ALS Canada Ltd.

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CERTIFICATE OF ANALYSIS (GUIDELINE EVALUATION)

Work Order	: **VA22C6618**	Page	: 1 of 3
Client	: **Vancouver School Board**	Laboratory	: Vancouver - Environmental
Contact	: Stephen Thomas	Account Manager	: Tasnia Tarannum
Address	: 1549 Clark Drive Vancouver BC Canada V5L 3L4	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Britannia Secondary	Date Samples Received	: 02-Nov-2022 14:48
PO	: ----	Date Analysis Commenced	: 09-Nov-2022
C-O-C number	: 20-1016772	Issue Date	: 14-Nov-2022 22:03
Sampler	: R.Lemay		
Site	: ----		
Quote number	: ----		
No. of samples received	: 11		
No. of samples analysed	: 11		

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
- Guideline Comparison

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*
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia

No Breaches Found

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.

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guidelines are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Key : LOR: Limit of Reporting (detection limit).

Unit	*Description*
mg/L	milligrams per litre

>: greater than.
<: less than.
Red shading is applied where the result is greater than the Guideline Upper Limit or the result is lower than the Guideline Lower Limit.
For drinking water samples, Red shading is applied where the result for E.coli, fecal or total coliforms is greater than or equal to the Guideline Upper Limit.

Analytical Results Evaluation

Matrix:	Client sample ID	----	----	----	----	----	----	----
	Sampling date/time	----	----	----	----	----	----	----
	Sub-Matrix	----		----	----	----	----	----
Analyte *CAS Number*	*Unit*	----	----	----	----	----	----	----
	-							

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

lead, total	7439-92-1	mg/L								

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QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA22C6618**	Page	: 1 of 6
Client	: **Vancouver School Board**	Laboratory	: Vancouver - Environmental
Contact	: Stephen Thomas	Account Manager	: Tasnia Tarannum
Address	: 1549 Clark Drive Vancouver BC Canada V5L 3L4	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Britannia Secondary	Date Samples Received	: 02-Nov-2022 14:48
PO	: ----	Issue Date	: 14-Nov-2022 22:03
C-O-C number	: 20-1016772		
Sampler	: R.Lemay		
Site	: ----		
Quote number	: ----		
No. of samples received	: 11		
No. of samples analysed	: 11		

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)

- No Analysis Holding Time Outliers exist.

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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Total Metals : Total metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Corr. 136 Rm. 141 S.S.D.F	E420	02-Nov-2022	09-Nov-2022	----	----		11-Nov-2022	180 days	9 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Corr. 226 Rm. 216 B.F	E420	02-Nov-2022	09-Nov-2022	----	----		11-Nov-2022	180 days	9 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Corr. 245 Rm. 220 S.S.D.F	E420	02-Nov-2022	09-Nov-2022	----	----		11-Nov-2022	180 days	9 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Corr. 245 Rm. 244 B.F	E420	02-Nov-2022	09-Nov-2022	----	----		11-Nov-2022	180 days	9 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Corr. 327 Rm. 325 S.S.D.F	E420	02-Nov-2022	09-Nov-2022	----	----		11-Nov-2022	180 days	9 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Corr. 330 Rm. 331 S.S.D.F	E420	02-Nov-2022	09-Nov-2022	----	----		11-Nov-2022	180 days	9 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Corr. 330 Rm. 3346 D.F	E420	02-Nov-2022	09-Nov-2022	----	----		11-Nov-2022	180 days	9 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Total Metals : Total metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Rm. 138 Girls change room S.S.D.F	E420	02-Nov-2022	09-Nov-2022	----	----		11-Nov-2022	180 days	9 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Rm. 203A Bubbler	E420	02-Nov-2022	09-Nov-2022	----	----		11-Nov-2022	180 days	9 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Rm. 203B Bubbler	E420	02-Nov-2022	09-Nov-2022	----	----		11-Nov-2022	180 days	9 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Rm. 213 Bubbler	E420	02-Nov-2022	09-Nov-2022	----	----		11-Nov-2022	180 days	9 days	✓

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

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

Matrix: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Total metals in Water by CRC ICPMS	E420	733966	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Total metals in Water by CRC ICPMS	E420	733966	1	20	5.0	5.0	✓
Method Blanks (MB)							
Total metals in Water by CRC ICPMS	E420	733966	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Total metals in Water by CRC ICPMS	E420	733966	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
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.

