Appendix D -

Geotechnical and Chemical Testing

City of Coquitlam
Soil Testing
Johnson Street and Glen Drive, Coquitlam

Table 1 - Soil Analytical Results

Project No.: MB39458-87413 (Johnson)
December 2021

Location		CSR Schedule 3.1 AL Standard[1a]	CSR Schedule 3.1 RL_{LD} Standard[1a]	CSR Schedule 3.1 RL_{HD} Standard[1a]	CSR Schedule 3.1 CL Standard[1a]	CSR Schedule 3.1 IL Standard[1a]	P4 Estimate Metro Vancouver[1b]	DL	BH21-1
Sample Name									BH21-1-1
Sample Depth (mbgs)									0.15
Lab Sample ID									VA21C6584-001
Date Sampled									26-Nov-21
Duplicate									-
pH									6.91
Parameter	CAS								
Extractable Petroleum Hydrocarbons									
EPH_{10-19}	-	NS	NS	NS	NS	NS	N/A	200	<200
EPH_{19-32}	-	NS	NS	NS	NS	NS	N/A	200	<200
LEPHs	-	1,000	1,000	1,000	2,000	2,000	N/A	200	<200
HEPHs	-	1,000	1,000	1,000	5,000	5,000	N/A	200	<200
Volatile Petroleum Hydrocarbons									
VH_{6-10}	-	NS	NS	NS	NS	NS	N/A	10	<10
VPHs	-	200	200	200	200	200	N/A	10	<10
Polycyclic Aromatic Hydrocarbons									
Acenaphthene	83-32-9	950	950	2,000	15,000	15,000	N/A	0.0050	<0.0050
Acenaphthylene	208-96-8	NS	NS	NS	NS	NS	N/A	0.0050	<0.0050
Acridine	260-94-6	NS	NS	NS	NS	NS	N/A	0.010	<0.010
Anthracene	120-12-7	2.54	2.54	304	304	304	N/A	0.0040	<0.0040
Benz(a)anthracene	56-55-3	0.1	1	10	10	10	N/A	0.010	<0.010
Benzo(a)pyrene	50-32-8	5[6]	5[6]	10[6]	30[6]	50[6]	N/A	0.010	<0.010
Benzo(b+j)fluoranthenes	-	0.1	1	10	10	10	N/A	0.010	<0.010
Benzo(b+j+k)fluoranthenes	-	NS	NS	NS	NS	NS	N/A	0.015	<0.015
Benzo(g,h,i)perylene	191-24-2	NS	NS	NS	NS	NS	N/A	0.010	<0.010
Benzo(k)fluoranthene	207-08-9	0.1	1	10	10	10	N/A	0.010	<0.010
Chrysene	218-01-9	200	200	400	4,500	4,500	N/A	0.010	<0.010
Dibenz(a,h)anthracene	53-70-3	0.1	1	10	10	10	N/A	0.0050	<0.0050
Fluoranthene	206-44-0	50[4]	50[4]	200[4]	200[4]	200[4]	N/A	0.010	<0.010
Fluorene	86-73-7	600	600	1,000	9,500	9,500	N/A	0.010	<0.010
Indeno(1,2,3-c,d)pyrene	193-39-5	0.1	1	10	10	10	N/A	0.010	<0.010
Methylnaphthalene, 1-	90-12-0	250	250	500	1,000	1,000	N/A	0.010	<0.010
Methylnaphthalene, 2-	91-57-6	60	60	100	950	950	N/A	0.010	<0.010
Naphthalene	91-20-3	0.6[6]	0.6[6]	20[6]	20[6]	20[6]	N/A	0.010	<0.010
Phenanthrene	85-01-8	0.1	5	50	50	50	N/A	0.010	<0.010
Pyrene	129-00-0	0.1	10	100	100	100	N/A	0.010	<0.010
Quinoline	91-22-5	2.5	2.5	4.5	10	10	N/A	0.010	<0.010
B(a)P total potency equivalents [B(a)P TPE]	-	NS	NS	NS	NS	NS	N/A	0.020	<0.020
IACR (CCME)	-	NS	NS	NS	NS	NS	N/A	0.150	<0.150
BTEXS, MTBE									
Benzene	71-43-2	0.035[5]	0.035[5]	0.035[5]	0.035[5]	0.035[5]	N/A	0.0050	<0.0050
Ethylbenzene	100-41-4	15[5]	15[5]	15[5]	15[5]	15[5]	N/A	0.015	<0.015
Methyl tert-butyl ether [MTBE]	1634-04-4	4,000	4,000	8,000	20,000	20,000	N/A	0.20	<0.200
Styrene	100-42-5	0.1	5	50	50	50	N/A	0.050	<0.050
Toluene	108-88-3	0.5[7]	0.5[7]	0.5[7]	0.5[7]	0.5[7]	N/A	0.050	<0.050
Xylene, meta- & para-	-	NS	NS	NS	NS	NS	N/A	0.050	<0.050
Xylene, ortho-	95-47-6	NS	NS	NS	NS	NS	N/A	0.050	<0.050
Xylenes, total	1330-20-7	6.5[5]	6.5[5]	6.5[5]	6.5[5]	6.5[5]	N/A	0.075	<0.075
Metals									
Aluminum	7429-90-5	40,000	40,000	40,000	250,000	250,000	35,000	50	10,500
Antimony	7440-36-0	20	20	40	40	40	4	0.10	0.13
Arsenic	7440-38-2	10[5]	10[5]	10[5]	10[5]	10[5]	8.5	0.10	1.89
Barium	7440-39-3	350[5]	350[5]	350[5]	350[5]	350[5]	90	0.50	50.5
Beryllium	7440-41-7	pH <6.5 = 1[7] pH 6.5 - <7.0 = 4[7] pH 7.0 - <7.5 = 30[7] 85[6]	pH <6.5 = 1[7] pH 6.5 - <7.0 = 4[7] pH 7.0 - <7.5 = 30[7] 85[6]	pH <6.5 = 1[7] pH 6.5 - <7.0 = 4[7] pH 7.0 - <7.5 = 30[7] 150[6]	pH ≤6.5 = 1[7] pH 6.5 - <7.0 = 4[7] pH 7.0 - <7.5 = 30[7] pH 7.5 - <8.0 = 250[7] 350[4]	pH ≤6.5 = 1[7] pH 6.5 - <7.0 = 4[7] pH 7.0 - <7.5 = 30[7] pH 7.5 - <8.0 = 250[7] 350[4]	0.7	0.10	0.14
Bismuth	7440-69-9	NS	NS	NS	NS	NS	NS	0.20	<0.20
Boron (SALM)	7440-42-8	8,500	8,500	15,000	50,000	NS	1	5.0	<5.0
Cadmium	7440-43-9	pH <7.0 = 1[5] pH 7.0 - <7.5 = 3[7] 10[8]	pH ≤7.0 = 1[5] pH 7.0 - <7.5 = 3[7] 20[4]	pH ≤7.0 = 1[5] pH 7.0 - <7.5 = 3[7] pH 7.5 - <8.0 = 20[7] 40[6]	pH ≤7.0 = 1[5] pH 7.0 - <7.5 = 3[7] pH 7.5 - <8.0 = 20[7] pH ≥ 8.0 = 50[7]	pH ≤7.0 = 1[5] pH 7.0 - <7.5 = 3[7] pH 7.5 - <8.0 = 20[7] pH ≥ 8.0 = 50[7]	0.4	0.020	0.052
Calcium	7440-70-2	NS	NS	NS	NS	NS	NS	50	3,950
Chromium, total	7440-47-3	60[8]	100[6]	250[4]	250[4]	250[4]	50	0.50	11.7
Cobalt	7440-48-4	25[4]	25[4]	25[4]	25[5]	25[5]	15	0.10	5.58
Copper	7440-50-8	pH <6.0 = 75[7] 150[4]	pH <6.0 = 75[7] 150[4]	pH <6.0 = 75[7] pH 6.0 - <6.5 = 150[7] 300[4]	pH <6.0 = 75[7] pH 6.0 - <6.5 = 150[7] 300[4]	pH <6.0 = 75[7] pH 6.0 - <6.5 = 150[7] 300[4]	150	0.50	13.8
Iron	7439-89-6	35,000	35,000	35,000	150,000	150,000	30,000	50	16,700
Lead	7439-92-1	120[6]	120[6]	120[6]	pH <5.5 = 120[5] 150[6]	pH <5.5 = 120[5] pH 5.5 - <6.0 = 150[5] pH 6.0 - <6.5 = 800[5] 1,000[4]	300	0.50	2.3
Lithium	7439-93-2	30	30	65	450	450	NS	2.0	4.6
Magnesium	7439-95-4	NS	NS	NS	NS	NS	NS	20	5,090
Manganese	7439-96-5	2,000[4]	2,000[4]	2,000[4]	2,000[4]	2,000[4]	1,000	1.00	269
Mercury	7439-97-6	0.6[8]	10[6]	25[6]	75[4]	75[4]	0.35	0.0500	<0.0500
Molybdenum	7439-98-7	3[9]	15[5]	15[5]	15[5]	15[5]	6	0.10	0.32
Nickel	7440-02-0	pH <7.5 = 70[5] 150[4]	pH <7.5 = 70[5] 150[4]	pH <7.5 = 70[5] 250[4]	pH <7.5 = 70[5] 250[4]	pH <7.5 = 70[5] 250[4]	40	0.50	7.60
Phosphorus	7723-17-0	NS	NS	NS	NS	NS	NS	50	373
Potassium	7440-09-7	NS	NS	NS	NS	NS	NS	100	800
Selenium	7782-49-2	1[5]	1[5]	1[5]	1[5]	1[5]	4	0.20	<0.20
Silver	7440-22-4	20	20	40	40	40	1	0.10	<0.10
Sodium	7440-23-5	NS	NS	NS	NS	NS	NS	50	310
Strontium	7440-24-6	9,500	9,500	20,000	150,000	150,000	55	0.50	32.5
Sulfur	7704-34-9	NS	NS	NS	NS	NS	3,000	1,000	<1000
Thallium	7440-28-0	2	9	25	25	25	NS	0.050	<0.050
Tin	740-31-5	5	50	300	300	300	4	2.0	<2.0
Titanium	7440-32-6	NS	NS	NS	NS	NS	NS	1.0	731
Tungsten	7440-33-7	15	15	25	200	200	NS	0.50	<0.50
Uranium	7440-61-1	15[9]	30[5]	30[5]	30[5]	30[5]	NS	0.05	0.38
Vanadium	7440-62-2	100[5]	100[5]	100[5]	100[5]	100[5]	75	0.20	45.7
Zinc	7440-66-6	pH <8.0 = 150[7] 200[10]	pH <8.0 = 150[7] pH ≥8.0 = 200[7]	pH <8.0 = 150[7] pH ≥8.0 = 200[7]	pH <8.0 = 150[7] pH ≥8.0 = 200[7]	pH <8.0 = 150[7] pH ≥8.0 = 200[7]	90	2.0	31.8
Zirconium	7440-67-7	NS	NS	NS	NS	NS	NS	1.0	1.9
Salt									
Chloride ion	16887-00-6	100[5]	100[5]	100[5]	100[5]	100[5]	NS	1.0	<5.1
Sodium Ion	17341-25-2	200[4]	200[4]	200[4]	1,000[4]	1,000[4]	NS	1.00	1.13

Notes:

1(a). BC Contaminated Sites Regulation (CSR) Schedule 3.1 Soil Standards, BC Reg 64/2021, dated 11 March 2021.

1(b). Protocol 4 for Contaminated Sites, Determining Background Soil Quality, Dated 13 May 2021.

2. All units are in µg/g unless otherwise specified.

3. **Definitions**

AL = Agricultural Land Use

RL_{LD} = Residential Low Density Land Use

RL_{HD} = Residential High Density Land Use

CL = Commercial Land Use

IL = Industrial Land Use

Bold number represents most stringent applicable standards.

Bold, underlined, and red concentrations exceed the applicable standards.

Bold and blue concentrations indicate parameters for which the laboratory detection limit exceeds the applicable standard.

Bold and purple concentrations exceed the applicable standards, but are less than the Protocol 4 background estimate.

DL = Laboratory detection limit.

< = Less than laboratory detection limit

- = Not analyzed

NS = No standard

N/A = Not applicable

4. Matrix Standard, "toxicity to soil invertebrates and plants", Schedule 3.1 Part 1 of CSR

5. Matrix Standard, "groundwater used for drinking water", Schedule 3.1 Part 1 of CSR

6. Matrix Standard, "intake of contaminated soil", Schedule 3.1 Part 1 of CSR

7. Matrix Standard, "groundwater flow to surface water used by aquatic life", Schedule 3.1 Part 1 of CSR

8. Matrix Standard, "livestock ingesting soil and fodder", Schedule 3.1 Part 1 of CSR

9. Matrix Standard, "groundwater used for irrigation", Schedule 3.1 Part 1 of CSR

10. Matrix Standard, "major microbial impairment", Schedule 3.1 Part 1 of CSR

Prepared By: AR
QAQC By: HZ

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **VA21C6584**	Page	: 1 of 6
Client	: **Metro Testing & Engineering Ltd.**	Laboratory	: Vancouver - Environmental
Contact	: Umaakant Narang	Account Manager	: Sneha Sansare
Address	: 401-6741 Cariboo Rd. Burnaby BC Canada V3N 4A3	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: MB39458-87413 (Johnson)	Date Samples Received	: 26-Nov-2021 16:40
PO	: ----	Date Analysis Commenced	: 07-Dec-2021
C-O-C number	: 20-938560	Issue Date	: 08-Dec-2021 18:23
Sampler	: AR		
Site	: ----		
Quote number	: Standing Offer		
No. of samples received	: 2		
No. of samples analysed	: 1		

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.

Signatories	*Position*	*Laboratory Department*
Caleb Deroche	Lab Analyst	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Paul Cushing	Team Leader - Organics	Organics, Burnaby, British Columbia
Russell Zhang		Metals, Burnaby, British Columbia

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).

Unit	*Description*
-	No Unit
%	percent
mg/kg	milligrams per kilogram
mg/L	milligrams per litre
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.

Page : 3 of 6
Work Order : VA21C6584
Client : Metro Testing & Engineering Ltd.
Project : MB39458-87413 (Johnson)

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	BH21-1-1	----	----	----	----
					Client sampling date / time	26-Nov-2021	----	----	----	----
						VA21C6584-001	--------	--------	--------	--------
						Result	----	----	----	----
Physical Tests										
% saturation	----	E141	1.0	%		25.7	----	----	----	----
moisture	----	E144	0.25	%		7.85	----	----	----	----
pH (1:2 soil:water)	----	E108	0.10	pH units		6.91	----	----	----	----
Saturated Paste Extractables										
chloride, soluble ion content	16887-00-6	EC239A.Cl	1.0	mg/kg		<5.1	----	----	----	----
chloride, soluble ion content	16887-00-6	E239.Cl	20	mg/L		<20	----	----	----	----
sodium, soluble ion content	17341-25-2	EC442	1.00	mg/kg		1.13	----	----	----	----
sodium, soluble ion content	17341-25-2	E442	2.0	mg/L		4.4	----	----	----	----
Metals										
aluminum	7429-90-5	E440	50	mg/kg		10500	----	----	----	----
antimony	7440-36-0	E440	0.10	mg/kg		0.13	----	----	----	----
arsenic	7440-38-2	E440	0.10	mg/kg		1.89	----	----	----	----
barium	7440-39-3	E440	0.50	mg/kg		50.5	----	----	----	----
beryllium	7440-41-7	E440	0.10	mg/kg		0.14	----	----	----	----
bismuth	7440-69-9	E440	0.20	mg/kg		<0.20	----	----	----	----
boron	7440-42-8	E440	5.0	mg/kg		<5.0	----	----	----	----
cadmium	7440-43-9	E440	0.020	mg/kg		0.052	----	----	----	----
calcium	7440-70-2	E440	50	mg/kg		3950	----	----	----	----
chromium	7440-47-3	E440	0.50	mg/kg		11.7	----	----	----	----
cobalt	7440-48-4	E440	0.10	mg/kg		5.58	----	----	----	----
copper	7440-50-8	E440	0.50	mg/kg		13.8	----	----	----	----
iron	7439-89-6	E440	50	mg/kg		16700	----	----	----	----
lead	7439-92-1	E440	0.50	mg/kg		2.25	----	----	----	----
lithium	7439-93-2	E440	2.0	mg/kg		4.6	----	----	----	----
magnesium	7439-95-4	E440	20	mg/kg		5090	----	----	----	----
manganese	7439-96-5	E440	1.0	mg/kg		269	----	----	----	----
mercury	7439-97-6	E510	0.0500	mg/kg		<0.0500	----	----	----	----
molybdenum	7439-98-7	E440	0.10	mg/kg		0.32	----	----	----	----
nickel	7440-02-0	E440	0.50	mg/kg		7.60	----	----	----	----
phosphorus	7723-14-0	E440	50	mg/kg		373	----	----	----	----
potassium	7440-09-7	E440	100	mg/kg		800	----	----	----	----

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Work Order	: VA21C6584
Client	: Metro Testing & Engineering Ltd.
Project	: MB39458-87413 (Johnson)

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	BH21-1-1	----	----	----	----
					Client sampling date / time	26-Nov-2021	----	----	----	----
						VA21C6584-001	--------	--------	--------	--------
						Result	----	----	----	----
Metals										
selenium	7782-49-2	E440	0.20	mg/kg		<0.20	----	----	----	----
silver	7440-22-4	E440	0.10	mg/kg		<0.10	----	----	----	----
sodium	7440-23-5	E440	50	mg/kg		310	----	----	----	----
strontium	7440-24-6	E440	0.50	mg/kg		32.5	----	----	----	----
sulfur	7704-34-9	E440	1000	mg/kg		<1000	----	----	----	----
thallium	7440-28-0	E440	0.050	mg/kg		<0.050	----	----	----	----
tin	7440-31-5	E440	2.0	mg/kg		<2.0	----	----	----	----
titanium	7440-32-6	E440	1.0	mg/kg		731	----	----	----	----
tungsten	7440-33-7	E440	0.50	mg/kg		<0.50	----	----	----	----
uranium	7440-61-1	E440	0.050	mg/kg		0.382	----	----	----	----
vanadium	7440-62-2	E440	0.20	mg/kg		45.7	----	----	----	----
zinc	7440-66-6	E440	2.0	mg/kg		31.8	----	----	----	----
zirconium	7440-67-7	E440	1.0	mg/kg		1.9	----	----	----	----
Volatile Organic Compounds [Fuels]										
benzene	71-43-2	E611A	0.0050	mg/kg		<0.0050	----	----	----	----
ethylbenzene	100-41-4	E611A	0.015	mg/kg		<0.015	----	----	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.200	mg/kg		<0.200	----	----	----	----
styrene	100-42-5	E611A	0.050	mg/kg		<0.050	----	----	----	----
toluene	108-88-3	E611A	0.050	mg/kg		<0.050	----	----	----	----
xylene, m+p-	179601-23-1	E611A	0.050	mg/kg		<0.050	----	----	----	----
xylene, o-	95-47-6	E611A	0.050	mg/kg		<0.050	----	----	----	----
xylenes, total	1330-20-7	E611A	0.075	mg/kg		<0.075	----	----	----	----
Volatile Organic Compounds Surrogates										
bromofluorobenzene, 4-	460-00-4	E611A	0.10	%		75.0	----	----	----	----
difluorobenzene, 1,4-	540-36-3	E611A	0.10	%		84.0	----	----	----	----
Hydrocarbons										
EPH (C10-C19)	----	E601A	200	mg/kg		<200	----	----	----	----
EPH (C19-C32)	----	E601A	200	mg/kg		<200	----	----	----	----
VHs (C6-C10)	----	E581.VH+F1	10	mg/kg		<10	----	----	----	----
HEPHs	----	EC600A	200	mg/kg		<200	----	----	----	----
LEPHs	----	EC600A	200	mg/kg		<200	----	----	----	----
VPHs	----	EC580A	10	mg/kg		<10	----	----	----	----

