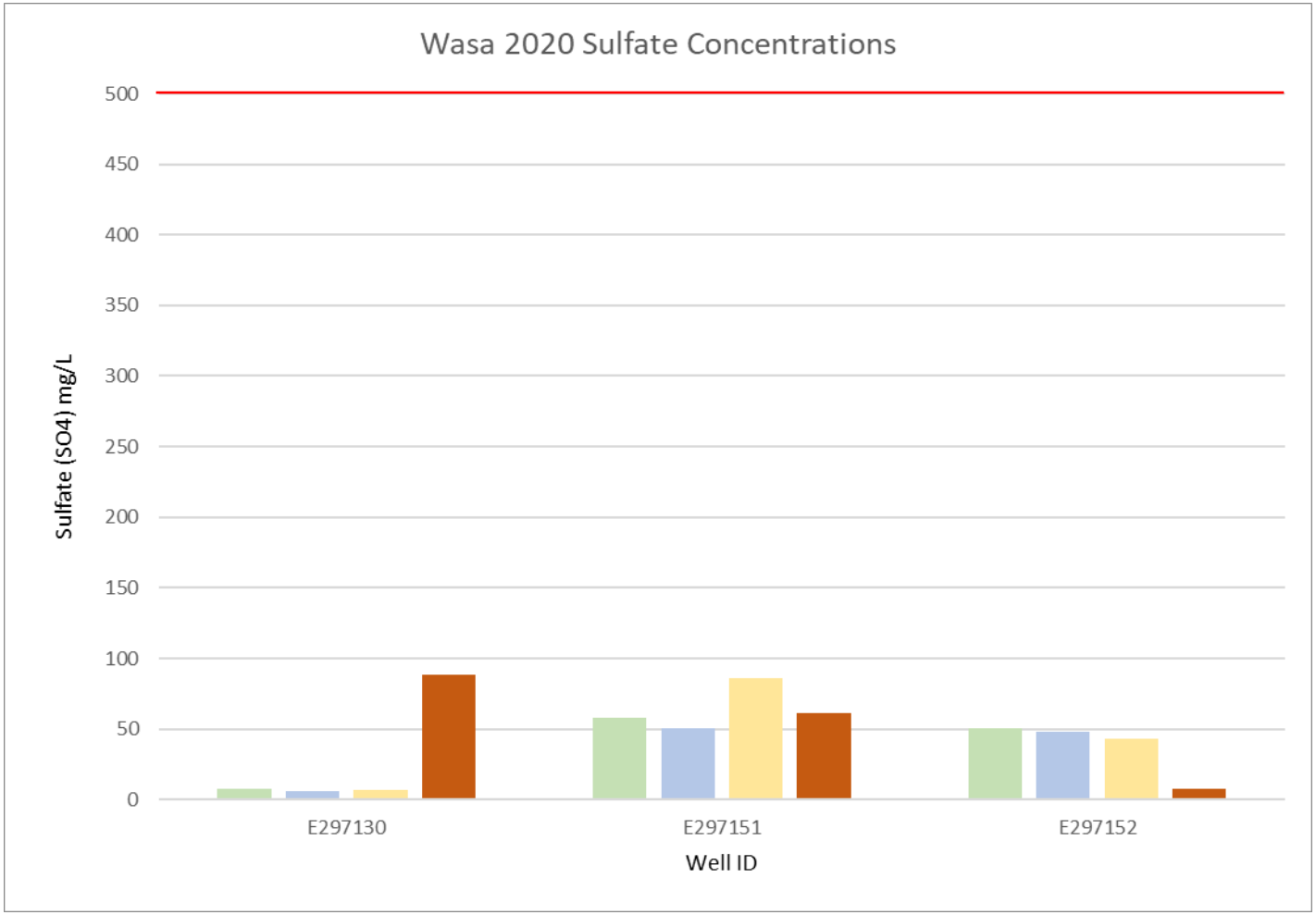
CHECKED	SG	



Sperling Hansen Associates	Regional District of East Kootenay	PROJECT: SOLID WASTE FACILITY MONITORING PROGRAM 2020-2025	TITLE: 2020 Sulfate Concentrations	SCALE: N/A; DATE: 28/01/2021 yyyy/mm/dd; PROJECT NO: 20050; DESIGNED; DRAWN CH; CHECKED SG; DRAWING NO: Figure 3

Sperling Hansen Associates	Regional District of East Kootenay	PROJECT: SOLID WASTE FACILITY MONITORING PROGRAM 2020-2025	TITLE: 2020 Sodium Concentrations

SCALE:	DATE:	PROJECT NO:
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DESIGNED	-	DRAWING NO:
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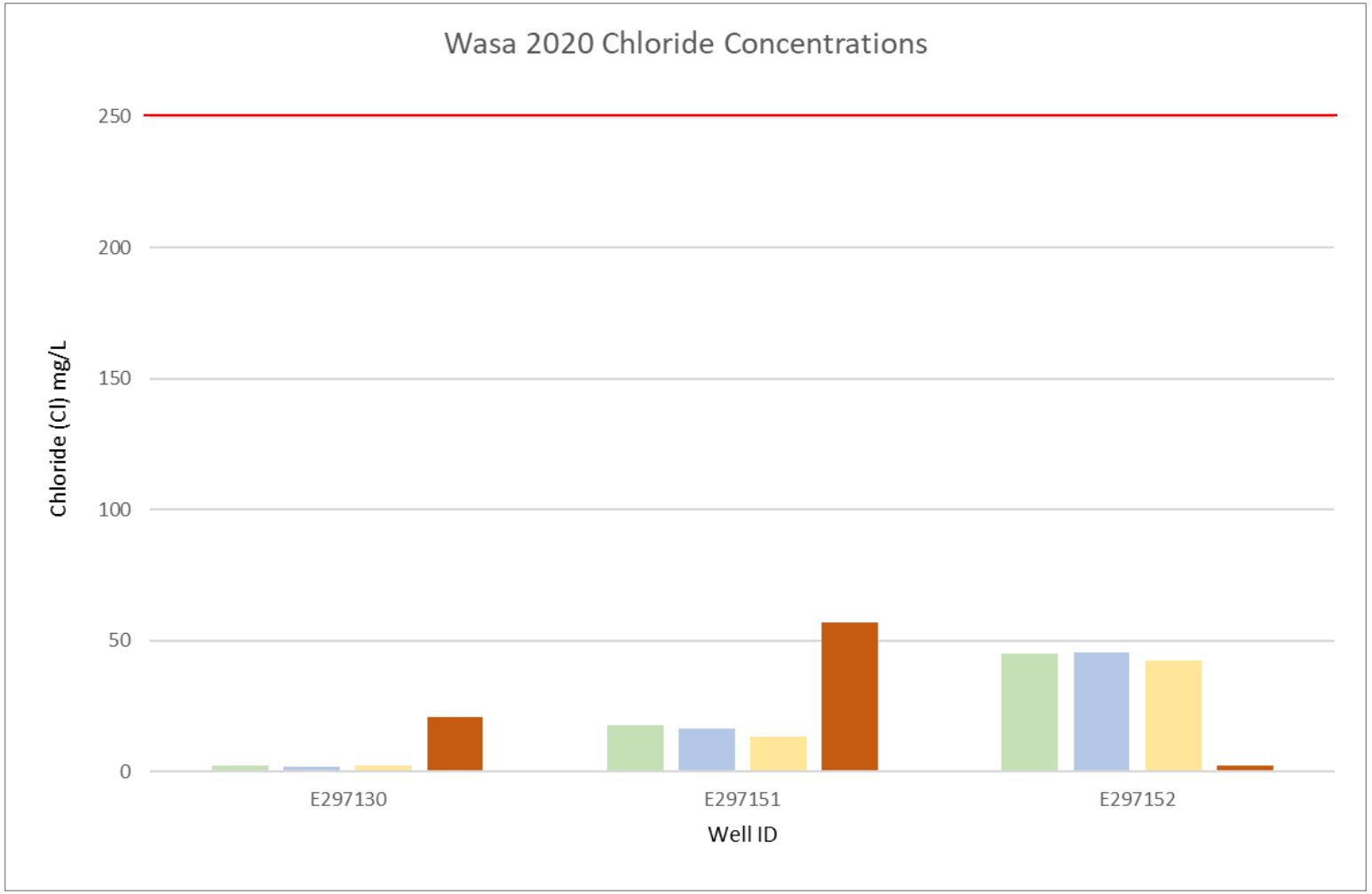
CHECKED	SG	



Sperling Hansen Associates	Regional District of East Kootenay	PROJECT: SOLID WASTE FACILITY MONITORING PROGRAM 2020-2025	TITLE: 2020 Chloride Concentrations

SCALE: N/A	DATE: 28/01/2021 yyyy/mm/dd	PROJECT NO: 20050	
DESIGNED		DRAWING NO: Figure 5	
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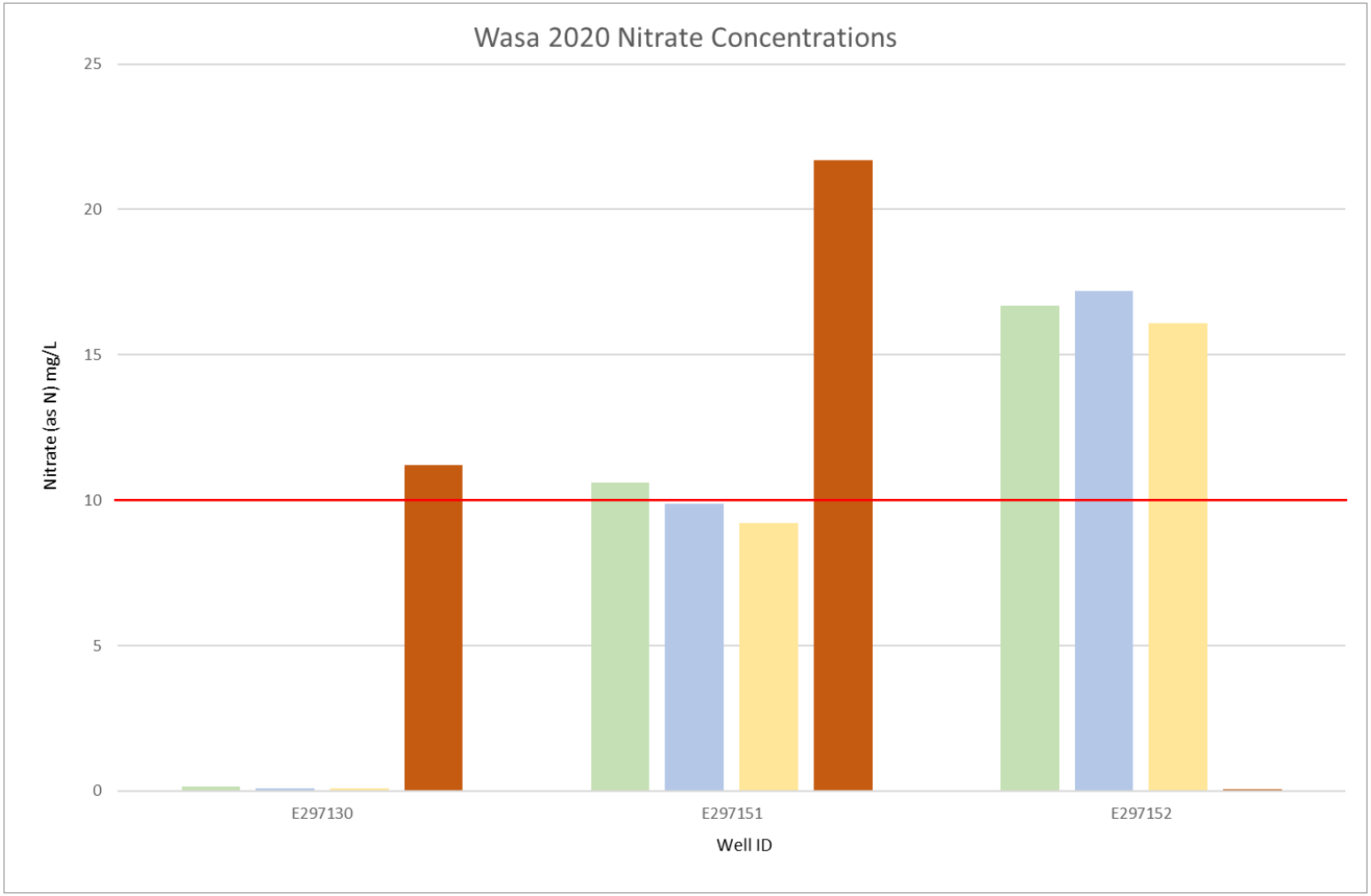
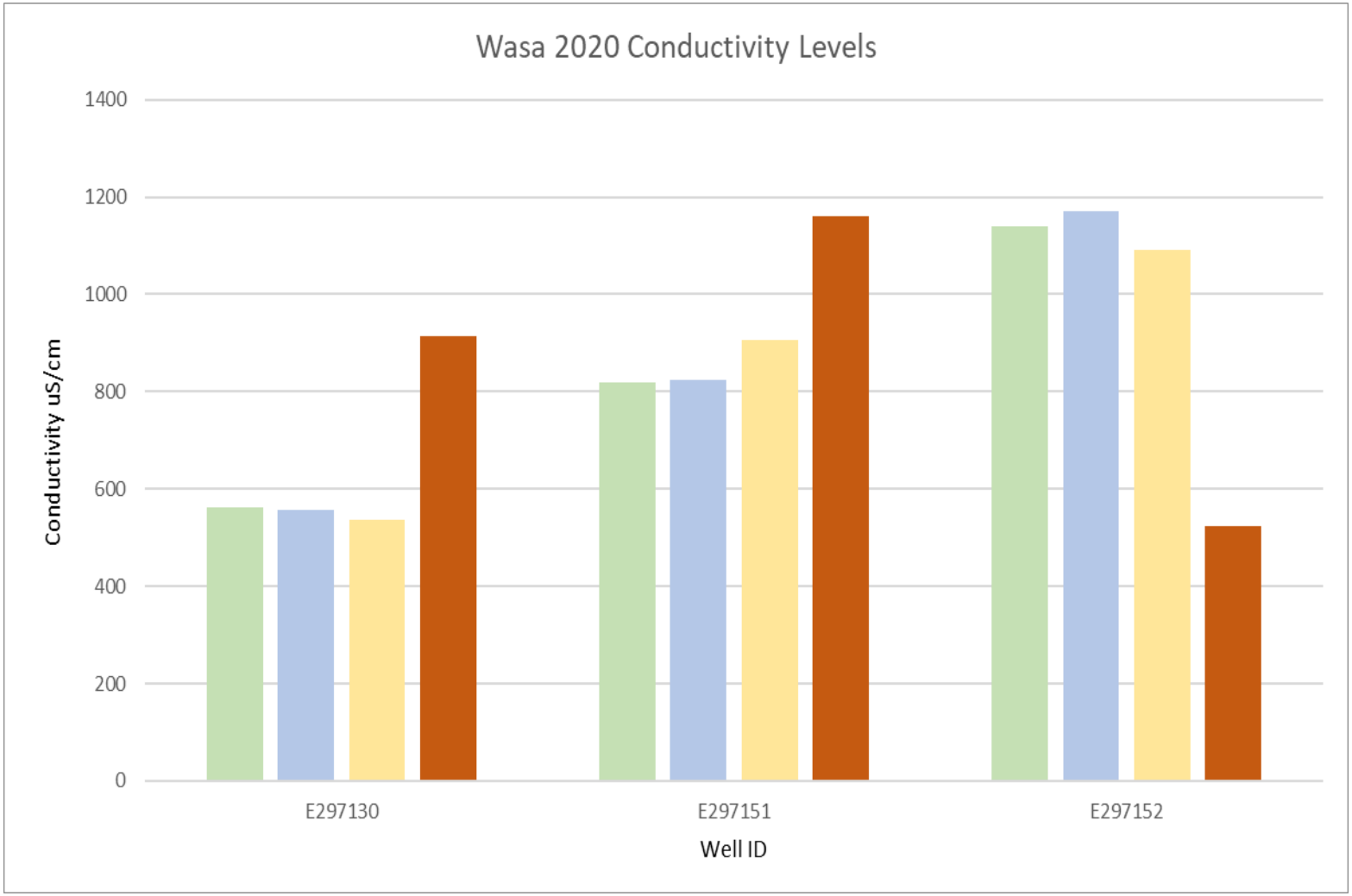


Sperling Hansen Associates	Regional District of East Kootenay	PROJECT: SOLID WASTE FACILITY MONITORING PROGRAM 2020-2025	TITLE: 2020 Nitrate Concentrations

SCALE:	DATE:	PROJECT NO:
N/A	28/01/2021 (yyyy/mm/dd)	20050
DESIGNED		DRAWING NO:
DRAWN	CH	Figure 6
CHECKED	SG	



SPERLING HANSEN ASSOCIATES	Regional District of East Kootenay	PROJECT: SOLID WASTE FACILITY MONITORING PROGRAM 2020-2025	TITLE: 2020 Conductivity

SCALE: N/A	DATE: 28/01/2021 yyyy/mm/dd	PROJECT NO: 20050	
DESIGNED		DRAWING NO: Figure 7	
DRAWN	CH		
CHECKED	SG		

APPENDICES

APPENDIX A
Wasa Operational Certificate

April 8, 2014

Tracking Number: 320585
Authorization Number: 107105

REGISTERED MAIL

Regional District of East Kootenay
12 24th Ave. S.
Cranbrook, BC V1C 3H8

Dear Operational Certificate Holder:

Enclosed is Operational Certificate 107105 issued under the provisions of the *Environmental Management Act*. Your attention is respectfully directed to the terms and conditions outlined in the operational certificate. An annual fee will be determined according to the Permit Fees Regulation.

