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To: [Environmental Compliance ENV:EX](#); marty@chholdings.ca; sgarthwaite@sperlinghansen.com
Subject: SPO MO1701: File 311372 Progress Report
Date: Monday, October 2, 2017 5:24:27 PM
Attachments: COA_SHA LE-1 7090659_September 2017.pdf
COA_SHA LE-1 7090659_September 2017.xls
COC_SHA SW1, MW6, MW3, MW2, DUP,FB_September 2017.pdf
2017 Surface Water Quality DATA-CLOSURE PLAN.pdf
PRJ17039 - September 30th Construction QAQC Report FULL.pdf

Please find the reporting requirements for File 311372 for the September 30, 2017 period.

ENVIRONMENTAL MONITORING SAMPLING as per Section 4 FILE 311372

SAMPLE LOCATION	SAMPLED (Y/N)	RESULTS
SHA-LE-1	Y	COA ATTACHED
SHA-LD-1	N (Dry Conditions)	N/A
SHA-SW-1	Y	COC ATTACHED
SHA-SW-2	N (Dry Conditions)	N/A
MW-2	Y	COC ATTACHED
MW-3	Y	COC ATTACHED
MW-6	Y	COC ATTACHED
DUPLICATE	Y	COC ATTACHED
FIELD BLANK	Y	COC ATTACHED

ATTACHED

Progress Report as per Section 6 File 311372

Water Quality Results as per Section 6Biii File 311372

Drop Box Link to Progress Report is also provided

<https://www.dropbox.com/s/1paaw761yv3ppct/PRJ17039%20-%20September%2030th%20Construction%20QAQC%20Report%20FULL.pdf?dl=0>



**PRJ17039 - September 30th
Construction QAQC Report
FULL.pdf**

www.dropbox.com

Shared with Dropbox

Thank you,

CERTIFICATE OF ANALYSIS

REPORTED TO Allterra Construction
2158 Millstream Road
Victoria, BC V9B 6H4

TEL (250) 508-0726
FAX

ATTENTION Rahim Gaidhar

WORK ORDER 7090659

PO NUMBER P15-06 SIRM

RECEIVED / TEMP 2017-09-08 12:00 / 13°C

PROJECT P17-932

REPORTED 2017-09-27

PROJECT INFO

COC NUMBER 20170907

General Comments:

CARO Analytical Services employs methods which are conducted according to procedures accepted by appropriate regulatory agencies, and/or are conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts, except where otherwise agreed to by the client.

The results in this report apply to the samples analyzed in accordance with the Chain of Custody or Sample Requisition document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Samples will be disposed of 30 days after the test report has been issued unless otherwise agreed to in writing.



Authorized By:

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Account Manager

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REPORTED TO Allterra Construction
PROJECT P17-932

WORK ORDER 7090659
REPORTED 2017-09-27

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Chain of Custody Document Analysis instructions provided by client	Appendix 5
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REPORTED TO PROJECT Allterra Construction
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WORK ORDER REPORTED 7090659
2017-09-27

Analysis Description	Method Reference	Technique	Location
Alkalinity in Water	APHA 2320 B*	Titration with H ₂ SO ₄	Kelowna
Anions by IC in Water	APHA 4110 B	Ion Chromatography with Chemical Suppression of Eluent Conductivity	Kelowna
Colour, True in Water	APHA 2120 C	Spectrophotometry (456 nm)	Kelowna
Conductivity in Water	APHA 2510 B	Conductivity Meter	Kelowna
Dissolved Metals by ICPMS in Water	APHA 3030 B / EPA 6020B	0.45 µm Filtration / Inductively Coupled Plasma-Mass Spectrometry (ICP-MS)	Richmond
EPH in Water	EPA 3511* / BCMOE EPHw	Hexane MicroExtraction (Base/Neutral) / Gas Chromatography (GC-FID)	Richmond
Hardness (as CaCO ₃) in Water	APHA 2340 B	Calculation: 2.497 [diss Ca] + 4.118 [diss Mg]	N/A
HEPHw in Water	BCMOE LEPH/HEPH	Calculation	N/A
LEPHw in Water	BCMOE LEPH/HEPH	Calculation	N/A
Mercury, total by CVAFS in Water	EPA 245.7*	BrCl ₂ Oxidation / Cold Vapor Atomic Fluorescence Spectrometry (CVAFS)	Richmond
pH in Water	APHA 4500-H+ B	Electrometry	Kelowna
Polycyclic Aromatic Hydrocarbons in Water	EPA 3511* / EPA 8270D	Hexane MicroExtraction (Base/Neutral) / GC-MS (SIM)	Richmond
Solids, Total Suspended in Water	APHA 2540 D*	Gravimetry (Dried at 103-105C)	Kelowna
Total Metals by ICPMS in Water	APHA 3030 E* / EPA 6020B	HNO ₃ +HCl Hot Block Digestion / Inductively Coupled Plasma-Mass Spectrometry (ICP-MS)	Richmond

Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method

Method Reference Descriptions:

APHA	Standard Methods for the Examination of Water and Wastewater, 22nd Edition, American Public Health Association/American Water Works Association/Water Environment Federation
BCMOE	British Columbia Environmental Laboratory Manual, 2013, British Columbia Ministry of Environment
EPA	United States Environmental Protection Agency Test Methods

Glossary of Terms:

MRL	Method Reporting Limit
<	Less than the Reported Detection Limit (RDL) - the RDL may be higher than the MRL due to various factors such as dilutions, limited sample volume, high moisture, or interferences
CU	Colour Units (referenced against a platinum cobalt standard)
mg/L	Milligrams per litre
pH units	pH < 7 = acidic, pH > 7 = basic
µg/L	Micrograms per litre
µS/cm	Microsiemens per centimetre

SAMPLE ANALYTICAL DATA

REPORTED TO PROJECT Allterra Construction
P17-932

WORK ORDER REPORTED 7090659
2017-09-27

Analyte	Result / Recovery	MRL / Limits	Units	Prepared	Analyzed	Notes
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Sample ID: SHA-LE-1 (7090659-01) [Water] Sampled: 2017-09-07 11:30

Anions

Chloride	5080	0.10	mg/L	N/A	2017-09-14	
Fluoride	< 0.10	0.10	mg/L	N/A	2017-09-12	
Nitrate (as N)	0.744	0.010	mg/L	N/A	2017-09-12	
Nitrite (as N)	< 0.010	0.010	mg/L	N/A	2017-09-12	
Sulfate	22000	1.0	mg/L	N/A	2017-09-14	

General Parameters

Alkalinity, Total (as CaCO ₃)	106	1.0	mg/L	N/A	2017-09-13	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0	mg/L	N/A	2017-09-13	
Alkalinity, Bicarbonate (as CaCO ₃)	106	1.0	mg/L	N/A	2017-09-13	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0	mg/L	N/A	2017-09-13	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0	mg/L	N/A	2017-09-13	
Colour, True	10	5.0	CU	N/A	2017-09-08	
Conductivity (EC)	16700	2.0	µS/cm	N/A	2017-09-13	
pH	7.70	0.10	pH units	N/A	2017-09-13	HT2
Solids, Total Suspended	8.6	2.0	mg/L	N/A	2017-09-12	

Calculated Parameters

Hardness, Total (as CaCO ₃)	5150	0.500	mg/L	N/A	N/A	
Nitrate+Nitrite (as N)	0.744	0.0200	mg/L	N/A	N/A	

Dissolved Metals

Aluminum, dissolved	0.0094	0.0050	mg/L	N/A	2017-09-15	
Antimony, dissolved	0.00024	0.00020	mg/L	N/A	2017-09-15	
Arsenic, dissolved	< 0.00050	0.00050	mg/L	N/A	2017-09-15	
Barium, dissolved	0.118	0.0050	mg/L	N/A	2017-09-15	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	N/A	2017-09-15	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	N/A	2017-09-15	
Boron, dissolved	0.520	0.0050	mg/L	N/A	2017-09-15	
Cadmium, dissolved	0.00172	0.000010	mg/L	N/A	2017-09-15	
Calcium, dissolved	1350	0.20	mg/L	N/A	2017-09-15	
Chromium, dissolved	0.00083	0.00050	mg/L	N/A	2017-09-15	
Cobalt, dissolved	0.00649	0.00010	mg/L	N/A	2017-09-15	
Copper, dissolved	0.00390	0.00040	mg/L	N/A	2017-09-15	
Iron, dissolved	0.020	0.010	mg/L	N/A	2017-09-15	
Lead, dissolved	< 0.00020	0.00020	mg/L	N/A	2017-09-15	
Lithium, dissolved	0.00134	0.00010	mg/L	N/A	2017-09-15	
Magnesium, dissolved	430	0.010	mg/L	N/A	2017-09-15	
Manganese, dissolved	34.0	0.00020	mg/L	N/A	2017-09-15	
Mercury, dissolved	< 0.000040	0.000040	mg/L	N/A	2017-09-15	
Molybdenum, dissolved	0.00179	0.00010	mg/L	N/A	2017-09-15	
Nickel, dissolved	0.00924	0.00040	mg/L	N/A	2017-09-15	
Phosphorus, dissolved	< 0.050	0.050	mg/L	N/A	2017-09-15	
Potassium, dissolved	36.2	0.10	mg/L	N/A	2017-09-15	
Selenium, dissolved	0.00056	0.00050	mg/L	N/A	2017-09-15	
Silicon, dissolved	9.0	1.0	mg/L	N/A	2017-09-15	

SAMPLE ANALYTICAL DATA

REPORTED TO PROJECT Allterra Construction
P17-932

WORK ORDER REPORTED 7090659
2017-09-27

Analyte	Result / Recovery	MRL / Limits	Units	Prepared	Analyzed	Notes
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Sample ID: SHA-LE-1 (7090659-01) [Water] Sampled: 2017-09-07 11:30, Continued

Dissolved Metals, Continued

Silver, dissolved	0.000075	0.000050	mg/L	N/A	2017-09-15
Sodium, dissolved	2660	0.10	mg/L	N/A	2017-09-15
Strontium, dissolved	7.38	0.0010	mg/L	N/A	2017-09-15
Sulfur, dissolved	890	3.0	mg/L	N/A	2017-09-15
Tellurium, dissolved	< 0.00050	0.00050	mg/L	N/A	2017-09-15
Thallium, dissolved	< 0.000020	0.000020	mg/L	N/A	2017-09-15
Thorium, dissolved	< 0.00010	0.00010	mg/L	N/A	2017-09-15
Tin, dissolved	< 0.00020	0.00020	mg/L	N/A	2017-09-15
Titanium, dissolved	< 0.0050	0.0050	mg/L	N/A	2017-09-15
Uranium, dissolved	0.00256	0.000020	mg/L	N/A	2017-09-15
Vanadium, dissolved	< 0.0010	0.0010	mg/L	N/A	2017-09-15
Zinc, dissolved	0.0107	0.0040	mg/L	N/A	2017-09-15
Zirconium, dissolved	< 0.00010	0.00010	mg/L	N/A	2017-09-15

Total Metals

Aluminum, total	0.154	0.0050	mg/L	2017-09-14	2017-09-15
Antimony, total	0.00021	0.00020	mg/L	2017-09-14	2017-09-15
Arsenic, total	0.00062	0.00050	mg/L	2017-09-14	2017-09-15
Barium, total	0.132	0.0050	mg/L	2017-09-14	2017-09-15
Beryllium, total	< 0.00010	0.00010	mg/L	2017-09-14	2017-09-15
Bismuth, total	< 0.00010	0.00010	mg/L	2017-09-14	2017-09-15
Boron, total	0.596	0.0050	mg/L	2017-09-14	2017-09-15
Cadmium, total	0.00184	0.000010	mg/L	2017-09-14	2017-09-15
Calcium, total	1430	0.20	mg/L	2017-09-14	2017-09-15
Chromium, total	0.00074	0.00050	mg/L	2017-09-14	2017-09-15
Cobalt, total	0.00712	0.00010	mg/L	2017-09-14	2017-09-15
Copper, total	0.00455	0.00040	mg/L	2017-09-14	2017-09-15
Iron, total	0.359	0.010	mg/L	2017-09-14	2017-09-15
Lead, total	< 0.00020	0.00020	mg/L	2017-09-14	2017-09-15
Lithium, total	0.00157	0.00010	mg/L	2017-09-14	2017-09-15
Magnesium, total	453	0.010	mg/L	2017-09-14	2017-09-15
Manganese, total	36.8	0.00020	mg/L	2017-09-14	2017-09-15
Mercury, total	< 0.000010	0.000010	mg/L	2017-09-13	2017-09-13
Molybdenum, total	0.00179	0.00010	mg/L	2017-09-14	2017-09-15
Nickel, total	0.00977	0.00040	mg/L	2017-09-14	2017-09-15
Phosphorus, total	< 0.050	0.050	mg/L	2017-09-14	2017-09-15
Potassium, total	38.4	0.10	mg/L	2017-09-14	2017-09-15
Selenium, total	0.00062	0.00050	mg/L	2017-09-14	2017-09-15
Silicon, total	9.5	1.0	mg/L	2017-09-14	2017-09-15
Silver, total	0.000093	0.000050	mg/L	2017-09-14	2017-09-15
Sodium, total	2770	0.10	mg/L	2017-09-14	2017-09-15
Strontium, total	7.98	0.0010	mg/L	2017-09-14	2017-09-15
Sulfur, total	928	3.0	mg/L	2017-09-14	2017-09-15
Tellurium, total	< 0.00050	0.00050	mg/L	2017-09-14	2017-09-15
Thallium, total	< 0.000020	0.000020	mg/L	2017-09-14	2017-09-15
Thorium, total	< 0.00010	0.00010	mg/L	2017-09-14	2017-09-15

SAMPLE ANALYTICAL DATA

REPORTED TO PROJECT Allterra Construction
P17-932

WORK ORDER REPORTED 7090659
2017-09-27

Analyte	Result / Recovery	MRL / Limits	Units	Prepared	Analyzed	Notes
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Sample ID: SHA-LE-1 (7090659-01) [Water] Sampled: 2017-09-07 11:30, Continued

Total Metals, Continued

Tin, total	< 0.00020	0.00020	mg/L	2017-09-14	2017-09-15	
Titanium, total	0.0107	0.0050	mg/L	2017-09-14	2017-09-15	
Uranium, total	0.00271	0.000020	mg/L	2017-09-14	2017-09-15	
Vanadium, total	0.0010	0.0010	mg/L	2017-09-14	2017-09-15	
Zinc, total	0.0133	0.0040	mg/L	2017-09-14	2017-09-15	
Zirconium, total	< 0.00010	0.00010	mg/L	2017-09-14	2017-09-15	

BCMOE Aggregate Hydrocarbons

EPHw10-19	< 250	250	µg/L	2017-09-13	2017-09-13	
EPHw19-32	< 250	250	µg/L	2017-09-13	2017-09-13	
LEPHw	< 250	250	µg/L	N/A	N/A	
HEPHw	< 250	250	µg/L	N/A	N/A	
Surrogate: 2-Methylnonane (EPH/F2-4)	72	60-140	%	2017-09-13	2017-09-13	

Polycyclic Aromatic Hydrocarbons (PAH)

Acenaphthene	< 0.050	0.050	µg/L	2017-09-13	2017-09-14	
Acenaphthylene	< 0.200	0.200	µg/L	2017-09-13	2017-09-14	
Acridine	< 0.050	0.050	µg/L	2017-09-13	2017-09-14	
Anthracene	< 0.010	0.010	µg/L	2017-09-13	2017-09-14	
Benz(a)anthracene	< 0.010	0.010	µg/L	2017-09-13	2017-09-14	
Benzo(a)pyrene	< 0.010	0.010	µg/L	2017-09-13	2017-09-14	
Benzo(b)fluoranthene	< 0.050	0.050	µg/L	2017-09-13	2017-09-14	
Benzo(b+j)fluoranthene	< 0.050	0.050	µg/L	2017-09-13	2017-09-14	
Benzo(g,h,i)perylene	< 0.050	0.050	µg/L	2017-09-13	2017-09-14	
Benzo(k)fluoranthene	< 0.050	0.050	µg/L	2017-09-13	2017-09-14	
Chrysene	< 0.050	0.050	µg/L	2017-09-13	2017-09-14	
Dibenz(a,h)anthracene	< 0.010	0.010	µg/L	2017-09-13	2017-09-14	
Fluoranthene	< 0.030	0.030	µg/L	2017-09-13	2017-09-14	
Fluorene	< 0.050	0.050	µg/L	2017-09-13	2017-09-14	
Indeno(1,2,3-cd)pyrene	< 0.050	0.050	µg/L	2017-09-13	2017-09-14	
Naphthalene	< 0.200	0.200	µg/L	2017-09-13	2017-09-14	
Phenanthrene	< 0.100	0.100	µg/L	2017-09-13	2017-09-14	
Pyrene	< 0.020	0.020	µg/L	2017-09-13	2017-09-14	
Quinoline	< 0.050	0.050	µg/L	2017-09-13	2017-09-14	
Surrogate: Acridine-d9	74	50-140	%	2017-09-13	2017-09-14	
Surrogate: Naphthalene-d8	97	50-140	%	2017-09-13	2017-09-14	
Surrogate: Perylene-d12	79	50-140	%	2017-09-13	2017-09-14	

Sample / Analysis Qualifiers:

HT2 The 15 minute recommended holding time (from sampling to analysis) has been exceeded - field analysis is recommended.