Page	: 5 of 6
Work Order	: VA21C6584
Client	: Metro Testing & Engineering Ltd.
Project	: MB39458-87413 (Johnson)

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	BH21-1-1	----	----	----	----
					Client sampling date / time	26-Nov-2021	----	----	----	----
						VA21C6584-001	--------	--------	--------	--------
						Result	----	----	----	----
Hydrocarbons Surrogates										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	1.0	%		104	----	----	----	----
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%		85.2	----	----	----	----
Polycyclic Aromatic Hydrocarbons										
acenaphthene	83-32-9	E641A-L	0.0050	mg/kg		<0.0050	----	----	----	----
acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg		<0.0050	----	----	----	----
acridine	260-94-6	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
anthracene	120-12-7	E641A-L	0.0040	mg/kg		<0.0040	----	----	----	----
benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
benzo(b+j)fluoranthene	----	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
benzo(b+j+k)fluoranthene	----	E641A-L	0.015	mg/kg		<0.015	----	----	----	----
benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
chrysene	218-01-9	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg		<0.0050	----	----	----	----
fluoranthene	206-44-0	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
fluorene	86-73-7	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
naphthalene	91-20-3	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
phenanthrene	85-01-8	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
pyrene	129-00-0	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
quinoline	91-22-5	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
B(a)P total potency equivalents [B(a)P TPE]	----	E641A-L	0.020	mg/kg		<0.020	----	----	----	----
IACR (CCME)	----	E641A-L	0.150	-		<0.150	----	----	----	----
Polycyclic Aromatic Hydrocarbons Surrogates										
acridine-d9	34749-75-2	E641A-L	0.1	%		99.3	----	----	----	----
chrysene-d12	1719-03-5	E641A-L	0.1	%		91.1	----	----	----	----
naphthalene-d8	1146-65-2	E641A-L	0.1	%		89.2	----	----	----	----
phenanthrene-d10	1517-22-2	E641A-L	0.1	%		105	----	----	----	----

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

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **VA21C6584**	Page	: 1 of 15
Client	: Metro Testing & Engineering Ltd.	Laboratory	: Vancouver - Environmental
Contact	: Umaakant Narang	Account Manager	: Sneha Sansare
Address	: 401-6741 Cariboo Rd. Burnaby BC Canada V3N 4A3	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: MB39458-87413 (Johnson)	Date Samples Received	: 26-Nov-2021 16:40
PO	: ----	Date Analysis Commenced	: 07-Dec-2021
C-O-C number	: 20-938560	Issue Date	: 08-Dec-2021 17:56
Sampler	: AR		
Site	: ----		
Quote number	: Standing Offer		
No. of samples received	: 2		
No. of samples analysed	: 1		

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*
Caleb Deroche	Lab Analyst	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Paul Cushing	Team Leader - Organics	Organics, Burnaby, British Columbia
Russell Zhang		Metals, Burnaby, British Columbia

Page	: 2 of 15
Work Order	: VA21C6584
Client	: Metro Testing & Engineering Ltd.
Project	: MB39458-87413 (Johnson)

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.

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: **Soil/Solid**

					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: 361830)											
VA21C6584-001	BH21-1-1	pH (1:2 soil:water)	----	E108	0.10	pH units	6.91	6.98	1.0%	5%	----
Physical Tests (QC Lot: 361839)											
VA21C6584-001	BH21-1-1	moisture	----	E144	0.25	%	7.85	9.39	17.8%	20%	----
Saturated Paste Extractables (QC Lot: 361833)											
VA21C6584-001	BH21-1-1	chloride, soluble ion content	16887-00-6	E239.Cl	20	mg/L	<20	<20	0	Diff <2x LOR	----
Saturated Paste Extractables (QC Lot: 361834)											
VA21C6584-001	BH21-1-1	% saturation	----	E141	1.0	%	25.7	28.0	8.34%	20%	----
Saturated Paste Extractables (QC Lot: 361835)											
VA21C6584-001	BH21-1-1	sodium, soluble ion content	17341-25-2	E442	2.0	mg/L	4.4	4.2	0.1	Diff <2x LOR	----
Metals (QC Lot: 361828)											
VA21C6584-001	BH21-1-1	mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	----
Metals (QC Lot: 361829)											
VA21C6584-001	BH21-1-1	aluminum	7429-90-5	E440	50	mg/kg	10500	10900	3.48%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	0.13	0.12	0.010	Diff <2x LOR	----
		arsenic	7440-38-2	E440	0.10	mg/kg	1.89	1.92	1.42%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	50.5	56.8	11.7%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.14	0.14	0.0002	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		boron	7440-42-8	E440	5.0	mg/kg	<5.0	<5.0	0	Diff <2x LOR	----
		cadmium	7440-43-9	E440	0.020	mg/kg	0.052	0.069	0.017	Diff <2x LOR	----
		calcium	7440-70-2	E440	50	mg/kg	3950	4150	4.81%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	11.7	13.5	14.1%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	5.58	5.78	3.55%	30%	----
		copper	7440-50-8	E440	0.50	mg/kg	13.8	14.9	8.04%	30%	----
		iron	7439-89-6	E440	50	mg/kg	16700	17000	1.87%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	2.25	2.46	0.21	Diff <2x LOR	----
		lithium	7439-93-2	E440	2.0	mg/kg	4.6	5.0	0.4	Diff <2x LOR	----
		magnesium	7439-95-4	E440	20	mg/kg	5090	4650	8.95%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	269	266	1.36%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	0.32	0.30	0.02	Diff <2x LOR	----
		nickel	7440-02-0	E440	0.50	mg/kg	7.60	8.10	6.36%	30%	----

Sub-Matrix: **Soil/Solid**

					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
Metals (QC Lot: 361829) - continued											
VA21C6584-001	BH21-1-1	phosphorus	7723-14-0	E440	50	mg/kg	373	415	10.6%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	800	880	9.84%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		sodium	7440-23-5	E440	50	mg/kg	310	343	10.2%	40%	----
		strontium	7440-24-6	E440	0.50	mg/kg	32.5	35.2	7.86%	40%	----
		sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	0	Diff <2x LOR	----
		thallium	7440-28-0	E440	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tin	7440-31-5	E440	2.0	mg/kg	<2.0	<2.0	0	Diff <2x LOR	----
		titanium	7440-32-6	E440	1.0	mg/kg	731	722	1.31%	40%	----
		tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		uranium	7440-61-1	E440	0.050	mg/kg	0.382	0.435	12.9%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	45.7	48.8	6.58%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	31.8	31.8	0.0166%	30%	----
		zirconium	7440-67-7	E440	1.0	mg/kg	1.9	2.3	0.4	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 362156)											
KS2103913-001	Anonymous	benzene	71-43-2	E611A	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.015	mg/kg	<0.015	<0.015	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.200	mg/kg	<0.200	<0.200	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 361831)											
VA21C6584-001	BH21-1-1	EPH (C10-C19)	----	E601A	200	mg/kg	<200	<200	0	Diff <2x LOR	----
		EPH (C19-C32)	----	E601A	200	mg/kg	<200	<200	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 362157)											
KS2103913-001	Anonymous	VHs (C6-C10)	----	E581.VH+F1	10	mg/kg	<10	<10	0	Diff <2x LOR	----
Polycyclic Aromatic Hydrocarbons (QC Lot: 361832)											
VA21C6584-001	BH21-1-1	acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		acridine	260-94-6	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.0040	<0.0040	0	Diff <2x LOR	----
		benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----

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Work Order	: VA21C6584
Client	: Metro Testing & Engineering Ltd.
Project	: MB39458-87413 (Johnson)

Sub-Matrix: **Soil/Solid**

					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*
Polycyclic Aromatic Hydrocarbons (QC Lot: 361832) - continued											
VA21C6584-001	BH21-1-1	benzo(b+j)fluoranthene	----	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		chrysene	218-01-9	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		fluoranthene	206-44-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		fluorene	86-73-7	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		naphthalene	91-20-3	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		phenanthrene	85-01-8	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		pyrene	129-00-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		quinoline	91-22-5	E641A-L	0.010	mg/kg	<0.010	<0.010	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: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 361839)						
moisture	----	E144	0.25	%	<0.25	----
Saturated Paste Extractables (QCLot: 361833)						
chloride, soluble ion content	16887-00-6	E239.Cl	20	mg/L	<20	----
Saturated Paste Extractables (QCLot: 361834)						
% saturation	----	E141	1	%	50.0	----
Saturated Paste Extractables (QCLot: 361835)						
sodium, soluble ion content	17341-25-2	E442	2	mg/L	<2.0	----
Metals (QCLot: 361828)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 361829)						
aluminum	7429-90-5	E440	50	mg/kg	<50	----
antimony	7440-36-0	E440	0.1	mg/kg	<0.10	----
arsenic	7440-38-2	E440	0.1	mg/kg	<0.10	----
barium	7440-39-3	E440	0.5	mg/kg	<0.50	----
beryllium	7440-41-7	E440	0.1	mg/kg	<0.10	----
bismuth	7440-69-9	E440	0.2	mg/kg	<0.20	----
boron	7440-42-8	E440	5	mg/kg	<5.0	----
cadmium	7440-43-9	E440	0.02	mg/kg	<0.020	----
calcium	7440-70-2	E440	50	mg/kg	<50	----
chromium	7440-47-3	E440	0.5	mg/kg	<0.50	----
cobalt	7440-48-4	E440	0.1	mg/kg	<0.10	----
copper	7440-50-8	E440	0.5	mg/kg	<0.50	----
iron	7439-89-6	E440	50	mg/kg	<50	----
lead	7439-92-1	E440	0.5	mg/kg	<0.50	----
lithium	7439-93-2	E440	2	mg/kg	<2.0	----
magnesium	7439-95-4	E440	20	mg/kg	<20	----
manganese	7439-96-5	E440	1	mg/kg	<1.0	----
molybdenum	7439-98-7	E440	0.1	mg/kg	<0.10	----
nickel	7440-02-0	E440	0.5	mg/kg	<0.50	----
phosphorus	7723-14-0	E440	50	mg/kg	<50	----
potassium	7440-09-7	E440	100	mg/kg	<100	----
selenium	7782-49-2	E440	0.2	mg/kg	<0.20	----
silver	7440-22-4	E440	0.1	mg/kg	<0.10	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 361829) - continued						
sodium	7440-23-5	E440	50	mg/kg	<50	----
strontium	7440-24-6	E440	0.5	mg/kg	<0.50	----
sulfur	7704-34-9	E440	1000	mg/kg	<1000	----
thallium	7440-28-0	E440	0.05	mg/kg	<0.050	----
tin	7440-31-5	E440	2	mg/kg	<2.0	----
titanium	7440-32-6	E440	1	mg/kg	<1.0	----
tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	----
uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----
vanadium	7440-62-2	E440	0.2	mg/kg	<0.20	----
zinc	7440-66-6	E440	2	mg/kg	<2.0	----
zirconium	7440-67-7	E440	1	mg/kg	<1.0	----
Volatile Organic Compounds (QCLot: 362156)						
benzene	71-43-2	E611A	0.005	mg/kg	<0.0050	----
ethylbenzene	100-41-4	E611A	0.015	mg/kg	<0.015	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.04	mg/kg	<0.040	----
styrene	100-42-5	E611A	0.05	mg/kg	<0.050	----
toluene	108-88-3	E611A	0.05	mg/kg	<0.050	----
xylene, m+p-	179601-23-1	E611A	0.05	mg/kg	<0.050	----
xylene, o-	95-47-6	E611A	0.05	mg/kg	<0.050	----
Hydrocarbons (QCLot: 361831)						
EPH (C10-C19)	----	E601A	200	mg/kg	<200	----
EPH (C19-C32)	----	E601A	200	mg/kg	<200	----
Hydrocarbons (QCLot: 362157)						
VHs (C6-C10)	----	E581.VH+F1	10	mg/kg	<10	----
Polycyclic Aromatic Hydrocarbons (QCLot: 361832)						
acenaphthene	83-32-9	E641A-L	0.005	mg/kg	<0.0050	----
acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	<0.0050	----
acridine	260-94-6	E641A-L	0.01	mg/kg	<0.010	----
anthracene	120-12-7	E641A-L	0.004	mg/kg	<0.0040	----
benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	<0.010	----
benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	<0.010	----
benzo(b+j)fluoranthene	----	E641A-L	0.01	mg/kg	<0.010	----
benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	<0.010	----
benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	<0.010	----
chrysene	218-01-9	E641A-L	0.01	mg/kg	<0.010	----
dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	<0.0050	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 361832) - continued						
fluoranthene	206-44-0	E641A-L	0.01	mg/kg	<0.010	----
fluorene	86-73-7	E641A-L	0.01	mg/kg	<0.010	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	<0.010	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	<0.010	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	<0.010	----
naphthalene	91-20-3	E641A-L	0.01	mg/kg	<0.010	----
phenanthrene	85-01-8	E641A-L	0.01	mg/kg	<0.010	----
pyrene	129-00-0	E641A-L	0.01	mg/kg	<0.010	----
quinoline	91-22-5	E641A-L	0.01	mg/kg	<0.010	----

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Work Order	: VA21C6584
Client	: Metro Testing & Engineering Ltd.
Project	: MB39458-87413 (Johnson)

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: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 361830)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	99.8	95.0	105	----
Physical Tests (QCLot: 361839)									
moisture	----	E144	0.25	%	50 %	102	90.0	110	----
Saturated Paste Extractables (QCLot: 361833)									
chloride, soluble ion content	16887-00-6	E239.Cl	20	mg/L	100 mg/L	102	80.0	120	----
Saturated Paste Extractables (QCLot: 361834)									
% saturation	----	E141	1	%	100 %	102	80.0	120	----
Saturated Paste Extractables (QCLot: 361835)									
sodium, soluble ion content	17341-25-2	E442	2	mg/L	50 mg/L	101	80.0	120	----
Metals (QCLot: 361828)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	103	80.0	120	----
Metals (QCLot: 361829)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	95.8	80.0	120	----
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	105	80.0	120	----
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	98.1	80.0	120	----
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	100	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	99.9	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	96.9	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	103	80.0	120	----
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	101	80.0	120	----
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	97.0	80.0	120	----
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	95.5	80.0	120	----
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	96.8	80.0	120	----
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	95.4	80.0	120	----
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	96.0	80.0	120	----
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	98.9	80.0	120	----
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	99.1	80.0	120	----
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	104	80.0	120	----
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	98.5	80.0	120	----
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	99.4	80.0	120	----
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	96.3	80.0	120	----
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	104	80.0	120	----

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Work Order	: VA21C6584
Client	: Metro Testing & Engineering Ltd.
Project	: MB39458-87413 (Johnson)

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 361829) - continued									
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	98.4	80.0	120	----
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	99.5	80.0	120	----
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	88.6	80.0	120	----
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	97.8	80.0	120	----
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	101	80.0	120	----
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	96.5	80.0	120	----
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	99.2	80.0	120	----
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	99.7	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	93.7	80.0	120	----
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	96.4	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	95.9	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	98.9	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	99.9	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	97.4	80.0	120	----
Volatile Organic Compounds (QCLot: 362156)									
benzene	71-43-2	E611A	0.005	mg/kg	2.5 mg/kg	101	70.0	130	----
ethylbenzene	100-41-4	E611A	0.015	mg/kg	2.5 mg/kg	100	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.04	mg/kg	2.5 mg/kg	114	70.0	130	----
styrene	100-42-5	E611A	0.05	mg/kg	2.5 mg/kg	111	70.0	130	----
toluene	108-88-3	E611A	0.05	mg/kg	2.5 mg/kg	103	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.05	mg/kg	5 mg/kg	109	70.0	130	----
xylene, o-	95-47-6	E611A	0.05	mg/kg	2.5 mg/kg	104	70.0	130	----
Hydrocarbons (QCLot: 361831)									
EPH (C10-C19)	----	E601A	200	mg/kg	1134.37 mg/kg	90.2	70.0	130	----
EPH (C19-C32)	----	E601A	200	mg/kg	575.98 mg/kg	91.1	70.0	130	----
Hydrocarbons (QCLot: 362157)									
VHs (C6-C10)	----	E581.VH+F1	10	mg/kg	85.8 mg/kg	96.3	70.0	130	----
Polycyclic Aromatic Hydrocarbons (QCLot: 361832)									
acenaphthene	83-32-9	E641A-L	0.005	mg/kg	0.5 mg/kg	78.9	60.0	130	----
acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	0.5 mg/kg	78.1	60.0	130	----
acridine	260-94-6	E641A-L	0.01	mg/kg	0.5 mg/kg	86.2	60.0	130	----
anthracene	120-12-7	E641A-L	0.004	mg/kg	0.5 mg/kg	92.2	60.0	130	----
benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	0.5 mg/kg	87.2	60.0	130	----
benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	0.5 mg/kg	85.2	60.0	130	----
benzo(b+j)fluoranthene	----	E641A-L	0.01	mg/kg	0.5 mg/kg	90.3	60.0	130	----

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Work Order	: VA21C6584
Client	: Metro Testing & Engineering Ltd.
Project	: MB39458-87413 (Johnson)

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 361832) - continued									
benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	0.5 mg/kg	103	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	0.5 mg/kg	87.9	60.0	130	----
chrysene	218-01-9	E641A-L	0.01	mg/kg	0.5 mg/kg	90.0	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	0.5 mg/kg	90.4	60.0	130	----
fluoranthene	206-44-0	E641A-L	0.01	mg/kg	0.5 mg/kg	92.0	60.0	130	----
fluorene	86-73-7	E641A-L	0.01	mg/kg	0.5 mg/kg	91.6	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	0.5 mg/kg	94.5	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	0.5 mg/kg	77.2	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	0.5 mg/kg	77.1	60.0	130	----
naphthalene	91-20-3	E641A-L	0.01	mg/kg	0.5 mg/kg	79.0	50.0	130	----
phenanthrene	85-01-8	E641A-L	0.01	mg/kg	0.5 mg/kg	92.6	60.0	130	----
pyrene	129-00-0	E641A-L	0.01	mg/kg	0.5 mg/kg	93.6	60.0	130	----
quinoline	91-22-5	E641A-L	0.01	mg/kg	0.5 mg/kg	68.8	60.0	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 >= 1x spike level.

