



Environmental

CERTIFICATE OF ANALYSIS

Work Order : **VA22A8586**
Client : **Keats Island Construction & Services Ltd.**
Contact : Scott Benson
Address : 299 Forin Road
Gibsons BC Canada V0N 1V0
Telephone : 604 989 4119
Project : Britannia Water
PO : ----
C-O-C number : 20-997758
Sampler : SB
Site : ----
Quote number : ----
No. of samples received : 2
No. of samples analysed : 2

Page : 1 of 4
Laboratory : Vancouver - Environmental
Account Manager : Tasnia Tarannum
Address : 8081 Lougheed Highway
Burnaby BC Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 22-Apr-2022 12:55
Date Analysis Commenced : 25-Apr-2022
Issue Date : 12-May-2022 12:39

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Dwayne Bennett	Supervisor - Inorganic	Metals, Calgary, Alberta
Joshua Stessun	Laboratory Analyst	Organics, Calgary, Alberta
Kim Jensen	Department Manager - Metals	Inorganics, Burnaby, British Columbia
Nguyen Tran	Laboratory Analyst	Organics, Calgary, Alberta
Oscar Ruiz	Lab Assistant	Metals, Calgary, Alberta
Sara Niroomand		Inorganics, Calgary, Alberta



General Comments

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

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

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

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

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

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

<: less than.

>: greater than.

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

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

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



Analytical Results

Sub-Matrix: Water					Client sample ID	Wells 6+8	Distribution	----	----	----
(Matrix: Water)					Client sampling date / time	20-Apr-2022 14:00	20-Apr-2022 13:30	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22A8586-001	VA22A8586-002	-----	-----	-----	
					Result	Result	----	----	----	
Physical Tests										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	15.1	55.1	----	----	----	
colour, true	----	E329	5.0	CU	<5.0	<5.0	----	----	----	
conductivity	----	E100	2.0	µS/cm	157	235	----	----	----	
pH	----	E108	0.10	pH units	7.29	7.94	----	----	----	
solids, total dissolved [TDS]	----	E162	10	mg/L	88	158	----	----	----	
turbidity	----	E121	0.10	NTU	<0.10	0.11	----	----	----	
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	46.5	49.9	----	----	----	
Anions and Nutrients										
chloride	16887-00-6	E235.Cl	0.50	mg/L	13.6	13.3	----	----	----	
fluoride	16984-48-8	E235.F	0.020	mg/L	0.044	0.047	----	----	----	
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.841	0.813	----	----	----	
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	----	----	----	
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	29.9	31.3	----	----	----	
Total Metals										
aluminum, total	7429-90-5	E420	0.0100	mg/L	0.0381	0.0152	----	----	----	
antimony, total	7440-36-0	E420	0.00050	mg/L	<0.00050	<0.00050	----	----	----	
arsenic, total	7440-38-2	E420	0.00010	mg/L	<0.00010	<0.00010	----	----	----	
barium, total	7440-39-3	E420	0.0200	mg/L	<0.0200	<0.0200	----	----	----	
boron, total	7440-42-8	E420	0.100	mg/L	<0.100	<0.100	----	----	----	
cadmium, total	7440-43-9	E420	0.000200	mg/L	0.000782	0.000736	----	----	----	
calcium, total	7440-70-2	E420	0.100	mg/L	15.1	16.9	----	----	----	
chromium, total	7440-47-3	E420	0.00200	mg/L	<0.00200	<0.00200	----	----	----	
copper, total	7440-50-8	E420	0.00100	mg/L	0.0161	0.0142	----	----	----	
iron, total	7439-89-6	E420	0.030	mg/L	<0.030	<0.030	----	----	----	
lead, total	7439-92-1	E420	0.000500	mg/L	<0.000500	<0.000500	----	----	----	
magnesium, total	7439-95-4	E420	0.100	mg/L	2.14	1.87	----	----	----	
manganese, total	7439-96-5	E420	0.00200	mg/L	0.00825	<0.00200	----	----	----	
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	----	----	----	
potassium, total	7440-09-7	E420	0.100	mg/L	0.971	0.861	----	----	----	
selenium, total	7782-49-2	E420	0.00100	mg/L	<0.00100	<0.00100	----	----	----	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Wells 6+8	Distribution	----	----	----
Client sampling date / time					20-Apr-2022 14:00	20-Apr-2022 13:30	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA22A8586-001	VA22A8586-002	-----	-----	-----	
					Result	Result	---	---	---	
Total Metals										
sodium, total	7440-23-5	E420	2.00	mg/L	8.77	23.2	----	----	----	
uranium, total	7440-61-1	E420	0.000100	mg/L	<0.000100	<0.000100	----	----	----	
zinc, total	7440-66-6	E420	0.0500	mg/L	0.131	0.131	----	----	----	
Volatile Organic Compounds [Fuels]										
benzene	71-43-2	E611A	0.50	µg/L	<0.50	----	----	----	----	
ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	----	----	----	----	
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	----	----	----	----	
styrene	100-42-5	E611A	0.50	µg/L	<0.50	----	----	----	----	
toluene	108-88-3	E611A	0.50	µg/L	<0.50	----	----	----	----	
xylene, m+p-	179601-23-1	E611A	0.40	µg/L	<0.40	----	----	----	----	
xylene, o-	95-47-6	E611A	0.30	µg/L	<0.30	----	----	----	----	
xylenes, total	1330-20-7	E611A	0.50	µg/L	<0.50	----	----	----	----	
BTEX, total	----	E611A	1.0	µg/L	<1.0	----	----	----	----	
Volatile Organic Compounds [THMs]										
bromodichloromethane	75-27-4	E611B	1.0	µg/L	----	2.5	----	----	----	
bromoform	75-25-2	E611B	1.0	µg/L	----	<1.0	----	----	----	
chloroform	67-66-3	E611B	1.0	µg/L	----	3.5	----	----	----	
dibromochloromethane	124-48-1	E611B	1.0	µg/L	----	2.8	----	----	----	
trihalomethanes [THMs], total	----	E611B	2.0	µg/L	----	8.8	----	----	----	
Volatile Organic Compounds [THMs] Surrogates										
bromofluorobenzene, 4-	460-00-4	E611B	1.0	%	----	73.0	----	----	----	
difluorobenzene, 1,4-	540-36-3	E611B	1.0	%	----	113	----	----	----	
Volatile Organic Compounds Surrogates										
bromofluorobenzene, 4-	460-00-4	E611A	1.0	%	94.2	----	----	----	----	
difluorobenzene, 1,4-	540-36-3	E611A	1.0	%	95.5	----	----	----	----	

