ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **VA20A4609**	Page	: 1 of 8
Client	: **Urban Systems Ltd.**	Laboratory	: Vancouver - Environmental
Contact	: Aaron Coelho	Account Manager	: Caitlin Fountain
Address	: 200 - 286 St. Paul Street Kamloops BC Canada V2C 6G4	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: (250)374-8311	Telephone	: +1 604 253 4188
Project	: 1788.0002.16	Date Samples Received	: 09-Apr-2020 09:50
PO	: ----	Date Analysis Commenced	: 09-Apr-2020
C-O-C number	: 17-758858	Issue Date	: 16-Apr-2020 10:59
Sampler	: ----		
Site	: ----		
Quote number	: Q58903		
No. of samples received	: 6		
No. of samples analysed	: 6		

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*
Aaron Yu	Laboratory Analyst	Metals, Burnaby, British Columbia
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Jashan Kaur	Lab Assistant	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia

General Comments

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

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

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

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

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

Unit	*Description*
-	No Unit
mg/L	milligrams per litre

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in reports identified as "Preliminary Report" are considered authorized for use.

Qualifiers

Qualifier	*Description*
DTSE	*Dissolved Se concentration exceeds total. Positive bias on D-Se suspected due to signal enhancement from volatile selenium species. Contact ALS if an alternative test to address this interference is needed.*

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	Town Booster Station	Mackenzie Hospital	Public Works Lunch Room	Pump House #1	#400 Skeene Drive
					Client sampling date / time	08-Apr-2020 10:30	08-Apr-2020 11:11	08-Apr-2020 09:30	08-Apr-2020 11:30	08-Apr-2020 12:00
						VA20A4609-001	VA20A4609-002	VA20A4609-003	VA20A4609-004	VA20A4609-005
						Result	Result	Result	Result	Result
Physical Tests										
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L		156	163	160	165	161
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L		158	156	167	167	165
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L		<0.0030	<0.0030	<0.0030	<0.0030	0.0037
antimony, total	7440-36-0	E420	0.00010	mg/L		0.00038	<0.00010	<0.00010	<0.00010	<0.00010
arsenic, total	7440-38-2	E420	0.00010	mg/L		0.00357	0.00218	0.00258	0.00582	0.00210
barium, total	7440-39-3	E420	0.00010	mg/L		0.0747	0.0656	0.0645	0.0808	0.0677
beryllium, total	7440-41-7	E420	0.000020	mg/L		<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
bismuth, total	7440-69-9	E420	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
boron, total	7440-42-8	E420	0.010	mg/L		0.020	<0.010	<0.010	<0.010	<0.010
cadmium, total	7440-43-9	E420	0.0000050	mg/L		0.0000267	<0.0000050	<0.0000050	<0.0000050	<0.0000050
calcium, total	7440-70-2	E420	0.050	mg/L		49.8	48.6	53.1	52.0	51.8
chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
cobalt, total	7440-48-4	E420	0.00010	mg/L		0.00018	<0.00010	<0.00010	<0.00010	<0.00010
copper, total	7440-50-8	E420	0.00050	mg/L		0.0662	0.365	0.107	<0.00050	0.601
iron, total	7439-89-6	E420	0.010	mg/L		0.655	0.047	0.059	0.189	0.053
lead, total	7439-92-1	E420	0.000050	mg/L		0.0128	0.000058	0.000237	<0.000050	0.00206
lithium, total	7439-93-2	E420	0.0010	mg/L		0.0128	0.0046	0.0050	0.0056	0.0049
magnesium, total	7439-95-4	E420	0.100	mg/L		8.26	8.41	8.36	8.95	8.79
manganese, total	7439-96-5	E420	0.00010	mg/L		0.325	0.0206	0.0190	0.139	0.0522
mercury, total	7439-97-6	E508	0.0000050	mg/L		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
molybdenum, total	7439-98-7	E420	0.000050	mg/L		0.000247	0.000555	0.000560	0.000980	0.000558
nickel, total	7440-02-0	E420	0.00050	mg/L		0.00210	<0.00050	<0.00050	<0.00050	<0.00050
phosphorus, total	7723-14-0	E420	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	<0.050
potassium, total	7440-09-7	E420	0.100	mg/L		0.654	0.620	0.674	0.714	0.657
selenium, total	7782-49-2	E420	0.000050	mg/L		<0.000050	0.000058	<0.000050	<0.000050	<0.000050
silicon, total	7440-21-3	E420	0.10	mg/L		4.33	4.17	4.41	4.90	4.50
silver, total	7440-22-4	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	0.000010
sodium, total	7440-23-5	E420	0.050	mg/L		3.35	3.13	3.35	3.20	3.17
strontium, total	7440-24-6	E420	0.00020	mg/L		0.211	0.208	0.209	0.206	0.209