This operational certificate does not authorize entry upon, crossing over, or use for any purpose of private or Crown lands or works, unless and except as authorized by the owner of such lands or works. The responsibility for obtaining such authority rests with the operational certificate holder. It is also the responsibility of the operational certificate holder to ensure that all activities conducted under this authorization are carried out with regard to the rights of third parties, and comply with other applicable legislation that may be in force.

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

Administration of this operational certificate will be carried out by staff from the Southern Interior Region - Kootenay. Plans, data and reports pertinent to the operational certificate are to be submitted to the Director, Environmental Protection, at the Ministry of Environment, Regional Operations, Southern Interior Region, 205 Industrial Road G, Cranbrook, BC V1C 7G5.

Yours truly,

Sajid A. Barlas, Ph.D., P.Ag.
for Director, *Environmental Management Act*

Ministry of Environment Environmental Protection Southern Interior
Mailing Address: 102 Industrial Place Penticton, BC V2A 7C8
Telephone: (250) 490-8200
Facsimile: (250) 490-2231
Website: www.gov.bc.ca/env

Southern Interior Region - Kootenay

Enclosure
cc: Environment Canada

Ministry of Environment

OPERATIONAL CERTIFICATE

107105

Under the Provisions of the *Environmental Management Act*

Regional District of East Kootenay
19 24th AVE S.
Cranbrook, BC V1C 3H8

is authorized to discharge effluent from septic tank pump-out operations to the ex-filtration ponds at the Transfer Station in Wasa, British Columbia, subject to the conditions listed below. Contravention of any of these conditions is a violation of the *Environmental Management Act* and may result in prosecution.

An annual permit fee will be charged as per the *Environmental Management Act* Permit Fee Regulation.

1. SPECIFIC AUTHORIZATION DISCHARGES AND RELATED REQUIREMENTS

1.1. Discharge of effluent to which this section is applicable is septic tank pumpage from the Central Subregion of the Regional District of East Kootenay as shown on the attached Site Plan.

1.1.1. The authorized rate of discharge is 175 m3/day.

1.1.2. The location of the discharge is District Lot 131, Kootenay District.

1.1.3. The characteristics of the effluent must be equivalent to or better than typical septic tank effluent and for the purpose of permit fee calculations, the following discharge factors must be used:

a) 5-day Biochemical Oxygen Demand, 130 mg/L

Date Issued: April 8, 2014

Sajid A. Barlas, Ph.D., P.Ag.
for Director, *Environmental Management Act*
Southern Interior Region - Kootenay

b) Total Suspended Solids, 130 mg/L.

1.2. The area from which the effluent originates is the Central Subregion of the Regional District of East Kootenay.

1.3. The works authorized are two ex-filtration ponds and related appurtenances, approximately located as shown on the attached Site Plan.

1.4. The works authorized must be complete and in operation at the time of discharge.

2. MAINTENANCE OF WORKS, EMERGENCY PROCEDURES AND NONCOMPLIANCE

The Permittee must inspect the pollution control works regularly and maintain them in good working order. In the event of an emergency or any condition which prevents continuing operation of the approved method of pollution control or results in noncompliance with the terms and conditions of this permit, the Permittee must immediately notify the Director and take appropriate remedial action.

3. SLUDGE WASTING AND DISPOSAL

The aged and dewatered sludge from the authorized works must be disposed of at a site authorized by the Director.

4. EX-FILTRATION PONDS

4.1. Discharge is to the upper pond for solids removal. Decanted liquids flow through a culvert to the lower pond where it eventually evaporates or infiltrates into the ground. Mechanical removal of solids from the upper pond occurs biennially and is applied in layers to the east side of the property.

4.2. There must be no overflow from the ex-filtration pond to the receiving environment. The ponds must have a minimum of 0.5m of freeboard at all times.

4.3. Surface drainage must be diverted away from the ex-filtration pond.

4.4. The residue removed from the ex-filtration pond must be disposed of in a manner authorized by the Director.

Date Issued: April 8, 2014

Sajid A. Barlas, Ph.D., P.Ag.
for Director, *Environmental Management Act*
Southern Interior Region - Kootenay

5. FENCING

The Permittee must erect a fence around the ex-filtration pond and such other areas as required by the Director. The height and type of fencing must meet the approval of the Director.

6. POSTING OF CAUTIONARY SIGNS

The Permittee must post signs to the satisfaction of the Director.

7. HAZARDOUS WASTES

No other waste including hazardous waste as defined by the Hazardous Waste Regulation is to be disposed of at the site without prior written authorization of the Director.

MONITORING

8. DISCHARGE MONITORING

The Permittee must record the monthly volume of effluent discharged to the ponds.

8.1. Sample Location and Frequency/Type

The Permittee must monitor all monitoring wells quarterly for the following parameters:

8.1.1. Field Tests:

Static water levels, pH, Sample temperature, Conductivity, and Total dissolved solids.

8.1.2. Laboratory Tests:

Sample temperature, Conductivity, Total alkalinity, Dissolved Chloride, Fluoride, Sulphate, Nitrate, Nitrite, TSS, Phosphate, Total coliform and Fecal coliform.

Date Issued: April 8, 2014

Sajid A. Barlas, Ph.D., P.Ag.
for Director, *Environmental Management Act*
Southern Interior Region - Kootenay

8.1.3. **Environmental Monitoring System (EMS) Numbers**

The following are the EMS site numbers assigned to the monitoring sites. These numbers are to be used when entering data directly into the Ministry EMS database in accordance with Section 55 of the Municipal Wastewater Regulation. Monitoring data must be submitted to the Ministry data base quarterly within 30 days of receipt.

Monitoring Well	EMS Number	Coordinates	Descriptor
MW-01	E297150	49.7373 N 115.7146 W	Background (Upgradient)
MW-02	E297130	49.7377 N 115.7160 W	Downgradient, NW of septic ponds
MW-03	E297151	49.7375 N 115.7161 W	Downgradient, W of septic ponds
MW-04	E297152	49.7376 N 115.7144 W	Downgradient, E of septic ponds

9. **REPORTING**

The Permittee must maintain data of analyses and volumes for inspection and submit the data to the Director for the previous year's monitoring.

All reports must be submitted within 60 days of the end of the calendar year.

Monitoring data must be submitted in an electronic format satisfactory to the Director.

Date Issued: April 8, 2014

Sajid A. Barlas, Ph.D., P.Ag.
for Director, *Environmental Management Act*
Southern Interior Region - Kootenay

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APPENDIX B
Water Quality Analysis

Results Summary VA20A0151

Project RDEK-WASA

Report To Ron Mickel, Eco/Logic Environmental

Client Sample ID		BCE STANDARDS		E297130	E297151	E297152
Date Sampled		DRINKING	AQUATIC	6-Jan-20	6-Jan-20	6-Jan-20
ALS Sample ID	Units			VA20A0151-001	VA20A0151-002	VA20A0151-003
Physical Tests (Matrix: Water)						
alkalinity, total (as CaCO3)	mg/L	500	*na*	325	371	518
conductivity	µS/cm	*700*	*na*	563	818	1140
hardness (as CaCO3), dissolved	mg/L	500	*na*	286	426	584
pH	pH units	*6.5-8.5*	*6.5-9*	8.33	8.15	8.22
Anions and Nutrients (Matrix: Water)						
ammonia, total (as N)	mg/L	*0.68-27.72*	*na*	0.0786	<0.0050	<0.0050
chloride	mg/L	*250*	*na*	2.14	17.7	44.8
fluoride	mg/L	*1.5*	*na*	0.115	<0.100	<0.100
nitrate (as N)	mg/L	*10*	*200*	0.168	10.6	16.7
nitrite (as N)	mg/L	*1*	*0.06*	0.0053	<0.0050	<0.0050
sulfate (as SO4)	mg/L	*500*	*100*	7.46	58.0	50.3
Bacteriological Tests (Matrix: Water)						
coliforms, thermotolerant [fecal]	CFU/100mL	<2	<200	<1	<1	<1
coliforms, total	CFU/100mL	<2	<200	<1	<1	<1

Dissolved Metals (Matrix: Water)		DRINKING	AQUATIC	E297130	E297151	E297152
aluminum, dissolved	mg/L	*0.2*	*0.1*	0.0014	0.0018	0.0015
antimony, dissolved	mg/L	*0.006*	*na*	<0.00010	<0.00010	0.00012
arsenic, dissolved	mg/L	*0.025*	*0.005*	0.00119	<0.00010	0.00010
barium, dissolved	mg/L	*1*	*na*	0.206	0.0390	0.0920
beryllium, dissolved	mg/L	*na*	*na*	<0.000100	<0.000100	<0.000100
bismuth, dissolved	mg/L	*na*	*na*	<0.000050	<0.000050	<0.000050
boron, dissolved	mg/L	*5*	*0.12*	0.014	0.016	0.019
cadmium, dissolved	mg/L	*0.005*	*0.2*	0.0000304	0.0000481	0.0000565
calcium, dissolved	mg/L	*na*	*na*	31.5	44.7	52.4
cesium, dissolved	mg/L	*na*	*na*	<0.000010	<0.000010	<0.000010
chromium, dissolved	mg/L	*na*	*1*	<0.00010	0.00076	0.00084
cobalt, dissolved	mg/L	*na*	*na*	<0.00010	<0.00010	<0.00010
copper, dissolved	mg/L	*5*	*0.09*	0.00345	0.00617	0.0244
iron, dissolved	mg/L	*0.03*	*na*	<0.010	<0.010	<0.010
lead, dissolved	mg/L	*0.01*	*3*	0.000196	0.000214	0.000189
lithium, dissolved	mg/L	*na*	*na*	0.0111	0.0046	0.0184
magnesium, dissolved	mg/L	*na*	*na*	50.4	76.5	110
manganese, dissolved	mg/L	*0.05*	*na*	0.0183	0.00040	0.00052

mercury, dissolved	mg/L	0.001	0.0006	<0.0000050	<0.0000050	<0.0000050
molybdenum, dissolved	mg/L	*0.25*	*2*	0.00459	0.000293	0.000263
nickel, dissolved	mg/L	*0.025*	*na*	<0.00050	0.00062	0.00126
phosphorus, dissolved	mg/L	*na*	*na*	<0.050	<0.050	<0.050
potassium, dissolved	mg/L	*na*	*na*	1.32	2.01	2.43
rubidium, dissolved	mg/L	*na*	*na*	0.00100	0.00193	0.00138
selenium, dissolved	mg/L	*0.01*	*na*	<0.000050	0.000128	0.000770
silicon, dissolved	mg/L	*na*	*na*	6.41	7.92	8.55
silver, dissolved	mg/L	*na*	*na*	<0.000010	<0.000010	<0.000010
sodium, dissolved	mg/L	*200*	*na*	16.3	18.1	33.0
strontium, dissolved	mg/L	*na*	*na*	0.677	0.316	0.582
sulfur, dissolved	mg/L	*500*	*na*	2.43	20.3	17.7
tellurium, dissolved	mg/L	*na*	*na*	<0.00020	<0.00020	<0.00020
thallium, dissolved	mg/L	*na*	*na*	<0.000010	<0.000010	<0.000010
thorium, dissolved	mg/L	*na*	*na*	<0.00010	<0.00010	<0.00010
tin, dissolved	mg/L	*na*	*na*	0.00047	0.00102	0.00050
titanium, dissolved	mg/L	*na*	*na*	<0.00030	<0.00030	<0.00030
tungsten, dissolved	mg/L	*na*	*na*	<0.00010	<0.00010	<0.00010
uranium, dissolved	mg/L	0.015	*na*	0.00442	0.00431	0.00730
vanadium, dissolved	mg/L	*na*	*na*	<0.00050	<0.00050	<0.00050
zinc, dissolved	mg/L	*na*	*0.03*	0.0039	0.0060	0.0187
zirconium, dissolved	mg/L	*na*	*na*	<0.00020	<0.00020	<0.00020

Qualifier Legend

DLDS Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.

