



BASELINE (SUMMER AND WINTER) TESTING (PHASE 3)

**AE PROJECT
NUMBER: 3000-31**

March 28, 2024

**BC MINISTRY OF TRANSPORTATION &
INFRASTRUCTURE**

5A 940 Blanshard Street
Victoria, BC V8W 9T5

ATTENTION: Paul Savinkoff, P.Geo.
Senior Geoscientist

REFERENCE: Highway 1 Widening from Lefeuvre to
Ross Road (Mainline West), Abbotsford,
BC

INTRODUCTION

Active Earth Engineering Ltd. (Active Earth) has been retained by the BC Ministry of Transportation & Infrastructure (MOTI, the 'client') to conduct Baseline Testing of wells and sewerage systems that were previously identified to be at medium to high risk of impacts from the proposed Highway 1 improvements between Lefeuvre and Ross Roads. This portion of the overall Highway 1 Improvements Project (the 'Project') is referred to as 'Mainline West' package.

The Project will involve construction of an additional highway lane in both directions, which will primarily encroach on the center median but will also include substantial traffic and drainage pattern changes at existing interchanges, overpasses and underpasses. The combined footprint of these areas is henceforth referred to as the 'Project Area.'

This report provides a summary of Baseline Testing results conducted during the wet and dry seasons, when groundwater levels were anticipated to be at their highest and lowest, respectively, and flows in receiving drainage courses (ditches, streams) were also expected to be at their highest and lowest.

This work was conducted in accordance with Contract 860-CS-5296 between MOTI and Active Earth.

BACKGROUND

Past assessment work within the Mainland West package has included desktop-based Initial Screening Level Assessment (Phase 1)¹ and subsequent on-site Ground Truthing (Phase 2)².

As part of the Initial Screening step completed in May of 2021, two (2) land parcels were flagged as warranting further consideration of potential impacts to domestic water supply wells and twenty-seven (27) land parcels were flagged as warranting further analysis of potential impacts to sewerage systems.

The Ground Truthing work completed in October 2021 re-reviewed the Initial Screening results with reference to the 50% Preliminary Design drawings. After completing this step, the number of wells requiring further assessment was reduced to zero, and the number of sewerage systems was reduced to five (5).

OBJECTIVES AND SCOPE OF WORK (PHASE 3)

The objectives of the Baseline Testing (Phase 3) work have been to further assess and document the pre-construction status of the 'moderate to high' risk sewerage systems identified in previous work and to make recommendations on how potential Project-related impacts can be mitigated.

For sewerage systems, potential impacts include impacts that could render them out of compliance with recommended minimum horizontal setbacks between dispersal fields and drainage ditches (particularly those connected to downstream fish habitat). For ephemeral streams, this setback distance is 15m, as recommended in the *Sewerage System Standard Practice Manual*.³ Encroaching on this setback could result in contamination of surface water by septic-sourced constituents (e.g. nutrients, bacteria). Potential impacts to sewerage systems also include impacts to their proper functioning. For example, changes to surface drainage patterns that cause a rise in the water table

¹ Active Earth Engineering, DRAFT Groundwater Assessment - Initial Screening (Phase 1) Highway 1 Widening from 264 St to Whatcom Rd, May, 30pp.

² Active Earth Engineering, 2021. DRAFT Baseline Groundwater Assessment (Phase 2) Highway 1 Widening from 264 St to Whatcom Rd, October, 38pp.

³ The Sewerage System Standard Practice Manual, version 3 (2014), published by the Health Protection Branch of the BC Ministry of Health, sets out a 30 m set back between a dispersal system and a permanent freshwater waterbody, and 15 m for an intermittent freshwater waterbody.

would reduce the vertical separation between the point of release of effluent and the groundwater table, potentially lessening the effectiveness of in-ground treatment.

As part of this Phase 3 assessment, our scope of work included:

- Reviewing the Issued for Tender (IFT) plans dated February 27, 2024. Special attention was given to properties that may be encroached upon by means of land acquisition, statutory rights of way or licensure for construction activities, or that may be affected by changes in surface drainage patterns.
- Identifying at-risk sewerage systems and wells not previously identified during our Initial Screening (Phase 1) and Ground-truthing (Phase 2) steps.
- Installing a drive point to measure groundwater elevations near existing 'at risk' sewerage systems (April 4, 2023).
- Collecting samples of groundwater and nearby surface water and analyzing for parameters indicative of sewerage system impacts (April 21, 25, and May 18, 2023).

The locations of the properties that were subject to further review or that underwent (Phase 3) Baseline Testing of ground and surface water quality are shown on Figure 1.

SEWERAGE SYSTEMS FINDINGS AND RECOMMENDATIONS

Updated Screening and Ground Truthing

Five (5) 'moderate risk' sewerage systems were identified in our Phase 2 Assessment within the Mainland West package. Review of the IFT plans and additional site visits downgraded all of these systems to 'low risk' owing to the adequate horizontal separation between the septic field and

- 1) areas that will be disturbed by construction activities, such as the Temporary Licence for Construction Activities (TLCA) and Statutory Right of Way (SRW), and/or
- 2) nearby surface drainage course and/or the unlikelihood that the surface drainage course will be altered in such a way as to encroach on the septic field or cause the water table to rise in the vicinity of the septic field.

This included obtaining additional 'as-built' drawings for a septic field located at 3555 Ross Road (Figure 3) and field-verifying its location relative to the TLCA. This resulted in maintenance of its designation as 'low risk.'

The design review and site visits did identify one sewerage system at 28709 Downes Road (Figure 2) that warranted Baseline Testing, the results of which are described in the following section.

Winter and Summer Baseline Testing Findings

Baseline Testing was undertaken at 28709 Downes Road (Figure 2) because the sewerage system is located less than 15m from the existing surface drainage course and some earthworks, drainage modifications or site usage modifications are likely. The field is located within a temporary license for construction activities (TLCA) area and property acquisition area. This sewerage system assigned a 'moderate risk' ranking owing to the potential for physical damage by heavy equipment moving or parking above it and/or the release of contaminants into the nearby drainage course.

A drive point was installed between the location of the septic field (identified in consultation with the landowner) and the existing surface drainage course to the northeast. Its location is shown in Figure 2. The borehole logs for the drive point are attached as Appendix A. Photos showing the drive point location are attached to this report.

Baseline water quality samples were collected from the drive point and from the adjacent surface drainage course and analyzed for:

- Physical parameters (pH, conductivity, hardness),
- Anions and nutrients (chloride, sulphate, phosphate, nitrate, nitrite, etc.),
- Bacteria (fecal and total coliforms), and
- Dissolved metals.

Depths to groundwater relative to ground surface and the presence of flow in the nearest drainage course were also noted during sample collection.

The water table depth and flow observations for the winter (April) and summer (August) Baseline Testing events are summarized in Table D, below:

TABLE B – DRIVE POINT WATER TABLE DEPTH MEASUREMENTS

Street Address	Drive point / Monitoring well Total Depth (m-bg)	WINTER EVENT (April 19 & 21, 2023) Depth to water (m-bg)	FLOW PRESENT IN DITCH? (Y/N)	SUMMER EVENT (August 24, 2023) Depth to water (m-bg)	FLOW PRESENT IN DITCH? (Y/N)
28709 Downes Road, Abbotsford	1.24	0.35	Y	> 1.24 (dry)	N

The winter water table was less than 1.0m below ground surface, which can compromise the proper functioning of the sewerage dispersal field owing to an inadequate vertical thickness of unsaturated material between the point of effluent release and the water table. Therefore, the potential for septic contaminants to reach the drainage courses is higher.

The summer water table was almost a metre lower than that measured in winter. There was also no flow observed in the drainage course, owing to the lack of surface runoff and groundwater discharge. No ground or surface water quality samples could be collected during the summer sampling event.

Table 2 summarizes the laboratory analytical results for the ground and surface water samples collected during the winter sampling event. Multiple trips to sampling stations were necessary to test for all parameters, owing to the limited volume of sample that could be obtained from the drive point at one time. Laboratory reports have been included with Appendix B. Water quality results for ground and surface water were compared to BC Approved and Working Water Quality Guidelines.

Concentrations of septic-system related parameters, including nitrate, total and fecal coliforms were elevated in surface water relative to groundwater. Assuming that the drive point is positioned on the groundwater flow path between the septic field and the surface drainage course, it can be interpreted that the septic field is not the primary source of nitrate and coliforms in the surface water. Still, caution should be exercised when working in and around this drainage course owing to the presence of fecal coliforms. As the nutrient and bacteria results were less than the AWQG the risk to the receiving environment was considered to be low.

The following table summarizes our interpretation of the sewerage system Baseline Testing results:

TABLE C – SEWERAGE SYSTEM BASELINE TESTING RESULTS

STREET ADDRESS	FINDINGS	UPDATED RISK LEVEL	RECOMMENDATIONS
28709 Downes Road, Abbotsford	Existing and planned surface drainage is <15m from existing septic field in high water table area (<1 mbg in winter). Surface water quality (elevated nitrate, fecal coliforms) unlikely to be sourced from septic field.	Moderate	Be aware of high fecal coliform counts if working in and around this surface drainage in winter. Prohibit the parking/movement of heavy equipment on the septic field. Replacement of the field may be necessary.

To protect the physical integrity of the septic field, we recommend that its exact location be surveyed and marked and that movement / stationing of heavy equipment on top of the field be prohibited. If this is not practical, then replacement with a better designed (e.g. sand mound) field may be necessary.

WATER WELLS FINDINGS AND RECOMMENDATIONS

Updated Screening and Ground Truthing

Re-review of the IFT plans identified one well (identified by database Well Tag Number 113997) within 35m of the TLCA at 3555 Ross Road (Figure 3). A site inspection conducted on March 7, 2024 by Active Earth in the presence of an employee of the mushroom farm confirmed that there is no well in this area.

LIMITATIONS

The use of this report by anyone is subject to the following conditions and limitations:

1. This report has been prepared at the request of the client (MOTI) and for the specific use referred to herein. The client may rely on this report, as may any Authorized Users as defined by Contract 860 CS 5296. It is not reasonable for any other party to rely on the contents of this report without first obtaining written authorization from the client and Active Earth Engineering Ltd.
2. Liability is expressly denied to any person other than the parties indicated above and those who obtain written consent. Accordingly, Active Earth Engineering Ltd. does not accept responsibility for any damage suffered by any such person as a

result of decisions made or actions based on this report. Diligence by all intended users is assumed.

3. This report is believed to provide a reasonable representation of the general environmental conditions within the Project area as of the date of this report. The conclusions made in this report reflect Active Earth's best judgment in light of the information available at the time of reporting. Should additional information become available or site conditions change, the conclusions and recommendations of this report may be subject to change.
4. Active Earth Engineering Ltd. has agreed to conduct an assessment and prepare this report as requested by the client named in the report for the use specified by the client, which is stated in the report. The client has agreed that the performance of this work and the report format are appropriate for the intended use. For any party to rely on this report in the future, supplemental investigation may be necessary to verify the site conditions at that time.
5. Written consent from Active Earth Engineering Ltd. must be obtained before any part of the report can be used for any purpose by anyone other than the client and other intended users identified in the report. Liability to any other party or for any other use is expressly denied regardless of who pays Active Earth Engineering Ltd.'s fee. Written consent and approval of Active Earth Engineering Ltd. must also be obtained before the report (or any part of it) can be altered or conveyed to other parties (excluding Authorized Users) or the public through prospectus, offering memoranda, advertising, public relations, news, sales or other media.

CLOSURE

We trust this provides the information required at this time. If you have any questions, or require additional clarification, please contact the undersigned.


Yours truly,

ACTIVE EARTH ENGINEERING LTD.

