ANNUAL WATER REPORT

2024

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INTRODUCTION

The District of Barriere is working to continually improve the water system and public awareness to meet the changing needs of our community.

Water safety is of the utmost importance to the District of Barriere. The supply of good, clean drinking water has been taken for granted by the general public in Canada until events such as the Walkerton E. Coli outbreak brought the safety of the water supply into the public eye.

This report has been submitted to Interior Health and is posted on the District of Barriere website: www.barriere.ca

We are dedicated to providing safe, clean water to the residents of Barriere as indicated in the following report.

WATER UTILITY OBJECTIVES

- To ensure adequate supply of high-quality water to the community.
- To effectively treat the raw water to provide potable water of integrity to the community.
- To ensure the adequate delivery of high-quality potable water to all points within the system for domestic and emergency purposes.
- To ensure effective management of all water system aspects and provide excellent customer service and information to the community.
- To manage water demand by effectively assessing and managing water losses from leakage in the system.
- To develop an effective water conservation program for operations and the wider community.
- To maintain water rates that encourage conservation and resource awareness while providing quality accessible water to consumers.

PROVINCIAL REQUIREMENTS

All drinking water in the water system must meet the Canadian Guidelines for Drinking Water Quality. In British Columbia, the Ministry of Health regulates water suppliers through the Drinking Water Protection Act. This legislation ensures safe drinking water in the Province. It requires that the water supplier monitor the drinking water source and distribution system to ensure compliance with the Drinking Water Protection regulations and report all results to the Health Authority. Water monitoring, inspection and testing, emergency response planning, cross connection control and security standards are all regulated for persons operating a water system.

Changes in water systems must be approved by the Interior Health Authority (IHA), and conform to the District's specifications.

Under the *BC Water Act*, the District must acquire licenses for withdrawal from water bodies.

Under the *Community Charter*, the District may, by bylaw, regulate, prohibit, and impose requirements in relation to municipal service and public health. The District must make reports available to the public on request regarding fees imposed under this section.

SUPPLY SOURCES

Community Water Plant – Spruce Crescent

The District of Barriere's potable water system is supplied by a system of three wells, one being constructed during the 1990s, the second in 2019 and the third most recently in 2022. All three wells are in the northeast quadrant of the community, adjacent to the Barriere River. Two deep wells (DW2 & DW3) are located at the north end of Spruce Crescent, and a third production well (PW1), is located on Bradford Road. The wells are summarized in Table 3.1 below. The location of these wells can be seen on the overall water system plan on the following page.

Table 3.1: Barriere's Supply Wells

Well	Year Built	Pumping Capacity (L/s)	Approximate Depth (m)	Known Issues Or Concerns
PW1 Bradford Park	2019	20	91	High Iron, Manganese
DW2 Spruce Crescent	1997	44	35	Increasing evidence of iron and manganese - limited lifespan
DW3 Spruce Crescent	2022	32	45	Manganese periodically found over the Aesthetic Objectives.

WATER TREATMENT

The well water is injected with a chlorine solution at the pump stations such that it contains an approximate free residual chlorine concentration of 1.0 mg/L adjacent to the pump stations and has been measured to 0.8 mg/L at the more remote parts of the system.
In terms of the Interior Health Authority requirements, this treatment is satisfactory in a ground water source that is not under the influence of surface water, as these types of supply are given credit for filtration. Referencing the 4-3-2-1-0 requirements, the chlorine addresses the 4 and the 0, while the fact that the Spruce Well supply is a non-GWUDI well appears to be protected by a confining layer and addresses points 3, 2, and 1.

RESERVOIR STORAGE

The North reservoir is a rectangular concrete tank with sloping sides and a capacity of 1,540m^3 (406,560 USG). It is located at the north end of the community adjacent to Barriere Lakes Road and has a free water level of 451 meters. A 350mm diameter supply main connects the reservoir with the rest of the system at the intersection of Lodgepole Road and Barriere Lakes Road.

The South reservoir is a rectangular concrete tank and has a capacity of 1,300m^3 (343,200 USG). It is located at the south end of the community near the top of Mountain Road and has a free water level of 451 meters. A 250mm diameter supply main connects the reservoir with the rest of the system at Mountain Road.

DISTRIBUTION SYSTEM

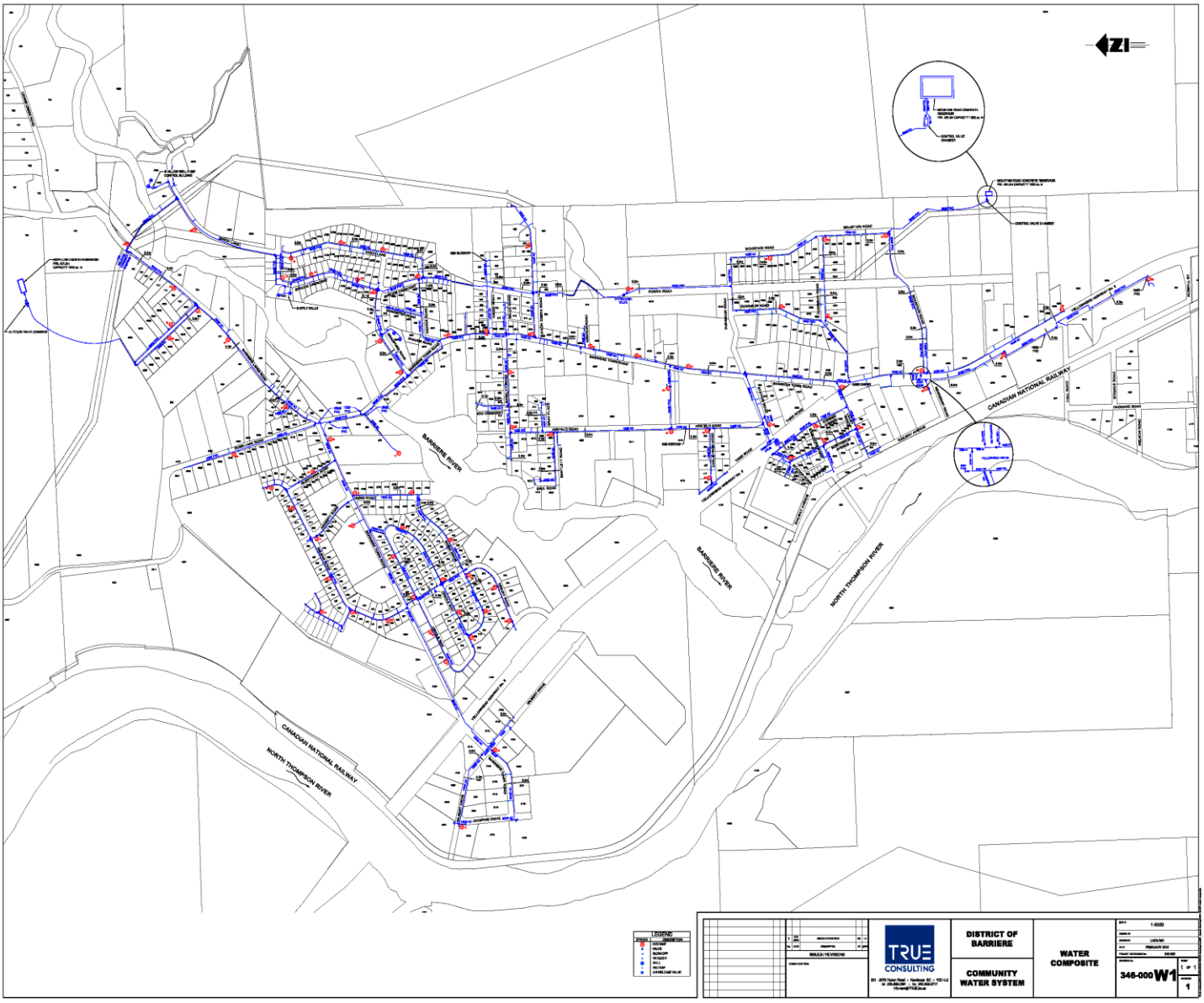
Approximately 25 Kilometers of watermain are joined together to create the District of Barriere water system. The water system has been undergoing upgrades to ensure the water quality is safe for consumption. The first upgrades were from 1966 onwards when the pipes were asbestos cement. Beginning in the 1980's the pipes began to be upgraded to PVC due to the potential health risks of leakage from decaying asbestos/cement pipe. The PVC pipes range in diameter from 100 mm to 350 mm and provide potable water to approximately 790 residential and 78 commercial service connections in Barriere.

The District irrigates four public parks (Fadear, Bradford, Oriole, Gray Place), four baseball fields, two green spaces, and the cemetery, during off-peak demand times using a total of 77 irrigation zones with an average of 3 sprinkler heads per zone. In addition, the school district operates and maintains irrigation for the three school fields in Barriere.

Several sections of pipe within the District's water supply system are undersized, limiting flows and negatively impacting fire protection and pressures in certain parts of the network. Piping has been upgraded at the High School intersection along Bradford Road, and from Barriere Town Road to Spruce Crescent.

The water distribution system is also shown on the District's webmap at www.barriere.ca

WATER SUPPLY SYSTEM



WATER SAMPLING AND TESTING

Bacteriological:
As required by the Interior Health Authority (IHA), staff takes weekly water samples for bacteriological testing for total coliforms and e-Coli bacteria. There are 3 different sampling sites used throughout Barriere; North, Centre, and South.

Full Spectrum Analysis:
Water samples have been sent from the source water for a full spectrum analysis. Parameters such as alkalinity, metals, pH, turbidity, and hardness are tested. *SEE ATTACHMENT 4*

Summary:
In 2024 the District of Barriere had no positive bacteriological testing results pertaining to Total Coliforms or E.Coli and remained in compliance throughout the entire year of 2024. In 2022, the District began analyzing and tracking manganese levels on a more frequent basis to observe trends during different operating periods and times of the year.

EMERGENCY RESPONSE PLAN

The District of Barriere's Emergency Response Plan for the water system was updated in 2023. It identifies several potential emergencies that could occur and provides a systematic approach on how the District will deal with those emergencies. The plan is available for public viewing at the District Office, 4936 Barriere Town Road.

WATER QUALITY COMPLAINTS

The District of Barriere received few complaints in 2024 in respect to the quality of water being provided. Our community water wells, especially the Bradford wells have elevated iron and manganese levels, which once combined with chlorine create a brownish precipitate that showed up throughout the distribution system, therefore creating an aesthetically unpleasing water quality. Although the water was still safe for human consumption, the District of Barriere along with the Interior Health authority (IHA), continued maintaining the water quality advisory (WQA) that was implemented in 2019. However, with the onboarding of DW3, IHA removed the WQA in December of 2022 and therefore, is no longer in effect.

Most of the complaints received in 2024 were the result of this iron/manganese precipitate getting dislodged from the water mains during our annual hydrant flushing program. This is a temporary issue that clears upon running a household tap for a short period of time. District staff continue to conduct annual watermain flushing as part of our continued commitment to providing safe, clean drinking water.

SYSTEM UPGRADES COMPLETED IN 2024

Barriere Water system

- Four new residential water services installed
- Five new hydrants, 280 m looped 250-mm PVC water main plus fifteen mainline valves at 4740 Yellowhead Highway.
- Installation of three new mainline valves on Barriere Town Road.
- Security fencing installed around the Community Water Plant.
- Leak detection completed in April. Three major leaks were detected and ultimately repaired.
- Six residential service line leaks were repaired.

POTENTIAL SYSTEM UPGRADES

- Biological manganese removal Water Treatment Plant.
- Complete source assessments for all water sources.
- Additional Production Well (DW4) as the municipalities' population grows.
- Upgrading the asbestos cement water main on Barriere Town Road, installed in 1966, from Bradford Rd. to Mountain Rd. to remove the bottleneck and balance North and South reservoirs.
- SCADA system installation to provide real-time data for monitoring and controlling the operation of our water system.
- Watermain looping to eliminate dead ends and builds resiliency.

CROSS CONNECTION CONTROL PROGRAM

The District of Barriere maintains a Cross Connection Control Program to prevent the potential backflow of non-potable water into the District's water distribution system. The Program is based on premises isolation to ensure there is a reliable barrier between private and public water systems. The program uses a priority approach with higher hazard ICI (Industrial, Commercial, and Institutional) service connections being first in line for inspections and compliance mandates, as well as residential connections with auxiliary water. The District of Barriere Water System Bylaw # 189 gives the District authority to implement this program.

All new ICI developments are required to be inspected for Cross Connections as a condition of the provision of water service.

Backflow prevention devices are documented and tracked by the District to ensure they are tested annually and in good working order. This annual testing must be carried out by a certified Backflow Assembly Tester. It is also worth noting that all residential outside hose bibs were confirmed to have vacuum breakers installed (2012) and all new builds are required to have them.

The District also monitors potential backflow situations through its water meter program. All service connections in the District must be metered. Our water meters will detect and flag backflow occurrences and provide additional information on time of occurrence, duration, and volume. If the situation were to occur, it would prompt immediate investigation and may trigger our Water System Emergency Response Plan.

2024 Summary Report

Total ICI Facilities/Premises (inc. District facilities and parks)	102
Total BFP's Tracked	45
Past Due Test Reports	24

Hazard (L/M/S)	Inspected Premises with CCs	Premises in Compliance
Sever	4	4
Moderate	16	11
Low	8	0
Total	28	15

The District will continue to improve and further implement its Cross Connection Control Program through inspections, tracking, program development and public education to eventually have all actual or potential cross connections identified and in compliance with our CCC Program.

OPERATOR CERTIFICATION

The District of Barriere currently employs three licensed operators, all in good standing with the EOCP. One Senior Utilities Specialist, who holds a Class 2 certification in Water Treatment and Water Distribution. One Water Technician 2, who holds a Class 1 certification in Water Treatment and Water Distribution, and Chlorine Handling Certification. One Water Technician 1, who holds a Class 2 certification in Water Distribution, Chlorine Handling Certification, and will be obtaining his Class 1 certification in Water Treatment soon. Our Wastewater Technician 2 is also the District of Barriere's cross connection control inspector and certified backflow assembly tester.

SUMMARY OF SOURCE WATER PROTECTION EFFORTS

The District of Barriere is currently working towards completing a wellhead protection plan to ensure a consistent effort is being made to protect our groundwater production wells. The wellhead protection plan assesses risks and makes recommendations with respect to source water protection. The plan notes that risks to production wells from activities within and outside the capture zone are perceived to be low. Another measure the District of Barriere has implemented is a property covenant on all surrounding residential homes which prohibits the use of fertilizers and pesticides. Further to this the District undertook a GWUDI/GARP study of its deep wells at the Spruce Crescent site to determine potential influences of the adjacent Barriere River. In addition, a Level I GARP Screening was completed for the Bradford PW1 in 2024 (See Attachment 4).

APPENDIX I

WATER CONSUMPTION (CUBIC METRES)

Month	2024 PW1	2024 DW2	2024 DW3	2023 PW1	2023 DW2	2023 DW3
January	270	12090	13169	455	11611	11350
February	261	15773	15697	460	10665	10434
March	218	22655	10899	435	12281	12458
April	541	12866	13072	335	16512	17139
May	237	19002	23695	380	20342	23788
June	269	19911	25363	634	22296	36172
July	2016	25981	38358	3369	19665	49066
August	3038	24134	30717	1498	22637	40969
September	167	17479	21405	484	19751	2192
October	370	12725	12454	263	12356	12398
November	268	10770	11114	300	10821	10163
December	292	12178	12371	292	10711	10578

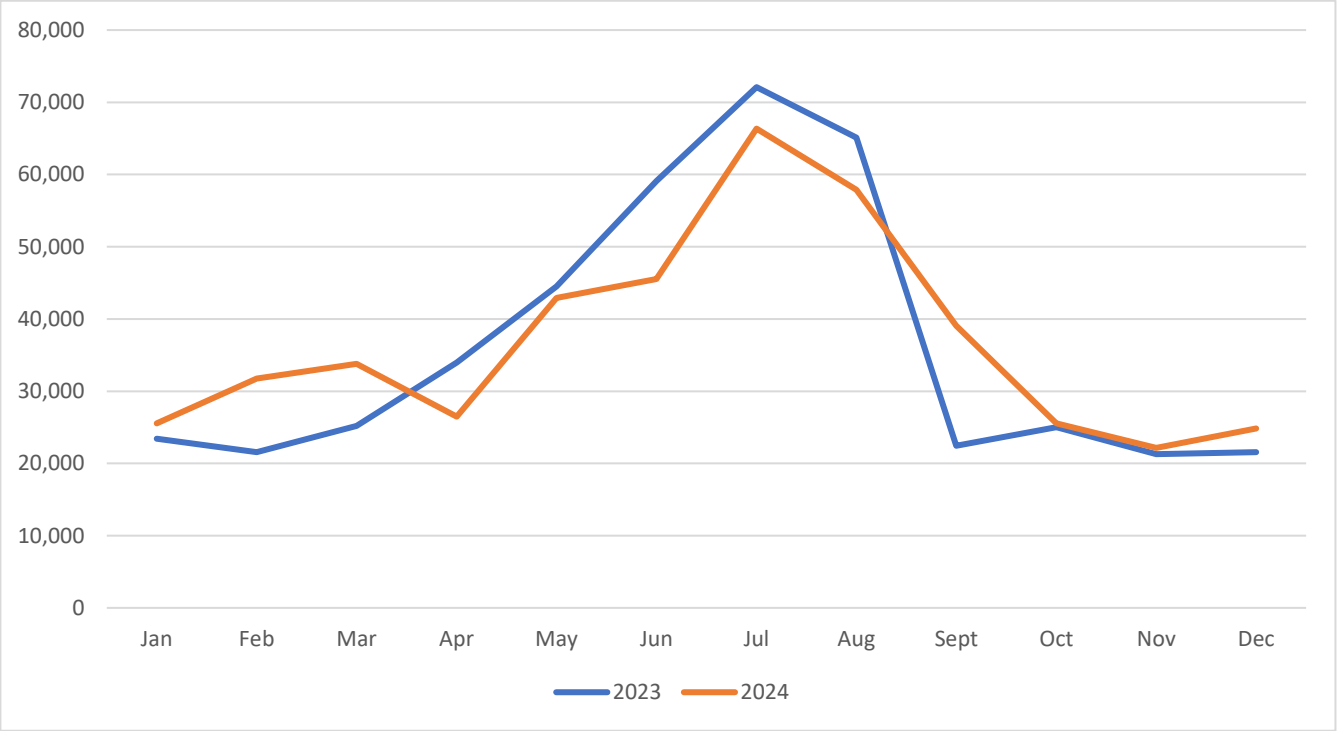
HISTORICAL ANNUAL WATER CONSUMPTION

Total Consumption for 2024: 441,825 cubic metres
Total Consumption for 2023: 435,260 cubic metres
Total Consumption for 2022: 382,660 cubic metres
Total Consumption for 2021: 386,849 cubic metres
Total Consumption for 2020: 312,417 cubic metres
Total Consumption for 2019: 452,792 cubic metres
Total Consumption for 2018: 552,371 cubic metres
Total Consumption for 2017: 601,764 cubic metres
Total Consumption for 2016: 462,902 cubic metres
Total Consumption for 2015: 538.725 cubic metres
Total Consumption for 2014: 536,108 cubic metres

APPENDIX II

WATER CONSUMPTION

2024 / 2023 Monthly Water Consumption



APPENDIX III

LOUIS CREEK INDUSTRIAL PARK (LCIP)

The District of Barriere has a small water system in the Louis Creek Industrial Park (LCIP) which is located 4 kilometers south of the town of Barriere. This water system serves only the businesses which are in the industrial park, along with 1 residential homeowner. The LCIP water system started production on June 1, 2020.

The water system consists of a 50-gpm production well, and a pump house where disinfection occurs. District utility staff attend this site daily where chlorine levels and flows are monitored. Weekly bacteriological samples are collected for analysis from an outside independent laboratory.

LCIP had no positive bacteriological testing results pertaining to Total Coliforms or E. Coli and remained in compliance throughout the entire year of 2023.

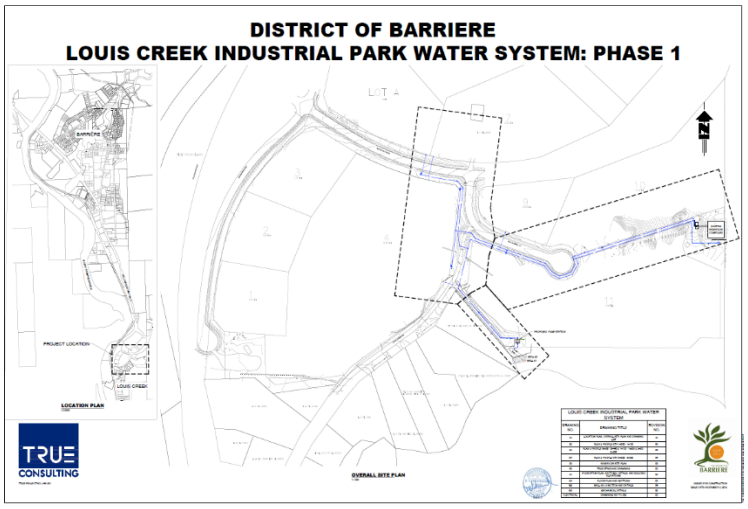
A new 1,410 m3 insulated steel reservoir including all underground piping and valves was installed and commissioned in 2023. The level sensor in the reservoir is powered using a 350-Watt solar panel. In addition, a 31 KVA diesel generator was installed at the pump house to provide backup power in case of an outage.

An extension to the watermain is proposed for 2025 to service the remaining industrial lots.

A full spectrum analysis of the raw water source was conducted in 2024 and is shown in Attachment 1 of this document.

LCIP WATER CONSUMPTION (CUBIC METERS)

Month	2023 LCIP	2023 LCIP
January	751	145
February	539	118
March	175	149
April	190	294
May	249	750
June	240	1131
July	531	2117
August	599	1108
September	642	1253
October	335	316
November	341	232
December	405	202



Total Consumption for 2024: 4,997 m3
Total Consumption for 2023: 8,030 m3

Interior Health Authority

Kamloops Health Centre
519 Columbia Street
Kamloops BC V2C 2T8
Canada

(250) 851-7340

Printed on: August 04, 202
3:09 PM

Interior Health Authority

Facility Inspected:		**Inspection #:**	I-2023-180769-180769
District of Barriere Water System		**Inspection Date:**	14-Jul-2023 10:28
Attention:	District of Barriere	**Completed Date:**	14-Jul-2023 13:00
		Inspected By:	Diana Tesic-Nagalingam
Site Address:	Hwy 5 N Barriere BC V0E 1E0	**Facility Type:**	District Municipality - Community LW
		Risk Rating:	Invalid
Site Phone:	(250) 672-9751	**Inspection Type:**	Monitoring
Site Fax:	(250) 672-9708	**Inspection Reasons:**	Monitoring
Site Email:	cmatthews@barriere.ca	**Infractions:**	3
		Delivery Method:	Email

Opening Comments and Observations:
Routine inspection.

N/A = Not Applicable No = No Yes = Yes

District Municipality - Community LW

LW1 - Core

LW1.1 - Are the water system details up to date? Yes

District Municipality - Community LW - LW - Distribution & Storage

LWD1 - Water - Distribution & Storage

LWD1.1 - Is the water system preparing or following a Cross Connection Control Program? Yes

The District has cross-connection bylaw and most of the ICI customers are accounted for. One of the operators is a certified CCC inspector who is also responsible for administering the program.

Response: Cross connection program summary is to be outlined in the Annual Drinking Water Report.

LWD1.2 - Does the water system follow a distribution system maintenance and protection plan or otherwise conduct routine maintenance of the distribution system? Yes

Formal operation and maintenance plan for the District is still in the development stage.

Response: Discussed the importance to include leak detection and valve exercise tasks to the O&M manual for the District.

District Municipality - Community LW - LW - Emergency Response

LWE1 - Emergency Response

LWE1.1 - Does the Water Supplier have a written emergency response plan and contingency plan? [DWPA Section 10 & 15(a), DWPR Section 13] Yes

LWE1.2 - Does the water system have a system that will notify operators of a process failure or breach of the system? Yes

District Municipality - Community LW - LW - Monitoring & Reporting

LWM1 - Monitoring & Reporting

LWM1.1 - Is the Water Supplier monitoring its source water and the drinking water it provides for the parameters, and at the frequency, established by the regulations and by its operating permit? [DWPA Section 11] Yes

Monitoring for bacteriological parameters is in compliance with the Schedule B.

Response: Comprehensive testing for each source needs to be completed annually.

LWM1.2 - Does the Water Supplier prepare and make public an Annual report? [DWPA Section 15(b), DWPR Section 11] Yes

LWM1.3 - Is the distribution system manually monitored for chlorine? Yes

LWM1.4 - Is the distribution system manually monitored for turbidity? Yes

LWM1.5 - Are the Point of Entry / Point of Use devices being maintained and monitored? N/A

District Municipality - Community LW - LW - Operations & Management

LWO1 - Operations & Management

LWO1.1 - Does the Water Supplier hold a valid Operating Permit? Yes

LWO1.2 - Does the water system have a Water Master Plan, or acceptable planning process, to achieve compliance with Provincial Treatment Objectives? Yes

First stage of the Water Master Plan is completed.

Response: Projects completed: Drilling Well #3 and its successful connection to the distribution system, relocation of stand-by power for continuous supply of potable water. Addition of Well #3 to the potable water supply is currently resolving the issue with the elevated manganese (manganese is kept below AO).
In order to complete other listed projects within the Water Master Plan the District will look into available funding options.

LWO1.3 - Does the water system have an Asset Management Plan? **No**

Follow up by: 03-Aug-2024

- *LWO1.3A - An Asset Management Plan is beneficial to a water system to plan for capital costs associated with infrastructure improvements and replacement*

LWO1.4 - Does the water system have an Operator certified to the Treatment Classification of the system? [DWPA Section 9, DWPR Section12] N/A

LWO1.5 - Does the water system have an Operator certified to the Distribution Classification of the system? [DWPA Section 9, DWPR Section12] Yes

Facility is classified as a WD Level 2.

Response: There are two operators with Level 2 WD and one operator with Level 1 WD certification.

LWO1.6 - Does the Water Supplier have a succession plan to train, recruit and retain staff at the required certification levels? Yes

District Municipality - Community LW - LW - Source

LWS1 - Source

LWS1.1 - Has a source assessment been prepared for each source? **No**

Source assessment is intended to help water suppliers develop a better understanding of the risks to drinking water safety and availability. It also can help suppliers operate more effectively in working to ensure the best possible water quality and assured quantity. The Comprehensive Drinking Water Source-to-Tap Assessment Guideline, or a similar document, can be utilized for the process.

Follow up by: 03-Aug-2024

LWS1.2 - Has a source assessment response plan been prepared for each source?

LWS1.3 - Is the system following their assessment response plan?

LWS1.4 - Has a Ground water At Risk of containing Pathogens (GARP) assessment been completed? **No**

GARP assessment needs to be completed on all of the production wells.

Follow up by: 03-Aug-2024

Response: The operators are encouraged to compile data on raw water quality (bacteriological, turbidity, conductivity, pH, temperature, etc.) to help with the GARP assessment process.

District Municipality - Community LW - LW - Treatment

LWT1 - Treatment

LWT1.1 - Does the water treatment plant(s) (WTP) meet the Drinking Water Treatment Objectives (Microbial) for Surface Water? N/A

LWT1.2 - Do the conditions for filtration exemption of the Drinking Water Treatment Objectives (Microbial) for Surface Water continue to be met? N/A

LWT1.3 - Does the water treatment plant (WTP) meet the Provincial Treatment Objectives (Microbial) for Ground Water Supplies? N/A

There are no GARP studies completed on the District's ground water sources which will provide direction for water treatment requirements.

LWT1.4 - Do the conditions for filtration exemption of the Drinking Water Treatment Objectives (Microbial) for Ground Water continue to be met? N/A

Actions Taken

Actions Taken:

- Site visit

Received By: **Inspector:**

Paul Amos

Diana Tesic-Nagalingam, Environmental Health Officer

Interior Health Authority

Printed on: August 18, 202
1:48 PM

Kamloops Health Centre
519 Columbia Street
Kamloops BC V2C 2T8
Canada

(250) 851-7340

Interior Health Authority

Facility Inspected:
Louis Creek Industrial Park

Attention: District of Barriere

Site Address: Louis Creek Rd
Louis Creek BC V0E 2E0

Site Phone: (250) 672-9751
Site Fax: (250) 672-9708
Site Email: dborrill@barriere.ca

Inspection #: I-2023-180785-180785
Inspection Date: 14-Jul-2023 13:30
Completed Date: 14-Jul-2023 15:00
Inspected By: Diana Tesic-Nagalingam
Facility Type: District Municipality - Community SW
Risk Rating: Invalid
Inspection Type: Monitoring
Inspection Reasons: Monitoring
Infractions: 2

Delivery Method: Email

Opening Comments and Observations:
Routine inspection.

