

2022 DRINKING WATER QUALITY

ANNUAL REPORT

DISTRICT OF SQUAMISH
June 2023

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Executive Summary

This report details the District of Squamish's drinking water supply and distribution water program for 2022. The District of Squamish is located within the unceded traditional territory of the Skwxwú7mesh (Squamish) and Tsleil-Waututh Nations. The District of Squamish's Water Supply and Distribution (WS&D) system is governed by the Province of British Columbia's Drinking Water Protection Act and Regulation (DWPA&R), Water Sustainability Act (WSA) and Ground Water Protection Regulation (GWPR), as well as a Permit to Operate, issued by Vancouver Coastal Health. In 2022, water samples were tested weekly for *E. coli* and total coliform bacteria to ensure water quality parameters met the applicable Guidelines for Canadian Drinking Water Quality set out by Health Canada and the potable water quality standards of the BC Drinking Water Protection Act.

The Squamish WS&D system is operated and maintained by the District of Squamish Water Utility team and is monitored 24 hours/day 365 days/year via the Supervisory Control and Data Acquisition (SCADA) system to ensure optimal and uninterrupted service to the community. The District of Squamish continues active programs relating to water quality, water conservation & loss prevention, water metering, unidirectional and dead-end flushing, and cross connection control in effort to reduce the demand on the water supply system and ensure the provision of clean and safe drinking water to the community. In addition to the implementation of several operational and capital improvement and renewal initiatives to increase system reliability and ensure long-term service sustainability.

1.0 Introduction

The purpose of this report is to meet the requirements of the BC Drinking Water Protection Act and Regulation, the requirements of the District's permit to operate, as well as to increase the understanding of the District's efforts to provide first class potable drinking water to its residents, to raise awareness of the importance conserving water and provide the results of the water quality testing that occurred in 2022. Samples collected from source water and the distribution system are analyzed and referenced to the applicable Guidelines for Canadian Drinking Water Quality set out by Health Canada, and the DWPA&R.

2.0 General Description

The District of Squamish can supply water to the community from three sources that include one primary groundwater source, and two surface water sources which are reserved for emergency backup. All water supplies are equipped with either primary or secondary chlorine disinfection. The distribution system consists of seven (7) reservoirs: twenty-three (23) active pressure reducing valve (PRV) stations, four (4) pump stations, 650 fire hydrants, 8,700 service connection and 167 km of watermain. The system delivers potable water to approximately 23,816 residents, nearly 800 industrial, commercial and institutional (ICI) customers, and the St'átmes (Stawamus 24), Yekw'ápssem (Yeakwapsem 18), Kewtín (Kowtain 17), Siyí7ch'em (Seaichem 16) and Wíwk'em (Waiwakum 14) First Nations Reserves within the District of Squamish (see Appendix B - District of Squamish Water Distribution Map). In 2021, the District provided 4.36 million cubic meters (m³) of potable water for consumption with an Average Daily Demand (ADD) of 12.2 ML/day and Maximum Daily Demand (MDD) of 19.8 ML/day.

The District employs a Supervisory Control and Data Acquisition (SCADA) system that continuously monitors the WS&D system, records data, and alerts District staff to areas of concern, faults and failures in the system.

3.0 Water Source

The District of Squamish has the ability to obtain its water from three sources:

- Primary Supply: Powerhouse Springs well field (main water supply to both South and North distribution)
- Emergency Backup Supply:
 - Stawamus River (South distribution Emergency Backup Water Supply)
 - Mashiter Creek (North distribution Emergency Backup Water supply)

Primary supply infrastructure is comprised of seven (7) groundwater wells at the Powerhouse Springs Well Field. If the well field is compromised or unable to meet the distribution system demands (due to a watermain break, pump failure or major fire flow demand or other emergency), water can be drawn from Stawamus River and/or Mashiter Creek. These surface water sources are available as backup only. **In 2022, there was no surface water use in the District of Squamish's water system.**

3.1 Powerhouse Springs Well Site

In 2022, the Powerhouse Springs well site, located near the confluence of Ring Creek and the Mamquam River, operated seven (7) active ground water wells which provide high quality potable water to the District of Squamish. A full description of the system's potential can be found in the District of Squamish – Water Master Plan, located on the District's website. Secondary chlorination is provided to ensure the microbial safety of the water as it travels throughout the distribution network by maintaining a minimum chlorine residual of 0.20mg/L at the end of the distribution network.

3.1.1 Ring Creek Aquifer

The Ring Creek Aquifer is recharged primarily by seepage from Ring Creek and Skookum Creek (69%). Rainfall and snowmelt seepage through the lava flow formation also recharges the aquifer (31%)¹. A Hydrogeological Assessment conducted in 2014 concluded that the water withdrawn by Powerhouse Springs Well Field is at "low risk of containing pathogens". As such, primary disinfection of the water pumped from the Powerhouse Springs aquifer is not necessary.

3.1.2 Powerhouse Springs Wells Rehabilitation

The District's waterworks department retained a Professional Hydrogeologist and a qualified well maintenance contractor to conduct well rehabilitation works. In spring of 2022 well No. 4 was rehabilitated, and the pump and motor were fully refurbished.

3.1.3 Chlorination of Powerhouse Springs Water

Groundwater pumped out of the Powerhouse Springs well field is chlorinated with sodium hypochlorite to ensure residual free chlorine is maintained within the distribution system. Utilities staff strive to maintain a concentration of 0.20 mg/l minimum free residual chlorine at all points within the distribution system.

In addition to grab sample testing, free chlorine residuals are continuously measured using online chlorine analyzers monitored by SCADA at nine locations throughout the distribution system.

3.2 Emergency Surface Water Sources: Stawamus River & Mashiter Creek

In the event of an emergency or water demand in excess of Powerhouse Springs well field capacity, water drawn from the Stawamus River and Mashiter Creek is treated using sodium hypochlorite chlorination as a primary disinfectant. Surface water sources are prone to variable water quality, unlike groundwater taken from an aquifer. For this reason, if back-up sources are activated, the District will immediately consult with VCH to assess water quality conditions and provide advice. It is likely that a Boil Water Advisory would be implemented should water from either of the surface water sources enter the distribution system. As such, a double block and bleed system is in place to ensure water from surface

¹ Powerhouse Springs Well Protection Plan, Piteau Associates Engineering Ltd, 2014

water sources cannot enter the WS&D system without on-site operator intervention. The District holds a water license for the Stawamus River and Mashiter Creek for 132 L/s and 184 L/s, respectively.

3.3 Potential Risks Under Ongoing Consideration

The District of Squamish is fortunate to have multiple sources of freshwater. However, the District is constantly monitoring the supply and distribution system for potential risks. Risks may include:

- Effects of climate change:
 - Glacier recession and lower than historical average snowpack reducing aquifer recharge rates
 - Increased likelihood of wildfire affecting critical infrastructure (such as Powerhouse Springs)
 - Increased demand due to increased drought conditions
- Increasing population causing increased consumption and requiring capital upgrades to maintain adequate fire flow capacity within the distribution system
- Aging infrastructure causing water loss
- Surface water sources are at risk of contamination from human and animal activity in the catchment area
- Increased development rates causing water main and service breaks during ground disturbance and construction activity

Proactive measures and ongoing maintenance programs in place to mitigate potential risks include:

- An update of the Water Master Plan (WMP) was started in 2022, completion is expected in 2024
- The District of Squamish Asset Management Plan (AMP) was revised in 2022
- A monitoring well is installed upstream of the PHS well field to monitor for fluctuations in aquifer capacity
- A Water Conservation Plan and ongoing program is in place
- A Watershed Protection Plan is
- Community water supply land designations are in place for both emergency surface water sources

4.0 Asset Management, Upgrades, Major Maintenance and Developer Contributions

The District of Squamish maintains and continues to improve its water distribution system to provide the best service possible. The following were some of the key successes from 2022:

- In late 2021 and into 2022, the District upgraded the water distribution system Supervisory Control and Data Acquisition (SCADA) software. The new system provides better data capture resolutions, reporting, user interfaces, remote access, and data manipulation to drive decision making processes and provide better remote monitoring, operation, and alarm notification capacity. Optimization of the new SCADA system is ongoing.
- Annual Capital Asset Replacement Program replaced 760 meters of watermain and associated appurtenances (fire hydrants, valves, service connections, etc.)
- Developer Infrastructure Contributions:
 - 1365 Pemberton Ave (Vantage) – New 150mm service and valves
 - 39666 Government Road (Northyards 1) – New 150mm service and new and/or replacement of 400m of 250mm watermain and 115m of 200mm watermain.
 - 38648 Buckley Ave (Affordable Housing) – New 150mm service, 140m of 200mm watermain and 1 fire hydrant
 - 38012 Third Ave (Ashlu) – New 150mm service, 45m of 300mm watermain and 1 fire hydrant
 - 41811 Hope Road – New 50mm service, fire hydrant and valving
 - Finch Drive to Rave Drive loop – 423m of 300mm watermain, valving and 4 new fire hydrants
 - 41273 Dowad Drive (Skydridge) – New air valve assembly and blow off
 - 1089 Wilson Crescent – New 75mm service and fire hydrant

5.0 Standards & Testing Results for Water Supply System

The District of Squamish holds a “Permit to Operate” a water supply system under VCH. The permit includes conditions that must be met to maintain this permit in good standing which are outlined in the following subsections. A copy of the permit is included in Appendix A - Permit to Operate.

5.1 Bacteriological Sampling

The Districts Permit to Operate requires that the District collect and analyze a minimum of 20 bacteriological samples per month from the distribution system. In 2022 the average number of water samples from the distribution system tested per month was 25.8. Figure 1 shows the number of monthly samples analyzed for bacteriological parameters in 2022. Sample test results are provided in detail in Appendix C - Water Sample Station Locations, and Appendix D - Water Sample Results.

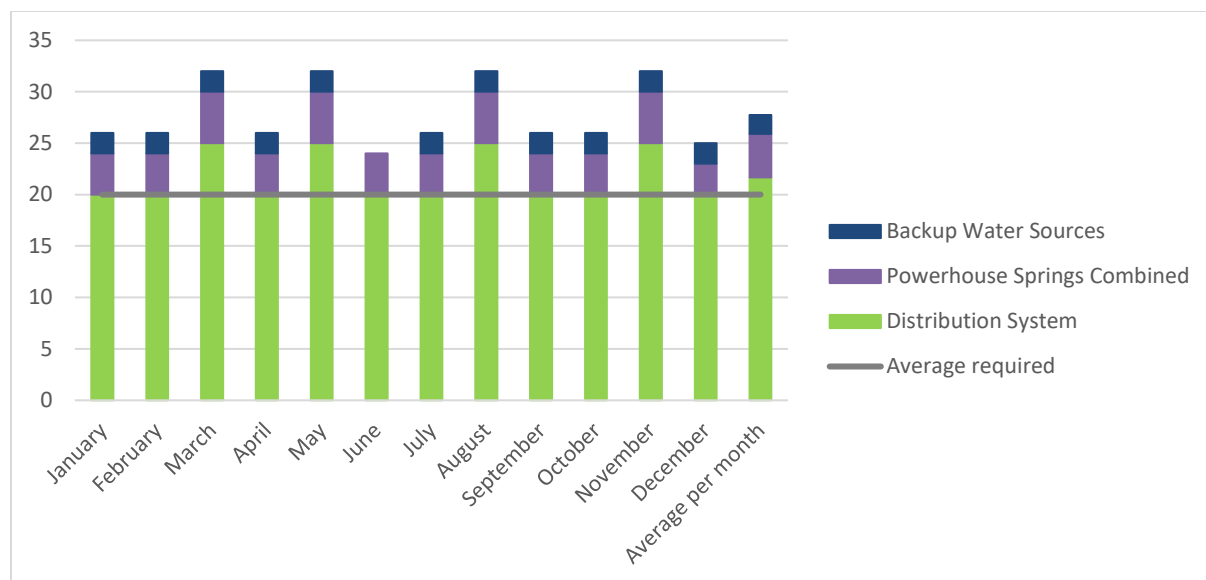


Figure 1. Number of monthly samples analyzed for bacteriological testing for the District of Squamish in 2022.

Water quality standards for potable water² are as follows:

<p style="text-align: center;"><i>Drinking Water Protection Act</i></p> <p style="text-align: center;">DRINKING WATER PROTECTION REGULATION</p> <p style="text-align: center;">[includes amendments up to B.C. Reg. 352/2005, December 9, 2005]</p>	
Parameter:	Standard:
Fecal coliform bacteria	No detectable fecal coliform bacteria per 100 ml
<i>Escherichia coli</i>	No detectable <i>Escherichia coli</i> per 100 ml
Total coliform bacteria	
(a) 1 sample in a 30 day period	No detectable total coliform bacteria per 100 ml
(b) more than 1 sample in a 30 day period	At least 90% of samples have no detectable total coliform bacteria per 100 ml and no sample has more than 10 total coliform bacteria per 100 ml

A summary of the bacteriological testing results for the District of Squamish in 2022 is shown in Table 1.

Table 1. Summary of the bacteriological testing results for the District of Squamish in 2022.

Water Distribution Sample Location	# of Samples	<i>E. coli</i> (EC/100 mL)			Total Coliform (TCU/100 mL)		
		minimum	maximum	average	minimum	maximum	average
Birken	26	<1	<1	<1	<1	<1	<1
Rockridge	26	<1	<1	<1	<1	<1	<1
Perth	26	<1	<1	<1	<1	<1	<1
Progress Way	25	<1	<1	<1	<1	<1	<1
Guildford	26	<1	<1	<1	<1	<1	<1
Quest University	26	<1	<1	<1	<1	<1	<1
Lomond	26	<1	<1	<1	<1	<1	<1
Parkway	26	<1	<1	<1	<1	<1	<1
Pemberton	26	<1	<1	<1	<1	<1	<1
Crumpit Woods	26	<1	<1	<1	<1	<1	<1
Powerhouse Springs (Pre-chlorination)	51	<1	<1	<1	<1	<1	<1
Total Samples:	310						

100% of the total samples tested negative or <1 per/100 mL for Total Coliform and *E.coli* in the distribution system over the monitoring period in 2022.

² http://www.bclaws.ca/civix/document/id/loo72/loo72/200_2003#section2

5.2 Physical and Chemical Parameters

Water is tested for a wide range of physical and chemical parameters carried out by an independent lab to ensure that potable water distributed within the District of Squamish meets the Guidelines for Canadian Drinking Water Quality (GCDWQ). Samples are tested semi-annually for physical and chemical parameters at Powerhouse Springs (the District's primary water source), and annually at Stawamus River and Mashiter Creek (emergency backup water sources). Unfortunately, in 2022 staff mistakenly collected physical and chemical samples from the back-up surface sources twice instead of Powerhouse Springs. This oversight occurred due to internal miscommunication due to staffing turnover and vacancies. Historically chemical, physical and bacterial water quality at Powerhouse Springs has been consistently excellent and many years of sampling results (collected from 2004 to 2021 and also samples collected in the first half of 2023 and included in Appendix E) demonstrate this fact. Staff will ensure chemical / physical samples are collected from Powerhouse Springs in 2023.

In 2023 samples will also be collected and analyzed for disinfection by-products at four (4) sample locations. Disinfection by-products (DPB's) are chemical compounds that form when chlorine compounds react with organic matter dissolved in water. All samples analyzed contained levels of disinfection by-products below the GCDWQ's MAC and detectable threshold.

5.2.1 Water Corrosivity

In 2016, VCH published a flushing guideline to reduce potential lead exposure in drinking water. The most recent version of the flushing guideline can be found in Appendix E. As stated in VCH's flushing guideline, lead may enter private drinking water systems from building plumbing when water sits in pipes for long periods of time, such as overnight or over weekends. This is particularly true for soft (low hardness) and slightly acidic (low pH and alkalinity) water typically found in many water systems in the South Coast of BC.

The current guideline for lead in drinking water is a maximum acceptable concentration (MAC) of 0.005 mg/L. Even though the District's water source contains no detectable lead, the water is soft (low in hardness), low in alkalinity, and exhibits a neutral to slightly basic pH (pH>7). These characteristics mean that the District's water tends to dissolve some materials that it may come into contact with. For example, if water sits unused in building piping for extended periods, it can draw out metals, including lead, from metal fixtures and pipes in homes. The District encourages its residents to follow VCH's flushing guideline to reduce potential lead exposure.

6.0 Conditions of Permit to Operate a Water Supply System

6.1 Cross-Connection Control Program

The District of Squamish continues to operate its Cross Connection Control (CCC) Program to protect the safety of the drinking water system. Contamination of the potable water system can happen from backflow through cross connections with private plumbing systems. A cross connection is a physical connection between a potable water supply system and a source of contamination. A backflow or back-

syphon event is the undesired reverse flow of water creating the potential for contaminants to be drawn back into the potable water supply system if a negative pressure event, such as a water main break, occurs in the system.

The District of Squamish is working to ensure the proper installation of backflow prevention assemblies to mitigate the hazards of cross connections. A backflow prevention assembly is a series of “one-way” valves that only allows water to flow in the desired direction and physically impedes reverse flow.

6.2 Well Protection Plan

Implementation of a Well Protection Plan is a condition of the District’s Permit to Operate. The Powerhouse Springs Well Protection Plan was developed in 2014 for the seven wells operating at Powerhouse Springs well field at the time. The Well Protection Plan can be found on the District’s website. This plan follows the Province of BC “Well Protection Toolkit” which includes defining the well protection area, identifying potential contaminants, developing management strategies and contingency plans, and finally, implementing a monitoring and evaluating the plan.

In accordance with the recommendations of the plan, the District of Squamish has obtained a community watershed land tenure from the Province for the Powerhouse Springs aquifer, controls access to the PHS, Stawamus and Mashiter sources and watersheds via various gates and fences, and has installed signage at the Powerhouse Springs well field to inform road and trail users that they are travelling through the groundwater protection zone. In addition, District staff regularly monitor the water supply sources for activities with the potential to impact water quality and/or quantity.

6.3 Dead-End and Unidirectional Flushing Program

The utilities waterworks crew conducts an annual watermain flushing program to scour water mains. The purpose of this program is to maintain distribution system capacity and remove aged water. The District conducts unidirectional flushing on 20% of the town’s water mains annually and flushes 100% of the dead-end lines each year to ensure water quality.

In 2022 uni-directional flushing program effort was focused in Brackendale (All water system mains North of the Easter Seal Camp). A dead-end flushing program was also completed to remove stagnant water and build up in all areas of the Squamish water system.

6.4 Online Monitoring

District staff continuously monitor the operation of the water supply system using SCADA to monitor the water network in real-time. Collected data ranges from the well field pump output flow, chlorine concentrations in key areas of the distribution system, rainfall accumulation data, reservoir levels, water pressures, etc. Alarms are generated if control point values go below minimum or above maximum thresholds or if equipment fault codes are registered. The SCADA system allows for operational optimization by automatically controlling variables such as reservoir levels and pump outputs to ensure that water is available to meet demand and, in some cases, allows for remote operator intervention if necessary.