Results Summary L2477031

Job Reference
Report To David Kvick, Sperling Hansen Associates Inc.
Date Received 21-Jul-2020 8:50
Report Date 22-Jul-2020 16:59
Report Version 1

Client Sample ID			E29730	E297151	E297152
Date Sampled			20-Jul-2020	20-Jul-2020	20-Jul-2020
Time Sampled			10:00	10:00	10:00
ALS Sample ID			L2477031-7	L2477031-8	L2477031-9
Parameter	Lowest Detection Limit	Units	Water	Water	Water
Physical Tests (Water)					
Hardness (as CaCO3)	0.50	mg/L	494	497	592
Total Suspended Solids	1.0	mg/L	5610	228	343
Anions and Nutrients (Water)					
Alkalinity, Total (as CaCO3)	2.0	mg/L	671	446	518
Ammonia as N	0.0050	mg/L	0.269	0.0108	0.0226
Bicarbonate (HCO3)	5.0	mg/L	819	544	631
Carbonate (CO3)	5.0	mg/L	<5.0	<5.0	<5.0
Chloride (Cl)	0.10	mg/L	2.35	13.5	42.2
Conductivity (EC)	2.0	uS/cm	537	906	1090
Fluoride (F)	0.020	mg/L	0.075	<0.10	<0.10
Hydroxide (OH)	5.0	mg/L	<5.0	<5.0	<5.0
Nitrate and Nitrite (as N)	0.0051	mg/L	0.174	9.2	16.1
Nitrate (as N)	0.0050	mg/L	0.0860	9.20	16.1
Nitrite (as N)	0.0010	mg/L	0.0878	<0.0050	<0.0050
pH	0.10	pH	7.89	7.81	7.83
Orthophosphate-Dissolved (as P)	0.0010	mg/L	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	0.0020	mg/L	2.29	0.0956	0.0646
Sulfate (SO4)	0.050	mg/L	6.52	85.6	43.2
Bacteriological Tests (Water)					
MPN - E. Coli	1	MPN/100mL	<1	<1	<1
Coliform Bacteria - Fecal	2	CFU/100mL	6000	<2	<2
MPN - Total Coliforms	1	MPN/100mL	>2419.6	<1	9
Total Metals (Water)					
Aluminum (Al)-Total	0.0030	mg/L			
Antimony (Sb)-Total	0.00010	mg/L			
Arsenic (As)-Total	0.00010	mg/L			
Barium (Ba)-Total	0.00010	mg/L			
Beryllium (Be)-Total	0.000020	mg/L			
Bismuth (Bi)-Total	0.000050	mg/L			
Boron (B)-Total	0.010	mg/L			
Cadmium (Cd)-Total	0.0000050	mg/L			
Calcium (Ca)-Total	0.050	mg/L			
Chromium (Cr)-Total	0.00010	mg/L			
Cobalt (Co)-Total	0.00010	mg/L			
Copper (Cu)-Total	0.00050	mg/L			
Iron (Fe)-Total	0.010	mg/L			
Lead (Pb)-Total	0.000050	mg/L			
Lithium (Li)-Total	0.0010	mg/L			
Magnesium (Mg)-Total	0.0050	mg/L			
Manganese (Mn)-Total	0.00010	mg/L			
Molybdenum (Mo)-Total	0.000050	mg/L			
Nickel (Ni)-Total	0.00050	mg/L			

Results Summary L2477031

Job Reference	
Report To	David Kvick, Sperling Hansen Associates Inc.
Date Received	21-Jul-2020 8:50
Report Date	22-Jul-2020 16:59
Report Version	1

Client Sample ID
Date Sampled
Time Sampled
ALS Sample ID

Parameter	Lowest Detection Limit	Units
Physical Tests (Water)		
Hardness (as CaCO3)	0.50	mg/L
Total Suspended Solids	1.0	mg/L
Anions and Nutrients (Water)		
Alkalinity, Total (as CaCO3)	2.0	mg/L
Ammonia as N	0.0050	mg/L
Bicarbonate (HCO3)	5.0	mg/L
Carbonate (CO3)	5.0	mg/L
Chloride (Cl)	0.10	mg/L
Conductivity (EC)	2.0	uS/cm
Fluoride (F)	0.020	mg/L
Hydroxide (OH)	5.0	mg/L
Nitrate and Nitrite (as N)	0.0051	mg/L
Nitrate (as N)	0.0050	mg/L
Nitrite (as N)	0.0010	mg/L
pH	0.10	pH
Orthophosphate-Dissolved (as P)	0.0010	mg/L
Phosphorus (P)-Total	0.0020	mg/L
Sulfate (SO4)	0.050	mg/L
Bacteriological Tests (Water)		
MPN - E. Coli	1	MPN/100mL
Coliform Bacteria - Fecal	2	CFU/100mL
MPN - Total Coliforms	1	MPN/100mL
Total Metals (Water)		
Aluminum (Al)-Total	0.0030	mg/L
Antimony (Sb)-Total	0.00010	mg/L
Arsenic (As)-Total	0.00010	mg/L
Barium (Ba)-Total	0.00010	mg/L
Beryllium (Be)-Total	0.000020	mg/L
Bismuth (Bi)-Total	0.000050	mg/L
Boron (B)-Total	0.010	mg/L
Cadmium (Cd)-Total	0.0000050	mg/L
Calcium (Ca)-Total	0.050	mg/L
Chromium (Cr)-Total	0.00010	mg/L
Cobalt (Co)-Total	0.00010	mg/L
Copper (Cu)-Total	0.00050	mg/L
Iron (Fe)-Total	0.010	mg/L
Lead (Pb)-Total	0.000050	mg/L
Lithium (Li)-Total	0.0010	mg/L
Magnesium (Mg)-Total	0.0050	mg/L
Manganese (Mn)-Total	0.00010	mg/L
Molybdenum (Mo)-Total	0.000050	mg/L
Nickel (Ni)-Total	0.00050	mg/L

Results Summary L2477031

Job Reference
Report To David Kvick, Sperling Hansen Associates Inc.
Date Received 21-Jul-2020 8:50
Report Date 22-Jul-2020 16:59
Report Version 1

Client Sample ID			E29730	E297151	E297152
Date Sampled			20-Jul-2020	20-Jul-2020	20-Jul-2020
Time Sampled			10:00	10:00	10:00
ALS Sample ID			L2477031-7	L2477031-8	L2477031-9
Parameter	Lowest Detection Limit	Units	Water	Water	Water
Phosphorus (P)-Total	0.050	mg/L			
Potassium (K)-Total	0.10	mg/L			
Selenium (Se)-Total	0.000050	mg/L			
Silicon (Si)-Total	0.050	mg/L			
Silver (Ag)-Total	0.000010	mg/L			
Sodium (Na)-Total	0.050	mg/L			
Strontium (Sr)-Total	0.00020	mg/L			
Sulfur (S)-Total	0.50	mg/L			
Thallium (Tl)-Total	0.000010	mg/L			
Tin (Sn)-Total	0.00010	mg/L			
Titanium (Ti)-Total	0.00030	mg/L			
Uranium (U)-Total	0.000010	mg/L			
Vanadium (V)-Total	0.00050	mg/L			
Zinc (Zn)-Total	0.0030	mg/L			
Zirconium (Zr)-Total	0.00030	mg/L			
Dissolved Metals (Water)					
Dissolved Metals Filtration Location		-	FIELD	FIELD	FIELD
Dissolved Metals Filtration Location		-	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved	0.0010	mg/L	1.49	0.0020	0.0056
Antimony (Sb)-Dissolved	0.00010	mg/L	<0.00010	<0.00010	<0.00010
Arsenic (As)-Dissolved	0.00010	mg/L	0.00355	0.00014	0.00013
Barium (Ba)-Dissolved	0.00010	mg/L	0.418	0.0415	0.100
Beryllium (Be)-Dissolved	0.000020	mg/L	0.000186	<0.000020	<0.000020
Bismuth (Bi)-Dissolved	0.000050	mg/L	<0.000050	<0.000050	<0.000050
Boron (B)-Dissolved	0.010	mg/L	0.012	0.026	0.015
Cadmium (Cd)-Dissolved	0.0000050	mg/L	0.000229	0.0000053	0.0000072
Calcium (Ca)-Dissolved	0.050	mg/L	92.1	55.0	45.8
Chromium (Cr)-Dissolved	0.00010	mg/L	0.00181	0.00061	0.00070
Cobalt (Co)-Dissolved	0.00010	mg/L	0.00384	<0.00010	<0.00010
Copper (Cu)-Dissolved	0.00020	mg/L	0.0297	0.00181	0.00089
Iron (Fe)-Dissolved	0.010	mg/L	2.79	<0.010	<0.010
Lead (Pb)-Dissolved	0.000050	mg/L	0.0283	0.000058	0.000084
Lithium (Li)-Dissolved	0.0010	mg/L	0.0108	0.0043	0.0149
Magnesium (Mg)-Dissolved	0.0050	mg/L	64.0	87.4	116
Manganese (Mn)-Dissolved	0.00010	mg/L	0.354	0.00022	0.00134
Molybdenum (Mo)-Dissolved	0.000050	mg/L	0.000347	0.000172	0.000178
Nickel (Ni)-Dissolved	0.00050	mg/L	0.00421	<0.00050	0.00078
Phosphorus (P)-Dissolved	0.050	mg/L	0.270	<0.050	<0.050
Potassium (K)-Dissolved	0.10	mg/L	1.83	2.22	2.35
Selenium (Se)-Dissolved	0.000050	mg/L	<0.000050	0.000170	0.000694
Silicon (Si)-Dissolved	0.050	mg/L	7.83	8.16	7.96
Silver (Ag)-Dissolved	0.000010	mg/L	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	0.050	mg/L	17.1	15.8	30.8
Strontium (Sr)-Dissolved	0.00020	mg/L	0.746	0.353	0.519
Sulfur (S)-Dissolved	0.50	mg/L	4.85	35.4	19.4
Thallium (Tl)-Dissolved	0.000010	mg/L	0.000037	<0.000010	<0.000010

Results Summary L2477031

Job Reference
Report To David Kvick, Sperling Hansen Associates Inc.
Date Received 21-Jul-2020 8:50
Report Date 22-Jul-2020 16:59
Report Version 1

Client Sample ID
Date Sampled
Time Sampled
ALS Sample ID

Parameter	Lowest Detection Limit	Units
Phosphorus (P)-Total	0.050	mg/L
Potassium (K)-Total	0.10	mg/L
Selenium (Se)-Total	0.000050	mg/L
Silicon (Si)-Total	0.050	mg/L
Silver (Ag)-Total	0.000010	mg/L
Sodium (Na)-Total	0.050	mg/L
Strontium (Sr)-Total	0.00020	mg/L
Sulfur (S)-Total	0.50	mg/L
Thallium (Tl)-Total	0.000010	mg/L
Tin (Sn)-Total	0.00010	mg/L
Titanium (Ti)-Total	0.00030	mg/L
Uranium (U)-Total	0.000010	mg/L
Vanadium (V)-Total	0.00050	mg/L
Zinc (Zn)-Total	0.0030	mg/L
Zirconium (Zr)-Total	0.00030	mg/L
Dissolved Metals (Water)		
Dissolved Metals Filtration Location		-
Dissolved Metals Filtration Location		-
Aluminum (Al)-Dissolved	0.0010	mg/L
Antimony (Sb)-Dissolved	0.00010	mg/L
Arsenic (As)-Dissolved	0.00010	mg/L
Barium (Ba)-Dissolved	0.00010	mg/L
Beryllium (Be)-Dissolved	0.000020	mg/L
Bismuth (Bi)-Dissolved	0.000050	mg/L
Boron (B)-Dissolved	0.010	mg/L
Cadmium (Cd)-Dissolved	0.0000050	mg/L
Calcium (Ca)-Dissolved	0.050	mg/L
Chromium (Cr)-Dissolved	0.00010	mg/L
Cobalt (Co)-Dissolved	0.00010	mg/L
Copper (Cu)-Dissolved	0.00020	mg/L
Iron (Fe)-Dissolved	0.010	mg/L
Lead (Pb)-Dissolved	0.000050	mg/L
Lithium (Li)-Dissolved	0.0010	mg/L
Magnesium (Mg)-Dissolved	0.0050	mg/L
Manganese (Mn)-Dissolved	0.00010	mg/L
Molybdenum (Mo)-Dissolved	0.000050	mg/L
Nickel (Ni)-Dissolved	0.00050	mg/L
Phosphorus (P)-Dissolved	0.050	mg/L
Potassium (K)-Dissolved	0.10	mg/L
Selenium (Se)-Dissolved	0.000050	mg/L
Silicon (Si)-Dissolved	0.050	mg/L
Silver (Ag)-Dissolved	0.000010	mg/L
Sodium (Na)-Dissolved	0.050	mg/L
Strontium (Sr)-Dissolved	0.00020	mg/L
Sulfur (S)-Dissolved	0.50	mg/L
Thallium (Tl)-Dissolved	0.000010	mg/L

Results Summary L2477031

Job Reference
Report To David Kvick, Sperling Hansen Associates Inc.
Date Received 21-Jul-2020 8:50
Report Date 22-Jul-2020 16:59
Report Version 1

Client Sample ID			E29730	E297151	E297152
Date Sampled			20-Jul-2020	20-Jul-2020	20-Jul-2020
Time Sampled			10:00	10:00	10:00
ALS Sample ID			L2477031-7	L2477031-8	L2477031-9
Parameter	Lowest Detection Limit	Units	Water	Water	Water
Tin (Sn)-Dissolved	0.00010	mg/L	0.00052	<0.00010	<0.00010
Titanium (Ti)-Dissolved	0.00030	mg/L	0.0254	<0.00030	<0.00030
Uranium (U)-Dissolved	0.000010	mg/L	0.00411	0.00494	0.00599
Vanadium (V)-Dissolved	0.00050	mg/L	0.00319	<0.00050	<0.00050
Zinc (Zn)-Dissolved	0.0010	mg/L	0.0273	0.0015	0.0030
Zirconium (Zr)-Dissolved	0.00030	mg/L	<0.00030	<0.00030	<0.00030

Qualifier Legend

DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
RRV	Reported Result Verified By Repeat Analysis
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased hig
DLA	Detection Limit adjusted for required dilution
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour,

Results Summary L2477031

Job Reference
Report To David Kvick, Sperling Hansen Associates Inc.
Date Received 21-Jul-2020 8:50
Report Date 22-Jul-2020 16:59
Report Version 1

Client Sample ID
Date Sampled
Time Sampled
ALS Sample ID

Parameter	Lowest Detection Limit	Units
Tin (Sn)-Dissolved	0.00010	mg/L
Titanium (Ti)-Dissolved	0.00030	mg/L
Uranium (U)-Dissolved	0.000010	mg/L
Vanadium (V)-Dissolved	0.00050	mg/L
Zinc (Zn)-Dissolved	0.0010	mg/L
Zirconium (Zr)-Dissolved	0.00030	mg/L

Qualifier Legend

DLHC	Detection Limit Raised: Dilution required due t
RRV	Reported Result Verified By Repeat Analysis
HTC	Hardness was calculated from Total Ca and/or Mg (dissolved Ca/Mg results unavail
DLA	Detection Limit adjusted for required dilution
DLM	Detection Limit Adjusted due to sample matrix, turbidity).

Results Summary L2518933

Job Reference	20050 WASA
Report To	Scott Garthwaite, Sperling Hansen Associates Inc.
Date Received	20-Oct-2020 8:33
Report Date	27-Oct-2020 15:58
Report Version	1