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 362156)										
KS2103913-001	Anonymous	benzene	71-43-2	E611A	1.98 mg/kg	3.125 mg/kg	89.6	60.0	140	----
		ethylbenzene	100-41-4	E611A	1.85 mg/kg	3.125 mg/kg	83.8	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	1.84 mg/kg	3.125 mg/kg	83.6	60.0	140	----
		styrene	100-42-5	E611A	1.96 mg/kg	3.125 mg/kg	88.8	60.0	140	----
		toluene	108-88-3	E611A	1.89 mg/kg	3.125 mg/kg	85.7	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	4.01 mg/kg	6.25 mg/kg	90.8	60.0	140	----
		xylene, o-	95-47-6	E611A	1.90 mg/kg	3.125 mg/kg	86.2	60.0	140	----
Hydrocarbons (QCLot: 361831)										
VA21C7240-002	Anonymous	EPH (C10-C19)	----	E601A	800 mg/kg	1134.37 mg/kg	87.6	60.0	140	----
		EPH (C19-C32)	----	E601A	410 mg/kg	575.98 mg/kg	88.6	60.0	140	----
Hydrocarbons (QCLot: 362157)										
KS2103913-002	Anonymous	VHs (C6-C10)	----	E581.VH+F1	85 mg/kg	171.9 mg/kg	68.8	60.0	140	----
Polycyclic Aromatic Hydrocarbons (QCLot: 361832)										
VA21C7240-002	Anonymous	acenaphthene	83-32-9	E641A-L	0.324 mg/kg	0.5 mg/kg	80.2	50.0	140	----
		acenaphthylene	208-96-8	E641A-L	0.325 mg/kg	0.5 mg/kg	80.3	50.0	140	----
		acridine	260-94-6	E641A-L	0.375 mg/kg	0.5 mg/kg	92.8	50.0	140	----
		anthracene	120-12-7	E641A-L	0.397 mg/kg	0.5 mg/kg	98.2	50.0	140	----
		benz(a)anthracene	56-55-3	E641A-L	0.386 mg/kg	0.5 mg/kg	95.4	50.0	140	----
		benzo(a)pyrene	50-32-8	E641A-L	0.376 mg/kg	0.5 mg/kg	92.9	50.0	140	----
		benzo(b+j)fluoranthene	----	E641A-L	0.374 mg/kg	0.5 mg/kg	92.6	50.0	140	----
		benzo(g,h,i)perylene	191-24-2	E641A-L	0.412 mg/kg	0.5 mg/kg	102	50.0	140	----
		benzo(k)fluoranthene	207-08-9	E641A-L	0.362 mg/kg	0.5 mg/kg	89.5	50.0	140	----
		chrysene	218-01-9	E641A-L	0.386 mg/kg	0.5 mg/kg	95.5	50.0	140	----
		dibenz(a,h)anthracene	53-70-3	E641A-L	0.372 mg/kg	0.5 mg/kg	92.1	50.0	140	----
		fluoranthene	206-44-0	E641A-L	0.394 mg/kg	0.5 mg/kg	97.6	50.0	140	----
		fluorene	86-73-7	E641A-L	0.388 mg/kg	0.5 mg/kg	95.9	50.0	140	----
		indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.381 mg/kg	0.5 mg/kg	94.2	50.0	140	----
		methylnaphthalene, 1-	90-12-0	E641A-L	0.317 mg/kg	0.5 mg/kg	78.5	50.0	140	----
		methylnaphthalene, 2-	91-57-6	E641A-L	0.314 mg/kg	0.5 mg/kg	77.7	50.0	140	----
		naphthalene	91-20-3	E641A-L	0.323 mg/kg	0.5 mg/kg	79.9	50.0	140	----
		phenanthrene	85-01-8	E641A-L	0.402 mg/kg	0.5 mg/kg	99.5	50.0	140	----

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 361832) - continued										
VA21C7240-002	Anonymous	pyrene	129-00-0	E641A-L	0.399 mg/kg	0.5 mg/kg	98.7	50.0	140	----
		quinoline	91-22-5	E641A-L	0.282 mg/kg	0.5 mg/kg	69.8	50.0	140	----

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix: **Soil/Solid**

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Saturated Paste Extractables (QCLot: 361833)									
QC-361833-003	RM	chloride, soluble ion content	16887-00-6	E239.Cl	994 mg/L	84.9	70.0	130	----
Saturated Paste Extractables (QCLot: 361834)									
QC-361834-003	RM	% saturation	----	E141	50.2 %	105	70.0	130	----
Saturated Paste Extractables (QCLot: 361835)									
QC-361835-003	RM	sodium, soluble ion content	17341-25-2	E442	610 mg/L	87.3	70.0	130	----
Metals (QCLot: 361828)									
QC-361828-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	103	70.0	130	----
Metals (QCLot: 361829)									
QC-361829-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	101	70.0	130	----
QC-361829-003	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	102	70.0	130	----
QC-361829-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	109	70.0	130	----
QC-361829-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	99.4	70.0	130	----
QC-361829-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	111	70.0	130	----
QC-361829-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	113	40.0	160	----
QC-361829-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	98.1	70.0	130	----
QC-361829-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	103	70.0	130	----
QC-361829-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	101	70.0	130	----
QC-361829-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	101	70.0	130	----
QC-361829-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	97.6	70.0	130	----
QC-361829-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	99.7	70.0	130	----
QC-361829-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	104	70.0	130	----
QC-361829-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	99.8	70.0	130	----
QC-361829-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	109	70.0	130	----
QC-361829-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	103	70.0	130	----
QC-361829-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	103	70.0	130	----
QC-361829-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	102	70.0	130	----
QC-361829-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	99.5	70.0	130	----
QC-361829-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	106	70.0	130	----
QC-361829-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	95.7	70.0	130	----

Sub-Matrix: **Soil/Solid**

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Metals (QCLot: 361829) - continued									
QC-361829-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	103	70.0	130	----
QC-361829-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	94.9	40.0	160	----
QC-361829-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	101	70.0	130	----
QC-361829-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	104	70.0	130	----
QC-361829-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	101	70.0	130	----
QC-361829-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	102	70.0	130	----
QC-361829-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	101	70.0	130	----
QC-361829-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	92.7	70.0	130	----

ALS Environmental

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA21C6584**	Page	: 1 of 8
Client	: **Metro Testing & Engineering Ltd.**	Laboratory	: Vancouver - Environmental
Contact	: Umaakant Narang	Account Manager	: Sneha Sansare
Address	: 401-6741 Cariboo Rd. Burnaby BC Canada V3N 4A3	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: MB39458-87413 (Johnson)	Date Samples Received	: 26-Nov-2021 16:40
PO	: ----	Issue Date	: 08-Dec-2021 17:56
C-O-C number	: 20-938560		
Sampler	: AR		
Site	: ----		
Quote number	: Standing Offer		
No. of samples received	: 2		
No. of samples analysed	: 1		

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.

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: **Soil/Solid**

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
Hydrocarbons : BC PHCs - EPH by GC-FID										
Glass soil jar/Teflon lined cap										
BH21-1-1	E601A	26-Nov-2021	07-Dec-2021	14 days	12 days	✓	08-Dec-2021	40 days	1 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial										
BH21-1-1	E581.VH+F1	26-Nov-2021	08-Dec-2021	----	----		08-Dec-2021	40 days	12 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap										
BH21-1-1	E510	26-Nov-2021	08-Dec-2021	----	----		08-Dec-2021	28 days	12 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap										
BH21-1-1	E440	26-Nov-2021	08-Dec-2021	----	----		08-Dec-2021	180 days	12 days	✓
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
BH21-1-1	E144	26-Nov-2021	----	----	----		07-Dec-2021	0 days	----	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
BH21-1-1	E108	26-Nov-2021	08-Dec-2021	----	----		08-Dec-2021	30 days	12 days	✓
Physical Tests : Saturation Percentage										
Glass soil jar/Teflon lined cap										
BH21-1-1	E141	26-Nov-2021	----	----	----		08-Dec-2021	28 days	12 days	✓

Page	: 3 of 8
Work Order	: VA21C6584
Client	: Metro Testing & Engineering Ltd.
Project	: MB39458-87413 (Johnson)

Matrix: **Soil/Solid**

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*	
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap										
BH21-1-1	E641A-L	26-Nov-2021	07-Dec-2021	14 days	12 days	✓	08-Dec-2021	40 days	0 days	✓
Saturated Paste Extractables : Ca, K, Mg, and Na by CRC ICPMS (Saturated Paste, mg/L)										
Glass soil jar/Teflon lined cap										
BH21-1-1	E442	26-Nov-2021	----	----	----		08-Dec-2021	365 days	12 days	✓
Saturated Paste Extractables : Chloride by IC (Saturated Paste)										
Glass soil jar/Teflon lined cap										
BH21-1-1	E239.Cl	26-Nov-2021	----	----	----		08-Dec-2021	365 days	12 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass soil methanol vial										
BH21-1-1	E611A	26-Nov-2021	08-Dec-2021	----	----		08-Dec-2021	40 days	12 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: **Soil/Solid**

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)							
BC PHCs - EPH by GC-FID	E601A	361831	1	19	5.2	5.0	✓
BTEX by Headspace GC-MS	E611A	362156	1	8	12.5	5.0	✓
Ca, K, Mg, and Na by CRC ICPMS (Saturated Paste, mg/L)	E442	361835	1	19	5.2	5.0	✓
Chloride by IC (Saturated Paste)	E239.Cl	361833	1	19	5.2	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	361828	1	19	5.2	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	361829	1	19	5.2	5.0	✓
Moisture Content by Gravimetry	E144	361839	1	19	5.2	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	361832	1	19	5.2	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	361830	1	19	5.2	5.0	✓
Saturation Percentage	E141	361834	1	19	5.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	362157	1	8	12.5	5.0	✓
Laboratory Control Samples (LCS)							
BC PHCs - EPH by GC-FID	E601A	361831	1	19	5.2	5.0	✓
BTEX by Headspace GC-MS	E611A	362156	1	8	12.5	5.0	✓
Ca, K, Mg, and Na by CRC ICPMS (Saturated Paste, mg/L)	E442	361835	2	19	10.5	10.0	✓
Chloride by IC (Saturated Paste)	E239.Cl	361833	2	19	10.5	10.0	✓
Mercury in Soil/Solid by CVAAS	E510	361828	2	19	10.5	10.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	361829	2	19	10.5	10.0	✓
Moisture Content by Gravimetry	E144	361839	1	19	5.2	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	361832	1	19	5.2	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	361830	1	19	5.2	5.0	✓
Saturation Percentage	E141	361834	2	19	10.5	10.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	362157	1	8	12.5	5.0	✓
Method Blanks (MB)							
BC PHCs - EPH by GC-FID	E601A	361831	1	19	5.2	5.0	✓
BTEX by Headspace GC-MS	E611A	362156	1	8	12.5	5.0	✓
Ca, K, Mg, and Na by CRC ICPMS (Saturated Paste, mg/L)	E442	361835	1	19	5.2	5.0	✓
Chloride by IC (Saturated Paste)	E239.Cl	361833	1	19	5.2	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	361828	1	19	5.2	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	361829	1	19	5.2	5.0	✓
Moisture Content by Gravimetry	E144	361839	1	19	5.2	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	361832	1	19	5.2	5.0	✓
Saturation Percentage	E141	361834	1	19	5.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	362157	1	8	12.5	5.0	✓
Matrix Spikes (MS)							
BC PHCs - EPH by GC-FID	E601A	361831	1	19	5.2	5.0	✓
BTEX by Headspace GC-MS	E611A	362156	1	8	12.5	5.0	✓

Matrix: **Soil/Solid**

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*
Matrix Spikes (MS) - Continued							
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	361832	1	19	5.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	362157	1	8	12.5	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
pH by Meter (1:2 Soil:Water Extraction)	E108 Vancouver - Environmental	Soil/Solid	BC Lab Manual	pH is determined by potentiometric measurement with a pH electrode at ambient laboratory temperature (normally 20 ± 5°C), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at <60 ºC) and sieved (10mesh/2mm) sample with ultra pure water at a 1:2 ratio of sediment to water. The pH is then measured by a standard pH probe.
Saturation Percentage	E141 Vancouver - Environmental	Soil/Solid	CSSS Ch. 18 (mod)/AER D50	Saturation Percentage (SP) is determined as the total volume of water present in a saturated paste (in mL) divided by the dry weight of the sample (in grams), expressed as a percentage.
Moisture Content by Gravimetry	E144 Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Chloride by IC (Saturated Paste)	E239.Cl Vancouver - Environmental	Soil/Solid	CSSS Ch. 15 (mod)/EPA 300.1 (mod)	Inorganic anions are analyzed by obtaining a soil extract produced by the saturated paste extraction procedure which is then analyzed by Ion Chromatography with conductivity and/or UV detection.
Metals in Soil/Solid by CRC ICPMS	E440 Vancouver - Environmental	Soil/Solid	EPA 6020B (mod)	This method is intended to liberate metals that may be environmentally available. Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Silicate minerals are not solubilized. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Elemental Sulfur may be poorly recovered by this method. Analysis is by Collision/Reaction Cell ICPMS.
Ca, K, Mg, and Na by CRC ICPMS (Saturated Paste, mg/L)	E442 Vancouver - Environmental	Soil/Solid	CSSS CH15/EPA 6020B (mod)	A soil extract produced by the saturated paste extraction procedure is analyzed for Calcium, Magnesium, Potassium and Sodium by Collision/Reaction Cell ICPMS as per "Soil Sampling Methods of Analysis" By M Carter.
Mercury in Soil/Solid by CVAAS	E510 Vancouver - Environmental	Soil/Solid	EPA 200.2/1631 Appendix (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl, followed by CVAAS analysis.
VH and F1 by Headspace GC-FID	E581.VH+F1 Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. 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.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
BC PHCs - EPH by GC-FID	E601A Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual (EPH in Solids by GC/FID) (mod)	Sample extracts are analyzed by GC-FID for BC hydrocarbon fractions.
BTEX by Headspace GC-MS	E611A Vancouver - Environmental	Soil/Solid	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.
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L Vancouver - Environmental	Soil/Solid	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are extracted with hexane/acetone and analyzed by GC-MS. If reported, IACR (index of additive cancer risk, unitless) and B(a)P toxic potency equivalent (in soil concentration units) are calculated as per CCME PAH Soil Quality Guidelines fact sheet (2010) or ABT1.
Chloride by IC (Saturated Paste) (mg/kg)	EC239A.CI Vancouver - Environmental	Soil/Solid	CSSS Ch. 15 (mod)/EPA 300.1 (mod)	Inorganic anions are analyzed by obtaining a soil extract produced by the saturated paste extraction procedure which is then analyzed by Ion Chromatography with conductivity and/or UV detection.
Ca, K, Mg, Na by ICPMS (Saturated Paste, mg/kg)	EC442 Vancouver - Environmental	Soil/Solid	CSSS CH15/EPA 6020B (mod)	A soil extract produced by the saturated paste extraction procedure is analyzed for Calcium, Magnesium, Potassium, Sodium by ICPMS.
VPH: VH-BTEX-Styrene	EC580A Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VH-BTEX = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.
LEPH and HEPH: EPH-PAH	EC600A Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual (LEPH and HEPH) (mod)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(b+j+k)fluoranthene, Benzo(a)pyrene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, and Pyrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH/EC	EP108 Vancouver - Environmental	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.
Digestion for Metals and Mercury	EP440 Vancouver - Environmental	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl. This method is intended to liberate metals that may be environmentally available.
VOCs Methanol Extraction for Headspace Analysis	EP581 Vancouver - Environmental	Soil/Solid	EPA 5035A (mod)	VOCs in samples are extracted with methanol. Extracts are then 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.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
PHCs and PAHs Hexane-Acetone Tumbler Extraction	EP601 Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1 (mod)	Samples are subsampled and Petroleum Hydrocarbons (PHC) and PAHs are extracted with 1:1 hexane:acetone using a rotary extractor.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **VA21C6584**	Page	: 1 of 6
Client	: **Metro Testing & Engineering Ltd.**	Laboratory	: Vancouver - Environmental
Contact	: Umaakant Narang	Account Manager	: Sneha Sansare
Address	: 401-6741 Cariboo Rd. Burnaby BC Canada V3N 4A3	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: MB39458-87413 (Johnson)	Date Samples Received	: 26-Nov-2021 16:40
PO	: ----	Date Analysis Commenced	: 07-Dec-2021
C-O-C number	: 20-938560	Issue Date	: 08-Dec-2021 18:23
Sampler	: AR		
Site	: ----		
Quote number	: Standing Offer		
No. of samples received	: 2		
No. of samples analysed	: 1		

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.

Signatories	*Position*	*Laboratory Department*
Caleb Deroche	Lab Analyst	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Paul Cushing	Team Leader - Organics	Organics, Burnaby, British Columbia
Russell Zhang		Metals, Burnaby, British Columbia

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).

Unit	*Description*
-	No Unit
%	percent
mg/kg	milligrams per kilogram
mg/L	milligrams per litre
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.