Yes = Yes N/A = Not Applicable No = No

District Municipality - Community SW

SW1 - Core

SW1.1 - Are the water system details up to date? Yes

District Municipality - Community SW - SW - Distribution & Storage

SWD1 - Distribution & Storage

SWD1.1 - Is the water system preparing or following a Cross Connection Control Program? Yes

SWD1.2 - Does the water system follow a distribution system maintenance and protection plan or otherwise conduct routine maintenance of the distribution system? Yes

District Municipality - Community SW - SW - Emergency Response

SWE1 - Emergency Response

SWE1.1 - Does the Water Supplier have a written emergency response plan and contingency plan? [DWPA Section 10 & 15(a), DWPR Section 13] Yes

SWE1.2 - Does the water system have a system that will notify operators of a process failure or breach of the system? Yes

Once the new reservoir is on-line it will be connected to the existing SCADA system.

District Municipality - Community SW - SW - Monitoring & Reporting

SWM1 - Monitoring & Reporting

SWM1.1 - Is the Water Supplier monitoring its source water and the drinking water it provides for the parameters, and at the frequency, established by the regulations and by its operating permit? [DWPA Section 11]	Yes
SWM1.2 - Does the Water Supplier prepare and make public an Annual report? [DWPA Section 15(b), DWPR Section 11]	N/A
SWM1.3 - Is the distribution system manually monitored for chlorine?	Yes
SWM1.4 - Is the distribution system manually monitored for turbidity?	Yes
SWM1.5 - Are the Point of Entry / Point of Use devices being maintained and monitored?	N/A

District Municipality - Community SW - SW - Operations & Management

SWO1 - Operations & Management

SWO1.1 - Does the Water Supplier hold a valid Operating Permit?	Yes
SWO1.2 - Does the water system have a Water Master Plan, or acceptable planning process, to achieve compliance with Provincial Treatment Objectives?	Yes
SWO1.3 - Does the water system have an Asset Management Plan?	
SWO1.4 - Does the water system have an Operator certified to the Treatment Classification of the system? [DWPA Section 9, DWPR Section12]	N/A
SWO1.5 - Does the water system have an Operator certified to the Distribution Classification of the system? [DWPA Section 9, DWPR Section12]	Yes
SWO1.6 - Does the Water Supplier have a succession plan to train, recruit and retain staff at the required certification levels?	Yes

District Municipality - Community SW - SW - Source

SWS1 - Source

SWS1.1 - Has a source assessment been prepared for each source? **No**

Complete source assessment for the production well utilizing Comprehensive Drinking Water Source-to-Tap Assessment Guideline or equivalent.

Follow up by: 15-Aug-2024

Response: Resources for water system operators: https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/drinking-water-quality/resources-for-water-system-operators

SWS1.2 - Has a source assessment response plan been prepared for each source?

SWS1.3 - Is the system following their assessment response plan?

SWS1.4 - Has a Ground water At Risk of containing Pathogens (GARP) assessment been completed? **No**

Follow up by: 17-Aug-2024

District Municipality - Community SW - SW - Treatment

SWT1 - Treatment

SWT1.1 - Does the water treatment plant(s) (WTP) meet the Drinking Water Treatment Objectives (Microbial) for Surface Water? N/A

SWT1.2 - Do the conditions for filtration exemption of the Drinking Water Treatment Objectives (Microbial) for Surface Water continue to be met? N/A

SWT1.3 - Does the water treatment plant (WTP) meet the Provincial Treatment Objectives (Microbial) for Ground Water Supplies? Yes

Currently the treatment consists of chlorination with contact time for virus reduction. If the subsequent GARP studies change the risk evaluation, the treatment will need to address newly identified risks to the ground water.

SWT1.4 - Do the conditions for filtration exemption of the Drinking Water Treatment Objectives (Microbial) for Ground Water continue to be met? Yes

Collect data on raw water turbidity to confirm that the conditions for filtration exemption are continuing to be met. This is in addition to periodic bacteriological monitoring of raw water.

Actions Taken

Actions Taken:

- Site visit

Closing Comments:

WIPN 33085 was drilled in 2010 and screened/developed in 2014. Depth of the well is 238 feet. New well is capable of producing 50 + USgpm. Surface seal is present (bentonite chip 18 feet deep).
System has a back-up power
New potable water reservoir is in the process of commissioning during the writing of this report.

Received By:

Paul Amos

Inspector:

Diana Tesic-Nagalingam, Environmental Health Officer

CERTIFICATE OF ANALYSIS

Work Order	:	**KS2404902**		
Client	:	**District of Barriere**	Laboratory	: ALS Environmental - Vancouver
Contact	:	Chris Matthews	Account Manager	: Caitlin Fountain
Address	:	PO Box 219 Barriere British Columbia Canada V0E 1E0	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	:	----	Telephone	: 250 372 3588
Project	:	District of Barriere Water	Date Samples Received	: 21-Nov-2024 12:23
PO	:	----	Date Analysis Commenced	: 22-Nov-2024
C-O-C number	:	----	Issue Date	: 03-Dec-2024 09:18
Sampler	:	Graham H		
Site	:	----		
Quote number	:	20DIOB100KS02 Water		
No. of samples received	:	1		
No. of samples analysed	:	1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Ghazaleh Khanmirzaei	Analyst	Metals, Burnaby, British Columbia
Jon Fisher	Production Manager, Environmental	Inorganics, Waterloo, Ontario
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Monica Ko	Lab Assistant	Microbiology, Burnaby, British Columbia
Monica Ko	Lab Assistant	Inorganics, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key: CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
LOR: Limit of Reporting (detection limit).

Unit	*Description*
mg/L	milligrams per litre
-	no units
% T/cm	% transmittance per centimetre
AU/cm	absorbance units per centimetre
CU	colour units (1 cu = 1 mg/l pt)
NTU	nephelometric turbidity units
µS/cm	microsiemens per centimetre
pH units	pH units
MPN/100mL	most probable number per hundred millilitres
%	percent
meq/L	milliequivalents per litre

<: less than.
>: greater than.
Surrogate: An analyte that is similar in behavior 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.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

					Client sample ID	Spruce Crescent DW2 - Raw Water Analysis Pumphouse	----	----	----	----
					Client sampling date / time	21-Nov-2024 10:15	----	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		KS2404902-001	----	----	----	----
						Result	----	----	----	----
Physical Tests										
Absorbance, UV (@ 254nm), unfiltered	----	E405/VA	0.0050	AU/cm		0.0110	----	----	----	----
Alkalinity, bicarbonate (as CaCO3)	----	E290/VA	1.0	mg/L		175	----	----	----	----
Alkalinity, carbonate (as CaCO3)	----	E290/VA	1.0	mg/L		<1.0	----	----	----	----
Alkalinity, hydroxide (as CaCO3)	----	E290/VA	1.0	mg/L		<1.0	----	----	----	----
Alkalinity, phenolphthalein (as CaCO3)	----	E290/VA	1.0	mg/L		<1.0	----	----	----	----
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L		175	----	----	----	----
Colour, true	----	E329/VA	5.0	CU		<5.0	----	----	----	----
Conductivity	----	E100/VA	2.0	µS/cm		351	----	----	----	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/VA	0.60	mg/L		190	----	----	----	----
Langelier index (@ 15°C)	----	EC105A/VA	0.010	-		0.279	----	----	----	----
Langelier index (@ 20°C)	----	EC105A/VA	0.010	-		0.354	----	----	----	----
Langelier index (@ 25°C)	----	EC105A/VA	0.010	-		0.424	----	----	----	----
Langelier index (@ 4°C)	----	EC105A/VA	0.010	-		0.104	----	----	----	----
Langelier index (@ 60°C)	----	EC105A/VA	0.010	-		0.872	----	----	----	----
Langelier index (@ 77°C)	----	EC105A/VA	0.010	-		1.07	----	----	----	----
pH	----	E108/VA	0.10	pH units		7.90	----	----	----	----
Solids, total dissolved [TDS]	----	E162/VA	10	mg/L		235	----	----	----	----
Turbidity	----	E121/VA	0.10	NTU		0.21	----	----	----	----
Transmittance, UV (@ 254nm), unfiltered	----	E405/VA	1.0	% T/cm		97.5	----	----	----	----

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

					Client sample ID	Spruce Crescent DW2 - Raw Water Analysis Pumphouse	----	----	----	----
					Client sampling date / time	21-Nov-2024 10:15	----	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		KS2404902-001	----	----	----	----
						Result	----	----	----	----
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L		0.0134	----	----	----	----
Bromide	24959-67-9	E235.Br-L/VA	0.050	mg/L		<0.050	----	----	----	----
Chloride	16887-00-6	E235.Cl/VA	0.50	mg/L		2.66	----	----	----	----
Fluoride	16984-48-8	E235.F/VA	0.020	mg/L		0.087	----	----	----	----
Kjeldahl nitrogen, total [TKN]	----	E318/VA	0.050	mg/L		0.066	----	----	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L/VA	0.0050	mg/L		0.316	----	----	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L/VA	0.0010	mg/L		<0.0010	----	----	----	----
Nitrogen, total organic	----	EC363/VA	0.050	mg/L		0.053	----	----	----	----
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	0.30	mg/L		19.4	----	----	----	----
Cyanides										
Cyanide, strong acid dissociable (Total)	----	E333/WT	0.0050	mg/L		<0.0050	----	----	----	----
Organic / Inorganic Carbon										
Carbon, total organic [TOC]	----	E355-L/VA	0.50	mg/L		0.66	----	----	----	----
Microbiological Tests										
Coliforms, total	----	E010/VA	1	MPN/100 mL		<1	----	----	----	----
Coliforms, Escherichia coli [E. coli]	----	E010/VA	1	MPN/100 mL		<1	----	----	----	----
Ion Balance										
Anion sum	----	EC101A/VA	0.10	meq/L		4.00	----	----	----	----
Cation sum (total)	----	EC101A/VA	0.10	meq/L		4.21	----	----	----	----
Ion balance (APHA)	----	EC101A/VA	0.010	%		2.56	----	----	----	----

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	Spruce Crescent DW2 - Raw Water Analysis Pumphouse	----	----	----	----
					Client sampling date / time	21-Nov-2024 10:15	----	----	----	----
						KS2404902-001	----	----	----	----
						Result	----	----	----	----
Total Metals										
Aluminum, total	7429-90-5	E420/VA	0.0030	mg/L		<0.0030	----	----	----	----
Antimony, total	7440-36-0	E420/VA	0.00010	mg/L		<0.00010	----	----	----	----
Arsenic, total	7440-38-2	E420/VA	0.00010	mg/L		0.00118	----	----	----	----
Barium, total	7440-39-3	E420/VA	0.00010	mg/L		0.0183	----	----	----	----
Beryllium, total	7440-41-7	E420/VA	0.000100	mg/L		<0.000100	----	----	----	----
Bismuth, total	7440-69-9	E420/VA	0.000050	mg/L		<0.000050	----	----	----	----
Boron, total	7440-42-8	E420/VA	0.010	mg/L		<0.010	----	----	----	----
Cadmium, total	7440-43-9	E420/VA	0.0000050	mg/L		0.0000117	----	----	----	----
Calcium, total	7440-70-2	E420/VA	0.050	mg/L		41.1	----	----	----	----
Cesium, total	7440-46-2	E420/VA	0.000010	mg/L		<0.000010	----	----	----	----
Chromium, total	7440-47-3	E420/VA	0.00050	mg/L		0.00077	----	----	----	----
Cobalt, total	7440-48-4	E420/VA	0.00010	mg/L		<0.00010	----	----	----	----
Copper, total	7440-50-8	E420/VA	0.00050	mg/L		0.00516	----	----	----	----
Iron, total	7439-89-6	E420/VA	0.010	mg/L		<0.010	----	----	----	----
Lead, total	7439-92-1	E420/VA	0.000050	mg/L		0.000207	----	----	----	----
Lithium, total	7439-93-2	E420/VA	0.0010	mg/L		0.0017	----	----	----	----
Magnesium, total	7439-95-4	E420/VA	0.0050	mg/L		21.3	----	----	----	----
Manganese, total	7439-96-5	E420/VA	0.00010	mg/L		0.00283	----	----	----	----
Mercury, total	7439-97-6	E508/VA	0.0000050	mg/L		<0.0000050	----	----	----	----
Molybdenum, total	7439-98-7	E420/VA	0.000050	mg/L		0.00152	----	----	----	----

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

					Client sample ID	Spruce Crescent DW2 - Raw Water Analysis Pumphouse	----	----	----	----
					Client sampling date / time	21-Nov-2024 10:15	----	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		KS2404902-001	----	----	----	----
						Result	----	----	----	----
Total Metals										
Nickel, total	7440-02-0	E420/VA	0.00050	mg/L		<0.00050	----	----	----	----
Phosphorus, total	7723-14-0	E420/VA	0.050	mg/L		<0.050	----	----	----	----
Potassium, total	7440-09-7	E420/VA	0.050	mg/L		1.77	----	----	----	----
Rubidium, total	7440-17-7	E420/VA	0.00020	mg/L		0.00046	----	----	----	----
Selenium, total	7782-49-2	E420/VA	0.000050	mg/L		0.000203	----	----	----	----
Silicon, total	7440-21-3	E420/VA	0.10	mg/L		8.31	----	----	----	----
Silver, total	7440-22-4	E420/VA	0.000010	mg/L		<0.000010	----	----	----	----
Sodium, total	7440-23-5	E420/VA	0.050	mg/L		8.32	----	----	----	----
Strontium, total	7440-24-6	E420/VA	0.00020	mg/L		0.265	----	----	----	----
Sulfur, total	7704-34-9	E420/VA	0.50	mg/L		7.00	----	----	----	----
Tellurium, total	13494-80-9	E420/VA	0.00020	mg/L		<0.00020	----	----	----	----
Thallium, total	7440-28-0	E420/VA	0.000010	mg/L		<0.000010	----	----	----	----
Thorium, total	7440-29-1	E420/VA	0.00010	mg/L		<0.00010	----	----	----	----
Tin, total	7440-31-5	E420/VA	0.00010	mg/L		<0.00010	----	----	----	----
Titanium, total	7440-32-6	E420/VA	0.00030	mg/L		<0.00030	----	----	----	----
Tungsten, total	7440-33-7	E420/VA	0.00010	mg/L		<0.00010	----	----	----	----
Uranium, total	7440-61-1	E420/VA	0.000010	mg/L		0.00190	----	----	----	----
Vanadium, total	7440-62-2	E420/VA	0.00050	mg/L		0.00087	----	----	----	----
Zinc, total	7440-66-6	E420/VA	0.0030	mg/L		0.0103	----	----	----	----
Zirconium, total	7440-67-7	E420/VA	0.00020	mg/L		<0.00020	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

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QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **KS2404902**	Page	: 1 of 10
Client	: **District of Barriere**	Laboratory	: ALS Environmental - Kamloops
Contact	: Chris Matthews	Account Manager	: Caitlin Fountain
Address	: PO Box 219 Barriere BC Canada V0E 1E0	Address	: 1445 McGill Road, Unit 2B Kamloops, British Columbia Canada V2C 6K7
Telephone	: ----	Telephone	: 250 372 3588
Project	: District of Barriere Water	Date Samples Received	: 21-Nov-2024 12:23
PO	: ----	Issue Date	: 03-Dec-2024 09:15
C-O-C number	: ----		
Sampler	: Graham H		
Site	: ----		
Quote number	: 20DIOB100KS02 Water		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
Spruce Crescent DW2 - Raw Water Analysis - Pumphouse	E298	21-Nov-2024	27-Nov-2024	28 days	6 days	✓	29-Nov-2024	28 days	8 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE										
Spruce Crescent DW2 - Raw Water Analysis - Pumphouse	E235.Br-L	21-Nov-2024	23-Nov-2024	28 days	2 days	✓	23-Nov-2024	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Spruce Crescent DW2 - Raw Water Analysis - Pumphouse	E235.Cl	21-Nov-2024	23-Nov-2024	28 days	2 days	✓	23-Nov-2024	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Spruce Crescent DW2 - Raw Water Analysis - Pumphouse	E235.F	21-Nov-2024	23-Nov-2024	28 days	2 days	✓	23-Nov-2024	28 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
Spruce Crescent DW2 - Raw Water Analysis - Pumphouse	E235.NO3-L	21-Nov-2024	23-Nov-2024	3 days	2 days	✓	23-Nov-2024	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
Spruce Crescent DW2 - Raw Water Analysis - Pumphouse	E235.NO2-L	21-Nov-2024	23-Nov-2024	3 days	2 days	✓	23-Nov-2024	3 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Spruce Crescent DW2 - Raw Water Analysis - Pumphouse	E235.SO4	21-Nov-2024	23-Nov-2024	28 days	2 days	✓	23-Nov-2024	28 days	2 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
Spruce Crescent DW2 - Raw Water Analysis - Pumphouse	E318	21-Nov-2024	27-Nov-2024	28 days	6 days	✓	29-Nov-2024	28 days	8 days	✓
Cyanides : Total Cyanide										
Opaque HDPE - total (sodium hydroxide)										
Spruce Crescent DW2 - Raw Water Analysis - Pumphouse	E333	21-Nov-2024	27-Nov-2024	14 days	6 days	✓	27-Nov-2024	14 days	6 days	✓
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate)										
Spruce Crescent DW2 - Raw Water Analysis - Pumphouse	E010	21-Nov-2024	----	----	----		22-Nov-2024	30 hrs	24 hrs	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
Spruce Crescent DW2 - Raw Water Analysis - Pumphouse	E355-L	21-Nov-2024	27-Nov-2024	28 days	6 days	✓	27-Nov-2024	28 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
Spruce Crescent DW2 - Raw Water Analysis - Pumphouse	E290	21-Nov-2024	23-Nov-2024	14 days	2 days	✓	23-Nov-2024	14 days	2 days	✓
Physical Tests : Apparent UV Absorbance and Transmittance by Spectrometry										
HDPE										
Spruce Crescent DW2 - Raw Water Analysis - Pumphouse	E405	21-Nov-2024	----	----	----		23-Nov-2024	3 days	2 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE										
Spruce Crescent DW2 - Raw Water Analysis - Pumphouse	E329	21-Nov-2024	23-Nov-2024	3 days	2 days	✓	24-Nov-2024	3 days	3 days	✓
Physical Tests : Conductivity in Water										
HDPE										
Spruce Crescent DW2 - Raw Water Analysis - Pumphouse	E100	21-Nov-2024	23-Nov-2024	28 days	2 days	✓	23-Nov-2024	28 days	2 days	✓
Physical Tests : pH by Meter										
HDPE										
Spruce Crescent DW2 - Raw Water Analysis - Pumphouse	E108	21-Nov-2024	23-Nov-2024	0.25 hrs	43 hrs	× EHTR-FM	23-Nov-2024	0.25 hrs	46 hrs	× EHTR-FM

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Physical Tests : TDS by Gravimetry										
HDPE										
Spruce Crescent DW2 - Raw Water Analysis - Pumphouse	E162	21-Nov-2024	----	----	----		27-Nov-2024	7 days	6 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE										
Spruce Crescent DW2 - Raw Water Analysis - Pumphouse	E121	21-Nov-2024	----	----	----		23-Nov-2024	3 days	2 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial - total (lab preserved)										
Spruce Crescent DW2 - Raw Water Analysis - Pumphouse	E508	21-Nov-2024	26-Nov-2024	28 days	5 days	✓	26-Nov-2024	28 days	5 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
Spruce Crescent DW2 - Raw Water Analysis - Pumphouse	E420	21-Nov-2024	26-Nov-2024	180 days	5 days	✓	28-Nov-2024	180 days	7 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	1780430	1	17	5.8	5.0	✓
Ammonia by Fluorescence	E298	1785233	1	20	5.0	5.0	✓
Apparent UV Absorbance and Transmittance by Spectrometry	E405	1780996	1	4	25.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	1780434	1	17	5.8	5.0	✓
Chloride in Water by IC	E235.Cl	1780433	1	17	5.8	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	1780438	1	12	8.3	5.0	✓
Conductivity in Water	E100	1780431	1	17	5.8	5.0	✓
Fluoride in Water by IC	E235.F	1780432	1	17	5.8	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1780435	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1780436	1	17	5.8	5.0	✓
pH by Meter	E108	1780429	1	10	10.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1780437	1	17	5.8	5.0	✓
TDS by Gravimetry	E162	1786605	1	20	5.0	5.0	✓
Total Coliforms and E. coli (Enzyme Substrate)	E010	1779273	2	18	11.1	10.0	✓
Total Cyanide	E333	1785403	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1785231	1	14	7.1	5.0	✓
Total Mercury in Water by CVAAS	E508	1783565	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1779678	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1785232	1	9	11.1	5.0	✓
Turbidity by Nephelometry	E121	1780808	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1780430	1	17	5.8	5.0	✓
Ammonia by Fluorescence	E298	1785233	1	20	5.0	5.0	✓
Apparent UV Absorbance and Transmittance by Spectrometry	E405	1780996	1	4	25.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	1780434	1	17	5.8	5.0	✓
Chloride in Water by IC	E235.Cl	1780433	1	17	5.8	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	1780438	1	12	8.3	5.0	✓
Conductivity in Water	E100	1780431	1	17	5.8	5.0	✓
Fluoride in Water by IC	E235.F	1780432	1	17	5.8	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1780435	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1780436	1	17	5.8	5.0	✓
pH by Meter	E108	1780429	1	10	10.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1780437	1	17	5.8	5.0	✓
TDS by Gravimetry	E162	1786605	1	20	5.0	5.0	✓
Total Cyanide	E333	1785403	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1785231	1	14	7.1	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
Total Mercury in Water by CVAAS	E508	1783565	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1779678	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1785232	1	9	11.1	5.0	✓
Turbidity by Nephelometry	E121	1780808	1	20	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1780430	1	17	5.8	5.0	✓
Ammonia by Fluorescence	E298	1785233	1	20	5.0	5.0	✓
Apparent UV Absorbance and Transmittance by Spectrometry	E405	1780996	1	4	25.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	1780434	1	17	5.8	5.0	✓
Chloride in Water by IC	E235.Cl	1780433	1	17	5.8	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	1780438	1	12	8.3	5.0	✓
Conductivity in Water	E100	1780431	1	17	5.8	5.0	✓
Fluoride in Water by IC	E235.F	1780432	1	17	5.8	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1780435	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1780436	1	17	5.8	5.0	✓
Sulfate in Water by IC	E235.SO4	1780437	1	17	5.8	5.0	✓
TDS by Gravimetry	E162	1786605	1	20	5.0	5.0	✓
Total Coliforms and E. coli (Enzyme Substrate)	E010	1779273	1	18	5.5	5.0	✓
Total Cyanide	E333	1785403	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1785231	1	14	7.1	5.0	✓
Total Mercury in Water by CVAAS	E508	1783565	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1779678	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1785232	1	9	11.1	5.0	✓
Turbidity by Nephelometry	E121	1780808	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1785233	1	20	5.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	1780434	1	17	5.8	5.0	✓
Chloride in Water by IC	E235.Cl	1780433	1	17	5.8	5.0	✓
Fluoride in Water by IC	E235.F	1780432	1	17	5.8	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1780435	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1780436	1	17	5.8	5.0	✓
Sulfate in Water by IC	E235.SO4	1780437	1	17	5.8	5.0	✓
Total Cyanide	E333	1785403	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1785231	1	14	7.1	5.0	✓
Total Mercury in Water by CVAAS	E508	1783565	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1779678	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1785232	1	9	11.1	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Coliforms and E. coli (Enzyme Substrate)	E010 ALS Environmental - Vancouver	Water	APHA 9223 (mod)	The enzyme substrate test simultaneously detects Total Coliforms and E. coli in a 100 mL sample after incubation at 35.0 ±0.5°C for either 18 or 24 hours (dependent on reagent used).
Conductivity in Water	E100 ALS Environmental - Vancouver	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Vancouver	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 ALS Environmental - Vancouver	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TDS by Gravimetry	E162 ALS Environmental - Vancouver	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Bromide in Water by IC (Low Level)	E235.Br-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Chloride in Water by IC	E235.Cl ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Sulfate in Water by IC	E235.SO4 ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Vancouver	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 ALS Environmental - Vancouver	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 ALS Environmental - Vancouver	Water	Method Fialab 100, 2018	TKN in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021).
Colour (True) by Spectrometer (5 CU)	E329 ALS Environmental - Vancouver	Water	APHA 2120 C (mod)	Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment.
Total Cyanide	E333 ALS Environmental - Waterloo	Water	ISO 14403 (mod)	Total or Strong Acid Dissociable (SAD) Cyanide is determined by Continuous Flow Analyzer (CFA) with in-line UV digestion followed by colourmetric analysis. Method Limitation: High levels of thiocyanate (SCN) may cause positive interference (up to 0.5% of SCN concentration).
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Apparent UV Absorbance and Transmittance by Spectrometry	E405 ALS Environmental - Vancouver	Water	APHA 5910 B (mod)	Apparent UV Absorbance is determined on an unfiltered sample by UV absorbance measurement in a quartz cell at 254 nm. The analysis is carried out without pH adjustment.
Total Metals in Water by CRC ICPMS	E420 ALS Environmental - Vancouver	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Mercury in Water by CVAAS	E508 ALS Environmental - Vancouver	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
Hardness (Calculated) from Total Ca/Mg	EC100A ALS Environmental - Vancouver	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
Ion Balance using Total Metals	EC101A ALS Environmental - Vancouver	Water	APHA 1030E	Cation Sum (using total metals), Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).
Saturation Index using Laboratory pH (Ca-T)	EC105A ALS Environmental - Vancouver	Water	APHA 2330B	Langelier Index provides an indication of scale formation potential at a given pH and temperature, and is calculated as per APHA 2330B Saturation Index. Positive values indicate oversaturation with respect to CaCO3. Negative values indicate undersaturation of CaCO3. This calculation uses laboratory pH measurements and provides estimates of Langelier Index at temperatures of 4, 15, 20, 25, 66, and 77°C. Ryznar Stability Index is an alternative index used for scale formation and corrosion potential.
Total Organic Nitrogen (Calculation)	EC363 ALS Environmental - Vancouver	Water	APHA 4500-NORG (TKN)/NH3-NITROGEN (NH3)	Total Organic Nitrogen is a calculated parameter. Total Organic Nitrogen = Total Kjeldahl Nitrogen - Ammonia.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Vancouver	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for TKN in water	EP318 ALS Environmental - Vancouver	Water	APHA 4500-Norg D (mod)	Samples are digested at high temperature using Sulfuric Acid with Copper catalyst, which converts organic nitrogen sources to Ammonia, which is then quantified by the analytical method as TKN. This method is unsuitable for samples containing high levels of nitrate. If nitrate exceeds TKN concentration by ten times or more, results may be biased low.
Preparation for Total Organic Carbon by Combustion	EP355 ALS Environmental - Vancouver	Water		Preparation for Total Organic Carbon by Combustion