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA22A8586	Page	: 1 of 10
Client	: Keats Island Construction & Services Ltd.	Laboratory	: Vancouver - Environmental
Contact	: Scott Benson	Account Manager	: Tasnia Tarannum
Address	: 299 Forin Road Gibsons BC Canada V0N 1V0	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: 604 989 4119	Telephone	: +1 604 253 4188
Project	: Britannia Water	Date Samples Received	: 22-Apr-2022 12:55
PO	: ----	Issue Date	: 12-May-2022 12:40
C-O-C number	: 20-997758		
Sampler	: SB		
Site	: ----		
Quote number	: ----		
No. of samples received	: 2		
No. of samples analysed	: 2		

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

Key

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

Workorder Comments

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

Summary of Outliers

Outliers : Quality Control Samples

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

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

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

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Analysis Holding Time Compliance

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

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

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

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

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Chloride in Water by IC											
HDPE Distribution	E235.Cl	20-Apr-2022	----	----	----		25-Apr-2022	28 days	5 days	✓	
Anions and Nutrients : Chloride in Water by IC											
HDPE Wells 6+8	E235.Cl	20-Apr-2022	----	----	----		25-Apr-2022	28 days	5 days	✓	
Anions and Nutrients : Fluoride in Water by IC											
HDPE Distribution	E235.F	20-Apr-2022	----	----	----		25-Apr-2022	28 days	5 days	✓	
Anions and Nutrients : Fluoride in Water by IC											
HDPE Wells 6+8	E235.F	20-Apr-2022	----	----	----		25-Apr-2022	28 days	5 days	✓	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE Distribution	E235.NO3-L	20-Apr-2022	----	----	----		25-Apr-2022	3 days	5 days	* EHT	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE Wells 6+8	E235.NO3-L	20-Apr-2022	----	----	----		25-Apr-2022	3 days	5 days	* EHT	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE Distribution	E235.NO2-L	20-Apr-2022	----	----	----		25-Apr-2022	3 days	5 days	* EHT	