Page : 3 of 6
Work Order : VA21C6584
Client : Metro Testing & Engineering Ltd.
Project : MB39458-87413 (Johnson)

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	BH21-1-1	----	----	----	----
					Client sampling date / time	26-Nov-2021	----	----	----	----
						VA21C6584-001	--------	--------	--------	--------
						Result	----	----	----	----
Physical Tests										
% saturation	----	E141	1.0	%		25.7	----	----	----	----
moisture	----	E144	0.25	%		7.85	----	----	----	----
pH (1:2 soil:water)	----	E108	0.10	pH units		6.91	----	----	----	----
Saturated Paste Extractables										
chloride, soluble ion content	16887-00-6	EC239A.Cl	1.0	mg/kg		<5.1	----	----	----	----
chloride, soluble ion content	16887-00-6	E239.Cl	20	mg/L		<20	----	----	----	----
sodium, soluble ion content	17341-25-2	EC442	1.00	mg/kg		1.13	----	----	----	----
sodium, soluble ion content	17341-25-2	E442	2.0	mg/L		4.4	----	----	----	----
Metals										
aluminum	7429-90-5	E440	50	mg/kg		10500	----	----	----	----
antimony	7440-36-0	E440	0.10	mg/kg		0.13	----	----	----	----
arsenic	7440-38-2	E440	0.10	mg/kg		1.89	----	----	----	----
barium	7440-39-3	E440	0.50	mg/kg		50.5	----	----	----	----
beryllium	7440-41-7	E440	0.10	mg/kg		0.14	----	----	----	----
bismuth	7440-69-9	E440	0.20	mg/kg		<0.20	----	----	----	----
boron	7440-42-8	E440	5.0	mg/kg		<5.0	----	----	----	----
cadmium	7440-43-9	E440	0.020	mg/kg		0.052	----	----	----	----
calcium	7440-70-2	E440	50	mg/kg		3950	----	----	----	----
chromium	7440-47-3	E440	0.50	mg/kg		11.7	----	----	----	----
cobalt	7440-48-4	E440	0.10	mg/kg		5.58	----	----	----	----
copper	7440-50-8	E440	0.50	mg/kg		13.8	----	----	----	----
iron	7439-89-6	E440	50	mg/kg		16700	----	----	----	----
lead	7439-92-1	E440	0.50	mg/kg		2.25	----	----	----	----
lithium	7439-93-2	E440	2.0	mg/kg		4.6	----	----	----	----
magnesium	7439-95-4	E440	20	mg/kg		5090	----	----	----	----
manganese	7439-96-5	E440	1.0	mg/kg		269	----	----	----	----
mercury	7439-97-6	E510	0.0500	mg/kg		<0.0500	----	----	----	----
molybdenum	7439-98-7	E440	0.10	mg/kg		0.32	----	----	----	----
nickel	7440-02-0	E440	0.50	mg/kg		7.60	----	----	----	----
phosphorus	7723-14-0	E440	50	mg/kg		373	----	----	----	----
potassium	7440-09-7	E440	100	mg/kg		800	----	----	----	----

Page : 4 of 6
Work Order : VA21C6584
Client : Metro Testing & Engineering Ltd.
Project : MB39458-87413 (Johnson)

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	BH21-1-1	----	----	----	----
					Client sampling date / time	26-Nov-2021	----	----	----	----
						VA21C6584-001	--------	--------	--------	--------
						Result	----	----	----	----
Metals										
selenium	7782-49-2	E440	0.20	mg/kg		<0.20	----	----	----	----
silver	7440-22-4	E440	0.10	mg/kg		<0.10	----	----	----	----
sodium	7440-23-5	E440	50	mg/kg		310	----	----	----	----
strontium	7440-24-6	E440	0.50	mg/kg		32.5	----	----	----	----
sulfur	7704-34-9	E440	1000	mg/kg		<1000	----	----	----	----
thallium	7440-28-0	E440	0.050	mg/kg		<0.050	----	----	----	----
tin	7440-31-5	E440	2.0	mg/kg		<2.0	----	----	----	----
titanium	7440-32-6	E440	1.0	mg/kg		731	----	----	----	----
tungsten	7440-33-7	E440	0.50	mg/kg		<0.50	----	----	----	----
uranium	7440-61-1	E440	0.050	mg/kg		0.382	----	----	----	----
vanadium	7440-62-2	E440	0.20	mg/kg		45.7	----	----	----	----
zinc	7440-66-6	E440	2.0	mg/kg		31.8	----	----	----	----
zirconium	7440-67-7	E440	1.0	mg/kg		1.9	----	----	----	----
Volatile Organic Compounds [Fuels]										
benzene	71-43-2	E611A	0.0050	mg/kg		<0.0050	----	----	----	----
ethylbenzene	100-41-4	E611A	0.015	mg/kg		<0.015	----	----	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.200	mg/kg		<0.200	----	----	----	----
styrene	100-42-5	E611A	0.050	mg/kg		<0.050	----	----	----	----
toluene	108-88-3	E611A	0.050	mg/kg		<0.050	----	----	----	----
xylene, m+p-	179601-23-1	E611A	0.050	mg/kg		<0.050	----	----	----	----
xylene, o-	95-47-6	E611A	0.050	mg/kg		<0.050	----	----	----	----
xylenes, total	1330-20-7	E611A	0.075	mg/kg		<0.075	----	----	----	----
Volatile Organic Compounds Surrogates										
bromofluorobenzene, 4-	460-00-4	E611A	0.10	%		75.0	----	----	----	----
difluorobenzene, 1,4-	540-36-3	E611A	0.10	%		84.0	----	----	----	----
Hydrocarbons										
EPH (C10-C19)	----	E601A	200	mg/kg		<200	----	----	----	----
EPH (C19-C32)	----	E601A	200	mg/kg		<200	----	----	----	----
VHs (C6-C10)	----	E581.VH+F1	10	mg/kg		<10	----	----	----	----
HEPHs	----	EC600A	200	mg/kg		<200	----	----	----	----
LEPHs	----	EC600A	200	mg/kg		<200	----	----	----	----
VPHs	----	EC580A	10	mg/kg		<10	----	----	----	----

Page : 5 of 6
Work Order : VA21C6584
Client : Metro Testing & Engineering Ltd.
Project : MB39458-87413 (Johnson)

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	BH21-1-1	----	----	----	----
					Client sampling date / time	26-Nov-2021	----	----	----	----
						VA21C6584-001	--------	--------	--------	--------
						Result	----	----	----	----
Hydrocarbons Surrogates										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	1.0	%		104	----	----	----	----
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%		85.2	----	----	----	----
Polycyclic Aromatic Hydrocarbons										
acenaphthene	83-32-9	E641A-L	0.0050	mg/kg		<0.0050	----	----	----	----
acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg		<0.0050	----	----	----	----
acridine	260-94-6	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
anthracene	120-12-7	E641A-L	0.0040	mg/kg		<0.0040	----	----	----	----
benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
benzo(b+j)fluoranthene	----	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
benzo(b+j+k)fluoranthene	----	E641A-L	0.015	mg/kg		<0.015	----	----	----	----
benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
chrysene	218-01-9	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg		<0.0050	----	----	----	----
fluoranthene	206-44-0	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
fluorene	86-73-7	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
naphthalene	91-20-3	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
phenanthrene	85-01-8	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
pyrene	129-00-0	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
quinoline	91-22-5	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
B(a)P total potency equivalents [B(a)P TPE]	----	E641A-L	0.020	mg/kg		<0.020	----	----	----	----
IACR (CCME)	----	E641A-L	0.150	-		<0.150	----	----	----	----
Polycyclic Aromatic Hydrocarbons Surrogates										
acridine-d9	34749-75-2	E641A-L	0.1	%		99.3	----	----	----	----
chrysene-d12	1719-03-5	E641A-L	0.1	%		91.1	----	----	----	----
naphthalene-d8	1146-65-2	E641A-L	0.1	%		89.2	----	----	----	----
phenanthrene-d10	1517-22-2	E641A-L	0.1	%		105	----	----	----	----

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

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **VA21C6584**	Page	: 1 of 15
Client	: Metro Testing & Engineering Ltd.	Laboratory	: Vancouver - Environmental
Contact	: Umaakant Narang	Account Manager	: Sneha Sansare
Address	: 401-6741 Cariboo Rd. Burnaby BC Canada V3N 4A3	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: MB39458-87413 (Johnson)	Date Samples Received	: 26-Nov-2021 16:40
PO	: ----	Date Analysis Commenced	: 07-Dec-2021
C-O-C number	: 20-938560	Issue Date	: 08-Dec-2021 17:56
Sampler	: AR		
Site	: ----		
Quote number	: Standing Offer		
No. of samples received	: 2		
No. of samples analysed	: 1		

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*
Caleb Deroche	Lab Analyst	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Paul Cushing	Team Leader - Organics	Organics, Burnaby, British Columbia
Russell Zhang		Metals, Burnaby, British Columbia

Page	: 2 of 15
Work Order	: VA21C6584
Client	: Metro Testing & Engineering Ltd.
Project	: MB39458-87413 (Johnson)

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.

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: **Soil/Solid**

					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: 361830)											
VA21C6584-001	BH21-1-1	pH (1:2 soil:water)	----	E108	0.10	pH units	6.91	6.98	1.0%	5%	----
Physical Tests (QC Lot: 361839)											
VA21C6584-001	BH21-1-1	moisture	----	E144	0.25	%	7.85	9.39	17.8%	20%	----
Saturated Paste Extractables (QC Lot: 361833)											
VA21C6584-001	BH21-1-1	chloride, soluble ion content	16887-00-6	E239.Cl	20	mg/L	<20	<20	0	Diff <2x LOR	----
Saturated Paste Extractables (QC Lot: 361834)											
VA21C6584-001	BH21-1-1	% saturation	----	E141	1.0	%	25.7	28.0	8.34%	20%	----
Saturated Paste Extractables (QC Lot: 361835)											
VA21C6584-001	BH21-1-1	sodium, soluble ion content	17341-25-2	E442	2.0	mg/L	4.4	4.2	0.1	Diff <2x LOR	----
Metals (QC Lot: 361828)											
VA21C6584-001	BH21-1-1	mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	----
Metals (QC Lot: 361829)											
VA21C6584-001	BH21-1-1	aluminum	7429-90-5	E440	50	mg/kg	10500	10900	3.48%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	0.13	0.12	0.010	Diff <2x LOR	----
		arsenic	7440-38-2	E440	0.10	mg/kg	1.89	1.92	1.42%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	50.5	56.8	11.7%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.14	0.14	0.0002	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		boron	7440-42-8	E440	5.0	mg/kg	<5.0	<5.0	0	Diff <2x LOR	----
		cadmium	7440-43-9	E440	0.020	mg/kg	0.052	0.069	0.017	Diff <2x LOR	----
		calcium	7440-70-2	E440	50	mg/kg	3950	4150	4.81%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	11.7	13.5	14.1%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	5.58	5.78	3.55%	30%	----
		copper	7440-50-8	E440	0.50	mg/kg	13.8	14.9	8.04%	30%	----
		iron	7439-89-6	E440	50	mg/kg	16700	17000	1.87%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	2.25	2.46	0.21	Diff <2x LOR	----
		lithium	7439-93-2	E440	2.0	mg/kg	4.6	5.0	0.4	Diff <2x LOR	----
		magnesium	7439-95-4	E440	20	mg/kg	5090	4650	8.95%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	269	266	1.36%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	0.32	0.30	0.02	Diff <2x LOR	----
		nickel	7440-02-0	E440	0.50	mg/kg	7.60	8.10	6.36%	30%	----

Sub-Matrix: **Soil/Solid**

					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
Metals (QC Lot: 361829) - continued											
VA21C6584-001	BH21-1-1	phosphorus	7723-14-0	E440	50	mg/kg	373	415	10.6%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	800	880	9.84%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		sodium	7440-23-5	E440	50	mg/kg	310	343	10.2%	40%	----
		strontium	7440-24-6	E440	0.50	mg/kg	32.5	35.2	7.86%	40%	----
		sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	0	Diff <2x LOR	----
		thallium	7440-28-0	E440	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tin	7440-31-5	E440	2.0	mg/kg	<2.0	<2.0	0	Diff <2x LOR	----
		titanium	7440-32-6	E440	1.0	mg/kg	731	722	1.31%	40%	----
		tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		uranium	7440-61-1	E440	0.050	mg/kg	0.382	0.435	12.9%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	45.7	48.8	6.58%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	31.8	31.8	0.0166%	30%	----
		zirconium	7440-67-7	E440	1.0	mg/kg	1.9	2.3	0.4	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 362156)											
KS2103913-001	Anonymous	benzene	71-43-2	E611A	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.015	mg/kg	<0.015	<0.015	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.200	mg/kg	<0.200	<0.200	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 361831)											
VA21C6584-001	BH21-1-1	EPH (C10-C19)	----	E601A	200	mg/kg	<200	<200	0	Diff <2x LOR	----
		EPH (C19-C32)	----	E601A	200	mg/kg	<200	<200	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 362157)											
KS2103913-001	Anonymous	VHs (C6-C10)	----	E581.VH+F1	10	mg/kg	<10	<10	0	Diff <2x LOR	----
Polycyclic Aromatic Hydrocarbons (QC Lot: 361832)											
VA21C6584-001	BH21-1-1	acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		acridine	260-94-6	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.0040	<0.0040	0	Diff <2x LOR	----
		benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----

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Work Order	: VA21C6584
Client	: Metro Testing & Engineering Ltd.
Project	: MB39458-87413 (Johnson)

Sub-Matrix: **Soil/Solid**

					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*
Polycyclic Aromatic Hydrocarbons (QC Lot: 361832) - continued											
VA21C6584-001	BH21-1-1	benzo(b+j)fluoranthene	----	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		chrysene	218-01-9	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		fluoranthene	206-44-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		fluorene	86-73-7	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		naphthalene	91-20-3	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		phenanthrene	85-01-8	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		pyrene	129-00-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		quinoline	91-22-5	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----

Page	: 6 of 15
Work Order	: VA21C6584
Client	: Metro Testing & Engineering Ltd.
Project	: MB39458-87413 (Johnson)

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: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 361839)						
moisture	----	E144	0.25	%	<0.25	----
Saturated Paste Extractables (QCLot: 361833)						
chloride, soluble ion content	16887-00-6	E239.Cl	20	mg/L	<20	----
Saturated Paste Extractables (QCLot: 361834)						
% saturation	----	E141	1	%	50.0	----
Saturated Paste Extractables (QCLot: 361835)						
sodium, soluble ion content	17341-25-2	E442	2	mg/L	<2.0	----
Metals (QCLot: 361828)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 361829)						
aluminum	7429-90-5	E440	50	mg/kg	<50	----
antimony	7440-36-0	E440	0.1	mg/kg	<0.10	----
arsenic	7440-38-2	E440	0.1	mg/kg	<0.10	----
barium	7440-39-3	E440	0.5	mg/kg	<0.50	----
beryllium	7440-41-7	E440	0.1	mg/kg	<0.10	----
bismuth	7440-69-9	E440	0.2	mg/kg	<0.20	----
boron	7440-42-8	E440	5	mg/kg	<5.0	----
cadmium	7440-43-9	E440	0.02	mg/kg	<0.020	----
calcium	7440-70-2	E440	50	mg/kg	<50	----
chromium	7440-47-3	E440	0.5	mg/kg	<0.50	----
cobalt	7440-48-4	E440	0.1	mg/kg	<0.10	----
copper	7440-50-8	E440	0.5	mg/kg	<0.50	----
iron	7439-89-6	E440	50	mg/kg	<50	----
lead	7439-92-1	E440	0.5	mg/kg	<0.50	----
lithium	7439-93-2	E440	2	mg/kg	<2.0	----
magnesium	7439-95-4	E440	20	mg/kg	<20	----
manganese	7439-96-5	E440	1	mg/kg	<1.0	----
molybdenum	7439-98-7	E440	0.1	mg/kg	<0.10	----
nickel	7440-02-0	E440	0.5	mg/kg	<0.50	----
phosphorus	7723-14-0	E440	50	mg/kg	<50	----
potassium	7440-09-7	E440	100	mg/kg	<100	----
selenium	7782-49-2	E440	0.2	mg/kg	<0.20	----
silver	7440-22-4	E440	0.1	mg/kg	<0.10	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 361829) - continued						
sodium	7440-23-5	E440	50	mg/kg	<50	----
strontium	7440-24-6	E440	0.5	mg/kg	<0.50	----
sulfur	7704-34-9	E440	1000	mg/kg	<1000	----
thallium	7440-28-0	E440	0.05	mg/kg	<0.050	----
tin	7440-31-5	E440	2	mg/kg	<2.0	----
titanium	7440-32-6	E440	1	mg/kg	<1.0	----
tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	----
uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----
vanadium	7440-62-2	E440	0.2	mg/kg	<0.20	----
zinc	7440-66-6	E440	2	mg/kg	<2.0	----
zirconium	7440-67-7	E440	1	mg/kg	<1.0	----
Volatile Organic Compounds (QCLot: 362156)						
benzene	71-43-2	E611A	0.005	mg/kg	<0.0050	----
ethylbenzene	100-41-4	E611A	0.015	mg/kg	<0.015	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.04	mg/kg	<0.040	----
styrene	100-42-5	E611A	0.05	mg/kg	<0.050	----
toluene	108-88-3	E611A	0.05	mg/kg	<0.050	----
xylene, m+p-	179601-23-1	E611A	0.05	mg/kg	<0.050	----
xylene, o-	95-47-6	E611A	0.05	mg/kg	<0.050	----
Hydrocarbons (QCLot: 361831)						
EPH (C10-C19)	----	E601A	200	mg/kg	<200	----
EPH (C19-C32)	----	E601A	200	mg/kg	<200	----
Hydrocarbons (QCLot: 362157)						
VHs (C6-C10)	----	E581.VH+F1	10	mg/kg	<10	----
Polycyclic Aromatic Hydrocarbons (QCLot: 361832)						
acenaphthene	83-32-9	E641A-L	0.005	mg/kg	<0.0050	----
acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	<0.0050	----
acridine	260-94-6	E641A-L	0.01	mg/kg	<0.010	----
anthracene	120-12-7	E641A-L	0.004	mg/kg	<0.0040	----
benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	<0.010	----
benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	<0.010	----
benzo(b+j)fluoranthene	----	E641A-L	0.01	mg/kg	<0.010	----
benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	<0.010	----
benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	<0.010	----
chrysene	218-01-9	E641A-L	0.01	mg/kg	<0.010	----
dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	<0.0050	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 361832) - continued						
fluoranthene	206-44-0	E641A-L	0.01	mg/kg	<0.010	----
fluorene	86-73-7	E641A-L	0.01	mg/kg	<0.010	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	<0.010	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	<0.010	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	<0.010	----
naphthalene	91-20-3	E641A-L	0.01	mg/kg	<0.010	----
phenanthrene	85-01-8	E641A-L	0.01	mg/kg	<0.010	----
pyrene	129-00-0	E641A-L	0.01	mg/kg	<0.010	----
quinoline	91-22-5	E641A-L	0.01	mg/kg	<0.010	----

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Work Order	: VA21C6584
Client	: Metro Testing & Engineering Ltd.
Project	: MB39458-87413 (Johnson)

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: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 361830)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	99.8	95.0	105	----
Physical Tests (QCLot: 361839)									
moisture	----	E144	0.25	%	50 %	102	90.0	110	----
Saturated Paste Extractables (QCLot: 361833)									
chloride, soluble ion content	16887-00-6	E239.Cl	20	mg/L	100 mg/L	102	80.0	120	----
Saturated Paste Extractables (QCLot: 361834)									
% saturation	----	E141	1	%	100 %	102	80.0	120	----
Saturated Paste Extractables (QCLot: 361835)									
sodium, soluble ion content	17341-25-2	E442	2	mg/L	50 mg/L	101	80.0	120	----
Metals (QCLot: 361828)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	103	80.0	120	----
Metals (QCLot: 361829)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	95.8	80.0	120	----
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	105	80.0	120	----
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	98.1	80.0	120	----
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	100	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	99.9	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	96.9	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	103	80.0	120	----
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	101	80.0	120	----
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	97.0	80.0	120	----
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	95.5	80.0	120	----
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	96.8	80.0	120	----
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	95.4	80.0	120	----
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	96.0	80.0	120	----
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	98.9	80.0	120	----
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	99.1	80.0	120	----
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	104	80.0	120	----
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	98.5	80.0	120	----
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	99.4	80.0	120	----
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	96.3	80.0	120	----
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	104	80.0	120	----

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Work Order	: VA21C6584
Client	: Metro Testing & Engineering Ltd.
Project	: MB39458-87413 (Johnson)