Prepared By,

Reviewed By,

Kathy Tixier, P.Eng.
Senior Hydrogeologist


Steve Boyce, B.A. (Env)
Principal, Senior Scientist

Marc Zubeł, P.Eng.
Marc Zubeł, P.Eng.
Senior Hydrogeologist

ATTACHMENTS

FIGURES

Figure 1 – Well and Sewerage System Locations

Figure 2 – Site Plan 28709 Downes Rd

Figure 3 – Site Plan 3555 Ross Rd

TABLES

Table 1 – Sewerage System Summary

Table 2 – Analytical Results for Sewerage System Parameters

PHOTOGRAPHS

Photo 1

APPENDICES

Appendix A – Active Earth Borehole Log

Appendix B – Laboratory Analytical Reports



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FIGURES



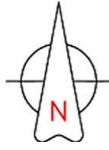


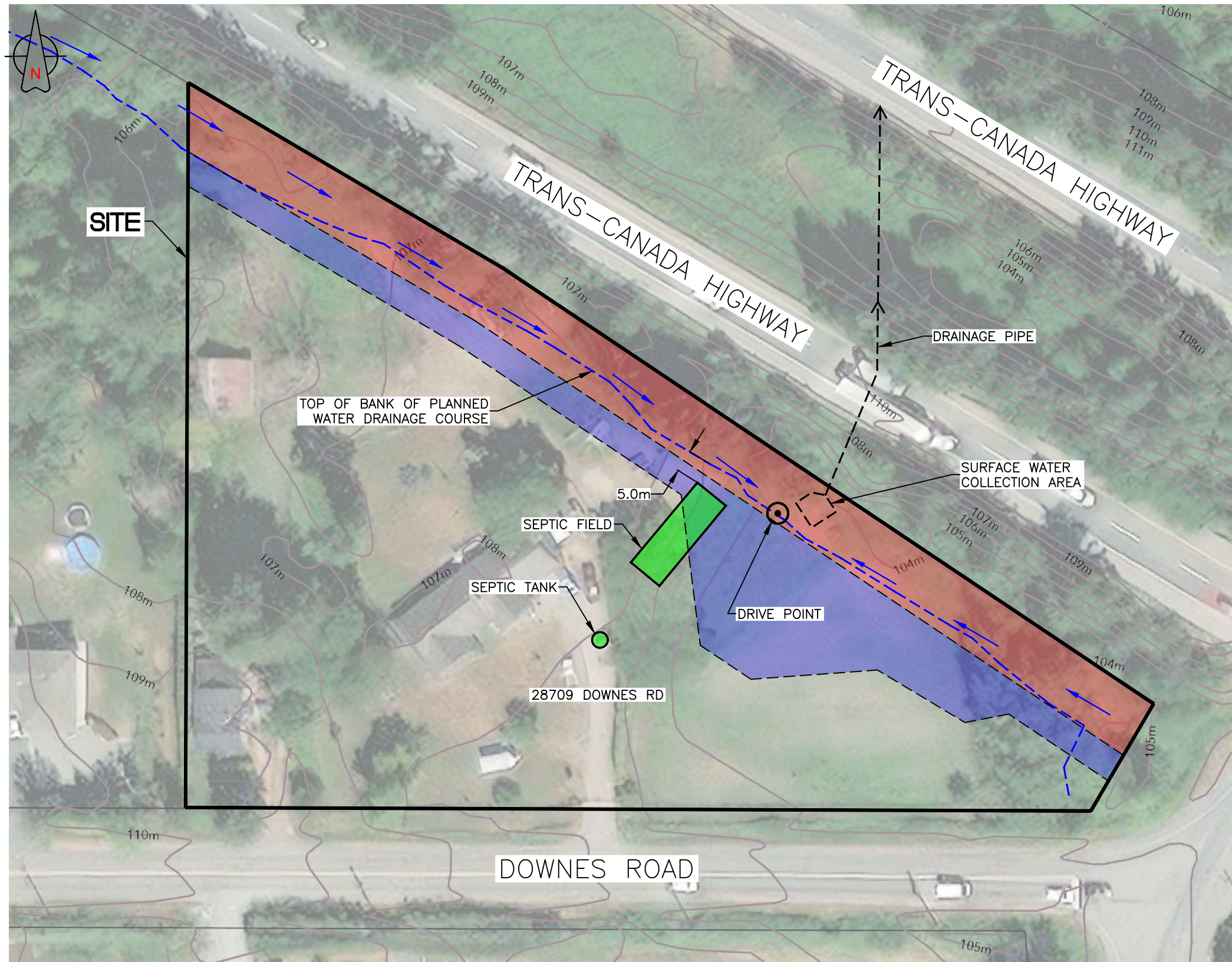


Image © 2024 Airbus






-  SEWERAGE SYSTEM
-  WATER WELL



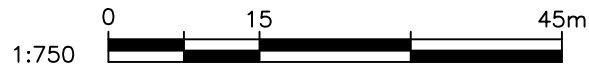
CLIENT NAME: MINISTRY OF TRANSPORTATION AND INFRASTRUCTURE		PROJECT LOCATION: ABBOTSFORD, BC	
WELL AND SEWERAGE SYSTEM LOCATIONS			
DWN BY: KT	DWG NAME: -1	DATE: 2023-12-08	FIGURE 1
CHK'D: KT	PLOT:	CADFILE: 3000-31	



LEGEND

-  APPROXIMATE SITE BOUNDARY
-  PROPERTY ACQUISITION
-  TEMPORARY LICENSE FOR CONSTRUCTION ACTIVITIES (TLCA)
-  STATUTORY RoW (SRW)
-  EXISTING SURFACE DRAINAGE

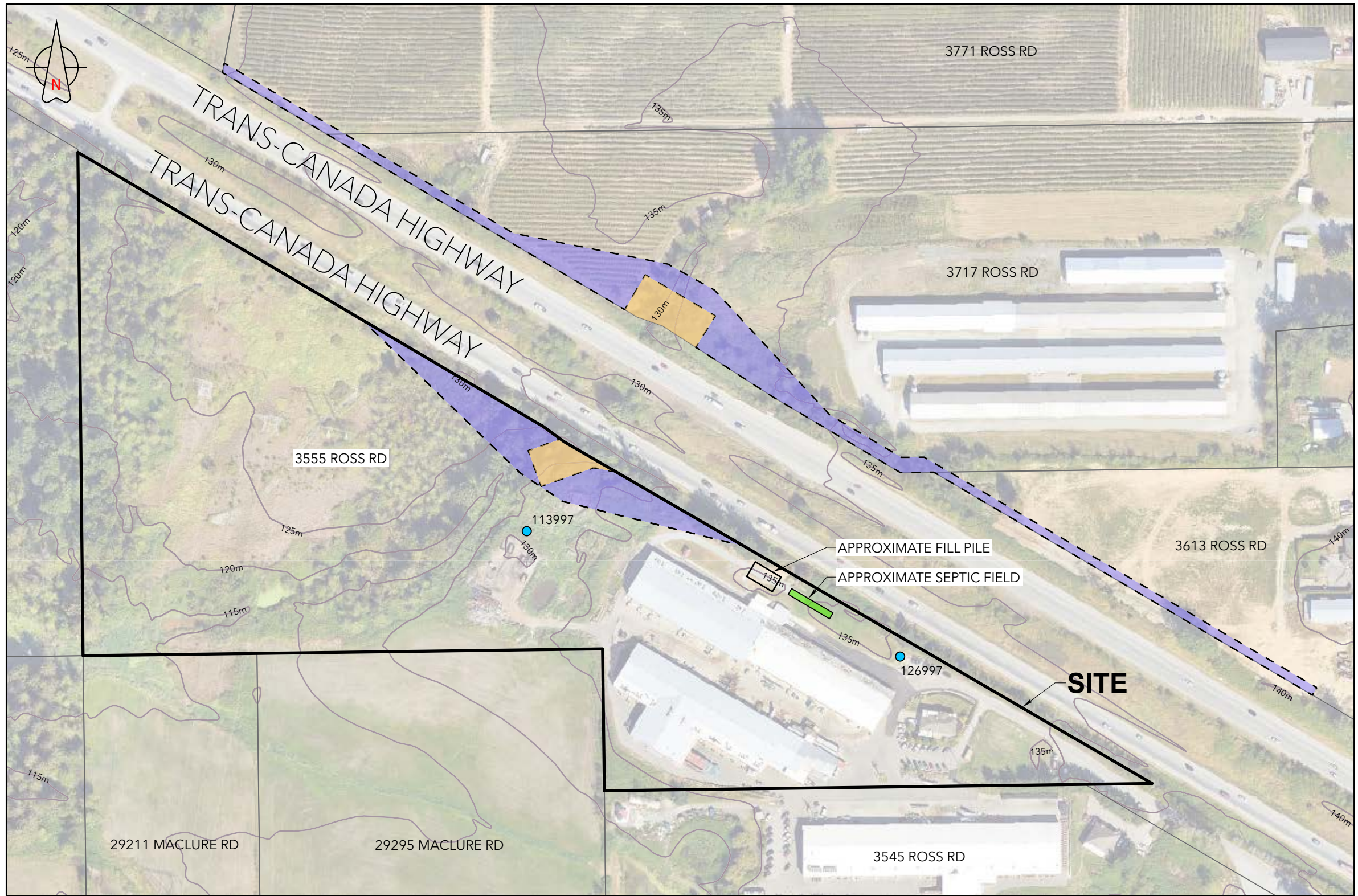
NOTE:
SEPTIC FIELD AND TANK, DOMESTIC WELL, DRIVE POINT, MONITORING WELL & DITCH SAMPLING LOCATIONS APPROXIMATE



CLIENT NAME: MINISTRY OF TRANSPORTATION AND INFRASTRUCTURE
PROJECT LOCATION: ABBOTSFORD, BC

**SITE PLAN
28709 DOWNES ROAD**

DWN BY: WS/GM DWG NAME: -2D23 DATE: 2023-12-08
CHK'D: KT/JT PLOT: CADFILE: 3000-31



- LEGEND**
- APPROXIMATE WATER WELL
 - APPROXIMATE LEGAL LOT LINE
 - APPROXIMATE SITE BOUNDARY
 - CONTOUR (5m)
 - TEMPORARY LICENSE FOR CONSTRUCTION ACTIVITIES (TLCA)
 - STATUTORY RoW (SRW)



CLIENT NAME: MINISTRY OF TRANSPORTATION AND INFRASTRUCTURE		PROJECT LOCATION: ABBOTSFORD, BC	
SITE PLAN			
3555 ROSS ROAD			
DWN BY: TL	DWG NAME: FIG1	DATE: 2024-03-28	FIGURE 3
CHK'D: JT	PLOT: 11x17	GISFILE: 3000-31	

REFERENCE: CITY OF ABBOTSFORD'S OPEN DATA HUB, GOOGLE EARTH IMAGERY DATED 2023



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TABLES

Table 1: Sewerage Systems Summary

STREET ADDRESS	PID	SEWERAGE SYSTEM PLANS RECEIVED?	SITE VISIT	WATER QUALITY TESTING?	INITIAL RISK LEVEL	RATIONALE	SUBSEQUENT ACTION	DEPTH TO GW (APR 19, 21 2023)	FINDINGS	UPDATED RISK LEVEL	RECOMMENDATIONS	FIGURE NO.
28709 Downes Road, Abbotsford	009-287-841	N	7-Feb-23	Y	-	Not identified in Phase 1 or 2	Site visit, installation of drive point, sampling of ground and surface water	0.35 m-bg	Existing and planned surface drainage is <15m from septic field in high water table area (<1 m-bg in winter). Surface water quality (elevated nitrate, fecal coliforms) unlikely to be sourced from septic field.	Low	Be aware of high fecal coliform counts if working in and around this surface drainage.	7
28944 Downes Road, Abbotsford	009-220-348	N	7-Feb-23	N	Moderate	Sewerage system likely within 30m, changes to adjacent drainage features and downgradient watercourse within 500m.	Site visit	-	Existing septic field >15m from existing surface drainage; no modifications of the drainage course are planned.	Low	None	-
28904 Downes Road, Abbotsford	009-220-291	N	7-Feb-23	N	Moderate	Sewerage system likely within 30m, changes to adjacent drainage features and downgradient watercourse within 500m.	Site visit	-	Existing septic field <15m from existing surface drainage and no modifications of the drainage course are planned.	Low	None	-
3545 Ross Road, Abbotsford	029-218-934	N	7-Feb-23	N	Moderate	Sewerage system likely within 30m, changes to adjacent drainage features and downgradient watercourse within 500m.	Site visit	-	The residence is serviced by the septic field at 3555 Ross Road, which is > 15m from the surface drainage.	Low	None.	-
3555 Ross Road, Abbotsford	006-957-889	N	7-Feb-23	N	Moderate	Confirmed approximately 12m from Highway 1, minimal changes to drainage, however, watercourse runs through the property.	Site visit	-	There are two septic fields on the property. One that services the agricultural/commercial building (< 15m from the surface drainage) and another that services two residences (> 15m from the surface drainage). No modifications of the drainage course are planned.	Low	None	-
3535 Ross Road, Abbotsford	004-629-850	N	7-Feb-23	N	Moderate	Sewerage system likely within 30m, changes to adjacent drainage features and downgradient watercourse within 500m.	Site visit	-	The septic field servicing the residence is >15m from the surface drainage. No modifications to the drainage course are planned.	Low	None	-

