

CERTIFICATE OF ANALYSIS

Work Order	: VA23B2805	Page	: 1 of 10
Client	: Northwest Research and Monitoring Ltd.	Laboratory	: Vancouver - Environmental
Contact	: Laura Guillon	Account Manager	: Sneha Sansare
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Project	: MWMt 2023	Date Samples Received	: 07-Jun-2023 17:00
PO	: ----	Date Analysis Commenced	: 07-Jun-2023
C-O-C number	: 20-1038109	Issue Date	: 14-Jun-2023 16:53
Sampler	: ----		
Site	: ----		
Quote number	: Q72918		
No. of samples received	: 7		
No. of samples analysed	: 7		

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

Signatories

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

Signatories	Position	Laboratory Department
Angelo Salandanan	Lab Assistant	Metals, Burnaby, British Columbia
Cecilia Zhang	Account Manager Assistant	Administration, Burnaby, British Columbia
Hyunduck Suk	Analyst	Inorganics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	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
-	no units
%	percent
°C	degrees celsius
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre
mV	millivolts
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.

Accreditation

Accreditation	Description	Laboratory	Address
A	CALA ISO/IEC 17025:2017	VA Vancouver - Environmental	8081 Lougheed Highway, Burnaby, British Columbia

Applicable accreditations are indicated in the Method/Lab column as superscripts.

Qualifiers

Qualifier	Description
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
RRV	Reported result verified by repeat analysis.



Analytical Results

Sub-Matrix: Water					Client sample ID	Shea Creek	Gosnell Creek	Crystal Creek	Morice River	Gosnell Creek Duplicate
(Matrix: Water)					Client sampling date / time	06-Jun-2023 12:25	06-Jun-2023 13:10	06-Jun-2023 13:40	06-Jun-2023 14:10	06-Jun-2023 13:10
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B2805-001	VA23B2805-002	VA23B2805-003	VA23B2805-004	VA23B2805-005	
					Result	Result	Result	Result	Result	
Field Tests										
Conductivity, field	----	EF001/VA		0.10	µS/cm	33.500	52.300	49.500	41.800	52.300
Oxygen, dissolved saturation %, field	----	EF001/VA		0.1	%	85.5	86.6	89.9	94.5	86.6
Oxygen, dissolved, field	----	EF001/VA		0.01	mg/L	10.25	10.28	10.65	11.55	10.28
pH, field	----	EF001/VA		0.10	pH units	8.57	7.91	7.30	7.81	7.91
Temperature, field	----	EF001/VA		0.10	°C	7.00	7.80	7.30	6.30	7.80
Physical Tests										
Alkalinity, total (as CaCO3)	----	E290/VA	A	1.0	mg/L	16.4	25.2	22.8	15.8	25.4
Hardness (as CaCO3), dissolved	----	EC100/VA		0.50	mg/L	16.0	24.6	22.5	18.8	24.4
Oxidation-reduction potential [ORP]	----	E125/VA	A	0.10	mV	315	304	298	316	298
Solids, total dissolved [TDS]	----	E162/VA	A	10	mg/L	26	38	36	23	34
Solids, total suspended [TSS]	----	E160/VA	A	3.0	mg/L	3.9	4.9	3.3	<3.0	4.3
Turbidity	----	E121/VA	A	0.10	NTU	0.54	1.67	0.63	0.56	1.89
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/VA	A	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Kjeldahl nitrogen, total [TKN]	----	EC318/VA		0.050	mg/L	0.081	0.068	<0.050	<0.050	0.069
Nitrate (as N)	14797-55-8	E235.NO3-L/V A	A	0.0050	mg/L	<0.0050	0.0129	<0.0050	0.0376	0.0136
Nitrate + Nitrite (as N)	----	EC235.N+N/V A		0.0050	mg/L	<0.0051	0.0129	<0.0051	0.0376	0.0136
Nitrite (as N)	14797-65-0	E235.NO2-L/V A	A	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrogen, total	7727-37-9	E366/VA	A	0.030	mg/L	0.081	0.081	0.046	0.067	0.083
Nitrogen, total dissolved	----	E368/VA	A	0.030	mg/L	0.086	0.081	0.042	0.071	0.077
Phosphorus, total	7723-14-0	E372-U/VA	A	0.0020	mg/L	0.0032	0.0048	0.0025	<0.0020	0.0057
Organic / Inorganic Carbon										
Carbon, dissolved organic [DOC]	----	E358-L/VA	A	0.50	mg/L	3.34	2.60	2.09	1.31	2.58
Total Metals										
Aluminum, total	7429-90-5	E420/VA	A	0.0030	mg/L	0.0654	0.135	0.0918	0.0370	0.139
Antimony, total	7440-36-0	E420/VA	A	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic, total	7440-38-2	E420/VA	A	0.00010	mg/L	0.00015	0.00020	0.00020	0.00011	0.00020



Analytical Results

Sub-Matrix: Water						Client sample ID	Shea Creek	Gosnell Creek	Crystal Creek	Morice River	Gosnell Creek Duplicate
(Matrix: Water)						Client sampling date / time	06-Jun-2023 12:25	06-Jun-2023 13:10	06-Jun-2023 13:40	06-Jun-2023 14:10	06-Jun-2023 13:10
Analyte	CAS Number	Method/Lab	LOR	Unit		VA23B2805-001	VA23B2805-002	VA23B2805-003	VA23B2805-004	VA23B2805-005	
						Result	Result	Result	Result	Result	
Total Metals											
Barium, total	7440-39-3	E420/VA	A	0.00010	mg/L	0.0209	0.0161	0.00391	0.0145	0.0160	
Beryllium, total	7440-41-7	E420/VA	A	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
Bismuth, total	7440-69-9	E420/VA	A	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
Boron, total	7440-42-8	E420/VA	A	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	
Cadmium, total	7440-43-9	E420/VA	A	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000089	0.0000050	
Calcium, total	7440-70-2	E420/VA	A	0.050	mg/L	5.26	8.49	8.12	6.84	8.47	
Cesium, total	7440-46-2	E420/VA	A	0.000010	mg/L	<0.000010	0.000013	<0.000010	<0.000010	0.000012	
Chromium, total	7440-47-3	E420/VA	A	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Cobalt, total	7440-48-4	E420/VA	A	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
Copper, total	7440-50-8	E420/VA	A	0.00050	mg/L	0.00054	0.00076	0.00078	0.00088	0.00077	
Iron, total	7439-89-6	E420/VA	A	0.010	mg/L	0.079	0.160	0.068	0.030	0.165	
Lead, total	7439-92-1	E420/VA	A	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
Lithium, total	7439-93-2	E420/VA	A	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
Magnesium, total	7439-95-4	E420/VA	A	0.0050	mg/L	0.826	1.04	0.662	0.580	1.02	
Manganese, total	7439-96-5	E420/VA	A	0.00010	mg/L	0.00876	0.0116	0.00246	0.00237	0.0121	
Molybdenum, total	7439-98-7	E420/VA	A	0.000050	mg/L	<0.000050	0.000218	0.000804	0.000432	0.000216	
Nickel, total	7440-02-0	E420/VA	A	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Phosphorus, total	7723-14-0	E420/VA	A	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
Potassium, total	7440-09-7	E420/VA	A	0.050	mg/L	0.134	0.151	0.184	0.273	0.150	
Rubidium, total	7440-17-7	E420/VA	A	0.00020	mg/L	<0.00020	0.00021	0.00027	0.00034	<0.00020	
Selenium, total	7782-49-2	E420/VA	A	0.000050	mg/L	<0.000050	<0.000050	0.000056	<0.000050	0.000065	
Silicon, total	7440-21-3	E420/VA	A	0.10	mg/L	2.54	3.13	3.06	1.66	3.17	
Silver, total	7440-22-4	E420/VA	A	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
Sodium, total	7440-23-5	E420/VA	A	0.050	mg/L	0.943	1.15	1.22	0.684	1.14	
Strontium, total	7440-24-6	E420/VA	A	0.00020	mg/L	0.0209	0.0308	0.0230	0.0290	0.0296	
Sulfur, total	7704-34-9	E420/VA	A	0.50	mg/L	<0.50	0.77	1.11	1.35	0.79	
Tellurium, total	13494-80-9	E420/VA	A	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
Thallium, total	7440-28-0	E420/VA	A	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
Thorium, total	7440-29-1	E420/VA	A	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
Tin, total	7440-31-5	E420/VA	A	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	



