## **ALS Canada Ltd.**



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

: VA23A2411 **Work Order** Page : 1 of 3

Client Laboratory : Vancouver - Environmental : Vancouver School Board

Contact : Stephen Thomas **Account Manager** : Tasnia Tarannum Address

: 1549 Clark Drive Address : 8081 Lougheed Highway

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

Telephone : ----Telephone : +1 604 253 4188 Project : Lord Nelson Elementary **Date Samples Received** : 01-Feb-2023 14:55

**Date Analysis Commenced** : 03-Feb-2023 PO

: 03-Feb-2023 20:25 C-O-C number : 866751 Issue Date : K. Messamore Sampler

Site

Quote number : Standing Offer No. of samples received : 12

No. of samples analysed : 12

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 Page : 2 of 3 Work Order : VA23A2411

Client : Vancouver School Board
Project : Lord Nelson 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 Work Order : VA23A2411

Client : Vancouver School Board
Project : Lord Nelson Elementary



## Analytical Results Evaluation

Matrix:	Client sample ID				 	 	
	Samplii	ng date/time			 	 	
		Sub-Matrix			 	 	
Analyte	CAS Number Unit				 	 	
		-					
Please refer to the General Comments section for	or an explanation of any q	ualifiers dete	cted.		_		
Lead, total	7	439-92-1	mg/L				



## **QUALITY CONTROL INTERPRETIVE REPORT**

**Work Order** :VA23A2411 Page : 1 of 6

Client Vancouver School Board Laboratory : Vancouver - Environmental

Contact Stephen Thomas **Account Manager** : Tasnia Tarannum

Address Address : 1549 Clark Drive : 8081 Lougheed Highway

Burnaby, British Columbia Canada V5A 1W9

Telephone Telephone : +1 604 253 4188 : Lord Nelson Elementary Project **Date Samples Received** : 01-Feb-2023 14:55

PO Issue Date : 03-Feb-2023 20:25 C-O-C number

Sampler : K. Messamore

Vancouver BC Canada V5L 3L4

:866751

: Standing Offer

Site

No. of samples received :12 No. of samples analysed :12

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

Quote number

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.

Page : 3 of 6 Work Order : VA23A2411

Client : Vancouver School Board
Project : Lord Nelson 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: x = Holding time exceedance	e; ✓ = Within Holding Time
---------------	---	----------------------------

Analyte Group	Method	Sampling Date	Ext	traction / Pr	eparation			Analy	sis	
Container / Client Sample ID(s)			Preparation	Holding	g Times	Eval	Analysis Date	Holdin	g Times	Eval
			Date	Rec	Actual			Rec	Actual	
Total Metals : Total metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Commons 117 RM 120 Bubbler	E420	01-Feb-2023	03-Feb-2023				03-Feb-2023	180 days	2 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Commons 117 RM 123 Bubbler	E420	01-Feb-2023	03-Feb-2023				03-Feb-2023	180 days	2 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Commons 126 RM 128 Bubbler	E420	01-Feb-2023	03-Feb-2023				03-Feb-2023	180 days	2 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Commons 126 RM 131 Bubbler	E420	01-Feb-2023	03-Feb-2023				03-Feb-2023	180 days	2 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Commons 212 RM 214 Bubbler	E420	01-Feb-2023	03-Feb-2023				03-Feb-2023	180 days	2 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Commons 212 RM 217 Bubbler	E420	01-Feb-2023	03-Feb-2023				03-Feb-2023	180 days	2 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Commons 220 RM 222 Bubbler	E420	01-Feb-2023	03-Feb-2023				03-Feb-2023	180 days	2 days	✓

Page : 4 of 6 Work Order : VA23A2411

Client : Vancouver School Board
Project : Lord Nelson Elementary



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

Analyte Group	Method	Sampling Date	Ext	raction / Pr	eparation			Analys	sis	
Container / Client Sample ID(s)			Preparation	Holding	Holding Times Eval		Analysis Date	Analysis Date Holding Times		Eval
			Date	Rec	Actual			Rec	Actual	
Total Metals : Total metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Commons 220 RM 225 Bubbler	E420	01-Feb-2023	03-Feb-2023				03-Feb-2023	180 days	2 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Commons 228 RM 231 Bubbler	E420	01-Feb-2023	03-Feb-2023				03-Feb-2023	180 days	2 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Commons 228 RM 234 Bubbler	E420	01-Feb-2023	03-Feb-2023				03-Feb-2023	180 days	2 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE - total (lab preserved)  Corr 102 RM 109 Bottle filler	E420	01-Feb-2023	03-Feb-2023				03-Feb-2023	180 days	2 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE - total (lab preserved) RM 306 Bubbler	E420	01-Feb-2023	03-Feb-2023				03-Feb-2023	180 days	2 days	✓