Client Sample ID			E297130	E297151	E297152
Date Sampled			19-Oct-2020	19-Oct-2020	19-Oct-2020
Time Sampled			12:00	12:00	12:00
ALS Sample ID			L2518933-1	L2518933-2	L2518933-3
Parameter	Lowest Detection Limit	Units	Water	Water	Water
Physical Tests (Water)					
Hardness (as CaCO3)	0.50	mg/L	563	732	320
Total Suspended Solids	1.0	mg/L	739	5020	8170
Anions and Nutrients (Water)					
Alkalinity, Total (as CaCO3)	2.0	mg/L	447	567	363
Ammonia as N	0.0050	mg/L	0.0214	0.0169	0.216
Bicarbonate (HCO3)	5.0	mg/L	530	692	431
Carbonate (CO3)	5.0	mg/L	7.7	<5.0	6.2
Chloride (Cl)	0.10	mg/L	20.9	56.9	2.35
Conductivity (EC)	2.0	uS/cm	915	1160	523
Fluoride (F)	0.020	mg/L	<0.10	<0.10	0.107
Hydroxide (OH)	5.0	mg/L	<5.0	<5.0	<5.0
Nitrate and Nitrite (as N)	0.0051	mg/L	11.2	21.7	0.0781
Nitrate (as N)	0.0050	mg/L	11.2	21.7	0.0550
Nitrite (as N)	0.0010	mg/L	<0.0050	<0.0050	0.0231
pH	0.10	pH	8.38	8.26	8.40
Sulfate (SO4)	0.050	mg/L	88.8	61.2	7.33
Bacteriological Tests (Water)					
MPN - E. Coli	1	MPN/100mL	<1	<1	<1
Coliform Bacteria - Fecal	100	CFU/100mL	<100	<100	100
MPN - Total Coliforms	1	MPN/100mL	57	58	130
Dissolved Metals (Water)					
Dissolved Mercury Filtration Location		-	FIELD	FIELD	FIELD
Dissolved Metals Filtration Location		-	FIELD	FIELD	FIELD
Dissolved Metals Filtration Location		-	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved	0.0010	mg/L	0.0012	<0.0010	0.0022
Antimony (Sb)-Dissolved	0.00010	mg/L	<0.00010	<0.00010	<0.00010
Arsenic (As)-Dissolved	0.00010	mg/L	0.00014	0.00016	0.00105
Barium (Ba)-Dissolved	0.00010	mg/L	0.0419	0.116	0.232
Beryllium (Be)-Dissolved	0.000020	mg/L	<0.000020	<0.000020	<0.000020
Bismuth (Bi)-Dissolved	0.000050	mg/L	<0.000050	<0.000050	<0.000050
Boron (B)-Dissolved	0.010	mg/L	0.028	0.025	0.014
Cadmium (Cd)-Dissolved	0.0000050	mg/L	<0.0000050	<0.0000050	0.0000059
Calcium (Ca)-Dissolved	0.050	mg/L	57.6	62.4	32.3
Chromium (Cr)-Dissolved	0.00010	mg/L	0.00057	0.00081	<0.00010
Cobalt (Co)-Dissolved	0.00010	mg/L	<0.00010	0.00011	0.00024
Copper (Cu)-Dissolved	0.00020	mg/L	0.00043	0.00061	0.00054
Iron (Fe)-Dissolved	0.010	mg/L	<0.010	<0.010	<0.010
Lead (Pb)-Dissolved	0.000050	mg/L	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	0.0010	mg/L	0.0049	0.0201	0.0112
Magnesium (Mg)-Dissolved	0.0050	mg/L	102	140	58.1
Manganese (Mn)-Dissolved	0.00010	mg/L	0.00034	0.00013	0.0544
Mercury (Hg)-Dissolved	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Dissolved	0.000050	mg/L	0.000246	0.000271	0.00496
Nickel (Ni)-Dissolved	0.00050	mg/L	<0.00050	0.00096	<0.00050
Phosphorus (P)-Dissolved	0.050	mg/L	<0.050	<0.050	<0.050
Potassium (K)-Dissolved	0.10	mg/L	2.29	2.59	1.43
Selenium (Se)-Dissolved	0.000050	mg/L	0.000082	0.000636	<0.000050
Silicon (Si)-Dissolved	0.050	mg/L	8.42	9.10	6.06
Silver (Ag)-Dissolved	0.000010	mg/L	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	0.050	mg/L	19.2	39.9	16.7
Strontium (Sr)-Dissolved	0.00020	mg/L	0.388	0.683	0.715
Sulfur (S)-Dissolved	0.50	mg/L	28.2	21.5	2.73
Thallium (Tl)-Dissolved	0.000010	mg/L	<0.000010	<0.000010	<0.000010
Tin (Sn)-Dissolved	0.00010	mg/L	<0.00010	0.00011	0.00011
Titanium (Ti)-Dissolved	0.00030	mg/L	<0.00030	<0.00030	<0.00030
Uranium (U)-Dissolved	0.000010	mg/L	0.00564	0.00842	0.00437
Vanadium (V)-Dissolved	0.00050	mg/L	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Dissolved	0.0010	mg/L	0.0080	0.0058	0.0050
Zirconium (Zr)-Dissolved	0.00030	mg/L	<0.00030	<0.00030	<0.00030

Qualifier Legend

DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, tur

APPENDIX C
Certificate of Analysis

Sperling Hansen Associates Inc.
ATTN: David Kvick
#8 - 1225 East Keith Road
North Vancouver BC V7J 1J3

Date Received: 21-JUL-20
Report Date: 22-JUL-20 16:59 (MT)
Version: FINAL

Client Phone: 604-986-7723

Certificate of Analysis

Lab Work Order #: L2477031

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers:
Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2477031-1	L2477031-2	L2477031-3	L2477031-4	L2477031-7
Description	BAILER	BAILER	BAILER	BAILER	BAILER
Sampled Date	19-JUL-20	19-JUL-20	19-JUL-20	19-JUL-20	20-JUL-20
Sampled Time	10:00	10:00	10:00	10:00	10:00
Client ID	MW04-A	MW04-02	E207780	E207782	E29730
Grouping / **Analyte**					
WATER					
Physical Tests					
Hardness (as CaCO3) (mg/L)	715	746	580 HTC	550 HTC	494
Total Suspended Solids (mg/L)	9810 DLHC	156	<1.0	<1.0	5610 DLHC
Anions and Nutrients					
Alkalinity, Total (as CaCO3) (mg/L)	1180	381	237	210	671
Ammonia as N (mg/L)	0.0266	0.0257	0.0429	0.0149	0.269
Bicarbonate (HCO3) (mg/L)	1440	465	289	256	819
Carbonate (CO3) (mg/L)	<5.0	<5.0	<5.0	<5.0	<5.0
Chloride (Cl) (mg/L)	24.9 DLHC	5.21 DLHC	3.33 DLHC	2.37	2.35
Conductivity (EC) (uS/cm)	1130	1060	919	906	537
Fluoride (F) (mg/L)	0.12 DLHC	0.14 DLHC	0.13 DLHC	0.169	0.075
Hydroxide (OH) (mg/L)	<5.0	<5.0	<5.0	<5.0	<5.0
Nitrate and Nitrite (as N) (mg/L)	0.199	<0.025	0.130	0.0191	0.174
Nitrate (as N) (mg/L)	0.199 DLHC	<0.025 DLHC	0.103 DLHC	0.0191	0.0860
Nitrite (as N) (mg/L)	<0.0050 DLHC	<0.0050 DLHC	0.0266 DLHC	<0.0010	0.0878
pH (pH)	7.14	7.35	7.72	7.69	7.89
Orthophosphate-Dissolved (as P) (mg/L)	0.0015	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total (mg/L)	4.85 DLHC	0.0781 DLHC	<0.0020 DLHC	<0.0020	2.29 DLHC
Sulfate (SO4) (mg/L)	339 DLHC	344 DLHC	334 DLHC	330	6.52
Bacteriological Tests					
MPN - E. Coli (MPN/100mL)					<1
Coliform Bacteria - Fecal (CFU/100mL)					6000 DLA
MPN - Total Coliforms (MPN/100mL)					>2419.6
Total Metals					
Aluminum (Al)-Total (mg/L)			<0.0030	<0.0030	
Antimony (Sb)-Total (mg/L)			<0.00010	<0.00010	
Arsenic (As)-Total (mg/L)			<0.00010	<0.00010	
Barium (Ba)-Total (mg/L)			0.0111	0.0104	
Beryllium (Be)-Total (mg/L)			<0.000020	<0.000020	
Bismuth (Bi)-Total (mg/L)			<0.000050	<0.000050	
Boron (B)-Total (mg/L)			0.033	0.028	
Cadmium (Cd)-Total (mg/L)			0.0000140	0.0000053	
Calcium (Ca)-Total (mg/L)			161	142	
Chromium (Cr)-Total (mg/L)			<0.00010	<0.00010	
Cobalt (Co)-Total (mg/L)			<0.00010	<0.00010	
Copper (Cu)-Total (mg/L)			<0.00050	0.00243	
Iron (Fe)-Total (mg/L)			0.067	<0.010	
Lead (Pb)-Total (mg/L)			<0.000050	0.000076	
Lithium (Li)-Total (mg/L)			0.0077	0.0093	
Magnesium (Mg)-Total (mg/L)			43.3	47.2	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2477031-8	L2477031-9			
	Description	BAILER	BAILER			
	Sampled Date	20-JUL-20	20-JUL-20			
	Sampled Time	10:00	10:00			
	Client ID	E297151	E297152			
Grouping	**Analyte**					
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	497	592			
	Total Suspended Solids (mg/L)	228	343			
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	446	518			
	Ammonia as N (mg/L)	0.0108	0.0226			
	Bicarbonate (HCO3) (mg/L)	544	631			
	Carbonate (CO3) (mg/L)	<5.0	<5.0			
	Chloride (Cl) (mg/L)	13.5 DLHC	42.2 DLHC			
	Conductivity (EC) (uS/cm)	906	1090			
	Fluoride (F) (mg/L)	<0.10 DLHC	<0.10 DLHC			
	Hydroxide (OH) (mg/L)	<5.0	<5.0			
	Nitrate and Nitrite (as N) (mg/L)	9.20	16.1			
	Nitrate (as N) (mg/L)	9.20 DLHC	16.1 DLHC			
	Nitrite (as N) (mg/L)	<0.0050 DLHC	<0.0050 DLHC			
	pH (pH)	7.81	7.83			
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010			
	Phosphorus (P)-Total (mg/L)	0.0956	0.0646			
	Sulfate (SO4) (mg/L)	85.6 DLHC	43.2 DLHC			
Bacteriological Tests	MPN - E. Coli (MPN/100mL)	<1	<1			
	Coliform Bacteria - Fecal (CFU/100mL)	<2 DLM	<2 DLM			
	MPN - Total Coliforms (MPN/100mL)	<1	9			
Total Metals	Aluminum (Al)-Total (mg/L)					
	Antimony (Sb)-Total (mg/L)					
	Arsenic (As)-Total (mg/L)					
	Barium (Ba)-Total (mg/L)					
	Beryllium (Be)-Total (mg/L)					
	Bismuth (Bi)-Total (mg/L)					
	Boron (B)-Total (mg/L)					
	Cadmium (Cd)-Total (mg/L)					
	Calcium (Ca)-Total (mg/L)					
	Chromium (Cr)-Total (mg/L)					
	Cobalt (Co)-Total (mg/L)					
	Copper (Cu)-Total (mg/L)					
	Iron (Fe)-Total (mg/L)					
	Lead (Pb)-Total (mg/L)					
	Lithium (Li)-Total (mg/L)					
	Magnesium (Mg)-Total (mg/L)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2477031-1	L2477031-2	L2477031-3	L2477031-4	L2477031-7
Description	BAILER	BAILER	BAILER	BAILER	BAILER
Sampled Date	19-JUL-20	19-JUL-20	19-JUL-20	19-JUL-20	20-JUL-20
Sampled Time	10:00	10:00	10:00	10:00	10:00
Client ID	MW04-A	MW04-02	E207780	E207782	E29730
Grouping / **Analyte**					
WATER					
Total Metals					
Manganese (Mn)-Total (mg/L)			0.00236	0.00097	
Molybdenum (Mo)-Total (mg/L)			0.000710	0.000643	
Nickel (Ni)-Total (mg/L)			<0.00050	<0.00050	
Phosphorus (P)-Total (mg/L)			<0.050	<0.050	
Potassium (K)-Total (mg/L)			1.05	1.05	
Selenium (Se)-Total (mg/L)			<0.000050	<0.000050	
Silicon (Si)-Total (mg/L)			3.89	3.67	
Silver (Ag)-Total (mg/L)			<0.000010	<0.000010	
Sodium (Na)-Total (mg/L)			3.57	8.21	
Strontium (Sr)-Total (mg/L)			1.90 RRV	1.84 RRV	
Sulfur (S)-Total (mg/L)			119	117	
Thallium (Tl)-Total (mg/L)			<0.000010	<0.000010	
Tin (Sn)-Total (mg/L)			<0.00010	<0.00010	
Titanium (Ti)-Total (mg/L)			<0.00030	<0.00030	
Uranium (U)-Total (mg/L)			0.00168	0.00168	
Vanadium (V)-Total (mg/L)			<0.00050	<0.00050	
Zinc (Zn)-Total (mg/L)			0.0493	0.0158	
Zirconium (Zr)-Total (mg/L)			<0.00030	<0.00030	
Dissolved Metals					
Dissolved Metals Filtration Location	FIELD	FIELD			FIELD
Aluminum (Al)-Dissolved (mg/L)	0.0261	0.0039			1.49
Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010			<0.00010
Arsenic (As)-Dissolved (mg/L)	0.00012	0.00011			0.00355
Barium (Ba)-Dissolved (mg/L)	0.0248	0.0169			0.418
Beryllium (Be)-Dissolved (mg/L)	<0.000020	<0.000020			0.000186
Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050			<0.000050
Boron (B)-Dissolved (mg/L)	0.036	0.040			0.012
Cadmium (Cd)-Dissolved (mg/L)	0.0000220	0.000126			0.000229
Calcium (Ca)-Dissolved (mg/L)	213	224			92.1
Chromium (Cr)-Dissolved (mg/L)	0.00011	<0.00010			0.00181
Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010			0.00384
Copper (Cu)-Dissolved (mg/L)	0.00101	0.00473			0.0297
Iron (Fe)-Dissolved (mg/L)	0.021	0.063			2.79
Lead (Pb)-Dissolved (mg/L)	0.000120	0.000119			0.0283
Lithium (Li)-Dissolved (mg/L)	0.0078	0.0085			0.0108
Magnesium (Mg)-Dissolved (mg/L)	44.5	45.7			64.0
Manganese (Mn)-Dissolved (mg/L)	0.00943	0.00530			0.354
Molybdenum (Mo)-Dissolved (mg/L)	0.000580	0.000647			0.000347

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2477031-8	L2477031-9			
	Description	BAILER	BAILER			
	Sampled Date	20-JUL-20	20-JUL-20			
	Sampled Time	10:00	10:00			
	Client ID	E297151	E297152			
Grouping	**Analyte**					
WATER						
Total Metals	Manganese (Mn)-Total (mg/L)					
	Molybdenum (Mo)-Total (mg/L)					
	Nickel (Ni)-Total (mg/L)					
	Phosphorus (P)-Total (mg/L)					
	Potassium (K)-Total (mg/L)					
	Selenium (Se)-Total (mg/L)					
	Silicon (Si)-Total (mg/L)					
	Silver (Ag)-Total (mg/L)					
	Sodium (Na)-Total (mg/L)					
	Strontium (Sr)-Total (mg/L)					
	Sulfur (S)-Total (mg/L)					
	Thallium (Tl)-Total (mg/L)					
	Tin (Sn)-Total (mg/L)					
	Titanium (Ti)-Total (mg/L)					
	Uranium (U)-Total (mg/L)					
	Vanadium (V)-Total (mg/L)					
	Zinc (Zn)-Total (mg/L)					
	Zirconium (Zr)-Total (mg/L)					
Dissolved Metals	Dissolved Metals Filtration Location	FIELD	FIELD			
	Aluminum (Al)-Dissolved (mg/L)	0.0020	0.0056			
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010			
	Arsenic (As)-Dissolved (mg/L)	0.00014	0.00013			
	Barium (Ba)-Dissolved (mg/L)	0.0415	0.100			
	Beryllium (Be)-Dissolved (mg/L)	<0.000020	<0.000020			
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050			
	Boron (B)-Dissolved (mg/L)	0.026	0.015			
	Cadmium (Cd)-Dissolved (mg/L)	0.0000053	0.0000072			
	Calcium (Ca)-Dissolved (mg/L)	55.0	45.8			
	Chromium (Cr)-Dissolved (mg/L)	0.00061	0.00070			
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010			
	Copper (Cu)-Dissolved (mg/L)	0.00181	0.00089			
	Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010			
	Lead (Pb)-Dissolved (mg/L)	0.000058	0.000084			
	Lithium (Li)-Dissolved (mg/L)	0.0043	0.0149			
	Magnesium (Mg)-Dissolved (mg/L)	87.4	116			
	Manganese (Mn)-Dissolved (mg/L)	0.00022	0.00134			
	Molybdenum (Mo)-Dissolved (mg/L)	0.000172	0.000178			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2477031-1	L2477031-2	L2477031-3	L2477031-4	L2477031-7
Description	BAILER	BAILER	BAILER	BAILER	BAILER
Sampled Date	19-JUL-20	19-JUL-20	19-JUL-20	19-JUL-20	20-JUL-20
Sampled Time	10:00	10:00	10:00	10:00	10:00
Client ID	MW04-A	MW04-02	E207780	E207782	E29730
Grouping **Analyte**					
WATER					
Dissolved Metals Nickel (Ni)-Dissolved (mg/L)	0.00073	0.00143			0.00421
Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050			0.270
Potassium (K)-Dissolved (mg/L)	1.15	1.54			1.83
Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050			<0.000050
Silicon (Si)-Dissolved (mg/L)	4.41	4.85			7.83
Silver (Ag)-Dissolved (mg/L)	0.000013	<0.000010			<0.000010
Sodium (Na)-Dissolved (mg/L)	10.4	4.44			17.1
Strontium (Sr)-Dissolved (mg/L)	1.83 RRV	2.11 RRV			0.746
Sulfur (S)-Dissolved (mg/L)	123	128			4.85
Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010			0.000037
Tin (Sn)-Dissolved (mg/L)	<0.00010	0.00030			0.00052
Titanium (Ti)-Dissolved (mg/L)	0.00052	<0.00030			0.0254
Uranium (U)-Dissolved (mg/L)	0.00145	0.00172			0.00411
Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050			0.00319
Zinc (Zn)-Dissolved (mg/L)	0.0018	0.0209			0.0273
Zirconium (Zr)-Dissolved (mg/L)	<0.00030	<0.00030			<0.00030

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2477031-8	L2477031-9			
	Description	BAILER	BAILER			
	Sampled Date	20-JUL-20	20-JUL-20			
	Sampled Time	10:00	10:00			
	Client ID	E297151	E297152			
Grouping	**Analyte**					
WATER						
Dissolved Metals	Nickel (Ni)-Dissolved (mg/L)	<0.00050	0.00078			
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050			
	Potassium (K)-Dissolved (mg/L)	2.22	2.35			
	Selenium (Se)-Dissolved (mg/L)	0.000170	0.000694			
	Silicon (Si)-Dissolved (mg/L)	8.16	7.96			
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010			
	Sodium (Na)-Dissolved (mg/L)	15.8	30.8			
	Strontium (Sr)-Dissolved (mg/L)	0.353	0.519			
	Sulfur (S)-Dissolved (mg/L)	35.4	19.4			
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010			
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010			
	Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030			
	Uranium (U)-Dissolved (mg/L)	0.00494	0.00599			
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050			
	Zinc (Zn)-Dissolved (mg/L)	0.0015	0.0030			
	Zirconium (Zr)-Dissolved (mg/L)	<0.00030	<0.00030			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Calcium (Ca)-Total	MS-B	L2477031-3, -4
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2477031-3, -4
Matrix Spike	Sodium (Na)-Total	MS-B	L2477031-3, -4
Matrix Spike	Sulfate (SO4)	MS-B	L2477031-1, -2, -3, -4, -7, -8, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLA	Detection Limit adjusted for required dilution
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BE-D-L-CCMS-CL	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

BE-T-L-CCMS-CL	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

CL-L-IC-N-CL	Water	Chloride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

F-L-IC-CL	Water	Fluoride	APHA 4110 B-Ion Chromatography
FCC-MF-CL	Water	Fecal Coliform Count-MF	APHA 9222D

This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.