As required in the Districts Permit to Operate, surface water sources are monitored for turbidity at both the Stawamus River and Mashiter Creek using online analyzers. If a backup surface water source were to be used, the chlorine levels would also be measured by on-line analyzers and communicated via the SCADA system after chlorine is added to the water entering the distribution system.

6.5 Long-Term Water Supply Strategy

The District of Squamish – Water Master Plan was completed in July 2015. The Water Master Plan can be found on the District’s website. This report analyzed the District’s existing water system, estimated future demands to the year 2031 and provided recommendations for long-term strategies. Recommendations identified in the Water Master Plan include a long-term source development strategy, a water meter implementation strategy, a water conservation plan, a watermain renewal program, and recommendations for Developer Cost Charge (DCC) projects.

Under current growth projections, the current water source capacity at the Powerhouse Springs Well field will be able to service the District beyond 2031. When demand approaches the current water source capacity, the District has several options to provide additional water supply. A replacement well, No. 3B, was drilled in 2018 and brought online in early 2020 to replace well No. 3. It provides additional capacity and increases the total combined well field pumping rate available from Powerhouse Springs. Further upgrades to Powerhouse Springs are included in the District’s 2023 – 2027 Financial Plan.

Although the Stawamus River and Mashiter Creek used to be the primary supply of potable water to the District prior to the development of the Powerhouse Springs well field, they are now only maintained for back-up and emergency purposes. Resuming their use as a primary source would require expensive capital upgrades to provide surface water treatment that meets current regulations and the associated ongoing maintenance costs.

A revision of the District’s Water Master Plan was initiated in 2022 and is expected to be completed in late 2023 or early 2024.

6.5.1 Water System Renewals and Upgrades

Upgrades and replacements to the water distribution system were completed in 2022 and included water main replacement on Reid Place, Reid Crescent, and the bridge crossing on third Avenue tide gate / bridge. In total 760m of water main was replaced. System maintenance and upgrades will continue in future years as per the District’s Asset Management Plan and Water Master Plan recommendations. A revision to the Districts Asset Management Plan was also completed in 2022.

6.5.2 Water Conservation

An important factor considering the rate of growth of the community and aging infrastructure is the need to reduce per capita water consumption to assist in maintaining adequate water supply while reducing the substantial costs associated with building the required infrastructure to increase production and

conveyance capacity. Outdoor water use is the primary target for water use reduction. In 2022 the total combined³ average day demand per capita was 516 L/c/d. Although this value represents a 3% increase over the previous year the District is still on track with the District's Water Conservation Plan reduction target of 1.0 L/c/d each year from 2014 to 2030.

6.5.3 Water Metering

In 2022 the District of Squamish continued its ongoing grant assisted program to install water meters for historically unmetered ICI customers. All new ICI and multi-family buildings are required to have a water meter included in their construction. Existing buildings are having meters installed as part of a multi-year capital project that will progress as funds become available.

6.6 Emergency Response and Contingency Plan

As per the requirements set out in the Districts' Permit to Operate, the District of Squamish reviews and submits updates to the Water System – Emergency Response and Contingency Plan (ERCP) annually. This document provides guidelines for action that will be taken by District staff in the event of an emergency.

The document outlines general actions that will be taken in the event there is a threat to the quality of drinking water, and requires that VCH's Drinking Water Officer (DWO) will be kept well informed. During an emergency, the DWO and other health authority staff will provide advice about public notification and monitoring of water quality, however the District of Squamish Communications Department will take the lead role as spokesperson for media inquiries and releases.

³ Total water consumption including industrial, commercial, institutional, and residential users.

7.0 Significant Events & Public Notification

There were no significant public notifications necessary in 2022 related to the drinking water system. Post pandemic related supply chain, staffing and general resource challenges continue to hamper water system operations, maintenance, replacement, and upgrade works. The District's water supply and distribution staffing levels were severely eroded in 2022 but have been restored as of June of 2023).

In December of 2022 cold weather and winter conditions caused power outages at Powerhouse Springs. This is not an uncommon event, however on December 24th 2022, when the power went out at Powerhouse Springs the back-up generator failed to start. Water system operators were able to maintain pressure in the system by cascading water from storage tanks (reservoirs) just long enough to enable a mechanical contractor to repair the generator and avoid activating surface water sources which most likely would have necessitated a boil water advisory to be put in place. Moving forward the District will continue monthly generator testing and bi-annual 3rd party inspection, maintenance and load testing as part of the annual preventative maintenance program. The District is also considering replacing or adding more back-up power redundancy at PHS to reduce future risk of station power loss.

Fortis BC will be constructing a major natural gas pipeline project from Burnaby to Squamish beginning in 2023. They have requested a Temporary Use Permit (TUP) from the District of Squamish to construct a temporary worker housing camp on a privately owned lot adjacent to the Powerhouse Springs Well Field. Staff have reviewed the proposal and will work with Fortis to mitigate risk and impacts to the water supply and distribution system related to the TUP and resulting camp if it is approved by Council.

7.1 Drinking Water Advisory/Boil Water Advisory

No Drinking Water Advisories or Boil Water Advisories were issued in 2022.

8.0 Operator Qualifications and Training

According to the Drinking Water Protection Regulation, under the Drinking Water Protection Act, staff working on the water system must have a minimum level of certification to match the facility classification and operators are certified by the Environmental Operators Certification Program (EOCP). This ensures that District staff are adequately trained to operate, maintain, and repair water supply and distribution system to protect the safety and quality of drinking water that is delivered to the end user.

The District of Squamish Water Distribution System is classified by the EOCP as a Class 3 facility (WD-III). The District of Squamish provides regular training opportunities to ensure staff maintain their certifications and supports its staff in achieving further education and training in their respective fields to provide the best service to its residents. Environmental Operators Certifications for Water Distribution held for the District of Squamish in 2022 are shown in Table 2.

Table 2. Total number of District of Squamish Utility staff that hold Water Distribution certificates for each level of training in the Environmental Operators Certification Program.

Level of Certification	Water Distribution
Operator in Training	1
Level 1	2
Level 2	2
Level 3	2
Total	7

9.0 Closing

The District of Squamish delivers a very high quality of drinking water to its residents and end users. Citizens of Squamish are fortunate to have access to a plentiful supply of groundwater from the Ring Creek Aquifer as the primary source for drinking water.

In 2022 the District of Squamish met all the conditions set out by VCH in the Districts' Permit to Operate a Water Supply System. In 2022 bacteriological sampling was completed weekly and met the potable water quality standards set out by the BC Drinking Water Protection Act and Regulation. The cross-connection control program, well protection plan and flushing programs were all carried out as outlined in the conditions of the District's Permit to Operate. The SCADA system continues to monitor the water distribution system in real-time and the District of Squamish has a long-term water supply strategy and an up-to-date Emergency Response and Contingency Plan to guide its response during emergency events.

The District continues to work to maintain, replace and upgrade the existing infrastructure, and to integrate operations and maintenance of new infrastructure, while aiming to reduce the overall demand on the system through the Water Conservation Program. Overall, the District of Squamish is proud of the water it delivers to its customers and residents and will continue to strive for the highest quality standards possible.

Appendix A - Permit to Operate



HEALTH PROTECTION

PERMIT TO OPERATE

A Water Supply System

Purveyor: District Of Squamish
Facility Name: District Of Squamish Waterworks

Conditions of Permit

Minimum bacteriological sampling frequency is 20 / month (distribution).
Test for physical and chemical parameters in accordance with your monitoring plan.
Operate in accordance with your Cross-Connection Control Program.
Implement your Well Protection Plan.
Maintain your Unidirectional Flushing Program annually
Maintain continuous on-line monitoring of the water disinfection process.
Maintain continuous on-line turbidity sampling for each surface water source.
Review and update the Emergency Response and Contingency Plan annually.

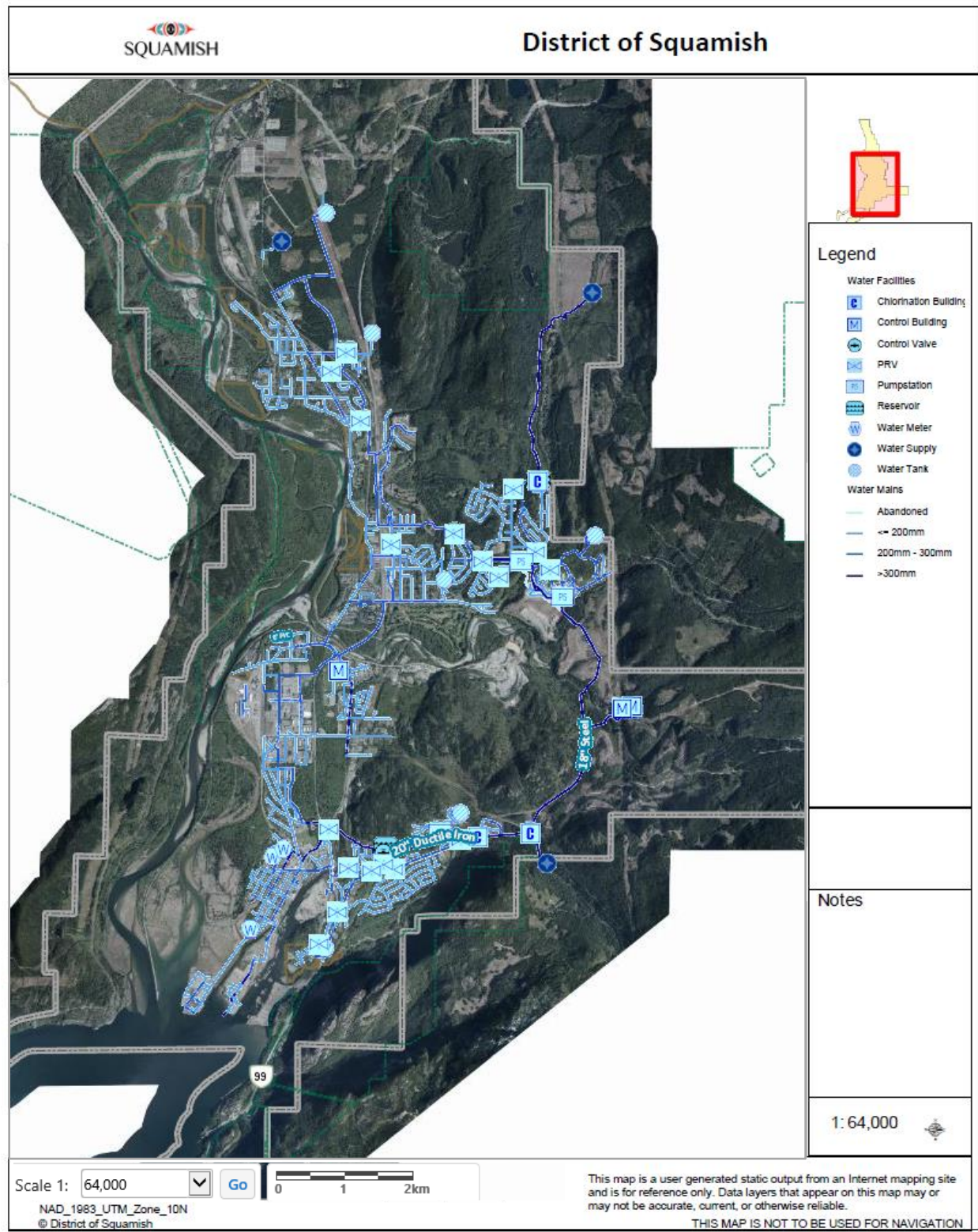
May 21, 1997
Effective Date
June 29, 2021
Revised Date



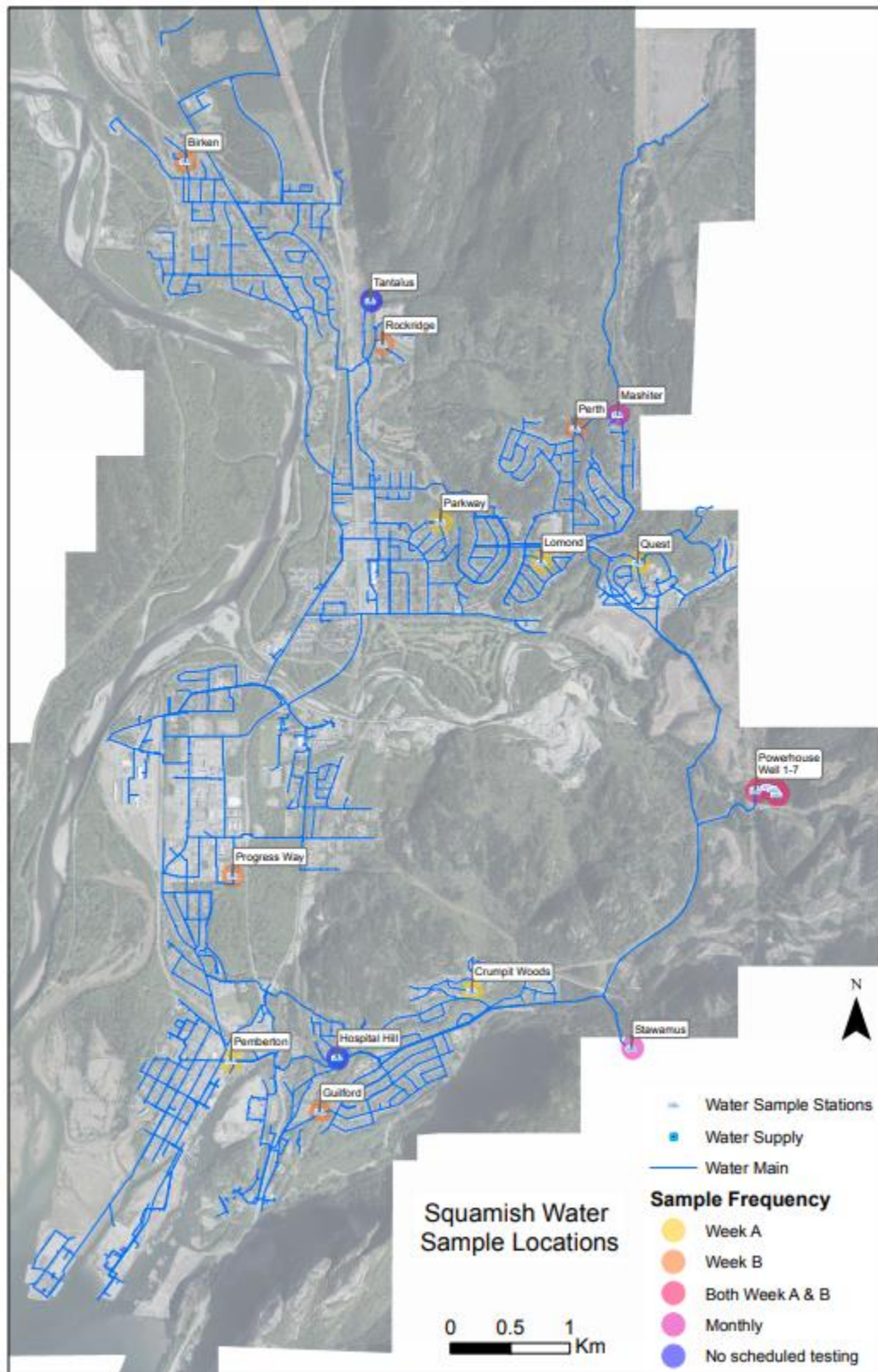
Drinking Water Officer

This permit must be displayed in a conspicuous place and is not transferable

Appendix B - District of Squamish Water Distribution Map



Appendix C - Water Sample Station Locations



Appendix D - VCH Advice re Lead in Drinking Water



Office of the Chief Medical Health Officer
800, 601 West Broadway
Vancouver, BC V5Z 4C2
Tel: 604.675.3900 Toll free 1.855.675.3900
Fax: 604.731.2756

Lead in Drinking Water

Lead is harmful to human health. Health impacts include effects on neurological development and behaviour in children and increased blood pressure and kidney issues in adults. Lead exposure can impact the health of everyone, but lead is more of a risk for pregnant women and young children because infants and children absorb lead more easily than adults and are more susceptible to its harmful effects, such as effects on behaviour and intelligence. The public's overall exposure to lead has decreased over the years as some major sources of lead have been eliminated. However building plumbing systems can still be a source of lead for people consuming the water (in addition to other sources such as food, soil, paint and dust). When there is a risk of lead being present in a buildings water system, steps can be taken to reduce exposure to lead from the drinking water.

What is a safe level?

Health Canada has reduced the maximum acceptable concentration of lead in drinking water to 5 parts per billion while at the same stating that lead levels should be as low as reasonably achievable. There is no known safe level of lead exposure.

What can I do?

The BC Ministry of Health document titled *Lead in Drinking Water* provides details on the issue and steps that can be taken to reduce lead levels in your drinking water:

<https://www.healthlinkbc.ca/hlbc/files/documents/healthfiles/hfile49e.pdf>

Health Canada's document titled: *Drinking water: what about lead?* provides similar details as well as a good description of the sources of lead within a building's plumbing system:

https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt_formats/pdf/pubs/what-about-lead/drinking-water-lead-eng.pdf

Water in Daycares and Homes with Infants

Infants are vulnerable to the effects of lead exposure, and could be highly exposed if they are consuming formula made with tap water from a building plumbing system with lead. Reduction of lead levels by flushing water lines may not be enough to adequately reduce the risk to infants. Additional steps such as the use of filters capable of removing lead or an alternate water source known to be lead free may be required to adequately mitigate the risks.

For licenced daycares VCH staff will work with facility operators to ensure that lead removal procedures are being employed and managed properly.