Table 2: Analytical Results for Sewerage System Parameters

Sample ID	Sample Location		28709 Downes Road			
	Date Sampled		W	D	D	
	21-Apr-23	25-Apr-23	18-May-23	21-Apr-23		
Completed by: TB Review by: KT						
BC Water Quality Guidelines						
	Freshwater Long-Term (Chronic)	Freshwater Short-Term (Acute)				
Physical Tests						
Hardness (as CaCO ₃)-mg/L	-	-	-	-	98.6	42.6
Conductivity -µS/cm	-	-	-	-	252	199
pH	pH<6.5	-	-	-	7.08	7.49
Anions and Nutrients (mg/L)						
Chloride	150	600	-	-	17.2	29.8
Kjeldahl nitrogen, total [TKN]	-	-	-	1.15	-	0.306
Nitrate (as N)	3	32.8	-	-	0.013	0.856
Nitrate + Nitrite (as N)	-	-	-	-	0.0147	-
Nitrite (as N)	0.02 @ CI <2 0.04 @ CI 2-<4 0.06 @ CI 4-<6 0.08 @ CI 6-<8 0.10 @ CI 8-<10 0.20 @ CI >10	0.06 @ CI <2 0.12 @ CI 2-<4 0.18 @ CI 4-<6 0.24 @ CI 6-<8 0.30 @ CI 8-<10 0.60 @ CI >10	-	-	0.0017	0.0022
Ortho-Phosphate, dissolved (as P)	-	-	-	-	-	<0.0010
Phosphorus, total	-	-	-	0.104	-	0.0167
Sulfate (as SO ₄)	128 @ H<30 218 @ H 31-75 309 @ H 76-180 429 @ 181-250 Site Specific @ H>250	-	-	-	2.36	7.91
Microbiological Tests (MPN/100ml)						
Coliforms, thermotolerant (fecal)	-	-	<2	-	-	249
Coliforms, total	-	-	97	-	-	727
Dissolved Metals (ug/L)						
aluminum (Al)-dissolved	could not be calculated due to insufficient data		-	-	-	29.9
antimony (Sb)-dissolved	-	-	-	-	-	0.16
arsenic (As)-dissolved	5	-	-	-	-	0.31
barium (Ba)-dissolved	1,000	-	-	-	-	25.6
beryllium (Be)-dissolved	0.13	-	-	-	-	<0.02
bismuth (Bi)-dissolved	-	-	-	-	-	<0.050
boron (B)-dissolved	1,200	-	-	-	-	<10
cadmium (Cd)-dissolved	Hardness Dependent		-	-	-	0.0122
	Long-Term (Chronic) Guideline		-	-	-	0.11
	Short-Term (Acute) Guideline		-	-	-	0.24
calcium (Ca)-dissolved	-	-	-	-	-	11,100
cesium (Cs)-dissolved	-	-	-	-	-	<0.010
chromium (Cr)-dissolved (Total) ⁽⁴⁾	1	-	-	-	-	<0.50
cobalt (Co)-dissolved	4	110	-	-	-	0.2
copper (Cu)-dissolved	could not be calculated due to insufficient data		-	-	-	2.71
iron (Fe)-dissolved ⁽³⁾	-	350	-	-	-	140
lead (Pb)-dissolved	Hardness Dependent		-	-	-	0.05
	Long-Term (Chronic) Guideline		-	-	-	4
	Short-Term (Acute) Guideline		-	-	-	28
lithium (Li)-dissolved	-	-	-	-	-	<1.0
magnesium (Mg)-dissolved	-	-	-	-	-	3,610
manganese (Mn)-dissolved ⁽³⁾	Hardness Dependent		-	-	-	91.6
	Long-Term (Chronic) Guideline		-	-	-	792
	Short-Term (Acute) Guideline		-	-	-	1,009
mercury (Hg)-dissolved	could not be calculated due to insufficient data		-	-	-	-
molybdenum (Mo)-dissolved	7,600	46,000	-	-	-	0.235
nickel (Ni)-dissolved	Hardness Dependent		-	-	-	0.73
	Long-Term (Chronic) Guideline		-	-	-	25.0
phosphorus (P)-dissolved	15*	-	-	-	-	<50
potassium (K)-dissolved	-	-	-	-	-	1590
rubidium (Rb)-dissolved	-	-	-	-	-	1.19
selenium (Se)-dissolved	2	-	-	-	-	<0.050
silicon (Si)-dissolved	-	-	-	-	-	3,080
silver (Ag)-dissolved	0.05 @ H < 100 1.5 @ H > 100	0.1 @ H < 100 3.0 @ H > 100	-	-	-	<0.010
sodium (Na)-dissolved	-	-	-	-	-	19,600
strontium (Sr)-dissolved	-	-	-	-	-	78.1
sulphur (S)-dissolved	-	-	-	-	-	2830
tellurium (Te)-dissolved	-	-	-	-	-	<0.20
thallium (Tl)-dissolved	0.8	-	-	-	-	<0.010
thorium (Th)-dissolved	-	-	-	-	-	<0.10
tin (Sn)-dissolved	-	-	-	-	-	<0.10
titanium (Ti)-dissolved	-	-	-	-	-	0.6
tungsten (W)-dissolved	-	-	-	-	-	<0.10
uranium (U)-dissolved	8.5	-	-	-	-	<0.010
vanadium (V)-dissolved	-	-	-	-	-	<0.50
zinc (Zn)-dissolved	Hardness Dependent		-	-	-	15.1
	Long-Term (Chronic) Guideline		-	-	-	8
	Short-Term (Acute) Guideline		-	-	-	33
zirconium (Zr)-dissolved	-	-	-	-	-	<0.30

*guideline for lakes where salmonids are predominant fish species

BLUE TEXT	Concentration less than Laboratory Method Detection Limit
BOLD, UNDERLINE	Laboratory Method Detection Limit exceeds one or more standard
BLUE SHADING	Concentration greater than BC WQG - Freshwater Long-Term Guideline
BOLD, BLUE SHADING	Concentration greater than BC WQG - Freshwater Short-Term Guideline



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PHOTOGRAPHS



PHOTOGRAPHS – 28709 DOWNES ROAD, ABBOTSFORD

Photo 1: Septic field, looking northeast. February 7, 2023.



Client Name	Site Location	Project No.
Ministry of Transportation and Infrastructure	Highway 1, 264 th Street to Whatcom Road	3000-31



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APPENDIX A

Driller Well Construction Records and Active Earth Borehole Logs



SUMMARY LOG

Drive Point Well#: **DP2**

Project: **28709 Downes Road**
 Location: Abbotsford, BC Client: Ministry of Transportation & Infrastructure
 Date(s) Drilled: Drilling Method:
 Company: Hole Diameter:
 Driller: Sample Type:
 Drill Make/Model: * indicates sent for lab analysis

Datum:
 Northing/Easting: ,
 Elevation:
Address: 28709 Downes Rd, Langley

AE Project No. 3000-31
 Logged by: Reviewed by:

DEPTH (m)	SAMPLE TYPE	SAMPLE NO	USCS	SOIL SYMBOL	SOIL DESCRIPTION	Water Level (m)	Monitoring Well
1						0.35m Apr 21, 23	Flush Mount
2							
3							
4							

ACTIVE_EARTH_LOG_3000-31.GPJ ACTIVEEARTH.GDT 23-5-17

Legend

Sand	Grout	Cement	50mm Solid PVC
Drill Cuttings	Slough	Bentonite	10 Slot PVC Screen

Screen Intervals Well: 1.0m to 1.2m



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APPENDIX B

Laboratory Analytical Reports



CERTIFICATE OF ANALYSIS

<p>Work Order : VA23A8665</p> <p>Amendment : 1</p> <p>Client : Active Earth Engineering Ltd.</p> <p>Contact : Kathy Tixier</p> <p>Address : 304-2600 Gladys Avenue Abbotsford BC Canada V2S 0E9</p> <p>Telephone : ----</p> <p>Project : 3000-31</p> <p>PO : 3000-31</p> <p>C-O-C number : 20-1014122</p> <p>Sampler : ----</p> <p>Site : ----</p> <p>Quote number : VA22-ACT1100-001 (Default Pricing 2022+)</p> <p>No. of samples received : 4</p> <p>No. of samples analysed : 4</p>	<p>Page : 1 of 6</p> <p>Laboratory : Vancouver - Environmental</p> <p>Account Manager : Sneha Sansare</p> <p>Address : 8081 Lougheed Highway Burnaby BC Canada V5A 1W9</p> <p>Telephone : +1 604 253 4188</p> <p>Date Samples Received : 21-Apr-2023 17:30</p> <p>Date Analysis Commenced : 21-Apr-2023</p> <p>Issue Date : 17-May-2023 17:27</p>
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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>
Delson Resende	Lab Assistant	Metals, Burnaby, British Columbia
Kate Dimitrova	Analyst	Inorganics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Microbiology, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	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>
-	no units
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre
MPN/100mL	most probable number per hundred millilitres
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

<i>Qualifier</i>	<i>Description</i>
DLA	Detection Limit adjusted for required dilution.
DLIS	Detection Limit Adjusted due to insufficient sample.
HTDC	Hold time exceeded for dilution or re-analysis. Reported results are consistent with initial results (tested within hold time), and are valid and defensible.



Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					26257 56 Ave - W	28709 Downes Rd -W	28709 Downes Rd -D	26431 52 Ave - Dom. Well.	----
Client sampling date / time					21-Apr-2023 01:10	21-Apr-2023 12:00	21-Apr-2023 12:15	21-Apr-2023 14:30	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23A8665-001	VA23A8665-002	VA23A8665-003	VA23A8665-004	-----
					Result	Result	Result	Result	----
Physical Tests									
Conductivity	----	E100/VA	2.0	µS/cm	----	----	199	121	----
Hardness (as CaCO3), dissolved	----	EC100/VA	0.50	mg/L	----	----	42.6	----	----
pH	----	E108/VA	0.10	pH units	----	----	7.49	7.28	----
Turbidity	----	E121/VA	0.10	NTU	----	----	----	0.64	----
Anions and Nutrients									
Chloride	16887-00-6	E235.Cl/VA	0.50	mg/L	----	----	29.8	3.27	----
Kjeldahl nitrogen, total [TKN]	----	E318/VA	0.050	mg/L	----	----	0.306	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L/V A	0.0050	mg/L	----	----	0.856 ^{HTDC}	0.693 ^{HTDC}	----
Nitrite (as N)	14797-65-0	E235.NO2-L/V A	0.0010	mg/L	----	----	0.0022 ^{HTDC}	<0.0010 ^{HTDC}	----
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/VA	0.0010	mg/L	----	----	<0.0010	----	----
Phosphorus, total	7723-14-0	E372-U/VA	0.0020	mg/L	----	----	0.0167	----	----
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	0.30	mg/L	----	----	7.91	4.00	----
Microbiological Tests									
Coliforms, thermotolerant [fecal]	----	E010.FC/VA	1	MPN/100mL	<5 ^{DLIS}	<2 ^{DLIS}	249	<1	----
Coliforms, total	----	E010/VA	1	MPN/100mL	<5 ^{DLIS}	97	727	<10 ^{DLA}	----
Coliforms, Escherichia coli [E. coli]	----	E010/VA	1	MPN/100mL	<5 ^{DLIS}	<2 ^{DLIS}	411	<10 ^{DLA}	----
Total Metals									
Aluminum, total	7429-90-5	E420/VA	0.0030	mg/L	----	----	----	<0.0030	----
Antimony, total	7440-36-0	E420/VA	0.00010	mg/L	----	----	----	<0.00010	----
Arsenic, total	7440-38-2	E420/VA	0.00010	mg/L	----	----	----	<0.00010	----
Barium, total	7440-39-3	E420/VA	0.00010	mg/L	----	----	----	0.00514	----
Beryllium, total	7440-41-7	E420/VA	0.000020	mg/L	----	----	----	<0.000020	----
Bismuth, total	7440-69-9	E420/VA	0.000050	mg/L	----	----	----	<0.000050	----
Boron, total	7440-42-8	E420/VA	0.010	mg/L	----	----	----	<0.010	----
Cadmium, total	7440-43-9	E420/VA	0.0000050	mg/L	----	----	----	0.0000173	----
Calcium, total	7440-70-2	E420/VA	0.050	mg/L	----	----	----	5.65	----
Cesium, total	7440-46-2	E420/VA	0.000010	mg/L	----	----	----	<0.000010	----
Chromium, total	7440-47-3	E420/VA	0.00050	mg/L	----	----	----	<0.00050	----