Analytical Results

Sub-Matrix: Water						Client sample ID	Shea Creek	Gosnell Creek	Crystal Creek	Morice River	Gosnell Creek Duplicate
(Matrix: Water)											
Client sampling date / time											
Analyte	CAS Number	Method/Lab	LOR	Unit		VA23B2805-001	VA23B2805-002	VA23B2805-003	VA23B2805-004	VA23B2805-005	
						Result	Result	Result	Result	Result	
Total Metals											
Titanium, total	7440-32-6	E420/VA	A	0.00030	mg/L	0.00149	0.00507	0.00367	<0.00090 ^{DLM}	<0.00510 ^{DLM}	
Tungsten, total	7440-33-7	E420/VA	A	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
Uranium, total	7440-61-1	E420/VA	A	0.000010	mg/L	<0.000010	0.000011	0.000026	0.000029	0.000011	
Vanadium, total	7440-62-2	E420/VA	A	0.00050	mg/L	<0.00050	0.00083	0.00068	<0.00050	0.00085	
Zinc, total	7440-66-6	E420/VA	A	0.0030	mg/L	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	
Zirconium, total	7440-67-7	E420/VA	A	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
Dissolved Metals											
Aluminum, dissolved	7429-90-5	E421/VA	A	0.0010	mg/L	0.0253	0.0160	0.0205	0.0095	0.0164	
Antimony, dissolved	7440-36-0	E421/VA	A	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
Arsenic, dissolved	7440-38-2	E421/VA	A	0.00010	mg/L	0.00015	0.00013	0.00018	<0.00010	0.00014	
Barium, dissolved	7440-39-3	E421/VA	A	0.00010	mg/L	0.0204	0.0150	0.00323	0.0144	0.0144	
Beryllium, dissolved	7440-41-7	E421/VA	A	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
Bismuth, dissolved	7440-69-9	E421/VA	A	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
Boron, dissolved	7440-42-8	E421/VA	A	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	
Cadmium, dissolved	7440-43-9	E421/VA	A	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
Calcium, dissolved	7440-70-2	E421/VA	A	0.050	mg/L	5.09	8.25	7.98	6.62	8.18	
Cesium, dissolved	7440-46-2	E421/VA	A	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
Chromium, dissolved	7440-47-3	E421/VA	A	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Cobalt, dissolved	7440-48-4	E421/VA	A	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
Copper, dissolved	7440-50-8	E421/VA	A	0.00020	mg/L	0.00047	0.00054	0.00063	0.00072	0.00054	
Iron, dissolved	7439-89-6	E421/VA	A	0.010	mg/L	0.034	0.038	<0.010	<0.010	0.037	
Lead, dissolved	7439-92-1	E421/VA	A	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
Lithium, dissolved	7439-93-2	E421/VA	A	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
Magnesium, dissolved	7439-95-4	E421/VA	A	0.0050	mg/L	0.794	0.984	0.626	0.541	0.976	
Manganese, dissolved	7439-96-5	E421/VA	A	0.00010	mg/L	0.00479	0.00664	0.00055	0.00064	0.00672	
Molybdenum, dissolved	7439-98-7	E421/VA	A	0.000050	mg/L	<0.000050	0.000215	0.000783	0.000422	0.000210	
Nickel, dissolved	7440-02-0	E421/VA	A	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Phosphorus, dissolved	7723-14-0	E421/VA	A	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
Potassium, dissolved	7440-09-7	E421/VA	A	0.050	mg/L	0.134	0.140	0.175	0.271	0.136	
Rubidium, dissolved	7440-17-7	E421/VA	A	0.00020	mg/L	<0.00020	<0.00020	0.00022	0.00034	<0.00020	



Analytical Results

Sub-Matrix: Water						Client sample ID				
(Matrix: Water)						Shea Creek	Gosnell Creek	Crystal Creek	Morice River	Gosnell Creek Duplicate
Client sampling date / time						06-Jun-2023 12:25	06-Jun-2023 13:10	06-Jun-2023 13:40	06-Jun-2023 14:10	06-Jun-2023 13:10
Analyte	CAS Number	Method/Lab	LOR	Unit		VA23B2805-001	VA23B2805-002	VA23B2805-003	VA23B2805-004	VA23B2805-005
						Result	Result	Result	Result	Result
Dissolved Metals										
Selenium, dissolved	7782-49-2	E421/VA	A	0.000050	mg/L	<0.000050	<0.000050	0.000065	<0.000050	0.000055
Silicon, dissolved	7440-21-3	E421/VA	A	0.050	mg/L	2.40	2.84	2.90	1.52	2.83
Silver, dissolved	7440-22-4	E421/VA	A	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium, dissolved	7440-23-5	E421/VA	A	0.050	mg/L	0.893	1.13	1.18	0.647	1.12
Strontium, dissolved	7440-24-6	E421/VA	A	0.00020	mg/L	0.0208	0.0290	0.0226	0.0296	0.0297
Sulfur, dissolved	7704-34-9	E421/VA	A	0.50	mg/L	<0.50	0.66	1.03	1.24	0.67
Tellurium, dissolved	13494-80-9	E421/VA	A	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium, dissolved	7440-28-0	E421/VA	A	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium, dissolved	7440-29-1	E421/VA	A	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin, dissolved	7440-31-5	E421/VA	A	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium, dissolved	7440-32-6	E421/VA	A	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten, dissolved	7440-33-7	E421/VA	A	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium, dissolved	7440-61-1	E421/VA	A	0.000010	mg/L	<0.000010	<0.000010	0.000023	0.000025	<0.000010
Vanadium, dissolved	7440-62-2	E421/VA	A	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc, dissolved	7440-66-6	E421/VA	A	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0012
Zirconium, dissolved	7440-67-7	E421/VA	A	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Dissolved metals filtration location	----	EP421/VA		-	-	Field	Field	Field	Field	Field

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.



Analytical Results

Sub-Matrix: Water					Client sample ID	Field Blank	Travel Blank	----	----	----
(Matrix: Water)										
					Client sampling date / time	06-Jun-2023 12:25	06-Jun-2023	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B2805-006	VA23B2805-007	-----	-----	-----	
					Result	Result	----	----	----	
Physical Tests										
Alkalinity, total (as CaCO3)	----	E290/VA	A	1.0	mg/L	<1.0	<1.0	----	----	----
Hardness (as CaCO3), dissolved	----	EC100/VA		0.50	mg/L	<0.50	----	----	----	
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/VA		0.50	mg/L	----	<0.50	----	----	
Oxidation-reduction potential [ORP]	----	E125/VA	A	0.10	mV	431	437	----	----	----
Solids, total dissolved [TDS]	----	E162/VA	A	10	mg/L	<10	<10	----	----	----
Solids, total suspended [TSS]	----	E160/VA	A	3.0	mg/L	<3.0	<3.0	----	----	----
Turbidity	----	E121/VA	A	0.10	NTU	<0.10	<0.10	----	----	----
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/VA	A	0.0050	mg/L	<0.0050	<0.0050	----	----	----
Kjeldahl nitrogen, total [TKN]	----	EC318/VA		0.050	mg/L	<0.050	<0.050	----	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L/V	A	0.0050	mg/L	<0.0050	<0.0050	----	----	----
Nitrate + Nitrite (as N)	----	A		0.0050	mg/L	<0.0051	<0.0051	----	----	----
		EC235.N+N/V								
Nitrite (as N)	14797-65-0	E235.NO2-L/V	A	0.0010	mg/L	<0.0010	<0.0010	----	----	----
		A								
Nitrogen, total	7727-37-9	E366/VA	A	0.030	mg/L	<0.030	<0.030	----	----	----
Nitrogen, total dissolved	----	E368/VA	A	0.030	mg/L	<0.030	----	----	----	----
Phosphorus, total	7723-14-0	E372-U/VA	A	0.0020	mg/L	<0.0020	<0.0020	----	----	----
Organic / Inorganic Carbon										
Carbon, dissolved organic [DOC]	----	E358-L/VA	A	0.50	mg/L	<0.50	----	----	----	----
Total Metals										
Aluminum, total	7429-90-5	E420/VA	A	0.0030	mg/L	<0.0030	<0.0030	----	----	----
Antimony, total	7440-36-0	E420/VA	A	0.00010	mg/L	<0.00010	<0.00010	----	----	----
Arsenic, total	7440-38-2	E420/VA	A	0.00010	mg/L	<0.00010	<0.00010	----	----	----
Barium, total	7440-39-3	E420/VA	A	0.00010	mg/L	<0.00010	<0.00010	----	----	----
Beryllium, total	7440-41-7	E420/VA	A	0.000020	mg/L	<0.000020	<0.000020	----	----	----
Bismuth, total	7440-69-9	E420/VA	A	0.000050	mg/L	<0.000050	<0.000050	----	----	----
Boron, total	7440-42-8	E420/VA	A	0.010	mg/L	<0.010	<0.010	----	----	----
Cadmium, total	7440-43-9	E420/VA	A	0.0000050	mg/L	<0.0000050	<0.0000050	----	----	----
Calcium, total	7440-70-2	E420/VA	A	0.050	mg/L	<0.050	<0.050	----	----	----