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 Wells 6+8	E235.NO2-L	20-Apr-2022	----	----	----		25-Apr-2022	3 days	5 days	*	EHT
Anions and Nutrients : Sulfate in Water by IC											
HDPE Distribution	E235.SO4	20-Apr-2022	----	----	----		25-Apr-2022	28 days	5 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Wells 6+8	E235.SO4	20-Apr-2022	----	----	----		25-Apr-2022	28 days	5 days	✓	
Physical Tests : Alkalinity Species by Titration											
HDPE Distribution	E290	20-Apr-2022	----	----	----		27-Apr-2022	14 days	7 days	✓	
Physical Tests : Alkalinity Species by Titration											
HDPE Wells 6+8	E290	20-Apr-2022	----	----	----		27-Apr-2022	14 days	7 days	✓	
Physical Tests : Colour (True) by Spectrometer											
HDPE Distribution	E329	20-Apr-2022	----	----	----		25-Apr-2022	3 days	5 days	*	EHT
Physical Tests : Colour (True) by Spectrometer											
HDPE Wells 6+8	E329	20-Apr-2022	----	----	----		25-Apr-2022	3 days	5 days	*	EHT
Physical Tests : Conductivity in Water											
HDPE Distribution	E100	20-Apr-2022	----	----	----		27-Apr-2022	28 days	7 days	✓	
Physical Tests : Conductivity in Water											
HDPE Wells 6+8	E100	20-Apr-2022	----	----	----		27-Apr-2022	28 days	7 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 : pH by Meter											
HDPE Distribution	E108	20-Apr-2022	----	----	----		27-Apr-2022	0.25 hrs	160 hrs	*	EHTR-FM
Physical Tests : pH by Meter											
HDPE Wells 6+8	E108	20-Apr-2022	----	----	----		27-Apr-2022	0.25 hrs	160 hrs	*	EHTR-FM
Physical Tests : TDS by Gravimetry											
HDPE Distribution	E162	20-Apr-2022	----	----	----		27-Apr-2022	7 days	6 days	✓	
Physical Tests : TDS by Gravimetry											
HDPE Wells 6+8	E162	20-Apr-2022	----	----	----		27-Apr-2022	7 days	6 days	✓	
Physical Tests : Turbidity by Nephelometry											
HDPE Distribution	E121	20-Apr-2022	----	----	----		26-Apr-2022	3 days	6 days	*	EHT
Physical Tests : Turbidity by Nephelometry											
HDPE Wells 6+8	E121	20-Apr-2022	----	----	----		26-Apr-2022	3 days	6 days	*	EHT
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) Distribution	E508	20-Apr-2022	----	----	----		28-Apr-2022	28 days	8 days	✓	
Total Metals : Total Mercury in Water by CVAAS											
Glass vial total (hydrochloric acid) Wells 6+8	E508	20-Apr-2022	----	----	----		28-Apr-2022	28 days	8 days	✓	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) Distribution	E420	20-Apr-2022	----	----	----		06-May-2022	180 days	16 days	✓	



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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) Wells 6+8	E420	20-Apr-2022	----	----	----		06-May-2022	180 days	16 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) Wells 6+8	E611A	20-Apr-2022	28-Apr-2022	----	----		28-Apr-2022	14 days	8 days	✓
Volatile Organic Compounds [THMs] : THMs by Headspace GC-MS										
Glass vial (sodium thiosulfate) Distribution	E611B	20-Apr-2022	28-Apr-2022	----	----		28-Apr-2022	14 days	8 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended
 EHT: Exceeded ALS recommended hold time prior to analysis.
 Rec. HT: ALS recommended hold time (see units).