Testing in schools

Drinking water testing for lead is required in school buildings.
 For more details see the Ministry of Education & Training website:

<https://www2.gov.bc.ca/gov/content/education-training/k-12/administration/legislation-policy/public-schools/testing-lead-content-in-drinking-water?keyword=lead&keyword=testing>

Additional Resources

Health Canada's Water Talk - The guideline for lead in drinking water:

<https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/water-quality/water-talk-minimizing-exposure-lead-drinking-water-distribution-systems.html#s5>

Guidelines for Canadian Drinking Water Quality: Guideline Technical Document – Lead:

<https://www.canada.ca/en/health-canada/services/publications/healthy-living/guidelines-canadian-drinking-water-quality-guideline-technical-document-lead.html>

Canadian water & Wastewater Association - Fact Sheet on LEAD (Pb)

http://www.cwwa.ca/pdf_files/CWWA_Lead%20Facts_2019.pdf

Contact information for Vancouver Coastal Health Environmental Health:

Area	Phone Number
Central Coast	604-983-6700
North Vancouver	604-983-6700
Powell River	604-485-3310
Richmond	604-233-3147
Sechelt	604-885-5164
Squamish	604-892-2293
Vancouver	604-675-3800
Whistler	604-932-3202

Appendix E - Sampling reports

1. Weekly Water Sample Results
2. Annual River Source Samples September 2022
3. Semi-Annual Samples May 2023

CERTIFICATE OF ANALYSIS

Work Order : **VA22C3143**
Client : **District of Squamish**
Contact : **Calem Gardner**
Address : **39907 Government Road PO Box 310**
Squamish BC Canada V8B 0A3
Telephone : **----**
Project : **Annual River Source Samples**
PO : **124710**
C-O-C number : **20-1017093**
Sampler : **Craig**
Site : **----**
Quote number : **----**
No. of samples received : **2**
No. of samples analysed : **2**

Page : **1 of 5**
Laboratory : **Vancouver - Environmental**
Account Manager : **Ian Chen**
Address : **8081 Lougheed Highway**
Burnaby BC Canada V5A 1W9
Telephone : **+1 604 253 4188**
Date Samples Received : **26-Sep-2022 12:50**
Date Analysis Commenced : **29-Sep-2022**
Issue Date : **07-Oct-2022 08:50**

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.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Adam Boettger	Team Leader - LCMS	LCMS, Waterloo, Ontario
Brieanna Allen	Production/Validation Manager	Inorganics, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Greg Pokocky	Supervisor - Inorganic	Inorganics, Waterloo, Ontario
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Owen Cheng		Metals, 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).

<i>Unit</i>	<i>Description</i>
µS/cm	Microsiemens per centimetre
CU	colour units (1 CU = 1 mg/L Pt)
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

<: 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					Client sample ID	Stawamus	Mashiter	----	----	----
(Matrix: Water)					Client sampling date / time	26-Sep-2022 09:00	26-Sep-2022 08:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22C3143-001	VA22C3143-002	-----	-----	-----	-----
					Result	Result	----	----	----	----
Physical Tests										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	9.2	19.1	----	----	----	----
colour, true	----	E329	5.0	CU	<5.0	<5.0	----	----	----	----
conductivity	----	E100	2.0	µS/cm	60.8	53.3	----	----	----	----
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	20.6	17.3	----	----	----	----
pH	----	E108	0.10	pH units	7.21	7.48	----	----	----	----
solids, total dissolved [TDS]	----	E162	10	mg/L	51	61	----	----	----	----
turbidity	----	E121	0.10	NTU	<0.10	<0.10	----	----	----	----
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	----	----	----	----
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	----	----	----	----
chloride	16887-00-6	E235.Cl	0.50	mg/L	0.72	0.64	----	----	----	----
fluoride	16984-48-8	E235.F	0.020	mg/L	0.048	0.034	----	----	----	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0968	0.0359	----	----	----	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	----	----	----	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	16.0	5.16	----	----	----	----
Cyanides										
cyanide, strong acid dissociable (total)	----	E333	0.0050	mg/L	<0.0050	<0.0050	----	----	----	----
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0806	0.0198	----	----	----	----
antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	----	----	----	----
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00016	0.00030	----	----	----	----
barium, total	7440-39-3	E420	0.00010	mg/L	0.00894	0.00356	----	----	----	----
beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	----	----	----	----
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	----	----	----	----
boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	----	----	----	----
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000509	<0.0000050	----	----	----	----
calcium, total	7440-70-2	E420	0.050	mg/L	7.00	5.59	----	----	----	----
cesium, total	7440-46-2	E420	0.000010	mg/L	<0.000010	<0.000010	----	----	----	----
chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	----	----	----	----
cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00036	<0.00010	----	----	----	----



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Stawamus	Mashiter	----	----	----
Client sampling date / time					26-Sep-2022 09:00	26-Sep-2022 08:00	----	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22C3143-001	VA22C3143-002	-----	-----	-----	-----
					Result	Result	----	----	----	----
Total Metals										
copper, total	7440-50-8	E420	0.00050	mg/L	0.0101	<0.00050	----	----	----	----
iron, total	7439-89-6	E420	0.010	mg/L	<0.010	<0.010	----	----	----	----
lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	<0.000050	----	----	----	----
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	0.0023	----	----	----	----
magnesium, total	7439-95-4	E420	0.0050	mg/L	0.769	0.808	----	----	----	----
manganese, total	7439-96-5	E420	0.00010	mg/L	0.00994	0.00033	----	----	----	----
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	----	----	----	----
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00184	0.000361	----	----	----	----
nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	<0.00050	----	----	----	----
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	----	----	----	----
potassium, total	7440-09-7	E420	0.050	mg/L	0.317	0.728	----	----	----	----
rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00043	0.00115	----	----	----	----
selenium, total	7782-49-2	E420	0.000050	mg/L	<0.000050	<0.000050	----	----	----	----
silicon, total	7440-21-3	E420	0.10	mg/L	4.21	13.0	----	----	----	----
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	----	----	----	----
sodium, total	7440-23-5	E420	0.050	mg/L	2.03	3.33	----	----	----	----
strontium, total	7440-24-6	E420	0.00020	mg/L	0.0359	0.0444	----	----	----	----
sulfur, total	7704-34-9	E420	0.50	mg/L	4.96	1.52	----	----	----	----
tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	----	----	----	----
thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	----	----	----	----
thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	----	----	----	----
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	----	----	----	----
titanium, total	7440-32-6	E420	0.00030	mg/L	<0.00030	<0.00030	----	----	----	----
tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	----	----	----	----
uranium, total	7440-61-1	E420	0.000010	mg/L	0.000297	<0.000010	----	----	----	----
vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	0.00277	----	----	----	----
zinc, total	7440-66-6	E420	0.0030	mg/L	0.0068	<0.0030	----	----	----	----
zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	----	----	----	----
Disinfectant By-Products										
bromate	15541-45-4	E722A	0.00030	mg/L	<0.00030	<0.00030	----	----	----	----
chlorate	14866-68-3	E409.CLO3	0.010	mg/L	<0.010	<0.010	----	----	----	----



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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA22C3143	Page	: 1 of 12
Client	: District of Squamish	Laboratory	: Vancouver - Environmental
Contact	: Calem Gardner	Account Manager	: Ian Chen
Address	: 39907 Government Road PO Box 310 Squamish BC Canada V8B 0A3	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Annual River Source Samples	Date Samples Received	: 26-Sep-2022 12:50
PO	: 124710	Issue Date	: 07-Oct-2022 08:50
C-O-C number	: 20-1017093		
Sampler	: Craig		
Site	: ----		
Quote number	: ----		
No. of samples received	: 2		
No. of samples analysed	: 2		

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 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	
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Mashiter	E298	26-Sep-2022	30-Sep-2022	----	----		02-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Stawamus	E298	26-Sep-2022	30-Sep-2022	----	----		02-Oct-2022	28 days	6 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE Mashiter	E235.Br-L	26-Sep-2022	29-Sep-2022	----	----		29-Sep-2022	28 days	3 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE Stawamus	E235.Br-L	26-Sep-2022	29-Sep-2022	----	----		29-Sep-2022	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Mashiter	E235.Cl	26-Sep-2022	29-Sep-2022	----	----		29-Sep-2022	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Stawamus	E235.Cl	26-Sep-2022	29-Sep-2022	----	----		29-Sep-2022	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Mashiter	E235.F	26-Sep-2022	29-Sep-2022	----	----		29-Sep-2022	28 days	3 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group 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	
Anions and Nutrients : Fluoride in Water by IC										
HDPE Stawamus	E235.F	26-Sep-2022	29-Sep-2022	----	----		29-Sep-2022	28 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Mashiter	E235.NO3-L	26-Sep-2022	29-Sep-2022	3 days	3 days	✓	29-Sep-2022	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Stawamus	E235.NO3-L	26-Sep-2022	29-Sep-2022	3 days	3 days	✓	29-Sep-2022	3 days	0 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Mashiter	E235.NO2-L	26-Sep-2022	29-Sep-2022	----	----		29-Sep-2022	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Stawamus	E235.NO2-L	26-Sep-2022	29-Sep-2022	----	----		29-Sep-2022	3 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE Mashiter	E235.SO4	26-Sep-2022	29-Sep-2022	----	----		29-Sep-2022	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE Stawamus	E235.SO4	26-Sep-2022	29-Sep-2022	----	----		29-Sep-2022	28 days	3 days	✓
Cyanides : Total Cyanide										
UV-inhibited HDPE - total (sodium hydroxide) Mashiter	E333	26-Sep-2022	05-Oct-2022	----	----		05-Oct-2022	14 days	9 days	✓
Cyanides : Total Cyanide										
UV-inhibited HDPE - total (sodium hydroxide) Stawamus	E333	26-Sep-2022	05-Oct-2022	----	----		05-Oct-2022	14 days	9 days	✓



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

Analyte Group 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	
Disinfectant By-Products : Bromate and Perchlorate in Water by LC-MS-MS										
Opaque HDPE (EDA) Mashiter	E722A	26-Sep-2022	03-Oct-2022	28 days	7 days	✓	04-Oct-2022	28 days	1 days	✓
Disinfectant By-Products : Bromate and Perchlorate in Water by LC-MS-MS										
Opaque HDPE (EDA) Stawamus	E722A	26-Sep-2022	03-Oct-2022	28 days	7 days	✓	04-Oct-2022	28 days	1 days	✓
Disinfectant By-Products : Chlorate (CLO3) in Waters by Ion Chromatography										
Opaque HDPE (EDA) Mashiter	E409.CLO3	26-Sep-2022	03-Oct-2022	----	----		03-Oct-2022	28 days	7 days	✓
Disinfectant By-Products : Chlorate (CLO3) in Waters by Ion Chromatography										
Opaque HDPE (EDA) Stawamus	E409.CLO3	26-Sep-2022	03-Oct-2022	----	----		03-Oct-2022	28 days	7 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Mashiter	E290	26-Sep-2022	29-Sep-2022	----	----		30-Sep-2022	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Stawamus	E290	26-Sep-2022	29-Sep-2022	----	----		30-Sep-2022	14 days	5 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE Mashiter	E329	26-Sep-2022	29-Sep-2022	----	----		29-Sep-2022	3 days	3 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE Stawamus	E329	26-Sep-2022	29-Sep-2022	----	----		29-Sep-2022	3 days	3 days	✓
Physical Tests : Conductivity in Water										
HDPE Mashiter	E100	26-Sep-2022	29-Sep-2022	----	----		30-Sep-2022	28 days	5 days	✓



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

Analyte Group 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 : Conductivity in Water										
HDPE Stawamus	E100	26-Sep-2022	29-Sep-2022	----	----		30-Sep-2022	28 days	5 days	✓
Physical Tests : pH by Meter										
HDPE Mashiter	E108	26-Sep-2022	29-Sep-2022	----	----		30-Sep-2022	0.25 hrs	36.25 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE Stawamus	E108	26-Sep-2022	29-Sep-2022	----	----		30-Sep-2022	0.25 hrs	36.25 hrs	✖ EHTR-FM
Physical Tests : TDS by Gravimetry										
HDPE Mashiter	E162	26-Sep-2022	----	----	----		30-Sep-2022	7 days	4 days	✓
Physical Tests : TDS by Gravimetry										
HDPE Stawamus	E162	26-Sep-2022	----	----	----		30-Sep-2022	7 days	4 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE Mashiter	E121	26-Sep-2022	----	----	----		29-Sep-2022	3 days	3 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE Stawamus	E121	26-Sep-2022	----	----	----		29-Sep-2022	3 days	3 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) Mashiter	E508	26-Sep-2022	29-Sep-2022	----	----		29-Sep-2022	28 days	3 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) Stawamus	E508	26-Sep-2022	29-Sep-2022	----	----		29-Sep-2022	28 days	3 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group 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	
Total Metals : Total metals in Water by CRC ICPMS										
HDPE total (nitric acid) Mashiter	E420	26-Sep-2022	02-Oct-2022	----	----		02-Oct-2022	180 days	6 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE total (nitric acid) Stawamus	E420	26-Sep-2022	02-Oct-2022	----	----		02-Oct-2022	180 days	6 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	Method	QC Lot #	Count		Frequency (%)		
Analytical Methods			QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	671507	1	18	5.5	5.0	✔
Ammonia by Fluorescence	E298	674604	1	19	5.2	5.0	✔
Bromate and Perchlorate in Water by LC-MS-MS	E722A	677469	1	6	16.6	5.0	✔
Bromide in Water by IC (Low Level)	E235.Br-L	671504	1	9	11.1	5.0	✔
Chlorate (CLO3) in Waters by Ion Chromatography	E409.CLO3	677498	1	3	33.3	5.0	✔
Chloride in Water by IC	E235.Cl	671500	1	11	9.0	5.0	✔
Colour (True) by Spectrometer (5 CU)	E329	671509	1	6	16.6	5.0	✔
Conductivity in Water	E100	671506	1	11	9.0	5.0	✔
Fluoride in Water by IC	E235.F	671503	1	10	10.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	671501	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	671502	1	20	5.0	5.0	✔
pH by Meter	E108	671505	1	11	9.0	5.0	✔
Sulfate in Water by IC	E235.SO4	671499	1	11	9.0	5.0	✔
TDS by Gravimetry	E162	674175	1	20	5.0	5.0	✔
Total Cyanide	E333	682169	1	7	14.2	5.0	✔
Total Mercury in Water by CVAAS	E508	672295	1	20	5.0	5.0	✔
Total metals in Water by CRC ICPMS	E420	673544	1	20	5.0	5.0	✔
Turbidity by Nephelometry	E121	671914	1	20	5.0	5.0	✔
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	671507	1	18	5.5	5.0	✔
Ammonia by Fluorescence	E298	674604	1	19	5.2	5.0	✔
Bromate and Perchlorate in Water by LC-MS-MS	E722A	677469	1	6	16.6	5.0	✔
Bromide in Water by IC (Low Level)	E235.Br-L	671504	1	9	11.1	5.0	✔
Chlorate (CLO3) in Waters by Ion Chromatography	E409.CLO3	677498	1	3	33.3	5.0	✔
Chloride in Water by IC	E235.Cl	671500	1	11	9.0	5.0	✔
Colour (True) by Spectrometer (5 CU)	E329	671509	1	6	16.6	5.0	✔
Conductivity in Water	E100	671506	1	11	9.0	5.0	✔
Fluoride in Water by IC	E235.F	671503	1	10	10.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	671501	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	671502	1	20	5.0	5.0	✔
pH by Meter	E108	671505	1	11	9.0	5.0	✔
Sulfate in Water by IC	E235.SO4	671499	1	11	9.0	5.0	✔
TDS by Gravimetry	E162	674175	1	20	5.0	5.0	✔
Total Cyanide	E333	682169	1	7	14.2	5.0	✔
Total Mercury in Water by CVAAS	E508	672295	1	20	5.0	5.0	✔
Total metals in Water by CRC ICPMS	E420	673544	1	20	5.0	5.0	✔
Turbidity by Nephelometry	E121	671914	1	20	5.0	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
Method Blanks (MB)							
Alkalinity Species by Titration	E290	671507	1	18	5.5	5.0	✔
Ammonia by Fluorescence	E298	674604	1	19	5.2	5.0	✔
Bromate and Perchlorate in Water by LC-MS-MS	E722A	677469	1	6	16.6	5.0	✔
Bromide in Water by IC (Low Level)	E235.Br-L	671504	1	9	11.1	5.0	✔
Chlorate (CLO3) in Waters by Ion Chromatography	E409.CLO3	677498	1	3	33.3	5.0	✔
Chloride in Water by IC	E235.Cl	671500	1	11	9.0	5.0	✔
Colour (True) by Spectrometer (5 CU)	E329	671509	1	6	16.6	5.0	✔
Conductivity in Water	E100	671506	1	11	9.0	5.0	✔
Fluoride in Water by IC	E235.F	671503	1	10	10.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	671501	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	671502	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	671499	1	11	9.0	5.0	✔
TDS by Gravimetry	E162	674175	1	20	5.0	5.0	✔
Total Cyanide	E333	682169	1	7	14.2	5.0	✔
Total Mercury in Water by CVAAS	E508	672295	1	20	5.0	5.0	✔
Total metals in Water by CRC ICPMS	E420	673544	1	20	5.0	5.0	✔
Turbidity by Nephelometry	E121	671914	1	20	5.0	5.0	✔
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	674604	1	19	5.2	5.0	✔
Bromate and Perchlorate in Water by LC-MS-MS	E722A	677469	1	6	16.6	5.0	✔
Bromide in Water by IC (Low Level)	E235.Br-L	671504	1	9	11.1	5.0	✔
Chlorate (CLO3) in Waters by Ion Chromatography	E409.CLO3	677498	1	3	33.3	5.0	✔
Chloride in Water by IC	E235.Cl	671500	1	11	9.0	5.0	✔
Fluoride in Water by IC	E235.F	671503	1	10	10.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	671501	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	671502	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	671499	1	11	9.0	5.0	✔
Total Cyanide	E333	682169	1	7	14.2	5.0	✔
Total Mercury in Water by CVAAS	E508	672295	1	20	5.0	5.0	✔
Total metals in Water by CRC ICPMS	E420	673544	1	20	5.0	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
Conductivity in Water	E100 Vancouver - Environmental	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 Vancouver - Environmental	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 Vancouver - Environmental	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 Vancouver - Environmental	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 Vancouver - Environmental	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 Vancouver - Environmental	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 Vancouver - Environmental	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 Vancouver - Environmental	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 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	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
Alkalinity Species by Titration	E290 Vancouver - Environmental	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 Vancouver - Environmental	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)
Colour (True) by Spectrometer (5 CU)	E329 Vancouver - Environmental	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 Vancouver - Environmental	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 colourimetric analysis. Method Limitation: High levels of thiocyanate (SCN) may cause positive interference (up to 0.5% of SCN concentration).
Chlorate (CLO ₃) in Waters by Ion Chromatography	E409.CLO ₃ Waterloo - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity detection.
Total metals in Water by CRC ICPMS	E420 Vancouver - Environmental	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.
Total Mercury in Water by CVAAS	E508 Vancouver - Environmental	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
Bromate and Perchlorate in Water by LC-MS-MS	E722A Waterloo - Environmental	Water	EPA 6850	A aliquot of the water sample is filtered and an internal standard is added. The sample is then analyzed by LC/MS/MS.
Hardness (Calculated) from Total Ca/Mg	EC100A Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO ₃), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO ₃ 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.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 Vancouver - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.

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Work Order : VA22C3143
Client : District of Squamish
Project : Annual River Source Samples



Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation of Bromate and Perchlorate in Water by LC-MS-MS	EP722 Waterloo - Environmental	Water	EPA 6850	An aliquot of the water sample is filtered if required and internal standard is added.

