



November 8, 2017

Reference No. 11149336

Maureen Bilawchuk
Senior Policy Specialist
Ministry of Environment and Climate Change Strategy
Environmental Standards Branch
325, 1011 Fourth Avenue
Prince George, BC V2L 3H9

Original Sent Via Email

Dear Ms. Bilawchuk:

**Re: Monthly Report #2 – October 2017
Landfill Closure Activities at Cobble Hill Holdings
460 Stebbings Rd Near Shawnigan Lake, British Columbia**

The purpose of this letter is to provide the Ministry of Environment and Climate Change Strategy (MOE) with GHD's monthly report on the landfill closure activities being conducted at the Cobble Hill Holdings (CHH) site located at 460 Stebbings Rd near Shawnigan Lake, BC (Site) pursuant to the June 29, 2017 Spill Prevention Order MO1701 (SPO), the August 11, 2017 letter from the MOE to the Named Parties, and associated correspondence.

As requested by the MOE, this letter provides the following information:

1. A description of the activities completed during the reporting month (October 1 and 31, 2017)
2. Photographs of the work
3. Documentation provided to the MOE
4. Qualitative and quantitative evidence of work completed
5. Discussion of Quality Control (QC) actions completed
6. Reviews of the semi-monthly status reports provided by the Named Parties

1. Activities completed

1. Based on GHD's conversations with Allterra Construction Ltd (Allterra) staff on October 5, 2017, GHD understood that no on-Site work related to the 2017 Minor Construction Works had been conducted by Allterra between October 1 and October 4, 2017, inclusive. Since the tasks that remained outstanding as of September 30, 2017 (i.e., install and commission the high level alarm and install a door on the Leachate Storage and Detection Facility as identified in GHD's previous monthly report dated October 23, 2017) were completed on October 5, 2017, and as GHD was not notified of additional on-Site work by the MOE or Allterra after October 5, 2017, no further on-Site inspections were conducted by GHD.



2. Staffing

- On October 5, 2017, the staffing consisted of one Allterra supervisor, two personnel from Allterra's alarm installation subcontractor, and one Qualified Professional (QP).

3. Equipment

- No equipment was used.

4. Total time on the project (based on GHD's observations) (note that these are reflections of hours actively performing tasks related to the SPO, not hours on Site):

- On October 5: personnel = 21 hours
- Total from August 23, 2017: personnel = 815 hours, equipment = 160 hours

5. Monthly Sampling

- Results for the September 2017 sampling event were provided and are discussed in Section 3 of this letter.
- October 2017 sampling was conducted as discussed in Section 3. Results are pending.

6. On-Site QP

- A QP was present on October 5, 2017. The QP representative was provided by Islander Engineering (IE) (Mike Achtem, P.Eng., PMP, CCA) for 6 hours, based on GHD's on-Site observations (note that a QP may have been present on Site without GHD's knowledge).

7. Leachate Storage and Detection Facility

- Tires were placed on the top of the roof liner to prevent potential wind damage.
- A plywood door on hinges was installed and secured with a padlock on the north side of the facility to enable access to the inside of the facility. As of GHD's October 5, 2017 site inspection, there was no signage observed on the door.
- A 100-mm flexible ribbed pipe was installed to connect the two leachate storage tanks at their base; the pipe allows leachate to freely flow between them. The pipe was secured to a pre-existing port on each tank with a cam-lock fitting.

8. Leachate Conveyance Piping

- Bedding material gradation reports were provided in the October 15, 2017 progress report as discussed in Section 6.

9. High Level Alarm

- The high level alarm system was installed in the Leachate Storage and Detection Facility and commissioned. The alarm system is battery powered; the battery is charged by a solar cell secured to the outside of the facility. To confirm proper operation, the alarm was manually triggered by raising the floats to approximately 0.3 m below the shoulder (top of the wall) of the



tanks. When triggered, the alarm sent an email to the on-site Islander Engineering and Allterra representatives. The high level alarm appeared to be operational.

10. Decommission Contact Water Containment Pond
 - The roll-off box containing the containment pond liner, which was observed to be on site on September 29, had been removed by October 5.
11. Stockpile and Cover Soil Management Area (SMA) Soil
 - This work was completed as discussed in the previous monthly report.
12. Install Shallow Seepage Blanket Monitoring Wells
 - This work was completed as discussed in the previous monthly report.
13. PEA Liner Repairs
 - This work was completed as discussed in the previous monthly report.
14. PEA Crest Ditch Ballasting
 - This work was completed as discussed in the previous monthly report.
15. Run-On Ditching
 - This work was completed as discussed in the previous monthly report.
16. Materials
 - Following installation, the high-level alarm successfully sent on an email when the high-level floats were triggered. Based on this observation, no concern was noted by GHD.
17. As-built drawings were provided in the October 15, 2017 progress report as discussed in Section 6.
18. No discrepancies to the Detailed Construction Plan were identified related to the work completed on October 5, 2017. Discrepancies addressed by SHA and related to work conducted in September 2017 are discussed in Section 6.
19. There is no on-site work still pending in conjunction with the 2017 Minor Construction Works.
 - Remaining deliverables not yet received by the MOE include liner repair QC test data for August 2017 PEA liner repair work, and August 2017 (if conducted) monitoring well and surface water sampling results.
20. Review of work compared to schedule identified in the Spill Prevention Order (SPO) or August 11, 2017 MOE letter:
 - Construction Activities commenced by August 28, 2017
 - Information has not been provided to GHD to conclude whether or not the planning for the work began by August 28, 2017.
 - One test pit along the PEA toe completed by September 30, 2017



- Four test pits along the toe (and one in the southern PEA run-on ditch) were completed on time. Based on the as-built drawings provided in the SHA October 15, 2017 progress report discussed in Section 6, the locations of the test pits along the toe from which clay was sampled (test pits TP1, TP2 and TP3) were located in cells 1A and 1B. Clay samples were not collected from cell 1C. This will be further discussed in a report to be submitted to the MOE under separate cover later in November 2017.
- Construction Activities completed by October 31, 2017
 - The on-Site construction work appears to be complete.
- Install high water level alarm by October 31, 2017
 - The high water level alarm was installed and operational as of October 5, 2017.
- Monthly sampling (surface & groundwater locations by August 31 and seepage blanket wells by October 31)
 - Information has not been provided to GHD to conclude whether or not sampling event(s) were completed prior to August 28, 2017.
 - The September 2017 sampling event was conducted and appears to be in compliance with the SPO; results are discussed in Section 3 of this letter.
 - The October 2017 sampling event was conducted; results are pending.
- Leachate volumes collected, stored, and transported submitted by the 15th & 30th (or the following business day)
 - Reports were received on time on October 16 and 30, 2017.
- Semi-Monthly Status Reports by the 15th & 30th (or the following business day) commencing when closure activities commence
 - Progress reports were received on time on October 16 and 30, 2017. They generally address SPO requirements for the reporting period as discussed in Section 6 of this letter.
- Sample Leak Detection Tank monthly when liquid is present
 - No liquid has been present to sample.
- Sample Leachate Tanks during leachate removal
 - No liquid was removed during the reporting period.

2. Photographs of the work

Photographs of the work conducted during the reporting period are provided in Attachment A.



3. Documentation provided to the MOE

The following project documentation received by the MOE for the reporting period is provided in Attachment B:

- 2017-10-16 – Email submitted on behalf of CHH to the MOE that included:
 - Leachate volumes collected, stored and transported for disposal “for the October 15, 2017 reporting period” per Section 1d of the June 29, 2017 Spill Prevention Order
 - Water quality results for surface water, groundwater and leachate sampled in September 2017 per Section 6(b)(iii) of the August 11, 2017 MOE letter with comparisons to BC Approved Water Quality Guidelines (WQGs) for drinking water and freshwater aquatic life:
 - Surface water sampled from surface water location SHA-SW1 (SHA-SW2 was dry) was analyzed for general water quality parameters and anions, dissolved and total metals, hydrocarbons and polycyclic aromatic hydrocarbons. This meets the sampling requirements listed in the Closure Plan (total/dissolved metals, hydrocarbons, physical parameters and nutrients). No exceedances of the WQGs were identified.
 - Groundwater sampled from monitoring wells MW2, MW3S/D, and MW6 was analyzed for general water quality parameters and anions, dissolved and total metals, hydrocarbons and polycyclic aromatic hydrocarbons. This meets the sampling requirements listed in the Closure Plan (total/dissolved metals, hydrocarbons, physical parameters and nutrients). Total manganese in MW-2 and MW-6 was identified to exceed WQGs. This will be further discussed in a final letter report to be provided to the MOE under separate cover in late November 2017.
 - The leachate sampled from leachate storage tank location SHA-LE-1 (the leachate detection tank was dry) was analyzed for general water quality parameters and anions, dissolved and total metals, hydrocarbons and polycyclic aromatic hydrocarbons. This meets the sampling requirements listed in the Closure Plan (total/dissolved metals, hydrocarbons, physical parameters and nutrients). Chloride, total cobalt, and total manganese was identified to exceed WQGs. This will be further discussed in a final letter report to be provided to the MOE under separate cover in late November 2017.
 - October 15, 2017 Progress Report per Section 6 of the August 11, 2017 MOE letter
 - Refer to GHD's review in Section 6 of this letter.
- 2017-10-30 – Email submitted on behalf of CHH to the MOE that included:
 - Leachate volumes collected, stored and transported for disposal “for the October 30, 2017 reporting period” per Section 1d of the June 29, 2017 Spill Prevention Order
 - Paperwork documenting the October 2017 sample collection at monitoring well, surface water and leachate storage locations per Section 4 of the August 11, 2017 MOE letter
 - Sampling of surface water location SHA-SW1; monitoring wells MW2, MW3S/D, MW6, SB-1, and SB-2; and leachate storage tank location SHA-LE-1 was completed on October 29, 2017.



Surface water location SHA-SW2, the leachate detection tank, and monitoring well SB-3 were dry and not sampled. Results are pending from SHA.

- September 30, 2017 "Field Review Report" per Section 6 of the August 11, 2017 MOE letter
 - Refer to GHD's review in Section 6 of this letter.

4. Qualitative and quantitative evidence of work completed

Refer to the summary of work completed, including material inspections, provided in Section 1 of this letter and supplemented by photographic documentation provided in Section 2 of this letter.

Refer to Section 5 of this letter regarding QC test results.

5. Discussion of Quality Control (QC) actions completed

Sieve analyses for the pipe bedding material is included in the Progress Report provided in Attachment B and as discussed in Section 6 of this letter.

6. Reviews of bi-monthly status reports provided by Named Parties

One progress report and one "field report" were received by the MOE for October 2017.

Progress Report – September 30 to October 5, 2017

A progress report dated October 15, 2017 was prepared by SHA for the period of September 30 to October 5, 2017 pursuant to the requirements of Section 6 of the MOE's August 11, 2017 letter.

Information provided included work completed, upcoming work, current schedule of remaining work, deviations from the Detailed Construction Plan, photographs, as-built drawings for the 2017 Minor Construction Works, and pipe bedding sieve analysis. The report states that all final construction tasks were completed on October 5, 2017, no further work is scheduled regarding the 2017 Minor Construction Works, and environmental monitoring would continue and be reported accordingly. There were five deviations to the Detailed Construction Plan discussed in the report:

1. Pipe Bedding Material for 'New Twin Piping from PEA to New Leachate Storage Facility'
 - Pipe bedding material was sourced on site. The material did not meet the specifications of the design; however, the QP approved the use of the material as being adequate for the intended use.
2. Clean Outs for 'New Twin Piping from PEA to New Leachate Storage Facility'
 - Cleanouts were not installed per the design based on QP approval based on alternate access available at "connection fittings located at the tie-in to leachate / leak detection storage tanks".



3. Stockpile and Cover Existing Soil in SMA

- The QP approved not washing the lock block walls of the SMA, which was to reduce the reintroduction of water into the stockpiled soils. The report states *"It is SHA's opinion that the current condition of the lock blocks do not pose any environmental or human health hazards in their current state."*
- GHD notes that the Detailed Construction Plan mentions that *"The concrete floor will be swept and washed"*; it doesn't specifically reference just the lock block walls. The concrete floor was also not washed as referenced in GHD's monthly report dated October 23, 2017.

4. Seepage Blanket Monitoring Wells at Landfill Toe

- The QP approved the use of 75 mm clear drain rock instead of 25-50 mm drain rock called for in the Detailed Construction Plan.

5. PEA Crest Ditch Ballasting

- Instead of coarse gravel and sand bags being used as ballast, the QP approved the use of rubber tires.

Upon review of the report, including the as-built drawings, GHD did not identify material inconsistencies with GHD's observations in the field.

Field Report – October 30, 2017

A document titled "Field Review Report" was prepared by IE dated October 30, 2017. The report provided the results of an inspection of the 2017 Minor Construction Works, including the PEA, leachate storage and leak detection system, SMA, former contact water containment pond, and cut-off ditch. IE did not identify any concerns regarding the status of these components.

GHD notes that several items required per the August 11, 2017 MOE letter (status of closure activities, QC and testing results, deviations from the construction work plan and schedule, and confirmation of planned activities and timing for the next reporting cycle) weren't specifically addressed in the October 30, 2017 Field Report. However, these items are related to the on-site construction phase of the 2017 Minor Construction Works and were addressed in the October 15, 2017 Progress Report, which stated that the construction works were complete, that no further work was scheduled, and that environmental monitoring would continue and be reported accordingly.



7. Closing

Should you have any questions regarding this letter, please do not hesitate to contact the undersigned.

Sincerely,

GHD

A handwritten signature in blue ink that reads "James Reid". The signature is written in a cursive style with a large, stylized "J" and "R".

James A. Reid, P.Eng.

A handwritten signature in black ink that reads "R. Trautmann". The signature is written in a cursive style with a large, stylized "R" and "T".

Reinhard Trautmann, ASCT

JAR/cs/03

Encl.

Attachment A

Monthly Photolog



PHOTO LOG

CLIENT: Ministry of Environment and Climate Change Strategy
PROJECT: Landfill Closure Activities at Cobble Hill Holdings, 460 Stebbings Rd Near Shawnigan Lake, BC
DATE: October 5, 2017

1) LEACHATE STORAGE AND DETECTION FACILITY



Photo 1 – High level controller inside leachate storage facility



Photo 2 – Controller screen for level and alarm controls



PHOTO LOG

CLIENT: Ministry of Environment and Climate Change Strategy
PROJECT: Landfill Closure Activities at Cobble Hill Holdings, 460 Stebbings Rd Near Shawnigan Lake, BC
DATE: Oct. 5, 2017



Photo 3 – Leachate storage facility with tires on roof to prevent wind damage and solar panel used to power the high level alarm system.

Attachment B

Project Documentation

James Reid

Subject: FW: 2017-10-15 SPOMO1701 CHH Data submissions
Attachments: 2017 Ground Water Quality DATA-CLOSURE PLAN.pdf; CHH COA 2_September 2017.pdf; 2017 Surface Water Quality DATA-CLOSURE PLAN.pdf; Progress Report-Oct 15 2017.pdf; CHH COA 2_September 2017.xls

From: spomo1701@outlook.com [<mailto:spomo1701@outlook.com>]

Sent: Monday, October 16, 2017 8:17 PM

To: Environmental Compliance ENV:EX

Subject: 2017-10-15 SPOMO1701 WQ Rpt Req

- ***Please find information regarding the Leachate reporting requirements for the October 15, 2017 reporting period as per SPILL PREVENTION ORDER : MO1701 Section 1d***

LEACHATE COLLECTED= 11.51 m³
LEACHATE STORED= 13.41 m³
LEACHATE TRANSPORTED= 0 m³

- ***Attached is information regarding water quality as per Section 6biii of File 311372 August 11, 2017 letter***

Sampling Summary for September 2017

1. *SHA-SW1 Sampled September 25, 2017*
2. *SHA-SW2-(Dry Conditions) September 6, 2017*
3. *MW6 Sampled September 25, 2017*
4. *MW3 Sampled September 25, 2017*
5. *MW2 Sampled September 25, 2017*
6. *SHA-LE-1 Sampled September 6, 2017*
7. *SHA-LD-1 (Dry Conditions) September 6, 2017*

Laboratory QA/QC presented in attached Certificate of Analysis displays recovery from reference samples for a number of dissolved metals are biased high.

- ***Attached is the QP Progress Report for Oct 15, 2017 as per File 311372 August 11, 2017 letter***

Thank you

Table GW1: Analytical Results for Nutrients in Groundwater

Sample Location	CSR Standards ⁽¹⁾		MW-6	MW-2	MW-3S	MW-3D	Field Blank
As-built Well Depths			47m	43m	23m	46m	
Sample ID			MW6	MW2	MW3S	MW3D	FB
Date Sampled	Aquatic Life	Drinking Water	7092382-03	7092382-04	7092382-05	7092382-06	7092382-07
Physical Tests			2017-09-25	2017-09-25	2017-09-25	2017-09-25	2017-09-25
Colour, True (TCU)	-	-	6.2	<5.0	<5.0	7	<5.0
Conductivity (uS/cm)	-	-	1330	251	342	250	<2.0
Hardness (as CaCO3) mg/L	-	-	599	126	138	99.9	<0.500
pH (pH Units)	-	-	7.31	7.58	7.58	7.63	6.13
Total Suspended Solids mg/L			14.8	29.4	6.8	77	<2.0
Total Dissolved Solids mg/L	-	-	-	-	-	-	-
Turbidity (NTU)	-	-	10.6	7.79	3.96	31.6	<0.10
Anions and Nutrients mg/L							
Alkalinity, Total (as CaCO3)	-	-	640	111	128	106	<1.0
Chloride (Cl)	1500	250	39.3	4.8	6.47	2.62	<0.10
Fluoride (F)	2 (H < 50) 3 (H ≥ 50)	1.5					<0.10
Nitrate (as N)	400	10	<0.10	0.26	0.22	0.25	
Nitrite (as N) ⁽¹⁾ Cl <2 mg/L	0.2		0.018	0.165	<0.010	0.015	<0.010
Cl 2 - <4 mg/L	0.4	3.2				<0.010	
Cl 4 - <6 mg/L	0.6			<0.010			
Cl 6 - <8 mg/L	0.8				<0.010		
Cl 8 - <10 mg/L	1						
Cl ≥ 10 mg/L	2		<0.010				
Sulfate (SO4)	1000	500	83.3	<1.0	44.3	22	<1.0

Notes: Refer to Table Endnotes (attached)

Table GW2: Analytical Results for Total Metals in Groundwater

Sample Location	CSR Standards ⁽¹⁾		MW-6	MW-2	MW-3S	MW-3D	Field Blank
As-built Well Depths			47m	43m	23m	46m	
Sample ID			MW6	MW2	MW3S	MW3D	FB
Date Sampled	Aquatic Life	Drinking Water	7092382-03	7092382-04	7092382-05	7092382-06	7092382-07
Physical Tests mg/L			2017-09-25	2017-09-25	2017-09-25	2017-09-25	2017-09-25
Hardness (as CaCO3)	-	-	599	126	138	99.9	<0.500
Total Metals mg/L							
Aluminum (Al)-Total	-	-	0.0272	0.849	0.0507	0.215	<0.0050
Antimony (Sb)-Total	-	-	0.00026	<0.00020	<0.00020	0.00021	<0.00020
Arsenic (As)-Total	-	-	0.00373	0.00187	0.00073	0.00138	<0.00050
Barium (Ba)-Total	-	-	0.0892	0.0315	0.036	0.0217	<0.0050
Beryllium (Be)-Total	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Boron (B)-Total	-	-	0.0872	0.0318	0.0264	0.0294	<0.0050
Cadmium (Cd)-Total	-	-	0.000017	0.000071	0.000394	0.000292	<0.000010
Calcium (Ca)-Total	-	-	186	39.5	49.6	35.9	<0.20
Chromium (Cr)-Total	-	-	<0.00050	0.00133	0.00059	<0.00050	<0.00050
Cobalt (Co)-Total	-	-	0.00222	0.00098	0.00045	0.00047	<0.00010
Copper (Cu)-Total	-	-	0.00072	0.00109	0.00126	0.00057	<0.00040
Iron (Fe)-Total	-	-	0.896	1.44	0.058	0.2	<0.010
Lead (Pb)-Total	-	-	0.00029	0.00024	<0.00020	<0.00020	<0.00020
Lithium (Li)-Total	-	-	0.0132	0.00024	0.00015	0.0002	<0.00010
Magnesium (Mg)-Total	-	-	37.1	7.62	7.39	6	<0.010
Manganese (Mn)-Total	-	-	2.12	0.508	0.289	0.323	<0.00020
Mercury (Hg)-Total	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	-	-	0.00084	0.00426	0.00656	0.00754	<0.00010
Nickel (Ni)-Total	-	-	0.00495	0.00202	0.00207	0.0023	<0.00040
Phosphorus (P)-Total	-	-	<0.050	0.201	0.066	0.104	<0.050
Potassium (K)-Total	-	-	4.16	0.75	1.06	0.71	<0.10
Selenium (Se)-Total	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Silicon (Si)-Total	-	-	12	8.2	6.6	7.3	<1.0
Silver (Ag)-Total	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Sodium (Na)-Total	-	-	74	9.28	16.3	12.7	<0.10
Strontium (Sr)-Total	-	-	0.601	0.168	0.24	0.209	<0.0010
Sulfur (S)-Total	-	-	27.8	7.4	15.6	9.5	<3.0
Tellurium (Te)-Total	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Thallium (Tl)-Total	-	-	0.000022	0.000021	0.000025	0.000023	<0.000020
Thorium (Th)-Total	-	-	<0.00010	0.00011	<0.00010	0.00036	<0.00010
Tin (Sn)-Total	-	-	0.00067	0.0002	0.00027	0.0003	<0.00020
Titanium (Ti)-Total	-	-	<0.0050	0.046	<0.0050	<0.0050	<0.0050
Uranium (U)-Total	-	-	0.00855	0.00101	0.00131	0.000911	<0.000020
Vanadium (V)-Total	-	-	<0.0010	0.0033	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Total	-	-	0.0051	0.0052	<0.0040	<0.0040	<0.0040
Zirconium (Zr)-Total	-	-	0.00017	0.0002	<0.00010	0.00022	<0.00010

Notes: Refer to Table Endnotes (attached)

Table GW3: Analytical Results for Dissolved Metals in Groundwater

Sample Location	CSR Standards ⁽¹⁾		MW-6	MW-2	MW-3S	MW-3D	Field Blank
As-built Well Depths			47m	43m	23m	46m	
Sample ID			MW6	MW2	MW3S	MW3D	FB
			7092382-03	7092382-04	7092382-05	7092382-06	7092382-07
Date Sampled	Aquatic Life	Drinking Water	2017-09-25	2017-09-25	2017-09-25	2017-09-25	2017-09-25
Physical Tests mg/L							
Hardness (as CaCO ₃)	-	-	599	126	138	99.9	<0.500
Dissolved Metals mg/L							
Aluminum (Al)-Dissolved	-	9.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Antimony (Sb)-Dissolved	0.2	0.006	<0.00020	<0.00020	<0.00020	0.00037	<0.00020
Arsenic (As)-Dissolved	0.05	0.01	0.00445	0.00193	0.00073	0.00132	<0.00050
Barium (Ba)-Dissolved	10	1	0.096	0.026	0.0302	0.0161	<0.0050
Beryllium (Be)-Dissolved	0.053	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Boron (B)-Dissolved	50	5	0.0939	0.0303	0.0238	0.0262	<0.0050
Cadmium (Cd)-Dissolved	0.0001 (H<30)	0.005					<0.000010
	0.0003 (H=30-<90)						
	0.0005 (H=90-<150)		<0.000010	<0.000010	0.000024	0.000013	
	0.0006 (H=150-<210)						
Calcium (Ca)-Dissolved	-	-	178	38.5	44.2	31.1	<0.20
Chromium (Cr)-Dissolved	0.01	0.05	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)-Dissolved	0.04	-	0.00233	0.00039	0.00044	0.00039	<0.00010
Copper (Cu)-Dissolved	0.02 (H<60)	1					<0.00040
	0.03 (H=50-<75)						
	0.04 (H=75-<100)					<0.00040	
	0.05 (H=100-<125)						
	0.06 (H=125-<150)			<0.00040	<0.00040		
	0.07 (H=150-<175)						
	0.08 (H=175-<200)						
	0.09 (H>200)		<0.00040				
Iron (Fe)-Dissolved	-	6.5	0.988	0.207	0.025	0.119	<0.010
Lead (Pb)-Dissolved	0.04 (H<60)	0.01					<0.00020
	0.05 (H=50-<100)					<0.00020	
	0.06 (H=100-<200)			<0.00020	<0.00020		
	0.11 (H=200-<300)						
	0.16 (H>300)		<0.00020				
Lithium (Li)-Dissolved	-	-	0.0146	<0.00010	<0.00010	<0.00010	<0.00010
Magnesium (Mg)-Dissolved	-	100	37.1	7.29	6.82	5.37	<0.010
Manganese (Mn)-Dissolved	-	0.55	2.3	0.632	0.265	0.324	<0.00020
Mercury (Hg)-Dissolved	0.001	0.001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	10	0.25	0.00083	0.00444	0.00601	0.00688	<0.00010
Nickel (Ni)-Dissolved	0.25 (H<60)	-					<0.00040
	0.65 (H=60-<120)					0.00185	
	1.1 (H=120-<180)			0.00127	0.00199		
	1.5 (H>=180)		0.00482				
Phosphorus(P)-Dissolved	-	-	<0.050	0.131	0.057	0.093	<0.050
Potassium (K)-Dissolved	-	-	4.44	0.71	0.97	0.63	<0.10
Selenium (Se)-Dissolved	0.01	0.01	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Silicon (Si)-Dissolved	-	-	12.2	7	6.1	6.1	<1.0
Silver (Ag)-Dissolved	0.0005 (H<=100)	-				<0.000050	<0.000050
	0.015 (H>100)		<0.000050	<0.000050	<0.000050		
Sodium (Na)-Dissolved	-	200	91.8	9.58	15.3	11.7	<0.10
Strontium (Sr)-Dissolved	-	-	0.616	0.167	0.221	0.19	<0.0010
Sulfur (S)-Dissolved	-	-	29.6	7.7	14.4	8.6	<3.0
Tellurium (Te)-Dissolved	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Thallium (Tl)-Dissolved	0.003	-	0.000027	<0.000020	0.000023	<0.000020	<0.000020
Thorium (Th)-Dissolved	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Dissolved	-	-	0.00027	<0.00020	<0.00020	<0.00020	<0.00020
Titanium (Ti)-Dissolved	1	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Uranium (U)-Dissolved	3	0.02	0.00916	0.00102	0.00117	0.000718	<0.000020
Vanadium (V)-Dissolved	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	0.075 (H<90)	5				<0.0040	<0.0040
	0.150 (H=90-<100)						
	0.900 (H=100-<200)			0.0219	<0.0040		
	1.650 (H=200-<300)						
	2.4 (H=300-<400)		<0.0040				
Zirconium (Zr)-Dissolved	-	-	0.00023	<0.00010	<0.00010	<0.00010	<0.00010

Notes: Refer to Table Endnotes (attached)

Table GW4: Analytical Results for Hydrocarbons and PAHs in Groundwater

Sample Location	CSR Standards ⁽¹⁾		MW-6	MW-2	MW-3S	MW-3D	Field Blank
As-built Well Depths			47m	43m	23m	46m	
Sample ID			MW6	MW2	MW3S	MW3D	FB
Date Sampled	Aquatic Life	Drinking Water	7092382-03	7092382-04	7092382-05	7092382-06	7092382-07
			2017-09-25	2017-09-25	2017-09-25	2017-09-25	2017-09-25
Hydrocarbons ug/L							
EPH10-19	5000	5000	<250	<250	<250	<250	<250
EPH10-19 (SG)	5000	5000	-	-	-	-	-
EPH19-32	-	-	<250	<250	<250	<250	<250
EPH19-32 (SG)	-	-	-	-	-	-	-
LEPH	500	-	<250	<250	<250	<250	<250
HEPH	-	-	<250	<250	<250	<250	<250
Polycyclic Aromatic Hydrocarbons ug/L							
Acenaphthene	60	-	<0.050	<0.050	<0.050	<0.050	<0.050
Acenaphthylene	-	-	<0.200	<0.200	<0.200	<0.200	<0.200
Acridine	0.5	-	<0.050	<0.050	<0.050	<0.050	<0.050
Anthracene	1	-	<0.010	<0.010	<0.010	<0.010	<0.010
Benz(a)anthracene	1	-	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(a)pyrene	0.1	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b)fluoranthene	-	-	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(b+)fluoranthene	-	-	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(g,h,i)perylene	-	-	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(k)fluoranthene	-	-	<0.050	<0.050	<0.050	<0.050	<0.050
Chrysene	1	-	<0.050	<0.050	<0.050	<0.050	<0.050
Dibenz(a,h)anthracene	-	-	<0.010	<0.010	<0.010	<0.010	<0.010
Fluoranthene	2	-	<0.030	<0.030	<0.030	<0.030	<0.030
Fluorene	120	-	<0.050	<0.050	<0.050	<0.050	<0.050
Indeno(1,2,3-c,d)pyrene	-	-	<0.050	<0.050	<0.050	<0.050	<0.050
Naphthalene	10	-	<0.200	<0.200	<0.200	<0.200	<0.200
Phenanthrene	3	-	<0.100	<0.100	<0.100	<0.100	<0.100
Pyrene	0.2	-	<0.020	<0.020	<0.020	<0.020	<0.020
Quinoline	34	-	<0.050	<0.050	<0.050	<0.050	<0.050

Notes: Refer to Table Endnotes (attached)

Analytical Table Footnotes: Analytical Results for Groundwater

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) A compendium of CSR Schedules 6 and 10 guidelines with respect to Drinking Water (DW) and Freshwater Aquatic Life (AW).