Analytical Results

Sub-Matrix: Water					Client sample ID	26257 56 Ave - W	28709 Downes Rd -W	28709 Downes Rd -D	26431 52 Ave - Dom. Well.	----
(Matrix: Water)					Client sampling date / time	21-Apr-2023 01:10	21-Apr-2023 12:00	21-Apr-2023 12:15	21-Apr-2023 14:30	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23A8665-001	VA23A8665-002	VA23A8665-003	VA23A8665-004	-----	
					Result	Result	Result	Result	----	
Total Metals										
Cobalt, total	7440-48-4	E420/VA	0.00010	mg/L	----	----	----	<0.00010	----	
Copper, total	7440-50-8	E420/VA	0.00050	mg/L	----	----	----	0.0192	----	
Iron, total	7439-89-6	E420/VA	0.010	mg/L	----	----	----	0.054	----	
Lead, total	7439-92-1	E420/VA	0.000050	mg/L	----	----	----	0.000409	----	
Lithium, total	7439-93-2	E420/VA	0.0010	mg/L	----	----	----	<0.0010	----	
Magnesium, total	7439-95-4	E420/VA	0.0050	mg/L	----	----	----	3.22	----	
Manganese, total	7439-96-5	E420/VA	0.00010	mg/L	----	----	----	0.0157	----	
Molybdenum, total	7439-98-7	E420/VA	0.000050	mg/L	----	----	----	0.000220	----	
Nickel, total	7440-02-0	E420/VA	0.00050	mg/L	----	----	----	0.00069	----	
Phosphorus, total	7723-14-0	E420/VA	0.050	mg/L	----	----	----	<0.050	----	
Potassium, total	7440-09-7	E420/VA	0.050	mg/L	----	----	----	0.633	----	
Rubidium, total	7440-17-7	E420/VA	0.00020	mg/L	----	----	----	0.00068	----	
Selenium, total	7782-49-2	E420/VA	0.000050	mg/L	----	----	----	0.000304	----	
Silicon, total	7440-21-3	E420/VA	0.10	mg/L	----	----	----	11.8	----	
Silver, total	7440-22-4	E420/VA	0.000010	mg/L	----	----	----	<0.000010	----	
Sodium, total	7440-23-5	E420/VA	0.050	mg/L	----	----	----	14.3	----	
Strontium, total	7440-24-6	E420/VA	0.00020	mg/L	----	----	----	0.0518	----	
Sulfur, total	7704-34-9	E420/VA	0.50	mg/L	----	----	----	1.70	----	
Tellurium, total	13494-80-9	E420/VA	0.00020	mg/L	----	----	----	<0.00020	----	
Thallium, total	7440-28-0	E420/VA	0.000010	mg/L	----	----	----	<0.000010	----	
Thorium, total	7440-29-1	E420/VA	0.00010	mg/L	----	----	----	<0.00010	----	
Tin, total	7440-31-5	E420/VA	0.00010	mg/L	----	----	----	<0.00010	----	
Titanium, total	7440-32-6	E420/VA	0.00030	mg/L	----	----	----	<0.00030	----	
Tungsten, total	7440-33-7	E420/VA	0.00010	mg/L	----	----	----	<0.00010	----	
Uranium, total	7440-61-1	E420/VA	0.000010	mg/L	----	----	----	<0.000010	----	
Vanadium, total	7440-62-2	E420/VA	0.00050	mg/L	----	----	----	<0.00050	----	
Zinc, total	7440-66-6	E420/VA	0.0030	mg/L	----	----	----	0.0499	----	
Zirconium, total	7440-67-7	E420/VA	0.00020	mg/L	----	----	----	<0.00020	----	
Dissolved Metals										
Aluminum, dissolved	7429-90-5	E421/VA	0.0010	mg/L	----	----	0.0299	----	----	



Analytical Results

Sub-Matrix: Water					Client sample ID	26257 56 Ave - W	28709 Downes Rd -W	28709 Downes Rd -D	26431 52 Ave - Dom. Well.	----
(Matrix: Water)					Client sampling date / time	21-Apr-2023 01:10	21-Apr-2023 12:00	21-Apr-2023 12:15	21-Apr-2023 14:30	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23A8665-001	VA23A8665-002	VA23A8665-003	VA23A8665-004	-----	
					Result	Result	Result	Result	---	
Dissolved Metals										
Antimony, dissolved	7440-36-0	E421/VA	0.00010	mg/L	---	---	0.00016	---	---	
Arsenic, dissolved	7440-38-2	E421/VA	0.00010	mg/L	---	---	0.00031	---	---	
Barium, dissolved	7440-39-3	E421/VA	0.00010	mg/L	---	---	0.0256	---	---	
Beryllium, dissolved	7440-41-7	E421/VA	0.000020	mg/L	---	---	<0.000020	---	---	
Bismuth, dissolved	7440-69-9	E421/VA	0.000050	mg/L	---	---	<0.000050	---	---	
Boron, dissolved	7440-42-8	E421/VA	0.010	mg/L	---	---	<0.010	---	---	
Cadmium, dissolved	7440-43-9	E421/VA	0.0000050	mg/L	---	---	0.0000122	---	---	
Calcium, dissolved	7440-70-2	E421/VA	0.050	mg/L	---	---	11.1	---	---	
Cesium, dissolved	7440-46-2	E421/VA	0.000010	mg/L	---	---	<0.000010	---	---	
Chromium, dissolved	7440-47-3	E421/VA	0.00050	mg/L	---	---	<0.00050	---	---	
Cobalt, dissolved	7440-48-4	E421/VA	0.00010	mg/L	---	---	0.00020	---	---	
Copper, dissolved	7440-50-8	E421/VA	0.00020	mg/L	---	---	0.00271	---	---	
Iron, dissolved	7439-89-6	E421/VA	0.010	mg/L	---	---	0.140	---	---	
Lead, dissolved	7439-92-1	E421/VA	0.000050	mg/L	---	---	0.000050	---	---	
Lithium, dissolved	7439-93-2	E421/VA	0.0010	mg/L	---	---	<0.0010	---	---	
Magnesium, dissolved	7439-95-4	E421/VA	0.0050	mg/L	---	---	3.61	---	---	
Manganese, dissolved	7439-96-5	E421/VA	0.00010	mg/L	---	---	0.0916	---	---	
Molybdenum, dissolved	7439-98-7	E421/VA	0.000050	mg/L	---	---	0.000235	---	---	
Nickel, dissolved	7440-02-0	E421/VA	0.00050	mg/L	---	---	0.00073	---	---	
Phosphorus, dissolved	7723-14-0	E421/VA	0.050	mg/L	---	---	<0.050	---	---	
Potassium, dissolved	7440-09-7	E421/VA	0.050	mg/L	---	---	1.59	---	---	
Rubidium, dissolved	7440-17-7	E421/VA	0.00020	mg/L	---	---	0.00119	---	---	
Selenium, dissolved	7782-49-2	E421/VA	0.000050	mg/L	---	---	<0.000050	---	---	
Silicon, dissolved	7440-21-3	E421/VA	0.050	mg/L	---	---	3.08	---	---	
Silver, dissolved	7440-22-4	E421/VA	0.000010	mg/L	---	---	<0.000010	---	---	
Sodium, dissolved	7440-23-5	E421/VA	0.050	mg/L	---	---	19.6	---	---	
Strontium, dissolved	7440-24-6	E421/VA	0.00020	mg/L	---	---	0.0781	---	---	
Sulfur, dissolved	7704-34-9	E421/VA	0.50	mg/L	---	---	2.83	---	---	
Tellurium, dissolved	13494-80-9	E421/VA	0.00020	mg/L	---	---	<0.00020	---	---	
Thallium, dissolved	7440-28-0	E421/VA	0.000010	mg/L	---	---	<0.000010	---	---	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	26257 56 Ave - W	28709 Downes Rd -W	28709 Downes Rd -D	26431 52 Ave - Dom. Well.	----
Client sampling date / time					21-Apr-2023 01:10	21-Apr-2023 12:00	21-Apr-2023 12:15	21-Apr-2023 14:30	----	
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23A8665-001	VA23A8665-002	VA23A8665-003	VA23A8665-004	-----	
					Result	Result	Result	Result	---	
Dissolved Metals										
Thorium, dissolved	7440-29-1	E421/VA	0.00010	mg/L	----	----	<0.00010	----	----	
Tin, dissolved	7440-31-5	E421/VA	0.00010	mg/L	----	----	<0.00010	----	----	
Titanium, dissolved	7440-32-6	E421/VA	0.00030	mg/L	----	----	0.00060	----	----	
Tungsten, dissolved	7440-33-7	E421/VA	0.00010	mg/L	----	----	<0.00010	----	----	
Uranium, dissolved	7440-61-1	E421/VA	0.000010	mg/L	----	----	<0.000010	----	----	
Vanadium, dissolved	7440-62-2	E421/VA	0.00050	mg/L	----	----	<0.00050	----	----	
Zinc, dissolved	7440-66-6	E421/VA	0.0010	mg/L	----	----	0.0151	----	----	
Zirconium, dissolved	7440-67-7	E421/VA	0.00030	mg/L	----	----	<0.00030	----	----	
Dissolved metals filtration location	----	EP421/VA	-	-	----	----	Laboratory	----	----	

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

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



QUALITY CONTROL INTERPRETIVE REPORT

<p>Work Order : VA23A8665</p> <p>Amendment : 1</p> <p>Client : Active Earth Engineering Ltd.</p> <p>Contact : Kathy Tixier</p> <p>Address : 304-2600 Gladys Avenue Abbotsford BC Canada V2S 0E9</p> <p>Telephone : ----</p> <p>Project : 3000-31</p> <p>PO : 3000-31</p> <p>C-O-C number : 20-1014122</p> <p>Sampler : ----</p> <p>Site : ----</p> <p>Quote number : VA22-ACT1100-001 (Default Pricing 2022+)</p> <p>No. of samples received : 4</p> <p>No. of samples analysed : 4</p>	<p>Page : 1 of 10</p> <p>Laboratory : Vancouver - Environmental</p> <p>Account Manager : Sneha Sansare</p> <p>Address : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p>Telephone : +1 604 253 4188</p> <p>Date Samples Received : 21-Apr-2023 17:30</p> <p>Issue Date : 17-May-2023 17:27</p>
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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

- Quality Control Sample Frequency Outliers occur - please see following pages for full details.



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 : Chloride in Water by IC										
HDPE 26431 52 Ave - Dom. Well.	E235.Cl	21-Apr-2023	24-Apr-2023	----	----		24-Apr-2023	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE 28709 Downes Rd -D	E235.Cl	21-Apr-2023	24-Apr-2023	----	----		24-Apr-2023	28 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001										
HDPE 28709 Downes Rd -D	E378-U	21-Apr-2023	24-Apr-2023	----	----		24-Apr-2023	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE 26431 52 Ave - Dom. Well.	E235.NO3-L	21-Apr-2023	24-Apr-2023	----	----		24-Apr-2023	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE 28709 Downes Rd -D	E235.NO3-L	21-Apr-2023	24-Apr-2023	----	----		24-Apr-2023	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE 26431 52 Ave - Dom. Well.	E235.NO2-L	21-Apr-2023	24-Apr-2023	----	----		24-Apr-2023	3 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 : Nitrite in Water by IC (Low Level)											
HDPE 28709 Downes Rd -D	E235.NO2-L	21-Apr-2023	24-Apr-2023	----	----		24-Apr-2023	3 days	3 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE 26431 52 Ave - Dom. Well.	E235.SO4	21-Apr-2023	24-Apr-2023	----	----		24-Apr-2023	28 days	3 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE 28709 Downes Rd -D	E235.SO4	21-Apr-2023	24-Apr-2023	----	----		24-Apr-2023	28 days	3 days	✔	
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)											
Amber glass total (sulfuric acid) 28709 Downes Rd -D	E318	21-Apr-2023	25-Apr-2023	----	----		25-Apr-2023	28 days	4 days	✔	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)											
Amber glass total (sulfuric acid) 28709 Downes Rd -D	E372-U	21-Apr-2023	25-Apr-2023	----	----		26-Apr-2023	28 days	5 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE - dissolved (lab preserved) 28709 Downes Rd -D	E421	21-Apr-2023	22-Apr-2023	----	----		23-Apr-2023	180 days	2 days	✔	
Microbiological Tests : Thermotolerant (Fecal) Coliform (Enzyme Substrate)											
Sterile HDPE (Sodium thiosulphate) 26257 56 Ave - W	E010.FC	21-Apr-2023	----	----	----		21-Apr-2023	30 hrs	17 hrs	✔	
Microbiological Tests : Thermotolerant (Fecal) Coliform (Enzyme Substrate)											
Sterile HDPE (Sodium thiosulphate) 26431 52 Ave - Dom. Well.	E010.FC	21-Apr-2023	----	----	----		21-Apr-2023	30 hrs	4 hrs	✔	
Microbiological Tests : Thermotolerant (Fecal) Coliform (Enzyme Substrate)											
Sterile HDPE (Sodium thiosulphate) 28709 Downes Rd -D	E010.FC	21-Apr-2023	----	----	----		21-Apr-2023	30 hrs	6 hrs	✔	