APPENDIX 1: QUALITY CONTROL DATA

REPORTED TO PROJECT Allterra Construction
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The following section displays the quality control (QC) data that is associated with your sample data. Groups of samples are prepared in "batches" and analyzed in conjunction with QC samples that ensure your data is of the highest quality. Common QC types include:

- **Method Blank (Blk):** Laboratory reagent water is carried through sample preparation and analysis steps. Method Blanks indicate that results are free from contamination, i.e. not biased high from sources such as the sample container or the laboratory environment
- **Duplicate (Dup):** Preparation and analysis of a replicate aliquot of a sample. Duplicates provide a measure of the analytical method's precision, i.e. how reproducible a result is. Duplicates are only reported if they are associated with your sample data.
- **Blank Spike (BS):** A known amount of standard is carried through sample preparation and analysis steps. Blank Spikes, also known as laboratory control samples (LCS), are prepared from a different source of standard than used for the calibration. They ensure that the calibration is acceptable (i.e. not biased high or low) and also provide a measure of the analytical method's accuracy (i.e. closeness of the result to a target value).
- **Standard Reference Material (SRM):** A material of similar matrix to the samples, externally certified for the parameter(s) listed. Standard Reference Materials ensure that the preparation steps in the method are adequate to achieve acceptable recoveries of the parameter(s) tested.

Each QC type is analyzed at a 5-10% frequency, i.e. one blank/duplicate/spike for every 10 samples. For all types of QC, the specified recovery (% Rec) and relative percent difference (RPD) limits are derived from long-term method performance averages and/or prescribed by the reference method.

Analyte	Result	MRL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Notes
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Anions, Batch B7I0651

Blank (B7I0651-BLK1)			Prepared: 2017-09-12, Analyzed: 2017-09-12						
Chloride	< 0.10	0.10 mg/L							
Fluoride	< 0.10	0.10 mg/L							
Nitrate (as N)	< 0.010	0.010 mg/L							
Nitrite (as N)	< 0.010	0.010 mg/L							
Sulfate	< 1.0	1.0 mg/L							
LCS (B7I0651-BS1)			Prepared: 2017-09-12, Analyzed: 2017-09-12						
Chloride	16.0	0.10 mg/L	16.0		100	90-110			
Fluoride	3.68	0.10 mg/L	4.00		92	88-108			
Nitrate (as N)	3.96	0.010 mg/L	4.00		99	93-108			
Nitrite (as N)	1.93	0.010 mg/L	2.00		97	85-114			
Sulfate	15.8	1.0 mg/L	16.0		99	91-109			

BCMOE Aggregate Hydrocarbons, Batch B7I0835

Blank (B7I0835-BLK1)			Prepared: 2017-09-13, Analyzed: 2017-09-13						
EPHw10-19	< 250	250 µg/L							
EPHw19-32	< 250	250 µg/L							
Surrogate: 2-Methylnonane (EPH/F2-4)	314	µg/L	444		71	60-140			
LCS (B7I0835-BS2)			Prepared: 2017-09-13, Analyzed: 2017-09-13						
EPHw10-19	14800	250 µg/L	15500		95	70-130			
EPHw19-32	20500	250 µg/L	22100		93	70-130			
Surrogate: 2-Methylnonane (EPH/F2-4)	451	µg/L	444		102	60-140			

Dissolved Metals, Batch B7I0909

Blank (B7I0909-BLK1)			Prepared: 2017-09-15, Analyzed: 2017-09-15						
Aluminum, dissolved	< 0.0050	0.0050 mg/L							
Antimony, dissolved	< 0.00020	0.00020 mg/L							
Arsenic, dissolved	< 0.00050	0.00050 mg/L							

APPENDIX 1: QUALITY CONTROL DATA

REPORTED TO PROJECT Allterra Construction
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2017-09-27

Analyte	Result	MRL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Notes
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Dissolved Metals, Batch B710909, Continued

Blank (B710909-BLK1), Continued

Prepared: 2017-09-15, Analyzed: 2017-09-15

Barium, dissolved	< 0.0050	0.0050 mg/L							
Beryllium, dissolved	< 0.00010	0.00010 mg/L							
Bismuth, dissolved	< 0.00010	0.00010 mg/L							
Boron, dissolved	< 0.0050	0.0050 mg/L							
Cadmium, dissolved	< 0.000010	0.000010 mg/L							
Calcium, dissolved	< 0.20	0.20 mg/L							
Chromium, dissolved	< 0.00050	0.00050 mg/L							
Cobalt, dissolved	< 0.00010	0.00010 mg/L							
Copper, dissolved	< 0.00040	0.00040 mg/L							
Iron, dissolved	< 0.010	0.010 mg/L							
Lead, dissolved	< 0.00020	0.00020 mg/L							
Lithium, dissolved	< 0.00010	0.00010 mg/L							
Magnesium, dissolved	< 0.010	0.010 mg/L							
Manganese, dissolved	< 0.00020	0.00020 mg/L							
Mercury, dissolved	< 0.000040	0.000040 mg/L							
Molybdenum, dissolved	< 0.00010	0.00010 mg/L							
Nickel, dissolved	< 0.00040	0.00040 mg/L							
Phosphorus, dissolved	< 0.050	0.050 mg/L							
Potassium, dissolved	< 0.10	0.10 mg/L							
Selenium, dissolved	< 0.00050	0.00050 mg/L							
Silicon, dissolved	< 1.0	1.0 mg/L							
Silver, dissolved	< 0.000050	0.000050 mg/L							
Sodium, dissolved	< 0.10	0.10 mg/L							
Strontium, dissolved	< 0.0010	0.0010 mg/L							
Sulfur, dissolved	< 3.0	3.0 mg/L							
Tellurium, dissolved	< 0.00050	0.00050 mg/L							
Thallium, dissolved	< 0.000020	0.000020 mg/L							
Thorium, dissolved	< 0.00010	0.00010 mg/L							
Tin, dissolved	< 0.00020	0.00020 mg/L							
Titanium, dissolved	< 0.0050	0.0050 mg/L							
Uranium, dissolved	< 0.000020	0.000020 mg/L							
Vanadium, dissolved	< 0.0010	0.0010 mg/L							
Zinc, dissolved	< 0.0040	0.0040 mg/L							
Zirconium, dissolved	< 0.00010	0.00010 mg/L							

LCS (B710909-BS1)

Prepared: 2017-09-15, Analyzed: 2017-09-15

Aluminum, dissolved	0.0233	0.0050 mg/L	0.0200	117	80-120
Antimony, dissolved	0.0194	0.00020 mg/L	0.0200	97	80-120
Arsenic, dissolved	0.0194	0.00050 mg/L	0.0200	97	80-120
Barium, dissolved	0.0189	0.0050 mg/L	0.0200	94	80-120
Beryllium, dissolved	0.0211	0.00010 mg/L	0.0200	105	80-120
Bismuth, dissolved	0.0213	0.00010 mg/L	0.0200	107	80-120
Boron, dissolved	0.0197	0.0050 mg/L	0.0200	98	80-120
Cadmium, dissolved	0.0193	0.000010 mg/L	0.0200	97	80-120
Calcium, dissolved	1.89	0.20 mg/L	2.00	94	80-120
Chromium, dissolved	0.0196	0.00050 mg/L	0.0200	98	80-120
Cobalt, dissolved	0.0203	0.00010 mg/L	0.0200	102	80-120
Copper, dissolved	0.0211	0.00040 mg/L	0.0200	106	80-120
Iron, dissolved	1.94	0.010 mg/L	2.00	97	80-120
Lead, dissolved	0.0211	0.00020 mg/L	0.0200	106	80-120
Lithium, dissolved	0.0220	0.00010 mg/L	0.0200	110	80-120
Magnesium, dissolved	2.06	0.010 mg/L	2.00	103	80-120
Manganese, dissolved	0.0192	0.00020 mg/L	0.0200	96	80-120
Mercury, dissolved	0.000869	0.000040 mg/L	0.00100	87	80-120
Molybdenum, dissolved	0.0187	0.00010 mg/L	0.0200	94	80-120
Nickel, dissolved	0.0198	0.00040 mg/L	0.0200	99	80-120
Phosphorus, dissolved	1.89	0.050 mg/L	2.00	95	80-120

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Analyte	Result	MRL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Notes
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Dissolved Metals, Batch B7I0909, Continued

LCS (B7I0909-BS1), Continued				Prepared: 2017-09-15, Analyzed: 2017-09-15					
Potassium, dissolved	1.98	0.10 mg/L	2.00		99	80-120			
Selenium, dissolved	0.0218	0.00050 mg/L	0.0200		109	80-120			
Silicon, dissolved	2.1	1.0 mg/L	2.00		105	80-120			
Silver, dissolved	0.0202	0.000050 mg/L	0.0200		101	80-120			
Sodium, dissolved	2.16	0.10 mg/L	2.40		90	80-120			
Strontium, dissolved	0.0187	0.0010 mg/L	0.0200		93	80-120			
Sulfur, dissolved	4.5	3.0 mg/L	5.00		89	80-120			
Tellurium, dissolved	0.0197	0.00050 mg/L	0.0200		98	80-120			
Thallium, dissolved	0.0212	0.000020 mg/L	0.0200		106	80-120			
Thorium, dissolved	0.0205	0.00010 mg/L	0.0200		103	80-120			
Tin, dissolved	0.0202	0.00020 mg/L	0.0200		101	80-120			
Titanium, dissolved	0.0192	0.0050 mg/L	0.0200		96	80-120			
Uranium, dissolved	0.0218	0.000020 mg/L	0.0200		109	80-120			
Vanadium, dissolved	0.0191	0.0010 mg/L	0.0200		95	80-120			
Zinc, dissolved	0.0214	0.0040 mg/L	0.0200		107	80-120			
Zirconium, dissolved	0.0201	0.00010 mg/L	0.0200		100	80-120			

Reference (B7I0909-SRM1)				Prepared: 2017-09-15, Analyzed: 2017-09-15					
Aluminum, dissolved	0.242	0.0050 mg/L	0.233		104	79-114			
Antimony, dissolved	0.0469	0.00020 mg/L	0.0430		109	89-123			
Arsenic, dissolved	0.451	0.00050 mg/L	0.438		103	87-113			
Barium, dissolved	3.30	0.0050 mg/L	3.35		99	85-114			
Beryllium, dissolved	0.235	0.00010 mg/L	0.213		110	79-122			
Boron, dissolved	1.68	0.0050 mg/L	1.74		97	79-117			
Cadmium, dissolved	0.228	0.000010 mg/L	0.224		102	89-112			
Calcium, dissolved	7.75	0.20 mg/L	7.69		101	85-120			
Chromium, dissolved	0.459	0.00050 mg/L	0.437		105	87-113			
Cobalt, dissolved	0.137	0.00010 mg/L	0.128		107	90-117			
Copper, dissolved	0.908	0.00040 mg/L	0.844		108	90-115			
Iron, dissolved	1.31	0.010 mg/L	1.29		101	86-112			
Lead, dissolved	0.118	0.00020 mg/L	0.112		106	90-113			
Lithium, dissolved	0.117	0.00010 mg/L	0.104		112	77-127			
Magnesium, dissolved	7.33	0.010 mg/L	6.92		106	84-116			
Manganese, dissolved	0.353	0.00020 mg/L	0.345		102	85-113			
Molybdenum, dissolved	0.428	0.00010 mg/L	0.426		100	87-112			
Nickel, dissolved	0.896	0.00040 mg/L	0.840		107	90-114			
Phosphorus, dissolved	0.489	0.050 mg/L	0.495		99	74-119			
Potassium, dissolved	3.26	0.10 mg/L	3.19		102	78-119			
Selenium, dissolved	0.0366	0.00050 mg/L	0.0331		111	89-123			
Sodium, dissolved	20.3	0.10 mg/L	19.1		106	81-117			
Strontium, dissolved	0.891	0.0010 mg/L	0.916		97	82-111			
Thallium, dissolved	0.0418	0.000020 mg/L	0.0393		106	90-113			
Uranium, dissolved	0.283	0.000020 mg/L	0.266		106	87-113			
Vanadium, dissolved	0.893	0.0010 mg/L	0.869		103	85-110			
Zinc, dissolved	0.912	0.0040 mg/L	0.881		103	88-114			

General Parameters, Batch B7I0512

Blank (B7I0512-BLK1)				Prepared: 2017-09-08, Analyzed: 2017-09-08					
Colour, True	< 5.0	5.0 CU							
Blank (B7I0512-BLK2)				Prepared: 2017-09-08, Analyzed: 2017-09-08					
Colour, True	< 5.0	5.0 CU							
LCS (B7I0512-BS1)				Prepared: 2017-09-08, Analyzed: 2017-09-08					
Colour, True	11	5.0 CU	10.0		105	85-115			

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Analyte	Result	MRL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Notes
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General Parameters, Batch B710512, Continued

LCS (B710512-BS2)			Prepared: 2017-09-08, Analyzed: 2017-09-08						
Colour, True	11	5.0 CU	10.0		108	85-115			

General Parameters, Batch B710762

Blank (B710762-BLK1)			Prepared: 2017-09-12, Analyzed: 2017-09-12						
Solids, Total Suspended	< 2.0	2.0 mg/L							

LCS (B710762-BS1)			Prepared: 2017-09-12, Analyzed: 2017-09-12						
Solids, Total Suspended	101	2.0 mg/L	100		101	91-106			

General Parameters, Batch B710808

Blank (B710808-BLK1)			Prepared: 2017-09-13, Analyzed: 2017-09-13						
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Alkalinity, Total (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Bicarbonate (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0 mg/L							
Conductivity (EC)	< 2.0	2.0 µS/cm							

Blank (B710808-BLK2)			Prepared: 2017-09-13, Analyzed: 2017-09-13						
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Alkalinity, Total (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Bicarbonate (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0 mg/L							
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0 mg/L							
Conductivity (EC)	< 2.0	2.0 µS/cm							

LCS (B710808-BS1)			Prepared: 2017-09-13, Analyzed: 2017-09-13						
Alkalinity, Total (as CaCO ₃)	101	1.0 mg/L	100		101	92-106			

LCS (B710808-BS2)			Prepared: 2017-09-13, Analyzed: 2017-09-13						
Alkalinity, Total (as CaCO ₃)	105	1.0 mg/L	100		105	92-106			

LCS (B710808-BS3)			Prepared: 2017-09-13, Analyzed: 2017-09-13						
Conductivity (EC)	1370	2.0 µS/cm	1410		97	95-104			