(2) Standard is dissolved Chloride-dependent.

BOLD, UNDERLINE

Laboratory Detection Limit exceeds one or more applicable Standard

BLUE SHADING

Concentration greater than CSR Aquatic Life (AW) Standard

BOLD, BEIGE TEXT

Concentration greater than CSR Drinking Water (DW) Standard

			SHA-LE-1	SHA-SW-1	SHA-SW-1	RPD
Table 1: Analytical Results for Nutrients in Surface Water			7090659-01	7092382-01	7092382-02	
Laboratory ID	BC DRINKING WATER QUALITY GUIDELINES	BC FRESHWATER AQUATIC LIFE WATER QUALITY GUIDELINES	SHA-LE-1	SHA-SW1	DUP SW1	
Sample ID			2017-09-07	2017-09-25	2017-09-25	
Date Sampled/Time						
Physical Tests						
Colour, True (Colour Units)	15 TCU	15 ⁽¹⁾ units absolute, or 5 units above background (30-day average)	10	5.5	5.5	*
Total Dissolved Solids (mg/L)	-	-				
Total Suspended Solids (mg/L)	-	25 mg/L above background (24-hr during	8.6	5.6	4.2	*
pH	7-10.5	6.5-9	7.7	7.71	7.72	0.13%
Conductivity (uS/cm)	-	-	16700	759	761	0.26%
Hardness (as CaCO3)	-	-	5150	361	357	1.11%
Turbidity (NTU)	1 NTU	8 NTU above background (24-hr during clear flow	-	0.95	0.9	5.41%
	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	106	206	197	4.47%
Acid Sensitivity		>20	Low	Low	Low	
Chloride (Cl)		250 mg/L	600 mg/L (instant max), 150 mg/L (30-day average)	5080	49.4	47.9
Fluoride (F)	1.5 mg/L (instant max) 1.0 mg/L (30-day average)	0.4 (Hardness <10mg/L) Hardness-Dependent AW (Hardness is >10mg/L) ⁽¹⁾	<0.10 0.35	<0.10 0.18	<0.10 0.06	*
Nitrate (as N)	45 mg/L	32.8 mg/L (instant maximum) 3.0 mg/L (30-day average)	0.744	0.476	0.498	4.52%
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	<0.010	<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	122	124	1.63%

Notes: Refer to Table Endnotes (attached)

Table 2: Analytical Results for Total Metals in Surface Water			SHA-LE-1	SHA-SW-1	SHA-SW-1	RPD
Laboratory ID	BC DRINKING WATER QUALITY GUIDELINES	BC FRESHWATER AQUATIC LIFE WATER QUALITY GUIDELINES	7090659-01	7092382-01	7092382-02	
Sample ID			SHA-LE-1	SHA-SW1	DUP SW1	
Date Sampled/Time			2017-09-07	2017-09-25	2017-09-25	
Physical Tests						
Hardness (as CaCO3) (mg/L)	-	-	5150	361	357	1.11%
pH	7-10.5	6.5-9	7.7	7.71	7.72	0.13%
Total Metals (mg/L)						
Aluminum (Al)-Total	0.2	-	0.154	0.0303	0.0255	17.20%
Antimony (Sb)-Total	-	-	0.00021	<0.00020	<0.00020	*
Arsenic (As)-Total	0.01	0.005	0.00062	<0.00050	<0.00050	*
Barium (Ba)-Total	-	-	0.132	0.0255	0.0259	1.56%
Beryllium (Be)-Total	-	-	<0.00010	<0.00010	<0.00010	*
Bismuth, total	-	-	<0.00010	<0.00010	<0.00010	*
Boron (B)-Total	5	1.2	0.596	0.0548	0.0372	38.26%
Cadmium (Cd)-Total	-	-	0.00184	0.000012	<0.000010	*
Calcium (Ca)-Total	-	-	1430	123	125	1.61%
Chromium (Cr)-Total Chromium	-	-	0.00074	<0.00050	<0.00050	*
Chromium (Cr(III))	-	-	-	-	-	
Chromium (Cr(VI))	-	-	-	-	-	
Cobalt (Co)-Total	-	0.110 (Short Term), 0.004 (Long Term Average)	0.00712	0.00025	0.00023	*
Copper (Cu)-Total	0.5	Hardness-Dependent ⁽⁷⁾	0.00455	0.0015	0.00144	*
		Hardness-Dependent BCAWQG to protect AW ⁽³⁾ (instant max)	0.4861	0.0359	0.0356	
		Hardness-Dependent BCAWQG to protect AW ⁽³⁾ (30-d average)	0.2060	0.0144	0.0143	
Iron (Fe)-Total	-	1	0.359	0.029	0.024	*
Lead (Pb)-Total	0.01	Hardness-Dependent ⁽³⁾	<0.00020	<0.00020	<0.00020	*
		Hardness-Dependent BCAWQG to protect AW ⁽³⁾ (instant max)	12.3328	0.4184	0.4126	
		Hardness-Dependent BCAWQG to protect AW ⁽³⁾ (30-d average)	0.4844	0.0196	0.0194	
Lithium (Li)-Total	-	-	0.00157	0.00032	0.00022	*
Magnesium (Mg)-Total	-	-	453	17	17.1	0.59%
Manganese (Mn)-Total	-	Hardness Dependent ⁽³⁾	36.8	0.12	0.108	10.53%
		Hardness-Dependent BCAWQG to protect AW ⁽³⁾ (instant max)	57.3	4.5	4.5	
		Hardness-Dependent BCAWQG to protect AW ⁽³⁾ (30-d average)	23.3	2.2	2.2	
Mercury (Hg)-Total	0.001	0.00002	<0.000010	<0.000010	<0.000010	*
Molybdenum (Mo)-Total	0.25	≤1 (instant max) 2 (30-d average)	0.00179	0.00235	0.00237	0.85%
Nickel (Ni)-Total	-	0.025 (Hardness-Dependent ⁽³⁾ BCAWWQG to protect AW H<60mg/L) Calculated Hardness-Dependent ⁽³⁾ BCAWWQG to protect AW 60≤H≤180 mg/L CaCO3	0.00977 1.910	0.0009 0.253	0.00084 0.251	*
Phosphorus(P)-Total	-	-	<0.050	<0.050	<0.050	*
Potassium (K)-Total	-	-	38.4	1.72	1.73	0.58%
Selenium (Se)-Total	0.01	0.002	0.00062	<0.00050	<0.00050	*
Silicon (Si)-Total	-	-	9.5	7.8	8	2.53%
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	<0.000050	<0.000050	*
Sodium (Na)-Total	-	-	2770	18.6	18.6	0.00%
Strontium (Sr)-Total	-	-	7.98	0.374	0.376	0.53%
Sulfur (S)-Total	-	-	928	45.6	45.5	0.22%
Tellurium (Te)-Total	-	-	<0.00050	<0.00050	<0.00050	*
Thallium (Tl)-Total	-	-	<0.000020	<0.000020	<0.000020	*
Thorium (Th)-Total	-	-	<0.00010	<0.00010	<0.00010	*
Tin (Sn)-Total	-	-	<0.00020	<0.00020	<0.00020	*
Titanium (Ti)-Total	-	-	0.0107	<0.0050	<0.0050	*
Uranium (U)-Total	-	-	0.00271	0.00294	0.00302	2.68%
Vanadium (V)-Total	-	-	0.001	<0.0010	<0.0010	*
Zinc (Zn)-Total	5.0	Hardness >90 mg/L	0.0133	<0.0040	<0.0040	*
		Hardness-Dependent BCAWQG to protect AW ⁽³⁾ (instant max)	3.828	0.236	0.233	
		Hardness-Dependent BCAWQG to protect AW ⁽³⁾ (30-d average)	3.803	0.211	0.208	
Zirconium (Zr)-Total	-	-	<0.00010	<0.00010	<0.00010	*

Table 3: Analytical Results for Dissolved Metals in Surface Water			SHA-LE-1	SHA-SW-1	SHA-SW-1	RPD
Laboratory ID	BC DRINKING WATER QUALITY GUIDELINES	BC FRESHWATER AQUATIC LIFE WATER QUALITY GUIDELINES	7090659-01	7092382-01	7092382-02	
Sample ID			SHA-LE-1	SHA-SW1	DUP SW1	
Date Sampled/Time			2017-09-07	2017-09-25	2017-09-25	
Physical Tests						
Hardness (as CaCO3) (mg/L)	-	-	5150	361	357	1.11%
pH	7-10.5	6.5-9	7.7	7.71	7.72	0.13%
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	<0.0050	<0.0050	*
		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	<0.00020	<0.00020	*
Arsenic (As)-Dissolved	-	-	<0.00050	<0.00050	<0.00050	*
Barium (Ba)-Dissolved	-	-	0.118	0.0253	0.0251	0.79%
Beryllium (Be)-Dissolved	-	-	<0.00010	<0.00010	<0.00010	*
Bismuth (Bi)-Dissolved	-	-	<0.00010	<0.00010	<0.00010	*
Boron (B)-Dissolved	-	-	0.52	0.0313	0.03	4.24%
Cadmium (Cd)-Dissolved	-	Hardness-Dependent ⁽³⁾	0.00172	0.00001	<0.000010	*
	-	Calculated Hardness-Dependent (3) BCAWQG to protect AW (short-term max) e[1.03 * ln(Hss) - 5.274] ug/L H<455mg/L	Hardness exceeds 455mg/L	0.00221	0.00218	
	-	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	Hardness exceeds 285mg/L	Hardness exceeds 285mg/L	
Calcium (Ca)-Dissolved	-	up to 4, highly sensitive to acid inputs 4 to 8, moderately sensitive over 8 low sensitivity	1350 Low	117 Low	115 Low	1.72%
Chromium (Cr)-Dissolved	-	-	0.00083	<0.00050	<0.00050	*
Cobalt (Co)-Dissolved	-	-	0.00649	0.0001	<0.00010	*
Copper (Cu)-Dissolved	-	-	0.0039	0.00112	0.00114	*
Iron (Fe)-Dissolved	-	0.35	0.02	<0.010	<0.010	*
Lead (Pb)-Dissolved	-	-	<0.00020	<0.00020	<0.00020	*
Lithium, dissolved	-	-	0.00134	0.00016	0.00015	*
Magnesium (Mg)-Dissolved	-	-	430	16.5	16.7	1.20%
Manganese (Mn)-Dissolved	-	-	34	0.0384	0.0367	4.53%
Mercury (Hg)-Dissolved	-	-	<0.000040	<0.000010	<0.000010	*
Molybdenum (Mo)-Dissolved	-	-	0.00179	0.00229	0.00222	3.10%
Nickel (Ni)-Dissolved	-	-	0.00924	0.00076	0.00075	*
Phosphorus (P)-Dissolved	-	-	<0.050	<0.050	<0.050	*
Potassium (K)-Dissolved	-	-	36.2	1.72	1.67	2.95%
Selenium (Se)-Dissolved	-	-	0.00056	<0.00050	<0.00050	*
Silicon (Si)-Dissolved	-	-	9	7.8	7.8	0.00%
Silver (Ag)-Dissolved	-	-	0.000075	<0.000050	<0.000050	*
Sodium (Na)-Dissolved	-	-	2660	18.6	18.7	0.54%
Strontium (Sr)-dissolved	-	-	7.38	0.359	0.359	0.00%
Sulfur (S)-Dissolved	-	-	890	42.5	42.6	0.24%
Tellurium (Te)-Dissolved	-	-	<0.00050	<0.00050	<0.00050	*
Thallium (Tl)-Dissolved	-	-	<0.000020	<0.000020	<0.000020	*
Thorium (Th)-Dissolved	-	-	<0.00010	<0.00010	<0.00010	*
Tin (Sn)-Dissolved	-	-	<0.00020	<0.00020	<0.00020	*
Titanium (Ti)-Dissolved	-	-	<0.0050	<0.0050	<0.0050	*
Uranium (U)-Dissolved	-	-	0.00256	0.00289	0.00286	1.04%
Vanadium (V)-Dissolved	-	-	<0.0010	<0.0010	<0.0010	*
Zinc (Zn)-Dissolved	-	-	0.0107	<0.0040	0.0067	*
Zirconium (Zr)-Dissolved	-	-	<0.00010	<0.00010	<0.00010	*

Notes: Refer to Table Endnotes (attached)

Table 4: Analytical Results for Hydrocarbons and PAHs in Surface Water			SHA-LE-1	SHA-SW-1	SHA-SW-1	RPD
Laboratory ID	BC DRINKING WATER QUALITY GUIDELINES	BC FRESHWATER AQUATIC LIFE WATER QUALITY GUIDELINES	7090659-01	7092382-01	7092382-02	
Sample ID			SHA-LE-1	SHA-SW1	DUP SW1	
Date Sampled/ Time			2017-09-07	2017-09-25	2017-09-25	
Hydrocarbons ug/L						
LEPH	-	-	<250	<250	<250	*
HEPH	-	-	<250	<250	<250	*
Polycyclic Aromatic						
Acenaphthene	-	6 (LONG TERM)	<0.050	<0.050	<0.050	*
Acenaphthylene	-	-	<0.200	<0.200	<0.200	*
Acridine	-	3 (LONG TERM), 0.05 (PHOTOTOXIC)	<0.050	<0.050	<0.050	*
Anthracene	-	4 (LONG TERM), 0.1 (PHOTOTOXIC)	<0.010	<0.010	<0.010	*
Benz(a)anthracene	0.01	0.1 (LONG TERM), 0.1 (PHOTOTOXIC)	<0.010	<0.010	<0.010	*
Benzo(a)pyrene	-	0.01 (LONG TERM)	<0.010	<0.010	<0.010	*
Benzo(b)fluoranthene	-	-	<0.050	<0.050	<0.050	*
Benzo(b+j)fluoranthene	-	-	<0.050	<0.050	<0.050	*
Benzo(g,h,i)perylene	-	-	<0.050	<0.050	<0.050	*
Benzo(k)fluoranthene	-	-	<0.050	<0.050	<0.050	*
Chrysene	-	-	<0.050	<0.050	<0.050	*
Dibenz(a,h)anthracene	-	-	<0.010	<0.010	<0.010	*
Fluoranthene	-	4 (LONG TERM), 0.2 (PHOTOTOXIC)	<0.030	<0.030	<0.030	*
Fluorene	-	12 (LONG TERM)	<0.050	<0.050	<0.050	*
Indeno(1,2,3-c,d)pyrene	-	-	<0.050	<0.050	<0.050	*
Naphthalene	-	1 (LONG TERM)	<0.200	<0.200	<0.200	*
Phenanthrene	-	0.3 (LONG TERM)	<0.100	<0.100	<0.100	*
Pyrene	-	0.02 (PHOTOTOXIC)	<0.020	<0.020	<0.020	*
Quinoline	-	-	<0.050	<0.050	<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 RDL.
- (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

BOLD, UNDERLINE

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)

CERTIFICATE OF ANALYSIS

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

TEL (250) 508-0726
FAX

ATTENTION Rahim Gaidhar

WORK ORDER 7092382

PO NUMBER P15-06 SIRM

RECEIVED / TEMP 2017-09-26 11:45 / 15°C

PROJECT P17-932

REPORTED 2017-10-03

PROJECT INFO

COC NUMBER B58830

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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If you have any questions or concerns, please contact me at bshaw@caro.ca

Locations:

#110 4011 Viking Way
Richmond, BC V6V 2K9
Tel: 604-279-1499

#102 3677 Highway 97N
Kelowna, BC V1X 5C3
Tel: 250-765-9646

17225 109 Avenue
Edmonton, AB T5S 1H7
Tel: 780-489-9100

www.caro.ca

REPORTED TO PROJECT Allterra Construction
P17-932

WORK ORDER REPORTED 7092382
2017-10-03

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
Chromium, Hexavalent (Total) in Water	APHA 3500-Cr B	Colorimetry	Richmond
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, dissolved by CVAFS in Water	EPA 245.7*	BrCl ₂ Oxidation / Cold Vapor Atomic Fluorescence Spectrometry (CVAFS)	Richmond
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
Turbidity in Water	APHA 2130 B	Nephelometry	Kelowna

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
NTU	Nephelometric Turbidity Units
pH units	pH < 7 = acidic, pH > 7 = basic
µg/L	Micrograms per litre
µS/cm	Microsiemens per centimetre

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2017-10-03

Analyte	Result / Recovery	MRL / Limits	Units	Prepared	Analyzed	Notes
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Sample ID: SHA-SW1 (7092382-01) [Water] Sampled: 2017-09-25 10:15

Anions

Chloride	49.4	0.10	mg/L	N/A	2017-10-02	
Fluoride	< 0.10	0.10	mg/L	N/A	2017-09-29	
Nitrate (as N)	0.476	0.010	mg/L	N/A	2017-09-29	
Nitrite (as N)	< 0.010	0.010	mg/L	N/A	2017-09-29	
Sulfate	122	1.0	mg/L	N/A	2017-10-02	

General Parameters

Alkalinity, Total (as CaCO ₃)	206	1.0	mg/L	N/A	2017-09-28	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0	mg/L	N/A	2017-09-28	
Alkalinity, Bicarbonate (as CaCO ₃)	206	1.0	mg/L	N/A	2017-09-28	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0	mg/L	N/A	2017-09-28	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0	mg/L	N/A	2017-09-28	
Chromium, Hexavalent	< 0.0010	0.0010	mg/L	N/A	2017-09-28	
Colour, True	5.5	5.0	CU	N/A	2017-09-29	
Conductivity (EC)	759	2.0	µS/cm	N/A	2017-09-28	
pH	7.71	0.10	pH units	N/A	2017-09-28	HT2
Solids, Total Suspended	5.6	2.0	mg/L	N/A	2017-09-28	
Turbidity	0.95	0.10	NTU	N/A	2017-09-29	HT1

Calculated Parameters

Chromium, Trivalent	< 0.00100	0.00100	mg/L	N/A	N/A	
Hardness, Total (as CaCO ₃)	361	0.500	mg/L	N/A	N/A	

Dissolved Metals

Aluminum, dissolved	< 0.0050	0.0050	mg/L	N/A	2017-10-03	
Antimony, dissolved	< 0.00020	0.00020	mg/L	N/A	2017-10-03	
Arsenic, dissolved	< 0.00050	0.00050	mg/L	N/A	2017-10-03	
Barium, dissolved	0.0253	0.0050	mg/L	N/A	2017-10-03	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	N/A	2017-10-03	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	N/A	2017-10-03	
Boron, dissolved	0.0313	0.0050	mg/L	N/A	2017-10-03	
Cadmium, dissolved	0.000010	0.000010	mg/L	N/A	2017-10-03	
Calcium, dissolved	117	0.20	mg/L	N/A	2017-10-03	
Chromium, dissolved	< 0.00050	0.00050	mg/L	N/A	2017-10-03	
Cobalt, dissolved	0.00010	0.00010	mg/L	N/A	2017-10-03	
Copper, dissolved	0.00112	0.00040	mg/L	N/A	2017-10-03	
Iron, dissolved	< 0.010	0.010	mg/L	N/A	2017-10-03	
Lead, dissolved	< 0.00020	0.00020	mg/L	N/A	2017-10-03	
Lithium, dissolved	0.00016	0.00010	mg/L	N/A	2017-10-03	
Magnesium, dissolved	16.5	0.010	mg/L	N/A	2017-10-03	
Manganese, dissolved	0.0384	0.00020	mg/L	N/A	2017-10-03	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2017-09-29	2017-09-29	
Molybdenum, dissolved	0.00229	0.00010	mg/L	N/A	2017-10-03	
Nickel, dissolved	0.00076	0.00040	mg/L	N/A	2017-10-03	
Phosphorus, dissolved	< 0.050	0.050	mg/L	N/A	2017-10-03	
Potassium, dissolved	1.72	0.10	mg/L	N/A	2017-10-03	

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Analyte	Result / Recovery	MRL / Limits	Units	Prepared	Analyzed	Notes
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Sample ID: SHA-SW1 (7092382-01) [Water] Sampled: 2017-09-25 10:15, Continued

Dissolved Metals, Continued

Selenium, dissolved	< 0.00050	0.00050	mg/L	N/A	2017-10-03
Silicon, dissolved	7.8	1.0	mg/L	N/A	2017-10-03
Silver, dissolved	< 0.000050	0.000050	mg/L	N/A	2017-10-03
Sodium, dissolved	18.6	0.10	mg/L	N/A	2017-10-03
Strontium, dissolved	0.359	0.0010	mg/L	N/A	2017-10-03
Sulfur, dissolved	42.5	3.0	mg/L	N/A	2017-10-03
Tellurium, dissolved	< 0.00050	0.00050	mg/L	N/A	2017-10-03
Thallium, dissolved	< 0.000020	0.000020	mg/L	N/A	2017-10-03
Thorium, dissolved	< 0.00010	0.00010	mg/L	N/A	2017-10-03
Tin, dissolved	< 0.00020	0.00020	mg/L	N/A	2017-10-03
Titanium, dissolved	< 0.0050	0.0050	mg/L	N/A	2017-10-03
Uranium, dissolved	0.00289	0.000020	mg/L	N/A	2017-10-03
Vanadium, dissolved	< 0.0010	0.0010	mg/L	N/A	2017-10-03
Zinc, dissolved	< 0.0040	0.0040	mg/L	N/A	2017-10-03
Zirconium, dissolved	< 0.00010	0.00010	mg/L	N/A	2017-10-03

Total Metals

Aluminum, total	0.0303	0.0050	mg/L	2017-10-02	2017-10-03
Antimony, total	< 0.00020	0.00020	mg/L	2017-10-02	2017-10-03
Arsenic, total	< 0.00050	0.00050	mg/L	2017-10-02	2017-10-03
Barium, total	0.0255	0.0050	mg/L	2017-10-02	2017-10-03
Beryllium, total	< 0.00010	0.00010	mg/L	2017-10-02	2017-10-03
Bismuth, total	< 0.00010	0.00010	mg/L	2017-10-02	2017-10-03
Boron, total	0.0548	0.0050	mg/L	2017-10-02	2017-10-03
Cadmium, total	0.000012	0.000010	mg/L	2017-10-02	2017-10-03
Calcium, total	123	0.20	mg/L	2017-10-02	2017-10-03
Chromium, total	< 0.00050	0.00050	mg/L	2017-10-02	2017-10-03
Cobalt, total	0.00025	0.00010	mg/L	2017-10-02	2017-10-03
Copper, total	0.00150	0.00040	mg/L	2017-10-02	2017-10-03
Iron, total	0.029	0.010	mg/L	2017-10-02	2017-10-03
Lead, total	< 0.00020	0.00020	mg/L	2017-10-02	2017-10-03
Lithium, total	0.00032	0.00010	mg/L	2017-10-02	2017-10-03
Magnesium, total	17.0	0.010	mg/L	2017-10-02	2017-10-03
Manganese, total	0.120	0.00020	mg/L	2017-10-02	2017-10-03
Mercury, total	< 0.000010	0.000010	mg/L	2017-10-02	2017-10-03
Molybdenum, total	0.00235	0.00010	mg/L	2017-10-02	2017-10-03
Nickel, total	0.00090	0.00040	mg/L	2017-10-02	2017-10-03
Phosphorus, total	< 0.050	0.050	mg/L	2017-10-02	2017-10-03
Potassium, total	1.72	0.10	mg/L	2017-10-02	2017-10-03
Selenium, total	< 0.00050	0.00050	mg/L	2017-10-02	2017-10-03
Silicon, total	7.8	1.0	mg/L	2017-10-02	2017-10-03
Silver, total	< 0.000050	0.000050	mg/L	2017-10-02	2017-10-03
Sodium, total	18.6	0.10	mg/L	2017-10-02	2017-10-03
Strontium, total	0.374	0.0010	mg/L	2017-10-02	2017-10-03
Sulfur, total	45.6	3.0	mg/L	2017-10-02	2017-10-03
Tellurium, total	< 0.00050	0.00050	mg/L	2017-10-02	2017-10-03