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		
Microbiological Tests : Thermotolerant (Fecal) Coliform (Enzyme Substrate)											
Sterile HDPE (Sodium thiosulphate) 28709 Downes Rd -W	E010.FC	21-Apr-2023	----	----	----		21-Apr-2023	30 hrs	6 hrs	✓	
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)											
Sterile HDPE (Sodium thiosulphate) 26257 56 Ave - W	E010	21-Apr-2023	----	----	----		21-Apr-2023	30 hrs	17 hrs	✓	
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)											
Sterile HDPE (Sodium thiosulphate) 26431 52 Ave - Dom. Well.	E010	21-Apr-2023	----	----	----		21-Apr-2023	30 hrs	4 hrs	✓	
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)											
Sterile HDPE (Sodium thiosulphate) 28709 Downes Rd -D	E010	21-Apr-2023	----	----	----		21-Apr-2023	30 hrs	6 hrs	✓	
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)											
Sterile HDPE (Sodium thiosulphate) 28709 Downes Rd -W	E010	21-Apr-2023	----	----	----		21-Apr-2023	30 hrs	6 hrs	✓	
Physical Tests : Conductivity in Water											
HDPE 26431 52 Ave - Dom. Well.	E100	21-Apr-2023	24-Apr-2023	----	----		25-Apr-2023	28 days	4 days	✓	
Physical Tests : Conductivity in Water											
HDPE 28709 Downes Rd -D	E100	21-Apr-2023	24-Apr-2023	----	----		25-Apr-2023	28 days	4 days	✓	
Physical Tests : pH by Meter											
HDPE 26431 52 Ave - Dom. Well.	E108	21-Apr-2023	24-Apr-2023	----	----		25-Apr-2023	0.25 hrs	24.25 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE 28709 Downes Rd -D	E108	21-Apr-2023	24-Apr-2023	----	----		25-Apr-2023	0.25 hrs	24.25 hrs	* EHTR-FM	



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 26431 52 Ave - Dom. Well.	E121	21-Apr-2023	----	----	----		24-Apr-2023	3 days	3 days	✔
Total Metals : Total metals in Water by CRC ICPMS										
HDPE - total (lab preserved) 26431 52 Ave - Dom. Well.	E420	21-Apr-2023	23-Apr-2023	----	----		24-Apr-2023	180 days	3 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 (%)		Evaluation
			QC	Regular	Actual	Expected	
Analytical Methods							
Laboratory Duplicates (DUP)							
Chloride in Water by IC	E235.Cl	908137	1	17	5.8	5.0	✔
Conductivity in Water	E100	908134	1	12	8.3	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	906935	1	1	100.0	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	908141	1	9	11.1	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	908139	1	17	5.8	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	908138	1	20	5.0	5.0	✔
pH by Meter	E108	908133	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	908136	1	17	5.8	5.0	✔
Thermotolerant (Fecal) Coliform (Enzyme Substrate)	E010.FC	906662	0	6	0.0	10.0	✘
Total Coliforms and E. coli (Enzyme Substrate)	E010	906661	1	9	11.1	10.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	909327	1	1	100.0	5.0	✔
Total metals in Water by CRC ICPMS	E420	907003	1	2	50.0	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	909322	1	19	5.2	5.0	✔
Turbidity by Nephelometry	E121	909089	1	13	7.6	5.0	✔
Laboratory Control Samples (LCS)							
Chloride in Water by IC	E235.Cl	908137	1	17	5.8	5.0	✔
Conductivity in Water	E100	908134	1	12	8.3	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	906935	1	1	100.0	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	908141	1	9	11.1	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	908139	1	17	5.8	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	908138	1	20	5.0	5.0	✔
pH by Meter	E108	908133	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	908136	1	17	5.8	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	909327	1	1	100.0	5.0	✔
Total metals in Water by CRC ICPMS	E420	907003	1	2	50.0	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	909322	1	19	5.2	5.0	✔
Turbidity by Nephelometry	E121	909089	1	13	7.6	5.0	✔
Method Blanks (MB)							
Chloride in Water by IC	E235.Cl	908137	1	17	5.8	5.0	✔
Conductivity in Water	E100	908134	1	12	8.3	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	906935	1	1	100.0	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	908141	1	9	11.1	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	908139	1	17	5.8	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	908138	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	908136	1	17	5.8	5.0	✔



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
<i>Analytical Methods</i>							
Method Blanks (MB) - Continued							
Thermotolerant (Fecal) Coliform (Enzyme Substrate)	E010.FC	906662	1	6	16.6	5.0	✔
Total Coliforms and E. coli (Enzyme Substrate)	E010	906661	1	9	11.1	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	909327	1	1	100.0	5.0	✔
Total metals in Water by CRC ICPMS	E420	907003	1	2	50.0	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	909322	1	19	5.2	5.0	✔
Turbidity by Nephelometry	E121	909089	1	13	7.6	5.0	✔
Matrix Spikes (MS)							
Chloride in Water by IC	E235.Cl	908137	1	17	5.8	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	906935	0	1	0.0	5.0	✘
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	908141	1	9	11.1	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	908139	1	17	5.8	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	908138	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	908136	1	17	5.8	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	909327	0	1	0.0	5.0	✘
Total metals in Water by CRC ICPMS	E420	907003	1	2	50.0	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	909322	1	19	5.2	5.0	✔



Methodology References and Summaries

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

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Coliforms and E. coli (Enzyme Substrate)	E010 Vancouver - Environmental	Water	APHA 9223 (mod)	The enzyme substrate test simultaneously detects Total Coliforms and E. coli in a 100 mL sample after incubation at 35.0 ±0.5°C for either 18 or 24 hours (dependent on reagent used).
Thermotolerant (Fecal) Coliform (Enzyme Substrate)	E010.FC Vancouver - Environmental	Water	APHA 9223 (mod)	The enzyme substrate test detects Thermotolerant Coliforms in a 100 mL sample after an 18 hour incubation at 44.5 ±0.2°C.
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.
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.
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.
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).



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
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.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U Vancouver - Environmental	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.
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.
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO ₃), dissolved" is calculated from the sum of dissolved 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.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
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.
Digestion for Total Phosphorus in water	EP372 Vancouver - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO ₃ .

QUALITY CONTROL REPORT

Work Order	: VA23A8665	Page	: 1 of 15
Amendment	: 1		
Client	: Active Earth Engineering Ltd.	Laboratory	: Vancouver - Environmental
Contact	: Kathy Tixier	Account Manager	: Sneha Sansare
Address	: 304-2600 Gladys Avenue Abbotsford BC Canada V2S 0E9	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	:	Telephone	: +1 604 253 4188
Project	: 3000-31	Date Samples Received	: 21-Apr-2023 17:30
PO	: 3000-31	Date Analysis Commenced	: 21-Apr-2023
C-O-C number	: 20-1014122	Issue Date	: 17-May-2023 17:27
Sampler	: ---- ----		
Site	: ----		
Quote number	: VA22-ACT1100-001 (Default Pricing 2022+)		
No. of samples received	: 4		
No. of samples analysed	: 4		

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>
Delson Resende	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Kate Dimitrova	Analyst	Vancouver Inorganics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Vancouver Microbiology, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	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: 908133)											
VA23A8665-003	28709 Downes Rd -D	pH	----	E108	0.10	pH units	7.49	7.49	0.00%	4%	----
Physical Tests (QC Lot: 908134)											
VA23A8665-003	28709 Downes Rd -D	Conductivity	----	E100	2.0	µS/cm	199	196	1.67%	10%	----
Physical Tests (QC Lot: 909089)											
VA23A8665-004	26431 52 Ave - Dom. Well.	Turbidity	----	E121	0.10	NTU	0.64	0.57	0.07	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 908136)											
VA23A8665-003	28709 Downes Rd -D	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	7.91	7.93	0.227%	20%	----
Anions and Nutrients (QC Lot: 908137)											
VA23A8665-003	28709 Downes Rd -D	Chloride	16887-00-6	E235.Cl	0.50	mg/L	29.8	29.8	0.163%	20%	----
Anions and Nutrients (QC Lot: 908138)											
VA23A8665-003	28709 Downes Rd -D	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0022	0.0023	0.00006	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 908139)											
VA23A8665-003	28709 Downes Rd -D	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.856	0.860	0.465%	20%	----
Anions and Nutrients (QC Lot: 908141)											
VA23A8665-003	28709 Downes Rd -D	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	0.0014	0.0004	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 909322)											
FJ2300872-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	<0.0020	<0.0020	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 909327)											
VA23A8665-003	28709 Downes Rd -D	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.306	0.305	0.0002	Diff <2x LOR	----
Microbiological Tests (QC Lot: 906661)											
VA23A8593-006	Anonymous	Coliforms, Escherichia coli [E. coli]	----	E010	10	MPN/100mL	20	31	11	Diff <2x LOR	----
		Coliforms, total	----	E010	10	MPN/100mL	435	488	11.5%	65%	----
Total Metals (QC Lot: 907003)											
VA23A8584-005	Anonymous	Aluminum, total	7429-90-5	E420	0.0030	mg/L	0.838	0.773	8.04%	20%	----
		Antimony, total	7440-36-0	E420	0.00010	mg/L	0.00055	0.00053	0.00002	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00947	0.00942	0.568%	20%	----
		Barium, total	7440-39-3	E420	0.00010	mg/L	0.118	0.115	2.25%	20%	----
		Beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----



Sub-Matrix: **Water** **Laboratory Duplicate (DUP) Report**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Total Metals (QC Lot: 907003) - continued											
VA23A8584-005	Anonymous	Boron, total	7440-42-8	E420	0.010	mg/L	0.314	0.316	0.746%	20%	---
		Cadmium, total	7440-43-9	E420	0.0000350	mg/L	<0.0000350	<0.0000350	0	Diff <2x LOR	---
		Calcium, total	7440-70-2	E420	0.050	mg/L	73.3	73.2	0.198%	20%	---
		Cesium, total	7440-46-2	E420	0.000010	mg/L	0.000054	0.000057	0.000003	Diff <2x LOR	---
		Chromium, total	7440-47-3	E420	0.000050	mg/L	0.00774	0.00742	4.31%	20%	---
		Cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00131	0.00131	0.194%	20%	---
		Copper, total	7440-50-8	E420	0.00050	mg/L	0.00697	0.00682	2.15%	20%	---
		Iron, total	7439-89-6	E420	0.010	mg/L	1.29	1.23	5.03%	20%	---
		Lead, total	7439-92-1	E420	0.000050	mg/L	0.000282	0.000278	0.000004	Diff <2x LOR	---
		Lithium, total	7439-93-2	E420	0.0010	mg/L	0.0095	0.0094	0.00008	Diff <2x LOR	---
		Magnesium, total	7439-95-4	E420	0.0050	mg/L	162	160	1.45%	20%	---
		Manganese, total	7439-96-5	E420	0.00010	mg/L	0.0327	0.0314	4.07%	20%	---
		Molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.0304	0.0302	0.859%	20%	---
		Nickel, total	7440-02-0	E420	0.00050	mg/L	0.0128	0.0122	5.04%	20%	---
		Phosphorus, total	7723-14-0	E420	0.050	mg/L	0.296	0.297	0.001	Diff <2x LOR	---
		Potassium, total	7440-09-7	E420	0.050	mg/L	24.0	24.0	0.304%	20%	---
		Rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00605	0.00596	1.50%	20%	---
		Selenium, total	7782-49-2	E420	0.000050	mg/L	0.00956	0.00919	4.03%	20%	---
		Silicon, total	7440-21-3	E420	0.10	mg/L	12.0	11.6	3.28%	20%	---
		Silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	---
		Sodium, total	7440-23-5	E420	0.050	mg/L	87.1	86.9	0.237%	20%	---
		Strontium, total	7440-24-6	E420	0.00020	mg/L	0.838	0.827	1.30%	20%	---
		Sulfur, total	7704-34-9	E420	0.50	mg/L	164	162	1.30%	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	0.000024	0.000023	0.0000006	Diff <2x LOR	---
		Thorium, total	7440-29-1	E420	0.00010	mg/L	0.00015	<0.00010	0.00005	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	0.0772	0.0734	5.02%	20%	---
		Tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	---
		Uranium, total	7440-61-1	E420	0.000010	mg/L	0.0151	0.0142	6.28%	20%	---
		Vanadium, total	7440-62-2	E420	0.00050	mg/L	0.0230	0.0226	1.74%	20%	---
		Zinc, total	7440-66-6	E420	0.0030	mg/L	0.0127	0.0131	0.0004	Diff <2x LOR	---
		Zirconium, total	7440-67-7	E420	0.00020	mg/L	0.00121	0.00113	0.00007	Diff <2x LOR	---