QUALITY CONTROL REPORT

Work Order	: VA22C3143	Page	: 1 of 14
Client	: District of Squamish	Laboratory	: Vancouver - Environmental
Contact	: Calem Gardner	Account Manager	: Ian Chen
Address	: 39907 Government Road PO Box 310 Squamish BC Canada V8B 0A3	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Annual River Source Samples	Date Samples Received	: 26-Sep-2022 12:50
PO	: 124710	Date Analysis Commenced	: 29-Sep-2022
C-O-C number	: 20-1017093	Issue Date	: 07-Oct-2022 08:50
Sampler	: Craig		
Site	: ----		
Quote number	: ----		
No. of samples received	: 2		
No. of samples analysed	: 2		

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.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Adam Boettger	Team Leader - LCMS	Waterloo LCMS, Waterloo, Ontario
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Kim Jensen	Department Manager - Metals	Vancouver Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Vancouver Inorganics, Burnaby, British Columbia
Owen Cheng		Vancouver Metals, 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: 671505)											
KS2203630-001	Anonymous	pH	----	E108	0.10	pH units	8.51	8.50	0.0706%	4%	----
Physical Tests (QC Lot: 671506)											
KS2203630-001	Anonymous	conductivity	----	E100	2.0	µS/cm	422	423	0.237%	10%	----
Physical Tests (QC Lot: 671507)											
KS2203630-001	Anonymous	alkalinity, total (as CaCO ₃)	----	E290	1.0	mg/L	229	232	1.35%	20%	----
Physical Tests (QC Lot: 671509)											
KS2203630-001	Anonymous	colour, true	----	E329	5.0	CU	<5.0	<5.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 671914)											
FJ2202722-001	Anonymous	turbidity	----	E121	0.10	NTU	0.54	0.49	0.04	Diff <2x LOR	----
Physical Tests (QC Lot: 674175)											
KS2203679-001	Anonymous	solids, total dissolved [TDS]	----	E162	13	mg/L	49	52	3	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 671499)											
VA22C3143-001	Stawamus	sulfate (as SO ₄)	14808-79-8	E235.SO4	0.30	mg/L	16.0	16.0	0.271%	20%	----
Anions and Nutrients (QC Lot: 671500)											
VA22C3143-001	Stawamus	chloride	16887-00-6	E235.Cl	0.50	mg/L	0.72	0.71	0.006	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 671501)											
VA22C3143-001	Stawamus	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0968	0.0964	0.442%	20%	----
Anions and Nutrients (QC Lot: 671502)											
VA22C3143-001	Stawamus	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 671503)											
VA22C3143-001	Stawamus	fluoride	16984-48-8	E235.F	0.020	mg/L	0.048	0.046	0.002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 671504)											
VA22C3143-001	Stawamus	bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 674604)											
FJ2202776-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0057	0.0055	0.0002	Diff <2x LOR	----
Cyanides (QC Lot: 682169)											
VA22C3131-002	Anonymous	cyanide, strong acid dissociable (total)	----	E333	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Total Metals (QC Lot: 672295)											
KS2203616-001	Anonymous	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Total Metals (QC Lot: 673544)											
VA22C3258-001	Anonymous	aluminum, total	7429-90-5	E420	0.0030	mg/L	0.213	0.222	3.87%	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
Total Metals (QC Lot: 673544) - continued											
VA22C3258-001	Anonymous	antimony, total	7440-36-0	E420	0.00010	mg/L	0.00641	0.00652	1.78%	20%	----
		arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00419	0.00406	3.29%	20%	----
		barium, total	7440-39-3	E420	0.00010	mg/L	0.0574	0.0568	1.06%	20%	----
		beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		boron, total	7440-42-8	E420	0.010	mg/L	0.052	0.051	0.0008	Diff <2x LOR	----
		cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000184	0.0000162	0.0000022	Diff <2x LOR	----
		calcium, total	7440-70-2	E420	0.050	mg/L	19.5	19.5	0.248%	20%	----
		cesium, total	7440-46-2	E420	0.000010	mg/L	0.00119	0.00123	3.33%	20%	----
		chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00010	0.00010	0.000002	Diff <2x LOR	----
		copper, total	7440-50-8	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		iron, total	7439-89-6	E420	0.010	mg/L	0.144	0.149	3.42%	20%	----
		lead, total	7439-92-1	E420	0.000050	mg/L	0.000727	0.000732	0.585%	20%	----
		lithium, total	7439-93-2	E420	0.0010	mg/L	0.0371	0.0367	1.28%	20%	----
		magnesium, total	7439-95-4	E420	0.0050	mg/L	1.16	1.14	1.96%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	0.0197	0.0195	1.08%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00561	0.00574	2.17%	20%	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, total	7440-09-7	E420	0.050	mg/L	7.64	7.53	1.43%	20%	----
		rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00928	0.00921	0.735%	20%	----
		selenium, total	7782-49-2	E420	0.000050	mg/L	0.000683	0.000724	5.86%	20%	----
		silicon, total	7440-21-3	E420	0.10	mg/L	1.50	1.68	11.6%	20%	----
		silver, total	7440-22-4	E420	0.000010	mg/L	0.000012	0.000012	0.0000002	Diff <2x LOR	----
		sodium, total	7440-23-5	E420	0.050	mg/L	20.0	19.1	4.56%	20%	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	0.363	0.368	1.31%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	15.8	14.8	6.31%	20%	----
		tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		thallium, total	7440-28-0	E420	0.000010	mg/L	0.000036	0.000037	0.0000010	Diff <2x LOR	----
		thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		titanium, total	7440-32-6	E420	0.00030	mg/L	0.00363	0.00354	2.64%	20%	----
		tungsten, total	7440-33-7	E420	0.00010	mg/L	0.00060	0.00060	0.000002	Diff <2x LOR	----
		uranium, total	7440-61-1	E420	0.000010	mg/L	0.000317	0.000314	0.949%	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
Total Metals (QC Lot: 673544) - continued											
VA22C3258-001	Anonymous	vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----
		zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Disinfectant By-Products (QC Lot: 677469)											
EO2208089-001	Anonymous	bromate	15541-45-4	E722A	0.30	µg/L	3.65	3.50	4.08%	30%	----
Disinfectant By-Products (QC Lot: 677498)											
EO2208089-001	Anonymous	chlorate	14866-68-3	E409.CLO3	0.050	mg/L	0.454	0.432	0.022	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: 671506)						
conductivity	----	E100	1	µS/cm	1.0	----
Physical Tests (QCLot: 671507)						
alkalinity, total (as CaCO ₃)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 671509)						
colour, true	----	E329	5	CU	<5.0	----
Physical Tests (QCLot: 671914)						
turbidity	----	E121	0.1	NTU	<0.10	----
Physical Tests (QCLot: 674175)						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Anions and Nutrients (QCLot: 671499)						
sulfate (as SO ₄)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 671500)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 671501)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 671502)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 671503)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 671504)						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 674604)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Cyanides (QCLot: 682169)						
cyanide, strong acid dissociable (total)	----	E333	0.002	mg/L	<0.0020	----
Total Metals (QCLot: 672295)						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Total Metals (QCLot: 673544)						
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	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 673544) - continued						
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	----
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	----
Disinfectant By-Products (QCLot: 677469)						
bromate	15541-45-4	E722A	0.3	µg/L	<0.30	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Disinfectant By-Products (QCLot: 677498)						
chlorate	14866-68-3	E409.CLO3	0.01	mg/L	<0.010	----



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	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 671505)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 671506)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	98.4	90.0	110	----
Physical Tests (QCLot: 671507)									
alkalinity, total (as CaCO ₃)	----	E290	1	mg/L	500 mg/L	109	85.0	115	----
Physical Tests (QCLot: 671509)									
colour, true	----	E329	5	CU	100 CU	100	85.0	115	----
Physical Tests (QCLot: 671914)									
turbidity	----	E121	0.1	NTU	200 NTU	99.0	85.0	115	----
Physical Tests (QCLot: 674175)									
solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	104	85.0	115	----
Anions and Nutrients (QCLot: 671499)									
sulfate (as SO ₄)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	105	90.0	110	----
Anions and Nutrients (QCLot: 671500)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 671501)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 671502)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	98.4	90.0	110	----
Anions and Nutrients (QCLot: 671503)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 671504)									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	99.3	85.0	115	----
Anions and Nutrients (QCLot: 674604)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	96.1	85.0	115	----
Cyanides (QCLot: 682169)									
cyanide, strong acid dissociable (total)	----	E333	0.002	mg/L	0.25 mg/L	89.7	80.0	120	----
Total Metals (QCLot: 672295)									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	103	80.0	120	----
Total Metals (QCLot: 673544)									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	101	80.0	120	----



Sub-Matrix: Water

Sub-Matrix: Water					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 673544) - continued									
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	110	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	108	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	107	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	102	80.0	120	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	108	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	86.2	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	103	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	104	80.0	120	----
cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	101	80.0	120	----
chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	102	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	104	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	106	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	104	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	98.4	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	104	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	99.9	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	109	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	100	80.0	120	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	106	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	109	80.0	120	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	104	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	102	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	99.3	80.0	120	----
sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	105	80.0	120	----
strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	104	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	95.1	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	102	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	108	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	103	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	102	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	95.4	80.0	120	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	103	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	106	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	105	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	101	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	99.5	80.0	120	----



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Disinfectant By-Products (QCLot: 677469)									
bromate	15541-45-4	E722A	0.3	µg/L	4 µg/L	93.1	70.0	130	----
Disinfectant By-Products (QCLot: 677498)									
chlorate	14866-68-3	E409.CLO3	0.01	mg/L	1 mg/L	99.4	85.0	115	----



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: 671499)										
VA22C3143-002	Mashiter	sulfate (as SO4)	14808-79-8	E235.SO4	108 mg/L	100 mg/L	108	75.0	125	----
Anions and Nutrients (QCLot: 671500)										
VA22C3143-002	Mashiter	chloride	16887-00-6	E235.Cl	107 mg/L	100 mg/L	107	75.0	125	----
Anions and Nutrients (QCLot: 671501)										
VA22C3143-002	Mashiter	nitrate (as N)	14797-55-8	E235.NO3-L	2.70 mg/L	2.5 mg/L	108	75.0	125	----
Anions and Nutrients (QCLot: 671502)										
VA22C3143-002	Mashiter	nitrite (as N)	14797-65-0	E235.NO2-L	0.508 mg/L	0.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 671503)										
VA22C3143-002	Mashiter	fluoride	16984-48-8	E235.F	1.06 mg/L	1 mg/L	106	75.0	125	----
Anions and Nutrients (QCLot: 671504)										
VA22C3143-002	Mashiter	bromide	24959-67-9	E235.Br-L	0.515 mg/L	0.5 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 674604)										
FJ2202776-002	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0985 mg/L	0.1 mg/L	98.5	75.0	125	----
Cyanides (QCLot: 682169)										
VA22C3134-001	Anonymous	cyanide, strong acid dissociable (total)	----	E333	0.225 mg/L	0.25 mg/L	89.9	75.0	125	----
Total Metals (QCLot: 672295)										
KS2203630-001	Anonymous	mercury, total	7439-97-6	E508	0.000102 mg/L	0.0001 mg/L	102	70.0	130	----
Total Metals (QCLot: 673544)										
VA22C3258-002	Anonymous	aluminum, total	7429-90-5	E420	ND mg/L	0.2 mg/L	ND	70.0	130	----
		antimony, total	7440-36-0	E420	0.0195 mg/L	0.02 mg/L	97.6	70.0	130	----
		arsenic, total	7440-38-2	E420	0.0190 mg/L	0.02 mg/L	94.9	70.0	130	----
		barium, total	7440-39-3	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		beryllium, total	7440-41-7	E420	0.0369 mg/L	0.04 mg/L	92.2	70.0	130	----
		bismuth, total	7440-69-9	E420	0.00956 mg/L	0.01 mg/L	95.6	70.0	130	----
		boron, total	7440-42-8	E420	0.077 mg/L	0.1 mg/L	77.2	70.0	130	----
		cadmium, total	7440-43-9	E420	0.00382 mg/L	0.004 mg/L	95.5	70.0	130	----
		calcium, total	7440-70-2	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		cesium, total	7440-46-2	E420	0.00969 mg/L	0.01 mg/L	96.9	70.0	130	----
		chromium, total	7440-47-3	E420	0.0368 mg/L	0.04 mg/L	91.9	70.0	130	----
		cobalt, total	7440-48-4	E420	0.0193 mg/L	0.02 mg/L	96.4	70.0	130	----



Sub-Matrix: **Water**

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: 673544) - continued										
VA22C3258-002	Anonymous	copper, total	7440-50-8	E420	0.0188 mg/L	0.02 mg/L	94.0	70.0	130	----
		iron, total	7439-89-6	E420	1.89 mg/L	2 mg/L	94.4	70.0	130	----
		lead, total	7439-92-1	E420	0.0184 mg/L	0.02 mg/L	92.2	70.0	130	----
		lithium, total	7439-93-2	E420	0.0868 mg/L	0.1 mg/L	86.8	70.0	130	----
		magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, total	7439-96-5	E420	0.0184 mg/L	0.02 mg/L	92.0	70.0	130	----
		molybdenum, total	7439-98-7	E420	0.0204 mg/L	0.02 mg/L	102	70.0	130	----
		nickel, total	7440-02-0	E420	0.0376 mg/L	0.04 mg/L	94.0	70.0	130	----
		phosphorus, total	7723-14-0	E420	9.83 mg/L	10 mg/L	98.3	70.0	130	----
		potassium, total	7440-09-7	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		rubidium, total	7440-17-7	E420	0.0189 mg/L	0.02 mg/L	94.4	70.0	130	----
		selenium, total	7782-49-2	E420	0.0398 mg/L	0.04 mg/L	99.4	70.0	130	----
		silicon, total	7440-21-3	E420	9.24 mg/L	10 mg/L	92.4	70.0	130	----
		silver, total	7440-22-4	E420	0.00408 mg/L	0.004 mg/L	102	70.0	130	----
		sodium, total	7440-23-5	E420	ND mg/L	2 mg/L	ND	70.0	130	----
		strontium, total	7440-24-6	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		sulfur, total	7704-34-9	E420	18.6 mg/L	20 mg/L	92.8	70.0	130	----
		tellurium, total	13494-80-9	E420	0.0386 mg/L	0.04 mg/L	96.6	70.0	130	----
		thallium, total	7440-28-0	E420	0.00371 mg/L	0.004 mg/L	92.7	70.0	130	----
		thorium, total	7440-29-1	E420	0.0207 mg/L	0.02 mg/L	103	70.0	130	----
		tin, total	7440-31-5	E420	0.0190 mg/L	0.02 mg/L	94.9	70.0	130	----
		titanium, total	7440-32-6	E420	0.0350 mg/L	0.04 mg/L	87.4	70.0	130	----
		tungsten, total	7440-33-7	E420	0.0188 mg/L	0.02 mg/L	94.0	70.0	130	----
		uranium, total	7440-61-1	E420	0.00382 mg/L	0.004 mg/L	95.5	70.0	130	----
		vanadium, total	7440-62-2	E420	0.0961 mg/L	0.1 mg/L	96.1	70.0	130	----
		zinc, total	7440-66-6	E420	0.373 mg/L	0.4 mg/L	93.2	70.0	130	----
		zirconium, total	7440-67-7	E420	0.0383 mg/L	0.04 mg/L	95.9	70.0	130	----
Disinfectant By-Products (QCLot: 677469)										
EO2208089-001	Anonymous	bromate	15541-45-4	E722A	3.68 µg/L	4 µg/L	92.1	70.0	130	----
Disinfectant By-Products (QCLot: 677498)										
EO2208089-001	Anonymous	chlorate	14866-68-3	E409.CLO3	4.77 mg/L	5 mg/L	95.5	75.0	125	----





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Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

COC Number: 20 - 1017093

Page

Environmental Division
VancouverWork Order Reference
VA22C3143

Telephone: +1 604 253 4188

Report To Contact and company name below will appear on the final report		Reports / Recipients		Turnaround Time (TAT) Requested	
Company:	DISTRICT OF SQUAMISH	Select Report Format:	<input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)	<input checked="" type="checkbox"/> Routine [R] if received by 3pm M-F - no surcharges apply	
Contact:	CALEM GARDNER	Merge QC/QCI Reports with COA	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A	<input type="checkbox"/> 4 day [P4] if received by 3pm M-F - 20% rush surcharge mini	
Phone:	604.892.7954	<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked		<input type="checkbox"/> 3 day [P3] if received by 3pm M-F - 25% rush surcharge mini	
Company address below will appear on the final report		Select Distribution:	<input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX	<input type="checkbox"/> 2 day [P2] if received by 3pm M-F - 50% rush surcharge mini	
Street:	39909 GOVERNMENT RD	Email 1 or Fax:	water@Squamish.ca	<input type="checkbox"/> 1 day [E] if received by 3pm M-F - 100% rush surcharge mini	
City/Province:	SQUAMISH BC	Email 2:		<input type="checkbox"/> Same day [E2] if received by 10am M-S - 200% rush surcharge. A may apply to rush requests on weekends, statutory holidays and not	
Postal Code:	V8B 0A3	Email 3:		Date and Time Required for all E&P TATs:	
Invoice To:	Same as Report To <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	Invoice Recipients		For all tests with rush TATs requested, please	
	Copy of Invoice with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	Select Invoice Distribution:	<input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX	Analysis F	
Company:	DISTRICT OF SQUAMISH	Email 1 or Fax:	cgardner@Squamish.ca	Indicate Filtered (F), Preserved (P) or Filtered (F)	
Contact:	CALEM GARDNER	Email 2:		Analysis F	
Project Information		Oil and Gas Required Fields (client use)			
ALS Account # / Quote #:		AFE/Cost Center:		PO#	
Job #:	ANNUAL RIVER SOURCE SAMPLES.	Major/Minor Code:		Routing Code:	
PO / AFE:	124 710	Requisitioner:			
LSD:		Location:			
ALS Lab Work Order # (ALS use only): 3143		ALS Contact:	IAN	Sampler: CRAIG	
ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mm-yy)	Time (hh:mm)	Sample Type	
	STAWAMUS	26-09-22	9:00	GRAB	
	MASHITER	26-09-22	8:00	GRAB	
	STAWAMUS	26-09-22	9:00	GRAB	
	MASHITER	26-09-22	8:00	GRAB	
	STAWAMUS	26-09-22	9:00	GRAB	
	MASHITER	26-09-22	8:00	GRAB	
	STAWAMUS	26-09-22	9:00	GRAB	
	MASHITER	26-09-22	8:00	GRAB	
	STAWAMUS	26-09-22	9:00	GRAB	
	MASHITER	26-09-22	8:00	GRAB	
Drinking Water (DW) Samples¹ (client use)		Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)		SAMPLE RECEIPT DETAILS (ALS use only)	
Are samples taken from a Regulated DW System? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO				Cooling Method: <input type="checkbox"/> NONE <input type="checkbox"/> ICE <input type="checkbox"/> ICE PACKS <input type="checkbox"/> FROZEN <input checked="" type="checkbox"/> COOLING INITIATED	
Are samples for human consumption/ use? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO				Submission Comments identified on Sample Receipt Notification: <input type="checkbox"/> YES <input type="checkbox"/> NO	
				Cooler Custody Seals intact: <input type="checkbox"/> YES <input checked="" type="checkbox"/> N/A Sample Custody Seals Intact: <input type="checkbox"/> YES <input checked="" type="checkbox"/> N/A	
				INITIAL COOLER TEMPERATURES °C: 14° FINAL COOLER TEMPERATURES °C:	
SHIPMENT RELEASE (client use)		INITIAL SHIPMENT RECEPTION (ALS use only)		FINAL SHIPMENT RECEPTION (ALS use only)	
Released by:	CRAIG HALLIDAY	Date:	SEPT. 26/22	Time:	
		Received by:		Date:	SEPT. 26/22
				Time:	12:50pm

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

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.