Quality Control Parameter Frequency Compliance

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

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

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
Analytical Methods							
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	467448	1	12	8.3	5.0	✓
BTEX by Headspace GC-MS	E611A	471655	1	11	9.0	5.0	✓
Chloride in Water by IC	E235.Cl	467450	1	20	5.0	5.0	✓
Colour (True) by Spectrometer	E329	467459	1	17	5.8	5.0	✓
Conductivity in Water	E100	467447	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	467453	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	467451	1	14	7.1	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	467452	1	20	5.0	5.0	✓
pH by Meter	E108	467446	1	19	5.2	5.0	✓
Sulfate in Water by IC	E235.SO4	467449	1	20	5.0	5.0	✓
TDS by Gravimetry	E162	469133	1	17	5.8	5.0	✓
THMs by Headspace GC-MS	E611B	471544	1	8	12.5	5.0	✓
Total Mercury in Water by CVAAS	E508	471355	1	5	20.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	477131	1	20	5.0	5.0	✓
Turbidity by Nephelometry	E121	468463	1	17	5.8	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	467448	1	12	8.3	5.0	✓
BTEX by Headspace GC-MS	E611A	471655	1	11	9.0	5.0	✓
Chloride in Water by IC	E235.Cl	467450	1	20	5.0	5.0	✓
Colour (True) by Spectrometer	E329	467459	1	17	5.8	5.0	✓
Conductivity in Water	E100	467447	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	467453	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	467451	1	14	7.1	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	467452	1	20	5.0	5.0	✓
pH by Meter	E108	467446	1	19	5.2	5.0	✓
Sulfate in Water by IC	E235.SO4	467449	1	20	5.0	5.0	✓
TDS by Gravimetry	E162	469133	1	17	5.8	5.0	✓
THMs by Headspace GC-MS	E611B	471544	1	8	12.5	5.0	✓
Total Mercury in Water by CVAAS	E508	471355	1	5	20.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	477131	1	20	5.0	5.0	✓
Turbidity by Nephelometry	E121	468463	1	17	5.8	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	467448	1	12	8.3	5.0	✓
BTEX by Headspace GC-MS	E611A	471655	1	11	9.0	5.0	✓
Chloride in Water by IC	E235.Cl	467450	1	20	5.0	5.0	✓
Colour (True) by Spectrometer	E329	467459	1	17	5.8	5.0	✓
Conductivity in Water	E100	467447	1	19	5.2	5.0	✓



Matrix: **Water**

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

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<i>Analytical Methods</i>							
Method Blanks (MB) - Continued							
Fluoride in Water by IC	E235.F	467453	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	467451	1	14	7.1	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	467452	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	467449	1	20	5.0	5.0	✓
TDS by Gravimetry	E162	469133	1	17	5.8	5.0	✓
THMs by Headspace GC-MS	E611B	471544	1	8	12.5	5.0	✓
Total Mercury in Water by CVAAS	E508	471355	1	5	20.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	477131	1	20	5.0	5.0	✓
Turbidity by Nephelometry	E121	468463	1	17	5.8	5.0	✓
Matrix Spikes (MS)							
BTEX by Headspace GC-MS	E611A	471655	1	11	9.0	5.0	✓
Chloride in Water by IC	E235.Cl	467450	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	467453	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	467451	1	14	7.1	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	467452	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	467449	1	20	5.0	5.0	✓
THMs by Headspace GC-MS	E611B	471544	1	8	12.5	5.0	✓
Total Mercury in Water by CVAAS	E508	471355	1	5	20.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	477131	1	20	5.0	5.0	✓



Methodology References and Summaries

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

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 Vancouver - Environmental	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TDS by Gravimetry	E162 Vancouver - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
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.



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Colour (True) by Spectrometer	E329 Vancouver - Environmental	Water	APHA 2120 C (mod)	Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment.
Total Metals in Water by CRC ICPMS	E420 Calgary - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Mercury in Water by CVAAS	E508 Calgary - Environmental	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
BTEX by Headspace GC-MS	E611A Calgary - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
THMs by Headspace GC-MS	E611B Calgary - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
Hardness (Calculated) from Total Ca/Mg	EC100A Calgary - 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.
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
VOCs Preparation for Headspace Analysis	EP581 Calgary - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.