LCS (B710808-BS4)			Prepared: 2017-09-13, Analyzed: 2017-09-13						
Conductivity (EC)	1360	2.0 µS/cm	1410		97	95-104			

Reference (B710808-SRM1)			Prepared: 2017-09-13, Analyzed: 2017-09-13						
pH	7.00	0.10 pH units	7.00		100	98-102			HT2

Reference (B710808-SRM2)			Prepared: 2017-09-13, Analyzed: 2017-09-13						
pH	7.00	0.10 pH units	7.00		100	98-102			HT2

Polycyclic Aromatic Hydrocarbons (PAH), Batch B710835

Blank (B710835-BLK1)			Prepared: 2017-09-13, Analyzed: 2017-09-13						
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Acenaphthene	< 0.050	0.050 µg/L							
Acenaphthylene	< 0.200	0.200 µg/L							
Acridine	< 0.050	0.050 µg/L							
Anthracene	< 0.010	0.010 µg/L							
Benzo(a)anthracene	< 0.010	0.010 µg/L							
Benzo(a)pyrene	< 0.010	0.010 µg/L							
Benzo(b)fluoranthene	< 0.050	0.050 µg/L							

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Analyte	Result	MRL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Notes
Polycyclic Aromatic Hydrocarbons (PAH), Batch B7I0835, Continued									
Blank (B7I0835-BLK1), Continued					Prepared: 2017-09-13, Analyzed: 2017-09-13				
Benzo(b+j)fluoranthene	< 0.050	0.050 µg/L							
Benzo(g,h,i)perylene	< 0.050	0.050 µg/L							
Benzo(k)fluoranthene	< 0.050	0.050 µg/L							
Chrysene	< 0.050	0.050 µg/L							
Dibenz(a,h)anthracene	< 0.010	0.010 µg/L							
Fluoranthene	< 0.030	0.030 µg/L							
Fluorene	< 0.050	0.050 µg/L							
Indeno(1,2,3-cd)pyrene	< 0.050	0.050 µg/L							
Naphthalene	< 0.200	0.200 µg/L							
Phenanthrene	< 0.100	0.100 µg/L							
Pyrene	< 0.020	0.020 µg/L							
Quinoline	< 0.050	0.050 µg/L							
Surrogate: Acridine-d9	4.13	µg/L	4.44		93	50-140			
Surrogate: Naphthalene-d8	3.81	µg/L	4.44		86	50-140			
Surrogate: Perylene-d12	5.08	µg/L	4.44		114	50-140			
LCS (B7I0835-BS1)					Prepared: 2017-09-13, Analyzed: 2017-09-13				
Acenaphthene	3.90	0.050 µg/L	4.44		88	58-125			
Acenaphthylene	4.02	0.200 µg/L	4.44		90	54-128			
Acridine	3.73	0.050 µg/L	4.44		84	50-112			
Anthracene	4.15	0.010 µg/L	4.44		93	66-125			
Benz(a)anthracene	4.51	0.010 µg/L	4.44		101	59-123			
Benzo(a)pyrene	4.14	0.010 µg/L	4.44		93	62-116			
Benzo(b)fluoranthene	3.92	0.050 µg/L	4.44		88	68-126			
Benzo(b+j)fluoranthene	8.61	0.050 µg/L	8.89		97	69-121			
Benzo(g,h,i)perylene	3.73	0.050 µg/L	4.44		84	58-129			
Benzo(k)fluoranthene	5.08	0.050 µg/L	4.44		114	67-128			
Chrysene	4.74	0.050 µg/L	4.44		107	58-125			
Dibenz(a,h)anthracene	3.62	0.010 µg/L	4.44		81	58-126			
Fluoranthene	4.45	0.030 µg/L	4.44		100	67-133			
Fluorene	4.07	0.050 µg/L	4.44		92	55-122			
Indeno(1,2,3-cd)pyrene	3.65	0.050 µg/L	4.44		82	62-126			
Naphthalene	3.85	0.200 µg/L	4.44		87	50-130			
Phenanthrene	4.66	0.100 µg/L	4.44		105	67-127			
Pyrene	4.63	0.020 µg/L	4.44		104	68-133			
Quinoline	4.72	0.050 µg/L	4.44		106	51-140			
Surrogate: Acridine-d9	4.31	µg/L	4.44		97	50-140			
Surrogate: Naphthalene-d8	3.81	µg/L	4.44		86	50-140			
Surrogate: Perylene-d12	5.17	µg/L	4.44		116	50-140			
LCS Dup (B7I0835-BSD1)					Prepared: 2017-09-13, Analyzed: 2017-09-13				
Acenaphthene	4.20	0.050 µg/L	4.44		94	58-125	7	16	
Acenaphthylene	4.36	0.200 µg/L	4.44		98	54-128	8	16	
Acridine	3.56	0.050 µg/L	4.44		80	50-112	5	26	
Anthracene	3.96	0.010 µg/L	4.44		89	66-125	5	14	
Benz(a)anthracene	4.57	0.010 µg/L	4.44		103	59-123	1	23	
Benzo(a)pyrene	4.13	0.010 µg/L	4.44		93	62-116	< 1	16	
Benzo(b)fluoranthene	3.90	0.050 µg/L	4.44		88	68-126	< 1	17	
Benzo(b+j)fluoranthene	8.67	0.050 µg/L	8.89		97	69-121	< 1	14	
Benzo(g,h,i)perylene	3.71	0.050 µg/L	4.44		83	58-129	< 1	25	
Benzo(k)fluoranthene	5.03	0.050 µg/L	4.44		113	67-128	< 1	18	
Chrysene	4.79	0.050 µg/L	4.44		108	58-125	1	24	
Dibenz(a,h)anthracene	3.60	0.010 µg/L	4.44		81	58-126	< 1	23	
Fluoranthene	4.12	0.030 µg/L	4.44		93	67-133	8	18	
Fluorene	4.17	0.050 µg/L	4.44		94	55-122	2	16	
Indeno(1,2,3-cd)pyrene	3.64	0.050 µg/L	4.44		82	62-126	< 1	22	

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Analyte	Result	MRL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Notes
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Polycyclic Aromatic Hydrocarbons (PAH), Batch B7I0835, Continued

LCS Dup (B7I0835-BSD1), Continued			Prepared: 2017-09-13, Analyzed: 2017-09-13						
Naphthalene	4.22	0.200 µg/L	4.44		95	50-130	9	18	
Phenanthrene	4.46	0.100 µg/L	4.44		100	67-127	4	14	
Pyrene	4.26	0.020 µg/L	4.44		96	68-133	8	18	
Quinoline	4.85	0.050 µg/L	4.44		109	51-140	3	12	
Surrogate: Acridine-d9	4.02	µg/L	4.44		90	50-140			
Surrogate: Naphthalene-d8	4.07	µg/L	4.44		92	50-140			
Surrogate: Perylene-d12	5.01	µg/L	4.44		113	50-140			

Total Metals, Batch B7I0861

Blank (B7I0861-BLK1)			Prepared: 2017-09-13, Analyzed: 2017-09-13						
Mercury, total	< 0.000010	0.000010 mg/L							
Blank (B7I0861-BLK2)			Prepared: 2017-09-13, Analyzed: 2017-09-13						
Mercury, total	< 0.000010	0.000010 mg/L							
Duplicate (B7I0861-DUP2)			Source: 7090659-01			Prepared: 2017-09-13, Analyzed: 2017-09-13			
Mercury, total	< 0.000010	0.000010 mg/L		< 0.000010				20	
Reference (B7I0861-SRM1)			Prepared: 2017-09-13, Analyzed: 2017-09-13						
Mercury, total	0.00461	0.000010 mg/L	0.00489		94	70-130			
Reference (B7I0861-SRM2)			Prepared: 2017-09-13, Analyzed: 2017-09-13						
Mercury, total	0.00428	0.000010 mg/L	0.00489		87	70-130			

Total Metals, Batch B7I0912

Blank (B7I0912-BLK1)			Prepared: 2017-09-14, Analyzed: 2017-09-15						
Aluminum, total	< 0.0050	0.0050 mg/L							
Antimony, total	< 0.00020	0.00020 mg/L							
Arsenic, total	< 0.00050	0.00050 mg/L							
Barium, total	< 0.0050	0.0050 mg/L							
Beryllium, total	< 0.00010	0.00010 mg/L							
Bismuth, total	< 0.00010	0.00010 mg/L							
Boron, total	< 0.0050	0.0050 mg/L							
Cadmium, total	< 0.000010	0.000010 mg/L							
Calcium, total	< 0.20	0.20 mg/L							
Chromium, total	< 0.00050	0.00050 mg/L							
Cobalt, total	< 0.00010	0.00010 mg/L							
Copper, total	< 0.00040	0.00040 mg/L							
Iron, total	< 0.010	0.010 mg/L							
Lead, total	< 0.00020	0.00020 mg/L							
Lithium, total	< 0.00010	0.00010 mg/L							
Magnesium, total	< 0.010	0.010 mg/L							
Manganese, total	< 0.00020	0.00020 mg/L							
Molybdenum, total	< 0.00010	0.00010 mg/L							
Nickel, total	< 0.00040	0.00040 mg/L							
Phosphorus, total	< 0.050	0.050 mg/L							
Potassium, total	< 0.10	0.10 mg/L							
Selenium, total	< 0.00050	0.00050 mg/L							
Silicon, total	< 1.0	1.0 mg/L							
Silver, total	< 0.000050	0.000050 mg/L							
Sodium, total	< 0.10	0.10 mg/L							
Strontium, total	< 0.0010	0.0010 mg/L							
Sulfur, total	< 3.0	3.0 mg/L							

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Analyte	Result	MRL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Notes
Total Metals, Batch B7I0912, Continued									
Blank (B7I0912-BLK1), Continued				Prepared: 2017-09-14, Analyzed: 2017-09-15					
Tellurium, total	< 0.00050	0.00050 mg/L							
Thallium, total	< 0.000020	0.000020 mg/L							
Thorium, total	< 0.00010	0.00010 mg/L							
Tin, total	< 0.00020	0.00020 mg/L							
Titanium, total	< 0.0050	0.0050 mg/L							
Uranium, total	< 0.000020	0.000020 mg/L							
Vanadium, total	< 0.0010	0.0010 mg/L							
Zinc, total	< 0.0040	0.0040 mg/L							
Zirconium, total	< 0.00010	0.00010 mg/L							
LCS (B7I0912-BS1)				Prepared: 2017-09-14, Analyzed: 2017-09-15					
Aluminum, total	0.0221	0.0050 mg/L	0.0200		110	80-120			
Antimony, total	0.0212	0.00020 mg/L	0.0200		106	80-120			
Arsenic, total	0.0215	0.00050 mg/L	0.0200		107	80-120			
Barium, total	0.0204	0.0050 mg/L	0.0200		102	80-120			
Beryllium, total	0.0209	0.00010 mg/L	0.0200		104	80-120			
Bismuth, total	0.0224	0.00010 mg/L	0.0200		112	80-120			
Boron, total	0.0210	0.0050 mg/L	0.0200		105	80-120			
Cadmium, total	0.0209	0.000010 mg/L	0.0200		105	80-120			
Calcium, total	2.13	0.20 mg/L	2.00		107	80-120			
Chromium, total	0.0218	0.00050 mg/L	0.0200		109	80-120			
Cobalt, total	0.0220	0.00010 mg/L	0.0200		110	80-120			
Copper, total	0.0229	0.00040 mg/L	0.0200		115	80-120			
Iron, total	2.13	0.010 mg/L	2.00		106	80-120			
Lead, total	0.0222	0.00020 mg/L	0.0200		111	80-120			
Lithium, total	0.0207	0.00010 mg/L	0.0200		104	80-120			
Magnesium, total	2.18	0.010 mg/L	2.00		109	80-120			
Manganese, total	0.0216	0.00020 mg/L	0.0200		108	80-120			
Molybdenum, total	0.0202	0.00010 mg/L	0.0200		101	80-120			
Nickel, total	0.0215	0.00040 mg/L	0.0200		107	80-120			
Phosphorus, total	2.13	0.050 mg/L	2.00		106	80-120			
Potassium, total	2.18	0.10 mg/L	2.00		109	80-120			
Selenium, total	0.0229	0.00050 mg/L	0.0200		114	80-120			
Silicon, total	2.3	1.0 mg/L	2.00		114	80-120			
Silver, total	0.0212	0.000050 mg/L	0.0200		106	80-120			
Sodium, total	2.21	0.10 mg/L	2.40		92	80-120			
Strontium, total	0.0209	0.0010 mg/L	0.0200		105	80-120			
Sulfur, total	5.3	3.0 mg/L	5.00		106	80-120			
Tellurium, total	0.0226	0.00050 mg/L	0.0200		113	80-120			
Thallium, total	0.0222	0.000020 mg/L	0.0200		111	80-120			
Thorium, total	0.0217	0.00010 mg/L	0.0200		108	80-120			
Tin, total	0.0220	0.00020 mg/L	0.0200		110	80-120			
Titanium, total	0.0221	0.0050 mg/L	0.0200		111	80-120			
Uranium, total	0.0228	0.000020 mg/L	0.0200		114	80-120			
Vanadium, total	0.0212	0.0010 mg/L	0.0200		106	80-120			
Zinc, total	0.0229	0.0040 mg/L	0.0200		115	80-120			
Zirconium, total	0.0222	0.00010 mg/L	0.0200		111	80-120			
Duplicate (B7I0912-DUP1)				Source: 7090659-01		Prepared: 2017-09-14, Analyzed: 2017-09-15			
Aluminum, total	0.152	0.0050 mg/L		0.154			1	20	
Antimony, total	< 0.00020	0.00020 mg/L		0.00021				20	
Arsenic, total	0.00063	0.00050 mg/L		0.00062				15	
Barium, total	0.129	0.0050 mg/L		0.132			2	9	
Beryllium, total	< 0.00010	0.00010 mg/L		< 0.00010				16	
Bismuth, total	< 0.00010	0.00010 mg/L		< 0.00010				20	
Boron, total	0.614	0.0050 mg/L		0.596			3	20	
Cadmium, total	0.00186	0.000010 mg/L		0.00184			1	20	