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 361829) - continued									
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	98.4	80.0	120	----
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	99.5	80.0	120	----
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	88.6	80.0	120	----
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	97.8	80.0	120	----
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	101	80.0	120	----
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	96.5	80.0	120	----
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	99.2	80.0	120	----
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	99.7	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	93.7	80.0	120	----
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	96.4	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	95.9	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	98.9	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	99.9	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	97.4	80.0	120	----
Volatile Organic Compounds (QCLot: 362156)									
benzene	71-43-2	E611A	0.005	mg/kg	2.5 mg/kg	101	70.0	130	----
ethylbenzene	100-41-4	E611A	0.015	mg/kg	2.5 mg/kg	100	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.04	mg/kg	2.5 mg/kg	114	70.0	130	----
styrene	100-42-5	E611A	0.05	mg/kg	2.5 mg/kg	111	70.0	130	----
toluene	108-88-3	E611A	0.05	mg/kg	2.5 mg/kg	103	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.05	mg/kg	5 mg/kg	109	70.0	130	----
xylene, o-	95-47-6	E611A	0.05	mg/kg	2.5 mg/kg	104	70.0	130	----
Hydrocarbons (QCLot: 361831)									
EPH (C10-C19)	----	E601A	200	mg/kg	1134.37 mg/kg	90.2	70.0	130	----
EPH (C19-C32)	----	E601A	200	mg/kg	575.98 mg/kg	91.1	70.0	130	----
Hydrocarbons (QCLot: 362157)									
VHs (C6-C10)	----	E581.VH+F1	10	mg/kg	85.8 mg/kg	96.3	70.0	130	----
Polycyclic Aromatic Hydrocarbons (QCLot: 361832)									
acenaphthene	83-32-9	E641A-L	0.005	mg/kg	0.5 mg/kg	78.9	60.0	130	----
acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	0.5 mg/kg	78.1	60.0	130	----
acridine	260-94-6	E641A-L	0.01	mg/kg	0.5 mg/kg	86.2	60.0	130	----
anthracene	120-12-7	E641A-L	0.004	mg/kg	0.5 mg/kg	92.2	60.0	130	----
benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	0.5 mg/kg	87.2	60.0	130	----
benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	0.5 mg/kg	85.2	60.0	130	----
benzo(b+j)fluoranthene	----	E641A-L	0.01	mg/kg	0.5 mg/kg	90.3	60.0	130	----

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Work Order	: VA21C6584
Client	: Metro Testing & Engineering Ltd.
Project	: MB39458-87413 (Johnson)

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 361832) - continued									
benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	0.5 mg/kg	103	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	0.5 mg/kg	87.9	60.0	130	----
chrysene	218-01-9	E641A-L	0.01	mg/kg	0.5 mg/kg	90.0	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	0.5 mg/kg	90.4	60.0	130	----
fluoranthene	206-44-0	E641A-L	0.01	mg/kg	0.5 mg/kg	92.0	60.0	130	----
fluorene	86-73-7	E641A-L	0.01	mg/kg	0.5 mg/kg	91.6	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	0.5 mg/kg	94.5	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	0.5 mg/kg	77.2	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	0.5 mg/kg	77.1	60.0	130	----
naphthalene	91-20-3	E641A-L	0.01	mg/kg	0.5 mg/kg	79.0	50.0	130	----
phenanthrene	85-01-8	E641A-L	0.01	mg/kg	0.5 mg/kg	92.6	60.0	130	----
pyrene	129-00-0	E641A-L	0.01	mg/kg	0.5 mg/kg	93.6	60.0	130	----
quinoline	91-22-5	E641A-L	0.01	mg/kg	0.5 mg/kg	68.8	60.0	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 >= 1x spike level.

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 362156)										
KS2103913-001	Anonymous	benzene	71-43-2	E611A	1.98 mg/kg	3.125 mg/kg	89.6	60.0	140	----
		ethylbenzene	100-41-4	E611A	1.85 mg/kg	3.125 mg/kg	83.8	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	1.84 mg/kg	3.125 mg/kg	83.6	60.0	140	----
		styrene	100-42-5	E611A	1.96 mg/kg	3.125 mg/kg	88.8	60.0	140	----
		toluene	108-88-3	E611A	1.89 mg/kg	3.125 mg/kg	85.7	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	4.01 mg/kg	6.25 mg/kg	90.8	60.0	140	----
		xylene, o-	95-47-6	E611A	1.90 mg/kg	3.125 mg/kg	86.2	60.0	140	----
Hydrocarbons (QCLot: 361831)										
VA21C7240-002	Anonymous	EPH (C10-C19)	----	E601A	800 mg/kg	1134.37 mg/kg	87.6	60.0	140	----
		EPH (C19-C32)	----	E601A	410 mg/kg	575.98 mg/kg	88.6	60.0	140	----
Hydrocarbons (QCLot: 362157)										
KS2103913-002	Anonymous	VHs (C6-C10)	----	E581.VH+F1	85 mg/kg	171.9 mg/kg	68.8	60.0	140	----
Polycyclic Aromatic Hydrocarbons (QCLot: 361832)										
VA21C7240-002	Anonymous	acenaphthene	83-32-9	E641A-L	0.324 mg/kg	0.5 mg/kg	80.2	50.0	140	----
		acenaphthylene	208-96-8	E641A-L	0.325 mg/kg	0.5 mg/kg	80.3	50.0	140	----
		acridine	260-94-6	E641A-L	0.375 mg/kg	0.5 mg/kg	92.8	50.0	140	----
		anthracene	120-12-7	E641A-L	0.397 mg/kg	0.5 mg/kg	98.2	50.0	140	----
		benz(a)anthracene	56-55-3	E641A-L	0.386 mg/kg	0.5 mg/kg	95.4	50.0	140	----
		benzo(a)pyrene	50-32-8	E641A-L	0.376 mg/kg	0.5 mg/kg	92.9	50.0	140	----
		benzo(b+j)fluoranthene	----	E641A-L	0.374 mg/kg	0.5 mg/kg	92.6	50.0	140	----
		benzo(g,h,i)perylene	191-24-2	E641A-L	0.412 mg/kg	0.5 mg/kg	102	50.0	140	----
		benzo(k)fluoranthene	207-08-9	E641A-L	0.362 mg/kg	0.5 mg/kg	89.5	50.0	140	----
		chrysene	218-01-9	E641A-L	0.386 mg/kg	0.5 mg/kg	95.5	50.0	140	----
		dibenz(a,h)anthracene	53-70-3	E641A-L	0.372 mg/kg	0.5 mg/kg	92.1	50.0	140	----
		fluoranthene	206-44-0	E641A-L	0.394 mg/kg	0.5 mg/kg	97.6	50.0	140	----
		fluorene	86-73-7	E641A-L	0.388 mg/kg	0.5 mg/kg	95.9	50.0	140	----
		indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.381 mg/kg	0.5 mg/kg	94.2	50.0	140	----
		methylnaphthalene, 1-	90-12-0	E641A-L	0.317 mg/kg	0.5 mg/kg	78.5	50.0	140	----
		methylnaphthalene, 2-	91-57-6	E641A-L	0.314 mg/kg	0.5 mg/kg	77.7	50.0	140	----
		naphthalene	91-20-3	E641A-L	0.323 mg/kg	0.5 mg/kg	79.9	50.0	140	----
		phenanthrene	85-01-8	E641A-L	0.402 mg/kg	0.5 mg/kg	99.5	50.0	140	----

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Work Order	: VA21C6584
Client	: Metro Testing & Engineering Ltd.
Project	: MB39458-87413 (Johnson)

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 361832) - continued										
VA21C7240-002	Anonymous	pyrene	129-00-0	E641A-L	0.399 mg/kg	0.5 mg/kg	98.7	50.0	140	----
		quinoline	91-22-5	E641A-L	0.282 mg/kg	0.5 mg/kg	69.8	50.0	140	----

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix: **Soil/Solid**

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Saturated Paste Extractables (QCLot: 361833)									
QC-361833-003	RM	chloride, soluble ion content	16887-00-6	E239.Cl	994 mg/L	84.9	70.0	130	----
Saturated Paste Extractables (QCLot: 361834)									
QC-361834-003	RM	% saturation	----	E141	50.2 %	105	70.0	130	----
Saturated Paste Extractables (QCLot: 361835)									
QC-361835-003	RM	sodium, soluble ion content	17341-25-2	E442	610 mg/L	87.3	70.0	130	----
Metals (QCLot: 361828)									
QC-361828-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	103	70.0	130	----
Metals (QCLot: 361829)									
QC-361829-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	101	70.0	130	----
QC-361829-003	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	102	70.0	130	----
QC-361829-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	109	70.0	130	----
QC-361829-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	99.4	70.0	130	----
QC-361829-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	111	70.0	130	----
QC-361829-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	113	40.0	160	----
QC-361829-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	98.1	70.0	130	----
QC-361829-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	103	70.0	130	----
QC-361829-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	101	70.0	130	----
QC-361829-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	101	70.0	130	----
QC-361829-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	97.6	70.0	130	----
QC-361829-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	99.7	70.0	130	----
QC-361829-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	104	70.0	130	----
QC-361829-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	99.8	70.0	130	----
QC-361829-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	109	70.0	130	----
QC-361829-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	103	70.0	130	----
QC-361829-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	103	70.0	130	----
QC-361829-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	102	70.0	130	----
QC-361829-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	99.5	70.0	130	----
QC-361829-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	106	70.0	130	----
QC-361829-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	95.7	70.0	130	----

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Work Order	: VA21C6584
Client	: Metro Testing & Engineering Ltd.
Project	: MB39458-87413 (Johnson)

Sub-Matrix: **Soil/Solid**

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Metals (QCLot: 361829) - continued									
QC-361829-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	103	70.0	130	----
QC-361829-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	94.9	40.0	160	----
QC-361829-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	101	70.0	130	----
QC-361829-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	104	70.0	130	----
QC-361829-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	101	70.0	130	----
QC-361829-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	102	70.0	130	----
QC-361829-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	101	70.0	130	----
QC-361829-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	92.7	70.0	130	----

ALS Environmental

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA21C6584**	Page	: 1 of 8
Client	: **Metro Testing & Engineering Ltd.**	Laboratory	: Vancouver - Environmental
Contact	: Umaakant Narang	Account Manager	: Sneha Sansare
Address	: 401-6741 Cariboo Rd. Burnaby BC Canada V3N 4A3	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: MB39458-87413 (Johnson)	Date Samples Received	: 26-Nov-2021 16:40
PO	: ----	Issue Date	: 08-Dec-2021 17:56
C-O-C number	: 20-938560		
Sampler	: AR		
Site	: ----		
Quote number	: Standing Offer		
No. of samples received	: 2		
No. of samples analysed	: 1		

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.

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: **Soil/Solid**

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
Hydrocarbons : BC PHCs - EPH by GC-FID										
Glass soil jar/Teflon lined cap										
BH21-1-1	E601A	26-Nov-2021	07-Dec-2021	14 days	12 days	✓	08-Dec-2021	40 days	1 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial										
BH21-1-1	E581.VH+F1	26-Nov-2021	08-Dec-2021	----	----		08-Dec-2021	40 days	12 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap										
BH21-1-1	E510	26-Nov-2021	08-Dec-2021	----	----		08-Dec-2021	28 days	12 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap										
BH21-1-1	E440	26-Nov-2021	08-Dec-2021	----	----		08-Dec-2021	180 days	12 days	✓
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
BH21-1-1	E144	26-Nov-2021	----	----	----		07-Dec-2021	0 days	----	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
BH21-1-1	E108	26-Nov-2021	08-Dec-2021	----	----		08-Dec-2021	30 days	12 days	✓
Physical Tests : Saturation Percentage										
Glass soil jar/Teflon lined cap										
BH21-1-1	E141	26-Nov-2021	----	----	----		08-Dec-2021	28 days	12 days	✓

Page	: 3 of 8
Work Order	: VA21C6584
Client	: Metro Testing & Engineering Ltd.
Project	: MB39458-87413 (Johnson)

Matrix: **Soil/Solid**

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*	
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap										
BH21-1-1	E641A-L	26-Nov-2021	07-Dec-2021	14 days	12 days	✓	08-Dec-2021	40 days	0 days	✓
Saturated Paste Extractables : Ca, K, Mg, and Na by CRC ICPMS (Saturated Paste, mg/L)										
Glass soil jar/Teflon lined cap										
BH21-1-1	E442	26-Nov-2021	----	----	----		08-Dec-2021	365 days	12 days	✓
Saturated Paste Extractables : Chloride by IC (Saturated Paste)										
Glass soil jar/Teflon lined cap										
BH21-1-1	E239.Cl	26-Nov-2021	----	----	----		08-Dec-2021	365 days	12 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass soil methanol vial										
BH21-1-1	E611A	26-Nov-2021	08-Dec-2021	----	----		08-Dec-2021	40 days	12 days	✓

Legend & Qualifier Definitions

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

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Work Order	: VA21C6584
Client	: Metro Testing & Engineering Ltd.
Project	: MB39458-87413 (Johnson)

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: **Soil/Solid**

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)							
BC PHCs - EPH by GC-FID	E601A	361831	1	19	5.2	5.0	✓
BTEX by Headspace GC-MS	E611A	362156	1	8	12.5	5.0	✓
Ca, K, Mg, and Na by CRC ICPMS (Saturated Paste, mg/L)	E442	361835	1	19	5.2	5.0	✓
Chloride by IC (Saturated Paste)	E239.Cl	361833	1	19	5.2	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	361828	1	19	5.2	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	361829	1	19	5.2	5.0	✓
Moisture Content by Gravimetry	E144	361839	1	19	5.2	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	361832	1	19	5.2	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	361830	1	19	5.2	5.0	✓
Saturation Percentage	E141	361834	1	19	5.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	362157	1	8	12.5	5.0	✓
Laboratory Control Samples (LCS)							
BC PHCs - EPH by GC-FID	E601A	361831	1	19	5.2	5.0	✓
BTEX by Headspace GC-MS	E611A	362156	1	8	12.5	5.0	✓
Ca, K, Mg, and Na by CRC ICPMS (Saturated Paste, mg/L)	E442	361835	2	19	10.5	10.0	✓
Chloride by IC (Saturated Paste)	E239.Cl	361833	2	19	10.5	10.0	✓
Mercury in Soil/Solid by CVAAS	E510	361828	2	19	10.5	10.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	361829	2	19	10.5	10.0	✓
Moisture Content by Gravimetry	E144	361839	1	19	5.2	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	361832	1	19	5.2	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	361830	1	19	5.2	5.0	✓
Saturation Percentage	E141	361834	2	19	10.5	10.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	362157	1	8	12.5	5.0	✓
Method Blanks (MB)							
BC PHCs - EPH by GC-FID	E601A	361831	1	19	5.2	5.0	✓
BTEX by Headspace GC-MS	E611A	362156	1	8	12.5	5.0	✓
Ca, K, Mg, and Na by CRC ICPMS (Saturated Paste, mg/L)	E442	361835	1	19	5.2	5.0	✓
Chloride by IC (Saturated Paste)	E239.Cl	361833	1	19	5.2	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	361828	1	19	5.2	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	361829	1	19	5.2	5.0	✓
Moisture Content by Gravimetry	E144	361839	1	19	5.2	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	361832	1	19	5.2	5.0	✓
Saturation Percentage	E141	361834	1	19	5.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	362157	1	8	12.5	5.0	✓
Matrix Spikes (MS)							
BC PHCs - EPH by GC-FID	E601A	361831	1	19	5.2	5.0	✓
BTEX by Headspace GC-MS	E611A	362156	1	8	12.5	5.0	✓

Matrix: **Soil/Solid**

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*
Matrix Spikes (MS) - Continued							
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	361832	1	19	5.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	362157	1	8	12.5	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
pH by Meter (1:2 Soil:Water Extraction)	E108 Vancouver - Environmental	Soil/Solid	BC Lab Manual	pH is determined by potentiometric measurement with a pH electrode at ambient laboratory temperature (normally 20 ± 5°C), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at <60 ºC) and sieved (10mesh/2mm) sample with ultra pure water at a 1:2 ratio of sediment to water. The pH is then measured by a standard pH probe.
Saturation Percentage	E141 Vancouver - Environmental	Soil/Solid	CSSS Ch. 18 (mod)/AER D50	Saturation Percentage (SP) is determined as the total volume of water present in a saturated paste (in mL) divided by the dry weight of the sample (in grams), expressed as a percentage.
Moisture Content by Gravimetry	E144 Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Chloride by IC (Saturated Paste)	E239.Cl Vancouver - Environmental	Soil/Solid	CSSS Ch. 15 (mod)/EPA 300.1 (mod)	Inorganic anions are analyzed by obtaining a soil extract produced by the saturated paste extraction procedure which is then analyzed by Ion Chromatography with conductivity and/or UV detection.
Metals in Soil/Solid by CRC ICPMS	E440 Vancouver - Environmental	Soil/Solid	EPA 6020B (mod)	This method is intended to liberate metals that may be environmentally available. Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Silicate minerals are not solubilized. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Elemental Sulfur may be poorly recovered by this method. Analysis is by Collision/Reaction Cell ICPMS.
Ca, K, Mg, and Na by CRC ICPMS (Saturated Paste, mg/L)	E442 Vancouver - Environmental	Soil/Solid	CSSS CH15/EPA 6020B (mod)	A soil extract produced by the saturated paste extraction procedure is analyzed for Calcium, Magnesium, Potassium and Sodium by Collision/Reaction Cell ICPMS as per "Soil Sampling Methods of Analysis" By M Carter.
Mercury in Soil/Solid by CVAAS	E510 Vancouver - Environmental	Soil/Solid	EPA 200.2/1631 Appendix (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl, followed by CVAAS analysis.
VH and F1 by Headspace GC-FID	E581.VH+F1 Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. 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.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
BC PHCs - EPH by GC-FID	E601A Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual (EPH in Solids by GC/FID) (mod)	Sample extracts are analyzed by GC-FID for BC hydrocarbon fractions.
BTEX by Headspace GC-MS	E611A Vancouver - Environmental	Soil/Solid	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.
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L Vancouver - Environmental	Soil/Solid	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are extracted with hexane/acetone and analyzed by GC-MS. If reported, IACR (index of additive cancer risk, unitless) and B(a)P toxic potency equivalent (in soil concentration units) are calculated as per CCME PAH Soil Quality Guidelines fact sheet (2010) or ABT1.
Chloride by IC (Saturated Paste) (mg/kg)	EC239A.CI Vancouver - Environmental	Soil/Solid	CSSS Ch. 15 (mod)/EPA 300.1 (mod)	Inorganic anions are analyzed by obtaining a soil extract produced by the saturated paste extraction procedure which is then analyzed by Ion Chromatography with conductivity and/or UV detection.
Ca, K, Mg, Na by ICPMS (Saturated Paste, mg/kg)	EC442 Vancouver - Environmental	Soil/Solid	CSSS CH15/EPA 6020B (mod)	A soil extract produced by the saturated paste extraction procedure is analyzed for Calcium, Magnesium, Potassium, Sodium by ICPMS.
VPH: VH-BTEX-Styrene	EC580A Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VH-BTEX = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.
LEPH and HEPH: EPH-PAH	EC600A Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual (LEPH and HEPH) (mod)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(b+j+k)fluoranthene, Benzo(a)pyrene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, and Pyrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH/EC	EP108 Vancouver - Environmental	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.
Digestion for Metals and Mercury	EP440 Vancouver - Environmental	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl. This method is intended to liberate metals that may be environmentally available.
VOCs Methanol Extraction for Headspace Analysis	EP581 Vancouver - Environmental	Soil/Solid	EPA 5035A (mod)	VOCs in samples are extracted with methanol. Extracts are then 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.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
PHCs and PAHs Hexane-Acetone Tumbler Extraction	EP601 Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1 (mod)	Samples are subsampled and Petroleum Hydrocarbons (PHC) and PAHs are extracted with 1:1 hexane:acetone using a rotary extractor.