Analytical Results

Sub-Matrix: Water						Client sample ID	Field Blank	Travel Blank	----	----	----
(Matrix: Water)											
						Client sampling date / time	06-Jun-2023 12:25	06-Jun-2023	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		VA23B2805-006	VA23B2805-007	-----	-----	-----	
						Result	Result	----	----	----	
Total Metals											
Cesium, total	7440-46-2	E420/VA	A	0.000010	mg/L	<0.000010	<0.000010	----	----	----	
Chromium, total	7440-47-3	E420/VA	A	0.000050	mg/L	<0.000050	<0.000050	----	----	----	
Cobalt, total	7440-48-4	E420/VA	A	0.000010	mg/L	<0.000010	<0.000010	----	----	----	
Copper, total	7440-50-8	E420/VA	A	0.000050	mg/L	<0.000050	<0.000050	----	----	----	
Iron, total	7439-89-6	E420/VA	A	0.010	mg/L	<0.010	<0.010	----	----	----	
Lead, total	7439-92-1	E420/VA	A	0.000050	mg/L	<0.000050	<0.000050	----	----	----	
Lithium, total	7439-93-2	E420/VA	A	0.0010	mg/L	<0.0010	<0.0010	----	----	----	
Magnesium, total	7439-95-4	E420/VA	A	0.0050	mg/L	<0.0050	<0.0050	----	----	----	
Manganese, total	7439-96-5	E420/VA	A	0.000010	mg/L	<0.000010	<0.000010	----	----	----	
Molybdenum, total	7439-98-7	E420/VA	A	0.000050	mg/L	<0.000050	<0.000050	----	----	----	
Nickel, total	7440-02-0	E420/VA	A	0.000050	mg/L	<0.000050	<0.000050	----	----	----	
Phosphorus, total	7723-14-0	E420/VA	A	0.050	mg/L	<0.050	<0.050	----	----	----	
Potassium, total	7440-09-7	E420/VA	A	0.050	mg/L	<0.050	<0.050	----	----	----	
Rubidium, total	7440-17-7	E420/VA	A	0.000020	mg/L	<0.000020	<0.000020	----	----	----	
Selenium, total	7782-49-2	E420/VA	A	0.000050	mg/L	<0.000050	<0.000050	----	----	----	
Silicon, total	7440-21-3	E420/VA	A	0.10	mg/L	<0.10	<0.10	----	----	----	
Silver, total	7440-22-4	E420/VA	A	0.000010	mg/L	<0.000010	<0.000010	----	----	----	
Sodium, total	7440-23-5	E420/VA	A	0.050	mg/L	0.260 ^{RRV}	<0.050	----	----	----	
Strontium, total	7440-24-6	E420/VA	A	0.000020	mg/L	<0.000020	<0.000020	----	----	----	
Sulfur, total	7704-34-9	E420/VA	A	0.50	mg/L	<0.50	<0.50	----	----	----	
Tellurium, total	13494-80-9	E420/VA	A	0.000020	mg/L	<0.000020	<0.000020	----	----	----	
Thallium, total	7440-28-0	E420/VA	A	0.000010	mg/L	<0.000010	<0.000010	----	----	----	
Thorium, total	7440-29-1	E420/VA	A	0.000010	mg/L	<0.000010	<0.000010	----	----	----	
Tin, total	7440-31-5	E420/VA	A	0.000010	mg/L	<0.000010	<0.000010	----	----	----	
Titanium, total	7440-32-6	E420/VA	A	0.000030	mg/L	<0.000030	<0.000030	----	----	----	
Tungsten, total	7440-33-7	E420/VA	A	0.000010	mg/L	<0.000010	<0.000010	----	----	----	
Uranium, total	7440-61-1	E420/VA	A	0.000010	mg/L	<0.000010	<0.000010	----	----	----	
Vanadium, total	7440-62-2	E420/VA	A	0.000050	mg/L	<0.000050	<0.000050	----	----	----	
Zinc, total	7440-66-6	E420/VA	A	0.0030	mg/L	<0.0030	<0.0030	----	----	----	
Zirconium, total	7440-67-7	E420/VA	A	0.000020	mg/L	<0.000020	<0.000020	----	----	----	



Analytical Results

Sub-Matrix: Water						Client sample ID	Field Blank	Travel Blank	----	----	----
(Matrix: Water)											
						Client sampling date / time	06-Jun-2023 12:25	06-Jun-2023	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		VA23B2805-006	VA23B2805-007	-----	-----	-----	
						Result	Result	---	---	---	
Dissolved Metals											
Aluminum, dissolved	7429-90-5	E421/VA	A	0.0010	mg/L	<0.0010	----	----	----	----	
Antimony, dissolved	7440-36-0	E421/VA	A	0.00010	mg/L	<0.00010	----	----	----	----	
Arsenic, dissolved	7440-38-2	E421/VA	A	0.00010	mg/L	<0.00010	----	----	----	----	
Barium, dissolved	7440-39-3	E421/VA	A	0.00010	mg/L	<0.00010	----	----	----	----	
Beryllium, dissolved	7440-41-7	E421/VA	A	0.000020	mg/L	<0.000020	----	----	----	----	
Bismuth, dissolved	7440-69-9	E421/VA	A	0.000050	mg/L	<0.000050	----	----	----	----	
Boron, dissolved	7440-42-8	E421/VA	A	0.010	mg/L	<0.010	----	----	----	----	
Cadmium, dissolved	7440-43-9	E421/VA	A	0.0000050	mg/L	<0.0000050	----	----	----	----	
Calcium, dissolved	7440-70-2	E421/VA	A	0.050	mg/L	<0.050	----	----	----	----	
Cesium, dissolved	7440-46-2	E421/VA	A	0.000010	mg/L	<0.000010	----	----	----	----	
Chromium, dissolved	7440-47-3	E421/VA	A	0.00050	mg/L	<0.00050	----	----	----	----	
Cobalt, dissolved	7440-48-4	E421/VA	A	0.00010	mg/L	<0.00010	----	----	----	----	
Copper, dissolved	7440-50-8	E421/VA	A	0.00020	mg/L	0.00046 ^{RRV}	----	----	----	----	
Iron, dissolved	7439-89-6	E421/VA	A	0.010	mg/L	<0.010	----	----	----	----	
Lead, dissolved	7439-92-1	E421/VA	A	0.000050	mg/L	<0.000050	----	----	----	----	
Lithium, dissolved	7439-93-2	E421/VA	A	0.0010	mg/L	<0.0010	----	----	----	----	
Magnesium, dissolved	7439-95-4	E421/VA	A	0.0050	mg/L	<0.0050	----	----	----	----	
Manganese, dissolved	7439-96-5	E421/VA	A	0.00010	mg/L	<0.00010	----	----	----	----	
Molybdenum, dissolved	7439-98-7	E421/VA	A	0.000050	mg/L	<0.000050	----	----	----	----	
Nickel, dissolved	7440-02-0	E421/VA	A	0.00050	mg/L	<0.00050	----	----	----	----	
Phosphorus, dissolved	7723-14-0	E421/VA	A	0.050	mg/L	<0.050	----	----	----	----	
Potassium, dissolved	7440-09-7	E421/VA	A	0.050	mg/L	<0.050	----	----	----	----	
Rubidium, dissolved	7440-17-7	E421/VA	A	0.00020	mg/L	<0.00020	----	----	----	----	
Selenium, dissolved	7782-49-2	E421/VA	A	0.000050	mg/L	<0.000050	----	----	----	----	
Silicon, dissolved	7440-21-3	E421/VA	A	0.050	mg/L	<0.050	----	----	----	----	
Silver, dissolved	7440-22-4	E421/VA	A	0.000010	mg/L	<0.000010	----	----	----	----	
Sodium, dissolved	7440-23-5	E421/VA	A	0.050	mg/L	0.269 ^{RRV}	----	----	----	----	
Strontium, dissolved	7440-24-6	E421/VA	A	0.00020	mg/L	<0.00020	----	----	----	----	
Sulfur, dissolved	7704-34-9	E421/VA	A	0.50	mg/L	<0.50	----	----	----	----	
Tellurium, dissolved	13494-80-9	E421/VA	A	0.00020	mg/L	<0.00020	----	----	----	----	



Analytical Results

Sub-Matrix: Water						Client sample ID	Field Blank	Travel Blank	----	----	----
(Matrix: Water)											
						Client sampling date / time	06-Jun-2023 12:25	06-Jun-2023	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		VA23B2805-006	VA23B2805-007	-----	-----	-----	
						Result	Result	----	----	----	
Dissolved Metals											
Thallium, dissolved	7440-28-0	E421/VA	A	0.000010	mg/L	<0.000010	----	----	----	----	
Thorium, dissolved	7440-29-1	E421/VA	A	0.00010	mg/L	<0.00010	----	----	----	----	
Tin, dissolved	7440-31-5	E421/VA	A	0.00010	mg/L	<0.00010	----	----	----	----	
Titanium, dissolved	7440-32-6	E421/VA	A	0.00030	mg/L	<0.00030	----	----	----	----	
Tungsten, dissolved	7440-33-7	E421/VA	A	0.00010	mg/L	<0.00010	----	----	----	----	
Uranium, dissolved	7440-61-1	E421/VA	A	0.000010	mg/L	<0.000010	----	----	----	----	
Vanadium, dissolved	7440-62-2	E421/VA	A	0.00050	mg/L	<0.00050	----	----	----	----	
Zinc, dissolved	7440-66-6	E421/VA	A	0.0010	mg/L	<0.0010	----	----	----	----	
Zirconium, dissolved	7440-67-7	E421/VA	A	0.00030	mg/L	<0.00030	----	----	----	----	
Dissolved metals filtration location	----	EP421/VA		-	-	Field	----	----	----	----	

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

Work Order	: VA23B2805	Page	: 1 of 19
Client	: Northwest Research and Monitoring Ltd.	Laboratory	: Vancouver - Environmental
Contact	: Laura Guillon	Account Manager	: Sneha Sansare
Address	: PO Box 4357 Smithers BC Canada V0J 2N0	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: MWMT 2023	Date Samples Received	: 07-Jun-2023 17:00
PO	: ----	Issue Date	: 14-Jun-2023 16:56
C-O-C number	: 20-1038109		
Sampler	: ----		
Site	: ----		
Quote number	: Q72918		
No. of samples received	: 7		
No. of samples analysed	: 7		

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

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO: Data Quality Objective.