QUALITY CONTROL REPORT

Work Order	: **KS2404902**	Page	: 1 of 13
Client	: District of Barriere	Laboratory	: ALS Environmental - Kamloops
Contact	: Chris Matthews	Account Manager	: Caitlin Fountain
Address	: PO Box 219 Barriere BC Canada V0E 1E0	Address	: 1445 McGill Road, Unit 2B Kamloops, British Columbia Canada V2C 6K7
Telephone	: ----	Telephone	: 250 372 3588
Project	: District of Barriere Water	Date Samples Received	: 21-Nov-2024 12:23
PO	: ----	Date Analysis Commenced	: 22-Nov-2024
C-O-C number	: ----	Issue Date	: 03-Dec-2024 09:17
Sampler	: Graham H		
Site	: ----		
Quote number	: 20DIOB100KS02 Water		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Ghazaleh Khanmirzaei	Analyst	Vancouver Metals, Burnaby, British Columbia
Jon Fisher	Production Manager, Environmental	Waterloo Inorganics, Waterloo, Ontario
Kim Jensen	Department Manager - Metals	Vancouver Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Vancouver Inorganics, Burnaby, British Columbia
Monica Ko	Lab Assistant	Vancouver Inorganics, Burnaby, British Columbia
Monica Ko	Lab Assistant	Vancouver Microbiology, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include 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 predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 1780429)											
FJ2403552-003	Anonymous	pH	----	E108	0.10	pH units	8.17	8.18	0.122%	4%	----
Physical Tests (QC Lot: 1780430)											
FJ2403552-003	Anonymous	Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	104	104	0.385%	200%	----
		Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0.00%	200%	----
		Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0.00%	200%	----
		Alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	104	104	0.385%	20%	----
Physical Tests (QC Lot: 1780431)											
FJ2403552-003	Anonymous	Conductivity	----	E100	2.0	µS/cm	1420	1410	0.423%	10%	----
Physical Tests (QC Lot: 1780438)											
KS2404902-001	Spruce Crescent DW2 - Raw Water Analysis Pumphouse	Colour, true	----	E329	5.0	CU	<5.0	<5.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 1780808)											
FJ2403543-001	Anonymous	Turbidity	----	E121	0.10	NTU	0.30	0.31	0.006	Diff <2x LOR	----
Physical Tests (QC Lot: 1780996)											
KS2404902-001	Spruce Crescent DW2 - Raw Water Analysis Pumphouse	Absorbance, UV (@ 254nm), unfiltered	----	E405	0.0050	AU/cm	0.0110	0.0110	0	Diff <2x LOR	----
Physical Tests (QC Lot: 1786605)											
KS2404897-001	Anonymous	Solids, total dissolved [TDS]	----	E162	20	mg/L	415	420	1.20%	20%	----
Anions and Nutrients (QC Lot: 1780432)											
FJ2403552-001	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.192	0.189	0.002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1780433)											
FJ2403552-001	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	45.8	45.8	0.00543%	20%	----
Anions and Nutrients (QC Lot: 1780434)											
FJ2403552-001	Anonymous	Bromide	24959-67-9	E235.Br-L	0.050	mg/L	0.766	0.771	0.697%	20%	----
Anions and Nutrients (QC Lot: 1780435)											
FJ2403552-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.225	0.224	0.390%	20%	----
Anions and Nutrients (QC Lot: 1780436)											
FJ2403552-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0126	0.0124	1.76%	20%	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Anions and Nutrients (QC Lot: 1780437)											
FJ2403552-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	69.0	69.1	0.121%	20%	----
Anions and Nutrients (QC Lot: 1785231)											
KS2404902-001	Spruce Crescent DW2 - Raw Water Analysis Pumphouse	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.066	0.051	0.015	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1785233)											
KS2404902-001	Spruce Crescent DW2 - Raw Water Analysis Pumphouse	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0134	0.0133	0.00010	Diff <2x LOR	----
Cyanides (QC Lot: 1785403)											
VA24D1834-003	Anonymous	Cyanide, strong acid dissociable (Total)	----	E333	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 1785232)											
KS2404902-001	Spruce Crescent DW2 - Raw Water Analysis Pumphouse	Carbon, total organic [TOC]	----	E355-L	0.50	mg/L	0.66	0.64	0.02	Diff <2x LOR	----
Microbiological Tests (QC Lot: 1779273)											
KS2404902-001	Spruce Crescent DW2 - Raw Water Analysis Pumphouse	Coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	<1	0	Diff <2x LOR	----
		Coliforms, total	----	E010	1	MPN/100mL	<1	<1	0	Diff <2x LOR	----
VA24D1700-076	Anonymous	Coliforms, Escherichia coli [E. coli]	----	E010	10	MPN/100mL	52	41	23.6%	65%	----
		Coliforms, total	----	E010	10	MPN/100mL	512	488	4.80%	65%	----
Total Metals (QC Lot: 1779678)											
VA24D1493-001	Anonymous	Aluminum, total	7429-90-5	E420	0.0060	mg/L	0.0113	0.0122	0.0008	Diff <2x LOR	----
		Antimony, total	7440-36-0	E420	0.00020	mg/L	0.00102	0.00100	0.00002	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00020	mg/L	0.00109	0.00105	0.00004	Diff <2x LOR	----
		Barium, total	7440-39-3	E420	0.00020	mg/L	0.0478	0.0470	1.70%	20%	----
		Beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Bismuth, total	7440-69-9	E420	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Boron, total	7440-42-8	E420	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
		Cadmium, total	7440-43-9	E420	0.0000100	mg/L	0.0000413	0.0000457	0.0000043	Diff <2x LOR	----
		Calcium, total	7440-70-2	E420	0.100	mg/L	395	397	0.505%	20%	----
		Cesium, total	7440-46-2	E420	0.000020	mg/L	0.000097	0.000098	0.0000003	Diff <2x LOR	----
		Chromium, total	7440-47-3	E420	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Copper, total	7440-50-8	E420	0.00100	mg/L	0.0125	0.0125	0.00319%	20%	----
		Iron, total	7439-89-6	E420	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 1779678) - continued											
VA24D1493-001	Anonymous	Lead, total	7439-92-1	E420	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Lithium, total	7439-93-2	E420	0.0020	mg/L	0.0116	0.0112	0.0004	Diff <2x LOR	----
		Magnesium, total	7439-95-4	E420	0.100	mg/L	115	114	0.768%	20%	----
		Manganese, total	7439-96-5	E420	0.00020	mg/L	0.00159	0.00172	0.00013	Diff <2x LOR	----
		Molybdenum, total	7439-98-7	E420	0.000100	mg/L	0.0221	0.0222	0.400%	20%	----
		Nickel, total	7440-02-0	E420	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Phosphorus, total	7723-14-0	E420	0.300	mg/L	<0.300	<0.300	0	Diff <2x LOR	----
		Potassium, total	7440-09-7	E420	0.100	mg/L	6.00	6.02	0.485%	20%	----
		Rubidium, total	7440-17-7	E420	0.00040	mg/L	0.00355	0.00333	0.00022	Diff <2x LOR	----
		Selenium, total	7782-49-2	E420	0.000100	mg/L	0.0229	0.0231	0.697%	20%	----
		Silicon, total	7440-21-3	E420	0.20	mg/L	10.4	10.0	4.36%	20%	----
		Silver, total	7440-22-4	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Sodium, total	7440-23-5	E420	0.100	mg/L	25.8	26.4	2.02%	20%	----
		Strontium, total	7440-24-6	E420	0.00040	mg/L	1.95	2.01	2.94%	20%	----
		Sulfur, total	7704-34-9	E420	1.00	mg/L	405	386	4.86%	20%	----
		Tellurium, total	13494-80-9	E420	0.00040	mg/L	<0.00040	<0.00040	0	Diff <2x LOR	----
		Thallium, total	7440-28-0	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Thorium, total	7440-29-1	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Tin, total	7440-31-5	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.0100	mg/L	<0.0100	<0.0100	0	Diff <2x LOR	----
		Tungsten, total	7440-33-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Uranium, total	7440-61-1	E420	0.000020	mg/L	0.0150	0.0160	6.29%	20%	----
		Vanadium, total	7440-62-2	E420	0.00100	mg/L	0.00130	0.00128	0.00002	Diff <2x LOR	----
		Zinc, total	7440-66-6	E420	0.0060	mg/L	<0.0060	<0.0060	0	Diff <2x LOR	----
		Zirconium, total	7440-67-7	E420	0.00040	mg/L	<0.00040	<0.00040	0	Diff <2x LOR	----
Total Metals (QC Lot: 1783565)											
FJ2403552-001	Anonymous	Mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1780430)						
Alkalinity, bicarbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, carbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, hydroxide (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 1780431)						
Conductivity	----	E100	1	µS/cm	1.2	----
Physical Tests (QCLot: 1780438)						
Colour, true	----	E329	5	CU	<5.0	----
Physical Tests (QCLot: 1780808)						
Turbidity	----	E121	0.1	NTU	<0.10	----
Physical Tests (QCLot: 1780996)						
Absorbance, UV (@ 254nm), unfiltered	----	E405	0.005	AU/cm	<0.0050	----
Physical Tests (QCLot: 1786605)						
Solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Anions and Nutrients (QCLot: 1780432)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1780433)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 1780434)						
Bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 1780435)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1780436)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1780437)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 1785231)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 1785233)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Cyanides (QCLot: 1785403)						

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Cyanides (QCLot: 1785403) - continued						
Cyanide, strong acid dissociable (Total)	----	E333	0.002	mg/L	<0.0020	----
Organic / Inorganic Carbon (QCLot: 1785232)						
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Microbiological Tests (QCLot: 1779273)						
Coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	----
Coliforms, total	----	E010	1	MPN/100mL	<1	----
Total Metals (QCLot: 1779678)						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
Barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
Boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
Calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
Copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
Iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
Lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
Potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
Silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
Silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
Sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 1779678) - continued						
Sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
Tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
Total Metals (QCLot: 1783565)						
Mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1780429)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 1780430)									
Alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	229 mg/L	102	75.0	125	----
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	103	85.0	115	----
Physical Tests (QCLot: 1780431)									
Conductivity	----	E100	1	µS/cm	147 µS/cm	93.6	90.0	110	----
Physical Tests (QCLot: 1780438)									
Colour, true	----	E329	5	CU	100 CU	104	85.0	115	----
Physical Tests (QCLot: 1780808)									
Turbidity	----	E121	0.1	NTU	200 NTU	100	85.0	115	----
Physical Tests (QCLot: 1780996)									
Absorbance, UV (@ 254nm), unfiltered	----	E405	0.005	AU/cm	0.693 AU/cm	93.9	85.0	115	----
Physical Tests (QCLot: 1786605)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	108	85.0	115	----
Anions and Nutrients (QCLot: 1780432)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	97.7	90.0	110	----
Anions and Nutrients (QCLot: 1780433)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	99.1	90.0	110	----
Anions and Nutrients (QCLot: 1780434)									
Bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	106	85.0	115	----
Anions and Nutrients (QCLot: 1780435)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	98.8	90.0	110	----
Anions and Nutrients (QCLot: 1780436)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	98.0	90.0	110	----
Anions and Nutrients (QCLot: 1780437)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1785231)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	116	75.0	125	----
Anions and Nutrients (QCLot: 1785233)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	98.5	85.0	115	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike: Target Concentration	Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Cyanides (QCLot: 1785403)									
Cyanide, strong acid dissociable (Total)	----	E333	0.002	mg/L	0.25 mg/L	90.3	80.0	120	----
Organic / Inorganic Carbon (QCLot: 1785232)									
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	104	80.0	120	----
Total Metals (QCLot: 1779678)									
Aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	97.5	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	104	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	107	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	106	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	103	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	104	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	102	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	107	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	102	80.0	120	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	106	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	104	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	102	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	97.2	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	106	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	98.9	80.0	120	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	103	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	103	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	102	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	102	80.0	120	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	94.9	80.0	120	----
Potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	101	80.0	120	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	99.4	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	100	80.0	120	----
Silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	106	80.0	120	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	96.9	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	100	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	109	80.0	120	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	103	80.0	120	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	106	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 1779678) - continued									
Thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	105	80.0	120	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	106	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	103	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	102	80.0	120	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	104	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	111	80.0	120	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	104	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	104	80.0	120	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	101	80.0	120	----
Total Metals (QCLot: 1783565)									
Mercury, total	7439-97-6	E508	0.000005	mg/L	0 mg/L	86.9	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1780432)										
FJ2403552-002	Anonymous	Fluoride	16984-48-8	E235.F	1.01 mg/L	1 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1780433)										
FJ2403552-002	Anonymous	Chloride	16887-00-6	E235.Cl	101 mg/L	100 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1780434)										
FJ2403552-002	Anonymous	Bromide	24959-67-9	E235.Br-L	ND mg/L	----	ND	75.0	125	----
Anions and Nutrients (QCLot: 1780435)										
FJ2403552-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.54 mg/L	2.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1780436)										
FJ2403552-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.499 mg/L	0.5 mg/L	99.8	75.0	125	----
Anions and Nutrients (QCLot: 1780437)										
FJ2403552-002	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	99.2 mg/L	100 mg/L	99.2	75.0	125	----
Anions and Nutrients (QCLot: 1785231)										
KS2404903-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	2.70 mg/L	2.5 mg/L	108	70.0	130	----
Anions and Nutrients (QCLot: 1785233)										
KS2404903-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.124 mg/L	0.1 mg/L	124	75.0	125	----
Cyanides (QCLot: 1785403)										
VA24D1834-003	Anonymous	Cyanide, strong acid dissociable (Total)	----	E333	0.230 mg/L	0.25 mg/L	92.1	75.0	125	----
Organic / Inorganic Carbon (QCLot: 1785232)										
KS2404903-001	Anonymous	Carbon, total organic [TOC]	----	E355-L	5.29 mg/L	5 mg/L	106	70.0	130	----
Total Metals (QCLot: 1779678)										
VA24D1542-001	Anonymous	Aluminum, total	7429-90-5	E420	ND mg/L	----	ND	70.0	130	----
		Antimony, total	7440-36-0	E420	ND mg/L	----	ND	70.0	130	----
		Arsenic, total	7440-38-2	E420	ND mg/L	----	ND	70.0	130	----
		Barium, total	7440-39-3	E420	ND mg/L	----	ND	70.0	130	----
		Beryllium, total	7440-41-7	E420	0.389 mg/L	0.4 mg/L	97.3	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.0971 mg/L	0.1 mg/L	97.1	70.0	130	----
		Boron, total	7440-42-8	E420	ND mg/L	----	ND	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.0403 mg/L	0.04 mg/L	101	70.0	130	----
		Calcium, total	7440-70-2	E420	ND mg/L	----	ND	70.0	130	----
		Cesium, total	7440-46-2	E420	0.102 mg/L	0.1 mg/L	102	70.0	130	----
		Chromium, total	7440-47-3	E420	ND mg/L	----	ND	70.0	130	----
		Cobalt, total	7440-48-4	E420	ND mg/L	----	ND	70.0	130	----
		Copper, total	7440-50-8	E420	ND mg/L	----	ND	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 1779678) - continued										
VA24D1542-001	Anonymous	Iron, total	7439-89-6	E420	ND mg/L	----	ND	70.0	130	----
		Lead, total	7439-92-1	E420	0.190 mg/L	0.2 mg/L	95.2	70.0	130	----
		Lithium, total	7439-93-2	E420	0.892 mg/L	1 mg/L	89.2	70.0	130	----
		Magnesium, total	7439-95-4	E420	ND mg/L	----	ND	70.0	130	----
		Manganese, total	7439-96-5	E420	ND mg/L	----	ND	70.0	130	----
		Molybdenum, total	7439-98-7	E420	ND mg/L	----	ND	70.0	130	----
		Nickel, total	7440-02-0	E420	ND mg/L	----	ND	70.0	130	----
		Phosphorus, total	7723-14-0	E420	90.9 mg/L	100 mg/L	90.9	70.0	130	----
		Potassium, total	7440-09-7	E420	ND mg/L	----	ND	70.0	130	----
		Rubidium, total	7440-17-7	E420	ND mg/L	----	ND	70.0	130	----
		Selenium, total	7782-49-2	E420	ND mg/L	----	ND	70.0	130	----
		Silicon, total	7440-21-3	E420	ND mg/L	----	ND	70.0	130	----
		Silver, total	7440-22-4	E420	0.0382 mg/L	0.04 mg/L	95.4	70.0	130	----
		Sodium, total	7440-23-5	E420	ND mg/L	----	ND	70.0	130	----
		Strontium, total	7440-24-6	E420	ND mg/L	----	ND	70.0	130	----
		Sulfur, total	7704-34-9	E420	ND mg/L	----	ND	70.0	130	----
		Tellurium, total	13494-80-9	E420	0.429 mg/L	0.4 mg/L	107	70.0	130	----
		Thallium, total	7440-28-0	E420	0.0369 mg/L	0.04 mg/L	92.3	70.0	130	----
		Thorium, total	7440-29-1	E420	0.188 mg/L	0.2 mg/L	94.3	70.0	130	----
		Tin, total	7440-31-5	E420	0.197 mg/L	0.2 mg/L	98.7	70.0	130	----
		Titanium, total	7440-32-6	E420	ND mg/L	----	ND	70.0	130	----
		Tungsten, total	7440-33-7	E420	0.196 mg/L	0.2 mg/L	98.0	70.0	130	----
		Uranium, total	7440-61-1	E420	ND mg/L	----	ND	70.0	130	----
		Vanadium, total	7440-62-2	E420	ND mg/L	----	ND	70.0	130	----
		Zinc, total	7440-66-6	E420	3.78 mg/L	4 mg/L	94.4	70.0	130	----
		Zirconium, total	7440-67-7	E420	0.408 mg/L	0.4 mg/L	102	70.0	130	----
Total Metals (QCLot: 1783565)										
FJ2403552-002	Anonymous	Mercury, total	7439-97-6	E508	0.0000956 mg/L	0 mg/L	95.6	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 15 -

Page of

Report To	Contact and company name below will appear on the final report
Company:	DISTRICT OF BARRIERE
Contact:	Chris Matthews
Phone:	250-320-1505 250-672-9751 Fax 250-672-9708
	Company address below will appear on the final report
Street:	P.O. Box 219
City/Province:	BARRIERE
Postal Code:	BC
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution

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

Quality Control (QC) Report with Report ☐ YES ☐ NO

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

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax

Email 2 cmatthews@barriere.ca

Email 3 pamos@barriere.ca

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax

Email 2

Project Information

ALS Account # / Quote #:

Job #:

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 # (lab use only) 4902

ALS Contact: **Sampler** GRAHAM

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:

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	Number of Containers
	Spruce Crescent DW2 - Raw Water Analysis	21 11 24	1015	Grab	6
	NTU: 0.13				
	CL2 Free: 0.00				
	CL2 Total: 0.00				
	PUMPHOUSE				
	Please reference WO# KS2304717 for required analysis				

Environmental Division
Kamloops
Work Order Reference
KS2404902

Telephone : +1 250 372 3588

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

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

Are samples for human drinking water use? ☐ YES ☐ 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		
1.0					

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date: NOV 21 2024	Time: 1323	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**.

dropoff

ALS Canada Ltd.

right solutions.
right partner.

CERTIFICATE OF ANALYSIS (GUIDELINE EVALUATION)

Work Order	: **KS2404903**	Page	: 1 of 6
Client	: **District of Barriere**	Laboratory	: ALS Environmental - Kamloops
Contact	: Chris Matthews	Account Manager	: Caitlin Fountain
Address	: PO Box 219 Barriere BC Canada V0E 1E0	Address	: 1445 McGill Road, Unit 2B Kamloops, British Columbia Canada V2C 6K7
Telephone	: ----	Telephone	: 250 372 3588
Project	: Louis Creek Water	Date Samples Received	: 21-Nov-2024 13:23
PO	: ----	Date Analysis Commenced	: 22-Nov-2024
C-O-C number	: ----	Issue Date	: 03-Dec-2024 09:18
Sampler	: Graham H		
Site	: ----		
Quote number	: 20DIOB100KS02 Water		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Guideline Comparison

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Ghazaleh Khanmirzaei	Analyst	Metals, Burnaby, British Columbia
Jon Fisher	Production Manager, Environmental	Inorganics, Waterloo, Ontario
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Monica Ko	Lab Assistant	Microbiology, Burnaby, British Columbia

No Breaches Found

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.
Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guidelines are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Key : LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	no units
%	percent
% T/cm	% transmittance per centimetre
µS/cm	microsiemens per centimetre
AU/cm	absorbance units per centimetre
CU	colour units (1 cu = 1 mg/l pt)
meq/L	milliequivalents per litre
mg/L	milligrams per litre
MPN/100mL	most probable number per hundred millilitres
NTU	nephelometric turbidity units
pH units	pH units

>: greater than.
<: less than.
Red shading is applied where the result or the LOR is greater than the Guideline Upper Limit (or lower than the Guideline Lower Limit, if applicable).
For drinking water samples, Red shading is applied where the result for E.coli, fecal or total coliforms is greater than or equal to the Guideline Upper Limit.

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Method/Lab	Unit	Client sample ID: Louis Creek - Raw Water Analysis Pumphouse	----	----	----	----	----	----
				Sampling date/time: 21-Nov-2024 08:50	----	----	----	----	----	----
				Sub-Matrix: Water	----	----	----	----	----	----
				KS2404903-001	--------	--------	--------	--------	--------	--------
Physical Tests										
Absorbance, UV (@ 254nm), unfiltered	----	E405/VA	AU/cm	0.0160	----	----	----	----	----	----
Alkalinity, bicarbonate (as CaCO3)	----	E290/VA	mg/L	204	----	----	----	----	----	----
Alkalinity, carbonate (as CaCO3)	----	E290/VA	mg/L	<1.0	----	----	----	----	----	----
Alkalinity, hydroxide (as CaCO3)	----	E290/VA	mg/L	<1.0	----	----	----	----	----	----
Alkalinity, phenolphthalein (as CaCO3)	----	E290/VA	mg/L	<1.0	----	----	----	----	----	----
Alkalinity, total (as CaCO3)	----	E290/VA	mg/L	204	----	----	----	----	----	----
Colour, true	----	E329/VA	CU	<5.0	----	----	----	----	----	----
Conductivity	----	E100/VA	µS/cm	435	----	----	----	----	----	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/VA	mg/L	245	----	----	----	----	----	----
Langelier index (@ 15°C)	----	EC105A/VA	-	0.892	----	----	----	----	----	----
Langelier index (@ 20°C)	----	EC105A/VA	-	0.965	----	----	----	----	----	----
Langelier index (@ 25°C)	----	EC105A/VA	-	1.04	----	----	----	----	----	----
Langelier index (@ 4°C)	----	EC105A/VA	-	0.718	----	----	----	----	----	----
Langelier index (@ 60°C)	----	EC105A/VA	-	1.48	----	----	----	----	----	----
Langelier index (@ 77°C)	----	EC105A/VA	-	1.68	----	----	----	----	----	----
pH	----	E108/VA	pH units	8.24	----	----	----	----	----	----
Solids, total dissolved [TDS]	----	E162/VA	mg/L	310	----	----	----	----	----	----
Turbidity	----	E121/VA	NTU	0.32	----	----	----	----	----	----
Transmittance, UV (@ 254nm), unfiltered	----	E405/VA	% T/cm	96.4	----	----	----	----	----	----
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/VA	mg/L	0.0290	----	----	----	----	----	----
Bromide	24959-67-9	E235.Br-L/VA	mg/L	<0.050	----	----	----	----	----	----
Chloride	16887-00-6	E235.Cl/VA	mg/L	2.48	----	----	----	----	----	----
Fluoride	16984-48-8	E235.F/VA	mg/L	0.096	----	----	----	----	----	----
Kjeldahl nitrogen, total [TKN]	----	E318/VA	mg/L	<0.050	----	----	----	----	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L/VA	mg/L	<0.0050	----	----	----	----	----	----

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Method/Lab	Unit	Client sample ID: Louis Creek - Raw Water Analysis Pumphouse	----	----	----	----	----	----
				Sampling date/time: 21-Nov-2024 08:50	----	----	----	----	----	----
				Sub-Matrix: Water	----	----	----	----	----	----
				KS2404903-001	--------	--------	--------	--------	--------	--------
Anions and Nutrients										
Nitrite (as N)	14797-65-0	E235.NO2-L/VA	mg/L	<0.0010	----	----	----	----	----	----
Nitrogen, total organic	----	EC363/VA	mg/L	<0.050	----	----	----	----	----	----
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	mg/L	38.3	----	----	----	----	----	----
Cyanides										
Cyanide, strong acid dissociable (Total)	----	E333/WT	mg/L	<0.0050	----	----	----	----	----	----
Organic / Inorganic Carbon										
Carbon, total organic [TOC]	----	E355-L/VA	mg/L	0.56	----	----	----	----	----	----
Microbiological Tests										
Coliforms, total	----	E010/VA	MPN/100 mL	<1	----	----	----	----	----	----
Coliforms, Escherichia coli [E. coli]	----	E010/VA	MPN/10 0mL	<1	----	----	----	----	----	----
Ion Balance										
Anion sum	----	EC101A/VA	meq/L	4.95	----	----	----	----	----	----
Cation sum (total)	----	EC101A/VA	meq/L	5.20	----	----	----	----	----	----
Ion balance (APHA)	----	EC101A/VA	%	2.46	----	----	----	----	----	----
Total Metals										
Aluminum, total	7429-90-5	E420/VA	mg/L	0.0037	----	----	----	----	----	----
Antimony, total	7440-36-0	E420/VA	mg/L	<0.00010	----	----	----	----	----	----
Arsenic, total	7440-38-2	E420/VA	mg/L	0.00128	----	----	----	----	----	----
Barium, total	7440-39-3	E420/VA	mg/L	0.00783	----	----	----	----	----	----
Beryllium, total	7440-41-7	E420/VA	mg/L	<0.000100	----	----	----	----	----	----
Bismuth, total	7440-69-9	E420/VA	mg/L	<0.000050	----	----	----	----	----	----
Boron, total	7440-42-8	E420/VA	mg/L	<0.010	----	----	----	----	----	----
Cadmium, total	7440-43-9	E420/VA	mg/L	0.0000073	----	----	----	----	----	----
Calcium, total	7440-70-2	E420/VA	mg/L	70.2	----	----	----	----	----	----

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Method/Lab	Unit	Client sample ID	Louis Creek - Raw Water Analysis Pumphouse	----	----	----	----	----	----
				Sampling date/time	21-Nov-2024 08:50	----	----	----	----	----	----
				Sub-Matrix	Water	----	----	----	----	----	----
					KS2404903-001	--------	--------	--------	--------	--------	--------
Total Metals											
Cesium, total	7440-46-2	E420/VA	mg/L		0.000019	----	----	----	----	----	----
Chromium, total	7440-47-3	E420/VA	mg/L		<0.00050	----	----	----	----	----	----
Cobalt, total	7440-48-4	E420/VA	mg/L		<0.00010	----	----	----	----	----	----
Copper, total	7440-50-8	E420/VA	mg/L		0.00068	----	----	----	----	----	----
Iron, total	7439-89-6	E420/VA	mg/L		0.093	----	----	----	----	----	----
Lead, total	7439-92-1	E420/VA	mg/L		<0.000050	----	----	----	----	----	----
Lithium, total	7439-93-2	E420/VA	mg/L		0.0021	----	----	----	----	----	----
Magnesium, total	7439-95-4	E420/VA	mg/L		16.9	----	----	----	----	----	----
Manganese, total	7439-96-5	E420/VA	mg/L		0.0702	----	----	----	----	----	----
Mercury, total	7439-97-6	E508/VA	mg/L		<0.0000050	----	----	----	----	----	----
Molybdenum, total	7439-98-7	E420/VA	mg/L		0.00254	----	----	----	----	----	----
Nickel, total	7440-02-0	E420/VA	mg/L		<0.00050	----	----	----	----	----	----
Phosphorus, total	7723-14-0	E420/VA	mg/L		0.075	----	----	----	----	----	----
Potassium, total	7440-09-7	E420/VA	mg/L		3.60	----	----	----	----	----	----
Rubidium, total	7440-17-7	E420/VA	mg/L		0.00231	----	----	----	----	----	----
Selenium, total	7782-49-2	E420/VA	mg/L		<0.000050	----	----	----	----	----	----
Silicon, total	7440-21-3	E420/VA	mg/L		11.6	----	----	----	----	----	----
Silver, total	7440-22-4	E420/VA	mg/L		<0.000010	----	----	----	----	----	----
Sodium, total	7440-23-5	E420/VA	mg/L		4.84	----	----	----	----	----	----
Strontium, total	7440-24-6	E420/VA	mg/L		0.358	----	----	----	----	----	----
Sulfur, total	7704-34-9	E420/VA	mg/L		13.7	----	----	----	----	----	----
Tellurium, total	13494-80-9	E420/VA	mg/L		<0.00020	----	----	----	----	----	----
Thallium, total	7440-28-0	E420/VA	mg/L		<0.000010	----	----	----	----	----	----
Thorium, total	7440-29-1	E420/VA	mg/L		<0.00010	----	----	----	----	----	----
Tin, total	7440-31-5	E420/VA	mg/L		<0.00010	----	----	----	----	----	----
Titanium, total	7440-32-6	E420/VA	mg/L		<0.00030	----	----	----	----	----	----
Tungsten, total	7440-33-7	E420/VA	mg/L		0.00010	----	----	----	----	----	----

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Method/Lab	Unit	Client sample ID	Louis Creek - Raw Water Analysis Pumphouse	----	----	----	----	----	----
				Sampling date/time	21-Nov-2024 08:50	----	----	----	----	----	----
				Sub-Matrix	Water	----	----	----	----	----	----
				KS2404903-001	--------	--------	--------	--------	--------	--------	--------
Total Metals											
Uranium, total	7440-61-1	E420/VA	mg/L		0.000016	----	----	----	----	----	----
Vanadium, total	7440-62-2	E420/VA	mg/L		<0.00050	----	----	----	----	----	----
Zinc, total	7440-66-6	E420/VA	mg/L		0.0031	----	----	----	----	----	----
Zirconium, total	7440-67-7	E420/VA	mg/L		<0.00020	----	----	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Key:

CERTIFICATE OF ANALYSIS

Work Order	:	**KS2404903**		
Client	:	**District of Barriere**	Laboratory	: ALS Environmental - Vancouver
Contact	:	Chris Matthews	Account Manager	: Caitlin Fountain
Address	:	PO Box 219 Barriere British Columbia Canada V0E 1E0	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	:	----	Telephone	: 250 372 3588
Project	:	Louis Creek Water	Date Samples Received	: 21-Nov-2024 13:23
PO	:	----	Date Analysis Commenced	: 22-Nov-2024
C-O-C number	:	----	Issue Date	: 03-Dec-2024 09:18
Sampler	:	Graham H		
Site	:	----		
Quote number	:	20DIOB100KS02 Water		
No. of samples received	:	1		
No. of samples analysed	:	1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Ghazaleh Khanmirzaei	Analyst	Metals, Burnaby, British Columbia
Jon Fisher	Production Manager, Environmental	Inorganics, Waterloo, Ontario
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Monica Ko	Lab Assistant	Microbiology, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key: CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
LOR: Limit of Reporting (detection limit).