City of Coquitlam
Soil Testing
Lincoln Avenue and Pipeline Drive, Coquitlam

Table 1 - Soil Analytical Results

Project No.: MB39458-87413 (Lincoln)
December 2021

Location		CSR Schedule 3.1 AL Standard [1a]	CSR Schedule 3.1 RL_{LD} Standard [1a]	CSR Schedule 3.1 RL_{HD} Standard [1a]	CSR Schedule 3.1 CL Standard [1a]	CSR Schedule 3.1 IL Standard [1a]	P4 Estimate Metro Vancouver [1b]	DL	BH21-1
Sample Name									BH21-1-1
Sample Depth (mbgs)									0.15
Lab Sample ID									VA21C6583-001
Date Sampled									26-Nov-21
Duplicate									-
Test Hole location									**Sta 0+31m west and 1m from north side**
pH									8.36
Parameter	CAS								
Extractable Petroleum Hydrocarbons									
EPH_{10-19}	-	NS	NS	NS	NS	NS	N/A	200	<200
EPH_{19-32}	-	NS	NS	NS	NS	NS	N/A	200	<200
LEPHs	-	1,000	1,000	1,000	2,000	2,000	N/A	200	<200
HEPHs	-	1,000	1,000	1,000	5,000	5,000	N/A	200	<200
Volatile Petroleum Hydrocarbons									
VH_{6-10}	-	NS	NS	NS	NS	NS	N/A	10	<10
VPHs	-	200	200	200	200	200	N/A	10	<10
Polycyclic Aromatic Hydrocarbons									
Acenaphthene	83-32-9	950	950	2,000	15,000	15,000	N/A	0.0050	<0.0050
Acenaphthylene	208-96-8	NS	NS	NS	NS	NS	N/A	0.0050	<0.0050
Acridine	260-94-6	NS	NS	NS	NS	NS	N/A	0.010	<0.010
Anthracene	120-12-7	2.54	2.54	304	304	304	N/A	0.0040	<0.0040
Benz(a)anthracene	56-55-3	0.1	1	10	10	10	N/A	0.010	<0.010
Benzo(a)pyrene	50-32-8	5[6]	5[6]	10[6]	30[6]	50[6]	N/A	0.010	<0.010
Benzo(b+j)fluoranthenes	-	0.1	1	10	10	10	N/A	0.010	0.010
Benzo(b+j+k)fluoranthenes	-	NS	NS	NS	NS	NS	N/A	0.015	<0.015
Benzo(g,h,i)perylene	191-24-2	NS	NS	NS	NS	NS	N/A	0.010	0.034
Benzo(k)fluoranthene	207-08-9	0.1	1	10	10	10	N/A	0.010	<0.010
Chrysene	218-01-9	200	200	400	4,500	4,500	N/A	0.010	<0.020
Dibenz(a,h)anthracene	53-70-3	0.1	1	10	10	10	N/A	0.0050	0.0068
Fluoranthene	206-44-0	50[4]	50[4]	200[4]	200[4]	200[4]	N/A	0.010	<0.010
Fluorene	86-73-7	600	600	1,000	9,500	9,500	N/A	0.010	<0.010
Indeno(1,2,3-c,d)pyrene	193-39-5	0.1	1	10	10	10	N/A	0.010	<0.010
Methylnaphthalene, 1-	90-12-0	250	250	500	1,000	1,000	N/A	0.010	<0.010
Methylnaphthalene, 2-	91-57-6	60	60	100	950	950	N/A	0.010	<0.010
Naphthalene	91-20-3	0.6[6]	0.6[6]	20[6]	20[6]	20[6]	N/A	0.010	<0.010
Phenanthrene	85-01-8	0.1	5	50	50	50	N/A	0.010	<0.010
Pyrene	129-00-0	0.1	10	100	100	100	N/A	0.010	<0.010
Quinoline	91-22-5	2.5	2.5	4.5	10	10	N/A	0.010	<0.010
B(a)P total potency equivalents [B(a)P TPE]	-	NS	NS	NS	NS	NS	N/A	0.020	<0.020
IACR (CCME)	-	NS	NS	NS	NS	NS	N/A	0.150	0.164
BTEXS, MTBE									
Benzene	71-43-2	0.035[5]	0.035[5]	0.035[5]	0.035[5]	0.035[5]	N/A	0.0050	0.0058
Ethylbenzene	100-41-4	15[5]	15[5]	15[5]	15[5]	15[5]	N/A	0.015	<0.015
Methyl tert-butyl ether [MTBE]	1634-04-4	4,000	4,000	8,000	20,000	20,000	N/A	0.20	<0.200
Styrene	100-42-5	0.1	5	50	50	50	N/A	0.050	<0.050
Toluene	108-88-3	0.5[7]	0.5[7]	0.5[7]	0.5[7]	0.5[7]	N/A	0.050	<0.050
Xylene, meta- & para-	-	NS	NS	NS	NS	NS	N/A	0.050	<0.050
Xylene, ortho-	95-47-6	NS	NS	NS	NS	NS	N/A	0.050	<0.050
Xylenes, total	1330-20-7	6.5[5]	6.5[5]	6.5[5]	6.5[5]	6.5[5]	N/A	0.075	<0.075
Metals									
Aluminum	7429-90-5	40,000	40,000	40,000	250,000	250,000	35,000	50	10,900
Antimony	7440-36-0	20	20	40	40	40	4	0.10	<0.10
Arsenic	7440-38-2	10[5]	10[5]	10[5]	10[5]	10[5]	8.5	0.10	1.15
Barium	7440-39-3	350[5]	350[5]	350[5]	350[5]	350[5]	90	0.50	74.2
Beryllium	7440-41-7	pH <6.5 = 1[7] pH 6.5 - <7.0 = 4[7] pH 7.0 - <7.5 = 30[7] 85[6]	pH <6.5 = 1[7] pH 6.5 - <7.0 = 4[7] pH 7.0 - <7.5 = 30[7] 85[6]	pH <6.5 = 1[7] pH 6.5 - <7.0 = 4[7] pH 7.0 - <7.5 = 30[7] 150[6]	pH ≤6.5 = 1[7] pH 6.5 - <7.0 = 4[7] pH 7.0 - <7.5 = 30[7] pH 7.5 - <8.0 = 250[7] 350[4]	pH ≤6.5 = 1[7] pH 6.5 - <7.0 = 4[7] pH 7.0 - <7.5 = 30[7] pH 7.5 - <8.0 = 250[7] 350[4]	0.7	0.10	<0.10
Bismuth	7440-69-9	NS	NS	NS	NS	NS	NS	0.20	<0.20
Boron (SALM)	7440-42-8	8,500	8,500	15,000	50,000	NS	1	5.0	<5.0
Cadmium	7440-43-9	pH <7.0 = 1[5] pH 7.0 - <7.5 = 3[7] 10[6]	pH ≤7.0 = 1[5] pH 7.0 - <7.5 = 3[7] 20[4]	pH ≤7.0 = 1[5] pH 7.0 - <7.5 = 3[7] pH 7.5 - <8.0 = 20[7] 40[6]	pH ≤7.0 = 1[5] pH 7.0 - <7.5 = 3[7] pH 7.5 - <8.0 = 20[7] pH ≥ 8.0 = 50[7]	pH ≤7.0 = 1[5] pH 7.0 - <7.5 = 3[7] pH 7.5 - <8.0 = 20[7] pH ≥ 8.0 = 50[7]	0.4	0.020	0.024
Calcium	7440-70-2	NS	NS	NS	NS	NS	NS	50	5,530
Chromium, total	7440-47-3	60[8]	100[6]	250[4]	250[4]	250[4]	50	0.50	9.6
Cobalt	7440-48-4	25[4]	25[4]	25[4]	25[5]	25[5]	15	0.10	5.78
Copper	7440-50-8	pH <6.0 = 75[7] 150[4]	pH <6.0 = 75[7] 150[4]	pH <6.0 = 75[7] pH 6.0 - <6.5 = 150[7] 300[4]	pH <6.0 = 75[7] pH 6.0 - <6.5 = 150[7] 300[4]	pH <6.0 = 75[7] pH 6.0 - <6.5 = 150[7] 300[4]	150	0.50	16.4
Iron	7439-89-6	35,000	35,000	35,000	150,000	150,000	30,000	50	16,100
Lead	7439-92-1	120[6]	120[6]	120[6]	pH <5.5 = 120[5] 150[6]	pH <5.5 = 120[5] pH 5.5 - <6.0 = 150[5] pH 6.0 - <6.5 = 800[5] 1,000[4]	300	0.50	1.1
Lithium	7439-93-2	30	30	65	450	450	NS	2.0	4.6
Magnesium	7439-95-4	NS	NS	NS	NS	NS	NS	20	4,640
Manganese	7439-96-5	2,000[4]	2,000[4]	2,000[4]	2,000[4]	2,000[4]	1,000	1.00	242
Mercury	7439-97-6	0.8[8]	10[5]	25[5]	75[4]	75[4]	0.35	0.0500	<0.0500
Molybdenum	7439-98-7	3[9]	15[5]	15[5]	15[5]	15[5]	6	0.10	0.27
Nickel	7440-02-0	pH <7.5 = 70[5] 150[4]	pH <7.5 = 70[5] 150[4]	pH <7.5 = 70[5] 250[4]	pH <7.5 = 70[5] 250[4]	pH <7.5 = 70[5] 250[4]	40	0.50	4.76
Phosphorus	7723-17-0	NS	NS	NS	NS	NS	NS	50	397
Potassium	7440-09-7	NS	NS	NS	NS	NS	NS	100	1,930
Selenium	7782-49-2	1[5]	1[5]	1[5]	1[5]	1[5]	4	0.20	<0.20
Silver	7440-22-4	20	20	40	40	40	1	0.10	<0.10
Sodium	7440-23-5	NS	NS	NS	NS	NS	NS	50	691
Strontium	7440-24-6	9,500	9,500	20,000	150,000	150,000	55	0.50	38.1
Sulfur	7704-34-9	NS	NS	NS	NS	NS	3,000	1,000	<1000
Thallium	7440-28-0	2	9	25	25	25	NS	0.050	<0.050
Tin	740-31-5	5	50	300	300	300	4	2.0	<2.0
Titanium	7440-32-6	NS	NS	NS	NS	NS	NS	1.0	812
Tungsten	7440-33-7	15	15	25	200	200	NS	0.50	4.22
Uranium	7440-61-1	15[9]	30[5]	30[5]	30[5]	30[5]	NS	0.05	0.32
Vanadium	7440-62-2	100[5]	100[5]	100[5]	100[5]	100[5]	75	0.20	52.5
Zinc	7440-66-6	pH <8.0 = 150[7] 200[10]	pH <8.0 = 150[7] pH ≥8.0 = 200[7]	pH <8.0 = 150[7] pH ≥8.0 = 200[7]	pH <8.0 = 150[7] pH ≥8.0 = 200[7]	pH <8.0 = 150[7] pH ≥8.0 = 200[7]	90	2.0	25.2
Zirconium	7440-67-7	NS	NS	NS	NS	NS	NS	1.0	<1.0
Salt									
Chloride ion	16887-00-6	100[5]	100[5]	100[5]	100[5]	100[5]	NS	1.0	<3.8
Sodium ion	17341-25-2	200[4]	200[4]	200[4]	1,000[4]	1,000[4]	NS	1.00	8.18

Notes:

1(a). BC Contaminated Sites Regulation (CSR) Schedule 3.1 Soil Standards, BC Reg 64/2021, dated 11 March 2021.

1(b). Protocol 4 for Contaminated Sites, Determining Background Soil Quality, Dated 13 May 2021.

2. All units are in µg/g unless otherwise specified.

3. **Definitions**

AL = Agricultural Land Use

RL_{LD} = Residential Low Density Land Use

RL_{HD} = Residential High Density Land Use

CL = Commercial Land Use

IL = Industrial Land Use

Bold number represents most stringent applicable standards.

Bold, underlined, and red concentrations exceed the applicable standards.

Bold and blue concentrations indicate parameters for which the laboratory detection limit exceeds the applicable standard.

Bold and purple concentrations exceed the applicable standards, but are less than the Protocol 4 background estimate.

DL = Laboratory detection limit.

< = Less than laboratory detection limit

- = Not analyzed

NS = No standard

N/A = Not applicable

4. Matrix Standard, "toxicity to soil invertebrates and plants", Schedule 3.1 Part 1 of CSR
5. Matrix Standard, "groundwater used for drinking water", Schedule 3.1 Part 1 of CSR
6. Matrix Standard, "intake of contaminated soil", Schedule 3.1 Part 1 of CSR
7. Matrix Standard, "groundwater flow to surface water used by aquatic life", Schedule 3.1 Part 1 of CSR
8. Matrix Standard, "livestock ingesting soil and fodder", Schedule 3.1 Part 1 of CSR
9. Matrix Standard, "groundwater used for irrigation", Schedule 3.1 Part 1 of CSR
10. Matrix Standard, "major microbial impairment", Schedule 3.1 Part 1 of CSR

Prepared By: AR
QAQC By: HZ

METRO TESTING + ENGINEERING

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **VA21C6583**	Page	: 1 of 6
Client	: **Metro Testing & Engineering Ltd.**	Laboratory	: Vancouver - Environmental
Contact	: Umaakant Narang	Account Manager	: Sneha Sansare
Address	: 401-6741 Cariboo Rd. Burnaby BC Canada V3N 4A3	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: MB39458-87413 (Lincoln)	Date Samples Received	: 26-Nov-2021 16:40
PO	: ----	Date Analysis Commenced	: 07-Dec-2021
C-O-C number	: 20-938561	Issue Date	: 08-Dec-2021 20:52
Sampler	: AR		
Site	: ----		
Quote number	: Standing Offer		
No. of samples received	: 2		
No. of samples analysed	: 1		

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.

Signatories	*Position*	*Laboratory Department*
Caleb Deroche	Lab Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Paul Cushing	Team Leader - Organics	Organics, Burnaby, British Columbia
Russell Zhang		Metals, Burnaby, British Columbia

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).

Unit	*Description*
-	No Unit
%	percent
mg/kg	milligrams per kilogram
mg/L	milligrams per litre
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.

Qualifiers

Qualifier	*Description*
DLCI	*Detection Limit Raised: Chromatographic interference due to co-elution.*

Page : 3 of 6
Work Order : VA21C6583
Client : Metro Testing & Engineering Ltd.
Project : MB39458-87413 (Lincoln)

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	BH21-1-1	----	----	----	----
					Client sampling date / time	26-Nov-2021	----	----	----	----
						VA21C6583-001	--------	--------	--------	--------
						Result	----	----	----	----
Physical Tests										
% saturation	----	E141	1.0	%		18.8	----	----	----	----
moisture	----	E144	0.25	%		3.82	----	----	----	----
pH (1:2 soil:water)	----	E108	0.10	pH units		8.36	----	----	----	----
Saturated Paste Extractables										
chloride, soluble ion content	16887-00-6	EC239A.Cl	1.0	mg/kg		<3.8	----	----	----	----
chloride, soluble ion content	16887-00-6	E239.Cl	20	mg/L		<20	----	----	----	----
sodium, soluble ion content	17341-25-2	EC442	1.00	mg/kg		8.18	----	----	----	----
sodium, soluble ion content	17341-25-2	E442	2.0	mg/L		43.5	----	----	----	----
Metals										
aluminum	7429-90-5	E440	50	mg/kg		10900	----	----	----	----
antimony	7440-36-0	E440	0.10	mg/kg		<0.10	----	----	----	----
arsenic	7440-38-2	E440	0.10	mg/kg		1.15	----	----	----	----
barium	7440-39-3	E440	0.50	mg/kg		74.2	----	----	----	----
beryllium	7440-41-7	E440	0.10	mg/kg		<0.10	----	----	----	----
bismuth	7440-69-9	E440	0.20	mg/kg		<0.20	----	----	----	----
boron	7440-42-8	E440	5.0	mg/kg		<5.0	----	----	----	----
cadmium	7440-43-9	E440	0.020	mg/kg		0.024	----	----	----	----
calcium	7440-70-2	E440	50	mg/kg		5530	----	----	----	----
chromium	7440-47-3	E440	0.50	mg/kg		9.57	----	----	----	----
cobalt	7440-48-4	E440	0.10	mg/kg		5.78	----	----	----	----
copper	7440-50-8	E440	0.50	mg/kg		16.4	----	----	----	----
iron	7439-89-6	E440	50	mg/kg		16100	----	----	----	----
lead	7439-92-1	E440	0.50	mg/kg		1.14	----	----	----	----
lithium	7439-93-2	E440	2.0	mg/kg		4.6	----	----	----	----
magnesium	7439-95-4	E440	20	mg/kg		4640	----	----	----	----
manganese	7439-96-5	E440	1.0	mg/kg		242	----	----	----	----
mercury	7439-97-6	E510	0.0500	mg/kg		<0.0500	----	----	----	----
molybdenum	7439-98-7	E440	0.10	mg/kg		0.27	----	----	----	----
nickel	7440-02-0	E440	0.50	mg/kg		4.76	----	----	----	----
phosphorus	7723-14-0	E440	50	mg/kg		397	----	----	----	----
potassium	7440-09-7	E440	100	mg/kg		1930	----	----	----	----

Page : 4 of 6
Work Order : VA21C6583
Client : Metro Testing & Engineering Ltd.
Project : MB39458-87413 (Lincoln)