APPENDIX 1: QUALITY CONTROL DATA

REPORTED TO PROJECT Allterra Construction
P17-932

WORK ORDER REPORTED 7090659
2017-09-27

Analyte	Result	MRL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Notes
Total Metals, Batch B7I0912, Continued									
Duplicate (B7I0912-DUP1), Continued		Source: 7090659-01		Prepared: 2017-09-14, Analyzed: 2017-09-15					
Calcium, total	1450	0.20 mg/L		1430		2		12	
Chromium, total	0.00080	0.00050 mg/L		0.00074				12	
Cobalt, total	0.00713	0.00010 mg/L		0.00712		< 1		13	
Copper, total	0.00456	0.00040 mg/L		0.00455		< 1		20	
Iron, total	0.360	0.010 mg/L		0.359		< 1		18	
Lead, total	< 0.00020	0.00020 mg/L		< 0.00020				20	
Lithium, total	0.00156	0.00010 mg/L		0.00157		1		19	
Magnesium, total	458	0.010 mg/L		453		1		10	
Manganese, total	37.2	0.00020 mg/L		36.8		1		13	
Molybdenum, total	0.00180	0.00010 mg/L		0.00179		< 1		20	
Nickel, total	0.00988	0.00040 mg/L		0.00977		1		20	
Phosphorus, total	< 0.050	0.050 mg/L		< 0.050				20	
Potassium, total	38.8	0.10 mg/L		38.4		1		13	
Selenium, total	0.00060	0.00050 mg/L		0.00062				20	
Silicon, total	9.7	1.0 mg/L		9.5		2		11	
Silver, total	0.000094	0.000050 mg/L		0.000093				18	
Sodium, total	5000000000	0.10 mg/L		2770		200		10	
Strontium, total	7.92	0.0010 mg/L		7.98		< 1		9	
Sulfur, total	933	3.0 mg/L		928		< 1		20	
Tellurium, total	< 0.00050	0.00050 mg/L		< 0.00050				20	
Thallium, total	< 0.000020	0.000020 mg/L		< 0.000020				20	
Thorium, total	< 0.00010	0.00010 mg/L		< 0.00010				18	
Tin, total	< 0.00020	0.00020 mg/L		< 0.00020				20	
Titanium, total	0.0106	0.0050 mg/L		0.0107				20	
Uranium, total	0.00269	0.000020 mg/L		0.00271		< 1		14	
Vanadium, total	0.0011	0.0010 mg/L		0.0010				17	
Zinc, total	0.0127	0.0040 mg/L		0.0133				8	
Zirconium, total	< 0.00010	0.00010 mg/L		< 0.00010				20	
Reference (B7I0912-SRM1)		Prepared: 2017-09-14, Analyzed: 2017-09-15							
Aluminum, total	0.326	0.0050 mg/L	0.303		108	82-114			
Antimony, total	0.0530	0.00020 mg/L	0.0511		104	88-115			
Arsenic, total	0.124	0.00050 mg/L	0.118		105	88-111			
Barium, total	0.775	0.0050 mg/L	0.823		94	83-110			
Beryllium, total	0.0478	0.00010 mg/L	0.0496		96	80-119			
Boron, total	2.99	0.0050 mg/L	3.45		87	80-118			
Cadmium, total	0.0499	0.000010 mg/L	0.0495		101	90-110			
Calcium, total	11.9	0.20 mg/L	11.6		103	85-113			
Chromium, total	0.262	0.00050 mg/L	0.250		105	88-111			
Cobalt, total	0.0412	0.00010 mg/L	0.0377		109	90-114			
Copper, total	0.538	0.00040 mg/L	0.486		111	90-117			
Iron, total	0.530	0.010 mg/L	0.488		109	90-116			
Lead, total	0.210	0.00020 mg/L	0.204		103	90-110			
Lithium, total	0.373	0.00010 mg/L	0.403		93	79-118			
Magnesium, total	4.03	0.010 mg/L	3.79		106	88-116			
Manganese, total	0.113	0.00020 mg/L	0.109		104	88-108			
Molybdenum, total	0.196	0.00010 mg/L	0.198		99	88-110			
Nickel, total	0.264	0.00040 mg/L	0.249		106	90-112			
Phosphorus, total	0.217	0.050 mg/L	0.227		96	72-118			
Potassium, total	8.01	0.10 mg/L	7.21		111	87-116			
Selenium, total	0.131	0.00050 mg/L	0.121		108	90-122			
Sodium, total	8.03	0.10 mg/L	7.54		107	86-118			
Strontium, total	0.385	0.0010 mg/L	0.375		103	86-110			
Thallium, total	0.0842	0.000020 mg/L	0.0805		105	90-113			
Uranium, total	0.0316	0.000020 mg/L	0.0306		103	88-112			
Vanadium, total	0.408	0.0010 mg/L	0.386		106	87-110			

APPENDIX 1: QUALITY CONTROL DATA

REPORTED TO PROJECT Allterra Construction
P17-932

WORK ORDER REPORTED 7090659
2017-09-27

Analyte	Result	MRL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Notes
<i>Total Metals, Batch B7I0912, Continued</i>									
Reference (B7I0912-SRM1), Continued				Prepared: 2017-09-14, Analyzed: 2017-09-15					
Zinc, total	2.64	0.0040 mg/L	2.49		106	90-113			

QC Qualifiers:

HT2 The 15 minute recommended holding time (from sampling to analysis) has been exceeded - field analysis is recommended.

Submission key E250-MCF-279Y	On 09/07/2017 12:57	By Rahim Gaidhar	Page 1/1
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Client Information	Project Information	Laboratory Information	COC Information
Allterra Construction 2158 Millstream Road Victoria BC V9B 6H4 Phone: (250) 508-0726	CHH SPO1701 Number: [none] Sample count: 1 TAT: 5	CARO Analytical Services #110 - 4011 Viking Way Richmond BC V6V 2K9 Phone: (604) 279-1499 Fax: (604) 279-1599	Number: 20170907 Shipped via: Other

#1	SHA-LE-1 09/07/2017 11:30 Grab / Water	Analyses Alkalinity, all (KEL) TAT: 5 Colour, True - 456 nm (KEL) TAT: 5 Conductivity in Water (RMD) TAT: 5 L/HEPH in Water (RMD) TAT: 5 Mercury, diss ICPMS, Low (RMD) TAT: 5 Mercury, total CVAFS Reg & Low (RMD) TAT: 5 Metals, dissolved, All, Low (RMD) TAT: 5 Metals, total, All, Low (RMD) TAT: 5 pH in Water (RMD) TAT: 5 Solids, Total Suspended (RMD) TAT: 5	Containers C05_125 mL Plastic (Metals) (2) C10_125 mL Plastic (H2SO4) (1) C03_250 mL Glass (EPH/PAH) (1) C11_1 L Plastic (General) (1) C06_40 mL Vial (Mercury) (2)
	Comments: Please run our regular analysis for general parameters and nutrients. LEPH/HEP/PAH is required. DISS and TOTAL Metals (including mercury) is required		

Relinquished by	Date/Time	Accepted by	Date/Time

CARO Analytical Services
FINAL Analytical Testing Report
Work Order: 7090659
Report Date: 2017-09-27 09:28:30

Client Allterra Construction
Attention Rahim Gaidhar
Project P17-932
Project Info [none]

Note: This is not the original data. Please refer to PDF / Hardcopy report.

LAB ID 7090659-01
CLIENT ID SHA-LE-1
DATE SAMPLED 2017-09-07
DATE RECEIVED 2017-09-08
MATRIX Water

General Method	Analyte	Units	RDL	
Anions	Chloride	mg/L	1000	5080
Anions	Fluoride	mg/L	0.1	<0.10
Anions	Nitrate (as N)	mg/L	0.01	0.744
Anions	Nitrite (as N)	mg/L	0.01	<0.010
Anions	Sulfate	mg/L	10000	22000
General Parameters	Colour, True	CU	5	10
General Parameters	Alkalinity, Total (as CaCO3)	mg/L	1	106
General Parameters	Alkalinity, Phenolphthalein (as Ca mg/L		1	<1.0
General Parameters	Alkalinity, Bicarbonate (as CaCO3 mg/L		1	106
General Parameters	Alkalinity, Carbonate (as CaCO3) mg/L		1	<1.0
General Parameters	Alkalinity, Hydroxide (as CaCO3) mg/L		1	<1.0
General Parameters	Solids, Total Suspended	mg/L	2	8.6
General Parameters	pH	pH units	0.1	7.7
General Parameters	Conductivity (EC)	uS/cm	2	16700
Calculated Parameters	Hardness, Total (as CaCO3)	mg/L	0.5	5150
Calculated Parameters	Nitrate+Nitrite (as N)	mg/L	0.02	0.744
Dissolved Metals	Aluminum, dissolved	mg/L	0.005	0.0094
Dissolved Metals	Antimony, dissolved	mg/L	0.0002	0.00024
Dissolved Metals	Arsenic, dissolved	mg/L	0.0005	<0.00050
Dissolved Metals	Barium, dissolved	mg/L	0.005	0.118
Dissolved Metals	Beryllium, dissolved	mg/L	0.0001	<0.00010
Dissolved Metals	Bismuth, dissolved	mg/L	0.0001	<0.00010
Dissolved Metals	Boron, dissolved	mg/L	0.005	0.52
Dissolved Metals	Cadmium, dissolved	mg/L	1E-05	0.00172
Dissolved Metals	Calcium, dissolved	mg/L	0.2	1350
Dissolved Metals	Chromium, dissolved	mg/L	0.0005	0.00083
Dissolved Metals	Cobalt, dissolved	mg/L	0.0001	0.00649
Dissolved Metals	Copper, dissolved	mg/L	0.0004	0.0039
Dissolved Metals	Iron, dissolved	mg/L	0.01	0.02
Dissolved Metals	Lead, dissolved	mg/L	0.0002	<0.00020
Dissolved Metals	Lithium, dissolved	mg/L	0.0001	0.00134
Dissolved Metals	Magnesium, dissolved	mg/L	0.01	430
Dissolved Metals	Manganese, dissolved	mg/L	0.0002	34
Dissolved Metals	Mercury, dissolved	mg/L	4E-05	<0.000040
Dissolved Metals	Molybdenum, dissolved	mg/L	0.0001	0.00179

General Method	Analyte	Units	RDL	
Dissolved Metals	Nickel, dissolved	mg/L	0.0004	0.00924
Dissolved Metals	Phosphorus, dissolved	mg/L	0.05	<0.050
Dissolved Metals	Potassium, dissolved	mg/L	0.1	36.2
Dissolved Metals	Selenium, dissolved	mg/L	0.0005	0.00056
Dissolved Metals	Silicon, dissolved	mg/L	1	9
Dissolved Metals	Silver, dissolved	mg/L	5E-05	0.000075
Dissolved Metals	Sodium, dissolved	mg/L	0.1	2660
Dissolved Metals	Strontium, dissolved	mg/L	0.001	7.38
Dissolved Metals	Sulfur, dissolved	mg/L	3	890
Dissolved Metals	Tellurium, dissolved	mg/L	0.0005	<0.00050
Dissolved Metals	Thallium, dissolved	mg/L	2E-05	<0.000020
Dissolved Metals	Thorium, dissolved	mg/L	0.0001	<0.00010
Dissolved Metals	Tin, dissolved	mg/L	0.0002	<0.00020
Dissolved Metals	Titanium, dissolved	mg/L	0.005	<0.0050
Dissolved Metals	Uranium, dissolved	mg/L	2E-05	0.00256
Dissolved Metals	Vanadium, dissolved	mg/L	0.001	<0.0010
Dissolved Metals	Zinc, dissolved	mg/L	0.004	0.0107
Dissolved Metals	Zirconium, dissolved	mg/L	0.0001	<0.00010
Total Metals	Aluminum, total	mg/L	0.005	0.154
Total Metals	Antimony, total	mg/L	0.0002	0.00021
Total Metals	Arsenic, total	mg/L	0.0005	0.00062
Total Metals	Barium, total	mg/L	0.005	0.132
Total Metals	Beryllium, total	mg/L	0.0001	<0.00010
Total Metals	Bismuth, total	mg/L	0.0001	<0.00010
Total Metals	Boron, total	mg/L	0.005	0.596
Total Metals	Cadmium, total	mg/L	1E-05	0.00184
Total Metals	Calcium, total	mg/L	0.2	1430
Total Metals	Chromium, total	mg/L	0.0005	0.00074
Total Metals	Cobalt, total	mg/L	0.0001	0.00712
Total Metals	Copper, total	mg/L	0.0004	0.00455
Total Metals	Iron, total	mg/L	0.01	0.359
Total Metals	Lead, total	mg/L	0.0002	<0.00020
Total Metals	Lithium, total	mg/L	0.0001	0.00157
Total Metals	Magnesium, total	mg/L	0.01	453
Total Metals	Manganese, total	mg/L	0.0002	36.8
Total Metals	Mercury, total	mg/L	1E-05	<0.000010
Total Metals	Molybdenum, total	mg/L	0.0001	0.00179
Total Metals	Nickel, total	mg/L	0.0004	0.00977
Total Metals	Phosphorus, total	mg/L	0.05	<0.050
Total Metals	Potassium, total	mg/L	0.1	38.4
Total Metals	Selenium, total	mg/L	0.0005	0.00062
Total Metals	Silicon, total	mg/L	1	9.5
Total Metals	Silver, total	mg/L	5E-05	0.000093
Total Metals	Sodium, total	mg/L	0.1	2770
Total Metals	Strontium, total	mg/L	0.001	7.98
Total Metals	Sulfur, total	mg/L	3	928
Total Metals	Tellurium, total	mg/L	0.0005	<0.00050

General Method	Analyte	Units	RDL	
Total Metals	Thallium, total	mg/L	2E-05	<0.000020
Total Metals	Thorium, total	mg/L	0.0001	<0.00010
Total Metals	Tin, total	mg/L	0.0002	<0.00020
Total Metals	Titanium, total	mg/L	0.005	0.0107
Total Metals	Uranium, total	mg/L	2E-05	0.00271
Total Metals	Vanadium, total	mg/L	0.001	0.001
Total Metals	Zinc, total	mg/L	0.004	0.0133
Total Metals	Zirconium, total	mg/L	0.0001	<0.00010
BCMOE Aggregate Hydrocarbons	EPHw10-19	ug/L	250	<250
BCMOE Aggregate Hydrocarbons	EPHw19-32	ug/L	250	<250
BCMOE Aggregate Hydrocarbons	LEPHw	ug/L	250	<250
BCMOE Aggregate Hydrocarbons	HEPHw	ug/L	250	<250
Polycyclic Aromatic Hydrocarbons (PAH)	Acenaphthene	ug/L	0.05	<0.050
Polycyclic Aromatic Hydrocarbons (PAH)	Acenaphthylene	ug/L	0.2	<0.200
Polycyclic Aromatic Hydrocarbons (PAH)	Acridine	ug/L	0.05	<0.050
Polycyclic Aromatic Hydrocarbons (PAH)	Anthracene	ug/L	0.01	<0.010
Polycyclic Aromatic Hydrocarbons (PAH)	Benz(a)anthracene	ug/L	0.01	<0.010
Polycyclic Aromatic Hydrocarbons (PAH)	Benzo(a)pyrene	ug/L	0.01	<0.010
Polycyclic Aromatic Hydrocarbons (PAH)	Benzo(b)fluoranthene	ug/L	0.05	<0.050
Polycyclic Aromatic Hydrocarbons (PAH)	Benzo(b+j)fluoranthene	ug/L	0.05	<0.050
Polycyclic Aromatic Hydrocarbons (PAH)	Benzo(g,h,i)perylene	ug/L	0.05	<0.050
Polycyclic Aromatic Hydrocarbons (PAH)	Benzo(k)fluoranthene	ug/L	0.05	<0.050
Polycyclic Aromatic Hydrocarbons (PAH)	Chrysene	ug/L	0.05	<0.050
Polycyclic Aromatic Hydrocarbons (PAH)	Dibenz(a,h)anthracene	ug/L	0.01	<0.010
Polycyclic Aromatic Hydrocarbons (PAH)	Fluoranthene	ug/L	0.03	<0.030
Polycyclic Aromatic Hydrocarbons (PAH)	Fluorene	ug/L	0.05	<0.050
Polycyclic Aromatic Hydrocarbons (PAH)	Indeno(1,2,3-cd)pyrene	ug/L	0.05	<0.050
Polycyclic Aromatic Hydrocarbons (PAH)	Naphthalene	ug/L	0.2	<0.200
Polycyclic Aromatic Hydrocarbons (PAH)	Phenanthrene	ug/L	0.1	<0.100
Polycyclic Aromatic Hydrocarbons (PAH)	Pyrene	ug/L	0.02	<0.020
Polycyclic Aromatic Hydrocarbons (PAH)	Quinoline	ug/L	0.05	<0.050

#110-4011 Viking Way, Richmond, BC V6V 2K9
#102-3677 Highway 97N, Kelowna, BC V1X 5C3
17225 109 Avenue NW, Edmonton, AB T5S 1H7