QUALITY CONTROL REPORT

Work Order	: **VA22C6618**	Page	: 1 of 3
Client	: Vancouver School Board	Laboratory	: Vancouver - Environmental
Contact	: Stephen Thomas	Account Manager	: Tasnia Tarannum
Address	: 1549 Clark Drive Vancouver BC Canada V5L 3L4	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	:	Telephone	: +1 604 253 4188
Project	: Britannia Secondary	Date Samples Received	: 02-Nov-2022 14:48
PO	: ----	Date Analysis Commenced	: 09-Nov-2022
C-O-C number	: 20-1016772	Issue Date	: 14-Nov-2022 22:03
Sampler	: R.Lemay ----		
Site	: ----		
Quote number	: ----		
No. of samples received	: 11		
No. of samples analysed	: 11		

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Laboratory Department*
Robin Weeks	Team Leader - Metals	Vancouver Metals, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

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

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Total Metals (QC Lot: 733966)											
VA22C6598-001	Anonymous	lead, total	7439-92-1	E420	0.000500	mg/L	<0.000500	<0.000500	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
Total Metals (QCLot: 733966)						
lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----

Laboratory Control Sample (LCS) Report

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

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 733966)									
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	109	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 (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 733966)										
VA22C6598-002	Anonymous	lead, total	7439-92-1	E420	0.0203 mg/L	0.02 mg/L	101	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

COC Number: 20 - 1016772

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Page of

Report To	Contact and company name below will appear on the final report
Company:	Vancouver School Board
Contact:	Stephen Thomas
Phone:	604 713-5637
	Company address below will appear on the final report
Street:	1549 Clark Drive
City/Province:	Vancouver B.C.
Postal Code:	
Invoice To	Same as Report To ☒ YES ☐ NO
	Copy of invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Reports / Recipients

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: sthomas@vsb.bc.ca

Email 2: ccarvell@vsb.bc.ca

Email 3: jdyung@vsb.bc.ca

Invoice Recipients

Select Invoice Distribution: ☒ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax:

Email 2:

Turnaround Time (TAT) Requested

☒ Routine [R] if received by 3pm M-F - no surcharges apply

☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum

☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum

☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum

☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum

☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm am/pm

For all tests with rush TATs requested, please contact your AM to confirm availability.

Project Information

ALS Account # / Quote #:

Job #: Britannia Secondary

PO / AFE:

LSD:

ALS Lab Work Order # (ALS use only): 6618

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#:

Major/Minor Code: Routing Code:

Requisitioner:

Location:

ALS Contact: T. Taramnum Sampler: R. Lemay

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)		Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Lead	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
1	Rm. 138 Girls change room	S.S.D.F	02-11-22	7:31	water					
2	Corr. 136 Rm. 141	S.S.D.F	02-11-22	7:36	water					
3	Corr 245 Rm. 220	S.S.D.F	02-11-22	7:43	water					
4	Corr. 245 Rm. 244	B.F.	02-11-22	7:47	water					
5	Corr. 330 Rm. 334b	D.F.	02-11-22	7:53	water					
6	Corr. 330 Rm. 331	S.S.D.F.	02-11-22	7:56	water					
7	Corr. 226 Rm. 216	B.F.	02-11-22	8:02	water					
8	Corr. 327 Rm. 325	S.S.D.F.	02-11-22	8:08	water					
9	Rm. 213	Bubbler	02-11-22	8:13	water					
10	Rm. 203A	Bubbler	02-11-22	8:18	water					
11	Rm. 203 B	Bubbler	02-11-22	8:23	water					

Environmental Division
Vancouver
Work Order Reference
VA22C6618

Telephone : +1 604 253 4188

Drinking Water (DW) Samples[1] (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)

No preservatives added

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			
			7			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (ALS use only)			FINAL SHIPMENT RECEPTION (ALS use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by: JC	Date: 2 Nov 22	Time: 14:48

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

White Paper Co. 604 951-3900