CERTIFICATE OF ANALYSIS (GUIDELINE EVALUATION)

Work Order	: **VA22A4373**	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	: V-Hill	Date Samples Received	: 02-Mar-2022 14:45
PO	: ----	Date Analysis Commenced	: 06-Mar-2022
C-O-C number	: 20-985906	Issue Date	: 07-Mar-2022 09:28
Sampler	: Robin LeMay		
Site	: ----		
Quote number	: DONT USE		
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*
Austin Wasylyshyn	Lab Analyst	Metals, Edmonton, 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.

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.

No Breaches Found

lead, total	7439-92-1	mg/L							

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA22A4373**	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	: V-Hill	Date Samples Received	: 02-Mar-2022 14:45
PO	: ----	Issue Date	: 07-Mar-2022 09:28
C-O-C number	: 20-985906		
Sampler	: Robin LeMay		
Site	: ----		
Quote number	: DONT USE		
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 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)

- 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)										
Bottle filler Corr. 146 Rm. 148 V-Hill	E420	02-Mar-2022	----	----	----		06-Mar-2022	180 days	4 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
Sink D.F. Corr. 122 R. 141 V-Hill	E420	02-Mar-2022	----	----	----		06-Mar-2022	180 days	4 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
Sink D.F. Opp. 134 V-Hill	E420	02-Mar-2022	----	----	----		06-Mar-2022	180 days	4 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
Sink D.F. Rm. 134 V-Hill	E420	02-Mar-2022	----	----	----		06-Mar-2022	180 days	4 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
Sink D.F. Rm. 139 V-Hill	E420	02-Mar-2022	----	----	----		06-Mar-2022	180 days	4 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
Sink D.F. Rm. 156 V-Hill	E420	02-Mar-2022	----	----	----		06-Mar-2022	180 days	4 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
Sink D.F. Rm. 163 V-Hill	E420	02-Mar-2022	----	----	----		06-Mar-2022	180 days	4 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)										
Sink D.F. Rm. 212 V-Hill	E420	02-Mar-2022	----	----	----		06-Mar-2022	180 days	4 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
Sink D.F. Rm. 225 V-Hill	E420	02-Mar-2022	----	----	----		06-Mar-2022	180 days	4 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
Sink D.F. Rm. 241 V-Hill	E420	02-Mar-2022	----	----	----		06-Mar-2022	180 days	4 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
Sink D.F. Rm. 252 V-Hill	E420	02-Mar-2022	----	----	----		06-Mar-2022	180 days	4 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	425140	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Total Metals in Water by CRC ICPMS	E420	425140	1	20	5.0	5.0	✓
Method Blanks (MB)							
Total Metals in Water by CRC ICPMS	E420	425140	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Total Metals in Water by CRC ICPMS	E420	425140	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 Edmonton - 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	: **VA22A4373**	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	: V-Hill	Date Samples Received	: 02-Mar-2022 14:45
PO	: ----	Date Analysis Commenced	: 06-Mar-2022
C-O-C number	: 20-985906	Issue Date	: 07-Mar-2022 09:28
Sampler	: Robin LeMay		
Site	: ----		
Quote number	: DONT USE		
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 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.

Signatories	*Position*	*Laboratory Department*
Austin Wasylyshyn	Lab Analyst	Metals, Edmonton, Alberta

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
Total Metals (QC Lot: 425140)											
VA22A4357-020	Anonymous	lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	<0.000050	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: 425140)						
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: 425140)									
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	94.7	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: 425140)										
VA22A4357-021	Anonymous	lead, total	7439-92-1	E420	0.0169 mg/L	0.02 mg/L	84.3	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