LOR: Limit of Reporting (detection limit).

RPD: Relative Percent Difference.

Workorder Comments

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

Summary of Outliers

Outliers : Quality Control Samples

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

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

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

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Analysis Holding Time Compliance

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

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

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

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

Matrix: Water

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Crystal Creek	E298	06-Jun-2023	08-Jun-2023	----	----		08-Jun-2023	28 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Field Blank	E298	06-Jun-2023	08-Jun-2023	----	----		08-Jun-2023	28 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Gosnell Creek	E298	06-Jun-2023	08-Jun-2023	----	----		08-Jun-2023	28 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Gosnell Creek Duplicate	E298	06-Jun-2023	08-Jun-2023	----	----		08-Jun-2023	28 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Morice River	E298	06-Jun-2023	08-Jun-2023	----	----		08-Jun-2023	28 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Shea Creek	E298	06-Jun-2023	08-Jun-2023	----	----		08-Jun-2023	28 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (lab preserved) Travel Blank	E298	06-Jun-2023	08-Jun-2023	3 days	2 days	✓	08-Jun-2023	28 days	0 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 : Nitrate in Water by IC (Low Level)										
HDPE Crystal Creek	E235.NO3-L	06-Jun-2023	09-Jun-2023	----	----		09-Jun-2023	3 days	3 days	✔
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Field Blank	E235.NO3-L	06-Jun-2023	09-Jun-2023	----	----		09-Jun-2023	3 days	3 days	✔
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Gosnell Creek	E235.NO3-L	06-Jun-2023	09-Jun-2023	----	----		09-Jun-2023	3 days	3 days	✔
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Gosnell Creek Duplicate	E235.NO3-L	06-Jun-2023	09-Jun-2023	----	----		09-Jun-2023	3 days	3 days	✔
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Morice River	E235.NO3-L	06-Jun-2023	09-Jun-2023	----	----		09-Jun-2023	3 days	3 days	✔
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Shea Creek	E235.NO3-L	06-Jun-2023	09-Jun-2023	----	----		09-Jun-2023	3 days	3 days	✔
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Travel Blank	E235.NO3-L	06-Jun-2023	09-Jun-2023	----	----		09-Jun-2023	3 days	3 days	✔
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Crystal Creek	E235.NO2-L	06-Jun-2023	09-Jun-2023	----	----		09-Jun-2023	3 days	3 days	✔
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Field Blank	E235.NO2-L	06-Jun-2023	09-Jun-2023	----	----		09-Jun-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 Gosnell Creek	E235.NO2-L	06-Jun-2023	09-Jun-2023	----	----		09-Jun-2023	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Gosnell Creek Duplicate	E235.NO2-L	06-Jun-2023	09-Jun-2023	----	----		09-Jun-2023	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Morice River	E235.NO2-L	06-Jun-2023	09-Jun-2023	----	----		09-Jun-2023	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Shea Creek	E235.NO2-L	06-Jun-2023	09-Jun-2023	----	----		09-Jun-2023	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Travel Blank	E235.NO2-L	06-Jun-2023	09-Jun-2023	----	----		09-Jun-2023	3 days	3 days	✓
Anions and Nutrients : Total Dissolved Nitrogen by Colourimetry										
Amber glass dissolved (sulfuric acid) Crystal Creek	E368	06-Jun-2023	08-Jun-2023	----	----		09-Jun-2023	28 days	3 days	✓
Anions and Nutrients : Total Dissolved Nitrogen by Colourimetry										
Amber glass dissolved (sulfuric acid) Field Blank	E368	06-Jun-2023	08-Jun-2023	----	----		09-Jun-2023	28 days	3 days	✓
Anions and Nutrients : Total Dissolved Nitrogen by Colourimetry										
Amber glass dissolved (sulfuric acid) Gosnell Creek	E368	06-Jun-2023	08-Jun-2023	----	----		09-Jun-2023	28 days	3 days	✓
Anions and Nutrients : Total Dissolved Nitrogen by Colourimetry										
Amber glass dissolved (sulfuric acid) Gosnell Creek Duplicate	E368	06-Jun-2023	08-Jun-2023	----	----		09-Jun-2023	28 days	3 days	✓



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

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Total Dissolved Nitrogen by Colourimetry										
Amber glass dissolved (sulfuric acid) Morice River	E368	06-Jun-2023	08-Jun-2023	----	----		09-Jun-2023	28 days	3 days	✓
Anions and Nutrients : Total Dissolved Nitrogen by Colourimetry										
Amber glass dissolved (sulfuric acid) Shea Creek	E368	06-Jun-2023	08-Jun-2023	----	----		09-Jun-2023	28 days	3 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) Crystal Creek	E366	06-Jun-2023	08-Jun-2023	----	----		09-Jun-2023	28 days	3 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) Field Blank	E366	06-Jun-2023	08-Jun-2023	----	----		09-Jun-2023	28 days	3 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) Gosnell Creek	E366	06-Jun-2023	08-Jun-2023	----	----		09-Jun-2023	28 days	3 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) Gosnell Creek Duplicate	E366	06-Jun-2023	08-Jun-2023	----	----		09-Jun-2023	28 days	3 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) Morice River	E366	06-Jun-2023	08-Jun-2023	----	----		09-Jun-2023	28 days	3 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) Shea Creek	E366	06-Jun-2023	08-Jun-2023	----	----		09-Jun-2023	28 days	3 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (lab preserved) Travel Blank	E366	06-Jun-2023	08-Jun-2023	3 days	2 days	✓	09-Jun-2023	28 days	1 days	✓



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

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			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) Crystal Creek	E372-U	06-Jun-2023	08-Jun-2023	----	----		09-Jun-2023	28 days	3 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Field Blank	E372-U	06-Jun-2023	08-Jun-2023	----	----		09-Jun-2023	28 days	3 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Gosnell Creek	E372-U	06-Jun-2023	08-Jun-2023	----	----		09-Jun-2023	28 days	3 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Gosnell Creek Duplicate	E372-U	06-Jun-2023	08-Jun-2023	----	----		09-Jun-2023	28 days	3 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Morice River	E372-U	06-Jun-2023	08-Jun-2023	----	----		09-Jun-2023	28 days	3 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Shea Creek	E372-U	06-Jun-2023	08-Jun-2023	----	----		09-Jun-2023	28 days	3 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (lab preserved) Travel Blank	E372-U	06-Jun-2023	08-Jun-2023	3 days	2 days	✓	09-Jun-2023	28 days	1 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) Crystal Creek	E421	06-Jun-2023	09-Jun-2023	----	----		12-Jun-2023	180 days	6 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) Field Blank	E421	06-Jun-2023	09-Jun-2023	----	----		12-Jun-2023	180 days	6 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	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) Gosnell Creek	E421	06-Jun-2023	09-Jun-2023	----	----		12-Jun-2023	180 days	6 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) Gosnell Creek Duplicate	E421	06-Jun-2023	09-Jun-2023	----	----		12-Jun-2023	180 days	6 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) Morice River	E421	06-Jun-2023	09-Jun-2023	----	----		12-Jun-2023	180 days	6 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) Shea Creek	E421	06-Jun-2023	09-Jun-2023	----	----		12-Jun-2023	180 days	6 days	✓
Field Tests : Field pH,EC,Salinity,Ci2,CiO2,ORP,DO, Turbidity,T,T-P,o-PO4,NH3,Chloramine										
HDPE - dissolved (lab preserved) Crystal Creek	EF001	06-Jun-2023	----	----	----		08-Jun-2023	----	----	
Field Tests : Field pH,EC,Salinity,Ci2,CiO2,ORP,DO, Turbidity,T,T-P,o-PO4,NH3,Chloramine										
HDPE - dissolved (lab preserved) Gosnell Creek	EF001	06-Jun-2023	----	----	----		08-Jun-2023	----	----	
Field Tests : Field pH,EC,Salinity,Ci2,CiO2,ORP,DO, Turbidity,T,T-P,o-PO4,NH3,Chloramine										
HDPE - dissolved (lab preserved) Gosnell Creek Duplicate	EF001	06-Jun-2023	----	----	----		08-Jun-2023	----	----	
Field Tests : Field pH,EC,Salinity,Ci2,CiO2,ORP,DO, Turbidity,T,T-P,o-PO4,NH3,Chloramine										
HDPE - dissolved (lab preserved) Morice River	EF001	06-Jun-2023	----	----	----		08-Jun-2023	----	----	
Field Tests : Field pH,EC,Salinity,Ci2,CiO2,ORP,DO, Turbidity,T,T-P,o-PO4,NH3,Chloramine										
HDPE - dissolved (lab preserved) Shea Creek	EF001	06-Jun-2023	----	----	----		08-Jun-2023	----	----	