HARDNESS-CALC-CL	Water	Hardness	APHA 2340 B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

MET-D-CCMS-CL	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-CL	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

N2N3-CALC-CL	Water	Nitrate+Nitrite	CALCULATION
NH3-L-F-CL	Water	Ammonia, Total (as N)	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-CL	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-CL	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Reference Information

P-T-L-COL-CL	Water	Phosphorus (P)-Total	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH/EC/ALK-CL	Water	pH, Conductivity and Total Alkalinity	APHA 4500H,2510,2320

All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)
pH measurement is determined from the activity of the hydrogen ions using a hydrogen electrode and a reference electrode.
Alkalinity measurement is based on the sample's capacity to neutralize acid
Conductivity measurement is based on the sample's capacity to convey an electric current

PO4-DO-L-COL-CL	Water	Orthophosphate-Dissolved (as P)	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-L-IC-N-CL	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TC-EC-MPN-CL	Water	Total Coliforms and E. Coli by MPN	APHA METHOD 9223

This analysis is carried out using procedures adapted from APHA Method 9223 "Enzyme Substrate Coliform Test". E. coli and Total Coliform are determined simultaneously. The
sample is mixed with a mixture hydrolyzable substrates and then sealed in a multi-well packet. The packet is incubated for 18 or 24 hours and then the number of wells exhibiting a positive response are counted. The final result is obtained by comparing the positive responses to a probability table.

TSS-L-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L2477031 Report Date: 22-JUL-20

Client: Sperling Hansen Associates Inc.
#8 - 1225 East Keith Road
North Vancouver BC V7J 1J3
Contact: David Kvick

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BE-D-L-CCMS-CL	**Water**							
Batch R5159852								
WG3367106-2 LCS		**TMRM**						
Beryllium (Be)-Dissolved			95.5		%		80-120	21-JUL-20
WG3367106-1 MB								
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	21-JUL-20
BE-T-L-CCMS-CL	**Water**							
Batch R5162023								
WG3367016-2 LCS		**TMRM**						
Beryllium (Be)-Total			101.4		%		80-120	22-JUL-20
WG3367016-1 MB								
Beryllium (Be)-Total			<0.000020		mg/L		0.00002	22-JUL-20
CL-L-IC-N-CL	**Water**							
Batch R5161078								
WG3367859-3 DUP		**L2477031-4**						
Chloride (Cl)		2.37	2.72		mg/L	14	20	21-JUL-20
WG3367859-2 LCS								
Chloride (Cl)			104.7		%		85-115	21-JUL-20
WG3367859-6 LCS								
Chloride (Cl)			104.2		%		85-115	21-JUL-20
WG3367859-1 MB								
Chloride (Cl)			<0.10		mg/L		0.1	21-JUL-20
WG3367859-5 MB								
Chloride (Cl)			<0.10		mg/L		0.1	21-JUL-20
WG3367859-4 MS		**L2477031-4**						
Chloride (Cl)			107.4		%		75-125	21-JUL-20
F-L-IC-CL	**Water**							
Batch R5161078								
WG3367859-3 DUP		**L2477031-4**						
Fluoride (F)		0.169	0.181		mg/L	7.2	20	21-JUL-20
WG3367859-2 LCS								
Fluoride (F)			100.3		%		85-115	21-JUL-20
WG3367859-6 LCS								
Fluoride (F)			99.9		%		85-115	21-JUL-20
WG3367859-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	21-JUL-20
WG3367859-5 MB								
Fluoride (F)			<0.020		mg/L		0.02	21-JUL-20
WG3367859-4 MS		**L2477031-4**						
Fluoride (F)			95.5		%		75-125	21-JUL-20

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
FCC-MF-CL	**Water**							
Batch R5162048								
WG3368157-1 MB								
Coliform Bacteria - Fecal			<1		CFU/100mL		1	21-JUL-20
MET-D-CCMS-CL	**Water**							
Batch R5159852								
WG3367106-2 LCS		**TMRM**						
Aluminum (Al)-Dissolved			104.4		%		80-120	21-JUL-20
Antimony (Sb)-Dissolved			105.1		%		80-120	21-JUL-20
Arsenic (As)-Dissolved			103.8		%		80-120	21-JUL-20
Barium (Ba)-Dissolved			107.2		%		80-120	21-JUL-20
Bismuth (Bi)-Dissolved			103.4		%		80-120	21-JUL-20
Boron (B)-Dissolved			97.9		%		80-120	21-JUL-20
Cadmium (Cd)-Dissolved			102.2		%		80-120	21-JUL-20
Calcium (Ca)-Dissolved			99.3		%		80-120	21-JUL-20
Chromium (Cr)-Dissolved			104.1		%		80-120	21-JUL-20
Cobalt (Co)-Dissolved			102.7		%		80-120	21-JUL-20
Copper (Cu)-Dissolved			105.9		%		80-120	21-JUL-20
Iron (Fe)-Dissolved			96.2		%		80-120	21-JUL-20
Lead (Pb)-Dissolved			102.1		%		80-120	21-JUL-20
Lithium (Li)-Dissolved			98.1		%		80-120	21-JUL-20
Magnesium (Mg)-Dissolved			109.1		%		80-120	21-JUL-20
Manganese (Mn)-Dissolved			105.5		%		80-120	21-JUL-20
Molybdenum (Mo)-Dissolved			101.8		%		80-120	21-JUL-20
Nickel (Ni)-Dissolved			103.1		%		80-120	21-JUL-20
Phosphorus (P)-Dissolved			107.8		%		70-130	21-JUL-20
Potassium (K)-Dissolved			104.7		%		80-120	21-JUL-20
Selenium (Se)-Dissolved			96.9		%		80-120	21-JUL-20
Silicon (Si)-Dissolved			102.1		%		60-140	21-JUL-20
Silver (Ag)-Dissolved			102.4		%		80-120	21-JUL-20
Sodium (Na)-Dissolved			101.6		%		80-120	21-JUL-20
Strontium (Sr)-Dissolved			111.3		%		80-120	21-JUL-20
Sulfur (S)-Dissolved			95.1		%		80-120	21-JUL-20
Thallium (Tl)-Dissolved			105.0		%		80-120	21-JUL-20
Tin (Sn)-Dissolved			100.1		%		80-120	21-JUL-20
Titanium (Ti)-Dissolved			103.6		%		80-120	21-JUL-20

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-CL	**Water**							
Batch R5159852								
WG3367106-2 LCS		**TMRM**						
Uranium (U)-Dissolved			98.5		%		80-120	21-JUL-20
Vanadium (V)-Dissolved			104.4		%		80-120	21-JUL-20
Zinc (Zn)-Dissolved			101.7		%		80-120	21-JUL-20
Zirconium (Zr)-Dissolved			94.8		%		80-120	21-JUL-20
WG3367106-1 MB								
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	21-JUL-20
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	21-JUL-20
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	21-JUL-20
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	21-JUL-20
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	21-JUL-20
Boron (B)-Dissolved			<0.010		mg/L		0.01	21-JUL-20
Cadmium (Cd)-Dissolved			<0.0000050		mg/L		0.000005	21-JUL-20
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	21-JUL-20
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	21-JUL-20
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	21-JUL-20
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	21-JUL-20
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	21-JUL-20
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	21-JUL-20
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	21-JUL-20
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	21-JUL-20
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	21-JUL-20
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	21-JUL-20
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	21-JUL-20
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	21-JUL-20
Potassium (K)-Dissolved			<0.050		mg/L		0.05	21-JUL-20
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	21-JUL-20
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	21-JUL-20
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	21-JUL-20
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	21-JUL-20
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	21-JUL-20
Sulfur (S)-Dissolved			<0.50		mg/L		0.5	21-JUL-20
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	21-JUL-20
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	21-JUL-20
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	21-JUL-20

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-CL	**Water**							
Batch R5159852								
WG3367106-1 MB								
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	21-JUL-20
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	21-JUL-20
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	21-JUL-20
Zirconium (Zr)-Dissolved			<0.00020		mg/L		0.0002	21-JUL-20
MET-T-CCMS-CL	**Water**							
Batch R5162023								
WG3367016-2 LCS		**TMRM**						
Aluminum (Al)-Total			107.8		%		80-120	22-JUL-20
Antimony (Sb)-Total			106.6		%		80-120	22-JUL-20
Arsenic (As)-Total			103.3		%		80-120	22-JUL-20
Barium (Ba)-Total			101.9		%		80-120	22-JUL-20
Bismuth (Bi)-Total			97.7		%		80-120	22-JUL-20
Boron (B)-Total			99.2		%		80-120	22-JUL-20
Cadmium (Cd)-Total			102.6		%		80-120	22-JUL-20
Calcium (Ca)-Total			100.1		%		80-120	22-JUL-20
Chromium (Cr)-Total			105.3		%		80-120	22-JUL-20
Cobalt (Co)-Total			100.8		%		80-120	22-JUL-20
Copper (Cu)-Total			103.9		%		80-120	22-JUL-20
Iron (Fe)-Total			99.1		%		80-120	22-JUL-20
Lead (Pb)-Total			101.5		%		80-120	22-JUL-20
Lithium (Li)-Total			102.1		%		80-120	22-JUL-20
Magnesium (Mg)-Total			113.9		%		80-120	22-JUL-20
Manganese (Mn)-Total			108.6		%		80-120	22-JUL-20
Molybdenum (Mo)-Total			97.2		%		80-120	22-JUL-20
Nickel (Ni)-Total			100.7		%		80-120	22-JUL-20
Phosphorus (P)-Total			107.9		%		70-130	22-JUL-20
Potassium (K)-Total			103.6		%		80-120	22-JUL-20
Selenium (Se)-Total			99.1		%		80-120	22-JUL-20
Silicon (Si)-Total			105.1		%		60-140	22-JUL-20
Silver (Ag)-Total			100.7		%		80-120	22-JUL-20
Sodium (Na)-Total			101.9		%		80-120	22-JUL-20
Strontium (Sr)-Total			103.1		%		80-120	22-JUL-20
Sulfur (S)-Total			101.5		%		80-120	22-JUL-20
Thallium (Tl)-Total			101.3		%		80-120	22-JUL-20

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-CL	**Water**							
Batch R5162023								
WG3367016-2 LCS		**TMRM**						
Tin (Sn)-Total			99.0		%		80-120	22-JUL-20
Titanium (Ti)-Total			100.5		%		80-120	22-JUL-20
Uranium (U)-Total			101.2		%		80-120	22-JUL-20
Vanadium (V)-Total			104.8		%		80-120	22-JUL-20
Zinc (Zn)-Total			95.5		%		80-120	22-JUL-20
Zirconium (Zr)-Total			93.1		%		80-120	22-JUL-20
WG3367016-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	22-JUL-20
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	22-JUL-20
Arsenic (As)-Total			<0.00010		mg/L		0.0001	22-JUL-20
Barium (Ba)-Total			<0.00010		mg/L		0.0001	22-JUL-20
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	22-JUL-20
Boron (B)-Total			<0.010		mg/L		0.01	22-JUL-20
Cadmium (Cd)-Total			<0.0000050		mg/L		0.000005	22-JUL-20
Calcium (Ca)-Total			<0.050		mg/L		0.05	22-JUL-20
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	22-JUL-20
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	22-JUL-20
Copper (Cu)-Total			<0.00050		mg/L		0.0005	22-JUL-20
Iron (Fe)-Total			<0.010		mg/L		0.01	22-JUL-20
Lead (Pb)-Total			<0.000050		mg/L		0.00005	22-JUL-20
Lithium (Li)-Total			<0.0010		mg/L		0.001	22-JUL-20
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	22-JUL-20
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	22-JUL-20
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	22-JUL-20
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	22-JUL-20
Phosphorus (P)-Total			<0.050		mg/L		0.05	22-JUL-20
Potassium (K)-Total			<0.050		mg/L		0.05	22-JUL-20
Selenium (Se)-Total			<0.000050		mg/L		0.00005	22-JUL-20
Silicon (Si)-Total			<0.050		mg/L		0.05	22-JUL-20
Silver (Ag)-Total			<0.000010		mg/L		0.00001	22-JUL-20
Sodium (Na)-Total			<0.050		mg/L		0.05	22-JUL-20
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	22-JUL-20
Sulfur (S)-Total			<0.50		mg/L		0.5	22-JUL-20
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	22-JUL-20