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Analyte	Result / Recovery	MRL / Limits	Units	Prepared	Analyzed	Notes
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Sample ID: SHA-SW1 (7092382-01) [Water] Sampled: 2017-09-25 10:15, Continued

Total Metals, Continued

Thallium, total	< 0.000020	0.000020	mg/L	2017-10-02	2017-10-03	
Thorium, total	< 0.00010	0.00010	mg/L	2017-10-02	2017-10-03	
Tin, total	< 0.00020	0.00020	mg/L	2017-10-02	2017-10-03	
Titanium, total	< 0.0050	0.0050	mg/L	2017-10-02	2017-10-03	
Uranium, total	0.00294	0.000020	mg/L	2017-10-02	2017-10-03	
Vanadium, total	< 0.0010	0.0010	mg/L	2017-10-02	2017-10-03	
Zinc, total	< 0.0040	0.0040	mg/L	2017-10-02	2017-10-03	
Zirconium, total	< 0.00010	0.00010	mg/L	2017-10-02	2017-10-03	

BCMOE Aggregate Hydrocarbons

EPHw10-19	< 250	250	µg/L	2017-09-30	2017-10-03	
EPHw19-32	< 250	250	µg/L	2017-09-30	2017-10-03	
LEPHw	< 250	250	µg/L	N/A	N/A	
HEPHw	< 250	250	µg/L	N/A	N/A	
Surrogate: 2-Methylnonane (EPH/F2-4)	92	60-140	%	2017-09-30	2017-10-03	

Polycyclic Aromatic Hydrocarbons (PAH)

Acenaphthene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Acenaphthylene	< 0.200	0.200	µg/L	2017-09-30	2017-10-02	
Acridine	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Anthracene	< 0.010	0.010	µg/L	2017-09-30	2017-10-02	
Benz(a)anthracene	< 0.010	0.010	µg/L	2017-09-30	2017-10-02	
Benzo(a)pyrene	< 0.010	0.010	µg/L	2017-09-30	2017-10-02	
Benzo(b)fluoranthene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Benzo(b+j)fluoranthene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Benzo(g,h,i)perylene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Benzo(k)fluoranthene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Chrysene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Dibenz(a,h)anthracene	< 0.010	0.010	µg/L	2017-09-30	2017-10-02	
Fluoranthene	< 0.030	0.030	µg/L	2017-09-30	2017-10-02	
Fluorene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Indeno(1,2,3-cd)pyrene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Naphthalene	< 0.200	0.200	µg/L	2017-09-30	2017-10-02	
Phenanthrene	< 0.100	0.100	µg/L	2017-09-30	2017-10-02	
Pyrene	< 0.020	0.020	µg/L	2017-09-30	2017-10-02	
Quinoline	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Surrogate: Acridine-d9	95	50-140	%	2017-09-30	2017-10-02	
Surrogate: Naphthalene-d8	120	50-140	%	2017-09-30	2017-10-02	
Surrogate: Perylene-d12	120	50-140	%	2017-09-30	2017-10-02	

Sample ID: DUP SW1 (7092382-02) [Water] Sampled: 2017-09-25 10:30

Anions

Chloride	47.9	0.10	mg/L	N/A	2017-10-02	
Fluoride	< 0.10	0.10	mg/L	N/A	2017-09-29	
Nitrate (as N)	0.498	0.010	mg/L	N/A	2017-09-29	

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2017-10-03

Analyte	Result / Recovery	MRL / Limits	Units	Prepared	Analyzed	Notes
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Sample ID: DUP SW1 (7092382-02) [Water] Sampled: 2017-09-25 10:30, Continued

Anions, Continued

Nitrite (as N)	< 0.010	0.010	mg/L	N/A	2017-09-29	
Sulfate	124	1.0	mg/L	N/A	2017-10-02	

General Parameters

Alkalinity, Total (as CaCO ₃)	197	1.0	mg/L	N/A	2017-09-28	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0	mg/L	N/A	2017-09-28	
Alkalinity, Bicarbonate (as CaCO ₃)	197	1.0	mg/L	N/A	2017-09-28	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0	mg/L	N/A	2017-09-28	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0	mg/L	N/A	2017-09-28	
Chromium, Hexavalent	< 0.0010	0.0010	mg/L	N/A	2017-09-28	
Colour, True	5.5	5.0	CU	N/A	2017-09-29	
Conductivity (EC)	761	2.0	µS/cm	N/A	2017-09-28	
pH	7.72	0.10	pH units	N/A	2017-09-28	HT2
Solids, Total Suspended	4.2	2.0	mg/L	N/A	2017-09-28	
Turbidity	0.90	0.10	NTU	N/A	2017-09-29	HT1

Calculated Parameters

Chromium, Trivalent	< 0.00100	0.00100	mg/L	N/A	N/A	
Hardness, Total (as CaCO ₃)	357	0.500	mg/L	N/A	N/A	

Dissolved Metals

Aluminum, dissolved	< 0.0050	0.0050	mg/L	N/A	2017-10-03	
Antimony, dissolved	< 0.00020	0.00020	mg/L	N/A	2017-10-03	
Arsenic, dissolved	< 0.00050	0.00050	mg/L	N/A	2017-10-03	
Barium, dissolved	0.0251	0.0050	mg/L	N/A	2017-10-03	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	N/A	2017-10-03	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	N/A	2017-10-03	
Boron, dissolved	0.0300	0.0050	mg/L	N/A	2017-10-03	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	N/A	2017-10-03	
Calcium, dissolved	115	0.20	mg/L	N/A	2017-10-03	
Chromium, dissolved	< 0.00050	0.00050	mg/L	N/A	2017-10-03	
Cobalt, dissolved	< 0.00010	0.00010	mg/L	N/A	2017-10-03	
Copper, dissolved	0.00114	0.00040	mg/L	N/A	2017-10-03	
Iron, dissolved	< 0.010	0.010	mg/L	N/A	2017-10-03	
Lead, dissolved	< 0.00020	0.00020	mg/L	N/A	2017-10-03	
Lithium, dissolved	0.00015	0.00010	mg/L	N/A	2017-10-03	
Magnesium, dissolved	16.7	0.010	mg/L	N/A	2017-10-03	
Manganese, dissolved	0.0367	0.00020	mg/L	N/A	2017-10-03	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2017-09-29	2017-09-29	
Molybdenum, dissolved	0.00222	0.00010	mg/L	N/A	2017-10-03	
Nickel, dissolved	0.00075	0.00040	mg/L	N/A	2017-10-03	
Phosphorus, dissolved	< 0.050	0.050	mg/L	N/A	2017-10-03	
Potassium, dissolved	1.67	0.10	mg/L	N/A	2017-10-03	
Selenium, dissolved	< 0.00050	0.00050	mg/L	N/A	2017-10-03	
Silicon, dissolved	7.8	1.0	mg/L	N/A	2017-10-03	
Silver, dissolved	< 0.000050	0.000050	mg/L	N/A	2017-10-03	

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Sample ID: DUP SW1 (7092382-02) [Water] Sampled: 2017-09-25 10:30, Continued

Dissolved Metals, Continued

Sodium, dissolved	18.7	0.10	mg/L	N/A	2017-10-03	
Strontium, dissolved	0.359	0.0010	mg/L	N/A	2017-10-03	
Sulfur, dissolved	42.6	3.0	mg/L	N/A	2017-10-03	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	N/A	2017-10-03	
Thallium, dissolved	< 0.000020	0.000020	mg/L	N/A	2017-10-03	
Thorium, dissolved	< 0.00010	0.00010	mg/L	N/A	2017-10-03	
Tin, dissolved	< 0.00020	0.00020	mg/L	N/A	2017-10-03	
Titanium, dissolved	< 0.0050	0.0050	mg/L	N/A	2017-10-03	
Uranium, dissolved	0.00286	0.000020	mg/L	N/A	2017-10-03	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	N/A	2017-10-03	
Zinc, dissolved	0.0067	0.0040	mg/L	N/A	2017-10-03	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	N/A	2017-10-03	

Total Metals

Aluminum, total	0.0255	0.0050	mg/L	2017-10-02	2017-10-03	
Antimony, total	< 0.00020	0.00020	mg/L	2017-10-02	2017-10-03	
Arsenic, total	< 0.00050	0.00050	mg/L	2017-10-02	2017-10-03	
Barium, total	0.0259	0.0050	mg/L	2017-10-02	2017-10-03	
Beryllium, total	< 0.00010	0.00010	mg/L	2017-10-02	2017-10-03	
Bismuth, total	< 0.00010	0.00010	mg/L	2017-10-02	2017-10-03	
Boron, total	0.0372	0.0050	mg/L	2017-10-02	2017-10-03	
Cadmium, total	< 0.000010	0.000010	mg/L	2017-10-02	2017-10-03	
Calcium, total	125	0.20	mg/L	2017-10-02	2017-10-03	
Chromium, total	< 0.00050	0.00050	mg/L	2017-10-02	2017-10-03	
Cobalt, total	0.00023	0.00010	mg/L	2017-10-02	2017-10-03	
Copper, total	0.00144	0.00040	mg/L	2017-10-02	2017-10-03	
Iron, total	0.024	0.010	mg/L	2017-10-02	2017-10-03	
Lead, total	< 0.00020	0.00020	mg/L	2017-10-02	2017-10-03	
Lithium, total	0.00022	0.00010	mg/L	2017-10-02	2017-10-03	
Magnesium, total	17.1	0.010	mg/L	2017-10-02	2017-10-03	
Manganese, total	0.108	0.00020	mg/L	2017-10-02	2017-10-03	
Mercury, total	< 0.000010	0.000010	mg/L	2017-10-02	2017-10-03	
Molybdenum, total	0.00237	0.00010	mg/L	2017-10-02	2017-10-03	
Nickel, total	0.00084	0.00040	mg/L	2017-10-02	2017-10-03	
Phosphorus, total	< 0.050	0.050	mg/L	2017-10-02	2017-10-03	
Potassium, total	1.73	0.10	mg/L	2017-10-02	2017-10-03	
Selenium, total	< 0.00050	0.00050	mg/L	2017-10-02	2017-10-03	
Silicon, total	8.0	1.0	mg/L	2017-10-02	2017-10-03	
Silver, total	< 0.000050	0.000050	mg/L	2017-10-02	2017-10-03	
Sodium, total	18.6	0.10	mg/L	2017-10-02	2017-10-03	
Strontium, total	0.376	0.0010	mg/L	2017-10-02	2017-10-03	
Sulfur, total	45.5	3.0	mg/L	2017-10-02	2017-10-03	
Tellurium, total	< 0.00050	0.00050	mg/L	2017-10-02	2017-10-03	
Thallium, total	< 0.000020	0.000020	mg/L	2017-10-02	2017-10-03	
Thorium, total	< 0.00010	0.00010	mg/L	2017-10-02	2017-10-03	
Tin, total	< 0.00020	0.00020	mg/L	2017-10-02	2017-10-03	

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Sample ID: DUP SW1 (7092382-02) [Water] Sampled: 2017-09-25 10:30, Continued

Total Metals, Continued

Titanium, total	< 0.0050	0.0050	mg/L	2017-10-02	2017-10-03	
Uranium, total	0.00302	0.000020	mg/L	2017-10-02	2017-10-03	
Vanadium, total	< 0.0010	0.0010	mg/L	2017-10-02	2017-10-03	
Zinc, total	< 0.0040	0.0040	mg/L	2017-10-02	2017-10-03	
Zirconium, total	< 0.00010	0.00010	mg/L	2017-10-02	2017-10-03	

BCMOE Aggregate Hydrocarbons

EPHw10-19	< 250	250	µg/L	2017-09-30	2017-10-03	
EPHw19-32	< 250	250	µg/L	2017-09-30	2017-10-03	
LEPHw	< 250	250	µg/L	N/A	N/A	
HEPHw	< 250	250	µg/L	N/A	N/A	
Surrogate: 2-Methylnonane (EPH/F2-4)	96	60-140	%	2017-09-30	2017-10-03	

Polycyclic Aromatic Hydrocarbons (PAH)

Acenaphthene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Acenaphthylene	< 0.200	0.200	µg/L	2017-09-30	2017-10-02	
Acridine	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Anthracene	< 0.010	0.010	µg/L	2017-09-30	2017-10-02	
Benz(a)anthracene	< 0.010	0.010	µg/L	2017-09-30	2017-10-02	
Benzo(a)pyrene	< 0.010	0.010	µg/L	2017-09-30	2017-10-02	
Benzo(b)fluoranthene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Benzo(b+j)fluoranthene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Benzo(g,h,i)perylene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Benzo(k)fluoranthene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Chrysene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Dibenz(a,h)anthracene	< 0.010	0.010	µg/L	2017-09-30	2017-10-02	
Fluoranthene	< 0.030	0.030	µg/L	2017-09-30	2017-10-02	
Fluorene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Indeno(1,2,3-cd)pyrene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Naphthalene	< 0.200	0.200	µg/L	2017-09-30	2017-10-02	
Phenanthrene	< 0.100	0.100	µg/L	2017-09-30	2017-10-02	
Pyrene	< 0.020	0.020	µg/L	2017-09-30	2017-10-02	
Quinoline	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Surrogate: Acridine-d9	96	50-140	%	2017-09-30	2017-10-02	
Surrogate: Naphthalene-d8	117	50-140	%	2017-09-30	2017-10-02	
Surrogate: Perylene-d12	84	50-140	%	2017-09-30	2017-10-02	

Sample ID: MW6 (7092382-03) [Water] Sampled: 2017-09-25 08:00

Anions

Chloride	39.3	0.10	mg/L	N/A	2017-10-02	
Fluoride	< 0.10	0.10	mg/L	N/A	2017-09-29	
Nitrate (as N)	0.018	0.010	mg/L	N/A	2017-09-29	
Nitrite (as N)	< 0.010	0.010	mg/L	N/A	2017-09-29	
Sulfate	83.3	1.0	mg/L	N/A	2017-10-02	

General Parameters

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Sample ID: MW6 (7092382-03) [Water] Sampled: 2017-09-25 08:00, Continued

General Parameters, Continued

Alkalinity, Total (as CaCO ₃)	640	1.0	mg/L	N/A	2017-09-28	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0	mg/L	N/A	2017-09-28	
Alkalinity, Bicarbonate (as CaCO ₃)	640	1.0	mg/L	N/A	2017-09-28	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0	mg/L	N/A	2017-09-28	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0	mg/L	N/A	2017-09-28	
Colour, True	6.2	5.0	CU	N/A	2017-09-29	
Conductivity (EC)	1330	2.0	µS/cm	N/A	2017-09-28	
pH	7.31	0.10	pH units	N/A	2017-09-28	HT2
Solids, Total Suspended	14.8	2.0	mg/L	N/A	2017-09-28	
Turbidity	10.6	0.10	NTU	N/A	2017-09-29	HT1

Calculated Parameters

Hardness, Total (as CaCO ₃)	599	0.500	mg/L	N/A	N/A	
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Dissolved Metals

Aluminum, dissolved	< 0.0050	0.0050	mg/L	N/A	2017-10-03	
Antimony, dissolved	< 0.00020	0.00020	mg/L	N/A	2017-10-03	
Arsenic, dissolved	0.00445	0.00050	mg/L	N/A	2017-10-03	
Barium, dissolved	0.0960	0.0050	mg/L	N/A	2017-10-03	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	N/A	2017-10-03	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	N/A	2017-10-03	
Boron, dissolved	0.0939	0.0050	mg/L	N/A	2017-10-03	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	N/A	2017-10-03	
Calcium, dissolved	178	0.20	mg/L	N/A	2017-10-03	
Chromium, dissolved	< 0.00050	0.00050	mg/L	N/A	2017-10-03	
Cobalt, dissolved	0.00233	0.00010	mg/L	N/A	2017-10-03	
Copper, dissolved	< 0.00040	0.00040	mg/L	N/A	2017-10-03	
Iron, dissolved	0.988	0.010	mg/L	N/A	2017-10-03	
Lead, dissolved	< 0.00020	0.00020	mg/L	N/A	2017-10-03	
Lithium, dissolved	0.0146	0.00010	mg/L	N/A	2017-10-03	
Magnesium, dissolved	37.1	0.010	mg/L	N/A	2017-10-03	
Manganese, dissolved	2.30	0.00020	mg/L	N/A	2017-10-03	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2017-09-29	2017-09-29	
Molybdenum, dissolved	0.00083	0.00010	mg/L	N/A	2017-10-03	
Nickel, dissolved	0.00482	0.00040	mg/L	N/A	2017-10-03	
Phosphorus, dissolved	< 0.050	0.050	mg/L	N/A	2017-10-03	
Potassium, dissolved	4.44	0.10	mg/L	N/A	2017-10-03	
Selenium, dissolved	< 0.00050	0.00050	mg/L	N/A	2017-10-03	
Silicon, dissolved	12.2	1.0	mg/L	N/A	2017-10-03	
Silver, dissolved	< 0.000050	0.000050	mg/L	N/A	2017-10-03	
Sodium, dissolved	91.8	0.10	mg/L	N/A	2017-10-03	
Strontium, dissolved	0.616	0.0010	mg/L	N/A	2017-10-03	
Sulfur, dissolved	29.6	3.0	mg/L	N/A	2017-10-03	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	N/A	2017-10-03	
Thallium, dissolved	0.000027	0.000020	mg/L	N/A	2017-10-03	

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Sample ID: MW6 (7092382-03) [Water] Sampled: 2017-09-25 08:00, Continued

Dissolved Metals, Continued

Thorium, dissolved	< 0.00010	0.00010	mg/L	N/A	2017-10-03
Tin, dissolved	0.00027	0.00020	mg/L	N/A	2017-10-03
Titanium, dissolved	< 0.0050	0.0050	mg/L	N/A	2017-10-03
Uranium, dissolved	0.00916	0.000020	mg/L	N/A	2017-10-03
Vanadium, dissolved	< 0.0010	0.0010	mg/L	N/A	2017-10-03
Zinc, dissolved	< 0.0040	0.0040	mg/L	N/A	2017-10-03
Zirconium, dissolved	0.00023	0.00010	mg/L	N/A	2017-10-03

Total Metals

Aluminum, total	0.0272	0.0050	mg/L	2017-10-02	2017-10-03
Antimony, total	0.00026	0.00020	mg/L	2017-10-02	2017-10-03
Arsenic, total	0.00373	0.00050	mg/L	2017-10-02	2017-10-03
Barium, total	0.0892	0.0050	mg/L	2017-10-02	2017-10-03
Beryllium, total	< 0.00010	0.00010	mg/L	2017-10-02	2017-10-03
Bismuth, total	< 0.00010	0.00010	mg/L	2017-10-02	2017-10-03
Boron, total	0.0872	0.0050	mg/L	2017-10-02	2017-10-03
Cadmium, total	0.000017	0.000010	mg/L	2017-10-02	2017-10-03
Calcium, total	186	0.20	mg/L	2017-10-02	2017-10-03
Chromium, total	< 0.00050	0.00050	mg/L	2017-10-02	2017-10-03
Cobalt, total	0.00222	0.00010	mg/L	2017-10-02	2017-10-03
Copper, total	0.00072	0.00040	mg/L	2017-10-02	2017-10-03
Iron, total	0.896	0.010	mg/L	2017-10-02	2017-10-03
Lead, total	0.00029	0.00020	mg/L	2017-10-02	2017-10-03
Lithium, total	0.0132	0.00010	mg/L	2017-10-02	2017-10-03
Magnesium, total	37.1	0.010	mg/L	2017-10-02	2017-10-03
Manganese, total	2.12	0.00020	mg/L	2017-10-02	2017-10-03
Mercury, total	< 0.000010	0.000010	mg/L	2017-10-02	2017-10-03
Molybdenum, total	0.00084	0.00010	mg/L	2017-10-02	2017-10-03
Nickel, total	0.00495	0.00040	mg/L	2017-10-02	2017-10-03
Phosphorus, total	< 0.050	0.050	mg/L	2017-10-02	2017-10-03
Potassium, total	4.16	0.10	mg/L	2017-10-02	2017-10-03
Selenium, total	< 0.00050	0.00050	mg/L	2017-10-02	2017-10-03
Silicon, total	12.0	1.0	mg/L	2017-10-02	2017-10-03
Silver, total	< 0.000050	0.000050	mg/L	2017-10-02	2017-10-03
Sodium, total	74.0	0.10	mg/L	2017-10-02	2017-10-03
Strontium, total	0.601	0.0010	mg/L	2017-10-02	2017-10-03
Sulfur, total	27.8	3.0	mg/L	2017-10-02	2017-10-03
Tellurium, total	< 0.00050	0.00050	mg/L	2017-10-02	2017-10-03
Thallium, total	0.000022	0.000020	mg/L	2017-10-02	2017-10-03
Thorium, total	< 0.00010	0.00010	mg/L	2017-10-02	2017-10-03
Tin, total	0.00067	0.00020	mg/L	2017-10-02	2017-10-03
Titanium, total	< 0.0050	0.0050	mg/L	2017-10-02	2017-10-03
Uranium, total	0.00855	0.000020	mg/L	2017-10-02	2017-10-03
Vanadium, total	< 0.0010	0.0010	mg/L	2017-10-02	2017-10-03
Zinc, total	0.0051	0.0040	mg/L	2017-10-02	2017-10-03
Zirconium, total	0.00017	0.00010	mg/L	2017-10-02	2017-10-03

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Sample ID: MW6 (7092382-03) [Water] Sampled: 2017-09-25 08:00, Continued

BCMOE Aggregate Hydrocarbons

EPHw10-19	< 250	250	µg/L	2017-09-30	2017-10-03	
EPHw19-32	< 250	250	µg/L	2017-09-30	2017-10-03	
LEPHw	< 250	250	µg/L	N/A	N/A	
HEPHw	< 250	250	µg/L	N/A	N/A	
Surrogate: 2-Methylnonane (EPH/F2-4)	93	60-140	%	2017-09-30	2017-10-03	

Polycyclic Aromatic Hydrocarbons (PAH)

Acenaphthene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Acenaphthylene	< 0.200	0.200	µg/L	2017-09-30	2017-10-02	
Acridine	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Anthracene	< 0.010	0.010	µg/L	2017-09-30	2017-10-02	
Benz(a)anthracene	< 0.010	0.010	µg/L	2017-09-30	2017-10-02	
Benzo(a)pyrene	< 0.010	0.010	µg/L	2017-09-30	2017-10-02	
Benzo(b)fluoranthene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Benzo(b+j)fluoranthene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Benzo(g,h,i)perylene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Benzo(k)fluoranthene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Chrysene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Dibenz(a,h)anthracene	< 0.010	0.010	µg/L	2017-09-30	2017-10-02	
Fluoranthene	< 0.030	0.030	µg/L	2017-09-30	2017-10-02	
Fluorene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Indeno(1,2,3-cd)pyrene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Naphthalene	< 0.200	0.200	µg/L	2017-09-30	2017-10-02	
Phenanthrene	< 0.100	0.100	µg/L	2017-09-30	2017-10-02	
Pyrene	< 0.020	0.020	µg/L	2017-09-30	2017-10-02	
Quinoline	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Surrogate: Acridine-d9	117	50-140	%	2017-09-30	2017-10-02	
Surrogate: Naphthalene-d8	122	50-140	%	2017-09-30	2017-10-02	
Surrogate: Perylene-d12	79	50-140	%	2017-09-30	2017-10-02	

Sample ID: MW2 (7092382-04) [Water] Sampled: 2017-09-25 09:40

Anions

Chloride	4.80	0.10	mg/L	N/A	2017-09-29	
Fluoride	0.26	0.10	mg/L	N/A	2017-09-29	
Nitrate (as N)	0.165	0.010	mg/L	N/A	2017-09-29	
Nitrite (as N)	< 0.010	0.010	mg/L	N/A	2017-09-29	
Sulfate	< 1.0	1.0	mg/L	N/A	2017-09-29	

General Parameters

Alkalinity, Total (as CaCO3)	111	1.0	mg/L	N/A	2017-09-28	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	N/A	2017-09-28	
Alkalinity, Bicarbonate (as CaCO3)	111	1.0	mg/L	N/A	2017-09-28	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	N/A	2017-09-28	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	N/A	2017-09-28	

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Sample ID: MW2 (7092382-04) [Water] Sampled: 2017-09-25 09:40, Continued

General Parameters, Continued

Colour, True	< 5.0	5.0	CU	N/A	2017-09-29	
Conductivity (EC)	251	2.0	µS/cm	N/A	2017-09-28	
pH	7.58	0.10	pH units	N/A	2017-09-28	HT2
Solids, Total Suspended	29.4	2.0	mg/L	N/A	2017-09-28	
Turbidity	7.79	0.10	NTU	N/A	2017-09-29	HT1

Calculated Parameters

Hardness, Total (as CaCO3)	126	0.500	mg/L	N/A	N/A	
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Dissolved Metals