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	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) Crystal Creek	E358-L	06-Jun-2023	08-Jun-2023	----	----		08-Jun-2023	28 days	2 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) Field Blank	E358-L	06-Jun-2023	08-Jun-2023	----	----		08-Jun-2023	28 days	2 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) Gosnell Creek	E358-L	06-Jun-2023	08-Jun-2023	----	----		08-Jun-2023	28 days	2 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) Gosnell Creek Duplicate	E358-L	06-Jun-2023	08-Jun-2023	----	----		08-Jun-2023	28 days	2 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) Morice River	E358-L	06-Jun-2023	08-Jun-2023	----	----		08-Jun-2023	28 days	2 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) Shea Creek	E358-L	06-Jun-2023	08-Jun-2023	----	----		08-Jun-2023	28 days	2 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Crystal Creek	E290	06-Jun-2023	09-Jun-2023	----	----		09-Jun-2023	14 days	3 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Field Blank	E290	06-Jun-2023	09-Jun-2023	----	----		09-Jun-2023	14 days	3 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Gosnell Creek	E290	06-Jun-2023	09-Jun-2023	----	----		09-Jun-2023	14 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	
Physical Tests : Alkalinity Species by Titration										
HDPE Gosnell Creek Duplicate	E290	06-Jun-2023	09-Jun-2023	----	----		09-Jun-2023	14 days	3 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Morice River	E290	06-Jun-2023	09-Jun-2023	----	----		09-Jun-2023	14 days	3 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Shea Creek	E290	06-Jun-2023	09-Jun-2023	----	----		09-Jun-2023	14 days	3 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Travel Blank	E290	06-Jun-2023	09-Jun-2023	----	----		09-Jun-2023	14 days	3 days	✓
Physical Tests : ORP by Electrode										
HDPE Crystal Creek	E125	06-Jun-2023	----	----	----		14-Jun-2023	0.25 hrs	188 hrs	✖ EHTR-FM
Physical Tests : ORP by Electrode										
HDPE Morice River	E125	06-Jun-2023	----	----	----		14-Jun-2023	0.25 hrs	188 hrs	✖ EHTR-FM
Physical Tests : ORP by Electrode										
HDPE Field Blank	E125	06-Jun-2023	----	----	----		14-Jun-2023	0.25 hrs	189 hrs	✖ EHTR-FM
Physical Tests : ORP by Electrode										
HDPE Gosnell Creek	E125	06-Jun-2023	----	----	----		14-Jun-2023	0.25 hrs	189 hrs	✖ EHTR-FM
Physical Tests : ORP by Electrode										
HDPE Gosnell Creek Duplicate	E125	06-Jun-2023	----	----	----		14-Jun-2023	0.25 hrs	189 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 : ORP by Electrode										
HDPE Shea Creek	E125	06-Jun-2023	----	----	----		14-Jun-2023	0.25 hrs	189 hrs	<div>✖ EHTR-FM</div>
Physical Tests : ORP by Electrode										
HDPE Travel Blank	E125	06-Jun-2023	----	----	----		14-Jun-2023	0.25 hrs	189 hrs	<div>✖ EHTR-FM</div>
Physical Tests : TDS by Gravimetry										
HDPE Crystal Creek	E162	06-Jun-2023	----	----	----		13-Jun-2023	7 days	7 days	<div>✔</div>
Physical Tests : TDS by Gravimetry										
HDPE Field Blank	E162	06-Jun-2023	----	----	----		13-Jun-2023	7 days	7 days	<div>✔</div>
Physical Tests : TDS by Gravimetry										
HDPE Gosnell Creek	E162	06-Jun-2023	----	----	----		13-Jun-2023	7 days	7 days	<div>✔</div>
Physical Tests : TDS by Gravimetry										
HDPE Gosnell Creek Duplicate	E162	06-Jun-2023	----	----	----		13-Jun-2023	7 days	7 days	<div>✔</div>
Physical Tests : TDS by Gravimetry										
HDPE Morice River	E162	06-Jun-2023	----	----	----		13-Jun-2023	7 days	7 days	<div>✔</div>
Physical Tests : TDS by Gravimetry										
HDPE Shea Creek	E162	06-Jun-2023	----	----	----		13-Jun-2023	7 days	7 days	<div>✔</div>
Physical Tests : TDS by Gravimetry										
HDPE Travel Blank	E162	06-Jun-2023	----	----	----		13-Jun-2023	7 days	7 days	<div>✔</div>



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 : TSS by Gravimetry										
HDPE Crystal Creek	E160	06-Jun-2023	----	----	----		13-Jun-2023	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Field Blank	E160	06-Jun-2023	----	----	----		13-Jun-2023	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Gosnell Creek	E160	06-Jun-2023	----	----	----		13-Jun-2023	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Gosnell Creek Duplicate	E160	06-Jun-2023	----	----	----		13-Jun-2023	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Morice River	E160	06-Jun-2023	----	----	----		13-Jun-2023	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Shea Creek	E160	06-Jun-2023	----	----	----		13-Jun-2023	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Travel Blank	E160	06-Jun-2023	----	----	----		13-Jun-2023	7 days	7 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE Crystal Creek	E121	06-Jun-2023	----	----	----		07-Jun-2023	3 days	1 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE Field Blank	E121	06-Jun-2023	----	----	----		07-Jun-2023	3 days	1 days	✓



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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : Turbidity by Nephelometry										
HDPE Gosnell Creek	E121	06-Jun-2023	----	----	----		07-Jun-2023	3 days	1 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE Gosnell Creek Duplicate	E121	06-Jun-2023	----	----	----		07-Jun-2023	3 days	1 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE Morice River	E121	06-Jun-2023	----	----	----		07-Jun-2023	3 days	1 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE Shea Creek	E121	06-Jun-2023	----	----	----		07-Jun-2023	3 days	1 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE Travel Blank	E121	06-Jun-2023	----	----	----		07-Jun-2023	3 days	1 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Crystal Creek	E420	06-Jun-2023	09-Jun-2023	----	----		09-Jun-2023	180 days	3 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Field Blank	E420	06-Jun-2023	09-Jun-2023	----	----		09-Jun-2023	180 days	3 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Gosnell Creek	E420	06-Jun-2023	09-Jun-2023	----	----		09-Jun-2023	180 days	3 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Gosnell Creek Duplicate	E420	06-Jun-2023	09-Jun-2023	----	----		09-Jun-2023	180 days	3 days	✓



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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Total Metals : Total metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Morice River	E420	06-Jun-2023	09-Jun-2023	----	----		09-Jun-2023	180 days	3 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Shea Creek	E420	06-Jun-2023	09-Jun-2023	----	----		09-Jun-2023	180 days	3 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Travel Blank	E420	06-Jun-2023	09-Jun-2023	----	----		09-Jun-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			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	980287	1	18	5.5	5.0	✔
Ammonia by Fluorescence	E298	977894	1	7	14.2	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	978769	1	19	5.2	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	977892	1	6	16.6	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	980290	1	16	6.2	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	980291	1	20	5.0	5.0	✔
ORP by Electrode	E125	988227	2	22	9.0	5.0	✔
TDS by Gravimetry	E162	986595	1	20	5.0	5.0	✔
Total Dissolved Nitrogen by Colourimetry	E368	977895	1	6	16.6	5.0	✔
Total metals in Water by CRC ICPMS	E420	977850	1	20	5.0	5.0	✔
Total Nitrogen by Colourimetry	E366	977893	1	7	14.2	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	977890	1	15	6.6	5.0	✔
TSS by Gravimetry	E160	986572	1	20	5.0	5.0	✔
Turbidity by Nephelometry	E121	977794	1	20	5.0	5.0	✔
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	980287	1	18	5.5	5.0	✔
Ammonia by Fluorescence	E298	977894	1	7	14.2	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	978769	1	19	5.2	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	977892	1	6	16.6	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	980290	1	16	6.2	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	980291	1	20	5.0	5.0	✔
ORP by Electrode	E125	988227	2	22	9.0	5.0	✔
TDS by Gravimetry	E162	986595	1	20	5.0	5.0	✔
Total Dissolved Nitrogen by Colourimetry	E368	977895	1	6	16.6	5.0	✔
Total metals in Water by CRC ICPMS	E420	977850	1	20	5.0	5.0	✔
Total Nitrogen by Colourimetry	E366	977893	1	7	14.2	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	977890	1	15	6.6	5.0	✔
TSS by Gravimetry	E160	986572	1	20	5.0	5.0	✔
Turbidity by Nephelometry	E121	977794	1	20	5.0	5.0	✔
Method Blanks (MB)							
Alkalinity Species by Titration	E290	980287	1	18	5.5	5.0	✔
Ammonia by Fluorescence	E298	977894	1	7	14.2	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	978769	1	19	5.2	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	977892	1	6	16.6	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	980290	1	16	6.2	5.0	✔



Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Method Blanks (MB) - Continued							
Nitrite in Water by IC (Low Level)	E235.NO2-L	980291	1	20	5.0	5.0	✔
TDS by Gravimetry	E162	986595	1	20	5.0	5.0	✔
Total Dissolved Nitrogen by Colourimetry	E368	977895	1	6	16.6	5.0	✔
Total metals in Water by CRC ICPMS	E420	977850	1	20	5.0	5.0	✔
Total Nitrogen by Colourimetry	E366	977893	1	7	14.2	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	977890	1	15	6.6	5.0	✔
TSS by Gravimetry	E160	986572	1	20	5.0	5.0	✔
Turbidity by Nephelometry	E121	977794	1	20	5.0	5.0	✔
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	977894	1	7	14.2	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	978769	1	19	5.2	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	977892	1	6	16.6	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	980290	1	16	6.2	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	980291	1	20	5.0	5.0	✔
Total Dissolved Nitrogen by Colourimetry	E368	977895	1	6	16.6	5.0	✔
Total metals in Water by CRC ICPMS	E420	977850	1	20	5.0	5.0	✔
Total Nitrogen by Colourimetry	E366	977893	1	7	14.2	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	977890	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
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.
ORP by Electrode	E125 Vancouver - Environmental	Water	ASTM D1498 (mod)	Oxidation reduction potential is reported as the oxidation-reduction potential of the platinum metal-reference electrode employed, measured in mV. For high accuracy test results, it is recommended that this analysis be conducted in the field.
TSS by Gravimetry	E160 Vancouver - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at $104 \pm 1^\circ\text{C}$, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
TDS by Gravimetry	E162 Vancouver - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at $180 \pm 2^\circ\text{C}$ for 16 hours or to constant weight, with gravimetric measurement of the residue.
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.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Dissolved Organic Carbon by Combustion (Low Level)	E358-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO ₂ . NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Nitrogen by Colourimetry	E366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Dissolved Nitrogen by Colourimetry	E368 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Total Dissolved Nitrogen is determined colourimetrically using a discrete analyzer after filtration through a 0.45 micron filter followed by heated persulfate digestion of the sample.
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U Vancouver - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
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.
Hardness (Calculated) from Total Ca/Mg	EC100A Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO ₃), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO ₃ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
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).
Total Kjeldahl Nitrogen (Calculation)	EC318 Vancouver - Environmental	Water	BC MOE LABORATORY MANUAL (2005)	Total Kjeldahl Nitrogen is a calculated parameter. Total Kjeldahl Nitrogen (calc) = Total Nitrogen - [Nitrite (as N) + Nitrate (as N)].



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Field pH,EC,Salinity,Cl ₂ ,ClO ₂ ,ORP,DO, Turbidity,T,T-P,o-PO ₄ ,NH ₃ ,Chloramine	EF001 Vancouver - Environmental	Water	Field Measurement (Client Supplied)	Field pH,EC,Salinity,Cl ₂ ,ClO ₂ ,ORP,DO, Turbidity,T,T-P,o-PO ₄ ,NH ₃ or Chloramine measurements provided by client and recorded on ALS report may affect the validity of results.
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298 Vancouver - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Preparation for Dissolved Organic Carbon for Combustion	EP358 Vancouver - Environmental	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Nitrogen in water	EP366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
Digestion for Total Dissolved Nitrogen in water	EP368 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Samples are filtration through a 0.45 micron filter and then heated with a persulfate digestion reagent.
Digestion for Total Phosphorus in water	EP372 Vancouver - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
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	: VA23B2805	Page	: 1 of 18
Client	: Northwest Research and Monitoring Ltd.	Laboratory	: Vancouver - Environmental
Contact	: Laura Guillon	Account Manager	: Sneha Sansare
Address	: PO Box 4357 Smithers BC Canada V0J 2N0	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	:	Telephone	: +1 604 253 4188
Project	: MWMt 2023	Date Samples Received	: 07-Jun-2023 17:00
PO	: ----	Date Analysis Commenced	: 07-Jun-2023
C-O-C number	: 20-1038109	Issue Date	: 14-Jun-2023 16:48
Sampler	: ----		
Site	: ----		
Quote number	: Q72918		
No. of samples received	: 7		
No. of samples analysed	: 7		

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
- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

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

Signatories	Position	Laboratory Department
Angelo Salandanan	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Cecilia Zhang	Account Manager Assistant	Vancouver Administration, Burnaby, British Columbia
Hyunduck Suk	Analyst	Vancouver Inorganics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	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
Physical Tests (QC Lot: 977794)											
VA23B2788-003	Anonymous	Turbidity	----	E121	0.10	NTU	1.15	1.08	0.07	Diff <2x LOR	----
Physical Tests (QC Lot: 980287)											
VA23B2805-003	Crystal Creek	Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	22.8	22.7	0.659%	20%	----
Physical Tests (QC Lot: 986572)											
KS2301968-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	5.5	5.9	0.4	Diff <2x LOR	----
Physical Tests (QC Lot: 986595)											
KS2301968-001	Anonymous	Solids, total dissolved [TDS]	----	E162	10	mg/L	27	29	2	Diff <2x LOR	----
Physical Tests (QC Lot: 988227)											
FJ2301384-001	Anonymous	Oxidation-reduction potential [ORP]	----	E125	0.10	mV	269	269	0.223%	15%	----
Physical Tests (QC Lot: 988229)											
VA23B2805-006	Field Blank	Oxidation-reduction potential [ORP]	----	E125	0.10	mV	431	433	0.579%	15%	----
Anions and Nutrients (QC Lot: 977890)											
VA23B2735-002	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0716	0.0745	3.97%	20%	----
Anions and Nutrients (QC Lot: 977893)											
VA23B2805-001	Shea Creek	Nitrogen, total	7727-37-9	E366	0.030	mg/L	0.081	0.079	0.001	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 977894)											
VA23B2805-001	Shea Creek	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 977895)											
VA23B2805-001	Shea Creek	Nitrogen, total dissolved	----	E368	0.030	mg/L	0.086	0.087	0.002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 980290)											
VA23B2805-001	Shea Creek	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: 980291)											
VA23B2805-001	Shea Creek	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 977892)											
VA23B2805-001	Shea Creek	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	3.34	3.46	0.12	Diff <2x LOR	----
Total Metals (QC Lot: 977850)											
VA23B2763-001	Anonymous	Aluminum, total	7429-90-5	E420	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----
		Antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00192	0.00192	0.303%	20%	----
		Barium, total	7440-39-3	E420	0.00010	mg/L	0.0699	0.0690	1.41%	20%	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Total Metals (QC Lot: 977850) - continued											
VA23B2763-001	Anonymous	Beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, total	7440-42-8	E420	0.010	mg/L	0.016	0.016	0.00004	Diff <2x LOR	----
		Cadmium, total	7440-43-9	E420	0.0000950	mg/L	<0.0000950	<0.0000950	0	Diff <2x LOR	----
		Calcium, total	7440-70-2	E420	0.050	mg/L	87.3	88.5	1.32%	20%	----
		Cesium, total	7440-46-2	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00129	0.00133	2.86%	20%	----
		Copper, total	7440-50-8	E420	0.00050	mg/L	0.00115	0.00115	0.0000009	Diff <2x LOR	----
		Iron, total	7439-89-6	E420	0.010	mg/L	2.81	2.69	4.35%	20%	----
		Lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		Magnesium, total	7439-95-4	E420	0.0050	mg/L	18.7	19.6	4.73%	20%	----
		Manganese, total	7439-96-5	E420	0.00010	mg/L	4.26	4.30	1.05%	20%	----
		Molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.395	0.396	0.270%	20%	----
		Nickel, total	7440-02-0	E420	0.00050	mg/L	0.00136	0.00138	0.00002	Diff <2x LOR	----
		Phosphorus, total	7723-14-0	E420	0.050	mg/L	0.641	0.649	1.32%	20%	----
		Potassium, total	7440-09-7	E420	0.050	mg/L	5.27	5.24	0.487%	20%	----
		Rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00093	0.00082	0.00010	Diff <2x LOR	----
		Selenium, total	7782-49-2	E420	0.000050	mg/L	0.000119	0.000137	0.000018	Diff <2x LOR	----
		Silicon, total	7440-21-3	E420	0.10	mg/L	20.2	19.6	2.93%	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	39.4	40.6	2.76%	20%	----
		Strontium, total	7440-24-6	E420	0.00020	mg/L	0.474	0.467	1.39%	20%	----
		Sulfur, total	7704-34-9	E420	0.50	mg/L	8.41	8.41	0.00435%	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	<0.000010	<0.000010	0	Diff <2x LOR	----
		Thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.00120	mg/L	<0.00120	<0.00120	0	Diff <2x LOR	----
		Tungsten, total	7440-33-7	E420	0.00010	mg/L	0.00025	0.00025	0.000007	Diff <2x LOR	----
		Uranium, total	7440-61-1	E420	0.000010	mg/L	0.000641	0.000630	1.84%	20%	----
		Vanadium, total	7440-62-2	E420	0.00050	mg/L	0.00271	0.00278	0.00007	Diff <2x LOR	----
		Zinc, total	7440-66-6	E420	0.0030	mg/L	0.0033	0.0036	0.0003	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: 977850) - continued											
VA23B2763-001	Anonymous	Zirconium, total	7440-67-7	E420	0.00020	mg/L	0.00119	0.00118	0.000002	Diff <2x LOR	----
Dissolved Metals (QC Lot: 978769)											
FJ2301336-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0029	0.0025	0.0004	Diff <2x LOR	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00215	0.00218	1.50%	20%	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00048	0.00045	0.00002	Diff <2x LOR	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0286	0.0292	1.91%	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	0.159	0.159	0.0685%	20%	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	152	154	1.19%	20%	----
		Cesium, dissolved	7440-46-2	E421	0.000010	mg/L	0.000058	0.000063	0.000006	Diff <2x LOR	----
		Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00030	0.00030	0.000004	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.237	0.230	3.18%	20%	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	92.2	89.8	2.61%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00020	0.00021	0.000009	Diff <2x LOR	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00895	0.00898	0.418%	20%	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.0202	0.0201	0.784%	20%	----
		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	4.44	4.47	0.633%	20%	----
		Rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00361	0.00362	0.246%	20%	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.0576	0.0573	0.615%	20%	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	2.01	1.99	1.14%	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	179	177	1.06%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.416	0.428	2.84%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	273	266	2.70%	20%	----
		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	0.000022	0.000025	0.000002	Diff <2x LOR	----
		Thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	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
Dissolved Metals (QC Lot: 978769) - continued											
FJ2301336-001	Anonymous	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	<0.00030	<0.00030	0	Diff <2x LOR	----
		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	0.00966	0.00980	1.50%	20%	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	0.00053	0.00050	0.00002	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		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: 977794)						
Turbidity	----	E121	0.1	NTU	<0.10	----
Physical Tests (QCLot: 980287)						
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 986572)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Physical Tests (QCLot: 986595)						
Solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Anions and Nutrients (QCLot: 977890)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 977893)						
Nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Anions and Nutrients (QCLot: 977894)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 977895)						
Nitrogen, total dissolved	----	E368	0.03	mg/L	<0.030	----
Anions and Nutrients (QCLot: 980290)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 980291)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Organic / Inorganic Carbon (QCLot: 977892)						
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 977850)						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
Barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
Boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
Calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 977850) - continued						
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: 978769)						
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	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 978769) - continued						
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				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 977794)									
Turbidity	----	E121	0.1	NTU	200 NTU	100.0	85.0	115	----
Physical Tests (QCLot: 980287)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	109	85.0	115	----
Physical Tests (QCLot: 986572)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	91.8	85.0	115	----
Physical Tests (QCLot: 986595)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	90.6	85.0	115	----
Anions and Nutrients (QCLot: 977890)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	92.6	80.0	120	----
Anions and Nutrients (QCLot: 977893)									
Nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 977894)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	102	85.0	115	----
Anions and Nutrients (QCLot: 977895)									
Nitrogen, total dissolved	----	E368	0.03	mg/L	0.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 980290)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 980291)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	96.6	90.0	110	----
Organic / Inorganic Carbon (QCLot: 977892)									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	94.7	80.0	120	----
Total Metals (QCLot: 977850)									
Aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	106	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	103	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	111	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	108	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	110	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	105	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	105	80.0	120	----