CHAIN OF CUSTODY RECORD COC# B 58830 PAGE OF

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Table 1: Analytical Results for Nutrients in Surface Water			SHA-LE-1
Laboratory ID	BC DRINKING WATER QUALITY GUIDELINES	BC FRESHWATER AQUATIC LIFE WATER QUALITY GUIDELINES	7090659-01
Sample ID			SHA-LE-1
Date Sampled/Time			2017-09-07
Physical Tests			
Colour, True (Colour Units)	15 TCU	15 ⁽¹⁾ units absolute, or 5 units above background (30-day average)	10
Total Dissolved Solids (mg/L)	-	-	
Total Suspended Solids (mg/L)	-	25 mg/L above background (24-hr	8.6
pH	7-10.5	6.5-9	7.7
Conductivity (uS/cm)	-	-	16700
Hardness (as CaCO3)	-	-	5150
Turbidity (NTU)	1 NTU	8 NTU above background (24-hr during clear flow	-
	5 NTU at any time when background is 8 - 50 NTU during high flows or in turbid waters	Change from background of 5 NTU at any time when background is 8 - 50 NTU during high flows or in turbid waters	-
Anions and Nutrients mg/L			
Alkalinity Total (as CaCO3)	<10 high sensitivity to acid inputs moderate sensitivity to acid inputs low sensitivity to acid inputs		10-20
Acid Sensitivity			>20
Chloride (Cl)	250 mg/L	600 mg/L (instant max), 150 mg/L (30-day average)	5080
Fluoride (F)	1.5 mg/L (instant max) 1.0 mg/L (30-day average)	0.4 (Hardness <10mg/L)	<0.10
		Hardness-Dependent AW (Hardness is >10mg/L) ⁽³⁾	0.35
Nitrate (as N)	45 mg/L	32.8 mg/L (instant maximum) 3.0 mg/L (30-day average)	0.744
Nitrite (as N) ⁽²⁾	3 mg/L	Cl > 10 mg/L 0.6 mg/L (MAX), 0.2 mg/L (30-day average)	<0.010
Sulfate (SO4) H 0-30 mg/L	500 mg/L	128 mg/L 30-day average)	
H 31 - 75 mg/L		218 mg/L (30-day average)	
H 76 - 180 mg/L		309 mg/L (30-day average)	
H 181 - 250 mg/L		429 mg/L (30-day average)	
H > 250 mg/L		TBD	22000

Notes: Refer to Table Endnotes (attached)

Table 2: Analytical Results for Total Metals in Surface Water			SHA-LE-1
Laboratory ID	BC DRINKING WATER QUALITY GUIDELINES	BC FRESHWATER AQUATIC LIFE WATER QUALITY GUIDELINES	7090659-01
Sample ID			SHA-LE-1
Date Sampled/Time			2017-09-07
Physical Tests			
Hardness (as CaCO3) (mg/L)	-	-	5150
pH	7-10.5	6.5-9	7.7
Total Metals (mg/L)			
Aluminum (Al)-Total	0.2	-	0.154
Antimony (Sb)-Total	-	-	0.00021
Arsenic (As)-Total	0.01	0.005	0.00062
Barium (Ba)-Total	-	-	0.132
Beryllium (Be)-Total	-	-	<0.00010
Bismuth, total	-	-	<0.00010
Boron (B)-Total	5	1.2	0.596
Cadmium (Cd)-Total	-	-	0.00184
Calcium (Ca)-Total	-	-	1430
Chromium (Cr)-Total Chromium	-	-	0.00074
Chromium (Cr(III))	-	-	-
Chromium (Cr(VI))	-	-	-
Cobalt (Co)-Total	-	0.110 (Short Term), 0.004 (Long Term Average)	0.00712
Copper (Cu)-Total	0.5	Hardness-Dependent ⁽⁷⁾	0.00455
		Hardness-Dependent BCAWQG to protect AW ⁽³⁾ (instant max)	0.4861
		Hardness-Dependent BCAWQG to protect AW ⁽³⁾ (30-d average)	0.2060
Iron (Fe)-Total	-	1	0.359
Lead (Pb)-Total	0.01	Hardness-Dependent ⁽³⁾	<0.00020
		Hardness-Dependent BCAWQG to protect AW ⁽³⁾ (instant max)	12.3328
		Hardness-Dependent BCAWQG to protect AW ⁽³⁾ (30-d average)	0.4844
Lithium (Li)-Total	-	-	0.00157
Magnesium (Mg)-Total	-	-	453
Manganese (Mn)-Total	-	Hardness Dependent ⁽³⁾	36.8
		Hardness-Dependent BCAWQG to protect AW ⁽³⁾ (instant max)	57.3
		Hardness-Dependent BCAWQG to protect AW ⁽³⁾ (30-d average)	23.3
Mercury (Hg)-Total	0.001	0.00002	<0.000010
Molybdenum (Mo)-Total	0.25	≤1 (instant max) 2 (30-d average)	0.00179
Nickel (Ni)-Total	-	0.025 (Hardness-Dependent ⁽³⁾ BCAWWQG to protect AW H<60mg/L)	0.00977
		Calculated Hardness-Dependent ⁽³⁾ BCAWWQG to protect AW 60≤H≤180 mg/L CaCO3	1.910
Phosphorus(P)-Total	-	-	<0.050
Potassium (K)-Total	-	-	38.4
Selenium (Se)-Total	0.01	0.002	0.00062
Silicon (Si)-Total	-	-	9.5
Silver (Ag)-Total	-	HARDNESS <100mg/L 0.0001 (SHORT TERM), 0.00005 (LONG TERM), HARDNESS >100mg/L 0.003 (SHORT TERM), 0.0015 (LONG TERM)	0.000093
Sodium (Na)-Total	-	-	2770
Strontium (Sr)-Total	-	-	7.98
Sulfur (S)-Total	-	-	928
Tellurium (Te)-Total	-	-	<0.00050
Thallium (Tl)-Total	-	-	<0.000020
Thorium (Th)-Total	-	-	<0.00010
Tin (Sn)-Total	-	-	<0.00020
Titanium (Ti)-Total	-	-	0.0107
Uranium (U)-Total	-	-	0.00271
Vanadium (V)-Total	-	-	0.001
Zinc (Zn)-Total	5.0	Hardness >90 mg/L	0.0133
		Hardness-Dependent BCAWQG to protect AW ⁽³⁾ (instant max)	3.828
		Hardness-Dependent BCAWQG to protect AW ⁽³⁾ (30-d average)	3.803
Zirconium (Zr)-Total	-	-	<0.00010

Table 3: Analytical Results for Dissolved Metals in Surface Water			SHA-LE-1
Laboratory ID	BC DRINKING WATER QUALITY GUIDELINES	BC FRESHWATER AQUATIC LIFE WATER QUALITY GUIDELINES	7090659-01
Sample ID			SHA-LE-1
Date Sampled/Time			2017-09-07
Physical Tests			
Hardness (as CaCO ₃) (mg/L)	-	-	5150
pH	7-10.5	6.5-9	7.7
Dissolved Metals (mg/L)			
Aluminum (Al)-Dissolved	-	0.05 (30-day average where median pH > 6.5) 0.1 (maximum where instantaneous pH > 6.5) *** indicates pH-dependent maximum where instant pH ≤ 6.5	0.0094
		pH/Hardness Dependent BCAWQG to protect AW ⁽⁴⁾ (instant max)	-
		pH/Hardness Dependent BCAWQG to protect AW ⁽⁴⁾ (30-d Mean)	-
Antimony (Sb)-Dissolved	-	-	0.00024
Arsenic (As)-Dissolved	-	-	<0.00050
Barium (Ba)-Dissolved	-	-	0.118
Beryllium (Be)-Dissolved	-	-	<0.00010
Bismuth (Bi)-Dissolved	-	-	<0.00010
Boron (B)-Dissolved	-	-	0.52
Cadmium (Cd)-Dissolved	-	Hardness-Dependent ⁽³⁾	0.00172
	-	Calculated Hardness-Dependent ⁽³⁾ BCAWWQG to protect AW (short-term max) $e[1.03 * \ln(Hss) - 5.274]$ ug/L H<455mg/L	Hardness exceeds 455mg/L
	-	Calculated Hardness-Dependent BCAWQG to protect AW ⁽³⁾ (long-term max) $e[0.736 * \ln(Hss) - 4.943]$ ug/L H<285mg/L	Hardness exceeds 285mg/L
Calcium (Ca)-Dissolved	-	up to 4, highly sensitive to acid inputs 4 to 8, moderately sensitive	1350 Low
Chromium (Cr)-Dissolved	-	-	0.00083
Cobalt (Co)-Dissolved	-	-	0.00649
Copper (Cu)-Dissolved	-	-	0.0039
Iron (Fe)-Dissolved	-	0.35	0.02
Lead (Pb)-Dissolved	-	-	<0.00020
Lithium, dissolved	-	-	0.00134
Magnesium (Mg)-Dissolved	-	-	430
Manganese (Mn)-Dissolved	-	-	34
Mercury (Hg)-Dissolved	-	-	<0.000040
Molybdenum (Mo)-Dissolved	-	-	0.00179
Nickel (Ni)-Dissolved	-	-	0.00924
Phosphorus (P)-Dissolved	-	-	<0.050
Potassium (K)-Dissolved	-	-	36.2
Selenium (Se)-Dissolved	-	-	0.00056
Silicon (Si)-Dissolved	-	-	9
Silver (Ag)-Dissolved	-	-	0.000075
Sodium (Na)-Dissolved	-	-	2660
Strontium (Sr)-dissolved	-	-	7.38
Sulfur (S)-Dissolved	-	-	890
Tellurium (Te)-Dissolved	-	-	<0.00050
Thallium (Tl)-Dissolved	-	-	<0.000020
Thorium (Th)-Dissolved	-	-	<0.00010
Tin (Sn)-Dissolved	-	-	<0.00020
Titanium (Ti)-Dissolved	-	-	<0.0050
Uranium (U)-Dissolved	-	-	0.00256
Vanadium (V)-Dissolved	-	-	<0.0010
Zinc (Zn)-Dissolved	-	-	0.0107
Zirconium (Zr)-Dissolved	-	-	<0.00010

Notes: Refer to Table Endnotes (attached)

Table 4: Analytical Results for Hydrocarbons and PAHs in Surface Water			SHA-LE-1
Laboratory ID	BC DRINKING WATER QUALITY GUIDELINES	BC FRESHWATER AQUATIC LIFE WATER QUALITY GUIDELINES	7090659-01
Sample ID			SHA-LE-1
Date Sampled/ Time			2017-09-07
Hydrocarbons ug/L			
LEPH	-	-	<250
HEPH	-	-	<250
Polycyclic Aromatic			
Acenaphthene	-	6 (LONG TERM)	<0.050
Acenaphthylene	-	-	<0.200
Acridine	-	3 (LONG TERM), 0.05 (PHOTOTOXIC)	<0.050
Anthracene	-	4 (LONG TERM), 0.1 (PHOTOTOXIC)	<0.010
Benz(a)anthracene	0.01	0.1 (LONG TERM), 0.1 (PHOTOTOXIC)	<0.010
Benzo(a)pyrene	-	0.01 (LONG TERM)	<0.010
Benzo(b)fluoranthene	-	-	<0.050
Benzo(b+j)fluoranthene	-	-	<0.050
Benzo(g,h,i)perylene	-	-	<0.050
Benzo(k)fluoranthene	-	-	<0.050
Chrysene	-	-	<0.050
Dibenz(a,h)anthracene	-	-	<0.010
Fluoranthene	-	4 (LONG TERM), 0.2 (PHOTOTOXIC)	<0.030
Fluorene	-	12 (LONG TERM)	<0.050
Indeno(1,2,3-c,d)pyrene	-	-	<0.050
Naphthalene	-	1 (LONG TERM)	<0.200
Phenanthrene	-	0.3 (LONG TERM)	<0.100
Pyrene	-	0.02 (PHOTOTOXIC)	<0.020
Quinoline	-	-	<0.050

Notes: Refer to Table Endnotes (attached)

Analytical Table Footnotes: Analytical Results for Surface Water

- All concentrations in mg/L, except pH or as indicated.
- "<" less than the laboratory detection limit indicated.
- "-" means not analyzed or no standard or guideline applies.
- * RPDs are not normally calculated where one or more concentrations are less than five times MDL.
- (1) Guideline of 15 mg/L Pt for Drinking Water. Once background levels are established, colour should also not exceed 5 mg/L above background, to protect for Aquatic Life. This is considered a clearwater system (background less than 20 mg/L Pt.)
- (2) Nitrite BCAWWQG Guideline is Chloride dependent
- (3) Standard is calculated based on the hardness dependent BCAWWQG formula, and has been calculated and shown for each individual result
- (4) pH-dependent maximum where instant pH < 6.5

<u>BOLD, UNDERLINE</u>	Laboratory Detection Limit exceeds one or more applicable Standard
BOLD, BLUE SHADING	Concentration greater than BCAWWQG Guideline
BOLD, BEIGE SHADING	Concentration greater than BCAWWQG Chronic Guideline
BOLD, GREEN SHADING	Concentration greater than BC Ministry of Environment Drinking Water Sources
RED FONT	Concentration less than laboratory detection limit (Formula 0.5MRL utilized for statistical analysis)

PROGRESS REPORT

CONSTRUCTION PROGRESS REPORT – 2017 Minor Construction Works

Project:	Cobble Hill Landfill – Closure Plan	Date:	September 30 th , 2017
Subject:	Construction Progress Update		
Location:	Cobble Hill Landfill	File:	17039-2017-02
Report			
Distribution:	SHA: Scott Garthwaite, Tony Sperling CHH: Michael Kelly, Marty Block Allterra Construction: Todd Mizuik, Raymond Lam GHD Limited: Reinhard Trautmann MoE: Maureen Bilawchuk, AJ Downie		

The following summary of work includes construction progress from September 21st – 30th, 2017 as well as the status of individual work tasks and deviations to the construction work plan and schedule. Additionally, the construction schedule has been updated to include planned activities for the next reporting cycle.

A photo log of construction activities is provided in Appendix A along with description of the work.

Status of Work Tasks

1. Secondary Clay Liner Investigation

Four test pits were excavated along the northern toe / edge of Permanent Encapsulation Area (PEA) to assess the integrity of secondary liner and visually confirm the depth.

- a. MoE and GHD personnel visually confirmed the presence and depth of the secondary clay liner. Test pits typically consisted of a shot rock/granular overburden, underlain by a layer of sand, underlain by a thick layer of brown clay.
 - b. GHD personnel collected samples from each test pit for laboratory analysis to confirm integrity.
 - c. In three of the test pits (test pits 1, 2, 3) a Shelby Tube was sledge hammered into the clay liner until practical refusal and samples were retrieved by GHD personnel.
 - d. Allterra has surveyed the test pit locations using GPS. All record files will be completed once all survey data has been processed. No damage to the existing liner or leachate collection / leak detection infrastructure was observed.
-



CONSTRUCTION PROGRESS MEETING

Status: Complete – as of September 29th, 2017

2. Installation of New Leachate and Leak Detection Storage Facility

The new leachate / leak detection storage facility is now in place approximately 60m north of the PEA. The following tasks were inspected by the QP (SHA & Islander Engineering) throughout construction:

- a. All excavations were completed in open cuts
- b. Surface water drainage was allowed for during backfill and grading works.
- c. QP inspected granular subgrade prior to lock block placement
- d. QP inspected granular subgrade prior to installation of heavy weight non-woven geotextile cushion layer
- e. QP inspected 40 mil LLDPE geomembrane secondary containment liner prior to installation and once installed. Secondary liner was secured to the lock block storage facility along the top of the 4th row of blocks, allowing adequate containment and storage if tanks were to breach.
- f. QP inspected heavy weight non-woven geotextile cushion layer prior to tank installation.
- g. QP inspected tank installation work and tie-in piping connections.
- h. QP inspected roof structure which includes wooden joists overlain by a poly liner. Poly roof liner extends over the roof onto each exterior wall approximately 1m down and is secured to a 2x4" with 'hilti-bolts' into the concrete lock blocks.
- i. New storage facility has been commissioned and is currently in use.

Status: Complete – as of September 29th, 2017 with the following still outstanding:

- Needs High Level Alarm System
- Needs interconnecting piping between 2x leachate storage tanks.