Dissolved Metals (QC Lot: 906935)



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
Dissolved Metals (QC Lot: 906935) - continued											
VA23A8665-003	28709 Downes Rd -D	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0299	0.0292	2.42%	20%	---
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00016	0.00015	0.000002	Diff <2x LOR	---
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00031	0.00032	0.00002	Diff <2x LOR	---
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0256	0.0261	1.83%	20%	---
		Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	---
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	---
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	---
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000122	0.0000114	0.0000008	Diff <2x LOR	---
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	11.1	10.9	1.68%	20%	---
		Cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	---
		Chromium, dissolved	7440-47-3	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	---
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00020	0.00020	0.000001	Diff <2x LOR	---
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00271	0.00274	1.21%	20%	---
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	0.140	0.140	0.176%	20%	---
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	0.000050	<0.000050	0.0000005	Diff <2x LOR	---
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	---
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	3.61	3.73	3.44%	20%	---
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0916	0.0922	0.750%	20%	---
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000235	0.000264	0.000028	Diff <2x LOR	---
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00073	0.00066	0.00006	Diff <2x LOR	---
		Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	---
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	1.59	1.63	2.09%	20%	---
		Rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00119	0.00120	0.000006	Diff <2x LOR	---
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	---
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	3.08	3.11	1.02%	20%	---
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	---
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	19.6	19.8	0.824%	20%	---
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0781	0.0794	1.65%	20%	---
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	2.83	3.16	0.34	Diff <2x LOR	---
		Tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	---
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	---
		Thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	---
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	---
		Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	0.00060	0.00051	0.00009	Diff <2x LOR	---



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Dissolved Metals (QC Lot: 906935) - continued											
VA23A8665-003	28709 Downes Rd -D	Tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0151	0.0151	0.133%	20%	----
		Zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----



Method Blank (MB) Report

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

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 908134)						
Conductivity	---	E100	1	µS/cm	1.1	---
Physical Tests (QCLot: 909089)						
Turbidity	---	E121	0.1	NTU	<0.10	---
Anions and Nutrients (QCLot: 908136)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
Anions and Nutrients (QCLot: 908137)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
Anions and Nutrients (QCLot: 908138)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	---
Anions and Nutrients (QCLot: 908139)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	---
Anions and Nutrients (QCLot: 908141)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	---
Anions and Nutrients (QCLot: 909322)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	---
Anions and Nutrients (QCLot: 909327)						
Kjeldahl nitrogen, total [TKN]	---	E318	0.05	mg/L	<0.050	---
Microbiological Tests (QCLot: 906661)						
Coliforms, Escherichia coli [E. coli]	---	E010	1	MPN/100mL	<1	---
Coliforms, total	---	E010	1	MPN/100mL	<1	---
Microbiological Tests (QCLot: 906662)						
Coliforms, thermotolerant [fecal]	---	E010.FC	1	MPN/100mL	<1	---
Total Metals (QCLot: 907003)						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	---
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	---
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	---
Barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	---
Beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	---
Bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	---
Boron, total	7440-42-8	E420	0.01	mg/L	<0.010	---
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	---
Calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	---



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 907003) - continued						
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	---
Dissolved Metals (QCLot: 906935)						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	---
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	---
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	---
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	---



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 906935) - continued						
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	---
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	---
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	---
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	---
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	---
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	---
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	---
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	---
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	---
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	---
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	---
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	---
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	---
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	---
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	---
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	---
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	---
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	---
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	---
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	---
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	---
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	---
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	---
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	---
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	---
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	---
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	---
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	---
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	---
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	---
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	---
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	---
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	---
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	---
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	---





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				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Physical Tests (QCLot: 908133)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 908134)									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	98.7	90.0	110	----
Physical Tests (QCLot: 909089)									
Turbidity	----	E121	0.1	NTU	200 NTU	100.0	85.0	115	----
Anions and Nutrients (QCLot: 908136)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	98.2	90.0	110	----
Anions and Nutrients (QCLot: 908137)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	98.2	90.0	110	----
Anions and Nutrients (QCLot: 908138)									
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: 908139)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.0	90.0	110	----
Anions and Nutrients (QCLot: 908141)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	101	80.0	120	----
Anions and Nutrients (QCLot: 909322)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	88.9	80.0	120	----
Anions and Nutrients (QCLot: 909327)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	102	75.0	125	----
Total Metals (QCLot: 907003)									
Aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	103	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	106	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	105	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	104	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	101	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	95.5	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	96.9	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	104	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	102	80.0	120	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	99.8	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
Total Metals (QCLot: 907003) - continued									
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	104	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	103	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	101	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	101	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	96.1	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	105	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	103	80.0	120	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	107	80.0	120	----
Potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	108	80.0	120	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	105	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	105	80.0	120	----
Silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	110	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	104	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	99.8	80.0	120	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	91.4	80.0	120	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	109	80.0	120	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	103	80.0	120	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	92.2	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	98.8	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	102	80.0	120	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	95.9	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	102	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	102	80.0	120	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	88.1	80.0	120	----
Dissolved Metals (QCLot: 906935)									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	103	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	113	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	103	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	108	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	102	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
Dissolved Metals (QCLot: 906935) - continued									
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	101	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	94.7	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	104	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	101	80.0	120	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	108	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	102	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	98.4	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	101	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	105	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	104	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	97.5	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	100	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	109	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	102	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	109	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	106	80.0	120	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	101	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	101	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	99.1	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	106	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	104	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	107	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	88.6	80.0	120	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	109	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	103	80.0	120	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	101	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	106	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	95.1	80.0	120	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	104	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	108	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	103	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	108	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	102	80.0	120	----



Matrix Spike (MS) Report

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

					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: 908136)										
VA23A8665-004	26431 52 Ave - Dom. Well.	Sulfate (as SO4)	14808-79-8	E235.SO4	104 mg/L	100 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 908137)										
VA23A8665-004	26431 52 Ave - Dom. Well.	Chloride	16887-00-6	E235.Cl	105 mg/L	100 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 908138)										
VA23A8665-004	26431 52 Ave - Dom. Well.	Nitrite (as N)	14797-65-0	E235.NO2-L	0.526 mg/L	0.5 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 908139)										
VA23A8665-004	26431 52 Ave - Dom. Well.	Nitrate (as N)	14797-55-8	E235.NO3-L	2.64 mg/L	2.5 mg/L	106	75.0	125	----
Anions and Nutrients (QCLot: 908141)										
VA23A8668-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0308 mg/L	0.03 mg/L	103	70.0	130	----
Anions and Nutrients (QCLot: 909322)										
FJ2300872-002	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0467 mg/L	0.05 mg/L	93.3	70.0	130	----
Total Metals (QCLot: 907003)										
VA23A8665-004	26431 52 Ave - Dom. Well.	Aluminum, total	7429-90-5	E420	0.213 mg/L	0.2 mg/L	107	70.0	130	----
		Antimony, total	7440-36-0	E420	0.0185 mg/L	0.02 mg/L	92.7	70.0	130	----
		Arsenic, total	7440-38-2	E420	0.0190 mg/L	0.02 mg/L	95.0	70.0	130	----
		Barium, total	7440-39-3	E420	0.0190 mg/L	0.02 mg/L	95.0	70.0	130	----
		Beryllium, total	7440-41-7	E420	0.0379 mg/L	0.04 mg/L	94.7	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.00936 mg/L	0.01 mg/L	93.6	70.0	130	----
		Boron, total	7440-42-8	E420	0.088 mg/L	0.1 mg/L	88.3	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.00385 mg/L	0.004 mg/L	96.3	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	0.00931 mg/L	0.01 mg/L	93.1	70.0	130	----
		Chromium, total	7440-47-3	E420	0.0388 mg/L	0.04 mg/L	97.1	70.0	130	----
		Cobalt, total	7440-48-4	E420	0.0189 mg/L	0.02 mg/L	94.6	70.0	130	----
		Copper, total	7440-50-8	E420	0.0187 mg/L	0.02 mg/L	93.7	70.0	130	----
		Iron, total	7439-89-6	E420	1.82 mg/L	2 mg/L	91.0	70.0	130	----
		Lead, total	7439-92-1	E420	0.0181 mg/L	0.02 mg/L	90.5	70.0	130	----
		Lithium, total	7439-93-2	E420	0.0896 mg/L	0.1 mg/L	89.6	70.0	130	----
		Magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 907003) - continued										
VA23A8665-004	26431 52 Ave - Dom. Well.	Manganese, total	7439-96-5	E420	0.0188 mg/L	0.02 mg/L	94.2	70.0	130	----
		Molybdenum, total	7439-98-7	E420	0.0188 mg/L	0.02 mg/L	93.9	70.0	130	----
		Nickel, total	7440-02-0	E420	0.0384 mg/L	0.04 mg/L	96.1	70.0	130	----
		Phosphorus, total	7723-14-0	E420	9.62 mg/L	10 mg/L	96.2	70.0	130	----
		Potassium, total	7440-09-7	E420	3.93 mg/L	4 mg/L	98.2	70.0	130	----
		Rubidium, total	7440-17-7	E420	0.0192 mg/L	0.02 mg/L	96.0	70.0	130	----
		Selenium, total	7782-49-2	E420	0.0390 mg/L	0.04 mg/L	97.5	70.0	130	----
		Silicon, total	7440-21-3	E420	ND mg/L	10 mg/L	ND	70.0	130	----
		Silver, total	7440-22-4	E420	0.00368 mg/L	0.004 mg/L	92.1	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	19.3 mg/L	20 mg/L	96.6	70.0	130	----
		Tellurium, total	13494-80-9	E420	0.0392 mg/L	0.04 mg/L	97.9	70.0	130	----
		Thallium, total	7440-28-0	E420	0.00357 mg/L	0.004 mg/L	89.2	70.0	130	----
		Thorium, total	7440-29-1	E420	0.0195 mg/L	0.02 mg/L	97.7	70.0	130	----
		Tin, total	7440-31-5	E420	0.0183 mg/L	0.02 mg/L	91.7	70.0	130	----
		Titanium, total	7440-32-6	E420	0.0383 mg/L	0.04 mg/L	95.8	70.0	130	----
		Tungsten, total	7440-33-7	E420	0.0173 mg/L	0.02 mg/L	86.6	70.0	130	----
		Uranium, total	7440-61-1	E420	0.00426 mg/L	0.004 mg/L	106	70.0	130	----
		Vanadium, total	7440-62-2	E420	0.0957 mg/L	0.1 mg/L	95.7	70.0	130	----
		Zinc, total	7440-66-6	E420	0.378 mg/L	0.4 mg/L	94.5	70.0	130	----
		Zirconium, total	7440-67-7	E420	0.0353 mg/L	0.04 mg/L	88.2	70.0	130	----



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Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