Aluminum, dissolved	< 0.0050	0.0050	mg/L	N/A	2017-10-03	
Antimony, dissolved	< 0.00020	0.00020	mg/L	N/A	2017-10-03	
Arsenic, dissolved	0.00193	0.00050	mg/L	N/A	2017-10-03	
Barium, dissolved	0.0260	0.0050	mg/L	N/A	2017-10-03	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	N/A	2017-10-03	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	N/A	2017-10-03	
Boron, dissolved	0.0303	0.0050	mg/L	N/A	2017-10-03	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	N/A	2017-10-03	
Calcium, dissolved	38.5	0.20	mg/L	N/A	2017-10-03	
Chromium, dissolved	< 0.00050	0.00050	mg/L	N/A	2017-10-03	
Cobalt, dissolved	0.00039	0.00010	mg/L	N/A	2017-10-03	
Copper, dissolved	< 0.00040	0.00040	mg/L	N/A	2017-10-03	
Iron, dissolved	0.207	0.010	mg/L	N/A	2017-10-03	
Lead, dissolved	< 0.00020	0.00020	mg/L	N/A	2017-10-03	
Lithium, dissolved	< 0.00010	0.00010	mg/L	N/A	2017-10-03	
Magnesium, dissolved	7.29	0.010	mg/L	N/A	2017-10-03	
Manganese, dissolved	0.632	0.00020	mg/L	N/A	2017-10-03	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2017-09-29	2017-09-29	
Molybdenum, dissolved	0.00444	0.00010	mg/L	N/A	2017-10-03	
Nickel, dissolved	0.00127	0.00040	mg/L	N/A	2017-10-03	
Phosphorus, dissolved	0.131	0.050	mg/L	N/A	2017-10-03	
Potassium, dissolved	0.71	0.10	mg/L	N/A	2017-10-03	
Selenium, dissolved	< 0.00050	0.00050	mg/L	N/A	2017-10-03	
Silicon, dissolved	7.0	1.0	mg/L	N/A	2017-10-03	
Silver, dissolved	< 0.000050	0.000050	mg/L	N/A	2017-10-03	
Sodium, dissolved	9.58	0.10	mg/L	N/A	2017-10-03	
Strontium, dissolved	0.167	0.0010	mg/L	N/A	2017-10-03	
Sulfur, dissolved	7.7	3.0	mg/L	N/A	2017-10-03	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	N/A	2017-10-03	
Thallium, dissolved	< 0.000020	0.000020	mg/L	N/A	2017-10-03	
Thorium, dissolved	< 0.00010	0.00010	mg/L	N/A	2017-10-03	
Tin, dissolved	< 0.00020	0.00020	mg/L	N/A	2017-10-03	
Titanium, dissolved	< 0.0050	0.0050	mg/L	N/A	2017-10-03	
Uranium, dissolved	0.00102	0.000020	mg/L	N/A	2017-10-03	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	N/A	2017-10-03	
Zinc, dissolved	0.0219	0.0040	mg/L	N/A	2017-10-03	

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Sample ID: MW2 (7092382-04) [Water] Sampled: 2017-09-25 09:40, Continued

Dissolved Metals, Continued

Zirconium, dissolved	< 0.00010	0.00010	mg/L	N/A	2017-10-03
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Total Metals

Aluminum, total	0.849	0.0050	mg/L	2017-10-02	2017-10-03
Antimony, total	< 0.00020	0.00020	mg/L	2017-10-02	2017-10-03
Arsenic, total	0.00187	0.00050	mg/L	2017-10-02	2017-10-03
Barium, total	0.0315	0.0050	mg/L	2017-10-02	2017-10-03
Beryllium, total	< 0.00010	0.00010	mg/L	2017-10-02	2017-10-03
Bismuth, total	< 0.00010	0.00010	mg/L	2017-10-02	2017-10-03
Boron, total	0.0318	0.0050	mg/L	2017-10-02	2017-10-03
Cadmium, total	0.000071	0.000010	mg/L	2017-10-02	2017-10-03
Calcium, total	39.5	0.20	mg/L	2017-10-02	2017-10-03
Chromium, total	0.00133	0.00050	mg/L	2017-10-02	2017-10-03
Cobalt, total	0.00098	0.00010	mg/L	2017-10-02	2017-10-03
Copper, total	0.00109	0.00040	mg/L	2017-10-02	2017-10-03
Iron, total	1.44	0.010	mg/L	2017-10-02	2017-10-03
Lead, total	0.00024	0.00020	mg/L	2017-10-02	2017-10-03
Lithium, total	0.00024	0.00010	mg/L	2017-10-02	2017-10-03
Magnesium, total	7.62	0.010	mg/L	2017-10-02	2017-10-03
Manganese, total	0.508	0.00020	mg/L	2017-10-02	2017-10-03
Mercury, total	< 0.000010	0.000010	mg/L	2017-10-02	2017-10-03
Molybdenum, total	0.00426	0.00010	mg/L	2017-10-02	2017-10-03
Nickel, total	0.00202	0.00040	mg/L	2017-10-02	2017-10-03
Phosphorus, total	0.201	0.050	mg/L	2017-10-02	2017-10-03
Potassium, total	0.75	0.10	mg/L	2017-10-02	2017-10-03
Selenium, total	< 0.00050	0.00050	mg/L	2017-10-02	2017-10-03
Silicon, total	8.2	1.0	mg/L	2017-10-02	2017-10-03
Silver, total	< 0.000050	0.000050	mg/L	2017-10-02	2017-10-03
Sodium, total	9.28	0.10	mg/L	2017-10-02	2017-10-03
Strontium, total	0.168	0.0010	mg/L	2017-10-02	2017-10-03
Sulfur, total	7.4	3.0	mg/L	2017-10-02	2017-10-03
Tellurium, total	< 0.00050	0.00050	mg/L	2017-10-02	2017-10-03
Thallium, total	0.000021	0.000020	mg/L	2017-10-02	2017-10-03
Thorium, total	0.00011	0.00010	mg/L	2017-10-02	2017-10-03
Tin, total	0.00020	0.00020	mg/L	2017-10-02	2017-10-03
Titanium, total	0.0460	0.0050	mg/L	2017-10-02	2017-10-03
Uranium, total	0.00101	0.000020	mg/L	2017-10-02	2017-10-03
Vanadium, total	0.0033	0.0010	mg/L	2017-10-02	2017-10-03
Zinc, total	0.0052	0.0040	mg/L	2017-10-02	2017-10-03
Zirconium, total	0.00020	0.00010	mg/L	2017-10-02	2017-10-03

BCMOE Aggregate Hydrocarbons

EPHw10-19	< 250	250	µg/L	2017-09-30	2017-10-03
EPHw19-32	< 250	250	µg/L	2017-09-30	2017-10-03
LEPHw	< 250	250	µg/L	N/A	N/A
HEPHw	< 250	250	µg/L	N/A	N/A

SAMPLE ANALYTICAL DATA

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Sample ID: MW2 (7092382-04) [Water] Sampled: 2017-09-25 09:40, Continued

BCMOE Aggregate Hydrocarbons, Continued

Surrogate: 2-Methylnonane (EPH/F2-4)	90	60-140	%	2017-09-30	2017-10-03
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Polycyclic Aromatic Hydrocarbons (PAH)

Acenaphthene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02
Acenaphthylene	< 0.200	0.200	µg/L	2017-09-30	2017-10-02
Acridine	< 0.050	0.050	µg/L	2017-09-30	2017-10-02
Anthracene	< 0.010	0.010	µg/L	2017-09-30	2017-10-02
Benz(a)anthracene	< 0.010	0.010	µg/L	2017-09-30	2017-10-02
Benzo(a)pyrene	< 0.010	0.010	µg/L	2017-09-30	2017-10-02
Benzo(b)fluoranthene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02
Benzo(b+j)fluoranthene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02
Benzo(g,h,i)perylene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02
Benzo(k)fluoranthene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02
Chrysene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02
Dibenz(a,h)anthracene	< 0.010	0.010	µg/L	2017-09-30	2017-10-02
Fluoranthene	< 0.030	0.030	µg/L	2017-09-30	2017-10-02
Fluorene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02
Indeno(1,2,3-cd)pyrene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02
Naphthalene	< 0.200	0.200	µg/L	2017-09-30	2017-10-02
Phenanthrene	< 0.100	0.100	µg/L	2017-09-30	2017-10-02
Pyrene	< 0.020	0.020	µg/L	2017-09-30	2017-10-02
Quinoline	< 0.050	0.050	µg/L	2017-09-30	2017-10-02
Surrogate: Acridine-d9	117	50-140	%	2017-09-30	2017-10-02
Surrogate: Naphthalene-d8	119	50-140	%	2017-09-30	2017-10-02
Surrogate: Perylene-d12	115	50-140	%	2017-09-30	2017-10-02

Sample ID: MW3S (7092382-05) [Water] Sampled: 2017-09-25 08:45

Anions

Chloride	6.47	0.10	mg/L	N/A	2017-09-29
Fluoride	0.22	0.10	mg/L	N/A	2017-09-29
Nitrate (as N)	< 0.010	0.010	mg/L	N/A	2017-09-29
Nitrite (as N)	< 0.010	0.010	mg/L	N/A	2017-09-29
Sulfate	44.3	1.0	mg/L	N/A	2017-09-29

General Parameters

Alkalinity, Total (as CaCO3)	128	1.0	mg/L	N/A	2017-09-28
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	N/A	2017-09-28
Alkalinity, Bicarbonate (as CaCO3)	128	1.0	mg/L	N/A	2017-09-28
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	N/A	2017-09-28
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	N/A	2017-09-28
Colour, True	< 5.0	5.0	CU	N/A	2017-09-29
Conductivity (EC)	342	2.0	µS/cm	N/A	2017-09-28
pH	7.58	0.10	pH units	N/A	2017-09-28 HT2
Solids, Total Suspended	6.8	2.0	mg/L	N/A	2017-09-28

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Sample ID: MW3S (7092382-05) [Water] Sampled: 2017-09-25 08:45, Continued

General Parameters, Continued

Turbidity	3.96	0.10	NTU	N/A	2017-09-29	HT1
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Calculated Parameters

Hardness, Total (as CaCO ₃)	138	0.500	mg/L	N/A	N/A	
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Dissolved Metals

Aluminum, dissolved	< 0.0050	0.0050	mg/L	N/A	2017-10-03	
Antimony, dissolved	< 0.00020	0.00020	mg/L	N/A	2017-10-03	
Arsenic, dissolved	0.00073	0.00050	mg/L	N/A	2017-10-03	
Barium, dissolved	0.0302	0.0050	mg/L	N/A	2017-10-03	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	N/A	2017-10-03	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	N/A	2017-10-03	
Boron, dissolved	0.0238	0.0050	mg/L	N/A	2017-10-03	
Cadmium, dissolved	0.000024	0.000010	mg/L	N/A	2017-10-03	
Calcium, dissolved	44.2	0.20	mg/L	N/A	2017-10-03	
Chromium, dissolved	< 0.00050	0.00050	mg/L	N/A	2017-10-03	
Cobalt, dissolved	0.00044	0.00010	mg/L	N/A	2017-10-03	
Copper, dissolved	< 0.00040	0.00040	mg/L	N/A	2017-10-03	
Iron, dissolved	0.025	0.010	mg/L	N/A	2017-10-03	
Lead, dissolved	< 0.00020	0.00020	mg/L	N/A	2017-10-03	
Lithium, dissolved	< 0.00010	0.00010	mg/L	N/A	2017-10-03	
Magnesium, dissolved	6.82	0.010	mg/L	N/A	2017-10-03	
Manganese, dissolved	0.265	0.00020	mg/L	N/A	2017-10-03	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2017-09-29	2017-09-29	
Molybdenum, dissolved	0.00601	0.00010	mg/L	N/A	2017-10-03	
Nickel, dissolved	0.00199	0.00040	mg/L	N/A	2017-10-03	
Phosphorus, dissolved	0.057	0.050	mg/L	N/A	2017-10-03	
Potassium, dissolved	0.97	0.10	mg/L	N/A	2017-10-03	
Selenium, dissolved	< 0.00050	0.00050	mg/L	N/A	2017-10-03	
Silicon, dissolved	6.1	1.0	mg/L	N/A	2017-10-03	
Silver, dissolved	< 0.000050	0.000050	mg/L	N/A	2017-10-03	
Sodium, dissolved	15.3	0.10	mg/L	N/A	2017-10-03	
Strontium, dissolved	0.221	0.0010	mg/L	N/A	2017-10-03	
Sulfur, dissolved	14.4	3.0	mg/L	N/A	2017-10-03	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	N/A	2017-10-03	
Thallium, dissolved	0.000023	0.000020	mg/L	N/A	2017-10-03	
Thorium, dissolved	< 0.00010	0.00010	mg/L	N/A	2017-10-03	
Tin, dissolved	< 0.00020	0.00020	mg/L	N/A	2017-10-03	
Titanium, dissolved	< 0.0050	0.0050	mg/L	N/A	2017-10-03	
Uranium, dissolved	0.00117	0.000020	mg/L	N/A	2017-10-03	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	N/A	2017-10-03	
Zinc, dissolved	< 0.0040	0.0040	mg/L	N/A	2017-10-03	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	N/A	2017-10-03	

Total Metals

Aluminum, total	0.0507	0.0050	mg/L	2017-10-02	2017-10-03	
Antimony, total	< 0.00020	0.00020	mg/L	2017-10-02	2017-10-03	

SAMPLE ANALYTICAL DATA

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Sample ID: MW3S (7092382-05) [Water] Sampled: 2017-09-25 08:45, Continued

Total Metals, Continued

Arsenic, total	0.00073	0.00050	mg/L	2017-10-02	2017-10-03	
Barium, total	0.0360	0.0050	mg/L	2017-10-02	2017-10-03	
Beryllium, total	< 0.00010	0.00010	mg/L	2017-10-02	2017-10-03	
Bismuth, total	< 0.00010	0.00010	mg/L	2017-10-02	2017-10-03	
Boron, total	0.0264	0.0050	mg/L	2017-10-02	2017-10-03	
Cadmium, total	0.000394	0.000010	mg/L	2017-10-02	2017-10-03	
Calcium, total	49.6	0.20	mg/L	2017-10-02	2017-10-03	
Chromium, total	0.00059	0.00050	mg/L	2017-10-02	2017-10-03	
Cobalt, total	0.00045	0.00010	mg/L	2017-10-02	2017-10-03	
Copper, total	0.00126	0.00040	mg/L	2017-10-02	2017-10-03	
Iron, total	0.058	0.010	mg/L	2017-10-02	2017-10-03	
Lead, total	< 0.00020	0.00020	mg/L	2017-10-02	2017-10-03	
Lithium, total	0.00015	0.00010	mg/L	2017-10-02	2017-10-03	
Magnesium, total	7.39	0.010	mg/L	2017-10-02	2017-10-03	
Manganese, total	0.289	0.00020	mg/L	2017-10-02	2017-10-03	
Mercury, total	< 0.000010	0.000010	mg/L	2017-10-02	2017-10-03	
Molybdenum, total	0.00656	0.00010	mg/L	2017-10-02	2017-10-03	
Nickel, total	0.00207	0.00040	mg/L	2017-10-02	2017-10-03	
Phosphorus, total	0.066	0.050	mg/L	2017-10-02	2017-10-03	
Potassium, total	1.06	0.10	mg/L	2017-10-02	2017-10-03	
Selenium, total	< 0.00050	0.00050	mg/L	2017-10-02	2017-10-03	
Silicon, total	6.6	1.0	mg/L	2017-10-02	2017-10-03	
Silver, total	< 0.000050	0.000050	mg/L	2017-10-02	2017-10-03	
Sodium, total	16.3	0.10	mg/L	2017-10-02	2017-10-03	
Strontium, total	0.240	0.0010	mg/L	2017-10-02	2017-10-03	
Sulfur, total	15.6	3.0	mg/L	2017-10-02	2017-10-03	
Tellurium, total	< 0.00050	0.00050	mg/L	2017-10-02	2017-10-03	
Thallium, total	0.000025	0.000020	mg/L	2017-10-02	2017-10-03	
Thorium, total	< 0.00010	0.00010	mg/L	2017-10-02	2017-10-03	
Tin, total	0.00027	0.00020	mg/L	2017-10-02	2017-10-03	
Titanium, total	< 0.0050	0.0050	mg/L	2017-10-02	2017-10-03	
Uranium, total	0.00131	0.000020	mg/L	2017-10-02	2017-10-03	
Vanadium, total	< 0.0010	0.0010	mg/L	2017-10-02	2017-10-03	
Zinc, total	< 0.0040	0.0040	mg/L	2017-10-02	2017-10-03	
Zirconium, total	< 0.00010	0.00010	mg/L	2017-10-02	2017-10-03	

BCMOE Aggregate Hydrocarbons

EPHw10-19	< 250	250	µg/L	2017-09-30	2017-10-03	
EPHw19-32	< 250	250	µg/L	2017-09-30	2017-10-03	
LEPHw	< 250	250	µg/L	N/A	N/A	
HEPHw	< 250	250	µg/L	N/A	N/A	
Surrogate: 2-Methylnonane (EPH/F2-4)	96	60-140	%	2017-09-30	2017-10-03	

Polycyclic Aromatic Hydrocarbons (PAH)

Acenaphthene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Acenaphthylene	< 0.200	0.200	µg/L	2017-09-30	2017-10-02	

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Sample ID: MW3S (7092382-05) [Water] Sampled: 2017-09-25 08:45, Continued

Polycyclic Aromatic Hydrocarbons (PAH), Continued

Acridine	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Anthracene	< 0.010	0.010	µg/L	2017-09-30	2017-10-02	
Benz(a)anthracene	< 0.010	0.010	µg/L	2017-09-30	2017-10-02	
Benzo(a)pyrene	< 0.010	0.010	µg/L	2017-09-30	2017-10-02	
Benzo(b)fluoranthene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Benzo(b+j)fluoranthene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Benzo(g,h,i)perylene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Benzo(k)fluoranthene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Chrysene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Dibenz(a,h)anthracene	< 0.010	0.010	µg/L	2017-09-30	2017-10-02	
Fluoranthene	< 0.030	0.030	µg/L	2017-09-30	2017-10-02	
Fluorene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Indeno(1,2,3-cd)pyrene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Naphthalene	< 0.200	0.200	µg/L	2017-09-30	2017-10-02	
Phenanthrene	< 0.100	0.100	µg/L	2017-09-30	2017-10-02	
Pyrene	< 0.020	0.020	µg/L	2017-09-30	2017-10-02	
Quinoline	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Surrogate: Acridine-d9	114	50-140	%	2017-09-30	2017-10-02	
Surrogate: Naphthalene-d8	117	50-140	%	2017-09-30	2017-10-02	
Surrogate: Perylene-d12	105	50-140	%	2017-09-30	2017-10-02	

Sample ID: MW3D (7092382-06) [Water] Sampled: 2017-09-25 09:00

Anions

Chloride	2.62	0.10	mg/L	N/A	2017-09-29	
Fluoride	0.25	0.10	mg/L	N/A	2017-09-29	
Nitrate (as N)	0.015	0.010	mg/L	N/A	2017-09-29	
Nitrite (as N)	< 0.010	0.010	mg/L	N/A	2017-09-29	
Sulfate	22.0	1.0	mg/L	N/A	2017-09-29	

General Parameters

Alkalinity, Total (as CaCO3)	106	1.0	mg/L	N/A	2017-09-28	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	N/A	2017-09-28	
Alkalinity, Bicarbonate (as CaCO3)	106	1.0	mg/L	N/A	2017-09-28	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	N/A	2017-09-28	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	N/A	2017-09-28	
Colour, True	7.0	5.0	CU	N/A	2017-09-29	
Conductivity (EC)	250	2.0	µS/cm	N/A	2017-09-28	
pH	7.63	0.10	pH units	N/A	2017-09-28	HT2
Solids, Total Suspended	77.0	2.0	mg/L	N/A	2017-09-28	
Turbidity	31.6	0.10	NTU	N/A	2017-09-29	HT1

Calculated Parameters

Hardness, Total (as CaCO3)	99.9	0.500	mg/L	N/A	N/A	
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Dissolved Metals

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Sample ID: MW3D (7092382-06) [Water] Sampled: 2017-09-25 09:00, Continued

Dissolved Metals, Continued

Aluminum, dissolved	< 0.0050	0.0050	mg/L	N/A	2017-10-03
Antimony, dissolved	0.00037	0.00020	mg/L	N/A	2017-10-03
Arsenic, dissolved	0.00132	0.00050	mg/L	N/A	2017-10-03
Barium, dissolved	0.0161	0.0050	mg/L	N/A	2017-10-03
Beryllium, dissolved	< 0.00010	0.00010	mg/L	N/A	2017-10-03
Bismuth, dissolved	< 0.00010	0.00010	mg/L	N/A	2017-10-03
Boron, dissolved	0.0262	0.0050	mg/L	N/A	2017-10-03
Cadmium, dissolved	0.000013	0.000010	mg/L	N/A	2017-10-03
Calcium, dissolved	31.1	0.20	mg/L	N/A	2017-10-03
Chromium, dissolved	< 0.00050	0.00050	mg/L	N/A	2017-10-03
Cobalt, dissolved	0.00039	0.00010	mg/L	N/A	2017-10-03
Copper, dissolved	< 0.00040	0.00040	mg/L	N/A	2017-10-03
Iron, dissolved	0.119	0.010	mg/L	N/A	2017-10-03
Lead, dissolved	< 0.00020	0.00020	mg/L	N/A	2017-10-03
Lithium, dissolved	< 0.00010	0.00010	mg/L	N/A	2017-10-03
Magnesium, dissolved	5.37	0.010	mg/L	N/A	2017-10-03
Manganese, dissolved	0.324	0.00020	mg/L	N/A	2017-10-03
Mercury, dissolved	< 0.000010	0.000010	mg/L	2017-09-29	2017-09-29
Molybdenum, dissolved	0.00688	0.00010	mg/L	N/A	2017-10-03
Nickel, dissolved	0.00185	0.00040	mg/L	N/A	2017-10-03
Phosphorus, dissolved	0.093	0.050	mg/L	N/A	2017-10-03
Potassium, dissolved	0.63	0.10	mg/L	N/A	2017-10-03
Selenium, dissolved	< 0.00050	0.00050	mg/L	N/A	2017-10-03
Silicon, dissolved	6.1	1.0	mg/L	N/A	2017-10-03
Silver, dissolved	< 0.000050	0.000050	mg/L	N/A	2017-10-03
Sodium, dissolved	11.7	0.10	mg/L	N/A	2017-10-03
Strontium, dissolved	0.190	0.0010	mg/L	N/A	2017-10-03
Sulfur, dissolved	8.6	3.0	mg/L	N/A	2017-10-03
Tellurium, dissolved	< 0.00050	0.00050	mg/L	N/A	2017-10-03
Thallium, dissolved	< 0.000020	0.000020	mg/L	N/A	2017-10-03
Thorium, dissolved	< 0.00010	0.00010	mg/L	N/A	2017-10-03
Tin, dissolved	< 0.00020	0.00020	mg/L	N/A	2017-10-03
Titanium, dissolved	< 0.0050	0.0050	mg/L	N/A	2017-10-03
Uranium, dissolved	0.000718	0.000020	mg/L	N/A	2017-10-03
Vanadium, dissolved	< 0.0010	0.0010	mg/L	N/A	2017-10-03
Zinc, dissolved	< 0.0040	0.0040	mg/L	N/A	2017-10-03
Zirconium, dissolved	< 0.00010	0.00010	mg/L	N/A	2017-10-03

Total Metals

Aluminum, total	0.215	0.0050	mg/L	2017-10-02	2017-10-03
Antimony, total	0.00021	0.00020	mg/L	2017-10-02	2017-10-03
Arsenic, total	0.00138	0.00050	mg/L	2017-10-02	2017-10-03
Barium, total	0.0217	0.0050	mg/L	2017-10-02	2017-10-03
Beryllium, total	< 0.00010	0.00010	mg/L	2017-10-02	2017-10-03
Bismuth, total	< 0.00010	0.00010	mg/L	2017-10-02	2017-10-03
Boron, total	0.0294	0.0050	mg/L	2017-10-02	2017-10-03

SAMPLE ANALYTICAL DATA

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Analyte	Result / Recovery	MRL / Limits	Units	Prepared	Analyzed	Notes
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Sample ID: MW3D (7092382-06) [Water] Sampled: 2017-09-25 09:00, Continued

Total Metals, Continued

Cadmium, total	0.000292	0.000010	mg/L	2017-10-02	2017-10-03	
Calcium, total	35.9	0.20	mg/L	2017-10-02	2017-10-03	
Chromium, total	< 0.00050	0.00050	mg/L	2017-10-02	2017-10-03	
Cobalt, total	0.00047	0.00010	mg/L	2017-10-02	2017-10-03	
Copper, total	0.00057	0.00040	mg/L	2017-10-02	2017-10-03	
Iron, total	0.200	0.010	mg/L	2017-10-02	2017-10-03	
Lead, total	< 0.00020	0.00020	mg/L	2017-10-02	2017-10-03	
Lithium, total	0.00020	0.00010	mg/L	2017-10-02	2017-10-03	
Magnesium, total	6.00	0.010	mg/L	2017-10-02	2017-10-03	
Manganese, total	0.323	0.00020	mg/L	2017-10-02	2017-10-03	
Mercury, total	< 0.000010	0.000010	mg/L	2017-10-02	2017-10-03	
Molybdenum, total	0.00754	0.00010	mg/L	2017-10-02	2017-10-03	
Nickel, total	0.00230	0.00040	mg/L	2017-10-02	2017-10-03	
Phosphorus, total	0.104	0.050	mg/L	2017-10-02	2017-10-03	
Potassium, total	0.71	0.10	mg/L	2017-10-02	2017-10-03	
Selenium, total	< 0.00050	0.00050	mg/L	2017-10-02	2017-10-03	
Silicon, total	7.3	1.0	mg/L	2017-10-02	2017-10-03	
Silver, total	< 0.000050	0.000050	mg/L	2017-10-02	2017-10-03	
Sodium, total	12.7	0.10	mg/L	2017-10-02	2017-10-03	
Strontium, total	0.209	0.0010	mg/L	2017-10-02	2017-10-03	
Sulfur, total	9.5	3.0	mg/L	2017-10-02	2017-10-03	
Tellurium, total	< 0.00050	0.00050	mg/L	2017-10-02	2017-10-03	
Thallium, total	0.000023	0.000020	mg/L	2017-10-02	2017-10-03	
Thorium, total	0.00036	0.00010	mg/L	2017-10-02	2017-10-03	
Tin, total	0.00030	0.00020	mg/L	2017-10-02	2017-10-03	
Titanium, total	< 0.0050	0.0050	mg/L	2017-10-02	2017-10-03	
Uranium, total	0.000911	0.000020	mg/L	2017-10-02	2017-10-03	
Vanadium, total	< 0.0010	0.0010	mg/L	2017-10-02	2017-10-03	
Zinc, total	< 0.0040	0.0040	mg/L	2017-10-02	2017-10-03	
Zirconium, total	0.00022	0.00010	mg/L	2017-10-02	2017-10-03	

BCMOE Aggregate Hydrocarbons

EPHw10-19	< 250	250	µg/L	2017-09-30	2017-10-03	
EPHw19-32	< 250	250	µg/L	2017-09-30	2017-10-03	
LEPHw	< 250	250	µg/L	N/A	N/A	
HEPHw	< 250	250	µg/L	N/A	N/A	
Surrogate: 2-Methylnonane (EPH/F2-4)	93	60-140	%	2017-09-30	2017-10-03	