3. Installation of New Twin Piping from Existing PEA Collection Pipes to New Storage Facility

Conveyance Piping for collected leachate from the PEA to the new storage facility is complete. The following tasks were inspected by the QP's throughout construction:

- a. Excavation for the twin pipe trench was completed with adequate grade, depth and width to accommodate the new conveyance piping.
- b. A combination of 5mm-12.5mm clear round drainage gravel and well graded sand was used for pipe bedding, pipe surround and as backfill material. Samples of both materials have been sent to the laboratory for gradation analysis and results will be provide once complete. Onsite QP inspected both materials onsite prior to use and approved both products.

CONSTRUCTION PROGRESS MEETING

- c. 2x conveyance piping was installed on approximate 2% grade (south to north) and was verified in the field with a laser level under QP supervision. As-built survey records will confirm all inverts and pipe grades once data has been processed.
- d. QP confirmed specifications for conveyance piping, warning tape, pipe bedding material and onsite fill.
- e. Completed pipe trench cross section includes 300mm of pipe bedding material, 2x 100mm solid HDPE DR17 pipes, overlain by 250-300mm of pipe bedding material (mechanically compacted), warning / tracer tape, overlain by a minimum of 300mm of well graded shot rock.
- f. A valve was included at mid-span between the PEA and storage facility on the leachate conveyance pipe.
- g. New HDPE conveyance piping was tied in to PEA leachate collection pipe with 'ferenco coupling' and to leak detection collection pipe with a PVC to HDPE threaded connection. QP inspected and approved all connections.
- h. Cleanouts were not installed on the conveyance lines as adequate access to the twin pipes are available at the tank connection location. Additionally, access to the leachate conveyance piping is also available at the 100mm valve location.

Status: Complete – as of September 29th, 2017.

- QP to provide Gradation reports for pipe bedding material when available.
- QP to provide As-built / records for pipe grades and invert connections.

4. Install High-Level Alarm System in Leachate Storage Tank

Status: Not Complete

- Attached Schedule outlines planned work

5. Decommissioning of Contact Water Containment Pond

Decommissioning of the Contact Water Pond has been completed under QP oversight. The following work activities were included and inspected by the QP:

- a. All contact water in the pond was removed and hauled offsite to a licensed disposal facility. Chain of Custody for all contact water removed is included in Appendix B.
- b. Existing pond liner was cut, folded and disposed of offsite at a licensed landfilling facility. A small amount of sludge was deposited in the Soil Management Area (SMA).
- c. Contact water pond was backfilled with granular material and track packed in 2x lifts.
- d. The decommissioned pond area was hand seeded.



Status: Complete – as of September 29th, 2017

6. Stockpile and Cover Existing Soil in SMA

Stockpiling and covering of soil in the SMA has been completed under QP oversight. The following work activities were included and inspected by the QP:

- a. All existing soil in the SMA (and small quantity from the Contact Water Pond) has been consolidated into one centralized windrow under the existing SMA cover system. The lock blocks walls and asphalt floor was thoroughly swept and clean up.
- b. QP approved not using water to wash-down the lock block walls. Re-introduction of water into the existing soils within SMA is not desirable.
- c. Windrowed soils were bucket packed with excavator and covered with approved 6 mil Poly sheets and secured with continuous line of sand bags along the base and crest as well as wooden pallets.

Status: Complete – as of September 29, 2017

7. Installation of Seepage Blanket Monitoring Wells at Landfill Toe

Shallow Seepage Blanket Wells have been completed under QP oversight. The following work activities were included and inspected by the QP:

- a. Three excavations were complete in locations outlined by the QP (10-15m offset from the north toe of the PEA) through blast rock and fractured bedrock.
- b. Rock hammer was used to construct 500mm sump into competent bedrock at each shallow well location. Depth and bedrock integrity was visually confirmed and approved by QP.
- c. Remaining shot rock debris was removed by hand prior to installation of PVC wells.
- d. 3x - 100mm Sched. 40 PVC wells were perforated with ¼” holes for the bottom 1.0m of the well and wrapped with non-woven geotextile prior to installation. The condition of the piping that was installed was approved by the QP.
- e. Wells were backfilled with clear 3” drain rock for the bottom 1.5m of the well.
- f. Separation geotextile was placed otop of the 3” drain rock material prior to backfilling to grade.
- g. Each well was then cut at approximately 600mm above the existing ground surface and a threaded cap was secured to each well.
- h. The following field measurements were taken at each well for depth to bottom and well stick up:



CONSTRUCTION PROGRESS MEETING

- i. SB-1: 157.75" from lid to sump bottom; 29" from lid to existing ground surface.
- ii. SB-2: 129" from lid to sump bottom; 25" from lid to existing ground surface.
- iii. SB-3: 139" from lid to sump bottom; 22" from lid to existing ground surface.
- i. A lock block was placed next to each well to provide protection.

Status: Complete- as of September 29th, 2017

- QP to provide As-built / records for Seepage Blanket Well locations.

8. Complete PEA Liner Repairs and Testing

All PEA Liner repairs and testing has been completed under QP oversight. The following work activities were included and inspected by the QP:

- a. A secondary inspection with Liner Contractors was completed and additional defects were identified during inspection. A total of 21 repairs were completed. The majority were small 'pin holes' with a few patches needed.
- b. QP inspected liner used in all patch work and approved the 40 mil LLDPE geomembrane liner material for thickness, density, carbon black content, tensile strength and elongation, tear resistance, puncture resistance and dimensional stability.
- c. Extrusion welders were qualified with QP oversight each morning of welding work to ensure equipment was operating properly. Qualification results are included in Appendix C.
- d. Also included in Appendix C is a map showing the approximate locations of the 21 repairs made (naming convention X-1 through X-21).
- e. All repairs were tested with a 'Vac-Box' to ensure repairs were complete. Vax Box Testing Log is presented in Appendix C.

Status: Complete – as of September 29, 2017.

9. Complete PEA Crest Ditch Ballasting

PEA crest ditch ballasting was completed under QP oversight. The following work activities were included and inspected by the QP:

- a. All crest ditch alignments were lined with heavy weight non-woven geotextile.
- b. Ditch ballast was changed from gravel + sand bags to rubber tires and approved by QP in the field. This change was made as rubber tires were available to contractor and their use minimized the foot traffic on the existing PEA liner. It is the opinion of the QP that rubber tires provide adequate weight to eliminate the



‘trampolining effect’ in the lined crest ditches as well as provide energy dissipation to clean surface water run-off.

Status: Complete – as of September 29th, 2017.

10. Run-on Ditch Extension Around the South Side of PEA

Run-on ditching was completed under QP oversight. The following work activities were included and inspected by the QP:

- a. Run-on ditching was completed in existing low permeability soil around the south side of the PEA at positive grade and tied into the existing western run-on ditch.

Status: Complete – as of September 29th, 2017.

Photos of Construction Activities are presented in Appendix A, attached.

Schedule of Upcoming Works:

A few minor tasks within the 2017 Minor Construction Works are still outstanding at the Cobble Hill Landfill. These items are outlined in the attached updated schedule and summarized below:

- Clay Liner Integrity: MoE laboratory testing
- Leachate and Leak Detection Storage Facility: Interconnecting piping between 2x tanks and high-level alarm system.
- Twin Piping Conveyance: 2x Gradation Reports for pipe bedding material and as-built records for inverts.
- High-Level Alarm System: Installation and commissioning of high-level alarm.
- Complete Seepage Blanket Wells: as-built locations for wells.



CONSTRUCTION PROGRESS MEETING

Please respond with any question or concerns regarding the above outlined construction activities, changes or upcoming scheduled works.

Report prepared by:

Sperling Hansen Associates

Scott Garthwaite, AScT
Office Manager

Updated Schedule - attached
Appendix A – Photo Log – attached
Appendix B – Chain of Custody for Contact Water Removal from Site
Appendix C – PEA Liner Repair QAQC

Table 1 - Construction Schedule

No.	Construction Tasks (2017)	September 2017										October 2017				Notes - Outstanding Work Items
		18	19	20	21	22	25	26	27	28	29	2	3	4	5	
1	Procurement of Materials and Mob / Demob															
2	Complete Secondary Clay Liner Investigation															as-built locations
3	Construct & Install New Leachate Storage Facility															Leachate tank interconnection piping still required
4	Install New Leachate Conveyance Piping and Tie-in															pipe bedding material gradation reports, as-built inverts
5	Install High Level Alarm for Leachate Tank															Alarm still required
6	Decommission Contact Water Pond															
7	Stockpile and Cover Existing Soil in SMA															
8	Install Shallow Seepage Blanket Monitoring Wells															as-built locations
9	Complete PEA Liner Repairs and Testing															
10	Complete PEA Crest Ditch Ballasting															
11	Complete Run-On Ditching															

Completed Task



APPENDIX A
Photo Log of Construction Activities

Cobble Hill Landfill Closure – 2017 Minor Construction Works

Secondary Clay Liner Investigation:



Photo 1 – GHD and SHA present for Secondary Clay Liner Investigation



Photo 2 – GHD Personnel Preparing for Clay Sampling – Shelby Tube

Leachate / Leak Detection Storage Facility:



Photo 3 – Leachate / Leak Detection Storage Facility with Roof Cover System in Place and Conveyance Piping Hooked Up.



Photo 4 – Storage Facility with Heavy Weight Non-Woven Geotextile in place prior to Secondary Liner System Installed.



Photo 5 – Subgrade and Lock Block Placement



Photo 6 – Lock Blocks installed 4 rows high and 6" clear crush backfill commencing around exterior of enclosure.



Photo 7 – Secondary Liner System in Lock Block Enclosure – Secured with 2x4” and ‘hilti-bolts.



Photo 8 – Placement of 3x Tanks in Lock Block Enclosure

Installation of New Twin Piping from Existing PEA Collection Pipes to New Storage Facility:



Photo 9 – Approved 100mm HDPE DR17 Pipe



Photo 10 – Twin Conveyance Piping laid Rough on approximately 300mm of granular pipe bedding material.



Photo 11 – Allterra Construction ensuring minimum 2% Grade on Conveyance Pipes

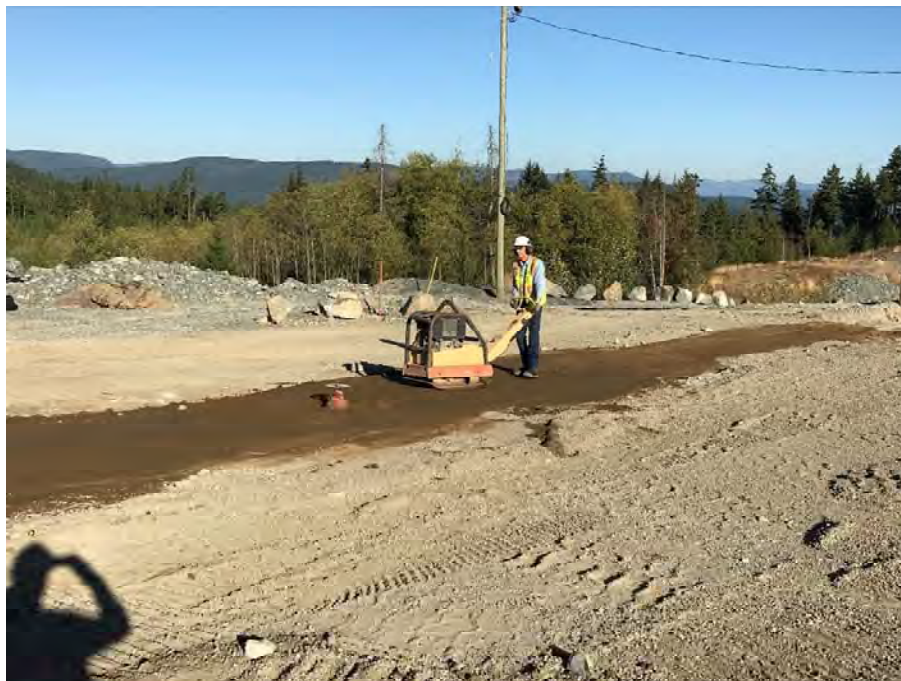


Photo 12 – Mechanical Compaction on Pipe Bedding Material along Conveyance Piping Alignment.



Photo 13 – Warning / Tracer Tape Deployed along Conveyance Pipe Alignment.



Photo 14 – Completed Conveyance Piping Installation. Note the Raised Berm to Ensure Adequate Coverage over Pipes. Also, Lock Blocks mark location for Valve on Leachate Conveyance Pipe.

Contact Water Pond Decommissioning:



Photo 15 – Contact Water Pond – Perimeter fencing removed and preparation for further decommissioning works.



Photo 16 – Backfilling of Contact Water Pond. Granular Soil was used and Track Packed in 2 Lifts.



Photo 17 – Contact Water Pond Decommissioning Complete



Photo 18 – Grass Seed was Hand Spread over Contact Water Pond Area.

Stockpile and Cover Existing Soil in SMA:



Photo 18 – Soil in SMA Centralized and Bucket Packed into One Large Windrow.



Photo 19 – Lock Block Walls within SMA were Swept and Dirt / Soil Removed from all Lock Blocks.



Photo 20 – SMA Soil Completely Covered / Encapsulated with 6 mil Poly and Secured with Sand Bags and Wood Pallets.

Installation of Seepage Blanket Monitoring Wells and Landfill North Toe:



Photo 21 – 100mm PVC Sched 40 Pipe Perforated with 1/4" Holes for min. 1.0m of Bottom of Well.



Photo 22 – Perforated Section of Seepage Blanket Wells Wrapped with Non-Woven Geotextile Prior to Well Development.



Photo 23 – Rock Hammer Used to Create min. 500mm Deep Sump into Competent Bedrock.



Photo 24 – Typical Seepage Well being Developed with 3" Clear Drain Rock for Bottom 1.5m of Well.



Photo 25 – Separation Geotextile Installed above Perforated Section of Well to Minimize Infiltration of Fines.



Photo 26 – Seepage Blanket Wells being Backfilled to Grade.



Photo 27 – Seepage Blanket Wells – Typical Completion.

PEA Liner Investigation:



Photo 28 – Liner Crew Preparing for Extrusion Welder Qualification Testing on a Sacrificial Sheet of 40mil LLDPE Smooth Geomembrane.



Photo 29 – Samples from the Tensometer Testing for Shear and Peel Strengths.



Photo 30 – Typical Extrusion Weld on a Small Pin Hole Repair.



Photo 31 – Typical Vac-Box Testing on a Liner Repair.

Complete PEA Crest Ditch Ballasting:



Photo 32 – Typical Completed Crest Ditch Ballast Application with Geotextile + Rubber Tires.

Run-On Ditch Extension Around the South Side of the PEA:



Photo 33 – Run-on Ditch Complete Around the South Side of the PEA.

APPENDIX B
Contact Water Pond C of C for Water Removal



CERTIFICATE OF WASTE RECEIVED TREATMENT / DISPOSAL / RECYCLING

(To Accompany Transporter and Delivery to Facility)

Classification:

x	< 3%
	Sludge
	Other

Document No.

Client Name

Client PO/Job No.

Allterra Construction Ltd

GENERATOR:

Section 1 : Generator

Generator Name: Allterra Construction Ltd Site Location: 460 Stebbings Rd, Shawnigan Lake

Generator Address: 2158 Millstream Rd, Victoria BC Site Address:

Generator Phone #: Site Phone #:

Description of Waste: Non-Regulated Wastewater

KEITH ALLEN

Generator's Representative
Name

K. Allen

Signature

SEP 18 2017

Shipment Date

Section 2 : Transporter

BCG No.

Emergency No.

N/A

1-250-252-0586

Transporter Load Size:

DESCRIPTION	Estimated Quantity (kg/Litres)	Actual Quantity (kg/Litres)	Total Volume (Kg/Litres)
NR Wastewater	20,000 litre	4399 imp gal	4399 imp gal
Sludge		SPL Ticket # 78860	

Company Name:

Address:

Driver Name/ Title:

Phone #:

Vehicle License #/Prov.:

Acknowledgement of Materials:

Coast Environmental Ltd

250-380-1166

TRUCK #31-65

BOY LEMARBUANA

[Signature]
Driver Signature

SEP 18 2017

Shipment Date

Section 3 : Destination (to be completed by Coast Environmental)

SPL - Wastewater Treatment Facility

995 Henry Eng Place, Victoria, BC V9B 6B2

Onsite Manager: Michael Beaumont

Phone: (250) 883-2829

Office: (250) 391-7892.