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-CL	**Water**							
Batch R5162023								
WG3367016-1 MB								
Tin (Sn)-Total			<0.00010		mg/L		0.0001	22-JUL-20
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	22-JUL-20
Uranium (U)-Total			<0.000010		mg/L		0.00001	22-JUL-20
Vanadium (V)-Total			<0.00050		mg/L		0.0005	22-JUL-20
Zinc (Zn)-Total			<0.0030		mg/L		0.003	22-JUL-20
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	22-JUL-20
NH3-L-F-CL	**Water**							
Batch R5159866								
WG3367138-18 LCS								
Ammonia as N			97.8		%		85-115	21-JUL-20
WG3367138-22 LCS								
Ammonia as N			98.8		%		85-115	21-JUL-20
WG3367138-26 LCS								
Ammonia as N			103.2		%		85-115	21-JUL-20
WG3367138-17 MB								
Ammonia as N			<0.0050		mg/L		0.005	21-JUL-20
WG3367138-21 MB								
Ammonia as N			<0.0050		mg/L		0.005	21-JUL-20
WG3367138-25 MB								
Ammonia as N			<0.0050		mg/L		0.005	21-JUL-20
NO2-L-IC-N-CL	**Water**							
Batch R5161078								
WG3367859-3 DUP		**L2477031-4**						
Nitrite (as N)		<0.0010	0.0020	RPD-NA	mg/L	N/A	20	21-JUL-20
WG3367859-2 LCS								
Nitrite (as N)			105.0		%		90-110	21-JUL-20
WG3367859-6 LCS								
Nitrite (as N)			104.6		%		90-110	21-JUL-20
WG3367859-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	21-JUL-20
WG3367859-5 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	21-JUL-20
WG3367859-4 MS		**L2477031-4**						
Nitrite (as N)			81.9		%		75-125	21-JUL-20
NO3-L-IC-N-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-L-IC-N-CL	**Water**							
Batch R5161078								
WG3367859-3 DUP		**L2477031-4**						
Nitrate (as N)		0.0191	0.0190		mg/L	0.5	20	21-JUL-20
WG3367859-2 LCS								
Nitrate (as N)			105.2		%		90-110	21-JUL-20
WG3367859-6 LCS								
Nitrate (as N)			104.9		%		90-110	21-JUL-20
WG3367859-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	21-JUL-20
WG3367859-5 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	21-JUL-20
WG3367859-4 MS		**L2477031-4**						
Nitrate (as N)			112.1		%		75-125	21-JUL-20
P-T-L-COL-CL	**Water**							
Batch R5161978								
WG3367969-30 LCS								
Phosphorus (P)-Total			108.0		%		80-120	22-JUL-20
WG3367969-29 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	22-JUL-20
PH/EC/ALK-CL	**Water**							
Batch R5161418								
WG3367941-3 DUP		**L2477031-9**						
pH		7.83	7.82	J	pH	0.01	0.2	22-JUL-20
Conductivity (EC)		1090	1090		uS/cm	0.0	10	22-JUL-20
Bicarbonate (HCO3)		631	644		mg/L	1.9	20	22-JUL-20
Carbonate (CO3)		<5.0	<5.0	RPD-NA	mg/L	N/A	20	22-JUL-20
Hydroxide (OH)		<5.0	<5.0	RPD-NA	mg/L	N/A	20	22-JUL-20
Alkalinity, Total (as CaCO3)		518	528		mg/L	1.9	20	22-JUL-20
WG3367941-2 LCS								
Conductivity (EC)			101.2		%		90-110	22-JUL-20
Alkalinity, Total (as CaCO3)			100.2		%		85-115	22-JUL-20
WG3367941-1 MB								
Conductivity (EC)			<2.0		uS/cm		2	22-JUL-20
Bicarbonate (HCO3)			<5.0		mg/L		5	22-JUL-20
Carbonate (CO3)			<5.0		mg/L		5	22-JUL-20
Hydroxide (OH)			<5.0		mg/L		5	22-JUL-20
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	22-JUL-20
PO4-DO-L-COL-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PO4-DO-L-COL-CL	**Water**							
Batch R5160111								
WG3367235-2 LCS								
Orthophosphate-Dissolved (as P)			99.7		%		80-120	21-JUL-20
WG3367235-6 LCS								
Orthophosphate-Dissolved (as P)			102.0		%		80-120	21-JUL-20
WG3367235-1 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	21-JUL-20
WG3367235-5 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	21-JUL-20
SO4-L-IC-N-CL	**Water**							
Batch R5161078								
WG3367859-3 DUP		**L2477031-4**						
Sulfate (SO4)		330	332		mg/L	0.6	20	21-JUL-20
WG3367859-2 LCS								
Sulfate (SO4)			104.7		%		85-115	21-JUL-20
WG3367859-6 LCS								
Sulfate (SO4)			102.6		%		85-115	21-JUL-20
WG3367859-1 MB								
Sulfate (SO4)			<0.050		mg/L		0.05	21-JUL-20
WG3367859-5 MB								
Sulfate (SO4)			<0.050		mg/L		0.05	21-JUL-20
WG3367859-4 MS		**L2477031-4**						
Sulfate (SO4)			N/A	MS-B	%		-	21-JUL-20
TC-EC-MPN-CL	**Water**							
Batch R5162027								
WG3368138-1 MB								
MPN - E. Coli			<1		MPN/100mL		1	21-JUL-20
MPN - Total Coliforms			<1		MPN/100mL		1	21-JUL-20
TSS-L-CL	**Water**							
Batch R5162260								
WG3366710-4 LCS								
Total Suspended Solids			97.6		%		85-115	21-JUL-20
WG3366710-3 MB								
Total Suspended Solids			<1.0		mg/L		1	21-JUL-20

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

L2477031-COFC

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Sperling Hansen Associates Inc.
Contact:	David Kvick
Phone:	604-813-8476
	Company address below will appear on the final report
Street:	8-1225 East Keith Road
City/Province:	North Vancouver B.C.,
Postal Code:	V7J 1J3
Invoice To	Same as Report To ☑ ☐ NO
	Copy of Invoice with Report ☑ ☐ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ ☑ EXCEL ☐ EDD (DIGITAL)

Quality Control (QC) Report with Report ☑ ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax

Email 2

Email 3

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax

Email 2

Project Information

ALS Account # / Quote #: Q80923

Job #:

PO / AFE:

LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#

Major/Minor Code: Routing Code:

Requisitioner:

Location: Columbia Valley

ALS Lab Work Order # (lab use only):

ALS Contact: Sampler: J. Solman

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ 3 day [P3] ☐ 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☒ Same Day, Weekend or Statutory holiday [E0] ☒

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	pH	Conductivity	Anions	NH_3	Total Alkalinity	TSS	Metals (F/P)	Metals (P)	Number of Containers
	~~2024~~ MW04 - A	19/07/20		Bailer	X	X	X	X	X	X	X		3
	MW04 - 02	19/07/20		"	X	X	X	X	X	X	X		3
	E207780	19/07/20		"	X	X	X	X	X	X		X	3
	E207782	19/07/20		"	X	X	X	X	X	X		X	3
	~~MW-5~~	~~2~~											
	~~MW-1~~												
	~~E207851~~												

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ ☑ NO

Are samples for human drinking water use? ☐ ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact ☒ Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
4					

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: J. Solman	Date: 20 7 2020	Time:	Received by:	Date: 7/21	Time: 8:51	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L2477031-COFC

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Sperling Hansen Associates Inc.
Contact:	David Kvick
Phone:	604-813-8476
	Company address below will appear on the final report
Street:	8-1225 East Keith Road
City/Province:	North Vancouver B.C.,
Postal Code:	V7J 1J3

Report Format / Distribution	
Select Report Format:	☑ EXCEL ☐ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	
Email 2	
Email 3	

Invoice To		
	Same as Report To	☑ ☐ NO
	Copy of Invoice with Report	☑ ☐ NO
Company:		
Contact:		

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	
Email 2	

Project Information	
ALS Account # / Quote #:	Q80923
Job #:	
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	Wasa

ALS Lab Work Order # (lab use only):

ALS Contact:

Sampler: J. Solman

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
4 day [P4]	☐	1 Business day [E1]	☐
3 day [P3]	☐	Same Day, Weekend or Statutory holiday [E0]	X
2 day [P2]	☐		

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	pH	Conductivity	Anions	NH3	Total Alkalinity	TSS	Metals (F/P)	Fecal + total Coliform	Number of Containers
	MW-5	20/7/2020		Water	X	X	X	X	X	X	X	X	4
	MW-1	"		"	X	X	X	X	X	X	X	X	4
	E297130	"		"	X	X	X	X	X	X	X	X	4
	E297151	"		"	X	X	X	X	X	X	X	X	4
	E297152	"		"	X	X	X	X	X	X	X	X	4

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ ☑ NO	
Are samples for human drinking water use? ☐ ☑ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☒ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: J. Solman	Date: 20/7/2020	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Sperling Hansen Associates Inc.
ATTN: Scott Garthwaite
#8 - 1225 East Keith Road
North Vancouver BC V7J 1J3

Date Received: 20-OCT-20
Report Date: 27-OCT-20 15:58 (MT)
Version: FINAL

Client Phone: 604-986-7723

Certificate of Analysis

Lab Work Order #: L2518933

Project P.O. #: NOT SUBMITTED
Job Reference: 20050 WASA
C of C Numbers:
Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2518933-1	L2518933-2	L2518933-3		
	Description	GW	GW	GW		
	Sampled Date	19-OCT-20	19-OCT-20	19-OCT-20		
	Sampled Time	12:00	12:00	12:00		
	Client ID	E297130	E297151	E297152		
Grouping	**Analyte**					
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	563	732	320		
	Total Suspended Solids (mg/L)	739	5020 DLHC	8170 DLHC		
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	447	567	363		
	Ammonia as N (mg/L)	0.0214	0.0169	0.216		
	Bicarbonate (HCO3) (mg/L)	530	692	431		
	Carbonate (CO3) (mg/L)	7.7	<5.0	6.2		
	Chloride (Cl) (mg/L)	20.9 DLHC	56.9 DLHC	2.35		
	Conductivity (EC) (uS/cm)	915	1160	523		
	Fluoride (F) (mg/L)	<0.10 DLHC	<0.10 DLHC	0.107		
	Hydroxide (OH) (mg/L)	<5.0	<5.0	<5.0		
	Nitrate and Nitrite (as N) (mg/L)	11.2	21.7	0.0781		
	Nitrate (as N) (mg/L)	11.2 DLHC	21.7 DLHC	0.0550		
	Nitrite (as N) (mg/L)	<0.0050 DLHC	<0.0050 DLHC	0.0231		
	pH (pH)	8.38	8.26	8.40		
	Sulfate (SO4) (mg/L)	88.8 DLHC	61.2 DLHC	7.33		
Bacteriological Tests	MPN - E. Coli (MPN/100mL)	<1	<1	<1		
	Coliform Bacteria - Fecal (CFU/100mL)	<100 DLM	<100 DLM	100 DLM		
	MPN - Total Coliforms (MPN/100mL)	57	58	130		
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD		
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD		
	Aluminum (Al)-Dissolved (mg/L)	0.0012	<0.0010	0.0022		
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010		
	Arsenic (As)-Dissolved (mg/L)	0.00014	0.00016	0.00105		
	Barium (Ba)-Dissolved (mg/L)	0.0419	0.116	0.232		
	Beryllium (Be)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020		
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050		
	Boron (B)-Dissolved (mg/L)	0.028	0.025	0.014		
	Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050	0.0000059		
	Calcium (Ca)-Dissolved (mg/L)	57.6	62.4	32.3		
	Chromium (Cr)-Dissolved (mg/L)	0.00057	0.00081	<0.00010		
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	0.00011	0.00024		
	Copper (Cu)-Dissolved (mg/L)	0.00043	0.00061	0.00054		
	Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010		
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050		
	Lithium (Li)-Dissolved (mg/L)	0.0049	0.0201	0.0112		
	Magnesium (Mg)-Dissolved (mg/L)	102	140	58.1		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2518933-1	L2518933-2	L2518933-3		
	Description	GW	GW	GW		
	Sampled Date	19-OCT-20	19-OCT-20	19-OCT-20		
	Sampled Time	12:00	12:00	12:00		
	Client ID	E297130	E297151	E297152		
Grouping	**Analyte**					
WATER						
Dissolved Metals	Manganese (Mn)-Dissolved (mg/L)	0.00034	0.00013	0.0544		
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050		
	Molybdenum (Mo)-Dissolved (mg/L)	0.000246	0.000271	0.00496		
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	0.00096	<0.00050		
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050		
	Potassium (K)-Dissolved (mg/L)	2.29	2.59	1.43		
	Selenium (Se)-Dissolved (mg/L)	0.000082	0.000636	<0.000050		
	Silicon (Si)-Dissolved (mg/L)	8.42	9.10	6.06		
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010		
	Sodium (Na)-Dissolved (mg/L)	19.2	39.9	16.7		
	Strontium (Sr)-Dissolved (mg/L)	0.388	0.683	0.715		
	Sulfur (S)-Dissolved (mg/L)	28.2	21.5	2.73		
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010		
	Tin (Sn)-Dissolved (mg/L)	<0.00010	0.00011	0.00011		
	Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030		
	Uranium (U)-Dissolved (mg/L)	0.00564	0.00842	0.00437		
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050		
	Zinc (Zn)-Dissolved (mg/L)	0.0080	0.0058	0.0050		
	Zirconium (Zr)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Sample Submission Listed:

Qualifier	Description
EXTEMP10	Samples Received with temperature >10 Degrees C - 11C

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2518933-1, -2, -3
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2518933-1, -2, -3
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2518933-1, -2, -3
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2518933-1, -2, -3
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2518933-1, -2, -3
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2518933-1, -2, -3
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2518933-1, -2, -3
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2518933-1, -2, -3
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2518933-1, -2, -3
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2518933-1, -2, -3
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2518933-1, -2, -3
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2518933-1, -2, -3
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2518933-1, -2, -3
Matrix Spike	Ammonia as N	MS-B	L2518933-1, -2, -3

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BE-D-L-CCMS-CL	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

CL-L-IC-N-CL	Water	Chloride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

F-L-IC-CL	Water	Fluoride	APHA 4110 B-Ion Chromatography
FCC-MF-CL	Water	Fecal Coliform Count-MF	APHA 9222D

This analysis is carried out using procedures adapted from APHA Method 9222 "Membrane Filter Technique for Members of the Coliform Group". Coliform bacteria is enumerated by culturing and colony counting. A known sample volume is filtered through a 0.45 micron membrane filter. The test involves an initial 24 hour incubation at 44.5 degrees C of the filter with the appropriate growth medium. This method is specific for thermotolerant bacteria (Fecal) and is used for non-turbid water with a low background bacteria level.

HARDNESS-CALC-CL	Water	Hardness	APHA 2340 B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-CL	Water	Dissolved Mercury in Water by CVAAS	APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

MET-D-CCMS-CL	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

N2N3-CALC-CL	Water	Nitrate+Nitrite	CALCULATION
NH3-L-F-CL	Water	Ammonia, Total (as N)	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et

Reference Information

al.

NO2-L-IC-N-CL	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-CL	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

PH/EC/ALK-CL	Water	pH, Conductivity and Total Alkalinity	APHA 4500H,2510,2320

All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)
pH measurement is determined from the activity of the hydrogen ions using a hydrogen electrode and a reference electrode.
Alkalinity measurement is based on the sample's capacity to neutralize acid
Conductivity measurement is based on the sample's capacity to convey an electric current

SO4-L-IC-N-CL	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TC-EC-MPN-CL	Water	Total Coliforms and E. Coli by MPN	APHA METHOD 9223

This analysis is carried out using procedures adapted from APHA Method 9223 "Enzyme Substrate Coliform Test". E. coli and Total Coliform are determined simultaneously. The
sample is mixed with a mixture hydrolyzable substrates and then sealed in a multi-well packet. The packet is incubated for 18 or 24 hours and then the number of wells exhibiting a positive response are counted. The final result is obtained by comparing the positive responses to a probability table.