Unit	*Description*
mg/L	milligrams per litre
pH units	pH units
µS/cm	microsiemens per centimetre
NTU	nephelometric turbidity units
CU	colour units (1 cu = 1 mg/l pt)
% T/cm	% transmittance per centimetre
AU/cm	absorbance units per centimetre
-	no units
MPN/100mL	most probable number per hundred millilitres
%	percent
meq/L	milliequivalents per litre

<: less than.
>: greater than.
Surrogate: An analyte that is similar in behavior 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.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

					Client sample ID	Louis Creek - Raw Water Analysis Pumphouse	----	----	----	----
					Client sampling date / time	21-Nov-2024 08:50	----	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		KS2404903-001	----	----	----	----
						Result	----	----	----	----
Physical Tests										
Absorbance, UV (@ 254nm), unfiltered	----	E405/VA	0.0050	AU/cm		0.0160	----	----	----	----
Alkalinity, bicarbonate (as CaCO3)	----	E290/VA	1.0	mg/L		204	----	----	----	----
Alkalinity, carbonate (as CaCO3)	----	E290/VA	1.0	mg/L		<1.0	----	----	----	----
Alkalinity, hydroxide (as CaCO3)	----	E290/VA	1.0	mg/L		<1.0	----	----	----	----
Alkalinity, phenolphthalein (as CaCO3)	----	E290/VA	1.0	mg/L		<1.0	----	----	----	----
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L		204	----	----	----	----
Colour, true	----	E329/VA	5.0	CU		<5.0	----	----	----	----
Conductivity	----	E100/VA	2.0	µS/cm		435	----	----	----	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/VA	0.60	mg/L		245	----	----	----	----
Langelier index (@ 15°C)	----	EC105A/VA	0.010	-		0.892	----	----	----	----
Langelier index (@ 20°C)	----	EC105A/VA	0.010	-		0.965	----	----	----	----
Langelier index (@ 25°C)	----	EC105A/VA	0.010	-		1.04	----	----	----	----
Langelier index (@ 4°C)	----	EC105A/VA	0.010	-		0.718	----	----	----	----
Langelier index (@ 60°C)	----	EC105A/VA	0.010	-		1.48	----	----	----	----
Langelier index (@ 77°C)	----	EC105A/VA	0.010	-		1.68	----	----	----	----
pH	----	E108/VA	0.10	pH units		8.24	----	----	----	----
Solids, total dissolved [TDS]	----	E162/VA	10	mg/L		310	----	----	----	----
Turbidity	----	E121/VA	0.10	NTU		0.32	----	----	----	----
Transmittance, UV (@ 254nm), unfiltered	----	E405/VA	1.0	% T/cm		96.4	----	----	----	----

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID: Louis Creek - Raw Water Analysis Pumphouse	----	----	----	----
					Client sampling date / time: 21-Nov-2024 08:50	----	----	----	----
					KS2404903-001	----	----	----	----
					Result	----	----	----	----
Anions and Nutrients									
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L	0.0290	----	----	----	----
Bromide	24959-67-9	E235.Br-L/VA	0.050	mg/L	<0.050	----	----	----	----
Chloride	16887-00-6	E235.Cl/VA	0.50	mg/L	2.48	----	----	----	----
Fluoride	16984-48-8	E235.F/VA	0.020	mg/L	0.096	----	----	----	----
Kjeldahl nitrogen, total [TKN]	----	E318/VA	0.050	mg/L	<0.050	----	----	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L/VA	0.0050	mg/L	<0.0050	----	----	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L/VA	0.0010	mg/L	<0.0010	----	----	----	----
Nitrogen, total organic	----	EC363/VA	0.050	mg/L	<0.050	----	----	----	----
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	0.30	mg/L	38.3	----	----	----	----
Cyanides									
Cyanide, strong acid dissociable (Total)	----	E333/WT	0.0050	mg/L	<0.0050	----	----	----	----
Organic / Inorganic Carbon									
Carbon, total organic [TOC]	----	E355-L/VA	0.50	mg/L	0.56	----	----	----	----
Microbiological Tests									
Coliforms, total	----	E010/VA	1	MPN/100 mL	<1	----	----	----	----
Coliforms, Escherichia coli [E. coli]	----	E010/VA	1	MPN/100 mL	<1	----	----	----	----
Ion Balance									
Anion sum	----	EC101A/VA	0.10	meq/L	4.95	----	----	----	----
Cation sum (total)	----	EC101A/VA	0.10	meq/L	5.20	----	----	----	----
Ion balance (APHA)	----	EC101A/VA	0.010	%	2.46	----	----	----	----

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID				
					Louis Creek - Raw Water Analysis Pumphouse	----	----	----	----
					Client sampling date / time				
					21-Nov-2024 08:50	----	----	----	----
					KS2404903-001	----	----	----	----
					Result	----	----	----	----
Total Metals									
Aluminum, total	7429-90-5	E420/VA	0.0030	mg/L	0.0037	----	----	----	----
Antimony, total	7440-36-0	E420/VA	0.00010	mg/L	<0.00010	----	----	----	----
Arsenic, total	7440-38-2	E420/VA	0.00010	mg/L	0.00128	----	----	----	----
Barium, total	7440-39-3	E420/VA	0.00010	mg/L	0.00783	----	----	----	----
Beryllium, total	7440-41-7	E420/VA	0.000100	mg/L	<0.000100	----	----	----	----
Bismuth, total	7440-69-9	E420/VA	0.000050	mg/L	<0.000050	----	----	----	----
Boron, total	7440-42-8	E420/VA	0.010	mg/L	<0.010	----	----	----	----
Cadmium, total	7440-43-9	E420/VA	0.0000050	mg/L	0.0000073	----	----	----	----
Calcium, total	7440-70-2	E420/VA	0.050	mg/L	70.2	----	----	----	----
Cesium, total	7440-46-2	E420/VA	0.000010	mg/L	0.000019	----	----	----	----
Chromium, total	7440-47-3	E420/VA	0.00050	mg/L	<0.00050	----	----	----	----
Cobalt, total	7440-48-4	E420/VA	0.00010	mg/L	<0.00010	----	----	----	----
Copper, total	7440-50-8	E420/VA	0.00050	mg/L	0.00068	----	----	----	----
Iron, total	7439-89-6	E420/VA	0.010	mg/L	0.093	----	----	----	----
Lead, total	7439-92-1	E420/VA	0.000050	mg/L	<0.000050	----	----	----	----
Lithium, total	7439-93-2	E420/VA	0.0010	mg/L	0.0021	----	----	----	----
Magnesium, total	7439-95-4	E420/VA	0.0050	mg/L	16.9	----	----	----	----
Manganese, total	7439-96-5	E420/VA	0.00010	mg/L	0.0702	----	----	----	----
Mercury, total	7439-97-6	E508/VA	0.0000050	mg/L	<0.0000050	----	----	----	----
Molybdenum, total	7439-98-7	E420/VA	0.000050	mg/L	0.00254	----	----	----	----

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

Analyte	CAS Number	Method/Lab	LOR	Unit	Louis Creek - Raw Water Analysis Pumphouse	----	----	----	----
Client sample ID					Louis Creek - Raw Water Analysis Pumphouse	----	----	----	----
Client sampling date / time					21-Nov-2024 08:50	----	----	----	----
					KS2404903-001	----	----	----	----
					Result	----	----	----	----
Total Metals									
Nickel, total	7440-02-0	E420/VA	0.00050	mg/L	<0.00050	----	----	----	----
Phosphorus, total	7723-14-0	E420/VA	0.050	mg/L	0.075	----	----	----	----
Potassium, total	7440-09-7	E420/VA	0.050	mg/L	3.60	----	----	----	----
Rubidium, total	7440-17-7	E420/VA	0.00020	mg/L	0.00231	----	----	----	----
Selenium, total	7782-49-2	E420/VA	0.000050	mg/L	<0.000050	----	----	----	----
Silicon, total	7440-21-3	E420/VA	0.10	mg/L	11.6	----	----	----	----
Silver, total	7440-22-4	E420/VA	0.000010	mg/L	<0.000010	----	----	----	----
Sodium, total	7440-23-5	E420/VA	0.050	mg/L	4.84	----	----	----	----
Strontium, total	7440-24-6	E420/VA	0.00020	mg/L	0.358	----	----	----	----
Sulfur, total	7704-34-9	E420/VA	0.50	mg/L	13.7	----	----	----	----
Tellurium, total	13494-80-9	E420/VA	0.00020	mg/L	<0.00020	----	----	----	----
Thallium, total	7440-28-0	E420/VA	0.000010	mg/L	<0.000010	----	----	----	----
Thorium, total	7440-29-1	E420/VA	0.00010	mg/L	<0.00010	----	----	----	----
Tin, total	7440-31-5	E420/VA	0.00010	mg/L	<0.00010	----	----	----	----
Titanium, total	7440-32-6	E420/VA	0.00030	mg/L	<0.00030	----	----	----	----
Tungsten, total	7440-33-7	E420/VA	0.00010	mg/L	0.00010	----	----	----	----
Uranium, total	7440-61-1	E420/VA	0.000010	mg/L	0.000016	----	----	----	----
Vanadium, total	7440-62-2	E420/VA	0.00050	mg/L	<0.00050	----	----	----	----
Zinc, total	7440-66-6	E420/VA	0.0030	mg/L	0.0031	----	----	----	----
Zirconium, total	7440-67-7	E420/VA	0.00020	mg/L	<0.00020	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

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QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **KS2404903**	Page	: 1 of 10
Client	: **District of Barriere**	Laboratory	: ALS Environmental - Kamloops
Contact	: Chris Matthews	Account Manager	: Caitlin Fountain
Address	: PO Box 219 Barriere BC Canada V0E 1E0	Address	: 1445 McGill Road, Unit 2B Kamloops, British Columbia Canada V2C 6K7
Telephone	: ----	Telephone	: 250 372 3588
Project	: Louis Creek Water	Date Samples Received	: 21-Nov-2024 13:23
PO	: ----	Issue Date	: 03-Dec-2024 09:18
C-O-C number	: ----		
Sampler	: Graham H		
Site	: ----		
Quote number	: 20DIOB100KS02 Water		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
Louis Creek - Raw Water Analysis - Pumphouse	E298	21-Nov-2024	27-Nov-2024	28 days	6 days	✓	29-Nov-2024	28 days	8 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE										
Louis Creek - Raw Water Analysis - Pumphouse	E235.Br-L	21-Nov-2024	23-Nov-2024	28 days	2 days	✓	23-Nov-2024	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Louis Creek - Raw Water Analysis - Pumphouse	E235.Cl	21-Nov-2024	23-Nov-2024	28 days	2 days	✓	23-Nov-2024	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Louis Creek - Raw Water Analysis - Pumphouse	E235.F	21-Nov-2024	23-Nov-2024	28 days	2 days	✓	23-Nov-2024	28 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
Louis Creek - Raw Water Analysis - Pumphouse	E235.NO3-L	21-Nov-2024	23-Nov-2024	3 days	2 days	✓	23-Nov-2024	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
Louis Creek - Raw Water Analysis - Pumphouse	E235.NO2-L	21-Nov-2024	23-Nov-2024	3 days	2 days	✓	23-Nov-2024	3 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Louis Creek - Raw Water Analysis - Pumphouse	E235.SO4	21-Nov-2024	23-Nov-2024	28 days	2 days	✓	23-Nov-2024	28 days	2 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
Louis Creek - Raw Water Analysis - Pumphouse	E318	21-Nov-2024	27-Nov-2024	28 days	6 days	✓	29-Nov-2024	28 days	8 days	✓
Cyanides : Total Cyanide										
Opaque HDPE - total (sodium hydroxide)										
Louis Creek - Raw Water Analysis - Pumphouse	E333	21-Nov-2024	27-Nov-2024	14 days	6 days	✓	27-Nov-2024	14 days	6 days	✓
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate)										
Louis Creek - Raw Water Analysis - Pumphouse	E010	21-Nov-2024	----	----	----		22-Nov-2024	30 hrs	25 hrs	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
Louis Creek - Raw Water Analysis - Pumphouse	E355-L	21-Nov-2024	27-Nov-2024	28 days	6 days	✓	27-Nov-2024	28 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
Louis Creek - Raw Water Analysis - Pumphouse	E290	21-Nov-2024	23-Nov-2024	14 days	2 days	✓	23-Nov-2024	14 days	2 days	✓
Physical Tests : Apparent UV Absorbance and Transmittance by Spectrometry										
HDPE										
Louis Creek - Raw Water Analysis - Pumphouse	E405	21-Nov-2024	----	----	----		23-Nov-2024	3 days	2 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE										
Louis Creek - Raw Water Analysis - Pumphouse	E329	21-Nov-2024	23-Nov-2024	3 days	2 days	✓	24-Nov-2024	3 days	3 days	✓
Physical Tests : Conductivity in Water										
HDPE										
Louis Creek - Raw Water Analysis - Pumphouse	E100	21-Nov-2024	23-Nov-2024	28 days	2 days	✓	23-Nov-2024	28 days	2 days	✓
Physical Tests : pH by Meter										
HDPE										
Louis Creek - Raw Water Analysis - Pumphouse	E108	21-Nov-2024	23-Nov-2024	0.25 hrs	45 hrs	× EHTR-FM	23-Nov-2024	0.25 hrs	48 hrs	× EHTR-FM

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Physical Tests : TDS by Gravimetry										
HDPE										
Louis Creek - Raw Water Analysis - Pumphouse	E162	21-Nov-2024	----	----	----		27-Nov-2024	7 days	6 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE										
Louis Creek - Raw Water Analysis - Pumphouse	E121	21-Nov-2024	----	----	----		23-Nov-2024	3 days	2 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial - total (lab preserved)										
Louis Creek - Raw Water Analysis - Pumphouse	E508	21-Nov-2024	26-Nov-2024	28 days	5 days	✓	26-Nov-2024	28 days	5 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
Louis Creek - Raw Water Analysis - Pumphouse	E420	21-Nov-2024	26-Nov-2024	180 days	5 days	✓	28-Nov-2024	180 days	7 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	1780430	1	17	5.8	5.0	✓
Ammonia by Fluorescence	E298	1785233	1	20	5.0	5.0	✓
Apparent UV Absorbance and Transmittance by Spectrometry	E405	1780996	1	4	25.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	1780434	1	17	5.8	5.0	✓
Chloride in Water by IC	E235.Cl	1780433	1	17	5.8	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	1780438	1	12	8.3	5.0	✓
Conductivity in Water	E100	1780431	1	17	5.8	5.0	✓
Fluoride in Water by IC	E235.F	1780432	1	17	5.8	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1780435	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1780436	1	17	5.8	5.0	✓
pH by Meter	E108	1780429	1	10	10.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1780437	1	17	5.8	5.0	✓
TDS by Gravimetry	E162	1786605	1	20	5.0	5.0	✓
Total Coliforms and E. coli (Enzyme Substrate)	E010	1779273	2	18	11.1	10.0	✓
Total Cyanide	E333	1785403	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1785231	1	14	7.1	5.0	✓
Total Mercury in Water by CVAAS	E508	1783565	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1779678	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1785232	1	9	11.1	5.0	✓
Turbidity by Nephelometry	E121	1780808	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1780430	1	17	5.8	5.0	✓
Ammonia by Fluorescence	E298	1785233	1	20	5.0	5.0	✓
Apparent UV Absorbance and Transmittance by Spectrometry	E405	1780996	1	4	25.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	1780434	1	17	5.8	5.0	✓
Chloride in Water by IC	E235.Cl	1780433	1	17	5.8	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	1780438	1	12	8.3	5.0	✓
Conductivity in Water	E100	1780431	1	17	5.8	5.0	✓
Fluoride in Water by IC	E235.F	1780432	1	17	5.8	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1780435	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1780436	1	17	5.8	5.0	✓
pH by Meter	E108	1780429	1	10	10.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1780437	1	17	5.8	5.0	✓
TDS by Gravimetry	E162	1786605	1	20	5.0	5.0	✓
Total Cyanide	E333	1785403	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1785231	1	14	7.1	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
Total Mercury in Water by CVAAS	E508	1783565	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1779678	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1785232	1	9	11.1	5.0	✓
Turbidity by Nephelometry	E121	1780808	1	20	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1780430	1	17	5.8	5.0	✓
Ammonia by Fluorescence	E298	1785233	1	20	5.0	5.0	✓
Apparent UV Absorbance and Transmittance by Spectrometry	E405	1780996	1	4	25.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	1780434	1	17	5.8	5.0	✓
Chloride in Water by IC	E235.Cl	1780433	1	17	5.8	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	1780438	1	12	8.3	5.0	✓
Conductivity in Water	E100	1780431	1	17	5.8	5.0	✓
Fluoride in Water by IC	E235.F	1780432	1	17	5.8	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1780435	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1780436	1	17	5.8	5.0	✓
Sulfate in Water by IC	E235.SO4	1780437	1	17	5.8	5.0	✓
TDS by Gravimetry	E162	1786605	1	20	5.0	5.0	✓
Total Coliforms and E. coli (Enzyme Substrate)	E010	1779273	1	18	5.5	5.0	✓
Total Cyanide	E333	1785403	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1785231	1	14	7.1	5.0	✓
Total Mercury in Water by CVAAS	E508	1783565	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1779678	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1785232	1	9	11.1	5.0	✓
Turbidity by Nephelometry	E121	1780808	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1785233	1	20	5.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	1780434	1	17	5.8	5.0	✓
Chloride in Water by IC	E235.Cl	1780433	1	17	5.8	5.0	✓
Fluoride in Water by IC	E235.F	1780432	1	17	5.8	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1780435	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1780436	1	17	5.8	5.0	✓
Sulfate in Water by IC	E235.SO4	1780437	1	17	5.8	5.0	✓
Total Cyanide	E333	1785403	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1785231	1	14	7.1	5.0	✓
Total Mercury in Water by CVAAS	E508	1783565	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1779678	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1785232	1	9	11.1	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Coliforms and E. coli (Enzyme Substrate)	E010 ALS Environmental - Vancouver	Water	APHA 9223 (mod)	The enzyme substrate test simultaneously detects Total Coliforms and E. coli in a 100 mL sample after incubation at 35.0 ±0.5°C for either 18 or 24 hours (dependent on reagent used).
Conductivity in Water	E100 ALS Environmental - Vancouver	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Vancouver	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 ALS Environmental - Vancouver	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TDS by Gravimetry	E162 ALS Environmental - Vancouver	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Bromide in Water by IC (Low Level)	E235.Br-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Chloride in Water by IC	E235.Cl ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Sulfate in Water by IC	E235.SO4 ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Vancouver	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 ALS Environmental - Vancouver	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 ALS Environmental - Vancouver	Water	Method Fialab 100, 2018	TKN in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021).
Colour (True) by Spectrometer (5 CU)	E329 ALS Environmental - Vancouver	Water	APHA 2120 C (mod)	Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment.
Total Cyanide	E333 ALS Environmental - Waterloo	Water	ISO 14403 (mod)	Total or Strong Acid Dissociable (SAD) Cyanide is determined by Continuous Flow Analyzer (CFA) with in-line UV digestion followed by colourmetric analysis. Method Limitation: High levels of thiocyanate (SCN) may cause positive interference (up to 0.5% of SCN concentration).
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Apparent UV Absorbance and Transmittance by Spectrometry	E405 ALS Environmental - Vancouver	Water	APHA 5910 B (mod)	Apparent UV Absorbance is determined on an unfiltered sample by UV absorbance measurement in a quartz cell at 254 nm. The analysis is carried out without pH adjustment.
Total Metals in Water by CRC ICPMS	E420 ALS Environmental - Vancouver	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Mercury in Water by CVAAS	E508 ALS Environmental - Vancouver	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
Hardness (Calculated) from Total Ca/Mg	EC100A ALS Environmental - Vancouver	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
Ion Balance using Total Metals	EC101A ALS Environmental - Vancouver	Water	APHA 1030E	Cation Sum (using total metals), Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).
Saturation Index using Laboratory pH (Ca-T)	EC105A ALS Environmental - Vancouver	Water	APHA 2330B	Langelier Index provides an indication of scale formation potential at a given pH and temperature, and is calculated as per APHA 2330B Saturation Index. Positive values indicate oversaturation with respect to CaCO3. Negative values indicate undersaturation of CaCO3. This calculation uses laboratory pH measurements and provides estimates of Langelier Index at temperatures of 4, 15, 20, 25, 66, and 77°C. Ryznar Stability Index is an alternative index used for scale formation and corrosion potential.
Total Organic Nitrogen (Calculation)	EC363 ALS Environmental - Vancouver	Water	APHA 4500-NORG (TKN)/NH3-NITROGEN (NH3)	Total Organic Nitrogen is a calculated parameter. Total Organic Nitrogen = Total Kjeldahl Nitrogen - Ammonia.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Vancouver	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for TKN in water	EP318 ALS Environmental - Vancouver	Water	APHA 4500-Norg D (mod)	Samples are digested at high temperature using Sulfuric Acid with Copper catalyst, which converts organic nitrogen sources to Ammonia, which is then quantified by the analytical method as TKN. This method is unsuitable for samples containing high levels of nitrate. If nitrate exceeds TKN concentration by ten times or more, results may be biased low.
Preparation for Total Organic Carbon by Combustion	EP355 ALS Environmental - Vancouver	Water		Preparation for Total Organic Carbon by Combustion

QUALITY CONTROL REPORT

Work Order	: **KS2404903**	Page	: 1 of 13
Client	: District of Barriere	Laboratory	: ALS Environmental - Kamloops
Contact	: Chris Matthews	Account Manager	: Caitlin Fountain
Address	: PO Box 219 Barriere BC Canada V0E 1E0	Address	: 1445 McGill Road, Unit 2B Kamloops, British Columbia Canada V2C 6K7
Telephone	: ----	Telephone	: 250 372 3588
Project	: Louis Creek Water	Date Samples Received	: 21-Nov-2024 13:23
PO	: ----	Date Analysis Commenced	: 22-Nov-2024
C-O-C number	: ----	Issue Date	: 03-Dec-2024 09:16
Sampler	: Graham H		
Site	: ----		
Quote number	: 20DIOB100KS02 Water		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Ghazaleh Khanmirzaei	Analyst	Vancouver Metals, Burnaby, British Columbia
Jon Fisher	Production Manager, Environmental	Waterloo Inorganics, Waterloo, Ontario
Kim Jensen	Department Manager - Metals	Vancouver Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Vancouver Inorganics, Burnaby, British Columbia
Monica Ko	Lab Assistant	Vancouver Microbiology, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include 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 predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 1780429)											
FJ2403552-003	Anonymous	pH	----	E108	0.10	pH units	8.17	8.18	0.122%	4%	----
Physical Tests (QC Lot: 1780430)											
FJ2403552-003	Anonymous	Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	104	104	0.385%	200%	----
		Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0.00%	200%	----
		Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0.00%	200%	----
		Alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	104	104	0.385%	20%	----
Physical Tests (QC Lot: 1780431)											
FJ2403552-003	Anonymous	Conductivity	----	E100	2.0	µS/cm	1420	1410	0.423%	10%	----
Physical Tests (QC Lot: 1780438)											
KS2404902-001	Anonymous	Colour, true	----	E329	5.0	CU	<5.0	<5.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 1780808)											
FJ2403543-001	Anonymous	Turbidity	----	E121	0.10	NTU	0.30	0.31	0.006	Diff <2x LOR	----
Physical Tests (QC Lot: 1780996)											
KS2404902-001	Anonymous	Absorbance, UV (@ 254nm), unfiltered	----	E405	0.0050	AU/cm	0.0110	0.0110	0	Diff <2x LOR	----
Physical Tests (QC Lot: 1786605)											
KS2404897-001	Anonymous	Solids, total dissolved [TDS]	----	E162	20	mg/L	415	420	1.20%	20%	----
Anions and Nutrients (QC Lot: 1780432)											
FJ2403552-001	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.192	0.189	0.002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1780433)											
FJ2403552-001	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	45.8	45.8	0.00543%	20%	----
Anions and Nutrients (QC Lot: 1780434)											
FJ2403552-001	Anonymous	Bromide	24959-67-9	E235.Br-L	0.050	mg/L	0.766	0.771	0.697%	20%	----
Anions and Nutrients (QC Lot: 1780435)											
FJ2403552-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.225	0.224	0.390%	20%	----
Anions and Nutrients (QC Lot: 1780436)											
FJ2403552-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0126	0.0124	1.76%	20%	----
Anions and Nutrients (QC Lot: 1780437)											
FJ2403552-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	69.0	69.1	0.121%	20%	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Anions and Nutrients (QC Lot: 1785231)											
KS2404902-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.066	0.051	0.015	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1785233)											
KS2404902-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0134	0.0133	0.00010	Diff <2x LOR	----
Cyanides (QC Lot: 1785403)											
VA24D1834-003	Anonymous	Cyanide, strong acid dissociable (Total)	----	E333	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 1785232)											
KS2404902-001	Anonymous	Carbon, total organic [TOC]	----	E355-L	0.50	mg/L	0.66	0.64	0.02	Diff <2x LOR	----
Microbiological Tests (QC Lot: 1779273)											
KS2404902-001	Anonymous	Coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	<1	0	Diff <2x LOR	----
		Coliforms, total	----	E010	1	MPN/100mL	<1	<1	0	Diff <2x LOR	----
VA24D1700-076	Anonymous	Coliforms, Escherichia coli [E. coli]	----	E010	10	MPN/100mL	52	41	23.6%	65%	----
		Coliforms, total	----	E010	10	MPN/100mL	512	488	4.80%	65%	----
Total Metals (QC Lot: 1779678)											
VA24D1493-001	Anonymous	Aluminum, total	7429-90-5	E420	0.0060	mg/L	0.0113	0.0122	0.0008	Diff <2x LOR	----
		Antimony, total	7440-36-0	E420	0.00020	mg/L	0.00102	0.00100	0.00002	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00020	mg/L	0.00109	0.00105	0.00004	Diff <2x LOR	----
		Barium, total	7440-39-3	E420	0.00020	mg/L	0.0478	0.0470	1.70%	20%	----
		Beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Bismuth, total	7440-69-9	E420	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Boron, total	7440-42-8	E420	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
		Cadmium, total	7440-43-9	E420	0.0000100	mg/L	0.0000413	0.0000457	0.0000043	Diff <2x LOR	----
		Calcium, total	7440-70-2	E420	0.100	mg/L	395	397	0.505%	20%	----
		Cesium, total	7440-46-2	E420	0.000020	mg/L	0.000097	0.000098	0.0000003	Diff <2x LOR	----
		Chromium, total	7440-47-3	E420	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Copper, total	7440-50-8	E420	0.00100	mg/L	0.0125	0.0125	0.00319%	20%	----
		Iron, total	7439-89-6	E420	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
		Lead, total	7439-92-1	E420	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Lithium, total	7439-93-2	E420	0.0020	mg/L	0.0116	0.0112	0.0004	Diff <2x LOR	----
		Magnesium, total	7439-95-4	E420	0.100	mg/L	115	114	0.768%	20%	----
		Manganese, total	7439-96-5	E420	0.00020	mg/L	0.00159	0.00172	0.00013	Diff <2x LOR	----
		Molybdenum, total	7439-98-7	E420	0.000100	mg/L	0.0221	0.0222	0.400%	20%	----
		Nickel, total	7440-02-0	E420	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 1779678) - continued											
VA24D1493-001	Anonymous	Phosphorus, total	7723-14-0	E420	0.300	mg/L	<0.300	<0.300	0	Diff <2x LOR	----
		Potassium, total	7440-09-7	E420	0.100	mg/L	6.00	6.02	0.485%	20%	----
		Rubidium, total	7440-17-7	E420	0.00040	mg/L	0.00355	0.00333	0.00022	Diff <2x LOR	----
		Selenium, total	7782-49-2	E420	0.000100	mg/L	0.0229	0.0231	0.697%	20%	----
		Silicon, total	7440-21-3	E420	0.20	mg/L	10.4	10.0	4.36%	20%	----
		Silver, total	7440-22-4	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Sodium, total	7440-23-5	E420	0.100	mg/L	25.8	26.4	2.02%	20%	----
		Strontium, total	7440-24-6	E420	0.00040	mg/L	1.95	2.01	2.94%	20%	----
		Sulfur, total	7704-34-9	E420	1.00	mg/L	405	386	4.86%	20%	----
		Tellurium, total	13494-80-9	E420	0.00040	mg/L	<0.00040	<0.00040	0	Diff <2x LOR	----
		Thallium, total	7440-28-0	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Thorium, total	7440-29-1	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Tin, total	7440-31-5	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.0100	mg/L	<0.0100	<0.0100	0	Diff <2x LOR	----
		Tungsten, total	7440-33-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Uranium, total	7440-61-1	E420	0.000020	mg/L	0.0150	0.0160	6.29%	20%	----
		Vanadium, total	7440-62-2	E420	0.00100	mg/L	0.00130	0.00128	0.00002	Diff <2x LOR	----
		Zinc, total	7440-66-6	E420	0.0060	mg/L	<0.0060	<0.0060	0	Diff <2x LOR	----
		Zirconium, total	7440-67-7	E420	0.00040	mg/L	<0.00040	<0.00040	0	Diff <2x LOR	----
Total Metals (QC Lot: 1783565)											
FJ2403552-001	Anonymous	Mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1780430)						
Alkalinity, bicarbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, carbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, hydroxide (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 1780431)						
Conductivity	----	E100	1	µS/cm	1.2	----
Physical Tests (QCLot: 1780438)						
Colour, true	----	E329	5	CU	<5.0	----
Physical Tests (QCLot: 1780808)						
Turbidity	----	E121	0.1	NTU	<0.10	----
Physical Tests (QCLot: 1780996)						
Absorbance, UV (@ 254nm), unfiltered	----	E405	0.005	AU/cm	<0.0050	----
Physical Tests (QCLot: 1786605)						
Solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Anions and Nutrients (QCLot: 1780432)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1780433)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 1780434)						
Bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 1780435)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1780436)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1780437)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 1785231)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 1785233)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Cyanides (QCLot: 1785403)						