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	Town Booster Station	Mackenzie Hospital	Public Works Lunch Room	Pump House #1	#400 Skeene Drive
					Client sampling date / time	08-Apr-2020 10:30	08-Apr-2020 11:11	08-Apr-2020 09:30	08-Apr-2020 11:30	08-Apr-2020 12:00
						VA20A4609-001	VA20A4609-002	VA20A4609-003	VA20A4609-004	VA20A4609-005
						Result	Result	Result	Result	Result
Total Metals										
sulfur, total	7704-34-9	E420	0.50	mg/L		3.26	3.40	3.46	3.52	3.56
thallium, total	7440-28-0	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
tin, total	7440-31-5	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
titanium, total	7440-32-6	E420	0.00030	mg/L		<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
uranium, total	7440-61-1	E420	0.000010	mg/L		0.00166	0.00170	0.00186	0.00282	0.00187
vanadium, total	7440-62-2	E420	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
zinc, total	7440-66-6	E420	0.0030	mg/L		0.0998	0.0063	0.0122	<0.0030	0.0245
zirconium, total	7440-67-7	E420	0.00030	mg/L		<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Dissolved Metals										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L		0.0020	0.0010	0.0010	<0.0010	0.0011
antimony, dissolved	7440-36-0	E421	0.00010	mg/L		0.00034	<0.00010	<0.00010	<0.00010	<0.00010
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L		0.00360	0.00216	0.00263	0.00584	0.00240
barium, dissolved	7440-39-3	E421	0.00010	mg/L		0.0732	0.0655	0.0646	0.0820	0.0631
beryllium, dissolved	7440-41-7	E421	0.000020	mg/L		<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
boron, dissolved	7440-42-8	E421	0.010	mg/L		0.022	<0.010	<0.010	<0.010	<0.010
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L		0.0000168	<0.0000050	<0.0000050	<0.0000050	<0.0000050
calcium, dissolved	7440-70-2	E421	0.050	mg/L		48.2	50.8	49.8	51.0	49.9
chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L		0.00014	<0.00010	<0.00010	<0.00010	<0.00010
copper, dissolved	7440-50-8	E421	0.00020	mg/L		0.0637	0.367	0.0961	0.00023	0.601
iron, dissolved	7439-89-6	E421	0.010	mg/L		0.539	0.045	0.055	0.177	0.057
lead, dissolved	7439-92-1	E421	0.000050	mg/L		0.0105	0.000063	0.000197	<0.000050	0.00173
lithium, dissolved	7439-93-2	E421	0.0010	mg/L		0.0126	0.0047	0.0046	0.0052	0.0045
magnesium, dissolved	7439-95-4	E421	0.100	mg/L		8.63	8.74	8.73	9.20	8.76
manganese, dissolved	7439-96-5	E421	0.00010	mg/L		0.264	0.0198	0.0170	0.127	0.0469
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L		<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000051
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L		0.000109	0.000513	0.000520	0.000660	0.000522
nickel, dissolved	7440-02-0	E421	0.00050	mg/L		0.00200	<0.00050	<0.00050	<0.00050	<0.00050
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	<0.050
potassium, dissolved	7440-09-7	E421	0.100	mg/L		0.618	0.628	0.626	0.690	0.616