QUALITY CONTROL REPORT

Work Order : **VA22A8586**

Page : 1 of 10

Client : Keats Island Construction & Services Ltd.
 Contact : Scott Benson
 Address : 299 Forin Road
 Gibsons BC Canada V0N 1V0
 Telephone : 604 989 4119
 Project : Britannia Water
 PO : ----
 C-O-C number : 20-997758
 Sampler : SB
 Site : ----
 Quote number : ----
 No. of samples received : 2
 No. of samples analysed : 2

Laboratory : Vancouver - Environmental
 Account Manager : Tasnia Tarannum
 Address : 8081 Lougheed Highway
 Burnaby, British Columbia Canada V5A 1W9
 Telephone : +1 604 253 4188
 Date Samples Received : 22-Apr-2022 12:55
 Date Analysis Commenced : 25-Apr-2022
 Issue Date : 12-May-2022 12:23

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 Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Dwayne Bennett	Supervisor - Inorganic	Metals, Calgary, Alberta
Joshua Stessun	Laboratory Analyst	Organics, Calgary, Alberta
Kim Jensen	Department Manager - Metals	Inorganics, Burnaby, British Columbia
Nguyen Tran	Laboratory Analyst	Organics, Calgary, Alberta
Oscar Ruiz	Lab Assistant	Metals, Calgary, Alberta
Sara Niroomand		Inorganics, Calgary, Alberta

Page : 2 of 10
Work Order : VA22A8586
Client : Keats Island Construction & Services Ltd.
Project : Britannia Water



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 Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage 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: 467446)											
VA22A8584-001	Anonymous	pH	----	E108	0.10	pH units	8.32	8.33	0.120%	4%	----
Physical Tests (QC Lot: 467447)											
VA22A8584-001	Anonymous	conductivity	----	E100	2.0	µS/cm	1490	1490	0.0673%	10%	----
Physical Tests (QC Lot: 467448)											
VA22A8584-001	Anonymous	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	144	144	0.0694%	20%	----
Physical Tests (QC Lot: 467459)											
KS2201338-001	Anonymous	colour, true	----	E329	5.0	CU	<5.0	<5.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 468463)											
FJ2200960-001	Anonymous	turbidity	----	E121	0.10	NTU	2.00	2.29	13.5%	15%	----
Physical Tests (QC Lot: 469133)											
VA22A8452-005	Anonymous	solids, total dissolved [TDS]	----	E162	20	mg/L	476	454	4.73%	20%	----
Anions and Nutrients (QC Lot: 467449)											
VA22A8584-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	1.50	mg/L	551	546	1.03%	20%	----
Anions and Nutrients (QC Lot: 467450)											
VA22A8584-001	Anonymous	chloride	16887-00-6	E235.Cl	2.50	mg/L	71.8	70.9	1.20%	20%	----
Anions and Nutrients (QC Lot: 467451)											
VA22A8584-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	0.163	0.142	0.0211	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 467452)											
VA22A8584-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 467453)											
VA22A8584-001	Anonymous	fluoride	16984-48-8	E235.F	0.100	mg/L	0.660	0.662	0.001	Diff <2x LOR	----
Total Metals (QC Lot: 471355)											
VA22A8569-001	Anonymous	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Total Metals (QC Lot: 477131)											
CG2205021-001	Anonymous	aluminum, total	7429-90-5	E420	0.0300	mg/L	4.98	5.58	11.4%	20%	----
		antimony, total	7440-36-0	E420	0.00100	mg/L	0.0160	0.0168	4.95%	20%	----
		arsenic, total	7440-38-2	E420	0.00100	mg/L	0.00835	0.00895	0.00059	Diff <2x LOR	----
		barium, total	7440-39-3	E420	0.00100	mg/L	0.359	0.406	12.3%	20%	----
		boron, total	7440-42-8	E420	0.100	mg/L	0.272	0.284	0.012	Diff <2x LOR	----
		cadmium, total	7440-43-9	E420	0.0000500	mg/L	0.00129	0.00136	5.79%	20%	----
		calcium, total	7440-70-2	E420	0.500	mg/L	81.4	85.1	4.43%	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: 477131) - continued											
CG2205021-001	Anonymous	chromium, total	7440-47-3	E420	0.00100	mg/L	0.0296	0.0339	13.6%	20%	----
		copper, total	7440-50-8	E420	0.00500	mg/L	0.251	0.277	10.0%	20%	----
		iron, total	7439-89-6	E420	0.100	mg/L	17.1	19.0	10.6%	20%	----
		lead, total	7439-92-1	E420	0.000500	mg/L	0.0190	0.0197	3.93%	20%	----
		magnesium, total	7439-95-4	E420	0.100	mg/L	18.2	20.3	11.2%	20%	----
		manganese, total	7439-96-5	E420	0.00100	mg/L	0.503	0.566	11.9%	20%	----
		potassium, total	7440-09-7	E420	0.500	mg/L	89.0	101	12.4%	20%	----
		selenium, total	7782-49-2	E420	0.000500	mg/L	0.000982	0.00115	0.000165	Diff <2x LOR	----
		sodium, total	7440-23-5	E420	0.500	mg/L	858	963	11.5%	20%	----
		uranium, total	7440-61-1	E420	0.000100	mg/L	0.000571	0.000580	0.000009	Diff <2x LOR	----
zinc, total	7440-66-6	E420	0.0300	mg/L	0.938	1.03	9.69%	20%	----		
Volatile Organic Compounds (QC Lot: 471655)											
RG2200361-001	Anonymous	benzene	71-43-2	E611A	0.00050	µg/L	0.00165 mg/L	1.74	0.10	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.00050	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.00050	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.00050	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.00050	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		Volatile Organic Compounds [THMs] (QC Lot: 471544)									
CG2204859-001	Anonymous	bromodichloromethane	75-27-4	E611B	1.0	µg/L	2.1	2.1	0.06	Diff <2x LOR	----
		bromoform	75-25-2	E611B	1.0	µg/L	<1.0	<1.0	0	Diff <2x LOR	----
		chloroform	67-66-3	E611B	1.0	µg/L	7.8	7.7	1.10%	30%	----
		dibromochloromethane	124-48-1	E611B	1.0	µg/L	<1.0	<1.0	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: 467447)						
conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 467448)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 467459)						
colour, true	----	E329	5	CU	<5.0	----
Physical Tests (QCLot: 468463)						
turbidity	----	E121	0.1	NTU	<0.10	----
Physical Tests (QCLot: 469133)						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Anions and Nutrients (QCLot: 467449)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 467450)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 467451)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 467452)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 467453)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Total Metals (QCLot: 471355)						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.00000005	----
Total Metals (QCLot: 477131)						
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	----
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	----
chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
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	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 477131) - continued						
magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
Volatile Organic Compounds (QCLot: 471655)						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	----
styrene	100-42-5	E611A	0.5	µg/L	<0.50	----
toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	----
xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	----
Volatile Organic Compounds [THMs] (QCLot: 471544)						
bromodichloromethane	75-27-4	E611B	1	µg/L	<1.0	----
bromoform	75-25-2	E611B	1	µg/L	<1.0	----
chloroform	67-66-3	E611B	1	µg/L	<1.0	----
dibromochloromethane	124-48-1	E611B	1	µg/L	<1.0	----