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Cyanides (QCLot: 1785403) - continued						
Cyanide, strong acid dissociable (Total)	----	E333	0.002	mg/L	<0.0020	----
Organic / Inorganic Carbon (QCLot: 1785232)						
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Microbiological Tests (QCLot: 1779273)						
Coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	----
Coliforms, total	----	E010	1	MPN/100mL	<1	----
Total Metals (QCLot: 1779678)						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
Barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
Boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
Calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
Copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
Iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
Lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
Potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
Silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
Silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
Sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 1779678) - continued						
Sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
Tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
Total Metals (QCLot: 1783565)						
Mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1780429)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 1780430)									
Alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	229 mg/L	102	75.0	125	----
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	103	85.0	115	----
Physical Tests (QCLot: 1780431)									
Conductivity	----	E100	1	µS/cm	147 µS/cm	93.6	90.0	110	----
Physical Tests (QCLot: 1780438)									
Colour, true	----	E329	5	CU	100 CU	104	85.0	115	----
Physical Tests (QCLot: 1780808)									
Turbidity	----	E121	0.1	NTU	200 NTU	100	85.0	115	----
Physical Tests (QCLot: 1780996)									
Absorbance, UV (@ 254nm), unfiltered	----	E405	0.005	AU/cm	0.693 AU/cm	93.9	85.0	115	----
Physical Tests (QCLot: 1786605)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	108	85.0	115	----
Anions and Nutrients (QCLot: 1780432)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	97.7	90.0	110	----
Anions and Nutrients (QCLot: 1780433)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	99.1	90.0	110	----
Anions and Nutrients (QCLot: 1780434)									
Bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	106	85.0	115	----
Anions and Nutrients (QCLot: 1780435)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	98.8	90.0	110	----
Anions and Nutrients (QCLot: 1780436)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	98.0	90.0	110	----
Anions and Nutrients (QCLot: 1780437)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1785231)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	116	75.0	125	----
Anions and Nutrients (QCLot: 1785233)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	98.5	85.0	115	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike: Target Concentration	Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Cyanides (QCLot: 1785403)									
Cyanide, strong acid dissociable (Total)	----	E333	0.002	mg/L	0.25 mg/L	90.3	80.0	120	----
Organic / Inorganic Carbon (QCLot: 1785232)									
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	104	80.0	120	----
Total Metals (QCLot: 1779678)									
Aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	97.5	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	104	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	107	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	106	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	103	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	104	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	102	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	107	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	102	80.0	120	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	106	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	104	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	102	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	97.2	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	106	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	98.9	80.0	120	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	103	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	103	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	102	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	102	80.0	120	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	94.9	80.0	120	----
Potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	101	80.0	120	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	99.4	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	100	80.0	120	----
Silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	106	80.0	120	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	96.9	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	100	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	109	80.0	120	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	103	80.0	120	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	106	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 1779678) - continued									
Thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	105	80.0	120	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	106	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	103	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	102	80.0	120	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	104	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	111	80.0	120	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	104	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	104	80.0	120	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	101	80.0	120	----
Total Metals (QCLot: 1783565)									
Mercury, total	7439-97-6	E508	0.000005	mg/L	0 mg/L	86.9	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1780432)										
FJ2403552-002	Anonymous	Fluoride	16984-48-8	E235.F	1.01 mg/L	1 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1780433)										
FJ2403552-002	Anonymous	Chloride	16887-00-6	E235.Cl	101 mg/L	100 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1780434)										
FJ2403552-002	Anonymous	Bromide	24959-67-9	E235.Br-L	ND mg/L	----	ND	75.0	125	----
Anions and Nutrients (QCLot: 1780435)										
FJ2403552-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.54 mg/L	2.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1780436)										
FJ2403552-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.499 mg/L	0.5 mg/L	99.8	75.0	125	----
Anions and Nutrients (QCLot: 1780437)										
FJ2403552-002	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	99.2 mg/L	100 mg/L	99.2	75.0	125	----
Anions and Nutrients (QCLot: 1785231)										
KS2404903-001	Louis Creek - Raw Water Analysis Pumphouse	Kjeldahl nitrogen, total [TKN]	----	E318	2.70 mg/L	2.5 mg/L	108	70.0	130	----
Anions and Nutrients (QCLot: 1785233)										
KS2404903-001	Louis Creek - Raw Water Analysis Pumphouse	Ammonia, total (as N)	7664-41-7	E298	0.124 mg/L	0.1 mg/L	124	75.0	125	----
Cyanides (QCLot: 1785403)										
VA24D1834-003	Anonymous	Cyanide, strong acid dissociable (Total)	----	E333	0.230 mg/L	0.25 mg/L	92.1	75.0	125	----
Organic / Inorganic Carbon (QCLot: 1785232)										
KS2404903-001	Louis Creek - Raw Water Analysis Pumphouse	Carbon, total organic [TOC]	----	E355-L	5.29 mg/L	5 mg/L	106	70.0	130	----
Total Metals (QCLot: 1779678)										
VA24D1542-001	Anonymous	Aluminum, total	7429-90-5	E420	ND mg/L	----	ND	70.0	130	----
		Antimony, total	7440-36-0	E420	ND mg/L	----	ND	70.0	130	----
		Arsenic, total	7440-38-2	E420	ND mg/L	----	ND	70.0	130	----
		Barium, total	7440-39-3	E420	ND mg/L	----	ND	70.0	130	----
		Beryllium, total	7440-41-7	E420	0.389 mg/L	0.4 mg/L	97.3	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.0971 mg/L	0.1 mg/L	97.1	70.0	130	----
		Boron, total	7440-42-8	E420	ND mg/L	----	ND	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.0403 mg/L	0.04 mg/L	101	70.0	130	----
		Calcium, total	7440-70-2	E420	ND mg/L	----	ND	70.0	130	----
		Cesium, total	7440-46-2	E420	0.102 mg/L	0.1 mg/L	102	70.0	130	----
		Chromium, total	7440-47-3	E420	ND mg/L	----	ND	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 1779678) - continued										
VA24D1542-001	Anonymous	Cobalt, total	7440-48-4	E420	ND mg/L	----	ND	70.0	130	----
		Copper, total	7440-50-8	E420	ND mg/L	----	ND	70.0	130	----
		Iron, total	7439-89-6	E420	ND mg/L	----	ND	70.0	130	----
		Lead, total	7439-92-1	E420	0.190 mg/L	0.2 mg/L	95.2	70.0	130	----
		Lithium, total	7439-93-2	E420	0.892 mg/L	1 mg/L	89.2	70.0	130	----
		Magnesium, total	7439-95-4	E420	ND mg/L	----	ND	70.0	130	----
		Manganese, total	7439-96-5	E420	ND mg/L	----	ND	70.0	130	----
		Molybdenum, total	7439-98-7	E420	ND mg/L	----	ND	70.0	130	----
		Nickel, total	7440-02-0	E420	ND mg/L	----	ND	70.0	130	----
		Phosphorus, total	7723-14-0	E420	90.9 mg/L	100 mg/L	90.9	70.0	130	----
		Potassium, total	7440-09-7	E420	ND mg/L	----	ND	70.0	130	----
		Rubidium, total	7440-17-7	E420	ND mg/L	----	ND	70.0	130	----
		Selenium, total	7782-49-2	E420	ND mg/L	----	ND	70.0	130	----
		Silicon, total	7440-21-3	E420	ND mg/L	----	ND	70.0	130	----
		Silver, total	7440-22-4	E420	0.0382 mg/L	0.04 mg/L	95.4	70.0	130	----
		Sodium, total	7440-23-5	E420	ND mg/L	----	ND	70.0	130	----
		Strontium, total	7440-24-6	E420	ND mg/L	----	ND	70.0	130	----
		Sulfur, total	7704-34-9	E420	ND mg/L	----	ND	70.0	130	----
		Tellurium, total	13494-80-9	E420	0.429 mg/L	0.4 mg/L	107	70.0	130	----
		Thallium, total	7440-28-0	E420	0.0369 mg/L	0.04 mg/L	92.3	70.0	130	----
		Thorium, total	7440-29-1	E420	0.188 mg/L	0.2 mg/L	94.3	70.0	130	----
		Tin, total	7440-31-5	E420	0.197 mg/L	0.2 mg/L	98.7	70.0	130	----
		Titanium, total	7440-32-6	E420	ND mg/L	----	ND	70.0	130	----
		Tungsten, total	7440-33-7	E420	0.196 mg/L	0.2 mg/L	98.0	70.0	130	----
		Uranium, total	7440-61-1	E420	ND mg/L	----	ND	70.0	130	----
		Vanadium, total	7440-62-2	E420	ND mg/L	----	ND	70.0	130	----
		Zinc, total	7440-66-6	E420	3.78 mg/L	4 mg/L	94.4	70.0	130	----
		Zirconium, total	7440-67-7	E420	0.408 mg/L	0.4 mg/L	102	70.0	130	----
Total Metals (QCLot: 1783565)										
FJ2403552-002	Anonymous	Mercury, total	7439-97-6	E508	0.0000956 mg/L	0 mg/L	95.6	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

COC Number: 15 -

Affix ALS barcode label here (lab use only)

Page of

Report To	Contact and company name below will appear on the final report
Company:	DISTRICT OF BARRIERE
Contact:	Chris Matthews
Phone:	250-320-1505 250-672-9751 Fax 250-672-9708
	Company address below will appear on the final report
Street:	P.O. Box 219
City/Province:	BARRIERE
Postal Code:	BC
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	
Contact:	

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

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

Project Information	
ALS Account # / Quote #:	
Job #:	
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 # (lab use only): 4903

ALS Contact:

Sampler: GRAHAM

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]	☐
2 day [P2]	☐		

Date and Time Required for all E&P TATs:

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	Number of Containers
	Louis Creek - Raw Water Analysis	21 11 29	850	Grab	6
	NTU: 0.07				
	CL2 Free: 0.00				
	CL2 Total: 0.00				
	Location: PUMP HOUSE				
	Please reference WO# KS2304717 for required analysis				

Environmental Division
Kamloops
Work Order Reference
KS2404903

Telephone : +1 250 372 3586

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? ☐ YES ☐ NO	
Are samples for human drinking water use? ☐ YES ☐ 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		
10					

SHIPMENT RELEASE (client use)		
Released by:	Date:	Time:

INITIAL SHIPMENT RECEPTION (lab use only)		
Received by:	Date:	Time:
	NOV 2 1 2024	1323

FINAL SHIPMENT RECEPTION (lab use only)		
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**.

drop off

ALS Canada Ltd.

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right partner.

CERTIFICATE OF ANALYSIS (GUIDELINE EVALUATION)

Work Order	: **KS2404904**	Page	: 1 of 6
Client	: **District of Barriere**	Laboratory	: ALS Environmental - Kamloops
Contact	: Chris Matthews	Account Manager	: Caitlin Fountain
Address	: PO Box 219 Barriere BC Canada V0E 1E0	Address	: 1445 McGill Road, Unit 2B Kamloops, British Columbia Canada V2C 6K7
Telephone	: ----	Telephone	: 250 372 3588
Project	: District of Barriere Water	Date Samples Received	: 21-Nov-2024 13:23
PO	: ----	Date Analysis Commenced	: 22-Nov-2024
C-O-C number	: ----	Issue Date	: 03-Dec-2024 09:16
Sampler	: Graham H		
Site	: ----		
Quote number	: 20DIOB100KS02 Water		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Guideline Comparison

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Ghazaleh Khanmirzaei	Analyst	Metals, Burnaby, British Columbia
Jon Fisher	Production Manager, Environmental	Inorganics, Waterloo, Ontario
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Monica Ko	Lab Assistant	Microbiology, Burnaby, British Columbia

No Breaches Found

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.
Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guidelines are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Key : LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	no units
%	percent
% T/cm	% transmittance per centimetre
µS/cm	microsiemens per centimetre
AU/cm	absorbance units per centimetre
CU	colour units (1 cu = 1 mg/l pt)
meq/L	milliequivalents per litre
mg/L	milligrams per litre
MPN/100mL	most probable number per hundred millilitres
NTU	nephelometric turbidity units
pH units	pH units

>: greater than.
<: less than.
Red shading is applied where the result or the LOR is greater than the Guideline Upper Limit (or lower than the Guideline Lower Limit, if applicable).
For drinking water samples, Red shading is applied where the result for E.coli, fecal or total coliforms is greater than or equal to the Guideline Upper Limit.

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Method/Lab	Unit	Client sample ID: Spruce Crescent DW3 - Raw Water Analysis Pumphouse	----	----	----	----	----	----
				Sampling date/time: 21-Nov-2024 09:50	----	----	----	----	----	----
				Sub-Matrix: Water	----	----	----	----	----	----
				KS2404904-001	---------	---------	---------	---------	---------	---------
Physical Tests										
Absorbance, UV (@ 254nm), unfiltered	----	E405/VA	AU/cm	0.0150	----	----	----	----	----	----
Alkalinity, bicarbonate (as CaCO3)	----	E290/VA	mg/L	188	----	----	----	----	----	----
Alkalinity, carbonate (as CaCO3)	----	E290/VA	mg/L	<1.0	----	----	----	----	----	----
Alkalinity, hydroxide (as CaCO3)	----	E290/VA	mg/L	<1.0	----	----	----	----	----	----
Alkalinity, phenolphthalein (as CaCO3)	----	E290/VA	mg/L	<1.0	----	----	----	----	----	----
Alkalinity, total (as CaCO3)	----	E290/VA	mg/L	188	----	----	----	----	----	----
Colour, true	----	E329/VA	CU	<5.0	----	----	----	----	----	----
Conductivity	----	E100/VA	µS/cm	383	----	----	----	----	----	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/VA	mg/L	208	----	----	----	----	----	----
Langelier index (@ 15°C)	----	EC105A/VA	-	0.502	----	----	----	----	----	----
Langelier index (@ 20°C)	----	EC105A/VA	-	0.575	----	----	----	----	----	----
Langelier index (@ 25°C)	----	EC105A/VA	-	0.646	----	----	----	----	----	----
Langelier index (@ 4°C)	----	EC105A/VA	-	0.327	----	----	----	----	----	----
Langelier index (@ 60°C)	----	EC105A/VA	-	1.09	----	----	----	----	----	----
Langelier index (@ 77°C)	----	EC105A/VA	-	1.29	----	----	----	----	----	----
pH	----	E108/VA	pH units	8.03	----	----	----	----	----	----
Solids, total dissolved [TDS]	----	E162/VA	mg/L	251	----	----	----	----	----	----
Turbidity	----	E121/VA	NTU	2.05	----	----	----	----	----	----
Transmittance, UV (@ 254nm), unfiltered	----	E405/VA	% T/cm	96.6	----	----	----	----	----	----
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/VA	mg/L	0.0196	----	----	----	----	----	----
Bromide	24959-67-9	E235.Br-L/VA	mg/L	<0.050	----	----	----	----	----	----
Chloride	16887-00-6	E235.Cl/VA	mg/L	2.28	----	----	----	----	----	----
Fluoride	16984-48-8	E235.F/VA	mg/L	0.092	----	----	----	----	----	----
Kjeldahl nitrogen, total [TKN]	----	E318/VA	mg/L	<0.050	----	----	----	----	----	----

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Method/Lab	Unit	Client sample ID: Spruce Crescent DW3 - Raw Water Analysis Pumphouse	----	----	----	----	----	----
				Sampling date/time: 21-Nov-2024 09:50	----	----	----	----	----	----
				Sub-Matrix: Water	----	----	----	----	----	----
				KS2404904-001	--------	--------	--------	--------	--------	--------
Anions and Nutrients										
Nitrate (as N)	14797-55-8	E235.NO3-L/VA	mg/L	0.224	----	----	----	----	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L/VA	mg/L	<0.0010	----	----	----	----	----	----
Nitrogen, total organic	----	EC363/VA	mg/L	<0.050	----	----	----	----	----	----
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	mg/L	24.4	----	----	----	----	----	----
Cyanides										
Cyanide, strong acid dissociable (Total)	----	E333/WT	mg/L	<0.0050	----	----	----	----	----	----
Organic / Inorganic Carbon										
Carbon, total organic [TOC]	----	E355-L/VA	mg/L	0.64	----	----	----	----	----	----
Microbiological Tests										
Coliforms, total	----	E010/VA	MPN/100 mL	<1	----	----	----	----	----	----
Coliforms, Escherichia coli [E. coli]	----	E010/VA	MPN/10 0mL	<1	----	----	----	----	----	----
Ion Balance										
Anion sum	----	EC101A/VA	meq/L	4.35	----	----	----	----	----	----
Cation sum (total)	----	EC101A/VA	meq/L	4.56	----	----	----	----	----	----
Ion balance (APHA)	----	EC101A/VA	%	2.36	----	----	----	----	----	----
Total Metals										
Aluminum, total	7429-90-5	E420/VA	mg/L	0.0164	----	----	----	----	----	----
Antimony, total	7440-36-0	E420/VA	mg/L	<0.00010	----	----	----	----	----	----
Arsenic, total	7440-38-2	E420/VA	mg/L	0.00157	----	----	----	----	----	----
Barium, total	7440-39-3	E420/VA	mg/L	0.0227	----	----	----	----	----	----
Beryllium, total	7440-41-7	E420/VA	mg/L	<0.000100	----	----	----	----	----	----
Bismuth, total	7440-69-9	E420/VA	mg/L	<0.000050	----	----	----	----	----	----
Boron, total	7440-42-8	E420/VA	mg/L	<0.010	----	----	----	----	----	----
Cadmium, total	7440-43-9	E420/VA	mg/L	0.0000122	----	----	----	----	----	----

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Method/Lab	Unit	Client sample ID	Spruce Crescent DW3 - Raw Water Analysis Pumphouse	----	----	----	----	----	----
				Sampling date/time	21-Nov-2024 09:50	----	----	----	----	----	----
				Sub-Matrix	Water	----	----	----	----	----	----
				KS2404904-001	--------	--------	--------	--------	--------	--------	--------
Total Metals											
Calcium, total	7440-70-2	E420/VA	mg/L		48.0	----	----	----	----	----	----
Cesium, total	7440-46-2	E420/VA	mg/L		<0.000010	----	----	----	----	----	----
Chromium, total	7440-47-3	E420/VA	mg/L		0.00051	----	----	----	----	----	----
Cobalt, total	7440-48-4	E420/VA	mg/L		<0.00010	----	----	----	----	----	----
Copper, total	7440-50-8	E420/VA	mg/L		0.00609	----	----	----	----	----	----
Iron, total	7439-89-6	E420/VA	mg/L		0.078	----	----	----	----	----	----
Lead, total	7439-92-1	E420/VA	mg/L		0.000266	----	----	----	----	----	----
Lithium, total	7439-93-2	E420/VA	mg/L		0.0021	----	----	----	----	----	----
Magnesium, total	7439-95-4	E420/VA	mg/L		21.4	----	----	----	----	----	----
Manganese, total	7439-96-5	E420/VA	mg/L		0.0256	----	----	----	----	----	----
Mercury, total	7439-97-6	E508/VA	mg/L		<0.0000050	----	----	----	----	----	----
Molybdenum, total	7439-98-7	E420/VA	mg/L		0.00168	----	----	----	----	----	----
Nickel, total	7440-02-0	E420/VA	mg/L		<0.00050	----	----	----	----	----	----
Phosphorus, total	7723-14-0	E420/VA	mg/L		<0.050	----	----	----	----	----	----
Potassium, total	7440-09-7	E420/VA	mg/L		1.96	----	----	----	----	----	----
Rubidium, total	7440-17-7	E420/VA	mg/L		0.00078	----	----	----	----	----	----
Selenium, total	7782-49-2	E420/VA	mg/L		0.000205	----	----	----	----	----	----
Silicon, total	7440-21-3	E420/VA	mg/L		8.43	----	----	----	----	----	----
Silver, total	7440-22-4	E420/VA	mg/L		<0.000010	----	----	----	----	----	----
Sodium, total	7440-23-5	E420/VA	mg/L		7.93	----	----	----	----	----	----
Strontium, total	7440-24-6	E420/VA	mg/L		0.308	----	----	----	----	----	----
Sulfur, total	7704-34-9	E420/VA	mg/L		8.25	----	----	----	----	----	----
Tellurium, total	13494-80-9	E420/VA	mg/L		<0.00020	----	----	----	----	----	----
Thallium, total	7440-28-0	E420/VA	mg/L		<0.000010	----	----	----	----	----	----
Thorium, total	7440-29-1	E420/VA	mg/L		<0.00010	----	----	----	----	----	----
Tin, total	7440-31-5	E420/VA	mg/L		<0.00010	----	----	----	----	----	----

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Method/Lab	Unit	Client sample ID	Spruce Crescent DW3 - Raw Water Analysis Pumphouse	----	----	----	----	----	----
				Sampling date/time	21-Nov-2024 09:50	----	----	----	----	----	----
				Sub-Matrix	Water	----	----	----	----	----	----
					KS2404904-001	--------	--------	--------	--------	--------	--------
Total Metals											
Titanium, total	7440-32-6	E420/VA	mg/L		0.00152	----	----	----	----	----	----
Tungsten, total	7440-33-7	E420/VA	mg/L		<0.00010	----	----	----	----	----	----
Uranium, total	7440-61-1	E420/VA	mg/L		0.00167	----	----	----	----	----	----
Vanadium, total	7440-62-2	E420/VA	mg/L		0.00085	----	----	----	----	----	----
Zinc, total	7440-66-6	E420/VA	mg/L		0.0127	----	----	----	----	----	----
Zirconium, total	7440-67-7	E420/VA	mg/L		<0.00020	----	----	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Key:

CERTIFICATE OF ANALYSIS

Work Order	:	**KS2404904**		
Client	:	**District of Barriere**	Laboratory	: ALS Environmental - Vancouver
Contact	:	Chris Matthews	Account Manager	: Caitlin Fountain
Address	:	PO Box 219 Barriere British Columbia Canada V0E 1E0	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	:	----	Telephone	: 250 372 3588
Project	:	District of Barriere Water	Date Samples Received	: 21-Nov-2024 13:23
PO	:	----	Date Analysis Commenced	: 22-Nov-2024
C-O-C number	:	----	Issue Date	: 03-Dec-2024 09:18
Sampler	:	Graham H		
Site	:	----		
Quote number	:	20DIOB100KS02 Water		
No. of samples received	:	1		
No. of samples analysed	:	1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Ghazaleh Khanmirzaei	Analyst	Metals, Burnaby, British Columbia
Jon Fisher	Production Manager, Environmental	Inorganics, Waterloo, Ontario
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Monica Ko	Lab Assistant	Microbiology, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key: CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
LOR: Limit of Reporting (detection limit).

Unit	*Description*
mg/L	milligrams per litre
pH units	pH units
µS/cm	microsiemens per centimetre
NTU	nephelometric turbidity units
CU	colour units (1 cu = 1 mg/l pt)
% T/cm	% transmittance per centimetre
AU/cm	absorbance units per centimetre
-	no units
MPN/100mL	most probable number per hundred millilitres
%	percent
meq/L	milliequivalents per litre

<: less than.
>: greater than.
Surrogate: An analyte that is similar in behavior 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.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	Spruce Crescent DW3 - Raw Water Analysis Pumphouse	----	----	----	----
					Client sampling date / time	21-Nov-2024 09:50	----	----	----	----
						KS2404904-001	----	----	----	----
						Result	----	----	----	----
Physical Tests										
Absorbance, UV (@ 254nm), unfiltered	----	E405/VA	0.0050	AU/cm		0.0150	----	----	----	----
Alkalinity, bicarbonate (as CaCO3)	----	E290/VA	1.0	mg/L		188	----	----	----	----
Alkalinity, carbonate (as CaCO3)	----	E290/VA	1.0	mg/L		<1.0	----	----	----	----
Alkalinity, hydroxide (as CaCO3)	----	E290/VA	1.0	mg/L		<1.0	----	----	----	----
Alkalinity, phenolphthalein (as CaCO3)	----	E290/VA	1.0	mg/L		<1.0	----	----	----	----
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L		188	----	----	----	----
Colour, true	----	E329/VA	5.0	CU		<5.0	----	----	----	----
Conductivity	----	E100/VA	2.0	µS/cm		383	----	----	----	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/VA	0.60	mg/L		208	----	----	----	----
Langelier index (@ 15°C)	----	EC105A/VA	0.010	-		0.502	----	----	----	----
Langelier index (@ 20°C)	----	EC105A/VA	0.010	-		0.575	----	----	----	----
Langelier index (@ 25°C)	----	EC105A/VA	0.010	-		0.646	----	----	----	----
Langelier index (@ 4°C)	----	EC105A/VA	0.010	-		0.327	----	----	----	----
Langelier index (@ 60°C)	----	EC105A/VA	0.010	-		1.09	----	----	----	----
Langelier index (@ 77°C)	----	EC105A/VA	0.010	-		1.29	----	----	----	----
pH	----	E108/VA	0.10	pH units		8.03	----	----	----	----
Solids, total dissolved [TDS]	----	E162/VA	10	mg/L		251	----	----	----	----
Turbidity	----	E121/VA	0.10	NTU		2.05	----	----	----	----
Transmittance, UV (@ 254nm), unfiltered	----	E405/VA	1.0	% T/cm		96.6	----	----	----	----

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	Spruce Crescent DW3 - Raw Water Analysis Pumphouse	----	----	----	----
					Client sampling date / time	21-Nov-2024 09:50	----	----	----	----
						KS2404904-001	----	----	----	----
						Result	----	----	----	----
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L		0.0196	----	----	----	----
Bromide	24959-67-9	E235.Br-L/VA	0.050	mg/L		<0.050	----	----	----	----
Chloride	16887-00-6	E235.Cl/VA	0.50	mg/L		2.28	----	----	----	----
Fluoride	16984-48-8	E235.F/VA	0.020	mg/L		0.092	----	----	----	----
Kjeldahl nitrogen, total [TKN]	----	E318/VA	0.050	mg/L		<0.050	----	----	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L/VA	0.0050	mg/L		0.224	----	----	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L/VA	0.0010	mg/L		<0.0010	----	----	----	----
Nitrogen, total organic	----	EC363/VA	0.050	mg/L		<0.050	----	----	----	----
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	0.30	mg/L		24.4	----	----	----	----
Cyanides										
Cyanide, strong acid dissociable (Total)	----	E333/WT	0.0050	mg/L		<0.0050	----	----	----	----
Organic / Inorganic Carbon										
Carbon, total organic [TOC]	----	E355-L/VA	0.50	mg/L		0.64	----	----	----	----
Microbiological Tests										
Coliforms, total	----	E010/VA	1	MPN/100 mL		<1	----	----	----	----
Coliforms, Escherichia coli [E. coli]	----	E010/VA	1	MPN/100 mL		<1	----	----	----	----
Ion Balance										
Anion sum	----	EC101A/VA	0.10	meq/L		4.35	----	----	----	----
Cation sum (total)	----	EC101A/VA	0.10	meq/L		4.56	----	----	----	----
Ion balance (APHA)	----	EC101A/VA	0.010	%		2.36	----	----	----	----