Polycyclic Aromatic Hydrocarbons (PAH)

Acenaphthene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Acenaphthylene	< 0.200	0.200	µg/L	2017-09-30	2017-10-02	
Acridine	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Anthracene	< 0.010	0.010	µg/L	2017-09-30	2017-10-02	
Benz(a)anthracene	< 0.010	0.010	µg/L	2017-09-30	2017-10-02	
Benzo(a)pyrene	< 0.010	0.010	µg/L	2017-09-30	2017-10-02	
Benzo(b)fluoranthene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	

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Sample ID: MW3D (7092382-06) [Water] Sampled: 2017-09-25 09:00, Continued

Polycyclic Aromatic Hydrocarbons (PAH), Continued

Benzo(b+j)fluoranthene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Benzo(g,h,i)perylene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Benzo(k)fluoranthene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Chrysene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Dibenz(a,h)anthracene	< 0.010	0.010	µg/L	2017-09-30	2017-10-02	
Fluoranthene	< 0.030	0.030	µg/L	2017-09-30	2017-10-02	
Fluorene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Indeno(1,2,3-cd)pyrene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Naphthalene	< 0.200	0.200	µg/L	2017-09-30	2017-10-02	
Phenanthrene	< 0.100	0.100	µg/L	2017-09-30	2017-10-02	
Pyrene	< 0.020	0.020	µg/L	2017-09-30	2017-10-02	
Quinoline	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Surrogate: Acridine-d9	112	50-140	%	2017-09-30	2017-10-02	
Surrogate: Naphthalene-d8	117	50-140	%	2017-09-30	2017-10-02	
Surrogate: Perylene-d12	114	50-140	%	2017-09-30	2017-10-02	

Sample ID: FB (7092382-07) [Water] Sampled: 2017-09-25 07:50

Anions

Chloride	< 0.10	0.10	mg/L	N/A	2017-09-29	
Fluoride	< 0.10	0.10	mg/L	N/A	2017-09-29	
Nitrate (as N)	< 0.010	0.010	mg/L	N/A	2017-09-29	
Nitrite (as N)	< 0.010	0.010	mg/L	N/A	2017-09-29	
Sulfate	< 1.0	1.0	mg/L	N/A	2017-09-29	

General Parameters

Alkalinity, Total (as CaCO ₃)	< 1.0	1.0	mg/L	N/A	2017-09-28	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0	mg/L	N/A	2017-09-28	
Alkalinity, Bicarbonate (as CaCO ₃)	< 1.0	1.0	mg/L	N/A	2017-09-28	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0	mg/L	N/A	2017-09-28	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0	mg/L	N/A	2017-09-28	
Colour, True	< 5.0	5.0	CU	N/A	2017-09-29	
Conductivity (EC)	< 2.0	2.0	µS/cm	N/A	2017-09-28	
pH	6.13	0.10	pH units	N/A	2017-09-28	HT2
Solids, Total Suspended	< 2.0	2.0	mg/L	N/A	2017-09-28	
Turbidity	< 0.10	0.10	NTU	N/A	2017-09-29	HT1

Calculated Parameters

Hardness, Total (as CaCO ₃)	< 0.500	0.500	mg/L	N/A	N/A	
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Dissolved Metals

Aluminum, dissolved	< 0.0050	0.0050	mg/L	N/A	2017-10-03	
Antimony, dissolved	< 0.00020	0.00020	mg/L	N/A	2017-10-03	
Arsenic, dissolved	< 0.00050	0.00050	mg/L	N/A	2017-10-03	
Barium, dissolved	< 0.0050	0.0050	mg/L	N/A	2017-10-03	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	N/A	2017-10-03	

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Sample ID: FB (7092382-07) [Water] Sampled: 2017-09-25 07:50, Continued

Dissolved Metals, Continued

Bismuth, dissolved	< 0.00010	0.00010	mg/L	N/A	2017-10-03
Boron, dissolved	< 0.0050	0.0050	mg/L	N/A	2017-10-03
Cadmium, dissolved	< 0.000010	0.000010	mg/L	N/A	2017-10-03
Calcium, dissolved	< 0.20	0.20	mg/L	N/A	2017-10-03
Chromium, dissolved	< 0.00050	0.00050	mg/L	N/A	2017-10-03
Cobalt, dissolved	< 0.00010	0.00010	mg/L	N/A	2017-10-03
Copper, dissolved	< 0.00040	0.00040	mg/L	N/A	2017-10-03
Iron, dissolved	< 0.010	0.010	mg/L	N/A	2017-10-03
Lead, dissolved	< 0.00020	0.00020	mg/L	N/A	2017-10-03
Lithium, dissolved	< 0.00010	0.00010	mg/L	N/A	2017-10-03
Magnesium, dissolved	< 0.010	0.010	mg/L	N/A	2017-10-03
Manganese, dissolved	< 0.00020	0.00020	mg/L	N/A	2017-10-03
Mercury, dissolved	< 0.000010	0.000010	mg/L	2017-09-29	2017-09-29
Molybdenum, dissolved	< 0.00010	0.00010	mg/L	N/A	2017-10-03
Nickel, dissolved	< 0.00040	0.00040	mg/L	N/A	2017-10-03
Phosphorus, dissolved	< 0.050	0.050	mg/L	N/A	2017-10-03
Potassium, dissolved	< 0.10	0.10	mg/L	N/A	2017-10-03
Selenium, dissolved	< 0.00050	0.00050	mg/L	N/A	2017-10-03
Silicon, dissolved	< 1.0	1.0	mg/L	N/A	2017-10-03
Silver, dissolved	< 0.000050	0.000050	mg/L	N/A	2017-10-03
Sodium, dissolved	< 0.10	0.10	mg/L	N/A	2017-10-03
Strontium, dissolved	< 0.0010	0.0010	mg/L	N/A	2017-10-03
Sulfur, dissolved	< 3.0	3.0	mg/L	N/A	2017-10-03
Tellurium, dissolved	< 0.00050	0.00050	mg/L	N/A	2017-10-03
Thallium, dissolved	< 0.000020	0.000020	mg/L	N/A	2017-10-03
Thorium, dissolved	< 0.00010	0.00010	mg/L	N/A	2017-10-03
Tin, dissolved	< 0.00020	0.00020	mg/L	N/A	2017-10-03
Titanium, dissolved	< 0.0050	0.0050	mg/L	N/A	2017-10-03
Uranium, dissolved	< 0.000020	0.000020	mg/L	N/A	2017-10-03
Vanadium, dissolved	< 0.0010	0.0010	mg/L	N/A	2017-10-03
Zinc, dissolved	< 0.0040	0.0040	mg/L	N/A	2017-10-03
Zirconium, dissolved	< 0.00010	0.00010	mg/L	N/A	2017-10-03

Total Metals

Aluminum, total	< 0.0050	0.0050	mg/L	2017-10-02	2017-10-03
Antimony, total	< 0.00020	0.00020	mg/L	2017-10-02	2017-10-03
Arsenic, total	< 0.00050	0.00050	mg/L	2017-10-02	2017-10-03
Barium, total	< 0.0050	0.0050	mg/L	2017-10-02	2017-10-03
Beryllium, total	< 0.00010	0.00010	mg/L	2017-10-02	2017-10-03
Bismuth, total	< 0.00010	0.00010	mg/L	2017-10-02	2017-10-03
Boron, total	< 0.0050	0.0050	mg/L	2017-10-02	2017-10-03
Cadmium, total	< 0.000010	0.000010	mg/L	2017-10-02	2017-10-03
Calcium, total	< 0.20	0.20	mg/L	2017-10-02	2017-10-03
Chromium, total	< 0.00050	0.00050	mg/L	2017-10-02	2017-10-03
Cobalt, total	< 0.00010	0.00010	mg/L	2017-10-02	2017-10-03
Copper, total	< 0.00040	0.00040	mg/L	2017-10-02	2017-10-03

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Sample ID: FB (7092382-07) [Water] Sampled: 2017-09-25 07:50, Continued

Total Metals, Continued

Iron, total	< 0.010	0.010	mg/L	2017-10-02	2017-10-03	
Lead, total	< 0.00020	0.00020	mg/L	2017-10-02	2017-10-03	
Lithium, total	< 0.00010	0.00010	mg/L	2017-10-02	2017-10-03	
Magnesium, total	< 0.010	0.010	mg/L	2017-10-02	2017-10-03	
Manganese, total	< 0.00020	0.00020	mg/L	2017-10-02	2017-10-03	
Mercury, total	< 0.000010	0.000010	mg/L	2017-10-02	2017-10-03	
Molybdenum, total	< 0.00010	0.00010	mg/L	2017-10-02	2017-10-03	
Nickel, total	< 0.00040	0.00040	mg/L	2017-10-02	2017-10-03	
Phosphorus, total	< 0.050	0.050	mg/L	2017-10-02	2017-10-03	
Potassium, total	< 0.10	0.10	mg/L	2017-10-02	2017-10-03	
Selenium, total	< 0.00050	0.00050	mg/L	2017-10-02	2017-10-03	
Silicon, total	< 1.0	1.0	mg/L	2017-10-02	2017-10-03	
Silver, total	< 0.000050	0.000050	mg/L	2017-10-02	2017-10-03	
Sodium, total	< 0.10	0.10	mg/L	2017-10-02	2017-10-03	
Strontium, total	< 0.0010	0.0010	mg/L	2017-10-02	2017-10-03	
Sulfur, total	< 3.0	3.0	mg/L	2017-10-02	2017-10-03	
Tellurium, total	< 0.00050	0.00050	mg/L	2017-10-02	2017-10-03	
Thallium, total	< 0.000020	0.000020	mg/L	2017-10-02	2017-10-03	
Thorium, total	< 0.00010	0.00010	mg/L	2017-10-02	2017-10-03	
Tin, total	< 0.00020	0.00020	mg/L	2017-10-02	2017-10-03	
Titanium, total	< 0.0050	0.0050	mg/L	2017-10-02	2017-10-03	
Uranium, total	< 0.000020	0.000020	mg/L	2017-10-02	2017-10-03	
Vanadium, total	< 0.0010	0.0010	mg/L	2017-10-02	2017-10-03	
Zinc, total	< 0.0040	0.0040	mg/L	2017-10-02	2017-10-03	
Zirconium, total	< 0.00010	0.00010	mg/L	2017-10-02	2017-10-03	

BCMOE Aggregate Hydrocarbons

EPHw10-19	< 250	250	µg/L	2017-09-30	2017-10-03	
EPHw19-32	< 250	250	µg/L	2017-09-30	2017-10-03	
LEPHw	< 250	250	µg/L	N/A	N/A	
HEPHw	< 250	250	µg/L	N/A	N/A	
Surrogate: 2-Methylnonane (EPH/F2-4)	92	60-140	%	2017-09-30	2017-10-03	

Polycyclic Aromatic Hydrocarbons (PAH)

Acenaphthene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Acenaphthylene	< 0.200	0.200	µg/L	2017-09-30	2017-10-02	
Acridine	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Anthracene	< 0.010	0.010	µg/L	2017-09-30	2017-10-02	
Benz(a)anthracene	< 0.010	0.010	µg/L	2017-09-30	2017-10-02	
Benzo(a)pyrene	< 0.010	0.010	µg/L	2017-09-30	2017-10-02	
Benzo(b)fluoranthene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Benzo(b+j)fluoranthene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Benzo(g,h,i)perylene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Benzo(k)fluoranthene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Chrysene	< 0.050	0.050	µg/L	2017-09-30	2017-10-02	
Dibenz(a,h)anthracene	< 0.010	0.010	µg/L	2017-09-30	2017-10-02	

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Sample ID: FB (7092382-07) [Water] Sampled: 2017-09-25 07:50, Continued

Polycyclic Aromatic Hydrocarbons (PAH), Continued

Fluoranthene	< 0.030	0.030 µg/L	2017-09-30	2017-10-02	
Fluorene	< 0.050	0.050 µg/L	2017-09-30	2017-10-02	
Indeno(1,2,3-cd)pyrene	< 0.050	0.050 µg/L	2017-09-30	2017-10-02	
Naphthalene	< 0.200	0.200 µg/L	2017-09-30	2017-10-02	
Phenanthrene	< 0.100	0.100 µg/L	2017-09-30	2017-10-02	
Pyrene	< 0.020	0.020 µg/L	2017-09-30	2017-10-02	
Quinoline	< 0.050	0.050 µg/L	2017-09-30	2017-10-02	
Surrogate: Acridine-d9	110	50-140 %	2017-09-30	2017-10-02	
Surrogate: Naphthalene-d8	117	50-140 %	2017-09-30	2017-10-02	
Surrogate: Perylene-d12	121	50-140 %	2017-09-30	2017-10-02	

Sample / Analysis Qualifiers:

HT1 The sample was prepared and/or analyzed past the recommended holding time.
HT2 The 15 minute recommended holding time (from sampling to analysis) has been exceeded - field analysis is recommended.

APPENDIX 1: QUALITY CONTROL DATA

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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 B7I2043

Blank (B7I2043-BLK1)			Prepared: 2017-09-29, Analyzed: 2017-09-29						
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 (B7I2043-BS1)			Prepared: 2017-09-29, Analyzed: 2017-09-29						
Chloride	16.1	0.10 mg/L	16.0		101	90-110			
Fluoride	3.83	0.10 mg/L	4.00		96	88-108			
Nitrate (as N)	4.00	0.010 mg/L	4.00		100	93-108			
Nitrite (as N)	1.94	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 B7I2189

Blank (B7I2189-BLK1)			Prepared: 2017-09-30, Analyzed: 2017-10-03						
EPHw10-19	< 250	250 µg/L							
EPHw19-32	< 250	250 µg/L							
Surrogate: 2-Methylnonane (EPH/F2-4)	417	µg/L	446		94	60-140			
LCS (B7I2189-BS2)			Prepared: 2017-09-30, Analyzed: 2017-10-03						
EPHw10-19	16500	250 µg/L	15500		106	70-130			
EPHw19-32	23200	250 µg/L	22100		105	70-130			
Surrogate: 2-Methylnonane (EPH/F2-4)	444	µg/L	445		100	60-140			

Dissolved Metals, Batch B7I2076

Blank (B7I2076-BLK1)			Prepared: 2017-09-29, Analyzed: 2017-09-29						
Mercury, dissolved	< 0.000010	0.000010 mg/L							
Blank (B7I2076-BLK2)			Prepared: 2017-09-29, Analyzed: 2017-09-29						
Mercury, dissolved	< 0.000010	0.000010 mg/L							

APPENDIX 1: QUALITY CONTROL DATA

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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 B7I2076, Continued

Duplicate (B7I2076-DUP2)		Source: 7092382-01		Prepared: 2017-09-29, Analyzed: 2017-09-29					
Mercury, dissolved	< 0.000010	0.000010 mg/L		< 0.000010				20	
Reference (B7I2076-SRM1)				Prepared: 2017-09-29, Analyzed: 2017-09-29					
Mercury, dissolved	0.00502	0.000010 mg/L		0.00489	103	80-120			
Reference (B7I2076-SRM2)				Prepared: 2017-09-29, Analyzed: 2017-09-29					
Mercury, dissolved	0.00466	0.000010 mg/L		0.00489	95	80-120			

Dissolved Metals, Batch B7J0053

Blank (B7J0053-BLK1)		Prepared: 2017-10-03, Analyzed: 2017-10-03							
Aluminum, dissolved	< 0.0050	0.0050 mg/L							
Antimony, dissolved	< 0.00020	0.00020 mg/L							
Arsenic, dissolved	< 0.00050	0.00050 mg/L							
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							
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 (B7J0053-BS1)		Prepared: 2017-10-03, Analyzed: 2017-10-03							
Aluminum, dissolved	0.0221	0.0050 mg/L	0.0200		110	80-120			
Antimony, dissolved	0.0190	0.00020 mg/L	0.0200		95	80-120			
Arsenic, dissolved	0.0193	0.00050 mg/L	0.0200		97	80-120			
Barium, dissolved	0.0195	0.0050 mg/L	0.0200		97	80-120			
Beryllium, dissolved	0.0212	0.00010 mg/L	0.0200		106	80-120			
Bismuth, dissolved	0.0206	0.00010 mg/L	0.0200		103	80-120			

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Dissolved Metals, Batch B7J0053, Continued

LCS (B7J0053-BS1), Continued				Prepared: 2017-10-03, Analyzed: 2017-10-03					
Boron, dissolved	0.0207	0.0050 mg/L	0.0200		104	80-120			
Cadmium, dissolved	0.0203	0.000010 mg/L	0.0200		101	80-120			
Calcium, dissolved	1.82	0.20 mg/L	2.00		91	80-120			
Chromium, dissolved	0.0195	0.00050 mg/L	0.0200		97	80-120			
Cobalt, dissolved	0.0196	0.00010 mg/L	0.0200		98	80-120			
Copper, dissolved	0.0208	0.00040 mg/L	0.0200		104	80-120			
Iron, dissolved	1.97	0.010 mg/L	2.00		99	80-120			
Lead, dissolved	0.0206	0.00020 mg/L	0.0200		103	80-120			
Lithium, dissolved	0.0213	0.00010 mg/L	0.0200		106	80-120			
Magnesium, dissolved	2.10	0.010 mg/L	2.00		105	80-120			
Manganese, dissolved	0.0195	0.00020 mg/L	0.0200		97	80-120			
Molybdenum, dissolved	0.0191	0.00010 mg/L	0.0200		96	80-120			
Nickel, dissolved	0.0201	0.00040 mg/L	0.0200		101	80-120			
Phosphorus, dissolved	1.86	0.050 mg/L	2.00		93	80-120			
Potassium, dissolved	1.93	0.10 mg/L	2.00		97	80-120			
Selenium, dissolved	0.0203	0.00050 mg/L	0.0200		102	80-120			
Silicon, dissolved	2.0	1.0 mg/L	2.00		101	80-120			
Silver, dissolved	0.0194	0.000050 mg/L	0.0200		97	80-120			
Sodium, dissolved	1.98	0.10 mg/L	2.40		82	80-120			
Strontium, dissolved	0.0192	0.0010 mg/L	0.0200		96	80-120			
Sulfur, dissolved	5.2	3.0 mg/L	5.00		104	80-120			
Tellurium, dissolved	0.0204	0.00050 mg/L	0.0200		102	80-120			
Thallium, dissolved	0.0205	0.000020 mg/L	0.0200		102	80-120			
Thorium, dissolved	0.0198	0.00010 mg/L	0.0200		99	80-120			
Tin, dissolved	0.0201	0.00020 mg/L	0.0200		101	80-120			
Titanium, dissolved	0.0194	0.0050 mg/L	0.0200		97	80-120			
Uranium, dissolved	0.0195	0.000020 mg/L	0.0200		97	80-120			
Vanadium, dissolved	0.0192	0.0010 mg/L	0.0200		96	80-120			
Zinc, dissolved	0.0202	0.0040 mg/L	0.0200		101	80-120			
Zirconium, dissolved	0.0200	0.00010 mg/L	0.0200		100	80-120			

Duplicate (B7J0053-DUP1)				Source: 7092382-03 Prepared: 2017-10-03, Analyzed: 2017-10-03					
Aluminum, dissolved	< 0.0050	0.0050 mg/L	< 0.0050					11	
Antimony, dissolved	< 0.00020	0.00020 mg/L	< 0.00020					20	
Arsenic, dissolved	0.00447	0.00050 mg/L	0.00445			< 1		8	
Barium, dissolved	0.0990	0.0050 mg/L	0.0960			3		7	
Beryllium, dissolved	< 0.00010	0.00010 mg/L	< 0.00010					14	
Bismuth, dissolved	< 0.00010	0.00010 mg/L	< 0.00010					20	
Boron, dissolved	0.0982	0.0050 mg/L	0.0939			4		13	
Cadmium, dissolved	0.000013	0.000010 mg/L	< 0.000010					20	
Calcium, dissolved	169	0.20 mg/L	178			5		8	
Chromium, dissolved	< 0.00050	0.00050 mg/L	< 0.00050					14	
Cobalt, dissolved	0.00225	0.00010 mg/L	0.00233			3		10	
Copper, dissolved	< 0.00040	0.00040 mg/L	< 0.00040					20	
Iron, dissolved	0.956	0.010 mg/L	0.988			3		14	
Lead, dissolved	< 0.00020	0.00020 mg/L	< 0.00020					20	
Lithium, dissolved	0.0155	0.00010 mg/L	0.0146			6		14	
Magnesium, dissolved	35.8	0.010 mg/L	37.1			4		6	
Manganese, dissolved	2.34	0.00020 mg/L	2.30			2		9	
Molybdenum, dissolved	0.00085	0.00010 mg/L	0.00083			2		19	
Nickel, dissolved	0.00462	0.00040 mg/L	0.00482			4		20	
Phosphorus, dissolved	< 0.050	0.050 mg/L	< 0.050					14	
Potassium, dissolved	4.30	0.10 mg/L	4.44			3		8	
Selenium, dissolved	< 0.00050	0.00050 mg/L	< 0.00050					20	
Silicon, dissolved	12.3	1.0 mg/L	12.2			< 1		12	

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Dissolved Metals, Batch B7J0053, Continued

Duplicate (B7J0053-DUP1), Continued		Source: 7092382-03		Prepared: 2017-10-03, Analyzed: 2017-10-03					
Silver, dissolved	0.000051	0.000050 mg/L		< 0.000050				20	
Sodium, dissolved	87.6	0.10 mg/L		91.8			5	6	
Strontium, dissolved	0.613	0.0010 mg/L		0.616			< 1	6	
Sulfur, dissolved	28.6	3.0 mg/L		29.6			4	20	
Tellurium, dissolved	< 0.00050	0.00050 mg/L		< 0.00050				20	
Thallium, dissolved	0.000029	0.000020 mg/L		0.000027				13	
Thorium, dissolved	< 0.00010	0.00010 mg/L		< 0.00010				20	
Tin, dissolved	0.00030	0.00020 mg/L		0.00027				20	
Titanium, dissolved	< 0.0050	0.0050 mg/L		< 0.0050				20	
Uranium, dissolved	0.00913	0.000020 mg/L		0.00916			< 1	14	
Vanadium, dissolved	< 0.0010	0.0010 mg/L		< 0.0010				20	
Zinc, dissolved	< 0.0040	0.0040 mg/L		< 0.0040				11	
Zirconium, dissolved	0.00022	0.00010 mg/L		0.00023				20	

Reference (B7J0053-SRM1)		Prepared: 2017-10-03, Analyzed: 2017-10-03							
Aluminum, dissolved	0.233	0.0050 mg/L	0.233		100	79-114			
Antimony, dissolved	0.0471	0.00020 mg/L	0.0430		109	89-123			
Arsenic, dissolved	0.451	0.00050 mg/L	0.438		103	87-113			
Barium, dissolved	3.45	0.0050 mg/L	3.35		103	85-114			
Beryllium, dissolved	0.238	0.00010 mg/L	0.213		112	79-122			
Boron, dissolved	1.72	0.0050 mg/L	1.74		99	79-117			
Cadmium, dissolved	0.239	0.000010 mg/L	0.224		107	89-112			
Calcium, dissolved	7.56	0.20 mg/L	7.69		98	85-120			
Chromium, dissolved	0.458	0.00050 mg/L	0.437		105	87-113			
Cobalt, dissolved	0.139	0.00010 mg/L	0.128		108	90-117			
Copper, dissolved	0.912	0.00040 mg/L	0.844		108	90-115			
Iron, dissolved	1.34	0.010 mg/L	1.29		104	86-112			
Lead, dissolved	0.118	0.00020 mg/L	0.112		105	90-113			
Lithium, dissolved	0.119	0.00010 mg/L	0.104		115	77-127			
Magnesium, dissolved	7.02	0.010 mg/L	6.92		101	84-116			
Manganese, dissolved	0.365	0.00020 mg/L	0.345		106	85-113			
Molybdenum, dissolved	0.433	0.00010 mg/L	0.426		102	87-112			
Nickel, dissolved	0.895	0.00040 mg/L	0.840		107	90-114			
Phosphorus, dissolved	0.500	0.050 mg/L	0.495		101	74-119			
Potassium, dissolved	3.23	0.10 mg/L	3.19		101	78-119			
Selenium, dissolved	0.0343	0.00050 mg/L	0.0331		104	89-123			
Sodium, dissolved	19.0	0.10 mg/L	19.1		99	81-117			
Strontium, dissolved	0.923	0.0010 mg/L	0.916		101	82-111			
Thallium, dissolved	0.0412	0.000020 mg/L	0.0393		105	90-113			
Uranium, dissolved	0.263	0.000020 mg/L	0.266		99	87-113			
Vanadium, dissolved	0.896	0.0010 mg/L	0.869		103	85-110			
Zinc, dissolved	0.931	0.0040 mg/L	0.881		106	88-114			

General Parameters, Batch B7I2000

Blank (B7I2000-BLK1)		Prepared: 2017-09-28, Analyzed: 2017-09-28							
Alkalinity, Total (as CaCO3)	< 1.0	1.0 mg/L							
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0 mg/L							
Alkalinity, Bicarbonate (as CaCO3)	< 1.0	1.0 mg/L							
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0 mg/L							
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0 mg/L							
Conductivity (EC)	< 2.0	2.0 µS/cm							
Blank (B7I2000-BLK2)		Prepared: 2017-09-28, Analyzed: 2017-09-28							
Alkalinity, Total (as CaCO3)	< 1.0	1.0 mg/L							