TSS-L-CL	Water	Total Suspended Solids	APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Sperling Hansen Associates Inc.
#8 - 1225 East Keith Road
North Vancouver BC V7J 1J3
Contact: Scott Garthwaite

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BE-D-L-CCMS-CL	**Water**							
Batch R5267236								
WG3431348-19 DUP		**L2518933-1**						
Beryllium (Be)-Dissolved		<0.000020	<0.000020	RPD-NA	mg/L	N/A	20	23-OCT-20
WG3431348-10 LCS		**TMRM**						
Beryllium (Be)-Dissolved			102.2		%		80-120	23-OCT-20
WG3431348-14 LCS		**TMRM**						
Beryllium (Be)-Dissolved			103.6		%		80-120	23-OCT-20
WG3431348-18 LCS		**TMRM**						
Beryllium (Be)-Dissolved			105.2		%		80-120	23-OCT-20
WG3431348-2 LCS		**TMRM**						
Beryllium (Be)-Dissolved			106.6		%		80-120	23-OCT-20
WG3431348-6 LCS		**TMRM**						
Beryllium (Be)-Dissolved			101.9		%		80-120	23-OCT-20
WG3431348-1 MB								
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	23-OCT-20
WG3431348-13 MB								
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	23-OCT-20
WG3431348-17 MB								
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	23-OCT-20
WG3431348-5 MB								
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	23-OCT-20
WG3431348-9 MB								
Beryllium (Be)-Dissolved			<0.000020		mg/L		0.00002	23-OCT-20
WG3431348-20 MS		**L2518933-1**						
Beryllium (Be)-Dissolved			100.6		%		70-130	23-OCT-20
CL-L-IC-N-CL	**Water**							
Batch R5261379								
WG3429191-2 LCS								
Chloride (Cl)			104.1		%		85-115	20-OCT-20
WG3429191-1 MB								
Chloride (Cl)			<0.10		mg/L		0.1	20-OCT-20
F-L-IC-CL	**Water**							
Batch R5261379								
WG3429191-2 LCS								
Fluoride (F)			98.8		%		85-115	20-OCT-20
WG3429191-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	20-OCT-20
FCC-MF-CL	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
FCC-MF-CL	**Water**							
Batch R5261803								
WG3429383-1 MB								
Coliform Bacteria - Fecal			<1		CFU/100mL		1	20-OCT-20
HG-D-CVAA-CL	**Water**							
Batch R5269634								
WG3433221-2 LCS								
Mercury (Hg)-Dissolved			99.0		%		80-120	27-OCT-20
WG3433221-1 MB								
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	27-OCT-20
MET-D-CCMS-CL	**Water**							
Batch R5267236								
WG3431348-19 DUP		**L2518933-1**						
Aluminum (Al)-Dissolved		0.0012	0.0012		mg/L	1.0	20	23-OCT-20
Antimony (Sb)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	23-OCT-20
Arsenic (As)-Dissolved		0.00014	0.00015		mg/L	3.8	20	23-OCT-20
Barium (Ba)-Dissolved		0.0419	0.0417		mg/L	0.3	20	23-OCT-20
Bismuth (Bi)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	23-OCT-20
Boron (B)-Dissolved		0.028	0.027		mg/L	1.0	20	23-OCT-20
Cadmium (Cd)-Dissolved		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	23-OCT-20
Calcium (Ca)-Dissolved		57.6	56.6		mg/L	1.8	20	23-OCT-20
Chromium (Cr)-Dissolved		0.00057	0.00056		mg/L	1.9	20	23-OCT-20
Cobalt (Co)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	23-OCT-20
Copper (Cu)-Dissolved		0.00043	0.00043		mg/L	1.8	20	23-OCT-20
Iron (Fe)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	23-OCT-20
Lead (Pb)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	23-OCT-20
Lithium (Li)-Dissolved		0.0049	0.0048		mg/L	0.8	20	23-OCT-20
Magnesium (Mg)-Dissolved		102	102		mg/L	0.1	20	23-OCT-20
Manganese (Mn)-Dissolved		0.00034	0.00033		mg/L	4.0	20	23-OCT-20
Molybdenum (Mo)-Dissolved		0.000246	0.000246		mg/L	0.1	20	23-OCT-20
Nickel (Ni)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	23-OCT-20
Phosphorus (P)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	23-OCT-20
Potassium (K)-Dissolved		2.29	2.28		mg/L	0.1	20	23-OCT-20
Selenium (Se)-Dissolved		0.000082	0.000079		mg/L	3.8	20	23-OCT-20
Silicon (Si)-Dissolved		8.42	8.47		mg/L	0.6	20	23-OCT-20
Silver (Ag)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	23-OCT-20
Sodium (Na)-Dissolved		19.2	19.8		mg/L	3.0	20	23-OCT-20

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-CL	**Water**							
Batch R5267236								
WG3431348-19 DUP		**L2518933-1**						
Strontium (Sr)-Dissolved		0.388	0.386		mg/L	0.5	20	23-OCT-20
Sulfur (S)-Dissolved		28.2	28.1		mg/L	0.3	20	23-OCT-20
Thallium (Tl)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	23-OCT-20
Tin (Sn)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	23-OCT-20
Titanium (Ti)-Dissolved		<0.00030	<0.00030	RPD-NA	mg/L	N/A	20	23-OCT-20
Uranium (U)-Dissolved		0.00564	0.00559		mg/L	0.9	20	23-OCT-20
Vanadium (V)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	23-OCT-20
Zinc (Zn)-Dissolved		0.0080	0.0078		mg/L	3.1	20	23-OCT-20
Zirconium (Zr)-Dissolved		<0.00030	<0.00030	RPD-NA	mg/L	N/A	20	23-OCT-20
WG3431348-10 LCS		**TMRM**						
Aluminum (Al)-Dissolved			109.5		%		80-120	23-OCT-20
Antimony (Sb)-Dissolved			99.7		%		80-120	23-OCT-20
Arsenic (As)-Dissolved			104.7		%		80-120	23-OCT-20
Barium (Ba)-Dissolved			106.5		%		80-120	23-OCT-20
Bismuth (Bi)-Dissolved			99.8		%		80-120	23-OCT-20
Boron (B)-Dissolved			93.2		%		80-120	23-OCT-20
Cadmium (Cd)-Dissolved			105.8		%		80-120	23-OCT-20
Calcium (Ca)-Dissolved			101.4		%		80-120	23-OCT-20
Chromium (Cr)-Dissolved			107.0		%		80-120	23-OCT-20
Cobalt (Co)-Dissolved			105.1		%		80-120	23-OCT-20
Copper (Cu)-Dissolved			104.6		%		80-120	23-OCT-20
Iron (Fe)-Dissolved			101.4		%		80-120	23-OCT-20
Lead (Pb)-Dissolved			99.3		%		80-120	23-OCT-20
Lithium (Li)-Dissolved			100.8		%		80-120	23-OCT-20
Magnesium (Mg)-Dissolved			111.4		%		80-120	23-OCT-20
Manganese (Mn)-Dissolved			107.9		%		80-120	23-OCT-20
Molybdenum (Mo)-Dissolved			99.7		%		80-120	23-OCT-20
Nickel (Ni)-Dissolved			105.7		%		80-120	23-OCT-20
Phosphorus (P)-Dissolved			106.0		%		70-130	23-OCT-20
Potassium (K)-Dissolved			108.0		%		80-120	23-OCT-20
Selenium (Se)-Dissolved			98.5		%		80-120	23-OCT-20
Silicon (Si)-Dissolved			101.2		%		60-140	23-OCT-20
Silver (Ag)-Dissolved			100.0		%		80-120	23-OCT-20
Sodium (Na)-Dissolved			106.8		%		80-120	23-OCT-20

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-CL	**Water**							
Batch R5267236								
WG3431348-10 LCS		**TMRM**						
Strontium (Sr)-Dissolved			104.0		%		80-120	23-OCT-20
Sulfur (S)-Dissolved			104.7		%		80-120	23-OCT-20
Thallium (Tl)-Dissolved			99.7		%		80-120	23-OCT-20
Tin (Sn)-Dissolved			100.5		%		80-120	23-OCT-20
Titanium (Ti)-Dissolved			102.0		%		80-120	23-OCT-20
Uranium (U)-Dissolved			99.6		%		80-120	23-OCT-20
Vanadium (V)-Dissolved			107.1		%		80-120	23-OCT-20
Zinc (Zn)-Dissolved			103.2		%		80-120	23-OCT-20
Zirconium (Zr)-Dissolved			96.2		%		80-120	23-OCT-20
WG3431348-14 LCS		**TMRM**						
Aluminum (Al)-Dissolved			113.7		%		80-120	23-OCT-20
Antimony (Sb)-Dissolved			105.4		%		80-120	23-OCT-20
Arsenic (As)-Dissolved			109.7		%		80-120	23-OCT-20
Barium (Ba)-Dissolved			110.4		%		80-120	23-OCT-20
Bismuth (Bi)-Dissolved			102.7		%		80-120	23-OCT-20
Boron (B)-Dissolved			96.1		%		80-120	23-OCT-20
Cadmium (Cd)-Dissolved			112.4		%		80-120	23-OCT-20
Calcium (Ca)-Dissolved			102.8		%		80-120	23-OCT-20
Chromium (Cr)-Dissolved			112.8		%		80-120	23-OCT-20
Cobalt (Co)-Dissolved			109.5		%		80-120	23-OCT-20
Copper (Cu)-Dissolved			109.5		%		80-120	23-OCT-20
Iron (Fe)-Dissolved			105.7		%		80-120	23-OCT-20
Lead (Pb)-Dissolved			102.2		%		80-120	23-OCT-20
Lithium (Li)-Dissolved			103.6		%		80-120	23-OCT-20
Magnesium (Mg)-Dissolved			114.1		%		80-120	23-OCT-20
Manganese (Mn)-Dissolved			111.4		%		80-120	23-OCT-20
Molybdenum (Mo)-Dissolved			104.9		%		80-120	23-OCT-20
Nickel (Ni)-Dissolved			110.5		%		80-120	23-OCT-20
Phosphorus (P)-Dissolved			110.5		%		70-130	23-OCT-20
Potassium (K)-Dissolved			112.9		%		80-120	23-OCT-20
Selenium (Se)-Dissolved			101.2		%		80-120	23-OCT-20
Silicon (Si)-Dissolved			106.4		%		60-140	23-OCT-20
Silver (Ag)-Dissolved			105.4		%		80-120	23-OCT-20
Sodium (Na)-Dissolved			108.7		%		80-120	23-OCT-20

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-CL	**Water**							
Batch R5267236								
WG3431348-14 LCS		**TMRM**						
Strontium (Sr)-Dissolved			108.1		%		80-120	23-OCT-20
Sulfur (S)-Dissolved			106.0		%		80-120	23-OCT-20
Thallium (Tl)-Dissolved			103.7		%		80-120	23-OCT-20
Tin (Sn)-Dissolved			106.1		%		80-120	23-OCT-20
Titanium (Ti)-Dissolved			106.3		%		80-120	23-OCT-20
Uranium (U)-Dissolved			102.9		%		80-120	23-OCT-20
Vanadium (V)-Dissolved			112.2		%		80-120	23-OCT-20
Zinc (Zn)-Dissolved			112.6		%		80-120	23-OCT-20
Zirconium (Zr)-Dissolved			102.6		%		80-120	23-OCT-20
WG3431348-18 LCS		**TMRM**						
Aluminum (Al)-Dissolved			111.5		%		80-120	23-OCT-20
Antimony (Sb)-Dissolved			105.5		%		80-120	23-OCT-20
Arsenic (As)-Dissolved			108.0		%		80-120	23-OCT-20
Barium (Ba)-Dissolved			110.2		%		80-120	23-OCT-20
Bismuth (Bi)-Dissolved			103.1		%		80-120	23-OCT-20
Boron (B)-Dissolved			97.5		%		80-120	23-OCT-20
Cadmium (Cd)-Dissolved			108.3		%		80-120	23-OCT-20
Calcium (Ca)-Dissolved			105.7		%		80-120	23-OCT-20
Chromium (Cr)-Dissolved			110.2		%		80-120	23-OCT-20
Cobalt (Co)-Dissolved			107.7		%		80-120	23-OCT-20
Copper (Cu)-Dissolved			106.5		%		80-120	23-OCT-20
Iron (Fe)-Dissolved			104.1		%		80-120	23-OCT-20
Lead (Pb)-Dissolved			103.3		%		80-120	23-OCT-20
Lithium (Li)-Dissolved			106.6		%		80-120	23-OCT-20
Magnesium (Mg)-Dissolved			112.0		%		80-120	23-OCT-20
Manganese (Mn)-Dissolved			108.6		%		80-120	23-OCT-20
Molybdenum (Mo)-Dissolved			106.1		%		80-120	23-OCT-20
Nickel (Ni)-Dissolved			107.0		%		80-120	23-OCT-20
Phosphorus (P)-Dissolved			108.2		%		70-130	23-OCT-20
Potassium (K)-Dissolved			110.7		%		80-120	23-OCT-20
Selenium (Se)-Dissolved			100.1		%		80-120	23-OCT-20
Silicon (Si)-Dissolved			105.5		%		60-140	23-OCT-20
Silver (Ag)-Dissolved			105.5		%		80-120	23-OCT-20
Sodium (Na)-Dissolved			108.9		%		80-120	23-OCT-20

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-CL	**Water**							
Batch R5267236								
WG3431348-18 LCS		**TMRM**						
Strontium (Sr)-Dissolved			110.9		%		80-120	23-OCT-20
Sulfur (S)-Dissolved			100.4		%		80-120	23-OCT-20
Thallium (Tl)-Dissolved			102.5		%		80-120	23-OCT-20
Tin (Sn)-Dissolved			105.6		%		80-120	23-OCT-20
Titanium (Ti)-Dissolved			98.3		%		80-120	23-OCT-20
Uranium (U)-Dissolved			101.3		%		80-120	23-OCT-20
Vanadium (V)-Dissolved			108.3		%		80-120	23-OCT-20
Zinc (Zn)-Dissolved			106.7		%		80-120	23-OCT-20
Zirconium (Zr)-Dissolved			103.3		%		80-120	23-OCT-20
WG3431348-2 LCS		**TMRM**						
Aluminum (Al)-Dissolved			117.0		%		80-120	23-OCT-20
Antimony (Sb)-Dissolved			105.1		%		80-120	23-OCT-20
Arsenic (As)-Dissolved			113.4		%		80-120	23-OCT-20
Barium (Ba)-Dissolved			112.4		%		80-120	23-OCT-20
Bismuth (Bi)-Dissolved			102.2		%		80-120	23-OCT-20
Boron (B)-Dissolved			101.9		%		80-120	23-OCT-20
Cadmium (Cd)-Dissolved			112.5		%		80-120	23-OCT-20
Calcium (Ca)-Dissolved			106.9		%		80-120	23-OCT-20
Chromium (Cr)-Dissolved			115.1		%		80-120	23-OCT-20
Cobalt (Co)-Dissolved			113.8		%		80-120	23-OCT-20
Copper (Cu)-Dissolved			112.9		%		80-120	23-OCT-20
Iron (Fe)-Dissolved			106.9		%		80-120	23-OCT-20
Lead (Pb)-Dissolved			105.0		%		80-120	23-OCT-20
Lithium (Li)-Dissolved			104.8		%		80-120	23-OCT-20
Magnesium (Mg)-Dissolved			100.3		%		80-120	23-OCT-20
Manganese (Mn)-Dissolved			115.9		%		80-120	23-OCT-20
Molybdenum (Mo)-Dissolved			104.7		%		80-120	23-OCT-20
Nickel (Ni)-Dissolved			113.4		%		80-120	23-OCT-20
Phosphorus (P)-Dissolved			116.1		%		70-130	23-OCT-20
Potassium (K)-Dissolved			118.7		%		80-120	23-OCT-20
Selenium (Se)-Dissolved			102.7		%		80-120	23-OCT-20
Silicon (Si)-Dissolved			108.0		%		60-140	23-OCT-20
Silver (Ag)-Dissolved			105.2		%		80-120	23-OCT-20
Sodium (Na)-Dissolved			113.1		%		80-120	23-OCT-20