Sub-Matrix: Water					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Analyte	CAS Number	Method	LOR	Unit					
Total Metals (QCLot: 977850) - continued									
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	105	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	104	80.0	120	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	104	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	105	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	105	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	104	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	105	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	103	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	109	80.0	120	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	107	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	105	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	104	80.0	120	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	104	80.0	120	----
Potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	110	80.0	120	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	106	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	103	80.0	120	----
Silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	117	80.0	120	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	99.1	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	110	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	103	80.0	120	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	108	80.0	120	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	100.0	80.0	120	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	104	80.0	120	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	99.7	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	104	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	104	80.0	120	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	101	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	106	80.0	120	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	108	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	99.1	80.0	120	----
Dissolved Metals (QCLot: 978769)									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	96.0	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	102	80.0	120	----



Sub-Matrix: Water					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Analyte	CAS Number	Method	LOR	Unit					
Dissolved Metals (QCLot: 978769) - continued									
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	106	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	105	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	102	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	94.7	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	99.8	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	99.9	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	102	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	98.5	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	99.1	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	97.9	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	101	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	96.7	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	102	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	102	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	99.0	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	103	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	98.8	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	108	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	107	80.0	120	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	98.8	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	97.8	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	108	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	97.5	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	102	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	94.2	80.0	120	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	97.6	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	99.5	80.0	120	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	93.5	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	101	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	97.1	80.0	120	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	93.4	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	99.3	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	102	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	96.4	80.0	120	----



Sub-Matrix: Water					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 978769) - continued									
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	99.5	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.

Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	Target	MS	Low	High	
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method						
Anions and Nutrients (QCLot: 977890)										
VA23B2735-004	Anonymous	Phosphorus, total	7723-14-0	E372-U	ND mg/L	0.05 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 977893)										
VA23B2805-002	Gosnell Creek	Nitrogen, total	7727-37-9	E366	0.407 mg/L	0.4 mg/L	102	70.0	130	----
Anions and Nutrients (QCLot: 977894)										
VA23B2805-002	Gosnell Creek	Ammonia, total (as N)	7664-41-7	E298	0.0993 mg/L	0.1 mg/L	99.3	75.0	125	----
Anions and Nutrients (QCLot: 977895)										
VA23B2805-002	Gosnell Creek	Nitrogen, total dissolved	----	E368	0.411 mg/L	0.4 mg/L	103	70.0	130	----
Anions and Nutrients (QCLot: 980290)										
VA23B2805-002	Gosnell Creek	Nitrate (as N)	14797-55-8	E235.NO3-L	2.62 mg/L	2.5 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 980291)										
VA23B2805-002	Gosnell Creek	Nitrite (as N)	14797-65-0	E235.NO2-L	0.498 mg/L	0.5 mg/L	99.7	75.0	125	----
Organic / Inorganic Carbon (QCLot: 977892)										
VA23B2805-002	Gosnell Creek	Carbon, dissolved organic [DOC]	----	E358-L	4.78 mg/L	5 mg/L	95.6	70.0	130	----
Total Metals (QCLot: 977850)										
VA23B2763-002	Anonymous	Aluminum, total	7429-90-5	E420	0.197 mg/L	0.2 mg/L	98.4	70.0	130	----
		Antimony, total	7440-36-0	E420	0.0206 mg/L	0.02 mg/L	103	70.0	130	----
		Arsenic, total	7440-38-2	E420	0.0210 mg/L	0.02 mg/L	105	70.0	130	----
		Barium, total	7440-39-3	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Beryllium, total	7440-41-7	E420	0.0408 mg/L	0.04 mg/L	102	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.00968 mg/L	0.01 mg/L	96.8	70.0	130	----
		Boron, total	7440-42-8	E420	0.104 mg/L	0.1 mg/L	104	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.00401 mg/L	0.004 mg/L	100	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	0.0104 mg/L	0.01 mg/L	104	70.0	130	----
		Chromium, total	7440-47-3	E420	0.0406 mg/L	0.04 mg/L	102	70.0	130	----
		Cobalt, total	7440-48-4	E420	0.0199 mg/L	0.02 mg/L	99.4	70.0	130	----
		Copper, total	7440-50-8	E420	0.0192 mg/L	0.02 mg/L	96.1	70.0	130	----
		Iron, total	7439-89-6	E420	ND mg/L	2 mg/L	ND	70.0	130	----
		Lead, total	7439-92-1	E420	0.0191 mg/L	0.02 mg/L	95.5	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: 977850) - continued											
VA23B2763-002	Anonymous	Lithium, total	7439-93-2	E420	0.101 mg/L	0.1 mg/L	101	70.0	130	----	
		Magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70.0	130	----	
		Manganese, total	7439-96-5	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----	
		Molybdenum, total	7439-98-7	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----	
		Nickel, total	7440-02-0	E420	0.0388 mg/L	0.04 mg/L	97.1	70.0	130	----	
		Phosphorus, total	7723-14-0	E420	10.1 mg/L	10 mg/L	101	70.0	130	----	
		Potassium, total	7440-09-7	E420	ND mg/L	4 mg/L	ND	70.0	130	----	
		Rubidium, total	7440-17-7	E420	0.0201 mg/L	0.02 mg/L	100	70.0	130	----	
		Selenium, total	7782-49-2	E420	0.0397 mg/L	0.04 mg/L	99.3	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	0.00401 mg/L	0.004 mg/L	100	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	20.6 mg/L	20 mg/L	103	70.0	130	----	
		Tellurium, total	13494-80-9	E420	0.0408 mg/L	0.04 mg/L	102	70.0	130	----	
		Thallium, total	7440-28-0	E420	0.00381 mg/L	0.004 mg/L	95.4	70.0	130	----	
		Thorium, total	7440-29-1	E420	0.0208 mg/L	0.02 mg/L	104	70.0	130	----	
		Tin, total	7440-31-5	E420	0.0208 mg/L	0.02 mg/L	104	70.0	130	----	
		Titanium, total	7440-32-6	E420	0.0413 mg/L	0.04 mg/L	103	70.0	130	----	
		Tungsten, total	7440-33-7	E420	0.0198 mg/L	0.02 mg/L	98.8	70.0	130	----	
		Uranium, total	7440-61-1	E420	0.00415 mg/L	0.004 mg/L	104	70.0	130	----	
		Vanadium, total	7440-62-2	E420	0.105 mg/L	0.1 mg/L	105	70.0	130	----	
		Zinc, total	7440-66-6	E420	0.383 mg/L	0.4 mg/L	95.8	70.0	130	----	
		Zirconium, total	7440-67-7	E420	0.0420 mg/L	0.04 mg/L	105	70.0	130	----	
Dissolved Metals (QCLot: 978769)											
FJ2301338-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.192 mg/L	0.2 mg/L	96.0	70.0	130	----	
		Antimony, dissolved	7440-36-0	E421	0.0198 mg/L	0.02 mg/L	99.0	70.0	130	----	
		Arsenic, dissolved	7440-38-2	E421	0.0206 mg/L	0.02 mg/L	103	70.0	130	----	
		Barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----	
		Beryllium, dissolved	7440-41-7	E421	0.0415 mg/L	0.04 mg/L	104	70.0	130	----	
		Bismuth, dissolved	7440-69-9	E421	0.00905 mg/L	0.01 mg/L	90.5	70.0	130	----	
		Boron, dissolved	7440-42-8	E421	0.102 mg/L	0.1 mg/L	102	70.0	130	----	
		Cadmium, dissolved	7440-43-9	E421	0.00398 mg/L	0.004 mg/L	99.5	70.0	130	----	
		Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----	
		Cesium, dissolved	7440-46-2	E421	0.0102 mg/L	0.01 mg/L	102	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
Dissolved Metals (QCLot: 978769) - continued										
FJ2301338-001	Anonymous	Chromium, dissolved	7440-47-3	E421	0.0396 mg/L	0.04 mg/L	99.0	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0195 mg/L	0.02 mg/L	97.7	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0194 mg/L	0.02 mg/L	97.0	70.0	130	----
		Iron, dissolved	7439-89-6	E421	1.89 mg/L	2 mg/L	94.6	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0189 mg/L	0.02 mg/L	94.6	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.0983 mg/L	0.1 mg/L	98.3	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	0.0197 mg/L	0.02 mg/L	98.4	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0206 mg/L	0.02 mg/L	103	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.0389 mg/L	0.04 mg/L	97.2	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	10.4 mg/L	10 mg/L	104	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	4.20 mg/L	4 mg/L	105	70.0	130	----
		Rubidium, dissolved	7440-17-7	E421	0.0199 mg/L	0.02 mg/L	99.6	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0417 mg/L	0.04 mg/L	104	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	10.0 mg/L	10 mg/L	100	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00402 mg/L	0.004 mg/L	100	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	18.4 mg/L	20 mg/L	92.2	70.0	130	----
		Tellurium, dissolved	13494-80-9	E421	0.0406 mg/L	0.04 mg/L	101	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00381 mg/L	0.004 mg/L	95.3	70.0	130	----
		Thorium, dissolved	7440-29-1	E421	0.0201 mg/L	0.02 mg/L	101	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0202 mg/L	0.02 mg/L	101	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0395 mg/L	0.04 mg/L	98.7	70.0	130	----
		Tungsten, dissolved	7440-33-7	E421	0.0190 mg/L	0.02 mg/L	95.0	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.00399 mg/L	0.004 mg/L	99.7	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.102 mg/L	0.1 mg/L	102	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.386 mg/L	0.4 mg/L	96.4	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.0405 mg/L	0.04 mg/L	101	70.0	130	----



Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:

Sub-Matrix:					Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method			Low	High	
Physical Tests (QCLot: 988227)									
	RM	Oxidation-reduction potential [ORP]	----	E125	220 mV	101	95.0	105	----
Physical Tests (QCLot: 988229)									
	RM	Oxidation-reduction potential [ORP]	----	E125	220 mV	101	95.0	105	----

Water Quality Sampling Field Card

Date	June 6, 2023	Water Stage	Water Colour	EMS #
Site	Shea Creek	L/M/H	Clear	E272563
Field Parameters				QA/QC
Sp. Cond. (uS/cm)	33.5	DO (ppm)	85.5 10.25	Regular Suite Y/N Duplicate Y/N
DO (%)	85.5	pH	8.57	Hydrocarbons Y/N Field Blank Y/N
MMHG	693.4	Water Temp	7.0°	Ice Cover (cm) # Sample Bottles
Notes: Questionable PH 9.23 pH MV - 10.1 18.3, used OAKton for PH PH on YSI isn't calibrating correctly. Say PH 4 is 7 So using Pocket OAKton PH reader				
Time of Sample	12:25	Project	WQO	

Water Quality Sampling Field Card

Date	June 6, 2023	Water Stage	Water Colour	EMS #
Site	Gosnell	L/M/H	Clear	292551
Field Parameters				QA/QC
Sp. Cond. (uS/cm)	52.3	DO (ppm)	10.28	Regular Suite Y/N Duplicate Y/N
DO (%)	86.6	pH OAKton Reader	7.91	Hydrocarbons Y/N Field Blank Y/N
MMHG	697.0	Water Temp	7.8	Ice Cover (cm) # Sample Bottles
Notes: YSI PH 7.28 → 9.48 PH MV - 139.1 Used OAKton for PH 7.91 water lvl is lower				
Time of Sample	1:10	Project	WQO	

Water Quality Sampling Field Card

Date	June 6, 2023	Water Stage	Water Colour	EMS #
Site	Crystal Creek	L/M/H	Clear	E272554
Field Parameters				QA/QC
Sp. Cond. (uS/cm)	49.5	DO (ppm)	10.65	Regular Suite Y/N Duplicate Y/N
DO (%)	89.9	pH OAKton	7.91	Hydrocarbons Y/N Field Blank Y/N
MMHG	688.2	Water Temp	7.3	Ice Cover (cm) # Sample Bottles
Notes: YSI PH 9.28 PH MV - 118.7; Used OAKton handheld Road not busy, sunny → clear sky, creek is low				
Time of Sample	1:40pm	Project	WQO	

Field Crew

Dallas Nikal Chad Lewis

2 of 2 pages

Water Quality Sampling Field Card						
Date	June 6, 2023		Water Stage	Water Colour	EMS #	
Site	Morice River		L / M / H	Clear Green	E272549	
Field Parameters					QA/QC	
Sp. Cond. (uS/cm)	41.8	DO (ppm)	11.55	Regular Suite Y/N	Duplicate Y/ <input checked="" type="checkbox"/>	
DO (%)	94.5	pH	7.81	Hydrocarbons Y/N	Field Blank Y/ <input checked="" type="checkbox"/>	
MMHG	647.2	Water Temp	6.3	Ice Cover (cm)	# Sample Bottles	
					None	5
Notes: YSI PH 8.69 PHMV - 89.0						
Time of Sample			2:10pm		Project	WQO

Water Quality Sampling Field Card						
Date			Water Stage	Water Colour	EMS #	
Site			L / M / H			
Field Parameters					QA/QC	
Sp. Cond. (uS/cm)		DO (ppm)		Regular Suite Y/N	Duplicate Y/N	
DO (%)		pH		Hydrocarbons Y/N	Field Blank Y/N	
		Water Temp		Ice Cover (cm)	# Sample Bottles	
Notes:						
Time of Sample					Project	

Water Quality Sampling Field Card						
Date			Water Stage	Water Colour	EMS #	
Site			L / M / H			
Field Parameters					QA/QC	
Sp. Cond. (uS/cm)		DO (ppm)		Regular Suite Y/N	Duplicate Y/N	
DO (%)		pH		Hydrocarbons Y/N	Field Blank Y/N	
		Water Temp		Ice Cover (cm)	# Sample Bottles	
Notes:						
Time of Sample					Project	



Work Order Reference
VA23B2805

Telephone : +1 604 253 4188

AUG 2020 FEBRUARY