Laboratory Control Sample (LCS) Report

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

Sub-Matrix: Water					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Physical Tests (QCLot: 467446)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 467447)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	101	90.0	110	----
Physical Tests (QCLot: 467448)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	100	85.0	115	----
Physical Tests (QCLot: 467459)									
colour, true	----	E329	5	CU	100 CU	99.4	85.0	115	----
Physical Tests (QCLot: 468463)									
turbidity	----	E121	0.1	NTU	200 NTU	96.5	85.0	115	----
Physical Tests (QCLot: 469133)									
solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	98.8	85.0	115	----
Anions and Nutrients (QCLot: 467449)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 467450)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 467451)									
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: 467452)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 467453)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	100	90.0	110	----
Total Metals (QCLot: 471355)									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	100	80.0	120	----
Total Metals (QCLot: 477131)									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	85.9	80.0	120	----
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	109	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	84.3	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	87.4	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	97.2	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	84.9	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	95.0	80.0	120	----
chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	84.2	80.0	120	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Total Metals (QCLot: 477131) - continued									
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	84.8	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	100	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	95.9	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	86.6	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	83.3	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	88.0	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	90.2	80.0	120	----
sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	87.8	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	89.5	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	84.9	80.0	120	----
Volatile Organic Compounds (QCLot: 471655)									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	105	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	97.9	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	108	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	102	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	101	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	98.6	70.0	130	----
xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	105	70.0	130	----
Volatile Organic Compounds [THMs] (QCLot: 471544)									
bromodichloromethane	75-27-4	E611B	1	µg/L	100 µg/L	107	70.0	130	----
bromoform	75-25-2	E611B	1	µg/L	100 µg/L	98.6	70.0	130	----
chloroform	67-66-3	E611B	1	µg/L	100 µg/L	114	70.0	130	----
dibromochloromethane	124-48-1	E611B	1	µg/L	100 µg/L	84.6	70.0	130	----