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	Spruce Crescent DW3 - Raw Water Analysis Pumphouse	----	----	----	----
					Client sampling date / time	21-Nov-2024 09:50	----	----	----	----
						KS2404904-001	----	----	----	----
						Result	----	----	----	----
Total Metals										
Aluminum, total	7429-90-5	E420/VA	0.0030	mg/L		0.0164	----	----	----	----
Antimony, total	7440-36-0	E420/VA	0.00010	mg/L		<0.00010	----	----	----	----
Arsenic, total	7440-38-2	E420/VA	0.00010	mg/L		0.00157	----	----	----	----
Barium, total	7440-39-3	E420/VA	0.00010	mg/L		0.0227	----	----	----	----
Beryllium, total	7440-41-7	E420/VA	0.000100	mg/L		<0.000100	----	----	----	----
Bismuth, total	7440-69-9	E420/VA	0.000050	mg/L		<0.000050	----	----	----	----
Boron, total	7440-42-8	E420/VA	0.010	mg/L		<0.010	----	----	----	----
Cadmium, total	7440-43-9	E420/VA	0.0000050	mg/L		0.0000122	----	----	----	----
Calcium, total	7440-70-2	E420/VA	0.050	mg/L		48.0	----	----	----	----
Cesium, total	7440-46-2	E420/VA	0.000010	mg/L		<0.000010	----	----	----	----
Chromium, total	7440-47-3	E420/VA	0.00050	mg/L		0.00051	----	----	----	----
Cobalt, total	7440-48-4	E420/VA	0.00010	mg/L		<0.00010	----	----	----	----
Copper, total	7440-50-8	E420/VA	0.00050	mg/L		0.00609	----	----	----	----
Iron, total	7439-89-6	E420/VA	0.010	mg/L		0.078	----	----	----	----
Lead, total	7439-92-1	E420/VA	0.000050	mg/L		0.000266	----	----	----	----
Lithium, total	7439-93-2	E420/VA	0.0010	mg/L		0.0021	----	----	----	----
Magnesium, total	7439-95-4	E420/VA	0.0050	mg/L		21.4	----	----	----	----
Manganese, total	7439-96-5	E420/VA	0.00010	mg/L		0.0256	----	----	----	----
Mercury, total	7439-97-6	E508/VA	0.0000050	mg/L		<0.0000050	----	----	----	----
Molybdenum, total	7439-98-7	E420/VA	0.000050	mg/L		0.00168	----	----	----	----

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

					Client sample ID	Spruce Crescent DW3 - Raw Water Analysis Pumphouse	----	----	----	----
					Client sampling date / time	21-Nov-2024 09:50	----	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		KS2404904-001	----	----	----	----
						Result	----	----	----	----
Total Metals										
Nickel, total	7440-02-0	E420/VA	0.00050	mg/L		<0.00050	----	----	----	----
Phosphorus, total	7723-14-0	E420/VA	0.050	mg/L		<0.050	----	----	----	----
Potassium, total	7440-09-7	E420/VA	0.050	mg/L		1.96	----	----	----	----
Rubidium, total	7440-17-7	E420/VA	0.00020	mg/L		0.00078	----	----	----	----
Selenium, total	7782-49-2	E420/VA	0.000050	mg/L		0.000205	----	----	----	----
Silicon, total	7440-21-3	E420/VA	0.10	mg/L		8.43	----	----	----	----
Silver, total	7440-22-4	E420/VA	0.000010	mg/L		<0.000010	----	----	----	----
Sodium, total	7440-23-5	E420/VA	0.050	mg/L		7.93	----	----	----	----
Strontium, total	7440-24-6	E420/VA	0.00020	mg/L		0.308	----	----	----	----
Sulfur, total	7704-34-9	E420/VA	0.50	mg/L		8.25	----	----	----	----
Tellurium, total	13494-80-9	E420/VA	0.00020	mg/L		<0.00020	----	----	----	----
Thallium, total	7440-28-0	E420/VA	0.000010	mg/L		<0.000010	----	----	----	----
Thorium, total	7440-29-1	E420/VA	0.00010	mg/L		<0.00010	----	----	----	----
Tin, total	7440-31-5	E420/VA	0.00010	mg/L		<0.00010	----	----	----	----
Titanium, total	7440-32-6	E420/VA	0.00030	mg/L		0.00152	----	----	----	----
Tungsten, total	7440-33-7	E420/VA	0.00010	mg/L		<0.00010	----	----	----	----
Uranium, total	7440-61-1	E420/VA	0.000010	mg/L		0.00167	----	----	----	----
Vanadium, total	7440-62-2	E420/VA	0.00050	mg/L		0.00085	----	----	----	----
Zinc, total	7440-66-6	E420/VA	0.0030	mg/L		0.0127	----	----	----	----
Zirconium, total	7440-67-7	E420/VA	0.00020	mg/L		<0.00020	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

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QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **KS2404904**	Page	: 1 of 10
Client	: **District of Barriere**	Laboratory	: ALS Environmental - Kamloops
Contact	: Chris Matthews	Account Manager	: Caitlin Fountain
Address	: PO Box 219 Barriere BC Canada V0E 1E0	Address	: 1445 McGill Road, Unit 2B Kamloops, British Columbia Canada V2C 6K7
Telephone	: ----	Telephone	: 250 372 3588
Project	: District of Barriere Water	Date Samples Received	: 21-Nov-2024 13:23
PO	: ----	Issue Date	: 03-Dec-2024 09:16
C-O-C number	: ----		
Sampler	: Graham H		
Site	: ----		
Quote number	: 20DIOB100KS02 Water		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
Spruce Crescent DW3 - Raw Water Analysis - Pumphouse	E298	21-Nov-2024	27-Nov-2024	28 days	6 days	✓	29-Nov-2024	28 days	8 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE										
Spruce Crescent DW3 - Raw Water Analysis - Pumphouse	E235.Br-L	21-Nov-2024	23-Nov-2024	28 days	2 days	✓	23-Nov-2024	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Spruce Crescent DW3 - Raw Water Analysis - Pumphouse	E235.Cl	21-Nov-2024	23-Nov-2024	28 days	2 days	✓	23-Nov-2024	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Spruce Crescent DW3 - Raw Water Analysis - Pumphouse	E235.F	21-Nov-2024	23-Nov-2024	28 days	2 days	✓	23-Nov-2024	28 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
Spruce Crescent DW3 - Raw Water Analysis - Pumphouse	E235.NO3-L	21-Nov-2024	23-Nov-2024	3 days	2 days	✓	23-Nov-2024	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
Spruce Crescent DW3 - Raw Water Analysis - Pumphouse	E235.NO2-L	21-Nov-2024	23-Nov-2024	3 days	2 days	✓	23-Nov-2024	3 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Spruce Crescent DW3 - Raw Water Analysis - Pumphouse	E235.SO4	21-Nov-2024	23-Nov-2024	28 days	2 days	✓	23-Nov-2024	28 days	2 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
Spruce Crescent DW3 - Raw Water Analysis - Pumphouse	E318	21-Nov-2024	27-Nov-2024	28 days	6 days	✓	29-Nov-2024	28 days	8 days	✓
Cyanides : Total Cyanide										
Opaque HDPE - total (sodium hydroxide)										
Spruce Crescent DW3 - Raw Water Analysis - Pumphouse	E333	21-Nov-2024	27-Nov-2024	14 days	6 days	✓	27-Nov-2024	14 days	6 days	✓
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate)										
Spruce Crescent DW3 - Raw Water Analysis - Pumphouse	E010	21-Nov-2024	----	----	----		22-Nov-2024	30 hrs	24 hrs	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
Spruce Crescent DW3 - Raw Water Analysis - Pumphouse	E355-L	21-Nov-2024	27-Nov-2024	28 days	6 days	✓	27-Nov-2024	28 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
Spruce Crescent DW3 - Raw Water Analysis - Pumphouse	E290	21-Nov-2024	23-Nov-2024	14 days	2 days	✓	23-Nov-2024	14 days	2 days	✓
Physical Tests : Apparent UV Absorbance and Transmittance by Spectrometry										
HDPE										
Spruce Crescent DW3 - Raw Water Analysis - Pumphouse	E405	21-Nov-2024	----	----	----		23-Nov-2024	3 days	2 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE										
Spruce Crescent DW3 - Raw Water Analysis - Pumphouse	E329	21-Nov-2024	23-Nov-2024	3 days	2 days	✓	24-Nov-2024	3 days	3 days	✓
Physical Tests : Conductivity in Water										
HDPE										
Spruce Crescent DW3 - Raw Water Analysis - Pumphouse	E100	21-Nov-2024	23-Nov-2024	28 days	2 days	✓	23-Nov-2024	28 days	2 days	✓
Physical Tests : pH by Meter										
HDPE										
Spruce Crescent DW3 - Raw Water Analysis - Pumphouse	E108	21-Nov-2024	23-Nov-2024	0.25 hrs	44 hrs	× EHTR-FM	23-Nov-2024	0.25 hrs	47 hrs	× EHTR-FM

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Physical Tests : TDS by Gravimetry										
HDPE										
Spruce Crescent DW3 - Raw Water Analysis - Pumphouse	E162	21-Nov-2024	----	----	----		27-Nov-2024	7 days	6 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE										
Spruce Crescent DW3 - Raw Water Analysis - Pumphouse	E121	21-Nov-2024	----	----	----		23-Nov-2024	3 days	2 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial - total (lab preserved)										
Spruce Crescent DW3 - Raw Water Analysis - Pumphouse	E508	21-Nov-2024	26-Nov-2024	28 days	5 days	✓	26-Nov-2024	28 days	5 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
Spruce Crescent DW3 - Raw Water Analysis - Pumphouse	E420	21-Nov-2024	26-Nov-2024	180 days	5 days	✓	28-Nov-2024	180 days	7 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	1780430	1	17	5.8	5.0	✓
Ammonia by Fluorescence	E298	1785233	1	20	5.0	5.0	✓
Apparent UV Absorbance and Transmittance by Spectrometry	E405	1780996	1	4	25.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	1780434	1	17	5.8	5.0	✓
Chloride in Water by IC	E235.Cl	1780433	1	17	5.8	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	1780438	1	12	8.3	5.0	✓
Conductivity in Water	E100	1780431	1	17	5.8	5.0	✓
Fluoride in Water by IC	E235.F	1780432	1	17	5.8	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1780435	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1780436	1	17	5.8	5.0	✓
pH by Meter	E108	1780429	1	10	10.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1780437	1	17	5.8	5.0	✓
TDS by Gravimetry	E162	1786605	1	20	5.0	5.0	✓
Total Coliforms and E. coli (Enzyme Substrate)	E010	1779273	2	18	11.1	10.0	✓
Total Cyanide	E333	1785403	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1785231	1	14	7.1	5.0	✓
Total Mercury in Water by CVAAS	E508	1783565	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1779678	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1785232	1	9	11.1	5.0	✓
Turbidity by Nephelometry	E121	1780808	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1780430	1	17	5.8	5.0	✓
Ammonia by Fluorescence	E298	1785233	1	20	5.0	5.0	✓
Apparent UV Absorbance and Transmittance by Spectrometry	E405	1780996	1	4	25.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	1780434	1	17	5.8	5.0	✓
Chloride in Water by IC	E235.Cl	1780433	1	17	5.8	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	1780438	1	12	8.3	5.0	✓
Conductivity in Water	E100	1780431	1	17	5.8	5.0	✓
Fluoride in Water by IC	E235.F	1780432	1	17	5.8	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1780435	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1780436	1	17	5.8	5.0	✓
pH by Meter	E108	1780429	1	10	10.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1780437	1	17	5.8	5.0	✓
TDS by Gravimetry	E162	1786605	1	20	5.0	5.0	✓
Total Cyanide	E333	1785403	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1785231	1	14	7.1	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
Total Mercury in Water by CVAAS	E508	1783565	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1779678	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1785232	1	9	11.1	5.0	✓
Turbidity by Nephelometry	E121	1780808	1	20	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1780430	1	17	5.8	5.0	✓
Ammonia by Fluorescence	E298	1785233	1	20	5.0	5.0	✓
Apparent UV Absorbance and Transmittance by Spectrometry	E405	1780996	1	4	25.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	1780434	1	17	5.8	5.0	✓
Chloride in Water by IC	E235.Cl	1780433	1	17	5.8	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	1780438	1	12	8.3	5.0	✓
Conductivity in Water	E100	1780431	1	17	5.8	5.0	✓
Fluoride in Water by IC	E235.F	1780432	1	17	5.8	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1780435	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1780436	1	17	5.8	5.0	✓
Sulfate in Water by IC	E235.SO4	1780437	1	17	5.8	5.0	✓
TDS by Gravimetry	E162	1786605	1	20	5.0	5.0	✓
Total Coliforms and E. coli (Enzyme Substrate)	E010	1779273	1	18	5.5	5.0	✓
Total Cyanide	E333	1785403	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1785231	1	14	7.1	5.0	✓
Total Mercury in Water by CVAAS	E508	1783565	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1779678	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1785232	1	9	11.1	5.0	✓
Turbidity by Nephelometry	E121	1780808	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1785233	1	20	5.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	1780434	1	17	5.8	5.0	✓
Chloride in Water by IC	E235.Cl	1780433	1	17	5.8	5.0	✓
Fluoride in Water by IC	E235.F	1780432	1	17	5.8	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1780435	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1780436	1	17	5.8	5.0	✓
Sulfate in Water by IC	E235.SO4	1780437	1	17	5.8	5.0	✓
Total Cyanide	E333	1785403	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1785231	1	14	7.1	5.0	✓
Total Mercury in Water by CVAAS	E508	1783565	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1779678	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1785232	1	9	11.1	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Coliforms and E. coli (Enzyme Substrate)	E010 ALS Environmental - Vancouver	Water	APHA 9223 (mod)	The enzyme substrate test simultaneously detects Total Coliforms and E. coli in a 100 mL sample after incubation at 35.0 ±0.5°C for either 18 or 24 hours (dependent on reagent used).
Conductivity in Water	E100 ALS Environmental - Vancouver	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Vancouver	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 ALS Environmental - Vancouver	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TDS by Gravimetry	E162 ALS Environmental - Vancouver	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Bromide in Water by IC (Low Level)	E235.Br-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Chloride in Water by IC	E235.Cl ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Sulfate in Water by IC	E235.SO4 ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Vancouver	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 ALS Environmental - Vancouver	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 ALS Environmental - Vancouver	Water	Method Fialab 100, 2018	TKN in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021).
Colour (True) by Spectrometer (5 CU)	E329 ALS Environmental - Vancouver	Water	APHA 2120 C (mod)	Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment.
Total Cyanide	E333 ALS Environmental - Waterloo	Water	ISO 14403 (mod)	Total or Strong Acid Dissociable (SAD) Cyanide is determined by Continuous Flow Analyzer (CFA) with in-line UV digestion followed by colourmetric analysis. Method Limitation: High levels of thiocyanate (SCN) may cause positive interference (up to 0.5% of SCN concentration).
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Apparent UV Absorbance and Transmittance by Spectrometry	E405 ALS Environmental - Vancouver	Water	APHA 5910 B (mod)	Apparent UV Absorbance is determined on an unfiltered sample by UV absorbance measurement in a quartz cell at 254 nm. The analysis is carried out without pH adjustment.
Total Metals in Water by CRC ICPMS	E420 ALS Environmental - Vancouver	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Mercury in Water by CVAAS	E508 ALS Environmental - Vancouver	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
Hardness (Calculated) from Total Ca/Mg	EC100A ALS Environmental - Vancouver	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
Ion Balance using Total Metals	EC101A ALS Environmental - Vancouver	Water	APHA 1030E	Cation Sum (using total metals), Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).
Saturation Index using Laboratory pH (Ca-T)	EC105A ALS Environmental - Vancouver	Water	APHA 2330B	Langelier Index provides an indication of scale formation potential at a given pH and temperature, and is calculated as per APHA 2330B Saturation Index. Positive values indicate oversaturation with respect to CaCO3. Negative values indicate undersaturation of CaCO3. This calculation uses laboratory pH measurements and provides estimates of Langelier Index at temperatures of 4, 15, 20, 25, 66, and 77°C. Ryznar Stability Index is an alternative index used for scale formation and corrosion potential.
Total Organic Nitrogen (Calculation)	EC363 ALS Environmental - Vancouver	Water	APHA 4500-NORG (TKN)/NH3-NITROGEN (NH3)	Total Organic Nitrogen is a calculated parameter. Total Organic Nitrogen = Total Kjeldahl Nitrogen - Ammonia.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Vancouver	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for TKN in water	EP318 ALS Environmental - Vancouver	Water	APHA 4500-Norg D (mod)	Samples are digested at high temperature using Sulfuric Acid with Copper catalyst, which converts organic nitrogen sources to Ammonia, which is then quantified by the analytical method as TKN. This method is unsuitable for samples containing high levels of nitrate. If nitrate exceeds TKN concentration by ten times or more, results may be biased low.
Preparation for Total Organic Carbon by Combustion	EP355 ALS Environmental - Vancouver	Water		Preparation for Total Organic Carbon by Combustion

QUALITY CONTROL REPORT

Work Order	: **KS2404904**	Page	: 1 of 13
Client	: District of Barriere	Laboratory	: ALS Environmental - Kamloops
Contact	: Chris Matthews	Account Manager	: Caitlin Fountain
Address	: PO Box 219 Barriere BC Canada V0E 1E0	Address	: 1445 McGill Road, Unit 2B Kamloops, British Columbia Canada V2C 6K7
Telephone	: ----	Telephone	: 250 372 3588
Project	: District of Barriere Water	Date Samples Received	: 21-Nov-2024 13:23
PO	: ----	Date Analysis Commenced	: 22-Nov-2024
C-O-C number	: ----	Issue Date	: 03-Dec-2024 09:18
Sampler	: Graham H		
Site	: ----		
Quote number	: 20DIOB100KS02 Water		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Ghazaleh Khanmirzaei	Analyst	Vancouver Metals, Burnaby, British Columbia
Jon Fisher	Production Manager, Environmental	Waterloo Inorganics, Waterloo, Ontario
Kim Jensen	Department Manager - Metals	Vancouver Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Vancouver Inorganics, Burnaby, British Columbia
Monica Ko	Lab Assistant	Vancouver Microbiology, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include 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 predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1780429)											
FJ2403552-003	Anonymous	pH	----	E108	0.10	pH units	8.17	8.18	0.122%	4%	----
Physical Tests (QC Lot: 1780430)											
FJ2403552-003	Anonymous	Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	104	104	0.385%	200%	----
		Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0.00%	200%	----
		Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0.00%	200%	----
		Alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	104	104	0.385%	20%	----
Physical Tests (QC Lot: 1780431)											
FJ2403552-003	Anonymous	Conductivity	----	E100	2.0	µS/cm	1420	1410	0.423%	10%	----
Physical Tests (QC Lot: 1780438)											
KS2404902-001	Anonymous	Colour, true	----	E329	5.0	CU	<5.0	<5.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 1780808)											
FJ2403543-001	Anonymous	Turbidity	----	E121	0.10	NTU	0.30	0.31	0.006	Diff <2x LOR	----
Physical Tests (QC Lot: 1780996)											
KS2404902-001	Anonymous	Absorbance, UV (@ 254nm), unfiltered	----	E405	0.0050	AU/cm	0.0110	0.0110	0	Diff <2x LOR	----
Physical Tests (QC Lot: 1786605)											
KS2404897-001	Anonymous	Solids, total dissolved [TDS]	----	E162	20	mg/L	415	420	1.20%	20%	----
Anions and Nutrients (QC Lot: 1780432)											
FJ2403552-001	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.192	0.189	0.002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1780433)											
FJ2403552-001	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	45.8	45.8	0.00543%	20%	----
Anions and Nutrients (QC Lot: 1780434)											
FJ2403552-001	Anonymous	Bromide	24959-67-9	E235.Br-L	0.050	mg/L	0.766	0.771	0.697%	20%	----
Anions and Nutrients (QC Lot: 1780435)											
FJ2403552-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.225	0.224	0.390%	20%	----
Anions and Nutrients (QC Lot: 1780436)											
FJ2403552-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0126	0.0124	1.76%	20%	----
Anions and Nutrients (QC Lot: 1780437)											
FJ2403552-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	69.0	69.1	0.121%	20%	----

Sub-Matrix: **Water**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Laboratory Duplicate (DUP) Report						
					LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Anions and Nutrients (QC Lot: 1785231)											
KS2404902-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.066	0.051	0.015	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1785233)											
KS2404902-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0134	0.0133	0.00010	Diff <2x LOR	----
Cyanides (QC Lot: 1785403)											
VA24D1834-003	Anonymous	Cyanide, strong acid dissociable (Total)	----	E333	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 1785232)											
KS2404902-001	Anonymous	Carbon, total organic [TOC]	----	E355-L	0.50	mg/L	0.66	0.64	0.02	Diff <2x LOR	----
Microbiological Tests (QC Lot: 1779273)											
KS2404902-001	Anonymous	Coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	<1	0	Diff <2x LOR	----
		Coliforms, total	----	E010	1	MPN/100mL	<1	<1	0	Diff <2x LOR	----
VA24D1700-076	Anonymous	Coliforms, Escherichia coli [E. coli]	----	E010	10	MPN/100mL	52	41	23.6%	65%	----
		Coliforms, total	----	E010	10	MPN/100mL	512	488	4.80%	65%	----
Total Metals (QC Lot: 1779678)											
VA24D1493-001	Anonymous	Aluminum, total	7429-90-5	E420	0.0060	mg/L	0.0113	0.0122	0.0008	Diff <2x LOR	----
		Antimony, total	7440-36-0	E420	0.00020	mg/L	0.00102	0.00100	0.00002	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00020	mg/L	0.00109	0.00105	0.00004	Diff <2x LOR	----
		Barium, total	7440-39-3	E420	0.00020	mg/L	0.0478	0.0470	1.70%	20%	----
		Beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Bismuth, total	7440-69-9	E420	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Boron, total	7440-42-8	E420	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
		Cadmium, total	7440-43-9	E420	0.0000100	mg/L	0.0000413	0.0000457	0.0000043	Diff <2x LOR	----
		Calcium, total	7440-70-2	E420	0.100	mg/L	395	397	0.505%	20%	----
		Cesium, total	7440-46-2	E420	0.000020	mg/L	0.000097	0.000098	0.0000003	Diff <2x LOR	----
		Chromium, total	7440-47-3	E420	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Copper, total	7440-50-8	E420	0.00100	mg/L	0.0125	0.0125	0.00319%	20%	----
		Iron, total	7439-89-6	E420	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
		Lead, total	7439-92-1	E420	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Lithium, total	7439-93-2	E420	0.0020	mg/L	0.0116	0.0112	0.0004	Diff <2x LOR	----
		Magnesium, total	7439-95-4	E420	0.100	mg/L	115	114	0.768%	20%	----
		Manganese, total	7439-96-5	E420	0.00020	mg/L	0.00159	0.00172	0.00013	Diff <2x LOR	----
		Molybdenum, total	7439-98-7	E420	0.000100	mg/L	0.0221	0.0222	0.400%	20%	----
		Nickel, total	7440-02-0	E420	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 1779678) - continued											
VA24D1493-001	Anonymous	Phosphorus, total	7723-14-0	E420	0.300	mg/L	<0.300	<0.300	0	Diff <2x LOR	----
		Potassium, total	7440-09-7	E420	0.100	mg/L	6.00	6.02	0.485%	20%	----
		Rubidium, total	7440-17-7	E420	0.00040	mg/L	0.00355	0.00333	0.00022	Diff <2x LOR	----
		Selenium, total	7782-49-2	E420	0.000100	mg/L	0.0229	0.0231	0.697%	20%	----
		Silicon, total	7440-21-3	E420	0.20	mg/L	10.4	10.0	4.36%	20%	----
		Silver, total	7440-22-4	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Sodium, total	7440-23-5	E420	0.100	mg/L	25.8	26.4	2.02%	20%	----
		Strontium, total	7440-24-6	E420	0.00040	mg/L	1.95	2.01	2.94%	20%	----
		Sulfur, total	7704-34-9	E420	1.00	mg/L	405	386	4.86%	20%	----
		Tellurium, total	13494-80-9	E420	0.00040	mg/L	<0.00040	<0.00040	0	Diff <2x LOR	----
		Thallium, total	7440-28-0	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Thorium, total	7440-29-1	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Tin, total	7440-31-5	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.0100	mg/L	<0.0100	<0.0100	0	Diff <2x LOR	----
		Tungsten, total	7440-33-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Uranium, total	7440-61-1	E420	0.000020	mg/L	0.0150	0.0160	6.29%	20%	----
		Vanadium, total	7440-62-2	E420	0.00100	mg/L	0.00130	0.00128	0.00002	Diff <2x LOR	----
		Zinc, total	7440-66-6	E420	0.0060	mg/L	<0.0060	<0.0060	0	Diff <2x LOR	----
		Zirconium, total	7440-67-7	E420	0.00040	mg/L	<0.00040	<0.00040	0	Diff <2x LOR	----
Total Metals (QC Lot: 1783565)											
FJ2403552-001	Anonymous	Mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1780430)						
Alkalinity, bicarbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, carbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, hydroxide (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 1780431)						
Conductivity	----	E100	1	µS/cm	1.2	----
Physical Tests (QCLot: 1780438)						
Colour, true	----	E329	5	CU	<5.0	----
Physical Tests (QCLot: 1780808)						
Turbidity	----	E121	0.1	NTU	<0.10	----
Physical Tests (QCLot: 1780996)						
Absorbance, UV (@ 254nm), unfiltered	----	E405	0.005	AU/cm	<0.0050	----
Physical Tests (QCLot: 1786605)						
Solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Anions and Nutrients (QCLot: 1780432)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1780433)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 1780434)						
Bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 1780435)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1780436)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1780437)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 1785231)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 1785233)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Cyanides (QCLot: 1785403)						

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Cyanides (QCLot: 1785403) - continued						
Cyanide, strong acid dissociable (Total)	----	E333	0.002	mg/L	<0.0020	----
Organic / Inorganic Carbon (QCLot: 1785232)						
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Microbiological Tests (QCLot: 1779273)						
Coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	----
Coliforms, total	----	E010	1	MPN/100mL	<1	----
Total Metals (QCLot: 1779678)						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
Barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
Boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
Calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
Copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
Iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
Lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
Potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
Silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
Silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
Sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 1779678) - continued						
Sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
Tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
Total Metals (QCLot: 1783565)						
Mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1780429)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 1780430)									
Alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	229 mg/L	102	75.0	125	----
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	103	85.0	115	----
Physical Tests (QCLot: 1780431)									
Conductivity	----	E100	1	µS/cm	147 µS/cm	93.6	90.0	110	----
Physical Tests (QCLot: 1780438)									
Colour, true	----	E329	5	CU	100 CU	104	85.0	115	----
Physical Tests (QCLot: 1780808)									
Turbidity	----	E121	0.1	NTU	200 NTU	100	85.0	115	----
Physical Tests (QCLot: 1780996)									
Absorbance, UV (@ 254nm), unfiltered	----	E405	0.005	AU/cm	0.693 AU/cm	93.9	85.0	115	----
Physical Tests (QCLot: 1786605)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	108	85.0	115	----
Anions and Nutrients (QCLot: 1780432)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	97.7	90.0	110	----
Anions and Nutrients (QCLot: 1780433)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	99.1	90.0	110	----
Anions and Nutrients (QCLot: 1780434)									
Bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	106	85.0	115	----
Anions and Nutrients (QCLot: 1780435)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	98.8	90.0	110	----
Anions and Nutrients (QCLot: 1780436)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	98.0	90.0	110	----
Anions and Nutrients (QCLot: 1780437)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1785231)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	116	75.0	125	----
Anions and Nutrients (QCLot: 1785233)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	98.5	85.0	115	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike: Target Concentration	Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Cyanides (QCLot: 1785403)									
Cyanide, strong acid dissociable (Total)	----	E333	0.002	mg/L	0.25 mg/L	90.3	80.0	120	----
Organic / Inorganic Carbon (QCLot: 1785232)									
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	104	80.0	120	----
Total Metals (QCLot: 1779678)									
Aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	97.5	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	104	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	107	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	106	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	103	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	104	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	102	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	107	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	102	80.0	120	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	106	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	104	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	102	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	97.2	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	106	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	98.9	80.0	120	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	103	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	103	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	102	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	102	80.0	120	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	94.9	80.0	120	----
Potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	101	80.0	120	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	99.4	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	100	80.0	120	----
Silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	106	80.0	120	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	96.9	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	100	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	109	80.0	120	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	103	80.0	120	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	106	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 1779678) - continued									
Thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	105	80.0	120	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	106	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	103	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	102	80.0	120	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	104	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	111	80.0	120	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	104	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	104	80.0	120	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	101	80.0	120	----
Total Metals (QCLot: 1783565)									
Mercury, total	7439-97-6	E508	0.000005	mg/L	0 mg/L	86.9	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1780432)										
FJ2403552-002	Anonymous	Fluoride	16984-48-8	E235.F	1.01 mg/L	1 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1780433)										
FJ2403552-002	Anonymous	Chloride	16887-00-6	E235.Cl	101 mg/L	100 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1780434)										
FJ2403552-002	Anonymous	Bromide	24959-67-9	E235.Br-L	ND mg/L	----	ND	75.0	125	----
Anions and Nutrients (QCLot: 1780435)										
FJ2403552-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.54 mg/L	2.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1780436)										
FJ2403552-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.499 mg/L	0.5 mg/L	99.8	75.0	125	----
Anions and Nutrients (QCLot: 1780437)										
FJ2403552-002	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	99.2 mg/L	100 mg/L	99.2	75.0	125	----
Anions and Nutrients (QCLot: 1785231)										
KS2404903-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	2.70 mg/L	2.5 mg/L	108	70.0	130	----
Anions and Nutrients (QCLot: 1785233)										
KS2404903-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.124 mg/L	0.1 mg/L	124	75.0	125	----
Cyanides (QCLot: 1785403)										
VA24D1834-003	Anonymous	Cyanide, strong acid dissociable (Total)	----	E333	0.230 mg/L	0.25 mg/L	92.1	75.0	125	----
Organic / Inorganic Carbon (QCLot: 1785232)										
KS2404903-001	Anonymous	Carbon, total organic [TOC]	----	E355-L	5.29 mg/L	5 mg/L	106	70.0	130	----
Total Metals (QCLot: 1779678)										
VA24D1542-001	Anonymous	Aluminum, total	7429-90-5	E420	ND mg/L	----	ND	70.0	130	----
		Antimony, total	7440-36-0	E420	ND mg/L	----	ND	70.0	130	----
		Arsenic, total	7440-38-2	E420	ND mg/L	----	ND	70.0	130	----
		Barium, total	7440-39-3	E420	ND mg/L	----	ND	70.0	130	----
		Beryllium, total	7440-41-7	E420	0.389 mg/L	0.4 mg/L	97.3	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.0971 mg/L	0.1 mg/L	97.1	70.0	130	----
		Boron, total	7440-42-8	E420	ND mg/L	----	ND	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.0403 mg/L	0.04 mg/L	101	70.0	130	----
		Calcium, total	7440-70-2	E420	ND mg/L	----	ND	70.0	130	----
		Cesium, total	7440-46-2	E420	0.102 mg/L	0.1 mg/L	102	70.0	130	----
		Chromium, total	7440-47-3	E420	ND mg/L	----	ND	70.0	130	----
		Cobalt, total	7440-48-4	E420	ND mg/L	----	ND	70.0	130	----
		Copper, total	7440-50-8	E420	ND mg/L	----	ND	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 1779678) - continued										
VA24D1542-001	Anonymous	Iron, total	7439-89-6	E420	ND mg/L	----	ND	70.0	130	----
		Lead, total	7439-92-1	E420	0.190 mg/L	0.2 mg/L	95.2	70.0	130	----
		Lithium, total	7439-93-2	E420	0.892 mg/L	1 mg/L	89.2	70.0	130	----
		Magnesium, total	7439-95-4	E420	ND mg/L	----	ND	70.0	130	----
		Manganese, total	7439-96-5	E420	ND mg/L	----	ND	70.0	130	----
		Molybdenum, total	7439-98-7	E420	ND mg/L	----	ND	70.0	130	----
		Nickel, total	7440-02-0	E420	ND mg/L	----	ND	70.0	130	----
		Phosphorus, total	7723-14-0	E420	90.9 mg/L	100 mg/L	90.9	70.0	130	----
		Potassium, total	7440-09-7	E420	ND mg/L	----	ND	70.0	130	----
		Rubidium, total	7440-17-7	E420	ND mg/L	----	ND	70.0	130	----
		Selenium, total	7782-49-2	E420	ND mg/L	----	ND	70.0	130	----
		Silicon, total	7440-21-3	E420	ND mg/L	----	ND	70.0	130	----
		Silver, total	7440-22-4	E420	0.0382 mg/L	0.04 mg/L	95.4	70.0	130	----
		Sodium, total	7440-23-5	E420	ND mg/L	----	ND	70.0	130	----
		Strontium, total	7440-24-6	E420	ND mg/L	----	ND	70.0	130	----
		Sulfur, total	7704-34-9	E420	ND mg/L	----	ND	70.0	130	----
		Tellurium, total	13494-80-9	E420	0.429 mg/L	0.4 mg/L	107	70.0	130	----
		Thallium, total	7440-28-0	E420	0.0369 mg/L	0.04 mg/L	92.3	70.0	130	----
		Thorium, total	7440-29-1	E420	0.188 mg/L	0.2 mg/L	94.3	70.0	130	----
		Tin, total	7440-31-5	E420	0.197 mg/L	0.2 mg/L	98.7	70.0	130	----
		Titanium, total	7440-32-6	E420	ND mg/L	----	ND	70.0	130	----
		Tungsten, total	7440-33-7	E420	0.196 mg/L	0.2 mg/L	98.0	70.0	130	----
		Uranium, total	7440-61-1	E420	ND mg/L	----	ND	70.0	130	----
		Vanadium, total	7440-62-2	E420	ND mg/L	----	ND	70.0	130	----
		Zinc, total	7440-66-6	E420	3.78 mg/L	4 mg/L	94.4	70.0	130	----
		Zirconium, total	7440-67-7	E420	0.408 mg/L	0.4 mg/L	102	70.0	130	----
Total Metals (QCLot: 1783565)										
FJ2403552-002	Anonymous	Mercury, total	7439-97-6	E508	0.0000956 mg/L	0 mg/L	95.6	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 15 -