Receiver Comments:

(location, type, special handling)

I hereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accepted

SPL

Name of Authorized Agent

[Signature]

Signature

9/18/17

Receipt Date

WASTE ACCEPTANCE FORM

SPL Wastewater Recovery 2007 Inc.
906 Henry Eng Place Victoria, V8B 6B2, BC
Tel: (250) 815-1304 Fax: (250) 381-7883
G.S.T. #: 831842158RT0001

TICKET: "78880

DATE: Sep 18, 2017

PERMIT STICKER: ☐

TIME IN: 09:50 TIME OUT: 10:10

LICENSE: 4350 1C

HAULER: Coast Environmental Ltd

VOLUME DISCHARGED: 4398.00

SOURCES:

ST #	STREET NAME	MUNICIPALITY	TYPE	APPROX GL	PRICE/PER	TOTAL
A 0	NONE	CVRD	Other	4398.00	0.340	1495.680

B

C

GST 5% 74.783

TOTAL 1570.463

DRIVER DECLARATION

I CERTIFY THAT THE ABOVE DESCRIBED WASTES DO NOT CONTAIN ANY MATERIALS OR SUBSTANCES WHICH ARE NOT PERMITTED BY APPLICABLE LAW TO BE DISPOSED AT THIS FACILITY, THAT THEY DO NOT CONTAIN ANY HAZARDOUS MATERIALS, AND THAT ALL INFORMATION CONTAINED IN THIS FORM IS TRUE AND CORRECT

GUT
DRIVER NAME

[Signature]
DRIVER SIGNATURE

OPERATOR DECLARATION

I CERTIFY THAT THE ABOVE DESCRIBED TRUCK LOAD WAS DISCHARGED AT THE SPL SEPTAGE PROCESSING FACILITY I HAVE NO KNOWLEDGE OF THE CONTENT OF THE TRUCK LOAD OTHER THAN THE INFORMATION GIVEN ON THIS FORM BY THE HAULER. PAYMENT HAS BEEN MADE IN THE FOLLOWING MANNER:

PAYMENT RECEIVED

BILLED ON ACCOUNT

Dave
OPERATOR NAME

[Signature]
OPERATOR SIGNATURE



CERTIFICATE OF WASTE RECEIVED TREATMENT / DISPOSAL / RECYCLING

(To Accompany Transporter and Delivery to Facility)

Classification:

x	< 3%
	Sludge
	Other

Document No

Client Name

Allterra Construction Ltd

Client PO/Job No.

GENERATOR:

Section 1: Generator

Generator Name: Allterra Construction Ltd Site Location: 460 Stebbings Rd, Shawnigan Lake

Generator Address: 2158 Millstream Rd, Victoria BC Site Address:

Generator Phone #: Site Phone #:

Description of Waste: Non-Regulated Wastewater

Jeff Edwards

Generator's Representative
Name

Jeff Edwards

Signature

SEP 18 2017

Shipment Date

Section 2: Transporter

BCG No.

Emergency No.

N/A

1-250-252-0586

Transporter Load Size:

DESCRIPTION

Estimated
Quantity
(kg/Litres)

Actual
Quantity
(kg/Litres)

Total
Volume
(Kg/Litres)

NR Wastewater
Sludge

20,000 litre

4399 impgal

4399 impgal

SPL Ticket # 78888

Company Name:

Address:

Driver Name/ Title:

Coast Environmental Ltd

GUY LEMARQUAND

Phone #:

250-380-1166

Vehicle License #/Prov.:

TRUCK # 31-65

Acknowledgement of Materials

Driver Signature

SEP 18 2017

Shipment Date

Section 3: Destination (to be completed by Coast Environmental)

SPL - Wastewater Treatment Facility
995 Henry Eng Place, Victoria, BC V9B 6B2

Onsite Manager: Michael Beaumont

Phone: (250) 883-2829

Office: (250) 391-7892

Receiver Comments:

(location, type, special handling)

I hereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accepted

SPL

Name of Authorized Agent

Dave CO

Signature

9/18/17

Receipt Date

WASTE ACCEPTANCE FORM

SPL Wastewater Recovery 2007 Inc.
888 Henry Eng Place Victoria, V8B 6B2, BC
Tel: (250) 519-1304 Fax: (250) 381-7683
G.S.T. #: 891842158RT0001

TICKET: *78808

DATE: Sep 18, 2017

PERMIT STICKER: ☐

TIME IN: 11:50 TIME OUT: 12:10

LICENSE: 4380 1C

HAULER: Coast Environmental Ltd

VOLUME DISCHARGED: 4389.00

SOURCES:

ST#	STREET NAME	MUNICIPALITY	TYPE	APPROX GL	PRICE/PER	TOTAL
A 0	NONE	CVRD	Other	4389.00	0.340	1495.660

B

C

GST 5% 74.783

TOTAL 1570.443

DRIVER DECLARATION

I CERTIFY THAT THE ABOVE DESCRIBED WASTES DO NOT CONTAIN ANY MATERIALS OR SUBSTANCES WHICH ARE NOT PERMITTED BY APPLICABLE LAW TO BE DISPOSED AT THIS FACILITY, THAT THEY DO NOT CONTAIN ANY HAZARDOUS MATERIALS, AND THAT ALL INFORMATION CONTAINED IN THIS FORM IS TRUE AND CORRECT

604
DRIVER NAME

[Signature]
DRIVER SIGNATURE

OPERATOR DECLARATION

I CERTIFY THAT THE ABOVE DESCRIBED TRUCK LOAD WAS DISCHARGED AT THE SPL SEPTAGE PROCESSING FACILITY I HAVE NO KNOWLEDGE OF THE CONTENT OF THE TRUCK LOAD OTHER THAN THE INFORMATION GIVEN ON THIS FORM BY THE HAULER. PAYMENT HAS BEEN MADE IN THE FOLLOWING MANNER:

PAYMENT RECEIVED

BILLED ON ACCOUNT

[Signature]
OPERATOR NAME

[Signature]
OPERATOR SIGNATURE



CERTIFICATE OF WASTE RECEIVED TREATMENT / DISPOSAL / RECYCLING

(To Accompany Transporter and Delivery to Facility)

Classification:

x	< 3%
	Sludge
	Other

Document No

Client Name

Client PO/Job No.

Allterra Construction Ltd

GENERATOR:

Section 1: Generator

Generator Name: Allterra Construction Ltd

Site Location: 460 Stebbings Rd, Shawnigan Lake

Generator Address: 2158 Millstream Rd, Victoria BC

Site Address:

Generator Phone #:

Site Phone #:

Description of Waste: Non-Regulated Wastewater

Jeff Edwards
Generator's Representative
Name

Jeff Edwards
Signature

SEP 18 2017
Shipment Date

Section 2: Transporter

BCG No.
Emergency No.

N/A
1-250-252-0586

Transporter Load Size:

DESCRIPTION	Estimated Quantity (kg/Litres)	Actual Quantity (kg/Litres)	Total Volume (Kg/Litres)
NR Wastewater	20,000 litre	4399 imp gal	4399 imp gal
Sludge			
	SPL Ticket # 78677		

Company Name:
Address:

Driver Name/ Title:
Phone #:

Coast Environmental Ltd
250-380-1166

GENY LEMARCAULT

Vehicle License #/Prov.:

#31-65

Acknowledgement of Materials.

Driver Signature

SEP 18 2017
Shipment Date

Section 3: Destination (to be completed by Coast Environmental)

SPL - Wastewater Treatment Facility
995 Henry Eng Place, Victoria, BC V9B 6B2

Onsite Manager: Michael Beaumont
Phone: (250) 883-2829
Office: (250) 391-7892

Receiver Comments:
(location, type, special handling)

I hereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accepted

SPL

Name of Authorized Agent

Dave CO
Signature

9 11 2017
Receipt Date

WASTE ACCEPTANCE FORM

SPL Wastewater Recovery 2007 Inc.
895 Henry Eng Place Victoria, V8B 8B2, BC
Tel: (250) 915-1304 Fax: (250) 391-7893
G.S.T. #: 931842158RT0001

TICKET: *78877

DATE: Sep 18, 2017

PERMIT STICKER: ☐

TIME IN: 13:50

TIME OUT: 14:10

LICENSE:

4368 1C

HAULER: Coast Environmental Ltd

VOLUME DISCHARGED:

4399.00

SOURCES:

ST#	STREET NAME	MUNICIPALITY	TYPE	APPROX GL	PRICE/PER	TOTAL
1 0	NONE	CVRD	Other	4399.00	0.340	1495.660

GST 5% 74.783

TOTAL 1570.443

DRIVER DECLARATION

I CERTIFY THAT THE ABOVE DESCRIBED WASTES DO NOT CONTAIN ANY MATERIALS OR SUBSTANCES WHICH ARE NOT PERMITTED BY APPLICABLE LAW TO BE DISPOSED AT THIS FACILITY, THAT THEY DO NOT CONTAIN ANY HAZARDOUS MATERIALS, AND THAT ALL INFORMATION CONTAINED IN THIS FORM IS TRUE AND CORRECT

GUY
DRIVER NAME

[Signature]
DRIVER SIGNATURE

OPERATOR DECLARATION

I CERTIFY THAT THE ABOVE DESCRIBED TRUCK LOAD WAS DISCHARGED AT THE SPL SEPTAGE PROCESSING FACILITY I HAVE NO KNOWLEDGE OF THE CONTENT OF THE TRUCK LOAD OTHER THAN THE INFORMATION GIVEN ON THIS FORM BY THE HAULER. PAYMENT HAS BEEN MADE IN THE FOLLOWING MANNER:

PAYMENT RECEIVED

BILLED ON ACCOUNT

Dave
OPERATOR NAME

[Signature]
OPERATOR SIGNATURE



CERTIFICATE OF WASTE RECEIVED TREATMENT / DISPOSAL / RECYCLING

(To Accompany Transporter and Delivery to Facility)

Classification:

x	< 3%
	Sludge
	Other

Document No

Client Name

Client PO/Job No.

Allterra Construction Ltd

GENERATOR:

Section 1: Generator

Generator Name: Allterra Construction Ltd

Site Location: 460 Stebbings Rd, Shawnigan Lake

Generator Address: 2158 Millsstream Rd, Victoria BC

Site Address:

Generator Phone #:

Site Phone #:

Description of Waste: Non-Regulated Wastewater

Generator's Representative
Name

Signature

Shipment Date

x KEITH ALLEN x Sept 19-2017

Section 2: Transporter

Transporter Load Size:

BCG No.

Emergency No.

N/A

1-250-252-0586

DESCRIPTION

Estimated
Quantity
(kg/Litres)

Actual
Quantity
(kg/Litres)

Total
Volume
(Kg/Litres)

NR Wastewater

20,000

Sludge

4399 imperial

4399 imperial

SPL Ticket # 78899

Company Name:

Address:

Coast Environmental

Driver Name/ Title:

Phone #:

Vehicle License #/Prov.:

Acknowledgement of Materials.

Coast Environmental Ltd

250-380-1166

Unit # 31 & 65

Mike Schepanski

Driver Signature

Sept 19-2017
Shipment Date

Section 3: Destination (to be completed by Coast Environmental)

SPL - Wastewater Treatment Facility

995 Henry Eng Place, Victoria, BC V9B 6B2

Onsite Manager: Michael Beaumont

Phone: (250) 883-2829

Office: (250) 391-7892

Receiver Comments:

(location, type, special handling)

I hereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accepted

SPL Dave Kinahan
Name of Authorized Agent

Signature

Receipt Date

Dave Kinahan

9/19/17

WASTE ACCEPTANCE FORM

SPL Wastewater Recovery 2007 Inc.
995 Henry Eng Place Victoria, V8V 8B2, BC
Tel: (250) 915-1304 Fax: (250) 381-7893
G.S.T. # 991842168RT0001

TICKET: 778899

DATE: Sep 19, 2017

PERMIT STICKER: ☐

TIME IN: 11:00 TIME OUT: 11:20

LICENSE: 03412C

HAULER: Coast Environmental Ltd

VOLUME DISCHARGED: 4399.00

SOURCES:

ST #	STREET NAME	MUNICIPALITY	TYPE	APPROX GL	PRICE/PER	TOTAL
1 0	NONE	CVRD	Other	4399.00	0.340	1495.660

GST 5% 74.763

TOTAL 1570.423

DRIVER DECLARATION

I CERTIFY THAT THE ABOVE DESCRIBED WASTES DO NOT CONTAIN ANY MATERIALS OR SUBSTANCES WHICH ARE NOT PERMITTED BY APPLICABLE LAW TO BE DISPOSED AT THIS FACILITY, THAT THEY DO NOT CONTAIN ANY HAZARDOUS MATERIALS, AND THAT ALL INFORMATION CONTAINED IN THIS FORM IS TRUE AND CORRECT

MS
DRIVER NAME


DRIVER SIGNATURE

OPERATOR DECLARATION

I CERTIFY THAT THE ABOVE DESCRIBED TRUCK LOAD WAS DISCHARGED AT THE SPL SEPTAGE PROCESSING FACILITY I HAVE NO KNOWLEDGE OF THE CONTENT OF THE TRUCK LOAD OTHER THAN THE INFORMATION GIVEN ON THIS FORM BY THE HAULER. PAYMENT HAS BEEN MADE IN THE FOLLOWING MANNER:

PAYMENT RECEIVED

BILLED ON ACCOUNT

Dave
OPERATOR NAME


OPERATOR SIGNATURE

①



CERTIFICATE OF WASTE RECEIVED TREATMENT / DISPOSAL / RECYCLING

(To Accompany Transporter and Delivery to Facility)

Classification:

x	< 3%
	Sludge
	Other

Document No

Client Name

Client PO/Job No.

Allterra Construction Ltd

GENERATOR :

Section 1 : Generator

Generator Name: Allterra Construction Ltd

Site Location: 460 Stebbings Rd, Shawnigan Lake

Generator Address: 2158 Millstream Rd, Victoria BC

Site Address:

Generator Phone #:

Site Phone #:

Description of Waste: Non-Regulated Wastewater

REITH ALLEN

Generator's Representative
Name

R. R. O.

Signature

Sept 19-2017

Shipment Date

Section 2 : Transporter

Transporter Load Size:

BCG No.

N/A

Emergency No.

1-250-252-0586

DESCRIPTION

Estimated
Quantity
(kg/Litres)

Actual
Quantity
(kg/Litres)

Total
Volume
(Kg/Litres)

NR Wastewater

20,000

4399 imperial

4399 imperial

Sludge

SPL Ticket # 78891

Company Name:

Coast Environmental

Address:

Driver Name/ Title:

Coast Environmental Ltd

Phone #:

250-380-1166

Vehicle License #/Prov.:

Unit # 31 & 65

Acknowledgement of Materials.