COC Number: 20 - 1014122

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:	Active Earth	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:	Kathy Tixier	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 minimum																																																																							
Phone:	778 9841223	<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 minimum																																																																							
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 minimum																																																																							
Street:		Email 1 or Fax:	Kathy.Tixier@activeearth.ca	<input type="checkbox"/> 1 day (E) if received by 3pm M-F - 100% rush surcharge minimum																																																																							
City/Province:		Email 2:		<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																																																																							
Postal Code:		Email 3:		Date and Time Required for all E&P TATs:		dd-mmm-yy hh:mm am/pm																																																																					
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 contact your AM to confirm availability.																																																																							
	Copy of Invoice with Report <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	Select Invoice Distribution:	<input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX	Analysis Request																																																																							
Company:		Email 1 or Fax:		Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below																																																																							
Contact:	ap@activeearth.ca	Email 2:		NUMBER OF CONTAINERS																																																																							
Project Information		Oil and Gas Required Fields (client use)		<table border="1"> <tr> <td>Sp. Cond.</td> <td>PH</td> <td>Chloride</td> <td>Nitrate - N</td> <td>Nitrite - N</td> <td>TKN - N</td> <td>Sulfate</td> <td>Total P (reactive)</td> <td>Diss. Ortho-P</td> <td>DC metals</td> <td>Total metals</td> <td>Total Coliform</td> <td>Fecal Coliform</td> <td>Turbidity</td> <td>SAMPLES ON HOLD</td> <td>EXTENDED STORAGE REQUIRED</td> <td>SUSPECTED HAZARD (see notes)</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>				Sp. Cond.	PH	Chloride	Nitrate - N	Nitrite - N	TKN - N	Sulfate	Total P (reactive)	Diss. Ortho-P	DC metals	Total metals	Total Coliform	Fecal Coliform	Turbidity	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)																																																			
Sp. Cond.	PH	Chloride	Nitrate - N					Nitrite - N	TKN - N	Sulfate	Total P (reactive)	Diss. Ortho-P	DC metals	Total metals	Total Coliform	Fecal Coliform	Turbidity	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)																																																							
ALS Account # / Quote #:		AFE/Cost Center:	PO#																																																																								
Job #:	3000 - 31	Major/Minor Code:	Routing Code:																																																																								
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LSD:		Location:																																																																									
ALS Lab Work Order # (ALS use only):		ALS Contact:	Sampler:																																																																								
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																																																																							
	26257 56 Ave - W	April	11:00	H2O	1																																																																						
	28709 Downes Rd - W	21	12:00		1																																																																						
	28709 Downes Rd - D		12:15		4	X	X	X																																																																			
	26431 52 Ave - Dum. Well		2:30		3	X	X	X																																																																			
Drinking Water (DW) Samples¹ (client use)		Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)		SAMPLE RECEIPT DETAILS																																																																							
Are samples taken from a Regulated DW System?	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	26431 52 Ave Dum. Well for total metals only		Cooling Method: <input type="checkbox"/> NONE <input type="checkbox"/> ICE <input checked="" type="checkbox"/> ICE PACKS																																																																							
Are samples for human consumption/ use?	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			Submission Comments identified on Sample Receipt Notification: _____																																																																							
				Cooler Custody Seals Intact: <input type="checkbox"/> YES <input type="checkbox"/> N/A Sample _____																																																																							
				INITIAL COOLER TEMPERATURES °C _____																																																																							
SHIPMENT RELEASE (client use)		INITIAL SHIPMENT RECEPTION (ALS use only)		FINAL SHIPMENT RECEPTION (ALS use only)																																																																							
Released by:	Date: Apr 21 2023	Time: 5:15pm	Received by:	Date: Apr 21	Time: 17:30	Received by:	Date: Apr 21	Time: 17:30																																																																			

Environmental Division
Vancouver
Work Order Reference
VA23A8665



Telephone: +1 604 253 4186



CERTIFICATE OF ANALYSIS

Work Order : **VA23A8872**
Client : **Active Earth Engineering Ltd.**
Contact : Kathy Tixier
Address : 304-2600 Gladys Avenue
 Abbotsford BC Canada V2S 0E9
Telephone : ----
Project : 3000-31
PO : ----
C-O-C number : 20-1014342
Sampler : ----
Site : ----
Quote number : VA22-ACT1100-001 (Default Pricing 2022+)
No. of samples received : 2
No. of samples analysed : 2

Page : 1 of 3
Laboratory : Vancouver - Environmental
Account Manager : Sneha Sansare
Address : 8081 Lougheed Highway
 Burnaby BC Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 25-Apr-2023 15:35
Date Analysis Commenced : 26-Apr-2023
Issue Date : 29-Apr-2023 15:31

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>
Courtney Cox	Analyst	Inorganics, Burnaby, British Columbia



General Comments

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

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

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

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

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

Unit	Description
mg/L	milligrams per litre

<: 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		26257 56	28709 Downes	----	----	----
(Matrix: Water)					Ave-W		Rd-W				
Client sampling date / time					25-Apr-2023	25-Apr-2023	----	----	----	----	----
					11:30	12:00					
Analyte	CAS Number	Method	LOR	Unit	VA23A8872-001	VA23A8872-002	-----	-----	-----	-----	-----
					Result	Result	----	----	----	----	----
Anions and Nutrients											
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.924	1.15	----	----	----	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0325	----	----	----	----	----	----
Nitrate + Nitrite (as N)	----	EC235.N+N	0.0050	mg/L	0.0325	----	----	----	----	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	----	----	----	----	----	----
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	----	----	----	----	----	----
Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0219	0.104	----	----	----	----	----

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





QUALITY CONTROL INTERPRETIVE REPORT

<p>Work Order : VA23A8872</p> <p>Client : Active Earth Engineering Ltd.</p> <p>Contact : Kathy Tixier</p> <p>Address : 304-2600 Gladys Avenue Abbotsford BC Canada V2S 0E9</p> <p>Telephone : ----</p> <p>Project : 3000-31</p> <p>PO : ----</p> <p>C-O-C number : 20-1014342</p> <p>Sampler : ----</p> <p>Site : ----</p> <p>Quote number : VA22-ACT1100-001 (Default Pricing 2022+)</p> <p>No. of samples received : 2</p> <p>No. of samples analysed : 2</p>	<p>Page : 1 of 7</p> <p>Laboratory : Vancouver - Environmental</p> <p>Account Manager : Sneha Sansare</p> <p>Address : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p>Telephone : +1 604 253 4188</p> <p>Date Samples Received : 25-Apr-2023 15:35</p> <p>Issue Date : 29-Apr-2023 15:31</p>
--	--

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 Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- Method Blank value outliers occur - please see following pages for full details.
- 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)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Method Blank (MB) Values								
Anions and Nutrients	QC-912592-001	----	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0042 ^B mg/L	0.001 mg/L	Blank result exceeds permitted value

Result Qualifiers

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.



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 : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001)										
HDPE 26257 56 Ave-W	E378-U	25-Apr-2023	27-Apr-2023	----	----		27-Apr-2023	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE 26257 56 Ave-W	E235.NO3-L	25-Apr-2023	27-Apr-2023	----	----		27-Apr-2023	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE 26257 56 Ave-W	E235.NO2-L	25-Apr-2023	27-Apr-2023	----	----		27-Apr-2023	3 days	2 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) 26257 56 Ave-W	E318	25-Apr-2023	26-Apr-2023	----	----		27-Apr-2023	28 days	2 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) 28709 Downes Rd-W	E318	25-Apr-2023	26-Apr-2023	----	----		27-Apr-2023	28 days	2 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) 26257 56 Ave-W	E372-U	25-Apr-2023	26-Apr-2023	----	----		28-Apr-2023	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 : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) 28709 Downes Rd-W	E372-U	25-Apr-2023	26-Apr-2023	----	----		28-Apr-2023	28 days	3 days	✔

Legend & Qualifier Definitions

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 (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Duplicates (DUP)							
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	912592	1	7	14.2	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	912584	1	11	9.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	912585	1	11	9.0	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	911390	1	7	14.2	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	911388	1	15	6.6	5.0	✔
Laboratory Control Samples (LCS)							
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	912592	1	7	14.2	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	912584	1	11	9.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	912585	1	11	9.0	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	911390	1	7	14.2	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	911388	1	15	6.6	5.0	✔
Method Blanks (MB)							
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	912592	1	7	14.2	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	912584	1	11	9.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	912585	1	11	9.0	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	911390	1	7	14.2	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	911388	1	15	6.6	5.0	✔
Matrix Spikes (MS)							
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	912592	1	7	14.2	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	912584	1	11	9.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	912585	1	11	9.0	5.0	✔
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	911390	1	7	14.2	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	911388	1	15	6.6	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
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.
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).
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.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U Vancouver - Environmental	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N Vancouver - Environmental	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
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.
Digestion for Total Phosphorus in water	EP372 Vancouver - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.



QUALITY CONTROL REPORT

<p>Work Order : VA23A8872</p> <p>Client : Active Earth Engineering Ltd.</p> <p>Contact : Kathy Tixier</p> <p>Address : 304-2600 Gladys Avenue Abbotsford BC Canada V2S 0E9</p> <p>Telephone :</p> <p>Project : 3000-31</p> <p>PO : ----</p> <p>C-O-C number : 20-1014342</p> <p>Sampler : ---- ----</p> <p>Site : ----</p> <p>Quote number : VA22-ACT1100-001 (Default Pricing 2022+)</p> <p>No. of samples received : 2</p> <p>No. of samples analysed : 2</p>	<p>Page : 1 of 4</p> <p>Laboratory : Vancouver - Environmental</p> <p>Account Manager : Sneha Sansare</p> <p>Address : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p>Telephone : +1 604 253 4188</p> <p>Date Samples Received : 25-Apr-2023 15:35</p> <p>Date Analysis Commenced : 26-Apr-2023</p> <p>Issue Date : 29-Apr-2023 15:31</p>
--	--

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>
Courtney Cox	Analyst	Vancouver Inorganics, 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
Anions and Nutrients (QC Lot: 911388)											
VA23A8671-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0022	0.0021	0.00009	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 911390)											
VA23A8671-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 912584)											
VA23A8983-008	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 912585)											
VA23A8983-008	Anonymous	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: 912592)											
VA23A8983-009	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----



Method Blank (MB) Report

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

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Anions and Nutrients (QCLot: 911388)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 911390)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 912584)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 912585)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 912592)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	# 0.0042	B

Qualifiers

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.

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**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Anions and Nutrients (QCLot: 911388)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	89.7	80.0	120	----
Anions and Nutrients (QCLot: 911390)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 912584)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.2	90.0	110	----
Anions and Nutrients (QCLot: 912585)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	98.5	90.0	110	----
Anions and Nutrients (QCLot: 912592)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	98.5	80.0	120	----



Matrix Spike (MS) Report

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

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		Qualifier
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	
Anions and Nutrients (QCLot: 911388)										
VA23A8671-002	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0470 mg/L	0.05 mg/L	94.1	70.0	130	----
Anions and Nutrients (QCLot: 911390)										
VA23A8671-002	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	2.56 mg/L	2.5 mg/L	103	70.0	130	----
Anions and Nutrients (QCLot: 912584)										
VA23A8983-009	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.56 mg/L	2.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 912585)										
VA23A8983-009	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.510 mg/L	0.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 912592)										
VA23A8983-008	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0332 mg/L	0.03 mg/L	111	70.0	130	----



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Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

COC Number: 20 - 1014342

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: <u>Active earth</u>		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: <u>Kathy Tixier</u>		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 minimum																														
Phone: <u>778 984 1223</u>		<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 minimum																														
Company address below will appear on the final report		Select Distribution: <input 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 minimum																														
Street:		Email 1 or Fax: <u>Kathy.tixier@activeearth.ca</u>			<input type="checkbox"/> 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum																														
City/Province:		Email 2:			<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																														
Postal Code:		Email 3:			Date and Time Required for all E&P TATs:			dd-mm-yy hh:mm am/pm																											
Invoice To		Invoice Recipients			Analysis Request																														
Same as Report To <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution: <input type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			For all tests with rush TATs requested, please contact your AM to confirm availability.																														
Copy of Invoice with Report <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		Email 1 or Fax: <u>ap@activeearth.ca</u>			<table border="1"> <tr> <td rowspan="2">NUMBER OF CONTAINERS</td> <td colspan="10">Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below</td> <td rowspan="2">SAMPLES ON HOLD</td> <td rowspan="2">EXTENDED STORAGE REQUIRED</td> <td rowspan="2">SUSPECTED HAZARD (see notes)</td> </tr> <tr> <td><u>6</u></td> <td><u>6</u></td> <td><u>6</u></td> <td><u>6</u></td> <td><u>6</u></td> <td><u>6</u></td> <td><u>6</u></td> <td><u>6</u></td> <td><u>6</u></td> <td><u>6</u></td> <td><u>6</u></td> </tr> </table>						NUMBER OF CONTAINERS	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below										SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>
NUMBER OF CONTAINERS	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below											SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)																					
	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>																								
Company:		Email 2:																																	
Contact:		Email 3:																																	
Project Information		Oil and Gas Required Fields (client use)																																	
ALS Account # / Quote #:		AFE/Cost Center:																																	
Job #: <u>3000-31</u>		Major/Minor Code:																																	
PO / AFE:		Requisitioner:																																	
LSD:		Location:																																	
ALS Lab Work Order # (ALS use only): <u>8872</u>		ALS Contact:																																	
		Sampler:																																	
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																															
	<u>26257 56 Ave - W</u>	<u>25-Apr</u>	<u>11:30</u>	<u>H2O</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>																					
	<u>28709 Downes Rd - W</u>	<u>25-Apr</u>	<u>12:00</u>	<u>H2O</u>	<u>X</u>	<u>X</u>	<u>X</u>																												
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 type="checkbox"/> YES <input checked="" type="checkbox"/> NO		<u>Analyze Nitrate + Nitrite if sufficient sample, Thanks!</u>			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 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 type="checkbox"/> N/A Sample Custody Seals Intact: <input type="checkbox"/> YES <input type="checkbox"/> N/A																														
					INITIAL COOLER TEMPERATURES °C: <u>5</u> FINAL COOLER TEMPERATURES °C: <u>5</u>																														
SHIPMENT RELEASE (client use)		INITIAL SHIPMENT RECEPTION (ALS use only)			FINAL SHIPMENT RECEPTION (ALS use only)																														
Released by: <u>Kathy Tixier</u>	Date: <u>25-Apr-2023</u>	Time: <u>4:00</u>	Received by:	Date:	Time:	Received by: <u>RJ</u>	Date: <u>Apr-25</u>	Time: <u>15:35</u>																											