Sample Range Report

Vancouver Coastal Health

Facility Name: District Of Squamish Waterworks

Date Range: Jan 1 2022 to Dec 31 2022

Operator Ben Kineshanko
Box 310
Squamish, BC V8B 0A3

Sampling Site	Date Collected	Total Coliform	E. Coli	Fecal Coliform
<u>Rockridge sample station, across from 41215-Rockridge Pl.</u>	1/4/2022 6:55:00 AM	LT1	LT1	
	1/10/2022 8:50:00 AM	LT1	LT1	
	1/25/2022 10:15:00 AM	LT1	LT1	
	2/8/2022 9:44:00 AM	LT1	LT1	
	2/23/2022 9:40:00 AM	LT1	LT1	
	3/14/2022 7:20:00 AM	LT1	LT1	
	3/22/2022 9:30:00 AM	LT1	LT1	
	3/28/2022 9:25:00 AM	LT1	LT1	
	4/26/2022 8:50:00 AM	LT1	LT1	
	5/9/2022 8:00:00 AM	LT1	LT1	
	5/24/2022 7:45:00 AM	LT1	LT1	
	6/6/2022 9:00:00 AM	LT1	LT1	
	6/20/2022 8:40:00 AM	LT1	LT1	
	7/4/2022 8:35:00 AM	LT1	LT1	
	7/19/2022 7:27:00 AM	LT1	LT1	
	8/2/2022 10:30:00 AM	LT1	LT1	
	8/15/2022 7:10:00 AM	LT1	LT1	
	8/29/2022 7:55:00 AM	LT1	LT1	
	9/12/2022 8:15:00 AM	LT1	LT1	
	9/26/2022 9:40:00 AM	LT1	LT1	
	10/11/2022 11:00:00 AM	LT1	LT1	
	10/24/2022 11:40:00	LT1	LT1	

AM		
11/7/2022 9:34:00	LT1	LT1
AM		
11/21/2022 7:34:00	LT1	LT1
AM		
12/5/2022 7:43:00	LT1	LT1
AM		
12/19/2022 7:55:00	<u>QRWRT</u>	<u>QRWRT</u>
AM		
Total Positive:	0	0

Crumpet Woods
sample station, 2252
Windsail Pl

1/18/2022 10:10:00	LT1	LT1
AM		
2/1/2022 9:00:00 AM	LT1	LT1
2/14/2022 10:10:00	LT1	LT1
AM		
3/1/2022 9:58:00 AM	LT1	LT1
3/8/2022 7:35:00 AM	REJCT DELAY3	REJCT DELAY3
3/22/2022 7:55:00	LT1	LT1
AM		
4/5/2022 10:14:00	LT1	LT1
AM		
4/19/2022 8:20:00	LT1	LT1
AM		
5/2/2022 10:00:00	LT1	LT1
AM		
5/17/2022 11:04:00	LT1	LT1
AM		
5/30/2022 9:15:00	LT1	LT1
AM		
6/15/2022 11:25:00	LT1	LT1
AM		
6/28/2022 10:32:00	LT1	LT1
AM		
7/12/2022 10:25:00	LT1	LT1
AM		
7/26/2022 8:56:00	LT1	LT1
AM		
8/9/2022 8:40:00 AM	LT1	LT1
8/22/2022 6:58:00	LT1	LT1
AM		
9/6/2022 9:34:00 AM	LT1	LT1
9/20/2022 10:00:00	LT1	LT1
AM		
10/4/2022 9:56:00	LT1	LT1
AM		
10/17/2022 10:35:00	LT1	LT1
AM		
11/1/2022 9:40:00	LT1	LT1
AM		
11/15/2022 9:08:00	LT1	LT1

AM		
11/29/2022 10:10:00	LT1	LT1
AM		
12/12/2022 9:35:00	LT1	LT1
AM		
12/19/2022 11:30:00	<u>QRWRT</u>	<u>QRWRT</u>
AM		
Total Positive:	0	0

41974 Birken Rd.
Brackendale

1/4/2022 6:28:00 AM	LT1	LT1
1/10/2022 8:20:00	LT1	LT1
AM		
1/25/2022 9:25:00	LT1	LT1
AM		
2/8/2022 9:59:00 AM	LT1	LT1
2/23/2022 8:25:00	LT1	LT1
AM		
3/14/2022 9:50:00	LT1	LT1
AM		
3/22/2022 9:05:00	LT1	LT1
AM		
3/28/2022 9:00:00	LT1	LT1
AM		
4/26/2022 8:15:00	LT1	LT1
AM		
5/9/2022 7:30:00 AM	LT1	LT1
5/24/2022 7:30:00	LT1	LT1
AM		
6/6/2022 8:00:00 AM	LT1	LT1
6/20/2022 8:15:00	LT1	LT1
AM		
7/4/2022 8:10:00 AM	LT1	LT1
7/19/2022 6:46:00	LT1	LT1
AM		
8/2/2022 10:10:00	LT1	LT1
AM		
8/15/2022 6:45:00	LT1	LT1
AM		
8/29/2022 7:30:00	LT1	LT1
AM		
9/12/2022 7:00:00	LT1	LT1
AM		
9/26/2022 9:00:00	LT1	LT1
AM		
10/11/2022 10:40:00	LT1	LT1
AM		
10/24/2022 11:50:00	LT1	LT1
AM		
11/7/2022 8:30:00	LT1	LT1
AM		
11/21/2022 7:16:00	LT1	LT1
AM		

12/5/2022 7:20:00 AM	LT1	LT1
12/19/2022 7:28:00 AM	<u>QRWRT</u>	<u>QRWRT</u>
Total Positive:	0	0

Parkway Sample
station, 40464 Park
Crescent

1/18/2022 12:24:00 AM	LT1	LT1
2/1/2022 9:50:00 AM	LT1	LT1
2/14/2022 11:00:00 AM	LT1	LT1
3/1/2022 7:15:00 AM	LT1	LT1
3/8/2022 8:28:00 AM	REJCT DELAY3	REJCT DELAY3
3/22/2022 9:40:00 AM	LT1	LT1
4/5/2022 7:55:00 AM	LT1	LT1
4/19/2022 7:15:00 AM	LT1	LT1
5/2/2022 7:30:00 AM	LT1	LT1
5/17/2022 8:45:00 AM	LT1	LT1
5/30/2022 7:20:00 AM	LT1	LT1
6/15/2022 9:30:00 AM	LT1	LT1
6/28/2022 9:19:00 AM	LT1	LT1
7/12/2022 7:05:00 AM	LT1	LT1
7/26/2022 7:23:00 AM	LT1	LT1
8/9/2022 7:30:00 AM	LT1	LT1
8/22/2022 8:08:00 AM	LT1	LT1
9/6/2022 8:54:00 AM	LT1	LT1
9/20/2022 8:30:00 AM	LT1	LT1
10/4/2022 8:25:00 AM	LT1	LT1
10/17/2022 9:30:00 AM	LT1	LT1
11/1/2022 11:00:00 AM	LT1	LT1
11/15/2022 8:00:00 AM	LT1	LT1
11/29/2022 7:19:00 AM	LT1	LT1
12/12/2022 7:36:00 AM	LT1	LT1
12/19/2022 8:45:00 AM	<u>QRWRT</u>	<u>QRWRT</u>

	Total Positive:	0	0
<u>Perth Sample</u>			
<u>Station, Garibaldi</u>			
<u>Highlands</u>			
1/4/2022 11:10:00 AM	LT1	LT1	
1/10/2022 9:15:00 AM	LT1	LT1	
1/25/2022 9:50:00 AM	LT1	LT1	
2/8/2022 9:18:00 AM	LT1	LT1	
2/23/2022 9:05:00 AM	LT1	LT1	
3/14/2022 6:55:00 AM	LT1	LT1	
3/22/2022 10:00:00 AM	LT1	LT1	
3/28/2022 10:10:00 AM	LT1	LT1	
4/26/2022 9:15:00 AM	LT1	LT1	
5/9/2022 8:30:00 AM	LT1	LT1	
5/24/2022 8:00:00 AM	LT1	LT1	
6/6/2022 9:30:00 AM	LT1	LT1	
6/20/2022 9:25:00 AM	LT1	LT1	
7/4/2022 9:00:00 AM	LT1	LT1	
7/19/2022 7:07:00 AM	LT1	LT1	
8/2/2022 11:05:00 AM	LT1	LT1	
8/15/2022 7:35:00 AM	LT1	LT1	
8/29/2022 8:20:00 AM	LT1	LT1	
9/12/2022 8:34:00 AM	LT1	LT1	
9/26/2022 10:26:00 AM	LT1	LT1	
10/11/2022 11:20:00 AM	LT1	LT1	
10/24/2022 11:15:00 AM	LT1	LT1	
11/7/2022 9:07:00 AM	LT1	LT1	
11/21/2022 8:27:00 AM	LT1	LT1	
12/5/2022 8:30:00 AM	LT1	LT1	
12/19/2022 9:20:00 AM	<u>QRWRT</u>	<u>QRWRT</u>	
Total Positive:	0	0	

Guilford sample
station, East of
Guilford & Valley Dr.

1/4/2022 10:45:00 AM	LT1	LT1
1/10/2022 7:30:00 AM	LT1	LT1
1/25/2022 10:55:00 AM	LT1	LT1
2/8/2022 7:58:00 AM	LT1	LT1
2/23/2022 11:40:00 AM	LT1	LT1
3/14/2022 9:00:00 AM	LT1	LT1
3/22/2022 8:13:00 AM	LT1	LT1
3/28/2022 7:35:00 AM	LT1	LT1
4/26/2022 10:00:00 AM	LT1	LT1
5/9/2022 9:20:00 AM	LT1	LT1
5/24/2022 8:50:00 AM	LT1	LT1
6/6/2022 10:20:00 AM	LT1	LT1
6/20/2022 10:15:00 AM	LT1	LT1
7/4/2022 10:00:00 AM	LT1	LT1
7/19/2022 8:24:00 AM	LT1	LT1
8/2/2022 8:30:00 AM	LT1	LT1
8/15/2022 8:35:00 AM	LT1	LT1
8/29/2022 8:50:00 AM	LT1	LT1
9/12/2022 9:15:00 AM	LT1	LT1
9/26/2022 11:02:00 AM	LT1	LT1
10/11/2022 8:30:00 AM	LT1	LT1
10/24/2022 10:30:00 AM	LT1	LT1
11/7/2022 10:55:00 AM	LT1	LT1
11/21/2022 9:39:00 AM	LT1	LT1
12/5/2022 9:30:00 AM	LT1	LT1
12/19/2022 11:10:00 AM	<u>QRWRT</u>	<u>QRWRT</u>
Total Positive:	0	0

Progress Way
sample station,
38917 Progress Way

1/4/2022 11:54:00 AM	LT1	LT1
1/10/2022 9:45:00 AM	LT1	LT1
1/25/2022 10:35:00 AM	LT1	LT1
2/8/2022 8:12:00 AM	LT1	LT1
2/23/2022 11:25:00 AM	LT1	LT1
3/14/2022 11:35:00 AM	LT1	LT1
3/22/2022 10:40:00 AM	LT1	LT1
3/28/2022 8:20:00 AM	LT1	LT1
4/26/2022 9:35:00 AM	LT1	LT1
5/9/2022 9:00:00 AM	LT1	LT1
5/24/2022 8:30:00 AM	LT1	LT1
6/6/2022 9:45:00 AM	LT1	LT1
6/20/2022 9:45:00 AM	LT1	LT1
7/4/2022 9:25:00 AM	LT1	LT1
7/19/2022 7:56:00 AM	LT1	LT1
8/2/2022 11:25:00 AM	LT1	LT1
8/15/2022 8:10:00 AM	LT1	LT1
8/29/2022 6:50:00 AM	LT1	LT1
9/12/2022 9:00:00 AM	LT1	LT1
9/26/2022 10:46:00 AM	LT1	LT1
10/11/2022 9:30:00 AM	LT1	LT1
10/24/2022 10:50:00 AM	LT1	LT1
11/7/2022 10:40:00 AM	LT1	LT1
11/21/2022 9:17:00 AM	LT1	LT1
12/5/2022 9:15:00 AM	<u>OGO OGC</u>	<u>OGO OGC</u>
Total Positive:	0	0

University Lands

1/18/2022 6:43:00 AM	LT1	LT1
2/1/2022 9:35:00 AM	LT1	LT1
2/14/2022 10:45:00 AM	LT1	LT1
3/1/2022 8:50:00 AM	LT1	LT1
3/8/2022 8:05:00 AM	REJCT DELAY3	REJCT DELAY3
3/22/2022 9:52:00 AM	LT1	LT1
4/5/2022 8:18:00 AM	LT1	LT1
4/19/2022 7:30:00 AM	LT1	LT1
5/2/2022 9:10:00 AM	LT1	LT1
5/17/2022 8:57:00 AM	LT1	LT1
5/30/2022 8:10:00 AM	LT1	LT1
6/15/2022 9:07:00 AM	LT1	LT1
6/28/2022 8:48:00 AM	LT1	LT1
7/12/2022 7:25:00 AM	LT1	LT1
7/26/2022 7:03:00 AM	LT1	LT1
8/9/2022 7:42:00 AM	LT1	LT1
8/22/2022 8:45:00 AM	LT1	LT1
9/6/2022 8:08:00 AM	LT1	LT1
9/20/2022 8:30:00 AM	LT1	LT1
10/4/2022 9:00:00 AM	LT1	LT1
10/17/2022 8:30:00 AM	LT1	LT1
11/1/2022 10:30:00 AM	LT1	LT1
11/15/2022 8:30:00 AM	LT1	LT1
11/29/2022 8:04:00 AM	LT1	LT1
12/12/2022 8:00:00 AM	LT1	LT1
12/19/2022 9:01:00 AM	<u>QRWRT</u>	<u>QRWRT</u>
Total Positive:	0	0

Lomond Sample
Station, Garibaldi
Highlands

1/18/2022 6:55:00 AM	LT1	LT1
2/1/2022 9:25:00 AM	LT1	LT1

2/14/2022 10:35:00 AM	LT1	LT1
3/1/2022 8:56:00 AM	LT1	LT1
3/8/2022 8:15:00 AM	REJCT DELAY3	REJCT DELAY3
3/22/2022 10:20:00 AM	LT1	LT1
4/5/2022 8:28:00 AM	LT1	LT1
4/19/2022 7:45:00 AM	LT1	LT1
5/2/2022 9:20:00 AM	LT1	LT1
5/17/2022 9:10:00 AM	LT1	LT1
5/30/2022 8:20:00 AM	LT1	LT1
6/15/2022 6:45:00 AM	LT1	LT1
6/28/2022 8:34:00 AM	LT1	LT1
7/12/2022 7:35:00 AM	LT1	LT1
7/26/2022 6:46:00 AM	LT1	LT1
8/9/2022 7:55:00 AM	LT1	LT1
8/22/2022 8:25:00 AM	LT1	LT1
9/6/2022 8:37:00 AM	LT1	LT1
9/20/2022 8:45:00 AM	LT1	LT1
10/4/2022 8:40:00 AM	LT1	LT1
10/17/2022 8:45:00 AM	LT1	LT1
11/1/2022 10:45:00 AM	LT1	LT1
11/15/2022 8:40:00 AM	LT1	LT1
11/29/2022 8:20:00 AM	LT1	LT1
12/12/2022 7:49:00 AM	LT1	LT1
12/19/2022 10:16:00 AM	<u>QRWRT</u>	<u>QRWRT</u>
Total Positive:	0	0

Pemberton sample station, across from 1551 Pemberton Ave

1/18/2022 7:18:00 AM	LT1	LT1
2/1/2022 10:35:00 AM	LT1	LT1
2/14/2022 11:20:00 AM	LT1	LT1
3/1/2022 9:28:00 AM	LT1	LT1

3/8/2022 9:00:00 AM	REJCT DELAY3	REJCT DELAY3
3/22/2022 11:05:00 AM	LT1	LT1
4/5/2022 11:24:00 AM	LT1	LT1
4/19/2022 8:00:00 AM	LT1	LT1
5/2/2022 9:45:00 AM	LT1	LT1
5/17/2022 10:00:00 AM	LT1	LT1
5/30/2022 8:45:00 AM	LT1	LT1
6/15/2022 11:45:00 AM	LT1	LT1
6/28/2022 10:09:00 AM	LT1	LT1
7/12/2022 9:05:00 AM	LT1	LT1
7/26/2022 8:29:00 AM	LT1	LT1
8/9/2022 8:55:00 AM	LT1	LT1
8/22/2022 9:50:00 AM	LT1	LT1
9/6/2022 9:17:00 AM	LT1	LT1
9/20/2022 9:30:00 AM	LT1	LT1
10/4/2022 9:31:00 AM	LT1	LT1
10/17/2022 10:00:00 AM	LT1	LT1
11/1/2022 10:00:00 AM	LT1	LT1
11/15/2022 9:32:00 AM	LT1	LT1
11/29/2022 9:51:00 AM	LT1	LT1
12/12/2022 9:02:00 AM	LT1	LT1
12/19/2022 10:50:00 AM	<u>QRWRT</u>	<u>QRWRT</u>
Total Positive:	0	0

Result Values:
E - estimated
L - less than
G - greater than

Samples that contain total coliform:	0	0.00% of total
Samples that contain e. coli:	0	0.00% of total
Samples that contain fecal coliform:	0	0.00% of total
Number of consecutive samples that contain total coliform:	0	
Number of samples that contain total coliform in last 30 days:	0/0	
Total number of samples:	259	

Comments:

Environmental Health Officer
Mar 9 2023

FOR FURTHER INFORMATION PLEASE CALL: Dan Glover (604) 892-2293

CERTIFICATE OF ANALYSIS

Work Order	: VA23A9469	Page	: 1 of 6
Amendment	: (Partial Results)		
Client	: District of Squamish	Laboratory	: Vancouver - Environmental
Contact	: Craig Halliday	Account Manager	: Ian Chen
Address	: 39907 Government Road PO Box 310 Squamish BC Canada V8B 0A3	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: 604 815 6864	Telephone	: +1 604 253 4188
Project	: Semi Annual Samples	Date Samples Received	: 02-May-2023 12:10
PO	: 123621	Date Analysis Commenced	: 03-May-2023
C-O-C number	: 20-1017353	Issue Date	: 09-May-2023 23:47
Sampler	: Craig Halliday		
Site	: ----		
Quote number	: ----		
No. of samples received	: 5		
No. of samples analysed	: 5		

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
- Surrogate Control Limits

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
Caitlin Macey	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Katrina Zwambag	Supervisor - HPLC	LCMS, Waterloo, Ontario
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Owen Cheng		Metals, Burnaby, British Columbia
Paul Cushing	Team Leader - Organics	Inorganics, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia



Page : 2 of 6
Work Order : VA23A9469
Client : District of Squamish
Project : Semi Annual Samples

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
µg/L	micrograms per litre
µS/cm	microsiemens per centimetre
CU	colour units (1 cu = 1 mg/l pt)
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

<: 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.