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

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

Page : 5 of 6 Work Order : VA23A2411

Client : Vancouver School Board Project : Lord Nelson 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 specificat												
Quality Control Sample Type			Co	unt	Frequency (%)								
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation						
Laboratory Duplicates (DUP)													
Total metals in Water by CRC ICPMS	E420	822192	1	20	5.0	5.0	✓						
Laboratory Control Samples (LCS)													
Total metals in Water by CRC ICPMS	E420	822192	1	20	5.0	5.0	✓						
Method Blanks (MB)													
Total metals in Water by CRC ICPMS	E420	822192	1	20	5.0	5.0	✓						
Matrix Spikes (MS)													
Total metals in Water by CRC ICPMS	E420	822192	1	20	5.0	5.0	✓						

Page : 6 of 6 Work Order : VA23A2411

Client : Vancouver School Board Project : Lord Nelson 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** :VA23A2411

Client : Vancouver School Board

: Stephen Thomas Contact Address

: 1549 Clark Drive

Vancouver BC Canada V5L 3L4

Telephone

**Project** : Lord Nelson Elementary

PO :----C-O-C number :866751

Sampler : K. Messamore

Site

Quote number : Standing Offer

No. of samples received : 12 No. of samples analysed : 12 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 :01-Feb-2023 14:55

**Date Analysis Commenced** :03-Feb-2023

Issue Date :03-Feb-2023 20:25

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 Page : 2 of 3 Work Order : VA23A2411

Client : Vancouver School Board
Project : Lord Nelson 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	ub-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: 822192)													
VA23A2391-001	Anonymous	Lead, total	7439-92-1	E420	0.000050	mg/L	0.000210	0.000213	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	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 822192)						
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	

Page : 3 of 3 Work Order : VA23A2411

Client : Vancouver School Board
Project : Lord Nelson 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						Low	High	Qualifier	
Total Metals (QCLot: 822192)										
Lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	102	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.

Cult Matrice Water		. , , ,	,	, 3	Matrix Spike (MS) Report							
Sub-Matrix: Water					matrix Spine (ms) Report							
					Spi	ke	Recovery (%)	Recovery	Limits (%)			
Laboratory sample	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier		
ID	1 - 1	1 -		I		_						
Total Metals (QC	Lot: 822192)											
VA23A2391-002	Anonymous	Lead, total	7439-92-1	E420	0.0194 mg/L	0.02 mg/L	96.8	70.0	130			

# ALS Environmental

## Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here

 $^{1}$  coo Number: 17 -  $^{1}866751$ 

(lab use only)