COC Number: 20 - 985906

Canada Toll Free: 1 800 668 9878

Page of

www.alsglobal.com

Environmental Division Vancouver
Work Order Reference
VA22A4373

Telephone : +1 604 253 4188

Report To	Contact and company name below will appear on the final report	Reports / Recipients	Turnaround Time (TAT) Requested
Company:	Vancouver School Board	Select Report Format: ☒ PDF ☐ EXCEL ☐ EDD (DIGITAL)	☑ Routine [R] if received by 3pm M-F - no surcharges apply
Contact:	Stephen Thomas	Merge QC/QCI Reports with COA ☐ YES ☐ NO ☐ N/A	☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimu
Phone:	604 - 713 - 5637	☐ Compare Results to Criteria on Report - provide details below if box checked	☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimu
	Company address below will appear on the final report	Select Distribution: ☒ EMAIL ☐ MAIL ☐ FAX	☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimu
Street:	1549 Clark Drive	Email 1 or Fax 55thomas@vsb.bc.ca	☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimu
City/Province:	Vancouver B.C.	Email 2 rlenay@vsb.bc.ca	☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Add
Postal Code:	V5L 3L4	Email 3 ccarrell@vsb.bc.ca	may apply to rush requests on weekends, statutory holidays and non-
Invoice To	Same as Report To ☒ YES ☐ NO	Invoice Recipients	Date and Time Required for all E&P TATs:
	Copy of Invoice with Report ☒ YES ☐ NO	Select Invoice Distribution: ☐ EMAIL ☐ MAIL ☐ FAX	For all tests with rush TATs requested, please
Company:		Email 1 or Fax	Analysis R
Contact:		Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#
Job #:	V-Hill	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (ALS use only):	AH3773	ALS Contact: T. Taramon	Sampler: R. Lenay

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 REQ	SUSPECTED HAZARD (see
	Sink D.F. Rm. 163 V-Hill	02 03 22	7:04am	water				
	Sink D.F. Rm. 156 V-Hill	02 03 22	7:07am	water				
	Bottlefiller Corr. 146 Rm. 148 V-Hill	02 03 22	7:10am	water				
	Sink D.F. Opp. 134 V-Hill	02 03 22	7:14am	water				
	Sink D.F. Corr. 122 Rm. 141 V-Hill	02 03 22	7:17am	water				
	Sink D.F. Rm. 139 V-Hill	02 03 22	7:19am	water				
	Sink DF. Rm. 134 V-Hill	02 03 22	7:22am	water				
	Sink DF Rm. 252 V-Hill	02 03 22	7:28am	water				
	Sink DF. Rm 241 V-Hill	02 03 22	7:32am	water				
	Sink DF. Rm. 225 V-Hill	02 03 22	7:35am	water				
	Sink DF. Rm. 212 V-Hill	02 03 22	7:37am	water				

Drinking Water (DW) Samples[1] (client use)	Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)
Are samples taken from a Regulated DW System? ☒ YES ☐ NO	
Are samples for human consumption/ use? ☒ YES ☐ NO	

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			
				8			

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 Mar 2022	Time: 1445

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.**

Results Summary VA22A4373

Project	V-Hill								
Report To	Stephen Thomas, Vancouver School Board								
Date Received	02-Mar-2022 14:45								
Issue Date	07-Mar-2022 09:29								
Amendment	0								
Client Sample ID			Sink D.F. Rm. 163 V-Hill	Sink D.F. Rm. 156 V-Hill	Bottle filler Corr. 146 Rm. 148 V-Hill	Sink D.F. Opp. 134 V-Hill	Sink D.F. Corr. 122 R. 141 V-Hill	Sink D.F. Rm. 139 V-Hill	Sink D.F. Rm. 134 V-Hill
Date Sampled			02-Mar-2022	02-Mar-2022	02-Mar-2022	02-Mar-2022	02-Mar-2022	02-Mar-2022	02-Mar-2022
Time Sampled			07:04	07:07	07:10	07:14	07:17	07:19	07:22
ALS Sample ID			VA22A4373-001	VA22A4373-002	VA22A4373-003	VA22A4373-004	VA22A4373-005	VA22A4373-006	VA22A4373-007
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
Total Metals (Matrix: Water)									
lead, total	0.000050	mg/L	0.000080	0.000051	0.000075	0.000151	0.00106	0.00503	0.000390

Sink D.F. Rm. 252 V-Hill	Sink D.F. Rm. 241 V-Hill	Sink D.F. Rm. 225 V-Hill	Sink D.F. Rm. 212 V-Hill
02-Mar-2022	02-Mar-2022	02-Mar-2022	02-Mar-2022
07:28	07:32	07:35	07:37
VA22A4373-008	VA22A4373-009	VA22A4373-010	VA22A4373-011
Sub-Matrix: Water	Sub-Matrix: Water	Sub-Matrix: Water	Sub-Matrix: Water
0.00780	0.000903	0.000780	0.000631