Matrix Spike (MS) Report

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

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 467449)										
VA22A8584-002	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	512 mg/L	500 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 467450)										
VA22A8584-002	Anonymous	chloride	16887-00-6	E235.Cl	508 mg/L	500 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 467451)										
VA22A8584-002	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	12.8 mg/L	12.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 467452)										
VA22A8584-002	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	2.55 mg/L	2.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 467453)										
VA22A8584-002	Anonymous	fluoride	16984-48-8	E235.F	5.12 mg/L	5 mg/L	102	75.0	125	----
Total Metals (QCLot: 471355)										
VA22A8586-001	Wells 6+8	mercury, total	7439-97-6	E508	0.0000936 mg/L	0.0001 mg/L	93.6	70.0	130	----
Total Metals (QCLot: 477131)										
CG2205034-001	Anonymous	aluminum, total	7429-90-5	E420	2.03 mg/L	2 mg/L	101	70.0	130	----
		antimony, total	7440-36-0	E420	0.213 mg/L	0.2 mg/L	106	70.0	130	----
		arsenic, total	7440-38-2	E420	0.198 mg/L	0.2 mg/L	99.0	70.0	130	----
		barium, total	7440-39-3	E420	0.206 mg/L	0.2 mg/L	103	70.0	130	----
		boron, total	7440-42-8	E420	1.09 mg/L	1 mg/L	109	70.0	130	----
		cadmium, total	7440-43-9	E420	0.0408 mg/L	0.04 mg/L	102	70.0	130	----
		calcium, total	7440-70-2	E420	ND mg/L	40 mg/L	ND	70.0	130	----
		chromium, total	7440-47-3	E420	0.400 mg/L	0.4 mg/L	100	70.0	130	----
		copper, total	7440-50-8	E420	0.197 mg/L	0.2 mg/L	98.6	70.0	130	----
		iron, total	7439-89-6	E420	20.0 mg/L	20 mg/L	99.9	70.0	130	----
		lead, total	7439-92-1	E420	0.191 mg/L	0.2 mg/L	95.7	70.0	130	----
		magnesium, total	7439-95-4	E420	ND mg/L	10 mg/L	ND	70.0	130	----
		manganese, total	7439-96-5	E420	ND mg/L	0.2 mg/L	ND	70.0	130	----
		potassium, total	7440-09-7	E420	41.4 mg/L	40 mg/L	104	70.0	130	----
		selenium, total	7782-49-2	E420	0.402 mg/L	0.4 mg/L	100	70.0	130	----
		sodium, total	7440-23-5	E420	21.2 mg/L	20 mg/L	106	70.0	130	----
		uranium, total	7440-61-1	E420	0.0382 mg/L	0.04 mg/L	95.6	70.0	130	----
		zinc, total	7440-66-6	E420	4.08 mg/L	4 mg/L	102	70.0	130	----



Sub-Matrix: **Water**

					<i>Matrix Spike (MS) Report</i>					
					<i>Spike</i>		<i>Recovery (%)</i>	<i>Recovery Limits (%)</i>		
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>Concentration</i>	<i>Target</i>	<i>MS</i>	<i>Low</i>	<i>High</i>	<i>Qualifier</i>
Volatile Organic Compounds (QCLot: 471655)										
RG2200361-001	Anonymous	benzene	71-43-2	E611A	107 µg/L	100 µg/L	107	70.0	130	----
		ethylbenzene	100-41-4	E611A	102 µg/L	100 µg/L	102	70.0	130	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	109 µg/L	100 µg/L	109	70.0	130	----
		styrene	100-42-5	E611A	97.8 µg/L	100 µg/L	97.8	70.0	130	----
		toluene	108-88-3	E611A	100 µg/L	100 µg/L	100	70.0	130	----
		xylene, m+p-	179601-23-1	E611A	206 µg/L	200 µg/L	103	70.0	130	----
		xylene, o-	95-47-6	E611A	103 µg/L	100 µg/L	103	70.0	130	----
Volatile Organic Compounds [THMs] (QCLot: 471544)										
CG2204859-001	Anonymous	bromodichloromethane	75-27-4	E611B	99.4 µg/L	100 µg/L	99.4	70.0	130	----
		bromoform	75-25-2	E611B	96.2 µg/L	100 µg/L	96.2	70.0	130	----
		chloroform	67-66-3	E611B	97.9 µg/L	100 µg/L	97.9	70.0	130	----
		dibromochloromethane	124-48-1	E611B	87.0 µg/L	100 µg/L	87.0	70.0	130	----