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-CL	**Water**							
Batch R5267236								
WG3431348-2 LCS		**TMRM**						
Strontium (Sr)-Dissolved			107.8		%		80-120	23-OCT-20
Sulfur (S)-Dissolved			105.2		%		80-120	23-OCT-20
Thallium (Tl)-Dissolved			104.1		%		80-120	23-OCT-20
Tin (Sn)-Dissolved			104.5		%		80-120	23-OCT-20
Titanium (Ti)-Dissolved			106.1		%		80-120	23-OCT-20
Uranium (U)-Dissolved			104.1		%		80-120	23-OCT-20
Vanadium (V)-Dissolved			114.5		%		80-120	23-OCT-20
Zinc (Zn)-Dissolved			111.9		%		80-120	23-OCT-20
Zirconium (Zr)-Dissolved			102.1		%		80-120	23-OCT-20
WG3431348-6 LCS		**TMRM**						
Aluminum (Al)-Dissolved			107.9		%		80-120	23-OCT-20
Antimony (Sb)-Dissolved			97.1		%		80-120	23-OCT-20
Arsenic (As)-Dissolved			104.9		%		80-120	23-OCT-20
Barium (Ba)-Dissolved			103.3		%		80-120	23-OCT-20
Bismuth (Bi)-Dissolved			97.2		%		80-120	23-OCT-20
Boron (B)-Dissolved			91.3		%		80-120	23-OCT-20
Cadmium (Cd)-Dissolved			105.7		%		80-120	23-OCT-20
Calcium (Ca)-Dissolved			101.4		%		80-120	23-OCT-20
Chromium (Cr)-Dissolved			106.3		%		80-120	23-OCT-20
Cobalt (Co)-Dissolved			105.3		%		80-120	23-OCT-20
Copper (Cu)-Dissolved			105.0		%		80-120	23-OCT-20
Iron (Fe)-Dissolved			99.3		%		80-120	23-OCT-20
Lead (Pb)-Dissolved			98.8		%		80-120	23-OCT-20
Lithium (Li)-Dissolved			99.7		%		80-120	23-OCT-20
Magnesium (Mg)-Dissolved			107.9		%		80-120	23-OCT-20
Manganese (Mn)-Dissolved			107.4		%		80-120	23-OCT-20
Molybdenum (Mo)-Dissolved			98.6		%		80-120	23-OCT-20
Nickel (Ni)-Dissolved			105.7		%		80-120	23-OCT-20
Phosphorus (P)-Dissolved			105.9		%		70-130	23-OCT-20
Potassium (K)-Dissolved			107.9		%		80-120	23-OCT-20
Selenium (Se)-Dissolved			95.5		%		80-120	23-OCT-20
Silicon (Si)-Dissolved			99.5		%		60-140	23-OCT-20
Silver (Ag)-Dissolved			99.4		%		80-120	23-OCT-20
Sodium (Na)-Dissolved			105.8		%		80-120	23-OCT-20

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-CL	**Water**							
Batch R5267236								
WG3431348-6 LCS		**TMRM**						
Strontium (Sr)-Dissolved			103.8		%		80-120	23-OCT-20
Sulfur (S)-Dissolved			102.5		%		80-120	23-OCT-20
Thallium (Tl)-Dissolved			98.6		%		80-120	23-OCT-20
Tin (Sn)-Dissolved			98.7		%		80-120	23-OCT-20
Titanium (Ti)-Dissolved			98.9		%		80-120	23-OCT-20
Uranium (U)-Dissolved			97.8		%		80-120	23-OCT-20
Vanadium (V)-Dissolved			107.4		%		80-120	23-OCT-20
Zinc (Zn)-Dissolved			104.7		%		80-120	23-OCT-20
Zirconium (Zr)-Dissolved			96.9		%		80-120	23-OCT-20
WG3431348-1 MB								
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	23-OCT-20
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-20
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-20
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-20
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	23-OCT-20
Boron (B)-Dissolved			<0.010		mg/L		0.01	23-OCT-20
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	23-OCT-20
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	23-OCT-20
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-20
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-20
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	23-OCT-20
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	23-OCT-20
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	23-OCT-20
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	23-OCT-20
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	23-OCT-20
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-20
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	23-OCT-20
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	23-OCT-20
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	23-OCT-20
Potassium (K)-Dissolved			<0.050		mg/L		0.05	23-OCT-20
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	23-OCT-20
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	23-OCT-20
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	23-OCT-20
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	23-OCT-20

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-CL	**Water**							
Batch R5267236								
WG3431348-1 MB								
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	23-OCT-20
Sulfur (S)-Dissolved			<0.50		mg/L		0.5	23-OCT-20
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	23-OCT-20
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-20
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	23-OCT-20
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	23-OCT-20
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	23-OCT-20
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	23-OCT-20
Zirconium (Zr)-Dissolved			<0.00020		mg/L		0.0002	23-OCT-20
WG3431348-13 MB								
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	23-OCT-20
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-20
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-20
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-20
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	23-OCT-20
Boron (B)-Dissolved			<0.010		mg/L		0.01	23-OCT-20
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	23-OCT-20
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	23-OCT-20
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-20
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-20
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	23-OCT-20
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	23-OCT-20
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	23-OCT-20
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	23-OCT-20
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	23-OCT-20
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-20
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	23-OCT-20
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	23-OCT-20
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	23-OCT-20
Potassium (K)-Dissolved			<0.050		mg/L		0.05	23-OCT-20
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	23-OCT-20
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	23-OCT-20
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	23-OCT-20
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	23-OCT-20

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-CL	**Water**							
Batch R5267236								
WG3431348-13 MB								
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	23-OCT-20
Sulfur (S)-Dissolved			<0.50		mg/L		0.5	23-OCT-20
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	23-OCT-20
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-20
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	23-OCT-20
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	23-OCT-20
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	23-OCT-20
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	23-OCT-20
Zirconium (Zr)-Dissolved			<0.00020		mg/L		0.0002	23-OCT-20
WG3431348-17 MB								
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	23-OCT-20
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-20
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-20
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-20
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	23-OCT-20
Boron (B)-Dissolved			<0.010		mg/L		0.01	23-OCT-20
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	23-OCT-20
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	23-OCT-20
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-20
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-20
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	23-OCT-20
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	23-OCT-20
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	23-OCT-20
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	23-OCT-20
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	23-OCT-20
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-20
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	23-OCT-20
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	23-OCT-20
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	23-OCT-20
Potassium (K)-Dissolved			<0.050		mg/L		0.05	23-OCT-20
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	23-OCT-20
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	23-OCT-20
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	23-OCT-20
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	23-OCT-20

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-CL	**Water**							
Batch R5267236								
WG3431348-17 MB								
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	23-OCT-20
Sulfur (S)-Dissolved			<0.50		mg/L		0.5	23-OCT-20
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	23-OCT-20
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-20
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	23-OCT-20
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	23-OCT-20
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	23-OCT-20
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	23-OCT-20
Zirconium (Zr)-Dissolved			<0.00020		mg/L		0.0002	23-OCT-20
WG3431348-5 MB								
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	23-OCT-20
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-20
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-20
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-20
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	23-OCT-20
Boron (B)-Dissolved			<0.010		mg/L		0.01	23-OCT-20
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	23-OCT-20
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	23-OCT-20
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-20
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-20
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	23-OCT-20
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	23-OCT-20
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	23-OCT-20
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	23-OCT-20
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	23-OCT-20
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-20
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	23-OCT-20
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	23-OCT-20
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	23-OCT-20
Potassium (K)-Dissolved			<0.050		mg/L		0.05	23-OCT-20
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	23-OCT-20
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	23-OCT-20
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	23-OCT-20
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	23-OCT-20

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-CL	**Water**							
Batch R5267236								
WG3431348-5 MB								
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	23-OCT-20
Sulfur (S)-Dissolved			<0.50		mg/L		0.5	23-OCT-20
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	23-OCT-20
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-20
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	23-OCT-20
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	23-OCT-20
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	23-OCT-20
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	23-OCT-20
Zirconium (Zr)-Dissolved			<0.00020		mg/L		0.0002	23-OCT-20
WG3431348-9 MB								
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	23-OCT-20
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-20
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-20
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-20
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	23-OCT-20
Boron (B)-Dissolved			<0.010		mg/L		0.01	23-OCT-20
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	23-OCT-20
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	23-OCT-20
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-20
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-20
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	23-OCT-20
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	23-OCT-20
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	23-OCT-20
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	23-OCT-20
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	23-OCT-20
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-20
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	23-OCT-20
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	23-OCT-20
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	23-OCT-20
Potassium (K)-Dissolved			<0.050		mg/L		0.05	23-OCT-20
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	23-OCT-20
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	23-OCT-20
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	23-OCT-20
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	23-OCT-20

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-CL	**Water**							
Batch R5267236								
WG3431348-9 MB								
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	23-OCT-20
Sulfur (S)-Dissolved			<0.50		mg/L		0.5	23-OCT-20
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	23-OCT-20
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	23-OCT-20
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	23-OCT-20
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	23-OCT-20
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	23-OCT-20
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	23-OCT-20
Zirconium (Zr)-Dissolved			<0.00020		mg/L		0.0002	23-OCT-20
WG3431348-20 MS		**L2518933-1**						
Aluminum (Al)-Dissolved			107.4		%		70-130	23-OCT-20
Antimony (Sb)-Dissolved			97.2		%		70-130	23-OCT-20
Arsenic (As)-Dissolved			107.4		%		70-130	23-OCT-20
Barium (Ba)-Dissolved			105.7		%		70-130	23-OCT-20
Bismuth (Bi)-Dissolved			98.1		%		70-130	23-OCT-20
Boron (B)-Dissolved			92.7		%		70-130	23-OCT-20
Cadmium (Cd)-Dissolved			105.8		%		70-130	23-OCT-20
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	23-OCT-20
Chromium (Cr)-Dissolved			106.2		%		70-130	23-OCT-20
Cobalt (Co)-Dissolved			105.8		%		70-130	23-OCT-20
Copper (Cu)-Dissolved			104.7		%		70-130	23-OCT-20
Iron (Fe)-Dissolved			101.3		%		70-130	23-OCT-20
Lead (Pb)-Dissolved			98.6		%		70-130	23-OCT-20
Lithium (Li)-Dissolved			100.7		%		70-130	23-OCT-20
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	23-OCT-20
Manganese (Mn)-Dissolved			105.9		%		70-130	23-OCT-20
Molybdenum (Mo)-Dissolved			96.9		%		70-130	23-OCT-20
Nickel (Ni)-Dissolved			105.4		%		70-130	23-OCT-20
Phosphorus (P)-Dissolved			107.2		%		70-130	23-OCT-20
Potassium (K)-Dissolved			109.3		%		70-130	23-OCT-20
Selenium (Se)-Dissolved			101.2		%		70-130	23-OCT-20
Silicon (Si)-Dissolved			96.9		%		70-130	23-OCT-20
Silver (Ag)-Dissolved			101.7		%		70-130	23-OCT-20
Sodium (Na)-Dissolved			102.8		%		70-130	23-OCT-20

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-CL	**Water**							
Batch R5267236								
WG3431348-20 MS		**L2518933-1**						
Strontium (Sr)-Dissolved			N/A	MS-B	%		-	23-OCT-20
Thallium (Tl)-Dissolved			98.4		%		70-130	23-OCT-20
Tin (Sn)-Dissolved			95.4		%		70-130	23-OCT-20
Titanium (Ti)-Dissolved			94.9		%		70-130	23-OCT-20
Uranium (U)-Dissolved			100.1		%		70-130	23-OCT-20
Vanadium (V)-Dissolved			106.0		%		70-130	23-OCT-20
Zinc (Zn)-Dissolved			104.6		%		70-130	23-OCT-20
Zirconium (Zr)-Dissolved			97.4		%		70-130	23-OCT-20
NH3-L-F-CL	**Water**							
Batch R5269668								
WG3433119-6 LCS								
Ammonia as N			107.2		%		85-115	27-OCT-20
WG3433119-5 MB								
Ammonia as N			<0.0050		mg/L		0.005	27-OCT-20
NO2-L-IC-N-CL	**Water**							
Batch R5261379								
WG3429191-2 LCS								
Nitrite (as N)			105.1		%		90-110	20-OCT-20
WG3429191-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	20-OCT-20
NO3-L-IC-N-CL	**Water**							
Batch R5261379								
WG3429191-2 LCS								
Nitrate (as N)			104.6		%		90-110	20-OCT-20
WG3429191-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	20-OCT-20
PH/EC/ALK-CL	**Water**							
Batch R5263236								
WG3429799-18 DUP		**L2518933-3**						
pH		8.40	8.42	J	pH	0.02	0.2	21-OCT-20
Conductivity (EC)		523	520		uS/cm	0.6	10	21-OCT-20
Bicarbonate (HCO3)		431	429		mg/L	0.5	20	21-OCT-20
Carbonate (CO3)		6.2	7.2		mg/L	14	20	21-OCT-20
Hydroxide (OH)		<5.0	<5.0	RPD-NA	mg/L	N/A	20	21-OCT-20
Alkalinity, Total (as CaCO3)		363	363		mg/L	0.0	20	21-OCT-20

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH/EC/ALK-CL	**Water**							
Batch R5263236								
WG3429799-17 LCS								
Conductivity (EC)			96.0		%		90-110	21-OCT-20
Alkalinity, Total (as CaCO3)			100.1		%		85-115	21-OCT-20
WG3429799-16 MB								
Conductivity (EC)			<2.0		uS/cm		2	21-OCT-20
Bicarbonate (HCO3)			<5.0		mg/L		5	21-OCT-20
Carbonate (CO3)			<5.0		mg/L		5	21-OCT-20
Hydroxide (OH)			<5.0		mg/L		5	21-OCT-20
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	21-OCT-20
SO4-L-IC-N-CL	**Water**							
Batch R5261379								
WG3429191-2 LCS								
Sulfate (SO4)			102.0		%		85-115	20-OCT-20
WG3429191-1 MB								
Sulfate (SO4)			<0.050		mg/L		0.05	20-OCT-20
TC-EC-MPN-CL	**Water**							
Batch R5261776								
WG3429378-4 MB								
MPN - E. Coli			<1		MPN/100mL		1	20-OCT-20
MPN - Total Coliforms			<1		MPN/100mL		1	20-OCT-20
WG3429378-7 MB								
MPN - E. Coli			<1		MPN/100mL		1	20-OCT-20
MPN - Total Coliforms			<1		MPN/100mL		1	20-OCT-20
TSS-L-CL	**Water**							
Batch R5268009								
WG3429618-19 LCS								
Total Suspended Solids			110.4		%		85-115	22-OCT-20
WG3429618-18 MB								
Total Suspended Solids			<1.0		mg/L		1	22-OCT-20

Quality Control Report

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

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Report To	Contact and company name below will appear on the final report
Company:	Sperling Hansen Associates Inc.
Contact:	Scott Garthwaite
Phone:	778-471-7088
	Company address below will appear on the final report
Street:	1225 East Keith Road
City/Province:	North Vancouver, B.C.
Postal Code:	V7J 1J3
Invoice To	Same as Report To ☑ ☑ NO
	Copy of Invoice with Report ☑ ☐ NO
Company:	
Contact:	

Reports / Recipients

Select Report Format: ☐ PDF ☑ EXCEL ☐ EDD (DIGITAL)

~~Merge QC/QCI Reports with COA ☐ YES ☐ NO ☐ N/A~~

☑ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: sgarthwaite@sperlinghansen.com

Email 2: chetherington@sperlinghansen.com

Email 3:

Invoice Recipients

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: rhajjafari@sperlinghansen.com

Email 2:

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply

☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum

☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum

☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum

☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum

☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm am/pm

For all tests with rush TATs requested, please contact your AM to confirm availability.

Project Information

ALS Account # / Quote #:

Job #: 20050 Wasa

PO / AFE:

LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#:

Major/Minor Code: Routing Code:

Requisitioner:

Location:

ALS Lab Work Order # (ALS use only):

ALS Contact: Dean Watt **Sampler:** Tyler McBride

Analysis Request

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Anions	Total Alkalinity	TSS	Dissolved Metals (F/P)	Total Metals (P)	Ammonia	Fecal and Total Coliform	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	~~E298130~~ E297130	19-10-20		Groundwater	5	x	x	x	x		x	x			
	E297151	19-10-20		Groundwater	5	x	x	x	x		x	x			
	E297152	19-10-20		Groundwater	5	x	x	x	x		x	x			

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ ☑ NO

Are samples for human consumption/ use? ☐ ☑ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

British Columbia Contaminated Sites Regulation Stage 10 Amendment (NOV, 2017)

British Columbia Approved and Working Water Quality Guidelines (MAY, 2015)

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
17							

SHIPMENT RELEASE (client use)

Released by:	Date:	Time:
Tyler McBride	Oct 19, 2020	

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:
	10/20	8:35

FINAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

END OF REPORT