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	BH21-1-1	----	----	----	----
					Client sampling date / time	26-Nov-2021	----	----	----	----
						VA21C6583-001	--------	--------	--------	--------
						Result	----	----	----	----
Metals										
selenium	7782-49-2	E440	0.20	mg/kg		<0.20	----	----	----	----
silver	7440-22-4	E440	0.10	mg/kg		<0.10	----	----	----	----
sodium	7440-23-5	E440	50	mg/kg		691	----	----	----	----
strontium	7440-24-6	E440	0.50	mg/kg		38.1	----	----	----	----
sulfur	7704-34-9	E440	1000	mg/kg		<1000	----	----	----	----
thallium	7440-28-0	E440	0.050	mg/kg		<0.050	----	----	----	----
tin	7440-31-5	E440	2.0	mg/kg		<2.0	----	----	----	----
titanium	7440-32-6	E440	1.0	mg/kg		812	----	----	----	----
tungsten	7440-33-7	E440	0.50	mg/kg		4.22	----	----	----	----
uranium	7440-61-1	E440	0.050	mg/kg		0.324	----	----	----	----
vanadium	7440-62-2	E440	0.20	mg/kg		52.5	----	----	----	----
zinc	7440-66-6	E440	2.0	mg/kg		25.2	----	----	----	----
zirconium	7440-67-7	E440	1.0	mg/kg		<1.0	----	----	----	----
Volatile Organic Compounds [Fuels]										
benzene	71-43-2	E611A	0.0050	mg/kg		0.0058	----	----	----	----
ethylbenzene	100-41-4	E611A	0.015	mg/kg		<0.015	----	----	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.200	mg/kg		<0.200	----	----	----	----
styrene	100-42-5	E611A	0.050	mg/kg		<0.050	----	----	----	----
toluene	108-88-3	E611A	0.050	mg/kg		<0.050	----	----	----	----
xylene, m+p-	179601-23-1	E611A	0.050	mg/kg		<0.050	----	----	----	----
xylene, o-	95-47-6	E611A	0.050	mg/kg		<0.050	----	----	----	----
xylenes, total	1330-20-7	E611A	0.075	mg/kg		<0.075	----	----	----	----
Volatile Organic Compounds Surrogates										
bromofluorobenzene, 4-	460-00-4	E611A	0.10	%		76.2	----	----	----	----
difluorobenzene, 1,4-	540-36-3	E611A	0.10	%		95.2	----	----	----	----
Hydrocarbons										
EPH (C10-C19)	----	E601A	200	mg/kg		<200	----	----	----	----
EPH (C19-C32)	----	E601A	200	mg/kg		<200	----	----	----	----
VHs (C6-C10)	----	E581.VH+F1	10	mg/kg		<10	----	----	----	----
HEPHs	----	EC600A	200	mg/kg		<200	----	----	----	----
LEPHs	----	EC600A	200	mg/kg		<200	----	----	----	----
VPHs	----	EC580A	10	mg/kg		<10	----	----	----	----

Page	: 5 of 6
Work Order	: VA21C6583
Client	: Metro Testing & Engineering Ltd.
Project	: MB39458-87413 (Lincoln)

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	BH21-1-1	----	----	----	----
					Client sampling date / time	26-Nov-2021	----	----	----	----
						VA21C6583-001	--------	--------	--------	--------
						Result	----	----	----	----
Hydrocarbons Surrogates										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	1.0	%		104	----	----	----	----
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%		81.2	----	----	----	----
Polycyclic Aromatic Hydrocarbons										
acenaphthene	83-32-9	E641A-L	0.0050	mg/kg		<0.0050	----	----	----	----
acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg		<0.0050	----	----	----	----
acridine	260-94-6	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
anthracene	120-12-7	E641A-L	0.0040	mg/kg		<0.0040	----	----	----	----
benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
benzo(b+j)fluoranthene	----	E641A-L	0.010	mg/kg		0.010	----	----	----	----
benzo(b+j+k)fluoranthene	----	E641A-L	0.015	mg/kg		<0.015	----	----	----	----
benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg		0.034	----	----	----	----
benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
chrysene	218-01-9	E641A-L	0.010	mg/kg		<0.020 DLCI	----	----	----	----
dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg		0.0068	----	----	----	----
fluoranthene	206-44-0	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
fluorene	86-73-7	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
naphthalene	91-20-3	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
phenanthrene	85-01-8	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
pyrene	129-00-0	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
quinoline	91-22-5	E641A-L	0.010	mg/kg		<0.010	----	----	----	----
B(a)P total potency equivalents [B(a)P TPE]	----	E641A-L	0.020	mg/kg		<0.020	----	----	----	----
IACR (CCME)	----	E641A-L	0.150	-		0.164	----	----	----	----
Polycyclic Aromatic Hydrocarbons Surrogates										
acridine-d9	34749-75-2	E641A-L	0.1	%		112	----	----	----	----
chrysene-d12	1719-03-5	E641A-L	0.1	%		104	----	----	----	----
naphthalene-d8	1146-65-2	E641A-L	0.1	%		112	----	----	----	----
phenanthrene-d10	1517-22-2	E641A-L	0.1	%		123	----	----	----	----

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

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **VA21C6583**	Page	: 1 of 15
Client	: Metro Testing & Engineering Ltd.	Laboratory	: Vancouver - Environmental
Contact	: Umaakant Narang	Account Manager	: Sneha Sansare
Address	: 401-6741 Cariboo Rd. Burnaby BC Canada V3N 4A3	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: MB39458-87413 (Lincoln)	Date Samples Received	: 26-Nov-2021 16:40
PO	: ----	Date Analysis Commenced	: 07-Dec-2021
C-O-C number	: 20-938561	Issue Date	: 08-Dec-2021 20:52
Sampler	: AR		
Site	: ----		
Quote number	: Standing Offer		
No. of samples received	: 2		
No. of samples analysed	: 1		

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*
Caleb Deroche	Lab Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Paul Cushing	Team Leader - Organics	Organics, Burnaby, British Columbia
Russell Zhang		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 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.

Page	: 3 of 15
Work Order	: VA21C6583
Client	: Metro Testing & Engineering Ltd.
Project	: MB39458-87413 (Lincoln)

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: **Soil/Solid**

					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: 361604)											
FJ2101347-001	Anonymous	pH (1:2 soil:water)	----	E108	0.10	pH units	7.76	7.75	0.1%	5%	----
Physical Tests (QC Lot: 361609)											
FJ2101347-001	Anonymous	moisture	----	E144	0.25	%	12.7	12.9	1.26%	20%	----
Saturated Paste Extractables (QC Lot: 361605)											
VA21C6581-002	Anonymous	chloride, soluble ion content	16887-00-6	E239.Cl	20	mg/L	151	151	0.0516%	30%	----
Saturated Paste Extractables (QC Lot: 361606)											
VA21C6581-002	Anonymous	% saturation	----	E141	1.0	%	29.4	32.0	8.34%	20%	----
Saturated Paste Extractables (QC Lot: 361607)											
VA21C6581-002	Anonymous	sodium, soluble ion content	17341-25-2	E442	2.0	mg/L	84.0	82.8	1.46%	30%	----
Metals (QC Lot: 361595)											
FJ2101347-001	Anonymous	mercury	7439-97-6	E510	0.0500	mg/kg	0.0724	0.0771	0.0046	Diff <2x LOR	----
Metals (QC Lot: 361596)											
FJ2101347-001	Anonymous	aluminum	7429-90-5	E440	50	mg/kg	10500	9880	6.44%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	0.68	0.59	0.10	Diff <2x LOR	----
		arsenic	7440-38-2	E440	0.10	mg/kg	13.8	12.4	10.9%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	423	413	2.23%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.61	0.58	0.02	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		boron	7440-42-8	E440	5.0	mg/kg	10.8	9.9	0.9	Diff <2x LOR	----
		cadmium	7440-43-9	E440	0.020	mg/kg	0.285	0.254	11.5%	30%	----
		calcium	7440-70-2	E440	50	mg/kg	10800	10900	1.47%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	20.2	18.4	9.78%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	8.50	6.90	20.8%	30%	----
		copper	7440-50-8	E440	0.50	mg/kg	21.8	19.9	9.44%	30%	----
		iron	7439-89-6	E440	50	mg/kg	26500	22900	14.7%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	12.6	11.9	5.83%	40%	----
		lithium	7439-93-2	E440	2.0	mg/kg	12.2	11.9	0.3	Diff <2x LOR	----
		magnesium	7439-95-4	E440	20	mg/kg	4120	3580	13.8%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	263	213	20.9%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	1.10	1.03	6.50%	40%	----
		nickel	7440-02-0	E440	0.50	mg/kg	20.9	19.8	5.81%	30%	----

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Laboratory Duplicate (DUP) Report						
					LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Metals (QC Lot: 361596) - continued											
FJ2101347-001	Anonymous	phosphorus	7723-14-0	E440	50	mg/kg	988	860	13.9%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	2480	2400	3.39%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	0.43	0.44	0.008	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	0.35	0.34	0.0006	Diff <2x LOR	----
		sodium	7440-23-5	E440	50	mg/kg	131	124	7	Diff <2x LOR	----
		strontium	7440-24-6	E440	0.50	mg/kg	52.0	55.4	6.29%	40%	----
		sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	0	Diff <2x LOR	----
		thallium	7440-28-0	E440	0.050	mg/kg	0.216	0.231	0.014	Diff <2x LOR	----
		tin	7440-31-5	E440	2.0	mg/kg	<2.0	<2.0	0	Diff <2x LOR	----
		titanium	7440-32-6	E440	1.0	mg/kg	38.7	23.0	50.8%	40%	DUP-H
		tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		uranium	7440-61-1	E440	0.050	mg/kg	0.744	0.642	14.7%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	41.4	36.8	11.7%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	79.2	67.5	15.9%	30%	----
		zirconium	7440-67-7	E440	1.0	mg/kg	1.2	1.1	0.2	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 361741)											
VA21C6581-002	Anonymous	benzene	71-43-2	E611A	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.015	mg/kg	<0.015	<0.015	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.200	mg/kg	<0.200	<0.200	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 361603)											
VA21C6197-032	Anonymous	EPH (C10-C19)	----	E601A	200	mg/kg	<200	<200	0	Diff <2x LOR	----
		EPH (C19-C32)	----	E601A	200	mg/kg	<200	<200	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 361740)											
VA21C6581-002	Anonymous	VHs (C6-C10)	----	E581.VH+F1	10	mg/kg	<10	<10	0	Diff <2x LOR	----
Polycyclic Aromatic Hydrocarbons (QC Lot: 361602)											
VA21C6197-032	Anonymous	acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		acridine	260-94-6	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		anthracene	120-12-7	E641A-L	0.0040	mg/kg	<0.0040	<0.0040	0	Diff <2x LOR	----
		benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----

Page	: 5 of 15
Work Order	: VA21C6583
Client	: Metro Testing & Engineering Ltd.
Project	: MB39458-87413 (Lincoln)

Sub-Matrix: **Soil/Solid**

					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*
Polycyclic Aromatic Hydrocarbons (QC Lot: 361602) - continued											
VA21C6197-032	Anonymous	benzo(b+j)fluoranthene	----	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		chrysene	218-01-9	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		fluoranthene	206-44-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		fluorene	86-73-7	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		naphthalene	91-20-3	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		phenanthrene	85-01-8	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		pyrene	129-00-0	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		quinoline	91-22-5	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----

Qualifiers

Qualifier	*Description*
DUP-H	*Duplicate results outside ALS DQO, due to sample heterogeneity.*

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: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 361609)						
moisture	----	E144	0.25	%	<0.25	----
Saturated Paste Extractables (QCLot: 361605)						
chloride, soluble ion content	16887-00-6	E239.Cl	20	mg/L	<20	----
Saturated Paste Extractables (QCLot: 361606)						
% saturation	----	E141	1	%	50.0	----
Saturated Paste Extractables (QCLot: 361607)						
sodium, soluble ion content	17341-25-2	E442	2	mg/L	<2.0	----
Metals (QCLot: 361595)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 361596)						
aluminum	7429-90-5	E440	50	mg/kg	<50	----
antimony	7440-36-0	E440	0.1	mg/kg	<0.10	----
arsenic	7440-38-2	E440	0.1	mg/kg	<0.10	----
barium	7440-39-3	E440	0.5	mg/kg	<0.50	----
beryllium	7440-41-7	E440	0.1	mg/kg	<0.10	----
bismuth	7440-69-9	E440	0.2	mg/kg	<0.20	----
boron	7440-42-8	E440	5	mg/kg	<5.0	----
cadmium	7440-43-9	E440	0.02	mg/kg	<0.020	----
calcium	7440-70-2	E440	50	mg/kg	<50	----
chromium	7440-47-3	E440	0.5	mg/kg	<0.50	----
cobalt	7440-48-4	E440	0.1	mg/kg	<0.10	----
copper	7440-50-8	E440	0.5	mg/kg	<0.50	----
iron	7439-89-6	E440	50	mg/kg	<50	----
lead	7439-92-1	E440	0.5	mg/kg	<0.50	----
lithium	7439-93-2	E440	2	mg/kg	<2.0	----
magnesium	7439-95-4	E440	20	mg/kg	<20	----
manganese	7439-96-5	E440	1	mg/kg	<1.0	----
molybdenum	7439-98-7	E440	0.1	mg/kg	<0.10	----
nickel	7440-02-0	E440	0.5	mg/kg	<0.50	----
phosphorus	7723-14-0	E440	50	mg/kg	<50	----
potassium	7440-09-7	E440	100	mg/kg	<100	----
selenium	7782-49-2	E440	0.2	mg/kg	<0.20	----
silver	7440-22-4	E440	0.1	mg/kg	<0.10	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 361596) - continued						
sodium	7440-23-5	E440	50	mg/kg	<50	----
strontium	7440-24-6	E440	0.5	mg/kg	<0.50	----
sulfur	7704-34-9	E440	1000	mg/kg	<1000	----
thallium	7440-28-0	E440	0.05	mg/kg	<0.050	----
tin	7440-31-5	E440	2	mg/kg	<2.0	----
titanium	7440-32-6	E440	1	mg/kg	<1.0	----
tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	----
uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----
vanadium	7440-62-2	E440	0.2	mg/kg	<0.20	----
zinc	7440-66-6	E440	2	mg/kg	<2.0	----
zirconium	7440-67-7	E440	1	mg/kg	<1.0	----
Volatile Organic Compounds (QCLot: 361741)						
benzene	71-43-2	E611A	0.005	mg/kg	<0.0050	----
ethylbenzene	100-41-4	E611A	0.015	mg/kg	<0.015	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.04	mg/kg	<0.040	----
styrene	100-42-5	E611A	0.05	mg/kg	<0.050	----
toluene	108-88-3	E611A	0.05	mg/kg	<0.050	----
xylene, m+p-	179601-23-1	E611A	0.05	mg/kg	<0.050	----
xylene, o-	95-47-6	E611A	0.05	mg/kg	<0.050	----
Hydrocarbons (QCLot: 361603)						
EPH (C10-C19)	----	E601A	200	mg/kg	<200	----
EPH (C19-C32)	----	E601A	200	mg/kg	<200	----
Hydrocarbons (QCLot: 361740)						
VHs (C6-C10)	----	E581.VH+F1	10	mg/kg	<10	----
Polycyclic Aromatic Hydrocarbons (QCLot: 361602)						
acenaphthene	83-32-9	E641A-L	0.005	mg/kg	<0.0050	----
acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	<0.0050	----
acridine	260-94-6	E641A-L	0.01	mg/kg	<0.010	----
anthracene	120-12-7	E641A-L	0.004	mg/kg	<0.0040	----
benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	<0.010	----
benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	<0.010	----
benzo(b+j)fluoranthene	----	E641A-L	0.01	mg/kg	<0.010	----
benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	<0.010	----
benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	<0.010	----
chrysene	218-01-9	E641A-L	0.01	mg/kg	<0.010	----
dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	<0.0050	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 361602) - continued						
fluoranthene	206-44-0	E641A-L	0.01	mg/kg	<0.010	----
fluorene	86-73-7	E641A-L	0.01	mg/kg	<0.010	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	<0.010	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	<0.010	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	<0.010	----
naphthalene	91-20-3	E641A-L	0.01	mg/kg	<0.010	----
phenanthrene	85-01-8	E641A-L	0.01	mg/kg	<0.010	----
pyrene	129-00-0	E641A-L	0.01	mg/kg	<0.010	----
quinoline	91-22-5	E641A-L	0.01	mg/kg	<0.010	----

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: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 361604)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 361609)									
moisture	----	E144	0.25	%	50 %	99.9	90.0	110	----
Saturated Paste Extractables (QCLot: 361605)									
chloride, soluble ion content	16887-00-6	E239.Cl	20	mg/L	100 mg/L	101	80.0	120	----
Saturated Paste Extractables (QCLot: 361606)									
% saturation	----	E141	1	%	100 %	102	80.0	120	----
Saturated Paste Extractables (QCLot: 361607)									
sodium, soluble ion content	17341-25-2	E442	2	mg/L	50 mg/L	97.6	80.0	120	----
Metals (QCLot: 361595)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	107	80.0	120	----
Metals (QCLot: 361596)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	94.1	80.0	120	----
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	106	80.0	120	----
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	96.1	80.0	120	----
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	98.9	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	101	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	98.9	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	106	80.0	120	----
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	100	80.0	120	----
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	98.1	80.0	120	----
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	93.2	80.0	120	----
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	96.6	80.0	120	----
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	94.7	80.0	120	----
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	95.5	80.0	120	----
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	101	80.0	120	----
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	100	80.0	120	----
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	102	80.0	120	----
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	95.2	80.0	120	----
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	102	80.0	120	----
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	95.8	80.0	120	----
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	96.5	80.0	120	----

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Work Order	: VA21C6583
Client	: Metro Testing & Engineering Ltd.
Project	: MB39458-87413 (Lincoln)

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 361596) - continued									
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	96.9	80.0	120	----
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	99.0	80.0	120	----
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	89.6	80.0	120	----
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	95.9	80.0	120	----
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	102	80.0	120	----
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	94.4	80.0	120	----
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	101	80.0	120	----
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	101	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	94.2	80.0	120	----
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	101	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	102	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	98.3	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	99.8	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	96.5	80.0	120	----
Volatile Organic Compounds (QCLot: 361741)									
benzene	71-43-2	E611A	0.005	mg/kg	2.5 mg/kg	121	70.0	130	----
ethylbenzene	100-41-4	E611A	0.015	mg/kg	2.5 mg/kg	117	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.04	mg/kg	2.5 mg/kg	114	70.0	130	----
styrene	100-42-5	E611A	0.05	mg/kg	2.5 mg/kg	116	70.0	130	----
toluene	108-88-3	E611A	0.05	mg/kg	2.5 mg/kg	121	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.05	mg/kg	5 mg/kg	122	70.0	130	----
xylene, o-	95-47-6	E611A	0.05	mg/kg	2.5 mg/kg	119	70.0	130	----
Hydrocarbons (QCLot: 361603)									
EPH (C10-C19)	----	E601A	200	mg/kg	1134.37 mg/kg	98.9	70.0	130	----
EPH (C19-C32)	----	E601A	200	mg/kg	575.98 mg/kg	96.5	70.0	130	----
Hydrocarbons (QCLot: 361740)									
VHs (C6-C10)	----	E581.VH+F1	10	mg/kg	85.8 mg/kg	104	70.0	130	----
Polycyclic Aromatic Hydrocarbons (QCLot: 361602)									
acenaphthene	83-32-9	E641A-L	0.005	mg/kg	0.5 mg/kg	83.6	60.0	130	----
acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	0.5 mg/kg	83.8	60.0	130	----
acridine	260-94-6	E641A-L	0.01	mg/kg	0.5 mg/kg	87.6	60.0	130	----
anthracene	120-12-7	E641A-L	0.004	mg/kg	0.5 mg/kg	102	60.0	130	----
benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	0.5 mg/kg	85.7	60.0	130	----
benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	0.5 mg/kg	86.1	60.0	130	----
benzo(b+j)fluoranthene	----	E641A-L	0.01	mg/kg	0.5 mg/kg	90.3	60.0	130	----

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Work Order	: VA21C6583
Client	: Metro Testing & Engineering Ltd.
Project	: MB39458-87413 (Lincoln)

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 361602) - continued									
benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	0.5 mg/kg	104	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	0.5 mg/kg	99.4	60.0	130	----
chrysene	218-01-9	E641A-L	0.01	mg/kg	0.5 mg/kg	101	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	0.5 mg/kg	91.0	60.0	130	----
fluoranthene	206-44-0	E641A-L	0.01	mg/kg	0.5 mg/kg	99.9	60.0	130	----
fluorene	86-73-7	E641A-L	0.01	mg/kg	0.5 mg/kg	99.3	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	0.5 mg/kg	86.8	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	0.5 mg/kg	80.9	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	0.5 mg/kg	79.7	60.0	130	----
naphthalene	91-20-3	E641A-L	0.01	mg/kg	0.5 mg/kg	74.7	50.0	130	----
phenanthrene	85-01-8	E641A-L	0.01	mg/kg	0.5 mg/kg	103	60.0	130	----
pyrene	129-00-0	E641A-L	0.01	mg/kg	0.5 mg/kg	98.9	60.0	130	----
quinoline	91-22-5	E641A-L	0.01	mg/kg	0.5 mg/kg	70.8	60.0	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 >= 1x spike level.