Qualifiers

Qualifier	Description
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
PHA	pH adjusted before analysis.

(Partial Results)



Page : 3 of 6
Work Order : VA23A9469
Client : District of Squamish
Project : Semi Annual Samples

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Power House Springs	BIRKEN	TANTALUS	ROCKRIDGE	CRUMPIT WOODS
Client sampling date / time					02-May-2023 06:45	02-May-2023 07:25	02-May-2023 07:35	02-May-2023 07:45	02-May-2023 07:10	
Analyte	CAS Number	Method	LOR	Unit	VA23A9469-001	VA23A9469-002	VA23A9469-003	VA23A9469-004	VA23A9469-005	
					Result	Result	Result	Result	Result	
Physical Tests										
Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	19.6	----	----	----	----	
Colour, true	----	E329	5.0	CU	<5.0	----	----	----	----	
Conductivity	----	E100	2.0	µS/cm	74.2	----	----	----	----	
Hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	21.9	----	----	----	----	
pH	----	E108	0.10	pH units	7.39	----	----	----	----	
Solids, total dissolved [TDS]	----	E162	10	mg/L	76	----	----	----	----	
Turbidity	----	E121	0.10	NTU	0.13	----	----	----	----	
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	----	----	----	----	
Bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	----	----	----	----	
Chloride	16887-00-6	E235.Cl	0.50	mg/L	4.38	----	----	----	----	
Fluoride	16984-48-8	E235.F	0.020	mg/L	0.078	----	----	----	----	
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	<0.050	----	----	----	----	
Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0608	----	----	----	----	
Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	----	----	----	----	
Nitrogen, total	7727-37-9	E366	0.030	mg/L	0.050	----	----	----	----	
Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0378	----	----	----	----	
Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	7.10	----	----	----	----	
Cyanides										
Cyanide, strong acid dissociable (Total)	----	E333	0.0050	mg/L	<0.0100 <small>DLM, PHA</small>	----	----	----	----	
Organic / Inorganic Carbon										
Carbon, total organic [TOC]	----	E355-L	0.50	mg/L	<0.50	----	----	----	----	
Inorganics										
Chlorite	14998-27-7	E409.CLO2	0.010	mg/L	Not Authorised	----	----	----	----	
Total Metals										
Aluminum, total	7429-90-5	E420	0.0030	mg/L	<0.0030	----	----	----	----	
Antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	----	----	----	----	
Arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00060	----	----	----	----	

(Partial Results)



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Work Order : VA23A9469
Client : District of Squamish
Project : Semi Annual Samples

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Power House Springs	BIRKEN	TANTALUS	ROCKRIDGE	CRUMPIT WOODS
Client sampling date / time					02-May-2023 06:45	02-May-2023 07:25	02-May-2023 07:35	02-May-2023 07:45	02-May-2023 07:10	
Analyte	CAS Number	Method	LOR	Unit	VA23A9469-001	VA23A9469-002	VA23A9469-003	VA23A9469-004	VA23A9469-005	
					Result	Result	Result	Result	Result	
Total Metals										
Barium, total	7440-39-3	E420	0.00010	mg/L	0.00157	----	----	----	----	
Beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	----	----	----	----	
Bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	----	----	----	----	
Boron, total	7440-42-8	E420	0.010	mg/L	0.020	----	----	----	----	
Cadmium, total	7440-43-9	E420	0.0000050	mg/L	<0.0000050	----	----	----	----	
Calcium, total	7440-70-2	E420	0.050	mg/L	6.65	----	----	----	----	
Cesium, total	7440-46-2	E420	0.000010	mg/L	0.000177	----	----	----	----	
Chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	----	----	----	----	
Cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	----	----	----	----	
Copper, total	7440-50-8	E420	0.00050	mg/L	0.0216	----	----	----	----	
Iron, total	7439-89-6	E420	0.010	mg/L	0.019	----	----	----	----	
Lead, total	7439-92-1	E420	0.000050	mg/L	0.000135	----	----	----	----	
Lithium, total	7439-93-2	E420	0.0010	mg/L	0.0026	----	----	----	----	
Magnesium, total	7439-95-4	E420	0.0050	mg/L	1.29	----	----	----	----	
Manganese, total	7439-96-5	E420	0.00010	mg/L	0.00030	----	----	----	----	
Mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	----	----	----	----	
Molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000609	----	----	----	----	
Nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	----	----	----	----	
Phosphorus, total	7723-14-0	E420	0.050	mg/L	0.077	----	----	----	----	
Potassium, total	7440-09-7	E420	0.050	mg/L	1.37	----	----	----	----	
Rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00391	----	----	----	----	
Selenium, total	7782-49-2	E420	0.000050	mg/L	0.000050	----	----	----	----	
Silicon, total	7440-21-3	E420	0.10	mg/L	14.9	----	----	----	----	
Silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	----	----	----	----	
Sodium, total	7440-23-5	E420	0.050	mg/L	5.22	----	----	----	----	
Strontium, total	7440-24-6	E420	0.00020	mg/L	0.0742	----	----	----	----	
Sulfur, total	7704-34-9	E420	0.50	mg/L	2.47	----	----	----	----	
Tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	----	----	----	----	
Thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	----	----	----	----	
Thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	----	----	----	----	

(Partial Results)



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Work Order : VA23A9469
Client : District of Squamish
Project : Semi Annual Samples

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Power House Springs	BIRKEN	TANTALUS	ROCKRIDGE	CRUMPT WOODS
Client sampling date / time					02-May-2023 06:45	02-May-2023 07:25	02-May-2023 07:35	02-May-2023 07:45	02-May-2023 07:10	
Analyte	CAS Number	Method	LOR	Unit	VA23A9469-001	VA23A9469-002	VA23A9469-003	VA23A9469-004	VA23A9469-005	
					Result	Result	Result	Result	Result	
Total Metals										
Tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	----	----	----	----	
Titanium, total	7440-32-6	E420	0.00030	mg/L	<0.00030	----	----	----	----	
Tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	----	----	----	----	
Uranium, total	7440-61-1	E420	0.000010	mg/L	0.000032	----	----	----	----	
Vanadium, total	7440-62-2	E420	0.00050	mg/L	0.0111	----	----	----	----	
Zinc, total	7440-66-6	E420	0.0030	mg/L	0.0036	----	----	----	----	
Zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	----	----	----	----	
Aggregate Organics										
Chemical oxygen demand [COD]	----	E559-L	10	mg/L	<10	----	----	----	----	
Volatile Organic Compounds [THMs]										
Bromodichloromethane	75-27-4	E611B	1.0	µg/L	----	<1.0	<1.0	<1.0	<1.0	
Bromoform	75-25-2	E611B	1.0	µg/L	----	<1.0	<1.0	<1.0	<1.0	
Chloroform	67-66-3	E611B	1.0	µg/L	----	<1.0	<1.0	<1.0	<1.0	
Dibromochloromethane	124-48-1	E611B	1.0	µg/L	----	<1.0	<1.0	<1.0	<1.0	
Trihalomethanes [THMs], total	----	E611B	2.0	µg/L	----	<2.0	<2.0	<2.0	<2.0	
Volatile Organic Compounds [THMs] Surrogates										
Bromofluorobenzene, 4-	460-00-4	E611B	1.0	%	----	88.0	87.4	85.0	86.2	
Difluorobenzene, 1,4-	540-36-3	E611B	1.0	%	----	97.3	97.5	98.0	98.1	
Disinfectant By-Products										
Bromate	15541-45-4	E722A	0.00030	mg/L	<0.00030	----	----	----	----	
Chlorate	14866-68-3	E409.CLO3	0.010	mg/L	Not Authorised	----	----	----	----	
Haloacetic Acids										
Bromochloroacetic acid	5589-96-8	E750	1.00	µg/L	----	<1.00	<1.00	<1.00	<1.00	
Dibromoacetic acid	631-64-1	E750	1.00	µg/L	----	<1.00	<1.00	<1.00	<1.00	
Dichloroacetic acid	79-43-6	E750	1.00	µg/L	----	<1.00	<1.00	<1.00	<1.00	
Monobromoacetic acid	79-08-3	E750	1.00	µg/L	----	<1.00	<1.00	<1.00	<1.00	
Monochloroacetic acid	79-11-8	E750	1.00	µg/L	----	<1.00	<1.00	<1.00	<1.00	
Trichloroacetic acid	76-03-9	E750	1.00	µg/L	----	<1.00	<1.00	<1.00	<1.00	
Haloacetic acids, total [HAA5]	----	E750	5.00	µg/L	----	<5.00	<5.00	<5.00	<5.00	

(Partial Results)



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Work Order : VA23A9469
Client : District of Squamish
Project : Semi Annual Samples

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA23A9469	Page	: 1 of 13
Amendment	: (Partial Results)		
Client	: District of Squamish	Laboratory	: Vancouver - Environmental
Contact	: Craig Halliday	Account Manager	: Ian Chen
Address	: 39907 Government Road PO Box 310 Squamish BC Canada V8B 0A3	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: 604 815 6864	Telephone	: +1 604 253 4188
Project	: Semi Annual Samples	Date Samples Received	: 02-May-2023 12:10
PO	: 123621	Issue Date	: 09-May-2023 23:47
C-O-C number	: 20-1017353		
Sampler	: Craig Halliday		
Site	: ----		
Quote number	: ----		
No. of samples received	: 5		
No. of samples analysed	: 5		

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.



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 Work Order : VA23A9469
 Client : District of Squamish
 Project : Semi Annual Samples

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	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Power House Springs	E559-L	02-May-2023	----	----	----		08-May-2023	28 days	6 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Power House Springs	E298	02-May-2023	06-May-2023	----	----		07-May-2023	28 days	5 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE Power House Springs	E235.Br-L	02-May-2023	03-May-2023	----	----		03-May-2023	28 days	1 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Power House Springs	E235.Cl	02-May-2023	03-May-2023	----	----		03-May-2023	28 days	1 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Power House Springs	E235.F	02-May-2023	03-May-2023	----	----		03-May-2023	28 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Power House Springs	E235.NO3-L	02-May-2023	03-May-2023	----	----		03-May-2023	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Power House Springs	E235.NO2-L	02-May-2023	03-May-2023	----	----		03-May-2023	3 days	1 days	✓

(Partial Results)



Page : 4 of 13
Work Order : VA23A9469
Client : District of Squamish
Project : Semi Annual Samples

Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group 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	
Anions and Nutrients : Sulfate in Water by IC										
HDPE Power House Springs	E235.SO4	02-May-2023	03-May-2023	----	----		03-May-2023	28 days	1 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) Power House Springs	E318	02-May-2023	04-May-2023	----	----		04-May-2023	28 days	2 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) Power House Springs	E366	02-May-2023	06-May-2023	----	----		08-May-2023	28 days	6 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Power House Springs	E372-U	02-May-2023	06-May-2023	----	----		08-May-2023	28 days	6 days	✓
Cyanides : Total Cyanide										
HDPE - total (sodium hydroxide) Power House Springs	E333	02-May-2023	04-May-2023	----	----		04-May-2023	14 days	2 days	✓
Disinfectant By-Products : Bromate and Perchlorate in Water by LC-MS-MS										
Opaque HDPE (EDA) Power House Springs	E722A	02-May-2023	04-May-2023	28 days	2 days	✓	05-May-2023	28 days	1 days	✓
Disinfectant By-Products : Chlorate (CLO3) in Waters by Ion Chromatography										
Opaque HDPE (EDA) Power House Springs	E409.CLO3	02-May-2023	04-May-2023	----	----			28 days	2 days	✓
Haloacetic Acids : Haloacetic Acids in Water by LC-MS/MS										
Glass vial (ammonium chloride) BIRKEN	E750	02-May-2023	04-May-2023	14 days	2 days	✓	04-May-2023	14 days	0 days	✓
Haloacetic Acids : Haloacetic Acids in Water by LC-MS/MS										
Glass vial (ammonium chloride) CRUMPIT WOODS	E750	02-May-2023	04-May-2023	14 days	2 days	✓	04-May-2023	14 days	0 days	✓

(Partial Results)

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Work Order : VA23A9469
Client : District of Squamish
Project : Semi Annual Samples



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

Analyte Group 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	
Haloacetic Acids : Haloacetic Acids in Water by LC-MS/MS										
Glass vial (ammonium chloride) ROCKRIDGE	E750	02-May-2023	04-May-2023	14 days	2 days	✓	04-May-2023	14 days	0 days	✓
Haloacetic Acids : Haloacetic Acids in Water by LC-MS/MS										
Glass vial (ammonium chloride) TANTALUS	E750	02-May-2023	04-May-2023	14 days	2 days	✓	04-May-2023	14 days	0 days	✓
Inorganics : Chlorite (CLO2) in Waters by Ion Chromatography										
Opaque HDPE (EDA) Power House Springs	E409.CLO2	02-May-2023	04-May-2023	----	----			14 days	2 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) Power House Springs	E355-L	02-May-2023	06-May-2023	----	----		06-May-2023	28 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Power House Springs	E290	02-May-2023	03-May-2023	----	----		03-May-2023	14 days	1 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE Power House Springs	E329	02-May-2023	03-May-2023	----	----		03-May-2023	3 days	1 days	✓
Physical Tests : Conductivity in Water										
HDPE Power House Springs	E100	02-May-2023	03-May-2023	----	----		03-May-2023	28 days	1 days	✓
Physical Tests : pH by Meter										
HDPE Power House Springs	E108	02-May-2023	03-May-2023	----	----		03-May-2023	0.25 hrs	3.25 hrs	✖ EHTR-FM
Physical Tests : TDS by Gravimetry										
HDPE Power House Springs	E162	02-May-2023	----	----	----		08-May-2023	7 days	6 days	✓

(Partial Results)



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Work Order : VA23A9469
Client : District of Squamish
Project : Semi Annual Samples

Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group 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 : Turbidity by Nephelometry										
HDPE Power House Springs	E121	02-May-2023	----	----	----		03-May-2023	3 days	1 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial - total (lab preserved) Power House Springs	E508	02-May-2023	06-May-2023	----	----		06-May-2023	28 days	4 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Power House Springs	E420	02-May-2023	03-May-2023	----	----		04-May-2023	180 days	2 days	✓
Volatile Organic Compounds [THMs] : THMs by Headspace GC-MS										
Glass vial (sodium thiosulfate) BIRKEN	E611B	02-May-2023	06-May-2023	----	----		06-May-2023	14 days	4 days	✓
Volatile Organic Compounds [THMs] : THMs by Headspace GC-MS										
Glass vial (sodium thiosulfate) CRUMPIT WOODS	E611B	02-May-2023	06-May-2023	----	----		06-May-2023	14 days	4 days	✓
Volatile Organic Compounds [THMs] : THMs by Headspace GC-MS										
Glass vial (sodium thiosulfate) ROCKRIDGE	E611B	02-May-2023	06-May-2023	----	----		06-May-2023	14 days	4 days	✓
Volatile Organic Compounds [THMs] : THMs by Headspace GC-MS										
Glass vial (sodium thiosulfate) TANTALUS	E611B	02-May-2023	06-May-2023	----	----		06-May-2023	14 days	4 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).