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General Parameters, Batch B7I2000, Continued									
Blank (B7I2000-BLK2), Continued			Prepared: 2017-09-28, Analyzed: 2017-09-28						
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 (B7I2000-BS1)			Prepared: 2017-09-28, Analyzed: 2017-09-28						
Alkalinity, Total (as CaCO ₃)	102	1.0 mg/L	100		102	92-106			
LCS (B7I2000-BS2)			Prepared: 2017-09-28, Analyzed: 2017-09-28						
Alkalinity, Total (as CaCO ₃)	102	1.0 mg/L	100		102	92-106			
LCS (B7I2000-BS3)			Prepared: 2017-09-28, Analyzed: 2017-09-28						
Conductivity (EC)	1340	2.0 µS/cm	1410		95	95-104			
LCS (B7I2000-BS4)			Prepared: 2017-09-28, Analyzed: 2017-09-28						
Conductivity (EC)	1380	2.0 µS/cm	1410		98	95-104			
Duplicate (B7I2000-DUP1)			Source: 7092382-01		Prepared: 2017-09-28, Analyzed: 2017-09-28				
Alkalinity, Total (as CaCO ₃)	192	1.0 mg/L		206			7	10	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	1.0 mg/L		< 1.0				10	
Alkalinity, Bicarbonate (as CaCO ₃)	192	1.0 mg/L		206			7	10	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	1.0 mg/L		< 1.0				10	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	1.0 mg/L		< 1.0				10	
Conductivity (EC)	761	2.0 µS/cm		759			< 1	5	
pH	7.79	0.10 pH units		7.71			1	4	HT2
Reference (B7I2000-SRM1)			Prepared: 2017-09-28, Analyzed: 2017-09-28						
pH	7.00	0.10 pH units	7.00		100	98-102			HT2
Reference (B7I2000-SRM2)			Prepared: 2017-09-28, Analyzed: 2017-09-28						
pH	7.00	0.10 pH units	7.00		100	98-102			HT2
General Parameters, Batch B7I2031									
Blank (B7I2031-BLK1)			Prepared: 2017-09-28, Analyzed: 2017-09-28						
Solids, Total Suspended	< 2.0	2.0 mg/L							
LCS (B7I2031-BS1)			Prepared: 2017-09-28, Analyzed: 2017-09-28						
Solids, Total Suspended	100	2.0 mg/L	100		100	91-106			
LCS Dup (B7I2031-BSD1)			Prepared: 2017-09-28, Analyzed: 2017-09-28						
Solids, Total Suspended	100	2.0 mg/L	100		100	91-106	< 1		
General Parameters, Batch B7I2044									
Blank (B7I2044-BLK1)			Prepared: 2017-09-28, Analyzed: 2017-09-28						
Chromium, Hexavalent	< 0.0010	0.0010 mg/L							
LCS (B7I2044-BS1)			Prepared: 2017-09-28, Analyzed: 2017-09-28						
Chromium, Hexavalent	0.101	0.0010 mg/L	0.100		101	90-111			
General Parameters, Batch B7I2129									
Blank (B7I2129-BLK1)			Prepared: 2017-09-29, Analyzed: 2017-09-29						
Colour, True	< 5.0	5.0 CU							

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General Parameters, Batch B7I2129, Continued									
Blank (B7I2129-BLK2)			Prepared: 2017-09-29, Analyzed: 2017-09-29						
Colour, True	< 5.0	5.0 CU							
Blank (B7I2129-BLK3)			Prepared: 2017-09-29, Analyzed: 2017-09-29						
Colour, True	< 5.0	5.0 CU							
LCS (B7I2129-BS1)			Prepared: 2017-09-29, Analyzed: 2017-09-29						
Colour, True	10	5.0 CU	10.0		100	85-115			
LCS (B7I2129-BS2)			Prepared: 2017-09-29, Analyzed: 2017-09-29						
Colour, True	12	5.0 CU	10.0		115	85-115			
LCS (B7I2129-BS3)			Prepared: 2017-09-29, Analyzed: 2017-09-29						
Colour, True	10	5.0 CU	10.0		100	85-115			
General Parameters, Batch B7I2160									
Blank (B7I2160-BLK1)			Prepared: 2017-10-01, Analyzed: 2017-10-01						
Turbidity	< 0.10	0.10 NTU							
Blank (B7I2160-BLK2)			Prepared: 2017-10-01, Analyzed: 2017-10-01						
Turbidity	< 0.10	0.10 NTU							
LCS (B7I2160-BS1)			Prepared: 2017-10-01, Analyzed: 2017-10-01						
Turbidity	37.9	0.10 NTU	40.0		95	90-110			
LCS (B7I2160-BS2)			Prepared: 2017-10-01, Analyzed: 2017-10-01						
Turbidity	37.8	0.10 NTU	40.0		94	90-110			
Duplicate (B7I2160-DUP1)			Source: 7092382-01		Prepared: 2017-10-01, Analyzed: 2017-10-01				
Turbidity	0.96	0.10 NTU		0.95			1	15	
Polycyclic Aromatic Hydrocarbons (PAH), Batch B7I2189									
Blank (B7I2189-BLK1)			Prepared: 2017-09-30, Analyzed: 2017-10-01						
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							
Benz(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							
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	4.67	µg/L	4.46		105	50-140			
Surrogate: Naphthalene-d8	5.36	µg/L	4.46		120	50-140			
Surrogate: Perylene-d12	5.81	µg/L	4.46		130	50-140			

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Polycyclic Aromatic Hydrocarbons (PAH), Batch B7I2189, Continued

LCS (B7I2189-BS1)			Prepared: 2017-09-30, Analyzed: 2017-10-01						
Acenaphthene	4.25	0.050 µg/L	4.46		95	58-125			
Acenaphthylene	4.28	0.200 µg/L	4.46		96	54-128			
Acridine	3.14	0.050 µg/L	4.46		71	50-112			
Anthracene	4.50	0.010 µg/L	4.46		101	66-125			
Benz(a)anthracene	5.28	0.010 µg/L	4.46		118	59-123			
Benzo(a)pyrene	4.20	0.010 µg/L	4.46		94	62-116			
Benzo(b)fluoranthene	4.56	0.050 µg/L	4.46		102	68-126			
Benzo(b+j)fluoranthene	9.90	0.050 µg/L	8.92		111	69-121			
Benzo(g,h,i)perylene	3.65	0.050 µg/L	4.46		82	58-129			
Benzo(k)fluoranthene	5.21	0.050 µg/L	4.46		117	67-128			
Chrysene	5.42	0.050 µg/L	4.46		122	58-125			
Dibenz(a,h)anthracene	3.62	0.010 µg/L	4.46		81	58-126			
Fluoranthene	5.19	0.030 µg/L	4.46		116	67-133			
Fluorene	4.14	0.050 µg/L	4.46		93	55-122			
Indeno(1,2,3-cd)pyrene	3.59	0.050 µg/L	4.46		81	62-126			
Naphthalene	4.72	0.200 µg/L	4.46		106	50-130			
Phenanthrene	4.32	0.100 µg/L	4.46		97	67-127			
Pyrene	5.17	0.020 µg/L	4.46		116	68-133			
Quinoline	3.36	0.050 µg/L	4.46		75	51-140			
Surrogate: Acridine-d9	5.01	µg/L	4.46		112	50-140			
Surrogate: Naphthalene-d8	5.38	µg/L	4.46		121	50-140			
Surrogate: Perylene-d12	5.15	µg/L	4.46		116	50-140			

LCS Dup (B7I2189-BSD1)			Prepared: 2017-09-30, Analyzed: 2017-10-01						
Acenaphthene	4.07	0.050 µg/L	4.42		92	58-125	4	16	
Acenaphthylene	4.06	0.200 µg/L	4.42		92	54-128	5	16	
Acridine	3.33	0.050 µg/L	4.42		75	50-112	6	26	
Anthracene	4.52	0.010 µg/L	4.42		102	66-125	< 1	14	
Benz(a)anthracene	5.31	0.010 µg/L	4.42		120	59-123	< 1	23	
Benzo(a)pyrene	4.29	0.010 µg/L	4.42		97	62-116	2	16	
Benzo(b)fluoranthene	4.73	0.050 µg/L	4.42		107	68-126	4	17	
Benzo(b+j)fluoranthene	9.52	0.050 µg/L	8.84		108	69-121	4	14	
Benzo(g,h,i)perylene	3.66	0.050 µg/L	4.42		83	58-129	< 1	25	
Benzo(k)fluoranthene	5.42	0.050 µg/L	4.42		123	67-128	4	18	
Chrysene	5.15	0.050 µg/L	4.42		117	58-125	5	24	
Dibenz(a,h)anthracene	3.74	0.010 µg/L	4.42		85	58-126	3	23	
Fluoranthene	5.35	0.030 µg/L	4.42		121	67-133	3	18	
Fluorene	4.04	0.050 µg/L	4.42		91	55-122	3	16	
Indeno(1,2,3-cd)pyrene	3.63	0.050 µg/L	4.42		82	62-126	< 1	22	
Naphthalene	4.30	0.200 µg/L	4.42		97	50-130	9	18	
Phenanthrene	4.34	0.100 µg/L	4.42		98	67-127	< 1	14	
Pyrene	5.32	0.020 µg/L	4.42		120	68-133	3	18	
Quinoline	3.23	0.050 µg/L	4.42		73	51-140	4	12	
Surrogate: Acridine-d9	5.37	µg/L	4.42		122	50-140			
Surrogate: Naphthalene-d8	5.05	µg/L	4.42		114	50-140			
Surrogate: Perylene-d12	5.24	µg/L	4.42		119	50-140			

Total Metals, Batch B7J0029

Blank (B7J0029-BLK1)			Prepared: 2017-10-02, Analyzed: 2017-10-03						
Mercury, total	< 0.000010	0.000010 mg/L							
Blank (B7J0029-BLK2)			Prepared: 2017-10-02, Analyzed: 2017-10-03						
Mercury, total	< 0.000010	0.000010 mg/L							

APPENDIX 1: QUALITY CONTROL DATA

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Analyte	Result	MRL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Notes
Total Metals, Batch B7J0029, Continued									
Reference (B7J0029-SRM1)			Prepared: 2017-10-02, Analyzed: 2017-10-03						
Mercury, total	0.00458	0.000010 mg/L	0.00489		94	80-120			
Reference (B7J0029-SRM2)			Prepared: 2017-10-02, Analyzed: 2017-10-03						
Mercury, total	0.00451	0.000010 mg/L	0.00489		92	80-120			
Total Metals, Batch B7J0113									
Blank (B7J0113-BLK1)			Prepared: 2017-10-02, Analyzed: 2017-10-03						
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							
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 (B7J0113-BS1)			Prepared: 2017-10-02, Analyzed: 2017-10-03						
Aluminum, total	0.0228	0.0050 mg/L	0.0200		114	80-120			
Antimony, total	0.0199	0.00020 mg/L	0.0200		100	80-120			
Arsenic, total	0.0191	0.00050 mg/L	0.0200		95	80-120			
Barium, total	0.0190	0.0050 mg/L	0.0200		95	80-120			
Beryllium, total	0.0209	0.00010 mg/L	0.0200		105	80-120			
Bismuth, total	0.0207	0.00010 mg/L	0.0200		104	80-120			
Boron, total	0.0199	0.0050 mg/L	0.0200		99	80-120			
Cadmium, total	0.0203	0.000010 mg/L	0.0200		102	80-120			
Calcium, total	2.07	0.20 mg/L	2.00		103	80-120			
Chromium, total	0.0194	0.00050 mg/L	0.0200		97	80-120			

APPENDIX 1: QUALITY CONTROL DATA

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Analyte	Result	MRL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Notes
Total Metals, Batch B7J0113, Continued									
LCS (B7J0113-BS1), Continued					Prepared: 2017-10-02, Analyzed: 2017-10-03				
Cobalt, total	0.0196	0.00010 mg/L	0.0200		98	80-120			
Copper, total	0.0207	0.00040 mg/L	0.0200		103	80-120			
Iron, total	1.98	0.010 mg/L	2.00		99	80-120			
Lead, total	0.0203	0.00020 mg/L	0.0200		102	80-120			
Lithium, total	0.0214	0.00010 mg/L	0.0200		107	80-120			
Magnesium, total	2.11	0.010 mg/L	2.00		106	80-120			
Manganese, total	0.0203	0.00020 mg/L	0.0200		101	80-120			
Molybdenum, total	0.0201	0.00010 mg/L	0.0200		101	80-120			
Nickel, total	0.0200	0.00040 mg/L	0.0200		100	80-120			
Phosphorus, total	1.89	0.050 mg/L	2.00		95	80-120			
Potassium, total	2.00	0.10 mg/L	2.00		100	80-120			
Selenium, total	0.0209	0.00050 mg/L	0.0200		105	80-120			
Silicon, total	2.1	1.0 mg/L	2.00		104	80-120			
Silver, total	0.0200	0.000050 mg/L	0.0200		100	80-120			
Sodium, total	2.10	0.10 mg/L	2.40		87	80-120			
Strontium, total	0.0198	0.0010 mg/L	0.0200		99	80-120			
Sulfur, total	5.6	3.0 mg/L	5.00		111	80-120			
Tellurium, total	0.0193	0.00050 mg/L	0.0200		97	80-120			
Thallium, total	0.0203	0.000020 mg/L	0.0200		102	80-120			
Thorium, total	0.0194	0.00010 mg/L	0.0200		97	80-120			
Tin, total	0.0204	0.00020 mg/L	0.0200		102	80-120			
Titanium, total	0.0196	0.0050 mg/L	0.0200		98	80-120			
Uranium, total	0.0204	0.000020 mg/L	0.0200		102	80-120			
Vanadium, total	0.0191	0.0010 mg/L	0.0200		95	80-120			
Zinc, total	0.0207	0.0040 mg/L	0.0200		104	80-120			
Zirconium, total	0.0202	0.00010 mg/L	0.0200		101	80-120			
Reference (B7J0113-SRM1)					Prepared: 2017-10-02, Analyzed: 2017-10-03				
Aluminum, total	0.296	0.0050 mg/L	0.303		98	82-114			
Antimony, total	0.0507	0.00020 mg/L	0.0511		99	88-115			
Arsenic, total	0.114	0.00050 mg/L	0.118		97	88-111			
Barium, total	0.754	0.0050 mg/L	0.823		92	83-110			
Beryllium, total	0.0526	0.00010 mg/L	0.0496		106	80-119			
Boron, total	3.37	0.0050 mg/L	3.45		98	80-118			
Cadmium, total	0.0499	0.000010 mg/L	0.0495		101	90-110			
Calcium, total	11.5	0.20 mg/L	11.6		99	85-113			
Chromium, total	0.249	0.00050 mg/L	0.250		100	88-111			
Cobalt, total	0.0379	0.00010 mg/L	0.0377		101	90-114			
Copper, total	0.506	0.00040 mg/L	0.486		104	90-117			
Iron, total	0.492	0.010 mg/L	0.488		101	90-116			
Lead, total	0.206	0.00020 mg/L	0.204		101	90-110			
Lithium, total	0.431	0.00010 mg/L	0.403		107	79-118			
Magnesium, total	3.98	0.010 mg/L	3.79		105	88-116			
Manganese, total	0.108	0.00020 mg/L	0.109		99	88-108			
Molybdenum, total	0.201	0.00010 mg/L	0.198		101	88-110			
Nickel, total	0.249	0.00040 mg/L	0.249		100	90-112			
Phosphorus, total	0.210	0.050 mg/L	0.227		92	72-118			
Potassium, total	7.37	0.10 mg/L	7.21		102	87-116			
Selenium, total	0.128	0.00050 mg/L	0.121		106	90-122			
Sodium, total	7.86	0.10 mg/L	7.54		104	86-118			
Strontium, total	0.376	0.0010 mg/L	0.375		100	86-110			
Thallium, total	0.0825	0.000020 mg/L	0.0805		103	90-113			
Uranium, total	0.0306	0.000020 mg/L	0.0306		100	88-112			
Vanadium, total	0.382	0.0010 mg/L	0.386		99	87-110			
Zinc, total	2.53	0.0040 mg/L	2.49		102	90-113			

APPENDIX 1: QUALITY CONTROL DATA

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WORK ORDER 7092382
REPORTED 2017-10-03

QC Qualifiers:

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

APPENDIX 2: ANALYTICAL SUMMARY

REPORTED TO PROJECT Allterra Construction
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WORK ORDER REPORTED 7092382
2017-10-03

		7092382-01	7092382-02	7092382-03	7092382-04	7092382-05	7092382-06
		Water	Water	Water	Water	Water	Water
		2017-09-25	2017-09-25	2017-09-25	2017-09-25	2017-09-25	2017-09-25
		SHA-SW1	DUP SW1	MW6	MW2	MW3S	MW3D
Anions	Chloride (mg/L)	49.4	47.9	39.3	4.80	6.47	2.62
	Fluoride (mg/L)	< 0.10	< 0.10	< 0.10	0.26	0.22	0.25
	Nitrate (as N) (mg/L)	0.476	0.498	0.018	0.165	< 0.010	0.015
	Nitrite (as N) (mg/L)	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
	Sulfate (mg/L)	122	124	83.3	< 1.0	44.3	22.0
General Parameters	Alkalinity, Total (as CaCO ₃) (mg/L)	206	197	640	111	128	106
	Alkalinity, Phenolphthalein (as CaCO ₃) (mg/L)	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	Alkalinity, Bicarbonate (as CaCO ₃) (mg/L)	206	197	640	111	128	106
	Alkalinity, Carbonate (as CaCO ₃) (mg/L)	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	Alkalinity, Hydroxide (as CaCO ₃) (mg/L)	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	Chromium, Hexavalent (mg/L)	< 0.0010	< 0.0010				
	Colour, True (CU)	5.5	5.5	6.2	< 5.0	< 5.0	7.0
	Conductivity (EC) (uS/cm)	759	761	1330	251	342	250
	pH (pH units)	7.71	7.72	7.31	7.58	7.58	7.63
	Solids, Total Suspended (mg/L)	5.6	4.2	14.8	29.4	6.8	77.0
	Turbidity (NTU)	0.95	0.90	10.6	7.79	3.96	31.6
Calculated Parameters	Chromium, Trivalent (mg/L)	< 0.00100	< 0.00100				
	Hardness, Total (as CaCO ₃) (mg/L)	361	357	599	126	138	99.9
Dissolved Metals	Aluminum, dissolved (mg/L)	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
	Antimony, dissolved (mg/L)	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	0.00037
	Arsenic, dissolved (mg/L)	< 0.00050	< 0.00050	0.00445	0.00193	0.00073	0.00132
	Barium, dissolved (mg/L)	0.0253	0.0251	0.0960	0.0260	0.0302	0.0161
	Beryllium, dissolved (mg/L)	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
	Bismuth, dissolved (mg/L)	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
	Boron, dissolved (mg/L)	0.0313	0.0300	0.0939	0.0303	0.0238	0.0262
	Cadmium, dissolved (mg/L)	0.000010	< 0.000010	< 0.000010	< 0.000010	0.000024	0.000013
	Calcium, dissolved (mg/L)	117	115	178	38.5	44.2	31.1
	Chromium, dissolved (mg/L)	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050
	Cobalt, dissolved (mg/L)	0.00010	< 0.00010	0.00233	0.00039	0.00044	0.00039
	Copper, dissolved (mg/L)	0.00112	0.00114	< 0.00040	< 0.00040	< 0.00040	< 0.00040
	Iron, dissolved (mg/L)	< 0.010	< 0.010	0.988	0.207	0.025	0.119
	Lead, dissolved (mg/L)	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020
	Lithium, dissolved (mg/L)	0.00016	0.00015	0.0146	< 0.00010	< 0.00010	< 0.00010
	Magnesium, dissolved (mg/L)	16.5	16.7	37.1	7.29	6.82	5.37
	Manganese, dissolved (mg/L)	0.0384	0.0367	2.30	0.632	0.265	0.324
	Mercury, dissolved (mg/L)	< 0.000010	< 0.000010	< 0.000010	< 0.000010	< 0.000010	< 0.000010
	Molybdenum, dissolved (mg/L)	0.00229	0.00222	0.00083	0.00444	0.00601	0.00688
	Nickel, dissolved (mg/L)	0.00076	0.00075	0.00482	0.00127	0.00199	0.00185
	Phosphorus, dissolved (mg/L)	< 0.050	< 0.050	< 0.050	0.131	0.057	0.093
	Potassium, dissolved (mg/L)	1.72	1.67	4.44	0.71	0.97	0.63
	Selenium, dissolved (mg/L)	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050
	Silicon, dissolved (mg/L)	7.8	7.8	12.2	7.0	6.1	6.1
	Silver, dissolved (mg/L)	< 0.000050	< 0.000050	< 0.000050	< 0.000050	< 0.000050	< 0.000050
	Sodium, dissolved (mg/L)	18.6	18.7	91.8	9.58	15.3	11.7

APPENDIX 2: ANALYTICAL SUMMARY

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WORK ORDER REPORTED 7092382
2017-10-03

		7092382-01	7092382-02	7092382-03	7092382-04	7092382-05	7092382-06
		Water	Water	Water	Water	Water	Water
		2017-09-25	2017-09-25	2017-09-25	2017-09-25	2017-09-25	2017-09-25
		SHA-SW1	DUP SW1	MW6	MW2	MW3S	MW3D
Dissolved Metals	Strontium, dissolved (mg/L)	0.359	0.359	0.616	0.167	0.221	0.190
	Sulfur, dissolved (mg/L)	42.5	42.6	29.6	7.7	14.4	8.6
	Tellurium, dissolved (mg/L)	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050
	Thallium, dissolved (mg/L)	< 0.000020	< 0.000020	0.000027	< 0.000020	0.000023	< 0.000020
	Thorium, dissolved (mg/L)	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
	Tin, dissolved (mg/L)	< 0.00020	< 0.00020	0.00027	< 0.00020	< 0.00020	< 0.00020
	Titanium, dissolved (mg/L)	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
	Uranium, dissolved (mg/L)	0.00289	0.00286	0.00916	0.00102	0.00117	0.000718
	Vanadium, dissolved (mg/L)	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
	Zinc, dissolved (mg/L)	< 0.0040	0.0067	< 0.0040	0.0219	< 0.0040	< 0.0040
	Zirconium, dissolved (mg/L)	< 0.00010	< 0.00010	0.00023	< 0.00010	< 0.00010	< 0.00010
Total Metals	Aluminum, total (mg/L)	0.0303	0.0255	0.0272	0.849	0.0507	0.215
	Antimony, total (mg/L)	< 0.00020	< 0.00020	0.00026	< 0.00020	< 0.00020	0.00021
	Arsenic, total (mg/L)	< 0.00050	< 0.00050	0.00373	0.00187	0.00073	0.00138
	Barium, total (mg/L)	0.0255	0.0259	0.0892	0.0315	0.0360	0.0217
	Beryllium, total (mg/L)	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
	Bismuth, total (mg/L)	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
	Boron, total (mg/L)	0.0548	0.0372	0.0872	0.0318	0.0264	0.0294
	Cadmium, total (mg/L)	0.000012	< 0.000010	0.000017	0.000071	0.000394	0.000292
	Calcium, total (mg/L)	123	125	186	39.5	49.6	35.9
	Chromium, total (mg/L)	< 0.00050	< 0.00050	< 0.00050	0.00133	0.00059	< 0.00050
	Cobalt, total (mg/L)	0.00025	0.00023	0.00222	0.00098	0.00045	0.00047
	Copper, total (mg/L)	0.00150	0.00144	0.00072	0.00109	0.00126	0.00057
	Iron, total (mg/L)	0.029	0.024	0.896	1.44	0.058	0.200
	Lead, total (mg/L)	< 0.00020	< 0.00020	0.00029	0.00024	< 0.00020	< 0.00020
	Lithium, total (mg/L)	0.00032	0.00022	0.0132	0.00024	0.00015	0.00020
	Magnesium, total (mg/L)	17.0	17.1	37.1	7.62	7.39	6.00
	Manganese, total (mg/L)	0.120	0.108	2.12	0.508	0.289	0.323
	Mercury, total (mg/L)	< 0.000010	< 0.000010	< 0.000010	< 0.000010	< 0.000010	< 0.000010
	Molybdenum, total (mg/L)	0.00235	0.00237	0.00084	0.00426	0.00656	0.00754
	Nickel, total (mg/L)	0.00090	0.00084	0.00495	0.00202	0.00207	0.00230
	Phosphorus, total (mg/L)	< 0.050	< 0.050	< 0.050	0.201	0.066	0.104
	Potassium, total (mg/L)	1.72	1.73	4.16	0.75	1.06	0.71
	Selenium, total (mg/L)	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050
	Silicon, total (mg/L)	7.8	8.0	12.0	8.2	6.6	7.3
	Silver, total (mg/L)	< 0.000050	< 0.000050	< 0.000050	< 0.000050	< 0.000050	< 0.000050
	Sodium, total (mg/L)	18.6	18.6	74.0	9.28	16.3	12.7
	Strontium, total (mg/L)	0.374	0.376	0.601	0.168	0.240	0.209
	Sulfur, total (mg/L)	45.6	45.5	27.8	7.4	15.6	9.5
	Tellurium, total (mg/L)	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050
	Thallium, total (mg/L)	< 0.000020	< 0.000020	0.000022	0.000021	0.000025	0.000023
	Thorium, total (mg/L)	< 0.00010	< 0.00010	< 0.00010	0.00011	< 0.00010	0.00036
	Tin, total (mg/L)	< 0.00020	< 0.00020	0.00067	0.00020	0.00027	0.00030
	Titanium, total (mg/L)	< 0.0050	< 0.0050	< 0.0050	0.0460	< 0.0050	< 0.0050
	Uranium, total (mg/L)	0.00294	0.00302	0.00855	0.00101	0.00131	0.000911

APPENDIX 2: ANALYTICAL SUMMARY

REPORTED TO PROJECT Allterra Construction
P17-932

WORK ORDER REPORTED 7092382
2017-10-03

		7092382-01	7092382-02	7092382-03	7092382-04	7092382-05	7092382-06
		Water	Water	Water	Water	Water	Water
		2017-09-25	2017-09-25	2017-09-25	2017-09-25	2017-09-25	2017-09-25
		SHA-SW1	DUP SW1	MW6	MW2	MW3S	MW3D
Total Metals	Vanadium, total (mg/L)	< 0.0010	< 0.0010	< 0.0010	0.0033	< 0.0010	< 0.0010
	Zinc, total (mg/L)	< 0.0040	< 0.0040	0.0051	0.0052	< 0.0040	< 0.0040
	Zirconium, total (mg/L)	< 0.00010	< 0.00010	0.00017	0.00020	< 0.00010	0.00022
BCMOE Aggregate Hydrocarbons	EPHw10-19 (ug/L)	< 250	< 250	< 250	< 250	< 250	< 250
	EPHw19-32 (ug/L)	< 250	< 250	< 250	< 250	< 250	< 250
	LEPHw (ug/L)	< 250	< 250	< 250	< 250	< 250	< 250
	HEPHw (ug/L)	< 250	< 250	< 250	< 250	< 250	< 250
	Sur: 2-Methylnonane (EPH/F2-4) (%)	92	96	93	90	96	93
Polycyclic Aromatic Hydrocarbons (PAH)	Acenaphthene (ug/L)	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
	Acenaphthylene (ug/L)	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200
	Acridine (ug/L)	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
	Anthracene (ug/L)	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
	Benz(a)anthracene (ug/L)	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
	Benzo(a)pyrene (ug/L)	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
	Benzo(b)fluoranthene (ug/L)	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
	Benzo(b+j)fluoranthene (ug/L)	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
	Benzo(g,h,i)perylene (ug/L)	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
	Benzo(k)fluoranthene (ug/L)	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
	Chrysene (ug/L)	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
	Dibenz(a,h)anthracene (ug/L)	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
	Fluoranthene (ug/L)	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030
	Fluorene (ug/L)	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
	Indeno(1,2,3-cd)pyrene (ug/L)	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
	Naphthalene (ug/L)	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200
	Phenanthrene (ug/L)	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100
	Pyrene (ug/L)	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
	Quinoline (ug/L)	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
	Sur: Acridine-d9 (%)	95	96	117	117	114	112
	Sur: Naphthalene-d8 (%)	120	117	122	119	117	117
	Sur: Perylene-d12 (%)	120	84	79	115	105	114