Page of

Report To	Contact and company name below will appear on the final report
Company:	DISTRICT OF BARRIERE
Contact:	Chris Matthews
Phone:	250-320-1505 250-672-9751 Fax 250-672-9708
	Company address below will appear on the final report
Street:	P.O. Box 219
City/Province:	BARRIERE
Postal Code:	BC
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution

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

Quality Control (QC) Report with Report ☐ YES ☐ NO

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

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax

Email 2 cmatthews@barriere.ca

Email 3 pamos@barriere.ca

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax

Email 2

Project Information

ALS Account # / Quote #:

Job #:

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 # (lab use only) 4904

ALS Contact:

Sampler: GRAHAM

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:

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	Number of Containers
	Spruce Crescent DW3 - Raw Water Analysis	21 11 24	950	Grab	6
	NTU: 0.35				
	CL2 Free: 0.00				
	CL2 Total: 0.00				
	PUMP HOUSE				
	Please reference WO# KS2304717 for required analysis				

Environmental Division
Kamloops
Work Order Reference
KS2404904

Telephone : +1 250 372 3588

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

Are samples taken from a Regulated DW System?

☐ YES ☐ NO

Are samples for human drinking water use?

☐ YES ☐ 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		
10					

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
				NOV 21 2024	1323			

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**.

drop off

ALS Canada Ltd.

right solutions.
right partner.

CERTIFICATE OF ANALYSIS (GUIDELINE EVALUATION)

Work Order	: **KS2404905**	Page	: 1 of 6
Client	: **District of Barriere**	Laboratory	: ALS Environmental - Kamloops
Contact	: Chris Matthews	Account Manager	: Caitlin Fountain
Address	: PO Box 219 Barriere BC Canada V0E 1E0	Address	: 1445 McGill Road, Unit 2B Kamloops, British Columbia Canada V2C 6K7
Telephone	: ----	Telephone	: 250 372 3588
Project	: District of Barriere Water	Date Samples Received	: 21-Nov-2024 13:23
PO	: ----	Date Analysis Commenced	: 22-Nov-2024
C-O-C number	: ----	Issue Date	: 03-Dec-2024 09:18
Sampler	: Graham H		
Site	: ----		
Quote number	: 20DIOB100KS02 Water		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Guideline Comparison

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Ghazaleh Khanmirzaei	Analyst	Metals, Burnaby, British Columbia
Jon Fisher	Production Manager, Environmental	Inorganics, Waterloo, Ontario
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Monica Ko	Lab Assistant	Microbiology, Burnaby, British Columbia

No Breaches Found

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.
Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guidelines are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Key : LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	no units
%	percent
% T/cm	% transmittance per centimetre
µS/cm	microsiemens per centimetre
AU/cm	absorbance units per centimetre
CU	colour units (1 cu = 1 mg/l pt)
meq/L	milliequivalents per litre
mg/L	milligrams per litre
MPN/100mL	most probable number per hundred millilitres
NTU	nephelometric turbidity units
pH units	pH units

>: greater than.
<: less than.
Red shading is applied where the result or the LOR is greater than the Guideline Upper Limit (or lower than the Guideline Lower Limit, if applicable).
For drinking water samples, Red shading is applied where the result for E.coli, fecal or total coliforms is greater than or equal to the Guideline Upper Limit.

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Method/Lab	Unit	Client sample ID: Bradford Park PW1 - Raw Water Analysis Pumphouse	----	----	----	----	----	----
				Sampling date/time: 21-Nov-2024 09:35	----	----	----	----	----	----
				Sub-Matrix: Water	----	----	----	----	----	----
				KS2404905-001	--------	--------	--------	--------	--------	--------
Physical Tests										
Absorbance, UV (@ 254nm), unfiltered	----	E405/VA	AU/cm	0.0070	----	----	----	----	----	----
Alkalinity, bicarbonate (as CaCO3)	----	E290/VA	mg/L	226	----	----	----	----	----	----
Alkalinity, carbonate (as CaCO3)	----	E290/VA	mg/L	<1.0	----	----	----	----	----	----
Alkalinity, hydroxide (as CaCO3)	----	E290/VA	mg/L	<1.0	----	----	----	----	----	----
Alkalinity, phenolphthalein (as CaCO3)	----	E290/VA	mg/L	<1.0	----	----	----	----	----	----
Alkalinity, total (as CaCO3)	----	E290/VA	mg/L	226	----	----	----	----	----	----
Colour, true	----	E329/VA	CU	<5.0	----	----	----	----	----	----
Conductivity	----	E100/VA	µS/cm	440	----	----	----	----	----	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/VA	mg/L	225	----	----	----	----	----	----
Langelier index (@ 15°C)	----	EC105A/VA	-	0.775	----	----	----	----	----	----
Langelier index (@ 20°C)	----	EC105A/VA	-	0.848	----	----	----	----	----	----
Langelier index (@ 25°C)	----	EC105A/VA	-	0.919	----	----	----	----	----	----
Langelier index (@ 4°C)	----	EC105A/VA	-	0.602	----	----	----	----	----	----
Langelier index (@ 60°C)	----	EC105A/VA	-	1.36	----	----	----	----	----	----
Langelier index (@ 77°C)	----	EC105A/VA	-	1.56	----	----	----	----	----	----
pH	----	E108/VA	pH units	8.23	----	----	----	----	----	----
Solids, total dissolved [TDS]	----	E162/VA	mg/L	306	----	----	----	----	----	----
Turbidity	----	E121/VA	NTU	0.32	----	----	----	----	----	----
Transmittance, UV (@ 254nm), unfiltered	----	E405/VA	% T/cm	98.4	----	----	----	----	----	----
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/VA	mg/L	0.0314	----	----	----	----	----	----
Bromide	24959-67-9	E235.Br-L/VA	mg/L	<0.050	----	----	----	----	----	----
Chloride	16887-00-6	E235.Cl/VA	mg/L	0.65	----	----	----	----	----	----
Fluoride	16984-48-8	E235.F/VA	mg/L	0.177	----	----	----	----	----	----
Kjeldahl nitrogen, total [TKN]	----	E318/VA	mg/L	<0.050	----	----	----	----	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L/VA	mg/L	<0.0050	----	----	----	----	----	----

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Method/Lab	Unit	Client sample ID	Bradford Park PW1 - Raw Water Analysis Pumphouse	----	----	----	----	----	----
				Sampling date/time	21-Nov-2024 09:35	----	----	----	----	----	----
				Sub-Matrix	Water	----	----	----	----	----	----
				KS2404905-001	--------	--------	--------	--------	--------	--------	--------
Anions and Nutrients											
Nitrite (as N)	14797-65-0	E235.NO2-L/VA	mg/L		<0.0010	----	----	----	----	----	----
Nitrogen, total organic	----	EC363/VA	mg/L		<0.050	----	----	----	----	----	----
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	mg/L		28.2	----	----	----	----	----	----
Cyanides											
Cyanide, strong acid dissociable (Total)	----	E333/WT	mg/L		<0.0050	----	----	----	----	----	----
Organic / Inorganic Carbon											
Carbon, total organic [TOC]	----	E355-L/VA	mg/L		<0.50	----	----	----	----	----	----
Microbiological Tests											
Coliforms, total	----	E010/VA	MPN/100 mL		<1	----	----	----	----	----	----
Coliforms, Escherichia coli [E. coli]	----	E010/VA	MPN/10 0mL		<1	----	----	----	----	----	----
Ion Balance											
Anion sum	----	EC101A/VA	meq/L		5.13	----	----	----	----	----	----
Cation sum (total)	----	EC101A/VA	meq/L		5.12	----	----	----	----	----	----
Ion balance (APHA)	----	EC101A/VA	%		-0.098	----	----	----	----	----	----
Total Metals											
Aluminum, total	7429-90-5	E420/VA	mg/L		<0.0030	----	----	----	----	----	----
Antimony, total	7440-36-0	E420/VA	mg/L		<0.00010	----	----	----	----	----	----
Arsenic, total	7440-38-2	E420/VA	mg/L		0.00629	----	----	----	----	----	----
Barium, total	7440-39-3	E420/VA	mg/L		0.0376	----	----	----	----	----	----
Beryllium, total	7440-41-7	E420/VA	mg/L		<0.000100	----	----	----	----	----	----
Bismuth, total	7440-69-9	E420/VA	mg/L		<0.000050	----	----	----	----	----	----
Boron, total	7440-42-8	E420/VA	mg/L		0.013	----	----	----	----	----	----
Cadmium, total	7440-43-9	E420/VA	mg/L		0.0000173	----	----	----	----	----	----
Calcium, total	7440-70-2	E420/VA	mg/L		49.5	----	----	----	----	----	----

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Method/Lab	Unit	Client sample ID	----	----	----	----	----	----
				Bradford Park PW1 - Raw Water Analysis Pumphouse						
				Sampling date/time: 21-Nov-2024 09:35	----	----	----	----	----	----
				Sub-Matrix: Water	----	----	----	----	----	----
				KS2404905-001	--------	--------	--------	--------	--------	--------
Total Metals										
Cesium, total	7440-46-2	E420/VA	mg/L	0.000014	----	----	----	----	----	----
Chromium, total	7440-47-3	E420/VA	mg/L	<0.00050	----	----	----	----	----	----
Cobalt, total	7440-48-4	E420/VA	mg/L	<0.00010	----	----	----	----	----	----
Copper, total	7440-50-8	E420/VA	mg/L	0.00174	----	----	----	----	----	----
Iron, total	7439-89-6	E420/VA	mg/L	0.069	----	----	----	----	----	----
Lead, total	7439-92-1	E420/VA	mg/L	<0.000050	----	----	----	----	----	----
Lithium, total	7439-93-2	E420/VA	mg/L	0.0040	----	----	----	----	----	----
Magnesium, total	7439-95-4	E420/VA	mg/L	24.6	----	----	----	----	----	----
Manganese, total	7439-96-5	E420/VA	mg/L	0.109	----	----	----	----	----	----
Mercury, total	7439-97-6	E508/VA	mg/L	<0.0000050	----	----	----	----	----	----
Molybdenum, total	7439-98-7	E420/VA	mg/L	0.00331	----	----	----	----	----	----
Nickel, total	7440-02-0	E420/VA	mg/L	<0.00050	----	----	----	----	----	----
Phosphorus, total	7723-14-0	E420/VA	mg/L	0.051	----	----	----	----	----	----
Potassium, total	7440-09-7	E420/VA	mg/L	3.25	----	----	----	----	----	----
Rubidium, total	7440-17-7	E420/VA	mg/L	0.00384	----	----	----	----	----	----
Selenium, total	7782-49-2	E420/VA	mg/L	<0.000050	----	----	----	----	----	----
Silicon, total	7440-21-3	E420/VA	mg/L	15.7	----	----	----	----	----	----
Silver, total	7440-22-4	E420/VA	mg/L	<0.000010	----	----	----	----	----	----
Sodium, total	7440-23-5	E420/VA	mg/L	12.4	----	----	----	----	----	----
Strontium, total	7440-24-6	E420/VA	mg/L	0.455	----	----	----	----	----	----
Sulfur, total	7704-34-9	E420/VA	mg/L	10.4	----	----	----	----	----	----
Tellurium, total	13494-80-9	E420/VA	mg/L	<0.00020	----	----	----	----	----	----
Thallium, total	7440-28-0	E420/VA	mg/L	<0.000010	----	----	----	----	----	----
Thorium, total	7440-29-1	E420/VA	mg/L	<0.00010	----	----	----	----	----	----
Tin, total	7440-31-5	E420/VA	mg/L	<0.00010	----	----	----	----	----	----
Titanium, total	7440-32-6	E420/VA	mg/L	<0.00030	----	----	----	----	----	----
Tungsten, total	7440-33-7	E420/VA	mg/L	0.00064	----	----	----	----	----	----

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Method/Lab	Unit	Client sample ID	Bradford Park PW1 - Raw Water Analysis Pumphouse	----	----	----	----	----	----
				Sampling date/time	21-Nov-2024 09:35	----	----	----	----	----	----
				Sub-Matrix	Water	----	----	----	----	----	----
				KS2404905-001	--------	--------	--------	--------	--------	--------	--------
Total Metals											
Uranium, total	7440-61-1	E420/VA	mg/L		0.000178	----	----	----	----	----	----
Vanadium, total	7440-62-2	E420/VA	mg/L		0.00114	----	----	----	----	----	----
Zinc, total	7440-66-6	E420/VA	mg/L		0.0048	----	----	----	----	----	----
Zirconium, total	7440-67-7	E420/VA	mg/L		<0.00020	----	----	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Key:

CERTIFICATE OF ANALYSIS

Work Order	:	**KS2404905**		
Client	:	**District of Barriere**	Laboratory	: ALS Environmental - Vancouver
Contact	:	Chris Matthews	Account Manager	: Caitlin Fountain
Address	:	PO Box 219 Barriere British Columbia Canada V0E 1E0	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	:	----	Telephone	: 250 372 3588
Project	:	District of Barriere Water	Date Samples Received	: 21-Nov-2024 13:23
PO	:	----	Date Analysis Commenced	: 22-Nov-2024
C-O-C number	:	----	Issue Date	: 03-Dec-2024 09:18
Sampler	:	Graham H		
Site	:	----		
Quote number	:	20DIOB100KS02 Water		
No. of samples received	:	1		
No. of samples analysed	:	1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Ghazaleh Khanmirzaei	Analyst	Metals, Burnaby, British Columbia
Jon Fisher	Production Manager, Environmental	Inorganics, Waterloo, Ontario
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Monica Ko	Lab Assistant	Microbiology, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key: CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
LOR: Limit of Reporting (detection limit).

Unit	*Description*
mg/L	milligrams per litre
pH units	pH units
µS/cm	microsiemens per centimetre
NTU	nephelometric turbidity units
CU	colour units (1 cu = 1 mg/l pt)
AU/cm	absorbance units per centimetre
% T/cm	% transmittance per centimetre
-	no units
MPN/100mL	most probable number per hundred millilitres
%	percent
meq/L	milliequivalents per litre

<: less than.
>: greater than.
Surrogate: An analyte that is similar in behavior 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.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID				
					Bradford Park PW1 - Raw Water Analysis Pumphouse	----	----	----	----
					Client sampling date / time				
					21-Nov-2024 09:35	----	----	----	----
					KS2404905-001	----	----	----	----
					Result	----	----	----	----
Physical Tests									
Absorbance, UV (@ 254nm), unfiltered	----	E405/VA	0.0050	AU/cm	0.0070	----	----	----	----
Alkalinity, bicarbonate (as CaCO3)	----	E290/VA	1.0	mg/L	226	----	----	----	----
Alkalinity, carbonate (as CaCO3)	----	E290/VA	1.0	mg/L	<1.0	----	----	----	----
Alkalinity, hydroxide (as CaCO3)	----	E290/VA	1.0	mg/L	<1.0	----	----	----	----
Alkalinity, phenolphthalein (as CaCO3)	----	E290/VA	1.0	mg/L	<1.0	----	----	----	----
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L	226	----	----	----	----
Colour, true	----	E329/VA	5.0	CU	<5.0	----	----	----	----
Conductivity	----	E100/VA	2.0	µS/cm	440	----	----	----	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/VA	0.60	mg/L	225	----	----	----	----
Langelier index (@ 15°C)	----	EC105A/VA	0.010	-	0.775	----	----	----	----
Langelier index (@ 20°C)	----	EC105A/VA	0.010	-	0.848	----	----	----	----
Langelier index (@ 25°C)	----	EC105A/VA	0.010	-	0.919	----	----	----	----
Langelier index (@ 4°C)	----	EC105A/VA	0.010	-	0.602	----	----	----	----
Langelier index (@ 60°C)	----	EC105A/VA	0.010	-	1.36	----	----	----	----
Langelier index (@ 77°C)	----	EC105A/VA	0.010	-	1.56	----	----	----	----
pH	----	E108/VA	0.10	pH units	8.23	----	----	----	----
Solids, total dissolved [TDS]	----	E162/VA	10	mg/L	306	----	----	----	----
Turbidity	----	E121/VA	0.10	NTU	0.32	----	----	----	----
Transmittance, UV (@ 254nm), unfiltered	----	E405/VA	1.0	% T/cm	98.4	----	----	----	----

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

					Client sample ID	Bradford Park PW1 - Raw Water Analysis Pumphouse	----	----	----	----
					Client sampling date / time	21-Nov-2024 09:35	----	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		KS2404905-001	----	----	----	----
						Result	----	----	----	----
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L		0.0314	----	----	----	----
Bromide	24959-67-9	E235.Br-L/VA	0.050	mg/L		<0.050	----	----	----	----
Chloride	16887-00-6	E235.Cl/VA	0.50	mg/L		0.65	----	----	----	----
Fluoride	16984-48-8	E235.F/VA	0.020	mg/L		0.177	----	----	----	----
Kjeldahl nitrogen, total [TKN]	----	E318/VA	0.050	mg/L		<0.050	----	----	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L/VA	0.0050	mg/L		<0.0050	----	----	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L/VA	0.0010	mg/L		<0.0010	----	----	----	----
Nitrogen, total organic	----	EC363/VA	0.050	mg/L		<0.050	----	----	----	----
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	0.30	mg/L		28.2	----	----	----	----
Cyanides										
Cyanide, strong acid dissociable (Total)	----	E333/WT	0.0050	mg/L		<0.0050	----	----	----	----
Organic / Inorganic Carbon										
Carbon, total organic [TOC]	----	E355-L/VA	0.50	mg/L		<0.50	----	----	----	----
Microbiological Tests										
Coliforms, total	----	E010/VA	1	MPN/100 mL		<1	----	----	----	----
Coliforms, Escherichia coli [E. coli]	----	E010/VA	1	MPN/100 mL		<1	----	----	----	----
Ion Balance										
Anion sum	----	EC101A/VA	0.10	meq/L		5.13	----	----	----	----
Cation sum (total)	----	EC101A/VA	0.10	meq/L		5.12	----	----	----	----
Ion balance (APHA)	----	EC101A/VA	0.010	%		-0.098	----	----	----	----

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	Bradford Park PW1 - Raw Water Analysis Pumphouse	----	----	----	----
					Client sampling date / time	21-Nov-2024 09:35	----	----	----	----
						KS2404905-001	----	----	----	----
						Result	----	----	----	----
Total Metals										
Aluminum, total	7429-90-5	E420/VA	0.0030	mg/L		<0.0030	----	----	----	----
Antimony, total	7440-36-0	E420/VA	0.00010	mg/L		<0.00010	----	----	----	----
Arsenic, total	7440-38-2	E420/VA	0.00010	mg/L		0.00629	----	----	----	----
Barium, total	7440-39-3	E420/VA	0.00010	mg/L		0.0376	----	----	----	----
Beryllium, total	7440-41-7	E420/VA	0.000100	mg/L		<0.000100	----	----	----	----
Bismuth, total	7440-69-9	E420/VA	0.000050	mg/L		<0.000050	----	----	----	----
Boron, total	7440-42-8	E420/VA	0.010	mg/L		0.013	----	----	----	----
Cadmium, total	7440-43-9	E420/VA	0.0000050	mg/L		0.0000173	----	----	----	----
Calcium, total	7440-70-2	E420/VA	0.050	mg/L		49.5	----	----	----	----
Cesium, total	7440-46-2	E420/VA	0.000010	mg/L		0.000014	----	----	----	----
Chromium, total	7440-47-3	E420/VA	0.00050	mg/L		<0.00050	----	----	----	----
Cobalt, total	7440-48-4	E420/VA	0.00010	mg/L		<0.00010	----	----	----	----
Copper, total	7440-50-8	E420/VA	0.00050	mg/L		0.00174	----	----	----	----
Iron, total	7439-89-6	E420/VA	0.010	mg/L		0.069	----	----	----	----
Lead, total	7439-92-1	E420/VA	0.000050	mg/L		<0.000050	----	----	----	----
Lithium, total	7439-93-2	E420/VA	0.0010	mg/L		0.0040	----	----	----	----
Magnesium, total	7439-95-4	E420/VA	0.0050	mg/L		24.6	----	----	----	----
Manganese, total	7439-96-5	E420/VA	0.00010	mg/L		0.109	----	----	----	----
Mercury, total	7439-97-6	E508/VA	0.0000050	mg/L		<0.0000050	----	----	----	----
Molybdenum, total	7439-98-7	E420/VA	0.000050	mg/L		0.00331	----	----	----	----

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID				
					Bradford Park PW1 - Raw Water Analysis Pumphouse	----	----	----	----
					Client sampling date / time				
					21-Nov-2024 09:35	----	----	----	----
					KS2404905-001	----	----	----	----
					Result	----	----	----	----
Total Metals									
Nickel, total	7440-02-0	E420/VA	0.00050	mg/L	<0.00050	----	----	----	----
Phosphorus, total	7723-14-0	E420/VA	0.050	mg/L	0.051	----	----	----	----
Potassium, total	7440-09-7	E420/VA	0.050	mg/L	3.25	----	----	----	----
Rubidium, total	7440-17-7	E420/VA	0.00020	mg/L	0.00384	----	----	----	----
Selenium, total	7782-49-2	E420/VA	0.000050	mg/L	<0.000050	----	----	----	----
Silicon, total	7440-21-3	E420/VA	0.10	mg/L	15.7	----	----	----	----
Silver, total	7440-22-4	E420/VA	0.000010	mg/L	<0.000010	----	----	----	----
Sodium, total	7440-23-5	E420/VA	0.050	mg/L	12.4	----	----	----	----
Strontium, total	7440-24-6	E420/VA	0.00020	mg/L	0.455	----	----	----	----
Sulfur, total	7704-34-9	E420/VA	0.50	mg/L	10.4	----	----	----	----
Tellurium, total	13494-80-9	E420/VA	0.00020	mg/L	<0.00020	----	----	----	----
Thallium, total	7440-28-0	E420/VA	0.000010	mg/L	<0.000010	----	----	----	----
Thorium, total	7440-29-1	E420/VA	0.00010	mg/L	<0.00010	----	----	----	----
Tin, total	7440-31-5	E420/VA	0.00010	mg/L	<0.00010	----	----	----	----
Titanium, total	7440-32-6	E420/VA	0.00030	mg/L	<0.00030	----	----	----	----
Tungsten, total	7440-33-7	E420/VA	0.00010	mg/L	0.00064	----	----	----	----
Uranium, total	7440-61-1	E420/VA	0.000010	mg/L	0.000178	----	----	----	----
Vanadium, total	7440-62-2	E420/VA	0.00050	mg/L	0.00114	----	----	----	----
Zinc, total	7440-66-6	E420/VA	0.0030	mg/L	0.0048	----	----	----	----
Zirconium, total	7440-67-7	E420/VA	0.00020	mg/L	<0.00020	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

ALS Canada Ltd.

right solutions.
right partner.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **KS2404905**	Page	: 1 of 10
Client	: **District of Barriere**	Laboratory	: ALS Environmental - Kamloops
Contact	: Chris Matthews	Account Manager	: Caitlin Fountain
Address	: PO Box 219 Barriere BC Canada V0E 1E0	Address	: 1445 McGill Road, Unit 2B Kamloops, British Columbia Canada V2C 6K7
Telephone	: ----	Telephone	: 250 372 3588
Project	: District of Barriere Water	Date Samples Received	: 21-Nov-2024 13:23
PO	: ----	Issue Date	: 03-Dec-2024 09:18
C-O-C number	: ----		
Sampler	: Graham H		
Site	: ----		
Quote number	: 20DIOB100KS02 Water		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
Bradford Park PW1 - Raw Water Analysis - Pumphouse	E298	21-Nov-2024	27-Nov-2024	28 days	6 days	✓	29-Nov-2024	28 days	8 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE										
Bradford Park PW1 - Raw Water Analysis - Pumphouse	E235.Br-L	21-Nov-2024	23-Nov-2024	28 days	2 days	✓	23-Nov-2024	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Bradford Park PW1 - Raw Water Analysis - Pumphouse	E235.Cl	21-Nov-2024	23-Nov-2024	28 days	2 days	✓	23-Nov-2024	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Bradford Park PW1 - Raw Water Analysis - Pumphouse	E235.F	21-Nov-2024	23-Nov-2024	28 days	2 days	✓	23-Nov-2024	28 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
Bradford Park PW1 - Raw Water Analysis - Pumphouse	E235.NO3-L	21-Nov-2024	23-Nov-2024	3 days	2 days	✓	23-Nov-2024	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
Bradford Park PW1 - Raw Water Analysis - Pumphouse	E235.NO2-L	21-Nov-2024	23-Nov-2024	3 days	2 days	✓	23-Nov-2024	3 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Bradford Park PW1 - Raw Water Analysis - Pumphouse	E235.SO4	21-Nov-2024	23-Nov-2024	28 days	2 days	✓	23-Nov-2024	28 days	2 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
Bradford Park PW1 - Raw Water Analysis - Pumphouse	E318	21-Nov-2024	27-Nov-2024	28 days	6 days	✓	29-Nov-2024	28 days	8 days	✓
Cyanides : Total Cyanide										
Opaque HDPE - total (sodium hydroxide)										
Bradford Park PW1 - Raw Water Analysis - Pumphouse	E333	21-Nov-2024	27-Nov-2024	14 days	6 days	✓	27-Nov-2024	14 days	6 days	✓
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate)										
Bradford Park PW1 - Raw Water Analysis - Pumphouse	E010	21-Nov-2024	----	----	----		22-Nov-2024	30 hrs	25 hrs	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
Bradford Park PW1 - Raw Water Analysis - Pumphouse	E355-L	21-Nov-2024	27-Nov-2024	28 days	6 days	✓	27-Nov-2024	28 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
Bradford Park PW1 - Raw Water Analysis - Pumphouse	E290	21-Nov-2024	23-Nov-2024	14 days	2 days	✓	23-Nov-2024	14 days	2 days	✓
Physical Tests : Apparent UV Absorbance and Transmittance by Spectrometry										
HDPE										
Bradford Park PW1 - Raw Water Analysis - Pumphouse	E405	21-Nov-2024	----	----	----		23-Nov-2024	3 days	2 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE										
Bradford Park PW1 - Raw Water Analysis - Pumphouse	E329	21-Nov-2024	23-Nov-2024	3 days	2 days	✓	24-Nov-2024	3 days	3 days	✓
Physical Tests : Conductivity in Water										
HDPE										
Bradford Park PW1 - Raw Water Analysis - Pumphouse	E100	21-Nov-2024	23-Nov-2024	28 days	2 days	✓	23-Nov-2024	28 days	2 days	✓
Physical Tests : pH by Meter										
HDPE										
Bradford Park PW1 - Raw Water Analysis - Pumphouse	E108	21-Nov-2024	23-Nov-2024	0.25 hrs	44 hrs	× EHTR-FM	23-Nov-2024	0.25 hrs	47 hrs	× EHTR-FM