(Partial Results)

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 Work Order : VA23A9469
 Client : District of Squamish
 Project : Semi Annual Samples



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	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	919675	1	11	9.0	5.0	✔
Ammonia by Fluorescence	E298	925637	1	9	11.1	5.0	✔
Bromate and Perchlorate in Water by LC-MS-MS	E722A	922151	1	13	7.6	5.0	✔
Bromide in Water by IC (Low Level)	E235.Br-L	919670	1	11	9.0	5.0	✔
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	927220	1	2	50.0	5.0	✔
Chlorate (CLO3) in Waters by Ion Chromatography	E409.CLO3	921893	1	10	10.0	5.0	✔
Chloride in Water by IC	E235.Cl	919669	1	11	9.0	5.0	✔
Chlorite (CLO2) in Waters by Ion Chromatography	E409.CLO2	921894	1	10	10.0	5.0	✔
Colour (True) by Spectrometer (5 CU)	E329	919678	1	6	16.6	5.0	✔
Conductivity in Water	E100	919676	1	11	9.0	5.0	✔
Fluoride in Water by IC	E235.F	919668	1	11	9.0	5.0	✔
Haloacetic Acids in Water by LC-MS/MS	E750	921891	1	20	5.0	4.7	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	919671	1	13	7.6	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	919672	1	12	8.3	5.0	✔
pH by Meter	E108	919674	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	919673	1	11	9.0	5.0	✔
TDS by Gravimetry	E162	926462	1	20	5.0	5.0	✔
THMs by Headspace GC-MS	E611B	925168	1	5	20.0	5.0	✔
Total Cyanide	E333	921627	1	20	5.0	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	922468	1	20	5.0	5.0	✔
Total Mercury in Water by CVAAS	E508	925060	1	20	5.0	5.0	✔
Total metals in Water by CRC ICPMS	E420	920075	1	15	6.6	5.0	✔
Total Nitrogen by Colourimetry	E366	925634	1	10	10.0	5.0	✔
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	925633	1	17	5.8	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	925636	1	10	10.0	5.0	✔
Turbidity by Nephelometry	E121	919929	1	20	5.0	5.0	✔
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	919675	1	11	9.0	5.0	✔
Ammonia by Fluorescence	E298	925637	1	9	11.1	5.0	✔
Bromate and Perchlorate in Water by LC-MS-MS	E722A	922151	1	13	7.6	5.0	✔
Bromide in Water by IC (Low Level)	E235.Br-L	919670	1	11	9.0	5.0	✔
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	927220	1	2	50.0	5.0	✔
Chlorate (CLO3) in Waters by Ion Chromatography	E409.CLO3	921893	1	10	10.0	5.0	✔
Chloride in Water by IC	E235.Cl	919669	1	11	9.0	5.0	✔
Chlorite (CLO2) in Waters by Ion Chromatography	E409.CLO2	921894	1	10	10.0	5.0	✔
Colour (True) by Spectrometer (5 CU)	E329	919678	1	6	16.6	5.0	✔

(Partial Results)

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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							
Conductivity in Water	E100	919676	1	11	9.0	5.0	✔
Fluoride in Water by IC	E235.F	919668	1	11	9.0	5.0	✔
Haloacetic Acids in Water by LC-MS/MS	E750	921891	1	20	5.0	4.7	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	919671	1	13	7.6	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	919672	1	12	8.3	5.0	✔
pH by Meter	E108	919674	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	919673	1	11	9.0	5.0	✔
TDS by Gravimetry	E162	926462	1	20	5.0	5.0	✔
THMs by Headspace GC-MS	E611B	925168	1	5	20.0	5.0	✔
Total Cyanide	E333	921627	1	20	5.0	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	922468	1	20	5.0	5.0	✔
Total Mercury in Water by CVAAS	E508	925060	1	20	5.0	5.0	✔
Total metals in Water by CRC ICPMS	E420	920075	1	15	6.6	5.0	✔
Total Nitrogen by Colourimetry	E366	925634	1	10	10.0	5.0	✔
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	925633	1	17	5.8	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	925636	1	10	10.0	5.0	✔
Turbidity by Nephelometry	E121	919929	1	20	5.0	5.0	✔
Method Blanks (MB)							
Alkalinity Species by Titration	E290	919675	1	11	9.0	5.0	✔
Ammonia by Fluorescence	E298	925637	1	9	11.1	5.0	✔
Bromate and Perchlorate in Water by LC-MS-MS	E722A	922151	1	13	7.6	5.0	✔
Bromide in Water by IC (Low Level)	E235.Br-L	919670	1	11	9.0	5.0	✔
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	927220	1	2	50.0	5.0	✔
Chlorate (CLO3) in Waters by Ion Chromatography	E409.CLO3	921893	1	10	10.0	5.0	✔
Chloride in Water by IC	E235.Cl	919669	1	11	9.0	5.0	✔
Chlorite (CLO2) in Waters by Ion Chromatography	E409.CLO2	921894	1	10	10.0	5.0	✔
Colour (True) by Spectrometer (5 CU)	E329	919678	1	6	16.6	5.0	✔
Conductivity in Water	E100	919676	1	11	9.0	5.0	✔
Fluoride in Water by IC	E235.F	919668	1	11	9.0	5.0	✔
Haloacetic Acids in Water by LC-MS/MS	E750	921891	1	20	5.0	4.7	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	919671	1	13	7.6	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	919672	1	12	8.3	5.0	✔
Sulfate in Water by IC	E235.SO4	919673	1	11	9.0	5.0	✔
TDS by Gravimetry	E162	926462	1	20	5.0	5.0	✔
THMs by Headspace GC-MS	E611B	925168	1	5	20.0	5.0	✔
Total Cyanide	E333	921627	1	20	5.0	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	922468	1	20	5.0	5.0	✔
Total Mercury in Water by CVAAS	E508	925060	1	20	5.0	5.0	✔
Total metals in Water by CRC ICPMS	E420	920075	2	15	13.3	5.0	✔

(Partial Results)



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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
Method Blanks (MB) - Continued							
Total Nitrogen by Colourimetry	E366	925634	1	10	10.0	5.0	✔
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	925633	1	17	5.8	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	925636	1	10	10.0	5.0	✔
Turbidity by Nephelometry	E121	919929	1	20	5.0	5.0	✔
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	925637	1	9	11.1	5.0	✔
Bromate and Perchlorate in Water by LC-MS-MS	E722A	922151	1	13	7.6	5.0	✔
Bromide in Water by IC (Low Level)	E235.Br-L	919670	1	11	9.0	5.0	✔
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	927220	1	2	50.0	5.0	✔
Chlorate (CLO3) in Waters by Ion Chromatography	E409.CLO3	921893	1	10	10.0	5.0	✔
Chloride in Water by IC	E235.Cl	919669	1	11	9.0	5.0	✔
Chlorite (CLO2) in Waters by Ion Chromatography	E409.CLO2	921894	1	10	10.0	5.0	✔
Fluoride in Water by IC	E235.F	919668	1	11	9.0	5.0	✔
Haloacetic Acids in Water by LC-MS/MS	E750	921891	1	20	5.0	4.7	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	919671	1	13	7.6	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	919672	1	12	8.3	5.0	✔
Sulfate in Water by IC	E235.SO4	919673	1	11	9.0	5.0	✔
THMs by Headspace GC-MS	E611B	925168	1	5	20.0	5.0	✔
Total Cyanide	E333	921627	1	20	5.0	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	922468	1	20	5.0	5.0	✔
Total Mercury in Water by CVAAS	E508	925060	1	20	5.0	5.0	✔
Total metals in Water by CRC ICPMS	E420	920075	1	15	6.6	5.0	✔
Total Nitrogen by Colourimetry	E366	925634	1	10	10.0	5.0	✔
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	925633	1	17	5.8	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	925636	1	10	10.0	5.0	✔



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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
Conductivity in Water	E100 Vancouver - Environmental	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 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally $20 \pm 5^\circ\text{C}$). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 Vancouver - Environmental	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 Vancouver - Environmental	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 $180 \pm 2^\circ\text{C}$ for 16 hours or to constant weight, with gravimetric measurement of the residue.
Bromide in Water by IC (Low Level)	E235.Br-L Vancouver - Environmental	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 Vancouver - Environmental	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 Vancouver - Environmental	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 Vancouver - Environmental	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 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

(Partial Results)



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Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Alkalinity Species by Titration	E290 Vancouver - Environmental	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 Vancouver - Environmental	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 Vancouver - Environmental	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 Vancouver - Environmental	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 Vancouver - Environmental	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 colourimetric 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 Vancouver - Environmental	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).
Total Nitrogen by Colourimetry	E366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U Vancouver - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Chlorite (ClO ₂) in Waters by Ion Chromatography	E409.ClO ₂ Waterloo - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity detection.
Chlorate (ClO ₃) in Waters by Ion Chromatography	E409.ClO ₃ Waterloo - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity detection.

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Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total metals in Water by CRC ICPMS	E420 Vancouver - Environmental	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.
Total Mercury in Water by CVAAS	E508 Vancouver - Environmental	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L Vancouver - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
THMs by Headspace GC-MS	E611B Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
Bromate and Perchlorate in Water by LC-MS-MS	E722A Waterloo - Environmental	Water	EPA 6850	A aliquot of the water sample is filtered and an internal standard is added. The sample is then analyzed by LC/MS/MS.
Haloacetic Acids in Water by LC-MS/MS	E750 Waterloo - Environmental	Water	MOE E3478	An aliquot of sample is fortified with formic acid and internal standards and analyzed via direct injection by LCMSMS
Hardness (Calculated) from Total Ca/Mg	EC100A Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO ₃), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO ₃ 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.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 Vancouver - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for TKN in water	EP318 Vancouver - Environmental	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.

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Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Total Organic Carbon by Combustion	EP355 Vancouver - Environmental	Water		Preparation for Total Organic Carbon by Combustion
Digestion for Total Nitrogen in water	EP366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
Digestion for Total Phosphorus in water	EP372 Vancouver - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
VOCs Preparation for Headspace Analysis	EP581 Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
Preparation of Bromate and Perchlorate in Water by LC-MS-MS	EP722 Waterloo - Environmental	Water	EPA 6850	An aliquot of the water sample is filtered if required and internal standard is added.
Preparation of Haloacetic acid in Water for LCMSMS	EP750 Waterloo - Environmental	Water	E3478	An aliquot of samples is fortified with formic acid and internal standard to be analyzed by direct injection LCMSMS

QUALITY CONTROL REPORT

Work Order	: VA23A9469	Page	: 1 of 15
Amendment	: (Partial Results)		
Client	: District of Squamish	Laboratory	: Vancouver - Environmental
Contact	: Craig Halliday	Account Manager	: Ian Chen
Address	: 39907 Government Road PO Box 310 Squamish BC Canada V8B 0A3	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	:	Telephone	: +1 604 253 4188
Project	: Semi Annual Samples	Date Samples Received	: 02-May-2023 12:10
PO	: 123621	Date Analysis Commenced	: 03-May-2023
C-O-C number	: 20-1017353	Issue Date	: 09-May-2023 23:47
Sampler	: Craig Halliday 604 815 6864		
Site	: ----		
Quote number	: ----		
No. of samples received	: 5		
No. of samples analysed	: 5		

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.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Caitlin Macey	Team Leader - Inorganics	Vancouver Inorganics, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Vancouver Organics, Burnaby, British Columbia
Katrina Zwambag	Supervisor - HPLC	Waterloo LCMS, Waterloo, Ontario
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Owen Cheng		Vancouver Metals, Burnaby, British Columbia
Paul Cushing	Team Leader - Organics	Vancouver Inorganics, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Vancouver Inorganics, 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.

(Partial Results)



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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: 919674)											
VA23A9425-002	Anonymous	pH	----	E108	0.10	pH units	8.24	8.25	0.121%	4%	----
Physical Tests (QC Lot: 919675)											
VA23A9425-002	Anonymous	Alkalinity, total (as CaCO ₃)	----	E290	1.0	mg/L	159	159	0.191%	20%	----
Physical Tests (QC Lot: 919676)											
VA23A9425-002	Anonymous	Conductivity	----	E100	2.0	µS/cm	5980	6020	0.667%	10%	----
Physical Tests (QC Lot: 919678)											
VA23A9469-001	Power House Springs	Colour, true	----	E329	5.0	CU	<5.0	<5.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 919929)											
VA23A9446-001	Anonymous	Turbidity	----	E121	0.10	NTU	<0.10	<0.10	0	Diff <2x LOR	----
Physical Tests (QC Lot: 926462)											
KS2301432-001	Anonymous	Solids, total dissolved [TDS]	----	E162	20	mg/L	219	230	4.89%	20%	----
Anions and Nutrients (QC Lot: 919668)											
VA23A9419-001	Anonymous	Fluoride	16984-48-8	E235.F	0.200	mg/L	<0.200	<0.200	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 919669)											
VA23A9419-001	Anonymous	Chloride	16887-00-6	E235.Cl	5.00	mg/L	108	109	0.328%	20%	----
Anions and Nutrients (QC Lot: 919670)											
VA23A9419-001	Anonymous	Bromide	24959-67-9	E235.Br-L	0.500	mg/L	<0.500	<0.500	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 919671)											
VA23A9419-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0500	mg/L	0.0604	0.0600	0.0004	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 919672)											
VA23A9419-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0100	mg/L	0.0278	0.0288	0.0010	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 919673)											
VA23A9419-001	Anonymous	Sulfate (as SO ₄)	14808-79-8	E235.SO4	3.00	mg/L	531	535	0.637%	20%	----
Anions and Nutrients (QC Lot: 922468)											
VA23A9469-001	Power House Springs	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 925634)											
VA23A9469-001	Power House Springs	Nitrogen, total	7727-37-9	E366	0.030	mg/L	0.050	0.052	0.003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 925636)											
FJ2300996-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0039	0.0039	0.00002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 925637)											

(Partial Results)



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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: 925637) - continued											
FJ2300996-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.551	0.538	2.40%	20%	----
Cyanides (QC Lot: 921627)											
VA23A9527-001	Anonymous	Cyanide, strong acid dissociable (Total)	----	E333	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 925633)											
FJ2300996-001	Anonymous	Carbon, total organic [TOC]	----	E355-L	0.50	mg/L	1.70	1.75	0.04	Diff <2x LOR	----
Total Metals (QC Lot: 920075)											
VA23A9513-001	Anonymous	Aluminum, total	7429-90-5	E420	0.0030	mg/L	0.394	0.427	8.14%	20%	----
		Antimony, total	7440-36-0	E420	0.00010	mg/L	0.00946	0.00978	3.31%	20%	----
		Arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00557	0.00559	0.303%	20%	----
		Barium, total	7440-39-3	E420	0.00010	mg/L	0.0641	0.0676	5.23%	20%	----
		Beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, total	7440-42-8	E420	0.010	mg/L	0.092	0.097	0.005	Diff <2x LOR	----
		Cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000177	0.0000130	0.0000047	Diff <2x LOR	----
		Calcium, total	7440-70-2	E420	0.050	mg/L	23.2	24.3	4.72%	20%	----
		Cesium, total	7440-46-2	E420	0.000010	mg/L	0.00183	0.00189	3.12%	20%	----
		Chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00013	0.00014	0.00002	Diff <2x LOR	----
		Copper, total	7440-50-8	E420	0.00050	mg/L	0.00079	0.00079	0.0000002	Diff <2x LOR	----
		Iron, total	7439-89-6	E420	0.010	mg/L	0.202	0.223	9.95%	20%	----
		Lead, total	7439-92-1	E420	0.000050	mg/L	0.000724	0.000750	3.58%	20%	----
		Lithium, total	7439-93-2	E420	0.0010	mg/L	0.0561	0.0610	8.39%	20%	----
		Magnesium, total	7439-95-4	E420	0.0050	mg/L	1.60	1.65	3.32%	20%	----
		Manganese, total	7439-96-5	E420	0.00010	mg/L	0.0368	0.0384	4.33%	20%	----
		Molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00822	0.00850	3.44%	20%	----
		Nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Phosphorus, total	7723-14-0	E420	0.050	mg/L	0.054	0.057	0.002	Diff <2x LOR	----
		Potassium, total	7440-09-7	E420	0.050	mg/L	11.8	11.8	0.364%	20%	----
		Rubidium, total	7440-17-7	E420	0.00020	mg/L	0.0150	0.0156	3.65%	20%	----
		Selenium, total	7782-49-2	E420	0.000050	mg/L	0.000937	0.000913	2.58%	20%	----
		Silicon, total	7440-21-3	E420	0.10	mg/L	2.23	2.37	6.01%	20%	----
		Silver, total	7440-22-4	E420	0.000010	mg/L	0.000011	0.000014	0.000002	Diff <2x LOR	----
		Sodium, total	7440-23-5	E420	0.050	mg/L	30.7	31.2	1.79%	20%	----
		Strontium, total	7440-24-6	E420	0.00020	mg/L	0.480	0.485	1.04%	20%	----

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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: 920075) - continued											
VA23A9513-001	Anonymous	Sulfur, total	7704-34-9	E420	0.50	mg/L	22.1	23.4	5.58%	20%	----
		Tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Thallium, total	7440-28-0	E420	0.000010	mg/L	0.000050	0.000053	0.000003	Diff <2x LOR	----
		Thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.00030	mg/L	0.00841	0.00934	10.5%	20%	----
		Tungsten, total	7440-33-7	E420	0.00010	mg/L	0.00065	0.00070	0.00005	Diff <2x LOR	----
		Uranium, total	7440-61-1	E420	0.000010	mg/L	0.000457	0.000472	3.26%	20%	----
		Vanadium, total	7440-62-2	E420	0.00050	mg/L	0.00059	0.00061	0.00002	Diff <2x LOR	----
		Zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----
		Zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Total Metals (QC Lot: 925060)											
VA23A9342-003	Anonymous	Mercury, total	7439-97-6	E508	0.0000050	mg/L	0.0000082	0.0000086	0.0000004	Diff <2x LOR	----
Aggregate Organics (QC Lot: 927220)											
VA23A9469-001	Power House Springs	Chemical oxygen demand [COD]	----	E559-L	10	mg/L	<10	<10	0	Diff <2x LOR	----
Volatile Organic Compounds [THMs] (QC Lot: 925168)											
VA23A9469-002	BIRKEN	Bromodichloromethane	75-27-4	E611B	1.0	µg/L	<1.0	<1.0	0.0%	30%	----
		Bromoform	75-25-2	E611B	1.0	µg/L	<1.0	<1.0	0.0%	30%	----
		Chloroform	67-66-3	E611B	1.0	µg/L	<1.0	<1.0	0.0%	30%	----
		Dibromochloromethane	124-48-1	E611B	1.0	µg/L	<1.0	<1.0	0.0%	30%	----
Disinfectant By-Products (QC Lot: 921893)											
CG2305426-001	Anonymous	Chlorate	14866-68-3	E409.CLO3	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
Disinfectant By-Products (QC Lot: 921894)											
CG2305426-001	Anonymous	Chlorite	14998-27-7	E409.CLO2	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
Disinfectant By-Products (QC Lot: 922151)											
CG2305399-013	Anonymous	Bromate	15541-45-4	E722A	0.30	µg/L	10.8	10.9	1.50%	30%	----
Haloacetic Acids (QC Lot: 921891)											
EO2303452-005	Anonymous	Bromochloroacetic acid	5589-96-8	E750	1.00	µg/L	<1.00	<1.00	0	Diff <2x LOR	----
		Dibromoacetic acid	631-64-1	E750	1.00	µg/L	<1.00	<1.00	0	Diff <2x LOR	----
		Dichloroacetic acid	79-43-6	E750	1.00	µg/L	11.9	12.3	3.00%	30%	----
		Monobromoacetic acid	79-08-3	E750	1.00	µg/L	<1.00	<1.00	0	Diff <2x LOR	----
		Monochloroacetic acid	79-11-8	E750	1.00	µg/L	<1.00	<1.00	0	Diff <2x LOR	----
		Trichloroacetic acid	76-03-9	E750	1.00	µg/L	16.5	16.5	0.103%	30%	----



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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: 919675)						
Alkalinity, total (as CaCO ₃)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 919676)						
Conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 919678)						
Colour, true	----	E329	5	CU	<5.0	----
Physical Tests (QCLot: 919929)						
Turbidity	----	E121	0.1	NTU	<0.10	----
Physical Tests (QCLot: 926462)						
Solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Anions and Nutrients (QCLot: 919668)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 919669)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 919670)						
Bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 919671)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 919672)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 919673)						
Sulfate (as SO ₄)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 922468)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 925634)						
Nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Anions and Nutrients (QCLot: 925636)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 925637)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Cyanides (QCLot: 921627)						
Cyanide, strong acid dissociable (Total)	----	E333	0.002	mg/L	<0.0020	----

(Partial Results)



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Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Organic / Inorganic Carbon (QCLot: 925633)						
Carbon, total organic [TOC]	---	E355-L	0.5	mg/L	<0.50	---
Total Metals (QCLot: 920075)						
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	MBRR
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	MBRR
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	---
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	---

(Partial Results)