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 361741)										
VA21C6581-002	Anonymous	benzene	71-43-2	E611A	3.18 mg/kg	3.125 mg/kg	130	60.0	140	----
		ethylbenzene	100-41-4	E611A	3.09 mg/kg	3.125 mg/kg	126	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	3.07 mg/kg	3.125 mg/kg	125	60.0	140	----
		styrene	100-42-5	E611A	3.10 mg/kg	3.125 mg/kg	126	60.0	140	----
		toluene	108-88-3	E611A	3.05 mg/kg	3.125 mg/kg	125	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	6.38 mg/kg	6.25 mg/kg	130	60.0	140	----
		xylene, o-	95-47-6	E611A	3.24 mg/kg	3.125 mg/kg	132	60.0	140	----
Hydrocarbons (QCLot: 361603)										
VA21C6581-002	Anonymous	EPH (C10-C19)	----	E601A	840 mg/kg	1134.37 mg/kg	94.5	60.0	140	----
		EPH (C19-C32)	----	E601A	390 mg/kg	575.98 mg/kg	86.9	60.0	140	----
Hydrocarbons (QCLot: 361740)										
VA21C6581-004	Anonymous	VHs (C6-C10)	----	E581.VH+F1	144 mg/kg	171.9 mg/kg	106	60.0	140	----
Polycyclic Aromatic Hydrocarbons (QCLot: 361602)										
FJ2101347-002	Anonymous	acenaphthene	83-32-9	E641A-L	0.316 mg/kg	0.5 mg/kg	84.9	50.0	140	----
		acenaphthylene	208-96-8	E641A-L	0.315 mg/kg	0.5 mg/kg	84.6	50.0	140	----
		acridine	260-94-6	E641A-L	0.350 mg/kg	0.5 mg/kg	93.8	50.0	140	----
		anthracene	120-12-7	E641A-L	0.384 mg/kg	0.5 mg/kg	103	50.0	140	----
		benz(a)anthracene	56-55-3	E641A-L	0.326 mg/kg	0.5 mg/kg	87.4	50.0	140	----
		benzo(a)pyrene	50-32-8	E641A-L	0.344 mg/kg	0.5 mg/kg	92.4	50.0	140	----
		benzo(b+j)fluoranthene	----	E641A-L	0.343 mg/kg	0.5 mg/kg	92.0	50.0	140	----
		benzo(g,h,i)perylene	191-24-2	E641A-L	0.372 mg/kg	0.5 mg/kg	99.7	50.0	140	----
		benzo(k)fluoranthene	207-08-9	E641A-L	0.366 mg/kg	0.5 mg/kg	98.1	50.0	140	----
		chrysene	218-01-9	E641A-L	0.355 mg/kg	0.5 mg/kg	95.1	50.0	140	----
		dibenz(a,h)anthracene	53-70-3	E641A-L	0.349 mg/kg	0.5 mg/kg	93.6	50.0	140	----
		fluoranthene	206-44-0	E641A-L	0.369 mg/kg	0.5 mg/kg	99.0	50.0	140	----
		fluorene	86-73-7	E641A-L	0.374 mg/kg	0.5 mg/kg	100	50.0	140	----
		indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.344 mg/kg	0.5 mg/kg	92.2	50.0	140	----
		methylnaphthalene, 1-	90-12-0	E641A-L	0.314 mg/kg	0.5 mg/kg	84.4	50.0	140	----
		methylnaphthalene, 2-	91-57-6	E641A-L	0.316 mg/kg	0.5 mg/kg	84.9	50.0	140	----
		naphthalene	91-20-3	E641A-L	0.315 mg/kg	0.5 mg/kg	84.6	50.0	140	----
		phenanthrene	85-01-8	E641A-L	0.393 mg/kg	0.5 mg/kg	105	50.0	140	----

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Work Order	: VA21C6583
Client	: Metro Testing & Engineering Ltd.
Project	: MB39458-87413 (Lincoln)

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 361602) - continued										
FJ2101347-002	Anonymous	pyrene	129-00-0	E641A-L	0.359 mg/kg	0.5 mg/kg	96.4	50.0	140	----
		quinoline	91-22-5	E641A-L	0.284 mg/kg	0.5 mg/kg	76.1	50.0	140	----

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Work Order	: VA21C6583
Client	: Metro Testing & Engineering Ltd.
Project	: MB39458-87413 (Lincoln)

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix: **Soil/Solid**

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Saturated Paste Extractables (QCLot: 361605)									
QC-361605-003	RM	chloride, soluble ion content	16887-00-6	E239.Cl	994 mg/L	89.3	70.0	130	----
Saturated Paste Extractables (QCLot: 361606)									
QC-361606-003	RM	% saturation	----	E141	50.2 %	106	70.0	130	----
Saturated Paste Extractables (QCLot: 361607)									
QC-361607-003	RM	sodium, soluble ion content	17341-25-2	E442	610 mg/L	88.4	70.0	130	----
Metals (QCLot: 361595)									
QC-361595-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	102	70.0	130	----
Metals (QCLot: 361596)									
QC-361596-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	99.4	70.0	130	----
QC-361596-003	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	97.9	70.0	130	----
QC-361596-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	108	70.0	130	----
QC-361596-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	100	70.0	130	----
QC-361596-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	105	70.0	130	----
QC-361596-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	114	40.0	160	----
QC-361596-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	99.5	70.0	130	----
QC-361596-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	102	70.0	130	----
QC-361596-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	98.8	70.0	130	----
QC-361596-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	99.7	70.0	130	----
QC-361596-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	99.5	70.0	130	----
QC-361596-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	98.3	70.0	130	----
QC-361596-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	102	70.0	130	----
QC-361596-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	99.1	70.0	130	----
QC-361596-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	107	70.0	130	----
QC-361596-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	103	70.0	130	----
QC-361596-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	100	70.0	130	----
QC-361596-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	97.6	70.0	130	----
QC-361596-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	95.5	70.0	130	----
QC-361596-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	105	70.0	130	----
QC-361596-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	94.9	70.0	130	----

Sub-Matrix: **Soil/Solid**

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Metals (QCLot: 361596) - continued									
QC-361596-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	99.7	70.0	130	----
QC-361596-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	97.8	40.0	160	----
QC-361596-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	93.4	70.0	130	----
QC-361596-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	104	70.0	130	----
QC-361596-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	98.3	70.0	130	----
QC-361596-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	100	70.0	130	----
QC-361596-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	101	70.0	130	----
QC-361596-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	98.2	70.0	130	----

ALS Environmental

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA21C6583**	Page	: 1 of 9
Client	: **Metro Testing & Engineering Ltd.**	Laboratory	: Vancouver - Environmental
Contact	: Umaakant Narang	Account Manager	: Sneha Sansare
Address	: 401-6741 Cariboo Rd. Burnaby BC Canada V3N 4A3	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: MB39458-87413 (Lincoln)	Date Samples Received	: 26-Nov-2021 16:40
PO	: ----	Issue Date	: 08-Dec-2021 20:52
C-O-C number	: 20-938561		
Sampler	: AR		
Site	: ----		
Quote number	: Standing Offer		
No. of samples received	: 2		
No. of samples analysed	: 1		

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.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- Duplicate outliers occur - please see following pages for full details.
- 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.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Soil/Solid**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Duplicate (DUP) RPDs								
Metals	Anonymous	Anonymous	titanium	7440-32-6	E440	50.8 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.

Result Qualifiers

Qualifier	Description
DUP-H	*Duplicate results outside ALS DQO, due to sample heterogeneity.*

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Work Order	: VA21C6583
Client	: Metro Testing & Engineering Ltd.
Project	: MB39458-87413 (Lincoln)

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: **Soil/Solid**

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
Hydrocarbons : BC PHCs - EPH by GC-FID										
Glass soil jar/Teflon lined cap										
BH21-1-1	E601A	26-Nov-2021	07-Dec-2021	14 days	11 days	✓	08-Dec-2021	40 days	1 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial										
BH21-1-1	E581.VH+F1	26-Nov-2021	07-Dec-2021	----	----		08-Dec-2021	40 days	11 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap										
BH21-1-1	E510	26-Nov-2021	08-Dec-2021	----	----		08-Dec-2021	28 days	12 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap										
BH21-1-1	E440	26-Nov-2021	08-Dec-2021	----	----		08-Dec-2021	180 days	12 days	✓
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
BH21-1-1	E144	26-Nov-2021	----	----	----		07-Dec-2021	0 days	----	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
BH21-1-1	E108	26-Nov-2021	08-Dec-2021	----	----		08-Dec-2021	30 days	12 days	✓
Physical Tests : Saturation Percentage										
Glass soil jar/Teflon lined cap										
BH21-1-1	E141	26-Nov-2021	----	----	----		07-Dec-2021	28 days	11 days	✓

Matrix: **Soil/Solid**

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
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap										
BH21-1-1	E641A-L	26-Nov-2021	07-Dec-2021	14 days	11 days	✓	08-Dec-2021	40 days	1 days	✓
Saturated Paste Extractables : Ca, K, Mg, and Na by CRC ICPMS (Saturated Paste, mg/L)										
Glass soil jar/Teflon lined cap										
BH21-1-1	E442	26-Nov-2021	----	----	----		07-Dec-2021	365 days	11 days	✓
Saturated Paste Extractables : Chloride by IC (Saturated Paste)										
Glass soil jar/Teflon lined cap										
BH21-1-1	E239.Cl	26-Nov-2021	----	----	----		08-Dec-2021	365 days	12 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass soil methanol vial										
BH21-1-1	E611A	26-Nov-2021	07-Dec-2021	----	----		08-Dec-2021	40 days	11 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: **Soil/Solid**

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)							
BC PHCs - EPH by GC-FID	E601A	361603	1	14	7.1	5.0	✓
BTEX by Headspace GC-MS	E611A	361741	1	7	14.2	5.0	✓
Ca, K, Mg, and Na by CRC ICPMS (Saturated Paste, mg/L)	E442	361607	1	7	14.2	5.0	✓
Chloride by IC (Saturated Paste)	E239.Cl	361605	1	7	14.2	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	361595	1	15	6.6	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	361596	1	17	5.8	5.0	✓
Moisture Content by Gravimetry	E144	361609	1	10	10.0	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	361602	1	16	6.2	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	361604	1	18	5.5	5.0	✓
Saturation Percentage	E141	361606	1	7	14.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	361740	1	7	14.2	5.0	✓
Laboratory Control Samples (LCS)							
BC PHCs - EPH by GC-FID	E601A	361603	1	14	7.1	5.0	✓
BTEX by Headspace GC-MS	E611A	361741	1	7	14.2	5.0	✓
Ca, K, Mg, and Na by CRC ICPMS (Saturated Paste, mg/L)	E442	361607	2	7	28.5	10.0	✓
Chloride by IC (Saturated Paste)	E239.Cl	361605	2	7	28.5	10.0	✓
Mercury in Soil/Solid by CVAAS	E510	361595	2	15	13.3	10.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	361596	2	17	11.7	10.0	✓
Moisture Content by Gravimetry	E144	361609	1	10	10.0	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	361602	1	16	6.2	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	361604	1	18	5.5	5.0	✓
Saturation Percentage	E141	361606	2	7	28.5	10.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	361740	1	7	14.2	5.0	✓
Method Blanks (MB)							
BC PHCs - EPH by GC-FID	E601A	361603	1	14	7.1	5.0	✓
BTEX by Headspace GC-MS	E611A	361741	1	7	14.2	5.0	✓
Ca, K, Mg, and Na by CRC ICPMS (Saturated Paste, mg/L)	E442	361607	1	7	14.2	5.0	✓
Chloride by IC (Saturated Paste)	E239.Cl	361605	1	7	14.2	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	361595	1	15	6.6	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	361596	1	17	5.8	5.0	✓
Moisture Content by Gravimetry	E144	361609	1	10	10.0	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	361602	1	16	6.2	5.0	✓
Saturation Percentage	E141	361606	1	7	14.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	361740	1	7	14.2	5.0	✓
Matrix Spikes (MS)							
BC PHCs - EPH by GC-FID	E601A	361603	1	14	7.1	5.0	✓
BTEX by Headspace GC-MS	E611A	361741	1	7	14.2	5.0	✓

Matrix: **Soil/Solid**

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*
Matrix Spikes (MS) - Continued							
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	361602	1	16	6.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	361740	1	7	14.2	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
pH by Meter (1:2 Soil:Water Extraction)	E108 Vancouver - Environmental	Soil/Solid	BC Lab Manual	pH is determined by potentiometric measurement with a pH electrode at ambient laboratory temperature (normally 20 ± 5°C), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at <60 ºC) and sieved (10mesh/2mm) sample with ultra pure water at a 1:2 ratio of sediment to water. The pH is then measured by a standard pH probe.
Saturation Percentage	E141 Vancouver - Environmental	Soil/Solid	CSSS Ch. 18 (mod)/AER D50	Saturation Percentage (SP) is determined as the total volume of water present in a saturated paste (in mL) divided by the dry weight of the sample (in grams), expressed as a percentage.
Moisture Content by Gravimetry	E144 Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Chloride by IC (Saturated Paste)	E239.Cl Vancouver - Environmental	Soil/Solid	CSSS Ch. 15 (mod)/EPA 300.1 (mod)	Inorganic anions are analyzed by obtaining a soil extract produced by the saturated paste extraction procedure which is then analyzed by Ion Chromatography with conductivity and/or UV detection.
Metals in Soil/Solid by CRC ICPMS	E440 Vancouver - Environmental	Soil/Solid	EPA 6020B (mod)	This method is intended to liberate metals that may be environmentally available. Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Silicate minerals are not solubilized. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Elemental Sulfur may be poorly recovered by this method. Analysis is by Collision/Reaction Cell ICPMS.
Ca, K, Mg, and Na by CRC ICPMS (Saturated Paste, mg/L)	E442 Vancouver - Environmental	Soil/Solid	CSSS CH15/EPA 6020B (mod)	A soil extract produced by the saturated paste extraction procedure is analyzed for Calcium, Magnesium, Potassium and Sodium by Collision/Reaction Cell ICPMS as per "Soil Sampling Methods of Analysis" By M Carter.
Mercury in Soil/Solid by CVAAS	E510 Vancouver - Environmental	Soil/Solid	EPA 200.2/1631 Appendix (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl, followed by CVAAS analysis.
VH and F1 by Headspace GC-FID	E581.VH+F1 Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. 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.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
BC PHCs - EPH by GC-FID	E601A Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual (EPH in Solids by GC/FID) (mod)	Sample extracts are analyzed by GC-FID for BC hydrocarbon fractions.
BTEX by Headspace GC-MS	E611A Vancouver - Environmental	Soil/Solid	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.
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L Vancouver - Environmental	Soil/Solid	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are extracted with hexane/acetone and analyzed by GC-MS. If reported, IACR (index of additive cancer risk, unitless) and B(a)P toxic potency equivalent (in soil concentration units) are calculated as per CCME PAH Soil Quality Guidelines fact sheet (2010) or ABT1.
Chloride by IC (Saturated Paste) (mg/kg)	EC239A.CI Vancouver - Environmental	Soil/Solid	CSSS Ch. 15 (mod)/EPA 300.1 (mod)	Inorganic anions are analyzed by obtaining a soil extract produced by the saturated paste extraction procedure which is then analyzed by Ion Chromatography with conductivity and/or UV detection.
Ca, K, Mg, Na by ICPMS (Saturated Paste, mg/kg)	EC442 Vancouver - Environmental	Soil/Solid	CSSS CH15/EPA 6020B (mod)	A soil extract produced by the saturated paste extraction procedure is analyzed for Calcium, Magnesium, Potassium, Sodium by ICPMS.
VPH: VH-BTEX-Styrene	EC580A Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VH-BTEX = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.
LEPH and HEPH: EPH-PAH	EC600A Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual (LEPH and HEPH) (mod)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(b+j+k)fluoranthene, Benzo(a)pyrene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, and Pyrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH/EC	EP108 Vancouver - Environmental	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.
Digestion for Metals and Mercury	EP440 Vancouver - Environmental	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl. This method is intended to liberate metals that may be environmentally available.
VOCs Methanol Extraction for Headspace Analysis	EP581 Vancouver - Environmental	Soil/Solid	EPA 5035A (mod)	VOCs in samples are extracted with methanol. Extracts are then 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.

Preparation Methods	*Method / Lab*	*Matrix*	*Method Reference*	*Method Descriptions*
PHCs and PAHs Hexane-Acetone Tumbler Extraction	EP601 Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1 (mod)	Samples are subsampled and Petroleum Hydrocarbons (PHC) and PAHs are extracted with 1:1 hexane:acetone using a rotary extractor.

TEST HOLE LOGS

Client: City of Coquitlam **Project No: MB39458-3**

Project: City Of Coquitlam 2022 Roads Rehab
87413 Pipeline/Lincoln PRV Relocation

Date of Investigation: November 26, 2021
Sta 0+00 at centre of Int Pipeline & Lincoln

Test Hole ID	Depth (m)	Soil Description	Moisture Content (%)	
			Depth (m)	(%)
TH #1 Sta 0+31m west and 1m from north side	0 – 100mm 100-200mm 200 – 600mm	Asphaltic concrete alligatored Gray sand and gravel (mulch) Tan sand with large cobbles Could not drill deeper hole discontinued		