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Physical Tests : TDS by Gravimetry										
HDPE										
Bradford Park PW1 - Raw Water Analysis - Pumphouse	E162	21-Nov-2024	----	----	----		27-Nov-2024	7 days	6 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE										
Bradford Park PW1 - Raw Water Analysis - Pumphouse	E121	21-Nov-2024	----	----	----		23-Nov-2024	3 days	2 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial - total (lab preserved)										
Bradford Park PW1 - Raw Water Analysis - Pumphouse	E508	21-Nov-2024	26-Nov-2024	28 days	5 days	✓	26-Nov-2024	28 days	5 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
Bradford Park PW1 - Raw Water Analysis - Pumphouse	E420	21-Nov-2024	26-Nov-2024	180 days	5 days	✓	28-Nov-2024	180 days	7 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	1780430	1	17	5.8	5.0	✓
Ammonia by Fluorescence	E298	1785233	1	20	5.0	5.0	✓
Apparent UV Absorbance and Transmittance by Spectrometry	E405	1780996	1	4	25.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	1780434	1	17	5.8	5.0	✓
Chloride in Water by IC	E235.Cl	1780433	1	17	5.8	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	1780438	1	12	8.3	5.0	✓
Conductivity in Water	E100	1780431	1	17	5.8	5.0	✓
Fluoride in Water by IC	E235.F	1780432	1	17	5.8	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1780435	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1780436	1	17	5.8	5.0	✓
pH by Meter	E108	1780429	1	10	10.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1780437	1	17	5.8	5.0	✓
TDS by Gravimetry	E162	1786605	1	20	5.0	5.0	✓
Total Coliforms and E. coli (Enzyme Substrate)	E010	1779273	2	18	11.1	10.0	✓
Total Cyanide	E333	1785403	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1785231	1	14	7.1	5.0	✓
Total Mercury in Water by CVAAS	E508	1783565	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1779678	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1785232	1	9	11.1	5.0	✓
Turbidity by Nephelometry	E121	1780808	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1780430	1	17	5.8	5.0	✓
Ammonia by Fluorescence	E298	1785233	1	20	5.0	5.0	✓
Apparent UV Absorbance and Transmittance by Spectrometry	E405	1780996	1	4	25.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	1780434	1	17	5.8	5.0	✓
Chloride in Water by IC	E235.Cl	1780433	1	17	5.8	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	1780438	1	12	8.3	5.0	✓
Conductivity in Water	E100	1780431	1	17	5.8	5.0	✓
Fluoride in Water by IC	E235.F	1780432	1	17	5.8	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1780435	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1780436	1	17	5.8	5.0	✓
pH by Meter	E108	1780429	1	10	10.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1780437	1	17	5.8	5.0	✓
TDS by Gravimetry	E162	1786605	1	20	5.0	5.0	✓
Total Cyanide	E333	1785403	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1785231	1	14	7.1	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
Total Mercury in Water by CVAAS	E508	1783565	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1779678	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1785232	1	9	11.1	5.0	✓
Turbidity by Nephelometry	E121	1780808	1	20	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1780430	1	17	5.8	5.0	✓
Ammonia by Fluorescence	E298	1785233	1	20	5.0	5.0	✓
Apparent UV Absorbance and Transmittance by Spectrometry	E405	1780996	1	4	25.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	1780434	1	17	5.8	5.0	✓
Chloride in Water by IC	E235.Cl	1780433	1	17	5.8	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	1780438	1	12	8.3	5.0	✓
Conductivity in Water	E100	1780431	1	17	5.8	5.0	✓
Fluoride in Water by IC	E235.F	1780432	1	17	5.8	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1780435	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1780436	1	17	5.8	5.0	✓
Sulfate in Water by IC	E235.SO4	1780437	1	17	5.8	5.0	✓
TDS by Gravimetry	E162	1786605	1	20	5.0	5.0	✓
Total Coliforms and E. coli (Enzyme Substrate)	E010	1779273	1	18	5.5	5.0	✓
Total Cyanide	E333	1785403	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1785231	1	14	7.1	5.0	✓
Total Mercury in Water by CVAAS	E508	1783565	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1779678	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1785232	1	9	11.1	5.0	✓
Turbidity by Nephelometry	E121	1780808	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1785233	1	20	5.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	1780434	1	17	5.8	5.0	✓
Chloride in Water by IC	E235.Cl	1780433	1	17	5.8	5.0	✓
Fluoride in Water by IC	E235.F	1780432	1	17	5.8	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1780435	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1780436	1	17	5.8	5.0	✓
Sulfate in Water by IC	E235.SO4	1780437	1	17	5.8	5.0	✓
Total Cyanide	E333	1785403	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	1785231	1	14	7.1	5.0	✓
Total Mercury in Water by CVAAS	E508	1783565	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1779678	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1785232	1	9	11.1	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Coliforms and E. coli (Enzyme Substrate)	E010 ALS Environmental - Vancouver	Water	APHA 9223 (mod)	The enzyme substrate test simultaneously detects Total Coliforms and E. coli in a 100 mL sample after incubation at 35.0 ±0.5°C for either 18 or 24 hours (dependent on reagent used).
Conductivity in Water	E100 ALS Environmental - Vancouver	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Vancouver	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 ALS Environmental - Vancouver	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TDS by Gravimetry	E162 ALS Environmental - Vancouver	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Bromide in Water by IC (Low Level)	E235.Br-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Chloride in Water by IC	E235.Cl ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Sulfate in Water by IC	E235.SO4 ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Vancouver	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 ALS Environmental - Vancouver	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 ALS Environmental - Vancouver	Water	Method Fialab 100, 2018	TKN in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021).
Colour (True) by Spectrometer (5 CU)	E329 ALS Environmental - Vancouver	Water	APHA 2120 C (mod)	Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment.
Total Cyanide	E333 ALS Environmental - Waterloo	Water	ISO 14403 (mod)	Total or Strong Acid Dissociable (SAD) Cyanide is determined by Continuous Flow Analyzer (CFA) with in-line UV digestion followed by colourmetric analysis. Method Limitation: High levels of thiocyanate (SCN) may cause positive interference (up to 0.5% of SCN concentration).
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Apparent UV Absorbance and Transmittance by Spectrometry	E405 ALS Environmental - Vancouver	Water	APHA 5910 B (mod)	Apparent UV Absorbance is determined on an unfiltered sample by UV absorbance measurement in a quartz cell at 254 nm. The analysis is carried out without pH adjustment.
Total Metals in Water by CRC ICPMS	E420 ALS Environmental - Vancouver	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Mercury in Water by CVAAS	E508 ALS Environmental - Vancouver	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
Hardness (Calculated) from Total Ca/Mg	EC100A ALS Environmental - Vancouver	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
Ion Balance using Total Metals	EC101A ALS Environmental - Vancouver	Water	APHA 1030E	Cation Sum (using total metals), Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).
Saturation Index using Laboratory pH (Ca-T)	EC105A ALS Environmental - Vancouver	Water	APHA 2330B	Langelier Index provides an indication of scale formation potential at a given pH and temperature, and is calculated as per APHA 2330B Saturation Index. Positive values indicate oversaturation with respect to CaCO3. Negative values indicate undersaturation of CaCO3. This calculation uses laboratory pH measurements and provides estimates of Langelier Index at temperatures of 4, 15, 20, 25, 66, and 77°C. Ryznar Stability Index is an alternative index used for scale formation and corrosion potential.
Total Organic Nitrogen (Calculation)	EC363 ALS Environmental - Vancouver	Water	APHA 4500-NORG (TKN)/NH3-NITROGEN (NH3)	Total Organic Nitrogen is a calculated parameter. Total Organic Nitrogen = Total Kjeldahl Nitrogen - Ammonia.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Vancouver	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for TKN in water	EP318 ALS Environmental - Vancouver	Water	APHA 4500-Norg D (mod)	Samples are digested at high temperature using Sulfuric Acid with Copper catalyst, which converts organic nitrogen sources to Ammonia, which is then quantified by the analytical method as TKN. This method is unsuitable for samples containing high levels of nitrate. If nitrate exceeds TKN concentration by ten times or more, results may be biased low.
Preparation for Total Organic Carbon by Combustion	EP355 ALS Environmental - Vancouver	Water		Preparation for Total Organic Carbon by Combustion

QUALITY CONTROL REPORT

Work Order	: **KS2404905**	Page	: 1 of 13
Client	: District of Barriere	Laboratory	: ALS Environmental - Kamloops
Contact	: Chris Matthews	Account Manager	: Caitlin Fountain
Address	: PO Box 219 Barriere BC Canada V0E 1E0	Address	: 1445 McGill Road, Unit 2B Kamloops, British Columbia Canada V2C 6K7
Telephone	: ----	Telephone	: 250 372 3588
Project	: District of Barriere Water	Date Samples Received	: 21-Nov-2024 13:23
PO	: ----	Date Analysis Commenced	: 22-Nov-2024
C-O-C number	: ----	Issue Date	: 03-Dec-2024 09:16
Sampler	: Graham H		
Site	: ----		
Quote number	: 20DIOB100KS02 Water		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Ghazaleh Khanmirzaei	Analyst	Vancouver Metals, Burnaby, British Columbia
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General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include 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 predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1780429)											
FJ2403552-003	Anonymous	pH	----	E108	0.10	pH units	8.17	8.18	0.122%	4%	----
Physical Tests (QC Lot: 1780430)											
FJ2403552-003	Anonymous	Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	104	104	0.385%	200%	----
		Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0.00%	200%	----
		Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0.00%	200%	----
		Alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	104	104	0.385%	20%	----
Physical Tests (QC Lot: 1780431)											
FJ2403552-003	Anonymous	Conductivity	----	E100	2.0	µS/cm	1420	1410	0.423%	10%	----
Physical Tests (QC Lot: 1780438)											
KS2404902-001	Anonymous	Colour, true	----	E329	5.0	CU	<5.0	<5.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 1780808)											
FJ2403543-001	Anonymous	Turbidity	----	E121	0.10	NTU	0.30	0.31	0.006	Diff <2x LOR	----
Physical Tests (QC Lot: 1780996)											
KS2404902-001	Anonymous	Absorbance, UV (@ 254nm), unfiltered	----	E405	0.0050	AU/cm	0.0110	0.0110	0	Diff <2x LOR	----
Physical Tests (QC Lot: 1786605)											
KS2404897-001	Anonymous	Solids, total dissolved [TDS]	----	E162	20	mg/L	415	420	1.20%	20%	----
Anions and Nutrients (QC Lot: 1780432)											
FJ2403552-001	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.192	0.189	0.002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1780433)											
FJ2403552-001	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	45.8	45.8	0.00543%	20%	----
Anions and Nutrients (QC Lot: 1780434)											
FJ2403552-001	Anonymous	Bromide	24959-67-9	E235.Br-L	0.050	mg/L	0.766	0.771	0.697%	20%	----
Anions and Nutrients (QC Lot: 1780435)											
FJ2403552-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.225	0.224	0.390%	20%	----
Anions and Nutrients (QC Lot: 1780436)											
FJ2403552-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0126	0.0124	1.76%	20%	----
Anions and Nutrients (QC Lot: 1780437)											
FJ2403552-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	69.0	69.1	0.121%	20%	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Anions and Nutrients (QC Lot: 1785231)											
KS2404902-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.066	0.051	0.015	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1785233)											
KS2404902-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0134	0.0133	0.00010	Diff <2x LOR	----
Cyanides (QC Lot: 1785403)											
VA24D1834-003	Anonymous	Cyanide, strong acid dissociable (Total)	----	E333	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 1785232)											
KS2404902-001	Anonymous	Carbon, total organic [TOC]	----	E355-L	0.50	mg/L	0.66	0.64	0.02	Diff <2x LOR	----
Microbiological Tests (QC Lot: 1779273)											
KS2404902-001	Anonymous	Coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	<1	0	Diff <2x LOR	----
		Coliforms, total	----	E010	1	MPN/100mL	<1	<1	0	Diff <2x LOR	----
VA24D1700-076	Anonymous	Coliforms, Escherichia coli [E. coli]	----	E010	10	MPN/100mL	52	41	23.6%	65%	----
		Coliforms, total	----	E010	10	MPN/100mL	512	488	4.80%	65%	----
Total Metals (QC Lot: 1779678)											
VA24D1493-001	Anonymous	Aluminum, total	7429-90-5	E420	0.0060	mg/L	0.0113	0.0122	0.0008	Diff <2x LOR	----
		Antimony, total	7440-36-0	E420	0.00020	mg/L	0.00102	0.00100	0.00002	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00020	mg/L	0.00109	0.00105	0.00004	Diff <2x LOR	----
		Barium, total	7440-39-3	E420	0.00020	mg/L	0.0478	0.0470	1.70%	20%	----
		Beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Bismuth, total	7440-69-9	E420	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Boron, total	7440-42-8	E420	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
		Cadmium, total	7440-43-9	E420	0.0000100	mg/L	0.0000413	0.0000457	0.0000043	Diff <2x LOR	----
		Calcium, total	7440-70-2	E420	0.100	mg/L	395	397	0.505%	20%	----
		Cesium, total	7440-46-2	E420	0.000020	mg/L	0.000097	0.000098	0.0000003	Diff <2x LOR	----
		Chromium, total	7440-47-3	E420	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Copper, total	7440-50-8	E420	0.00100	mg/L	0.0125	0.0125	0.00319%	20%	----
		Iron, total	7439-89-6	E420	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
		Lead, total	7439-92-1	E420	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Lithium, total	7439-93-2	E420	0.0020	mg/L	0.0116	0.0112	0.0004	Diff <2x LOR	----
		Magnesium, total	7439-95-4	E420	0.100	mg/L	115	114	0.768%	20%	----
		Manganese, total	7439-96-5	E420	0.00020	mg/L	0.00159	0.00172	0.00013	Diff <2x LOR	----
		Molybdenum, total	7439-98-7	E420	0.000100	mg/L	0.0221	0.0222	0.400%	20%	----
		Nickel, total	7440-02-0	E420	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 1779678) - continued											
VA24D1493-001	Anonymous	Phosphorus, total	7723-14-0	E420	0.300	mg/L	<0.300	<0.300	0	Diff <2x LOR	----
		Potassium, total	7440-09-7	E420	0.100	mg/L	6.00	6.02	0.485%	20%	----
		Rubidium, total	7440-17-7	E420	0.00040	mg/L	0.00355	0.00333	0.00022	Diff <2x LOR	----
		Selenium, total	7782-49-2	E420	0.000100	mg/L	0.0229	0.0231	0.697%	20%	----
		Silicon, total	7440-21-3	E420	0.20	mg/L	10.4	10.0	4.36%	20%	----
		Silver, total	7440-22-4	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Sodium, total	7440-23-5	E420	0.100	mg/L	25.8	26.4	2.02%	20%	----
		Strontium, total	7440-24-6	E420	0.00040	mg/L	1.95	2.01	2.94%	20%	----
		Sulfur, total	7704-34-9	E420	1.00	mg/L	405	386	4.86%	20%	----
		Tellurium, total	13494-80-9	E420	0.00040	mg/L	<0.00040	<0.00040	0	Diff <2x LOR	----
		Thallium, total	7440-28-0	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Thorium, total	7440-29-1	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Tin, total	7440-31-5	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.0100	mg/L	<0.0100	<0.0100	0	Diff <2x LOR	----
		Tungsten, total	7440-33-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Uranium, total	7440-61-1	E420	0.000020	mg/L	0.0150	0.0160	6.29%	20%	----
		Vanadium, total	7440-62-2	E420	0.00100	mg/L	0.00130	0.00128	0.00002	Diff <2x LOR	----
		Zinc, total	7440-66-6	E420	0.0060	mg/L	<0.0060	<0.0060	0	Diff <2x LOR	----
		Zirconium, total	7440-67-7	E420	0.00040	mg/L	<0.00040	<0.00040	0	Diff <2x LOR	----
Total Metals (QC Lot: 1783565)											
FJ2403552-001	Anonymous	Mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1780430)						
Alkalinity, bicarbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, carbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, hydroxide (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	<1.0	----
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 1780431)						
Conductivity	----	E100	1	µS/cm	1.2	----
Physical Tests (QCLot: 1780438)						
Colour, true	----	E329	5	CU	<5.0	----
Physical Tests (QCLot: 1780808)						
Turbidity	----	E121	0.1	NTU	<0.10	----
Physical Tests (QCLot: 1780996)						
Absorbance, UV (@ 254nm), unfiltered	----	E405	0.005	AU/cm	<0.0050	----
Physical Tests (QCLot: 1786605)						
Solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Anions and Nutrients (QCLot: 1780432)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1780433)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 1780434)						
Bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 1780435)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1780436)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1780437)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 1785231)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 1785233)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Cyanides (QCLot: 1785403)						

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Cyanides (QCLot: 1785403) - continued						
Cyanide, strong acid dissociable (Total)	----	E333	0.002	mg/L	<0.0020	----
Organic / Inorganic Carbon (QCLot: 1785232)						
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Microbiological Tests (QCLot: 1779273)						
Coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	----
Coliforms, total	----	E010	1	MPN/100mL	<1	----
Total Metals (QCLot: 1779678)						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
Barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
Boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
Calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
Copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
Iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
Lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
Potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
Silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
Silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
Sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 1779678) - continued						
Sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
Tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
Total Metals (QCLot: 1783565)						
Mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1780429)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 1780430)									
Alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	229 mg/L	102	75.0	125	----
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	103	85.0	115	----
Physical Tests (QCLot: 1780431)									
Conductivity	----	E100	1	µS/cm	147 µS/cm	93.6	90.0	110	----
Physical Tests (QCLot: 1780438)									
Colour, true	----	E329	5	CU	100 CU	104	85.0	115	----
Physical Tests (QCLot: 1780808)									
Turbidity	----	E121	0.1	NTU	200 NTU	100	85.0	115	----
Physical Tests (QCLot: 1780996)									
Absorbance, UV (@ 254nm), unfiltered	----	E405	0.005	AU/cm	0.693 AU/cm	93.9	85.0	115	----
Physical Tests (QCLot: 1786605)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	108	85.0	115	----
Anions and Nutrients (QCLot: 1780432)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	97.7	90.0	110	----
Anions and Nutrients (QCLot: 1780433)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	99.1	90.0	110	----
Anions and Nutrients (QCLot: 1780434)									
Bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	106	85.0	115	----
Anions and Nutrients (QCLot: 1780435)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	98.8	90.0	110	----
Anions and Nutrients (QCLot: 1780436)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	98.0	90.0	110	----
Anions and Nutrients (QCLot: 1780437)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1785231)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	116	75.0	125	----
Anions and Nutrients (QCLot: 1785233)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	98.5	85.0	115	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike: Target Concentration	Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Cyanides (QCLot: 1785403)									
Cyanide, strong acid dissociable (Total)	----	E333	0.002	mg/L	0.25 mg/L	90.3	80.0	120	----
Organic / Inorganic Carbon (QCLot: 1785232)									
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	104	80.0	120	----
Total Metals (QCLot: 1779678)									
Aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	97.5	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	104	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	107	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	106	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	103	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	104	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	102	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	107	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	102	80.0	120	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	106	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	104	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	102	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	97.2	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	106	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	98.9	80.0	120	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	103	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	103	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	102	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	102	80.0	120	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	94.9	80.0	120	----
Potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	101	80.0	120	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	99.4	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	100	80.0	120	----
Silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	106	80.0	120	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	96.9	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	100	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	109	80.0	120	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	103	80.0	120	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	106	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 1779678) - continued									
Thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	105	80.0	120	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	106	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	103	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	102	80.0	120	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	104	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	111	80.0	120	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	104	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	104	80.0	120	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	101	80.0	120	----
Total Metals (QCLot: 1783565)									
Mercury, total	7439-97-6	E508	0.000005	mg/L	0 mg/L	86.9	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1780432)										
FJ2403552-002	Anonymous	Fluoride	16984-48-8	E235.F	1.01 mg/L	1 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1780433)										
FJ2403552-002	Anonymous	Chloride	16887-00-6	E235.Cl	101 mg/L	100 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1780434)										
FJ2403552-002	Anonymous	Bromide	24959-67-9	E235.Br-L	ND mg/L	----	ND	75.0	125	----
Anions and Nutrients (QCLot: 1780435)										
FJ2403552-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.54 mg/L	2.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1780436)										
FJ2403552-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.499 mg/L	0.5 mg/L	99.8	75.0	125	----
Anions and Nutrients (QCLot: 1780437)										
FJ2403552-002	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	99.2 mg/L	100 mg/L	99.2	75.0	125	----
Anions and Nutrients (QCLot: 1785231)										
KS2404903-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	2.70 mg/L	2.5 mg/L	108	70.0	130	----
Anions and Nutrients (QCLot: 1785233)										
KS2404903-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.124 mg/L	0.1 mg/L	124	75.0	125	----
Cyanides (QCLot: 1785403)										
VA24D1834-003	Anonymous	Cyanide, strong acid dissociable (Total)	----	E333	0.230 mg/L	0.25 mg/L	92.1	75.0	125	----
Organic / Inorganic Carbon (QCLot: 1785232)										
KS2404903-001	Anonymous	Carbon, total organic [TOC]	----	E355-L	5.29 mg/L	5 mg/L	106	70.0	130	----
Total Metals (QCLot: 1779678)										
VA24D1542-001	Anonymous	Aluminum, total	7429-90-5	E420	ND mg/L	----	ND	70.0	130	----
		Antimony, total	7440-36-0	E420	ND mg/L	----	ND	70.0	130	----
		Arsenic, total	7440-38-2	E420	ND mg/L	----	ND	70.0	130	----
		Barium, total	7440-39-3	E420	ND mg/L	----	ND	70.0	130	----
		Beryllium, total	7440-41-7	E420	0.389 mg/L	0.4 mg/L	97.3	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.0971 mg/L	0.1 mg/L	97.1	70.0	130	----
		Boron, total	7440-42-8	E420	ND mg/L	----	ND	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.0403 mg/L	0.04 mg/L	101	70.0	130	----
		Calcium, total	7440-70-2	E420	ND mg/L	----	ND	70.0	130	----
		Cesium, total	7440-46-2	E420	0.102 mg/L	0.1 mg/L	102	70.0	130	----
		Chromium, total	7440-47-3	E420	ND mg/L	----	ND	70.0	130	----
		Cobalt, total	7440-48-4	E420	ND mg/L	----	ND	70.0	130	----
		Copper, total	7440-50-8	E420	ND mg/L	----	ND	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 1779678) - continued										
VA24D1542-001	Anonymous	Iron, total	7439-89-6	E420	ND mg/L	----	ND	70.0	130	----
		Lead, total	7439-92-1	E420	0.190 mg/L	0.2 mg/L	95.2	70.0	130	----
		Lithium, total	7439-93-2	E420	0.892 mg/L	1 mg/L	89.2	70.0	130	----
		Magnesium, total	7439-95-4	E420	ND mg/L	----	ND	70.0	130	----
		Manganese, total	7439-96-5	E420	ND mg/L	----	ND	70.0	130	----
		Molybdenum, total	7439-98-7	E420	ND mg/L	----	ND	70.0	130	----
		Nickel, total	7440-02-0	E420	ND mg/L	----	ND	70.0	130	----
		Phosphorus, total	7723-14-0	E420	90.9 mg/L	100 mg/L	90.9	70.0	130	----
		Potassium, total	7440-09-7	E420	ND mg/L	----	ND	70.0	130	----
		Rubidium, total	7440-17-7	E420	ND mg/L	----	ND	70.0	130	----
		Selenium, total	7782-49-2	E420	ND mg/L	----	ND	70.0	130	----
		Silicon, total	7440-21-3	E420	ND mg/L	----	ND	70.0	130	----
		Silver, total	7440-22-4	E420	0.0382 mg/L	0.04 mg/L	95.4	70.0	130	----
		Sodium, total	7440-23-5	E420	ND mg/L	----	ND	70.0	130	----
		Strontium, total	7440-24-6	E420	ND mg/L	----	ND	70.0	130	----
		Sulfur, total	7704-34-9	E420	ND mg/L	----	ND	70.0	130	----
		Tellurium, total	13494-80-9	E420	0.429 mg/L	0.4 mg/L	107	70.0	130	----
		Thallium, total	7440-28-0	E420	0.0369 mg/L	0.04 mg/L	92.3	70.0	130	----
		Thorium, total	7440-29-1	E420	0.188 mg/L	0.2 mg/L	94.3	70.0	130	----
		Tin, total	7440-31-5	E420	0.197 mg/L	0.2 mg/L	98.7	70.0	130	----
		Titanium, total	7440-32-6	E420	ND mg/L	----	ND	70.0	130	----
		Tungsten, total	7440-33-7	E420	0.196 mg/L	0.2 mg/L	98.0	70.0	130	----
		Uranium, total	7440-61-1	E420	ND mg/L	----	ND	70.0	130	----
		Vanadium, total	7440-62-2	E420	ND mg/L	----	ND	70.0	130	----
		Zinc, total	7440-66-6	E420	3.78 mg/L	4 mg/L	94.4	70.0	130	----
		Zirconium, total	7440-67-7	E420	0.408 mg/L	0.4 mg/L	102	70.0	130	----
Total Metals (QCLot: 1783565)										
FJ2403552-002	Anonymous	Mercury, total	7439-97-6	E508	0.0000956 mg/L	0 mg/L	95.6	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 15 -

Page of

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply
Company:	DISTRICT OF BARRIERE	Select Report Format: ☑ PDF ☐ EXCEL ☐ EDD (DIGITAL)	Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Chris Matthews	Quality Control (QC) Report with Report ☐ YES ☐ NO	PRIORITY (Business Days): 4 day [P4] ☐ / 3 day [P3] ☐ / 2 day [P2] ☐ — EMERGENCY: 1 Business day [E1] ☐ / Same Day, Weekend or Statutory holiday [E0] ☐
Phone:	250-3201505 250-672-9751 Fax 250-672-9708	☐ Compare Results to Criteria on Report - provide details below if box checked	
	Company address below will appear on the final report	Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	
Street:	P.O. Box 219	Email 1 or Fax	Date and Time Required for all E&P TATs:
City/Province:	BARRIERE	Email 2 cmatthews@barriere.ca	For tests that can not be performed according to the service level selected, you will be contacted.
Postal Code:	BC	Email 3 pamos@barriere.ca	
Invoice To	Same as Report To ☑ YES ☐ NO	**Invoice Distribution**	**Analysis Request**
	Copy of Invoice with Report ☑ YES ☐ NO	Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
Company:		Email 1 or Fax	
Contact:		Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)	4905	ALS Contact:	Sampler: GRAHAM

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	Number of Containers
	Bradford Park PW1 - Raw Water Analysis	21 11 24	935	Grab	6
	NTU: 0.11				
	CL2 Free: 0.00				
	CL2 Total: 0.00				
	PUMPHOUSE				
	Please reference WO# KS2304717 for required analysis				

Environmental Division
Kamloops
Work Order Reference
KS2404905

Telephone : +1 250 372 3588

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? ☐ YES ☐ NO	
Are samples for human drinking water use? ☐ YES ☐ 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		
1.0					

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date: NOV 21 2024	Time: 1323	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**.

drop dt