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Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

COC Number: 20-997758

Page 1 of 1

Contact and company name below will appear on the final report

Reports / Recipients

Turnaround Time (TAT) Requested

Analysis Re

Environmental Division
Vancouver
Work Order Reference
VA22A8586

Telephone: +1 604 263 4188



Report To: KEATS USD CONST
Company: SCOTT BENSON
Contact: 604 240 7561
Company address below will appear on the final report
Street:
City/Province:
Postal Code:
Invoice To: Same as Report To YES NO
Copy of Invoice with Report YES NO
Company:
Contact:
ALS Account # / Quote #:
Job #:
PO / AFE: BRITANNIA WATER
LSD:
ALS Lab Work Order # (ALS use only):

Select Report Format: PDF EXCEL EDD (DIGITAL)
Merge QC/QCI Reports with COA YES NO N/A
 Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: EMAIL MAIL FAX
Email 1 or Fax: SCOTT @ KICAS.CO
Email 2: REPORT @ KICAS.CO
Email 3: BENWICKI @ SRA.BC.CA
Invoice Recipients
Select Invoice Distribution: EMAIL MAIL FAX
Email 1 or Fax: KIM @ KICAS.CO
Email 2: ADMIN @ KICAS.CO
Oil and Gas Required Fields (client use)
AFE/COS Center: PO#
Major/Minor Code: Routing Code:
Requisitioner: Location:
ALS Contact: Sampler: SB.

Routing (R) if received by 3pm M-F - no surcharges apply
 4 day (R4) if received by 3pm M-F - 20% rush surcharge minimum
 3 day (R3) if received by 3pm M-F - 25% rush surcharge minimum
 2 day (R2) if received by 3pm M-F - 50% rush surcharge minimum
 1 day (R1) if received by 3pm M-F - 100% rush surcharge minimum
Same day (E) if received by 10am M-S - 200% rush surcharge. Adult may apply to rush requests on weekends, statutory holidays and non-ro
Date and Time Required for all ESP TATs:
For all tests with rush TATs requested, please e
Indicate Filled (F), Preserved (P) or Filled and
Analysis Re

Table with columns: ALS Sample # (ALS use only), Sample Identification and/or Coordinates (This description will appear on the report), Date (dd-mm-yy), Time (hh:mm), Sample Type, NUMBER OF CONTAINERS

Table with columns: NUMBER OF CONTAINERS, D.WATER PKG, THM, BTX, SAMPLES ON HOLD, EXTENDED STORAGE REQUIREMENT, SUSPECTED HAZARD (see note)

Drinking Water (DW) Samples (client use)
Are samples taken from a Regulated DW System? YES NO
Are samples for human consumption/ use? YES NO
Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)
RANCIAL DRINKING WATER (NO GACF)
SHIPMENT RELEASE (client use)
Released by: BENSON Date: 22 APR 22 Time: 11:55
INITIAL SHIPMENT RECEPTION (ALS use only)
Received by: Date: Date: Date: Time: Time: Time: Time:
WHITE - LABORATORY COPY YELLOW - CLIENT COPY

SAMPLE RECEIPT DETAILS (ALS use only)
Cooling Method: NONE ICE ICE PACKS FROZEN COOLING INITIATED
Submission Comments identified on Sample Receipt Notification: YES NO
Cooler Custody Seals Intact: YES N/A Sample Custody Seals Intact: YES N/A
INITIAL COOLER TEMPERATURES °C: FINAL COOLER TEMPERATURES °C:
INITIAL SHIPMENT RECEPTION (ALS use only)
Received by: Date: 20 Apr 22 Time: 12:55 PM
ALS RECEIPT

ALS RECEIPT