REPORTED TO PROJECT Allterra Construction
P17-932

WORK ORDER REPORTED 7092382
2017-10-03

		7092382-07
		Water
		2017-09-25
		FB
Anions	Chloride (mg/L)	< 0.10
	Fluoride (mg/L)	< 0.10
	Nitrate (as N) (mg/L)	< 0.010
	Nitrite (as N) (mg/L)	< 0.010
	Sulfate (mg/L)	< 1.0
General Parameters	Alkalinity, Total (as CaCO ₃) (mg/L)	< 1.0
	Alkalinity, Phenolphthalein (as CaCO ₃) (mg/	< 1.0
	Alkalinity, Bicarbonate (as CaCO ₃) (mg/L)	< 1.0
	Alkalinity, Carbonate (as CaCO ₃) (mg/L)	< 1.0
	Alkalinity, Hydroxide (as CaCO ₃) (mg/L)	< 1.0
	Colour, True (CU)	< 5.0
	Conductivity (EC) (uS/cm)	< 2.0
	pH (pH units)	6.13
	Solids, Total Suspended (mg/L)	< 2.0
	Turbidity (NTU)	< 0.10
Calculated Parameters	Hardness, Total (as CaCO ₃) (mg/L)	< 0.500
Dissolved Metals	Aluminum, dissolved (mg/L)	< 0.0050
	Antimony, dissolved (mg/L)	< 0.00020
	Arsenic, dissolved (mg/L)	< 0.00050
	Barium, dissolved (mg/L)	< 0.0050
	Beryllium, dissolved (mg/L)	< 0.00010
	Bismuth, dissolved (mg/L)	< 0.00010
	Boron, dissolved (mg/L)	< 0.0050
	Cadmium, dissolved (mg/L)	< 0.000010
	Calcium, dissolved (mg/L)	< 0.20
	Chromium, dissolved (mg/L)	< 0.00050
	Cobalt, dissolved (mg/L)	< 0.00010
	Copper, dissolved (mg/L)	< 0.00040
	Iron, dissolved (mg/L)	< 0.010
	Lead, dissolved (mg/L)	< 0.00020
	Lithium, dissolved (mg/L)	< 0.00010
	Magnesium, dissolved (mg/L)	< 0.010
	Manganese, dissolved (mg/L)	< 0.00020
	Mercury, dissolved (mg/L)	< 0.000010
	Molybdenum, dissolved (mg/L)	< 0.00010
	Nickel, dissolved (mg/L)	< 0.00040
	Phosphorus, dissolved (mg/L)	< 0.050
	Potassium, dissolved (mg/L)	< 0.10
	Selenium, dissolved (mg/L)	< 0.00050
	Silicon, dissolved (mg/L)	< 1.0
	Silver, dissolved (mg/L)	< 0.000050
	Sodium, dissolved (mg/L)	< 0.10
	Strontium, dissolved (mg/L)	< 0.0010
	Sulfur, dissolved (mg/L)	< 3.0

APPENDIX 2: ANALYTICAL SUMMARY

REPORTED TO PROJECT Allterra Construction
P17-932

WORK ORDER REPORTED 7092382
2017-10-03

		7092382-07
		Water
		2017-09-25
		FB
Dissolved Metals	Tellurium, dissolved (mg/L)	< 0.00050
	Thallium, dissolved (mg/L)	< 0.000020
	Thorium, dissolved (mg/L)	< 0.00010
	Tin, dissolved (mg/L)	< 0.00020
	Titanium, dissolved (mg/L)	< 0.0050
	Uranium, dissolved (mg/L)	< 0.000020
	Vanadium, dissolved (mg/L)	< 0.0010
	Zinc, dissolved (mg/L)	< 0.0040
	Zirconium, dissolved (mg/L)	< 0.00010
Total Metals	Aluminum, total (mg/L)	< 0.0050
	Antimony, total (mg/L)	< 0.00020
	Arsenic, total (mg/L)	< 0.00050
	Barium, total (mg/L)	< 0.0050
	Beryllium, total (mg/L)	< 0.00010
	Bismuth, total (mg/L)	< 0.00010
	Boron, total (mg/L)	< 0.0050
	Cadmium, total (mg/L)	< 0.000010
	Calcium, total (mg/L)	< 0.20
	Chromium, total (mg/L)	< 0.00050
	Cobalt, total (mg/L)	< 0.00010
	Copper, total (mg/L)	< 0.00040
	Iron, total (mg/L)	< 0.010
	Lead, total (mg/L)	< 0.00020
	Lithium, total (mg/L)	< 0.00010
	Magnesium, total (mg/L)	< 0.010
	Manganese, total (mg/L)	< 0.00020
	Mercury, total (mg/L)	< 0.000010
	Molybdenum, total (mg/L)	< 0.00010
	Nickel, total (mg/L)	< 0.00040
	Phosphorus, total (mg/L)	< 0.050
	Potassium, total (mg/L)	< 0.10
	Selenium, total (mg/L)	< 0.00050
	Silicon, total (mg/L)	< 1.0
	Silver, total (mg/L)	< 0.000050
	Sodium, total (mg/L)	< 0.10
	Strontium, total (mg/L)	< 0.0010
	Sulfur, total (mg/L)	< 3.0
	Tellurium, total (mg/L)	< 0.00050
	Thallium, total (mg/L)	< 0.000020
	Thorium, total (mg/L)	< 0.00010
	Tin, total (mg/L)	< 0.00020
	Titanium, total (mg/L)	< 0.0050
	Uranium, total (mg/L)	< 0.000020
	Vanadium, total (mg/L)	< 0.0010
	Zinc, total (mg/L)	< 0.0040

APPENDIX 2: ANALYTICAL SUMMARY

REPORTED TO PROJECT Allterra Construction
P17-932

WORK ORDER REPORTED 7092382
2017-10-03

		7092382-07
		Water
		2017-09-25
		FB
Total Metals	Zirconium, total (mg/L)	< 0.00010
BCMOE Aggregate Hydrocarbons	EPHw10-19 (ug/L)	< 250
	EPHw19-32 (ug/L)	< 250
	LEPHw (ug/L)	< 250
	HEPHw (ug/L)	< 250
	Sur: 2-Methylnonane (EPH/F2-4) (%)	92
Polycyclic Aromatic Hydrocarbons (PAH)	Acenaphthene (ug/L)	< 0.050
	Acenaphthylene (ug/L)	< 0.200
	Acridine (ug/L)	< 0.050
	Anthracene (ug/L)	< 0.010
	Benz(a)anthracene (ug/L)	< 0.010
	Benzo(a)pyrene (ug/L)	< 0.010
	Benzo(b)fluoranthene (ug/L)	< 0.050
	Benzo(b+j)fluoranthene (ug/L)	< 0.050
	Benzo(g,h,i)perylene (ug/L)	< 0.050
	Benzo(k)fluoranthene (ug/L)	< 0.050
	Chrysene (ug/L)	< 0.050
	Dibenz(a,h)anthracene (ug/L)	< 0.010
	Fluoranthene (ug/L)	< 0.030
	Fluorene (ug/L)	< 0.050
	Indeno(1,2,3-cd)pyrene (ug/L)	< 0.050
	Naphthalene (ug/L)	< 0.200
	Phenanthrene (ug/L)	< 0.100
	Pyrene (ug/L)	< 0.020
	Quinoline (ug/L)	< 0.050
	Sur: Acridine-d9 (%)	110
	Sur: Naphthalene-d8 (%)	117
	Sur: Perylene-d12 (%)	121



C V6V 2K9
BC V1X 5C3
B T5S 1H7

CHAIN OF CUSTODY RECORD

COC# **B 58830** PAGE **OF**

RELINQUISHED BY:

DATE:	Sept 25 2011
TIME:	

RECEIVED BY:

RECEIVED BY: NOVEX TC	DATE: 09/26 TIME: 11:45
--------------------------	----------------------------

DATE:	09/26
TIME:	11:45

TURNAROUND TIME REQUESTED:

Routine: (5-7 Days) ☒
 Rush: 1 Day* ☐ 2 Day* ☐ 3 Day* ☐
 Other*

***Contact Lab To Confirm. Surcharge May Apply**

PROJECT NUMBER / INFO:

917-932

REGULATORY APPLICATION:

Show on Report ☐

Canadian Drinking Water Quality ☐ BC WQG ☐ BC HWR ☐
BC CSR Soil: WL ☐ AL ☐ PL ☐ RL-LD ☐ RL-HD ☐ CL ☐ IL ☐
BC CSR Water: AW ☒ LW ☐ LW ☐ DW ☒

CCME: OTHER:

A: Biohazard	D: Asbestos	G: Strong Odour
B: Cyanide	E: Heavy Metals	H: High Contamination
C: PCBs	F: Flammable	I: Other (please specify*)

ANALYSES REQUESTED:[illegible]**SHIPPING INSTRUCTIONS:**Return Cooler(s) ☐

SAMPLE RETENTION:

☐ 30 Days (default)60 Days ☐ 90 Days ☐

Other (surcharges will apply):

* OTHER INSTRUCTIONS:

OTHER INSTRUCTIONS: Please Run our regular analysis for water LEAD/HIGH AM, metals + H₂ (tot) and Diss Nutrients (ALK)

If you would like to talk to a real live Scientist about your project requirements, please check here: ☐

SAMPLE RECEIPT CONDITION:

COOLER 1 (°C): 14.7 ICE: Y ☒ N ☐COOLER 2 (°C): ICE: Y ☐ N ☐COOLER 3 (°C): _____ ICE: Y ☐ N ☐

Page 40 of 40

PROGRESS REPORT

CONSTRUCTION PROGRESS REPORT – 2017 Minor Construction Works

Project:	Cobble Hill Landfill – Closure Plan	Date:	October 15 th , 2017
Subject:	Construction Progress Update		
Location:	Cobble Hill Landfill	File:	17039-2017-03
Report			
Distribution:	CHH: Michael Kelly, Marty Block Allterra Construction: Todd Mizuik, Raymond Lam MoE: Maureen Bilawchuk, AJ Downie		

The following summary of work includes construction progress from September 30th to October 5th, 2017 as well as the status of individual work tasks and deviations to the construction work plan. A photo log of construction activities for the above-mentioned dates is provided in Appendix A along with description of the work. Additionally, as-built record drawings have been included in Appendix B and laboratory analysis for pipe bedding materials are included in Appendix C.

1. **Status of Work Tasks**

- A. Secondary Clay Liner Investigation – **Complete** (Sept. 29th, 2017)
- B. New Leachate & Leak Detection Storage Facility– **Complete** (Oct. 5th, 2017)

-High level alarm has been installed in the leachate storage facility and is operational. Works included installation of a solar panel, control panel, transducer, floats and fully automated high and low-level alarm system for leachate tanks. Smartphone application was downloaded by the Electrical Contractor during install and functionality of the remote system was explained, tested and verified by the QP. With smartphone, levels in the tanks can be monitored and floats and alarms adjusted. The smartphone application has been downloaded by Allterra and will be used to manage leachate levels with the storage facility.

-Interconnecting hose (4” flex hose) between the two leachate storage tanks is installed. Connection were inspected and verified by QP.

-As-builts included in Appendix B

C. Installation of New Twin Piping from Existing PEA Collection Pipes to New Storage Facility – **Complete** (Sept. 29th, 2017)

-As-builts included in Appendix B

-Gradation Reports for Pipe Bedding Materials included in Appendix C

D. Decommissioning of Contract Water Containment Pond – **Complete** (Sept. 29th, 2017)

E. Stockpile and Cover Existing Soil in SMA – **Complete** (Sept. 29th, 2017)

F. Installation of Seepage Blanket Monitoring Wells – **Complete** (Sept. 29th, 2017)

-As-builts included in Appendix B

G. PEA Liner Repairs and Testing – **Complete** (Sept. 29th, 2017)

-As-builts included in Appendix B

H. PEA Crest Ditch Ballasting – **Complete** (Sept. 29th, 2017)

-As-builts included in Appendix B

I. Run-on Ditch Extension South Side of PEA – **Complete** (Sept. 29th, 2017)

-As-builts included in Appendix B

2. Deviations to Original Work Plan

A. Pipe Bedding Material for ‘New Twin Piping from PEA to New Leachate Storage Facility’: Pipe bedding material was sourced onsite from two stockpiles:

1) Pipe Bedding-1: 5-15mm Clear Round Gravel, and

2) Pipe Bedding-2: Well Graded Sand.

Sieve analysis were conducted on both materials and although they differ from the gradation specification included in the design, both products used are adequate for pipe bedding materials and were approved in the field prior to use by the QP. Sieve Analysis reports are included in Appendix C.

- B. Clean Outs for ‘New Twin Piping from PEA to New Leachate Storage Facility’:
Cleanouts on the Leak Detection and Leachate conveyance pipes were not constructed. Access to both Leachate and Leak Detection conveyance pipes is available at connection fittings located at the tie-in to leachate / leak detection storage tanks. Decision to not include the Clean-outs was made during construction and approved by the QP in the field.
- C. Stockpile and Cover Existing Soil in SMA:
In the original plan, it was outlined that the lock block walls were required to be washed down with water. During SMA clean up activities it was further discussed and QP approved ‘NOT’ washing down the lock block walls to reduce the re-introduction of water into the remediated soils. It is SHA’s opinion that the current condition of the lock blocks do not pose any environmental or human health hazards in their current state.
- D. Seepage Blanket Monitoring Wells at Landfill Toe:
A change to the backfill material was approved in the field by the QP. Original plan specified a 25-50mm clear drain rock be used. In place of the 25-50mm drain rock, 75mm clear drain rock was used.
- E. PEA Crest Ditch Ballasting:
A change to the ballast material used in the crest ditch of the PEA was approved in the field by the QP. The design plan specified coarse gravel and sandbags be placed over a layer of 8oz. Non-Woven geotextile. During construction, the ballast material was changed from coarse gravel and sand bags to rubber tires, placed back to back along the entire alignment.

3. Schedule

The 2017 Minor Construction Works are complete onsite at the Cobble Hill Landfill. All final construction tasks were completed on October 5th, 2017 with the completion of the High-level alarm in the Leachate Storage Facility as well as the interconnecting piping between the 2x Leachate Tanks. Environmental monitoring, including water quality sampling, will continue to be completed by the Named Parties at the site, and reported on accordingly.

Outstanding work items outlined in the September 30th Construction Progress Report have been completed and are included in this report. No further work is scheduled regarding the 2017 Minor Construction Works.

Please respond with any question or concerns regarding the above outlined construction activities or deviations to the design plan.

Report prepared by:

Sperling Hansen Associates



Scott Garthwaite, ASCT
Office Manager

Appendix A – Photo Log – attached
Appendix B – As-built Record Drawings - attached
Appendix C – Gradation Reports - attached

APPENDIX A
Photo Log of Construction Activities

Cobble Hill Landfill Closure – 2017 Minor Construction Works

Leachate / Leak Detection Storage Facility:



Photo 1 – 2x Leachate Tank Interconnecting Pipe Installed.



Photo 2 – Solar Panel Installed and Operational at Leachate Storage Facility.



Photo 3 – Digital Readout Screen on Inside Door of Control Panel – for High-level Alarm.

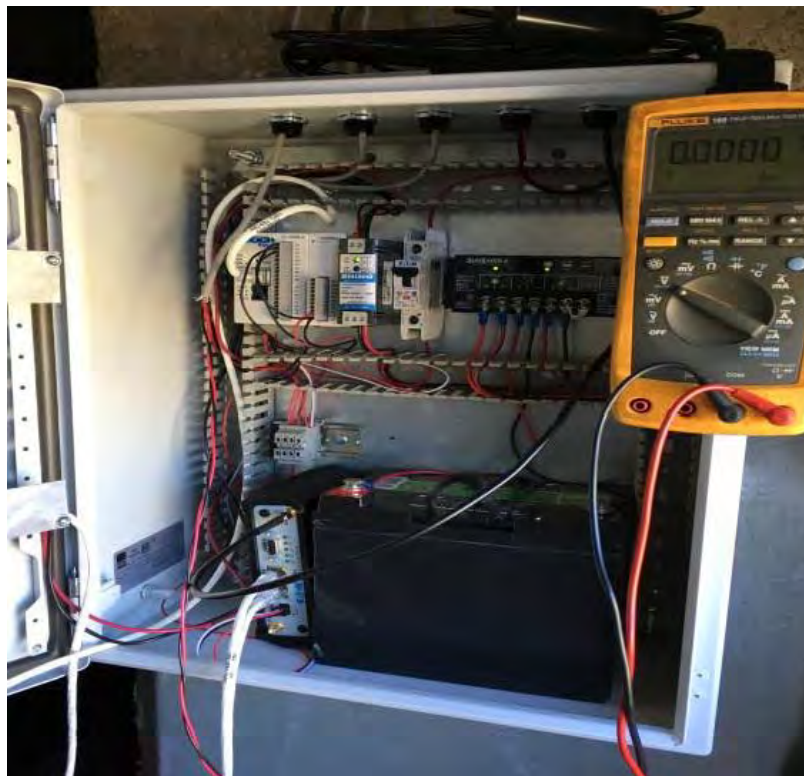
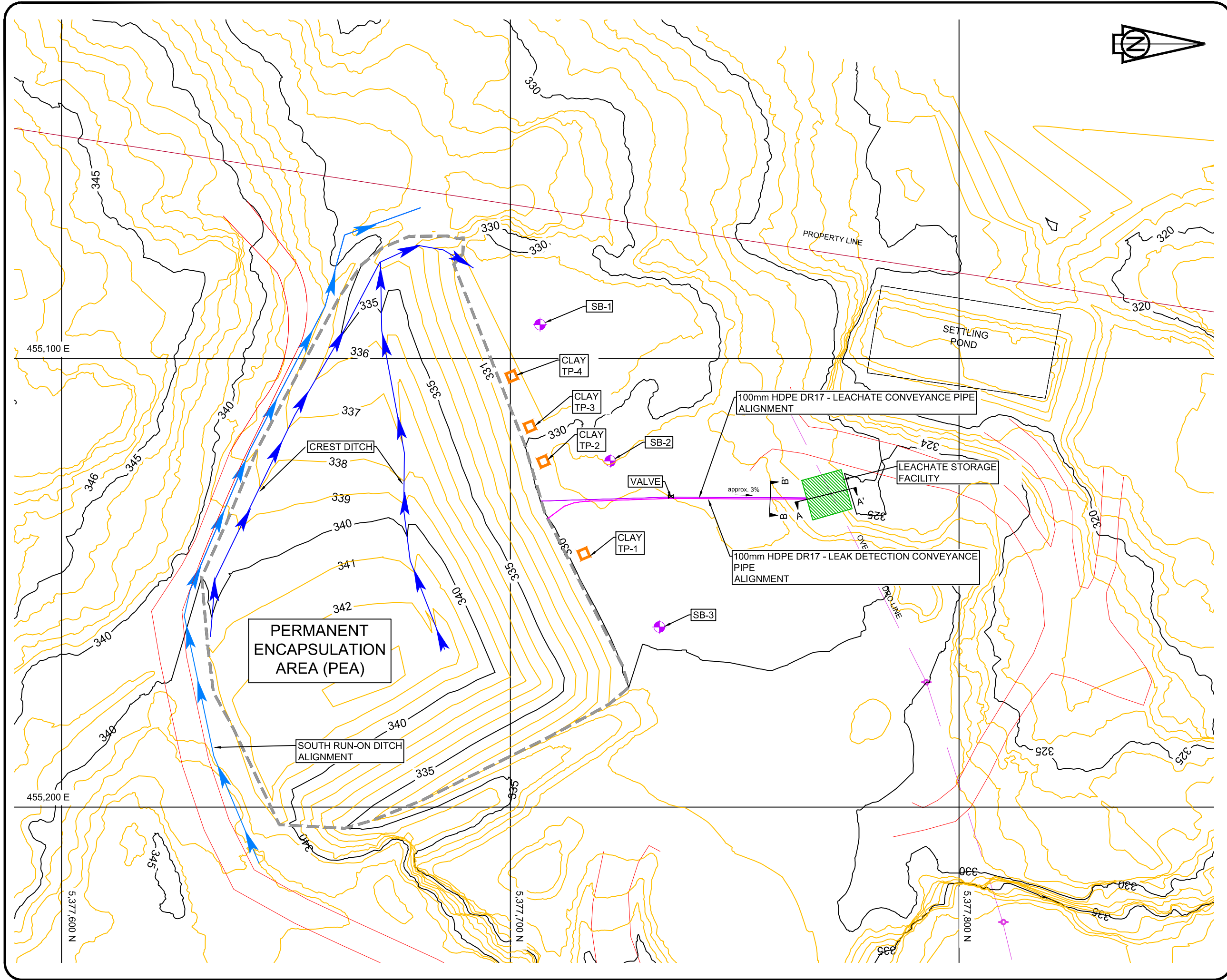


Photo 4 – Control Panel: PLC, 12V Battery, Router and Wiring – High-Level Alarm

APPENDIX B
As-Built Drawings



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
- RUN-ON DIVERSION DITCH
- PROPERTY LINES
- LEACHATE CONVEYANCE PIPE
- LEAK DETECTION CONVEYANCE PIPE
- CLAY TEST PIT LOCATIONS
- SEEPAGE BLANKET MONITORING LOCATION
- LEACHATE CONVEYANCE VALVE
- LEACHATE STORAGE FACILITY

CLIENT:

COBBLE HILL HOLDINGS LTD.

PROJECT:

COBBLE HILL LANDFILL
DETAILED CONSTRUCTION PLAN FOR
2017 MINOR WORKS

TITLE:

AS-BUILT
PLAN VIEW

SCALE:

1:1,250

DATE:

2017/10/12
yyyy/mm/dd

PROJECT NO:

PRJ 17039

DESIGNED

DRAWN

CHECKED

DRAWING NO:

FIGURE 1

- 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:

NOTES:

- LEACHATE TANKS EQUIPPED WITH HIGH-LEVEL ALARM
- SOLAR PANEL POWER SUPPLY
- CONTROL PANEL INSIDE STORAGE FACILITY
- REMOTELY MONITORED LEVELS IN TANKS WITH SMARTPHONE APP. FOR REAL TIME READOUTS.

CLIENT:

COBBLE HILL HOLDINGS LTD.