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	Town Booster Station	Mackenzie Hospital	Public Works Lunch Room	Pump House #1	#400 Skeene Drive
					Client sampling date / time	08-Apr-2020 10:30	08-Apr-2020 11:11	08-Apr-2020 09:30	08-Apr-2020 11:30	08-Apr-2020 12:00
						VA20A4609-001	VA20A4609-002	VA20A4609-003	VA20A4609-004	VA20A4609-005
						Result	Result	Result	Result	Result
Dissolved Metals										
selenium, dissolved	7782-49-2	E421	0.000050	mg/L		<0.000050	<0.000050	<0.000050 DTSE	<0.000050	<0.000050
silicon, dissolved	7440-21-3	E421	0.050	mg/L		4.22	4.31	4.36	4.76	4.31
silver, dissolved	7440-22-4	E421	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	0.000010
sodium, dissolved	7440-23-5	E421	0.050	mg/L		2.95	3.02	3.00	3.03	3.06
strontium, dissolved	7440-24-6	E421	0.00020	mg/L		0.201	0.211	0.209	0.206	0.204
sulfur, dissolved	7704-34-9	E421	0.50	mg/L		3.27	3.21	3.42	3.06	3.23
thallium, dissolved	7440-28-0	E421	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
tin, dissolved	7440-31-5	E421	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
titanium, dissolved	7440-32-6	E421	0.00030	mg/L		<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
uranium, dissolved	7440-61-1	E421	0.000010	mg/L		0.00162	0.00173	0.00174	0.00283	0.00169
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
zinc, dissolved	7440-66-6	E421	0.0010	mg/L		0.0775	0.0059	0.0090	0.0027	0.0177
zirconium, dissolved	7440-67-7	E421	0.00030	mg/L		<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
dissolved metals filtration location	----	EP421	-	-		Field	Field	Field	Field	Field
dissolved mercury filtration location	----	EP509	-	-		Field	Field	Field	Field	Field