[Signature]

Driver Signature

Sept 19-2017

Shipment Date

Section 3 : Destination (to be completed by Coast Environmental)

SPL - Wastewater Treatment Facility

995 Henry Eng Place, Victoria, BC V9B 6B2

Onsite Manager: Michael Beaumont

Phone: (250) 883-2829

Office: (250) 391-7892

Receiver Comments:

(location, type, special handling)

I hereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accepted

Scott Symington

REITH ALLEN

Name of Authorized Agent

[Signature]

Signature

Sept 19/17

Receipt Date

WASTE ACCEPTANCE FORM

SPL Wastewater Recovery 2007 Inc.
895 Henry Eng Plaza Victoria, V8B 6B2, BC
Tel: (250) 815-1304 Fax: (250) 391-7883
B.S.T. # 831842158RT0001

TICKET: *78891

DATE: Sep 19, 2017

PERMIT STICKER: ☐

TIME IN: 08:53 TIME OUT: 09:19

LICENSE: 03412C

HAULER: Coast Environmental Ltd

VOLUME DISCHARGED: 4389.00

SOURCES:

ST #	STREET NAME	MUNICIPALITY	TYPE	APPROX GL	PRICE/PER	TOTAL
A 0	NONE	CVRD	Other	4389.00	0.340	1492.860

GST 5% 74.783

TOTAL 1567.643

DRIVER DECLARATION

I CERTIFY THAT THE ABOVE DESCRIBED WASTES DO NOT CONTAIN ANY MATERIALS OR SUBSTANCES WHICH ARE NOT PERMITTED BY APPLICABLE LAW TO BE DISPOSED AT THIS FACILITY, THAT THEY DO NOT CONTAIN ANY HAZARDOUS MATERIALS, AND THAT ALL INFORMATION CONTAINED IN THIS FORM IS TRUE AND CORRECT

MS
DRIVER NAME

[Signature]
DRIVER SIGNATURE

OPERATOR DECLARATION

I CERTIFY THAT THE ABOVE DESCRIBED TRUCK LOAD WAS DISCHARGED AT THE SPL SEPTAGE PROCESSING FACILITY I HAVE NO KNOWLEDGE OF THE CONTENT OF THE TRUCK LOAD OTHER THAN THE INFORMATION GIVEN ON THIS FORM BY THE HAULER. PAYMENT HAS BEEN MADE IN THE FOLLOWING MANNER:

PAYMENT RECEIVED

BILLED ON ACCOUNT

Scott
OPERATOR NAME

[Signature]
OPERATOR SIGNATURE



CERTIFICATE OF WASTE RECEIVED TREATMENT / DISPOSAL / RECYCLING

(To Accompany Transporter and Delivery to Facility)

Classification:

X	< 3%
	Sludge
	Other

Document No.

Client Name

Client PO/Job No.

Allterra Construction Ltd

GENERATOR:

Section 1: Generator

Generator Name: Allterra Construction Ltd

Site Location: 460 Stebbings Rd, Shawnigan Lake

Generator Address: 2158 Millstream Rd, Victoria BC

Site Address:

Generator Phone #:

Site Phone #:

Description of Waste: Non-Regulated Wastewater

Generator's Representative
Name

Signature

Shipment Date

REITH ALLEN

K. Allen

Sept 20, 2017

Section 2: Transporter

BCG No.

Emergency No.

N/A

1-250-252-0586

Transporter Load Size:

DESCRIPTION

Estimated
Quantity
(kg/Litres)

Actual
Quantity
(kg/Litres)

Total
Volume
(Kg/Litres)

NR Wastewater

20,000

Sludge

4399 imp gal

4399 imp gal

SPL Ticket # 78929

Company Name:

Address:

Driver Name/Title:

Phone #:

Vehicle License #/Prov.:

Acknowledgement of Materials

Coast Environmental Ltd

250-380-1166

#31 - #92

Mike Schepaniuk

Driver Signature

Shipment Date

Sept 20 - 2017

Section 3: Destination (to be completed by Coast Environmental)

SPL - Wastewater Treatment Facility

995 Henry Eng Place, Victoria, BC V9B 6B2

Onsite Manager:

Michael Beaumont

Phone: (250) 883-2829

Office: (250) 391-7892

Receiver Comments:

(location, type, special handling)

I hereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accepted

Scott Symington
Name of Authorized Agent

Signature

Receipt Date

Scott Symington

Sept 20/17

WASTE ACCEPTANCE FORM

SPL Wastewater Recovery 2007 Inc.
995 Henry Eng Place Victoria, V8B 6B2, BC
Tel: (250) 815-1304 Fax: (250) 381-7883
G.S.T. #: 891842158RT0001

TICKET: *78828

DATE: Sep 20, 2017

PERMIT STICKER: ☐

TIME IN: 08:35 TIME OUT: 08:55

LICENSE: 034120

HAULER: Coast Environmental Ltd

VOLUME DISCHARGED: 4388.00

SOURCES:

ST #	STREET NAME	MUNICIPALITY	TYPE	APPROX GL	PRICE/PER	TOTAL
A 0	NONE	CVRD	Other	4388.00	0.340	1495.880

B

C

GST 2% 74.783

TOTAL 1570.663

DRIVER DECLARATION

I CERTIFY THAT THE ABOVE DESCRIBED WASTES DO NOT CONTAIN ANY MATERIALS OR SUBSTANCES WHICH ARE NOT PERMITTED BY APPLICABLE LAW TO BE DISPOSED AT THIS FACILITY, THAT THEY DO NOT CONTAIN ANY HAZARDOUS MATERIALS, AND THAT ALL INFORMATION CONTAINED IN THIS FORM IS TRUE AND CORRECT

MS
DRIVER NAME

[Signature]
DRIVER SIGNATURE

OPERATOR DECLARATION

I CERTIFY THAT THE ABOVE DESCRIBED TRUCK LOAD WAS DISCHARGED AT THE SPL SEPTAGE PROCESSING FACILITY I HAVE NO KNOWLEDGE OF THE CONTENT OF THE TRUCK LOAD OTHER THAN THE INFORMATION GIVEN ON THIS FORM BY THE HAULER. PAYMENT HAS BEEN MADE IN THE FOLLOWING MANNER:

PAYMENT RECEIVED

BILLED ON ACCOUNT

[Signature]
OPERATOR NAME

[Signature]
OPERATOR SIGNATURE



CERTIFICATE OF WASTE RECEIVED TREATMENT / DISPOSAL / RECYCLING

(To Accompany Transporter and Delivery to Facility)

Classification:

X	< 3%
	Sludge
	Other

Document No

Client Name

Client PO/Job No.

Allterra Construction Ltd

GENERATOR:

Section 1 : Generator

Generator Name: Allterra Construction Ltd

Site Location: 460 Stebbings Rd, Shawnigan Lake

Generator Address: 2158 Millsstream Rd, Victoria BC

Site Address:

Generator Phone #:

Site Phone #:

Description of Waste: Non-Regulated Wastewater

KEITH ALLEN

Generator's Representative
Name

K. Allen

Signature

Sept 20/17

Shipment Date

Section 2 : Transporter

Transporter Load Size:

BCG No.

N/A

Emergency No.

1-250-252-0586

DESCRIPTION

Estimated
Quantity
(kg/Litres)

Actual
Quantity
(kg/Litres)

Total
Volume
(Kg/Litres)

NR Wastewater

9500 litres

1845 Imp Gall

1845 m³

Sludge

SPL Ticket # 78948

Company Name:

Address:

Driver Name/ Title:

Coast Environmental Ltd

Ken Ball

Phone #: 250 252 0115

250-380-1166

Vehicle License #/Prov.:

37

Acknowledgement of Materials.

Ken Ball

Driver Signature

Sept 20/17

Shipment Date

Section 3 : Destination (to be completed by Coast Environmental)

SPL - Wastewater Treatment Facility

995 Henry Eng Place, Victoria, BC V9B 6B2

Onsite Manager: Michael Beaumont

Phone: (250) 883-2829

Office: (250) 391-7892

Receiver Comments:

(location, type, special handling)

I hereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accepted

Blair Tassone

Name of Authorized Agent

[Signature]

Signature

Sept 20, 2017

Receipt Date



WASTE ACCEPTANCE FORM

995 Henry Eng Place
Victoria, BC V9B 6B2

Tel: (250) 391-7892
Fax: (250) 391-7893

Date (dd-mm-yy): 20-09-2017
Time (24 hr notation): 12:40 pm
Hauler Name: Coast Environmental Ltd

Ticket Number: 78948
Current Facility User CRD Permit Sticker:
Truck Volume Discharged: 1845.00

LOAD INFORMATION

Name	Address	Type Code	Approximate Gallons
A <u>NONE</u>	<u>CVRD</u>	<u>Other</u>	<u>1845.00</u>
B _____	_____	_____	_____
C _____	_____	_____	_____

This information is required by CRD Bylaw No. 2827 Section 2.7(b). It is confidential information that will only be used for regulatory purposes. Should SPL be required to submit this information to any regulatory entity the hauler and generator will be notified.

TYPE CODES

RS Residential Septage	SB San. Sewage from Ships	FOG Grease Trap Waste	C/O Clean Out
IS Institutional Septage	SD San. Sewage from Docks	LS Lift Station	DGrit Dirty Grit
CS Commercial Septage	PIT Pit Toilets	SS Sewage Sludge	CGrit Clean Grit
POT Portable Toilets	CW Car Wash Waste	OT Other	AH After Hours

CHARGES

A	<u>1845.00</u> gallons	X	<u>0.34</u> price / gallon	=	<u>\$627.30</u>
B	_____ gallons	X	_____ price / gallon	=	_____
C	_____ gallons	X	_____ price / gallon	=	_____
Subtotal					<u>\$627.30</u>
GST					<u>\$31.37</u>
Total					<u>\$658.67</u>

I certify that the above described wastes do not contain any materials or substances which are not permitted by applicable law to be disposed at this facility, that they do not contain any hazardous materials, and that all information contained in this form is true and correct.

Ken Ball
Driver's Name (please print)

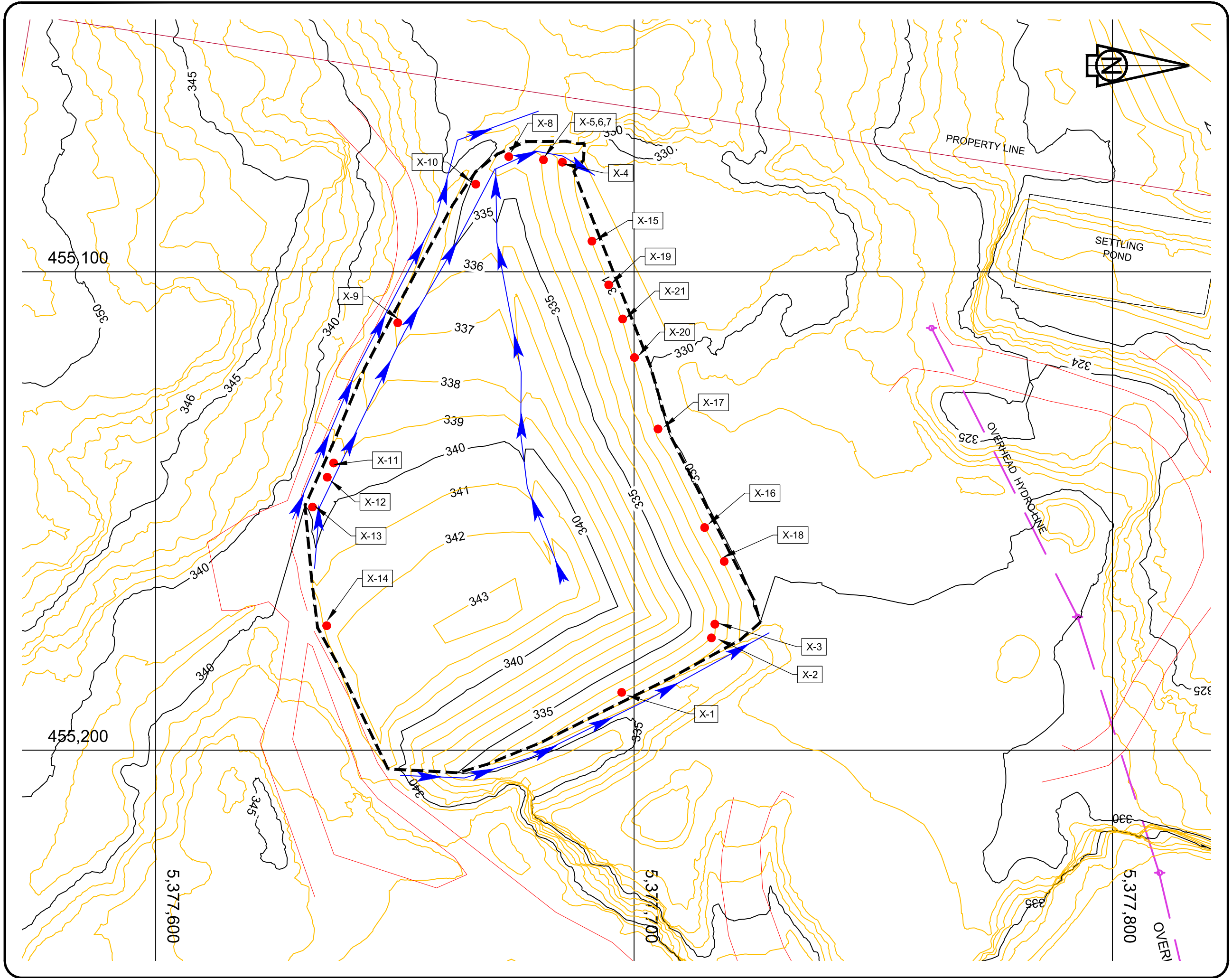
Ken Ball
Driver's Signature

I certify that the above described truck load was discharged at SPL. I have no knowledge of the content of the truck load other than the information given on this form by the hauler.

Dave
Operator's Name (please print)

Dave
Operator's Signature

APPENDIX C
PEA Liner Repair QAQC



SPERLING
HANSEN
ASSOCIATES

Landfill Services Group

- Landfill Siting
- Design & Operations Plans
- Landfill Closure
- Environmental Monitoring

#8 - 1225 East Keith Road
North Vancouver, B.C. V7J 1J3
Phone: (604) 986-7723
Fax: (604) 986-7734

LEGEND:

- 5m EXISTING CONTOUR
- 1m EXISTING CONTOUR
- ROAD
- SURFACE WATER DITCH
- PROPERTY LINES
- CREEK
- LANDFILL LINER EXTENTS
- PEA Liner Repair Location
X-1 THROUGH X-21

CLIENT:

COBBLE HILL HOLDINGS LTD.

PROJECT:

COBBLE HILL LANDFILL
CLOSURE PLAN - 2017 MINOR
CONSTRUCTION WORKS

TITLE:

PERMANENT
ENCAPSULATION AREA
-REPAIR WORK

SCALE:

1:750

DATE:

2017/09/29
yyyy/mm/dd

PROJECT NO:

PRJ 17039

DESIGNED

DRAWN

CHECKED

DRAWING NO:

FIGURE C-1

PEA Liner Welding Qualifications

Date: 26/09/2017

Extrusion Welder #: K-6

Welder Temp: 425 F.

Strength (ppi)				
Peel	Shear	Pass	Fail	QP
68	71	Y	N	SG
64	65	Y	N	SG
68	71	Y	N	SG
67	73	Y	N	SG
65	73	Y	N	SG

PEA Liner Qualifications

Date: 27/09/2017

Extrusion Welder #: K-6

Welder Temp: 425 F.

Strength (ppi)				
Peel	Shear	Pass	Fail	QP
70	77	Y	N	SG
63	73	Y	N	SG
72	79	Y	N	SG
73	78	Y	N	SG
68	78	Y	N	SG

PEA Liner Qualifications

Date: 28/09/2017

Extrusion Welder #: K-6

Welder Temp: 425 F.

Strength (ppi)				
Peel	Shear	Pass	Fail	QP
75	76	Y	N	SG
69	74	Y	N	SG
70	72	Y	N	SG
66	75	Y	N	SG
69	77	Y	N	SG

Notes:

Min Strength Values: (40mil LLDPE Geomembrane-smooth)

Shear: 60 ppi

Peel: 44 ppi

Extrusion Detail Log

Vacuum Box Testing

Repair #	Testing Results	QP
1	Pass	SG
2	Pass	SG
3	Pass	SG
4	Pass	SG
5	Pass	SG
6	Pass	SG
7	Pass	SG
8	Pass	SG
9	Pass	SG
10	Pass	SG
11	Pass	SG
12	Pass	SG
13	Pass	SG
14	Pass	SG
15	Pass	SG
16	Pass	SG
17	Pass	SG
18	Pass	SG
19	Pass	SG
20	Pass	SG
21	Pass	SG