## **ALS Canada Ltd.**

Contact

Sampler



## **CERTIFICATE OF ANALYSIS (GUIDELINE EVALUATION)**

**Work Order** : **VA22C9955** Page : 1 of 3

Client : Vancouver School Board : Vancouver - Environmental

Address : 1549 Clark Drive Address : 8081 Lougheed Highway

Clark Drive . 6061 Lougheed Highway

Vancouver BC Canada V5L 3L4 Burnaby, British Columbia Canada V5A 1W9

**Account Manager** 

: Tasnia Tarannum

Telephone : ---- Telephone : +1 604 253 4188

Project : L'Ecole Bilinge Elementary Date Samples Received : 09-Dec-2022 14:48

PO Date Analysis Commenced : 12-Dec-2022

C-O-C number : 20-1038007 | Issue Date : 13-Dec-2022 09:31

Site : ---Quote number : ---No. of samples received : 3
No. of samples analysed : 3

: R. Lemay

: Stephen Thomas

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

Kim Jensen Department Manager - Metals Metals, Burnaby, British Columbia

Page : 2 of 3 Work Order · VA22C9955

Client : Vancouver School Board
Project : L'Ecole Bilinge Elementary



#### 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

<sup>&</sup>gt;: greater 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.

<sup>&</sup>lt;: less than.

Page

3 of 3 VA22C9955 Work Order

Client Vancouver School Board L'Ecole Bilinge Elementary Project



## Analytical Results Evaluation

Matrix:	Client sample ID				 	 
S				 	 	
	Sub-Matrix				 	 
Analyte CAS Nun	ber Unit				 	 
	-					
Please refer to the General Comments section for an explanation of	any qualifiers det	ected.				
lead, total	7439-92-1	mg/L				



## **QUALITY CONTROL INTERPRETIVE REPORT**

**Work Order** : **VA22C9955** Page : 1 of 5

Client : Vancouver School Board Laboratory : Vancouver - Environmental

Contact : Stephen Thomas Account Manager : Tasnia Tarannum

Address :1549 Clark Drive Address :8081 Lougheed Highway

Burnaby, British Columbia Canada V5A 1W9

Telephone :---- Telephone :+1 604 253 4188

Project :L'Ecole Bilinge Elementary Date Samples Received :09-Dec-2022 14:48

PO : ---- Issue Date : 13-Dec-2022 09:30

C-O-C number : 20-1038007
Sampler : R. Lemay

Site :---Quote number :---No. of samples received :3
No. of samples analysed :3

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.

Vancouver BC Canada V5L 3L4

**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.

Page : 3 of 5 Work Order · VA22C9955

Client : Vancouver School Board
Project : L'Ecole Bilinge Elementary



## **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

							roraning time exteet			Troiding Tim
Analyte Group	Method	Sampling Date	Ext	raction / Pr	eparation			Analys	sis	
Container / Client Sample ID(s)			Preparation	Holding	Holding Times Eval		Analysis Date	Holding Times		Eval
			Date	Rec	Actual			Rec	Actual	
Total Metals : Total metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
Corr. 101 Rm. 151 Bottle Filler	E420	09-Dec-2022	12-Dec-2022				13-Dec-2022	180	4 days	✓
								days		
Total Metals : Total metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
Corr. 101 Rm. 151 S.S.D.F	E420	09-Dec-2022	12-Dec-2022				13-Dec-2022	180	4 days	✓
								days		
Total Metals : Total metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
Corr. 202 Rm. 204 Bottle Filler	E420	09-Dec-2022	12-Dec-2022				13-Dec-2022	180	4 days	✓
								days		

#### **Legend & Qualifier Definitions**

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

Page : 4 of 5 Work Order : VA22C9955

Client : Vancouver School Board
Project : L'Ecole Bilinge Elementary



## **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			Co	ount		Frequency (%)					
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation				
Laboratory Duplicates (DUP)											
Total metals in Water by CRC ICPMS	E420	774594	1	17	5.8	5.0	✓				
Laboratory Control Samples (LCS)											
Total metals in Water by CRC ICPMS	E420	774594	1	17	5.8	5.0	✓				
Method Blanks (MB)											
Total metals in Water by CRC ICPMS	E420	774594	1	17	5.8	5.0	✓				
Matrix Spikes (MS)											
Total metals in Water by CRC ICPMS	E420	774594	1	17	5.8	5.0	✓				

Page : 5 of 5 Work Order : VA22C9955

Client : Vancouver School Board
Project : L'Ecole Bilinge Elementary



## **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	Water	EPA 200.2/6020B	Water samples are digested with nitric and hydrochloric acids, and analyzed by
			(mod)	Collision/Reaction Cell ICPMS.
	Vancouver -			
	Environmental			Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered
				by this method.

## **ALS Canada Ltd.**



## **QUALITY CONTROL REPORT**

**Work Order** :VA22C9955

Client : Vancouver School Board

: Stephen Thomas Contact Address

: 1549 Clark Drive

Vancouver BC Canada V5L 3L4

**Project** : L'Ecole Bilinge Elementary

PO

C-O-C number :20-1038007 Sampler :R. Lemay

Site Quote number No. of samples received : 3 No. of samples analysed : 3 Page : 1 of 3

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 :09-Dec-2022 14:48

**Date Analysis Commenced** :12-Dec-2022

Issue Date :13-Dec-2022 09:30

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

Telephone

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

Kim Jensen Department Manager - Metals Vancouver Metals, Burnaby, British Columbia Page : 2 of 3 Work Order : VA22C9955

Client : Vancouver School Board
Project : L'Ecole Bilinge Elementary



#### **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 Lo	t: 774594)												
VA22C9897-002	Anonymous	lead, total	7439-92-1	E420	0.000050	mg/L	0.000156	0.000153	0.000003	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 Me	lethod	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 774594)						
lead, total	7439-92-1 E4	420	0.00005	mg/L	<0.000050	

Page: 3 of 3

Work Order: VA22C9955

Client : Vancouver School Board
Project : L'Ecole Bilinge Elementary



## 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: 774594)									
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	97.0	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.

	1 (	1 / / /	,	, 3						
Sub-Matrix: Water							Matrix Spi	ke (MS) Report		
					Spi	ike	Recovery (%)	Recovery	Limits (%)	
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QC	Lot: 774594)									
VA22C9897-003	Anonymous	lead, total	7439-92-1	E420	0.0184 mg/L	0.02 mg/L	92.2	70.0	130	

ALS www.alsglobal.c

Canada Toll Free: 1 800 668 9878

COC Number: 20 - 1038007

Page

of

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Street:	1549 Clark Drive			55thomas@	vsb b c		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						d fees	W. (**)		(ALS US	e omy	b.	*			
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## **Results Summary VA22C9955**

**Project** L'Ecole Bilinge Elementary

**Report To** Stephen Thomas, Vancouver School Board

 Date Received
 09-Dec-2022 14:48

 Issue Date
 13-Dec-2022 09:31

Amendment 0

Client Sample ID			Corr. 101 Rm. 151 Bottle Filler	Corr. 101 Rm. 151 S.S.D.F	Corr. 202 Rm. 204 Bottle Filler
Date Sampled			09-Dec-2022	09-Dec-2022	09-Dec-2022
Time Sampled			07:28	07:29	07:33
ALS Sample ID			VA22C9955-001	VA22C9955-002	VA22C9955-003
Analyte	Lowest Detection Limit	Units	Sub-Matrix: Water	Sub-Matrix: Water	Sub-Matrix: Water
Total Metals (Matrix: Water)					
lead, total	0.000050	mg/L	<0.000050	<0.000050	<0.000050