PROJECT:

COBBLE HILL LANDFILL
DETAILED CONSTRUCTION PLAN FOR
2017 MINOR CONSTRUCTION WORKS

TITLE:

AS-BUILT
DETAILS - 2

SCALE:

DATE:

PROJECT NO:

2017/10/12
yyyy/mm/dd

PRJ 17039

DESIGNED

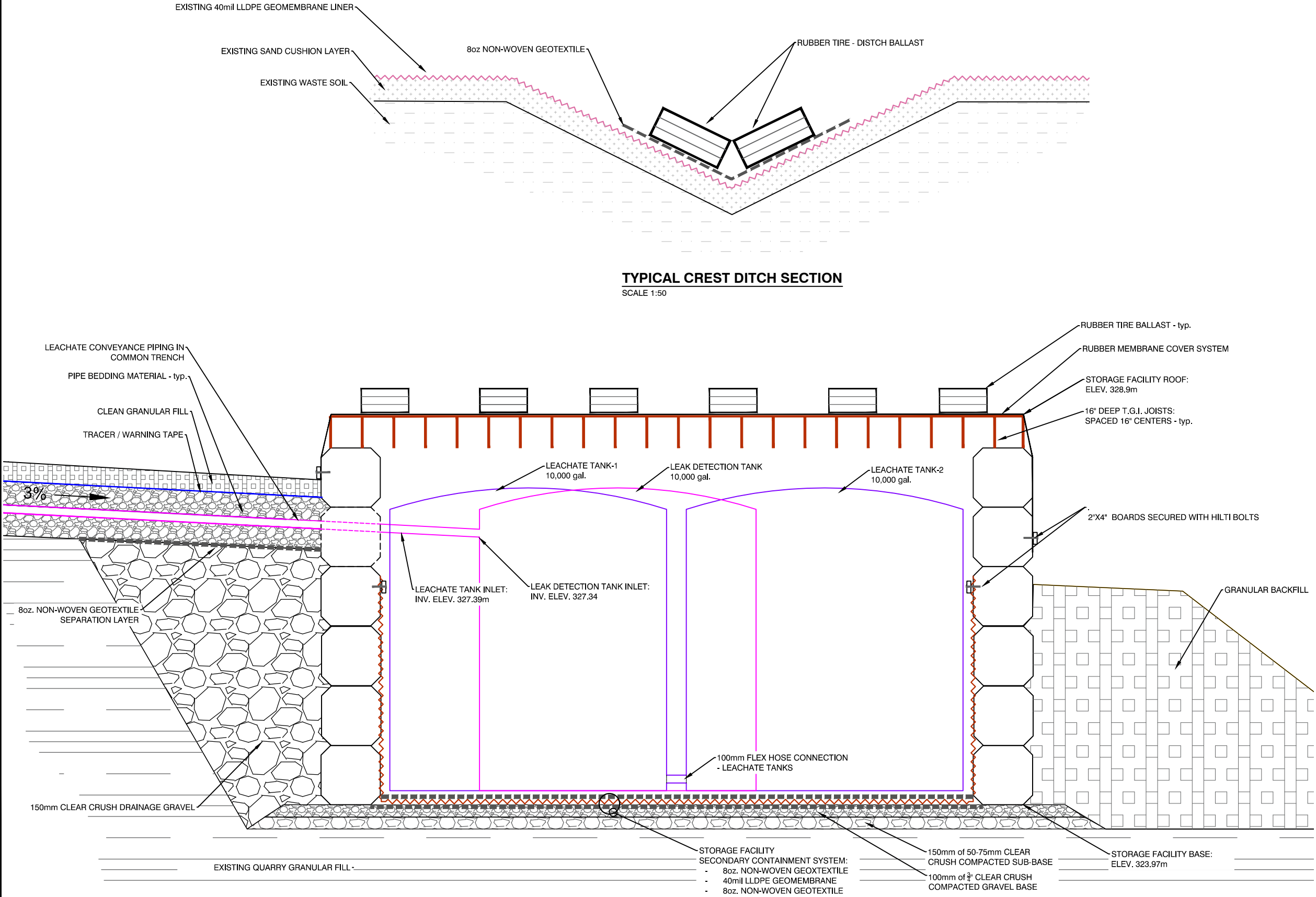
DRAWING NO:

DRAWN

SG

CHECKED

FIGURE 3





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:

PEA - AS-BUILTS
REPAIR WORK

SCALE:

1:750

DATE:

2017/09/29
yyyy/mm/dd

PROJECT NO:

PRJ 17039

DESIGNED

DRAWN

CHECKED

DRAWING NO:

FIGURE 4

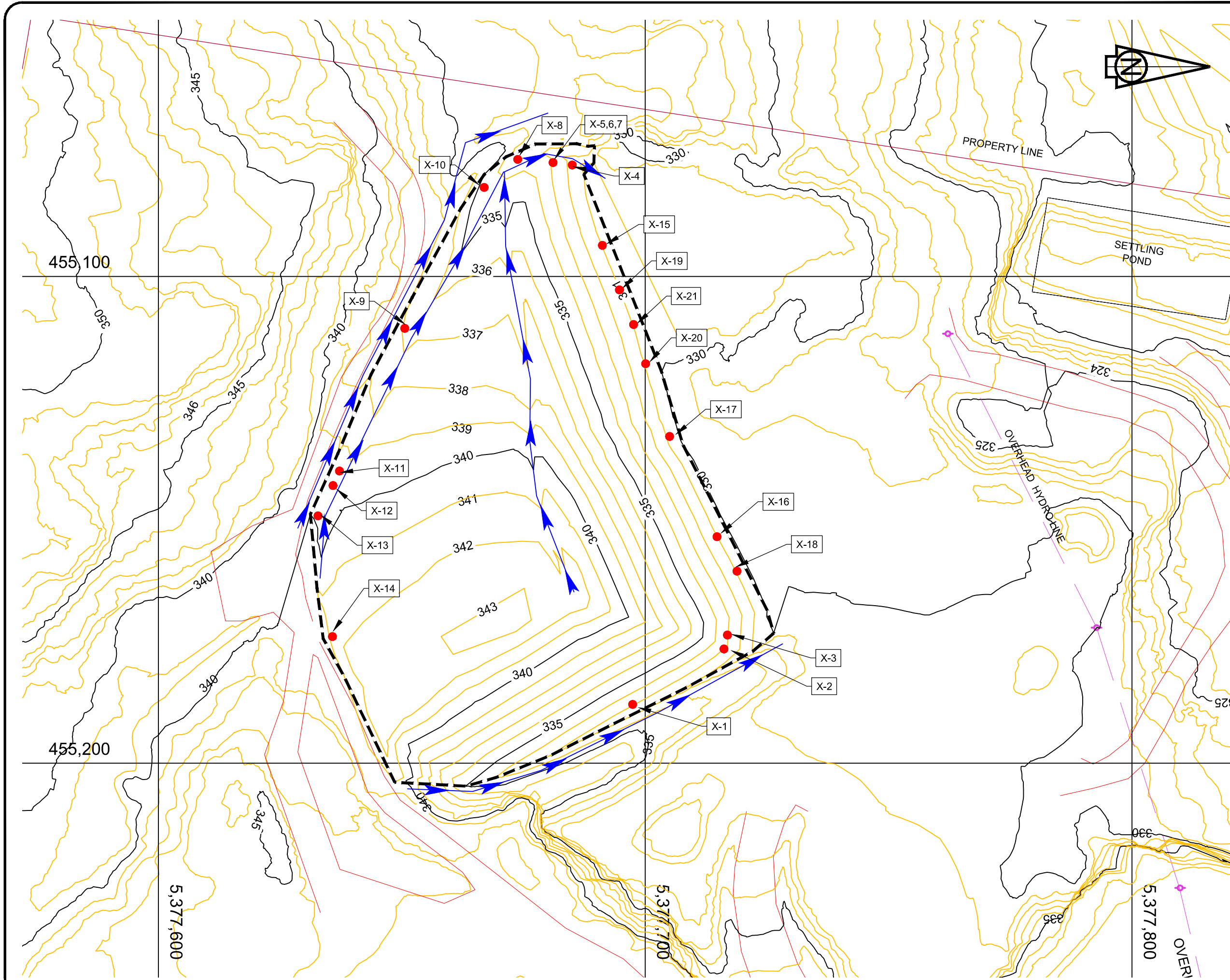


Table 1 - Seepage Blanket Monitoring Wells

As-Built Data

Name	Northing	Easting	Ground Elev. (m)	Stick Up (m)	Total Well Depth (m)	Sump Elev. (m)	Screen Length (m)
SB-1	5,377,706	455,092	329.57	0.74	4.01	326.3	1.5
SB-2	5,377,722	455,123	328.97	0.64	3.28	326.33	1.5
SB-3	5,377,733	455,160	331.16	0.56	3.53	328.19	1.5

APPENDIX C
Pipe Bedding Sieve Analysis



KamTech

QUALITY MANAGEMENT

TO: Sperling Hansen Associates

1332 McGill Road
Kamloops, B.C.
V2C 6N6

PROJECT #: QM17-41

COPIES TO:

ATTN: Mairi Dalgleish

PROJECT: Materials Testing

SIEVE ANALYSIS REPORT

SAMPLE ID: Pipe Bedding 1

SAMPLE TYPE: Bulk

SAMPLED BY: Client

DATE SAMPLED: September 28, 2017

DATE RECEIVED: October 2, 2017

DATE TESTED: October 4, 2017

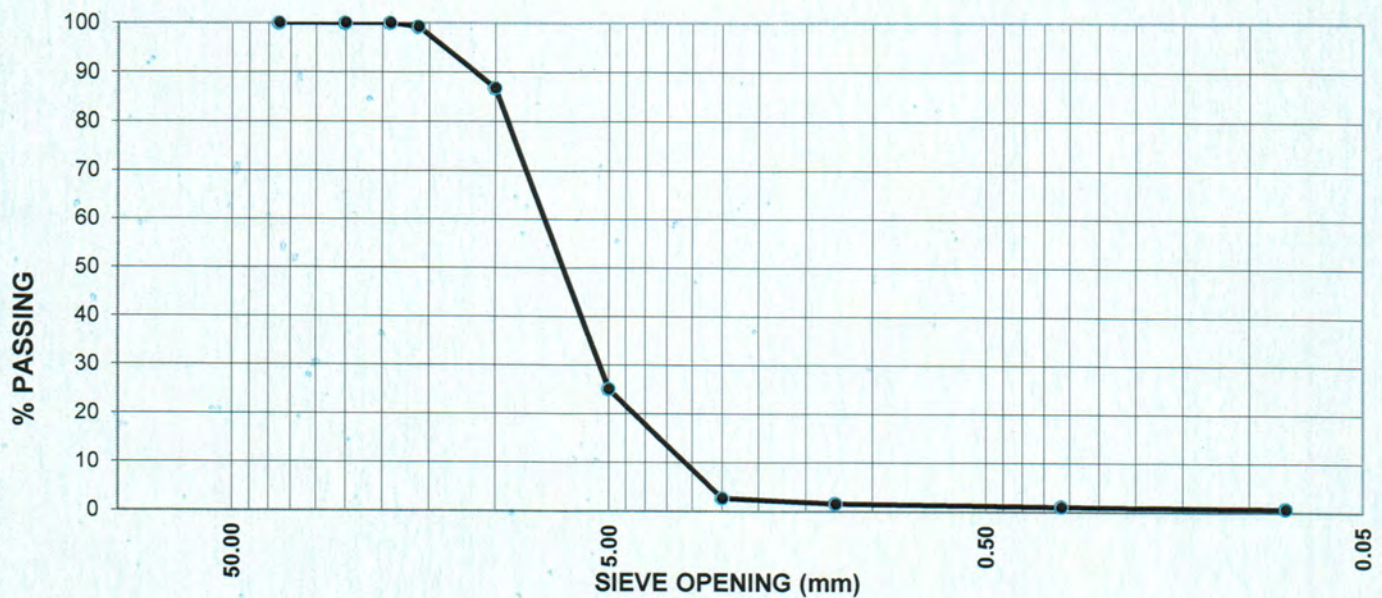
SOURCE: Cobble Hill Landfill

COMMENTS:

In Situ Moisture : 0.63%

Pipe Bedding Material

Sieve (mm)	Percent Passing	Spec Min %	Spec Max %
37.5	100.0		
25.0	100.0		
19.0	100.0		
16.0	99.2		
10.0	86.8		
5.0	25.1		
2.50	2.7		
1.25	1.6		
0.315	1.0		
0.08	0.7		



Per



KamTech

QUALITY MANAGEMENT

TO: Sperling Hansen Associates

1332 McGill Road
Kamloops, B.C.
V2C 6N6

PROJECT #: QM17-41

COPIES TO:

ATTN: Mairi Dagleish

PROJECT: Materials Testing

SIEVE ANALYSIS REPORT

SAMPLE ID: Pipe Bedding 2

SAMPLE TYPE: Bulk

SAMPLED BY: Client

DATE SAMPLED: September 28, 2017

DATE RECEIVED: October 2, 2017

DATE TESTED: October 4, 2017

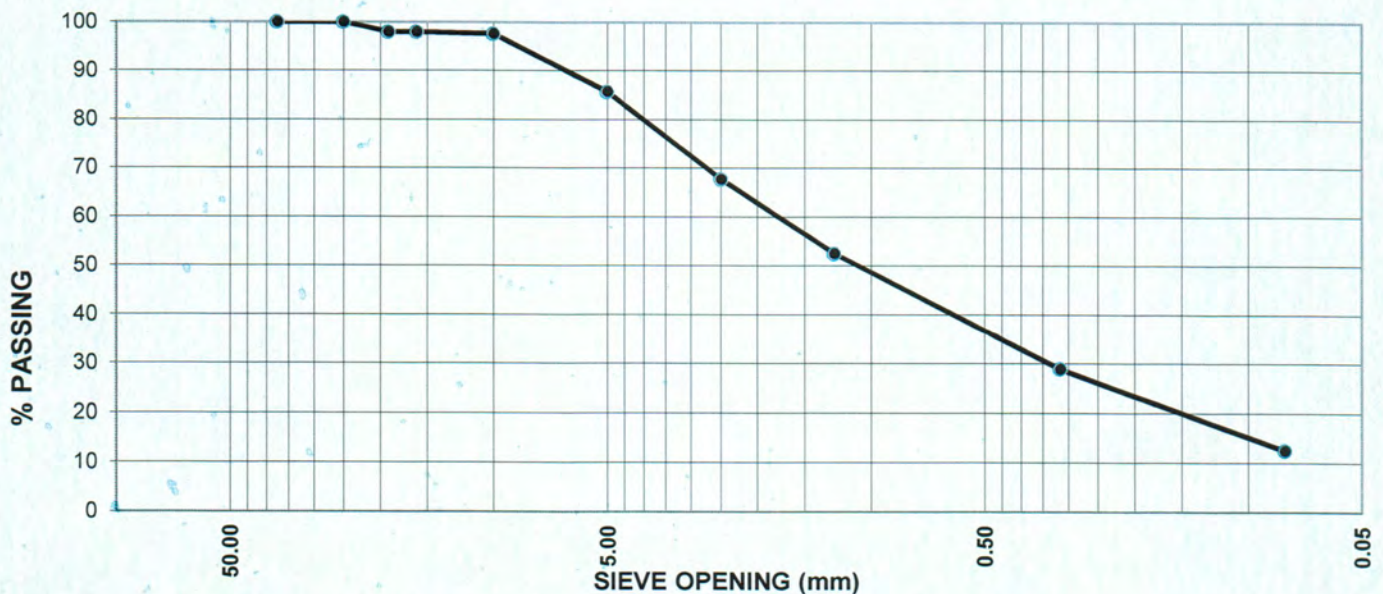
SOURCE: Cobble Hill Landfill

COMMENTS:

In Situ Moisture : 2.21 %

Pipe Bedding Material

Sieve (mm)	Percent Passing	Spec Min %	Spec Max %
37.5	100.0		
25.0	100.0		
19.0	98.0		
16.0	98.0		
10.0	97.6		
5.0	85.7		
2.50	67.7		
1.25	52.5		
0.315	28.9		
0.08	12.5		



Per

James Reid

Subject: FW: AJEMS/REINHARD FW: SPO MO1701-Status Update October 30, 2017
Attachments: OCTOBER 2017 COC.pdf; Landfill Closure Field Report-OCTOBER 30, 2017.pdf

From: spomo1701@outlook.com [<mailto:spomo1701@outlook.com>]
Sent: Monday, October 30, 2017 7:09 PM
To: Environmental Compliance ENV:EX
Subject: SPO MO1701-Status Update October 30, 2017

- ***Please find information regarding the Leachate reporting requirements for the October 30, 2017 reporting period as per SPILL PREVENTION ORDER : MO1701 Section 1d***

LEACHATE COLLECTED= 9.51 m³
LEACHATE STORED= 22.92 m³
LEACHATE TRANSPORTED= 0 m³

- ***Attached is the COC regarding water quality as per Section 6biii of File 311372 August 11, 2017 letter. There are no pending Laboratory Results***

Sampling Summary. All Samples were taken on October 29, 2017

1. SHA-SW1
2. SHA-SW2-(Dry Conditions)
3. MW6
4. MW3
5. MW2
6. SHA-LE-1
7. SHA-LD-1 (Dry Conditions)
8. SB-1
9. SB-2
10. SB-3 (Dry Conditions)

- ***Attached is the QP Progress Report for Oct 30, 2017 as per File 311372 August 11, 2017 letter***

Client Information	Project Information	Laboratory Information	COC Information
Allterra Construction 2158 Millstream Road Victoria BC V9B 6H4 Phone: (250) 508-0726	P17-932 Number: [none] Sample count: 10 TAT: 5	CARO Analytical Services #110 - 4011 Viking Way Richmond BC V6V 2K9 Phone: (604) 279-1499 Fax: (604) 279-1599	Number: October 2017 Shipped via: Harbour Air

#	Sample Information	Analyses	Containers
#1	MW6 10/29/2017 09:00 Grab / Water	Alkalinity, all (KEL) TAT: 5 Anions in Water by IC, 5 Analytes (KEL) TAT: 5 Conductivity in Water (RMD) TAT: 5 L/HEPH in Water (RMD) TAT: 5 Comments: PAH Required Mercury, diss ICPMS, Low (RMD) TAT: 5 Metals, dissolved, All, Low (RMD) TAT: 5 Metals, total, All, Low (RMD) TAT: 5 pH in Water (RMD) TAT: 5 Turbidity (RMD) TAT: 5 Comments: TSS also required	C05_125 mL Plastic (Metals) (1) S05_125 mL Plastic (Metals-F) (1) C06_40 mL Vial (Mercury) (1) S06_40 mL Vial (Mercury-F) (1) C10_125 mL Plastic (H2SO4) (1) C11_1 L Plastic (General) (1) C03_250 mL Glass (EPH/PAH) (1)
#2	MW2 10/29/2017 10:40 Grab / Water	Alkalinity, all (KEL) TAT: 5 Anions in Water by IC, 5 Analytes (KEL) TAT: 5 Conductivity in Water (RMD) TAT: 5 L/HEPH in Water (RMD) TAT: 5 Comments: PAH Required Mercury, diss ICPMS, Low (RMD) TAT: 5 Metals, dissolved, All, Low (RMD) TAT: 5 Metals, total, All, Low (RMD) TAT: 5 pH in Water (RMD) TAT: 5 Turbidity (RMD) TAT: 5 Comments: TSS also required	C05_125 mL Plastic (Metals) (1) S05_125 mL Plastic (Metals-F) (1) C06_40 mL Vial (Mercury) (1) S06_40 mL Vial (Mercury-F) (1) C10_125 mL Plastic (H2SO4) (1) C11_1 L Plastic (General) (1) C03_250 mL Glass (EPH/PAH) (1)
#3	MW3S 10/29/2017 11:30 Grab / Water	Alkalinity, all (KEL) TAT: 5 Anions in Water by IC, 5 Analytes (KEL) TAT: 5 Conductivity in Water (RMD) TAT: 5 L/HEPH in Water (RMD) TAT: 5 Comments: PAH Required Mercury, diss ICPMS, Low (RMD) TAT: 5 Metals, dissolved, All, Low (RMD) TAT: 5 Metals, total, All, Low (RMD) TAT: 5 pH in Water (RMD) TAT: 5 Turbidity (RMD) TAT: 5 Comments: TSS also required	C05_125 mL Plastic (Metals) (1) S05_125 mL Plastic (Metals-F) (1) C06_40 mL Vial (Mercury) (1) S06_40 mL Vial (Mercury-F) (1) C10_125 mL Plastic (H2SO4) (1) C11_1 L Plastic (General) (1) C03_250 mL Glass (EPH/PAH) (1)
#4	MW3D 10/29/2017 11:45 Grab / Water	Alkalinity, all (KEL) TAT: 5 Anions in Water by IC, 5 Analytes (KEL) TAT: 5 Conductivity in Water (RMD) TAT: 5 L/HEPH in Water (RMD) TAT: 5 Comments: PAH Required Mercury, diss ICPMS, Low (RMD) TAT: 5 Metals, dissolved, All, Low (RMD) TAT: 5 Metals, total, All, Low (RMD) TAT: 5 pH in Water (RMD) TAT: 5 Turbidity (RMD) TAT: 5 Comments: TSS also required	C05_125 mL Plastic (Metals) (1) S05_125 mL Plastic (Metals-F) (1) C06_40 mL Vial (Mercury) (1) S06_40 mL Vial (Mercury-F) (1) C10_125 mL Plastic (H2SO4) (1) C11_1 L Plastic (General) (1) C03_250 mL Glass (EPH/PAH) (1)
#5	SW1 10/29/2017 12:15 Grab / Water	Alkalinity, all (KEL) TAT: 5 Anions in Water by IC, 5 Analytes (KEL) TAT: 5 Conductivity in Water (RMD) TAT: 5 L/HEPH in Water (RMD) TAT: 5 Comments: PAH Required Mercury, diss ICPMS, Low (RMD) TAT: 5 Metals, dissolved, All, Low (RMD) TAT: 5 Metals, total, All, Low +Cr6 (RMD) TAT: 5 pH in Water (RMD) TAT: 5 Turbidity (RMD) TAT: 5	C05_125 mL Plastic (Metals) (1) S05_125 mL Plastic (Metals-F) (1) C06_40 mL Vial (Mercury) (1) S06_40 mL Vial (Mercury-F) (1) C10_125 mL Plastic (H2SO4) (1) C11_1 L Plastic (General) (1) C03_250 mL Glass (EPH/PAH) (1) C09_125 mL Plastic (CN/Cr6) (1)

		Comments: TSS also required	
#6	SW1-DUP 10/29/2017 12:30 Grab / Water	Analyses Alkalinity, all (KEL) TAT: 5 Anions in Water by IC, 5 Analytes (KEL) TAT: 5 Conductivity in Water (RMD) TAT: 5 L/HEPH in Water (RMD) TAT: 5 Comments: PAH Required Mercury, diss ICPMS, Low (RMD) TAT: 5 Metals, dissolved, All, Low (RMD) TAT: 5 Metals, total, All, Low +Cr6 (RMD) TAT: 5 pH in Water (RMD) TAT: 5 Turbidity (RMD) TAT: 5 Comments: TSS also required	Containers C05_125 mL Plastic (Metals) (1) S05_125 mL Plastic (Metals-F) (1) C06_40 mL Vial (Mercury) (1) S06_40 mL Vial (Mercury-F) (1) C10_125 mL Plastic (H2SO4) (1) C11_1 L Plastic (General) (1) C03_250 mL Glass (EPH/PAH) (1) C09_125 mL Plastic (CN/Cr6) (1)
#7	LE-1 10/29/2017 09:30 Grab / Water	Analyses Alkalinity, all (KEL) TAT: 5 Anions in Water by IC, 5 Analytes (KEL) TAT: 5 Conductivity in Water (RMD) TAT: 5 L/HEPH in Water (RMD) TAT: 5 Comments: PAH Required Mercury, diss ICPMS, Low (RMD) TAT: 5 Metals, dissolved, All, Low (RMD) TAT: 5 Metals, total, All, Low (RMD) TAT: 5 pH in Water (RMD) TAT: 5 Turbidity (RMD) TAT: 5 Comments: TSS also required	Containers C05_125 mL Plastic (Metals) (1) S05_125 mL Plastic (Metals-F) (1) C06_40 mL Vial (Mercury) (1) S06_40 mL Vial (Mercury-F) (1) C10_125 mL Plastic (H2SO4) (1) C11_1 L Plastic (General) (1) C03_250 mL Glass (EPH/PAH) (1)
#8	SB1 10/29/2017 15:00 Grab / Water	Analyses Alkalinity, all (KEL) TAT: 5 Anions in Water by IC, 5 Analytes (KEL) TAT: 5 Conductivity in Water (RMD) TAT: 5 L/HEPH in Water (RMD) TAT: 5 Comments: PAH Required Mercury, diss ICPMS, Low (RMD) TAT: 5 Metals, dissolved, All, Low (RMD) TAT: 5 Metals, total, All, Low (RMD) TAT: 5 pH in Water (RMD) TAT: 5 Turbidity (RMD) TAT: 5 Comments: TSS also required	Containers C05_125 mL Plastic (Metals) (1) S05_125 mL Plastic (Metals-F) (1) C06_40 mL Vial (Mercury) (1) S06_40 mL Vial (Mercury-F) (1) C10_125 mL Plastic (H2SO4) (1) C11_1 L Plastic (General) (1) C03_250 mL Glass (EPH/PAH) (1)
#9	SB2 10/29/2017 13:50 Grab / Water	Analyses Alkalinity, all (KEL) TAT: 5 Anions in Water by IC, 5 Analytes (KEL) TAT: 5 Conductivity in Water (RMD) TAT: 5 L/HEPH in Water (RMD) TAT: 5 Comments: PAH Required Mercury, diss ICPMS, Low (RMD) TAT: 5 Metals, dissolved, All, Low (RMD) TAT: 5 Metals, total, All, Low (RMD) TAT: 5 pH in Water (RMD) TAT: 5 Turbidity (RMD) TAT: 5 Comments: TSS also required	Containers C05_125 mL Plastic (Metals) (1) S05_125 mL Plastic (Metals-F) (1) C06_40 mL Vial (Mercury) (1) S06_40 mL Vial (Mercury-F) (1) C10_125 mL Plastic (H2SO4) (1) C11_1 L Plastic (General) (1) C03_250 mL Glass (EPH/PAH) (1)
#10	FB 10/29/2017 08:45 Grab / Water	Analyses Alkalinity, all (KEL) TAT: 5 Anions in Water by IC, 5 Analytes (KEL) TAT: 5 Conductivity in Water (RMD) TAT: 5 L/HEPH in Water (RMD) TAT: 5 Comments: PAH Required Mercury, diss ICPMS, Low (RMD) TAT: 5 Metals, dissolved, All, Low (RMD) TAT: 5 Metals, total, All, Low (RMD) TAT: 5 pH in Water (RMD) TAT: 5 Turbidity (RMD) TAT: 5 Comments: TSS also required	Containers C05_125 mL Plastic (Metals) (1) S05_125 mL Plastic (Metals-F) (1) C06_40 mL Vial (Mercury) (1) S06_40 mL Vial (Mercury-F) (1) C10_125 mL Plastic (H2SO4) (1) C11_1 L Plastic (General) (1) C03_250 mL Glass (EPH/PAH) (1)

Relinquished by	Date/Time	Accepted by	Date/Time

FIELD REVIEW REPORT		DATE: October 30 2017	ISLANDER PROJECT No.: 2087
REPORT No: 7	STAGE OF CONSTRUCTION: Landfill Closure	WEATHER: Sunny 13 deg	PAGE: 1 of 3
PROJECT: Cobble Hill Landfill 2017 Minor Construction Works			
TO:	Allterra Construction	ATTENTION:	Rahim Gaidhar
CC:	Todd Mizuik (Allterra)		

The field review included the inspection of the following items included in the detailed summary of works section of the *Cobble Hill Landfill — 2017 Minor Construction Works, Detailed Construction Plan (Sperling Hansen Associates, September 13, 2017)*:

- **PEA – Liner appears to be in good condition and all repairs are holding up and are in good condition.**
- **Installation of new Leachate and Leak Detection system**
 - All works are complete and system is functional. Allterra is monitoring the water quality and levels in tanks and there have been no concerns to date.
- **Soil Management Area (SMA)**
 - Soil is covered with a PVC liner and weighted down with wooden crates and tires inside the SMA. All works are in good condition and no noticeable changes since the date of our last inspection
- **Decommissioning of Contact Water Containment Pond**
 - Containment pond is filled and secure. All works are in good condition and no noticeable changes since the date of our last inspection
- **Construction of cut-off ditch upland of PEA**
 - This ditch is complete and is performing well. Evidence from last significant rainfall would indicate that all upland runoff is being contained and routed around edge of PEA

Should there be any discrepancy or omission identified in the enclosed field review, please contact the undersigned at your earliest convenience.

ISLANDER ENGINEERING LTD.



Mike Achtem, P.Eng

FIELD REVIEW REPORT		DATE: October 30 2017	ISLANDER PROJECT No.: 2087
REPORT No: 7	STAGE OF CONSTRUCTION: Landfill Closure	WEATHER: Overcast/rain 13deg	PAGE: 2 of 3



SMA - liner on, no breaches or concerns – looking south



SMA – looking north



Contact water containment Pond – backfilled – no concerns



New Leachate and Leak Detention facility

FIELD REVIEW REPORT		DATE: October 30 2017	ISLANDER PROJECT No.: 2087
REPORT No: 7	STAGE OF CONSTRUCTION: Landfill Closure	WEATHER: sunny 13deg	PAGE: 3 of 3



PEA – liner near NW corner. Good condition.



PEA– NE corner



Cut-off ditch upland of PEA



PEA looking north towards pipe trench and storage facility