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

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	#216 Black Water Crest.	----	----	----	----
					Client sampling date / time	08-Apr-2020 11:00	----	----	----	----
						VA20A4609-006	--------	--------	--------	--------
						Result	----	----	----	----
Physical Tests										
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L		164	----	----	----	----
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L		168	----	----	----	----
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L		<0.0030	----	----	----	----
antimony, total	7440-36-0	E420	0.00010	mg/L		<0.00010	----	----	----	----
arsenic, total	7440-38-2	E420	0.00010	mg/L		0.00263	----	----	----	----
barium, total	7440-39-3	E420	0.00010	mg/L		0.0639	----	----	----	----
beryllium, total	7440-41-7	E420	0.000020	mg/L		<0.000020	----	----	----	----
bismuth, total	7440-69-9	E420	0.000050	mg/L		<0.000050	----	----	----	----
boron, total	7440-42-8	E420	0.010	mg/L		<0.010	----	----	----	----
cadmium, total	7440-43-9	E420	0.0000050	mg/L		<0.0000050	----	----	----	----
calcium, total	7440-70-2	E420	0.050	mg/L		53.8	----	----	----	----
chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L		<0.00010	----	----	----	----
cobalt, total	7440-48-4	E420	0.00010	mg/L		<0.00010	----	----	----	----
copper, total	7440-50-8	E420	0.00050	mg/L		0.0906	----	----	----	----
iron, total	7439-89-6	E420	0.010	mg/L		0.073	----	----	----	----
lead, total	7439-92-1	E420	0.000050	mg/L		0.000815	----	----	----	----
lithium, total	7439-93-2	E420	0.0010	mg/L		0.0049	----	----	----	----
magnesium, total	7439-95-4	E420	0.100	mg/L		8.18	----	----	----	----
manganese, total	7439-96-5	E420	0.00010	mg/L		0.0297	----	----	----	----
mercury, total	7439-97-6	E508	0.0000050	mg/L		<0.0000050	----	----	----	----
molybdenum, total	7439-98-7	E420	0.000050	mg/L		0.000541	----	----	----	----
nickel, total	7440-02-0	E420	0.00050	mg/L		<0.00050	----	----	----	----
phosphorus, total	7723-14-0	E420	0.050	mg/L		<0.050	----	----	----	----
potassium, total	7440-09-7	E420	0.100	mg/L		0.705	----	----	----	----
selenium, total	7782-49-2	E420	0.000050	mg/L		<0.000050	----	----	----	----
silicon, total	7440-21-3	E420	0.10	mg/L		4.52	----	----	----	----
silver, total	7440-22-4	E420	0.000010	mg/L		<0.000010	----	----	----	----
sodium, total	7440-23-5	E420	0.050	mg/L		3.18	----	----	----	----
strontium, total	7440-24-6	E420	0.00020	mg/L		0.209	----	----	----	----
sulfur, total	7704-34-9	E420	0.50	mg/L		3.56	----	----	----	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	#216 Black Water Crest.	----	----	----	----
					Client sampling date / time	08-Apr-2020 11:00	----	----	----	----
						VA20A4609-006	--------	--------	--------	--------
						Result	----	----	----	----
Total Metals										
thallium, total	7440-28-0	E420	0.000010	mg/L		<0.000010	----	----	----	----
tin, total	7440-31-5	E420	0.00010	mg/L		<0.00010	----	----	----	----
titanium, total	7440-32-6	E420	0.00030	mg/L		<0.00030	----	----	----	----
uranium, total	7440-61-1	E420	0.000010	mg/L		0.00182	----	----	----	----
vanadium, total	7440-62-2	E420	0.00050	mg/L		<0.00050	----	----	----	----
zinc, total	7440-66-6	E420	0.0030	mg/L		0.0270	----	----	----	----
zirconium, total	7440-67-7	E420	0.00030	mg/L		<0.00030	----	----	----	----
Dissolved Metals										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L		0.0011	----	----	----	----
antimony, dissolved	7440-36-0	E421	0.00010	mg/L		<0.00010	----	----	----	----
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L		0.00266	----	----	----	----
barium, dissolved	7440-39-3	E421	0.00010	mg/L		0.0655	----	----	----	----
beryllium, dissolved	7440-41-7	E421	0.000020	mg/L		<0.000020	----	----	----	----
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L		<0.000050	----	----	----	----
boron, dissolved	7440-42-8	E421	0.010	mg/L		<0.010	----	----	----	----
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L		<0.0000050	----	----	----	----
calcium, dissolved	7440-70-2	E421	0.050	mg/L		51.2	----	----	----	----
chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L		<0.00010	----	----	----	----
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L		<0.00010	----	----	----	----
copper, dissolved	7440-50-8	E421	0.00020	mg/L		0.0870	----	----	----	----
iron, dissolved	7439-89-6	E421	0.010	mg/L		0.070	----	----	----	----
lead, dissolved	7439-92-1	E421	0.000050	mg/L		0.000835	----	----	----	----
lithium, dissolved	7439-93-2	E421	0.0010	mg/L		0.0047	----	----	----	----
magnesium, dissolved	7439-95-4	E421	0.100	mg/L		8.74	----	----	----	----
manganese, dissolved	7439-96-5	E421	0.00010	mg/L		0.0269	----	----	----	----
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L		<0.0000050	----	----	----	----
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L		0.000532	----	----	----	----
nickel, dissolved	7440-02-0	E421	0.00050	mg/L		<0.00050	----	----	----	----
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L		<0.050	----	----	----	----
potassium, dissolved	7440-09-7	E421	0.100	mg/L		0.700	----	----	----	----
selenium, dissolved	7782-49-2	E421	0.000050	mg/L		<0.000050	----	----	----	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	#216 Black Water Crest.	----	----	----	----
					Client sampling date / time	08-Apr-2020 11:00	----	----	----	----
						VA20A4609-006	--------	--------	--------	--------
						Result	----	----	----	----
Dissolved Metals										
silicon, dissolved	7440-21-3	E421	0.050	mg/L		4.22	----	----	----	----
silver, dissolved	7440-22-4	E421	0.000010	mg/L		<0.000010	----	----	----	----
sodium, dissolved	7440-23-5	E421	0.050	mg/L		3.12	----	----	----	----
strontium, dissolved	7440-24-6	E421	0.00020	mg/L		0.214	----	----	----	----
sulfur, dissolved	7704-34-9	E421	0.50	mg/L		3.28	----	----	----	----
thallium, dissolved	7440-28-0	E421	0.000010	mg/L		<0.000010	----	----	----	----
tin, dissolved	7440-31-5	E421	0.00010	mg/L		<0.00010	----	----	----	----
titanium, dissolved	7440-32-6	E421	0.00030	mg/L		<0.00030	----	----	----	----
uranium, dissolved	7440-61-1	E421	0.000010	mg/L		0.00180	----	----	----	----
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L		<0.00050	----	----	----	----
zinc, dissolved	7440-66-6	E421	0.0010	mg/L		0.0275	----	----	----	----
zirconium, dissolved	7440-67-7	E421	0.00030	mg/L		<0.00030	----	----	----	----
dissolved metals filtration location	----	EP421	-	-		Field	----	----	----	----
dissolved mercury filtration location	----	EP509	-	-		Field	----	----	----	----

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