Page

www.alsglobal.com Report To Contact and company name below will appear on the final report Report Format / Distribution Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply) Company: VANCOUNER PDF EXCEL EDD (DIGITAL) Regular [R] JCHOOL BOARD Select Report Format: Standard TAT if received by 3 pm - business days - no surcharges apply STEDHEN Business day [E - 100%] Contact: ) AMCHT Quality Control (QC) Report with Report 4 day [P4-20%] Phone: 634-713-5637 Compare Results to Criteria on Report - provide details below if box checked 3 day [P3-25%] Same Day, Weekend or Statutory holiday [E2 -200%] EMAIL | MAIL | FAX (Laboratory opening fees may apply) ] · Company address below will appear on the final report Select Distribution: 2 day [P2-50%] 1549 clark LINE SSTHOMAS (DUSB. Dr. CA Street Date and Time Required for all E&P TATS dd-mmm-vy hh:mm Email 1 or Fax City/Province CCARRECLIA VSB. BC. CA For tests that can not be performed according to the service level selected, you will be contacted. Vancouver Email 2 Postal Code: Email 3 JOUONGO JUB, BC.CA Analysis Request Invoice To Same as Report To YES NO Invoice Distribution Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below CONTAINERS EMAIL MAIL FAX Copy of Invoice with Report YES 🗍 NO Select Invoice Distribution: HOL Company: Email 1 or Fax Contact: Email 2 **Project Information** Oil and Gas Required Fields (client use) ZO ALS Account # / Quote # AFE/Cost Center ORD ELEMENTARY Major/Minor Code: NELSON. Routing Code: ഗ PO / AFE: Requisitioner: 9 Ш SD: Location: 귑 NUMBER Sampler: K. MESYAMES ALS Contact: T. TARINNUM ALS Lab Work Order # (lab use only): M Sample Identification and/or Coordinates Date Time ALS Sample # Sample Type (lab use only) (This description will appear on the report) (dd-mmm-vv) (hh:mm) Bulller RM 1-Feb-23 7:05 WATER 228 ê Q COMMONS RM Bubbler 1- Feb - 23 10 WATER Environmental Division 228 WATER Vancouver COMMONS Bubbler Work Order Reference COMMONS 2.7-0 RM Rubbler WATER VA23A2411 commons 220 WATER RM 222 BINPPIEL 212 RM 217 Bubble COMMONS WATER 212 214 RM Bubbler WATER commons. RM Bubble MAJEV COMMONS RM 123 COMMONS WATER COUR 102 RM 09 BOHIR FILE WATER 126 COMMON RM Babbler ヲ; WATFR 131 COMMONS R.M 7. Bubble SAMPLE CONDITION AS RECEIVED (lab use only) Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below Drinking Water (DW) Samples1 (client use) (electronic COC only) Frozen SIF Observations No Are samples taken from a Regulated DW System? ce Packs lce Cubes Custody seal intact X YES . NO Cooling Initiated preservatues Are samples for human consumption/ use? INITIAL COOLER TEMPERATURES °C FINAL COOLER TEMPERATURES OF X YES NO SHIPMENT RELEASE (client use) INITIAL SHIPMENT RECEPTION (lab use only) FINAL SHIPMENT RECEPTION (lab use only) Released by: Received by: Received by: REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - LABORATORY COPY YELLOW - CLIENT COPY

## **Results Summary VA23A2411**

Project Lord Nelson Elementary

Report To Stephen Thomas, Vancouver School Board

 Date Received
 01-Feb-2023 14:55

 Issue Date
 03-Feb-2023 20:26

Amendment

Client Sample ID			RM 306 Bubbler	Commons 228 RM 234 Bubbler	Commons 228 RM 231 Bubbler	Commons 220 RM 225 Bubbler	Commons 220 RM 222 Bubbler	Commons 212 RM 217 Bubbler	Commons 212 RM 214 Bubbler	Commons 117 RM 120 Bubbler	Commons 117 RM 123 Bubbler	Corr 102 RM 109 Bottle filler	Commons 126 RM 128 Bubbler	Commons 126 RM 131 Bubbler
Date Sampled			01-Feb-2023	01-Feb-2023	01-Feb-2023	01-Feb-2023	01-Feb-2023	01-Feb-2023	01-Feb-2023	01-Feb-2023	01-Feb-2023	01-Feb-2023	01-Feb-2023	01-Feb-2023
Time Sampled			07:05	07:10	07:12	07:14	07:16	07:25	07:26	07:30	07:31	07:35	07:38	07:39
ALS Sample ID			VA23A2411-001	VA23A2411-002	VA23A2411-003	VA23A2411-004	VA23A2411-005	VA23A2411-006	VA23A2411-007	VA23A2411-008	VA23A2411-009	VA23A2411-010	VA23A2411-011	VA23A2411-012
Analyte	Lowest Detection Limit	Units	Sub-Matrix: Water	Sub-Matrix: Water	Sub-Matrix: Water	Sub-Matrix: Water	Sub-Matrix: Water	Sub-Matrix: Water	Sub-Matrix: Water	Sub-Matrix: Water	Sub-Matrix: Water	Sub-Matrix: Water	Sub-Matrix: Water	Sub-Matrix: Water
Total Metals (Matrix: Water) Lead, total	0.000050	mg/L	0.000059	0.000096	0.000073	0.000080	0.000062	0.000055	0.000077	0.000061	<0.000050	0.000116	0.000082	0.000052