Environmental Division
Vancouver
Work Order Reference
VA23A8872

Telephone: +1 604 253 4188



CERTIFICATE OF ANALYSIS

Work Order : **VA23B1031**
Client : **Active Earth Engineering Ltd.**
Contact : Kathy Tixier
Address : 304-2600 Gladys Avenue
 Abbotsford BC Canada V2S 0E9
Telephone : ----
Project : 3000-31
PO : ----
C-O-C number : 20-1014123
Sampler : ----
Site : ----
Quote number : VA22-ACT1100-001 (Default Pricing 2022+)
No. of samples received : 1
No. of samples analysed : 1

Page : 1 of 3
Laboratory : Vancouver - Environmental
Account Manager : Sneha Sansare
Address : 8081 Lougheed Highway
 Burnaby BC Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 18-May-2023 15:30
Date Analysis Commenced : 19-May-2023
Issue Date : 24-May-2023 11:28

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>
Arshdeep Kaur	Lab Assistant	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Inorganics, Burnaby, British Columbia



General Comments

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

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

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

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

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

<i>Unit</i>	<i>Description</i>
-	no units
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre
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	28709 Downes Rd-W	----	----	----	----
(Matrix: Water)					Client sampling date / time	18-May-2023 15:00	----	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B1031-001	-----	-----	-----	-----	
					Result	----	----	----	----	
Physical Tests										
Conductivity	----	E100/VA	2.0	µS/cm	252	----	----	----	----	
Hardness (as CaCO3), dissolved	----	EC100/VA	0.60	mg/L	98.6	----	----	----	----	
pH	----	E108/VA	0.10	pH units	7.08	----	----	----	----	
Anions and Nutrients										
Chloride	16887-00-6	E235.Cl/VA	0.50	mg/L	17.2	----	----	----	----	
Nitrate (as N)	14797-55-8	E235.NO3-L/V A	0.0050	mg/L	0.0130	----	----	----	----	
Nitrite (as N)	14797-65-0	E235.NO2-L/V A	0.0010	mg/L	0.0017	----	----	----	----	
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	0.30	mg/L	2.36	----	----	----	----	
Dissolved Metals										
Calcium, dissolved	7440-70-2	E421/VA	0.050	mg/L	22.0	----	----	----	----	
Magnesium, dissolved	7439-95-4	E421/VA	0.0050	mg/L	10.6	----	----	----	----	
Dissolved metals filtration location	----	EP421/VA	-	-	Laboratory	----	----	----	----	

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

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



QUALITY CONTROL INTERPRETIVE REPORT

<p>Work Order : VA23B1031</p> <p>Client : Active Earth Engineering Ltd.</p> <p>Contact : Kathy Tixier</p> <p>Address : 304-2600 Gladys Avenue Abbotsford BC Canada V2S 0E9</p> <p>Telephone : ----</p> <p>Project : 3000-31</p> <p>PO : ----</p> <p>C-O-C number : 20-1014123</p> <p>Sampler : ----</p> <p>Site : ----</p> <p>Quote number : VA22-ACT1100-001 (Default Pricing 2022+)</p> <p>No. of samples received : 1</p> <p>No. of samples analysed : 1</p>	<p>Page : 1 of 7</p> <p>Laboratory : Vancouver - Environmental</p> <p>Account Manager : Sneha Sansare</p> <p>Address : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p>Telephone : +1 604 253 4188</p> <p>Date Samples Received : 18-May-2023 15:30</p> <p>Issue Date : 24-May-2023 11:28</p>
--	--

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 : Chloride in Water by IC										
HDPE 28709 Downes Rd-W	E235.Cl	18-May-2023	19-May-2023	----	----		19-May-2023	28 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE 28709 Downes Rd-W	E235.NO3-L	18-May-2023	19-May-2023	----	----		19-May-2023	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE 28709 Downes Rd-W	E235.NO2-L	18-May-2023	19-May-2023	----	----		19-May-2023	3 days	1 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE 28709 Downes Rd-W	E235.SO4	18-May-2023	19-May-2023	----	----		19-May-2023	28 days	1 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) 28709 Downes Rd-W	E421	18-May-2023	22-May-2023	----	----		23-May-2023	180 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE 28709 Downes Rd-W	E100	18-May-2023	19-May-2023	----	----		19-May-2023	28 days	1 days	✓
Physical Tests : pH by Meter										
HDPE 28709 Downes Rd-W	E108	18-May-2023	19-May-2023	----	----		19-May-2023	0.25 hrs	1.32 hrs	* EHTR-FM



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 (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Duplicates (DUP)							
Chloride in Water by IC	E235.Cl	945885	1	7	14.2	5.0	✔
Conductivity in Water	E100	945881	1	13	7.6	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	946015	1	1	100.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	945887	1	14	7.1	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	945888	1	14	7.1	5.0	✔
pH by Meter	E108	945879	1	18	5.5	5.0	✔
Sulfate in Water by IC	E235.SO4	945889	1	7	14.2	5.0	✔
Laboratory Control Samples (LCS)							
Chloride in Water by IC	E235.Cl	945885	1	7	14.2	5.0	✔
Conductivity in Water	E100	945881	1	13	7.6	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	946015	1	1	100.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	945887	1	14	7.1	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	945888	1	14	7.1	5.0	✔
pH by Meter	E108	945879	1	18	5.5	5.0	✔
Sulfate in Water by IC	E235.SO4	945889	1	7	14.2	5.0	✔
Method Blanks (MB)							
Chloride in Water by IC	E235.Cl	945885	1	7	14.2	5.0	✔
Conductivity in Water	E100	945881	1	13	7.6	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	946015	1	1	100.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	945887	1	14	7.1	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	945888	1	14	7.1	5.0	✔
Sulfate in Water by IC	E235.SO4	945889	1	7	14.2	5.0	✔
Matrix Spikes (MS)							
Chloride in Water by IC	E235.Cl	945885	1	7	14.2	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	946015	1	1	100.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	945887	1	14	7.1	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	945888	1	14	7.1	5.0	✔
Sulfate in Water by IC	E235.SO4	945889	1	7	14.2	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.
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.
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.
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO ₃), dissolved" is calculated from the sum of dissolved 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.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO ₃ .

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Work Order : VA23B1031
Client : Active Earth Engineering Ltd.
Project : 3000-31



QUALITY CONTROL REPORT

Work Order	: VA23B1031	Page	: 1 of 6
Client	: Active Earth Engineering Ltd.	Laboratory	: Vancouver - Environmental
Contact	: Kathy Tixier	Account Manager	: Sneha Sansare
Address	: 304-2600 Gladys Avenue Abbotsford BC Canada V2S 0E9	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	:	Telephone	: +1 604 253 4188
Project	: 3000-31	Date Samples Received	: 18-May-2023 15:30
PO	: ----	Date Analysis Commenced	: 19-May-2023
C-O-C number	: 20-1014123	Issue Date	: 24-May-2023 11:28
Sampler	: ---- ----		
Site	: ----		
Quote number	: VA22-ACT1100-001 (Default Pricing 2022+)		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

This Quality Control Report contains the following information:

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

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Arshdeep Kaur	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Vancouver Inorganics, Burnaby, British Columbia

Page : 2 of 6
Work Order : VA23B1031
Client : Active Earth Engineering Ltd.
Project : 3000-31



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: 945879)											
VA23B0947-003	Anonymous	pH	----	E108	0.10	pH units	5.42	5.45	0.552%	4%	----
Physical Tests (QC Lot: 945881)											
VA23B0947-003	Anonymous	Conductivity	----	E100	2.0	µS/cm	<2.0	<2.0	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 945885)											
VA23B0947-001	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 945887)											
VA23B0947-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.497	0.495	0.420%	20%	----
Anions and Nutrients (QC Lot: 945888)											
VA23B0947-001	Anonymous	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: 945889)											
VA23B0947-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	0.59	0.59	0.004	Diff <2x LOR	----
Dissolved Metals (QC Lot: 946015)											
VA23B0893-001	Anonymous	Calcium, dissolved	7440-70-2	E421	0.050	mg/L	18.7	19.3	3.57%	20%	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	7.39	7.37	0.288%	20%	----



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: 945881)						
Conductivity	----	E100	1	µS/cm	<1.0	----
Anions and Nutrients (QCLot: 945885)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 945887)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 945888)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 945889)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Dissolved Metals (QCLot: 946015)						
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----



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: 945879)									
pH	----	E108	----	pH units	7 pH units	99.7	98.0	102	----
Physical Tests (QCLot: 945881)									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	95.6	90.0	110	----
Anions and Nutrients (QCLot: 945885)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 945887)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 945888)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 945889)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	104	90.0	110	----
Dissolved Metals (QCLot: 946015)									
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	104	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	99.8	80.0	120	----



Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level $\geq 1 \times$ 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	Qualifier
Anions and Nutrients (QCLot: 945885)										
VA23B0947-002	Anonymous	Chloride	16887-00-6	E235.Cl	107 mg/L	100 mg/L	107	75.0	125	----
Anions and Nutrients (QCLot: 945887)										
VA23B0947-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.69 mg/L	2.5 mg/L	107	75.0	125	----
Anions and Nutrients (QCLot: 945888)										
VA23B0947-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.509 mg/L	0.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 945889)										
VA23B0947-002	Anonymous	Sulfate (as SO ₄)	14808-79-8	E235.SO4	108 mg/L	100 mg/L	108	75.0	125	----
Dissolved Metals (QCLot: 946015)										
VA23B0893-002	Anonymous	Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----



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Chain of Custody (COC) / Analytical Request Form

COC Number: 20 - 1014123

Canada Toll Free: 1 800 668 9878

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:	<i>Active Earth</i>	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:	<i>Kathy Tixie</i>	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 minimum										
Phone:	<i>778 984 1223</i>	Compare Results to Criteria on Report - provide details below if box checked:	<input type="checkbox"/>	<input type="checkbox"/> 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum										
Company address below will appear on the final report		Select Distribution:	<input 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 minimum										
Street:		Email 1 or Fax:	<i>Kathy.tixie@activeearth.ca</i>	<input type="checkbox"/> 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum										
City/Province:		Email 2:		<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										
Postal Code:		Email 3:		Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm am/pm										
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 contact your AM to confirm availability.									
Company:	Copy of Invoice with Report <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	Select Invoice Distribution:	<input type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX	Analysis Request										
Contact:		Email 1 or Fax:	<i>ap@activeearth.ca</i>	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below										
Project Information		Oil and Gas Required Fields (client use)			NUMBER OF CONTAINERS					SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)		
ALS Account # / Quote #:		AFE/Cost Center:	PO#											
Job #:	<i>3000-31</i>	Major/Minor Code:	Routing Code:											
PO / AFE:		Requisitioner:												
LSD:		Location:												
ALS Lab Work Order # (ALS use only):	<i>B1e31</i>	ALS Contact:	Sampler:											
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										
	<i>28709 Downnes Rd - W</i>	<i>18-May</i>	<i>3:00 pm</i>	<i>H₂O</i>	<i>CL</i>	<i>NO₃-N</i>					<i>NO₂-N</i>	<i>Sol^y</i>	<i>Hardness</i>	<i>pH</i>
					X	X	X	X	X	X				

Environmental Division
Vancouver
Work Order Reference
VA23B1031

Telephone : +1 604 253 4188

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 type="checkbox"/> YES <input checked="" type="checkbox"/> NO	<i>If insufficient sample, priority parameters, in order of importance: NO₃-N, NO₂-N, Sol^y, CL, pH, conductivity</i>			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	Submission Comments identified on Sample Receipt Notification: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO					
Are samples for human consumption/ use? <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				
SHIPMENT RELEASE (client use)		INITIAL SHIPMENT RECEPTION (ALS use only)			FINAL SHIPMENT RECEPTION (ALS use only)						
Released by:	<i>Kathy Tixie</i>	Date:	<i>18-May-2023</i>	Time:	<i>4:20</i>	Received by:	<i>HK</i>	Date:	<i>18 May</i>	Time:	<i>3:30 PM</i>

White Paper Co. 604 951-3900

REFER TO BACK PAGE FOR SALS LOCATIONS AND SAMPLING INFORMATION
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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.