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Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 920075) - continued						
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: 925060)						
Mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Aggregate Organics (QCLot: 927220)						
Chemical oxygen demand [COD]	----	E559-L	10	mg/L	<10	----
Volatile Organic Compounds [THMs] (QCLot: 925168)						
Bromodichloromethane	75-27-4	E611B	1	µg/L	<1.0	----
Bromoform	75-25-2	E611B	1	µg/L	<1.0	----
Chloroform	67-66-3	E611B	1	µg/L	<1.0	----
Dibromochloromethane	124-48-1	E611B	1	µg/L	<1.0	----
Disinfectant By-Products (QCLot: 921893)						
Chlorate	14866-68-3	E409.CLO3	0.01	mg/L	<0.010	----
Disinfectant By-Products (QCLot: 921894)						
Chlorite	14998-27-7	E409.CLO2	0.01	mg/L	<0.010	----
Disinfectant By-Products (QCLot: 922151)						
Bromate	15541-45-4	E722A	0.3	µg/L	<0.30	----
Haloacetic Acids (QCLot: 921891)						
Bromochloroacetic acid	5589-96-8	E750	0.5	µg/L	<0.50	----
Dibromoacetic acid	631-64-1	E750	1	µg/L	<1.00	----
Dichloroacetic acid	79-43-6	E750	1	µg/L	<1.00	----
Monobromoacetic acid	79-08-3	E750	0.2	µg/L	<0.20	----
Monochloroacetic acid	79-11-8	E750	0.5	µg/L	<0.50	----
Trichloroacetic acid	76-03-9	E750	1	µg/L	<1.00	----

Qualifiers

Qualifier	Description
MBRR	Initial MB for this submission had positive results for flagged analyte (data not shown). Low level samples were repeated with new QC (2nd MB results shown). High level results (>5x initial MB level) and non-detect results were reported and are defensible



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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	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 919674)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 919675)									
Alkalinity, total (as CaCO ₃)	----	E290	1	mg/L	500 mg/L	106	85.0	115	----
Physical Tests (QCLot: 919676)									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	98.6	90.0	110	----
Physical Tests (QCLot: 919678)									
Colour, true	----	E329	5	CU	100 CU	104	85.0	115	----
Physical Tests (QCLot: 919929)									
Turbidity	----	E121	0.1	NTU	200 NTU	99.5	85.0	115	----
Physical Tests (QCLot: 926462)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	93.5	85.0	115	----
Anions and Nutrients (QCLot: 919668)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 919669)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 919670)									
Bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	107	85.0	115	----
Anions and Nutrients (QCLot: 919671)									
Nitrate (as N)	14797-55-8	E235.NO ₃ -L	0.005	mg/L	2.5 mg/L	105	90.0	110	----
Anions and Nutrients (QCLot: 919672)									
Nitrite (as N)	14797-65-0	E235.NO ₂ -L	0.001	mg/L	0.5 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 919673)									
Sulfate (as SO ₄)	14808-79-8	E235.SO ₄	0.3	mg/L	100 mg/L	105	90.0	110	----
Anions and Nutrients (QCLot: 922468)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	98.2	75.0	125	----
Anions and Nutrients (QCLot: 925634)									
Nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	95.3	75.0	125	----
Anions and Nutrients (QCLot: 925636)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	97.1	80.0	120	----
Anions and Nutrients (QCLot: 925637)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	99.8	85.0	115	----

(Partial Results)



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Sub-Matrix: Water					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Analyte	CAS Number	Method	LOR	Unit					
Cyanides (QCLot: 921627)									
Cyanide, strong acid dissociable (Total)	----	E333	0.002	mg/L	0.25 mg/L	86.2	80.0	120	----
Organic / Inorganic Carbon (QCLot: 925633)									
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	109	80.0	120	----
Total Metals (QCLot: 920075)									
Aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	102	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	105	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	101	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	99.6	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	104	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	103	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	103	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	102	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	98.6	80.0	120	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	97.4	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	97.2	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	99.2	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	98.1	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	103	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	102	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	103	80.0	120	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	106	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	102	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	99.7	80.0	120	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	111	80.0	120	----
Potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	105	80.0	120	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	102	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	102	80.0	120	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	97.4	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	107	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	101	80.0	120	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	95.8	80.0	120	----

(Partial Results)



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Work Order : VA23A9469
Client : District of Squamish
Project : Semi Annual Samples

Sub-Matrix: Water

Analyte					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
CAS Number	Method	LOR	Unit						
Total Metals (QCLot: 920075) - continued									
Tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	98.7	80.0	120	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	104	80.0	120	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	102	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	99.7	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	104	80.0	120	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	97.8	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	103	80.0	120	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	102	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	105	80.0	120	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	101	80.0	120	----
Total Metals (QCLot: 925060)									
Mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	89.8	80.0	120	----
Aggregate Organics (QCLot: 927220)									
Chemical oxygen demand [COD]	----	E559-L	10	mg/L	100 mg/L	107	85.0	115	----
Volatile Organic Compounds [THMs] (QCLot: 925168)									
Bromodichloromethane	75-27-4	E611B	1	µg/L	100 µg/L	89.7	70.0	130	----
Bromoform	75-25-2	E611B	1	µg/L	100 µg/L	104	70.0	130	----
Chloroform	67-66-3	E611B	1	µg/L	100 µg/L	92.8	70.0	130	----
Dibromochloromethane	124-48-1	E611B	1	µg/L	100 µg/L	90.8	70.0	130	----
Disinfectant By-Products (QCLot: 921893)									
Chlorate	14866-68-3	E409.CLO3	0.01	mg/L	1 mg/L	110	85.0	115	----
Disinfectant By-Products (QCLot: 921894)									
Chlorite	14998-27-7	E409.CLO2	0.01	mg/L	1 mg/L	110	85.0	115	----
Disinfectant By-Products (QCLot: 922151)									
Bromate	15541-45-4	E722A	0.3	µg/L	4 µg/L	96.0	70.0	130	----
Haloacetic Acids (QCLot: 921891)									
Bromochloroacetic acid	5589-96-8	E750	0.5	µg/L	2.5 µg/L	88.9	70.0	130	----
Dibromoacetic acid	631-64-1	E750	1	µg/L	5 µg/L	110	70.0	130	----
Dichloroacetic acid	79-43-6	E750	1	µg/L	5 µg/L	118	70.0	130	----
Monobromoacetic acid	79-08-3	E750	0.2	µg/L	1 µg/L	111	70.0	130	----
Monochloroacetic acid	79-11-8	E750	0.5	µg/L	2.5 µg/L	112	70.0	130	----
Trichloroacetic acid	76-03-9	E750	1	µg/L	5 µg/L	111	70.0	130	----

(Partial Results)

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Work Order : VA23A9469
Client : District of Squamish
Project : Semi Annual Samples



Sub-Matrix: Water					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier

(Partial Results)



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Work Order : VA23A9469
Client : District of Squamish
Project : Semi Annual Samples

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 $\geq 1 \times$ 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
Anions and Nutrients (QCLot: 919668)									
VA23A9425-001	Anonymous	Fluoride	16984-48-8	E235.F	53.1 mg/L	50 mg/L	106	75.0	125
Anions and Nutrients (QCLot: 919669)									
VA23A9425-001	Anonymous	Chloride	16887-00-6	E235.Cl	5260 mg/L	5000 mg/L	105	75.0	125
Anions and Nutrients (QCLot: 919670)									
VA23A9425-001	Anonymous	Bromide	24959-67-9	E235.Br-L	26.0 mg/L	25 mg/L	104	75.0	125
Anions and Nutrients (QCLot: 919671)									
VA23A9425-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	132 mg/L	125 mg/L	106	75.0	125
Anions and Nutrients (QCLot: 919672)									
VA23A9425-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	25.3 mg/L	25 mg/L	101	75.0	125
Anions and Nutrients (QCLot: 919673)									
VA23A9425-001	Anonymous	Sulfate (as SO ₄)	14808-79-8	E235.SO ₄	5170 mg/L	5000 mg/L	103	75.0	125
Anions and Nutrients (QCLot: 922468)									
VA23A9512-013	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	2.36 mg/L	2.5 mg/L	94.4	70.0	130
Anions and Nutrients (QCLot: 925634)									
VA23A9472-006	Anonymous	Nitrogen, total	7727-37-9	E366	ND mg/L	0.08 mg/L	ND	70.0	130
Anions and Nutrients (QCLot: 925636)									
FJ2300996-002	Anonymous	Phosphorus, total	7723-14-0	E372-U	ND mg/L	0.05 mg/L	ND	70.0	130
Anions and Nutrients (QCLot: 925637)									
FJ2300996-002	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.109 mg/L	0.1 mg/L	109	75.0	125
Cyanides (QCLot: 921627)									
VA23A9576-001	Anonymous	Cyanide, strong acid dissociable (Total)	----	E333	1.13 mg/L	1.25 mg/L	90.6	75.0	125
Organic / Inorganic Carbon (QCLot: 925633)									
FJ2300996-002	Anonymous	Carbon, total organic [TOC]	----	E355-L	ND mg/L	5 mg/L	ND	70.0	130
Total Metals (QCLot: 920075)									
VA23A9513-002	Anonymous	Aluminum, total	7429-90-5	E420	ND mg/L	0.2 mg/L	ND	70.0	130
		Antimony, total	7440-36-0	E420	0.0197 mg/L	0.02 mg/L	98.4	70.0	130
		Arsenic, total	7440-38-2	E420	0.0186 mg/L	0.02 mg/L	93.2	70.0	130
		Barium, total	7440-39-3	E420	ND mg/L	0.02 mg/L	ND	70.0	130

(Partial Results)



Page : 14 of 15
Work Order : VA23A9469
Client : District of Squamish
Project : Semi Annual Samples

Sub-Matrix: Water

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: 920075) - continued										
VA23A9513-002	Anonymous	Beryllium, total	7440-41-7	E420	0.0388 mg/L	0.04 mg/L	97.0	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.00951 mg/L	0.01 mg/L	95.1	70.0	130	----
		Boron, total	7440-42-8	E420	0.097 mg/L	0.1 mg/L	97.4	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.00396 mg/L	0.004 mg/L	99.0	70.0	130	----
		Calcium, total	7440-70-2	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		Cesium, total	7440-46-2	E420	0.00950 mg/L	0.01 mg/L	95.0	70.0	130	----
		Chromium, total	7440-47-3	E420	0.0379 mg/L	0.04 mg/L	94.8	70.0	130	----
		Cobalt, total	7440-48-4	E420	0.0192 mg/L	0.02 mg/L	96.2	70.0	130	----
		Copper, total	7440-50-8	E420	0.0185 mg/L	0.02 mg/L	92.7	70.0	130	----
		Iron, total	7439-89-6	E420	1.95 mg/L	2 mg/L	97.6	70.0	130	----
		Lead, total	7439-92-1	E420	0.0187 mg/L	0.02 mg/L	93.4	70.0	130	----
		Lithium, total	7439-93-2	E420	0.0919 mg/L	0.1 mg/L	91.9	70.0	130	----
		Magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, total	7439-96-5	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Molybdenum, total	7439-98-7	E420	0.0196 mg/L	0.02 mg/L	97.9	70.0	130	----
		Nickel, total	7440-02-0	E420	0.0375 mg/L	0.04 mg/L	93.8	70.0	130	----
		Phosphorus, total	7723-14-0	E420	10.00 mg/L	10 mg/L	100.0	70.0	130	----
		Potassium, total	7440-09-7	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		Rubidium, total	7440-17-7	E420	0.0190 mg/L	0.02 mg/L	94.8	70.0	130	----
		Selenium, total	7782-49-2	E420	0.0378 mg/L	0.04 mg/L	94.5	70.0	130	----
		Silicon, total	7440-21-3	E420	9.85 mg/L	10 mg/L	98.5	70.0	130	----
		Silver, total	7440-22-4	E420	0.00381 mg/L	0.004 mg/L	95.2	70.0	130	----
		Sodium, total	7440-23-5	E420	ND mg/L	2 mg/L	ND	70.0	130	----
		Strontium, total	7440-24-6	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, total	7704-34-9	E420	ND mg/L	20 mg/L	ND	70.0	130	----
		Tellurium, total	13494-80-9	E420	0.0388 mg/L	0.04 mg/L	97.0	70.0	130	----
		Thallium, total	7440-28-0	E420	0.00375 mg/L	0.004 mg/L	93.9	70.0	130	----
		Thorium, total	7440-29-1	E420	0.0206 mg/L	0.02 mg/L	103	70.0	130	----
		Tin, total	7440-31-5	E420	0.0194 mg/L	0.02 mg/L	97.0	70.0	130	----
		Titanium, total	7440-32-6	E420	0.0416 mg/L	0.04 mg/L	104	70.0	130	----
		Tungsten, total	7440-33-7	E420	0.0184 mg/L	0.02 mg/L	91.9	70.0	130	----
		Uranium, total	7440-61-1	E420	0.00394 mg/L	0.004 mg/L	98.4	70.0	130	----
		Vanadium, total	7440-62-2	E420	0.0983 mg/L	0.1 mg/L	98.3	70.0	130	----
		Zinc, total	7440-66-6	E420	0.403 mg/L	0.4 mg/L	101	70.0	130	----
		Zirconium, total	7440-67-7	E420	0.0404 mg/L	0.04 mg/L	101	70.0	130	----

(Partial Results)



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Work Order : VA23A9469
Client : District of Squamish
Project : Semi Annual Samples

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: 925060)										
VA23A9365-001	Anonymous	Mercury, total	7439-97-6	E508	0.0000921 mg/L	0.0001 mg/L	92.1	70.0	130	----
Aggregate Organics (QCLot: 927220)										
VA23A9623-001	Anonymous	Chemical oxygen demand [COD]	----	E559-L	ND mg/L	100 mg/L	ND	75.0	125	----
Volatile Organic Compounds [THMs] (QCLot: 925168)										
VA23A9469-003	TANTALUS	Bromodichloromethane	75-27-4	E611B	91.9 µg/L	100 µg/L	91.9	60.0	140	----
		Bromoform	75-25-2	E611B	106 µg/L	100 µg/L	106	60.0	140	----
		Chloroform	67-66-3	E611B	91.2 µg/L	100 µg/L	91.2	60.0	140	----
		Dibromochloromethane	124-48-1	E611B	93.6 µg/L	100 µg/L	93.6	60.0	140	----
Disinfectant By-Products (QCLot: 921893)										
CG2305426-001	Anonymous	Chlorate	14866-68-3	E409.CLO3	0.979 mg/L	1 mg/L	97.9	75.0	125	----
Disinfectant By-Products (QCLot: 921894)										
CG2305426-001	Anonymous	Chlorite	14998-27-7	E409.CLO2	0.992 mg/L	1 mg/L	99.2	75.0	125	----
Disinfectant By-Products (QCLot: 922151)										
CG2305399-013	Anonymous	Bromate	15541-45-4	E722A	ND µg/L	4 µg/L	ND	70.0	130	----
Haloacetic Acids (QCLot: 921891)										
EO2303452-005	Anonymous	Bromochloroacetic acid	5589-96-8	E750	2.80 µg/L	2.5 µg/L	112	70.0	130	----
		Dibromoacetic acid	631-64-1	E750	6.39 µg/L	5 µg/L	128	70.0	130	----
		Dichloroacetic acid	79-43-6	E750	ND µg/L	5 µg/L	ND	70.0	130	----
		Monobromoacetic acid	79-08-3	E750	1.02 µg/L	1 µg/L	102	70.0	130	----
		Monochloroacetic acid	79-11-8	E750	2.31 µg/L	2.5 µg/L	92.6	70.0	130	----
		Trichloroacetic acid	76-03-9	E750	ND µg/L	5 µg/L	ND	70.0	130	----



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Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

COC Number: 20 - 1017353

Page 1 of 1

Report To Contact and company name below will appear on the final report		Reports / Recipients		Turnaround Time (TAT) Requested		AFFIX ALS BARCODE LABEL HERE (ALS use only)	
Company: DISTRICT OF SQUAMISH		Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)		<input checked="" type="checkbox"/> Routine [R] if received by 3pm M-F - no surcharges apply <input type="checkbox"/> 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum <input type="checkbox"/> 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum <input type="checkbox"/> 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum <input type="checkbox"/> 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum <input type="checkbox"/> Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests			
Contact: CRAIG HALLIDAY		Merge QC/QCI Reports with COA <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A					
Phone: 604.815.9942		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX					
Company address below will appear on the final report		Email 1 or Fax: challiday@squamish.ca		Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm am/pm			
Street: 39909 GOVERNMENT RD		Email 2		For all tests with rush TATs requested, please contact your AM to confirm availability.			
City/Province: SQUAMISH BC		Email 3		Analysis Request			
Postal Code: V8B 0A3				Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below			
Invoice To: Same as Report To <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Invoice Recipients		NUMBER OF CONTAINERS BROMATE/CHLORITE CYANIDES GENERAL METALS + MECHANICAL NOT FOR COOLING HAA THM		MPLES ON HOLD TENDED STORAGE REQUIRED SUSPECTED HAZARD (see notes)	
Copy of Invoice with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX					
Company: DISTRICT OF SQUAMISH		Email 1 or Fax: challiday@squamish.ca					
Contact: CRAIG HALLIDAY		Email 2					
Project Information		Oil and Gas Required Fields (client use)					
ALS Account # / Quote #:		AFE/Cost Center:					
Job #: SEMI-ANNUAL		Major/Minor Code:					
PO / AFE: 123621		Requisitioner:					
LSD:		Location:					
ALS Lab Work Order # (ALS use only):		ALS Contact: KAITLYN		Sampler: CRAIG			
ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type			
	POWER HOUSE SPRINGS	02-05-23	6:45	GRAB	1		
	POWER HOUSE SPRINGS	02-05-23	6:45	GRAB	1		
	POWER HOUSE SPRINGS	02-05-23	6:45	GRAB	1		
	POWER HOUSE SPRINGS	02-05-23	6:47	GRAB	2		
	POWER HOUSE SPRINGS	02-05-23	6:48	GRAB	1		
	BIRKEN	02-05-23	7:25	GRAB	4		
	TANTALUS	02-05-23	7:35	GRAB	4		
	ROCKRIDGE	02-05-23	7:45	GRAB	4		
	CRUMPIT WOODS	02-05-23	7:10	GRAB	4		
Drinking Water (DW) Samples¹ (client use)		Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)		SAMPLE RECEIPT DETAILS (ALS use only)			
Are samples taken from a Regulated DW System? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO				Cooling Method: <input type="checkbox"/> NONE <input type="checkbox"/> ICE <input checked="" type="checkbox"/> ICE PACKS <input type="checkbox"/> FROZEN <input type="checkbox"/> COOLING INITIATED			
Are samples for human consumption/ use? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO				Submission Comments identified on Sample Receipt Notification: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			
				Cooler Custody Seals Intact: <input type="checkbox"/> YES <input type="checkbox"/> N/A Sample Custody Seals Intact: <input type="checkbox"/> YES <input type="checkbox"/> N/A			
				INITIAL COOLER TEMPERATURES °C: FINAL COOLER TEMPERATURES °C:			
				14			
SHIPMENT RELEASE (client use)		INITIAL SHIPMENT RECEPTION (ALS use only)		FINAL SHIPMENT RECEPTION (ALS use only)			
Released by: CALEM GARDNER	Date:	Time:	Received by:	Date:	Time:	Received by: CAS	Date: 05/02/23
							12:10 PM

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

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.

AUG 2020 (REV)